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Conceptrichtlijn Tennisarm en Golfarm

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INITIATIEF

Vereniging voor Sportgeneeskunde

IN SAMENWERKING MET

Koninklijk Nederlands Genootschap voor Fysiotherapie

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Nederlandse Vereniging voor Reumatologie

Nederlandse Orthopaedische Vereniging

Nederlandse Vereniging voor Radiologie

Vereniging van Oefentherapeuten Cesar en Mensendieck

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MET ONDERSTEUNING VAN

Kennisinstituut van de Federatie Medisch Specialisten

FINANCIERING

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5 **Colofon**
CONCEPTRICHTLIJN TENNISARM EN GOLFARM
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5 Startpagina – Tennisarm en Golfarm

Waar gaat deze richtlijn over?

- Deze richtlijn richt zich op wat volgens de huidige maatstaven de beste zorg is voor patiënten met een tennisarm (laterale epicondylaire tendinopathie, LET) of golfarm (mediale epicondylaire tendinopathie, MET). In de richtlijn komen de volgende onderwerpen aan bod:
- De rol van anamnese, lichamelijk onderzoek en beeldvorming bij de diagnostiek. Aanbevelingen zijn uitsluitend gebaseerd op onderzoek naar LET en geëxtrapoleerd naar MET;
 - De plaats van niet-medicamenteuze behandelingen, waaronder oefentherapie, manuele therapie, braces, orthesen, armsleeves, dry needling en shockwavetherapie. Aanbevelingen zijn uitsluitend gebaseerd op onderzoek naar LET en ge-extrapoleerd naar MET;
 - De waarde van medicamenteuze behandelingen, in het bijzonder injecties met corticosteroïden, plaatjes-rijk plasma en autoloog bloed. Aanbevelingen zijn uitsluitend gebaseerd op onderzoek naar LET en ge-extrapoleerd naar MET;
 - De rol van chirurgische behandeling, waaronder percutane technieken en operatieve interventies bij patiënten met aanhoudende klachten. Aanbevelingen zijn uitsluitend gebaseerd op onderzoek naar LET en ge-extrapoleerd naar MET;
 - Risicofactoren voor het ontstaan van LET en MET. Aanbevelingen zijn gebaseerd op onderzoek naar zowel LET als MET;
 - Prognostische factoren voor langdurige klachten die het herstel kunnen vertragen. Aanbevelingen zijn gebaseerd op onderzoek naar zowel LET als MET.

Voor wie is deze richtlijn bedoeld?

- De richtlijn is bestemd voor alle zorgverleners die betrokken zijn bij tweede- of derdelijns zorg voor patiënten met een LET of MET.

Definitie tennisarm en golfarm

- Een laterale epicondylaire tendinopathie wordt ook wel een tennisarm, tenniselleboog, padelelleboog of epicondylitis lateralis genoemd. Hierbij zijn er lokale pijnklachten ter plaatse van de aanhechting van de *polsstrekkers* aan de elleboog en is de structuur van de pees aangedaan.

- Een mediale epicondylaire tendinopathie wordt ook wel een golfarm, golfelleboog, golferselleboog of epicondylitis medialis genoemd. Hierbij zijn er lokale pijnklachten ter plaatse van de aanhechting van de *polsbuigers* aan de elleboog en is de structuur van de pees aangedaan.

Voor patiënten

- Deze richtlijn beschrijft de diagnostiek en behandeling van een tennisarm of golfarm. Ook beschrijft het risicofactoren voor het ontstaan ervan en factoren die het herstel mogelijk kunnen vertragen.

Hoe is de richtlijn tot stand gekomen?

- Het initiatief voor deze richtlijn is afkomstig van de Vereniging voor Sportgeneeskunde (VSG). De richtlijn is opgesteld door een multidisciplinaire commissie met vertegenwoordigers vanuit de reumatologen, orthopedisch chirurgen, radiologen, fysiotherapeuten en oefentherapeuten. Om discrepanties met de NHG-standaard tijdig in kaart te brengen, zijn de modules Diagnostiek, Beeldvorming, Operatief en Niet-medicamenteuze behandeling voorgelegd aan en tegengelezen door het NHG. Er werd

- 5 aandacht besteed aan het patiëntenperspectief door inbreng van de Patiëntenfederatie tijdens de commentaarfase.

5 **Verantwoording**

Werkwijze

Voor meer details over de gebruikte richtlijnmethodologie verwijzen wij u naar de [Werkwijze](#). Relevante informatie voor de ontwikkeling/herziening van deze richtlijnmodule is hieronder weergegeven.

Samenstelling werkgroep

Werkgroep

- 15 • Dr. F.M.A.P. (Femke) Claessen (vz.), Sportarts, Erasmus MC en KNLTB, VSG
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- Drs. D.M.S. (Diede) Bakker, Fysiotherapeut & Manueel therapeut, Diaconessenhuis, KNGF
- 20 • Dr. J.S. (Jacqueline) Dekkers, Reumatoloog, LUMC, NVR
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- Prof. dr. M.P.J. (Michel) van den Bekerom, Orthopedisch chirurg, OLVG en Hoogleraar, VU, NOV
- Drs. M. (Mirwais) Mehrab, Sportarts, Erasmus MC en UMC Utrecht, VSG
- 25 • Drs. H.K. (Rik) van der Kolk, MSC, Sportarts, VSG
- S.V. (Stella) Harder, Fysiotherapeut, Fysio-Spot, KNGF
- V.R.J. (Valerie) Tillie, Oefentherapeut Cesar/Mensendieck, ABC-Tilburg, Koninklijke Auris Groep, VvOCM

Klankbordgroeplid

- 30 • Drs. A. (Aimee) Kok-Pigge, Huisarts, NHG

Met ondersteuning van

- 35 • A.C. (Anniek) van 't Veld, Adviseur, Kennisinstituut van de Federatie Medisch Specialisten
- Dr. M. (Mirre) den Ouden-Vierwind, Adviseur, Kennisinstituut van de Federatie Medisch Specialisten (t/m maart 2025)
- Dr. M.L. (Marja) Molag, Adviseur, Kennisinstituut van de Federatie Medisch Specialisten (vanaf april 2025)
- 40 • Esther van der Bijl, Informatiespecialist, Kennisinstituut van de Federatie Medisch Specialisten

5 Belangenverklaringen

Een overzicht van de belangen van de clusterleden en het oordeel over het omgaan met eventuele belangen vindt u in onderstaande tabel. De ondertekende belangenverklaringen zijn op te vragen bij het secretariaat van het Kennisinstituut van de Federatie Medisch Specialisten via secretariaat@kennisinstituut.nl.

10 Werkgroep

Naam	Hoofdfunctie	Nevenwerkzaamheden	Persoonlijke financiële belangen	Persoonlijke relaties	Extern gefinancierd onderzoek	Intellectuele belangen en reputatie	Overige belangen
Femke Claessen (vz)	Sportarts, Erasmus MC & KNLTB	Toernooi begeleiding voor de ATP, WTA en Premier Padel	Niet van toepassing	Niet van toepassing	Niet van toepassing	Niet van toepassing	Niet van toepassing
Denise Eygendaal	Afdelingshoofd Orthopedie en Sportgeneeskunde Erasmus MC Orthopedisch chirurg bovenste extremiteit Erasmus MC	1. Treasurer Global Elbow Network 2. Founder "Elleboogkliniek.NL" (educational platform) 3. Board Member Dutch Arthroscopy & Arthroplasty society 4. Founder and president of Dutch Orthopedie Ladies Society (DOLS) 5. Board member AO Nederland 6. Honorary appointment Amphibia Hospita! 7. Professor by special appointment University of Amsterdam 8. Editor Journal "strategies in Trauma and limb reconstruction" 9. Opponent UV Zweden	Geen	Geen	Geen	Geen	Geen

		<p>10. Editor book Arke Sportsmedia: Elbow werk is Team werk.</p> <p>11. Consultant KNLTB</p> <p>12. Reviewer for JBJS, KSST, BJSM, JSES, Lancet</p> <p>13. Educational consultant IBRA</p> <p>14. Member Editorial Board EFORT</p> <p>15. Corresponding member of honour ASES</p> <p>16. Lecturer tor the International Olympic Committee Course</p> <p>17. Course chairman of annual Dutch A.O. complex elbow course</p> <p>18. Course chairman of annual A.O. international advanced course</p> <p>19. Board of trusteesof JESES</p> <p>20. adviseur/ expert rechtbank</p>					
Diede Bakker	<p>fysiotherapeut- Manueeltherapeut, Fysiotherapie Utrecht Oost (betaald)</p> <p>fysiotherapeut combispreekuur Diakonessenhuis (betaald)</p>	Medeoprichter/ lid elleboog netwerk Nederland (onbetaald)	Niet van toepassing	Niet van toepassing	Niet van toepassing	Niet van toepassing	Niet van toepassing
Jacqueline Dekkers	Reumatoloog, LUMC	Geen	Niet van toepassing	Niet van toepassing	1. KNAW, ZonWM - betaalde beurs voor	Niet van toepassing	Niet van toepassing

					wetenschappelijk onderzoek. Dit heeft geen relatie met deze richtlijn 2. Roche en Novartis voor klinische studies, instelling krijgt vergoeding. Geen relatie met deze richtlijn - Geen projectleider		
Mariëlle Olsthoorn	Radioloog Erasmus MC, Rotterdam	Niet van toepassing	Niet van toepassing	Niet van toepassing	Niet van toepassing	Niet van toepassing	Niet van toepassing
Michel van den Bekerom	Orthopedisch chirurg, OLVG, Amsterdam Hoogleraar sport trauma, VU, Amsterdam	Betaald onderwijs geven voor vele niet commerciële partijen.	Fellow en research support van Smith en Nephew, bestaande uit een geldbedrag. Smith and Nephew maakt apparatuur voor het verrichten van een arthroscopie. Een tennisarm kan middels een arthroscopie geopereerd worden. De support wordt per 1-1-2025 beëindigd.	Niet van toepassing	ZonMW, SECEC, Schouderennetwerk, VU, OLVG	Niet van toepassing	Niet van toepassing
Mirwais Mehrab	Sportarts, Erasmus MC en UMC Utrecht.	Clubarts Feyenoord Academy, betaald. Teamarts Nederlands elftal Jongens Onder 16 jaar, betaald. Bondsarts Nederlandse Gewichtheffbond,	Niet van toepassing	Niet van toepassing	Niet van toepassing	Niet van toepassing	Niet van toepassing

		onbetaald. Wetenschappelijk onderzoeker (PhD student) Erasmus MC, onbetaald.					
Rik van der Kolk	Sportarts, ZZP'er OLVG en KNSB	Niet van toepassing	Niet van toepassing	Niet van toepassing	Niet van toepassing	Niet van toepassing	Niet van toepassing
Stella Harder	Fysiotherapeut bij Fysio-Spot	NOC-NSF KNSB Talent team Zuidwest. Fysiotherapeut.	Niet van toepassing	Niet van toepassing	Niet van toepassing	Meer verdieping in het onderwerp zal mijn expertise ten goede komen. Natuurlijk ook leuk voor CV building. Verder geen belangen.	Niet van toepassing
Valerie Tillie	Oefentherapeut Cesar/Mensendieck ABC-Tilburg Koninklijke Auris Groep	Fontys	Niet van toepassing	Niet van toepassing	Niet van toepassing	Zelf bekend met RSI vanaf m'n 15jaar.	Niet van toepassing

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Klankbordgroep

Naam	Hoofdfunctie	Nevenwerkzaamheden	Persoonlijke Financiële Belangen	Persoonlijke Relaties	Extern gefinancierd onderzoek	Intell. belangen en reputatie	Overige belangen
Aimee-Claire Kok	Wetenschappelijk medewerker richtlijnen Nederlands Huisartsen Genootschap (NHG)	Waarnemend huisarts	Niet van toepassing	Niet van toepassing	Niet van toepassing	Niet van toepassing	Niet van toepassing

5 Kwalitatieve raming van mogelijke financiële gevolgen in het kader van de Wkkgz

Bij de richtlijnmodule voerde de werkgroep conform de Wet kwaliteit, klachten en geschillen zorg (Wkkgz) een kwalitatieve raming uit om te beoordelen of de aanbevelingen mogelijk leiden tot substantiële financiële gevolgen. Bij het uitvoeren van deze beoordeling is de richtlijnmodule op verschillende domeinen getoetst (zie het [stroomschema](#) bij [Werkwijze](#)).

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Module	Uitkomst raming	Toelichting
Module 1 diagnose	Geen financiële gevolgen	Hoewel uit de toetsing volgt dat de aanbeveling(en) breed toepasbaar zijn (5.000-40.000 patiënten), volgt ook uit de toetsing dat het overgrote deel ($\pm 90\%$) van de zorgaanbieders en zorgverleners al aan de norm voldoet. Er worden daarom geen financiële gevolgen verwacht.
Module 2 Beeldvorming	Geen financiële gevolgen	Uit de toetsing volgt dat de aanbeveling(en) niet breed toepasbaar zijn (<5.000 patiënten) en daarom naar verwachting geen substantiële financiële gevolgen zal hebben voor de collectieve uitgaven.
Submodule 3.1.1 Progressieve oefentherapie	Geen financiële gevolgen	Hoewel uit de toetsing volgt dat de aanbeveling(en) breed toepasbaar zijn (5.000-40.000 patiënten), volgt ook uit de toetsing dat het overgrote deel ($\pm 90\%$) van de zorgaanbieders en zorgverleners al aan de norm voldoet. Er worden daarom geen substantiële financiële gevolgen verwacht.
Submodule 3.1.2 Functionele ondersteuning: brace	Geen financiële gevolgen	Hoewel uit de toetsing volgt dat de aanbeveling(en) breed toepasbaar zijn (5.000-40.000 patiënten), volgt ook uit de toetsing dat het overgrote deel ($\pm 90\%$) van de zorgaanbieders en zorgverleners al aan de norm voldoet. Er worden daarom geen substantiële financiële gevolgen verwacht.

Submodule 3.1.3 Functionele ondersteuning: spalk	Geen financiële gevolgen	Hoewel uit de toetsing volgt dat de aanbeveling(en) breed toepasbaar zijn (5.000-40.000 patiënten), volgt ook uit de toetsing dat het overgrote deel ($\pm 90\%$) van de zorgaanbieders en zorgverleners al aan de norm voldoet. Er worden daarom geen substantiële financiële gevolgen verwacht.
Submodule 3.1.4 Functionele ondersteuning: onderarm- en polsorthese	Geen financiële gevolgen	Hoewel uit de toetsing volgt dat de aanbeveling(en) breed toepasbaar zijn (5.000-40.000 patiënten), volgt ook uit de toetsing dat het overgrote deel ($\pm 90\%$) van de zorgaanbieders en zorgverleners al aan de norm voldoet. Er worden daarom geen substantiële financiële gevolgen verwacht.
Submodule 3.2.1 Corticosteroiden injecties	Geen financiële gevolgen	Hoewel uit de toetsing volgt dat de aanbeveling(en) breed toepasbaar zijn (5.000-40.000 patiënten), volgt ook uit de toetsing dat het geen nieuwe manier van zorgverlening of andere organisatie van zorgverlening betreft. Er worden daarom geen financiële gevolgen verwacht.
Submodule 3.2.2 Plaatjes-rijk bloed en autoloog bloed injecties	Geen financiële gevolgen	Hoewel uit de toetsing volgt dat de aanbeveling(en) breed toepasbaar zijn (5.000-40.000 patiënten), volgt ook uit de toetsing dat het geen nieuwe manier van zorgverlening of andere organisatie van zorgverlening betreft. Er worden daarom geen substantiële financiële gevolgen verwacht.
Module 4 Behandeling operatief	Geen financiële gevolgen	Uit de toetsing volgt dat de aanbeveling(en) niet breed toepasbaar zijn (<5.000 patiënten) en daarom naar verwachting geen substantiële financiële gevolgen zal hebben voor de collectieve uitgaven.

Submodule 5.1 Risicofactoren	Geen financiële gevolgen	Hoewel uit de toetsing volgt dat de aanbeveling(en) breed toepasbaar zijn (5.000-40.000 patiënten), volgt ook uit de toetsing dat het geen nieuwe manier van zorgverlening of andere organisatie van zorgverlening betreft. Er worden daarom geen financiële gevolgen verwacht.
Submodule 5.2 Prognostische factoren	Geen financiële gevolgen	Hoewel uit de toetsing volgt dat de aanbeveling(en) breed toepasbaar zijn (5.000-40.000 patiënten), volgt ook uit de toetsing dat het geen nieuwe manier van zorgverlening of andere organisatie van zorgverlening betreft. Er worden daarom geen financiële gevolgen verwacht.

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5 Module 1 Diagnose

Uitgangsvraag

Hoe kan de diagnose laterale of mediale epicondylaire tendinopathie het best worden gesteld en wat is daarin de rol van anamnese en lichamelijk onderzoek?

10

Introduction (English)

Lateral epicondylar tendinopathy (LET) is a tendon injury characterized by localized pain at the attachment of the forearm extensor muscles to the lateral side of the distal humerus. In lateral epicondylar tendinopathy, the structure of the common extensor tendons is affected. In medial epicondylar tendinopathy (MET), the attachment of the medial common flexor-pronator tendon to the medial side of the distal humerus is affected. A thorough patient history and physical examination are essential for establishing the diagnosis. Numerous physical tests for diagnosing LET and MET are described in the literature. None of the described tests provide adequate certainty to reliably confirm or exclude the condition. Integrating key diagnostic questions during the history-taking process may serve as a valuable complementary approach. This process is feasible in both primary care and secondary care settings.

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Search and select

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A systematic review of the literature was performed to answer the following question(s): *What is the diagnostic accuracy of physical examination tests and medical history taking in patients suspected of lateral epicondylar tendinopathy or medial epicondylar tendinopathy?*

Table 1. PICRO

Patients	Patients suspected of LET or MET
Index test	Physical examination tests (Cozen's test, Polk's test, Maudsley's test, middle finger resistance, extension test, Mill's test, Kaplan sign test, grip strength test, epicondylitis medialis (shear) test, golfer's elbow test) AND/OR (medical) history, and questionnaires Purpose: diagnostic Position: add-on
Comparator test	All physical examination tests mentioned AND/OR other (medical) history and questionnaires mentioned under I
Reference test	NA
Outcomes	Sensitivity, specificity, PPV, NPV
Other selection criteria	Study design: systematic reviews, diagnostic test accuracy studies (with single-gate design, cross-sectional study)

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Relevant outcome measures

The guideline panel considered sensitivity and PPV as a **critical** outcome measure for decision making; and specificity and NPV as an **important** outcome measure for decision making.

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Table 2. Consequences of diagnostic test characteristics

Outcome	Consequences	Relevance
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True positives (TP), high sensitivity	Patients are justifiably diagnosed with LET or MET; giving treatment is justified	Critical
True negatives (TN), high specificity	Patients are justifiably not diagnosed with LET or MET; not giving treatment is justified	Important
False positives (FP), low specificity	Patients are unjustifiably diagnosed with LET or MET; giving treatment is unjustified	Critical
False negatives (FN), low sensitivity	Patients are unjustifiably not diagnosed with LET or MET; not giving treatment is unjustified	Important
Positive predictive value (PPV)	Proportion of patients who are justifiably diagnosed with LET or MET	Critical
Negative predictive value (NPV)	Proportion of patients who are justifiably diagnosed with not having LET or MET	Important

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A priori, the guideline panel did not define the outcome measures listed above but used the definitions used in the studies.

10 The guideline panel used the following cut-off values to grade sensitivity, specificity, NPV, and PPV:

- Very high: 90% to 100%.
- High: >80% to 90%.
- Moderate: 65% to 80%.
- Low: <65%.

15

Search and select (Methods)

20 A systematic literature search was performed by a medical information specialist using the following bibliographic databases: Embase.com and Ovid/Medline. Both databases were searched from 2005 to February 3rd, 2025 for systematic reviews and observational studies. Systematic searches were completed using a combination of controlled vocabulary/subject headings (e.g., Emtree-terms, MeSH) wherever they were available and natural language keywords. The overall search strategy was derived from two primary search concepts: (1) lateral/medial epicondylitis; (2) physical examination tests. Duplicates were removed using
25 EndNote software. After deduplication a total of 217 records were imported for title/abstract screening. Initially, 12 studies were selected based on title and abstract screening. After reading the full text, nine studies were excluded (see the exclusion table under the tab 'Evidence tabellen'), and three studies were included.

30 **Summary of literature**

Description of studies

35 For LET, a total of three studies on physical examination tests were included in the literature analysis. Important study characteristics and results are summarized in table 3. The assessment of the risk of bias is summarized in the risk of bias tables (under the tab 'Evidence tabellen'). Studies about medical history taking were not identified. For MET, no studies on physical examination were found.

5 **Karanasios (2022)** performed a systematic review (SR) of studies evaluating the diagnostic accuracy of examination tests used in LET. Eligibility criteria were prospective and retrospective observational studies which reported on 1) a cohort of adult patients with LET of both sexes, 2) diagnostic accuracy of physical examination tests, medical imaging, or questionnaires for the diagnosis of LET, 3) included any physical examination test used as a reference standard because of the lack of a gold standard for the diagnosis of LET, 4) reported a 2x2 contingency table or results in sufficient detail to allow reconstruction of 2x2 contingency tables. MEDLINE, PubMed, CINAHL, EMBASE, PEDro, ScienceDirect, and Cochrane Library were searched on March 11, 2020. Authors also searched for grey literature via OpenGrey, WHO online collection, Clinical Trials. Gov, Australian New Zealand Clinical Trials registry and Cochrane CENTRAL Register. In total, 24 studies were included in the qualitative synthesis, all using a type of physical examination test as a gold standard to diagnose LET. Only studies that compared physical examination tests against each other were considered useful for the purpose of this guideline (Dones, 2014b; Dorf, 2007). However, the study of Dones (2014b) was a SR and therefore excluded. One useful study investigating physical examination tests to diagnose LET was left (Dorf, 2007). Studies not included in the SR of **Karanasios (2022)**, but considered relevant for this guideline, included Yoon (2019) and Murphy (2015).

25 **Yoon (2019)** investigated the diagnostic value of tender point palpation and resisted maneuvers in the evaluation of LET. The study analyzed baseline data from 1,216 workers recruited within the WISTAH multicenter prospective cohort study of upper extremity musculoskeletal disorders. The study population primarily consisted of active workers from 17 diverse production facilities in Wisconsin, Utah, and Illinois. The prevalence of LET varied substantially depending on the applied case definition: it was 12.1% when defined by lateral elbow pain alone, 10.0% when defined as lateral elbow pain plus any positive tender point, and 4.7% when defined as lateral elbow pain plus a tender point and at least one positive resisted maneuver. The study compared palpation of six standardized elbow points using four kg of force with resisted maneuvers (Cozen's test and Maudsley test). All participants underwent two independent physical examinations, carried out during the initial occupational health assessment as part of the cohort enrollment. Thus, the tests were performed cross-sectionally and in the workplace setting, prior to any further diagnostic or therapeutic interventions

40 **Murphy (2015)** performed a prospective diagnostic accuracy study to assess the reliability of four widely used physical examination maneuvers for diagnosing LET. The study included 44 patients (46 affected elbows). All patients presented with less than six weeks of lateral elbow pain and had at least one positive provocative test on initial examination. Patients with other diagnoses (e.g., radial tunnel syndrome, fracture, plica) or with prior treatments (such as corticosteroid injections or surgery) were excluded.

45 The index tests under investigation were:

Lateral epicondyle tenderness test (LETT)

Wrist extension test (WET) – resisted wrist extension (Cozen's test)

Long finger extension test (LFET) – resisted middle finger extension (Maudsley test)

Resisted supination test (RST)

50 The reference standard was defined as relief of pain and resolution of physical findings after local anesthetic (lidocaine) injection into the lateral epicondylar region. Patients were re-examined 10 minutes post-injection, and tests that turned negative were considered true positives for LET.

- 5 Testing occurred during the initial outpatient evaluation in an orthopedic clinic, with standardized examination protocols followed by three attending orthopedic surgeons.

Table 3. Characteristics of included studies

Study	Participants	Comparison	Follow-up	Outcome measures	Comments	Risk of bias (per outcome measure)*
<i>Included in systematic review Karanasios, 2022</i>						
Dorf, 2007	<p><u>N at baseline:</u> 40 patients with grip strength measurements. This group underwent both index test and reference test.</p> <p><u>Age (mean, SD)</u> Not reported</p> <p><u>Sex</u> Not reported</p> <p><u>Prevalence of disease with reference test (%):</u> 40/40 (100%)</p> <p><u>Setting:</u> hand clinic</p>	<p><u>Index test (cut-off point(s)):</u> Grip strength test 5%, 8%, 10% decrease</p> <p><u>Reference test (cut-off point(s)):</u> tenderness over the ECRB or the common extensor origin and at least 2 of the 3 following tests: Cozen's, Mill's, and Maudsley's test</p>	NA	Sensitivity% Specificity%	<p>No benefits received from a commercial party</p> <p>Support received from the Orthopaedic Research Education Foundation and the NIH/NIAMS (AR49407).</p>	High (all outcomes)
<i>Individual studies</i>						
Yoon, 2019	<p><u>N at baseline:</u> 1216 workers; 12.1% (=147 patients) with lateral elbow pain on the right side, were analyzed</p> <p><u>Age (mean ± SD)</u> Total cohort: 41.9y ± 11.4</p> <p><u>Sex (f/m)</u> Total cohort: 804/412</p> <p><u>Setting:</u> Workplace</p>	<p><u>Index test (cut-off point(s)):</u> tender point palpation at 6 sites</p> <p><u>Comparator test (cut-off point(s)):</u> Cozen's test, Maudsley test</p> <p><u>Reference test (cut-off point(s)):</u> Lateral elbow pain + pain at any tender point</p>	NA	Sensitivity Specificity	<p>No funding issues reported</p> <p>No conflicts of interest reported</p>	High (all outcomes)

Murphy, 2015	<p>N at baseline: 44 (46 elbows)</p> <p>Age Total cohort: 50y (range, 35 to 69)</p> <p>Sex (f/m) Total cohort: 24/20</p> <p>Prevalence of disease with reference test (%): not reported</p> <p>Symptom duration: <6 weeks of lateral elbow pain</p>	<p><u>Index test:</u> Lateral epicondyle tenderness test (LETT), wrist extension test (WET, Cozen's test), Long finger extension test (LFET, Maudsley test), Resisted supination test (RST)</p> <p><u>Reference test (cut-off point(s)):</u> relief of pain and resolution of physical findings after local anesthetic (lidocaine) injection</p>	NA	Sensitivity	<p>Financial disclosure: Dr. Robert Murphy has no disclosures. Dr. Azar holds stock in Pfizer and receives royalties from Elsevier. Dr. Throckmorton is a paid consultant of Zimmer and Biomet. He holds stock in Gilead and receives royalties from Elsevier and serves on the editorial boards of AJO, JOT, Tech Shoulder Elbow Surg. Dr. Mauck receives royalties from Elsevier. Dr. Smith has no disclosures. The authors report no conflicts of interest in regards to this manuscript.</p>	Low (all outcomes)
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**For further details, see risk of bias table in the appendix*

Results

Diagnostic accuracy measures (sensitivity, specificity, PPV, NPV)

10

The effect of elbow position on maximum grip strength

One study (Dorf, 2007) included in the review of Karanasios (2022) compared the effect of elbow position on maximum grip strength to diagnose LET. The results are shown in Table 4 below. With increasing difference in maximum grip strength, the sensitivity decreased, and the specificity increased. PPV and NPV were not reported.

15

Table 4. Overview of diagnostic accuracy measures of maximum grip strength compared to tenderness over the ECRB or the common extensor origin and at least 2 of the 3 following tests: Cozen's, Mill's and Maudsley test

Author, year	N	Entity	Sensitivity % (95% CI)	Specificity % (95% CI)	PPV % (95% CI)	NPV % (95% CI)
Dorf, 2007	40 patients with grip strength measurements	MGS 5%	83 (66.4-92.7)	80	Not reported	
		MGS 8%	80 (58.4-91.9)	85 (64-94.8)		
		MGS 10%	78 (59.1-88.2)	90 (59.6-98.2)		

MGS: maximum grip strength

5

Comparison of diagnostic measures for different elbow tender points and case definitions

One study compared sensitivity and specificity for different elbow tender points and different case definitions to help in the diagnosis of LET (Yoon, 2019). The results are shown in Table 5 below. The highest sensitivity was reached when applying case definition three (lateral elbow pain + positive Cozen's test) and tender point six (radial tunnel). The corresponding specificity was 73.8. 95% confidence intervals were not reported, as well as PPV and NPV.

15 **Table 5.** Overview of sensitivity and specificity of different tender points and different case definitions

Author, year	Tender point	Sensitivity % (95% CI)						Specificity % (95% CI)					
		1	2	3	4	5	6	1	2	3	4	5	6
Yoon, 2019	Case def 1	6.8	16.3	14.3	14.3	21.2	53.1	97.9	96.9	97.6	96.3	87.3	75.9
	Case def 2	6.7	33.3	30.0	13.3	20.0	46.7	97.9	96.0	96.8	95.2	85.7	72.8
	Case def 3	8.9	28.6	23.2	21.4	26.8	57.1	97.7	96.5	97.1	95.8	86.1	73.8
	Case def 4	7.7	34.6	34.6	15.4	15.4	46.2	97.5	96.0	96.8	95.2	85.6	72.8
	Case def 5	8.3	28.3	21.7	20.0	28.3	56.7	97.7	96.5	97.1	95.8	86.8	73.9

Tender point 1: lateral epicondyle; tender point 2: lateral epicondyle; tender point 3: between lateral epicondyle and radial head; tender point 4: radial head; tender point 5: 1-2 cm distal to the radial head; tender point 6: radial tunnel. Case definition 1: lateral elbow pain; definition 2: lateral elbow pain + positive Maudsley test; definition 3: lateral elbow pain + positive Cozen's test; definition 4: lateral elbow pain + positive Maudsley test + positive Cozen's test; definition 5: lateral elbow pain + positive Maudsley test OR Cozen's test

20

5 Physical examination maneuvers vs. relief of pain and resolution of physical findings after local anesthetic injection.

One study compared the sensitivity of four physical maneuvers and combinations to diagnose LET (Murphy, 2015). The results are shown in Table 6 below. The highest sensitivity was reached when using the LETT and RST. Specificity, PPV and NPV were not reported.

10

Table 6 Overview of sensitivity of physical examinations maneuvers and combination

Examination maneuver	Sensitivity (95% CI)
Lateral epicondyle tenderness test (LETT)	80 (69-92)
Wrist extension test (WET, Cozen's test)	74 (61-87)
Long finger extension test (LFET, Maudsley test)	54 (39-69)
Resisted supination test (RST)	59 (44-73)
LETT+WET	90 (79-101)
LETT+RST	95 (85-105)

Level of evidence of the literature and conclusions

15 The level of evidence regarding diagnostic accuracy outcome measures were retrieved from observational studies and therefore started high.

Diagnostic accuracy measures (sensitivity, specificity, PPV, NPV)

The effect of elbow position on maximum grip strength

20 The level of evidence for the outcome **sensitivity** and **specificity** was downgraded by three levels due to problems with patient selection and the index test (-1 RoB), and wide 95% CIs for 5%, 8% and 10% decrease in maximum grip strength (-2 imprecision). The final level of evidence was graded 'very low'.

Low GRADE	There is little confidence in the reported sensitivity of the LETT, WET, LFET, and RST performed in isolation in adults suspected of lateral epicondylar tendinopathy. <i>Source: (Murphy, 2015)</i>
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The level of evidence for the outcome **sensitivity** of the **LETT+WET combined** and the **LETT+RST combined** was downgraded by one level due to small sample size for the combined physical maneuvers (-1 imprecision). The final level of evidence was graded 'moderate'.

30

Moderate GRADE	The combined LETT and WET & LETT and RST appear to have a very high sensitivity in adults suspected of lateral epicondylar tendinopathy. <i>Source: (Murphy, 2015)</i>
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35 No GRADE possible for the outcomes **specificity, PPV, and NPV**, because no evidence was found.

- GRADE	<p>No evidence was found about the specificity, PPV, and NPV regarding the effect of LETT, WET, LFET, RST, LETT+WET combined, and LETT+RST combined, in adults suspected of lateral epicondylar tendinopathy.</p> <p>Source: -</p>
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Overwegingen – van bewijs naar aanbeveling (NL)

Balans tussen gewenste en ongewenste effecten

Er is systematisch literatuuronderzoek verricht naar de diagnostische accuratesse van verschillende typen lichamelijke onderzoeken die worden verricht om de diagnose laterale epicondylaire tendinopathie (LET) of mediale epicondylaire tendinopathie (MET) te stellen in individuen met een verdenking op LET of MET. Het doel van dit literatuuronderzoek was onderzoeken welk type lichamenlijk onderzoek onderscheidend is voor het correct diagnosticeren van LET of MET.

Alleen voor LET is literatuur gevonden. Er is één systematisch review geselecteerd dat naast beeldvormingstechnieken, ook één studie heeft geïnccludeerd over verschillende typen lichamenlijk onderzoek. Daarnaast zijn nog een aantal individuele observationele studies geïnccludeerd die ook als relevant zijn beoordeeld door de werkgroep. Elke studie vergelijkt een ander type lichamenlijk onderzoek als indextest met een referentietest. Vandaar dat hieronder per vergelijking een conclusie wordt gegeven.

Het effect van elleboogpositie op maximale handknijpkracht

De cruciale uitkomstmaat sensitiviteit voor maximale handknijpkracht loopt uiteen van redelijk (10% en 8% daling) tot hoog (5% daling) voor detectie van LET. De cruciale uitkomstmaat PPV is niet beschreven. De belangrijke uitkomstmaat specificiteit voor maximale handknijpkracht loopt uiteen van redelijk (5% daling) tot heel hoog (10% daling). NPV (belangrijk) is niet gerapporteerd.

Het effect van verschillende elleboogdrukpunten en definities van een tennisarm

De hoogste sensitiviteit (cruciaal) werd bereikt bij elleboogdrukpunt 6 (radial tunnel) in combinatie met case definitie 3 (laterale elleboogpijn + positieve Cozen test). Deze sensitiviteit was laag. De cruciale uitkomstmaat PPV is niet beschreven. De belangrijke uitkomstmaat specificiteit bij hetzelfde drukpunt en dezelfde case definitie is redelijk voor detectie van LET. NPV is niet gerapporteerd. De 95% betrouwbaarheidsintervallen zijn niet gerapporteerd.

Lichamenlijk onderzoek vs. pijnverlichting na locale injectie

De hoogste sensitiviteit (cruciaal) werd bereikt bij een combinatie van lichamenlijke testen, namelijk de laterale epicondylaire drukpunten test en het strekken van de pols of de laterale epicondylaire drukpunten test en de weerstandstest. Deze sensitiviteit was heel hoog. De cruciale uitkomstmaat PPV en de belangrijke uitkomstmaten specificiteit en NPV zijn niet gerapporteerd.

Anamnese

Anamnese is essentieel voor het verfijnen van de differentiaaldiagnose (DD) in aanvulling op het lichamenlijk onderzoek. Klachten die bij patiënten met ellebooggerelateerde pathologie uitgevraagd moet worden zijn: pijn, bewegingsbeperking, gevoelens van instabiliteit, blokkeren van het gewricht, zwelling, neurologische symptomen en de invloed van sport- en werkbelasting op de klachten. Door deze symptomen te specificeren kan de DD verder worden ingeperkt. De lokalisatie van de pijn kan worden onderverdeeld in vier anatomische

5 regio's: lateraal, mediaal, anterieur en posterieur. Bij patiënten met een LET is er sprake van laterale elleboogpijn, terwijl bij patiënten met een MET sprake is van mediale elleboogpijn (Claessen [2022]).

10 Kryger (2007) analyseerde de toegevoegde waarde van lichamelijk onderzoek bovenop het bekend zijn met de medische geschiedenis door middel van vragenlijsten onder Deense computerwerkers met LET uit de NUDATA-cohortstudie. De belangrijkste bevinding van het onderzoek was dat in dit zeer grote cohort van computerwerkers weinig proefpersonen voldeden aan algemeen aanvaarde criteria voor LET. Het aantal klinische bevindingen nam duidelijk toe naarmate de pijnscore hoger was. De sterkste verbanden werden gevonden met de pijnscores uit de vragenlijst die vlak vóór het onderzoek werd ingevuld.

Kwaliteit van bewijs

Het effect van elleboogpositie op maximale handknijpkracht

20 De overall kwaliteit van bewijs is zeer laag. Dit betekent dat we zeer onzeker zijn over het gevonden geschatte effect van de cruciale uitkomstmaten.

Er is afgewaardeerd vanwege zeer ernstige:

Risk of Bias: methodologische beperkingen, vanwege problemen met selectie van patiënten en de indextest.

25 Imprecisie: onnauwkeurigheid, omdat beide grenzen van het 95% betrouwbaarheidsinterval (BI) waarden bevat die kunnen leiden tot een andere conclusie.

Het effect van verschillende elleboogdrukpunten en definities van een tennisarm

30 Hier kon de kwaliteit van bewijs niet worden beoordeeld door GRADE, vanwege gebrek aan data (het 95% BI werd niet gerapporteerd).

Lichamelijk onderzoek vs. pijnverlichting na lokale injectie

De overall kwaliteit van bewijs voor de *individuele testen* is laag. Dit betekent dat we onzeker zijn over het gevonden geschatte effect van de cruciale uitkomstmaten.

Er is afgewaardeerd vanwege ernstige:

35 Imprecisie: onnauwkeurigheid, omdat beide grenzen van het 95% BI voor de individuele testen waarden bevat die kunnen leiden tot een andere conclusie.

De overall kwaliteit van bewijs voor de *gecombineerde testen* is redelijk. Dit betekent dat we redelijk zeker zijn over het gevonden geschatte effect van de cruciale uitkomstmaten.

40 Er is afgewaardeerd vanwege:

Imprecisie: kleine populatiegrootte

Waarden en voorkeuren van patiënten (en eventueel hun naasten/verzorgers)

45 Anamnese en lichamelijk onderzoek hebben vaak de voorkeur van patiënten en zijn accuraat genoeg voor de diagnose LET of MET. Naast de elleboogtesten, worden ook de pols en schouder onderzocht. Verder aanvullend onderzoek is niet noodzakelijk. Deze procedure is laagdrempelig, eenvoudig, wordt goed verdragen door de patiënt en heeft geen bijwerkingen.

Kostenaspecten

50 De anamnese en lichamelijke testen voor LET en MET zijn accuraat en leveren geen extra kosten op.

55

5 Gelijkheid ((health) equity/equitable)
De teststrategie heeft geen invloed op gezondheidsgelijkheid want iedereen heeft toegang tot dezelfde lichamelijke onderzoeken.

Aanvaardbaarheid

10 *Ethische aanvaardbaarheid*
Het uitvoeren van de anamnese en lichamelijk onderzoek is aanvaardbaar voor de betrokkenen. Er zijn geen ethische bezwaren.

Duurzaamheid

15 Duurzaamheidsaspecten spelen geen rol bij anamnese en lichamelijke onderzoeken.

Haalbaarheid

20 Het uitvoeren van de anamnese en het lichamelijk onderzoek is haalbaar, omdat dit al standaardzorg in de praktijk is.

Aanbeveling(en)

Rationale van de aanbeveling: weging van argumenten voor en tegen de indextest

25 De meeste evidence komt voort uit LET; bewijs voor MET ontbreekt. Anamnese en lichamelijk onderzoek zijn voldoende om een LET of MET te diagnosticeren. Het brengt geen extra kosten met zich mee en iedere patiënt heeft gelijke toegang tot deze zorg.

Eindoordeel:

30 Sterke aanbeveling voor het doen van anamnese met aanvullend lichamelijk onderzoek voor het diagnosticeren van LET of MET.

Stel bij patiënten met (mogelijke) laterale of mediale epicondylaire tendinopathie de diagnose primair op basis van anamnese en lichamelijk onderzoek.

Voer hierbij minimaal de volgende stappen uit:

1. Verricht de anamnese en vraag systematisch naar:

- pijn;
- bewegingsbeperking;
- gevoelens van instabiliteit;
- blokkeren van het gewricht;
- zwelling;
- neurologische symptomen;
- sport- en werkbelasting;
- locatie van de pijn (essentieel voor de differentiaaldiagnose).

2. Voer aansluitend het lichamelijk onderzoek uit passend bij een vermoeden van laterale of mediale epicondylaire tendinopathie.

Kennisvragen

35 Tijdens de ontwikkeling van deze module is systematisch naar onderzoeken gezocht die de zoekvraag kunnen beantwoorden. Door gebruik te maken van een systematische literatuuranalyse met beoordeling van de bewijskracht is duidelijk geworden dat er binnen deze module nog kennisvragen bestaan. De werkgroep meent dat (vervolg)onderzoek wenselijk is om in de toekomst een duidelijker antwoord te kunnen geven op vragen uit de praktijk.

40

- 5 *Kennisvraag:*
Wat is de meest accurate diagnostische strategie van anamnese / lichamenlijk onderzoek bij patiënten met een verdenking op LET of MET?

Toelichting:

- 10 Binnen het lichamenlijk onderzoek is er op dit moment geen gouden standaard voor het diagnosticeren van LET of MET. Hier is meer onderzoek voor nodig.

Implementatieplan

Implementatietabel

<i>Vraag</i>	<i>Antwoord:</i> <i>Kruis aan en licht toe/</i> <i>beschrijf</i>		<i>Toelichting keuze:</i>
11. Wat was het onderliggende probleem om deze uitgangsvraag uit te werken?		Ongewenste praktijkvariatie	
		Nieuwe evidentie	
	X	Anders	Er bestaan veel verschillende lichamenlijke testen om LET of MET te diagnosticeren. Het is onbekend welke combinatie van testen het best onderscheidend is om LET of MET te diagnosticeren.
12. Maak een inschatting over hoeveel patiënten het ongeveer gaat waar de aanbeveling betrekking op heeft?		< 1000	
		< 5000	
	X	5000-40.000	
		> 40.000	
13. Is de aanbeveling onderdeel van een bredere set interventies of verwant aan andere richtlijnen of modules? Zo ja, hoe verhoudt zij zich daartoe en moet hiermee rekening worden gehouden bij de implementatie, of kan de aanbeveling als losstaand worden beschouwd?		Ja	
	X	Nee	
14. Belemmeringen en kansen op verschillende niveaus voor landelijke toepassing van de aanbeveling:		Belemmerende factoren	Bevorderende factoren/ kansen
Richtlijn/ klinisch traject (innovatie)	X		Aanbeveling is simpel geformuleerd en makkelijk op te volgen in de praktijk
Zorgverleners (artsen en verpleegkundigen)	X		Aanbeveling is al standaardzorg in de praktijk en daardoor voor artsen gemakkelijk uit te voeren

Patiënt/ cliënt (naasten)	X		Goed samen-beslis proces nodig.
Sociale context			
Organisatorische context			
Financiële en juridische context			
15. A) Welke personen/partijen zijn van belang bij het toepassen van de aanbeveling in de praktijk? (kruis aan) B) Wat is er nodig van deze personen/partijen om de aanbeveling in de praktijk te kunnen brengen? Denk aan aanpassingen in gedrag, werkwijzen, beleid, samenwerking of andere randvoorwaarden.		A	B
		Patiënt/ cliënt (naaste)	
	X	Professional	Niks nodig, want aanbeveling is al standaard zorg in de praktijk
		Beroepsvereniging, nl	
		Ziekenhuis (raad van bestuur/UMCNL (voorheen NFU)/NVZ)	
		Zorgverzekeraars/ NZa	
		Zorginstituut [duiding nodig]	
		Anders	Verspreiding bijvoorbeeld via social media of Podcast
16. Binnen welk tijdsbestek moet de aanbeveling zijn geïmplementeerd?	X	< 1 jaar	Aanbeveling is al standaardzorg, dus binnen 1 jaar is haalbaar
		binnen 2-3 jaar	
17. Conclusie: is er extra actie en/of ondersteuning nodig voor implementatie van de aanbeveling? <i>De reguliere implementatieroutes (publicatie en disseminatie via officiële kanalen, opname in professionele standaarden, scholing en nascholing, gebruik van bestaande ICT systemen, audits en visitaties) van de richtlijnmodule alleen is onvoldoende.</i>		Ja	
	X	Nee	Reguliere implementatie is voldoende doordat de aanbeveling al standaardzorg is in de praktijk
18. Plaatsing op de Landelijke Implementatieagenda Medisch Specialistische zorg is gewenst. Het gaat om zorg die (grotendeels) wordt uitgevoerd binnen de ziekenhuismuren. Succesvolle implementatie vraagt om actieve betrokkenheid en samenwerking van meerdere relevante partijen binnen de zorgpraktijk.		Ja *	
	X	Nee	Aanbeveling is al standaardzorg in de praktijk

- 5 *Deze aanbeveling komt mogelijk in aanmerking voor plaatsing op de Landelijke Implementatieagenda van het programma Zorg Evaluatie & Gepast Gebruik (ZE&GG), waarin alle betrokken partijen in de medisch-specialistische zorg samenwerken aan de implementatie van bewezen beste zorg. De Federatie levert namens het veld goed onderbouwde aanbevelingen aan, die zijn getoetst op de behoefte aan een implementatie-impuls. De onderwerpen op de Implementatieagenda zijn onderdeel van landelijke zorginkoopafspraken tussen zorgverzekeraars en zorgaanbieders. Voor de beoordeling van aanbevelingen uit richtlijnen wordt gebruikgemaakt van de implementatietabel. Op basis hiervan kunnen we de andere partijen goed informeren en gezamenlijk besluiten of plaatsing op de Implementatieagenda passend is.
- 10

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5 Bijlagen bij module Diagnose

Risk of Bias table diagnostic accuracy studies (QUADAS II, 2011)

Study reference	Patient selection	Index test	Reference standard	Flow and timing	Comments with respect to applicability
Yoon, 2019	<p><u>Was a consecutive or random sample of patients enrolled?</u> Probably no, because workers were recruited, which may have resulted in a higher prevalence than the general population.</p> <p><u>Was a case-control design avoided?</u> Yes, it was a cohort study</p> <p><u>Did the study avoid inappropriate exclusions?</u> Yes</p>	<p><u>Were the index test results interpreted without knowledge of the results of the reference standard?</u> Yes</p> <p><u>If a threshold was used, was it pre-specified?</u> Yes</p>	<p><u>Is the reference standard likely to correctly classify the target condition?</u> Probably no, only lateral elbow pain as symptom is not sufficient</p> <p><u>Were the reference standard results interpreted without knowledge of the results of the index test?</u> Yes, reference test is lateral elbow pain. Patients with lateral elbow pain were analyzed, thus assuming that these results were interpreted prior to knowledge of results of the index test.</p>	<p><u>Was there an appropriate interval between index test(s) and reference standard?</u> Unclear</p> <p><u>Did all patients receive a reference standard?</u> Yes</p> <p><u>Did patients receive the same reference standard?</u> No, the reference standard differed per case definition</p> <p><u>Were all patients included in the analysis?</u> No, only patients with lateral elbow pain were included (=12.1% of total cohort)</p>	<p><u>Are there concerns that the included patients do not match the review question?</u> No</p> <p><u>Are there concerns that the index test, its conduct, or interpretation differ from the review question?</u> No</p> <p><u>Are there concerns that the target condition as defined by the reference standard does not match the review question?</u> No, the ref test is a universally accepted gold standard.</p>
	<p>CONCLUSION: Could the selection of patients have introduced bias?</p> <p>RISK: HIGH</p>	<p>CONCLUSION: Could the conduct or interpretation of the index test have introduced bias?</p> <p>RISK: LOW</p>	<p>CONCLUSION: Could the reference standard, its conduct, or its interpretation have introduced bias?</p> <p>RISK: HIGH</p>	<p>CONCLUSION Could the patient flow have introduced bias?</p> <p>RISK: LOW</p>	

Study reference	Patient selection	Index test	Reference standard	Flow and timing	Comments with respect to applicability
Murphy, 2015	<p><u>Was a consecutive or random sample of patients enrolled?</u> Unclear</p> <p><u>Was a case-control design avoided?</u> Yes</p> <p><u>Did the study avoid inappropriate exclusions?</u> Yes</p>	<p><u>Were the index test results interpreted without knowledge of the results of the reference standard?</u> Yes, because all index tests were performed before the reference standard</p> <p><u>If a threshold was used, was it pre-specified?</u> Yes, pain provoked during maneuver = positive</p>	<p><u>Is the reference standard likely to correctly classify the target condition?</u> Probably not, pain relief and resolution of physical findings after local anesthetic injection as ref test is not perfect due to placebo effect</p> <p><u>Were the reference standard results interpreted without knowledge of the results of the index test?</u> Yes, Index tests were performed first, then injection was given, and afterward the presence or absence of pain relief was assessed</p>	<p><u>Was there an appropriate interval between index test(s) and reference standard?</u> Yes</p> <p><u>Did all patients receive a reference standard?</u> Yes</p> <p><u>Did patients receive the same reference standard?</u> Yes, every patient received the same procedure: local anesthetic injection into the lateral epicondylar region followed by re-examination</p> <p><u>Were all patients included in the analysis?</u> Yes, no dropouts reported</p>	<p><u>Are there concerns that the included patients do not match the review question?</u> No</p> <p><u>Are there concerns that the index test, its conduct, or interpretation differ from the review question?</u> No</p> <p><u>Are there concerns that the target condition as defined by the reference standard does not match the review question?</u> Yes, the ref test is not a universally accepted gold standard.</p>
	<p>CONCLUSION: Could the selection of patients have introduced bias?</p> <p>RISK: low</p>	<p>CONCLUSION: Could the conduct or interpretation of the index test have introduced bias?</p> <p>RISK: low</p>	<p>CONCLUSION: Could the reference standard, its conduct, or its interpretation have introduced bias?</p> <p>RISK: low</p>	<p>CONCLUSION Could the patient flow have introduced bias?</p> <p>RISK: low</p>	

5

5 **Table of excluded studies**

Reference	Reason for exclusion
Arrigoni P, Cucchi D, Menon A, Randelli P. It's time to change perspective! New diagnostic tools for lateral elbow pain. <i>Musculoskelet Surg.</i> 2017 Dec;101(Suppl 2):175-179. doi: 10.1007/s12306-017-0486-8. Epub 2017 Aug 2. PMID: 28770509.	Wrong comparator: arthroscopy
Blanchette MA, Normand MC. Cross-cultural adaptation of the patient-rated tennis elbow evaluation to Canadian French. <i>J Hand Ther.</i> 2010 Jul-Sep;23(3):290-9; quiz 300. doi: 10.1016/j.jht.2010.01.003. Epub 2010 Apr 18. PMID: 20400264.	Wrong outcomes: correlation between questionnaires
Greene C, Droppelmann G, García N, Jorquera C, Verdugo A. A New Test for the Advanced Diagnosis of Lateral Elbow Tendinopathy with Concomitant Intrasubstance Tear: Failure to Resist Extension Effort (the Free Test). <i>Orthop Res Rev.</i> 2022 Dec 30;14:495-503. doi: 10.2147/ORR.S364050. PMID: 36606066; PMCID: PMC9809378.	Wrong comparator: ultrasound as reference standard
Fan ZJ, Silverstein BA, Bao S, Bonauto DK, Howard NL, Smith CK. The association between combination of hand force and forearm posture and incidence of lateral epicondylitis in a working population. <i>Hum Factors.</i> 2014 Feb;56(1):151-65. doi: 10.1177/0018720813492327. PMID: 24669550.	Wrong outcomes: LET incidence
Kryger AI, Lassen CF, Andersen JH. The role of physical examinations in studies of musculoskeletal disorders of the elbow. <i>Occup Environ Med.</i> 2007 Nov;64(11):776-81. doi: 10.1136/oem.2005.026260. Epub 2007 May 23. PMID: 17522132; PMCID: PMC2078422.	Wrong comparison: blinded vs. non-blinded physical examination
Pitts G, Uhl TL, Day JM. Grip strength is more sensitive to changes in elbow position than isolated wrist extension strength in patients with lateral elbow tendinopathy. <i>J Hand Ther.</i> 2021 Jul-Sep;34(3):509-511. doi: 10.1016/j.jht.2020.03.019. Epub 2020 Jun 18. PMID: 32565100.	Lack of relevant data
Satake H, Naganuma Y, Honma R, Shibuya J, Maruyama M, Takagi M. The Effect of Elbow and Forearm Position on the Resisted Wrist Extension Test and Incidence of Sensory Disturbance of the Superficial Radial Nerve in Patients with Lateral Epicondylitis. <i>J Hand Surg Asian Pac Vol.</i> 2022 Aug;27(4):665-671. doi: 10.1142/S2424835522500667. Epub 2022 Aug 11. PMID: 35965378.	Wrong comparison: the effect of the position of the elbow and forearm on resisted wrist extension test
Soares MM, Souza PC, Ribeiro AP. Differences in Clinical Tests for Assessing Lateral Epicondylitis Elbow in Adults Concerning Their Physical Activity Level: Test Reliability, Accuracy of Ultrasound Imaging, and Relationship with Energy Expenditure. <i>Int J Environ Res Public Health.</i> 2023 Jan 18;20(3):1794. doi: 10.3390/ijerph20031794. PMID: 36767167; PMCID: PMC9914816.	Wrong comparison: influence of physical activity on clinical tests
Zwerus EL, Somford MP, Maissan F, Heisen J, Eygendaal D, van den Bekerom MP. Physical examination of the elbow, what is the evidence? A systematic literature review. <i>Br J Sports Med.</i> 2018 Oct;52(19):1253-1260. doi: 10.1136/bjsports-2016-096712. Epub 2017 Mar 1. PMID: 28249855.	More recent systematic review available

Literature search strategy

Zoekverantwoording

10 **Algemene informatie**

Cluster/richtlijn: Tennisarm en Golfarm - UV1 Diagnose	
Uitgangsvraag/modules: Hoe kan het best de diagnose tennis- of golfarm worden gesteld, en wat is daarin de rol van anamnese en lichamelijk onderzoek?	
Database(s): Embase.com, Ovid/Medline	Datum: 3 februari 2025
Periode: vanaf 2005	Talen: geen restrictive
Literatuurspecialist: Esther van der Bijl	Rayyan review: https://new.rayyan.ai/reviews/1311099/overview
BMI-zoekblokken: voor verschillende opdrachten wordt (deels) gebruik gemaakt van de zoekblokken van BMI-Online https://blocks.bmi-online.nl/ Deduplication: voor het ontdebelen is gebruik gemaakt van http://dedupendnote.nl/	
<p>Toelichting: Voor deze vraag is gezocht op de elementen tennisarm/ golfarm EN diagnose EN sensitiviteit-/specificiteitsfilter.</p> <p>De volgende sleutelartikelen worden gevonden met deze search:</p> <ul style="list-style-type: none"> Karanasios S, Korakakis V, Moutzouri M, Drakonaki E, Koci K, Pantazopoulou V, Gioftsos G (2022). Diagnostic accuracy of examination tests for lateral elbow tendinopathy (let) - a systematic review.. Journal of Hand Therapy, 35(4), 541-551. https://dx.doi.org/10.1016/j.jht.2021.02.002 Zwerus EL, Somford MP, Maissan F, Heisen J, Eygendaal D & van den Bekerom MP (2018). Physical examination of the elbow, what is the evidence? a systematic literature review.. British Journal of Sports Medicine, 52(19), 1253-1260. https://dx.doi.org/10.1136/bjsports-2016-096712 <p>Het volgende achtergrondartikel staat niet in Embase.com, Ovid/Medline:</p> <ul style="list-style-type: none"> Claessen F.M.A.P, Nagel M, Eygendaal D. (2022). How to take medical history from patients with elbow complaints. In (Red), Elbow work is teamwork (pp. 17-36). Arko Sports Media BV. 	
<p>Te gebruiken voor richtlijntekst:</p> <p>A systematic literature search was performed by a medical information specialist using the following bibliographic databases: Embase.com and Ovid/Medline. Both databases were searched from 2005 to the 3rd of Februari 2025 for systematic reviews and observational studies. Systematic searches were completed using a combination of controlled vocabulary/subject headings (e.g., Emtree-terms, MeSH) wherever they were available and natural language keywords. The overall search strategy was derived from two primary search concepts: (1) lateral/ medial epicondylitis; (2) physical examination tests. Duplicates were removed using EndNote software. After deduplication a total of 217 records were imported for title/abstract screening.</p>	

5

Zoekopbrengst - 3 februari 2025

	EMBASE	OVID/MEDLINE	Ontdubbeld
SR	28	25	37
Observationele studies	149	97	180
Totaal	177	122	217*

**in Rayyan*

10

Zoekstrategie - 3 februari 2025

Embase.com

No.	Query	Results
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#1	'tennis elbow'/exp OR 'medial epicondylitis'/exp OR (((tennis* OR golf*) NEAR/3 (arm* OR elbow*)):ti,ab,kw) OR (((epicondylit* OR epycondylit* OR epicondylitid* OR epycondylitid*) NEAR/3 (humer* OR lateral* OR external* OR radiohumer* OR medial*)):ti,ab,kw) OR (((elbow* OR epicondyl* OR ecrb) NEAR/7 (tendinopath* OR tendonopath* OR tendinos*)):ti,ab,kw) OR (((lateral* OR medial*) NEAR/3 elbow* NEAR/3 pain*):ti,ab,kw) OR epicondylalg*:ti,ab,kw	4797
#2	'physical examination'/exp OR 'anamnesis'/exp OR 'diagnostic test'/exp OR 'middle finger'/exp OR 'muscle strength'/exp OR 'grip strength test'/exp OR 'shear test'/exp OR 'shear strength'/exp OR 'onset time'/exp OR 'medical history'/exp OR 'questionnaire'/exp OR (((diagnostic* OR diagnos?s) NEAR/3 (method* OR procedur* OR technique*)):ti,ab,kw) OR (('middle finger*' NEAR/3 resist*):ti,ab,kw) OR ((lock* NEAR/3 symptom*):ti,ab,kw) OR ((trauma* NEAR/3 moment*):ti,ab,kw) OR (((grip* OR hand* OR muscle*) NEAR/7 strength*):ti,ab,kw) OR (('tennis* elbow*' NEAR/3 evaluat*):ti,ab,kw) OR ((physical* NEAR/3 (exam* OR assessment* OR check* OR inspect*)):ti,ab,kw) OR 'anamnes*:ti,ab,kw OR 'histor* taking*:ti,ab,kw OR 'medical* histor*:ti,ab,kw OR 'medical* interview*:ti,ab,kw OR 'patient* histor*:ti,ab,kw OR cozen*:ti,ab,kw OR polk*:ti,ab,kw OR maudsley*:ti,ab,kw OR test*:ti,ab,kw OR mills:ti,ab,kw OR mill:ti,ab,kw OR kaplan*:ti,ab,kw OR shear*:ti,ab,kw OR onset*:ti,ab,kw OR 'pop* sensati*:ti,ab,kw OR questionnaire*:ti,ab,kw OR survey*:ti,ab,kw OR thomsen*:ti,ab,kw OR prtee:ti,ab,kw	10075135
#3	'sensitivity and specificity'/de OR sensitivity:ab,ti OR specificity:ab,ti OR predict*:ab,ti OR 'roc curve':ab,ti OR 'receiver operator':ab,ti OR 'receiver operators':ab,ti OR likelihood:ab,ti OR 'diagnostic error'/exp OR 'diagnostic accuracy'/exp OR 'diagnostic test accuracy study'/exp OR 'inter observer':ab,ti OR 'intra observer':ab,ti OR interobserver:ab,ti OR intraobserver:ab,ti OR validity:ab,ti OR kappa:ab,ti OR reliability:ab,ti OR reproducibility:ab,ti OR ((test NEAR/2 're-test'):ab,ti) OR ((test NEAR/2 'retest'):ab,ti) OR 'reproducibility'/exp OR accuracy:ab,ti OR 'differential diagnosis'/exp OR 'validation study'/de OR 'measurement precision'/exp OR 'diagnostic value'/exp OR 'reliability'/exp OR 'predictive value'/exp OR ppv:ti,ab,kw OR npv:ti,ab,kw OR (((false OR true) NEAR/3 (negative OR positive)):ti,ab)	6727411
#4	#1 AND #2 AND #3	374
#5	#4 AND [2005-2025]/py NOT ('conference abstract'/it OR 'editorial'/it OR 'letter'/it OR 'note'/it) NOT (('animal'/exp OR 'animal experiment'/exp OR 'animal model'/exp OR 'nonhuman'/exp) NOT 'human'/exp)	252
#6	'meta analysis'/exp OR 'meta analysis (topic)'/exp OR 'systematic review'/exp OR 'systematic review (topic)'/exp OR 'scoping review'/exp OR 'rapid review'/exp OR 'umbrella review'/exp OR 'cochrane database of systematic reviews'/jt OR 'network meta-analysis'/exp OR 'networkmeta analy*:ti,ab,kw OR 'networkmetaanaly*:ti,ab,kw OR metaanaly*:ti,ab,kw OR 'meta analy*:ti,ab,kw OR metanaly*:ti,ab,kw OR prisma:ti,ab,kw OR prospero:ti,ab,kw OR metaanali*:ti,ab,kw OR 'meta anali*:ti,ab,kw OR metanali*:ti,ab,kw OR (((systemati* OR scoping OR umbrella OR 'structured literature') NEAR/3 (review* OR overview*)):ti,ab,kw) OR (((structured OR systemic*) NEAR/3 (review* OR overview* OR synth*) NEAR/3 literature):ti,ab,kw) OR ((systemic* NEAR/1 review*):ti,ab,kw) OR (((systemati* OR literature OR database* OR 'data base*') NEAR/10 search*):ti,ab,kw) OR (((structured OR comprehensive* OR systemic*) NEAR/3 search*):ti,ab,kw) OR (((literature NEAR/3 (review* OR overview*)):ti,ab,kw) AND (search*:ti,ab,kw OR database*:ti,ab,kw OR 'data base*':ti,ab,kw)) OR (('data extraction*':ti,ab,kw OR 'data source*':ti,ab,kw) AND ('study selection*':ti,ab,kw OR 'studies selection*':ti,ab,kw)) OR ('search strateg*':ti,ab,kw AND 'selection criteria*':ti,ab,kw) OR ('data source*':ti,ab,kw AND 'data synth*':ti,ab,kw) OR medline*:ti,ab,kw OR pubmed*:ti,ab,kw OR 'pub med*':ti,ab,kw OR embase:ti,ab,kw OR cochrane*:ti,ab,kw OR (((critical* OR rapid*) NEAR/2 (review* OR overview* OR synth*)):ti) OR (((critical* OR rapid*) NEAR/3 (review* OR overview* OR synth*)):ab) AND (search*:ab OR database*:ab OR 'data base*':ab)) OR metasynth*:ti,ab,kw OR 'meta synth*':ti,ab,kw OR 'review* of review*':ti,ab,kw	1118710

#7	'major clinical study'/de OR 'clinical study'/de OR 'family study'/de OR 'longitudinal study'/de OR 'retrospective study'/de OR 'prospective study'/de OR 'cohort analysis'/de OR 'case control study'/de OR 'comparative study'/exp OR 'control group'/de OR 'controlled study'/de OR 'controlled clinical trial'/de OR 'crossover procedure'/de OR 'double blind procedure'/de OR 'phase 2 clinical trial'/de OR 'phase 3 clinical trial'/de OR 'phase 4 clinical trial'/de OR 'pretest posttest design'/de OR 'pretest posttest control group design'/de OR 'quasi experimental study'/de OR 'single blind procedure'/de OR 'triple blind procedure'/de OR ((cohort NEAR/1 (study OR studies)):ab,ti) OR (('case control' NEAR/1 (study OR studies)):ab,ti) OR (('follow up' NEAR/1 (study OR studies)):ab,ti) OR (observational NEAR/1 (study OR studies)) OR ((epidemiologic NEAR/1 (study OR studies)):ab,ti) OR (('cross sectional' NEAR/1 (study OR studies)):ab,ti) OR (((control OR controlled) NEAR/6 trial):ti,ab,kw) OR (((control OR controlled) NEAR/1 active):ti,ab,kw) OR 'open label*:ti,ab,kw OR (((double OR two OR three OR multi OR trial) NEAR/1 (arm OR arms)):ti,ab,kw) OR ((allocat* NEAR/10 (arm OR arms)):ti,ab,kw) OR placebo*:ti,ab,kw OR 'sham-control*:ti,ab,kw OR (((single OR double OR triple OR assessor) NEAR/1 (blind* OR masked)):ti,ab,kw) OR nonrandom*:ti,ab,kw OR 'non-random*:ti,ab,kw OR 'quasi-experiment*:ti,ab,kw OR crossover:ti,ab,kw OR 'cross over':ti,ab,kw OR 'parallel group*:ti,ab,kw OR 'factorial trial':ti,ab,kw OR ((phase NEAR/5 (study OR trial)):ti,ab,kw) OR ((case* NEAR/6 (matched OR control*)):ti,ab,kw) OR ((match* NEAR/6 (pair OR pairs OR cohort* OR control* OR group* OR healthy OR age OR sex OR gender OR patient* OR subject* OR participant*)):ti,ab,kw) OR ((propensity NEAR/6 (scor* OR match*)):ti,ab,kw) OR versus:ti OR vs:ti OR compar*:ti OR ((compar* NEAR/1 study):ti,ab,kw) OR (('observational study'/de OR 'cross-sectional study'/de OR 'multicenter study'/de OR 'correlational study'/de OR 'follow up'/de OR cohort*:ti,ab,kw OR 'follow up':ti,ab,kw OR followup:ti,ab,kw OR longitudinal*:ti,ab,kw OR prospective*:ti,ab,kw OR retrospective*:ti,ab,kw OR observational*:ti,ab,kw OR 'cross sectional*':ti,ab,kw OR cross?ectional*:ti,ab,kw OR multigent*:ti,ab,kw OR 'multi-cent*':ti,ab,kw OR consecutive*:ti,ab,kw) AND (group:ti,ab,kw OR groups:ti,ab,kw OR subgroup*:ti,ab,kw OR versus:ti,ab,kw OR vs:ti,ab,kw OR compar*:ti,ab,kw OR 'odds ratio*:ab OR 'relative odds':ab OR 'risk ratio*:ab OR 'relative risk*':ab OR 'rate ratio':ab OR aor:ab OR arr:ab OR rrr:ab OR (('or' OR 'rr') NEAR/6 ci):ab)))	17753223
#8	#5 AND #6 – SR	28
#9	#5 AND #7 NOT #8 – Observatoneel	149
#10	#8 OR #9 – Totaal	177

5

Ovid/Medline

#	Searches	Results
1	exp Tennis Elbow/ or exp Elbow Tendinopathy/ or ((tennis* or golf*) adj3 (arm* or elbow*)):ti,ab,kf. or ((epicondylit* or epycondylit* or epicondylitid* or epycondylitid*) adj3 (humer* or lateral* or external* or radiohumer* or medial*)):ti,ab,kf. or ((elbow* or epicondyl* or ecrb) adj7 (tendinopath* or tendonopath* or tendinos*)):ti,ab,kf. or ((lateral* or medial*) adj3 elbow* adj3 pain*)):ti,ab,kf. or epicondylg*.ti,ab,kf.	3446
2	exp Physical Examination/ or exp Diagnostic Tests, Routine/ or exp Medical History Taking/ or exp Muscle Strength/ or exp Hand Strength/ or exp Shear Strength/ or exp "Surveys and Questionnaires"/ or ((diagnostic* or diagnos?s) adj3 (method* or procedur* or technique*)):ti,ab,kf. or (middle finger* adj3 resist*)):ti,ab,kf. or (lock* adj3 symptom*)):ti,ab,kf. or (trauma* adj3 moment*)):ti,ab,kf. or ((grip* or hand* or muscle*) adj7 strength*)):ti,ab,kf. or (tennis* elbow* adj3 evaluat*)):ti,ab,kf. or (physical* adj3 (exam* or assessment* or check* or inspect*)):ti,ab,kf. or anamnes*.ti,ab,kf. or histor* taking*.ti,ab,kf. or medical* histor*.ti,ab,kf. or medical* interview*.ti,ab,kf. or patient* histor*.ti,ab,kf. or cozen*.ti,ab,kf. or polk*.ti,ab,kf. or maudsley*.ti,ab,kf. or test*.ti,ab,kf. or mills.ti,ab,kf. or mill.ti,ab,kf. or kaplan*.ti,ab,kf. or shear*.ti,ab,kf. or onset*.ti,ab,kf. or pop* sensati*.ti,ab,kf. or questionnaire*.ti,ab,kf. or survey*.ti,ab,kf. or thomsen*.ti,ab,kf. or prtee.ti,ab,kf.	7965336

3	exp "Sensitivity and Specificity"/ or (sensitivity or specificity).ti,ab. or (predict* or ROC-curve or receiver-operator*).ti,ab. or (likelihood or LR*).ti,ab. or exp Diagnostic Errors/ or (inter-observer or intra-observer or interobserver or intraobserver or validity or kappa or reliability).ti,ab. or reproducibility.ti,ab. or (test adj2 (re-test or retest)).ti,ab. or "Reproducibility of Results"/ or accuracy.ti,ab. or Diagnosis, Differential/ or Validation Study/ or ((false or true) adj3 (negative or positive)).ti,ab.	5319693
4	1 and 2 and 3	257
5	limit 4 to yr="2005 -Current"	206
6	5 not (comment/ or editorial/ or letter/) not ((exp animals/ or exp models, animal/) not humans/)	204
7	meta-analysis/ or meta-analysis as topic/ or (metaanaly* or meta-analy* or metanaly*).ti,ab,kf. or systematic review/ or cochrane.jw. or (prisma or prospero).ti,ab,kf. or ((systemati* or scoping or umbrella or "structured literature") adj3 (review* or overview*)).ti,ab,kf. or (systemic* adj1 review*).ti,ab,kf. or ((systemati* or literature or database* or data-base*) adj10 search*).ti,ab,kf. or ((structured or comprehensive* or systemic*) adj3 search*).ti,ab,kf. or ((literature adj3 review*) and (search* or database* or data-base*)).ti,ab,kf. or (("data extraction" or "data source*") and "study selection").ti,ab,kf. or ("search strategy" and "selection criteria").ti,ab,kf. or ("data source*" and "data synthesis").ti,ab,kf. or (medline or pubmed or embase or cochrane).ab. or ((critical or rapid) adj2 (review* or overview* or synthes*)).ti. or (((critical* or rapid*) adj3 (review* or overview* or synthes*)) and (search* or database* or data-base*)).ab. or (metasynthes* or meta-synthes*).ti,ab,kf.	809456
8	Epidemiologic studies/ or case control studies/ or exp cohort studies/ or Controlled Before-After Studies/ or Case control.tw. or cohort.tw. or Cohort analy\$.tw. or (Follow up adj (study or studies)).tw. or (observational adj (study or studies)).tw. or Longitudinal.tw. or Retrospective*.tw. or prospective*.tw. or consecutive*.tw. or Cross sectional.tw. or Cross-sectional studies/ or historically controlled study/ or interrupted time series analysis/ [Onder exp cohort studies vallen ook longitudinale, prospectieve en retrospectieve studies]	4952223
9	Case-control Studies/ or clinical trial, phase ii/ or clinical trial, phase iii/ or clinical trial, phase iv/ or comparative study/ or control groups/ or controlled before-after studies/ or controlled clinical trial/ or double-blind method/ or historically controlled study/ or matched-pair analysis/ or single-blind method/ or (((control or controlled) adj6 (study or studies or trial)) or (compar* adj (study or studies)) or ((control or controlled) adj1 active) or "open label*" or ((double or two or three or multi or trial) adj (arm or arms)) or (allocat* adj10 (arm or arms)) or placebo* or "sham-control*" or ((single or double or triple or assessor) adj1 (blind* or masked)) or nonrandom* or "non-random*" or "quasi-experiment*" or "parallel group*" or "factorial trial" or "pretest posttest" or (phase adj5 (study or trial)) or (case* adj6 (matched or control*)) or (match* adj6 (pair or pairs or cohort* or control* or group* or healthy or age or sex or gender or patient* or subject* or participant*)) or (propensity adj6 (scor* or match*)))).ti,ab,kf. or (confounding adj6 adjust*).ti,ab. or (versus or vs or compar*).ti. or ((exp cohort studies/ or epidemiologic studies/ or multicenter study/ or observational study/ or seroepidemiologic studies/ or (cohort* or 'follow up' or followup or longitudinal* or prospective* or retrospective* or observational* or multicent* or 'multi-cent*' or consecutive*).ti,ab,kf.) and ((group or groups or subgroup* or versus or vs or compar*).ti,ab,kf. or ('odds ratio*' or 'relative odds' or 'risk ratio*' or 'relative risk*' or aor or arr or rrr).ab. or ("OR" or "RR") adj6 CI).ab.))	5900024
10	6 and 7 – SR	25
11	(6 and (8 or 9)) not 10 – Observatieel	97
12	10 or 11 – Totaal	122

5

5 Module 2 Beeldvorming

Uitgangsvraag

Wat is de bijdrage van beeldvorming voor het stellen van de diagnose laterale epicondylaire tendinopathie of mediale epicondylaire tendinopathie?

10

Introduction (English)

Currently, no standardized guidelines exist for the diagnosis of lateral or medial epicondylar tendinopathy. Clinical examination plays a central role in establishing the diagnosis, while diagnostic imaging may provide additional information. However, in most patients imaging is not necessary. Clarifying the precise role of diagnostic imaging is therefore essential, as it may help to avoid unnecessary medical costs.

15

Search and select

A systematic review of the literature was performed to answer the following question(s):

20

What is the diagnostic accuracy of imaging techniques compared to physical examination tests to diagnose lateral or medial epicondylar tendinopathy?

Table 1. PICRO

Patients	Individuals suspected of lateral or medial epicondylar tendinopathy
Index test	Imaging techniques including echo, MRI, x-ray, Ultrasound Tissue Characterization
Comparator test	Not applicable
Reference test	Physical examination tests
Outcomes	Sensitivity, specificity, positive predictive value (PPV), negative predictive value (NPV)
Other selection criteria	Study design: systematic reviews, diagnostic test accuracy studies (with single-gate design, cross-sectional study)

25

Relevant outcome measures

The guideline panel considered sensitivity and PPV as **critical** outcome measures for decision making; and specificity and NPV as **important** outcome measures for decision making.

30

Table 2. Consequences of diagnostic test characteristics

Outcome	Consequences	Relevance
True positives (TP), high sensitivity	Patients are justifiably diagnosed with LET or MET; giving treatment is justified	Critical
True negatives (TN), high specificity	Patients are justifiably not diagnosed with LET or MET; not giving treatment is justified	Important
False positives (FP), low specificity	Patients are unjustifiably diagnosed with LET or MET; giving treatment is unjustified	Critical
False negatives (FN), low sensitivity	Patients are unjustifiably not diagnosed with LET or MET; not giving treatment is unjustified	Important

Positive prediction value (PPV)	Proportion of patients who are justifiably not diagnosed with LET or MET	Critical
Negative prediction value (NPV)	Proportion of patients who are unjustifiably not diagnosed with LET or MET	Important

5

A priori, the guideline panel did not define the outcome measures listed above but used the definitions described in the studies.

10 For MRI, the entities oedema and tendon thickening are considered most important. For Gray-Scale Ultrasound Imaging, hypoechogenicity and tendon thickening are most important. In the literature analysis, the following two groups are used: tendon thickening and signal intensity changes.

15 The guideline panel used the following cut-off values to grade sensitivity, specificity, NPV, and PPV:

Very high: 90% to 100%.

High: >80% to 90%.

Moderate: 65% to 80%.

20

Low: <65%.

Search and select (Methods)

25 A systematic literature search was performed by a medical information specialist using the following bibliographic databases: Embase.com and Ovid/Medline. Both databases were searched from 2004 to 10-12-2024 for systematic reviews, RCTs, observational and other studies. Systematic searches were completed using a combination of controlled vocabulary/subject headings (e.g., Emtree-terms, MeSH) wherever they were available and natural language keywords. The overall search strategy was derived from two primary search concepts: (1) lateral/medial epicondylitis; (2) imaging techniques. Duplicates were removed using EndNote software. After deduplication, a total of 224 records were imported for title/abstract screening. Initially, 31 studies were selected based on title and abstract screening. After reading the full text, 30 studies were excluded (see the exclusion table under the tab 'Evidence tabellen'), and 1 study was included.

35 **Summary of literature**

Description of studies

40 For *lateral epicondylar tendinopathy (LET)*, 1 study was included in the analysis of the literature. Important study characteristics and results are summarized in table 3. The assessment of the risk of bias is summarized in the risk of bias tables (under the tab 'Evidence tabellen'). For *medial epicondylar tendinopathy (MET)*, no studies were included.

LATERAL EPICONDYLAR TENDINOPATHY (LET)

45 **Karanasios (2022)** performed a systematic review (SR) of studies evaluating the diagnostic accuracy of examination tests used in LET. Eligibility criteria were prospective and retrospective observational studies which reported on 1) a cohort of adult patients with LET of both sexes, 2) diagnostic accuracy of physical examination tests, medical imaging, or questionnaires for the diagnosis of LET, 3) included any physical examination test used as a reference standard because of the lack of a gold standard for the diagnosis of LET, 4) reported a 2x2 contingency table or results in sufficient detail to allow reconstruction of 2x2

5 contingency tables. MEDLINE, PubMed, CINAHL, EMBASE, PEDro, ScienceDirect, and
 Cochrane Library were searched on March 11, 2020. Authors also searched for grey
 literature via OpenGrey, WHO online collection, Clinical Trials. Gov, Australian New Zealand
 Clinical Trials registry and Cochrane CENTRAL Register. In total, 24 studies were included in
 10 the qualitative synthesis, which all included a type of physical examination test as a gold
 standard to diagnose LET. Elastography and Superb Microvascular Imaging (SMI) are
 currently not used as routine examination for the diagnosis of LET in clinical practice in the
 Netherlands, and therefore not considered useful for the purpose of this guideline (Ahn,
 2014; Arslan, 2018; De Zordo, 2009; Park, 2014; Zhu, 2020). Studies investigating the
 diagnostic accuracy of physical examination tests were also not useful for this guideline
 15 (Dones, 2014b; Dorf 2007), because it did not match the PICRO. Four useful studies
 investigating MRI (Mackay, 2003; Steinborn, 1999; Van Kollenburg, 2009; Walton, 2011) and
 10 useful studies investigating hypoechogenicity and tendon thickening using Gray scale
 (Doppler) ultrasound imaging (Dones, 2014a; du Toit, 2009; Heales, 2014; Khoury and
 Cardinal, 2009; Lee, 2011; Noh, 2010; Obradov & Anderson, 2012; Struijs, 2005; Toprak,
 20 2012; Zeisig, 2006) were left.

MEDIAL EPICONDYLAR TENDINOPATHY (MET)

No studies included

25 **Table 3. Characteristics of included studies**

Study	Participants	Comparison	Follow-up	Outcome measures	Comments	Risk of bias (per outcome measure)*
Lateral epicondylar tendinopathy (LET)						
<i>Included in systematic review Karanasios, 2022</i>						
MRI						
Mackay, 2003	N at baseline: 20 patients (23 elbows) Mean age: 41y (range, 19-56) Sex (f/m): 11/9 Symptom duration: mean 5 months (range, 6 weeks-1y)	Index test (cut-off point(s)): MRI, cut offs not reported Reference test (cut-off point(s)): 1) Presence of pain and tenderness localized to the CEO, exacerbated by activity 2) Pain on passive stretching or resisted active contraction of the CEO muscles	NA	Sensitivity% Specificity% PPV% NPV%	No conflicts of interests reported	Unclear (all outcomes)

Steinborn, 1999	<p>N at baseline: 23 patients (51 elbows) and 7 healthy controls</p> <p>Mean age of 23 patients: 47y (range, 29-58)</p> <p>Mean age of 7 controls: 25y (range, 22-29)</p> <p>Sex (f/m) within</p> <ul style="list-style-type: none"> - patient group: 15/8 - Control group: 5/2 <p>Symptom duration of 23 patients: 17.1 months (range, 1-84 months)</p>	<p>Index test (cut-off point(s)): MRI with the following cut-offs:</p> <ul style="list-style-type: none"> - Grade 0: no contrast enhancement - Grade 1: contrast enhancement without tendon thickening - Grade 2: contrast enhancement involving <50% tendon thickening - Grade 3: Contrast enhancement >50% of tendon thickening <p>Reference test (cut-off point(s)): Clinical findings and history including muscle weakness, pain localized to the lateral epicondyle, aggravation of pain by weight-bearing and resisted supination and wrist extension</p>	NA	Sensitivity% Specificity% PPV% NPV%	No conflicts of interests reported	High (all outcomes)
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Van Kollenburg, 2009	<p>N at baseline: 69 total (72 elbows); 22 LET and 47 controls</p> <p>Mean age of 22 patients: 47y (SD, 8) Mean age of 47 controls: 48y (SD, 9)</p> <p>Sex (f/m) within patient group: 13/9</p> <p>Sex (f/m) within control group: 26/18</p> <p>Symptom duration: 1.2y (range, 3 months to 5 years)</p>	<p>Index test (cut-off point(s)): MRI</p> <p>Reference test (cut-off point(s)): History of lateral elbow pain, discrete tenderness over the origin of the ECRB, Mill's and Cozen's test</p>	NA	Sensitivity% Specificity% PPV% NPV%	No conflicts of interests reported	High (all outcomes)
Walton, 2011	<p>N at baseline: 21 total; 21 LET</p> <p>Mean age of 21 patients: 51y (SD, 7.6)</p> <p>Sex (f/m) within patient group: 10/11</p> <p>Symptom duration: at least 6 months</p>	<p>Index test (cut-off point(s)): MRI</p> <p>Criteria: Normal/mild – separation severity score 1 – separation length 0-2 mm</p> <p>Moderate - separation severity score 2 – separation length 2-5 mm</p> <p>Severe - separation severity score 3 – separation length >6 mm</p> <p>Reference test (cut-off point(s)): Local tenderness during palpation of the common extensor origin, Cozen's test or Maudsley test</p>	NA	Sensitivity%	No conflicts of interests reported	Unclear (all outcomes)
Grayscale (Doppler) ultrasound imaging						

Dones, 2014a	<p>N at baseline: 51 total, 102 elbows; 51 LET</p> <p>Mean age of 51 LET patients: 41y (SD 13)</p> <p>Symptom duration Acute: 0.46 months Chronic: 6.7 months</p>	<p>Index test (cut-off point(s)): Gray scale Doppler USI</p> <p>Reference test (cut-off point(s)): at least one of the following tests: Cozen's, Mill's and Maudsley test</p>	NA	<p>Sensitivity%</p> <p>Specificity%</p> <p>PPV%</p> <p>NPV%</p>	<p>This research has received funding from the Department of Science and Technology of the Republic of the Philippines. No other conflicts of interest reported.</p>	Low (all outcomes)
Du Toit, 2008	<p>N at baseline: 43 total, 88 elbows; 25 LET 18 controls</p> <p>Mean age of 25 LET patients: 50y (SD 9)</p> <p>Mean age of 18 controls: 49y (SD 10)</p> <p>Symptom duration of 25 LET patients: 27 months (SD 38)</p>	<p>Index test (cut-off point(s)): Gray scale Doppler USI</p> <p>Reference test (cut-off point(s)): at least one of the following tests: local tenderness during palpation of the common extensor origin, Cozen's test and gripping</p>	NA	<p>Sensitivity%</p> <p>Specificity%</p> <p>PPV%</p> <p>NPV%</p>	<p>Financial support from The University of Queensland and National Health and Medical Research Council of Australia (Primary Care Research): project number: 252710</p> <p>No other conflicts of interest reported</p>	High (all outcomes)

Heales, 2014	N at baseline: 60 total, 60 elbows; 30 LET 30 controls Mean age of 30 LET patients: 49.6y Mean age of 30 controls: 50.6y Symptom duration of 30 LET patients: 19.9 weeks	Index test (cut-off point(s)): Gray scale Doppler USI Reference test (cut-off point(s)): at least one of the following tests: local tenderness over the common extensor origin and pain provoked during Cozen's test, Maudsley test and gripping	NA	Sensitivity% Specificity% PPV% NPV%	Funding was provided by a program grant from the National Health and Medical Research Council of Australia (ID631717). P. H. is supported by a senior principal research fellowship (APP1002190), and L. H., by an Australian postgraduate award scholarship. No other conflicts of interests reported	High (all outcomes)
Khoury and Cardinal, 2009	N at baseline: 8 total, 8 elbows Mean age: 45y	Index test (cut-off point(s)): Gray scale Doppler USI Reference test (cut-off point(s)): clinical diagnosis	NA	Sensitivity% Specificity% PPV% NPV%	Information about funding not reported No conflicts of interests reported	High (all outcomes)
Lee, 2011	N at baseline: 111 total, 114 elbows; 48 LET 63 controls Mean age 48 LET patients: 48.3y Mean age 63 controls: 48.3y	Index test (cut-off point(s)): Gray scale USI Reference test (cut-off point(s)): clinical diagnosis	NA	Sensitivity% Specificity% PPV% NPV%	Information about funding not reported No conflicts of interests reported	High (all outcomes)
Noh, 2010	N at baseline: 54 total, 54 elbows; 27 LET 27 controls Symptom duration 27 LET patients: 8.7 weeks	Index test (cut-off point(s)): Gray scale USI Reference test (cut-off point(s)): local tenderness during palpation of the common extensor origin and Cozen's test	NA	Sensitivity% Specificity% PPV% NPV%	No conflicts of interest reported	High (all outcomes)

Obradov and Anderson, 2012	<p>N at baseline: 48 total, 59 elbows; 43 LET 5 controls</p> <p>Mean age of 43 LET patients: 47y (SD 7.7) Mean age of 5 controls: 36y (SD 8.7)</p> <p>Symptom duration of 43 LET patients >6 months</p>	<p>Index test (cut-off point(s)): Gray scale Doppler USI</p> <p>Reference test (cut-off point(s)): pain provoked by U/S probe in the lateral epicondyle and Cozen's test</p>	NA	<p>Sensitivity%</p> <p>Specificity%</p> <p>PPV%</p> <p>NPV%</p>	No conflicts of interests reported	High (all outcomes)
Struijs, 2005	<p>N at baseline: 57 total, 114 elbows; 57 LET</p> <p>Mean age of 57 LET patients: 45.5y (SD 12.8)</p> <p>Symptom duration: 17 weeks (SD 11.3)</p>	<p>Index test (cut-off point(s)): Gray scale USI</p> <p>Reference test (cut-off point(s)): local tenderness during palpation of the common extensor origin and Cozen's test</p>	NA	<p>Sensitivity%</p> <p>Specificity%</p> <p>PPV%</p> <p>NPV%</p>	<p>This study was partly funded by Bauerfeind, manufacturer of orthotic devices</p> <p>No other conflicts of interests reported</p>	High (all outcomes)
Toprak, 2012	<p>N at baseline: 224 total, 408 elbows; 164 LET 80 controls</p> <p>Mean age of 164 LET patients: 43y Mean age of 80 controls: 39y</p>	<p>Index test (cut-off point(s)): Gray scale Doppler USI</p> <p>Reference test (cut-off point(s)): local tenderness during palpation of the common extensor origin and Cozen's test</p>	NA	<p>Sensitivity%</p> <p>Specificity%</p> <p>PPV%</p> <p>NPV%</p>	No conflicts of interests reported	High (all outcomes)
Zeisig, 2006	<p>N at baseline: 28 total, 44 elbows; 17 LET 11 controls</p> <p>Mean age of 17 LET patients: 45y</p> <p>Symptom duration: 18 months</p>	<p>Index test (cut-off point(s)): Gray scale Doppler USI</p> <p>Reference test (cut-off point(s)): local tenderness during palpation of the common extensor origin and Cozen's test</p>	NA	<p>Sensitivity%</p> <p>Specificity%</p> <p>PPV%</p> <p>NPV%</p>	No conflicts of interests reported	High (all outcomes)

Medial epicondylar tendinopathy (MET)
No studies included

5 *For further details, see risk of bias table in the appendix

Results

LET

MRI

10 Four studies – included in the review of Karanasios (2022) – compared MRI with a
 combination of physical examination tests as a reference standard (Mackay, 2003;
 Steinborn, 1999; Van Kollenburg, 2009; Walton, 2011). The studies either detected a form of
 tendon thickening or signal intensity changes. All studies used local tenderness during
 15 palpation of the common extensor origin and Cozen’s test. Additive to these tests, two
 studies used the Mill’s test as reference standard (Mackay, 2003; Van Kollenburg, 2009), one
 study used the resisted supination test (Steinborn, 1999), and one study the Maudsley test
 (Walton, 2011). One additional study examined different MRI signal intensity changes
 (Steinborn, 1999). The results of diagnostic accuracy of MRI in the diagnosis of LET are
 20 shown in Table 4 below.

The diagnostic accuracy for tendon thickening ranged between 83% and 100% (sensitivity)
 and between 65% and 94% (specificity). The PPV and NPV were reported moderate to very
 high. Results for signal intensity changes showed a moderate to very high sensitivity and a
 25 low to high specificity. The PPV varied between 76% and 84% and the NPV was reported 68%
 and 92%.

Table 4. Diagnostic accuracy of MRI as index test in LET

Study (year)	Index test (entity)	Sensitivity % (95% CI)	Specificity % (95% CI)	PPV % (95% CI)	NPV % (95% CI)
Tendon thickening					
Mackay, 2003	Oedema	100 (85.2-100)	64.7 (38.3-85.8)	79.3 (66.8-87.9)	100
Mackay, 2003	Tendon thickening	82.61 (61.2-95)	94.1 (71.3-99.8)	95 (73.8-99.2)	80 (62-90.7)
Walton, 2011	Tendinosis	86	NA	NA	NA
Van Kollenburg, 2009	Enthesopathy	100 (85.7-100)	81.2 (67.4-91)	72.7 (59.7-82.8)	100
Signal intensity changes					
Steinborn, 1999	Signal intensity changes ^a	96.6 (78.0-99.9)	61.1 (35.7-82.7)	75.8 (63.6-84.9)	91.6 (60.9-98.7)
Steinborn, 1999	Signal intensity changes ^b	69.6 (47.1-86.8)	83.3 (58.6-96.4)	84.2 (64.7-93.9)	68.2 (52.8-80.4)

^a Refers to study results using T1-weighted spin-echo sequences in axial and coronal slice orientation

30 ^b Refers to study results using T2-weighted spin-echo sequences in axial and coronal slice orientation

Gray-scale (Doppler) ultrasound imaging

In total, 10 studies – included in the review of Karanasios (2022) – compared the diagnostic
 accuracy of tendon thickening and signal intensity changes by using Gray-scale (Doppler)
 35 ultrasound imaging as index test, with a combination of physical examination tests as a
 reference standard (Dones, 2014; du Toit, 2008; Heales, 2014; Khoury and Cardinal, 2009;

5 Lee, 2011; Toprak, 2014; Noh, 2010; Struijs, 2005; Zeisig, 2006, Obradov and Anderson,
2012). Most studies used local tenderness during palpation of the common extensor origin
and Cozen's test as reference standard (du Toit, 2008; Heales, 2014; Toprak, 2012; Noh,
2010; Struijs, 2005; Zeisig, 2006). Additive to these tests, some studies used gripping (du
10 Toit, 2008; Heales, 2014) and the Maudsley test (Heales, 2014). The study of Dones (2014a)
used either the Cozen's test, the Mill's test or the Maudsley test and the study of Obradov
and Anderson (2012) used the test in which pain in the lateral epicondyle was provoked by
using a U/S probe and the Cozen's test as reference standard. Two studies did not clarify
which combination of tests were used (Khoury and Cardinal, 2009; Lee, 2011). The results of
15 diagnostic accuracy of Gray-scale (Doppler) ultrasound imaging in the diagnosis of LET are
shown in Table 5 below.

The diagnostic accuracy for tendon thickening ranged from 13% to 100% (sensitivity) and
from 52% to 100% (specificity). The PPV was reported low to very high and the NPV showed
20 results that varied between 47% and 88%. Results for signal intensity changes showed a low
to very high sensitivity and specificity. The PPV varied between 47% and 100% and the NPV
ranged between 46% and 100%.

5 **Table 5.** Diagnostic accuracy of hypoechogenicity, tendon thickening, and tear by using Gray-scale (Doppler) ultrasound imaging as and index test in LET

Study (year)	Entity	Sensitivity % (95% CI)	Specificity % (95% CI)	PPV % (95% CI)	NPV % (95% CI)
Tendon thickening					
Dones, 2014a ^a	Thickening	13 (4-31)	100 (85-100)	100 (44-100)	50 (36-64)
Dones, 2014a ^b	Thickening	13 (5-29)	96 (80-100)	80 (38-96)	47 (34-61)
du Toit, 2008	Thickening	72 (50-90)	52 (30-80)	59 (40-90)	67 (40-90)
Heales, 2014	Thickening	70 (52-83)	67 (49-81)	68 (49-83)	69 (49-84)
Khoury and Cardinal, 2009	Thickening	100 (63-100)	NA	NA	NA
Lee, 2011	Thickening	86 (74-94)	83 (71-91)	80 (70-87)	88 (79-94)
Toprak, 2014	Thickening	38 (32-44.2)	85 (78-90.1)	80 (72-85)	47 (44-50)
Signal intensity changes					
Dones, 2014a ^a	Hypoechogenicity	67 (46-82)	38 (21-60)	55 (38-72)	50 (18-72)
Dones, 2014a ^b	Hypoechogenicity	81 (64-91)	64 (45-80)	74 (57-85)	73 (52-87)
du Toit, 2008	Hypoechogenicity	53 (30-70)	89 (80-100)	74 (50-90)	77 (60-90)
Heales, 2014	Hypoechogenicity	53 (36-70)	60 (42-75)	47 (30-65)	46 (27-66)
Khoury and Cardinal, 2009	Hypoechogenicity	100 (63-100)	NA	NA	NA
Lee, 2011	Hypoechogenicity	35 (22-50)	94 (85-98)	82 (62-93)	64 (59-69)
Noh, 2010	Hypoechogenicity	59.3 (38.8-77.6)	85.2 (66.3-95.8)	80 (60.6-91.2)	67.6 (56.4-77.2)
Struijs, 2005	Hypoechogenicity	67 (53-79)	80.7 (68.1-89.9)	77 (66-85.8)	71 (62-78)
Zeisig, 2006	Hypoechogenicity	100 (84.5-100)	100 (84.5-100)	100	100
Obradov and Anderson, 2012	Hypoechogenicity	86 (73-93)	100 (72-100)	100	59 (36-78)

^a study results refer to patients with symptoms duration <6 weeks

^b study results refer to patients with symptoms duration >6 weeks

10 MET

Results are not reported, because no studies for MET were included.

Conclusion

LET

15 1a. MRI vs physical examination tests – tendon thickening

Sensitivity (crucial), specificity (important), PPV (crucial), NPV (important)

The level of evidence for the outcomes **sensitivity, specificity and PPV** was downgraded by three levels due to limitations in study design (problems with patient selection, -1 RoB) and wide 95% confidence intervals (CIs) (-2 imprecision). The final level of evidence was graded

20 'very low'.

Very low GRADE	<p>The evidence about the reported sensitivity, specificity and PPV for tendon thickening detected using MRI is very uncertain in adults suspected of lateral epicondylar tendinopathy.</p> <p><i>Sources: (Mackay, 2003; van Kollenburg, 2009 (retrieved from review of Karanasios, 2022))</i></p>
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The level of evidence for the outcome **NPV** was downgraded by two levels due to wide 95% CIs (-2 imprecision). The final level of evidence was graded 'low'.

Low GRADE	<p>There is little confidence in the reported NPV for tendon thickening detected using MRI in adults suspected of lateral epicondylar tendinopathy.</p> <p><i>Sources: Mackay, 2003 (retrieved from review of Karanasios, 2022))</i></p>
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1b. MRI vs physical examination tests – Signal intensity changes

The level of evidence for the outcomes **sensitivity, specificity, PPV and NPV** was downgraded by three levels due to limitations in study design (problems with patient selection and flow and timing, -1 RoB) and wide 95% confidence intervals (CIs) (-2 imprecision). The final level of evidence was graded 'very low'.

15

Very low GRADE	<p>The evidence about the reported sensitivity, specificity, PPV and NPV for signal intensity changes detected using MRI is very uncertain in adults suspected of lateral epicondylar tendinopathy.</p> <p><i>Sources: (Steinborn, 1999 (retrieved from review Karanasios, 2022))</i></p>
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2a. Gray-scale (Doppler) ultrasound imaging vs. physical examination tests – tendon thickening

20

Sensitivity (crucial), specificity (important), PPV (crucial), NPV (important)

The level of evidence for the outcome **sensitivity** was downgraded by three levels due to limitations in study design (problems with patient selection and index test, -1 RoB), no overlap in 95% CIs (-1 inconsistency), and wide 95% CIs (-1 imprecision). The final level of evidence was graded 'very low'.

25

Very low GRADE	<p>The evidence about the reported sensitivity of Gray-scale Doppler ultrasound imaging for detection of tendon thickening is very uncertain in adults suspected of lateral epicondylar tendinopathy.</p> <p><i>Sources: (Dones, 2014; du Toit, 2008; Heales, 2014; Khoury and Cardinal, 2009; Lee, 2011; Toprak, 2014 (retrieved from review of Karanasios, 2022))</i></p>
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- 5 The level of evidence for the outcomes **specificity, PPV and NPV** was downgraded by three levels due to limitations in study design (problems with patient selection and index test, -1 RoB) and wide 95% CIs (-2 imprecision). The final level of evidence was graded 'very low'.

Very low GRADE	<p>The evidence about the reported specificity, PPV and NPV of Gray-scale Doppler ultrasound imaging for detection of tendon thickening is very uncertain in adults suspected of lateral epicondylar tendinopathy.</p> <p>Sources: (Dones, 2014; du Toit, 2008; Heales, 2014; Khoury and Cardinal, 2009; Lee, 2011; Noh, 2010; Struijs, 2005; Zeisig, 2006; Obradov and Anderson, 2012; Toprak, 2014; Tarhan, 2009 (retrieved from review of Karanasios, 2022))</p>
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10

2b. Gray-scale (Doppler) ultrasound imaging vs. physical examination tests - Signal intensity changes

The level of evidence for the outcomes **sensitivity, specificity, PPV and NPV** was downgraded by three levels due to limitations in study design (problems with patient selection, index test, and flow and timing, -1 RoB) and wide 95% CIs (-2 imprecision). The final level of evidence was graded 'very low'.

15

Very low GRADE	<p>The evidence about the reported sensitivity, specificity, PPV and NPV of Gray-scale Doppler ultrasound imaging for detection of signal intensity changes is very uncertain in adults suspected of lateral epicondylar tendinopathy.</p> <p>Sources: (Dones, 2014; du Toit, 2008; Heales, 2014; Khoury and Cardinal, 2009; Lee, 2011; Noh, 2010; Struijs, 2005; Zeisig, 2006; Obradov and Anderson, 2012 (retrieved from review of Karanasios, 2022))</p>
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Overwegingen – van bewijs naar aanbeveling (NL)

20

Balans tussen gewenste en ongewenste effecten

Er is systematisch literatuuronderzoek verricht naar de diagnostische accuratesse van beeldvormingstechnieken vergeleken met verschillende typen lichamelijke onderzoeken als referentietest (gouden standaard) om de diagnose laterale epicondylaire tendinopathie (LET) of mediale epicondylaire tendinopathie (MET) te stellen. Er is hierbij specifiek literatuur over MRI en echografie geselecteerd, omdat deze technieken in de Nederlandse praktijk het vaakst worden toegepast t.o.v. andere nog minder frequent gebruikte modaliteiten (bijv. elastografie) voor het diagnosticeren van LET of MET. Het doel van dit literatuuronderzoek was het nut van MRI en echografie als aanvullend onderzoek bij een klinische diagnose LET en MET onderzoeken. De diagnostische accuratesse van MRI en echografie voor het correct diagnosticeren van LET of MET is ook geanalyseerd.

25

30

Er is een systematisch review geselecteerd dat over verschillende beeldvormingstechnieken gaat, maar waarvan alleen MRI en echografie relevant bleken. De vergelijking is gemaakt met verschillende lichamelijke onderzoeken als referentiestandaard.

35

1a: MRI (peesverdikking) vs. lichamelijk onderzoek als referentietest

5 De cruciale uitkomstmaten sensitiviteit en positief voorspellende waarde (PVW) van het
aantonen van een peesverdikking lopen respectievelijk uiteen van hoog tot heel hoog, en
van gemiddeld tot heel hoog. De belangrijke uitkomstmaat specificiteit loopt uiteen van laag
tot heel hoog en de negatief voorspellende waarde (NVW) loopt uiteen van gemiddeld tot
heel hoog.

10

Vergelijking 1b: MRI (signaalveranderingen) vs. lichamelijk onderzoek als referentietest

De cruciale uitkomstmaten sensitiviteit en PVW van het aantonen van signaalveranderingen
lopen respectievelijk van gemiddeld tot heel hoog, en van gemiddeld tot hoog. De
belangrijke uitkomstmaten specificiteit en NVW lopen respectievelijk uiteen van laag tot
15 hoog en van gemiddeld tot heel hoog.

Vergelijking 2a: Echografie (peesverdikking) vs. lichamelijk onderzoek als referentietest

De cruciale uitkomstmaten sensitiviteit en PVW van het aantonen van een peesverdikking
lopen beide uiteen van laag tot heel hoog. De belangrijke uitkomstmaten specificiteit en
20 NVW lopen respectievelijk uiteen van laag tot heel hoog en van laag tot hoog. Eén studie
rapporteerde alleen de sensitiviteit (Khoury and Cardinal, 2009).

Vergelijking 2b: Echografie (hypoechoogeniciteit) vs. lichamelijk onderzoek als referentietest

De cruciale uitkomstmaten sensitiviteit en PVW van het aantonen van een hypo-
25 echogeniciteit lopen beide uiteen van laag tot heel hoog. Hetzelfde geldt voor de belangrijke
uitkomstmaten specificiteit en NVW. Eén studie rapporteerde alleen de sensitiviteit (Khoury
and Cardinal, 2009).

30 Voor alle vier de vergelijkingen werden klinische uitkomsten niet gerapporteerd. Er werden
geen studies gevonden over beeldvormingstechnieken in individuen met een verdenking op
MET.

35 Naast de welbekende beeldvormende onderzoeken MRI en echografie worden ook andere
onderzoeken in de literatuur besproken en onderzocht. Een voorbeeld daarvan is shear
wave en strain elastografie, waarbij kwantitatieve informatie wordt verkregen over de
structuur van het weefsel. Voor deze technieken dient aanvullende software aangeschaft te
worden op de echo apparatuur. Dit brengt extra kosten met zich mee en is niet op grote
schaal beschikbaar in Nederland. Om deze reden wordt dit onderzoek niet besproken in
40 deze richtlijn.

MRI vs. lichamelijk onderzoek

Scheur

Een peesverdikking en signaalintensiteitsveranderingen op de MRI zijn de belangrijkste
kenmerken om te beoordelen of een patiënt LET of MET heeft. Naast deze kenmerken kan
45 ook gekeken worden of iemand een scheur heeft. In de studie van Karanasios (2022) was de
sensitiviteit van een MRI voor een scheur laag, terwijl de specificiteit juist heel hoog was. De
PVW varieerde tussen de 78% en 100% en de NVW varieerde tussen laag en hoog. Zie ook
tabel 6 hieronder. MRI is dus beperkt bruikbaar bij het uitsluiten van LET of MET (door de
lage sensitiviteit), maar als op de MRI een scheur te zien is, ondersteunt dat sterk de
50 diagnose LET of MET (door de hoge specificiteit).

Tabel 6. Diagnostische accurratess van MRI als index test in LET voor het beoordelen van een scheur

Study (year)	Entity	Sensitivity % (95% CI)	Specificity % (95% CI)	PPV % (95% CI)	NPV % (95% CI)
Mackay, 2003	Tear	56.5 (34.5-76.8)	100 (80.5-100)	100	63 (51.6-73)

Van Kollenburg, 2009	Tear	58.3 (36.6-77.9)	91.7 (80-97.9)	77.8 (56.3-90.5)	81.5 (73.1-87.7)
Walton, 2011	Tear	57	NA	NA	NA

5

Echografie vs. lichamelijk onderzoek

Scheur

10 Ook op een echo kan een scheur worden waargenomen. In totaal rapporteerden zes studies opgenomen door het systematische review van Karanasios (2022), resultaten over een scheur. De resultaten met betrekking tot de diagnostische nauwkeurigheid van een echo bij de diagnose LET worden weergegeven in Tabel 7 hieronder. De resultaten laten zien dat er

15 weinig tot geen variatie in de gerapporteerde diagnostische accuratesse is. De sensitiviteit is laag en de specificiteit juist heel hoog. Ook de PVW is heel hoog, de NVW is laag. Door de lage sensitiviteit is echografie dus beperkt bruikbaar bij het uitsluiten van LET of MET. Maar als de echo afwijkingen laat zien, ondersteunt dat sterk de diagnose LET of MET door een hoge specificiteit. Een zeer hoge PVW betekent dat echografie voor het aantonen van een scheur zeer betrouwbaar is, wanneer de test positief is. De lage NVW betekent dat een negatief testresultaat niet betrouwbaar is. Met andere woorden: wanneer echografie geen

20 scheur aantoont, kan het nog steeds zijn dat de patiënt LET of MET heeft.

Tabel 7. Diagnostische accuratesse van echografie als index test in LET voor het beoordelen van een scheur

Studie (jaar)	Entiteit	Sensitiviteit % (95% CI)	Specificiteit % (95% CI)	PVW % (95% CI)	NVW % (95% CI)
Dones, 2014a ^a	Scheur	4 (1-20)	100 (85-100)	100 (21-100)	48 (34-62)
Dones, 2014a ^b	Scheur	3 (1-16)	100 (87-100)	100 (21-100)	45 (33-58)
Heales, 2014	Scheur	43 (27-61)	100 (89-100)	100 (72-100)	64 (48-77)
Khoury en Cardinal, 2009	Scheur	38 (9-76)	NA	NA	NA
Toprak, 2014	Scheur	35 (29-41.3)	100 (98-100)	100	50 (48-52.1)
Obradov en Anderson, 2012	Scheur	14 (8-27)	100 (72-100)	100 (63-100)	19 (11-32)
Tarhan, 2009	Scheur	9.6	NA	NA	NA

^a Resultaten verwijzen naar patiënten met symptomen <6 weken

^b Resultaten verwijzen naar patiënten met symptomen >6 weken

25

Verkalking, corticale onregelmatigheden en neovascularisatie

Naast een scheur, worden eventuele verkalkingen, corticale onregelmatigheden en neovascularisatie ook beoordeeld op de echo voor LET. In totaal vergeleken negen studies, opgenomen door de review van Karanasios (2022), de diagnostische accuratesse van

30 verkalkingen, corticale onregelmatigheden en neovascularisatie, waarbij gebruik werd gemaakt van echografie als index test en een combinatie van lichamelijke onderzoeken als referentiestandaard. De resultaten met betrekking tot de diagnostische nauwkeurigheid van echografie bij de diagnose LET worden weergegeven in Tabel 8 hieronder.

35

De sensitiviteit voor een verkalking werd als laag gerapporteerd (5–42%), terwijl de specificiteit als hoog tot zeer hoog werd gerapporteerd (83–100%). Voor corticale onregelmatigheden werd eveneens een lage sensitiviteit gevonden (18–63%) en de specificiteit varieerde van laag tot zeer hoog (63–100%). De resultaten voor

- 5 neovascularisatie toonden een sensitiviteit die varieerde van laag tot zeer hoog (8–95,4%) en een specificiteit van matig tot zeer hoog (77–100%). De PVW voor een verkalking varieerde van laag tot zeer hoog (29–100%), maar de NVW werd uitsluitend als laag gerapporteerd (23–58%). De PVW voor corticale onregelmatigheden lag tussen 49% en 100%, en de NPV tussen 20% en 75%. De resultaten voor neovascularisatie lieten een matige tot zeer hoge PVW en een lage tot zeer hoge NVW zien. De grote variatie in PVW en NVW voor de verschillende entiteiten geeft aan dat de betrouwbaarheid van een positieve echografie sterk varieert.

15 **Tabel 8. Diagnostische accuratesse van verkalkingen, corticale onregelmatigheden en neovascularisatie gebruikmakend van echografie als index test bij patiënten met verdenking op LET**

Studie (jaar)	Entiteit	Sensitiviteit % (95% CI)	Specificiteit % (95% CI)	PVW % (95% CI)	NVW % (95% CI)
Dones, 2014a ^a	Verkalking	42 (24-61)	90 (71-97)	83 (55-95)	58 (41-73)
Dones, 2014a ^b	Verkalking	39 (24-56)	92 (75-98)	86 (60-96)	55 (40-69)
Heales, 2014	Verkalking	7 (2-21)	83 (66-93)	29 (5-70)	47 (34-61)
Lee, 2011	Verkalking	5.9 (1.2-16.3)	95 (87-99)	50 (17-83)	56 (54-58)
Struijs, 2005	Verkalking	5 (1.1-14.6)	100 (93.7-100)	100	51 (49.8-52.9)
Toprak, 2014	Verkalking	31 (25.3-37.2)	99 (95-100)	97 (90-99)	48 (46-50)
Obradov en Anderson, 2012	Verkalking	33 (21-47)	100 (72-100)	100 (80-100)	23 (13-34)
Tarhan, 2009	Verkalking	9.6	NA	NA	NA
Dones, 2014a ^a	Corticale onregelmatigheden	30 (15-50)	81 (60-92)	64 (35-85)	50 (34-66)
Dones, 2014a ^b	Corticale onregelmatigheden	23 (11-40)	76 (57-89)	54 (29-77)	44 (30-49)
du Toit, 2008	Corticale onregelmatigheden	63 (40-80)	63 (50-80)	49 (30-60)	75 (60-90)
Lee, 2011	Corticale onregelmatigheden	18 (8-30)	95 (87-99)	75 (46-91)	59 (55-62)
Toprak, 2014	Corticale onregelmatigheden	55 (48.4-61.1)	91 (86-95)	90.7 (85-94)	57 (53-60)
Obradov en Anderson, 2012	Corticale onregelmatigheden	18 (10-11)	100 (72-100)	100 (69-100)	20 (11-33)
Dones, 2014a ^a	Neovascularisatie	8 (2-26)	95 (77-100)	67 (21-94)	48 (33-62)
Dones, 2014a ^b	Neovascularisatie	16 (7-33)	92 (75-98)	71 (36-92)	47 (34-61)
du Toit, 2008	Neovascularisatie	81 (60-90)	98 (90-100)	96 (60-90)	90 (80-100)
Heales, 2014	Neovascularisatie	63 (45-78)	77 (59-88)	73 (52-88)	68 (49-82)
Zeisig, 2006	Neovascularisatie	95.4 (77-99.8)	91 (71-99)	91.3 (74-97.5)	95.2 (75-99.3)
Obradov en Anderson, 2012	Neovascularisatie	57 (43-70)	100 (72-100)	100 (96-100)	32 (19-50)

^a Resultaten verwijzen naar patiënten met symptomen <6 weken

5 ^b Resultaten verwijzen naar patiënten met symptomen >6 weken

Kwaliteit van bewijs

Hieronder wordt per vergelijking de kwaliteit van bewijs beschreven.

10 *Vergelijking 1a: MRI (peesverdikking) vs. lichamelijk onderzoek als referentietest*
De overall kwaliteit van bewijs is zeer laag. Dit betekent dat we zeer onzeker zijn over wat de gevonden geschatte diagnostische accuratesse van de cruciale uitkomstmaten sensitiviteit en PVW van MRI is t.o.v. lichamelijk onderzoek voor het aantonen van een peesverdikking bij individuen met klachten van laterale epicondylaire tendinopathie.

15

Er is afgewaardeerd vanwege:

Ernstige risk of bias: methodologische beperkingen (door gebruik van het case-control design).

20

Zeer ernstige imprecisie: onnauwkeurigheid, omdat het betrouwbaarheidsinterval (BI) meerdere grenzen overschrijdt.

Vergelijking 1b: MRI (signaalveranderingen) vs. lichamelijk onderzoek als referentietest

25 De overall kwaliteit van bewijs is zeer laag. Dit betekent dat we zeer onzeker zijn over wat de gevonden geschatte diagnostische accuratesse van de cruciale uitkomstmaten sensitiviteit en PVW van MRI is t.o.v. lichamelijk onderzoek voor het aantonen van signaalveranderingen bij individuen met klachten van laterale epicondylaire tendinopathie.

Er is afgewaardeerd vanwege:

30

Ernstige risk of bias: methodologische beperkingen (door gebruik van het case-control design en problemen met flow en timing).

Zeer ernstige imprecisie: onnauwkeurigheid, omdat het BI voor het detecteren van signaalveranderingen in de elleboog meerdere grenzen overschrijdt.

Vergelijking 2a: Echografie (peesverdikking) vs. lichamelijk onderzoek als referentietest

35 De overall kwaliteit van bewijs is zeer laag. Dit betekent dat we zeer onzeker zijn wat de gevonden geschatte diagnostische accuratesse van de cruciale uitkomstmaten sensitiviteit en PVW echografie is t.o.v. lichamelijk onderzoek voor het aantonen van een peesverdikking bij individuen met klachten van laterale epicondylaire tendinopathie.

40

Er is afgewaardeerd vanwege:

Ernstige risk of bias: methodologische beperkingen (door gebruik van het case-control design en problemen met de index test).

45

Ernstige inconsistentie: geen overlap in 95% BI van de volgende studies: Dones (2014a) en Toprak (2014) enerzijds en Du Toit (2008), Heales (2014) en Khoury and Cardinal (2009) anderszijds.

Ernstige imprecisie: onnauwkeurigheid, omdat het BI voor het detecteren van peesverdikking in de elleboog meerdere grenzen overschrijdt.

Vergelijking 2b: Echografie (hypoechoogeniciteit) vs. lichamelijk onderzoek als referentietest

50 De overall kwaliteit van bewijs is zeer laag. Dit betekent dat we zeer onzeker zijn over de gevonden geschatte diagnostische accuratesse van de cruciale uitkomstmaten sensitiviteit en PVW voor het detecteren van hypoechoogeniciteit in de elleboog.

Er is afgewaardeerd vanwege:

55

Ernstige risk of bias: methodologische beperkingen (problemen met selectie van patiënten, problemen met de index test en problemen met flow en timing)

5 Zeer ernstige imprecisie: onnauwkeurigheid, omdat het BI voor het detecteren van hypoechogeniciteit in de elleboog meerdere grenzen overschrijdt.

Waarden en voorkeuren van patiënten (en eventueel hun naasten/verzorgers)

10 Aanvullende beeldvorming middels echografie dan wel MRI kan de diagnose LET dan wel MET ondersteunen. Echter is het klinisch onderzoek leidend voor de diagnose, omdat er ook asymptomatische afwijkingen bij het aanvullend onderzoek gevonden kunnen worden. Indien het lichamelijk onderzoek al conclusief genoeg is over de diagnose, is aanvullend beeldvormend onderzoek niet zinvol. Onnodig beeldvorming vervaardigen zorgt voor een onnodige belasting van de patiënt.

15

Kostenaspecten

De indextest (MRI en echografie) is duurder dan de referentietest (lichamelijk onderzoek). Dit weegt niet op tegen het verschil in accuratesse. MRI is een kostbaar onderzoek, zowel qua prijs als de beschikbaarheid. Echografie is in vergelijking met MRI goedkoper en toegankelijker. Gezien de accuratesse van de anamnese en het lichamelijk onderzoek is aanvullende beeldvorming derhalve niet aan te bevelen.

20

Gelijkheid ((health) equity/equitable)

25 Het aanvragen van beeldvormend onderzoek (MRI of echografie) leidt niet tot gezondheidsongelijkheid. Deze beeldvorming wordt vergoed vanuit de basisverzekering (met uitzondering van het eigen risico).

25

Aanvaardbaarheid

Ethische aanvaardbaarheid

30 De diagnostiek lijkt aanvaardbaar voor de betrokkenen. Er zijn geen ethische bezwaren voor het aanvragen en ondergaan van aanvullende beeldvorming.

30

Duurzaamheid

35 Bij MRI en echografie spelen de volgende duurzaamheidsaspecten een rol. Patiënten dienen voor het aanvullend onderzoek een extra bezoek aan het ziekenhuis af te leggen. Daarnaast vergt het gebruik van apparatuur en de opslag van de afbeeldingen die daarbij vervaardigd worden energie. Dit alles zorgt voor meer CO₂ uitstoot. Bij lichamelijk onderzoek ten tijde van het polibezoek spelen bovenstaande duurzaamheidsaspecten geen rol.

35

Haalbaarheid

40 De diagnostiek lijkt haalbaar gezien dit niet standaard hoeft te worden vervaardigd.

40

Aanbevelingen

Rationale van de aanbeveling: weging van argumenten voor en tegen de indextest

45 Er is onvoldoende bewijs dat beeldvormend onderzoek (MRI en echografie) noodzakelijk is voor de diagnostiek van LET of MET. Lichamelijk onderzoek is voldoende om een LET of MET te diagnosticeren. Rekening houdend met de beschikbaarheid van aanvullend beeldvormend onderzoek, kosten en duurzaamheid, wordt het derhalve niet aanbevolen om routinematig beeldvorming te verrichten bij verdenking op LET of MET. Indien het lichamelijk onderzoek
50 inconclusief is en een diagnose gewenst is, kan aanvullend beeldvormend onderzoek worden overwogen.

50

Eindoordeel:

55 Zwakke aanbeveling tegen het doen van beeldvormend onderzoek.

55

Laat je leiden door resultaten van lichamelijk onderzoek bij verdenking op een laterale of mediale epicondylaire tendinopathie.

Vermijd beeldvormend onderzoek (MRI of echo) als onderdeel van de primaire diagnostiek voor een laterale of mediale epicondylaire tendinopathie.

Overweeg aanvullend beeldvormend onderzoek door de behandelaar indien het lichamelijk onderzoek niet conclusief is.

5

Kennisvragen

Tijdens de ontwikkeling van deze module is systematisch naar onderzoeken gezocht die de zoekvraag kunnen beantwoorden. Door gebruik te maken van een systematische literatuuranalyse met beoordeling van de bewijskracht is duidelijk geworden dat er binnen deze module nog kennisvragen bestaan. De werkgroep meent dat (vervolg)onderzoek wenselijk is om in de toekomst een duidelijker antwoord te kunnen geven op vragen uit de praktijk.

10

Kennisvraag:

15

Wat is de prognostische waarde van beeldvorming (UTC) voor het beoordelen van de structuur van een pees in patiënten met verdenking op een tennisarm of golfarm?

Toelichting:

20

Het is momenteel onvoldoende duidelijk of dmv UTC kan worden voorspeld of iemand een tennisarm of golfarm zal ontwikkelen.

Implementatieplan

Implementatietabel

Vraag	Antwoord: Kruis aan en licht toe/ beschrijf	Toelichting keuze:
I1. Wat was het onderliggende probleem om deze uitgangsvraag uit te werken?	Ongewenste praktijkvariatie	
	Nieuwe evidentie	
	X Anders	Beeldvorming als aanvulling op het lichamelijk onderzoek biedt extra informatie, maar wordt bij verdenking op LET eigenlijk nooit gebruikt. Om onnodige medische kosten te vermijden, is het daarom belangrijk om de precieze rol van beeldvorming bij het stellen van de diagnose LET te bepalen.
I2. Maak een inschatting over hoeveel patiënten het ongeveer gaat waar de aanbeveling betrekking op heeft?	< 1000	
	X < 5000	
	5000-40.000	

		> 40.000	
13. Is de aanbeveling onderdeel van een bredere set interventies of verwant aan andere richtlijnen of modules? Zo ja, hoe verhoudt zij zich daartoe en moet hiermee rekening worden gehouden bij de implementatie, of kan de aanbeveling als losstaand worden beschouwd?		Ja	
	X	Nee	
14. Belemmeringen en kansen op verschillende niveaus voor landelijke toepassing van de aanbeveling:		Belemmerende factoren	
		Bevorderende factoren/ kansen	
Richtlijn/ klinisch traject (innovatie)	X	Aanbeveling is simpel geformuleerd en makkelijk op te volgen in de praktijk	
Zorgverleners (artsen en verpleegkundigen)	X	Aanbeveling is al standaardzorg in de praktijk en daardoor voor artsen gemakkelijk uit te voeren	
Patiënt/ cliënt (naasten)	X	Een patiënt wil misschien wel beeldvorming eerder in het proces als behandelingen niet effectief blijken	
Sociale context			
Organisatorische context	X	De aanbeveling sluit aan bij de beperkte MRI-capaciteit	
Financiële en juridische context			
15. A) Welke personen/partijen zijn van belang bij het toepassen van de aanbeveling in de praktijk? (kruis aan) B) Wat is er nodig van deze personen/partijen om de aanbeveling in de praktijk te kunnen brengen? Denk aan aanpassingen in gedrag, werkwijzen, beleid, samenwerking of andere randvoorwaarden.		A	
		B	
	X	Patiënt/ cliënt (naaste)	Goede uitleg dat beeldvormingsonderzoek niet standaard nodig is voor de diagnose LET of MET.
	X	Professional	
	X	Beroepsvereniging, nl	Verspreiding van de richtlijn onder de beroepsgroep
		Ziekenhuis (raad van bestuur/UMCNL (voorheen NFU)/NVZ)	
		Zorgverzekeraars/ NZa	
	Zorginstituut [duiding nodig]		

		Anders	
16. Binnen welk tijdsbestek moet de aanbeveling zijn geïmplementeerd?	X	< 1 jaar	Aanbeveling is al standaardzorg, dus binnen 1 jaar is haalbaar
		binnen 2-3 jaar	
17. Conclusie: is er extra actie en/of ondersteuning nodig voor implementatie van de aanbeveling? <i>De reguliere implementieroutes (publicatie en disseminatie via officiële kanalen, opname in professionele standaarden, scholing en nascholing, gebruik van bestaande ICT systemen, audits en visitaties) van de richtlijnmodule alleen is onvoldoende.</i>		Ja	
	X	Nee	Reguliere implementatie is voldoende doordat de aanbeveling al standaardzorg is in de praktijk
18. Plaatsing op de Landelijke Implementatieagenda Medisch Specialistische zorg is gewenst. Het gaat om zorg die (grotendeels) wordt uitgevoerd binnen de ziekenhuismuren. Succesvolle implementatie vraagt om actieve betrokkenheid en samenwerking van meerdere relevante partijen binnen de zorgpraktijk.		Ja *	
	X	Nee	Aanbeveling is al standaardzorg in de praktijk

5

**Deze aanbeveling komt mogelijk in aanmerking voor plaatsing op de Landelijke Implementatieagenda van het programma Zorg Evaluatie & Gepast Gebruik (ZE&GG), waarin alle betrokken partijen in de medisch-specialistische zorg samenwerken aan de implementatie van bewezen beste zorg. De Federatie levert namens het veld goed onderbouwde aanbevelingen aan, die zijn getoetst op de behoefte aan een implementatie-impuls. De onderwerpen op de Implementatieagenda zijn onderdeel van landelijke zorginkoopafspraken tussen zorgverzekeraars en zorgaanbieders. Voor de beoordeling van aanbevelingen uit richtlijnen wordt gebruikgemaakt van de implementatietabel. Op basis hiervan kunnen we de andere partijen goed informeren en gezamenlijk besluiten of plaatsing op de Implementatieagenda passend is.*

10

15 Literatuur

In literature analysis

Karanasios S, Korakakis V, Moutzouri M, Drakonaki E, Koci K, Pantazopoulou V, Tsepis E, Gioftsos G. Diagnostic accuracy of examination tests for lateral elbow tendinopathy (LET) - A systematic review. *J Hand Ther.* 2022 Oct-Dec;35(4):541-551. doi: 10.1016/j.jht.2021.02.002. Epub 2021 Feb 27. PMID: 33814224.

20

5 Bijlagen bij module Beeldvorming

Risk of Bias table diagnostic accuracy studies (QUADAS II, 2011)

Study reference	Patient selection	Index test	Reference standard	Flow and timing	Comments with respect to applicability
Mackay, 2003 (from review Karanasios, 2022)	<p><u>Was a consecutive or random sample of patients enrolled?</u> Yes</p> <p><u>Was a case-control design avoided?</u> Yes</p> <p><u>Did the study avoid inappropriate exclusions?</u> Yes</p>	<p><u>Were the index test results interpreted without knowledge of the results of the reference standard?</u> Yes, each scan was read independently by three consultant radiologists, blinded to the clinical findings</p> <p><u>If a threshold was used, was it pre-specified?</u> Unclear</p>	<p><u>Is the reference standard likely to correctly classify the target condition?</u> Yes</p> <p><u>Were the reference standard results interpreted without knowledge of the results of the index test?</u> Yes</p>	<p><u>Was there an appropriate interval between index test(s) and reference standard?</u> Unclear</p> <p><u>Did all patients receive a reference standard?</u> Yes</p> <p><u>Did patients receive the same reference standard?</u> Yes</p> <p><u>Were all patients included in the analysis?</u> Yes</p>	<p><u>Are there concerns that the included patients do not match the review question?</u> No</p> <p><u>Are there concerns that the index test, its conduct, or interpretation differ from the review question?</u> No</p> <p><u>Are there concerns that the target condition as defined by the reference standard does not match the review question?</u> No</p>
	<p>CONCLUSION: Could the selection of patients have introduced bias?</p> <p>RISK: LOW</p>	<p>CONCLUSION: Could the conduct or interpretation of the index test have introduced bias?</p> <p>RISK: UNCLEAR Reason: it is not reported whether a threshold for the diagnosis of LET was used</p>	<p>CONCLUSION: Could the reference standard, its conduct, or its interpretation have introduced bias?</p> <p>RISK: LOW</p>	<p>CONCLUSION Could the patient flow have introduced bias?</p> <p>RISK: UNCLEAR Reason: the time interval between index test and reference standard is not reported.</p>	

Study reference	Patient selection	Index test	Reference standard	Flow and timing	Comments with respect to applicability
Steinborn, 1999 (from review Karanasios, 2022)	<p><u>Was a consecutive or random sample of patients enrolled?</u> No Reason: also healthy volunteers were included</p> <p><u>Was a case-control design avoided?</u> Unclear</p> <p><u>Did the study avoid inappropriate exclusions?</u> Unclear</p>	<p><u>Were the index test results interpreted without knowledge of the results of the reference standard?</u> Unclear</p> <p><u>If a threshold was used, was it pre-specified?</u> Yes</p>	<p><u>Is the reference standard likely to correctly classify the target condition?</u> Yes</p> <p><u>Were the reference standard results interpreted without knowledge of the results of the index test?</u> Yes</p>	<p><u>Was there an appropriate interval between index test(s) and reference standard?</u> No</p> <p><u>Did all patients receive a reference standard?</u> No</p> <p><u>Did patients receive the same reference standard?</u> No</p> <p><u>Were all patients included in the analysis?</u> Yes</p>	<p><u>Are there concerns that the included patients do not match the review question?</u> No</p> <p><u>Are there concerns that the index test, its conduct, or interpretation differ from the review question?</u> No</p> <p><u>Are there concerns that the target condition as defined by the reference standard does not match the review question?</u> No</p>
	<p>CONCLUSION: Could the selection of patients have introduced bias?</p> <p>RISK: HIGH Reason: a case-control design was not avoided</p>	<p>CONCLUSION: Could the conduct or interpretation of the index test have introduced bias?</p> <p>RISK: UNCLEAR Reason: it is not reported whether index test results were interpreted without knowledge of the results of the reference standard (no information about blinding of the radiographs).</p>	<p>CONCLUSION: Could the reference standard, its conduct, or its interpretation have introduced bias?</p> <p>RISK: LOW</p>	<p>CONCLUSION Could the patient flow have introduced bias?</p> <p>RISK: HIGH Reason: no interval between index test and reference standard reported, the healthy controls did not receive a reference standard.</p>	

Study reference	Patient selection	Index test	Reference standard	Flow and timing	Comments with respect to applicability
Van Kollenburg, 2009 (from review Karanasios, 2022)	<p><u>Was a consecutive or random sample of patients enrolled?</u> Yes</p> <p><u>Was a case-control design avoided?</u> No</p> <p><u>Did the study avoid inappropriate exclusions?</u> Yes</p>	<p><u>Were the index test results interpreted without knowledge of the results of the reference standard?</u> Yes</p> <p><u>If a threshold was used, was it pre-specified?</u> Yes</p>	<p><u>Is the reference standard likely to correctly classify the target condition?</u> Yes</p> <p><u>Were the reference standard results interpreted without knowledge of the results of the index test?</u> Yes</p>	<p><u>Was there an appropriate interval between index test(s) and reference standard?</u> Unclear</p> <p><u>Did all patients receive a reference standard?</u> Yes</p> <p><u>Did patients receive the same reference standard?</u> Yes</p> <p><u>Were all patients included in the analysis?</u> Yes</p>	<p><u>Are there concerns that the included patients do not match the review question?</u> Yes</p> <p><u>Are there concerns that the index test, its conduct, or interpretation differ from the review question?</u> No</p> <p><u>Are there concerns that the target condition as defined by the reference standard does not match the review question?</u> No</p>
	<p>CONCLUSION: Could the selection of patients have introduced bias?</p> <p>RISK: HIGH Reason: a case control design was used</p>	<p>CONCLUSION: Could the conduct or interpretation of the index test have introduced bias?</p> <p>RISK: LOW</p>	<p>CONCLUSION: Could the reference standard, its conduct, or its interpretation have introduced bias?</p> <p>RISK: LOW</p>	<p>CONCLUSION Could the patient flow have introduced bias?</p> <p>RISK: UNCLEAR Reason: it is not reported whether there is a time interval used between index test and reference standard</p>	

Study reference	Patient selection	Index test	Reference standard	Flow and timing	Comments with respect to applicability
Walton, 2011 (from review Karanasios, 2022)	<p><u>Was a consecutive or random sample of patients enrolled?</u> Yes</p> <p><u>Was a case-control design avoided?</u> Yes</p> <p><u>Did the study avoid inappropriate exclusions?</u> Yes</p>	<p><u>Were the index test results interpreted without knowledge of the results of the reference standard?</u> Yes, radiologists were blinded to the results of the clinical severity tests</p> <p><u>If a threshold was used, was it pre-specified?</u> Yes</p>	<p><u>Is the reference standard likely to correctly classify the target condition?</u> Yes</p> <p><u>Were the reference standard results interpreted without knowledge of the results of the index test?</u> Yes</p>	<p><u>Was there an appropriate interval between index test(s) and reference standard?</u> Unclear</p> <p><u>Did all patients receive a reference standard?</u> Yes</p> <p><u>Did patients receive the same reference standard?</u> Yes</p> <p><u>Were all patients included in the analysis?</u> Yes</p>	<p><u>Are there concerns that the included patients do not match the review question?</u> No</p> <p><u>Are there concerns that the index test, its conduct, or interpretation differ from the review question?</u> No</p> <p><u>Are there concerns that the target condition as defined by the reference standard does not match the review question?</u> No</p>
	<p>CONCLUSION: Could the selection of patients have introduced bias?</p> <p>RISK: LOW</p>	<p>CONCLUSION: Could the conduct or interpretation of the index test have introduced bias?</p> <p>RISK: LOW</p>	<p>CONCLUSION: Could the reference standard, its conduct, or its interpretation have introduced bias?</p> <p>RISK: LOW</p>	<p>CONCLUSION Could the patient flow have introduced bias?</p> <p>RISK: UNCLEAR Reason: unclear if there is a time interval between index test and reference standard</p>	

Study reference	Patient selection	Index test	Reference standard	Flow and timing	Comments with respect to applicability
Dones, 2014a	<p><u>Was a consecutive or random sample of patients enrolled?</u> yes</p> <p><u>Was a case-control design avoided?</u> Yes</p> <p><u>Did the study avoid inappropriate exclusions?</u> Yes</p>	<p><u>Were the index test results interpreted without knowledge of the results of the reference standard?</u> Yes</p> <p><u>If a threshold was used, was it pre-specified?</u> No information</p>	<p><u>Is the reference standard likely to correctly classify the target condition?</u> Yes</p> <p><u>Were the reference standard results interpreted without knowledge of the results of the index test?</u> Yes</p>	<p><u>Was there an appropriate interval between index test(s) and reference standard?</u></p> <p><u>Did all patients receive a reference standard?</u> Yes</p> <p><u>Did patients receive the same reference standard?</u> Yes</p> <p><u>Were all patients included in the analysis?</u> No, minimal loss to follow-up</p>	<p><u>Are there concerns that the included patients do not match the review question?</u> No</p> <p><u>Are there concerns that the index test, its conduct, or interpretation differ from the review question?</u> No</p> <p><u>Are there concerns that the target condition as defined by the reference standard does not match the review question?</u> No</p>
	<p>CONCLUSION: Could the selection of patients have introduced bias?</p> <p>RISK: LOW</p>	<p>CONCLUSION: Could the conduct or interpretation of the index test have introduced bias?</p> <p>RISK: LOW</p>	<p>CONCLUSION: Could the reference standard, its conduct, or its interpretation have introduced bias?</p> <p>RISK: LOW</p>	<p>CONCLUSION Could the patient flow have introduced bias?</p> <p>RISK: LOW</p>	

Study reference	Patient selection	Index test	Reference standard	Flow and timing	Comments with respect to applicability
du Toit, 2008	<p><u>Was a consecutive or random sample of patients enrolled?</u> Yes</p> <p><u>Was a case-control design avoided?</u> No</p> <p><u>Did the study avoid inappropriate exclusions?</u> Yes</p>	<p><u>Were the index test results interpreted without knowledge of the results of the reference standard?</u> No, the sonographer was aware of which elbows were symptomatic, which may have introduced interpretation bias.</p> <p><u>If a threshold was used, was it pre-specified?</u> Yes</p>	<p><u>Is the reference standard likely to correctly classify the target condition?</u> Yes</p> <p><u>Were the reference standard results interpreted without knowledge of the results of the index test?</u> Yes</p>	<p><u>Was there an appropriate interval between index test(s) and reference standard?</u> Yes, within 1h</p> <p><u>Did all patients receive a reference standard?</u> Yes</p> <p><u>Did patients receive the same reference standard?</u> Yes</p> <p><u>Were all patients included in the analysis?</u> Yes</p>	<p><u>Are there concerns that the included patients do not match the review question?</u> No</p> <p><u>Are there concerns that the index test, its conduct, or interpretation differ from the review question?</u> No</p> <p><u>Are there concerns that the target condition as defined by the reference standard does not match the review question?</u> No</p>
	<p>CONCLUSION: Could the selection of patients have introduced bias?</p> <p>RISK: HIGH</p>	<p>CONCLUSION: Could the conduct or interpretation of the index test have introduced bias?</p> <p>RISK: HIGH</p>	<p>CONCLUSION: Could the reference standard, its conduct, or its interpretation have introduced bias?</p> <p>RISK: LOW</p>	<p>CONCLUSION Could the patient flow have introduced bias?</p> <p>RISK: LOW</p>	

Study reference	Patient selection	Index test	Reference standard	Flow and timing	Comments with respect to applicability
Heales, 2014	<p><u>Was a consecutive or random sample of patients enrolled?</u> No, recruitment through media advertising, not consecutive sampling</p> <p><u>Was a case-control design avoided?</u> No, case-control design with 30 patients clinically diagnosed with LET and 30 healthy controls</p> <p><u>Did the study avoid inappropriate exclusions?</u> Yes</p>	<p><u>Were the index test results interpreted without knowledge of the results of the reference standard?</u> Yes, the experienced sonographers were blinded to the clinical status of participants</p> <p><u>If a threshold was used, was it pre-specified?</u> Unclear</p>	<p><u>Is the reference standard likely to correctly classify the target condition?</u> Yes</p> <p><u>Were the reference standard results interpreted without knowledge of the results of the index test?</u> Yes</p>	<p><u>Was there an appropriate interval between index test(s) and reference standard?</u> Yes</p> <p><u>Did all patients receive a reference standard?</u> Yes</p> <p><u>Did patients receive the same reference standard?</u> Yes</p> <p><u>Were all patients included in the analysis?</u> Yes</p>	<p><u>Are there concerns that the included patients do not match the review question?</u> No</p> <p><u>Are there concerns that the index test, its conduct, or interpretation differ from the review question?</u> No</p> <p><u>Are there concerns that the target condition as defined by the reference standard does not match the review question?</u> No</p>
	<p>CONCLUSION: Could the selection of patients have introduced bias?</p> <p>RISK: HIGH</p>	<p>CONCLUSION: Could the conduct or interpretation of the index test have introduced bias?</p> <p>RISK: UNCLEAR</p>	<p>CONCLUSION: Could the reference standard, its conduct, or its interpretation have introduced bias?</p> <p>RISK: LOW</p>	<p>CONCLUSION Could the patient flow have introduced bias?</p> <p>RISK: LOW</p>	

Study reference	Patient selection	Index test	Reference standard	Flow and timing	Comments with respect to applicability
Khoury and Cardinal, 2009	<p><u>Was a consecutive or random sample of patients enrolled?</u> No information</p> <p><u>Was a case-control design avoided?</u> Yes, 8 patients clinically diagnosed with the asymptomatic elbow as control</p> <p><u>Did the study avoid inappropriate exclusions?</u> Yes</p>	<p><u>Were the index test results interpreted without knowledge of the results of the reference standard?</u> Unclear</p> <p><u>If a threshold was used, was it pre-specified?</u> Unclear</p>	<p><u>Is the reference standard likely to correctly classify the target condition?</u> Unclear</p> <p><u>Were the reference standard results interpreted without knowledge of the results of the index test?</u> Unclear</p>	<p><u>Was there an appropriate interval between index test(s) and reference standard?</u> Unclear</p> <p><u>Did all patients receive a reference standard?</u> Unclear</p> <p><u>Did patients receive the same reference standard?</u> Yes</p> <p><u>Were all patients included in the analysis?</u> Yes</p>	<p><u>Are there concerns that the included patients do not match the review question?</u> Unclear</p> <p><u>Are there concerns that the index test, its conduct, or interpretation differ from the review question?</u> No</p> <p><u>Are there concerns that the target condition as defined by the reference standard does not match the review question?</u> Unclear</p>
	<p>CONCLUSION: Could the selection of patients have introduced bias?</p> <p>RISK: HIGH</p>	<p>CONCLUSION: Could the conduct or interpretation of the index test have introduced bias?</p> <p>RISK: UNCLEAR</p>	<p>CONCLUSION: Could the reference standard, its conduct, or its interpretation have introduced bias?</p> <p>RISK: UNCLEAR</p>	<p>CONCLUSION Could the patient flow have introduced bias?</p> <p>RISK: UNCLEAR</p>	

Study reference	Patient selection	Index test	Reference standard	Flow and timing	Comments with respect to applicability
Lee, 2011	<p><u>Was a consecutive or random sample of patients enrolled?</u> Yes</p> <p><u>Was a case-control design avoided?</u> No, cases recruited who were diagnosed by orthopedic surgeon and healthy volunteers were recruited</p> <p><u>Did the study avoid inappropriate exclusions?</u> Yes</p>	<p><u>Were the index test results interpreted without knowledge of the results of the reference standard?</u> Yes</p> <p><u>If a threshold was used, was it pre-specified?</u> Yes</p>	<p><u>Is the reference standard likely to correctly classify the target condition?</u> Yes</p> <p><u>Were the reference standard results interpreted without knowledge of the results of the index test?</u> Yes</p>	<p><u>Was there an appropriate interval between index test(s) and reference standard?</u> Yes</p> <p><u>Did all patients receive a reference standard?</u> Yes</p> <p><u>Did patients receive the same reference standard?</u> Yes</p> <p><u>Were all patients included in the analysis?</u> Yes</p>	<p><u>Are there concerns that the included patients do not match the review question?</u> Unclear</p> <p><u>Are there concerns that the index test, its conduct, or interpretation differ from the review question?</u> No</p> <p><u>Are there concerns that the target condition as defined by the reference standard does not match the review question?</u> No</p>
	<p>CONCLUSION: Could the selection of patients have introduced bias?</p> <p>RISK: HIGH</p>	<p>CONCLUSION: Could the conduct or interpretation of the index test have introduced bias?</p> <p>RISK: LOW</p>	<p>CONCLUSION: Could the reference standard, its conduct, or its interpretation have introduced bias?</p> <p>RISK: LOW</p>	<p>CONCLUSION Could the patient flow have introduced bias?</p> <p>RISK: LOW</p>	

Study reference	Patient selection	Index test	Reference standard	Flow and timing	Comments with respect to applicability
Noh, 2010	<p><u>Was a consecutive or random sample of patients enrolled?</u> Yes, 27 consecutive patients were recruited</p> <p><u>Was a case-control design avoided?</u> No, case-control design was used</p> <p><u>Did the study avoid inappropriate exclusions?</u> Yes</p>	<p><u>Were the index test results interpreted without knowledge of the results of the reference standard?</u> No, the ultrasound examination was performed by the senior author (orthopaedic surgeon) who was aware of whether the participant was symptomatic or healthy. This lack of blinding may introduce interpretation bias</p> <p><u>If a threshold was used, was it pre-specified?</u> Unclear</p>	<p><u>Is the reference standard likely to correctly classify the target condition?</u> Yes, diagnosis of lateral epicondylitis was based on accepted clinical criteria (pain, tenderness, positive Cozen's test)</p> <p><u>Were the reference standard results interpreted without knowledge of the results of the index test?</u> Yes</p>	<p><u>Was there an appropriate interval between index test(s) and reference standard?</u> Unclear</p> <p><u>Did all patients receive a reference standard?</u> Yes</p> <p><u>Did patients receive the same reference standard?</u> Yes</p> <p><u>Were all patients included in the analysis?</u> Yes</p>	<p><u>Are there concerns that the included patients do not match the review question?</u> No</p> <p><u>Are there concerns that the index test, its conduct, or interpretation differ from the review question?</u> No</p> <p><u>Are there concerns that the target condition as defined by the reference standard does not match the review question?</u> No</p>
	<p>CONCLUSION: Could the selection of patients have introduced bias?</p> <p>RISK: HIGH</p>	<p>CONCLUSION: Could the conduct or interpretation of the index test have introduced bias?</p> <p>RISK: HIGH</p>	<p>CONCLUSION: Could the reference standard, its conduct, or its interpretation have introduced bias?</p> <p>RISK: LOW</p>	<p>CONCLUSION Could the patient flow have introduced bias?</p> <p>RISK: UNCLEAR</p>	

Study reference	Patient selection	Index test	Reference standard	Flow and timing	Comments with respect to applicability
Obradov and Anderson, 2012	<p><u>Was a consecutive or random sample of patients enrolled?</u> Yes, 43 consecutive patients were referred by experienced orthopaedic surgeons</p> <p><u>Was a case-control design avoided?</u> No, case-control design was used (5 healthy volunteers served as controls)</p> <p><u>Did the study avoid inappropriate exclusions?</u> Yes</p>	<p><u>Were the index test results interpreted without knowledge of the results of the reference standard?</u> No, Examinations were performed by one of two experienced radiologists using a standardized protocol. However, interpretation of patient images was done retrospectively on static images, which may have introduced bias (e.g., anisotropy artifacts).</p> <p><u>If a threshold was used, was it pre-specified?</u> Unclear</p>	<p><u>Is the reference standard likely to correctly classify the target condition?</u> Yes, combined patient history, clinical criteria, and concordant probe-induced pain at the lateral epicondyle, which is widely accepted in LE studies.</p> <p><u>Were the reference standard results interpreted without knowledge of the results of the index test?</u> Unclear</p>	<p><u>Was there an appropriate interval between index test(s) and reference standard?</u> Yes</p> <p><u>Did all patients receive a reference standard?</u> Yes</p> <p><u>Did patients receive the same reference standard?</u> Yes</p> <p><u>Were all patients included in the analysis?</u> Yes</p>	<p><u>Are there concerns that the included patients do not match the review question?</u> No</p> <p><u>Are there concerns that the index test, its conduct, or interpretation differ from the review question?</u> No</p> <p><u>Are there concerns that the target condition as defined by the reference standard does not match the review question?</u> Unclear</p>
	<p>CONCLUSION: Could the selection of patients have introduced bias?</p> <p>RISK: HIGH</p>	<p>CONCLUSION: Could the conduct or interpretation of the index test have introduced bias?</p> <p>RISK: HIGH</p>	<p>CONCLUSION: Could the reference standard, its conduct, or its interpretation have introduced bias?</p> <p>RISK: UNCLEAR</p>	<p>CONCLUSION Could the patient flow have introduced bias?</p> <p>RISK: LOW</p>	

Study reference	Patient selection	Index test	Reference standard	Flow and timing	Comments with respect to applicability
Struijs, 2005	<p><u>Was a consecutive or random sample of patients enrolled?</u> Yes</p> <p><u>Was a case-control design avoided?</u> Yes</p> <p><u>Did the study avoid inappropriate exclusions?</u> Yes</p>	<p><u>Were the index test results interpreted without knowledge of the results of the reference standard?</u> Yes</p> <p><u>If a threshold was used, was it pre-specified?</u> Unclear</p>	<p><u>Is the reference standard likely to correctly classify the target condition?</u> Yes</p> <p><u>Were the reference standard results interpreted without knowledge of the results of the index test?</u> Yes</p>	<p><u>Was there an appropriate interval between index test(s) and reference standard?</u> Unclear</p> <p><u>Did all patients receive a reference standard?</u> Yes</p> <p><u>Did patients receive the same reference standard?</u> Yes</p> <p><u>Were all patients included in the analysis?</u> No, because scans from 15 patients were not suitable for analysis</p>	<p><u>Are there concerns that the included patients do not match the review question?</u> No</p> <p><u>Are there concerns that the index test, its conduct, or interpretation differ from the review question?</u> Unclear</p> <p><u>Are there concerns that the target condition as defined by the reference standard does not match the review question?</u> Unclear</p>
	<p>CONCLUSION: Could the selection of patients have introduced bias?</p> <p>RISK: LOW</p>	<p>CONCLUSION: Could the conduct or interpretation of the index test have introduced bias?</p> <p>RISK: UNCLEAR</p>	<p>CONCLUSION: Could the reference standard, its conduct, or its interpretation have introduced bias?</p> <p>RISK: LOW</p>	<p>CONCLUSION Could the patient flow have introduced bias?</p> <p>RISK: HIGH</p>	

Study reference	Patient selection	Index test	Reference standard	Flow and timing	Comments with respect to applicability
Toprak, 2012	<p><u>Was a consecutive or random sample of patients enrolled?</u> Unclear</p> <p><u>Was a case-control design avoided?</u> No, 80 healthy controls were included</p> <p><u>Did the study avoid inappropriate exclusions?</u> Yes</p>	<p><u>Were the index test results interpreted without knowledge of the results of the reference standard?</u> Unclear</p> <p><u>If a threshold was used, was it pre-specified?</u> Unclear</p>	<p><u>Is the reference standard likely to correctly classify the target condition?</u> Yes</p> <p><u>Were the reference standard results interpreted without knowledge of the results of the index test?</u> Yes</p>	<p><u>Was there an appropriate interval between index test(s) and reference standard?</u> Yes</p> <p><u>Did all patients receive a reference standard?</u> Yes</p> <p><u>Did patients receive the same reference standard?</u> Yes</p> <p><u>Were all patients included in the analysis?</u> Yes</p>	<p><u>Are there concerns that the included patients do not match the review question?</u> Unclear</p> <p><u>Are there concerns that the index test, its conduct, or interpretation differ from the review question?</u> No</p> <p><u>Are there concerns that the target condition as defined by the reference standard does not match the review question?</u> No</p>
	<p>CONCLUSION: Could the selection of patients have introduced bias?</p> <p>RISK: HIGH</p>	<p>CONCLUSION: Could the conduct or interpretation of the index test have introduced bias?</p> <p>RISK: UNCLEAR</p>	<p>CONCLUSION: Could the reference standard, its conduct, or its interpretation have introduced bias?</p> <p>RISK: LOW</p>	<p>CONCLUSION Could the patient flow have introduced bias?</p> <p>RISK: LOW</p>	

Study reference	Patient selection	Index test	Reference standard	Flow and timing	Comments with respect to applicability
Zeisig, 2006	<p><u>Was a consecutive or random sample of patients enrolled?</u> Yes</p> <p><u>Was a case-control design avoided?</u> No, 17 LET patients and 11 matched controls were included</p> <p><u>Did the study avoid inappropriate exclusions?</u> Yes</p>	<p><u>Were the index test results interpreted without knowledge of the results of the reference standard?</u> No</p> <p><u>If a threshold was used, was it pre-specified?</u> Unclear</p>	<p><u>Is the reference standard likely to correctly classify the target condition?</u> Yes</p> <p><u>Were the reference standard results interpreted without knowledge of the results of the index test?</u> Yes</p>	<p><u>Was there an appropriate interval between index test(s) and reference standard?</u> Unclear</p> <p><u>Did all patients receive a reference standard?</u> Yes</p> <p><u>Did patients receive the same reference standard?</u> Yes</p> <p><u>Were all patients included in the analysis?</u> Yes</p>	<p><u>Are there concerns that the included patients do not match the review question?</u> Unclear</p> <p><u>Are there concerns that the index test, its conduct, or interpretation differ from the review question?</u> No</p> <p><u>Are there concerns that the target condition as defined by the reference standard does not match the review question?</u> No</p>
	<p>CONCLUSION: Could the selection of patients have introduced bias?</p> <p>RISK: HIGH</p>	<p>CONCLUSION: Could the conduct or interpretation of the index test have introduced bias?</p> <p>RISK: HIGH</p>	<p>CONCLUSION: Could the reference standard, its conduct, or its interpretation have introduced bias?</p> <p>RISK: LOW</p>	<p>CONCLUSION Could the patient flow have introduced bias?</p> <p>RISK: UNCLEAR</p>	

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5 **Table of excluded studies**

Reference	Reason for exclusion
Lateral epicondylitis (LE)	
Arslan S, Karahan AY, Oncu F, Bakdik S, Durmaz MS, Tolu I. Diagnostic Performance of Superb Microvascular Imaging and Other Sonographic Modalities in the Assessment of Lateral Epicondylitis. <i>J Ultrasound Med.</i> 2018 Mar;37(3):585-593. doi: 10.1002/jum.14369. Epub 2017 Aug 29. PMID: 28850740.	Included in review of Karanasios (2022), but not useful for the purpose of this guideline, because SMI and elastography are not current clinical practice in the Netherlands
Çelikaş M, Köse Ö. Value of radiographic assessment in the diagnosis of lateral epicondylitis. <i>Anatolian Journal of Clinical Investigation.</i> 2009;3(2):136-137	Full-tekst only available in Turkish
Cha YK, Kim SJ, Park NH, Kim JY, Kim JH, Park JY. Magnetic resonance imaging of patients with lateral epicondylitis: Relationship between pain and severity of imaging features in elbow joints. <i>Acta Orthop Traumatol Turc.</i> 2019 Sep;53(5):366-371. doi: 10.1016/j.aott.2019.04.006. Epub 2019 Apr 28. PMID: 31040053; PMCID: PMC6819801.	Wrong outcomes
Chand PP, Shriram T, Dharmalingam L. To Evaluate the Magnetic Resonance Imaging (MRI) of Patients with Lateral Epicondylitis. <i>Journal of Cardiovascular Disease Research.</i> 2022;13(1):910-919	Wrong outcomes (no diagnostic accuracy outcomes) and wrong comparator (PRTEE)
Clarke AW, Ahmad M, Curtis M, Connell DA. Lateral elbow tendinopathy: correlation of ultrasound findings with pain and functional disability. <i>Am J Sports Med.</i> 2010 Jun;38(6):1209-14. doi: 10.1177/0363546509359066. Epub 2010 Mar 24. PMID: 20335508.	Wrong aim (which entities on ultrasound are best prognostic indicators for response on conservative treatment)
De Zordo T, Lill SR, Fink C, Feuchtnner GM, Jaschke W, Bellmann-Weiler R, Klauser AS. Real-time sonoelastography of lateral epicondylitis: comparison of findings between patients and healthy volunteers. <i>AJR Am J Roentgenol.</i> 2009 Jul;193(1):180-5. doi: 10.2214/AJR.08.2020. PMID: 19542412.	Included in review of Karanasios (2022), but not useful, because the topic is elastography, which is not current clinical practice in the Netherlands.
Dones VC 3rd, Grimmer K, Thoires K, Suarez CG, Luker J. The diagnostic validity of musculoskeletal ultrasound in lateral epicondylalgia: a systematic review. <i>BMC Med Imaging.</i> 2014 Mar 3;14:10. doi: 10.1186/1471-2342-14-10. PMID: 24589069; PMCID: PMC4015882.	More recent systematic review is available (Karanasios, 2022)
Elsayed, M., Hafez, M.R.M. & Ibrahim, M.A.H. Ultrasound with shear wave elastography in diagnosis and follow-up of common extensor tendinopathy in cases with lateral epicondylitis: a cross-sectional analytic study. <i>Egypt J Radiol Nucl Med</i> 53, 236 (2022). https://doi.org/10.1186/s43055-022-00919-5	Elastography not used in clinical practice for the diagnosis of LE in the Netherlands
Heales LJ, Broadhurst N, Mellor R, Hodges PW, Vicenzino B. Diagnostic ultrasound imaging for lateral epicondylalgia: a case-control study. <i>Med Sci Sports Exerc.</i> 2014 Nov;46(11):2070-6. doi: 10.1249/MSS.0000000000000345. PMID: 24848494.	Included in review of Karanasios (2022)
Ikeda K, Ogawa T, Ikumi A, Yoshii Y, Kohyama S, Ikeda R, Yamazaki M. Individual Evaluation of the Common Extensor Tendon and Lateral Collateral Ligament Improves the Severity Diagnostic Accuracy of Magnetic Resonance Imaging for Lateral Epicondylitis. <i>Diagnostics (Basel).</i> 2022 Aug 2;12(8):1871. doi: 10.3390/diagnostics12081871. PMID: 36010221; PMCID: PMC9406652.	Wrong index test (individual evaluation of common extensor tendon and lateral collateral ligament vs. combined evaluation)

Ikeda K, Ogawa T, Ikumi A, Yoshii Y, Kohyama S, Ikeda R, Yamazaki M. Magnetic resonance imaging predicts outcomes of conservative treatment in patients with lateral epicondylitis. <i>J Orthop Sci</i> . 2024 May;29(3):795-801. doi: 10.1016/j.jos.2023.03.014. Epub 2023 Apr 4. PMID: 37024365.	Wrong aim: how could MRI results predict treatment response in LET patients who received conservative treatment and a surgery
Jeon JY, Lee MH, Jeon IH, Chung HW, Lee SH, Shin MJ. Lateral epicondylitis: Associations of MR imaging and clinical assessments with treatment options in patients receiving conservative and arthroscopic managements. <i>Eur Radiol</i> . 2018 Mar;28(3):972-981. doi: 10.1007/s00330-017-5084-5. Epub 2017 Oct 12. PMID: 29027008.	Wrong aim: how could MRI results predict treatment response in LET patients who received conservative treatment and a surgery
Kijowski R, De Smet AA. Magnetic resonance imaging findings in patients with medial epicondylitis. <i>Skeletal Radiol</i> . 2005 Apr;34(4):196-202. doi: 10.1007/s00256-005-0896-9. Epub 2005 Feb 15. PMID: 15711999.	No diagnostic accuracy outcomes
Kocyigit F, Kuyucu E, Kocyigit A, Herek DT, Savkin R, Aslan UB, Karabulut N. Association of real-time sonoelastography findings with clinical parameters in lateral epicondylitis. <i>Rheumatol Int</i> . 2016 Jan;36(1):91-100. doi: 10.1007/s00296-015-3356-4. Epub 2015 Sep 5. PMID: 26342298.	Elastography not used in clinical practice for the diagnosis of LE in the Netherlands
van Kollenburg JA, Brouwer KM, Jupiter JB, Ring D. Magnetic resonance imaging signal abnormalities in enthesopathy of the extensor carpi radialis longus origin. <i>J Hand Surg Am</i> . 2009 Jul-Aug;34(6):1094-8. doi: 10.1016/j.jhsa.2009.02.023. Epub 2009 Jun 5. PMID: 19501476.	Included in review of Karanasios (2022)
Latham SK, Smith TO. The diagnostic test accuracy of ultrasound for the detection of lateral epicondylitis: a systematic review and meta-analysis. <i>Orthop Traumatol Surg Res</i> . 2014 May;100(3):281-6. doi: 10.1016/j.otsr.2014.01.006. Epub 2014 Apr 4. PMID: 24709302.	More recent systematic review is available (Karanasios, 2022)
Lee MH, Cha JG, Jin W, Kim BS, Park JS, Lee HK, Hong HS. Utility of sonographic measurement of the common tensor tendon in patients with lateral epicondylitis. <i>AJR Am J Roentgenol</i> . 2011 Jun;196(6):1363-7. doi: 10.2214/AJR.10.5769. PMID: 21606300.	Included in review of Karanasios (2022)
Levin D, Nazarian LN, Miller TT, O'Kane PL, Feld RI, Parker L, McShane JM. Lateral epicondylitis of the elbow: US findings. <i>Radiology</i> . 2005 Oct;237(1):230-4. doi: 10.1148/radiol.2371040784. Epub 2005 Aug 18. PMID: 16118152.	Included in review of Karanasios (2022), does not describe hypoechogenicity and tendon thickening, which are considered most important
Obradov M, Anderson PG. Ultra sonographic findings for chronic lateral epicondylitis. <i>JBR-BTR</i> . 2012 Mar-Apr;95(2):66-70. PMID: 22764657.	Included in review of Karanasios (2022)
Park G, Kwon D, Park J. Diagnostic confidence of sonoelastography as adjunct to greyscale ultrasonography in lateral elbow tendinopathy. <i>Chin Med J (Engl)</i> . 2014;127(17):3110-5. PMID: 25189955.	Included in review of karanasios (2022), but not usefull for the purpose of this guideline, because it's about elastography (no current clinical practice in the Netherlands)
Soares MM, Souza PC, Ribeiro AP. Differences in Clinical Tests for Assessing Lateral Epicondylitis Elbow in Adults Concerning Their Physical Activity Level: Test Reliability, Accuracy of Ultrasound Imaging, and Relationship with Energy Expenditure. <i>Int J Environ Res Public Health</i> . 2023 Jan 18;20(3):1794. doi: 10.3390/ijerph20031794. PMID: 36767167; PMCID: PMC9914816.	Wrong reference standard (ultrasound instead of clinical diagnosis)

Struijs PA, Spruyt M, Assendelft WJ, van Dijk CN. The predictive value of diagnostic sonography for the effectiveness of conservative treatment of tennis elbow. <i>AJR Am J Roentgenol.</i> 2005 Nov;185(5):1113-8. doi: 10.2214/AJR.04.0656. PMID: 16247118.	Included in review of Karanasios (2022)
Thakor MA, Panasara PH, Prakash S, Patel PB. Evaluation of Lateral Epicondylitis using MRI: A Clinical Study. <i>International Journal of Pharmaceutical and Clinical Research.</i> 2024; 16(8):1326-1330	Wrong outcomes and wrong reference standard
du Toit C, Stieler M, Saunders R, Bisset L, Vicenzino B. Diagnostic accuracy of power Doppler ultrasound in patients with chronic tennis elbow. <i>Br J Sports Med.</i> 2008 Nov;42(11):872-6. doi: 10.1136/bjsm.2007.043901. Epub 2008 Feb 28. Erratum in: <i>Br J Sports Med.</i> 2009 Apr;43(4):310-1. PMID: 18308874.	Included in review of Karanasios (2022)
Toprak U, Başkan B, Üstüner E, Öten E, Altın L, Karademir MA, Bodur H. Common extensor tendon thickness measurements at the radiocapitellar region in diagnosis of lateral elbow tendinopathy. <i>Diagn Interv Radiol.</i> 2012 Nov-Dec;18(6):566-70. doi: 10.4261/1305-3825.DIR.5575-12.2. Epub 2012 Apr 13. PMID: 22498913.	Included in review of Karanasios (2022)
Tuntiyatorn P, Taweesakulvashra R, Kanchanathepsak T, Rojpitipongsakorn C, Tawonsawatruk T. Validation of a novel magnetic resonance imaging classification and recommended treatment for lateral elbow tendinopathy. <i>BMC Musculoskelet Disord.</i> 2022 Aug 22;23(1):803. doi: 10.1186/s12891-022-05758-z. PMID: 35996100; PMCID: PMC9396854.	Wrong outcomes and wrong reference standard
Walton MJ, Mackie K, Fallon M, Butler R, Breidahl W, Zheng MH, Wang A. The reliability and validity of magnetic resonance imaging in the assessment of chronic lateral epicondylitis. <i>J Hand Surg Am.</i> 2011 Mar;36(3):475-9. doi: 10.1016/j.jhssa.2010.11.040. Epub 2011 Feb 18. PMID: 21334144.	Included in review of Karanasios (2022)
Wang Y, Nie F, Wang T, Li Y, Xu P. Systematic reviews of the accuracy of musculoskeletal ultrasound in the diagnosis of lateral epicondylalgia. <i>Chinese Journal of Tissue Engineering Research.</i> 2019;23(32):5233-5239	Full-tekst only available in Chinese
Zhu B, You Y, Xiang X, Wang L, Qiu L. Assessment of common extensor tendon elasticity in patients with lateral epicondylitis using shear wave elastography. <i>Quant Imaging Med Surg.</i> 2020 Jan;10(1):211-219. doi: 10.21037/qims.2019.10.07. PMID: 31956543; PMCID: PMC6960433.	Elastography no current clinical practice in the Netherlands
Medial epicondylitis (ME)	
Bang JY, Hahn S, Yi J, Lim YJ, Jung HK. Clinical applicability of shear wave elastography for the evaluation of medial epicondylitis. <i>Eur Radiol.</i> 2021 Sep;31(9):6726-6735. doi: 10.1007/s00330-021-07791-3. Epub 2021 Feb 25. PMID: 33634322.	Elastography not used in clinical practice for the diagnosis of LE in the Netherlands

5

Literature search strategy

Zoekopbrengst - 10 december 2024

	EMBASE	OID/MEDLINE	Reeds in Rayyan	Nieuw
SR	20	11	21	1
RCT	44	15	49	

Observationele studies	84	53	92	
Overige studies	76	50		91
Totaal	224	129	162	92*

5

**224 in Rayyan*

3 december 2024

	EMBASE	OVID/MEDLINE	Ontdubbeld
SR	19	11	21
RCT	44	16	49
Observationele studies	84	53	92
Totaal	147	80	162*

10

**in Rayyan*

Zoekstrategie - 10 december 2024

Embase.com

No.	Query	Results
#1	'tennis elbow'/exp OR 'medial epicondylitis'/exp OR (((tennis* OR golf*) NEAR/3 (arm* OR elbow*)):ti,ab,kw) OR (((epicondylitis OR epycondylitis OR epicondylitides OR epycondylitides) NEAR/3 (humer* OR lateral* OR external* OR radiohumer* OR medial*)):ti,ab,kw) OR (((elbow* OR epicondyl*) NEAR/7 (tendinopath* OR tendonopath* OR tendinos*)):ti,ab,kw)	4559
#2	'nuclear magnetic resonance imaging'/exp OR 'mri scanner'/exp OR ('magnetic resonance':ab,ti AND (image:ab,ti OR images:ab,ti OR imaging:ab,ti)) OR mri:ab,ti OR mris:ab,ti OR nmr:ab,ti OR mra:ab,ti OR mras:ab,ti OR zeugmatograph*:ab,ti OR 'mr tomography':ab,ti OR 'mr tomographies':ab,ti OR 'mr tomographic':ab,ti OR 'mr imag*':ti,ab,kw OR 'proton spin':ab,ti OR ((magneti*:ab,ti OR 'chemical shift':ab,ti) AND imaging:ab,ti) OR fmri:ab,ti OR fmr:ab,ti OR rsfmri:ti,ab,kw	1692351
#3	'computer assisted tomography'/exp OR 'cat scan*':ti,ab,kw OR ((compute* NEAR/3 tomograph*):ti,ab,kw) OR ct:ti,ab,kw OR cts:ti,ab,kw	1878942
#4	'ultrasound'/exp OR 'ultrasound scanner'/exp OR 'echography'/exp OR 'endoscopic ultrasonography'/exp OR ultraso*:ti,ab,kw OR sonograph*:ti,ab,kw OR echograph*:ti,ab,kw OR sonogram*:ti,ab,kw	1550918
#5	'radiography'/exp OR radiogram*:ti,ab,kw OR radiograph*:ti,ab,kw OR radiolog*:ti,ab,kw OR roentgen*:ti,ab,kw OR rontgen*:ti,ab,kw OR 'x ray*':ti,ab,kw OR xray*:ti,ab,kw	2492382
#6	'diagnostic imaging equipment'/exp OR 'imaging and display'/exp OR image*:ti,ab,kw OR imaging:ti,ab,kw	3624189
#7	#2 OR #3 OR #4 OR #5 OR #6	6840872

#8	'sensitivity and specificity'/de OR sensitivity:ab,ti OR specificity:ab,ti OR predict*:ab,ti OR 'roc curve':ab,ti OR 'receiver operator':ab,ti OR 'receiver operators':ab,ti OR likelihood:ab,ti OR 'diagnostic error'/exp OR 'diagnostic accuracy'/exp OR 'diagnostic test accuracy study'/exp OR 'inter observer':ab,ti OR 'intra observer':ab,ti OR interobserver:ab,ti OR intraobserver:ab,ti OR validity:ab,ti OR kappa:ab,ti OR reliability:ab,ti OR reproducibility:ab,ti OR ((test NEAR/2 're-test'):ab,ti) OR ((test NEAR/2 'retest'):ab,ti) OR 'reproducibility'/exp OR accuracy:ab,ti OR 'differential diagnosis'/exp OR 'validation study'/de OR 'measurement precision'/exp OR 'diagnostic value'/exp OR 'reliability'/exp OR 'predictive value'/exp OR ppv:ti,ab,kw OR npv:ti,ab,kw OR (((false OR true) NEAR/3 (negative OR positive)):ti,ab)	6658753
#9	#1 AND #7 AND #8	307
#10	#9 AND [2004-2025]/py NOT ('conference abstract'/it OR 'editorial'/it OR 'letter'/it OR 'note'/it) NOT (('animal'/exp OR 'animal experiment'/exp OR 'animal model'/exp OR 'nonhuman'/exp) NOT 'human'/exp)	224
#11	'meta analysis'/exp OR 'meta analysis (topic)'/exp OR metaanaly*:ti,ab OR 'meta analy*':ti,ab OR metanaly*:ti,ab OR 'systematic review'/de OR 'cochrane database of systematic reviews'/jt OR prisma:ti,ab OR prospero:ti,ab OR (((systemati* OR scoping OR umbrella OR 'structured literature') NEAR/3 (review* OR overview*)):ti,ab) OR ((systemic* NEAR/1 review*):ti,ab) OR (((systemati* OR literature OR database* OR 'data base*') NEAR/10 search*):ti,ab) OR (((structured OR comprehensive* OR systemic*) NEAR/3 search*):ti,ab) OR (((literature NEAR/3 review*):ti,ab) AND (search*:ti,ab OR database*:ti,ab OR 'data base*':ti,ab)) OR (('data extraction':ti,ab OR 'data source*':ti,ab) AND 'study selection':ti,ab) OR ('search strategy':ti,ab AND 'selection criteria':ti,ab) OR ('data source*':ti,ab AND 'data synthesis':ti,ab) OR medline:ab OR pubmed:ab OR embase:ab OR cochrane:ab OR (((critical OR rapid) NEAR/2 (review* OR overview* OR syntheses*)):ti) OR (((critical* OR rapid*) NEAR/3 (review* OR overview* OR syntheses*)):ab) AND (search*:ab OR database*:ab OR 'data base*':ab)) OR metasyntes*:ti,ab OR 'meta syntheses*':ti,ab	1084135
#12	'clinical trial'/exp OR 'randomization'/exp OR 'single blind procedure'/exp OR 'double blind procedure'/exp OR 'crossover procedure'/exp OR 'placebo'/exp OR 'prospective study'/exp OR rct:ab,ti OR random*:ab,ti OR 'single blind':ab,ti OR 'randomised controlled trial':ab,ti OR 'randomized controlled trial'/exp OR placebo*:ab,ti	4160878
#13	'major clinical study'/de OR 'clinical study'/de OR 'case control study'/de OR 'family study'/de OR 'longitudinal study'/de OR 'retrospective study'/de OR 'prospective study'/de OR 'comparative study'/de OR 'cohort analysis'/de OR ((cohort NEAR/1 (study OR studies)):ab,ti) OR (('case control' NEAR/1 (study OR studies)):ab,ti) OR (('follow up' NEAR/1 (study OR studies)):ab,ti) OR (observational NEAR/1 (study OR studies)) OR ((epidemiologic NEAR/1 (study OR studies)):ab,ti) OR (('cross sectional' NEAR/1 (study OR studies)):ab,ti)	8534328

#14	'case control study'/de OR 'comparative study'/exp OR 'control group'/de OR 'controlled study'/de OR 'controlled clinical trial'/de OR 'crossover procedure'/de OR 'double blind procedure'/de OR 'phase 2 clinical trial'/de OR 'phase 3 clinical trial'/de OR 'phase 4 clinical trial'/de OR 'pretest posttest design'/de OR 'pretest posttest control group design'/de OR 'quasi experimental study'/de OR 'single blind procedure'/de OR 'triple blind procedure'/de OR (((control OR controlled) NEAR/6 trial):ti,ab,kw) OR (((control OR controlled) NEAR/6 (study OR studies)):ti,ab,kw) OR (((control OR controlled) NEAR/1 active):ti,ab,kw) OR 'open label*':ti,ab,kw OR (((double OR two OR three OR multi OR trial) NEAR/1 (arm OR arms)):ti,ab,kw) OR ((allocat* NEAR/10 (arm OR arms)):ti,ab,kw) OR placebo*:ti,ab,kw OR 'sham-control*':ti,ab,kw OR (((single OR double OR triple OR assessor) NEAR/1 (blind* OR masked)):ti,ab,kw) OR nonrandom*:ti,ab,kw OR 'non-random*':ti,ab,kw OR 'quasi-experiment*':ti,ab,kw OR crossover:ti,ab,kw OR 'cross over':ti,ab,kw OR 'parallel group*':ti,ab,kw OR 'factorial trial':ti,ab,kw OR ((phase NEAR/5 (study OR trial)):ti,ab,kw) OR ((case* NEAR/6 (matched OR control*)):ti,ab,kw) OR ((match* NEAR/6 (pair OR pairs OR cohort* OR control* OR group* OR healthy OR age OR sex OR gender OR patient* OR subject* OR participant*)):ti,ab,kw) OR ((propensity NEAR/6 (scor* OR match*)):ti,ab,kw) OR versus:ti OR vs:ti OR compar*:ti OR ((compar* NEAR/1 study):ti,ab,kw) OR (('major clinical study'/de OR 'clinical study'/de OR 'cohort analysis'/de OR 'observational study'/de OR 'cross-sectional study'/de OR 'multicenter study'/de OR 'correlational study'/de OR 'follow up'/de OR cohort*:ti,ab,kw) OR 'follow up':ti,ab,kw) OR followup:ti,ab,kw) OR longitudinal*:ti,ab,kw) OR prospective*:ti,ab,kw) OR retrospective*:ti,ab,kw) OR observational*:ti,ab,kw) OR 'cross sectional*':ti,ab,kw) OR cross?ectional*:ti,ab,kw) OR multicent*:ti,ab,kw) OR 'multi-cent*':ti,ab,kw) OR consecutive*:ti,ab,kw) AND (group:ti,ab,kw) OR groups:ti,ab,kw) OR subgroup*:ti,ab,kw) OR versus:ti,ab,kw) OR vs:ti,ab,kw) OR compar*:ti,ab,kw) OR 'odds ratio*':ab) OR 'relative odds':ab) OR 'risk ratio*':ab) OR 'relative risk*':ab) OR 'rate ratio':ab) OR aor:ab) OR arr:ab) OR rrr:ab) OR (('or' OR 'rr') NEAR/6 ci:ab)))	15607914
#15	#10 AND #11 - SR	20
#16	#10 AND #12 NOT #15 - RCT	44
#17	#10 AND (#13 OR #14) NOT (#15 OR #16) - Observatieel	84
#18	#10 NOT (#15 OR #16 OR #17) - Overig	76
#19	#15 OR #16 OR #17 OR #18 - Totaal	224

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Ovid/Medline

#	Searches	Results
1	exp Tennis Elbow/ or exp Elbow Tendinopathy/ or ((tennis* or golf*) adj3 (arm* or elbow*)):ti,ab,kf. or ((epicondylitis or epycondylitis or epicondylitides or epycondylitides) adj3 (humer* or lateral* or external* or radiohumer* or medial*)):ti,ab,kf. or ((elbow* or epicondyl*) adj7 (tendinopath* or tendonopath* or tendinos*)):ti,ab,kf.	3245
2	exp magnetic resonance imaging/ or ("magnetic resonance" and (image or images or imaging)):ti,ab,kf. or mri.ti,ab,kf. or mris.ti,ab,kf. or nmr.ti,ab,kf. or mra.ti,ab,kf. or mras.ti,ab,kf. or zeugmatograph*.ti,ab,kf. or "mr tomography".ti,ab,kf. or "mr tomographies".ti,ab,kf. or "mr tomographic".ti,ab,kf. or 'mr imag*'.ti,ab,kf. or "proton spin".ti,ab,kf. or ((magneti* or "chemical shift") and imaging).ti,ab,kf. or fmri.ti,ab,kf. or fmrri.ti,ab,kf. or rsfmri.ti,ab,kf.	1026302
3	exp Tomography, X-Ray Computed/ or 'cat scan*'.ti,ab,kf. or (compute* adj3 tomograph*).ti,ab,kf. or ct.ti,ab,kf. or cts.ti,ab,kf.	916431
4	exp Ultrasonography/ or exp Ultrasonics/ or exp Endosonography/ or ultraso*.ti,ab,kf. or sonograph*.ti,ab,kf. or echograph*.ti,ab,kf. or sonogram*.ti,ab,kf.	796760
5	exp Radiography/ or radiogram*.ti,ab,kf. or radiograph*.ti,ab,kf. or radiolog*.ti,ab,kf. or roentgen*.ti,ab,kf. or rontgen*.ti,ab,kf. or 'x ray*'.ti,ab,kf. or xray*.ti,ab,kf.	1971927

6	exp Diagnostic Imaging/ or image*.ti,ab,kf. or imaging.ti,ab,kf.	3850036
7	2 or 3 or 4 or 5 or 6	5005413
8	exp "Sensitivity and Specificity"/ or (sensitivity or specificity).ti,ab. or (predict* or ROC-curve or receiver-operator*).ti,ab. or (likelihood or LR*).ti,ab. or exp Diagnostic Errors/ or (inter-observer or intra-observer or interobserver or intraobserver or validity or kappa or reliability).ti,ab. or reproducibility.ti,ab. or (test adj2 (re-test or retest)).ti,ab. or "Reproducibility of Results"/ or accuracy.ti,ab. or Diagnosis, Differential/ or Validation Study/ or ((false or true) adj3 (negative or positive)).ti,ab.	5270540
9	1 and 7 and 8	155
10	limit 9 to yr="2004 -Current"	131
11	10 not (comment/ or editorial/ or letter/) not ((exp animals/ or exp models, animal/) not humans/)	129
12	meta-analysis/ or meta-analysis as topic/ or (metaanaly* or meta-analy* or metanaly*).ti,ab,kf. or systematic review/ or cochrane.jw. or (prisma or prospero).ti,ab,kf. or ((systemati* or scoping or umbrella or "structured literature") adj3 (review* or overview*).ti,ab,kf. or (systemic* adj1 review*).ti,ab,kf. or ((systemati* or literature or database* or data-base*) adj10 search*).ti,ab,kf. or ((structured or comprehensive* or systemic*) adj3 search*).ti,ab,kf. or ((literature adj3 review*) and (search* or database* or data-base*)).ti,ab,kf. or (("data extraction" or "data source*") and "study selection").ti,ab,kf. or ("search strategy" and "selection criteria").ti,ab,kf. or ("data source*" and "data synthesis").ti,ab,kf. or (medline or pubmed or embase or cochrane).ab. or ((critical or rapid) adj2 (review* or overview* or synthes*).ti. or (((critical* or rapid*) adj3 (review* or overview* or synthes*)) and (search* or database* or data-base*)).ab. or (metasynthes* or meta-synthes*).ti,ab,kf.	795237
13	exp clinical trial/ or randomized controlled trial/ or exp clinical trials as topic/ or randomized controlled trials as topic/ or Random Allocation/ or Double-Blind Method/ or Single-Blind Method/ or (clinical trial, phase i or clinical trial, phase ii or clinical trial, phase iii or clinical trial, phase iv or controlled clinical trial or randomized controlled trial or multicenter study or clinical trial).pt. or random*.ti,ab. or (clinic* adj trial*).tw. or ((singl* or doubl* or treb* or tripl*) adj (blind\$3 or mask\$3)).tw. or Placebos/ or placebo*.tw.	2816230
14	Epidemiologic studies/ or case control studies/ or exp cohort studies/ or Controlled Before-After Studies/ or Case control.tw. or cohort.tw. or Cohort analy\$.tw. or (Follow up adj (study or studies)).tw. or (observational adj (study or studies)).tw. or Longitudinal.tw. or Retrospective*.tw. or prospective*.tw. or consecutive*.tw. or Cross sectional.tw. or Cross-sectional studies/ or historically controlled study/ or interrupted time series analysis/ [Onder exp cohort studies vallen ook longitudinale, prospectieve en retrospectieve studies]	4903419
15	Case-control Studies/ or clinical trial, phase ii/ or clinical trial, phase iii/ or clinical trial, phase iv/ or comparative study/ or control groups/ or controlled before-after studies/ or controlled clinical trial/ or double-blind method/ or historically controlled study/ or matched-pair analysis/ or single-blind method/ or (((control or controlled) adj6 (study or studies or trial)) or (compar* adj (study or studies)) or ((control or controlled) adj1 active) or "open label*" or ((double or two or three or multi or trial) adj (arm or arms)) or (allocat* adj10 (arm or arms)) or placebo* or "sham-control*" or ((single or double or triple or assessor) adj1 (blind* or masked)) or nonrandom* or "non-random*" or "quasi-experiment*" or "parallel group*" or "factorial trial" or "pretest posttest" or (phase adj5 (study or trial)) or (case* adj6 (matched or control*)) or (match* adj6 (pair or pairs or cohort* or control* or group* or healthy or age or sex or gender or patient* or subject* or participant*)) or (propensity adj6 (scor* or match*)).ti,ab,kf. or (confounding adj6 adjust*).ti,ab. or (versus or vs or compar*).ti. or ((exp cohort studies/ or epidemiologic studies/ or multicenter study/ or observational study/ or seroepidemiologic studies/ or (cohort* or 'follow up' or followup or longitudinal* or prospective* or retrospective* or observational* or multigent* or 'multi-cent*' or consecutive*).ti,ab,kf.) and ((group or groups or subgroup* or versus or vs or	5854976

	compar*).ti,ab,kf. or ('odds ratio*' or 'relative odds' or 'risk ratio*' or 'relative risk*' or aor or arr or rrr).ab. or (("OR" or "RR") adj6 CI).ab.))	
16	11 and 12 - SR	11
17	(11 and 13) not 16 - RCT	15
18	(11 and (14 or 15)) not (16 or 17) - Observatieel	53
19	11 not (16 or 17 or 18) - Overig	50
20	16 or 17 or 18 or 19 - Totaal	129

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5 Module 3 Conservatieve behandelingen

De module Conservatieve behandelingen bestaat uit de volgende onderwerpen:

- Niet-medicamenteuze behandelingen
- Medicamenteuze behandeling

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Submodule 3.1 Niet-medicamenteuze behandelingen

De submodule Niet-medicamenteuze behandelingen bestaat uit de volgende onderwerpen:

- Progressieve oefentherapie
- Functionele ondersteuning: brace
- Functionele ondersteuning: spalk
- Functionele ondersteuning: onderarm- en polsorthese

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Submodule 3.1.1 Progressieve oefentherapie

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Uitgangsvraag

Wat is de waarde van progressieve oefentherapie bij patiënten met klachten van mediale of laterale epicondylaire tendinopathie?

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Introduction (English)

Current clinical practice for lateral and medial epicondylar tendinopathy shows wide variation in progressive exercise therapy/physiotherapy and manual therapy approaches, and inconsistent use of braces, orthoses, arm sleeves, dry needling, and shockwave therapy. This variability reflects uncertainty in the evidence of the different treatment options and can result in suboptimal patient outcomes. A comprehensive synthesis of comparative effectiveness is needed to standardize care and guide shared decision-making. Clear, evidence-based recommendations may reduce ineffective or unnecessary interventions and yield health gains in pain reduction, elbow function, and timely return to work or sport.

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Search and select

A systematic review of the literature was performed to answer the following question(s): What is the efficacy of exercise therapy compared to placebo or wait-and-see policy, in patients suspected of lateral or medial epicondylar tendinopathy?

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Table 1. PICO

Patients	Patients with lateral medial epicondylar tendinopathy
Intervention	Exercise therapy
Control	Placebo, wait and see policy
Outcomes	Patient recovery, elbow function, pain, return to sports/work, quality of life, complications
Other selection criteria	Study design: systematic reviews and randomized controlled trials

Relevant outcome measures

The guideline panel considered patient recovery, elbow function, pain, return to sports or work and quality of life as **critical** outcome measures for decision making; and complications as an **important** outcome measure for decision making.

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5 A priori, the guideline panel did not define the outcome measures listed above but used the definitions described in the studies.

For the Visual Analogue Scale (VAS), the guideline panel defined a mean difference (MD) of 2.0 points (1.0 point for professional athletes) as a minimal clinically (patient) important difference and $0.91 < RR < 1.1$ for complications. For the outcome pain-free or minimal grip strength, the guideline panel used a MD of at least 5 kg or 50 N as minimal clinically (patient) important difference (Bohannon, 2019). For the remaining outcomes the guideline panel defined 25% ($0.8 \geq RR \geq 1.25$) for dichotomous outcomes and a MD of 10% for continuous outcomes as a minimal clinically (patient) important difference.

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Search and select (Methods)

A systematic literature search was performed by a medical information specialist using the following bibliographic databases: Embase.com and Ovid/Medline. Both databases were searched from 2004 to the 11th of December 2024 for systematic reviews and RCTs.

20 Systematic searches were completed using a combination of controlled vocabulary/subject headings (e.g., Emtree-terms, MeSH) wherever they were available and natural language keywords. The overall search strategy was derived from eight primary search concepts: (1) lateral/ medial epicondylar tendinopathy; (2) exercise therapy; (3) braces; (4) manual therapy; (5) orthoses; (6) armsleeves; (7) dry needling (8) shockwave therapy. Duplicates were removed using EndNote software. After deduplication a total of 669 records were imported for title/abstract screening.

Initially, 33 studies were selected based on title and abstract screening. After reading the full text, 28 studies were excluded (see the exclusion table under the tab 'Evidence tabellen'), and five studies were included, of which three studies were about progressive exercise therapy.

Summary of literature

Description of studies

35 A total of three studies on progressive exercise therapie in patients with lateral epicondylar tendinopathy were included in the analysis of the literature. Important study characteristics and results are summarized in table 2. The assessment of the risk of bias is summarized in the risk of bias tables (under the tab 'Evidence tabellen'). No studies about medial epicondylar tendinopathy were included.

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Exercise therapy

Wallis (2024) performed a Cochrane review in which they included randomized or quasi-randomized trials that described the favorable and unfavorable effects of manual therapy, exercises or both for adults with lateral elbow pain. The comparison between exercise therapy and placebo/wait-and-see policy was used for the purpose of this review. They searched three databases on 31 January 2024. Twenty-three trials were included in the Cochrane review, of which three were considered useful for the current guideline (Peterson, 2011; Tonks, 2007; Vuvan, 2020). The other trials were excluded because they compared other interventions. Trial inclusion criteria were: randomized or quasi-randomized trials about adults with lateral elbow pain. Interventions were manual therapy, exercises or both compared to placebo or minimal or no intervention. Comparisons of manual therapy and prescribed exercises with either intervention alone, with or without glucocorticoid injection were also included. Trials were excluded when testing a single application of an intervention or comparison of different types of manual therapy or prescribed exercises. Risk of bias was assessed by following methodological domains as recommended by Cochrane.

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Table 2 Characteristics of included studies

Study	Participants	Comparison	Follow-up	Outcome measures	Comments	Risk of bias (per outcome measure)*
<i>Included in systematic review Wallis (2024)</i>						
Peterson, 2011 <i>Sweden, primary care, RCT</i>	<p><u>N at baseline</u> I: 40 C: 41</p> <p><u>Age</u> (mean \pm SD) I: 49.8 \pm 8.1 C: 47.4 \pm 8.6</p> <p><u>Sex</u> (%female) I: 40.0 C: 43.9</p> <p><u>Pain level</u> (mean \pm SD) (/100) I: 42.2 \pm 26.5 units C: 33.9 \pm 29.3 units</p>	<p><u>Intervention</u> Exercise: progressive resistance exercise for extensor muscles of the affected forearm, including eccentric and concentric exercises. The loading equipment consisted of plastic water containers with a handle. The initial load was standardised to 1 kg (1 litre of water) for women and 2 kg for men. Participants sat in a chair and supported the forearm on the arm rest or on an adjacent table. Holding the handle of the plastic water container with a clenched fist in pronation and the container hanging freely in front of the armchair or below the table-top, the load was lifted or lowered. 3 sets of 15 repetitions per session, once daily for 3 months.</p> <p><u>Control</u></p>	3 months	Pain (VAS), elbow function (DASH), quality of life (Gothenburg Quality of Life questionnaire)	This study was supported by grants from the Swedish Research Council (grant no. K2005-27X-15293-01A), The Amersham Fund at Uppsala University, The Research Fund at Uppsala County Council, The Family Medicine Foundation and Uppsala University.	High (all outcomes)

		No intervention: single session of advice that the condition was painful but harmless, that the arm should be used in ordinary daily activities, and advised to 'wait and see'. Participants were permitted to use paracetamol as needed (no other pain relieving or anti-inflammatory medication).				
Tonks, 2007 <i>UK, orthopedic outpatient clinic, RCT</i>	<u>N at baseline</u> I: 12 C: 12 <u>Age</u> (mean ± SD) I: 43.8 ± 7.5 C: 43.4 ± 7.1 <u>Sex</u> (%female) NR <u>Pain score</u> (component of the Patient Related Forearm Evaluation Questionnaire, mean ± SD) I: 4.6 ± 1.8 C: 5.1 ± 1.2	<u>Intervention</u> Exercise: progressive slow, repetitive wrist and forearm stretching and muscle conditioning that was intensified over 4 phases. 4 to 6 times daily at home for 6 weeks. Each program included 10 repetitions in 2 or 3 series for each exercise. Every exercise period ended with stretching for at least 30 seconds in both flexion and extension and each individual exercise movement was done slowly while the patient counted to 8. <u>Control</u>	7 weeks	Pain (PRFEQ), elbow function (pain-free grip strength, PRFEQ)	Source of funding not reported.	High (all outcomes)

<p>Vuvan, 2020 Australia, primary care, RCT</p>	<p><u>N at baseline</u> I: 21 C: 19</p> <p><u>Age (mean ± SD)</u> I: 48.0 ± 7.9 C: 49.0 ± 10.2</p> <p><u>Sex (%female)</u> I: 33.3 C: 21.1</p> <p><u>Pain severity (rest) in previous week (mean ± SD) (/10):</u> I: 1.6 ± 1.1 units C: 2.0 ± 1.9 units</p> <p><u>Pain severity (worst) in previous week (/10):</u> I: 6.8 ± 1.8 units C: 7.8 ± 1.4 units</p>	<p><u>Observation</u> <u>Intervention</u> Exercise: progressive isometric wrist extension exercise, performed at home, using a container of water with a handle as resistance and progressed weekly by adding water to the container or increasing the duration of exercise, according to standardised criteria. Participants were instructed to hold the water-filled container in the affected arm, with the forearm resting on the edge of a table (upper body in sound postural alignment, elbow approximately 90° flexion, forearm pronated, wrist 30° extension). The other hand was used to lower the water container to the floor between sets. 1 daily session for 8 weeks; starting load was equivalent to 20% MVC of the unaffected side with 5% MVC added each fortnight; week 1, 3, 5, 7 - 30 sec</p>	<p>8 weeks</p>	<p>Pain (NRS), elbow function (pain-free grip strength, PRTEE), complications</p>	<p>Funding was provided by a program grant from the National Health and Medical Research Council of Australia (ID631717).</p>	<p>Some concerns (all outcomes)</p>
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		<p>holds, 4 reps, 120 secs total time under tension; week 2, 4, 6, 8: 45 sec holds, 3 reps, 135 secs total time under tension.</p> <p><u>Control</u> Advice: written and verbal general advice from the same physiotherapist regarding self-management and ergonomics</p>				
<p><i>DASH - Disabilities of the Arm, Shoulder and Hand questionnaire; NR - not reported; NRS – Numeric Rating Scale; PRTEE - Patient-Rated Tennis Elbow Evaluation; PRFEQ - Patient-Rated Forearm Evaluation Questionnaire; VAS – visual analogue scale;</i></p>						

5

*For further details, see risk of bias table in the appendix or systematic review

5 **Results**

Results were extracted from the data reported in the studies as means ± standard deviations (SDs). If data were presented by medians (interquartile ranges), results were converted into means ± SD by the conversion tool described by Weir (2018).

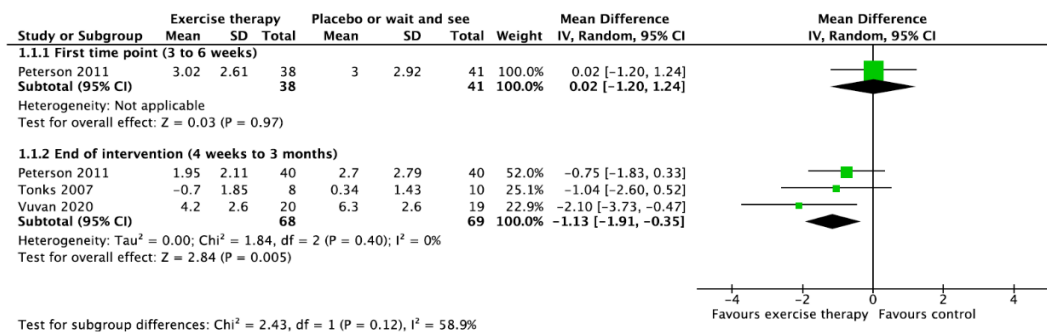
10 **Progressive exercise therapy**

Pain (crucial)

Three studies reported mean pain (Peterson, 2011; Tonks, 2007; Vuvan, 2020) (Figure 1). Peterson (2011) reported pain with VAS, Tonks (2007) with the pain sub score of the Patient-Rated Forearm Evaluation Questionnaire (PRFEQ) and Vuvan (2020) reported pain using the Numerical Rating Scale (NRS). Mean pain was reported on a scale from 0 to 10 where 0 represents no pain.

At 3 to 6 weeks, mean pain was 0.02 points higher (95% CI 1.20 lower to 1.24 higher) in the progressive exercise therapy group compared to wait and see policy (Figure 1), which is not clinically relevant for general patients with LET, nor for professional athletes with LET.

At 4 weeks to 3 months, mean pain was 1.13 points lower (95% CI 1.91 lower to 0.35 lower) in the progressive exercise therapy group compared to wait and see policy (Figure 1), in favor of the progressive exercise therapy group, but not clinically relevant for general patients with LET.



25 **Figure 1.** Mean pain in exercise therapy versus wait and see policy.

Quality of life (crucial)

30 One study (Peterson, 2011) reported the mean quality of life using the well-being score from Gothenburg Quality of Life questionnaire (7-point Likert scale ranging from ‘very bad’ to ‘excellent, could not be better’; higher is better). They reported a mean difference in quality of life score of 0.50 points lower (95%CI 1.01 lower to 0.01 higher) in favor of wait and see policy, but not clinically relevant.

35 **Elbow function (crucial)**

Tonks (2007) and Vuvan (2020) measured the outcome pain-free grip strength using a hand dynamometer (higher is better).

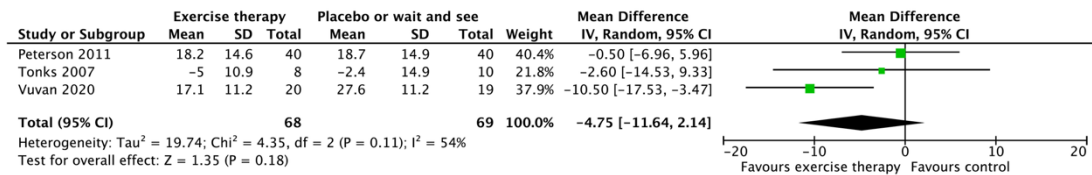
Tonks (2007) reported a MD in pain-free grip strength of 3.49 kg higher (95% CI 6.22 lower to 13.20 higher) in favor of progressive exercise therapy, but not clinically relevant.

40 Vuvan (2020) reported a MD in pain-free grip strength of 34.70 Newton lower (95% CI 98.71 lower to 29.31 higher) in favor of wait and see policy, but also not clinically relevant.

Besides, three studies reported mean disability (Peterson, 2011; Tonks, 2007; Vuvan, 2020) (Figure 2). Peterson (2011) used the Disabilities of the Arm, Shoulder and Hand questionnaire (DASH) to assess disability, Tonks (2007) used the disability sub score of the PRFEQ and Vuvan (2020) used the disability sub score of the Patient-Rated Tennis Elbow

45

5 Evaluation (PRTEE). Mean disability was reported on a scale from 0 to 100 where 0 represents no disability. Mean disability was 4.75 points lower (95% CI 11.64 points lower to 2.14 points higher), in favor of the progressive exercise therapy group, but not clinically relevant.



10 **Figure 2.** Mean disability in exercise therapy versus wait and see policy.

Return to sports/work (crucial)

No studies reported on return to sports/work for progressive exercise therapy.

15 Patient recovery (crucial)

No studies reported on patient recovery for progressive exercise therapy.

Complications (important)

20 One study (Vuvan, 2020) reported the proportion of any adverse events. In total, 3/21 patients who received progressive exercise therapy had any adverse event (by Vuvan (2020) reported as “feeling worse on the global rating of change scale” and classified as adverse event by Wallis (2024)) whereas no adverse events were reported in patients who received wait and see policy. This corresponded to a RR of 6.36 (95%CI 0.35 to 115.73), in favor of wait and see policy, and clinically relevant.

25

5 Summary of Findings

Summary of Findings table 1: Progressive exercise therapy versus placebo or wait and see policy

Outcome	Study results and measurements	Absolute effect estimates		Certainty of the evidence (Quality of evidence)	Summary
		Placebo or wait and see policy	Exercise therapy		
Pain (crucial) 3 to 6 weeks	Measured by: VAS Scale: 0-10, lower is better Based on data from 79 participants in 1 study	MD 0.02 points higher (95% CI, 1.20 lower to 1.24 higher)		Very low Due to serious risk of bias, Due to very serious imprecision ¹	The evidence is very uncertain about the effect of exercise therapy on pain after 3 to 6 weeks when compared with placebo or wait and see policy in <i>general patients</i> with lateral epicondylar tendinopathy. (Peterson, 2011)
Pain (crucial) 3 to 6 weeks	Measured by: VAS Scale: 0-10, lower is better Based on data from 79 participants in 1 study	MD 0.02 points higher (95% CI, 1.20 lower to 1.24 higher)		Very low Due to serious risk of bias, Due to serious indirectness, Due to very serious imprecision ²	The evidence is very uncertain about the effect of exercise therapy on pain after 3 to 6 weeks when compared with placebo or wait and see policy in <i>professional athletes</i> with lateral epicondylar tendinopathy. (Peterson, 2011)
Pain (crucial) 4 weeks to 3 months	Measured by: VAS, PRFEQ, NRS Scale mean pain: 0-10, lower is better Based on data from 137 participants in 3 studies	MD 1.13 points lower (95% CI, 1.91 lower to 0.35 lower)		Very low Due to serious risk of bias, Due to very serious imprecision ¹	The evidence is very uncertain about the effect of exercise therapy on pain after 4 weeks to 3 months when compared with placebo or wait and see policy in <i>general patients</i> with lateral epicondylar tendinopathy. (Peterson, 2011; Tonks, 2007; Vuvan, 2020)

<p>Quality of life (crucial)</p>	<p>Measured by: Gothenburg Quality of Life questionnaire (7-point Likert scale ranging from 'very bad' to 'excellent, could not be better'; higher is better) Based on data from 79 participants in 1 study</p>	<p>MD 0.50 points lower (95% CI, 1.10 lower to 0.01 higher)</p>	<p>Very low Due to serious risk of bias, Due to very serious imprecision¹</p>	<p>The evidence is very uncertain about the effect of exercise therapy on quality of life when compared with placebo or wait and see policy in <i>general patients</i> with lateral epicondylar tendinopathy. <i>(Peterson, 2011)</i></p>
<p>Elbow function - pain free grip strength (crucial)</p>	<p>Measured by: hand dynamometer (higher is better) Based on data from 57 participants in 2 studies</p>	<p>MD 3.49 kg higher (95% CI, 6.22 lower to 13.20 higher) (Tonks, 2007) MD of 34.70 Newton higher (95% CI, 98.71 lower to 29.31 higher) (Vuvan, 2020)</p>	<p>Very low Due to serious risk of bias, Due to very serious imprecision¹</p>	<p>The evidence is very uncertain about the effect of exercise therapy on elbow function measured with the pain free grip strength when compared with placebo or wait and see policy in <i>general patients</i> with lateral epicondylar tendinopathy. <i>(Tonks, 2007; Vuvan, 2020)</i></p>
<p>Elbow function – disability (crucial)</p>	<p>Measured by: DASH, PRFEQ, PRTEE Scale mean disability: 0-100, lower is better Based on data from 137 participants in 3 studies</p>	<p>MD 4.75 points lower (95% CI, 11.64 lower to 2.14 higher)</p>	<p>Very low Due to serious risk of bias, Due to very serious imprecision¹</p>	<p>The evidence is very uncertain about the effect of exercise therapy on elbow function measured as disability when compared with placebo or wait and see policy in <i>general patients</i> with lateral epicondylar tendinopathy. <i>(Peterson, 2011; Tonks, 2007; Vuvan, 2020)</i></p>
<p>Return to sports/work (crucial)</p>			<p>No GRADE (no evidence was found)</p>	<p>No evidence was found regarding the effect of exercise therapy on return to sports or work when compared with placebo or wait and see policy in <i>general patients</i> with lateral epicondylar tendinopathy.</p>
<p>Patient recovery (crucial)</p>			<p>No GRADE (no evidence was found)</p>	<p>No evidence was found regarding the effect of exercise therapy on patient recovery when compared with placebo or wait and see policy in <i>general patients</i> with lateral epicondylar tendinopathy.</p>

Complications (important)	Based on data from 40 participants in 1 study	Three of the 21 patients who received exercise therapy had any adverse event.	Very low Due to serious risk of bias, Due to very serious imprecision ¹	The evidence is very uncertain about the effect of exercise therapy on complications when compared with placebo or wait and see policy in <i>general patients</i> with epicondylar tendinopathy. <i>(Vuvan, 2020)</i>
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- 5
1. **Risk of bias: serious. Concerns about blinding.**
Imprecision: very serious. Due to the optimal information size which was not achieved.
 2. **Risk of bias: serious. Concerns about blinding.**
Indirectness: serious. Study results in the general patient with LET may not be applicable in professional athletes with LET.
Imprecision: very serious. Overlap of 95% CI with both boundaries of clinical relevance (VAS=1.0 point)
- 10

5 **Overwegingen – van bewijs naar aanbeveling (NL)**

Balans tussen gewenste en ongewenste effecten

Progressieve oefentherapie

10 Er werd één systematische review (drie relevante RCT's) gevonden die rapporteerde over oefentherapie vergeleken met placebo of afwachtend beleid. Er werd geen klinisch relevant effect gevonden op de cruciale uitkomstmaten pijn, kwaliteit van leven en elleboogfunctie. De bewijskracht was zeer laag. Voor de belangrijke uitkomstmaat complicaties werd een klinisch relevant effect gevonden in het voordeel van afwachtend beleid. Echter was de bewijskracht zeer laag. Geen van de studies rapporteerde over de cruciale uitkomstmaat terugkeer naar sport/werk of herstel van de patiënt. Op basis van deze resultaten kan er dus geen voorkeur worden uitgesproken voor progressieve oefentherapie of placebo of afwachtend beleid.

Kwaliteit van bewijs

Progressieve oefentherapie

20 De overall kwaliteit van bewijs is zeer laag. Dit betekent dat we zeer onzeker zijn over het gevonden geschatte effect van de cruciale uitkomstmaten. Er is afgewaardeerd vanwege (zeer) ernstige:

- Risk of Bias: methodologische beperkingen, vanwege onzekerheid over blindering.
- Indirectheid: indirectheid van het bewijs door verschillen in populatie (studieresultaten in algemene patiënten met LET zijn mogelijk niet 1-op-1 te vertalen naar topsporters met LET).
- 25 • Imprecisie: onnauwkeurigheid, vanwege het niet bereiken van de optimale steekproefgrootte en omdat het BI de grenzen van klinische relevantie overschrijdt.

Waarden en voorkeuren van patiënten (en eventueel hun naasten/verzorgers)

30 Voor veel patiënten met LET of MET staat pijnvermindering en herstel van functie centraal, omdat dit direct invloed heeft op werk en sportdeelname. Interventies zoals (progressieve) oefentherapie worden in de praktijk als ondersteunend ervaren, omdat deze behandelingen het gevoel geven bij te dragen aan herstel of tijdelijk pijnverlichting bieden. In de wetenschappelijke literatuur worden echter geen klinisch relevante effecten gevonden. Het risico op complicaties bij oefentherapie is zeer laag, wat voor patiënten geruststellend kan zijn. Duidelijke voorlichting rondom niet-35 medicamenteuze interventies is belangrijk. Patiënten dienen realistische verwachtingen te hebben van het mogelijke effect op pijn en functieherstel, evenals van de onzekerheid over de langetermijneffecten. Het is van belang dat er tijd en ruimte is om samen met de patiënt af te wegen in hoeverre de klachten het dagelijks functioneren, werk of sport beïnvloeden, en of de patiënt bereid is eventuele ongemakken van de interventie te accepteren. De waarde van potentieel sneller herstel of ondersteuning hierbij (los van het daadwerkelijke effect) kan daarbij groter zijn voor 40 patiënten met fysiek zwaar werk dan voor patiënten waarbij de klachten het dagelijks functioneren minder beperken.

Kostenaspecten

45 De interventies leveren over het algemeen meer kosten op dan een afwachtend beleid, doordat oefentherapie additionele zorg vraagt. Een belangrijk onderdeel van oefentherapie is patiënteducatie en adviezen ten aanzien van load management; deze elementen zijn relatief goedkoop, ondersteunen zelfmanagement en zouden kunnen bijdragen aan kosteneffectieve begeleiding. Daar staat tegenover dat, wanneer een interventie daadwerkelijk leidt tot potentieel 50 sneller functieherstel, dit mogelijk kan bijdragen aan korter verzuim van werk of sportactiviteiten en daarmee maatschappelijke kosten kan beperken. De bewijskracht is echter zeer laag en onzeker. Het is niet duidelijk of de hogere zorgkosten van interventies opwegen tegen mogelijke gezondheidswinst en maatschappelijke baten.

5 Gelijkheid ((health) equity/equitable)

Mocht er gekozen worden voor een niet-medicamenteuze behandeling van een LET of MET, dan is het belangrijk dat toegang tot zorg zo min mogelijk afhankelijk is van sociaaleconomische status, woonplaats of aanvullende verzekering. Niet alle patiënten hebben een aanvullende verzekering die fysiotherapie of oefentherapie volledig vergoed, wat kan leiden tot ongelijkheid in toegang tot de
10 zorg. Online oefenprogramma's kunnen bijdragen aan gelijke toegankelijkheid, doordat deze voor iedereen beschikbaar zijn en de afhankelijkheid van fysieke zorgmomenten verminderen. Het aanbieden van zorg in deze flexibele en laagdrempelige vorm kan helpen om gezondheidsverschillen tussen patiënten te verkleinen. De focus van de niet-medicamenteuze behandeling ligt voornamelijk op fysiotherapie of oefentherapie met patiënteducatie en duidelijke adviezen over load
15 management, zodat patiënten daarna zelfstandig kunnen oefenen.

Aanvaardbaarheid:

Ethische aanvaardbaarheid

Er zijn geen ethische bezwaren van toepassing voor niet-medicamenteuze interventies, mits deze
20 interventies worden toegepast met een duidelijke voorlichting en in samenspraak met de patiënt.

Duurzaamheid

Fysiotherapie en oefentherapie kunnen leiden tot extra reisbewegingen en daarmee een hogere CO₂
25 uitstoot. Patiënteducatie en online oefenprogramma's kunnen dit deels ondervangen en zo bijdragen aan een duurzamere zorgpraktijk.

Haalbaarheid

De niet-medicamenteuze interventies bij LET en MET zijn goed haalbaar. In Nederland is er een ruim
30 en landelijk dekkend aanbod van fysiotherapeuten, oefentherapeuten en andere zorgverleners die deze behandelingen kunnen aanbieden.

Aanbevelingen

Rationale van de aanbeveling: weging van argumenten voor en tegen de interventies

De literatuursamenvatting (gericht op oefentherapie) laat zien dat progressieve oefentherapie
35 weinig tot geen effect heeft op pijnvermindering en functieherstel bij een LET of MET. Echter kunnen patiënten deze behandelingen wel als ondersteunend ervaren en is er geen risico op complicaties.

Eindoordeel:

40 Zwakke aanbeveling vóór progressieve oefentherapie.

Overweeg een verwijzing voor progressieve oefentherapie, met nadruk op educatie over pijn en load management ter bevordering van zelfmanagement. Dit kan vooral waardevol zijn voor patiënten met een fysiek beroep of sporters.

Kennisvragen

Tijdens de ontwikkeling van deze module is gebleken dat er binnen deze module nog te weinig
45 bewijs is voor de onderbouwing van de aanbeveling en dus kennisvragen bestaan. De werkgroep meent dat (vervolg)onderzoek wenselijk is om in de toekomst een duidelijker antwoord te kunnen geven op vragen uit de praktijk.

- 5 Kennisvraag 1:
- Wat is de (kosten)- effectiviteit en veiligheid van progressieve oefentherapie bij patiënten met mediale epicondylaire tendinopathie (MET) vergeleken met placebo of een afwachtend beleid?

10 Toelichting:
Voor MET zijn geen gerandomiseerde studies geïnccludeerd. Hierdoor zijn aanbevelingen voor MET grotendeels geëxtrapoleerd van LET, wat leidt tot indirectheid van bewijs. Goed opgezette, multicenter RCT's met duidelijke diagnostische criteria en relevante uitkomstmaten zijn nodig om de effectiviteit en veiligheid specifiek voor MET vast te stellen.

15 Kennisvraag 2:

- Leidt progressieve oefentherapie bij LET of MET tot snellere terugkeer naar werk of sport en tot beter patiënt gerapporteerd herstel vergeleken met placebo of afwachtend beleid?

20 Toelichting:
Terugkeer naar werk of sport en patiëntherstel zijn cruciale uitkomstmaten voor besluitvorming, maar worden in de huidige literatuur nauwelijks gerapporteerd. Hierdoor is het onduidelijk of progressieve oefentherapie klinisch relevante maatschappelijke of functionele winst oplevert.

25 Toekomstig onderzoek dient deze uitkomsten systematisch en gestandaardiseerd te meten, bij voorkeur met voldoende follow-upduur ($\geq 6-12$ maanden).

Kennisvraag 3

- 30
- Wat is de effectiviteit van gestandaardiseerde oefentherapieprogramma's (met duidelijk gedefinieerde type contractie, intensiteit, frequentie en duur) bij LET en MET, en in hoeverre beïnvloedt therapietrouw het behandelresultaat?

35 Toelichting:
De huidige literatuur laat een grote variatie zien in type oefentherapie (excentrisch, concentrisch, isometrisch), intensiteit, frequentie en behandelduur, terwijl de bewijskracht voor effectiviteit zeer laag is. Door deze heterogeniteit is het niet mogelijk om optimale behandelparameters vast te stellen of resultaten goed te vergelijken. Daarnaast wordt therapietrouw zelden systematisch gemeten, terwijl dit mogelijk van invloed is op het behandelresultaat. Goed opgezette, voldoende

40 grote RCT's met gestandaardiseerde interventies en monitoring van adherence zijn nodig om de klinische meerwaarde van oefentherapie beter te kunnen bepalen.

5 Implementeren-tabel
Implementatietabel

Vraag	Antwoord: Kruis aan en licht toe/ beschrijf	Toelichting keuze:
11. Wat was het onderliggende probleem om deze uitgangsvraag uit te werken?		Ongewenste praktijkvariatie
	X	Nieuwe evidentie
		Anders
12. Maak een inschatting over hoeveel patiënten het ongeveer gaat waar de aanbeveling betrekking op heeft?		< 1000
		< 5000
	X	5000-40.000
13. Is de aanbeveling onderdeel van een bredere set interventies of verwant aan andere richtlijnen of modules? Zo ja, hoe verhoudt zij zich daartoe en moet hiermee rekening worden gehouden bij de implementatie, of kan de aanbeveling als losstaand worden beschouwd?		Ja
	X	Nee
14. Belemmeringen en kansen op verschillende niveaus voor landelijke toepassing van de aanbeveling:		Belemmerende factoren
Richtlijn/ klinisch traject (innovatie)	X	Aanbeveling sluit mogelijk niet aan bij bestaande routine om oefentherapie te geven voor LET of MET
Zorgverleners (artsen en verpleegkundigen)	X	Aanpassing in attitude nodig, omdat het nu heel gebruikelijk is om fysiotherapie of oefentherapie te geven bij LET of MET
Patiënt/ cliënt (naasten)	X	Patiënt begrijpt mogelijk niet waarom conservatieve behandelingen niet meer gegeven worden. Goede uitleg nodig.
Sociale context	X	Werkdruk en sportcultuur gericht op doorbelasting kunnen belastingreductie bemoeilijken.
Organisatorische context		
Financiële en juridische context	X	
15. A) Welke personen/partijen zijn van belang bij het toepassen van de aanbeveling in de praktijk? (kruis aan) B) Wat is er nodig van deze personen/partijen om de aanbeveling in de praktijk te kunnen brengen? Denk aan aanpassingen in gedrag, werkwijzen, beleid, samenwerking of andere randvoorwaarden.		A
		Patiënt/ cliënt (naaste)
	X	Professional
	X	Beroepsvereniging, nl
		Ziekenhuis (raad van bestuur/UMCNL (voorheen NFU)/NVZ)
		B
		Stelt indicatie, geeft voorlichting en verwijst zo nodig
		Goede verspreiding van richtlijn via de gebruikelijke kanalen in de 1 ^e en 2 ^e lijn

	X	Zorgverzekeraars/ NZa	geen aanpassing nodig; aanbevolen zorg kan als aanvullende verzekering in het pakket
		Zorginstituut [duiding nodig]	
		Anders	
16. Binnen welk tijdsbestek moet de aanbeveling zijn geïmplementeerd?	X	< 1 jaar	
		binnen 2-3 jaar	
17. Conclusie: is er extra actie en/of ondersteuning nodig voor implementatie van de aanbeveling? <i>De reguliere implementatieroutes (publicatie en disseminatie via officiële kanalen, opname in professionele standaarden, scholing en nascholing, gebruik van bestaande ICT systemen, audits en visitaties) van de richtlijnmodule alleen is onvoldoende.</i>		Ja	
	X	Nee	De reguliere implementatieroutes van de richtlijnmodule is voldoende.
18. Plaatsing op de Landelijke Implementatieagenda Medisch Specialistische zorg is gewenst. <i>Het gaat om zorg die (grotendeels) wordt uitgevoerd binnen de ziekenhuismuren. Succesvolle implementatie vraagt om actieve betrokkenheid en samenwerking van meerdere relevante partijen binnen de zorgpraktijk.</i>		Ja *	
	X	Nee	Zie boven, implementatie kan via reguliere kanalen plaatsvinden

- 5 *Deze aanbeveling komt mogelijk in aanmerking voor plaatsing op de Landelijke Implementatieagenda van het programma Zorg Evaluatie & Gepast Gebruik (ZE&GG), waarin alle betrokken partijen in de medisch-specialistische zorg samenwerken aan de implementatie van bewezen beste zorg. De Federatie levert namens het veld goed onderbouwde aanbevelingen aan, die zijn getoetst op de behoefte aan een implementatie-impuls. De onderwerpen op de Implementatieagenda zijn onderdeel van landelijke zorginkoopafspraken tussen zorgverzekeraars en zorgaanbieders. Voor de beoordeling van aanbevelingen uit richtlijnen wordt gebruikgemaakt van de implementatietabel. Op basis hiervan kunnen we de andere partijen goed informeren en gezamenlijk besluiten of plaatsing op de Implementatieagenda passend is.
- 10

5 **Literatuur**

Bohannon RW. Minimal clinically important difference for grip strength: a systematic review. *J Phys Ther Sci.* 2019 Jan;31(1):75-78. doi: 10.1589/jpts.31.75. Epub 2019 Jan 10. PMID: 30774209; PMCID: PMC6348186.

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Wallis JA, Bourne AM, Jessup RL, Johnston RV, Frydman A, Cyril S, Buchbinder R. Manual therapy and exercise for lateral elbow pain. *Cochrane Database Syst Rev.* 2024 May 28;5(5):CD013042. doi: 10.1002/14651858.CD013042.pub2. PMID: 38802121; PMCID: PMC11129914.

5 Bijlagen bij Submodule 3.1.1. Progressieve oefentherapie

Risk of Bias tables

See the systematic review of Wallis (2024) for the risk of bias of the individual studies.

5 **Table of excluded studies**

Reference	Reason for exclusion
Bisset L, Smidt N, Van der Windt DA, Bouter LM, Jull G, Brooks P, Vicenzino B. Conservative treatments for tennis elbow do subgroups of patients respond differently? <i>Rheumatology</i> (Oxford). 2007 Oct;46(10):1601-5. doi: 10.1093/rheumatology/kem192. PMID: 17890274.	Use of more recent SR from Wallis 2024. These 2 RCTs (Smidt 2002 and Bisset 2006) are also included
Boisubert B, Brousse C, Zaoui A, Montigny JP. Nonsurgical treatment of tennis elbow. In <i>Annales de Readaptation et de Medecine Physique: Revue Scientifique de la Societe Francaise de Reeducation Fonctionnelle de Readaptation et de Medecine Physique</i> 2004 Aug 1 (Vol. 47, No. 6, pp. 346-355).	Full text only available in French
Buchbinder R, Green SE, Youd JM, Assendelft WJ, Barnsley L, Smidt N. Shock wave therapy for lateral elbow pain. <i>Cochrane Database Syst Rev</i> . 2005 Oct 19;2005(4):CD003524. doi: 10.1002/14651858.CD003524.pub2. PMID: 16235324; PMCID: PMC8717012.	Wrong intervention: ECSWT
Buchbinder R, Green SE, Youd JM, Assendelft WJ, Barnsley L, Smidt N. Systematic review of the efficacy and safety of shock wave therapy for lateral elbow pain. <i>J Rheumatol</i> . 2006 Jul;33(7):1351-63. PMID: 16821270.	Double with Cochrane SR from Buchbinder 2005.
Chen Q, Shen P, Zhang B, Chen Y, Zheng C. Long-term effectiveness of conservative management for lateral epicondylitis: a meta-analysis. <i>J Plast Surg Hand Surg</i> . 2023 Aug 24;58:67-73. doi: 10.2340/jphs.v58.12333. PMID: 37615315.	ECSWT and injections not relevant + Use more recent review of Wallis 2024 for exercise
Kaplan S, Sah V, Ozkan S, Adanas C, Delen V. Comparative Effects of Focused and Radial Extracorporeal Shock Wave Therapies on Lateral Epicondylitis: A Randomised Sham-controlled Trial. <i>J Coll Physicians Surg Pak</i> . 2023 May;33(5):554-559. doi: 10.29271/jcpsp.2023.05.554. PMID: 37190692.	Wrong intervention: ECSWT
Karanasios S, Korakakis V, Whiteley R, Vasilogiorgis I, Woodbridge S, Giotfos G. Exercise interventions in lateral elbow tendinopathy have better outcomes than passive interventions, but the effects are small: a systematic review and meta-analysis of 2123 subjects in 30 trials. <i>Br J Sports Med</i> . 2021 May;55(9):477-485. doi: 10.1136/bjsports-2020-102525. Epub 2020 Nov 4. PMID: 33148599.	Use more recent review of Wallis 2024
Kim YJ, Wood SM, Yoon AP, Howard JC, Yang LY, Chung KC. Efficacy of Nonoperative Treatments for Lateral Epicondylitis: A Systematic Review and Meta-Analysis. <i>Plast Reconstr Surg</i> . 2021 Jan 1;147(1):112-125. doi: 10.1097/PRS.0000000000007440. PMID: 33002980.	Injections not relevant for this module, overlapping studies for electrophysiotherapy with more recent SR from Xiong 2024, use more recent SR from Heales 2020 with search date Sep-2019 for physical therapy
Lapner P, Alfonso A, Hebert-Davies J, Pollock JW, Marsh J, King GJW; Canadian Shoulder and Elbow Society (CSES). Nonoperative treatment of lateral epicondylitis: a systematic review and meta-analysis. <i>JSES Int</i> . 2021 Dec 18;6(2):321-330. doi: 10.1016/j.jseint.2021.11.010. PMID: 35252934; PMCID: PMC8888180.	Injections not relevant + more recent SR on physiotherapy available, namely Chen's 2023
Lapner P, Alfonso A, Herbert-Davies J, Pollock JW, Marsh J, King G; Canadian Shoulder and Elbow Society (CSES). Position statement: nonoperative management of lateral epicondylitis in adults. <i>Can J Surg</i> . 2022 Sep 21;65(5):E625-E629. doi: 10.1503/cjs.019221. PMID: 36130807; PMCID: PMC9503571.	Position statement

Li Y, Mei L, Rahat S, Pang L, Li R, Xiong Y, Li J, Tang X. The efficacy of kinesio tape in patients with lateral elbow tendinopathy: A systematic review and meta-analysis of prospective randomized controlled trials. <i>Heliyon</i> . 2024 Feb 4;10(3):e25606. doi: 10.1016/j.heliyon.2024.e25606. PMID: 38356591; PMCID: PMC10865320.	Wrong intervention: tape
Liu WC, Chen CT, Lu CC, Tsai YC, Liu YC, Hsu CW, Shih CL, Chen PC, Fu YC. Extracorporeal Shock Wave Therapy Shows Superiority Over Injections for Pain Relief and Grip Strength Recovery in Lateral Epicondylitis: A Systematic Review and Network Meta-analysis. <i>Arthroscopy</i> . 2022 Jun;38(6):2018-2034.e12. doi: 10.1016/j.arthro.2022.01.025. Epub 2022 Jan 31. PMID: 35093494.	Wrong intervention: ECSWT and injections
Long L, Briscoe S, Cooper C, Hyde C, Crathorne L. What is the clinical effectiveness and cost-effectiveness of conservative interventions for tendinopathy? An overview of systematic reviews of clinical effectiveness and systematic review of economic evaluations. <i>Health Technol Assess</i> . 2015 Jan;19(8):1-134. doi: 10.3310/hta19080. PMID: 25629427; PMCID: PMC4781358.	Wrong outcome: cost-effectiveness
Lowdon H, Chong HH, Dhingra M, Goma AR, Teece L, Booth S, Watts AC, Singh HP. Comparison of Interventions for Lateral Elbow Tendinopathy: A Systematic Review and Network Meta-Analysis for Patient-Rated Tennis Elbow Evaluation Pain Outcome. <i>J Hand Surg Am</i> . 2024 Jul;49(7):639-648. doi: 10.1016/j.jhsa.2024.03.007. Epub 2024 Apr 28. PMID: 38678448.	ECSWT, dry needling, kinesiotape. Use for physiotherapy/exercise more recent Cochrane review by Wallis 2024
Menta R, Randhawa K, Côté P, Wong JJ, Yu H, Sutton D, Varatharajan S, Southerst D, D'Angelo K, Cox J, Brown C, Dion S, Mior S, Stupar M, Shearer HM, Lindsay GM, Jacobs C, Taylor-Vaisey A. The effectiveness of exercise for the management of musculoskeletal disorders and injuries of the elbow, forearm, wrist, and hand: a systematic review by the Ontario Protocol for Traffic Injury Management (OPTIMa) collaboration. <i>J Manipulative Physiol Ther</i> . 2015 Sep;38(7):507-20. doi: 10.1016/j.jmpt.2015.06.002. Epub 2015 Jun 27. PMID: 26130104.	Use the more recent Cochrane review by Wallis 2024
Ng GY, Chan HL. The immediate effects of tension of counterforce forearm brace on neuromuscular performance of wrist extensor muscles in subjects with lateral humeral epicondylitis. <i>J Orthop Sports Phys Ther</i> . 2004 Feb;34(2):72-8. doi: 10.2519/jospt.2004.34.2.72. PMID: 15029940.	Wrong intervention: strap tensions
Nimgade A, Sullivan M, Goldman R. Physiotherapy, steroid injections, or rest for lateral epicondylitis? What the evidence suggests. <i>Pain Pract</i> . 2005 Sep;5(3):203-15. doi: 10.1111/j.1533-2500.2005.05307.x. PMID: 17147582.	Steroids not relevant; Wallis 2024 for physiotherapy more recent
Rompe JD, Maffulli N. Repetitive shock wave therapy for lateral elbow tendinopathy (tennis elbow): a systematic and qualitative analysis. <i>Br Med Bull</i> . 2007;83:355-78. doi: 10.1093/bmb/ldm019. Epub 2007 Jul 11. PMID: 17626054.	Wrong intervention: ECSWT
Samiei S, Aminianfar A, Paknazar F. Ultra-sonographic study of the effect of dry needling of extensor muscles combined with Mulligan mobilization technique on extensor muscle tendon thickness, pain and upper limb function in patients with lateral epicondylitis: A double-blinded randomized clinical trial. <i>koomesh</i> . 2021;23(6):e153306	Full text only available in Persian

Sayegh ET, Strauch RJ. Does nonsurgical treatment improve longitudinal outcomes of lateral epicondylitis over no treatment? A meta-analysis. Clin Orthop Relat Res. 2015 Mar;473(3):1093-107. doi: 10.1007/s11999-014-4022-y. Epub 2014 Oct 29. PMID: 25352261; PMCID: PMC4317462.	SR of Wallis 2024 more recent
Sims SE, Miller K, Elfar JC, Hammert WC. Non-surgical treatment of lateral epicondylitis: a systematic review of randomized controlled trials. Hand (N Y). 2014 Dec;9(4):419-46. doi: 10.1007/s11552-014-9642-x. PMID: 25414603; PMCID: PMC4235906.	Injections, laser therapy, ESWT. Brace relevant, but incorrect control group used
Srinivas MR, Kalyan G, Rao JB, Kumar TS. " A Comparitive Study On The Effectiveness Of Ultrasound With Progressive Strengthening Exercises In Lateral Epicondylitis". NeuroQuantology. 2022 Nov 1;20(16):297-304.	Wrong comparison: ultrasound
Tennis elbow: injections, PT, or wait-and-see? J Fam Pract. 2007 Feb;56(2):98. PMID: 17607826.	Wrong study design: commentary
Wood SM, Yoon AP, Tseng HJ, Yang LY, Chung KC. Comparative Effectiveness of Physical Therapy and Electrophysiotherapy for the Treatment of Lateral Epicondylitis: A Network Meta-Analysis. Plast Reconstr Surg. 2022 Sep 1;150(3):594e-607e. doi: 10.1097/PRS.0000000000009437. Epub 2022 Jul 1. PMID: 35791264.	The included studies do not meet the C in the established PICO
Xiong Y, Wen T, Jin S, Lin L, Shao Q, Peng Y, Zheng Q, Li W. Efficacy and safety of extracorporeal shock wave therapy for upper limb tendonitis: a systematic review and meta-analysis of randomized controlled trials. Front Med (Lausanne). 2024 Jul 30;11:1394268. doi: 10.3389/fmed.2024.1394268. PMID: 39139789; PMCID: PMC11319137.	Wrong intervention: ECSWT
Yoon SY, Kim YW, Shin IS, Moon HI, Lee SC. Does the Type of Extracorporeal Shock Therapy Influence Treatment Effectiveness in Lateral Epicondylitis? A Systematic Review and Meta-analysis. Clin Orthop Relat Res. 2020 Oct;478(10):2324-2339. doi: 10.1097/CORR.0000000000001246. PMID: 32332245; PMCID: PMC7491893.	Wrong intervention: ECSWT
Zheng C, Zeng D, Chen J, Liu S, Li J, Ruan Z, Liang W. Effectiveness of extracorporeal shock wave therapy in patients with tennis elbow: A meta-analysis of randomized controlled trials. Medicine (Baltimore). 2020 Jul 24;99(30):e21189. doi: 10.1097/MD.00000000000021189. PMID: 32791694; PMCID: PMC7387053.	Wrong intervention: ECSWT
Zunke P, Auffarth A, Hitzl W, Moursy M. The effect of manual therapy to the thoracic spine on pain-free grip and sympathetic activity in patients with lateral epicondylalgia humeri. A randomized, sample sized planned, placebo-controlled, patient-blinded monocentric trial. BMC Musculoskelet Disord. 2020 Mar 24;21(1):186. doi: 10.1186/s12891-020-3175-y. PMID: 32209068; PMCID: PMC7093973.	Wrong setting: lab setting

5

Literature search strategy

Algemene informatie

Cluster/richtlijn: Tennisarm en Golfarm - UV3 Behandeling conservatief
Uitgangsvraag/modules: Wat is de waarde van oefentherapie, manuele therapie, braces, orthoses, en/of armsleeves, dry needling en shockwave therapie bij patiënten met klachten van epicondylitis lateralis of epicondylitis medialis?

Database(s): Embase.com, Ovid/Medline	Datum: 11 december 2024
Periode: vanaf 2004	Talen: geen restrictie
Literatuurspecialist: Esther van der Bijl	Rayyan review: https://new.rayyan.ai/reviews/1258141/overview
BMI-zoekblokken: voor verschillende opdrachten wordt (deels) gebruik gemaakt van de zoekblokken van BMI-Online https://blocks.bmi-online.nl/ Deduplication: voor het ontdebelen is gebruik gemaakt van http://dedupendnote.nl/	
Toelichting: Voor deze vraag is gezocht op de elementen tennisarm/ golfarm EN (oefentherapie OF manuele therapie OF braces OF orthoses OF armsleeves OF dry needling OF shockwave therapie) . Het sleutelartikel wordt gevonden met deze search.	
Te gebruiken voor richtlijntekst: A systematic literature search was performed by a medical information specialist using the following bibliographic databases: Embase.com and Ovid/Medline. Both databases were searched from 2004 to the 11 th of December 2024 for systematic reviews and RCTs. Systematic searches were completed using a combination of controlled vocabulary/subject headings (e.g., Emtree-terms, MeSH) wherever they were available and natural language keywords. The overall search strategy was derived from eight primary search concepts: (1) lateral/ medial epicondylitis; (2) exercise therapy; (3) braces; (4) manual therapy; (5) orthoses; (6) armsleeves; (7) dry needling (8) shockwave therapy. Duplicates were removed using EndNote software. After deduplication a total of 669 records were imported for title/abstract screening.	

5

Zoekopbrengst - 11 december 2024

	EMBASE	OVID/MEDLINE	Ontdubbeld
SR	205	148	228
RCT	371	278	441
Totaal	576	426	669*

*in Rayyan

Zoekstrategie - 11 december 2024

10

Embase.com

No.	Query	Results
#1	'tennis elbow'/exp OR 'medial epicondylitis'/exp OR (((tennis* OR golf*) NEAR/3 (arm* OR elbow*)):ti,ab,kw) OR (((epicondylitis OR epycondylitis OR epicondylitides OR epycondylitides) NEAR/3 (humer* OR lateral* OR external* OR radiohumer* OR medial*)):ti,ab,kw) OR (((elbow* OR epicondyl*) NEAR/7 (tendinopath* OR tendonopath* OR tendinos*)):ti,ab,kw)	4559
#2	'kinesiotherapy'/exp OR 'training'/exp OR 'musculoskeletal manipulation'/exp OR 'orthosis'/exp OR 'brace'/de OR 'arm brace'/de OR 'elbow brace'/exp OR 'manipulative medicine'/exp OR 'dry needling'/exp OR 'shock wave'/exp OR 'shock wave therapy'/exp OR 'physiotherapy'/exp OR 'arm exercise'/exp OR (((orthoepedic* OR orthopedic* OR orthotic*) NEAR/3 (device* OR support*)):ti,ab,kw) OR ((elbow* NEAR/3 (immobiliz* OR immobilis*)):ti,ab,kw) OR (((manipulati* OR manual* OR physical* OR physio) NEAR/3 (therap* OR treatment* OR medicine*)):ti,ab,kw) OR ((arm* NEAR/3 sleeve*):ti,ab,kw) OR exercis*:ti,ab,kw OR kinesiotherap*:ti,ab,kw OR kinesitherap*:ti,ab,kw OR training*:ti,ab,kw OR 'musculoskeletal manipulati*':ti,ab,kw OR 'kinetic* chain*':ti,ab,kw OR orth?s*:ti,ab,kw OR brace*:ti,ab,kw OR armsleeve*:ti,ab,kw OR 'dry needl*':ti,ab,kw OR 'shock wave*':ti,ab,kw OR 'shockwave*':ti,ab,kw OR physiotherap*:ti,ab,kw	1595820

#3	#1 AND #2	1686
#4	#3 AND [2004-2025]/py NOT ('conference abstract'/it OR 'editorial'/it OR 'letter'/it OR 'note'/it) NOT (('animal'/exp OR 'animal experiment'/exp OR 'animal model'/exp OR 'nonhuman'/exp) NOT 'human'/exp)	1085
#5	'meta analysis'/exp OR 'meta analysis (topic)'/exp OR metaanaly*:ti,ab OR 'meta analy*':ti,ab OR metanaly*:ti,ab OR 'systematic review'/de OR 'cochrane database of systematic reviews'/jt OR prisma:ti,ab OR prospero:ti,ab OR (((systemati* OR scoping OR umbrella OR 'structured literature') NEAR/3 (review* OR overview*)):ti,ab) OR ((systemic* NEAR/1 review*):ti,ab) OR (((systemati* OR literature OR database* OR 'data base*') NEAR/10 search*):ti,ab) OR (((structured OR comprehensive* OR systemic*) NEAR/3 search*):ti,ab) OR (((literature NEAR/3 review*):ti,ab) AND (search*:ti,ab OR database*:ti,ab OR 'data base*':ti,ab)) OR (('data extraction':ti,ab OR 'data source*':ti,ab) AND 'study selection':ti,ab) OR ('search strategy':ti,ab AND 'selection criteria':ti,ab) OR ('data source*':ti,ab AND 'data synthesis':ti,ab) OR medline:ab OR pubmed:ab OR embase:ab OR cochrane:ab OR (((critical OR rapid) NEAR/2 (review* OR overview* OR synthes*)):ti) OR (((critical* OR rapid*) NEAR/3 (review* OR overview* OR synthes*)):ab) AND (search*:ab OR database*:ab OR 'data base*':ab)) OR metasynthes*:ti,ab OR 'meta synthes*':ti,ab	1085389
#6	'clinical trial'/exp OR 'randomization'/exp OR 'single blind procedure'/exp OR 'double blind procedure'/exp OR 'crossover procedure'/exp OR 'placebo'/exp OR 'prospective study'/exp OR rct:ab,ti OR random*:ab,ti OR 'single blind':ab,ti OR 'randomised controlled trial':ab,ti OR 'randomized controlled trial'/exp OR placebo*:ab,ti	4165415
#7	#4 AND #5 - SR	205
#8	#4 AND #6 NOT #7 - RCT	371
#9	#7 OR #8 - Totaal	576

5

Ovid/Medline

#	Searches	Results
1	exp Tennis Elbow/ or exp Elbow Tendinopathy/ or ((tennis* or golf*) adj3 (arm* or elbow*)):ti,ab,kf. or ((epicondylitis or epycondylitis or epicondylitides or epycondylitides) adj3 (humer* or lateral* or external* or radiohumer* or medial*)):ti,ab,kf. or ((elbow* or epicondyl*) adj3 (tendinopath* or tendonopath* or tendinos*)):ti,ab,kf.	3245
2	exp Physical Therapy Modalities/ or exp Exercise Therapy/ or exp Musculoskeletal Manipulations/ or exp Orthotic Devices/ or exp Braces/ or exp Manipulation, Osteopathic/ or exp Dry Needling/ or exp Extracorporeal Shockwave Therapy/ or ((orthoepadic* or orthopedic* or orthotic*) adj3 (device* or support*)):ti,ab,kf. or (elbow* adj3 (immobiliz* or immobilis*)):ti,ab,kf. or ((manipulati* or manual* or physical* or physio) adj3 (therap* or treatment* or medicine*)):ti,ab,kf. or (arm* adj3 sleeve*):ti,ab,kf. or exercis*:ti,ab,kf. or kinesiotherap*:ti,ab,kf. or kinesitherap*:ti,ab,kf. or training*:ti,ab,kf. or musculoskeletal manipulati*:ti,ab,kf. or kinetic* chain*:ti,ab,kf. or orth?s?s:ti,ab,kf. or brace*:ti,ab,kf. or armsleeve*:ti,ab,kf. or dry needl*:ti,ab,kf. or shock wave*:ti,ab,kf. or shockwave*:ti,ab,kf. or physiotherap*:ti,ab,kf.	115898 8
3	1 and 2	1034
4	limit 3 to yr="2004 -Current"	799
5	4 not (comment/ or editorial/ or letter/) not ((exp animals/ or exp models, animal/) not humans/)	753

6	meta-analysis/ or meta-analysis as topic/ or (metaanaly* or meta-analy* or metanaly*).ti,ab,kf. or systematic review/ or cochrane.jw. or (prisma or prospero).ti,ab,kf. or ((systemati* or scoping or umbrella or "structured literature") adj3 (review* or overview*)).ti,ab,kf. or (systemic* adj1 review*).ti,ab,kf. or ((systemati* or literature or database* or data-base*) adj10 search*).ti,ab,kf. or ((structured or comprehensive* or systemic*) adj3 search*).ti,ab,kf. or ((literature adj3 review*) and (search* or database* or data-base*)).ti,ab,kf. or (("data extraction" or "data source*") and "study selection").ti,ab,kf. or ("search strategy" and "selection criteria").ti,ab,kf. or ("data source*" and "data synthesis").ti,ab,kf. or (medline or pubmed or embase or cochrane).ab. or ((critical or rapid) adj2 (review* or overview* or synthes*)).ti. or (((critical* or rapid*) adj3 (review* or overview* or synthes*)) and (search* or database* or data-base*)).ab. or (metasynthes* or meta-synthes*).ti,ab,kf.	795237
7	exp clinical trial/ or randomized controlled trial/ or exp clinical trials as topic/ or randomized controlled trials as topic/ or Random Allocation/ or Double-Blind Method/ or Single-Blind Method/ or (clinical trial, phase i or clinical trial, phase ii or clinical trial, phase iii or clinical trial, phase iv or controlled clinical trial or randomized controlled trial or multicenter study or clinical trial).pt. or random*.ti,ab. or (clinic* adj trial*).tw. or ((singl* or doubl* or treb* or tripl*) adj (blind\$3 or mask\$3)).tw. or Placebos/ or placebo*.tw.	2816230
8	5 and 6 - SR	148
9	(5 and 7) not 8 - RCT	278
10	8 or 9 - Totaal	426

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Submodule 3.1.2 Functionele ondersteuning: brace

Uitgangsvraag

- 10 Wat is de waarde van braces bij patiënten met klachten van mediale of laterale epicondylaire tendinopathie?

Introduction (English)

- 15 Current clinical practice for lateral and medial epicondylar tendinopathy shows wide variation in physiotherapy and manual therapy approaches, and inconsistent use of braces, orthoses, arm sleeves, dry needling, and shockwave therapy. This variability reflects uncertainty in the evidence of the different treatment options and can result in suboptimal patient outcomes. A comprehensive synthesis of comparative effectiveness is needed to standardize care and guide shared decision-making. Clear, evidence-based
- 20 recommendations may reduce ineffective or unnecessary interventions and yield health gains in pain reduction, elbow function, and timely return to work or sport.

Search and select

- 25 A systematic review of the literature was performed to answer the following question(s):
 What is the efficacy of braces compared to placebo or wait-and-see policy, in patients suspected of lateral or medial epicondylar tendinopathy?

Table 1. PICO

Patients	Patients with lateral medial epicondylar tendinopathy
Intervention	braces
Control	Placebo, wait and see policy

Outcomes	Patient recovery, elbow function, pain, return to sports/work, quality of life, complications
Other selection criteria	Study design: systematic reviews and randomized controlled trials

5

Relevant outcome measures

The guideline panel considered patient recovery, elbow function, pain, return to sports or work and quality of life as **critical** outcome measures for decision making; and complications as an **important** outcome measure for decision making.

10

A priori, the guideline panel did not define the outcome measures listed above but used the definitions described in the studies.

15 For the Visual Analogue Scale (VAS), the guideline panel defined a mean difference (MD) of 2.0 points (1.0 point for professional athletes) as a minimal clinically (patient) important difference and $0.91 > RR > 1.1$ for complications. For the outcome pain-free or minimal grip strength, the guideline panel used a MD of at least 5 kg or 50 N as minimal clinically (patient) important difference (Bohannon, 2019). For the remaining outcomes the guideline panel defined 25% ($0.8 \geq RR \geq 1.25$) for dichotomous outcomes and a MD of 10% for continuous outcomes as a minimal clinically (patient) important difference.

20

Search and select (Methods)

25 A systematic literature search was performed by a medical information specialist using the following bibliographic databases: Embase.com and Ovid/Medline. Both databases were searched from 2004 to the 11th of December 2024 for systematic reviews and RCTs. Systematic searches were completed using a combination of controlled vocabulary/subject headings (e.g., Emtree-terms, MeSH) wherever they were available and natural language keywords. The overall search strategy was derived from eight primary search concepts: (1) lateral/ medial epicondylar tendinopathy; (2) exercise therapy; (3) braces; (4) manual therapy; (5) orthoses; (6) armsleeves; (7) dry needling (8) shockwave therapy. Duplicates were removed using EndNote software. After deduplication a total of 669 records were imported for title/abstract screening.

30

35 Initially, 33 studies were selected based on title and abstract screening. After reading the full text, 28 studies were excluded (see the exclusion table under the tab 'Evidence tabellen'), and five studies were included, of which two studies were about braces.

Summary of literature

Description of studies

40 A total of two studies on braces in patients with lateral epicondylar tendinopathy were included in the analysis of the literature. Important study characteristics and results are summarized in table 2. The assessment of the risk of bias is summarized in the risk of bias tables (under the tab 'Evidence tabellen'). No studies about medial epicondylar tendinopathy were included.

45

Braces

50 [Faes \(2006\)](#) performed an RCT to determine the effects of wearing a brace for three months in patients with LET. They included individuals aged 18 to 70 years with a physician-confirmed diagnosis of LET, recurrence of symptoms following initial treatment, persistence of symptoms despite alternative treatments for LET and the ability to complete questionnaires in Dutch. Besides, other inclusion criteria were pressure pain at the lateral

5 epicondyle, absence of pain during palmar flexion of the wrist against resistance, a positive
Mill's test, and pain on the lateral side of the elbow during wrist dorsiflexion against
resistance. Exclusion criteria were bilateral lateral epicondylar tendinopathy, symptom
duration of less than six weeks (to minimize the influence of spontaneous recovery), the
10 presence of neurological or rheumatic disorders affecting the lower arm or wrist, and a
history of muscular, neural, or bony injuries to the lower arm or wrist other than LET.

[Kroslak \(2019\)](#) performed a prospective, randomized, double-blind, placebo-controlled
clinical trial to evaluate whether counterforce bracing provides additional benefits compared
to placebo bracing in the treatment of LET. They included individuals aged 18 years or older
15 with a clinical diagnosis of LET (point tenderness over the lateral epicondyle and pain
exacerbation during the chair pick-up test and maximal hand grip), and a symptom duration
of 4 weeks to 6 months at the time of presentation. Exclusion criteria were a history of
surgery or dislocation of the affected elbow, a corticosteroid injection in the affected elbow
within the previous three months, or presented with scarring over the elbow, or sensory
20 and/or motor deficits distal to the elbow. Additionally, patients who were unwilling or
unable to attend the required follow-up visits or to participate in either treatment group
were excluded.

25

Table 2. Characteristics of included studies

Study	Participants	Comparison	Follow-up	Outcome measures	Comments	Risk of bias (per outcome measure)*
<i>Individual studies</i>						
<p>Faes, 2006 Netherlands, RCT</p>	<p><u>N at baseline</u> I: 30 C: 33</p> <p><u>Age</u> (mean \pm SD) I: 46 \pm 8 C: 48 \pm 9</p> <p><u>Sex</u> (%female) I: 63 C: 48</p> <p><u>Pain score</u> (VAS, mean \pm SD) I: 4.3 \pm 2.1 C: 4.3 \pm 1.8</p>	<p><u>Intervention</u> Brace treatment: dynamic extensor brace.</p> <p><u>Control</u> No brace treatment</p>	Up to 12 weeks	Pain (VAS), elbow function (PRFEQ, grip strength)	Funding from Somas, Sint Anthonis, The Netherlands. No serious conflicts of interest.	Some concerns (all outcomes)
<p>Kroslak, 2019 Sydney, Australia, RCT</p>	<p><u>N at baseline</u> I: 22 C: 23</p> <p><u>Age</u> (mean; range) I: 51 (38-66) C: 51 (40-73)</p> <p><u>Sex</u> (%female) I: 36 C: 35</p> <p><u>Pain score</u> NR</p>	<p><u>Intervention</u> Counterforce bracing</p> <p><u>Control</u> Placebo bracing</p>	2, 6, 12, and 26 weeks, as well as long term (mean follow-up was 3 years)	Pain (Likert verbal descriptor pain scales based on a modified L'Insalata shoulder rating questionnaire), elbow function (Likert verbal descriptor pain scales based on a modified L'Insalata shoulder rating questionnaire), complications	The authors, their immediate families, and any research foundations with which they are affiliated have not received any financial payments or other benefits from any commercial entity related to the subject of this article.	Some concerns (all outcomes)

*For further details, see risk of bias table in the appendix or systematic review

5 **Results**

Results were extracted from the data reported in the studies as means \pm standard deviations (SDs). If data were presented by medians (interquartile ranges), results were converted into means \pm SD by the conversion tool described by Weir (2018).

10 **Braces**

Pain (crucial)

Faes (2006) reported pain measured by a horizontal 10-cm VAS (scale 0-10, lower is better). Brace treatment for 12 weeks resulted in a significant reduction in VAS-score ($p < 0.01$) and differed significantly as compared to no brace treatment ($p < 0.042$).

15

Kroslak (2019) reported pain severity at rest with Likert verbal descriptor pain scales based on a modified L'Insalata shoulder rating questionnaire (range: no pain to very severe pain). Patients who received the padded-brace reported a significant improvement in pain level during rest from week 2 with a reduction to almost none at week 26 and at long-term follow-up ($P = 0.003$ and $P = 0.002$, respectively) from the mild or moderate initial levels while patients who received the sham-brace also reported an improvement with a reduction from mild or moderate to mild or none at 26 weeks ($P = 0.007$) and long-term follow-up ($P = 0.02$). At 2 weeks, the padded-brace group reported significantly less pain than the sham-brace group ($P < 0.001$).

25

Since no absolute values were provided for these outcome measures, these results were not evaluated by GRADE.

Quality of life (crucial)

30 No studies reported on quality of life for braces.

Elbow function (crucial)

Faes (2006) reported the functionality of the arm by the PRFEQ (scale 0-10, lower is better), pain-free grip strength and maximum grip strength. Brace treatment for 12 weeks resulted in a significant improvement in functionality ($p < 0.01$) and differed significantly from no brace treatment ($p < 0.042$). Besides, brace treatment for 12 weeks resulted in a significant improvement in pain-free grip strength ($p < 0.01$) and differed significantly from no brace treatment ($p < 0.042$). However, brace treatment for 12 weeks resulted in no difference in maximum grip strength but differed significantly from no brace treatment ($p < 0.042$).

40

Kroslak (2019) reported overall elbow function with Likert verbal descriptor pain scales based on a modified L'Insalata shoulder rating questionnaire (range: very bad to excellent). Patients who received a padded brace improved from fair or poor function to good at 26 weeks and good or excellent at long-term follow-up ($P < 0.001$), while patients who received the sham-brace improved from fair to poor function to good or fair at 26 weeks and at long-term follow-up ($P < 0.001$). At 26 weeks, the padded-brace group reported a significantly better outcome than the sham-brace group ($P = 0.041$). Besides, Kroslak (2019) reported grip strength. The grip strength improved in both groups by 26 weeks: by 44% for patients who received the padded-brace ($P = 0.001$) and by 19% for patients who received the sham-brace ($P < 0.001$). Both the padded brace and placebo brace group improved in the degree of difficulty with picking up objects from week 6 onward. The sham-brace group and padded brace group improved from moderate or severe to mild or none at 26 weeks. The same result was observed for the outcome difficulty with twisting motions: both groups improved to mild at 26 weeks. The degree of elbow stiffness also improved in both groups, from little or mildly stiff levels to little or none at 26 weeks.

55

5 None of the outcomes were different between the groups.

Since no absolute values were provided for these outcome measures, these results were not evaluated by GRADE.

10 Return to sports/work (crucial)

No studies reported on return to sports/work for braces.

Patient recovery (crucial)

No studies reported on patient recovery for braces.

15

Complications (important)

[Kroslak \(2019\)](#) reported that no significant complications occurred for patients who received the bracing or rehabilitation protocol. Since no absolute values were provided for this outcome measure, this result was not evaluated by GRADE.

5 Summary of Findings

Braces versus placebo or wait and see policy

Outcome	Study results and measurements	Absolute effect estimates		Certainty of the evidence (Quality of evidence)	Summary
		Placebo or wait and see policy	Braces		
Pain (crucial)	Measured by: VAS (scale 0-10, lower is better) or Likert verbal descriptor pain scales based on a modified L'Insalata shoulder rating questionnaire (range: no pain to very severe pain) Based on data from 108 participants in 2 studies	Faes (2006) reported that brace treatment for 12 weeks resulted in a significant reduction in VAS-score ($p < 0.01$) and differed significantly as compared to no brace treatment ($p < 0.042$). Kroslak (2019) reported that at 2 weeks, the padded-brace group reported significantly less pain at rest than the sham-brace group ($P < 0.001$).		No GRADE (clear interpretation of evidence not possible)	Due to lack of data, it was not possible to draw conclusions regarding the effect of braces on pain when compared with placebo or wait and see policy in <i>general patients</i> with lateral epicondylar tendinopathy. <i>(Faes, 2006; Kroslak, 2019)</i>
Quality of life (crucial)				No GRADE (no evidence was found)	No evidence was found regarding the effect of braces on quality of life when compared with placebo or wait and see policy in <i>general patients</i> with lateral epicondylar tendinopathy.
Elbow function (crucial)	Measured by: PRFEQ (scale 0-10, lower is better) or Likert verbal descriptor pain scales based on a modified L'Insalata shoulder rating questionnaire (range: very bad to excellent) Based on data from 108 participants in 2 studies	Faes (2006) reported that brace treatment for 12 weeks differed significantly from no brace treatment on functionality ($p < 0.042$), pain-free grip strength ($p < 0.01$) and maximum grip strength ($p < 0.042$). Kroslak (2019) reported that at 26 weeks, the padded-brace group reported a significantly better function than the sham-brace group ($P = 0.041$).		No GRADE (clear interpretation of evidence not possible)	Due to lack of data, it was not possible to draw conclusions regarding the effect of braces on elbow function when compared with placebo or wait and see policy in <i>general patients</i> with lateral epicondylar tendinopathy. <i>(Faes, 2006; Kroslak, 2019)</i>

Return to sports/work (crucial)			No GRADE (no evidence was found)	No evidence was found regarding the effect of braces on return to sports or work when compared with placebo or wait and see policy in <i>general patients</i> with lateral epicondylar tendinopathy.
Patient recovery (crucial)			No GRADE (no evidence was found)	No evidence was found regarding the effect of braces on patient recovery when compared with placebo or wait and see policy in <i>general patients</i> with lateral epicondylar tendinopathy.
Complications (important)	Based on data from 108 participants in 2 studies	Kroslak (2019) reported that no significant complications occurred.	No GRADE (clear interpretation of evidence not possible)	Due to lack of data, it was not possible to draw conclusions regarding the effect of braces on complications when compared with placebo or wait and see policy in <i>general patients</i> with lateral epicondylar tendinopathy. <i>(Kroslak, 2019)</i>

5

5 **Overwegingen – van bewijs naar aanbeveling (NL)**

Balans tussen gewenste en ongewenste effecten

Brace

10 Er werden twee RCT's gevonden die rapporteerden over een brace vergeleken met placebo of standaardzorg. Voor de cruciale uitkomstmaten pijn en elleboogfunctie en de belangrijke uitkomstmaat complicaties werden geen absolute waarden weergegeven in de studies waardoor een GRADE beoordeling niet mogelijk was. Geen van de studies rapporteerde over de cruciale uitkomstmaten kwaliteit van leven, terugkeer naar sport/werk of herstel van de patiënten. Op basis van deze uitkomsten kan er dus geen voorkeur worden uitgesproken
15 voor de brace vergeleken met placebo of standaardzorg.

Kwaliteit van bewijs

Brace

20 Geen beoordeling van kwaliteit van bewijs door het ontbreken van absolute waarden.

Waarden en voorkeuren van patiënten (en eventueel hun naasten/verzorgers)

25 Voor veel patiënten met LET of MET staat pijnvermindering en herstel van functie centraal, omdat dit direct invloed heeft op werk en sportdeelname. Interventies zoals een brace worden in de praktijk als ondersteunend ervaren, omdat deze behandeling het gevoel geeft bij te dragen aan herstel of tijdelijk pijnverlichting bieden. In de wetenschappelijke literatuur worden hiervoor echter geen aanwijzingen gevonden. Het risico op complicaties bij conservatieve hulpmiddelen zoals een brace is zeer laag, wat voor patiënten geruststellend kan zijn. Patiënten dienen realistische verwachtingen te hebben van het mogelijke effect op
30 pijn en functieherstel, evenals van de onzekerheid over de langetermijneffecten. Het is van belang dat er tijd en ruimte is om samen met de patiënt af te wegen in hoeverre de klachten het dagelijks functioneren, werk of sport beïnvloeden, en of de patiënt bereid is eventuele ongemakken van de interventie te accepteren. De waarde van potentieel sneller herstel of
35 ondersteuning hierbij (los van het daadwerkelijke effect) kan daarbij groter zijn voor patiënten met fysiek zwaar werk dan voor patiënten waarbij de klachten het dagelijks functioneren minder beperken.

Kostenaspecten

40 De interventies leveren over het algemeen meer kosten op dan een afwachtend beleid, doordat braces additionele zorg of hulpmiddelen vragen.

Gelijkheid ((health) equity/equitable)

45 Mocht er gekozen worden voor een brace als behandeling voor een LET of MET, dan is het belangrijk dat toegang tot zorg zo min mogelijk afhankelijk is van sociaaleconomische status, woonplaats of aanvullende verzekering.

Aanvaardbaarheid:

Ethische aanvaardbaarheid

50 Er zijn geen ethische bezwaren van toepassing voor een brace als niet-medicamenteuze interventie, mits deze interventie wordt toegepast met een duidelijke voorlichting en in samenspraak met de patiënt.

Duurzaamheid

55 Niet van toepassing.

- 5 Haalbaarheid
Braces zijn breed beschikbaar via reguliere zorgkanalen en hulpmiddelenleveranciers.

Aanbevelingen

Rationale van de aanbeveling: weging van argumenten voor en tegen de interventies

- 10 De literatuursamenvatting laat zien dat de effectiviteit van braces onvoldoende onderbouwd is door beperkte en onvolledig gerapporteerde data.

Eindoordeel:

Sterke aanbeveling tegen brace.

15

Adviseer geen routinematige immobilisatie met een brace bij een laterale of mediale epicondylaire tendinopathie.

Kennisvragen

- 20 Tijdens de ontwikkeling van deze module is gebleken dat er binnen deze module nog te weinig bewijs is voor de onderbouwing van de aanbeveling en dus kennisvragen bestaan. De werkgroep meent dat (vervolg)onderzoek wenselijk is om in de toekomst een duidelijker antwoord te kunnen geven op vragen uit de praktijk.

Kennisvraag 1:

- 25 - Wat is de (kosten)- effectiviteit en veiligheid van functionele ondersteunende behandelingen zoals een brace bij patiënten met mediale epicondylaire tendinopathie (MET) vergeleken met placebo of een afwachtend beleid?

Toelichting:

- 30 Voor MET zijn geen gerandomiseerde studies geïnccludeerd. Hierdoor zijn aanbevelingen voor MET grotendeels geëxtrapoleerd van LET, wat leidt tot indirectheid van bewijs. Goed opgezette, multicenter RCT's met duidelijke diagnostische criteria en relevante uitkomstmaten zijn nodig om de effectiviteit en veiligheid specifiek voor MET vast te stellen.

35 Kennisvraag 2:

- Leidt een brace bij LET of MET tot snellere terugkeer naar werk of sport en tot beter patiënt gerapporteerd herstel vergeleken met placebo of afwachtend beleid?

40 Toelichting:

Terugkeer naar werk/sport en patiëntherstel zijn cruciale uitkomstmaten voor besluitvorming, maar worden in de huidige literatuur nauwelijks gerapporteerd. Hierdoor is het onduidelijk of interventies klinisch relevante maatschappelijke of functionele winst opleveren. Toekomstig onderzoek dient deze uitkomsten systematisch en gestandaardiseerd te meten, bij voorkeur met voldoende follow-upduur (≥6–12 maanden).

45

5 **Implementeren-tabel**
Implementatietabel

Vraag	Antwoord: <i>Kruis aan en licht toe/ beschrijf</i>		Toelichting keuze:
I1. Wat was het onderliggende probleem om deze uitgangsvraag uit te werken?		Ongewenste praktijkvariatie	
	X	Nieuwe evidentie	Onduidelijkheid over effectiviteit van conservatieve behandelingen
		Anders	
I2. Maak een inschatting over hoeveel patiënten het ongeveer gaat waar de aanbeveling betrekking op heeft?		< 1000	
		< 5000	
	X	5000-40.000	
		> 40.000	
I3. Is de aanbeveling onderdeel van een bredere set interventies of verwant aan andere richtlijnen of modules? Zo ja, hoe verhoudt zij zich daartoe en moet hiermee rekening worden gehouden bij de implementatie, of kan de aanbeveling als losstaand worden beschouwd?		Ja	
	X	Nee	
I4. Belemmeringen en kansen op verschillende niveaus voor landelijke toepassing van de aanbeveling:		Belemmerende factoren	Bevorderende factoren/ kansen
Richtlijn/ klinisch traject (innovatie)	X	Aanbeveling sluit mogelijk niet aan bij bestaande routine	Aanbevelingen zijn simpel geformuleerd en dus makkelijk op te volgen.
Zorgverleners (artsen en verpleegkundigen)	X	Aanpassing in attitude nodig	Duidelijkheid voor 1 ^e lijn.
Patiënt/ cliënt (naasten)	X	Patiënt begrijpt mogelijk niet waarom een brace niet meer gegeven wordt. Goede uitleg nodig.	
Sociale context	X	Werkdruk en sportcultuur gericht op doorbelasting kunnen belastingreductie bemoeilijken.	Afstemming met werkgever of bedrijfsarts kan veilige opbouw van belasting ondersteunen.
Organisatorische context			
Financiële en juridische context	X		Het vermijden van niet-effectieve interventies kan kosten besparen en doelmatigheid vergroten.
I5. A) Welke personen/partijen zijn van belang bij het toepassen van de aanbeveling in de praktijk? (kruis aan)		A	B
		Patiënt/ cliënt (naaste)	

B) Wat is er nodig van deze personen/partijen om de aanbeveling in de praktijk te kunnen brengen? Denk aan aanpassingen in gedrag, werkwijzen, beleid, samenwerking of andere randvoorwaarden.	X	Professional	Stelt indicatie, geeft voorlichting en verwijst zo nodig
	X	Beroepsvereniging, nl	Goede verspreiding van richtlijn via de gebruikelijke kanalen in de 1 ^e en 2 ^e lijn
		Ziekenhuis (raad van bestuur/UMCNL (voorheen NFU)/NVZ)	
	X	Zorgverzekeraars/ NZa	geen aanpassing nodig; aanbevolen zorg kan als aanvullende verzekering in het pakket
		Zorginstituut [duiding nodig]	
		Anders	
16. Binnen welk tijdsbestek moet de aanbeveling zijn geïmplementeerd?	X	< 1 jaar	
		binnen 2-3 jaar	
17. Conclusie: is er extra actie en/of ondersteuning nodig voor implementatie van de aanbeveling? <i>De reguliere implementatieroutes (publicatie en disseminatie via officiële kanalen, opname in professionele standaarden, scholing en nascholing, gebruik van bestaande ICT systemen, audits en visitaties) van de richtlijnmodule alleen is onvoldoende.</i>		Ja	
	X	Nee	De reguliere implementatieroutes van de richtlijnmodule is voldoende.
18. Plaatsing op de Landelijke Implementatieagenda Medisch Specialistische zorg is gewenst. Het gaat om zorg die (grotendeels) wordt uitgevoerd binnen de ziekenhuismuren. Succesvolle implementatie vraagt om actieve betrokkenheid en samenwerking van meerdere relevante partijen binnen de zorgpraktijk.		Ja *	
	X	Nee	Zie boven, implementatie kan via reguliere kanalen plaatsvinden

- 5 *Deze aanbeveling komt mogelijk in aanmerking voor plaatsing op de Landelijke Implementatieagenda van het programma Zorg Evaluatie & Gepast Gebruik (ZE&GG), waarin alle betrokken partijen in de medisch-specialistische zorg samenwerken aan de implementatie van bewezen beste zorg. De Federatie levert namens het veld goed onderbouwde aanbevelingen aan, die zijn getoetst op de behoefte aan een implementatie-impuls. De onderwerpen op de Implementatieagenda zijn onderdeel van
- 10 landelijke zorginkoopafspraken tussen zorgverzekeraars en zorgaanbieders. Voor de beoordeling van aanbevelingen uit richtlijnen wordt gebruikgemaakt van de implementatietabel. Op basis hiervan kunnen we de andere partijen goed informeren en gezamenlijk besluiten of plaatsing op de Implementatieagenda passend is.

5 **Literatuur**

Bohannon RW. Minimal clinically important difference for grip strength: a systematic review. *J Phys Ther Sci.* 2019 Jan;31(1):75-78. doi: 10.1589/jpts.31.75. Epub 2019 Jan 10. PMID: 30774209; PMCID: PMC6348186.

10 Faes M, van den Akker B, de Lint JA, Kooloos JG, Hopman MT. Dynamic extensor brace for lateral epicondylitis. *Clin Orthop Relat Res.* 2006 Jan;442:149-57. doi: 10.1097/01.blo.0000187057.35196.57. PMID: 16394754.

15 Kroslak M, Pirapakaran K, Murrell GAC. Counterforce bracing of lateral epicondylitis: a prospective, randomized, double-blinded, placebo-controlled clinical trial. *J Shoulder Elbow Surg.* 2019 Feb;28(2):288-295. doi: 10.1016/j.jse.2018.10.002. PMID: 30658774.

5 Bijlagen bij submodule 3.1.2. Functionele ondersteuning: Brace

Risk of Bias tables

Risk of bias table for intervention studies (randomized controlled trials; based on Cochrane risk of bias tool and suggestions by the CLARITY Group at McMaster University)

Study reference (first author, publication year)	Was the allocation sequence adequately generated?	Was the allocation adequately concealed?	Blinding: Was knowledge of the allocated interventions adequately prevented? Were patients blinded? Were healthcare providers blinded? Were data collectors blinded? Were outcome assessors blinded? Were data analysts blinded?	Was loss to follow-up (missing outcome data) infrequent?	Are reports of the study free of selective outcome reporting?	Was the study apparently free of other problems that could put it at a risk of bias?	Overall risk of bias If applicable/necessary, per outcome measure
	Definitely yes Probably yes Probably no Definitely no	Definitely yes Probably yes Probably no Definitely no	Definitely yes Probably yes Probably no Definitely no	Definitely yes Probably yes Probably no Definitely no	Definitely yes Probably yes Probably no Definitely no	Definitely yes Probably yes Probably no Definitely no	LOW Some concerns HIGH

Faes, 2006	Probably yes; Reason: Drawing envelopes was used for randomization.	No information	Probably no; Reason: Researcher was aware of the treatment.	Probably no; Reason: Loss to follow-up was different between groups (26.7% versus 3%). No intention-to-treat analysis, but results of the subjects who withdrew from the study were not included in the analysis.	Probably yes; Reason: All relevant outcomes were reported.	Probably yes; Reason: No other problems noted.	Some concerns Reason: Concerns about blinding and randomisation.
Krosiak, 2019	Definitely yes; Reason: Randomisation was performed via computer-generated code.	Definitely yes; Reason: Unmarked envelopes were used.	Probably yes; Reason: One author performed the assessments and follow-ups of patients and was blinded to the brace worn. The research assistant applied the braces and instructed the patients on their use but was blinded to the outcomes.	Probably no; Reason: Loss to follow-up was frequent in both groups.	Probably yes; Reason: All relevant outcomes were reported.	Probably no; Reason: Because of recruitment difficulties, the study was stopped before the projected numbers were achieved.	Some concerns Reason: High drop-out rate and recruitment stopped early.

5

5 **Table of excluded studies**

Reference	Reason for exclusion
Bisset L, Smidt N, Van der Windt DA, Bouter LM, Jull G, Brooks P, Vicenzino B. Conservative treatments for tennis elbow do subgroups of patients respond differently? <i>Rheumatology (Oxford)</i> . 2007 Oct;46(10):1601-5. doi: 10.1093/rheumatology/kem192. PMID: 17890274.	Use of more recent SR from Wallis 2024. These 2 RCTs (Smidt 2002 and Bisset 2006) are also included
Boisubert B, Brousse C, Zaoui A, Montigny JP. Nonsurgical treatment of tennis elbow. In <i>Annales de Readaptation et de Medecine Physique: Revue Scientifique de la Societe Francaise de Reeducation Fonctionnelle de Readaptation et de Medecine Physique</i> 2004 Aug 1 (Vol. 47, No. 6, pp. 346-355).	Full text only available in French
Buchbinder R, Green SE, Youd JM, Assendelft WJ, Barnsley L, Smidt N. Shock wave therapy for lateral elbow pain. <i>Cochrane Database Syst Rev</i> . 2005 Oct 19;2005(4):CD003524. doi: 10.1002/14651858.CD003524.pub2. PMID: 16235324; PMCID: PMC8717012.	Wrong intervention: ECSWT
Buchbinder R, Green SE, Youd JM, Assendelft WJ, Barnsley L, Smidt N. Systematic review of the efficacy and safety of shock wave therapy for lateral elbow pain. <i>J Rheumatol</i> . 2006 Jul;33(7):1351-63. PMID: 16821270.	Double with Cochrane SR from Buchbinder 2005.
Chen Q, Shen P, Zhang B, Chen Y, Zheng C. Long-term effectiveness of conservative management for lateral epicondylitis: a meta-analysis. <i>J Plast Surg Hand Surg</i> . 2023 Aug 24;58:67-73. doi: 10.2340/jphs.v58.12333. PMID: 37615315.	ECSWT and injections not relevant + Use more recent review of Wallis 2024 for exercise
Kaplan S, Sah V, Ozkan S, Adanas C, Delen V. Comparative Effects of Focused and Radial Extracorporeal Shock Wave Therapies on Lateral Epicondylitis: A Randomised Sham-controlled Trial. <i>J Coll Physicians Surg Pak</i> . 2023 May;33(5):554-559. doi: 10.29271/jcpsp.2023.05.554. PMID: 37190692.	Wrong intervention: ECSWT
Karanasios S, Korakakis V, Whiteley R, Vasilogiorgis I, Woodbridge S, Giftofos G. Exercise interventions in lateral elbow tendinopathy have better outcomes than passive interventions, but the effects are small: a systematic review and meta-analysis of 2123 subjects in 30 trials. <i>Br J Sports Med</i> . 2021 May;55(9):477-485. doi: 10.1136/bjsports-2020-102525. Epub 2020 Nov 4. PMID: 33148599.	Use more recent review of Wallis 2024
Kim YJ, Wood SM, Yoon AP, Howard JC, Yang LY, Chung KC. Efficacy of Nonoperative Treatments for Lateral Epicondylitis: A Systematic Review and Meta-Analysis. <i>Plast Reconstr Surg</i> . 2021 Jan 1;147(1):112-125. doi: 10.1097/PRS.0000000000007440. PMID: 33002980.	Injections not relevant for this module, overlapping studies for electrophysiotherapy with more recent SR from Xiong 2024, use more recent SR from Heales 2020 with search date Sep-2019 for physical therapy
Lapner P, Alfonso A, Hebert-Davies J, Pollock JW, Marsh J, King GJW; Canadian Shoulder and Elbow Society (CSES). Nonoperative treatment of lateral epicondylitis: a systematic review and meta-analysis. <i>JSES Int</i> . 2021 Dec 18;6(2):321-330. doi: 10.1016/j.jseint.2021.11.010. PMID: 35252934; PMCID: PMC8888180.	Injections not relevant + more recent SR on physiotherapy available, namely Chen's 2023
Lapner P, Alfonso A, Herbert-Davies J, Pollock JW, Marsh J, King G; Canadian Shoulder and Elbow Society (CSES). Position statement: nonoperative management of lateral epicondylitis in adults. <i>Can J Surg</i> . 2022 Sep 21;65(5):E625-E629. doi: 10.1503/cjs.019221. PMID: 36130807; PMCID: PMC9503571.	Position statement

Li Y, Mei L, Rahat S, Pang L, Li R, Xiong Y, Li J, Tang X. The efficacy of kinesio tape in patients with lateral elbow tendinopathy: A systematic review and meta-analysis of prospective randomized controlled trials. <i>Heliyon</i> . 2024 Feb 4;10(3):e25606. doi: 10.1016/j.heliyon.2024.e25606. PMID: 38356591; PMCID: PMC10865320.	Wrong intervention: tape
Liu WC, Chen CT, Lu CC, Tsai YC, Liu YC, Hsu CW, Shih CL, Chen PC, Fu YC. Extracorporeal Shock Wave Therapy Shows Superiority Over Injections for Pain Relief and Grip Strength Recovery in Lateral Epicondylitis: A Systematic Review and Network Meta-analysis. <i>Arthroscopy</i> . 2022 Jun;38(6):2018-2034.e12. doi: 10.1016/j.arthro.2022.01.025. Epub 2022 Jan 31. PMID: 35093494.	Wrong intervention: ECSWT and injections
Long L, Briscoe S, Cooper C, Hyde C, Crathorne L. What is the clinical effectiveness and cost-effectiveness of conservative interventions for tendinopathy? An overview of systematic reviews of clinical effectiveness and systematic review of economic evaluations. <i>Health Technol Assess</i> . 2015 Jan;19(8):1-134. doi: 10.3310/hta19080. PMID: 25629427; PMCID: PMC4781358.	Wrong outcome: cost-effectiveness
Lowdon H, Chong HH, Dhingra M, Gomaa AR, Teece L, Booth S, Watts AC, Singh HP. Comparison of Interventions for Lateral Elbow Tendinopathy: A Systematic Review and Network Meta-Analysis for Patient-Rated Tennis Elbow Evaluation Pain Outcome. <i>J Hand Surg Am</i> . 2024 Jul;49(7):639-648. doi: 10.1016/j.jhsa.2024.03.007. Epub 2024 Apr 28. PMID: 38678448.	ECSWT, dry needling, kinesiotape. Use for physiotherapy/exercise more recent Cochrane review by Wallis 2024
Menta R, Randhawa K, Côté P, Wong JJ, Yu H, Sutton D, Varatharajan S, Southerst D, D'Angelo K, Cox J, Brown C, Dion S, Mior S, Stupar M, Shearer HM, Lindsay GM, Jacobs C, Taylor-Vaisey A. The effectiveness of exercise for the management of musculoskeletal disorders and injuries of the elbow, forearm, wrist, and hand: a systematic review by the Ontario Protocol for Traffic Injury Management (OPTIMa) collaboration. <i>J Manipulative Physiol Ther</i> . 2015 Sep;38(7):507-20. doi: 10.1016/j.jmpt.2015.06.002. Epub 2015 Jun 27. PMID: 26130104.	Use the more recent Cochrane review by Wallis 2024
Ng GY, Chan HL. The immediate effects of tension of counterforce forearm brace on neuromuscular performance of wrist extensor muscles in subjects with lateral humeral epicondylitis. <i>J Orthop Sports Phys Ther</i> . 2004 Feb;34(2):72-8. doi: 10.2519/jospt.2004.34.2.72. PMID: 15029940.	Wrong intervention: strap tensions
Nimgade A, Sullivan M, Goldman R. Physiotherapy, steroid injections, or rest for lateral epicondylitis? What the evidence suggests. <i>Pain Pract</i> . 2005 Sep;5(3):203-15. doi: 10.1111/j.1533-2500.2005.05307.x. PMID: 17147582.	Steroids not relevant; Wallis 2024 for physiotherapy more recent
Rompe JD, Maffulli N. Repetitive shock wave therapy for lateral elbow tendinopathy (tennis elbow): a systematic and qualitative analysis. <i>Br Med Bull</i> . 2007;83:355-78. doi: 10.1093/bmb/ldm019. Epub 2007 Jul 11. PMID: 17626054.	Wrong intervention: ECSWT
Samiei S, Aminianfar A, Paknazar F. Ultra-sonographic study of the effect of dry needling of extensor muscles combined with Mulligan mobilization technique on extensor muscle tendon thickness, pain and upper limb function in patients with lateral epicondylitis: A double-blinded randomized clinical trial. <i>koomesh</i> .2021;23(6):e153306	Full text only available in Persian

Sayegh ET, Strauch RJ. Does nonsurgical treatment improve longitudinal outcomes of lateral epicondylitis over no treatment? A meta-analysis. Clin Orthop Relat Res. 2015 Mar;473(3):1093-107. doi: 10.1007/s11999-014-4022-y. Epub 2014 Oct 29. PMID: 25352261; PMCID: PMC4317462.	SR of Wallis 2024 more recent
Sims SE, Miller K, Elfar JC, Hammert WC. Non-surgical treatment of lateral epicondylitis: a systematic review of randomized controlled trials. Hand (N Y). 2014 Dec;9(4):419-46. doi: 10.1007/s11552-014-9642-x. PMID: 25414603; PMCID: PMC4235906.	Injections, laser therapy, ESWT. Brace relevant, but incorrect control group used
Srinivas MR, Kalyan G, Rao JB, Kumar TS. " A Comparitive Study On The Effectiveness Of Ultrasound With Progressive Strengthening Exercises In Lateral Epicondylitis". NeuroQuantology. 2022 Nov 1;20(16):297-304.	Wrong comparison: ultrasound
Tennis elbow: injections, PT, or wait-and-see? J Fam Pract. 2007 Feb;56(2):98. PMID: 17607826.	Wrong study design: commentary
Wood SM, Yoon AP, Tseng HJ, Yang LY, Chung KC. Comparative Effectiveness of Physical Therapy and Electrophysiotherapy for the Treatment of Lateral Epicondylitis: A Network Meta-Analysis. Plast Reconstr Surg. 2022 Sep 1;150(3):594e-607e. doi: 10.1097/PRS.0000000000009437. Epub 2022 Jul 1. PMID: 35791264.	The included studies do not meet the C in the established PICO
Xiong Y, Wen T, Jin S, Lin L, Shao Q, Peng Y, Zheng Q, Li W. Efficacy and safety of extracorporeal shock wave therapy for upper limb tendonitis: a systematic review and meta-analysis of randomized controlled trials. Front Med (Lausanne). 2024 Jul 30;11:1394268. doi: 10.3389/fmed.2024.1394268. PMID: 39139789; PMCID: PMC11319137.	Wrong intervention: ECSWT
Yoon SY, Kim YW, Shin IS, Moon HI, Lee SC. Does the Type of Extracorporeal Shock Therapy Influence Treatment Effectiveness in Lateral Epicondylitis? A Systematic Review and Meta-analysis. Clin Orthop Relat Res. 2020 Oct;478(10):2324-2339. doi: 10.1097/CORR.0000000000001246. PMID: 32332245; PMCID: PMC7491893.	Wrong intervention: ECSWT
Zheng C, Zeng D, Chen J, Liu S, Li J, Ruan Z, Liang W. Effectiveness of extracorporeal shock wave therapy in patients with tennis elbow: A meta-analysis of randomized controlled trials. Medicine (Baltimore). 2020 Jul 24;99(30):e21189. doi: 10.1097/MD.00000000000021189. PMID: 32791694; PMCID: PMC7387053.	Wrong intervention: ECSWT
Zunke P, Auffarth A, Hitzl W, Moursy M. The effect of manual therapy to the thoracic spine on pain-free grip and sympathetic activity in patients with lateral epicondylalgia humeri. A randomized, sample sized planned, placebo-controlled, patient-blinded monocentric trial. BMC Musculoskelet Disord. 2020 Mar 24;21(1):186. doi: 10.1186/s12891-020-3175-y. PMID: 32209068; PMCID: PMC7093973.	Wrong setting: lab setting

5

Literature search strategy

Algemene informatie

Cluster/richtlijn: Tennisarm en Golfarm - UV3 Behandeling conservatief
Uitgangsvraag/modules: Wat is de waarde van oefentherapie, manuele therapie, braces, orthoses, en/of armsleeves, dry needling en shockwave therapie bij patiënten met klachten van epicondylitis lateralis of epicondylitis medialis?

Database(s): Embase.com, Ovid/Medline	Datum: 11 december 2024
Periode: vanaf 2004	Talen: geen restrictie
Literatuurspecialist: Esther van der Bijl	Rayyan review: https://new.rayyan.ai/reviews/1258141/overview
BMI-zoekblokken: voor verschillende opdrachten wordt (deels) gebruik gemaakt van de zoekblokken van BMI-Online https://blocks.bmi-online.nl/ Deduplication: voor het ontdebelen is gebruik gemaakt van http://dedupendnote.nl/	
Toelichting: Voor deze vraag is gezocht op de elementen tennisarm/ golfarm EN (oefentherapie OF manuele therapie OF braces OF orthoses OF armsleeves OF dry needling OF shockwave therapie) . Het sleutelartikel wordt gevonden met deze search.	
Te gebruiken voor richtlijntekst: A systematic literature search was performed by a medical information specialist using the following bibliographic databases: Embase.com and Ovid/Medline. Both databases were searched from 2004 to the 11 th of December 2024 for systematic reviews and RCTs. Systematic searches were completed using a combination of controlled vocabulary/subject headings (e.g., Emtree-terms, MeSH) wherever they were available and natural language keywords. The overall search strategy was derived from eight primary search concepts: (1) lateral/ medial epicondylitis; (2) exercise therapy; (3) braces; (4) manual therapy; (5) orthoses; (6) armsleeves; (7) dry needling (8) shockwave therapy. Duplicates were removed using EndNote software. After deduplication a total of 669 records were imported for title/abstract screening.	

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Zoekopbrengst - 11 december 2024

	EMBASE	OVID/MEDLINE	Ontdubbeld
SR	205	148	228
RCT	371	278	441
Totaal	576	426	669*

**in Rayyan*

Zoekstrategie - 11 december 2024

10

Embase.com

No.	Query	Results
#1	'tennis elbow'/exp OR 'medial epicondylitis'/exp OR (((tennis* OR golf*) NEAR/3 (arm* OR elbow*)):ti,ab,kw) OR (((epicondylitis OR epycondylitis OR epicondylitides OR epycondylitides) NEAR/3 (humer* OR lateral* OR external* OR radiohumer* OR medial*)):ti,ab,kw) OR (((elbow* OR epicondyl*) NEAR/7 (tendinopath* OR tendonopath* OR tendinos*)):ti,ab,kw)	4559
#2	'kinesiotherapy'/exp OR 'training'/exp OR 'musculoskeletal manipulation'/exp OR 'orthosis'/exp OR 'brace'/de OR 'arm brace'/de OR 'elbow brace'/exp OR 'manipulative medicine'/exp OR 'dry needling'/exp OR 'shock wave'/exp OR 'shock wave therapy'/exp OR 'physiotherapy'/exp OR 'arm exercise'/exp OR (((orthoepedic* OR orthopedic* OR orthotic*) NEAR/3 (device* OR support*)):ti,ab,kw) OR ((elbow* NEAR/3 (immobiliz* OR immobilis*)):ti,ab,kw) OR (((manipulati* OR manual* OR physical* OR physio) NEAR/3 (therap* OR treatment* OR medicine*)):ti,ab,kw) OR ((arm* NEAR/3 sleeve*):ti,ab,kw) OR exercis*:ti,ab,kw OR kinesiotherap*:ti,ab,kw OR kinesitherap*:ti,ab,kw OR training*:ti,ab,kw OR 'musculoskeletal manipulati*':ti,ab,kw OR 'kinetic* chain*':ti,ab,kw OR orth?s*:ti,ab,kw OR brace*:ti,ab,kw OR armsleeve*:ti,ab,kw OR 'dry needl*':ti,ab,kw OR 'shock wave*':ti,ab,kw OR 'shockwave*':ti,ab,kw OR physiotherap*:ti,ab,kw	1595820

#3	#1 AND #2	1686
#4	#3 AND [2004-2025]/py NOT ('conference abstract'/it OR 'editorial'/it OR 'letter'/it OR 'note'/it) NOT (('animal'/exp OR 'animal experiment'/exp OR 'animal model'/exp OR 'nonhuman'/exp) NOT 'human'/exp)	1085
#5	'meta analysis'/exp OR 'meta analysis (topic)'/exp OR metaanaly*:ti,ab OR 'meta analy*':ti,ab OR metanaly*:ti,ab OR 'systematic review'/de OR 'cochrane database of systematic reviews'/jt OR prisma:ti,ab OR prospero:ti,ab OR (((systemati* OR scoping OR umbrella OR 'structured literature') NEAR/3 (review* OR overview*)):ti,ab) OR ((systemic* NEAR/1 review*):ti,ab) OR (((systemati* OR literature OR database* OR 'data base*') NEAR/10 search*):ti,ab) OR (((structured OR comprehensive* OR systemic*) NEAR/3 search*):ti,ab) OR (((literature NEAR/3 review*):ti,ab) AND (search*:ti,ab OR database*:ti,ab OR 'data base*':ti,ab)) OR (('data extraction':ti,ab OR 'data source*':ti,ab) AND 'study selection':ti,ab) OR ('search strategy':ti,ab AND 'selection criteria':ti,ab) OR ('data source*':ti,ab AND 'data synthesis':ti,ab) OR medline:ab OR pubmed:ab OR embase:ab OR cochrane:ab OR (((critical OR rapid) NEAR/2 (review* OR overview* OR syntheses*)):ti) OR (((critical* OR rapid*) NEAR/3 (review* OR overview* OR syntheses*)):ab) AND (search*:ab OR database*:ab OR 'data base*':ab)) OR metasynthes*:ti,ab OR 'meta syntheses*':ti,ab	1085389
#6	'clinical trial'/exp OR 'randomization'/exp OR 'single blind procedure'/exp OR 'double blind procedure'/exp OR 'crossover procedure'/exp OR 'placebo'/exp OR 'prospective study'/exp OR rct:ab,ti OR random*:ab,ti OR 'single blind':ab,ti OR 'randomised controlled trial':ab,ti OR 'randomized controlled trial'/exp OR placebo*:ab,ti	4165415
#7	#4 AND #5 - SR	205
#8	#4 AND #6 NOT #7 - RCT	371
#9	#7 OR #8 - Totaal	576

5

Ovid/Medline

#	Searches	Results
1	exp Tennis Elbow/ or exp Elbow Tendinopathy/ or ((tennis* or golf*) adj3 (arm* or elbow*)):ti,ab,kf. or ((epicondylitis or epycondylitis or epicondylitides or epycondylitides) adj3 (humer* or lateral* or external* or radiohumer* or medial*)):ti,ab,kf. or ((elbow* or epicondyl*) adj3 (tendinopath* or tendonopath* or tendinos*)):ti,ab,kf.	3245
2	exp Physical Therapy Modalities/ or exp Exercise Therapy/ or exp Musculoskeletal Manipulations/ or exp Orthotic Devices/ or exp Braces/ or exp Manipulation, Osteopathic/ or exp Dry Needling/ or exp Extracorporeal Shockwave Therapy/ or ((orthopeadic* or orthopedic* or orthotic*) adj3 (device* or support*)):ti,ab,kf. or (elbow* adj3 (immobiliz* or immobilis*)):ti,ab,kf. or ((manipulati* or manual* or physical* or physio) adj3 (therap* or treatment* or medicine*)):ti,ab,kf. or (arm* adj3 sleeve*):ti,ab,kf. or exercis*:ti,ab,kf. or kinesiotherap*:ti,ab,kf. or kinesitherap*:ti,ab,kf. or training*:ti,ab,kf. or musculoskeletal manipulati*:ti,ab,kf. or kinetic* chain*:ti,ab,kf. or orth?s?s:ti,ab,kf. or brace*:ti,ab,kf. or armsleeve*:ti,ab,kf. or dry needl*:ti,ab,kf. or shock wave*:ti,ab,kf. or shockwave*:ti,ab,kf. or physiotherap*:ti,ab,kf.	115898 8
3	1 and 2	1034
4	limit 3 to yr="2004 -Current"	799
5	4 not (comment/ or editorial/ or letter/) not ((exp animals/ or exp models, animal/) not humans/)	753

6	meta-analysis/ or meta-analysis as topic/ or (metaanaly* or meta-analy* or metanaly*).ti,ab,kf. or systematic review/ or cochrane.jw. or (prisma or prospero).ti,ab,kf. or ((systemati* or scoping or umbrella or "structured literature") adj3 (review* or overview*)).ti,ab,kf. or (systemic* adj1 review*).ti,ab,kf. or ((systemati* or literature or database* or data-base*) adj10 search*).ti,ab,kf. or ((structured or comprehensive* or systemic*) adj3 search*).ti,ab,kf. or ((literature adj3 review*) and (search* or database* or data-base*)).ti,ab,kf. or (("data extraction" or "data source*") and "study selection").ti,ab,kf. or ("search strategy" and "selection criteria").ti,ab,kf. or ("data source*" and "data synthesis").ti,ab,kf. or (medline or pubmed or embase or cochrane).ab. or ((critical or rapid) adj2 (review* or overview* or synthes*)).ti. or (((critical* or rapid*) adj3 (review* or overview* or synthes*)) and (search* or database* or data-base*)).ab. or (metasynthes* or meta-synthes*).ti,ab,kf.	795237
7	exp clinical trial/ or randomized controlled trial/ or exp clinical trials as topic/ or randomized controlled trials as topic/ or Random Allocation/ or Double-Blind Method/ or Single-Blind Method/ or (clinical trial, phase i or clinical trial, phase ii or clinical trial, phase iii or clinical trial, phase iv or controlled clinical trial or randomized controlled trial or multicenter study or clinical trial).pt. or random*.ti,ab. or (clinic* adj trial*).tw. or ((singl* or doubl* or treb* or tripl*) adj (blind\$3 or mask\$3)).tw. or Placebos/ or placebo*.tw.	2816230
8	5 and 6 - SR	148
9	(5 and 7) not 8 - RCT	278
10	8 or 9 - Totaal	426

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Submodule 3.1.3 Functionele ondersteuning: spalk

Uitgangsvraag

10 Wat is de waarde van spalken bij patiënten met klachten van mediale of laterale epicondylaire tendinopathie?

Introduction (English)

15 Current clinical practice for lateral and medial epicondylar tendinopathy shows wide variation in physiotherapy and manual therapy approaches, and inconsistent use of braces, orthoses, arm sleeves, dry needling, and shockwave therapy. This variability reflects uncertainty in the evidence of the different treatment options and can result in suboptimal patient outcomes. A comprehensive synthesis of comparative effectiveness is needed to standardize care and guide shared decision-making. Clear, evidence-based
20 recommendations may reduce ineffective or unnecessary interventions and yield health gains in pain reduction, elbow function, and timely return to work or sport.

Search and select

25 A systematic review of the literature was performed to answer the following question(s): What is the efficacy of splints compared to placebo or wait-and-see policy, in patients suspected of lateral or medial epicondylar tendinopathy?

Table 1. PICO

Patients	Patients with lateral medial epicondylar tendinopathy
Intervention	Splints
Control	Placebo, wait and see policy
Outcomes	Patient recovery, elbow function, pain, return to sports/work, quality of life, complications

5

Relevant outcome measures

The guideline panel considered patient recovery, elbow function, pain, return to sports or work and quality of life as **critical** outcome measures for decision making; and complications as an **important** outcome measure for decision making.

A priori, the guideline panel did not define the outcome measures listed above but used the definitions described in the studies.

15 For the Visual Analogue Scale (VAS), the guideline panel defined a mean difference (MD) of 2.0 points (1.0 point for professional athletes) as a minimal clinically (patient) important difference and $0.91 > RR > 1.1$ for complications. For the outcome pain-free or minimal grip strength, the guideline panel used a MD of at least 5 kg or 50 N as minimal clinically (patient) important difference (Bohannon, 2019). For the remaining outcomes the guideline panel
20 defined 25% ($0.8 \geq RR \geq 1.25$) for dichotomous outcomes and a MD of 10% for continuous outcomes as a minimal clinically (patient) important difference.

Search and select (Methods)

25 A systematic literature search was performed by a medical information specialist using the following bibliographic databases: Embase.com and Ovid/Medline. Both databases were searched from 2004 to the 11th of December 2024 for systematic reviews and RCTs. Systematic searches were completed using a combination of controlled vocabulary/subject headings (e.g., Emtree-terms, MeSH) wherever they were available and natural language keywords. The overall search strategy was derived from eight primary search concepts: (1)
30 lateral/ medial epicondylar tendinopathy; (2) exercise therapy; (3) braces; (4) manual therapy; (5) orthoses; (6) armsleeves; (7) dry needling (8) shockwave therapy. Duplicates were removed using EndNote software. After deduplication a total of 669 records were imported for title/abstract screening.

35 Initially, 33 studies were selected based on title and abstract screening. After reading the full text, 28 studies were excluded (see the exclusion table under the tab 'Evidence tabellen'), and five studies were included, of which one study was about splints.

Summary of literature

40 Description of studies

One study on splints in patients with lateral epicondylar tendinopathy was included in the analysis of the literature. Important study characteristics and results are summarized in table 2. The assessment of the risk of bias is summarized in the risk of bias tables (under the tab 'Evidence tabellen'). No studies about medial epicondylar tendinopathy were included.

45

Splints

[Songur \(2024\)](#) performed a prospective RCT to determine the clinical and ultrasonographic efficacy of the lateral epicondylitis band (LEB) and the wrist extensor splint (WES) for the treatment of LET. They included individuals aged 18 to 65 years with lateral elbow pain with
50 localized tenderness, at least two positive findings among specific LET diagnostic tests (positive Cozen's test, positive Maudley's test, and decreased hand grip strength), ultrasonographic findings indicating any change in maximum tendon thickness measurements (MTTM) and grade 1 or higher TUSS parameters, symptom duration of 2–12 weeks, a resting pain score of at least 3 on the visual analog scale (VAS) and willingness to

- 5 provide informed consent to participate in the study. Exclusion criteria were lateral elbow pain persisting for more than 12 weeks, presence of LET in the opposite extremity, history of physical therapy for LET within the past 3 months, prior injections for LET, previous elbow surgery, history of elbow fracture, upper extremity muscle weakness due to radiculopathy or neuropathy, presence of neurological, rheumatic, psychiatric or malignant conditions,
- 10 pregnancy and inability to comply with study requirements.

5

Table 2. Characteristics of included studies

Study	Participants	Comparison	Follow-up	Outcome measures	Comments	Risk of bias (per outcome measure)*
<i>Individual studies</i>						
Songur, 2024 Turkey, 1 center, RCT	<p><u>N at baseline</u> I.1: 59 I.2: 59 C: 62</p> <p><u>Age</u> (mean \pm SD) I.1: 47.42 \pm 8.83 I.2: 47.40 \pm 7.91 C: 46.18 \pm 8.58</p> <p><u>Sex</u> (%female) I.1: 51 I.2: 68 C: 58</p>	<p><u>Intervention 1</u> Lateral epicondylitis band: non-elastic band applied 5 cm distal to the lateral epicondyle on the proximal forearm, designed to restrict muscle expansion while allowing elbow flexion. Participants were instructed to make a fist, and the band's tightness was adjusted accordingly. After opening their fist, participants were asked to assess the pressure on their forearm and to repeat the process while wearing the band</p> <p><u>Intervention 2</u> Wrist extensor splint: upper extremity splint designed to hold the wrist in 15 degrees of extension with the support of a polyethylene bar. This design helps maintain the extensor muscles</p>	6 weeks	Pain (VAS), elbow function (PRTEE, hand grip strength),	Source of funding or conflicts of interest not reported.	Some concerns (all outcomes)

		<p>and tendons in a relaxed position, allowing them to rest. The splint was applied to the distal wrist and forearm without restricting finger movements.</p> <p><u>Control</u> Education-only (wait-and-see)</p>				
<p><i>DASH - Disabilities of the Arm, Shoulder and Hand questionnaire; NR - not reported; NRS – Numeric Rating Scale; PRTEE - Patient-Rated Tennis Elbow Evaluation; PRFEQ - Patient-Rated Forearm Evaluation Questionnaire; VAS – visual analogue scale;</i></p>						

5 *For further details, see risk of bias table in the appendix or systematic review

5 **Results**

Results were extracted from the data reported in the studies as means \pm standard deviations (SDs). If data were presented by medians (interquartile ranges), results were converted into means \pm SD by the conversion tool described by Weir (2018).

10 **Splints**

Pain (crucial)

[Songur \(2024\)](#) reported pain at rest with the VAS (scale 0-10, lower is better) and reported the pain score with the PRTEE (5 questions on a scale 0-10, lower is better).

15 *At rest*

Patients who received either a lateral epicondylitis band or wrist extensor splint had at 6 weeks a mean VAS score at rest of 0.7 (SD 1.5) as compared to 3.3 (SD 3.0) for patients who received education only. The MD was 2.60 points lower (95% CI, 3.50 lower to 1.70 lower), in favor of the splint groups and clinically relevant for both general patients and professional athletes with LET.

20

PRTEE-pain

Patients who received a lateral epicondylitis band had a mean PRTEE-pain score at 6 weeks of 9.5 (SD 11.8) as compared to 23.8 (SD 11.0) for patients who received education only. The MD was 14.3 points lower (95% CI, 18.64 lower to 9.96 lower), in favor of the lateral epicondylitis band group and clinically relevant. In addition, patients who received a wrist extensor splint had at 6 weeks a mean PRTEE-pain score of 8.8 (SD 6.5) as compared to 23.8 (SD 11.0) for patients who received education only. The MD was 15.00 points lower (95% CI, 18.44 lower to 11.56 lower), in favor of the splint group, and clinically relevant.

25

30

Quality of life (crucial)

No studies reported on quality of life for splints.

Elbow function (crucial)

35 [Songur \(2024\)](#) reported the function measured with the PRTEE (10 questions on a scale 0-10; lower is better). At 6 weeks, patients who received a lateral epicondylitis band had a mean PRTEE function score of 7.7 (SD 8.0) as compared to 23.3 (SD 9.3) for patients who received education only. The MD was 15.60 lower (95% CI, 18.90 lower to 12.30 lower), in favor of the lateral epicondylitis band group, and clinically relevant. In addition, patients who

40 received a wrist extensor splint had a mean PRTEE function score at 6 weeks of 8.3 (SD 5.7) as compared to 23.3 (SD 9.3) for patients who received education only. The MD was 15.00 points lower (95% CI, 17.94 lower to 12.06 lower), in favor of the wrist extensor splint group, and clinically relevant.

40

45 Besides, [Songur \(2024\)](#) reported the hand grip strength, assessed using a digital hand dynamometer (higher is better). Patients who received a lateral epicondylitis band had a mean hand grip strength at 6 weeks of 27.6 kg (SD 12.4) as compared to 20.3 kg (SD 11.4) for patients who received education only. The MD was 7.30 higher (95% CI, 2.77 higher to 11.83 higher), in favor of the lateral epicondylitis band group, and clinically relevant. In addition,

50 patients who received a wrist extensor splint (n=53) had a mean hand grip strength at 6 weeks of 21.5 kg (SD 7.2) as compared to 20.3 kg (SD 11.4) for patients who received education only. The MD was 1.20 higher (95% CI, 2.43 lower to 4.83 higher), in favor of the wrist extensor splint group, but not clinically relevant.

50

5 Return to sports/work (crucial)
No studies reported on return to sports/work for splints.

Patient recovery (crucial)
No studies reported on patient recovery for splints.

10 Complications (important)
No studies reported on complications for splints.

5 Summary of Findings

Splints versus placebo or wait and see policy

Outcome	Study results and measurements	Absolute effect estimates		Certainty of the evidence (Quality of evidence)	Summary
		Placebo or wait and see policy	Splints		
Pain – at rest for lateral epicondylitis band and wrist extensor splint (crucial)	Measured by: VAS Scale 0-10, lower is better Based on data from 180 participants in 1 study	MD 2.60 points lower (95% CI, 3.50 lower to 1.70 lower)		Very low Due to serious risk of bias, Due to very serious imprecision ¹	The evidence is very uncertain about the effect of a lateral epicondylitis band or wrist extensor splint on pain measured with VAS when compared with placebo or wait and see policy in <i>general patients</i> with lateral epicondylar tendinopathy. (Songur, 2024)
Pain – at rest for lateral epicondylitis band and wrist extensor splint (crucial)	Measured by: VAS Scale 0-10, lower is better Based on data from 180 participants in 1 study	MD 2.60 points lower (95% CI, 3.50 lower to 1.70 lower)		Very low Due to serious risk of bias, Due to serious indirectness, Due to serious imprecision ²	The evidence is very uncertain about the effect of a lateral epicondylitis band or wrist extensor splint on pain measured with VAS when compared with placebo or wait and see policy in <i>professional athletes</i> with lateral epicondylar tendinopathy. (Songur, 2024)
Pain – PRTEE for lateral epicondylitis band (crucial)	Measured by: PRTEE 5 questions on a scale 0-10; best=0, worst=50 Based on data from 121 participants in 1 study	MD 14.3 points lower (95% CI, 18.64 lower to 9.96 lower)		Very low Due to serious risk of bias, Due to very serious imprecision ¹	The evidence is very uncertain about the effect of a lateral epicondylitis band on pain measured with PRTEE when compared with placebo or wait and see policy in <i>general patients</i> with lateral epicondylar tendinopathy. (Songur, 2024)
Pain – PRTEE for wrist extensor splint (crucial)	Measured by: PRTEE 5 questions on a scale 0-10; best=0, worst=50 Based on data from 121 participants in 1 study	MD 15.00 points lower (95% CI, 18.44 lower to 11.56 lower)		Very low Due to serious risk of bias, Due to very serious imprecision ¹	The evidence is very uncertain about the effect of a wrist extensor splint on pain measured with PRTEE when compared with placebo or wait and see policy in <i>general patients</i> with lateral epicondylar tendinopathy. (Songur, 2024)

Quality of life (crucial)			No GRADE (no evidence was found)	No evidence was found regarding the effect of splints on quality of life when compared with placebo or wait and see policy in <i>general patients</i> with lateral epicondylar tendinopathy.
Elbow function – PRTEE for lateral epicondylitis band (crucial)	Measured by: PRTEE 10 questions on a scale 0-10; best=0, worst=50 Based on data from 121 participants in 1 study	MD 15.60 lower (95% CI, 18.90 lower to 12.30 lower)	Very low Due to serious risk of bias, Due to very serious imprecision ¹	The evidence is very uncertain about the effect of a lateral epicondylitis band on elbow function measured with PRTEE when compared with placebo or wait and see policy in <i>general patients</i> with lateral epicondylar tendinopathy. (Songur, 2024)
Elbow function – PRTEE for wrist extensor splint (crucial)	Measured by: PRTEE 10 questions on a scale 0-10; best=0, worst=50 Based on data from 121 participants in 1 study	MD 15.00 points lower (95% CI, 17.94 lower to 12.06 lower)	Very low Due to serious risk of bias, Due to very serious imprecision ¹	The evidence is very uncertain about the effect of a wrist extensor splint on elbow function measured with PRTEE when compared with placebo or wait and see policy in <i>general patients</i> with lateral epicondylar tendinopathy. (Songur, 2024)
Elbow function – hand grip strength for lateral epicondylitis band (crucial)	Measured with hand dynamometer (higher is better) Based on data from 121 participants in 1 study	MD 7.30 higher (95% CI, 2.77 higher to 11.83 higher)	Very low Due to serious risk of bias, Due to very serious imprecision ¹	The evidence is very uncertain about the effect of a lateral epicondylitis band on elbow function measured with hand grip strength when compared with placebo or wait and see policy in <i>general patients</i> with lateral epicondylar tendinopathy. (Songur, 2024)
Elbow function – hand grip strength for wrist extensor splint (crucial)	Measured with hand dynamometer (higher is better) Based on data from 121 participants in 1 study	MD 1.20 higher (95% CI, 2.43 lower to 4.83 higher)	Very low Due to serious risk of bias, Due to very serious imprecision ¹	The evidence is very uncertain about the effect of a wrist extensor splint on elbow function measured with hand grip strength when compared with placebo or wait and see policy in <i>general patients</i> with lateral epicondylar tendinopathy. (Songur, 2024)

Return to sports/work (crucial)			No GRADE (no evidence was found)	No evidence was found regarding the effect of splints on return to sports or work when compared with placebo or wait and see policy in <i>general patients</i> with lateral epicondylar tendinopathy.
Patient recovery (crucial)			No GRADE (no evidence was found)	No evidence was found regarding the effect of splints on patient recovery when compared with placebo or wait and see policy in <i>general patients</i> with lateral epicondylar tendinopathy.
Complications (important)			No GRADE (no evidence was found)	No evidence was found regarding the effect of splints on complications when compared with placebo or wait and see policy in <i>general patients</i> with lateral epicondylar tendinopathy.

- 5
- Risk of bias: serious. Due to single-blinded study.**
Imprecision: very serious. Due to the optimal information size which was not achieved.
 - Risk of bias: serious. Due to single-blinded study.**
Indirectness: serious. Study results in the general patient with LET may not be applicable in professional athletes with LET.
Imprecision: serious. Due to the optimal information size which was not achieved.

5 **Overwegingen – van bewijs naar aanbeveling (NL)**

Balans tussen gewenste en ongewenste effecten

Spalk

10 Er werd één RCT gevonden die rapporteerde over een spalk vergeleken met placebo of
standaardzorg. Voor de cruciale uitkomstmaat pijn werd een klinisch relevant effect gevonden voor
zowel de algemene patiënt met laterale epicondylaire tendinopathie (LET) als topsporters met LET in
het voordeel van een spalk. Echter was de bewijskracht zeer laag. Voor de cruciale uitkomstmaat
elleboogfunctie werd ook een klinisch relevant effect gevonden. Voor handgrijpkracht met een
15 polsxtensor-spalk werd geen klinisch relevant effect gevonden. De bewijskracht voor beide cruciale
uitkomstmaten was echter zeer laag. Geen van de studies rapporteerde over de cruciale
uitkomstmaten kwaliteit van leven, terugkeer naar sport/werk of herstel van de patiënten. Ook
rapporteerde geen studie over de belangrijke uitkomstmaat complicaties. Op basis van deze
resultaten kan er geen voorkeur worden uitgesproken voor de spalk vergeleken met placebo of
20 standaardzorg.

Kwaliteit van bewijs

Spalk

25 De overall kwaliteit van bewijs is zeer laag. Dit betekent dat we zeer onzeker zijn over het gevonden
geschatte effect van de cruciale uitkomstmaten. Er is afgewaardeerd vanwege (zeer) ernstige:

- Risk of Bias: methodologische beperkingen, vanwege onzekerheid over blinding.
- Indirectheid: indirectheid van het bewijs door verschillen in populatie (studieresultaten in algemene patiënten met LET zijn mogelijk niet 1-op-1 te vertalen naar topsporters met LET).
- Imprecisie: onnauwkeurigheid, vanwege het niet bereiken van de optimale steekproefgrootte.

30

Waarden en voorkeuren van patiënten (en eventueel hun naasten/verzorgers)

35 Voor veel patiënten met LET of MET staat pijnvermindering en herstel van functie centraal, omdat
dit direct invloed heeft op werk en sportdeelname. Interventies zoals een spalk worden in de praktijk
als ondersteunend ervaren, omdat deze behandelingen het gevoel geven bij te dragen aan herstel of
tijdelijk pijnverlichting bieden. In de wetenschappelijke literatuur werd een klinisch relevante effect
gevonden, maar de bewijskracht was zeer laag. Het risico op complicaties bij conservatieve
hulpmiddelen zoals een spalk is zeer laag, wat voor patiënten geruststellend kan zijn. Duidelijke
40 voorlichting rondom niet-medicamenteuze interventies zoals een spalk is belangrijk. Patiënten
dienen realistische verwachtingen te hebben van het mogelijke effect op pijn en functieherstel,
evenals van de onzekerheid over de langetermijneffecten. Het is van belang dat er tijd en ruimte is
om samen met de patiënt af te wegen in hoeverre de klachten het dagelijks functioneren, werk of
sport beïnvloeden, en of de patiënt bereid is eventuele ongemakken van de interventie te
45 accepteren. De waarde van potentieel sneller herstel of ondersteuning hierbij (los van het
daadwerkelijke effect) kan daarbij groter zijn voor patiënten met fysiek zwaar werk dan voor
patiënten waarbij de klachten het dagelijks functioneren minder beperken.

Kostenaspecten

50 De interventies leveren over het algemeen meer kosten op dan een afwachtend beleid, doordat
spalken additionele zorg of hulpmiddelen vragen.

Gelijkheid ((health) equity/equitable)

5 Mocht er gekozen worden voor een spalk als behandeling voor een LET of MET, dan is het belangrijk dat toegang tot zorg zo min mogelijk afhankelijk is van sociaaleconomische status, woonplaats of aanvullende verzekering.

Aanvaardbaarheid:

10 *Ethische aanvaardbaarheid*

Er zijn geen ethische bezwaren van toepassing voor een spalk als niet-medicamenteuze interventie, mits deze interventie wordt toegepast met een duidelijke voorlichting en in samenspraak met de patiënt.

15 *Duurzaamheid*

Niet van toepassing.

Haalbaarheid

20 Spalken zijn breed beschikbaar via reguliere zorgkanalen en hulpmiddelenleveranciers.

Aanbevelingen

Rationale van de aanbeveling: weging van argumenten voor en tegen de interventies

25 De literatuursamenvatting laat zien dat voor spalken een klinisch relevant effect op pijn werd gevonden ten opzichte van standaardzorg, zowel bij algemene patiënten als bij topsporters met LET. Echter, de bewijskracht is zeer laag, waardoor de zekerheid over het werkelijke effect beperkt is.

Eindoordeel:

Sterke aanbeveling tegen spalk.

Adviseer geen routinematige immobilisatie met een spalk bij een laterale of mediale epicondylaire tendinopathie.

30

Kennisvragen

35 Tijdens de ontwikkeling van deze module is gebleken dat er binnen deze module nog te weinig bewijs is voor de onderbouwing van de aanbeveling en dus kennisvragen bestaan. De werkgroep meent dat (vervolg)onderzoek wenselijk is om in de toekomst een duidelijker antwoord te kunnen geven op vragen uit de praktijk.

Kennisvraag 1:

40 - Wat is de (kosten)- effectiviteit en veiligheid van functionele ondersteunende behandeling zoals een spalk bij patiënten met mediale epicondylaire tendinopathie (MET) vergeleken met placebo of een afwachtend beleid?

Toelichting:

45 Voor MET zijn geen gerandomiseerde studies geïnccludeerd. Hierdoor zijn aanbevelingen voor MET grotendeels geëxtrapoleerd van LET, wat leidt tot indirectheid van bewijs. Goed opgezette, multicenter RCT's met duidelijke diagnostische criteria en relevante uitkomstmaten zijn nodig om de effectiviteit en veiligheid specifiek voor MET vast te stellen.

Kennisvraag 2:

50

- 5 - Leidt een spalk bij LET of MET tot snellere terugkeer naar werk of sport en tot beter patiënt gerapporteerd herstel vergeleken met placebo of afwachtend beleid?

Toelichting:

- 10 Terugkeer naar werk/sport en patiëntherstel zijn cruciale uitkomstmaten voor besluitvorming, maar worden in de huidige literatuur nauwelijks gerapporteerd. Hierdoor is het onduidelijk of interventies klinisch relevante maatschappelijke of functionele winst opleveren. Toekomstig onderzoek dient deze uitkomsten systematisch en gestandaardiseerd te meten, bij voorkeur met voldoende follow-upduur ($\geq 6-12$ maanden).

Implementeren-tabel
Implementatietabel

Vraag	Antwoord: <i>Kruis aan en licht toe/ beschrijf</i>		Toelichting keuze:
I1. Wat was het onderliggende probleem om deze uitgangsvraag uit te werken?		Ongewenste praktijkvariatie	
	X	Nieuwe evidentie	Onduidelijkheid over effectiviteit van conservatieve behandelingen
		Anders	
I2. Maak een inschatting over hoeveel patiënten het ongeveer gaat waar de aanbeveling betrekking op heeft?		< 1000	
		< 5000	
	X	5000-40.000	
		> 40.000	
I3. Is de aanbeveling onderdeel van een bredere set interventies of verwant aan andere richtlijnen of modules? Zo ja, hoe verhoudt zij zich daartoe en moet hiermee rekening worden gehouden bij de implementatie, of kan de aanbeveling als losstaand worden beschouwd?		Ja	
	X	Nee	
I4. Belemmeringen en kansen op verschillende niveaus voor landelijke toepassing van de aanbeveling:		Belemmerende factoren	Bevorderende factoren/ kansen
Richtlijn/ klinisch traject (innovatie)	X	Aanbeveling sluit mogelijk niet aan bij bestaande routine	Aanbevelingen zijn simpel geformuleerd en dus makkelijk op te volgen.
Zorgverleners (artsen en verpleegkundigen)	X	Aanpassing in attitude nodig	Duidelijkheid voor 1 ^e lijn.
Patiënt/ cliënt (naasten)	X	Patiënt begrijpt mogelijk niet waarom een spalk niet meer gegeven wordt. Goede uitleg nodig.	
Sociale context	X	Werkdruk en sportcultuur gericht op doorbelasting kunnen belastingreductie bemoeilijken.	Afstemming met werkgever of bedrijfsarts kan veilige opbouw van belasting ondersteunen.
Organisatorische context			
Financiële en juridische context	X		Het vermijden van niet-effectieve interventies kan kosten besparen en doelmatigheid vergroten.
I5. A) Welke personen/partijen zijn van belang bij het toepassen van de aanbeveling in de praktijk? (kruis aan)		A	B
		Patiënt/ cliënt (naaste)	

B) Wat is er nodig van deze personen/partijen om de aanbeveling in de praktijk te kunnen brengen? Denk aan aanpassingen in gedrag, werkwijzen, beleid, samenwerking of andere randvoorwaarden.	X	Professional	Stelt indicatie, geeft voorlichting en verwijst zo nodig
	X	Beroepsvereniging, nl	Goede verspreiding van richtlijn via de gebruikelijke kanalen in de 1 ^e en 2 ^e lijn
		Ziekenhuis (raad van bestuur/UMCNL (voorheen NFU)/NVZ)	
	X	Zorgverzekeraars/ NZa	geen aanpassing nodig; aanbevolen zorg kan als aanvullende verzekering in het pakket
		Zorginstituut [duiding nodig]	
		Anders	
16. Binnen welk tijdsbestek moet de aanbeveling zijn geïmplementeerd?	X	< 1 jaar	
		binnen 2-3 jaar	
17. Conclusie: is er extra actie en/of ondersteuning nodig voor implementatie van de aanbeveling? <i>De reguliere implementatieroutes (publicatie en disseminatie via officiële kanalen, opname in professionele standaarden, scholing en nascholing, gebruik van bestaande ICT systemen, audits en visitaties) van de richtlijnmodule alleen is onvoldoende.</i>		Ja	
	X	Nee	De reguliere implementatieroutes van de richtlijnmodule is voldoende.
18. Plaatsing op de Landelijke Implementatieagenda Medisch Specialistische zorg is gewenst. Het gaat om zorg die (grotendeels) wordt uitgevoerd binnen de ziekenhuismuren. Succesvolle implementatie vraagt om actieve betrokkenheid en samenwerking van meerdere relevante partijen binnen de zorgpraktijk.		Ja *	
	X	Nee	Zie boven, implementatie kan via reguliere kanalen plaatsvinden

*Deze aanbeveling komt mogelijk in aanmerking voor plaatsing op de Landelijke Implementatieagenda van het programma Zorg Evaluatie & Gepast Gebruik (ZE&GG), waarin alle betrokken partijen in de medisch-specialistische zorg samenwerken aan de implementatie van bewezen beste zorg. De Federatie levert namens het veld goed onderbouwde aanbevelingen aan, die zijn getoetst op de behoefte aan een implementatie-impuls. De onderwerpen op de Implementatieagenda zijn onderdeel van landelijke zorginkoopafspraken tussen zorgverzekeraars en zorgaanbieders. Voor de beoordeling van aanbevelingen uit richtlijnen wordt gebruikgemaakt van de implementatietabel. Op basis hiervan kunnen we de andere partijen goed informeren en gezamenlijk besluiten of plaatsing op de Implementatieagenda passend is.

5 **Literatuur**

Bohannon RW. Minimal clinically important difference for grip strength: a systematic review. *J Phys Ther Sci.* 2019 Jan;31(1):75-78. doi: 10.1589/jpts.31.75. Epub 2019 Jan 10. PMID: 30774209; PMCID: PMC6348186.

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Songur K, Demir ZD, Baysan C, Dilek B. Clinical and Ultrasonographic Effectiveness of Two Different Splints Used for the Treatment of Lateral Epicondylitis: A Prospective Randomized Controlled Study. *Arch Phys Med Rehabil.* 2024 Apr;105(4):655-663. doi: 10.1016/j.apmr.2023.12.010. Epub 2023 Dec 30. PMID: 38163530.

5 Bijlagen bij submodule 3.1.3. Functionele ondersteuning: spalk

Risk of Bias tables

Risk of bias table for intervention studies (randomized controlled trials; based on Cochrane risk of bias tool and suggestions by the CLARITY Group at McMaster University)

Study reference (first author, publication year)	Was the allocation sequence adequately generated?	Was the allocation adequately concealed?	Blinding: Was knowledge of the allocated interventions adequately prevented? Were patients blinded? Were healthcare providers blinded? Were data collectors blinded? Were outcome assessors blinded? Were data analysts blinded?	Was loss to follow-up (missing outcome data) infrequent?	Are reports of the study free of selective outcome reporting?	Was the study apparently free of other problems that could put it at a risk of bias?	Overall risk of bias If applicable/necessary, per outcome measure
	Definitely yes Probably yes Probably no Definitely no	Definitely yes Probably yes Probably no Definitely no	Definitely yes Probably yes Probably no Definitely no	Definitely yes Probably yes Probably no Definitely no	Definitely yes Probably yes Probably no Definitely no	Definitely yes Probably yes Probably no Definitely no	LOW Some concerns HIGH

Songur, 2024	Definitely yes; Reason: Block randomization was used.	Probably yes; Reason: Randomization was carried out by researcher who was not involved in the study.	Probably no; Reason: Single-blinded study. Researcher who applied the splints was not blinded. Evaluations were made by the same clinician who was blind to the groups of participants.	Probably yes; Reason: Loss to follow-up was similar among groups (14.5% versus 10.2%). Intention-to-treat analysis was performed.	Probably yes; Reason: All relevant outcomes were reported.	Probably no; Reason: Use of the splints was not documented in a diary, so may be used different than advised.	Some concerns Reason: Single-blinded study.
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Table of excluded studies

Reference	Reason for exclusion
Bisset L, Smidt N, Van der Windt DA, Bouter LM, Jull G, Brooks P, Vicenzino B. Conservative treatments for tennis elbow do subgroups of patients respond differently? <i>Rheumatology (Oxford)</i> . 2007 Oct;46(10):1601-5. doi: 10.1093/rheumatology/kem192. PMID: 17890274.	● Use of more recent SR from Wallis 2024. These 2 RCTs (Smidt 2002 and Bisset 2006) are also included
Boisubert B, Brousse C, Zaoui A, Montigny JP. Nonsurgical treatment of tennis elbow. In <i>Annales de Readaptation et de Medecine Physique: Revue Scientifique de la Societe Francaise de Reeducation Fonctionnelle de Readaptation et de Medecine Physique</i> 2004 Aug 1 (Vol. 47, No. 6, pp. 346-355).	Full text only available in French
Buchbinder R, Green SE, Youd JM, Assendelft WJ, Barnsley L, Smidt N. Shock wave therapy for lateral elbow pain. <i>Cochrane Database Syst Rev</i> . 2005 Oct 19;2005(4):CD003524. doi: 10.1002/14651858.CD003524.pub2. PMID: 16235324; PMCID: PMC8717012.	Wrong intervention: ECSWT
Buchbinder R, Green SE, Youd JM, Assendelft WJ, Barnsley L, Smidt N. Systematic review of the efficacy and safety of shock wave therapy for lateral elbow pain. <i>J Rheumatol</i> . 2006 Jul;33(7):1351-63. PMID: 16821270.	Double with Cochrane SR from Buchbinder 2005.
Chen Q, Shen P, Zhang B, Chen Y, Zheng C. Long-term effectiveness of conservative management for lateral epicondylitis: a meta-analysis. <i>J Plast Surg Hand Surg</i> . 2023 Aug 24;58:67-73. doi: 10.2340/jphs.v58.12333. PMID: 37615315.	ECSWT and injections not relevant + Use more recent review of Wallis 2024 for exercise
Kaplan S, Sah V, Ozkan S, Adanas C, Delen V. Comparative Effects of Focused and Radial Extracorporeal Shock Wave Therapies on Lateral Epicondylitis: A Randomised Sham-controlled Trial. <i>J Coll Physicians Surg Pak</i> . 2023 May;33(5):554-559. doi: 10.29271/jcpsp.2023.05.554. PMID: 37190692.	Wrong intervention: ECSWT
Karanasios S, Korakakis V, Whiteley R, Vasilogeorgis I, Woodbridge S, Gioftsos G. Exercise interventions in lateral elbow tendinopathy have better outcomes than passive interventions, but the effects are small: a systematic review and meta-analysis of 2123 subjects in 30 trials. <i>Br J Sports Med</i> . 2021 May;55(9):477-485. doi: 10.1136/bjsports-2020-102525. Epub 2020 Nov 4. PMID: 33148599.	Use more recent review of Wallis 2024
Kim YJ, Wood SM, Yoon AP, Howard JC, Yang LY, Chung KC. Efficacy of Nonoperative Treatments for Lateral Epicondylitis: A Systematic Review and Meta-Analysis. <i>Plast Reconstr Surg</i> . 2021 Jan 1;147(1):112-125. doi: 10.1097/PRS.0000000000007440. PMID: 33002980.	Injections not relevant for this module, overlapping studies for electrophysiotherapy with more recent SR from Xiong 2024, use more recent SR from Heales 2020 with search date Sep-2019 for physical therapy
Lapner P, Alfonso A, Hebert-Davies J, Pollock JW, Marsh J, King GJW; Canadian Shoulder and Elbow Society (CSES). Nonoperative treatment of lateral epicondylitis: a systematic review and meta-analysis. <i>JSES Int</i> . 2021 Dec 18;6(2):321-330. doi: 10.1016/j.jseint.2021.11.010. PMID: 35252934; PMCID: PMC8888180.	Injections not relevant + more recent SR on physiotherapy available, namely Chen's 2023
Lapner P, Alfonso A, Herbert-Davies J, Pollock JW, Marsh J, King G; Canadian Shoulder and Elbow Society (CSES). Position statement: nonoperative management of lateral epicondylitis in adults. <i>Can J Surg</i> . 2022 Sep 21;65(5):E625-E629. doi: 10.1503/cjs.019221. PMID: 36130807; PMCID: PMC9503571.	Position statement

Li Y, Mei L, Rahat S, Pang L, Li R, Xiong Y, Li J, Tang X. The efficacy of kinesio tape in patients with lateral elbow tendinopathy: A systematic review and meta-analysis of prospective randomized controlled trials. <i>Heliyon</i> . 2024 Feb 4;10(3):e25606. doi: 10.1016/j.heliyon.2024.e25606. PMID: 38356591; PMCID: PMC10865320.	Wrong intervention: tape
Liu WC, Chen CT, Lu CC, Tsai YC, Liu YC, Hsu CW, Shih CL, Chen PC, Fu YC. Extracorporeal Shock Wave Therapy Shows Superiority Over Injections for Pain Relief and Grip Strength Recovery in Lateral Epicondylitis: A Systematic Review and Network Meta-analysis. <i>Arthroscopy</i> . 2022 Jun;38(6):2018-2034.e12. doi: 10.1016/j.arthro.2022.01.025. Epub 2022 Jan 31. PMID: 35093494.	Wrong intervention: ECSWT and injections
Long L, Briscoe S, Cooper C, Hyde C, Crathorne L. What is the clinical effectiveness and cost-effectiveness of conservative interventions for tendinopathy? An overview of systematic reviews of clinical effectiveness and systematic review of economic evaluations. <i>Health Technol Assess</i> . 2015 Jan;19(8):1-134. doi: 10.3310/hta19080. PMID: 25629427; PMCID: PMC4781358.	Wrong outcome: cost-effectiveness
Lowdon H, Chong HH, Dhingra M, Gomaa AR, Teece L, Booth S, Watts AC, Singh HP. Comparison of Interventions for Lateral Elbow Tendinopathy: A Systematic Review and Network Meta-Analysis for Patient-Rated Tennis Elbow Evaluation Pain Outcome. <i>J Hand Surg Am</i> . 2024 Jul;49(7):639-648. doi: 10.1016/j.jhsa.2024.03.007. Epub 2024 Apr 28. PMID: 38678448.	ECSWT, dry needling, kinesiotape. Use for physiotherapy/exercise more recent Cochrane review by Wallis 2024
Menta R, Randhawa K, Côté P, Wong JJ, Yu H, Sutton D, Varatharajan S, Southerst D, D'Angelo K, Cox J, Brown C, Dion S, Mior S, Stupar M, Shearer HM, Lindsay GM, Jacobs C, Taylor-Vaisey A. The effectiveness of exercise for the management of musculoskeletal disorders and injuries of the elbow, forearm, wrist, and hand: a systematic review by the Ontario Protocol for Traffic Injury Management (OPTIMa) collaboration. <i>J Manipulative Physiol Ther</i> . 2015 Sep;38(7):507-20. doi: 10.1016/j.jmpt.2015.06.002. Epub 2015 Jun 27. PMID: 26130104.	Use the more recent Cochrane review by Wallis 2024
Ng GY, Chan HL. The immediate effects of tension of counterforce forearm brace on neuromuscular performance of wrist extensor muscles in subjects with lateral humeral epicondylitis. <i>J Orthop Sports Phys Ther</i> . 2004 Feb;34(2):72-8. doi: 10.2519/jospt.2004.34.2.72. PMID: 15029940.	Wrong intervention: strap tensions
Nimgade A, Sullivan M, Goldman R. Physiotherapy, steroid injections, or rest for lateral epicondylitis? What the evidence suggests. <i>Pain Pract</i> . 2005 Sep;5(3):203-15. doi: 10.1111/j.1533-2500.2005.05307.x. PMID: 17147582.	Steroids not relevant; Wallis 2024 for physiotherapy more recent
Rompe JD, Maffulli N. Repetitive shock wave therapy for lateral elbow tendinopathy (tennis elbow): a systematic and qualitative analysis. <i>Br Med Bull</i> . 2007;83:355-78. doi: 10.1093/bmb/ldm019. Epub 2007 Jul 11. PMID: 17626054.	Wrong intervention: ECSWT
Samiei S, Aminianfar A, Paknazar F. Ultra-sonographic study of the effect of dry needling of extensor muscles combined with Mulligan mobilization technique on extensor muscle tendon thickness, pain and upper limb function in patients with lateral epicondylitis: A double-blinded randomized clinical trial. <i>koomesh</i> .2021;23(6):e153306	Full text only available in Persian

Sayegh ET, Strauch RJ. Does nonsurgical treatment improve longitudinal outcomes of lateral epicondylitis over no treatment? A meta-analysis. Clin Orthop Relat Res. 2015 Mar;473(3):1093-107. doi: 10.1007/s11999-014-4022-y. Epub 2014 Oct 29. PMID: 25352261; PMCID: PMC4317462.	SR of Wallis 2024 more recent
Sims SE, Miller K, Elfar JC, Hammert WC. Non-surgical treatment of lateral epicondylitis: a systematic review of randomized controlled trials. Hand (N Y). 2014 Dec;9(4):419-46. doi: 10.1007/s11552-014-9642-x. PMID: 25414603; PMCID: PMC4235906.	Injections, laser therapy, ESWT. Brace relevant, but incorrect control group used
Srinivas MR, Kalyan G, Rao JB, Kumar TS. " A Comparitive Study On The Effectiveness Of Ultrasound With Progressive Strengthening Exercises In Lateral Epicondylitis". NeuroQuantology. 2022 Nov 1;20(16):297-304.	Wrong comparison: ultrasound
Tennis elbow: injections, PT, or wait-and-see? J Fam Pract. 2007 Feb;56(2):98. PMID: 17607826.	Wrong study design: commentary
Wood SM, Yoon AP, Tseng HJ, Yang LY, Chung KC. Comparative Effectiveness of Physical Therapy and Electrophysiotherapy for the Treatment of Lateral Epicondylitis: A Network Meta-Analysis. Plast Reconstr Surg. 2022 Sep 1;150(3):594e-607e. doi: 10.1097/PRS.0000000000009437. Epub 2022 Jul 1. PMID: 35791264.	The included studies do not meet the C in the established PICO
Xiong Y, Wen T, Jin S, Lin L, Shao Q, Peng Y, Zheng Q, Li W. Efficacy and safety of extracorporeal shock wave therapy for upper limb tendonitis: a systematic review and meta-analysis of randomized controlled trials. Front Med (Lausanne). 2024 Jul 30;11:1394268. doi: 10.3389/fmed.2024.1394268. PMID: 39139789; PMCID: PMC11319137.	Wrong intervention: ECSWT
Yoon SY, Kim YW, Shin IS, Moon HI, Lee SC. Does the Type of Extracorporeal Shock Therapy Influence Treatment Effectiveness in Lateral Epicondylitis? A Systematic Review and Meta-analysis. Clin Orthop Relat Res. 2020 Oct;478(10):2324-2339. doi: 10.1097/CORR.0000000000001246. PMID: 32332245; PMCID: PMC7491893.	Wrong intervention: ECSWT
Zheng C, Zeng D, Chen J, Liu S, Li J, Ruan Z, Liang W. Effectiveness of extracorporeal shock wave therapy in patients with tennis elbow: A meta-analysis of randomized controlled trials. Medicine (Baltimore). 2020 Jul 24;99(30):e21189. doi: 10.1097/MD.00000000000021189. PMID: 32791694; PMCID: PMC7387053.	Wrong intervention: ECSWT
Zunke P, Auffarth A, Hitzl W, Moursy M. The effect of manual therapy to the thoracic spine on pain-free grip and sympathetic activity in patients with lateral epicondylalgia humeri. A randomized, sample sized planned, placebo-controlled, patient-blinded monocentric trial. BMC Musculoskelet Disord. 2020 Mar 24;21(1):186. doi: 10.1186/s12891-020-3175-y. PMID: 32209068; PMCID: PMC7093973.	Wrong setting: lab setting

5

Literature search strategy

Cluster/richtlijn: Tennisarm en Golfarm - UV3 Behandeling conservatief	
Uitgangsvraag/modules: Wat is de waarde van oefentherapie, manuele therapie, braces, orthoses, en/of armsleeves, dry needling en shockwave therapie bij patiënten met klachten van epicondylitis lateralis of epicondylitis medialis?	
Database(s): Embase.com, Ovid/Medline	Datum: 11 december 2024

Periode: vanaf 2004	Talen: geen restrictie
Literatuurspecialist: Esther van der Bijl	Rayyan review: https://new.rayyan.ai/reviews/1258141/overview
BMI-zoekblokken: voor verschillende opdrachten wordt (deels) gebruik gemaakt van de zoekblokken van BMI-Online https://blocks.bmi-online.nl/ Deduplication: voor het ontdebellen is gebruik gemaakt van http://dedupendnote.nl/	
<p>Toelichting: Voor deze vraag is gezocht op de elementen tennisarm/ golfarm EN (oefentherapie OF manuele therapie OF braces OF orthoses OF armsleeves OF dry needling OF shockwave therapie) .</p> <p>Het sleutelartikel wordt gevonden met deze search.</p>	
<p>Te gebruiken voor richtlijntekst: A systematic literature search was performed by a medical information specialist using the following bibliographic databases: Embase.com and Ovid/Medline. Both databases were searched from 2004 to the 11th of December 2024 for systematic reviews and RCTs. Systematic searches were completed using a combination of controlled vocabulary/subject headings (e.g., Emtree-terms, MeSH) wherever they were available and natural language keywords. The overall search strategy was derived from eight primary search concepts: (1) lateral/medial epicondylitis; (2) exercise therapy; (3) braces; (4) manual therapy; (5) orthoses; (6) armsleeves; (7) dry needling (8) shockwave therapy. Duplicates were removed using EndNote software. After deduplication a total of 669 records were imported for title/abstract screening.</p>	

5

Zoekopbrengst 11 december 2024

	EMBASE	OVID/MEDLINE	Ontdubbeld
SR	205	148	228
RCT	371	278	441
Totaal	576	426	669*

*in Rayyan

10

Zoekstrategie Embase.com 11 december 2024

No.	Query	Results
#1	'tennis elbow'/exp OR 'medial epicondylitis'/exp OR (((tennis* OR golf*) NEAR/3 (arm* OR elbow*)):ti,ab,kw) OR (((epicondylitis OR epycondylitis OR epicondylitides OR epycondylitides) NEAR/3 (humer* OR lateral* OR external* OR radiohumer* OR medial*)):ti,ab,kw) OR (((elbow* OR epicondyl*) NEAR/7 (tendinopath* OR tendonopath* OR tendinos*)):ti,ab,kw)	4559
#2	'kinesiotherapy'/exp OR 'training'/exp OR 'musculoskeletal manipulation'/exp OR 'orthosis'/exp OR 'brace'/de OR 'arm brace'/de OR 'elbow brace'/exp OR 'manipulative medicine'/exp OR 'dry needling'/exp OR 'shock wave'/exp OR 'shock wave therapy'/exp OR 'physiotherapy'/exp OR 'arm exercise'/exp OR (((orthoepadic* OR orthopedic* OR orthotic*) NEAR/3 (device* OR support*)):ti,ab,kw) OR ((elbow* NEAR/3 (immobiliz* OR immobilis*)):ti,ab,kw) OR (((manipulati* OR manual* OR physical* OR physio) NEAR/3 (therap* OR treatment* OR medicine*)):ti,ab,kw) OR ((arm* NEAR/3 sleeve*):ti,ab,kw) OR exercis*:ti,ab,kw OR kinesiotherap*:ti,ab,kw OR kinesitherap*:ti,ab,kw OR training*:ti,ab,kw OR 'musculoskeletal manipulati*':ti,ab,kw OR 'kinetic* chain*':ti,ab,kw OR orth?s?:ti,ab,kw OR brace*:ti,ab,kw OR armsleeve*:ti,ab,kw OR 'dry needl*':ti,ab,kw OR 'shock wave*':ti,ab,kw OR 'shockwave*':ti,ab,kw OR physiotherap*:ti,ab,kw	1595820
#3	#1 AND #2	1686

#4	#3 AND [2004-2025]/py NOT ('conference abstract'/it OR 'editorial'/it OR 'letter'/it OR 'note'/it) NOT (('animal'/exp OR 'animal experiment'/exp OR 'animal model'/exp OR 'nonhuman'/exp) NOT 'human'/exp)	1085
#5	'meta analysis'/exp OR 'meta analysis (topic)'/exp OR metaanaly*:ti,ab OR 'meta analy*':ti,ab OR metanaly*:ti,ab OR 'systematic review'/de OR 'cochrane database of systematic reviews'/jt OR prisma:ti,ab OR prospero:ti,ab OR (((systemati* OR scoping OR umbrella OR 'structured literature') NEAR/3 (review* OR overview*)):ti,ab) OR ((systemic* NEAR/10 search*):ti,ab) OR (((systemati* OR literature OR database* OR 'data base*') NEAR/3 search*):ti,ab) OR (((literature NEAR/3 review*):ti,ab) AND (search*:ti,ab OR database*:ti,ab OR 'data base*':ti,ab)) OR (('data extraction':ti,ab OR 'data source*':ti,ab) AND 'study selection':ti,ab) OR ('search strategy':ti,ab AND 'selection criteria':ti,ab) OR ('data source*':ti,ab AND 'data synthesis':ti,ab) OR medline:ab OR pubmed:ab OR embase:ab OR cochrane:ab OR (((critical OR rapid) NEAR/2 (review* OR overview* OR synthes*)):ti) OR (((critical* OR rapid*) NEAR/3 (review* OR overview* OR synthes*)):ab) AND (search*:ab OR database*:ab OR 'data base*':ab)) OR metasynthes*:ti,ab OR 'meta synthes*':ti,ab	1085389
#6	'clinical trial'/exp OR 'randomization'/exp OR 'single blind procedure'/exp OR 'double blind procedure'/exp OR 'crossover procedure'/exp OR 'placebo'/exp OR 'prospective study'/exp OR rct:ab,ti OR random*:ab,ti OR 'single blind':ab,ti OR 'randomised controlled trial':ab,ti OR 'randomized controlled trial'/exp OR placebo*:ab,ti	4165415
#7	#4 AND #5 - SR	205
#8	#4 AND #6 NOT #7 - RCT	371
#9	#7 OR #8 - Totaal	576

5

Zoekstrategie Ovid/Medline 11 december 2024

#	Searches	Results
1	exp Tennis Elbow/ or exp Elbow Tendinopathy/ or ((tennis* or golf*) adj3 (arm* or elbow*)):ti,ab,kf. or ((epicondylitis or epycondylitis or epicondylitides or epycondylitides) adj3 (humer* or lateral* or external* or radiohumer* or medial*)):ti,ab,kf. or ((elbow* or epicondyl*) adj7 (tendinopath* or tendonopath* or tendinos*)):ti,ab,kf.	3245
2	exp Physical Therapy Modalities/ or exp Exercise Therapy/ or exp Musculoskeletal Manipulations/ or exp Orthotic Devices/ or exp Braces/ or exp Manipulation, Osteopathic/ or exp Dry Needling/ or exp Extracorporeal Shockwave Therapy/ or ((orthopeadic* or orthopedic* or orthotic*) adj3 (device* or support*)):ti,ab,kf. or (elbow* adj3 (immobiliz* or immobilis*)):ti,ab,kf. or ((manipulati* or manual* or physical* or physio) adj3 (therap* or treatment* or medicine*)):ti,ab,kf. or (arm* adj3 sleeve*):ti,ab,kf. or exercis*:ti,ab,kf. or kinesiotherap*:ti,ab,kf. or kinesitherap*:ti,ab,kf. or training*:ti,ab,kf. or musculoskeletal manipulati*:ti,ab,kf. or kinetic* chain*:ti,ab,kf. or orth?s?s:ti,ab,kf. or brace*:ti,ab,kf. or armsleeve*:ti,ab,kf. or dry needl*:ti,ab,kf. or shock wave*:ti,ab,kf. or shockwave*:ti,ab,kf. or physiotherap*:ti,ab,kf.	1158988
3	1 and 2	1034
4	limit 3 to yr="2004 -Current"	799
5	4 not (comment/ or editorial/ or letter/) not ((exp animals/ or exp models, animal/) not humans/)	753

6	meta-analysis/ or meta-analysis as topic/ or (metaanaly* or meta-analy* or metanaly*).ti,ab,kf. or systematic review/ or cochrane.jw. or (prisma or prospero).ti,ab,kf. or ((systemati* or scoping or umbrella or "structured literature") adj3 (review* or overview*).ti,ab,kf. or (systemic* adj1 review*).ti,ab,kf. or ((systemati* or literature or database* or data-base*) adj10 search*).ti,ab,kf. or ((structured or comprehensive* or systemic*) adj3 search*).ti,ab,kf. or ((literature adj3 review*) and (search* or database* or data-base*).ti,ab,kf. or (("data extraction" or "data source*") and "study selection").ti,ab,kf. or ("search strategy" and "selection criteria").ti,ab,kf. or ("data source*" and "data synthesis").ti,ab,kf. or (medline or pubmed or embase or cochrane).ab. or ((critical or rapid) adj2 (review* or overview* or synthes*).ti. or (((critical* or rapid*) adj3 (review* or overview* or synthes*)) and (search* or database* or data-base*).ab. or (metasynthes* or meta-synthes*).ti,ab,kf.	795237
7	exp clinical trial/ or randomized controlled trial/ or exp clinical trials as topic/ or randomized controlled trials as topic/ or Random Allocation/ or Double-Blind Method/ or Single-Blind Method/ or (clinical trial, phase i or clinical trial, phase ii or clinical trial, phase iii or clinical trial, phase iv or controlled clinical trial or randomized controlled trial or multicenter study or clinical trial).pt. or random*.ti,ab. or (clinic* adj trial*).tw. or ((singl* or doubl* or treb* or tripl*) adj (blind\$3 or mask\$3)).tw. or Placebos/ or placebo*.tw.	2816230
8	5 and 6 - SR	148
9	(5 and 7) not 8 - RCT	278
10	8 or 9 - Totaal	426

5

Submodule 3.1.4 Functionele ondersteuning: onderarm- en pols orthese

Uitgangsvraag

10 Wat is de waarde van orthoses, dry needling en shockwave therapie bij patiënten met klachten van mediale of laterale epicondylaire tendinopathie?

Introduction (English)

15 Current clinical practice for lateral and medial epicondylar tendinopathy shows wide variation in physiotherapy and manual therapy approaches, and inconsistent use of braces, orthoses, arm sleeves, dry needling, and shockwave therapy. This variability reflects uncertainty in the evidence of the different treatment options and can result in suboptimal patient outcomes. A comprehensive synthesis of comparative effectiveness is needed to standardize care and guide shared decision-making. Clear, evidence-based
20 recommendations may reduce ineffective or unnecessary interventions and yield health gains in pain reduction, elbow function, and timely return to work or sport.

Search and select

25 A systematic review of the literature was performed to answer the following question(s): What is the efficacy of manual therapy, orthoses and armsleeves compared to placebo or wait-and-see policy, in patients suspected of lateral or medial epicondylar tendinopathy?

Table 1. PICO

Patients	Patients with lateral medial epicondylar tendinopathy
Intervention	Manual therapy, orthoses, armsleeves
Control	Placebo, wait and see policy
Outcomes	Patient recovery, elbow function, pain, return to sports/work, quality of life, complications

5

Relevant outcome measures

10 The guideline panel considered patient recovery, elbow function, pain, return to sports or work and quality of life as **critical** outcome measures for decision making; and complications as an **important** outcome measure for decision making.

A priori, the guideline panel did not define the outcome measures listed above but used the definitions described in the studies.

15 For the Visual Analogue Scale (VAS), the guideline panel defined a mean difference (MD) of 2.0 points (1.0 point for professional athletes) as a minimal clinically (patient) important difference and $0.91 < RR < 1.1$ for complications. For the outcome pain-free or minimal grip strength, the guideline panel used a MD of at least 5 kg or 50 N as minimal clinically (patient) important difference (Bohannon, 2019). For the remaining outcomes the guideline panel
20 defined 25% ($0.8 \geq RR \geq 1.25$) for dichotomous outcomes and a MD of 10% for continuous outcomes as a minimal clinically (patient) important difference.

Search and select (Methods)

25 A systematic literature search was performed by a medical information specialist using the following bibliographic databases: Embase.com and Ovid/Medline. Both databases were searched from 2004 to the 11th of December 2024 for systematic reviews and RCTs. Systematic searches were completed using a combination of controlled vocabulary/subject headings (e.g., Emtree-terms, MeSH) wherever they were available and natural language keywords. The overall search strategy was derived from eight primary search concepts: (1)
30 lateral/ medial epicondylar tendinopathy; (2) exercise therapy; (3) braces; (4) manual therapy; (5) orthoses; (6) armsleeves; (7) dry needling (8) shockwave therapy. Duplicates were removed using EndNote software. After deduplication a total of 669 records were imported for title/abstract screening.

35 Initially, 33 studies were selected based on title and abstract screening. After reading the full text, 28 studies were excluded (see the exclusion table under the tab 'Evidence tabellen'), and five studies were included, of which one study was about orthoses.

Summary of literature

40 Description of studies

One study on orthoses in patients with lateral epicondylar tendinopathy was included in the analysis of the literature. Important study characteristics and results are summarized in table 2. The assessment of the risk of bias is summarized in the risk of bias tables (under the tab 'Evidence tabellen'). No studies about manual therapy and among medial epicondylar
45 tendinopathy patients were included.

Forearm and wrist orthosis

50 [Heales \(2020\)](#) performed a systematic review in which they included randomized controlled trials (RCTs) and randomized crossover trials that described the effect of forearm and/or wrist orthoses on pain and function in individuals with lateral elbow tendinopathy (LET). For the purpose of this review, the comparison with a placebo condition (i.e. an orthosis placed proximal to the elbow) was used. They searched four databases in September 2019. Seven studies were included in the review, of which two were considered useful for the current guideline (Sadeghi-Demneh, 2013; Jafarian, 2009). The other trials were excluded because

5 they compared other interventions. Trial inclusion criteria were a clinical diagnosis of LET,
use of an isolated wrist and/or forearm orthosis, without an orthosis or a placebo condition
as control, reported outcome measures related to pain, function or sensorimotor measures,
and investigated immediate effects (i.e., within-session). Animal studies, reviews, case
10 studies, abstracts, and letters to the editor were excluded. Risk of bias was assessed by the
Joanna Briggs Institute (JBI) quality appraisal tool.

Manual therapy

No literature was found on manual therapy.

15

5

Table 2. Characteristics of included studies

Study	Participants	Comparison	Follow-up	Outcome measures	Comments	Risk of bias (per outcome measure)*
<i>Included in systematic review Heales (2020)</i>						
Jafarian, 2009 <i>Iran, randomized crossover design</i>	<u>N at baseline</u> : 52 <u>Sex (%female)</u> : 61.5 <u>Age</u> : 41.2 ± 8.1 <u>Pain</u> : NR	<u>Intervention</u> 3 common types of orthoses (2 elbow counter-force orthoses and a wrist splint) <u>Control</u> Placebo	Immediately post application	Elbow function (pain-free grip strength, maximum grip strength)		Some concerns (all outcomes)
Sadeghi-Demneh 2013 <i>Iran, randomized crossover design</i>	<u>N at baseline</u> : 52 <u>Sex (%female)</u> : 61.5 <u>Age</u> : 41.2 ± 8.1 <u>Pain</u> : NR	<u>Intervention</u> 3 common types of orthoses (2 elbow counter-force orthoses and a wrist splint) <u>Control</u> Placebo	Immediately post application	Pain (VAS)		Some concerns (all outcomes)

*For further details, see risk of bias table in the appendix or systematic review

5 **Results**

Results were extracted from the data reported in the studies as means \pm standard deviations (SDs). If data were presented by medians (interquartile ranges), results were converted into means \pm SD by the conversion tool described by Weir (2018).

10 **Forearm and wrist orthosis**

Pain (crucial)

One study (Sadeghi-Demneh, 2013) reported pain measured with VAS (scale 0-10, lower is better) for elbow strap, elbow sleeve and wrist splint. Each participant served as their own control.

15 After wearing a forearm orthosis, patients reported a mean pain score of 4.1 (SD 2.1) as compared to a mean score of 5.8 (SD 2.4) after wearing a placebo orthosis. The MD was 1.72 points lower (95% CI, 2.4 lower to 1.0 lower), in favor of the forearm orthosis group. This is not clinically relevant for general patients with LET, but it is clinically relevant for professional athletes with LET.

20 After wearing a forearm-elbow sleeve, patients reported a mean pain score of 4.4 (SD 1.9) as compared to a mean score of 5.8 (SD 2.4) after wearing a placebo orthosis. The MD was 1.4 points lower (95% CI, 2 lower to 0.75 lower), in favor of the forearm elbow sleeve. This is not clinically relevant for general patients with LET, but it is clinically relevant for professional athletes with LET.

25 After wearing a wrist splint, patients reported a mean pain score of 5.3 (SD 1.6) as compared to a mean score of 5.8 (SD 2.4) after wearing a placebo orthosis. The MD was 0.48 points lower (95% CI, 0.96 lower to 0.01 higher), in favor of the wrist splint, but not clinically relevant for both general patients and professional athletes with LET.

30 Quality of life (crucial)

No studies reported on quality of life for forearm and wrist orthosis.

Elbow function (crucial)

35 One study (Jafarian, 2009) reported pain-free grip strength and maximum grip strength for the elbow strap, elbow sleeve and wrist splint. Each participant served as their own control. The grip strength measurements were assessed using a digital handgrip dynamometer (higher is better).

Pain-free grip strength

40 After wearing a forearm orthosis, the pain-free grip strength was 156 Newton (SD 88) as compared to 135 Newton (SD 77) after wearing a placebo orthosis. The MD was 21 Newton higher (95% CI 2 higher to 39 higher), in favor of the forearm orthosis group, but not clinically relevant.

45 After wearing a forearm-elbow sleeve, the pain-free grip strength was 156 Newton (SD 88) as compared to 135 Newton (SD 77) after wearing a placebo orthosis. The MD was 21 Newton higher (95% CI 4 higher to 37 higher), in favor of the forearm-elbow sleeve, but not clinically relevant.

50 After wearing a wrist splint, the pain-free grip strength was 129 Newton (SD 74) as compared to 135 Newton (SD 77) after wearing a placebo orthosis. The MD was 6 Newton lower (95% CI 21 lower to 9 higher), in favor of the placebo orthosis, but not clinically relevant.

Maximum grip strength

55 After wearing a forearm orthosis, the maximum grip strength was 174 Newton (SD 97) as compared to 161 Newton (SD 95) after wearing a placebo orthosis. The MD was 13 Newton

5 higher (95% CI 15 lower to 42 higher), in favor of the forearm orthosis group, but not clinically relevant.

After wearing a forearm-elbow sleeve, the maximum grip strength was 175 Newton (SD 95) as compared to 161 Newton (SD 95) after wearing a placebo orthosis. The MD was 14 Newton higher (95% CI 3 lower to 30 higher), in favor of the forearm-elbow sleeve group,

10 but not clinically relevant.

After wearing a wrist splint, the maximum grip strength was 142 Newton (SD 73) as compared to 161 Newton (SD 95) after wearing a placebo orthosis. The MD was 19 Newton lower (95%CI 39 lower to 2 higher), in favor of the placebo orthosis group, but not clinically relevant.

15

Return to sports/work (crucial)

No studies reported on return to sports/work for forearm and wrist orthosis.

Patient recovery (crucial)

20 No studies reported on patient recovery for forearm and wrist orthosis.

Complications (important)

No studies reported complications for forearm and wrist orthosis.

25

5 Summary of Findings

Forearm and wrist orthosis versus placebo or wait and see policy

Outcome	Study results and measurements	Absolute effect estimates		Certainty of the evidence (Quality of evidence)	Summary
		Placebo or wait and see policy	Forearm and wrist orthosis		
Pain – forearm orthosis (crucial)	Measured by: VAS Scale: 0-10, lower is better Based on data from 52 participants in 1 study	MD 1.72 points lower (95% CI, 2.4 lower to 1.0 lower)		Very low Due to serious risk of bias, Due to very serious imprecision ¹	The evidence is very uncertain about the effect of a forearm orthosis on pain when compared with placebo or wait and see policy in <i>general patients</i> with lateral epicondylar tendinopathy. <i>(Sadeghi-Demneh, 2013)</i>
Pain – forearm orthosis (crucial)	Measured by: VAS Scale: 0-10, lower is better Based on data from 52 participants in 1 study	MD 1.72 points lower (95% CI, 2.4 lower to 1.0 lower)		Very low Due to serious risk of bias, Due to serious indirectness, Due to serious imprecision ²	The evidence is very uncertain about the effect of a forearm orthosis on pain when compared with placebo or wait and see policy in <i>professional athletes</i> with lateral epicondylar tendinopathy. <i>(Sadeghi-Demneh, 2013)</i>
Pain – forearm elbow sleeve (crucial)	Measured by: VAS Scale: 0-10, lower is better Based on data from 52 participants in 1 study	MD 1.4 points lower (95% CI, 2 lower to 0.75 lower)		Very low Due to serious risk of bias, Due to very serious imprecision ¹	The evidence is very uncertain about the effect of a forearm orthosis on pain when compared with placebo or wait and see policy in <i>general patients</i> with epicondylar tendinopathy. <i>(Sadeghi-Demneh, 2013)</i>
Pain – forearm elbow sleeve (crucial)	Measured by: VAS Scale: 0-10, lower is better Based on data from 52 participants in 1 study	MD 1.4 points lower (95% CI, 2 lower to 0.75 lower)		Very low Due to serious risk of bias, Due to serious indirectness, Due to serious imprecision ²	The evidence is very uncertain about the effect of a forearm orthosis on pain when compared with placebo or wait and see policy in <i>professional athletes</i> with epicondylar tendinopathy. <i>(Sadeghi-Demneh, 2013)</i>
Pain – wrist splint (crucial)	Measured by: VAS Scale: 0-10, lower is better Based on data from 52 participants in 1 study	MD 0.48 points lower (95% CI, 0.96 lower to 0.01 higher)		Very low Due to serious risk of bias, Due to very serious imprecision ¹	The evidence is very uncertain about the effect of a forearm orthosis on pain when compared with placebo or wait and see policy in <i>general patients</i> with epicondylar tendinopathy. <i>(Sadeghi-Demneh, 2013)</i>

Pain – wrist splint (crucial)	Measured by: VAS Scale: 0-10, lower is better Based on data from 52 participants in 1 study	MD 0.48 points lower (95% CI, 0.96 lower to 0.01 higher)	Very low Due to serious risk of bias, Due to serious indirectness, Due to serious imprecision ³	The evidence is very uncertain about the effect of a forearm orthosis on pain when compared with placebo or wait and see policy in <i>professional athletes</i> with epicondylar tendinopathy. <i>(Sadeghi-Demneh, 2013)</i>
Quality of life (crucial)			No GRADE (no evidence was found)	No evidence was found regarding the effect of forearm and wrist orthosis on quality of life when compared with placebo or wait and see policy in <i>general patients</i> with lateral epicondylar tendinopathy.
Elbow function – pain free grip strength for forearm orthosis (crucial)	Measured by: hand dynamometer (higher is better) Based on data from 52 participants in 1 study	MD 21 Newton higher (95% CI, 2 higher to 39 higher)	Very low Due to serious risk of bias, Due to very serious imprecision ¹	The evidence is very uncertain about the effect of a forearm orthosis on elbow function measured with the pain free grip strength when compared with placebo or wait and see policy in <i>general patients</i> with lateral epicondylar tendinopathy. <i>(Jafarian, 2009)</i>
Elbow function – pain free grip strength for forearm elbow sleeve (crucial)	Measured by: hand dynamometer (higher is better) Based on data from 52 participants in 1 study	MD 21 Newton higher (95% CI, 4 higher to 37 higher)	Very low Due to serious risk of bias, Due to very serious imprecision ¹	The evidence is very uncertain about the effect of a forearm elbow sleeve on elbow function measured with the pain free grip strength when compared with placebo or wait and see policy in <i>general patients</i> with lateral epicondylar tendinopathy. <i>(Jafarian, 2009)</i>
Elbow function – pain free grip strength for wrist splint (crucial)	Measured by: hand dynamometer (higher is better) Based on data from 52 participants in 1 study	MD 6 Newton lower (95% CI, 21 lower to 9 higher)	Very low Due to serious risk of bias, Due to very serious imprecision ¹	The evidence is very uncertain about the effect of a wrist splint on elbow function measured with the pain free grip strength when compared with placebo or wait and see policy in <i>general patients</i> with lateral epicondylar tendinopathy. <i>(Jafarian, 2009)</i>

Elbow function – maximum grip strength for forearm orthosis (crucial)	Measured by: hand dynamometer (higher is better) Based on data from 52 participants in 1 study	MD 13 Newton higher (95% CI, 15 lower to 42 higher)	Very low Due to serious risk of bias, Due to very serious imprecision ¹	The evidence is very uncertain about the effect of a forearm orthosis on elbow function measured with the maximum grip strength when compared with placebo or wait and see policy in <i>general patients</i> with lateral epicondylar tendinopathy. (Jafarian, 2009)
Elbow function – maximum grip strength for forearm elbow sleeve (crucial)	Measured by: hand dynamometer (higher is better) Based on data from 52 participants in 1 study	MD 14 Newton higher (95% CI, 3 lower to 30 higher)	Very low Due to serious risk of bias, Due to very serious imprecision ¹	The evidence is very uncertain about the effect of a forearm elbow sleeve on elbow function measured with the maximum grip strength when compared with placebo or wait and see policy in <i>general patients</i> with lateral epicondylar tendinopathy. (Jafarian, 2009)
Elbow function – maximum grip strength for wrist splint (crucial)	Measured by: hand dynamometer (higher is better) Based on data from 52 participants in 1 study	MD 19 Newton lower (95% CI, 39 lower to 2 higher)	Very low Due to serious risk of bias, Due to very serious imprecision ¹	The evidence is very uncertain about the effect of a wrist splint on elbow function measured with the maximum grip strength when compared with placebo or wait and see policy in <i>general patients</i> with lateral epicondylar tendinopathy. (Jafarian, 2009)
Return to sports/work (crucial)			No GRADE (no evidence was found)	No evidence was found regarding the effect of forearm and wrist orthosis on return to sports or work when compared with placebo or wait and see policy in <i>general patients</i> with lateral or medial epicondylar tendinopathy.
Patient recovery (crucial)			No GRADE (no evidence was found)	No evidence was found regarding the effect of forearm and wrist orthosis on patient recovery when compared with placebo or wait and see policy in <i>general patients</i> with lateral or medial epicondylar tendinopathy.

<p>Complications (important)</p>			<p>No GRADE (no evidence was found)</p>	<p>No evidence was found regarding the effect of forearm and wrist orthosis on complications when compared with placebo or wait and see policy in <i>general patients</i> with lateral or medial epicondylar tendinopathy.</p>
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- 5
1. Risk of bias: serious. Due to concerns about randomization and blinding.
Imprecision: very serious. Due to the optimal information size which was not achieved.
 2. Risk of bias: serious. Due to concerns about randomization and blinding.
Indirectness: serious. Study results in the general patient with LET may not be applicable in professional athletes with LET.
Imprecision: serious. Overlap of 95% CI with right boundary of clinical relevance (VAS=1.0 point).
- 10
3. Risk of bias: serious. Due to concerns about randomization and blinding.
Indirectness: serious. Study results in the general patient with LET may not be applicable in professional athletes with LET.
Imprecision: serious. Due to the optimal information size which was not achieved.

5 Overwegingen – van bewijs naar aanbeveling (NL)

Balans tussen gewenste en ongewenste effecten

Onderarm- en polsorthese

10 Er werd één systematische review (twee relevante gerandomiseerde cross-over studies) gevonden dat rapporteerde over een onderarm- en polsorthese vergeleken met placebo of standaardzorg (deelnemer was zijn eigen controle). Er werd geen klinisch relevant effect gevonden op de cruciale uitkomstmaat elleboogfunctie. Voor de algemene patiënt met LET werd ook geen klinisch relevant verschil op de cruciale uitkomstmaat pijn gevonden, maar voor topsporters was deze uitkomstmaat wel klinisch relevant en in het voordeel van de onderarm orthese en de armsleeve. De bewijskracht was echter zeer laag. Geen van de studies rapporteerde over de cruciale uitkomstmaten kwaliteit van leven, terugkeer naar sport/werk of herstel van de patiënten. Ook rapporteerde geen studie over de belangrijke uitkomstmaat complicaties. Op basis van deze resultaten kan er dus geen voorkeur worden uitgesproken voor onderarm- of polsorthese of armsleeve vergeleken met placebo of standaardzorg.

Aanpalende literatuur: shockwave therapie

25 Naast oefentherapie, onderarm- en polsortheses, braces en spalken is het aanbieden van shockwave therapie als niet-medicamenteuze conservatieve behandeling voor LET en mediale epicondylaire tendinopathie (MET) zeer populair. Omwille van de afbakening zijn studies naar shockwave therapie niet opgenomen in de literatuursamenvatting van deze module. Echter, acht de werkgroep het wel relevant om de literatuur hierover te benoemen.

30 Lowdon (2024) heeft in een netwerk meta-analyse (NMA) het bewijs over o.a. shockwave therapie vergeleken met placebo/standaardzorg bij patiënten met LET. Uit deze analyse blijkt dat shockwave therapie, vergeleken met placebo of standaardzorg, bij een klinisch relevant verschil van 10 punten op de cruciale uitkomstmaat pijn (PRTEE) geen klinisch relevant effect heeft op zowel de korte termijn (≤ 6 weken, gemiddeld verschil van +1.27 punten) als de middellange termijn (> 6 weken tot 6 maanden, gemiddeld verschil van -3.30 punten). De NMA rapporteerde niet over de cruciale uitkomstmaten kwaliteit van leven, terugkeer naar sport/werk of volledig herstel. Op basis van deze uitkomsten kan er dus geen voorkeur worden uitgesproken voor shockwave therapie vergeleken met placebo of standaardzorg.

Aanpalende literatuur: dry needling

40 Ook de toepassing van dry needling is populair als niet-medicamenteuze conservatieve behandeling voor LET of MET. Vanwege de afbakening van deze module zijn studies over dry needling niet opgenomen in de literatuursamenvatting. Echter, de werkgroep vindt de literatuur hierover wel belangrijk om te benoemen.

45 In dezelfde NMA van Lowdon (2024) is ook het effect van dry needling onderzocht. Op de korte termijn (≤ 6 weken) werd mogelijk een klinisch relevant effect van dry needling t.o.v. placebo gevonden op de cruciale uitkomstmaat pijn (PRTEE, gemiddeld verschil van -18.42 punten). Het betrouwbaarheidsinterval (BI) doorkruist echter de linkergrens van klinische relevantie (10 punten), waardoor de bewijskracht van deze bevinding afneemt. Op de middellange termijn (> 6 weken tot 6 maanden) bleef het effect klinisch relevant en doorkruist het BI de grens van klinisch relevantie niet. Dit suggereert dat dry needling mogelijk vanaf 6 weken tot 6 maanden een pijnreducerend effect kan hebben. De NMA rapporteerde niet over de cruciale uitkomstmaten kwaliteit van leven, terugkeer naar sport/werk of volledig herstel.

5 Kwaliteit van bewijs

Onderarm- en polsorthese

De overall kwaliteit van bewijs is zeer laag. Dit betekent dat we zeer onzeker zijn over het gevonden geschatte effect van de cruciale uitkomstmaten.

10 Er is afgewaardeerd vanwege (zeer) ernstige:

- Risk of Bias: methodologische beperkingen, vanwege onzekerheid over randomisatie en blinding.
- Indirectheid: indirectheid van het bewijs door verschillen in populatie (studieresultaten in algemene patiënten met LET zijn mogelijk niet 1-op-1 te vertalen naar topsporters met LET).
- 15 • Imprecisie: onnauwkeurigheid, vanwege het niet bereiken van de optimale steekproefgrootte en omdat het BI de rechtergrens van klinische relevantie overschrijdt.

Waarden en voorkeuren van patiënten (en eventueel hun naasten/verzorgers)

20 Voor veel patiënten met LET of MET staat pijnvermindering en herstel van functie centraal, omdat dit direct invloed heeft op werk en sportdeelname. Interventies zoals orthesen en arm sleeves worden in de praktijk als ondersteunend ervaren, omdat deze behandelingen het gevoel geven bij te dragen aan herstel of tijdelijk pijnverlichting bieden. In de wetenschappelijke literatuur worden echter geen klinisch relevante effecten gevonden. Het risico op complicaties bij conservatieve hulpmiddelen zoals orthesen is zeer laag, wat voor patiënten geruststellend kan zijn. Bij shockwave therapie en dry needling kunnen patiënten tijdelijk pijnvermindering ervaren. Echter suggereert de literatuur dat er voor shockwave therapie geen klinisch relevant effect is op korte en middellange termijn. Daarbij kunnen sommige patiënten terughoudend zijn vanwege de invasieve aard. Voor dry needling lijkt er wel een klinisch relevant effect op pijn op te treden na middellange termijn, maar ook hier geldt de invasieve aard als mogelijk nadeel voor patiënten. Duidelijke voorlichting rondom niet-medicamenteuze interventies is belangrijk. Patiënten dienen realistische verwachtingen te hebben van het mogelijke effect op pijn en functieherstel, evenals van de onzekerheid over de langetermijneffecten. Het is van belang dat er tijd en ruimte is om samen met de patiënt af te wegen in hoeverre de klachten het dagelijks functioneren, werk of sport beïnvloeden, en of de patiënt bereid is eventuele ongemakken van de interventie te accepteren. De waarde van potentieel sneller herstel of ondersteuning hierbij (los van het daadwerkelijke effect) kan daarbij groter zijn voor patiënten met fysiek zwaar werk dan voor patiënten waarbij de klachten het dagelijks functioneren minder beperken.

Kostenaspecten

40 De interventies leveren over het algemeen meer kosten op dan een afwachtend beleid, doordat orthesen, shockwave therapie en dry needling additionele zorg of hulpmiddelen vragen.

Gelijkheid ((health) equity/equitable)

45 Mocht er gekozen worden voor een orthose of armsleeve als behandeling voor een LET of MET, dan is het belangrijk dat toegang tot zorg zo min mogelijk afhankelijk is van sociaaleconomische status, woonplaats of aanvullende verzekering.

Aanvaardbaarheid:

Ethische aanvaardbaarheid

50 Er zijn geen ethische bezwaren van toepassing voor een orthose of armsleeve als niet-medicamenteuze interventie, mits deze interventies worden toegepast met een duidelijke voorlichting en in samenspraak met de patiënt.

5 **Duurzaamheid**
Niet van toepassing.

Haalbaarheid

10 Orthesen en armsleeves zijn breed beschikbaar via reguliere zorgkanalen en hulpmiddelenleveranciers.

Aanbevelingen

Rationale van de aanbeveling: weging van argumenten voor en tegen de interventies

15 De literatuursamenvatting (gericht op onderarm- en polorthesen) laat zien dat voor onderarm- en polsorthesen bij de algemene patiënt met LET geen klinisch relevant effect op pijn gevonden werd. Bij topsporters werd een klinisch relevant verschil gerapporteerd in het voordeel van een onderarmorthese of armsleeve, maar de bewijskracht is zeer laag. De aanpalende literatuur over shockwave therapie en dry needling laat geen effect zien op pijn bij shockwave therapie en wel een effect op pijn bij dry needling.

20 Eindoordeel:

Zwakke aanbeveling vóór progressieve oefentherapie en dry needling; aanbeveling tegen brace, orthese, armsleeve of spalk en shockwave therapie.

Adviseer geen routinematige immobilisatie met een orthese of armsleeve bij een laterale of mediale epicondylaire tendinopathie.

Adviseer geen shockwave therapie als behandeling voor een laterale of mediale epicondylaire tendinopathie.

Overweeg dry needling als aanvullende behandeling voor pijnvermindering, echter is het bewijs hiervoor beperkt.

25 **Kennisvragen**

Tijdens de ontwikkeling van deze module is gebleken dat er binnen deze module nog te weinig bewijs is voor de onderbouwing van de aanbeveling en dus kennisvragen bestaan. De werkgroep meent dat (vervolg)onderzoek wenselijk is om in de toekomst een duidelijker antwoord te kunnen geven op vragen uit de praktijk.

Kennisvraag 1:

35 - Wat is de (kosten)- effectiviteit en veiligheid van functionele ondersteunende behandeling zoals een orthese of armsleeve bij patiënten met mediale epicondylaire tendinopathie (MET) vergeleken met placebo of een afwachtend beleid?

Toelichting:

40 Voor MET zijn geen gerandomiseerde studies geïnccludeerd. Hierdoor zijn aanbevelingen voor MET grotendeels geëxtrapoleerd van LET, wat leidt tot indirectheid van bewijs. Goed opgezette, multicenter RCT's met duidelijke diagnostische criteria en relevante uitkomstmaten zijn nodig om de effectiviteit en veiligheid specifiek voor MET vast te stellen.

- 5 Kennisvraag 2:
- Leidt een orthese of armsleeve bij LET of MET tot snellere terugkeer naar werk of sport en tot beter patiënt gerapporteerd herstel vergeleken met placebo of afwachtend beleid?

Toelichting:

- 10 Terugkeer naar werk/sport en patiëntherstel zijn cruciale uitkomstmaten voor besluitvorming, maar worden in de huidige literatuur nauwelijks gerapporteerd. Hierdoor is het onduidelijk of interventies klinisch relevante maatschappelijke of functionele winst opleveren. Toekomstig onderzoek dient deze uitkomsten systematisch en gestandaardiseerd te meten, bij voorkeur met voldoende follow-upduur ($\geq 6-12$ maanden).

15

5 **Implementeren-tabel**
Implementatietabel

Vraag	Antwoord: <i>Kruis aan en licht toe/ beschrijf</i>		Toelichting keuze:
I1. Wat was het onderliggende probleem om deze uitgangsvraag uit te werken?		Ongewenste praktijkvariatie	
	X	Nieuwe evidentie	Onduidelijkheid over effectiviteit van conservatieve behandelingen
		Anders	
I2. Maak een inschatting over hoeveel patiënten het ongeveer gaat waar de aanbeveling betrekking op heeft?		< 1000	
		< 5000	
	X	5000-40.000	
		> 40.000	
I3. Is de aanbeveling onderdeel van een bredere set interventies of verwant aan andere richtlijnen of modules? Zo ja, hoe verhoudt zij zich daartoe en moet hiermee rekening worden gehouden bij de implementatie, of kan de aanbeveling als losstaand worden beschouwd?		Ja	
	X	Nee	
I4. Belemmeringen en kansen op verschillende niveaus voor landelijke toepassing van de aanbeveling:		Belemmerende factoren	Bevorderende factoren/ kansen
Richtlijn/ klinisch traject (innovatie)	X	Aanbeveling sluit mogelijk niet aan bij bestaande routine	Aanbevelingen zijn simpel geformuleerd en dus makkelijk op te volgen.
Zorgverleners (artsen en verpleegkundigen)	X	Aanpassing in attitude nodig	Duidelijkheid voor 1 ^e lijn.
Patiënt/ cliënt (naasten)	X	Patiënt begrijpt mogelijk niet waarom conservatieve behandelingen niet meer gegeven worden. Goede uitleg nodig.	
Sociale context	X	Werkdruk en sportcultuur gericht op doorbelasting kunnen belastingreductie bemoeilijken.	Afstemming met werkgever of bedrijfsarts kan veilige opbouw van belasting ondersteunen.
Organisatorische context			
Financiële en juridische context	X		Het vermijden van niet-effectieve interventies kan kosten besparen en doelmatigheid vergroten.
I5. A) Welke personen/partijen zijn van belang bij het toepassen van de aanbeveling in de praktijk? (kruis aan)		A	B
		Patiënt/ cliënt (naaste)	

B) Wat is er nodig van deze personen/partijen om de aanbeveling in de praktijk te kunnen brengen? Denk aan aanpassingen in gedrag, werkwijzen, beleid, samenwerking of andere randvoorwaarden.	X	Professional	Stelt indicatie, geeft voorlichting en verwijst zo nodig
	X	Beroepsvereniging, nl	Goede verspreiding van richtlijn via de gebruikelijke kanalen in de 1 ^e en 2 ^e lijn
		Ziekenhuis (raad van bestuur/UMCNL (voorheen NFU)/NVZ)	
	X	Zorgverzekeraars/ NZa	geen aanpassing nodig; aanbevolen zorg kan als aanvullende verzekering in het pakket
		Zorginstituut [duiding nodig]	
		Anders	
16. Binnen welk tijdsbestek moet de aanbeveling zijn geïmplementeerd?	X	< 1 jaar	
		binnen 2-3 jaar	
17. Conclusie: is er extra actie en/of ondersteuning nodig voor implementatie van de aanbeveling? <i>De reguliere implementatieroutes (publicatie en disseminatie via officiële kanalen, opname in professionele standaarden, scholing en nascholing, gebruik van bestaande ICT systemen, audits en visitaties) van de richtlijnmodule alleen is onvoldoende.</i>		Ja	
	X	Nee	De reguliere implementatieroutes van de richtlijnmodule is voldoende.
18. Plaatsing op de Landelijke Implementatieagenda Medisch Specialistische zorg is gewenst. Het gaat om zorg die (grotendeels) wordt uitgevoerd binnen de ziekenhuismuren. Succesvolle implementatie vraagt om actieve betrokkenheid en samenwerking van meerdere relevante partijen binnen de zorgpraktijk.		Ja *	
	X	Nee	Zie boven, implementatie kan via reguliere kanalen plaatsvinden

- 5 *Deze aanbeveling komt mogelijk in aanmerking voor plaatsing op de Landelijke Implementatieagenda van het programma Zorg Evaluatie & Gepast Gebruik (ZE&GG), waarin alle betrokken partijen in de medisch-specialistische zorg samenwerken aan de implementatie van bewezen beste zorg. De Federatie levert namens het veld goed onderbouwde aanbevelingen aan, die zijn getoetst op de behoefte aan een implementatie-impuls. De onderwerpen op de Implementatieagenda zijn onderdeel van
- 10 landelijke zorginkoopafspraken tussen zorgverzekeraars en zorgaanbieders. Voor de beoordeling van aanbevelingen uit richtlijnen wordt gebruikgemaakt van de implementatietabel. Op basis hiervan kunnen we de andere partijen goed informeren en gezamenlijk besluiten of plaatsing op de Implementatieagenda passend is.

5 **Literatuur**

Bohannon RW. Minimal clinically important difference for grip strength: a systematic review. *J Phys Ther Sci.* 2019 Jan;31(1):75-78. doi: 10.1589/jpts.31.75. Epub 2019 Jan 10. PMID: 30774209; PMCID: PMC6348186.

10

Heales LJ, McClintock SR, Maynard S, Lems CJ, Rose JA, Hill C, Kean CO, Obst S. Evaluating the immediate effect of forearm and wrist orthoses on pain and function in individuals with lateral elbow tendinopathy: A systematic review. *Musculoskelet Sci Pract.* 2020 Jun;47:102147. doi: 10.1016/j.msksp.2020.102147. Epub 2020 Mar 5. PMID: 32452393.

5 **Bijlagen bij submodule 3.1.4. Functionele ondersteuning: onderarm- en polsorthese**

Risk of Bias tables

10 See the systematic review of Heales (2020) for the risk of bias of the individual studies.

Table of excluded studies

Reference	Reason for exclusion
Bisset L, Smidt N, Van der Windt DA, Bouter LM, Jull G, Brooks P, Vicenzino B. Conservative treatments for tennis elbow do subgroups of patients respond differently? <i>Rheumatology (Oxford)</i> . 2007 Oct;46(10):1601-5. doi: 10.1093/rheumatology/kem192. PMID: 17890274.	Use of more recent SR from Wallis 2024. These 2 RCTs (Smidt 2002 and Bisset 2006) are also included
Boisubert B, Brousse C, Zaoui A, Montigny JP. Nonsurgical treatment of tennis elbow. In <i>Annales de Readaptation et de Medecine Physique: Revue Scientifique de la Societe Francaise de Reeducation Fonctionnelle de Readaptation et de Medecine Physique</i> 2004 Aug 1 (Vol. 47, No. 6, pp. 346-355).	Full text only available in French
Buchbinder R, Green SE, Youd JM, Assendelft WJ, Barnsley L, Smidt N. Shock wave therapy for lateral elbow pain. <i>Cochrane Database Syst Rev</i> . 2005 Oct 19;2005(4):CD003524. doi: 10.1002/14651858.CD003524.pub2. PMID: 16235324; PMCID: PMC8717012.	Wrong intervention: ECSWT
Buchbinder R, Green SE, Youd JM, Assendelft WJ, Barnsley L, Smidt N. Systematic review of the efficacy and safety of shock wave therapy for lateral elbow pain. <i>J Rheumatol</i> . 2006 Jul;33(7):1351-63. PMID: 16821270.	Double with Cochrane SR from Buchbinder 2005.
Chen Q, Shen P, Zhang B, Chen Y, Zheng C. Long-term effectiveness of conservative management for lateral epicondylitis: a meta-analysis. <i>J Plast Surg Hand Surg</i> . 2023 Aug 24;58:67-73. doi: 10.2340/jphs.v58.12333. PMID: 37615315.	ECSWT and injections not relevant + Use more recent review of Wallis 2024 for exercise
Kaplan S, Sah V, Ozkan S, Adanas C, Delen V. Comparative Effects of Focused and Radial Extracorporeal Shock Wave Therapies on Lateral Epicondylitis: A Randomised Sham-controlled Trial. <i>J Coll Physicians Surg Pak</i> . 2023 May;33(5):554-559. doi: 10.29271/jcpsp.2023.05.554. PMID: 37190692.	Wrong intervention: ECSWT
Karanasios S, Korakakis V, Whiteley R, Vasilogeorgis I, Woodbridge S, Gioftsos G. Exercise interventions in lateral elbow tendinopathy have better outcomes than passive interventions, but the effects are small: a systematic review and meta-analysis of 2123 subjects in 30 trials. <i>Br J Sports Med</i> . 2021 May;55(9):477-485. doi: 10.1136/bjsports-2020-102525. Epub 2020 Nov 4. PMID: 33148599.	Use more recent review of Wallis 2024
Kim YJ, Wood SM, Yoon AP, Howard JC, Yang LY, Chung KC. Efficacy of Nonoperative Treatments for Lateral Epicondylitis: A Systematic Review and Meta-Analysis. <i>Plast Reconstr Surg</i> . 2021 Jan 1;147(1):112-125. doi: 10.1097/PRS.0000000000007440. PMID: 33002980.	Injections not relevant for this module, overlapping studies for electrophysiotherapy with more recent SR from Xiong 2024, use more recent SR from Heales 2020 with search date Sep-2019 for physical therapy
Lapner P, Alfonso A, Hebert-Davies J, Pollock JW, Marsh J, King GJW; Canadian Shoulder and Elbow Society (CSES). Nonoperative treatment of lateral epicondylitis: a systematic review and meta-analysis. <i>JSES Int</i> . 2021 Dec 18;6(2):321-330. doi: 10.1016/j.jseint.2021.11.010. PMID: 35252934; PMCID: PMC8888180.	Injections not relevant + more recent SR on physiotherapy available, namely Chen's 2023
Lapner P, Alfonso A, Herbert-Davies J, Pollock JW, Marsh J, King G; Canadian Shoulder and Elbow Society (CSES). Position statement: nonoperative management of lateral epicondylitis in adults. <i>Can J Surg</i> . 2022 Sep 21;65(5):E625-E629. doi: 10.1503/cjs.019221. PMID: 36130807; PMCID: PMC9503571.	Position statement

Li Y, Mei L, Rahat S, Pang L, Li R, Xiong Y, Li J, Tang X. The efficacy of kinesio tape in patients with lateral elbow tendinopathy: A systematic review and meta-analysis of prospective randomized controlled trials. <i>Heliyon</i> . 2024 Feb 4;10(3):e25606. doi: 10.1016/j.heliyon.2024.e25606. PMID: 38356591; PMCID: PMC10865320.	Wrong intervention: tape
Liu WC, Chen CT, Lu CC, Tsai YC, Liu YC, Hsu CW, Shih CL, Chen PC, Fu YC. Extracorporeal Shock Wave Therapy Shows Superiority Over Injections for Pain Relief and Grip Strength Recovery in Lateral Epicondylitis: A Systematic Review and Network Meta-analysis. <i>Arthroscopy</i> . 2022 Jun;38(6):2018-2034.e12. doi: 10.1016/j.arthro.2022.01.025. Epub 2022 Jan 31. PMID: 35093494.	Wrong intervention: ECSWT and injections
Long L, Briscoe S, Cooper C, Hyde C, Crathorne L. What is the clinical effectiveness and cost-effectiveness of conservative interventions for tendinopathy? An overview of systematic reviews of clinical effectiveness and systematic review of economic evaluations. <i>Health Technol Assess</i> . 2015 Jan;19(8):1-134. doi: 10.3310/hta19080. PMID: 25629427; PMCID: PMC4781358.	Wrong outcome: cost-effectiveness
Lowdon H, Chong HH, Dhingra M, Gomaa AR, Teece L, Booth S, Watts AC, Singh HP. Comparison of Interventions for Lateral Elbow Tendinopathy: A Systematic Review and Network Meta-Analysis for Patient-Rated Tennis Elbow Evaluation Pain Outcome. <i>J Hand Surg Am</i> . 2024 Jul;49(7):639-648. doi: 10.1016/j.jhsa.2024.03.007. Epub 2024 Apr 28. PMID: 38678448.	ECSWT, dry needling, kinesiotape. Use for physiotherapy/exercise more recent Cochrane review by Wallis 2024
Menta R, Randhawa K, Côté P, Wong JJ, Yu H, Sutton D, Varatharajan S, Southerst D, D'Angelo K, Cox J, Brown C, Dion S, Mior S, Stupar M, Shearer HM, Lindsay GM, Jacobs C, Taylor-Vaisey A. The effectiveness of exercise for the management of musculoskeletal disorders and injuries of the elbow, forearm, wrist, and hand: a systematic review by the Ontario Protocol for Traffic Injury Management (OPTIMa) collaboration. <i>J Manipulative Physiol Ther</i> . 2015 Sep;38(7):507-20. doi: 10.1016/j.jmpt.2015.06.002. Epub 2015 Jun 27. PMID: 26130104.	Use the more recent Cochrane review by Wallis 2024
Ng GY, Chan HL. The immediate effects of tension of counterforce forearm brace on neuromuscular performance of wrist extensor muscles in subjects with lateral humeral epicondylitis. <i>J Orthop Sports Phys Ther</i> . 2004 Feb;34(2):72-8. doi: 10.2519/jospt.2004.34.2.72. PMID: 15029940.	Wrong intervention: strap tensions
Nimgade A, Sullivan M, Goldman R. Physiotherapy, steroid injections, or rest for lateral epicondylitis? What the evidence suggests. <i>Pain Pract</i> . 2005 Sep;5(3):203-15. doi: 10.1111/j.1533-2500.2005.05307.x. PMID: 17147582.	Steroids not relevant; Wallis 2024 for physiotherapy more recent
Rompe JD, Maffulli N. Repetitive shock wave therapy for lateral elbow tendinopathy (tennis elbow): a systematic and qualitative analysis. <i>Br Med Bull</i> . 2007;83:355-78. doi: 10.1093/bmb/ldm019. Epub 2007 Jul 11. PMID: 17626054.	Wrong intervention: ECSWT
Samiei S, Aminianfar A, Paknazar F. Ultra-sonographic study of the effect of dry needling of extensor muscles combined with Mulligan mobilization technique on extensor muscle tendon thickness, pain and upper limb function in patients with lateral epicondylitis: A double-blinded randomized clinical trial. <i>koomesh</i> .2021;23(6):e153306	Full text only available in Persian

Sayegh ET, Strauch RJ. Does nonsurgical treatment improve longitudinal outcomes of lateral epicondylitis over no treatment? A meta-analysis. Clin Orthop Relat Res. 2015 Mar;473(3):1093-107. doi: 10.1007/s11999-014-4022-y. Epub 2014 Oct 29. PMID: 25352261; PMCID: PMC4317462.	SR of Wallis 2024 more recent
Sims SE, Miller K, Elfar JC, Hammert WC. Non-surgical treatment of lateral epicondylitis: a systematic review of randomized controlled trials. Hand (N Y). 2014 Dec;9(4):419-46. doi: 10.1007/s11552-014-9642-x. PMID: 25414603; PMCID: PMC4235906.	Injections, laser therapy, ESWT. Brace relevant, but incorrect control group used
Srinivas MR, Kalyan G, Rao JB, Kumar TS. " A Comparitive Study On The Effectiveness Of Ultrasound With Progressive Strengthening Exercises In Lateral Epicondylitis". NeuroQuantology. 2022 Nov 1;20(16):297-304.	Wrong comparison: ultrasound
Tennis elbow: injections, PT, or wait-and-see? J Fam Pract. 2007 Feb;56(2):98. PMID: 17607826.	Wrong study design: commentary
Wood SM, Yoon AP, Tseng HJ, Yang LY, Chung KC. Comparative Effectiveness of Physical Therapy and Electrophysiotherapy for the Treatment of Lateral Epicondylitis: A Network Meta-Analysis. Plast Reconstr Surg. 2022 Sep 1;150(3):594e-607e. doi: 10.1097/PRS.0000000000009437. Epub 2022 Jul 1. PMID: 35791264.	The included studies do not meet the C in the established PICO
Xiong Y, Wen T, Jin S, Lin L, Shao Q, Peng Y, Zheng Q, Li W. Efficacy and safety of extracorporeal shock wave therapy for upper limb tendonitis: a systematic review and meta-analysis of randomized controlled trials. Front Med (Lausanne). 2024 Jul 30;11:1394268. doi: 10.3389/fmed.2024.1394268. PMID: 39139789; PMCID: PMC11319137.	Wrong intervention: ECSWT
Yoon SY, Kim YW, Shin IS, Moon HI, Lee SC. Does the Type of Extracorporeal Shock Therapy Influence Treatment Effectiveness in Lateral Epicondylitis? A Systematic Review and Meta-analysis. Clin Orthop Relat Res. 2020 Oct;478(10):2324-2339. doi: 10.1097/CORR.0000000000001246. PMID: 32332245; PMCID: PMC7491893.	Wrong intervention: ECSWT
Zheng C, Zeng D, Chen J, Liu S, Li J, Ruan Z, Liang W. Effectiveness of extracorporeal shock wave therapy in patients with tennis elbow: A meta-analysis of randomized controlled trials. Medicine (Baltimore). 2020 Jul 24;99(30):e21189. doi: 10.1097/MD.00000000000021189. PMID: 32791694; PMCID: PMC7387053.	Wrong intervention: ECSWT
Zunke P, Auffarth A, Hitzl W, Moursy M. The effect of manual therapy to the thoracic spine on pain-free grip and sympathetic activity in patients with lateral epicondylalgia humeri. A randomized, sample sized planned, placebo-controlled, patient-blinded monocentric trial. BMC Musculoskelet Disord. 2020 Mar 24;21(1):186. doi: 10.1186/s12891-020-3175-y. PMID: 32209068; PMCID: PMC7093973.	Wrong setting: lab setting

Literature search strategy

Cluster/richtlijn: Tennisarm en Golfarm - UV3 Behandeling conservatief
Uitgangsvraag/modules: Wat is de waarde van oefentherapie, manuele therapie, braces, orthoses, en/of armsleeves, dry needling en shockwave therapie bij patiënten met klachten van epicondylitis lateralis of epicondylitis medialis?

Database(s): Embase.com, Ovid/Medline	Datum: 11 december 2024
Periode: vanaf 2004	Talen: geen restrictie
Literatuurspecialist: Esther van der Bijl	Rayyan review: https://new.rayyan.ai/reviews/1258141/overview
BMI-zoekblokken: voor verschillende opdrachten wordt (deels) gebruik gemaakt van de zoekblokken van BMI-Online https://blocks.bmi-online.nl/ Deduplication: voor het ontdubbelen is gebruik gemaakt van http://dedupendnote.nl/	
Toelichting: Voor deze vraag is gezocht op de elementen tennisarm/ golfarm EN (oefentherapie OF manuele therapie OF braces OF orthoses OF armsleeves OF dry needling OF shockwave therapie) . Het sleutelartikel wordt gevonden met deze search.	
Te gebruiken voor richtlijntekst: A systematic literature search was performed by a medical information specialist using the following bibliographic databases: Embase.com and Ovid/Medline. Both databases were searched from 2004 to the 11 th of December 2024 for systematic reviews and RCTs. Systematic searches were completed using a combination of controlled vocabulary/subject headings (e.g., Emtree-terms, MeSH) wherever they were available and natural language keywords. The overall search strategy was derived from eight primary search concepts: (1) lateral/medial epicondylitis; (2) exercise therapy; (3) braces; (4) manual therapy; (5) orthoses; (6) armsleeves; (7) dry needling (8) shockwave therapy. Duplicates were removed using EndNote software. After deduplication a total of 669 records were imported for title/abstract screening.	

Zoekopbrengst 11 december 2024

	EMBASE	OVID/MEDLINE	Ontdubbeld
SR	205	148	228
RCT	371	278	441
Totaal	576	426	669*

*in Rayyan

Zoekstrategie Embase.com 11 december 2024

No.	Query	Results
#1	'tennis elbow'/exp OR 'medial epicondylitis'/exp OR (((tennis* OR golf*) NEAR/3 (arm* OR elbow*)):ti,ab,kw) OR (((epicondylitis OR epycondylitis OR epicondylitides OR epycondylitides) NEAR/3 (humer* OR lateral* OR external* OR radiohumer* OR medial*)):ti,ab,kw) OR (((elbow* OR epicondyl*) NEAR/7 (tendinopath* OR tendonopath* OR tendinos*)):ti,ab,kw)	4559
#2	'kinesiotherapy'/exp OR 'training'/exp OR 'musculoskeletal manipulation'/exp OR 'orthosis'/exp OR 'brace'/de OR 'arm brace'/de OR 'elbow brace'/exp OR 'manipulative medicine'/exp OR 'dry needling'/exp OR 'shock wave'/exp OR 'shock wave therapy'/exp OR 'physiotherapy'/exp OR 'arm exercise'/exp OR (((orthoepadic* OR orthopedic* OR orthotic*) NEAR/3 (device* OR support*)):ti,ab,kw) OR ((elbow* NEAR/3 (immobiliz* OR immobilis*)):ti,ab,kw) OR (((manipulati* OR manual* OR physical* OR physio) NEAR/3 (therap* OR treatment* OR medicine*)):ti,ab,kw) OR ((arm* NEAR/3 sleeve*):ti,ab,kw) OR exercis*:ti,ab,kw OR kinesiotherap*:ti,ab,kw OR kinesitherap*:ti,ab,kw OR training*:ti,ab,kw OR 'musculoskeletal manipulati*:ti,ab,kw OR 'kinetic* chain*:ti,ab,kw OR orth?s?s:ti,ab,kw OR brace*:ti,ab,kw OR armsleeve*:ti,ab,kw OR 'dry needl*:ti,ab,kw OR 'shock wave*:ti,ab,kw OR 'shockwave*:ti,ab,kw OR physiotherap*:ti,ab,kw	1595820
#3	#1 AND #2	1686

#4	#3 AND [2004-2025]/py NOT ('conference abstract'/it OR 'editorial'/it OR 'letter'/it OR 'note'/it) NOT (('animal'/exp OR 'animal experiment'/exp OR 'animal model'/exp OR 'nonhuman'/exp) NOT 'human'/exp)	1085
#5	'meta analysis'/exp OR 'meta analysis (topic)'/exp OR metaanaly*:ti,ab OR 'meta analy*':ti,ab OR metanaly*:ti,ab OR 'systematic review'/de OR 'cochrane database of systematic reviews'/jt OR prisma:ti,ab OR prospero:ti,ab OR (((systemati* OR scoping OR umbrella OR 'structured literature') NEAR/3 (review* OR overview*)):ti,ab) OR ((systemic* NEAR/10 search*):ti,ab) OR (((systemati* OR literature OR database* OR 'data base*') NEAR/3 search*):ti,ab) OR (((literature NEAR/3 review*):ti,ab) AND (search*:ti,ab OR database*:ti,ab OR 'data base*':ti,ab)) OR (('data extraction':ti,ab OR 'data source*':ti,ab) AND 'study selection':ti,ab) OR ('search strategy':ti,ab AND 'selection criteria':ti,ab) OR ('data source*':ti,ab AND 'data synthesis':ti,ab) OR medline:ab OR pubmed:ab OR embase:ab OR cochrane:ab OR (((critical OR rapid) NEAR/2 (review* OR overview* OR synthes*)):ti) OR (((critical* OR rapid*) NEAR/3 (review* OR overview* OR synthes*)):ab) AND (search*:ab OR database*:ab OR 'data base*':ab)) OR metasynthes*:ti,ab OR 'meta synthes*':ti,ab	1085389
#6	'clinical trial'/exp OR 'randomization'/exp OR 'single blind procedure'/exp OR 'double blind procedure'/exp OR 'crossover procedure'/exp OR 'placebo'/exp OR 'prospective study'/exp OR rct:ab,ti OR random*:ab,ti OR 'single blind':ab,ti OR 'randomised controlled trial':ab,ti OR 'randomized controlled trial'/exp OR placebo*:ab,ti	4165415
#7	#4 AND #5 - SR	205
#8	#4 AND #6 NOT #7 - RCT	371
#9	#7 OR #8 - Totaal	576

Zoekstrategie Ovid/Medline 11 december 2024

#	Searches	Results
1	exp Tennis Elbow/ or exp Elbow Tendinopathy/ or ((tennis* or golf*) adj3 (arm* or elbow*)):ti,ab,kf. or ((epicondylitis or epycondylitis or epicondylitides or epycondylitides) adj3 (humer* or lateral* or external* or radiohumer* or medial*)):ti,ab,kf. or ((elbow* or epicondyl*) adj7 (tendinopath* or tendonopath* or tendinos*)):ti,ab,kf.	3245
2	exp Physical Therapy Modalities/ or exp Exercise Therapy/ or exp Musculoskeletal Manipulations/ or exp Orthotic Devices/ or exp Braces/ or exp Manipulation, Osteopathic/ or exp Dry Needling/ or exp Extracorporeal Shockwave Therapy/ or ((orthopeadic* or orthopedic* or orthotic*) adj3 (device* or support*)):ti,ab,kf. or (elbow* adj3 (immobiliz* or immobilis*)):ti,ab,kf. or ((manipulati* or manual* or physical* or physio) adj3 (therap* or treatment* or medicine*)):ti,ab,kf. or (arm* adj3 sleeve*):ti,ab,kf. or exercis*.ti,ab,kf. or kinesiotherap*.ti,ab,kf. or kinesitherap*.ti,ab,kf. or training*.ti,ab,kf. or musculoskeletal manipulati*.ti,ab,kf. or kinetic* chain*.ti,ab,kf. or orth?s?s.ti,ab,kf. or brace*.ti,ab,kf. or armsleeve*.ti,ab,kf. or dry needl*.ti,ab,kf. or shock wave*.ti,ab,kf. or shockwave*.ti,ab,kf. or physiotherap*.ti,ab,kf.	1158988
3	1 and 2	1034
4	limit 3 to yr="2004 -Current"	799
5	4 not (comment/ or editorial/ or letter/) not ((exp animals/ or exp models, animal/) not humans/)	753

6	meta-analysis/ or meta-analysis as topic/ or (metaanaly* or meta-analy* or metanaly*).ti,ab,kf. or systematic review/ or cochrane.jw. or (prisma or prospero).ti,ab,kf. or ((systemati* or scoping or umbrella or "structured literature") adj3 (review* or overview*).ti,ab,kf. or (systemic* adj1 review*).ti,ab,kf. or ((systemati* or literature or database* or data-base*) adj10 search*).ti,ab,kf. or ((structured or comprehensive* or systemic*) adj3 search*).ti,ab,kf. or ((literature adj3 review*) and (search* or database* or data-base*).ti,ab,kf. or (("data extraction" or "data source*") and "study selection").ti,ab,kf. or ("search strategy" and "selection criteria").ti,ab,kf. or ("data source*" and "data synthesis").ti,ab,kf. or (medline or pubmed or embase or cochrane).ab. or ((critical or rapid) adj2 (review* or overview* or synthes*).ti. or (((critical* or rapid*) adj3 (review* or overview* or synthes*)) and (search* or database* or data-base*).ab. or (metasynthes* or meta-synthes*).ti,ab,kf.	795237
7	exp clinical trial/ or randomized controlled trial/ or exp clinical trials as topic/ or randomized controlled trials as topic/ or Random Allocation/ or Double-Blind Method/ or Single-Blind Method/ or (clinical trial, phase i or clinical trial, phase ii or clinical trial, phase iii or clinical trial, phase iv or controlled clinical trial or randomized controlled trial or multicenter study or clinical trial).pt. or random*.ti,ab. or (clinic* adj trial*).tw. or ((singl* or doubl* or treb* or tripl*) adj (blind\$3 or mask\$3)).tw. or Placebos/ or placebo*.tw.	2816230
8	5 and 6 - SR	148
9	(5 and 7) not 8 - RCT	278
10	8 or 9 - Totaal	426

Submodule 3.2 Medicamenteuze behandelingen

De submodule Medicamenteuze behandelingen bestaat uit de volgende onderwerpen:

- Corticosteroiden injecties
- Plaatjes-rijk plasma en autoloog bloed injecties

Submodule 3.2.1 Corticosteroiden injecties

Uitgangsvraag

Wat is de waarde van injecties met corticosteroïden als behandeling voor patiënten met een laterale epicondylaire tendinopathie of mediale epicondylaire tendinopathie?

Introduction (English)

Corticosteroid injections are regularly used to treat patients with lateral epicondylar tendinopathy or medial epicondylar tendinopathy. Particularly when conservative treatment approaches such as rest, physical therapy, and pain medication failed. However, the efficacy of these injections is unclear.

Search and select

A systematic review of the literature was conducted to answer the following question(s):
What is the effect of corticosteroid injection therapy in patients with lateral epicondylar tendinopathy or medial epicondylar tendinopathy?

Table 1. PICO

Patients	Patients with lateral or medial epicondylar tendinopathy
Intervention	Injections with corticosteroids
Control	Placebo, wait and see policy

Outcomes	Patient recovery, elbow function, pain, return to sports/work, quality of life, complications
Other selection criteria	Study design: systematic reviews and randomized controlled trials

Relevant outcome measures

The guideline panel considered patient recovery, elbow function, pain, return to sport or work and quality of life as critical outcome measures for decision making. Complications were considered an important outcome measure.

The guideline panel did not predefine the outcome measures listed above but used the definitions reported in the studies.

The guideline panel defined a minimum of 2.0 points difference for the Visual Analogue Scale (VAS) and $0.91 > RR > 1.1$ for adverse events as clinically relevant. For the remaining outcomes the panel defined minimal clinical relevance as: 25% ($0.8 \geq RR \geq 1.25$) for dichotomous outcomes, 10% difference for continuous outcomes and standardized mean difference ($0.5 \geq SMD \geq 0.5$).

Search and select (Methods)

A systematic literature search was performed by a medical information specialist using the following bibliographic databases: Embase.com and Ovid/Medline. Both databases were searched from 2004 to 19th of December 2024 for systematic reviews and RCTs. Systematic searches were completed using a combination of controlled vocabulary/subject headings (e.g., Emtree-terms, MeSH) wherever they were available and natural language keywords. The overall search strategy was derived from two primary search concepts: (1) lateral/medial epicondylitis; (2) injection. Duplicates were removed using EndNote software. After deduplication a total of 585 records were imported for title/abstract screening. Initially, 27 studies were selected based on title and abstract screening. After reading the full text, 26 studies were excluded (see the exclusion table under the tab 'Evidence tabellen'), and one study were included.

Summary of literature

Description of studies

One study was included in the literature analysis. Important study characteristics and results are summarized in table 2.

Lapner (2022) performed a systematic review on physiotherapy, corticosteroid injection, platelet-rich plasma (PRP) and autologous blood (AB) compared to no active treatment or placebo. They report on the outcomes of pain and function. They report on seven studies that compared corticosteroid injection with no active treatment. These trials were included in this review. Trial inclusion criteria were English-language; RCT design; patients aged 18 to 75 years of age with lateral epicondylar tendinopathy; minimum follow-up >6 months after the first intervention. Risk of bias was assessed with the Cochrane Risk of Bias Tool for RCTs.

Table 2. Characteristics of included studies

Study	Participants	Comparison	Follow-up	Outcome measures	Comments	Risk of bias (per outcome measure)*
<i>Included in systematic review Lapner (2022)</i>						
Bisset, 2006 <i>Australia, 1 site, RCT</i>	<p><u>N at baseline</u> I: 65 C: 67</p> <p><u>Age</u> (mean ± SD) I: 47.8 ± 8.2 C: 47.3 ± 8.1</p> <p><u>Sex</u> (%female) I: 38 C: 36</p> <p><u>Pain</u> (VAS, mean ± SD) I: 53.5 ± 23.0 C: 61.3 ± 22.6</p>	<p><u>Intervention</u> Steroid injection "Second injection after two weeks if deemed necessary by medical practitioners"</p> <p><u>Control</u> Wait and see "Specific instructions on modifying their daily activities to avoid aggravating pain. Use, drugs/heat/cold or <u>braces</u> as needed.</p>	52 weeks	<p>Patient recovery (Global improvement) Function (pain free grip force) Pain severity (VAS) Elbow disability (pain free function questionnaire)</p>	Study includes a third arm with physiotherapy. Not reported in this review	Some concerns <i>No blinding of participants and personnel</i>
Coombes, 2013	<p><u>N at baseline</u> I: 43 C: 41</p> <p><u>Age</u> (mean ± SD) I: 49.3 ± 8.9 C: 48.7 ± 7.7</p> <p><u>Sex</u> (%female) I: 37 C: 37</p> <p><u>Pain</u> (VAS resting, mean [IQR]) I: 4.5 [0 to 18] C: 9 [0 to 15]</p> <p><u>Pain</u> (VAS worst, mean ± SD) I: 62.0 ± 20.3 C: 62.4 ± 19.8</p>	<p><u>Intervention</u> Corticosteroid injection</p> <p><u>Control</u> Placebo injection</p>		Pain (VAS), Function (PRTEE)	Study includes a third and fourth arm in which the interventions are combined with physiotherapy. Not reported in this review	High <i>No adequate randomization and no blinding of participants and personnel.</i>

Study	Participants	Comparison	Follow-up	Outcome measures	Comments	Risk of bias (per outcome measure)*
Lindhovius, 2008 United States, 1 site, RCT	<p><u>N at baseline</u> I: 31 C: 33</p> <p><u>Age</u> (mean \pm SD)** I: 50 \pm 8 C: 51 \pm 10</p> <p><u>Sex</u> (%female)** I: 63 C: 60</p> <p><u>Pain</u> (VAS, mean \pm SD) ** I: 5.8 \pm 4.7 C: 4.6 \pm 2.0</p>	<p><u>Intervention</u> Dexamethasone injection</p> <p><u>Control</u> Lidocaine injection</p>	6 months	Function (DASH, grip strength), Pain (VAS)	Clinically relevant difference (>1 point on VAS) at baseline in favor of placebo group	High <i>No reporting on blinding, baseline difference between groups.</i>
Price, 1991 United Kingdom, unclear n of sites, RCT	<p><u>N at baseline</u> I: 29 C: 29</p> <p><u>Age</u> (median [range]) I: 47 [34-64] C: 46 [32-62]</p> <p><u>Sex</u> (%female) I: 38 C: 48</p> <p><u>Pain</u> (VAS, mean [95% CI]) I: 4.9 [4.1 to 5.8] C: 5.0 [4.2 to 5.8]</p>	<p><u>Intervention</u> Hydrocortisone injection</p> <p><u>Control</u> Lignocaine 1% injection</p>	24 weeks	Pain (VAS)	Participants in either group could have had a recent steroid injection.	Low

Study	Participants	Comparison	Follow-up	Outcome measures	Comments	Risk of bias (per outcome measure)*
<p>Smidt, 2002 Netherlands, 1 site, RCT</p>	<p><u>N at baseline</u> I: C:</p> <p><u>Age</u> (median [IQR]) I: 47 [41 to 54] C: 46 [42 to 54]</p> <p><u>Sex</u> (%female) I: 55 C: 53</p> <p><u>Pain</u> (VAS, median [IQR]) I: 60 [40-70] C: 60 [30-70]</p>	<p><u>Intervention</u> Corticosteroid injection</p> <p><u>Control</u> Wait and see</p>	52 weeks	Pain (pain during the day; VAS); Function (Elbow disability, pain-free grip strength); Patient improvement (Likert scale)	Study includes a third arm with physiotherapy. Not reported in this review	Medium <i>No blinding of participants and data assessors</i>
<p>Tharirian, 2014 Iran, 1 site, RCT</p>	<p><u>N at baseline</u> I: 18 C: 20</p> <p><u>Age</u> (mean ± SD) I: 47.3 ± 6.0 C: 48 ± 78.0</p> <p><u>Sex</u> (%female) I: 56 C: 55</p> <p><u>Pain</u> (VAS, mean ± SD) I: 6.0 ± 0.8 C: 5.8 ± 0.7</p>	<p><u>Intervention</u> 4 mg depomedrol</p> <p><u>Control</u> Saline injection</p>		Pain (VAS)	Study includes a third and fourth arm in which the interventions are combined with a splint. Not reported in this review	Low

Study	Participants	Comparison	Follow-up	Outcome measures	Comments	Risk of bias (per outcome measure)*
Wolf, 2011 USA, 2 sites RCT	<u>N at baseline</u> Total: 34 (for three arms, per group NR) <u>N at follow-up</u> I: 9 C: 9 <u>Age (mean)</u> NR <u>Sex (%female)</u> NR <u>Pain (VAS)</u> I: 5 ± 3.1 C: 5 ± 3	<u>Intervention</u> Glucocorticoid injection <u>Control</u> Saline injection No other treatments allowed during follow-up	6 months	Pain (VAS) Elbow function (DASH)	Study includes a third arm with autologous blood. This arm is assessed in the review on AB/PRP. Funded by a research grant	Low
*For further details, see risk of bias table in the appendix or systematic review DASH - Disabilities of the Arm, Shoulder and Hand questionnaire; IQR- interquartile range; NR – not reported; PRTEE - Patient-Rated Tennis Elbow Evaluation; VAS – visual analogue scale						

5 **Results**

Results were extracted from the studies as means ± standard deviations (SDs). If data were presented by medians (interquartile ranges), results were converted into means ± SD by the conversion tool described by Weir (2018).

10 **Pain (crucial)**

Pain intensity was reported with a visual analogue scale (VAS) by all seven studies. The VAS ranges from 0 to 10 where 0 represents no pain and 10 the worst possible pain. Mean pain was 0.70 points higher (95% CI: 0.22 to 1.17 higher) in the CS group compared to placebo or usual care (Figure 1). This difference is not clinically relevant.

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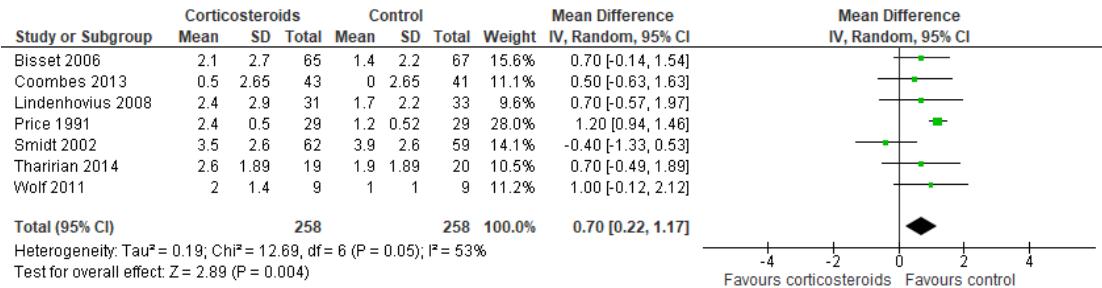


Figure 1. Pain after corticosteroid injection versus placebo or usual care

25

Quality of life (crucial)

No studies reported on quality of life after CS injections.

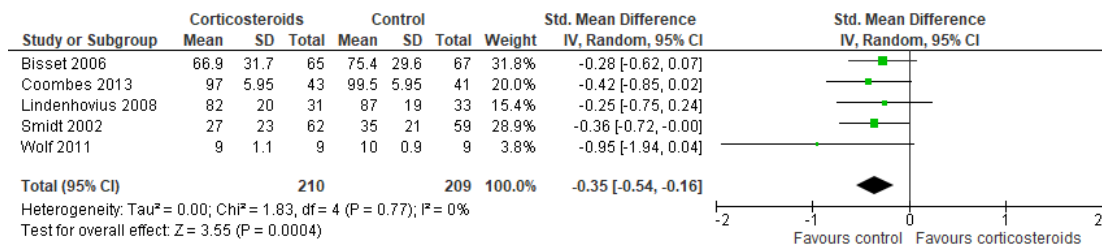
Elbow function (crucial)

30

Five studies reported on elbow function after CS injection versus placebo or usual care (Figure 2). One study reported the Patient-Rated Tennis Elbow Evaluation (PRTEE; **Coombes, 2013**), two studies report the Disabilities of the Arm, Shoulder and Hand questionnaire (DASH; **Lindenhovius, 2008; Wolf, 2011**), one study reported the modified pain-free function questionnaire; (**Smidt, 2002**) and one study reported the pain-free function questionnaire (**Bisset, 2006**). The standardized mean difference (SMD) of function was 0.35 lower (95% CI 0.54 lower to 0.16 lower) in favor of the placebo or usual care group (Figure 2). This difference is not clinically relevant.

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Figure 2. Elbow function after corticosteroid injection versus placebo or usual care

Return to sports/work (crucial)

No studies reported on return to sports or work after CS injections.

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Patient recovery (crucial)

No studies reported on patient recovery after CS injections.

Complications (important)

55

No studies reported on complications after CS injections.

Summary of Findings

Corticosteroid injection vs placebo or usual care

Outcome	Study results and measurements	Absolute effect estimates		Certainty of the evidence (Quality of evidence)	Summary
		Placebo or usual care	Corticosteroid injection		
Pain (crucial) >3 months	Measured by: VAS Scale: 0 - 10 Lower better	MD 0.70 higher (CI 95% 0.22 higher to 1.17 higher)		Low Due to very serious risk of bias ¹	Corticosteroid injection may have little to no effect on pain when compared to placebo or usual care in individuals with lateral or medial epicondylar tendinopathy. <i>(Bisset, 2006; Coombes, 2013; Lindenhovius, 2008; Price, 1991; Smidt, 2002; Tharirian, 2014; Wolf, 2011)</i>
Quality of life (crucial)				No GRADE (no evidence was found)	No evidence was found regarding the effect of corticosteroid injection on return to sport when compared to placebo or usual care in individuals with lateral or medial epicondylar tendinopathy.
Elbow function (crucial)	Measured by: PRTEE, DASH, (modified) pain free function questionnaire Higher better	SMD 0.35 lower (CI 95% 0.54 lower to 0.16 lower)		Low Due to very serious risk of bias ¹	Corticosteroid injection may have little to no effect on elbow function when compared to placebo or usual care in individuals with lateral or medial epicondylar tendinopathy <i>(Bisset, 2006; Coombes, 2013; Lindenhovius, 2008; Smidt, 2002; Wolf, 2011)</i>
Return to sport (crucial)				No GRADE (no evidence was found)	No evidence was found regarding the effect of corticosteroid injection on return to sport when compared to placebo or usual care in individuals with lateral or medial epicondylar tendinopathy.
Patient recovery (crucial)				No GRADE (no evidence was found)	No evidence was found regarding the effect of corticosteroid injection on patient recovery when compared to placebo or usual care in individuals with lateral or medial epicondylar tendinopathy.
Adverse events (crucial)				No GRADE (no evidence was found)	No evidence was found regarding the effect of corticosteroid injection on adverse events when compared to placebo or usual care in individuals with lateral or medial epicondylar tendinopathy.

¹. Risk of Bias: serious. Selective outcome reporting, inadequate randomization, blinding.

5 **Overwegingen – van bewijs naar aanbeveling (NL)**

Balans tussen gewenste en ongewenste effecten

Er werd één RCT en één systematische review (met zeven relevante RCT's) gevonden die rapporteerden over corticosteroiden (CS) injecties vergeleken met placebo of standaardzorg. De studies rapporteerden geen klinisch relevant verschil op de cruciale uitkomstmaten pijn en functie. Op basis van deze uitkomstmaten kan er dus geen voorkeur worden uitgesproken voor de interventie vergeleken met een placebo of standaardzorg.

10

Geen van de studies rapporteerde over de cruciale uitkomstmaat kwaliteit van leven. De belangrijke uitkomstmaten terugkeer naar sport of werk, herstel van de patiënt en complicaties werden niet onderzocht door de geselecteerde studies.

15

Kwaliteit van bewijs

De overall kwaliteit van bewijs is laag. Dit betekent dat we onzeker zijn over het gevonden geschatte effect van de cruciale uitkomstmaten pijn en functie.

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Er is afgewaardeerd vanwege zeer ernstige Risk of Bias: methodologische beperkingen (selectieve rapportage van uitkomstmaten, inadequate blinding, inadequate randomisatie).

Waarden en voorkeuren van patiënten (en eventueel hun naasten/verzorgers)

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Duidelijke voorlichting rondom CS injecties is erg belangrijk. Zo dienen patiënten geïnformeerd te worden over de verwachte beperkte duur van het effect van CS injecties op pijn en geen effect op de elleboogfunctie.

Kostenaspecten

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De kostenaspecten van CS injecties bij een laterale epicondylaire tendinopathie (LET) of mediale epicondylaire tendinopathie (MET) hangen o.a. af van de setting waarin de behandeling plaatsvindt en de vergoedingsstructuur binnen de zorgverzekering. De CS injectie is uiteraard duurder ten opzichte van reguliere zorg (afwachtend beleid).

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Gelijkheid ((health) equity/equitable)

De aanbeveling heeft geen effect op gezondheidsgelijkheid. Dit komt omdat de werkgroep adviseert uitermate terughoudend te zijn met het gebruik van CS injecties.

Aanvaardbaarheid

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Ethische aanvaardbaarheid

Het niet geven van een CS injectie lijkt aanvaardbaar voor de betrokkenen. Er zijn geen ethische bezwaren.

Duurzaamheid

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Duurzaamheidsoverwegingen spelen geen rol bij de keuze voor behandeling.

Haalbaarheid

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De werkgroep adviseert zeer terughoudend te zijn met het geven van CS injecties als behandeling voor LET of MET. In uitzonderlijke gevallen kan een CS injectie toch gegeven worden. In dat geval zijn CS injecties in de meeste praktijken aanwezig en is het dus haalbaar om deze injectie te zetten.

Aanbeveling

Rationale van de aanbeveling: weging van argumenten voor en tegen de interventies

- 5 Studies met corticosteroïden (CS) injecties laten na langere follow-up geen klinisch relevant voordeel zien op pijn. Er wordt geen verbetering van de elleboogfunctie gezien. Ondanks de lage kosten en haalbaarheid in de praktijk, wegen voor de werkgroep de argumenten tegen het gebruik van CS injecties zwaarder.

10 Eindoordeel:

Sterke aanbeveling tegen gebruik van corticosteroïden injecties bij de behandeling van laterale epicondylaire tendinopathie of mediale epicondylaire tendinopathy klachten.

Wees zeer terughoudend met het geven van een corticosteroïden injectie als behandeling aan patiënten met klachten van een laterale of mediale epicondylaire tendinopathie.

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Kennisvragen

Tijdens de ontwikkeling van de module Medicamenteuze behandeling is gebleken dat er binnen deze module geen kennisvragen zijn.

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Implementatieplan

Implementatietabel

<i>Vraag</i>	<i>Antwoord: Kruis aan en licht toe/ beschrijf</i>		<i>Toelichting keuze:</i>
I1. Wat was het onderliggende probleem om deze uitgangsvraag uit te werken?		Ongewenste praktijkvariatie	
	X	Nieuwe evidentie	Onduidelijkheid over effectiviteit van CS injecties.
		Anders	
I2. Maak een inschatting over hoeveel patiënten het ongeveer gaat waar de aanbeveling betrekking op heeft?		< 1000	
		< 5000	
	X	5000-40.000	
		> 40.000	
I3. Is de aanbeveling onderdeel van een bredere set interventies of verwant aan andere richtlijnen of modules? Zo ja, hoe verhoudt zij zich daartoe en moet hiermee rekening worden gehouden bij de implementatie, of kan de aanbeveling als losstaand worden beschouwd?		Ja	
	X	Nee	
I4. Belemmeringen en kansen op verschillende niveaus voor landelijke toepassing van de aanbeveling:		Belemmerende factoren	Bevorderende factoren/ kansen

Richtlijn/ klinisch traject (innovatie)	X	Aanbeveling sluit niet aan bij bestaande routine om vaak CS injecties te geven voor LET of MET	Aanbevelingen zijn simpel geformuleerd en dus makkelijk op te volgen.
Zorgverleners (artsen en verpleegkundigen)	X	Aanpassing in attitude nodig, omdat het nu heel gebruikelijk is om CS injecties te geven bij LET of MET	Duidelijkheid voor 1 ^e lijn.
Patiënt/ cliënt (naasten)	X	Patiënt begrijpt mogelijk niet waarom een CS injectie niet (meer) wordt gegeven. Goede uitleg nodig.	Het niet aanbevelen van injecties leidt automatisch ook tot geen bijwerkingen
Sociale context	X	Geen medische handeling verrichten is iets wat een patiënt niet verwacht.	
Organisatorische context	X		Minder personeel nodig, minder administratieve lasten, geen logistieke problemen.
Financiële en juridische context	X		Goedkoper voor zorg
15. A) Welke personen/partijen zijn van belang bij het toepassen van de aanbeveling in de praktijk? (kruis aan) B) Wat is er nodig van deze personen/partijen om de aanbeveling in de praktijk te kunnen brengen? Denk aan aanpassingen in gedrag, werkwijzen, beleid, samenwerking of andere randvoorwaarden.		A	B
	X	Patiënt/ cliënt (naaste)	
	X	Professional	Consequent geen CS injecties meer geven
	X	Beroepsvereniging, nl	Goede verspreiding van richtlijn via de gebruikelijke kanalen in de 1 ^e en 2 ^e lijn
		Ziekenhuis (raad van bestuur/UMCNL (voorheen NFU)/NVZ)	
		Zorgverzekeraars/ NZa	
		Zorginstituut [duiding nodig]	
		Anders	
16. Binnen welk tijdsbestek moet de aanbeveling zijn geïmplementeerd?	X	< 1 jaar	
		binnen 2-3 jaar	
17. Conclusie: is er extra actie en/of ondersteuning nodig voor implementatie van de aanbeveling?	X	Ja	Reguliere implementatieroutes van de module alleen is onvoldoende

De reguliere implementatieroutes (publicatie en disseminatie via officiële kanalen, opname in professionele standaarden, scholing en nascholing, gebruik van bestaande ICT systemen, audits en visitaties) van de richtlijnmodule alleen is onvoldoende.		Nee	
18. Plaatsing op de Landelijke Implementatieagenda Medisch Specialistische zorg is gewenst. Het gaat om zorg die (grotendeels) wordt uitgevoerd binnen de ziekenhuismuren. Succesvolle implementatie vraagt om actieve betrokkenheid en samenwerking van meerdere relevante partijen binnen de zorgpraktijk.	X	Ja *	Het geven van corticosteroiden injecties voor LET of MET is nog heel gebruikelijk. Extra aandacht door plaatsing op de Landelijke Implementatieagenda is nodig om het niet geven van deze injectie beter te implementeren in de zorg.
		Nee	

5 *Deze aanbeveling komt mogelijk in aanmerking voor plaatsing op de Landelijke Implementatieagenda van het programma Zorg Evaluatie & Gepast Gebruik (ZE&GG), waarin alle betrokken partijen in de medisch-specialistische zorg samenwerken aan de implementatie van bewezen beste zorg. De Federatie levert namens het veld goed onderbouwde aanbevelingen aan, die zijn getoetst op de behoefte aan een implementatie-impuls. De
10 onderwerpen op de Implementatieagenda zijn onderdeel van landelijke zorginkoopafspraken tussen zorgverzekeraars en zorgaanbieders. Voor de beoordeling van aanbevelingen uit richtlijnen wordt gebruikgemaakt van de implementatietabel. Op basis hiervan kunnen we de andere partijen goed informeren en gezamenlijk besluiten of plaatsing op de Implementatieagenda passend is.

Literatuur

- 15 Lapner P, Alfonso A, Hebert-Davies J, Pollock JW, Marsh J, King GJW; Canadian Shoulder and Elbow Society (CSES). Nonoperative treatment of lateral epicondylitis: a systematic review and meta-analysis. JSES Int. 2021 Dec 18;6(2):321-330. doi: 10.1016/j.jseint.2021.11.010. PMID: 35252934; PMCID: PMC8888180.
- 20 Weir CJ, Butcher I, Assi V, Lewis SC, Murray GD, Langhorne P, Brady MC. Dealing with missing standard deviation and mean values in meta-analysis of continuous outcomes: a systematic review. BMC Med Res Methodol. 2018 Mar 7;18(1):25. doi: 10.1186/s12874-018-0483-0. PMID: 29514597; PMCID: PMC5842611.

5 Bijlagen bij submodule Corticosteroiden injecties

Table of excluded studies

Reference	Reason for exclusion
Arora KK, Kapila R, Kapila S, Patra A, Chaudhary P, Singal A. Management of Lateral Epicondylitis: A Prospective Comparative Study Comparing the Local Infiltrations of Leucocyte Enriched Platelet-Rich Plasma (L-aPRP), Glucocorticoid and Normal Saline. <i>Malays Orthop J.</i> 2022 Mar;16(1):58-69. doi: 10.5704/MOJ.2203.009. PMID: 35519524; PMCID: PMC9017925.	No absolute outcome data reported
Averell N, Goodwin B, Park S, Spicer S, Wilson M, Mitchell J, Martinez N, Palhang M, Jabon J, Jermyn R. The concentration of platelets in PRP does not affect pain outcomes in lateral epicondylitis: a systematic review and meta-analysis. <i>Pain Manag.</i> 2024;14(4):223-233. doi: 10.1080/17581869.2024.2360381. Epub 2024 Jun 14. PMID: 38874535; PMCID: PMC11229443.	Wrong comparison
Lowdon H, Chong HH, Dhingra M, Gomaa AR, Teece L, Booth S, Watts AC, Singh HP. Comparison of Interventions for Lateral Elbow Tendinopathy: A Systematic Review and Network Meta-Analysis for Patient-Rated Tennis Elbow Evaluation Pain Outcome. <i>J Hand Surg Am.</i> 2024 Jul;49(7):639-648. doi: 10.1016/j.jhsa.2024.03.007. Epub 2024 Apr 28. PMID: 38678448.	SR that evaluated less outcome measures than Lapner. All relevant included studies are assessed in current review
Bonczar M, Ostrowski P, Plutecki D, Dziedzic M, FLorek J, Michalik W, Przybycień W, Depukat P, Rutowicz B, Walocha E, Koziej M. Treatment Options for Tennis Elbow - An Umbrella Review. <i>Folia Med Cracov.</i> 2023 Oct 30;63(3):31-58. doi: 10.24425/fmc.2023.147213. PMID: 38310528.	Does not report data on comparison (only pre-post)
Chen Q, Shen P, Zhang B, Chen Y, Zheng C. Long-term effectiveness of conservative management for lateral epicondylitis: a meta-analysis. <i>J Plast Surg Hand Surg.</i> 2023 Aug 24;58:67-73. doi: 10.2340/jphs.v58.12333. PMID: 37615315.	Focuses on long term outcomes, misses relevant studies for this PICO
Erpala F, Ozturk T, Zengin EC, Bakir U. Early Results of Kinesio Taping and Steroid Injections in Elbow Lateral Epicondylitis: A Randomized, Controlled Study. <i>Medicina (Kaunas).</i> 2021 Mar 24;57(4):306. doi: 10.3390/medicina57040306. PMID: 33805193; PMCID: PMC8064344.	Follow-up too short
Naveena HM, Manjanatha R, Salwan A. A Comparative Study of the Efficacy of Platelet-Rich Plasma (PRP) vs. Other Conservative Treatments for Lateral Epicondylitis. <i>Cureus.</i> 2024 Oct 1;16(10):e70590. doi: 10.7759/cureus.70590. PMID: 39483595; PMCID: PMC11527516.	Control group used a brace – not usual care
Jokar R, Esmaeilnejadganji SM, Bijani A, Kamali Ahangar S, Javer R, Mohammadi G. Local autologous blood and corticosteroid injection on pain and function in patients with tennis elbow. <i>Caspian J Intern Med.</i> 2023 Fall;14(4):633-639. doi: 10.22088/cjim.14.4.633. PMID: 38024173; PMCID: PMC10646365.	Control group used a brace – not usual care

<p>Kaya SS, Yardımcı G, Göksu H, Genç H. Effects of splinting and three injection therapies (corticosteroid, autologous blood and prolotherapy) on pain, grip strength, and functionality in patients with lateral epicondylitis. <i>Turk J Phys Med Rehabil.</i> 2022 Jun 1;68(2):205-213. doi: 10.5606/tftrd.2022.8007. PMID: 35989952; PMCID: PMC9366475.</p>	<p>Control group used a splint– not usual care</p>
<p>Karjalainen TV, Silagy M, O'Bryan E, Johnston RV, Cyril S, Buchbinder R. Autologous blood and platelet-rich plasma injection therapy for lateral elbow pain. <i>Cochrane Database Syst Rev.</i> 2021 Sep 30;9(9):CD010951. doi: 10.1002/14651858.CD010951.pub2. PMID: 34590307; PMCID: PMC8481072.</p>	<p>Wrong intervention: AB and PRP injection</p>
<p>Keijsers R, Kuijer PPFM, Gerritsma-Bleeker CLE, Kleinlugtenbelt YV, Beumer A, The B, Landman EBM, de Vries AJ, Eygendaal D. In the Treatment of Lateral Epicondylitis by Percutaneous Perforation, Injectables Have No Added Value. <i>Clin Orthop Relat Res.</i> 2024 Feb 1;482(2):325-336. doi: 10.1097/CORR.0000000000002774. Epub 2023 Aug 15. PMID: 37594385; PMCID: PMC10776141.</p>	<p>Wrong intervention: percutaneous nettoyage</p>
<p>Vasudeva A, Parihar R, Neyaz O, Bharti A, Handa G. Efficacy of a local corticosteroid injection on pain, disability and radial nerve thickness in patients with lateral epicondylitis. <i>J Family Med Prim Care.</i> 2021 Dec;10(12):4502-4508. doi: 10.4103/jfmpc.jfmpc_1173_21. Epub 2021 Dec 27. PMID: 35280608; PMCID: PMC8884310.</p>	<p>Control group used a brace – not usual care</p>
<p>Muthu S, Patel S, Gobbur A, Patil SC, Ks KH, Yadav V, Jeyaraman M. Platelet-rich plasma therapy ensures pain reduction in the management of lateral epicondylitis - a PRISMA-compliant network meta-analysis of randomized controlled trials. <i>Expert Opin Biol Ther.</i> 2022 Apr;22(4):535-546. doi: 10.1080/14712598.2022.2032638. Epub 2022 Jan 31. PMID: 35078375.</p>	<p>Systematic review broader than our scope. No information in addition to Lapner</p>
<p>Tavassoli M, Jokar R, Zamani M, Khafri S, Esmailnejad-Ganji SM. Clinical efficacy of local injection therapies for lateral epicondylitis: A systematic review and network meta-analysis. <i>Caspian J Intern Med.</i> 2022 Spring;13(2):311-325. doi: 10.22088/cjim.13.2.1. PMID: 35919654; PMCID: PMC9301214</p>	<p>Network meta analysis, with broader scope than our review</p>
<p>Wong JRY, Toth E, Rajesparan K, Rashid A. The use of platelet-rich plasma therapy in treating tennis elbow: A critical review of randomised control trials. <i>J Clin Orthop Trauma.</i> 2022 Jul 31;32:101965. doi: 10.1016/j.jcot.2022.101965. PMID: 35990997; PMCID: PMC9382321.</p>	<p>Systematic review of insufficient quality: No meta analysis</p>
<p>Kim YJ, Wood SM, Yoon AP, Howard JC, Yang LY, Chung KC. Efficacy of Nonoperative Treatments for Lateral Epicondylitis: A Systematic Review and Meta-Analysis. <i>Plast Reconstr Surg.</i> 2021 Jan 1;147(1):112-125. doi: 10.1097/PRS.0000000000007440. PMID: 33002980.</p>	<p>No subanalysis for different injections</p>
<p>Simental-Mendía M, Vilchez-Cavazos F, Álvarez-Villalobos N, Blázquez-Saldaña J, Peña-Martínez V, Villarreal-Villarreal G, Acosta-Olivo C. Clinical efficacy of platelet-rich plasma in the treatment of lateral epicondylitis: a systematic review and meta-analysis of randomized placebo-controlled clinical trials. <i>Clin Rheumatol.</i> 2020 Aug;39(8):2255-2265. doi: 10.1007/s10067-020-05000-y. Epub 2020 Feb 26. PMID: 32103373.</p>	<p>Less recent systematic review compared to Lapner</p>

<p>Barnett J, Bernacki MN, Kainer JL, Smith HN, Zaharoff AM, Subramanian SK. The effects of regenerative injection therapy compared to corticosteroids for the treatment of lateral Epicondylitis: a systematic review and meta-analysis. Arch Physiother. 2019 Nov 13;9:12. doi: 10.1186/s40945-019-0063-6. Erratum in: Arch Physiother. 2020 Jan 27;10:5. doi: 10.1186/s40945-020-0076-1. PMID: 31754461; PMCID: PMC6854772.</p>	<p>Less recent systematic review compared to Lapner</p>
<p>Gao B, Dwivedi S, DeFroda S, Bokshan S, Ready LV, Cole BJ, Owens BD. The Therapeutic Benefits of Saline Solution Injection for Lateral Epicondylitis: A Meta-analysis of Randomized Controlled Trials Comparing Saline Injections With Nonsurgical Injection Therapies. Arthroscopy. 2019 Jun;35(6):1847-1859.e12. doi: 10.1016/j.arthro.2019.02.051. Epub 2019 May 6. PMID: 31072722.</p>	<p>Systematic review looking at change scores – not following GRADE methodology</p>
<p>Lian J, Mohamadi A, Chan JJ, Hanna P, Hemmati D, Lechtig A, Nazarian A. Comparative Efficacy and Safety of Nonsurgical Treatment Options for Enthesopathy of the Extensor Carpi Radialis Brevis: A Systematic Review and Meta-analysis of Randomized Placebo-Controlled Trials. Am J Sports Med. 2019 Oct;47(12):3019-3029. doi: 10.1177/0363546518801914. Epub 2018 Oct 31. PMID: 30380334.</p>	<p>Less recent systematic review compared to Lapner</p>
<p>Lin YC, Wu WT, Hsu YC, Han DS, Chang KV. Comparative effectiveness of botulinum toxin versus non-surgical treatments for treating lateral epicondylitis: a systematic review and meta-analysis. Clin Rehabil. 2018 Feb;32(2):131-145. doi: 10.1177/0269215517702517. Epub 2017 Mar 28. PMID: 28349703.</p>	<p>Less recent systematic review compared to Lapner</p>
<p>Mi B, Liu G, Zhou W, Lv H, Liu Y, Wu Q, Liu J. Platelet rich plasma versus steroid on lateral epicondylitis: meta-analysis of randomized clinical trials. Phys Sportsmed. 2017 May;45(2):97-104. doi: 10.1080/00913847.2017.1297670. Epub 2017 Mar 3. PMID: 28276986.</p>	<p>Less recent systematic review compared to Lapner</p>
<p>Arirachakaran A, Sukthuyat A, Sisayanarane T, Laoratanavoraphong S, Kanchanatawan W, Kongtharvonskul J. Platelet-rich plasma versus autologous blood versus steroid injection in lateral epicondylitis: systematic review and network meta-analysis. J Orthop Traumatol. 2016 Jun;17(2):101-12. doi: 10.1007/s10195-015-0376-5. Epub 2015 Sep 11. PMID: 26362783; PMCID: PMC4882297.</p>	<p>Less recent systematic review compared to Lapner</p>
<p>Claessen FMAP, Heesters BA, Chan JJ, Kachooei AR, Ring D. A Meta-Analysis of the Effect of Corticosteroid Injection for Enthesopathy of the Extensor Carpi Radialis Brevis Origin. J Hand Surg Am. 2016 Oct;41(10):988-998.e2. doi: 10.1016/j.jhsa.2016.07.097. Epub 2016 Aug 18. PMID: 27546443.</p>	<p>Less recent systematic review compared to Lapner</p>
<p>Dong W, Goost H, Lin XB, Burger C, Paul C, Wang ZL, Kong FL, Welle K, Jiang ZC, Kabir K. Injection therapies for lateral epicondylalgia: a systematic review and Bayesian network meta-analysis. Br J Sports Med. 2016 Aug;50(15):900-8. doi: 10.1136/bjsports-2014-094387. Epub 2015 Sep 21. PMID: 26392595.</p>	<p>Less recent systematic review compared to Lapner</p>
<p>Ahmad Z, Brooks R, Kang SN, Weaver H, Nunney I, Tytherleigh-Strong G, Rushton N. The effect of platelet-rich plasma on clinical outcomes in lateral epicondylitis. Arthroscopy. 2013 Nov;29(11):1851-62. doi: 10.1016/j.arthro.2013.07.272. Epub 2013 Sep 21. PMID: 24060428.</p>	<p>Less recent systematic review compared to Lapner</p>

Krogh TP, Bartels EM, Ellingsen T, Stengaard-Pedersen K, Buchbinder R, Fredberg U, Bliddal H, Christensen R. Comparative effectiveness of injection therapies in lateral epicondylitis: a systematic review and network meta-analysis of randomized controlled trials. Am J Sports Med. 2013 Jun;41(6):1435-46. doi: 10.1177/0363546512458237. Epub 2012 Sep 12. PMID: 22972856.	Less recent systematic review compared to Lapner
Sharifzadeh S, Tadrissi S, Fallah E. The effect of corticosteroid, and saline injection on pain perception and function of patients with lateral epicondylitis: A triple-blinded, randomized, controlled trial. J Popul Ther Clin Pharmacol. 2023 Jun; 30(15):e11-e18. doi: 10.47750/jptcp.2023.30.15.002	Control group received strength training, not usual care

5

Literature search strategy

Zoekverantwoording

Algemene informatie

Cluster/richtlijn: Tennisarm en Golfarm - UV3.2 Medicamenteus	
Uitgangsvraag/modules: Wat is de waarde van injecties als behandeling van patiënten met klachten van een laterale of mediale epicondylaire tendinopathie?	
Database(s): Embase.com, Ovid/Medline	Datum: 19 december 2024
Periode: vanaf 2004	Talen: geen restrictie
Literatuurspecialist: Esther van der Bijl	Rayyan review: https://new.rayyan.ai/reviews/1266766/overview
BMI-zoekblokken: voor verschillende opdrachten wordt (deels) gebruik gemaakt van de zoekblokken van BMI-Online https://blocks.bmi-online.nl/ Deduplication: voor het ontdubbelen is gebruik gemaakt van http://dedupendnote.nl/	
Toelichting: Voor deze vraag is gezocht op de elementen 'tennisarm/ golfarm' EN 'injectie'. De sleutelartikelen worden gevonden met deze search. Het achtergrondartikel van Ahmed et al. (2023) valt uit op studiedesign.	
Te gebruiken voor richtlijntekst: A systematic literature search was performed by a medical information specialist using the following bibliographic databases: Embase.com and Ovid/Medline. Both databases were searched from 2004 to 19 th of December 2024 for systematic reviews and RCTs. Systematic searches were completed using a combination of controlled vocabulary/subject headings (e.g., Emtree-terms, MeSH) wherever they were available and natural language keywords. The overall search strategy was derived from two primary search concepts: (1) lateral/ medial epicondylar tendinopathy; (2) injection. Duplicates were removed using EndNote software. After deduplication a total of 585 records were imported for title/abstract screening.	

10

Zoekopbrengst - 19 december 2024

	EMBASE	OVID/MEDLINE	Ontdubbeld
SR	199	138	224
RCT	312	204	361
Totaal	511	342	585*

*in Rayyan

Zoekstrategie - 19 december 2024

5 *Embase.com*

No.	Query	Results
#1	'tennis elbow'/exp OR 'medial epicondylitis'/exp OR (((tennis* OR golf*) NEAR/3 (arm* OR elbow*)):ti,ab,kw) OR (((epicondylitis OR epycondylitis OR epicondylitides OR epycondylitides) NEAR/3 (humer* OR lateral* OR external* OR radiohumer* OR medial*)):ti,ab,kw) OR (((elbow* OR epicondyl*) NEAR/7 (tendinopath* OR tendonopath* OR tendinos*)):ti,ab,kw)	4563

#2	'injection'/exp OR 'steroid'/exp OR 'corticosteroid'/exp OR 'steroid therapy'/exp OR 'botulinum toxin a'/exp OR 'botulinum toxin'/exp OR 'glycosaminoglycan'/exp OR 'hyaluronic acid'/exp OR 'autologous blood'/exp OR 'prolotherapy'/exp OR 'thrombocyte rich plasma'/exp OR inject*:ti,ab,kw OR steroid*:ti,ab,kw OR (('adren* cort*' OR adrenocort* OR adrenalcort*) NEAR/3 (hormone* OR steroid*)):ti,ab,kw) OR 'adrenocorticosteroid*:ti,ab,kw OR 'cortic* steroid*:ti,ab,kw OR 'corticoid*:ti,ab,kw OR 'corticosteroid*:ti,ab,kw OR 'dermocorticosteroid*:ti,ab,kw OR 'botulinus toxin*:ti,ab,kw OR 'botulism toxin*:ti,ab,kw OR btx:ti,ab,kw OR 'bont a':ti,ab,kw OR 'abobotulinum toxin a':ti,ab,kw OR 'abobotulinumtoxin a':ti,ab,kw OR 'abobotulinumtoxina':ti,ab,kw OR 'agn 151607':ti,ab,kw OR 'agn151607':ti,ab,kw OR 'alluzience':ti,ab,kw OR 'ant 1207':ti,ab,kw OR 'ant 1401':ti,ab,kw OR 'ant 1403':ti,ab,kw OR 'ant1207':ti,ab,kw OR 'ant1401':ti,ab,kw OR 'ant1403':ti,ab,kw OR 'azzalure':ti,ab,kw OR 'bocouture':ti,ab,kw OR 'boe-tox':ti,ab,kw OR 'botox':ti,ab,kw OR 'botulift':ti,ab,kw OR 'botulin a':ti,ab,kw OR 'botulin toxin a':ti,ab,kw OR 'botulinium a toxin*':ti,ab,kw OR 'botulinum a toxin*':ti,ab,kw OR 'botulinium toxin*':ti,ab,kw OR 'botulinum toxin*':ti,ab,kw OR 'cnt 52120':ti,ab,kw OR 'cnt52120':ti,ab,kw OR 'cunox':ti,ab,kw OR 'daxibotulinum toxin a':ti,ab,kw OR 'daxibotulinumtoxin a':ti,ab,kw OR 'daxibotulinumtoxina':ti,ab,kw OR 'daxify':ti,ab,kw OR 'dtx 021':ti,ab,kw OR 'dtx021':ti,ab,kw OR 'dwp 450':ti,ab,kw OR 'dwp450':ti,ab,kw OR 'dyslor':ti,ab,kw OR 'dysport':ti,ab,kw OR 'evabotulinum toxin a':ti,ab,kw OR 'evabotulinumtoxin a':ti,ab,kw OR 'evabotulinumtoxina':ti,ab,kw OR 'evosyal':ti,ab,kw OR 'gemibotulinum toxin a':ti,ab,kw OR 'gemibotulinumtoxin a':ti,ab,kw OR 'gemibotulinumtoxina':ti,ab,kw OR 'gsk 1358820':ti,ab,kw OR 'gsk1358820':ti,ab,kw OR 'hg 102':ti,ab,kw OR 'hg102':ti,ab,kw OR 'hu 014':ti,ab,kw OR 'hu014':ti,ab,kw OR 'hutox':ti,ab,kw OR 'incobotulinum toxin a':ti,ab,kw OR 'incobotulinumtoxin a':ti,ab,kw OR 'incobotulinumtoxina':ti,ab,kw OR 'ipn 10200':ti,ab,kw OR 'ipn 59011':ti,ab,kw OR 'ipn10200':ti,ab,kw OR 'ipn59011':ti,ab,kw OR 'jeuveau':ti,ab,kw OR 'letibotulinum toxin a':ti,ab,kw OR 'letibotulinumtoxin a':ti,ab,kw OR 'letibotulinumtoxina':ti,ab,kw OR 'letybo':ti,ab,kw OR 'liztox':ti,ab,kw OR 'lp 09':ti,ab,kw OR 'lp09':ti,ab,kw OR 'meditoxin':ti,ab,kw OR 'mt 10107':ti,ab,kw OR 'mt 10109':ti,ab,kw OR 'mt10107':ti,ab,kw OR 'mt10109':ti,ab,kw OR 'nabota':ti,ab,kw OR 'neuronox':ti,ab,kw OR 'nivobotulinum toxin a':ti,ab,kw OR 'nivobotulinumtoxin a':ti,ab,kw OR 'nivobotulinumtoxina':ti,ab,kw OR 'nt 201':ti,ab,kw OR 'nt201':ti,ab,kw OR 'nuceiva':ti,ab,kw OR 'oculum':ti,ab,kw OR 'onabotulinum toxin a':ti,ab,kw OR 'onabotulinumtoxin a':ti,ab,kw OR 'onabotulinumtoxina':ti,ab,kw OR 'onaclostox':ti,ab,kw OR 'pm 12759':ti,ab,kw OR 'pm12759':ti,ab,kw OR 'prabotulinum toxin a':ti,ab,kw OR 'prabotulinumtoxin a':ti,ab,kw OR 'prabotulinumtoxina':ti,ab,kw OR 'prosigne':ti,ab,kw OR 'purtox':ti,ab,kw OR 'qm 1114':ti,ab,kw OR 'qm1114':ti,ab,kw OR 'relabotulinum toxin a':ti,ab,kw OR 'relabotulinumtoxin a':ti,ab,kw OR 'relabotulinumtoxina':ti,ab,kw OR 'reloxin':ti,ab,kw OR 'rt 002':ti,ab,kw OR 'rt002':ti,ab,kw OR 'rtt 150':ti,ab,kw OR 'rtt150':ti,ab,kw OR 'vistabel':ti,ab,kw OR 'vistabex':ti,ab,kw OR 'xeomeen':ti,ab,kw OR 'xeomin':ti,ab,kw OR 'adant':ti,ab,kw OR 'amvisc':ti,ab,kw OR 'arthrease':ti,ab,kw OR 'artz':ti,ab,kw OR 'biolon':ti,ab,kw OR 'bionect':ti,ab,kw OR 'clearvisc':ti,ab,kw OR 'duovisc':ti,ab,kw OR 'durolane':ti,ab,kw OR 'eyecon':ti,ab,kw OR 'halonix':ti,ab,kw OR 'healon':ti,ab,kw OR 'healonid':ti,ab,kw OR 'hialid':ti,ab,kw OR 'hyalcon':ti,ab,kw OR 'hyalein':ti,ab,kw OR 'hyalgal':ti,ab,kw OR 'hyalgan':ti,ab,kw OR 'hyalovet':ti,ab,kw OR 'hyalubrix':ti,ab,kw OR 'hyaluronan':ti,ab,kw OR 'hyaluronate':ti,ab,kw OR 'hyaluronic acid*':ti,ab,kw OR 'hyladerm':ti,ab,kw OR 'hylaform':ti,ab,kw OR 'hylumed':ti,ab,kw OR 'hyruan':ti,ab,kw OR 'ialugen':ti,ab,kw OR 'juvederm':ti,ab,kw OR 'lagrice' ofteno':ti,ab,kw OR 'laservis':ti,ab,kw OR 'me 3710':ti,ab,kw OR 'monovisc':ti,ab,kw OR 'na hylan':ti,ab,kw OR 'nrd 101':ti,ab,kw OR 'nrd101':ti,ab,kw OR 'ophthalin':ti,ab,kw OR 'orthovisc':ti,ab,kw OR 'ostenil':ti,ab,kw OR 'perlane':ti,ab,kw OR 'provisc':ti,ab,kw OR 'radiaplexrx':ti,ab,kw OR 'restylane':ti,ab,kw OR 'si 4402':ti,ab,kw OR 'sinovial':ti,ab,kw OR 'sl 1010':ti,ab,kw OR 'sodium hyaluronate':ti,ab,kw OR 'supartz':ti,ab,kw OR 'suplasyn':ti,ab,kw OR 'synocrom':ti,ab,kw OR 'synojoynt':ti,ab,kw OR 'synvisc':ti,ab,kw OR 'teosyal':ti,ab,kw OR 'triluron':ti,ab,kw OR 'unihylon':ti,ab,kw OR 'viscoseal':ti,ab,kw OR 'vismed':ti,ab,kw OR 'vitrax':ti,ab,kw OR 'glucosamine* glycan*':ti,ab,kw OR 'glucosaminoglycan*':ti,ab,kw OR 'glucosaminoglycan*':ti,ab,kw OR 'glycoaminoglycan*':ti,ab,kw OR 'glycosaminoglycan*':ti,ab,kw OR 'glycosaminoglycan*':ti,ab,kw OR 'mucopolysaccharide*':ti,ab,kw OR 'polymucosaccharide*':ti,ab,kw OR 'prolotherap*':ti,ab,kw OR 'platelet* rich plasma*':ti,ab,kw OR 'thrombocyt* rich plasma*':ti,ab,kw OR 'prp':ti,ab,kw OR 'autolog* blood*':ti,ab,kw OR 'nettoya*':ti,ab,kw OR 'proliferation therap*':ti,ab,kw	3674822
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#3	#1 AND #2	1507
#4	#3 AND [2004-2025]/py NOT ('conference abstract'/it OR 'editorial'/it OR 'letter'/it OR 'note'/it) NOT (('animal'/exp OR 'animal experiment'/exp OR 'animal model'/exp OR 'nonhuman'/exp) NOT 'human'/exp)	954
#5	'meta analysis'/exp OR 'meta analysis (topic)'/exp OR 'systematic review'/exp OR 'systematic review (topic)'/exp OR 'scoping review'/exp OR 'rapid review'/exp OR 'umbrella review'/exp OR 'cochrane database of systematic reviews'/jt OR 'network meta-analysis'/exp OR 'networkmeta analy*':ti,ab,kw OR 'networkmetaanaly*':ti,ab,kw OR metaanaly*':ti,ab,kw OR 'meta analy*':ti,ab,kw OR metanaly*':ti,ab,kw OR prisma:ti,ab,kw OR prospero:ti,ab,kw OR metaanali*':ti,ab,kw OR 'meta anali*':ti,ab,kw OR metanali*':ti,ab,kw OR (((systemati* OR scoping OR umbrella OR 'structured literature') NEAR/3 (review* OR overview*)):ti,ab,kw) OR (((structured OR systemic*) NEAR/3 (review* OR overview* OR synth*) NEAR/3 literature):ti,ab,kw) OR ((systemic* NEAR/1 review*):ti,ab,kw) OR (((systemati* OR literature OR database* OR 'data base*') NEAR/10 search*):ti,ab,kw) OR (((structured OR comprehensive* OR systemic*) NEAR/3 search*):ti,ab,kw) OR (((literature NEAR/3 (review* OR overview*)):ti,ab,kw) AND (search*':ti,ab,kw OR database*':ti,ab,kw OR 'data base*':ti,ab,kw)) OR (('data extraction*':ti,ab,kw OR 'data source*':ti,ab,kw) AND ('study selection*':ti,ab,kw OR 'studies selection*':ti,ab,kw)) OR ('search strateg*':ti,ab,kw AND 'selection criteria*':ti,ab,kw) OR ('data source*':ti,ab,kw AND 'data synth*':ti,ab,kw) OR medline*':ti,ab,kw OR pubmed*':ti,ab,kw OR 'pub med*':ti,ab,kw OR embase:ti,ab,kw OR cochrane*':ti,ab,kw OR (((critical* OR rapid*) NEAR/2 (review* OR overview* OR synth*)):ti) OR (((critical* OR rapid*) NEAR/3 (review* OR overview* OR synth*)):ab) AND (search*':ab OR database*':ab OR 'data base*':ab)) OR metasynth*':ti,ab,kw OR 'meta synth*':ti,ab,kw OR 'review* of review*':ti,ab,kw	1105494
#6	'clinical trial'/exp OR 'randomization'/exp OR 'single blind procedure'/exp OR 'double blind procedure'/exp OR 'crossover procedure'/exp OR 'placebo'/exp OR 'prospective study'/exp OR rct:ab,ti OR random*':ab,ti OR 'single blind':ab,ti OR 'randomised controlled trial':ab,ti OR 'randomized controlled trial'/exp OR placebo*':ab,ti	4172502
#7	#4 AND #5 - SR	199
#8	#4 AND #6 NOT #7 - RCT	312
#9	#7 OR #8 - Totaal	511

5

Ovid/Medline

#	Searches	Results
1	exp Tennis Elbow/ or exp Elbow Tendinopathy/ or ((tennis* or golf*) adj3 (arm* or elbow*)):ti,ab,kf. or ((epicondylitis or epycondylitis or epicondylitides or epycondylitides) adj3 (humer* or lateral* or external* or radiohumer* or medial*)):ti,ab,kf. or ((elbow* or epicondyl*) adj7 (tendinopath* or tendonopath* or tendinos*)):ti,ab,kf.	3246

2	<p>exp Injections/ or exp Steroids/ or exp Adrenal Cortex Hormones/ or exp Botulinum Toxins/ or exp Botulinum Toxins, Type A/ or exp Glycosaminoglycans/ or exp Hyaluronic Acid/ or exp Blood Transfusion, Autologous/ or exp Prolotherapy/ or exp Platelet-Rich Plasma/ or inject*.ti,ab,kf. or steroid*.ti,ab,kf. or ((adren* cort* or adrenocort* or adrenalcort*) adj3 (hormone* or steroid*)).ti,ab,kf. or adrenocorticosteroid*.ti,ab,kf. or cortic* steroid*.ti,ab,kf. or corticoid*.ti,ab,kf. or corticosteroid*.ti,ab,kf. or dermocorticosteroid*.ti,ab,kf. or botulinus toxin*.ti,ab,kf. or botulism toxin*.ti,ab,kf. or btx.ti,ab,kf. or bont a.ti,ab,kf. or abobotulinum toxin a.ti,ab,kf. or abobotulinumtoxin a.ti,ab,kf. or abobotulinumtoxina.ti,ab,kf. or agn 151607.ti,ab,kf. or agn151607.ti,ab,kf. or alluzience.ti,ab,kf. or ant 1207.ti,ab,kf. or ant 1401.ti,ab,kf. or ant 1403.ti,ab,kf. or ant1207.ti,ab,kf. or ant1401.ti,ab,kf. or ant1403.ti,ab,kf. or azzalure.ti,ab,kf. or bocouture.ti,ab,kf. or 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3710.ti,ab,kf. or monovisc.ti,ab,kf. or na hylan.ti,ab,kf. or nrd 101.ti,ab,kf. or nrd101.ti,ab,kf. or ophthalin.ti,ab,kf. or orthovisc.ti,ab,kf. or ostenil.ti,ab,kf. or perlane.ti,ab,kf. or provisc.ti,ab,kf. or radiaplexrx.ti,ab,kf. or restylane.ti,ab,kf. or si 4402.ti,ab,kf. or sinovial.ti,ab,kf. or sl 1010.ti,ab,kf. or sodium hyaluronate.ti,ab,kf. or supartz.ti,ab,kf. or suplasyn.ti,ab,kf. or synocrom.ti,ab,kf. or synojoynt.ti,ab,kf. or synvisc.ti,ab,kf. or teosyal.ti,ab,kf. or trilonon.ti,ab,kf. or unihylon.ti,ab,kf. or visco seal.ti,ab,kf. or vismed.ti,ab,kf. or vitrax.ti,ab,kf. or glucosamine* glycan*.ti,ab,kf. or glucosaminoglycan*.ti,ab,kf. or glucosaminoglycan*.ti,ab,kf. or glycoaminoglycan*.ti,ab,kf. or glycosaminoglycan*.ti,ab,kf. or glycosaminoglycan*.ti,ab,kf. or mucopolysaccharide*.ti,ab,kf. or polymucosaccharide*.ti,ab,kf. or prolotherap*.ti,ab,kf. or platelet* rich plasma*.ti,ab,kf. or thrombocyt* rich plasma*.ti,ab,kf. or prp.ti,ab,kf. or autolog* blood*.ti,ab,kf. or nettoya*.ti,ab,kf. or proliferation therap*.ti,ab,kf.</p>	2380533
3	1 and 2	885
4	limit 3 to yr="2004 -Current"	711
5	4 not (comment/ or editorial/ or letter/) not ((exp animals/ or exp models, animal/) not humans/)	651

6	meta-analysis/ or meta-analysis as topic/ or (metaanaly* or meta-analy* or metanaly*).ti,ab,kf. or systematic review/ or cochrane.jw. or (prisma or prospero).ti,ab,kf. or ((systemati* or scoping or umbrella or "structured literature") adj3 (review* or overview*).ti,ab,kf. or (systemic* adj1 review*).ti,ab,kf. or ((systemati* or literature or database* or data-base*) adj10 search*).ti,ab,kf. or ((structured or comprehensive* or systemic*) adj3 search*).ti,ab,kf. or ((literature adj3 review*) and (search* or database* or data-base*)).ti,ab,kf. or (("data extraction" or "data source*") and "study selection").ti,ab,kf. or ("search strategy" and "selection criteria").ti,ab,kf. or ("data source*" and "data synthesis").ti,ab,kf. or (medline or pubmed or embase or cochrane).ab. or ((critical or rapid) adj2 (review* or overview* or synthes*).ti. or (((critical* or rapid*) adj3 (review* or overview* or synthes*)) and (search* or database* or data-base*)).ab. or (metasynthes* or meta-synthes*).ti,ab,kf.	797180
7	exp clinical trial/ or randomized controlled trial/ or exp clinical trials as topic/ or randomized controlled trials as topic/ or Random Allocation/ or Double-Blind Method/ or Single-Blind Method/ or (clinical trial, phase i or clinical trial, phase ii or clinical trial, phase iii or clinical trial, phase iv or controlled clinical trial or randomized controlled trial or multicenter study or clinical trial).pt. or random*.ti,ab. or (clinic* adj trial*).tw. or ((singl* or doubl* or treb* or tripl*) adj (blind\$3 or mask\$3)).tw. or Placebos/ or placebo*.tw.	2819562
8	5 and 6 - SR	138
9	(5 and 7) not 8 - RCT	204
10	8 or 9 - Totaal	342

5

Submodule 3.2.2 Plaatjes-rijk plasma en autoloog bloed injecties

Uitgangsvraag

10 Wat is de waarde van injecties met plaatjes-rijk bloedplasma of autoloog bloed als behandeling voor patiënten met een laterale epicondylaire tendinopathie of mediale epicondylaire tendinopathie ?

Introduction (English)

15 Platelet-rich-plasma and autologous blood injections are regularly used to treat patients with lateral epicondylar tendinopathy or medial epicondylar tendinopathy. Particularly when conservative treatment approaches such as rest, physical therapy, and pain medication failed. However, the efficacy of these injections is unclear.

Search and select

20 A systematic review of the literature was conducted to answer the following question(s):
What is the effect of platelet-rich-plasma and autologous blood injection therapy in patients with lateral epicondylar tendinopathy or medial epicondylar tendinopathy?

Table 1. PICO

Patients	Patients with lateral or medial epicondylar tendinopathy
Intervention	Injections with - platelet-rich plasma (PRP) - autologous blood (AB)
Control	Placebo, wait and see policy
Outcomes	Patient recovery, elbow function, pain, return to sports/work, quality of life, complications
Other selection criteria	Study design: systematic reviews and randomized controlled trials

5 Relevant outcome measures

The guideline panel considered patient recovery, elbow function, pain, return to sport or work and quality of life as critical outcome measures for decision making. Complications were considered an important outcome measure.

- 10 The guideline panel did not predefine the outcome measures listed above but used the definitions reported in the studies.

15 The guideline panel defined a minimum of 2.0 points difference for the Visual Analogue Scale (VAS) and $0.91 > RR > 1.1$ for adverse events as clinically relevant. For the remaining outcomes the panel defined minimal clinical relevance as: 25% ($0.8 \geq RR \geq 1.25$) for dichotomous outcomes, 10% difference for continuous outcomes and standardized mean difference ($0.5 \geq SMD \geq 0.5$).

20 Search and select (Methods)

- 20 A systematic literature search was performed by a medical information specialist using the following bibliographic databases: Embase.com and Ovid/Medline. Both databases were searched from 2004 to 19th of December 2024 for systematic reviews and RCTs. Systematic searches were completed using a combination of controlled vocabulary/subject headings (e.g., Emtree-terms, MeSH) wherever they were available and natural language keywords.
- 25 The overall search strategy was derived from two primary search concepts: (1) lateral/medial epicondylitis; (2) injection. Duplicates were removed using EndNote software. After deduplication a total of 585 records were imported for title/abstract screening.

- 30 Initially, 27 studies were selected based on title and abstract screening. After reading the full text, 25 studies were excluded (see the exclusion table under the tab 'Evidence tabellen'), and two studies were included.

Summary of literature

Description of studies

- 35 Two studies were included in the literature analysis. Important study characteristics and results are summarized in table 2. The assessment of the risk of bias is summarized in the risk of bias tables (under the tab 'Evidence tabellen').

- 40 **Karjalainen (2021)** conducted a systematic review in which they included RCTs and semi-RCTs that examined the effect of AB, PRP or PRP-related products in participants with lateral elbow pain. The main comparison was PRP or AB versus placebo. Four databases were searched on 18 September 2020. Thirty-two trials were included of which seven were considered useful for this guideline. The other trials were excluded because they did not compare injection to placebo. Inclusion criteria were RCT design, participants >16 years of
- 45 age with lateral elbow pain as defined by the authors. Trials with participants with bilateral tendonitis were included, when results were presented separately. Participants with pain due to acute trauma injury were excluded. Trials assessing additional benefit of PRP or AB in surgical procedures were excluded. Risk of Bias was assessed by following methodological domains as recommended by Cochrane.

- 50 One RCT published after the search date of **Karjalainen (2021)** was included in addition to the systematic review.

- 55 **Keijsers (2024)** compared AB injection with placebo (saline injection) and injection without substance. They included individuals aged 18 to 70 years old with symptomatic lateral

- 5 epicondylar tendinopathy for at least 6 weeks that had not responded to non-surgical treatment. Exclusion criteria were: prior injection therapy, history of surgery, trauma, other elbow pathology, inflammatory diseases or other chronic pain syndromes, pain at the medial epicondyle, neck or shoulder correlating with elbow-pain and allergy to lidocaine.

Table 2. Characteristics of included studies

Study	Participants	Comparison	Follow-up	Outcome measures	Comments	Risk of bias (per outcome measure)*
Autologous blood and PRP						
<i>Included in systematic review Karjalainen (2021)</i>						
Krogh, 2013 Denmark, 1 site, RCT	<u>N at baseline</u> I: 20 C: 20 <u>Age (mean±SD)</u> I: 47 ± 7.1 C: 44.7 ± 7.9 <u>Sex (%female)</u> I: 55 C: 55 <u>Pain (PRTEE, mean ± SD)</u> I: 27.5 ± 7.5 C: 25.0 ± 7.3	<u>Intervention</u> PRP <u>Control</u> Saline	3 months	Pain (PRTEE) Disability (PRTEE) AE	Provided with PRP-kits.	Low

<p>Linnanmäki (2020) Finland, 1 site, RCT</p>	<p><u>N at baseline</u> I.1: 40 I.2: 40 C: 39</p> <p><u>Age</u> (mean ± SD) I.1: 46 ± 5 I.2: 46 ± 10 C: 49 ± 8</p> <p><u>Sex</u> (%female) I.1: 55 I.2: 50 C: 56</p> <p><u>Pain</u> (VAS, mean ± SD) I.1: 5.7 ± 1.7 I.2: 5.7 ± 1.5 C: 5.9 ± 1.8</p>	<p><u>Intervention 1</u> PRP injection</p> <p><u>Intervention 2</u> Autologous blood injection</p> <p><u>Control</u> Saline injection</p>	<p>1 year</p>	<p>Pain (VAS) Function (DASH, grip strength)</p>	<p>Funded by a research grant</p>	<p>Low</p>
<p>Martin, 2019 Spain, 1 site, RCT</p>	<p><u>N at baseline</u> I: 41 C: 39</p> <p><u>Age</u> (mean ± SD) I: 48.3 ± 7.6 C: 50.7 ± 6.7</p> <p><u>Sex</u> (%female) I: 46 C: 61</p> <p><u>Pain</u> (VAS, mean ± SD) I: 5.9 ± 1.5 C: 5.9 ± 1.8</p>	<p><u>Intervention</u> Two PRP injections, two weeks apart.</p> <p><u>Control</u> Two lidocaine injections, two weeks apart</p>	<p>12 months</p>	<p>Pain (VAS) Function (DASH) AE</p>	<p>Funded by a research grant</p>	<p>Low</p>

<p>Mishra, 2014 USA, 12 sites, RCT</p>	<p><u>N at baseline</u> I: 116 C: 114</p> <p><u>Age (mean)</u> I: 48.4 C: 47.4</p> <p><u>Sex (%female)</u> NR</p> <p><u>Pain</u> NR</p>	<p><u>Intervention</u> PRP injection</p> <p><u>Control</u> Bupivacaine injection</p>	<p>24 weeks</p>	<p>Pain (VAS) Function (PRTEE) AE</p>	<p>Funded by manufacturer of PRP centrifugation system.</p>	<p>High (study sponsoring, lack of withdrawal reasons, lack of reporting data at inclusion)</p>
<p>Montalvan, 2015 France, 1 site, RCT</p>	<p><u>N at baseline</u> I: 25 C: 25</p> <p><u>Age (mean ± SD)</u> I: 47 ± 9.2 C: 46.4 ± 8.6</p> <p><u>Sex</u> NR</p> <p><u>Pain (VAS, mean ± SD)</u> I: 6.8 ± 0.8 C: 7 ± 1</p>	<p><u>Intervention</u> Two PRP injections, four weeks apart</p> <p><u>Control</u> Two saline injections, four weeks apart</p> <p><i>Rehabilitation, PT or other injections not allowed</i></p>	<p>1 year</p>	<p>Pain (VAS) Function (Roles-Maudsley score) AE</p>	<p>Funded by manufacturer of PRP centrifugation system.</p>	<p>Low</p>

<p>Yerlikaya , 2018 Turkey, 1 site, RCT</p>	<p><u>N at baseline</u> I.1: 30 I.2: 30 C: 30</p> <p><u>Age (mean ± SD)</u> I.1: 45 ± 8.6 I.2: 46.5 ±8.7 C: 47.6 ± 9.1</p> <p><u>Sex (%female)</u> I.1: 86.7 I.2: 63.3 C: 63.3</p> <p><u>Pain (VAS during activity, mean ± SD)</u> I.1: 8.7 ± 1.7 I.2: 7.9 ± 1.8 C: 8.2 ± 1.7</p>	<p><u>Intervention 1</u> PRP injection – leukocyte rich</p> <p><u>Intervention 2</u> PRP injection – leukocyte poor</p> <p><u>Control</u> Saline injection</p> <p><i>All groups followed an exercise program for 4 weeks</i></p>	<p>8 weeks</p>	<p>VAS (nocturnal VAS scores) AE</p>		<p>Medium (reporting bias)</p>
<p>Palacio, 2016 Brazil, 1 site, RCT</p>	<p><u>N at baseline</u> I: 20 C: 20</p> <p><u>Age (mean [range])</u> I: 47.9 [42.2 to 5.36]] C: 46.6 [41.6 to 21.6]</p> <p><u>Sex</u> NR</p> <p><u>Pain (PRTEE, mean ± SD)</u> I: 51.7 ± 4.4 C: 47.1 ± 4.9</p>	<p><u>Intervention</u> PRP injection</p> <p><u>Control</u> Neocaine injection</p>	<p>3 months</p>	<p>Function (PRTEE)</p>	<p>Study includes a third arm with a corticosteroid. Not reported in this review</p>	<p>Medium <i>Risk of selective reporting</i></p>

<p>Schoffl, 2017 Germany, 1 site, RCT</p>	<p><u>N at baseline</u> I: 25 C: 25</p> <p><u>Age (mean ± SD)</u> I: 52.6 ± 11.5 C: 52.6 ± 11.6</p> <p><u>Sex (%female)</u> I: 50 C: 50</p> <p><u>Pain (VAS, mean ± SD)</u> I: 4.2 ± 1.8 C: 5.4 ± 0.7</p>	<p><u>Intervention</u> PRP injection and dry needling</p> <p><u>Control</u> Placebo and dry needling</p>	6 months	Function (DASH)		Medium, <i>High risk of reporting incomplete data</i>
<p>Wolf, 2011 USA, 2 sites RCT</p>	<p><u>N at baseline</u> Total: 34 (per group NR)</p> <p><u>N at follow-up</u> I: 10 C: 9</p> <p><u>Age (mean)</u> NR</p> <p><u>Sex (%female)</u> NR</p> <p><u>Pain (VAS)</u> I: 5 ± 3.1 C: 5 ± 3</p>	<p><u>Intervention</u> autologous blood injection</p> <p><u>Control</u> Saline injection</p> <p>No other treatments allowed during follow-up</p>	6 months	Pain (VAS) Elbow function (DASH)	<p>Study includes a third arm with glucocorticoid. This is assessed in the review on corticosteroid injections.</p> <p>Funded by a research grant</p>	Low
<i>Individual studies</i>						

<p>Keijsers, 2024 Netherlands, 4 sites, RCT</p>	<p><u>N at baseline</u> I: 54 C: 57</p> <p><u>Age</u> (mean ± SD) I: 51 ± 7 C: 53 ± 8</p> <p><u>Sex</u> (%female) I: 57 C: 46</p> <p><u>Pain</u> (VAS during activity, mean ± SD) I: 67 ± 20 C: 69 ± 17</p> <p><u>Pain</u> (VAS during rest, mean ± SD) I: 36 ± 24 C: 34 ± 24</p>	<p><u>Intervention</u> Autologous blood injection</p> <p><u>Control</u> Dextrose injection</p> <p>Injection with the Instant Tennis Elbow Cure device. Before injection, ultrasound-guided localization and depth measurement of the ECRB tendon were performed.</p>	<p>5 months, 1 year</p>	<p>Pain (VAS after provocation, during rest and after activity) Function (grip strength, OES, QuickDASCH, PRTEE), QoL (EQ5D)</p>	<p>Study includes a third arm with perforation only. Not reported in this review</p>	<p>Low</p>
<p><i>*For further details, see risk of bias table in the appendix or systematic review</i> DASH - Disabilities of the Arm, Shoulder and Hand questionnaire; fu – follow-up; IQR- interquartile range; NR – not reported; OES – oxford elbow scale; PRP – platelet-rich-plasma; PRTEE - Patient-Rated Tennis Elbow Evaluation; VAS – visual analogue scale;</p>						

5 **Results**

Results were extracted from the studies as means ± standard deviations (SDs). If data were presented by medians (interquartile ranges), results were converted into means ± SD by the conversion tool described by Weir (2018).

10 **Pain (crucial)**

All studies reported pain intensity using a VAS, except **Krogh (2013)**, who used the pain subscore of the patient-rated tennis elbow evaluation (PRTEE) questionnaire. This score represents average pain over the last week. Both scores range from 0 to 10 where 0 represents no pain and 10 the worst possible pain.

15

At 6 weeks, mean pain was 0.14 points higher (95% CI 0.30 lower to 0.58 higher) in the PRP or AB group compared to placebo (Figure 1).

20

At 6 weeks to 6 months, mean pain was 0.07 points lower (95% CI 0.59 lower to 0.45 higher) in the PRP or AB group compared to placebo (Figure 1).

At 6 to 12 months, mean pain was 0.21 lower (95% CI: 0.62 lower to 0.19 higher) in the PRP or AB group compared to placebo (Figure 1). None of the differences are clinically relevant.

25

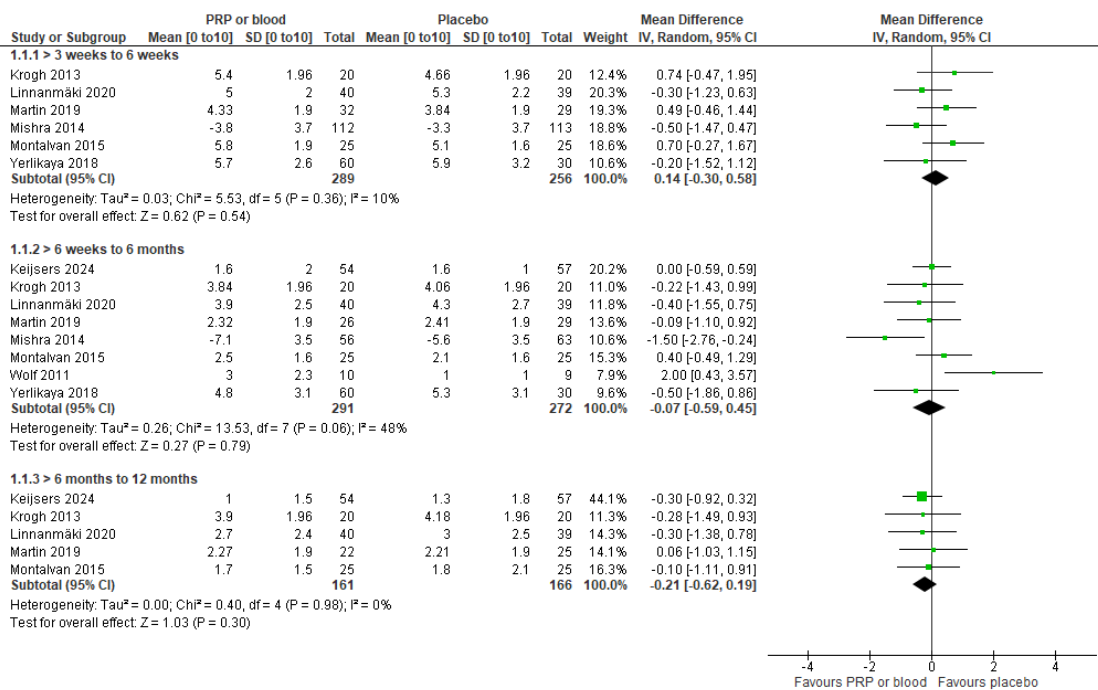


Figure 1. Pain after autologous blood or platelet rich plasma injection versus placebo injection

50

Keijsers (2024) also reported on pain intensity after provocation and during activity using a VAS score (range 0-100; higher score is more severe pain). These results are presented in table 3.

Table 3. Additional VAS pain scores reported by Keijsers (2024)

	5 months		1 year	
	Autologous blood	Dextrose	Autologous blood	Dextrose
VAS after provocation	26 ± 27	29 ± 32	NR	NR
VAS during activity	29 ± 26	40 ± 29	17 ± 20	28 ± 26

Values are reported as mean ± SD;
Abbreviations: NR – not reported; VAS – visual analogue scale

5

Quality of life (crucial)

Keijsers (2024) reported on quality of life with the EQ-5D VAS. They reported a mean difference of 2.8 points higher (98% CI 1.1 lower to 6.6 points higher) in the AB group compared to the placebo group. This difference is not clinically relevant. No other studies reported on quality of life for PRP or AB injections. Since Keijsers (2024) only reported changes between groups, and no absolute values, no GRADE assessment was performed for this outcome measure.

10

Elbow function (crucial)

15

Eight studies reported on elbow function for PRP or AB injections versus placebo or usual care (Figure 4). Three studies reported the PRTEE (**Krogh, 2013; Mishra, 2014; Palacio, 2016**), four studies reported the DASH (**Linnanmäki, 2020; Martin, 2019; Schoffl, 2017; Wolff, 2011**), and one study reported the Roles-Maudsley scale (**Montalvan, 2015**) (Figure 4). These scales were converted to a scale from 0 to 100 with 0 representing best function, or no disability.

20

At 6 weeks, mean function was 1.65 points higher (95% CI 1.66 lower to 4.96 higher) in the PRP or AB group compared to placebo (Figure 2).

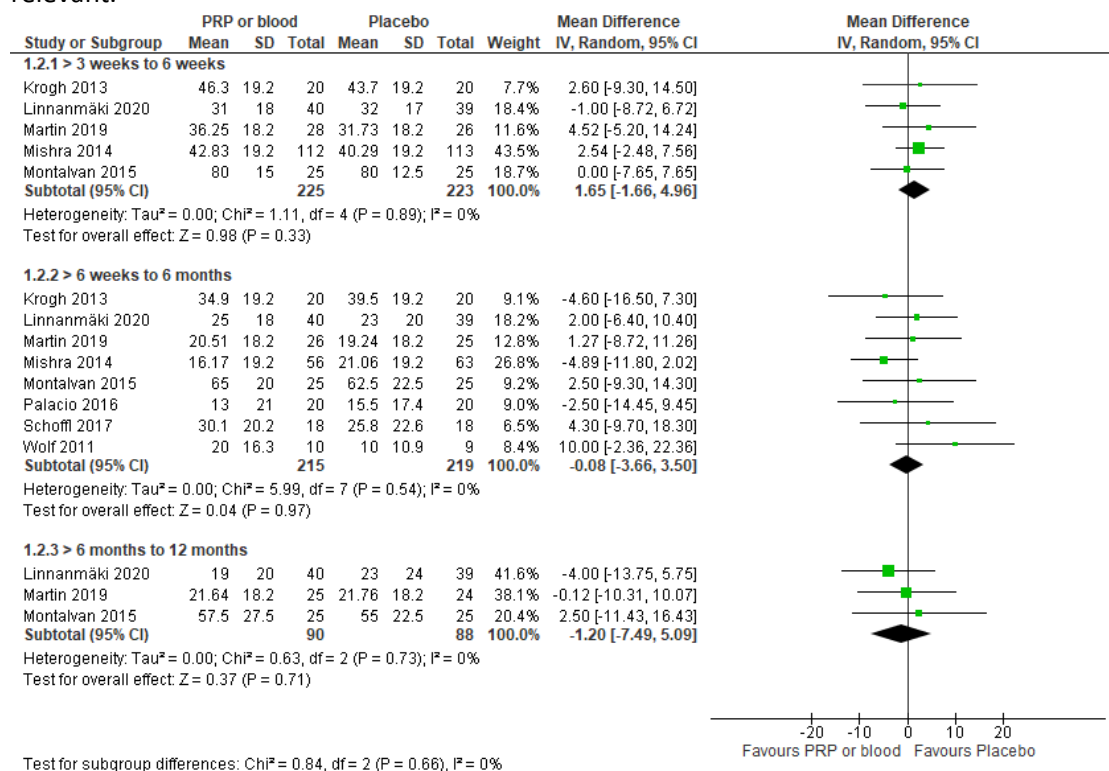
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At 6 weeks to 6 months, mean function was 0.08 points lower (95% CI 3.36 lower to 3.50 higher) in the PRP or AB group compared to placebo (Figure 2).

30

At 6 to 12 months, mean function was 1.2 points lower (95% CI 7.49 lower to 5.09 higher) in the PRP or AB group compared to placebo (Figure 2). None of the differences are clinically relevant.

35



55

Figure 2. Elbow function after autologous blood or platelet rich plasma injection versus placebo injection.

5 Keijsers (2024) reported on elbow function with the Oxford Elbow Score (OES), PRTEE and the QuickDASH. No numerical data were reported, but the authors wrote "clinically important difference was only found for the QuickDASH score. For the other outcomes [OES, PRTEE (eds)], no clinically important differences were found".

10 Since no absolute values were reported for these outcome measures, these results were not evaluated by GRADE.

Return to sports/work (crucial)

No studies reported on return to sports or work after PRP or AB injections.

15

Patient recovery (crucial)

No studies reported on patient recovery after PRP or AB injections.

Complications (important)

20 One study (Martin, 2019) reported on withdrawal due to adverse events. They reported one withdrawal in the PRP/AB group compared to three in the placebo group. This corresponded to a risk ratio of 0.32 (95% CI: 0.03 to 2.92) in favor of the PRP/AB group. This difference is clinically relevant.

25 Adverse events were documented in five studies (Figure 3). Keijsers (2024) reported no adverse events. Krogh (2024) reported seven adverse events in the PRP group (persistent pain after injection [n=4], limitation of movement after injection [n=3]) and seven in the control group (persistent pain after injection [n=1], limitation of movement after injection [n=1], rash at injection site, which resolved spontaneously [n=1], skin atrophy [n=3], loss of pigmentation [n=1]).

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Martin (2019) reported 6 adverse events in both the PRP and the placebo group (pain and swelling in 6 weeks following injection [n=12]).

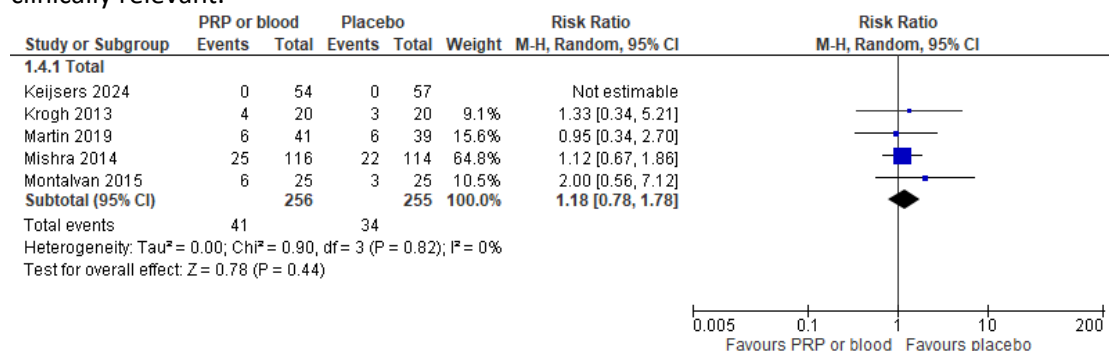
35 Mishra (2014) reported 22 adverse events in the PRP group and 20 in the placebo group (pain after the injection lasting < 48 hours [n=42]) and three serious adverse events in the PRP group (severe pain, until 2 and 4 days after treatment [n=2]; unstable angina 4 months after treatment [n=1]) and two serious adverse events in the placebo group (radial/ulnar fracture [n=1]; shoulder arthroscopic surgery with decompression [n=1]).

40 Montalvan (2015) reported 6 adverse events in the PRP group (pain after injection, disappearing after 3 days [n=4]; local cutaneous allergic reaction [n=2]) and 3 in the placebo group (pain after injection, disappearing after 3 days [n=2], hematoma after injection [n=1]).

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45 Risk ratio: 1.18 (95% CI: 0.78 to 1.78) in favor of the placebo group. This difference is clinically relevant.

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Figure 3. Adverse events after autologous blood or platelet rich plasma injection versus placebo injection.

5 Summary of Findings

Platelet-rich plasma or Autologous blood vs placebo or usual care

Outcome	Study results and measurements	Absolute effect estimates		Certainty of the evidence (Quality of evidence)	Summary
		Placebo or usual care	Autologous blood or PRP injection		
Pain (crucial) >3 weeks to 6 weeks	Measured by: VAS, PRTEE Scale: 0 - 10 Lower better Based on data from 545 participants in 6 studies		MD 0.14 higher (CI 95% 0.30 lower - 0.58 higher)	Moderate Due to serious risk of bias ¹	Platelet-rich plasma or autologous blood injection probably results in little to no difference in pain when compared to placebo or usual care in individuals with lateral or medial epicondylar tendinopathy. <i>(Keijsers 2024, Krogh 2013, Linnanmäki 2020, Yerlikaya 2018, Martin 2019, Mishra 2014, Montalvan 2015, Wolf 2011)</i>
Pain (crucial) >6 weeks to 6 months	Measured by: VAS, PRTEE Scale: 0 - 10 Lower better Based on data from 563 participants in 8 studies		MD 0.07 lower (CI 95% 0.59 lower - 0.45 higher)		
Pain (crucial) >6 months to 12 months	Measured by: VAS, PRTEE Scale: 0 - 10 Lower better Based on data from 327 participants in 5 studies		MD 0.21 lower (CI 95% 0.62 lower - 0.19 higher)		
Quality of life (crucial)				No GRADE (no evidence was found)	No evidence was found regarding the effect of platelet-rich plasma or autologous blood injection on quality of life when compared to placebo or usual care in individuals with lateral or medial epicondylar tendinopathy.

Elbow function (crucial) > 3 weeks to 6 weeks	Measured by: PRTEE, DASH Roles-Maudsley scale Scale: 0 - 100 Lower better Based on data from 448 participants in 5 studies	MD 1.65 higher (CI 95% 1.66 lower - 4.96 higher)		Platelet-rich plasma or autologous blood injection probably results in little to no effect on elbow function when compared to placebo or usual care in individuals with lateral or medial epicondylar tendinopathy (Schoffl 2017, Wolf 2011, Martin 2019, Mishra 2014, Montalvan 2015, Palacio 2016, Krogh 2013, Linnanmäki 2020)
Elbow function (crucial) > 6 weeks to 6 months	Measured by: PRTEE, DASH, Roles-Maudsley scale Scale: 0 - 100 Lower better Based on data from 434 participants in 8 studies	MD 0.08 lower (CI 95% 3.36 lower – 3.50 higher)	Moderate Due to serious risk of bias ¹	
Elbow function > 6 months to 12 months	Measured by: PRTEE, DASH, Roles-Maudsley scale Scale: 0 - 100 Lower better Based on data from 203 participants in 3 studies	MD 1.20 lower (CI 95% 7.49 lower - 5.09 higher)		
Return to sport (important)			No GRADE (no evidence was found)	No evidence was found regarding the effect of platelet-rich plasma or autologous blood injection on return to sport when compared to placebo or usual care in individuals with lateral or medial epicondylar tendinopathy.
Patient recovery (important)			No GRADE (no evidence was found)	No evidence was found regarding the effect of platelet-rich plasma or autologous blood injection on patient recovery when compared to placebo or usual care in individuals with lateral or medial epicondylar tendinopathy.
Withdrawal due to Adverse events (important)	Relative risk: 0.32 (CI 95% 0.03 - 2.92) Based on data from 80 participants in 1 study	77 per 1000 25 per 1000 Difference: 52 fewer per 1000 (CI 95% 75 fewer - 148 more)	Very low Due to serious risk of bias, Due to very serious imprecision ²	The evidence is very uncertain about the effect of platelet-rich plasma or autologous blood injection on withdrawal due to adverse events when compared to placebo or usual care in individuals with lateral or medial epicondylar tendinopathy. (Martin, 2019)
Adverse events (important)	Relative risk: 1.18 (CI 95% 0.78 - 1.78)	133 per 1000 157 per 1000	Low	

	Based on data from 511 participants in 5 studies	Difference: 24 more per 1000 (CI 95% 29 fewer - 104 more)	Due to serious risk of bias, Due to serious imprecision ³	Platelet-rich plasma or autologous blood injection might lead to more adverse events adverse events when compared to placebo or usual care in individuals with lateral or medial epicondylar tendinopathy <i>(Keijsers 2024, Krogh 2013, Martin 2019, Martin 2019, Mishra 2014, Montalvan 2015)</i>
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¹. Risk of Bias: serious. Selective outcome reporting;

². Risk of Bias: serious. Selective outcome reporting, study sponsoring; Imprecision: very serious. Wide confidence intervals;

³. Risk of Bias: serious. Selective outcome reporting; Imprecision: serious. Wide confidence intervals.

5 **Overwegingen – van bewijs naar aanbeveling (NL)**

Balans tussen gewenste en ongewenste effecten

Er werd één RCT en één systematische review (met tien relevante RCTs) gevonden die rapporteerden over injecties met PRP of AB vergeleken met placebo of standaardzorg. De studies rapporteerden geen klinisch relevante verschillen op de cruciale uitkomstmaten pijn en functie. De bewijskracht voor deze bevindingen is redelijk. De studies toonden aan dat PRP of AB injecties mogelijk leiden tot meer complicaties, de bewijskracht voor deze bevinding is echter laag. Op basis van deze uitkomstmaten kan er dus geen voorkeur worden uitgesproken voor de interventie vergeleken met placebo of standaardzorg.

15 Geen van de studies rapporteerde over de cruciale uitkomstmaat kwaliteit van leven. Ook de belangrijke uitkomstmaten terugkeer naar sport of werk, herstel van de patiënt en complicaties werden niet onderzocht.

Kwaliteit van bewijs

20 De overall kwaliteit van bewijs is redelijk. Dit betekent dat we redelijk zeker zijn over het gevonden geschatte effect van de cruciale uitkomstmaten pijn en functie.

25 Er is afgewaardeerd vanwege Risk of Bias: methodologische beperkingen (mogelijk selectieve uitkomstrapportage). Voor de uitkomstmaat complicaties is ook afgewaardeerd voor imprecisie omdat het betrouwbaarheidsinterval de grenzen van klinische relevantie overschreed.

Waarden en voorkeuren van patiënten (en eventueel hun naasten/verzorgers)

30 Duidelijke voorlichting rondom PRP/AB injecties aan patiënten is erg belangrijk. Er is geen effect op pijn en elleboogfunctie na PRP/AB injecties. Een bijkomend nadelig gevolg van PRP/AB injecties is het risico op complicaties.

Kostenaspecten

35 De kostenaspecten van PRP of AB injecties bij een laterale epicondylaire tendinopathie (LET) of mediale epicondylaire tendinopathie (MET) hangen o.a. af van de setting waarin de behandeling plaatsvindt en de vergoedingsstructuur binnen de zorgverzekering. De PRP/AB injectie is uiteraard duurder ten opzichte van reguliere zorg (afwachtend beleid).

Gelijkheid ((health) equity/equitable)

40 De aanbeveling heeft geen effect op gezondheidsgelijkheid. Dit komt omdat de werkgroep het afraad om PRP/AB injecties te gebruiken als behandeling.

Aanvaardbaarheid

Ethische aanvaardbaarheid

45 Het niet geven van een PRP/AB injectie lijkt aanvaardbaar voor de betrokkenen. Er zijn geen ethische bezwaren.

Duurzaamheid

Duurzaamheidsoverwegingen spelen geen rol bij de keuze voor behandeling.

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Haalbaarheid

PRP/AB injecties worden afgeraden door de werkgroep en dus spelen haalbaarheidsaspecten hierbij geen rol.

5 **Aanbeveling**

Rationale van de aanbeveling: weging van argumenten voor en tegen de interventies

10 PRP of AB injecties laten geen klinisch relevante verschillen zien ten aanzien van pijnvermindering en verbetering van de elleboogfunctie. Bovendien is er sprake van een lichte toename van bijwerkingen en bestaat er onzekerheid over de veiligheid op de lange termijn. Gezien het beperkte klinische effect en de nadelen, wegen de argumenten tegen het gebruik van PRP/AB bij de behandeling van laterale epicondylaire tendinopathie zwaarder dan de argumenten voor.

Eindoordeel:

15 Sterke aanbeveling tegen gebruik van PRP/AB injecties bij de behandeling van laterale epicondylaire tendinopathie of mediale epicondylaire tendinopathy klachten.

Geef geen injecties met plaatjes-rijk plasma of autoloog bloed als behandeling aan patiënten met klachten van een laterale of mediale epicondylaire tendinopathie.

Kennisvragen

20 Tijdens de ontwikkeling van de module Medicamenteuze behandeling is gebleken dat er binnen deze module geen kennisvragen zijn.

Implementatieplan

Implementatietabel

<i>Vraag</i>	<i>Antwoord: Kruis aan en licht toe/ beschrijf</i>	<i>Toelichting keuze:</i>
11. Wat was het onderliggende probleem om deze uitgangsvraag uit te werken?	Ongewenste praktijkvariatie	
	X Nieuwe evidentie	Onduidelijkheid over effectiviteit van PRP/AB injecties.
	Anders	
12. Maak een inschatting over hoeveel patiënten het ongeveer gaat waar de aanbeveling betrekking op heeft?	< 1000	
	< 5000	
	X 5000-40.000	
	> 40.000	
13. Is de aanbeveling onderdeel van een bredere set interventies of verwant aan andere richtlijnen of modules? Zo ja, hoe verhoudt zij zich daartoe en moet hiermee rekening worden gehouden bij de implementatie, of kan de aanbeveling als losstaand worden beschouwd?	Ja	
	X Nee	
14. Belemmeringen en kansen op verschillende niveaus voor landelijke toepassing van de aanbeveling:	Belemmerende factoren	Bevorderende factoren/ kansen

Richtlijn/ klinisch traject (innovatie)	X		Aanbevelingen zijn simpel geformuleerd en dus makkelijk op te volgen.
Zorgverleners (artsen en verpleegkundigen)	X		Duidelijkheid voor 1 ^e lijn.
Patiënt/ cliënt (naasten)	X	Patiënt begrijpt mogelijk niet waarom een PRP/AB injectie niet (meer) wordt gegeven. Goede uitleg nodig.	Het niet aanbevelen van injecties leidt automatisch ook tot geen bijwerkingen
Sociale context	X	Geen medische handeling verrichten is iets wat een patiënt niet verwacht	
Organisatorische context	X		Minder personeel nodig, minder administratieve lasten, geen logistieke problemen
Financiële en juridische context	X		Goedkoper voor zorg
15. A) Welke personen/partijen zijn van belang bij het toepassen van de aanbeveling in de praktijk? (kruis aan) B) Wat is er nodig van deze personen/partijen om de aanbeveling in de praktijk te kunnen brengen? Denk aan aanpassingen in gedrag, werkwijzen, beleid, samenwerking of andere randvoorwaarden.		A	B
	X	Patiënt/ cliënt (naaste)	
	X	Professional	Consequent geen PRP/AB injecties meer geven
	X	Beroepsvereniging, nl	Goede verspreiding van richtlijn via de gebruikelijke kanalen in de 1 ^e en 2 ^e lijn
		Ziekenhuis (raad van bestuur/UMCNL (voorheen NFU)/NVZ)	
		Zorgverzekeraars/ NZa	
		Zorginstituut [duiding nodig]	
		Anders	
16. Binnen welk tijdsbestek moet de aanbeveling zijn geïmplementeerd?	X	< 1 jaar	
		binnen 2-3 jaar	
17. Conclusie: is er extra actie en/of ondersteuning nodig voor implementatie van de aanbeveling?	X	Ja	De reguliere implementatieroutes van de richtlijnmodule alleen is onvoldoende.

De reguliere implementieroutes (publicatie en disseminatie via officiële kanalen, opname in professionele standaarden, scholing en nascholing, gebruik van bestaande ICT systemen, audits en visitaties) van de richtlijnmodule alleen is onvoldoende.		Nee	
18. Plaatsing op de Landelijke Implementatieagenda Medisch Specialistische zorg is gewenst. <i>Het gaat om zorg die (grotendeels) wordt uitgevoerd binnen de ziekenhuismuren. Succesvolle implementatie vraagt om actieve betrokkenheid en samenwerking van meerdere relevante partijen binnen de zorgpraktijk.</i>	X	Ja *	Het geven van een PRP of autoloog bloed injectie voor LET of MET is heel gebruikelijk. Extra aandacht voor deze aanbeveling is nodig door plaatsing op de Landelijke Implementatieagenda
		Nee	

- 5 *Deze aanbeveling komt mogelijk in aanmerking voor plaatsing op de Landelijke Implementatieagenda van het programma Zorg Evaluatie & Gepast Gebruik (ZE&GG), waarin alle betrokken partijen in de medisch-specialistische zorg samenwerken aan de implementatie van bewezen beste zorg. De Federatie levert namens het veld goed onderbouwde aanbevelingen aan, die zijn getoetst op de behoefte aan een implementatie-impuls. De onderwerpen op de Implementatieagenda zijn onderdeel van landelijke zorginkoopafspraken tussen zorgverzekeraars en zorgaanbieders. Voor de beoordeling van aanbevelingen uit richtlijnen wordt gebruikgemaakt van de implementatietabel. Op basis hiervan kunnen we de andere partijen goed informeren en gezamenlijk besluiten of plaatsing op de Implementatieagenda passend is.
- 10

Literatuur

- 15 Karjalainen TV, Silagy M, O'Bryan E, Johnston RV, Cyril S, Buchbinder R. Autologous blood and platelet-rich plasma injection therapy for lateral elbow pain. *Cochrane Database Syst Rev.* 2021 Sep 30;9(9):CD010951. doi: 10.1002/14651858.CD010951.pub2. PMID: 34590307; PMCID: PMC8481072.
- 20 Keijsers R, Kuijer PPFM, Gerritsma-Bleeker CLE, Kleinlugtenbelt YV, Beumer A, The B, Landman EBM, de Vries AJ, Eygendaal D. In the Treatment of Lateral Epicondylitis by Percutaneous Perforation, Injectables Have No Added Value. *Clin Orthop Relat Res.* 2024 Feb 1;482(2):325-336. doi: 10.1097/CORR.0000000000002774. Epub 2023 Aug 15. PMID: 37594385; PMCID: PMC10776141.
- 25 Weir CJ, Butcher I, Assi V, Lewis SC, Murray GD, Langhorne P, Brady MC. Dealing with missing standard deviation and mean values in meta-analysis of continuous outcomes: a systematic review. *BMC Med Res Methodol.* 2018 Mar 7;18(1):25. doi: 10.1186/s12874-018-0483-0. PMID: 29514597; PMCID: PMC5842611.

Bijlagen bij submodule Autoloog bloed injecties

Risk of Bias tables

Risk of bias table for intervention studies (randomized controlled trials; based on Cochrane risk of bias tool and suggestions by the CLARITY Group at McMaster University)

Study reference (first author, publication year)	Was the allocation sequence adequately generated?	Was the allocation adequately concealed?	Blinding: Was knowledge of the allocated interventions adequately prevented? Were patients/ healthcare providers / data collectors / outcome assessors/ data analysts blinded?	Was loss to follow-up (missing outcome data) infrequent?	Are reports of the study free of selective outcome reporting?	Was the study apparently free of other problems that could put it at a risk of bias?	Overall risk of bias If applicable/necessary, per outcome measure LOW Some concerns HIGH
Keyzers, 2024	Definitely yes; Reason: Central blocked randomization with computer generated random numbers	Definitely yes; Reason: Opaque, sealed envelopes were used and opened by a supporting nurse.	Probably yes; Reason: patients and outcome assessors were blinded. Blinding of data analysts not reported. Health care providers not blinded	Probably no Reason: Loss – to-follow up was 17 and 30 percent respectively at 5 months for the primary outcome measures. However, an ITT analysis was performed.	Probably yes Reason: All relevant outcomes were reported;	Definitely yes; Reason: No other problems noted	Low Reason: Patients and outcome assessors blinded. ITT analysis to account for loss-to follow-up.

5 **Table of excluded studies**

Reference	Reason for exclusion
Arora KK, Kapila R, Kapila S, Patra A, Chaudhary P, Singal A. Management of Lateral Epicondylitis: A Prospective Comparative Study Comparing the Local Infiltrations of Leucocyte Enriched Platelet-Rich Plasma (L-aPRP), Glucocorticoid and Normal Saline. <i>Malays Orthop J.</i> 2022 Mar;16(1):58-69. doi: 10.5704/MOJ.2203.009. PMID: 35519524; PMCID: PMC9017925.	No absolute outcome data reported
Averell N, Goodwin B, Park S, Spicer S, Wilson M, Mitchell J, Martinez N, Palhang M, Jabon J, Jermyn R. The concentration of platelets in PRP does not affect pain outcomes in lateral epicondylitis: a systematic review and meta-analysis. <i>Pain Manag.</i> 2024;14(4):223-233. doi: 10.1080/17581869.2024.2360381. Epub 2024 Jun 14. PMID: 38874535; PMCID: PMC11229443.	Wrong comparison
Lowdon H, Chong HH, Dhingra M, Gomaa AR, Teece L, Booth S, Watts AC, Singh HP. Comparison of Interventions for Lateral Elbow Tendinopathy: A Systematic Review and Network Meta-Analysis for Patient-Rated Tennis Elbow Evaluation Pain Outcome. <i>J Hand Surg Am.</i> 2024 Jul;49(7):639-648. doi: 10.1016/j.jhsa.2024.03.007. Epub 2024 Apr 28. PMID: 38678448.	SR that evaluated less outcome measures than Lapner. All relevant included studies are assessed in current review
Bonczar M, Ostrowski P, Plutecki D, Dziedzic M, Florek J, Michalik W, Przybycień W, Depukat P, Rutowicz B, Walocha E, Koziej M. Treatment Options for Tennis Elbow - An Umbrella Review. <i>Folia Med Cracov.</i> 2023 Oct 30;63(3):31-58. doi: 10.24425/fmc.2023.147213. PMID: 38310528.	Does not report data on comparison (only pre-post)
Chen Q, Shen P, Zhang B, Chen Y, Zheng C. Long-term effectiveness of conservative management for lateral epicondylitis: a meta-analysis. <i>J Plast Surg Hand Surg.</i> 2023 Aug 24;58:67-73. doi: 10.2340/jphs.v58.12333. PMID: 37615315.	Focuses on long term outcomes, misses relevant studies for this PICO
Erpala F, Ozturk T, Zengin EC, Bakir U. Early Results of Kinesio Taping and Steroid Injections in Elbow Lateral Epicondylitis: A Randomized, Controlled Study. <i>Medicina (Kaunas).</i> 2021 Mar 24;57(4):306. doi: 10.3390/medicina57040306. PMID: 33805193; PMCID: PMC8064344.	Follow-up too short
Naveena HM, Manjanatha R, Salwan A. A Comparative Study of the Efficacy of Platelet-Rich Plasma (PRP) vs. Other Conservative Treatments for Lateral Epicondylitis. <i>Cureus.</i> 2024 Oct 1;16(10):e70590. doi: 10.7759/cureus.70590. PMID: 39483595; PMCID: PMC11527516.	Control group used a brace – not usual care
Jokar R, Esmailnejadganji SM, Bijani A, Kamali Ahangar S, Javer R, Mohammadi G. Local autologous blood and corticosteroid injection on pain and function in patients with tennis elbow. <i>Caspian J Intern Med.</i> 2023 Fall;14(4):633-639. doi: 10.22088/cjim.14.4.633. PMID: 38024173; PMCID: PMC10646365.	Control group used a brace – not usual care
Kaya SS, Yardımcı G, Göksu H, Genç H. Effects of splinting and three injection therapies (corticosteroid, autologous blood and prolotherapy) on pain, grip strength, and functionality in patients with lateral epicondylitis. <i>Turk J Phys Med Rehabil.</i> 2022 Jun 1;68(2):205-213. doi: 10.5606/tftrd.2022.8007. PMID: 35989952; PMCID: PMC9366475.	Control group used a splint– not usual care

Lapner P, Alfonso A, Hebert-Davies J, Pollock JW, Marsh J, King GJW; Canadian Shoulder and Elbow Society (CSES). Nonoperative treatment of lateral epicondylitis: a systematic review and meta-analysis. <i>JSES Int.</i> 2021 Dec 18;6(2):321-330. doi: 10.1016/j.jseint.2021.11.010. PMID: 35252934; PMCID: PMC8888180.	Wrong intervention: CS injections
Vasudeva A, Parihar R, Neyaz O, Bharti A, Handa G. Efficacy of a local corticosteroid injection on pain, disability and radial nerve thickness in patients with lateral epicondylitis. <i>J Family Med Prim Care.</i> 2021 Dec;10(12):4502-4508. doi: 10.4103/jfmpc.jfmpc_1173_21. Epub 2021 Dec 27. PMID: 35280608; PMCID: PMC8884310.	Control group used a brace – not usual care
Muthu S, Patel S, Gobbur A, Patil SC, Ks KH, Yadav V, Jeyaraman M. Platelet-rich plasma therapy ensures pain reduction in the management of lateral epicondylitis - a PRISMA-compliant network meta-analysis of randomized controlled trials. <i>Expert Opin Biol Ther.</i> 2022 Apr;22(4):535-546. doi: 10.1080/14712598.2022.2032638. Epub 2022 Jan 31. PMID: 35078375.	Systematic review broader than our scope. No information in addition to Lapner
Tavassoli M, Jokar R, Zamani M, Khafri S, Esmaeilnejad-Ganji SM. Clinical efficacy of local injection therapies for lateral epicondylitis: A systematic review and network meta-analysis. <i>Caspian J Intern Med.</i> 2022 Spring;13(2):311-325. doi: 10.22088/cjim.13.2.1. PMID: 35919654; PMCID: PMC9301214	Network meta analysis, with broader scope than our review
Wong JRY, Toth E, Rajesparan K, Rashid A. The use of platelet-rich plasma therapy in treating tennis elbow: A critical review of randomised control trials. <i>J Clin Orthop Trauma.</i> 2022 Jul 31;32:101965. doi: 10.1016/j.jcot.2022.101965. PMID: 35990997; PMCID: PMC9382321.	Systematic review of insufficient quality: No meta analysis
Kim YJ, Wood SM, Yoon AP, Howard JC, Yang LY, Chung KC. Efficacy of Nonoperative Treatments for Lateral Epicondylitis: A Systematic Review and Meta-Analysis. <i>Plast Reconstr Surg.</i> 2021 Jan 1;147(1):112-125. doi: 10.1097/PRS.00000000000007440. PMID: 33002980.	No subanalysis for different injections
Simental-Mendía M, Vilchez-Cavazos F, Álvarez-Villalobos N, Blázquez-Saldaña J, Peña-Martínez V, Villarreal-Villarreal G, Acosta-Olivo C. Clinical efficacy of platelet-rich plasma in the treatment of lateral epicondylitis: a systematic review and meta-analysis of randomized placebo-controlled clinical trials. <i>Clin Rheumatol.</i> 2020 Aug;39(8):2255-2265. doi: 10.1007/s10067-020-05000-y. Epub 2020 Feb 26. PMID: 32103373.	Less recent systematic review compared to Lapner
Barnett J, Bernacki MN, Kainer JL, Smith HN, Zaharoff AM, Subramanian SK. The effects of regenerative injection therapy compared to corticosteroids for the treatment of lateral Epicondylitis: a systematic review and meta-analysis. <i>Arch Physiother.</i> 2019 Nov 13;9:12. doi: 10.1186/s40945-019-0063-6. Erratum in: <i>Arch Physiother.</i> 2020 Jan 27;10:5. doi: 10.1186/s40945-020-0076-1. PMID: 31754461; PMCID: PMC6854772.	Less recent systematic review compared to Lapner
Gao B, Dwivedi S, DeFroda S, Bokshan S, Ready LV, Cole BJ, Owens BD. The Therapeutic Benefits of Saline Solution Injection for Lateral Epicondylitis: A Meta-analysis of Randomized Controlled Trials Comparing Saline Injections With Nonsurgical Injection Therapies. <i>Arthroscopy.</i> 2019 Jun;35(6):1847-1859.e12. doi: 10.1016/j.arthro.2019.02.051. Epub 2019 May 6. PMID: 31072722.	Systematic review looking at change scores – not following GRADE methodology

Lian J, Mohamadi A, Chan JJ, Hanna P, Hemmati D, Lechtig A, Nazarian A. Comparative Efficacy and Safety of Nonsurgical Treatment Options for Enthesopathy of the Extensor Carpi Radialis Brevis: A Systematic Review and Meta-analysis of Randomized Placebo-Controlled Trials. <i>Am J Sports Med.</i> 2019 Oct;47(12):3019-3029. doi: 10.1177/0363546518801914. Epub 2018 Oct 31. PMID: 30380334.	Less recent systematic review compared to Lapner
Lin YC, Wu WT, Hsu YC, Han DS, Chang KV. Comparative effectiveness of botulinum toxin versus non-surgical treatments for treating lateral epicondylitis: a systematic review and meta-analysis. <i>Clin Rehabil.</i> 2018 Feb;32(2):131-145. doi: 10.1177/0269215517702517. Epub 2017 Mar 28. PMID: 28349703.	Less recent systematic review compared to Lapner
Mi B, Liu G, Zhou W, Lv H, Liu Y, Wu Q, Liu J. Platelet rich plasma versus steroid on lateral epicondylitis: meta-analysis of randomized clinical trials. <i>Phys Sportsmed.</i> 2017 May;45(2):97-104. doi: 10.1080/00913847.2017.1297670. Epub 2017 Mar 3. PMID: 28276986.	Less recent systematic review compared to Lapner
Arirachakaran A, Sukthuyat A, Sisayanarane T, Laoratanavoraphong S, Kanchanatawan W, Kongtharvonskul J. Platelet-rich plasma versus autologous blood versus steroid injection in lateral epicondylitis: systematic review and network meta-analysis. <i>J Orthop Traumatol.</i> 2016 Jun;17(2):101-12. doi: 10.1007/s10195-015-0376-5. Epub 2015 Sep 11. PMID: 26362783; PMCID: PMC4882297.	Less recent systematic review compared to Lapner
Claessen FMAP, Heesters BA, Chan JJ, Kachoei AR, Ring D. A Meta-Analysis of the Effect of Corticosteroid Injection for Enthesopathy of the Extensor Carpi Radialis Brevis Origin. <i>J Hand Surg Am.</i> 2016 Oct;41(10):988-998.e2. doi: 10.1016/j.jhsa.2016.07.097. Epub 2016 Aug 18. PMID: 27546443.	Less recent systematic review compared to Lapner
Dong W, Goost H, Lin XB, Burger C, Paul C, Wang ZL, Kong FL, Welle K, Jiang ZC, Kabir K. Injection therapies for lateral epicondylalgia: a systematic review and Bayesian network meta-analysis. <i>Br J Sports Med.</i> 2016 Aug;50(15):900-8. doi: 10.1136/bjsports-2014-094387. Epub 2015 Sep 21. PMID: 26392595.	Less recent systematic review compared to Lapner
Ahmad Z, Brooks R, Kang SN, Weaver H, Nunney I, Tytherleigh-Strong G, Rushton N. The effect of platelet-rich plasma on clinical outcomes in lateral epicondylitis. <i>Arthroscopy.</i> 2013 Nov;29(11):1851-62. doi: 10.1016/j.arthro.2013.07.272. Epub 2013 Sep 21. PMID: 24060428.	Less recent systematic review compared to Lapner
Krogh TP, Bartels EM, Ellingsen T, Stengaard-Pedersen K, Buchbinder R, Fredberg U, Bliddal H, Christensen R. Comparative effectiveness of injection therapies in lateral epicondylitis: a systematic review and network meta-analysis of randomized controlled trials. <i>Am J Sports Med.</i> 2013 Jun;41(6):1435-46. doi: 10.1177/0363546512458237. Epub 2012 Sep 12. PMID: 22972856.	Less recent systematic review compared to Lapner
Sharifzadeh S, Tadrissi S, Fallah E. The effect of corticosteroid, and saline injection on pain perception and function of patients with lateral epicondylitis: A triple-blinded, randomized, controlled trial. <i>J Popul Ther Clin Pharmacol.</i> 2023 Jun; 30(15):e11-e18. doi: 10.47750/jptcp.2023.30.15.002	Control group received strength training, not usual care

5

Literature search strategy
Zoekverantwoording

5 Algemene informatie

Cluster/richtlijn: Tennisarm en Golfarm - UV3.2 Medicamenteus	
Uitgangsvraag/modules: Wat is de waarde van injecties als behandeling van patiënten met klachten van een laterale of mediale epicondylaire tendinopathie?	
Database(s): Embase.com, Ovid/Medline	Datum: 19 december 2024
Periode: vanaf 2004	Talen: geen restrictie
Literatuurspecialist: Esther van der Bijl	Rayyan review: https://new.rayyan.ai/reviews/1266766/overview
BMI-zoekblokken: voor verschillende opdrachten wordt (deels) gebruik gemaakt van de zoekblokken van BMI-Online https://blocks.bmi-online.nl/ Deduplication: voor het ontdebellen is gebruik gemaakt van http://dedupendnote.nl/	
<p>Toelichting: Voor deze vraag is gezocht op de elementen 'tennisarm/ golfarm' EN 'injectie'.</p> <p>De sleutelartikelen worden gevonden met deze search. Het achtergrondartikel van Ahmed et al. (2023) valt uit op studiedesign.</p>	
<p>Te gebruiken voor richtlijntekst: A systematic literature search was performed by a medical information specialist using the following bibliographic databases: Embase.com and Ovid/Medline. Both databases were searched from 2004 to 19th of December 2024 for systematic reviews and RCTs. Systematic searches were completed using a combination of controlled vocabulary/subject headings (e.g., Emtree-terms, MeSH) wherever they were available and natural language keywords. The overall search strategy was derived from two primary search concepts: (1) lateral/medial epicondylar tendinopathy; (2) injection. Duplicates were removed using EndNote software. After deduplication a total of 585 records were imported for title/abstract screening.</p>	

Zoekopbrengst - 19 december 2024

	EMBASE	OVID/MEDLINE	Ontdubbeld
SR	199	138	224
RCT	312	204	361
Totaal	511	342	585*

*in Rayyan

10 Zoekstrategie - 19 december 2024

Embase.com

No.	Query	Results
#1	'tennis elbow'/exp OR 'medial epicondylitis'/exp OR (((tennis* OR golf*) NEAR/3 (arm* OR elbow*)):ti,ab,kw) OR (((epicondylitis OR epycondylitis OR epicondylitides OR epycondylitides) NEAR/3 (humer* OR lateral* OR external* OR radiohumer* OR medial*)):ti,ab,kw) OR (((elbow* OR epicondyl*) NEAR/7 (tendinopath* OR tendonopath* OR tendinos*)):ti,ab,kw)	4563

#2	'injection'/exp OR 'steroid'/exp OR 'corticosteroid'/exp OR 'steroid therapy'/exp OR 'botulinum toxin a'/exp OR 'botulinum toxin'/exp OR 'glycosaminoglycan'/exp OR 'hyaluronic acid'/exp OR 'autologous blood'/exp OR 'prolotherapy'/exp OR 'thrombocyte rich plasma'/exp OR inject*:ti,ab,kw OR steroid*:ti,ab,kw OR (('adren* cort*' OR adrenocort* OR adrenalcort*) NEAR/3 (hormone* OR steroid*)):ti,ab,kw) OR 'adrenocorticosteroid*:ti,ab,kw OR 'cortic* steroid*:ti,ab,kw OR 'corticoid*:ti,ab,kw OR 'corticosteroid*:ti,ab,kw OR 'dermocorticosteroid*:ti,ab,kw OR 'botulinus toxin*:ti,ab,kw OR 'botulism toxin*:ti,ab,kw OR btx:ti,ab,kw OR 'bont a':ti,ab,kw OR 'abobotulinum toxin a':ti,ab,kw OR 'abobotulinumtoxin a':ti,ab,kw OR 'abobotulinumtoxina':ti,ab,kw OR 'agn 151607':ti,ab,kw OR 'agn151607':ti,ab,kw OR 'alluzience':ti,ab,kw OR 'ant 1207':ti,ab,kw OR 'ant 1401':ti,ab,kw OR 'ant 1403':ti,ab,kw OR 'ant1207':ti,ab,kw OR 'ant1401':ti,ab,kw OR 'ant1403':ti,ab,kw OR 'azzalure':ti,ab,kw OR 'bocouture':ti,ab,kw OR 'boe-tox':ti,ab,kw OR 'botox':ti,ab,kw OR 'botulift':ti,ab,kw OR 'botulin a':ti,ab,kw OR 'botulin toxin a':ti,ab,kw OR 'botulinium a toxin*':ti,ab,kw OR 'botulinum a toxin*':ti,ab,kw OR 'botulinium toxin*':ti,ab,kw OR 'botulinum toxin*':ti,ab,kw OR 'cnt 52120':ti,ab,kw OR 'cnt52120':ti,ab,kw OR 'cunox':ti,ab,kw OR 'daxibotulinum toxin a':ti,ab,kw OR 'daxibotulinumtoxin a':ti,ab,kw OR 'daxibotulinumtoxina':ti,ab,kw OR 'daxify':ti,ab,kw OR 'dtx 021':ti,ab,kw OR 'dtx021':ti,ab,kw OR 'dwp 450':ti,ab,kw OR 'dwp450':ti,ab,kw OR 'dyslor':ti,ab,kw OR 'dysport':ti,ab,kw OR 'evabotulinum toxin a':ti,ab,kw OR 'evabotulinumtoxin a':ti,ab,kw OR 'evabotulinumtoxina':ti,ab,kw OR 'evosyal':ti,ab,kw OR 'gemibotulinum toxin a':ti,ab,kw OR 'gemibotulinumtoxin a':ti,ab,kw OR 'gemibotulinumtoxina':ti,ab,kw OR 'gsk 1358820':ti,ab,kw OR 'gsk1358820':ti,ab,kw OR 'hg 102':ti,ab,kw OR 'hg102':ti,ab,kw OR 'hu 014':ti,ab,kw OR 'hu014':ti,ab,kw OR 'hutox':ti,ab,kw OR 'incobotulinum toxin a':ti,ab,kw OR 'incobotulinumtoxin a':ti,ab,kw OR 'incobotulinumtoxina':ti,ab,kw OR 'ipn 10200':ti,ab,kw OR 'ipn 59011':ti,ab,kw OR 'ipn10200':ti,ab,kw OR 'ipn59011':ti,ab,kw OR 'jeuveau':ti,ab,kw OR 'letibotulinum toxin a':ti,ab,kw OR 'letibotulinumtoxin a':ti,ab,kw OR 'letibotulinumtoxina':ti,ab,kw OR 'letybo':ti,ab,kw OR 'liztox':ti,ab,kw OR 'lp 09':ti,ab,kw OR 'lp09':ti,ab,kw OR 'meditoxin':ti,ab,kw OR 'mt 10107':ti,ab,kw OR 'mt 10109':ti,ab,kw OR 'mt10107':ti,ab,kw OR 'mt10109':ti,ab,kw OR 'nabota':ti,ab,kw OR 'neuronox':ti,ab,kw OR 'nivobotulinum toxin a':ti,ab,kw OR 'nivobotulinumtoxin a':ti,ab,kw OR 'nivobotulinumtoxina':ti,ab,kw OR 'nt 201':ti,ab,kw OR 'nt201':ti,ab,kw OR 'nuceiva':ti,ab,kw OR 'oculum':ti,ab,kw OR 'onabotulinum toxin a':ti,ab,kw OR 'onabotulinumtoxin a':ti,ab,kw OR 'onabotulinumtoxina':ti,ab,kw OR 'onaclostox':ti,ab,kw OR 'pm 12759':ti,ab,kw OR 'pm12759':ti,ab,kw OR 'prabotulinum toxin a':ti,ab,kw OR 'prabotulinumtoxin a':ti,ab,kw OR 'prabotulinumtoxina':ti,ab,kw OR 'prosigne':ti,ab,kw OR 'purtox':ti,ab,kw OR 'qm 1114':ti,ab,kw OR 'qm1114':ti,ab,kw OR 'relabotulinum toxin a':ti,ab,kw OR 'relabotulinumtoxin a':ti,ab,kw OR 'relabotulinumtoxina':ti,ab,kw OR 'reloxin':ti,ab,kw OR 'rt 002':ti,ab,kw OR 'rt002':ti,ab,kw OR 'rtt 150':ti,ab,kw OR 'rtt150':ti,ab,kw OR 'vistabel':ti,ab,kw OR 'vistabex':ti,ab,kw OR 'xeomeen':ti,ab,kw OR 'xeomin':ti,ab,kw OR 'adant':ti,ab,kw OR 'amvisc':ti,ab,kw OR 'arthrease':ti,ab,kw OR 'artz':ti,ab,kw OR 'biolon':ti,ab,kw OR 'bionect':ti,ab,kw OR 'clearvisc':ti,ab,kw OR 'duovisc':ti,ab,kw OR 'durolane':ti,ab,kw OR 'eyecon':ti,ab,kw OR 'halonix':ti,ab,kw OR 'healon':ti,ab,kw OR 'healonid':ti,ab,kw OR 'hialid':ti,ab,kw OR 'hyalcon':ti,ab,kw OR 'hyalein':ti,ab,kw OR 'hyalgal':ti,ab,kw OR 'hyalgan':ti,ab,kw OR 'hyalovet':ti,ab,kw OR 'hyalubrix':ti,ab,kw OR 'hyaluronan':ti,ab,kw OR 'hyaluronate':ti,ab,kw OR 'hyaluronic acid*':ti,ab,kw OR 'hyladerm':ti,ab,kw OR 'hylaform':ti,ab,kw OR 'hylumed':ti,ab,kw OR 'hyruan':ti,ab,kw OR 'ialugen':ti,ab,kw OR 'juvederm':ti,ab,kw OR 'lagrice' ofteno':ti,ab,kw OR 'laservis':ti,ab,kw OR 'me 3710':ti,ab,kw OR 'monovisc':ti,ab,kw OR 'na hylan':ti,ab,kw OR 'nrd 101':ti,ab,kw OR 'nrd101':ti,ab,kw OR 'ophthalin':ti,ab,kw OR 'orthovisc':ti,ab,kw OR 'ostenil':ti,ab,kw OR 'perlane':ti,ab,kw OR 'provisc':ti,ab,kw OR 'radiaplexrx':ti,ab,kw OR 'restylane':ti,ab,kw OR 'si 4402':ti,ab,kw OR 'sinovial':ti,ab,kw OR 'sl 1010':ti,ab,kw OR 'sodium hyaluronate':ti,ab,kw OR 'supartz':ti,ab,kw OR 'suplasyn':ti,ab,kw OR 'synocrom':ti,ab,kw OR 'synojoynt':ti,ab,kw OR 'synvisc':ti,ab,kw OR 'teosyal':ti,ab,kw OR 'triluron':ti,ab,kw OR 'unihylon':ti,ab,kw OR 'viscoseal':ti,ab,kw OR 'vismed':ti,ab,kw OR 'vitrax':ti,ab,kw OR 'glucosamine* glycan*':ti,ab,kw OR 'glucosaminoglycan*':ti,ab,kw OR 'glucosaminoglycan*':ti,ab,kw OR 'glycoaminoglycan*':ti,ab,kw OR 'glycosaminoglycan*':ti,ab,kw OR 'glycosaminoglycan*':ti,ab,kw OR 'mucopolysaccharide*':ti,ab,kw OR 'polymucosaccharide*':ti,ab,kw OR 'prolotherap*':ti,ab,kw OR 'platelet* rich plasma*':ti,ab,kw OR 'thrombocyt* rich plasma*':ti,ab,kw OR prp:ti,ab,kw OR 'autolog* blood*':ti,ab,kw OR nettoya*:ti,ab,kw OR 'proliferation therap*':ti,ab,kw	3674822
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#3	#1 AND #2	1507
#4	#3 AND [2004-2025]/py NOT ('conference abstract'/it OR 'editorial'/it OR 'letter'/it OR 'note'/it) NOT (('animal'/exp OR 'animal experiment'/exp OR 'animal model'/exp OR 'nonhuman'/exp) NOT 'human'/exp)	954
#5	'meta analysis'/exp OR 'meta analysis (topic)'/exp OR 'systematic review'/exp OR 'systematic review (topic)'/exp OR 'scoping review'/exp OR 'rapid review'/exp OR 'umbrella review'/exp OR 'cochrane database of systematic reviews'/jt OR 'network meta-analysis'/exp OR 'networkmeta analy*':ti,ab,kw OR 'networkmetaanaly*':ti,ab,kw OR metaanaly*':ti,ab,kw OR 'meta analy*':ti,ab,kw OR metanaly*':ti,ab,kw OR prisma:ti,ab,kw OR prospero:ti,ab,kw OR metaanali*':ti,ab,kw OR 'meta anali*':ti,ab,kw OR metanali*':ti,ab,kw OR (((systemati* OR scoping OR umbrella OR 'structured literature') NEAR/3 (review* OR overview*)):ti,ab,kw) OR (((structured OR systemic*) NEAR/3 (review* OR overview* OR synth*) NEAR/3 literature):ti,ab,kw) OR ((systemic* NEAR/1 review*):ti,ab,kw) OR (((systemati* OR literature OR database* OR 'data base*') NEAR/10 search*):ti,ab,kw) OR (((structured OR comprehensive* OR systemic*) NEAR/3 search*):ti,ab,kw) OR (((literature NEAR/3 (review* OR overview*)):ti,ab,kw) AND (search*':ti,ab,kw OR database*':ti,ab,kw OR 'data base*':ti,ab,kw)) OR (('data extraction*':ti,ab,kw OR 'data source*':ti,ab,kw) AND ('study selection*':ti,ab,kw OR 'studies selection*':ti,ab,kw)) OR ('search strateg*':ti,ab,kw AND 'selection criteria*':ti,ab,kw) OR ('data source*':ti,ab,kw AND 'data synth*':ti,ab,kw) OR medline*':ti,ab,kw OR pubmed*':ti,ab,kw OR 'pub med*':ti,ab,kw OR embase:ti,ab,kw OR cochrane*':ti,ab,kw OR (((critical* OR rapid*) NEAR/2 (review* OR overview* OR synth*)):ti) OR (((critical* OR rapid*) NEAR/3 (review* OR overview* OR synth*)):ab) AND (search*':ab OR database*':ab OR 'data base*':ab)) OR metasynth*':ti,ab,kw OR 'meta synth*':ti,ab,kw OR 'review* of review*':ti,ab,kw	1105494
#6	'clinical trial'/exp OR 'randomization'/exp OR 'single blind procedure'/exp OR 'double blind procedure'/exp OR 'crossover procedure'/exp OR 'placebo'/exp OR 'prospective study'/exp OR rct:ab,ti OR random*':ab,ti OR 'single blind':ab,ti OR 'randomised controlled trial':ab,ti OR 'randomized controlled trial'/exp OR placebo*':ab,ti	4172502
#7	#4 AND #5 - SR	199
#8	#4 AND #6 NOT #7 - RCT	312
#9	#7 OR #8 - Totaal	511

5

5 Ovid/Medline

#	Searches	Results
1	exp Tennis Elbow/ or exp Elbow Tendinopathy/ or ((tennis* or golf*) adj3 (arm* or elbow*)).ti,ab,kf. or ((epicondylitis or epycondylitis or epicondylitides or epycondylitides) adj3 (humer* or lateral* or external* or radiohumer* or medial*)).ti,ab,kf. or ((elbow* or epicondyl*) adj7 (tendinopath* or tendonopath* or tendinos*)).ti,ab,kf.	3246
2	exp Injections/ or exp Steroids/ or exp Adrenal Cortex Hormones/ or exp Botulinum Toxins/ or exp Botulinum Toxins, Type A/ or exp Glycosaminoglycans/ or exp Hyaluronic Acid/ or exp Blood Transfusion, Autologous/ or exp Prolotherapy/ or exp Platelet-Rich Plasma/ or inject*.ti,ab,kf. or steroid*.ti,ab,kf. or ((adren* cort* or adrenocort* or adrenalcort*) adj3 (hormone* or steroid*)).ti,ab,kf. or adrenocorticosteroid*.ti,ab,kf. or cortic* steroid*.ti,ab,kf. or corticoid*.ti,ab,kf. or corticosteroid*.ti,ab,kf. or dermocorticosteroid*.ti,ab,kf. or botulinus toxin*.ti,ab,kf. or botulism toxin*.ti,ab,kf. or btx.ti,ab,kf. or bont.a.ti,ab,kf. or abobotulinum toxin.a.ti,ab,kf. or abobotulinumtoxin.a.ti,ab,kf. or abobotulinumtoxina.ti,ab,kf. or agn 151607.ti,ab,kf. or agn151607.ti,ab,kf. or alluzience.ti,ab,kf. or ant 1207.ti,ab,kf. or ant 1401.ti,ab,kf. or ant 1403.ti,ab,kf. or ant1207.ti,ab,kf. or ant1401.ti,ab,kf. or ant1403.ti,ab,kf. or azzalure.ti,ab,kf. or bocouture.ti,ab,kf. or boe-tox.ti,ab,kf. or botox.ti,ab,kf. or botulift.ti,ab,kf. or botulin.a.ti,ab,kf. or botulin toxin.a.ti,ab,kf. or botulinium a toxin*.ti,ab,kf. or botulinum a toxin*.ti,ab,kf. or botulinium toxin*.ti,ab,kf. or botulinum toxin*.ti,ab,kf. or cnt 52120.ti,ab,kf. or cnt52120.ti,ab,kf. or cunox.ti,ab,kf. or daxibotulinum toxin.a.ti,ab,kf. or daxibotulinumtoxin.a.ti,ab,kf. or daxibotulinumtoxina.ti,ab,kf. or daxxify.ti,ab,kf. or "dtx 021".ti,ab,kf. or dtx021.ti,ab,kf. or dwp 450.ti,ab,kf. or dwp450.ti,ab,kf. or dyslor.ti,ab,kf. or dysport.ti,ab,kf. or evabotulinum toxin.a.ti,ab,kf. or evabotulinumtoxin.a.ti,ab,kf. or evabotulinumtoxina.ti,ab,kf. or evosyal.ti,ab,kf. or gemibotulinum toxin.a.ti,ab,kf. or gemibotulinumtoxin.a.ti,ab,kf. or gemibotulinumtoxina.ti,ab,kf. or gsk 1358820.ti,ab,kf. or gsk1358820.ti,ab,kf. or hg 102.ti,ab,kf. or hg102.ti,ab,kf. or "hu 014".ti,ab,kf. or hu014.ti,ab,kf. or hutox.ti,ab,kf. or incobotulinum toxin.a.ti,ab,kf. or incobotulinumtoxin.a.ti,ab,kf. or incobotulinumtoxina.ti,ab,kf. or ipn 10200.ti,ab,kf. or ipn 59011.ti,ab,kf. or ipn10200.ti,ab,kf. or ipn59011.ti,ab,kf. or jeuveau.ti,ab,kf. or letibotulinum toxin.a.ti,ab,kf. or letibotulinumtoxin.a.ti,ab,kf. or letibotulinumtoxina.ti,ab,kf. or letybo.ti,ab,kf. or liztox.ti,ab,kf. or "lp 09".ti,ab,kf. or lp09.ti,ab,kf. or meditoxin.ti,ab,kf. or mt 10107.ti,ab,kf. or mt 10109.ti,ab,kf. or mt10107.ti,ab,kf. or mt10109.ti,ab,kf. or nabota.ti,ab,kf. or neuronox.ti,ab,kf. or nivobotulinum toxin.a.ti,ab,kf. or nivobotulinumtoxin.a.ti,ab,kf. or nivobotulinumtoxina.ti,ab,kf. or nt 201.ti,ab,kf. or nt201.ti,ab,kf. or nuceiva.ti,ab,kf. or oculinum.ti,ab,kf. or onabotulinum toxin.a.ti,ab,kf. or onabotulinumtoxin.a.ti,ab,kf. or onabotulinumtoxina.ti,ab,kf. or onaclostox.ti,ab,kf. or pm 12759.ti,ab,kf. or pm12759.ti,ab,kf. or prabotulinum toxin.a.ti,ab,kf. or prabotulinumtoxin.a.ti,ab,kf. or prabotulinumtoxina.ti,ab,kf. or prosigne.ti,ab,kf. or purtox.ti,ab,kf. or qm 1114.ti,ab,kf. or qm1114.ti,ab,kf. or relabotulinum toxin.a.ti,ab,kf. or relabotulinumtoxin.a.ti,ab,kf. or relabotulinumtoxina.ti,ab,kf. or reloxin.ti,ab,kf. or "rt 002".ti,ab,kf. or rt002.ti,ab,kf. or rtt 150.ti,ab,kf. or rtt150.ti,ab,kf. or vistabel.ti,ab,kf. or vistabex.ti,ab,kf. or xeomeen.ti,ab,kf. or xeomin.ti,ab,kf. or adamant.ti,ab,kf. or amvisc.ti,ab,kf. or arthrease.ti,ab,kf. or artz.ti,ab,kf. or biolon.ti,ab,kf. or bionect.ti,ab,kf. or clearvisc.ti,ab,kf. or duovisc.ti,ab,kf. or durolane.ti,ab,kf. or eyecon.ti,ab,kf. or halonix.ti,ab,kf. or healon.ti,ab,kf. or healonid.ti,ab,kf. or hialid.ti,ab,kf. or hyalcon.ti,ab,kf. or hyalein.ti,ab,kf. or hyalgal.ti,ab,kf. or hyalgan.ti,ab,kf. or hyalovet.ti,ab,kf. or hyalubrix.ti,ab,kf. or hyaluronan.ti,ab,kf. or hyaluronate.ti,ab,kf. or hyaluronic acid*.ti,ab,kf. or hyladerm.ti,ab,kf. or hylaform.ti,ab,kf. or hylumed.ti,ab,kf. or hyruan.ti,ab,kf. or ialugen.ti,ab,kf. or juvederm.ti,ab,kf. or lagricel ofteno.ti,ab,kf. or laservis.ti,ab,kf. or me 3710.ti,ab,kf. or monovisc.ti,ab,kf. or na hylan.ti,ab,kf. or nrd 101.ti,ab,kf. or nrd101.ti,ab,kf. or ophthalin.ti,ab,kf. or orthovisc.ti,ab,kf. or ostenil.ti,ab,kf. or perlane.ti,ab,kf. or provisc.ti,ab,kf. or radiaplexrx.ti,ab,kf. or restylane.ti,ab,kf. or si 4402.ti,ab,kf. or sinovial.ti,ab,kf. or sl 1010.ti,ab,kf. or sodium hyaluronate.ti,ab,kf. or supartz.ti,ab,kf. or suplasyn.ti,ab,kf. or synocrom.ti,ab,kf. or synojoynt.ti,ab,kf. or synvisc.ti,ab,kf. or teosyal.ti,ab,kf. or triluron.ti,ab,kf. or unihylon.ti,ab,kf. or visco seal.ti,ab,kf. or vismed.ti,ab,kf. or vitrax.ti,ab,kf. or glucosamine* glycan*.ti,ab,kf. or glucosaminoglycan*.ti,ab,kf. or glucosaminoglycan*.ti,ab,kf. or glycoaminoglycan*.ti,ab,kf. or glycosaminoglycan*.ti,ab,kf. or glycosaminoglycan*.ti,ab,kf. or mucopolysaccharide*.ti,ab,kf. or polymucosaccharide*.ti,ab,kf. or prolotherap*.ti,ab,kf. or platelet* rich plasma*.ti,ab,kf. or thrombocyt* rich plasma*.ti,ab,kf. or prp.ti,ab,kf. or autolog* blood*.ti,ab,kf. or nettoy*.ti,ab,kf. or proliferation therap*.ti,ab,kf.	2380533

3	1 and 2	885
4	limit 3 to yr="2004 -Current"	711
5	4 not (comment/ or editorial/ or letter/) not ((exp animals/ or exp models, animal/) not humans/)	651
6	meta-analysis/ or meta-analysis as topic/ or (metaanaly* or meta-analy* or metanaly*).ti,ab,kf. or systematic review/ or cochrane.jw. or (prisma or prospero).ti,ab,kf. or ((systemati* or scoping or umbrella or "structured literature") adj3 (review* or overview*).ti,ab,kf. or (systemic* adj1 review*).ti,ab,kf. or ((systemati* or literature or database* or data-base*) adj10 search*).ti,ab,kf. or ((structured or comprehensive* or systemic*) adj3 search*).ti,ab,kf. or ((literature adj3 review*) and (search* or database* or data-base*).ti,ab,kf. or (("data extraction" or "data source*") and "study selection").ti,ab,kf. or ("search strategy" and "selection criteria").ti,ab,kf. or ("data source*" and "data synthesis").ti,ab,kf. or (medline or pubmed or embase or cochrane).ab. or ((critical or rapid) adj2 (review* or overview* or synthes*).ti. or (((critical* or rapid*) adj3 (review* or overview* or synthes*)) and (search* or database* or data-base*).ab. or (metasynthes* or meta-synthes*).ti,ab,kf.	797180
7	exp clinical trial/ or randomized controlled trial/ or exp clinical trials as topic/ or randomized controlled trials as topic/ or Random Allocation/ or Double-Blind Method/ or Single-Blind Method/ or (clinical trial, phase i or clinical trial, phase ii or clinical trial, phase iii or clinical trial, phase iv or controlled clinical trial or randomized controlled trial or multicenter study or clinical trial).pt. or random*.ti,ab. or (clinic* adj trial*).tw. or ((singl* or doubl* or treb* or tripl*) adj (blind\$3 or mask\$3)).tw. or Placebos/ or placebo*.tw.	2819562
8	5 and 6 - SR	138
9	(5 and 7) not 8 - RCT	204
10	8 or 9 - Totaal	342

5

5 Module 4 Behandeling operatief

Uitgangsvraag

10 Wat is de meerwaarde van percutane chirurgische technieken en een chirurgische interventie voor patiënten met klachten van laterale epicondylaire tendinopathie en mediale epicondylaire tendinopathie?

Introduction (English)

15 Lateral epicondylar tendinopathy (LET) and medial epicondylar tendinopathy (MET) have a favourable natural course. There is little scientific evidence that surgical treatment is better than wait-and-see. However, worldwide, a variety of open, arthroscopic and percutaneous surgical procedures is still frequently performed for LET and MET.

Search and select

20 A systematic review of the literature was performed to answer the following question(s):
What is the effect of surgical treatment such as percutaneous release of the common extensor origin in patients with lateral and medial epicondylar tendinopathy?

Table 1. PICO

Patients	Patients with lateral and medial epicondylar tendinopathy
Intervention	Surgical treatment, such as percutaneous release of the common extensor origin
Control	Wait-and-see approach/placebo/watchful-waiting/sham surgery
Outcomes	Patient recovery, elbow function (range of motion or PROMS), pain, return to sports or work, quality of life, complications
Other selection criteria	Study design: systematic reviews and randomized controlled trials Adult population (18+) Symptom duration ≥ 6 months

25

Relevant outcome measures

The guideline panel considered patient recovery, elbow function (range of motion or PROMS), pain, return to sports or work and quality of life as **critical** outcome measures for decision making; and complications as an **important** outcome measure for decision making.

30

A priori, the guideline panel defined that elbow function must be measured using range of motion, PROMS, employability or VAS on overall result of functioning of the elbow. The other outcomes were not defined a priori.

35

The guideline panel defined a 25% difference (RR < 0.80 to > 1.25) for dichotomous outcomes, a risk difference (RD) of 25% for dichotomous outcomes with very few events, and a mean difference (MD) of 10% for continuous outcomes, as a minimal clinically (patient) important difference.

40

Search and select (Methods)

The databases Medline (via OVID) and Embase (via Embase.com) were searched with relevant search terms from 2005 to the 23rd of January 2025. The detailed search strategy is depicted under the tab Methods. The systematic literature search resulted in 438 hits. Studies were selected based on the following criteria: systematic reviews and randomized

5 controlled trials comparing surgical treatment vs. natural course in adult patients with lateral epicondylar tendinopathy or medial epicondylar tendinopathy for at least 6 months. Titles and abstracts were screened using the ASReview software. The settings TF-IDF and Naïve bayes were used. Bateman (2019) was used as prior knowledge for inclusion. Peerboom (2010) and Bateman (2022) were used as prior knowledge for exclusions. The first 10 10% of hits were screened by the guideline panel and the guideline methodologist. The remaining articles were subsequently screened by the guideline methodologist, using the following stopping rule: stop after 10% of the total set subsequent exclusions.

15 Based on title and abstract, 6 articles were initially selected. After screening the full-text articles, one study was included, and 5 studies were excluded (see the table with reasons for exclusion under the tab Methods).

Summary of literature

Description of studies

20 One study was included in the analysis of the literature (Kroslak, 2018). Important study characteristics and results are summarized in table 2. The assessment of the risk of bias is summarized in the risk of bias table (under the tab ‘Evidence tabellen’). No studies on MET were found.

25 **Kroslak (2018)** conducted a prospective, randomized, double-blind, placebo-controlled trial to evaluate the effectiveness of the Nirschl procedure for tennis elbow (LET) compared to sham surgery. Patients were at least 18 years old with a clinical diagnosis of LET (characterized by point tenderness over the lateral epicondyle and pain aggravated by the chair pick-up test and maximal hand grip) that persisted despite at least 6 months of medical 30 treatment. In total, 13 patients received surgery (Nirschl mini-open technique without cortical drilling) and 13 patients received sham surgery. Groups were comparable at baseline. The participant recruitment was ended before the powered sample size of 40 patients in each group was reached because of recruitment difficulties. Patients were followed for 6 months up to 2.5 years. Outcomes relevant for the purpose of this guideline 35 included elbow function, pain and complications.

Table 2. Characteristics of included studies

Study	Participants	Comparison	Follow-up	Outcome measures	Comments	Risk of bias (per outcome measure)*
<i>Individual studies</i>						

Kroslak, 2018	<p><u>N at baseline</u> Intervention: 13 Control: 13</p> <p><u>Median age at surgery</u> Intervention: 53y (range, 42-68) Control: 51y (range, 41-77)</p> <p><u>Sex (male)</u> Intervention: 4 (30.8%) Control: 3 (23.1%)</p> <p><u>Mean symptom duration, y</u> Intervention: 6.2 (range, 0.8-29) Control: 5.2 (range, 0.8-27)</p>	<p><u>Intervention:</u> Surgery (Nirschl mini-open technique without cortical drilling)</p> <p><u>Control:</u> Sham surgery (skin incision)</p>	6 months up to 2.5 years	Elbow function, pain, complications	One or more of the authors has declared the following potential conflict of interest or source of funding: National Day Surgery Sydney (NDSS) for theater facilities and surgical materials, George Murrell Shoulders (GMS) for consulting rooms and secretarial support, and AOSSM Sandy Kirkley Clinical Outcome Research Grant. G.A.C.M. is on the board of NDSS and principal of GMS; has financial interest in NDSS and GMS; and is a consultant for Smith & Nephew.	Some concerns (all outcomes)
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5 *For further details, see risk of bias table in the appendix

Results

1. Patient recovery (critical)

Not reported.

10

2. Elbow function (critical)

Kroslak (2018) reported that there were no significant differences in difficulty with twisting motions, active extension-flexion range of motion of the elbow, and forearm pronation-supination range of motion between the surgery group (n=13) and sham-surgery group (n=13) at any time point after surgery. Since no raw data were presented, no GRADE assessment could be performed.

15

3. Pain (critical)

Frequency of pain with activity or at rest

Kroslak (2018) reported that there were no differences in the frequency of (extreme) pain with activity or at rest between the surgery group (n=13) and sham-surgery group (n=13) at any time point after surgery.

20

1. Severity of pain

Kroslak (2018) reported that there were no differences in the severity of pain during activity, at rest or during sleep between the surgery group (n=13) and sham-surgery group (n=13) at any time point after surgery.

25

Since no raw data were presented, no GRADE assessment could be performed.

30

- 5 4. Return to sports or work (critical)
 Not reported.
5. Quality of life (critical)
 Not reported.
- 10 6. Complications (important)
 Kroslak (2018) reported that no postoperative complications occurred for patients who underwent either surgery (n=13) or sham-surgery (n=13). This corresponded to a calculated RD of 0.00% (95%CI -0.14 to 0.14).
- 15

5 Summary of Findings

Population: Patients with lateral epicondylar tendinopathy (LET)

Intervention: Surgical treatment

Comparator: Sham-surgery

Outcome Timeframe	Study results and measurements	Absolute effect estimates		Certainty of the evidence (Quality of evidence)	Conclusions
		Sham-surgery	Surgical treatment		
Patient recovery (critical)	-	-	-	No GRADE (no evidence was found)	No evidence was found regarding the effect of surgical treatment on patient recovery when compared with sham-surgery in patients with LET
Elbow function (critical)	Measured by: 8-inch 360 goniometer (for extension, flexion, pronation and supination); Based on data from 1 study	No significant differences between surgery group and sham-surgery group on: - Difficulty with twisting motions - Extension-flexion range of motion - Pronation-supination range of motion		No GRADE (clear interpretation of evidence not possible)	Due to lack of raw data, it was not possible to draw conclusions regarding the effect of surgical treatment on elbow function when compared with sham-surgery in patients with LET. <i>(Kroslak, 2018)</i>
Pain (critical)	Measured by: Likert-based verbal descriptor scale with activity, at rest and during sleep* Based on data from 1 study	No differences in the frequency of pain (with activity, at rest or for extreme pain) or severity of pain (with activity, at rest or during sleep) between the surgery group and sham-surgery group at any time point after surgery.		No GRADE (clear interpretation of evidence not possible)	Due to lack of raw data, it was not possible to draw conclusions regarding the effect of surgical treatment on pain when compared with sham-surgery in patients with LET. <i>(Kroslak, 2018)</i>
Return to sports or work (critical)	-	-	-	No GRADE (no evidence was found)	No evidence was found regarding the effect of surgical treatment on return to sports or work when compared with sham-surgery in patients with LET.

Quality of life (critical)	-	-	No GRADE (no evidence was found)	No evidence was found regarding the effect of surgical treatment on quality of life when compared with sham-surgery in patients with LET.
Complications (important)	Based on data from 1 study	No postoperative complications occurred for patients who underwent either surgery (0/13 patients) or sham-surgery (0/13 patients). Risk difference is 0.00 (95%CI -0.14 to 0.14)	Very low GRADE Due to serious risk of bias and very serious imprecision ¹	The evidence is very uncertain about the effect of surgical treatment on complications when compared with sham-surgery in patients with LET. <i>(Krosiak, 2018)</i>

5 * See modified L'Insalata shoulder rating questionnaire in study of L'Insalata 1997

¹ Risk of bias: serious, because patient recruitment was stopped before the powered sample size was reached.

Imprecision: very serious, because of the low number of events and the optimal information size was not achieved.

5 **Overwegingen – van bewijs naar aanbeveling (NL)**

Balans tussen gewenste en ongewenste effecten

Voor de cruciale uitkomstmaten herstel, terugkeer naar sport of werk en kwaliteit van leven werd geen bewijs gevonden. Voor de cruciale uitkomsten elleboogfunctie en pijn kon het bewijs niet goed beoordeeld worden door een gebrek aan ruwe data. Een operatie lijkt geen verschil te maken in elleboogfunctie en pijn vergeleken met een sham-operatie. Er werden geen complicaties gerapporteerd bij patiënten die een operatie of sham-operatie ondergingen.

10
15 Vanwege het beperkte beschikbare bewijs, worden ook studies die indirecte vergelijkingen beschrijven meegenomen en hieronder beschreven.

Het systematisch review (SR) van **Bateman (2019)** is niet meegenomen in de literatuuranalyse, omdat het SR van Challoumas (2019) een recentere zoekdatum heeft. Het SR van Challoumas (2019) is vervolgens niet meegenomen in de literatuuranalyse, omdat de beoordeling van kwaliteit twijfelachtig was.

20
25 De SR's van **Bateman (2019)** en **Challoumas (2019)** geven een overzicht van het beschikbare bewijs over het effect van chirurgie t.o.v. niet-chirurgische ingrepen en sham interventies als behandeling van LET (Bateman, 2019) en als behandeling van alle tendinopathieën, inclusief LET (Challoumas, 2019). Bateman (2019) concludeerde dat chirurgische interventies niet beter zijn dan niet-chirurgische interventies en sham interventies. Challoumas (2019) concludeerde o.a. dat fysiotherapie even effectief was als chirurgie voor de uitkomsten pijn, functie, peeskracht, range of motion, succes van de behandeling en kwaliteit van leven, zowel op relatief korte- als langetermijn.

30
35 De RCT van **Keijsers (2024)** onderzocht de toegevoegde waarde van een injectie met autoloog bloed, dextrose, of perforatie alleen. In totaal werden 166 patiënten met LET gerandomiseerd in de 3 eerdergenoemde groepen. Er bleek geen extra voordeel van een injectie met autoloog bloed of dextrose t.o.v. perforatie alleen op de primaire uitkomst VAS na provocatie tests op 5 maanden na behandeling. Alleen voor de QuickDASH score over tijd werd een klinisch relevant verschil in het voordeel van de groepen 'alleen perforatie en 'autoloog bloed' vergeleken met de 'dextrosegroep' gevonden. Injecteerbaar autoloog bloed en dextrose bieden geen voordeel ten opzichte van perforatie alleen bij de behandeling van LET, en worden daarom niet aanbevolen voor deze aandoening.

40
45 Het protocol van de RCT van **Matache (2016)** beschrijft een onderzoek naar de effectiviteit en veiligheid van een chirurgische ingreep (arthroscopisch) vs. placebo ingreep bij patiënten met chronische LET (>6 maanden symptomen). Patiënten zullen worden gerandomiseerd in een groep die extensor carpi radialis brevis (ECRB) release krijgt of geen ECRB release. De primaire uitkomst is Mayo Elbow Performance Score (MEPS) na 1 jaar follow-up. Secundaire uitkomsten zijn Disability of the Shoulder and Hand (DASH) score, American Shoulder and Elbow Surgeons elbow (ASES-e) score en handkracht op 3, 6, 12 en 24 maanden, terugkeer naar werk, mogelijkheid om weer te kunnen werken en adverse events. Naar verwachting is de RCT van Matache (2016) eind 2025 klaar (op moment van schrijven).

50
55 Een argument om geen chirurgische interventie uit te voeren bij LET patiënten met klachten gedurende <12 maanden, is dat volgens een recente studie 90% van de mensen met niet-behandelde LET klachten uiteindelijk vanzelf herstelt binnen 12 maanden (Ikonen, 2022). Een andere zeer recente studie van een Finse onderzoeksgroep doet een conclusie in dezelfde richting, namelijk dat patiënten met een gemiddelde duur van LET klachten van 20

5 maanden (SD 12) na een jaar follow-up toch symptoomverlichting ervaren zonder chirurgische interventie (Karjalainen, 2025).

Kwaliteit van bewijs

10 De overall kwaliteit van bewijs van de cruciale uitkomstmaten kon niet worden beoordeeld middels GRADE, omdat deze niet werden gerapporteerd en vanwege gebrek aan ruwe numerieke data.

Waarden en voorkeuren van patiënten (en eventueel hun naasten/verzorgers)

15 Patiënten met LET die potentieel in aanmerking komen voor een operatie, hebben over het algemeen al >6 maanden last van klachten. Ze ervaren chronische pijn en kunnen hun arm niet (goed) gebruiken. Eén van de gewenste voordelen van een operatie voor patiënten met LET is dat de pijn minder erg kan worden. Er kunnen echter ook complicaties optreden, maar die kans is klein (1-5%). De gemiddelde hersteltijd voor een patiënt is 3-6 maanden. Het is onbekend of een operatie vergeleken met het natuurlijk beloop op korte termijn leidt tot
20 minder pijn. Op lange termijn is een operatie meestal minder effectief. Het is belangrijk dat de patiënt hiervan goed op de hoogte wordt gesteld.

Kostenaspecten

25 De behandeling van chronische LET middels een operatie is niet bewezen effectief, dus is deze behandeling ook niet kosteneffectief.

Gelijkheid ((health) equity/equitable)

30 Gelijke toegang tot de zorg blijft behouden voor patiënten met LET die een operatieve invasieve ingreep zouden ondergaan, omdat alle orthopedische ingrepen worden vergoed indien LET patiënten een Nederlandse verzekering hebben.

Aanvaardbaarheid

Ethische aanvaardbaarheid

35 De werkgroep voorziet geen ethische bezwaren, gezien het zwakke indirecte bewijs.

Duurzaamheid

Bij gelijke uitkomsten, heeft de behandeling met de minste schade de voorkeur. In het kader van duurzaamheid spelen de volgende aspecten een rol:
40 Een chirurgische ingreep leidt tot meer afval, meer reisbewegingen (vóór de ingreep, controles), hogere CO₂-uitstoot. Er is geen garantie dat patiënten met LET die een operatie hebben ondergaan, sneller kunnen terugkeren op de arbeidsmarkt dan patiënten zonder een operatie.

Haalbaarheid

45 Het eventueel uitvoeren van een operatie is haalbaar. Alleen in tijden van maatschappelijke ontwrichting kan een operatie voor patiënten met chronische LET niet uitgevoerd worden.

Aanbeveling

Rationale van de aanbeveling: weging van argumenten voor en tegen de interventies

50 Het wetenschappelijk bewijs voor het aanbevelen van een chirurgische ingreep inclusief percutane chirurgische technieken is zwak en indirect. Het is niet bewezen dat de patiënt met chronische klachten van LET of MET sneller van de pijn af is met een operatieve ingreep dan bij het natuurlijk beloop. Omdat een operatieve ingreep voor LET of MET bij kort durende klachten niet bewezen effectiever is dan het natuurlijk beloop, is een operatieve
55 ingreep niet kosteneffectief.

5 **Eindoordeel:**
Zwakke aanbeveling tegen

Wees terughoudend met opereren van patiënten met een laterale en mediale epicondylaire tendinopathie gedurende de eerste 12 maanden.

Overweeg na 12 maanden in selectieve gevallen* een chirurgische interventie. Deze kan bestaan uit een percutane, arthroscopische of klassieke open techniek. Informeer de patiënt over het beperkte wetenschappelijke bewijs van de chirurgische interventie.

*selectieve gevallen:

- bij ernstige klachten die het dagelijks functioneren beperken.
- een sterke wens voor klachtenverlichting bij de patiënt.
- onvoldoende verbetering op niet-chirurgische interventies.

Kennisvragen

10 Tijdens de ontwikkeling van deze module is gebleken dat er binnen deze module nog te weinig bewijs is voor de onderbouwing van de aanbeveling en dat er dus kennisvragen bestaan. De werkgroep meent dat (vervolg)onderzoek wenselijk is om in de toekomst een duidelijker antwoord te kunnen geven op vragen uit de praktijk.

15 *Kennisvraag:*

Wat is de effectiviteit en veiligheid van een operatieve ingreep zoals percutane chirurgische technieken versus placebo/natuurlijk beloop bij volwassen patiënten met LET of MET met klachten gedurende tenminste 12 maanden?

20 *Toelichting:*

Het is op dit moment onvoldoende duidelijk of een operatieve ingreep voor patiënten met chronische LET of MET effectiever is dan het natuurlijk beloop. Het huidige bewijs is namelijk gebaseerd op één trial die vroegtijdig gestopt is.

25 **Implementatieplan**

Implementatietabel

Vraag	Antwoord: <i>Kruis aan en licht toe/ beschrijf</i>	Toelichting keuze:
11. Wat was het onderliggende probleem om deze uitgangsvraag uit te werken?	Ongewenste praktijkvariatie	
	Nieuwe evidentie	
	X Anders	De literatuur toont aan dat een operatieve ingreep vs natuurlijk beloop geen invloed heeft, bij patiënten met 1-jaar durende klachten van LET of MET, maar wereldwijd worden toch chirurgische ingrepen uitgevoerd voor deze indicatie.
	X < 1000	

12. Maak een inschatting over hoeveel patiënten het ongeveer gaat waar de aanbeveling betrekking op heeft?	< 5000	
	5000-40.000	
	> 40.000	
13. Is de aanbeveling onderdeel van een bredere set interventies of verwant aan andere richtlijnen of modules? Zo ja, hoe verhoudt zij zich daartoe en moet hiermee rekening worden gehouden bij de implementatie, of kan de aanbeveling als losstaand worden beschouwd?	Ja	
	X	Nee
14. Belemmeringen en kansen op verschillende niveaus voor landelijke toepassing van de aanbeveling:	Belemmerende factoren	Bevorderende factoren/ kansen
Richtlijn/ klinisch traject (innovatie)	X	De aanbeveling is gebaseerd op (te) weinig goede kwaliteit van bewijs; meer hoge kwaliteit RCT's nodig
Zorgverleners (artsen en verpleegkundigen)	X	Duidelijk geformuleerde aanbeveling en sluit al goed aan bij de bestaande routine.
Patiënt/ cliënt (naasten)	X	Aanbeveling is al grotendeels gelijk aan hoe het in de praktijk gaat; de aanbeveling zal snel routine worden voor orthopeden.
Sociale context	X	Patiënt heeft mogelijk na langdurige klachten en geen effect van eerdere conservatieve behandelingen toch de voorkeur voor een operatie
Organisatorische context	X	Uitleggen aan patiënten dat angst en depressie de belangrijkste factoren zijn die invloed hebben op pijn intensiteit
Financiële en juridische context		Gunstig voor personeel, minder administratieve lasten, minder gebruik van de operatie capaciteit, minder geld nodig voor de zorg
	A	B

15. A) Welke personen/partijen zijn van belang bij het toepassen van de aanbeveling in de praktijk? (kruis aan) B) Wat is er nodig van deze personen/partijen om de aanbeveling in de praktijk te kunnen brengen? Denk aan aanpassingen in gedrag, werkwijzen, beleid, samenwerking of andere randvoorwaarden.	X	Patiënt/ cliënt (naaste)	Patiënten moeten actief betrokken worden in het samenbeslissen proces, ondersteund door duidelijke communicatie vanuit de professional om toch echt terughoudend te zijn met een operatie.
	X	Professional	Voldoende expertise in het uitvoeren van de operatie
	X	Beroepsvereniging, nl	Faciliteren van kennisdeling
		Ziekenhuis (raad van bestuur/UMCNL (voorheen NFU)/NVZ)	
		Zorgverzekeraars/ NZa	
		Zorginstituut [duiding nodig]	
		Anders	
16. Binnen welk tijdsbestek moet de aanbeveling zijn geïmplementeerd?	X	< 1 jaar	Eenvoudige aanpassing
		binnen 2-3 jaar	
17. Conclusie: is er extra actie en/of ondersteuning nodig voor implementatie van de aanbeveling? <i>De reguliere implementatieroutes (publicatie en disseminatie via officiële kanalen, opname in professionele standaarden, scholing en nascholing, gebruik van bestaande ICT systemen, audits en visitaties) van de richtlijnmodule alleen is onvoldoende.</i>		Ja	
	X	Nee	De reguliere implementatieroutes van de richtlijnmodule zijn voldoende.
18. Plaatsing op de Landelijke Implementatieagenda Medisch Specialistische zorg is gewenst. Het gaat om zorg die (grotendeels) wordt uitgevoerd binnen de ziekenhuismuren. Succesvolle implementatie vraagt om actieve betrokkenheid en samenwerking van meerdere relevante partijen binnen de zorgpraktijk.		Ja *	
	X	Nee	Zie hierboven

- 5 *Deze aanbeveling komt mogelijk in aanmerking voor plaatsing op de Landelijke Implementatieagenda van het programma Zorg Evaluatie & Gepast Gebruik (ZE&GG), waarin alle betrokken partijen in de medisch-specialistische zorg samenwerken aan de implementatie van bewezen beste zorg. De Federatie levert namens het veld goed onderbouwde aanbevelingen aan, die zijn getoetst op de behoefte aan een implementatie-impuls. De onderwerpen op de Implementatieagenda zijn onderdeel van landelijke zorginkoopafspraken tussen zorgverzekeraars en zorgaanbieders. Voor de beoordeling van aanbevelingen uit richtlijnen wordt gebruikgemaakt van de implementatietabel. Op basis hiervan kunnen we de andere partijen goed informeren en gezamenlijk besluiten of plaatsing op de Implementatieagenda passend is.
- 10

5 **Literatuur**

Bateman M, Littlewood C, Rawson B, Tambe AA. Surgery for tennis elbow: a systematic review. *Shoulder Elbow*. 2019 Feb;11(1):35-44. doi: 10.1177/1758573217745041. Epub 2017 Dec 11. PMID: 30719096; PMCID: PMC6348580.

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5 Bijlagen bij module 4 Behandeling operatief

Risk of bias table for intervention studies (randomized controlled trials; based on Cochrane risk of bias tool and suggestions by the CLARITY Group at McMaster University)

Study reference (first author, publication year)	Was the allocation sequence adequately generated?	Was the allocation adequately concealed?	Blinding: Was knowledge of the allocated interventions adequately prevented? Were patients blinded? Were healthcare providers blinded? Were data collectors blinded? Were outcome assessors blinded? Were data analysts blinded?	Was loss to follow-up (missing outcome data) infrequent?	Are reports of the study free of selective outcome reporting?	Was the study apparently free of other problems that could put it at a risk of bias?	Overall risk of bias If applicable/necessary, per outcome measure
	Definitely yes Probably yes Probably no Definitely no	Definitely yes Probably yes Probably no Definitely no	Definitely yes Probably yes Probably no Definitely no	Definitely yes Probably yes Probably no Definitely no	Definitely yes Probably yes Probably no Definitely no	Definitely yes Probably yes Probably no Definitely no	LOW Some concerns HIGH

Kroslak, 2018	Probably yes; Reason: "Patient randomization was performed via a computer generated code".	Probably yes; Reason: "Code was printed and sealed in unmarked envelopes. Envelope was randomly selected and opened by a theater assistant. At the conclusion of the procedure, the patient's name was written on the envelope, and the randomization slip was placed back in the envelope, resealed, and stored securely until the conclusion of the trial".	Probably yes; Reason: "Patients were blinded. One author performed the initial assessments and subsequent postoperative follow-up of patients and was blinded to the procedure performed. The other author performed the surgery but was blinded to the pre- and postoperative outcomes".	Probably yes; Reason: Loss to follow-up was infrequent and only for longer follow-up time.	Probably yes; Reason: All relevant outcomes were reported.	Definitely no; Reason: Patient recruitment was stopped before the powered sample size was reached.	Some concerns
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5 Table of excluded studies

Reference	Reason for exclusion
Bateman M, Littlewood C, Rawson B, Tambe AA. Surgery for tennis elbow: a systematic review. <i>Shoulder Elbow</i> . 2019 Feb;11(1):35-44. doi: 10.1177/1758573217745041. Epub 2017 Dec 11. PMID: 30719096; PMCID: PMC6348580.	Systematic review of Challoumas has a more recent search date.
Buchbinder R, Johnston RV, Barnsley L, Assendelft WJ, Bell SN, Smidt N. Surgery for lateral elbow pain. <i>Cochrane Database Syst Rev</i> . 2011 Mar 16;2011(3):CD003525. doi: 10.1002/14651858.CD003525.pub2. PMID: 21412883; PMCID: PMC7154580.	Wrong comparison (all included studies compare 2 surgical techniques with each other or compare surgery with ESWT or with botox)
Challoumas D, Clifford C, Kirwan P, Millar NL. How does surgery compare to sham surgery or physiotherapy as a treatment for tendinopathy? A systematic review of randomised trials. <i>BMJ Open Sport Exerc Med</i> . 2019 Apr 24;5(1):e000528. doi: 10.1136/bmjsem-2019-000528. PMID: 31191975; PMCID: PMC6539146.	The quality assessment was done in a strange way, i.e. only the study by Krosiak is relevant and assessed as low RoB, but was stopped prematurely and that should be included in the RoB.
Matache BA, Berdusco R, Momoli F, Lapner PL, Pollock JW. A randomized, double-blind sham-controlled trial on the efficacy of arthroscopic tennis elbow release for the management of chronic lateral epicondylitis. <i>BMC Musculoskelet Disord</i> . 2016 Jun 1;17:239. doi: 10.1186/s12891-016-1093-9. PMID: 27245219; PMCID: PMC4888299.	Protocol
Moradi A, Pasdar P, Mehrad-Majd H, Ebrahimzadeh MH. Clinical Outcomes of Open versus Arthroscopic Surgery for Lateral Epicondylitis, Evidence from a Systematic Review. <i>Arch Bone Jt Surg</i> . 2019 Mar;7(2):91-104. PMID: 31211187; PMCID: PMC6510924.	Wrong comparison (arthroscopic vs open surgery)

Literature search strategy

Algemene informatie

Cluster/richtlijn: Tennisarm en Golfarm - UV4 Behandeling operatief	
Uitgangsvraag/modules: Wat is de meerwaarde van percutane nettoyage en een operatieve behandeling voor patiënten met klachten van epicondylitis lateralis of epicondylitis medialis?	
Database(s): Embase.com, Ovid/Medline	Datum: 23 januari 2025
Periode: vanaf 2005	Talen: geen restrictie
Literatuurspecialist: Esther van der Bijl	Rayyan review: https://new.rayyan.ai/reviews/1299021/overview
BMI-zoekblokken: voor verschillende opdrachten wordt (deels) gebruik gemaakt van de zoekblokken van BMI-Online https://blocks.bmi-online.nl/ Deduplication: voor het ontdebellen is gebruik gemaakt van http://dedupendnote.nl/	

Toelichting:

Voor deze vraag is gezocht op de elementen **tennisarm/ golfarm** EN **chirurgische behandeling**.

De volgende sleutelartikelen worden gevonden met deze search:

- Bateman M, Littlewood C, Rawson B & Tambe AA (2019). Surgery for tennis elbow: a systematic review.. *Shoulder And Elbow*, 11(1), 35-44. <https://dx.doi.org/10.1177/1758573217745041>
- Kroslak M & Murrell GAC (2018). Surgical treatment of lateral epicondylitis: a prospective, randomized, double-blinded, placebo-controlled clinical trial.. *American Journal of Sports Medicine*, 46(5), 1106-1113. <https://dx.doi.org/10.1177/0363546517753385>
- Pierce TP, Issa K, Gilbert BT, Hanly B, Festa A, McInerney VK & Scillia AJ (2017). A systematic review of tennis elbow surgery: open versus arthroscopic versus percutaneous release of the common extensor origin.. *Arthroscopy*, 33(6), 1260-1268.e2. <https://dx.doi.org/10.1016/j.arthro.2017.01.042>
- Panthi S, Khatri K, Kharel K, Byanjankar S, Shrestha R, Sharma JR, Vijay V (2017). Outcome of percutaneous release of tennis elbow: a non-randomized controlled trial study.. *Cureus*, 9(1), e952. <https://dx.doi.org/10.7759/cureus.952>

Het volgende sleutelartikel valt uit op studiedesign:

- Sharma V, Kumar A, Parashar A, Rai V, Kumar V & Udiwal H (2024). Percutaneous tenotomy for chronic tennis elbow: a minimally invasive technique with better outcomes - a case series.. *Journal of Orthopaedic Case Reports*, 14(2), 125-130. <https://dx.doi.org/10.13107/jocr.2024.v14.i02.4242>

Te gebruiken voor richtlijntekst:

A systematic literature search was performed by a medical information specialist using the following bibliographic databases: Embase.com and Ovid/Medline. Both databases were searched from 2005 to the 23rd of Januari 2025 for systematic reviews and RCTs. Systematic searches were completed using a combination of controlled vocabulary/subject headings (e.g., Emtree-terms, MeSH) wherever they were available and natural language keywords. The overall search strategy was derived from 2 primary search concepts: (1) lateral/medial epicondylitis; (2) surgical treatment. Duplicates were removed using EndNote software. After deduplication a total of 438 records were imported for title/abstract screening.

5

Zoekopbrengst - 23 januari 2025

	EMBASE	OVID/MEDLINE	Ontdubbeld
SR	154	109	180
RCT	207	125	258
Totaal	361	234	438*

**in Rayyan*

Zoekstrategie - 23 januari 2025

10

Embase.com

No.	Query	Results
#1	'tennis elbow'/exp OR 'medial epicondylitis'/exp OR (((tennis* OR golf*) NEAR/3 (arm* OR elbow*)):ti,ab,kw) OR (((epicondylit* OR epycondylit* OR epicondylitid* OR epycondylitid*) NEAR/3 (humer* OR lateral* OR external* OR radiohumer* OR medial*)):ti,ab,kw) OR (((elbow* OR epicondyl* OR ecrb) NEAR/7 (tendinopath* OR tendonopath* OR tendinos*)):ti,ab,kw) OR (((lateral* OR medial*) NEAR/3 elbow* NEAR/3 pain*):ti,ab,kw) OR epicondyalg*:ti,ab,kw	4786

#2	'percutaneous tenotomy'/exp OR 'tenotomy'/exp OR 'fenestration'/exp OR 'percutaneous release'/exp OR 'surgery'/exp OR 'surgical patient'/exp OR 'surgical risk'/exp OR 'perioperative period'/exp OR 'surgery'/lnk OR (((percutan* OR tendon*) NEAR/3 (releas* OR lengthening*)):ti,ab,kw) OR ((arthroscopic NEAR/3 (surger* OR surgic* OR therap* OR treatment* OR operat* OR intervention* OR technique*)):ti,ab,kw) OR tendotom*:ti,ab,kw OR tenontom*:ti,ab,kw OR tenotom*:ti,ab,kw OR fenestrati*:ti,ab,kw OR surgic*:ti,ab,kw OR surger*:ti,ab,kw OR operation*:ti,ab,kw OR operative:ti,ab,kw OR presurg*:ti,ab,kw OR preoperati*:ti,ab,kw OR perisurg*:ti,ab,kw OR perioperati*:ti,ab,kw OR postsurg*:ti,ab,kw OR postoperati*:ti,ab,kw OR nonsurg*:ti,ab,kw OR nonoperatic*:ti,ab,kw OR laparoscop*:ti,ab,kw OR intraoperati*:ti,ab,kw OR excisi*:ti,ab,kw	8343672
#3	#1 AND #2	1862
#4	#3 AND [2005-2025]/py NOT ('conference abstract'/it OR 'editorial'/it OR 'letter'/it OR 'note'/it) NOT (('animal'/exp OR 'animal experiment'/exp OR 'animal model'/exp OR 'nonhuman'/exp) NOT 'human'/exp)	1095
#5	'meta analysis'/exp OR 'meta analysis (topic)'/exp OR 'systematic review'/exp OR 'systematic review (topic)'/exp OR 'scoping review'/exp OR 'rapid review'/exp OR 'umbrella review'/exp OR 'cochrane database of systematic reviews'/jt OR 'network meta-analysis'/exp OR 'networkmeta analy*:ti,ab,kw OR 'networkmetaanaly*:ti,ab,kw OR metaanaly*:ti,ab,kw OR 'meta analy*:ti,ab,kw OR metanaly*:ti,ab,kw OR prisma:ti,ab,kw OR prospero:ti,ab,kw OR metaanali*:ti,ab,kw OR 'meta anali*:ti,ab,kw OR metanali*:ti,ab,kw OR (((systemati* OR scoping OR umbrella OR 'structured literature') NEAR/3 (review* OR overview*)):ti,ab,kw) OR (((structured OR systemic*) NEAR/3 (review* OR overview* OR synth*) NEAR/3 literature):ti,ab,kw) OR ((systemic* NEAR/1 review*):ti,ab,kw) OR (((systemati* OR literature OR database* OR 'data base*') NEAR/10 search*):ti,ab,kw) OR (((structured OR comprehensive* OR systemic*) NEAR/3 search*):ti,ab,kw) OR (((literature NEAR/3 (review* OR overview*)):ti,ab,kw) AND (search*:ti,ab,kw OR database*:ti,ab,kw OR 'data base*':ti,ab,kw)) OR (('data extraction*':ti,ab,kw OR 'data source*':ti,ab,kw) AND ('study selection*':ti,ab,kw OR 'studies selection*':ti,ab,kw)) OR ('search strateg*':ti,ab,kw AND 'selection criteria*':ti,ab,kw) OR ('data source*':ti,ab,kw AND 'data synth*':ti,ab,kw) OR medline*:ti,ab,kw OR pubmed*:ti,ab,kw OR 'pub med*':ti,ab,kw OR embase:ti,ab,kw OR cochrane*:ti,ab,kw OR (((critical* OR rapid*) NEAR/2 (review* OR overview* OR synth*)):ti) OR (((critical* OR rapid*) NEAR/3 (review* OR overview* OR synth*)):ab) AND (search*:ab OR database*:ab OR 'data base*':ab)) OR metasynth*:ti,ab,kw OR 'meta synth*':ti,ab,kw OR 'review* of review*':ti,ab,kw	1115544
#6	'clinical trial'/exp OR 'randomization'/exp OR 'single blind procedure'/exp OR 'double blind procedure'/exp OR 'crossover procedure'/exp OR 'placebo'/exp OR 'prospective study'/exp OR rct:ab,ti OR random*:ab,ti OR 'single blind':ab,ti OR 'randomised controlled trial':ab,ti OR 'randomized controlled trial'/exp OR placebo*:ab,ti	4191923
#7	#4 AND #5 - SR	154
#8	#4 AND #6 NOT #7 - RCT	207
#9	#7 OR #8 - Totaal	361

5

Ovid/Medline

#	Searches	Results
1	exp Tennis Elbow/ or exp Elbow Tendinopathy/ or ((tennis* or golf*) adj3 (arm* or elbow*)):ti,ab,kf. or ((epicondylit* or epycondylit* or epicondylitid* or epycondylitid*) adj3 (humer* or lateral* or external* or radiohumer* or medial*)):ti,ab,kf. or ((elbow* or epicondyl* or ecrb) adj7 (tendinopath* or tendonopath* or tendinos*)):ti,ab,kf. or (((lateral* or medial*) adj3 elbow* adj3 pain*)):ti,ab,kf. or epicondylalg*:ti,ab,kf.	3437

2	exp Tenotomy/ or exp Surgical Procedures, Operative/ or exp Specialties, Surgical/ or su.fs. or exp Perioperative Period/ or ((percutan* or tendon*) adj3 (releas* or lengthening*)).ti,ab,kf. or (arthroscopic adj3 (surger* or surgic* or therap* or treatment* or operat* or intervention* or technique*)).ti,ab,kf. or tendotom*.ti,ab,kf. or tenotom*.ti,ab,kf. or tenotom*.ti,ab,kf. or fenestrati*.ti,ab,kf. or surgic*.ti,ab,kf. or surger*.ti,ab,kf. or operation*.ti,ab,kf. or operative.ti,ab,kf. or presurg*.ti,ab,kf. or preoperati*.ti,ab,kf. or perisurg*.ti,ab,kf. or perioperati*.ti,ab,kf. or postsurg*.ti,ab,kf. or postoperati*.ti,ab,kf. or nonsurg*.ti,ab,kf. or nonoperatic*.ti,ab,kf. or laparoscop*.ti,ab,kf. or intraoperati*.ti,ab,kf. or excisi*.ti,ab,kf.	595154 2
3	1 and 2	1279
4	limit 3 to yr="2005 -Current"	844
5	4 not (comment/ or editorial/ or letter/) not ((exp animals/ or exp models, animal/) not humans/)	811
6	exp Meta-Analysis/ or exp "Meta-Analysis as Topic"/ or exp Network Meta-Analysis/ or exp Systematic Review/ or exp "Systematic Reviews as Topic"/ or (networkmeta analy* or networkmetaanaly* or metaanaly* or meta analy* or metanaly* or prisma or prospero or metaanali* or meta anali* or metanali*).ti,ab,kf. or ((systemati* or scoping or umbrella or structured literature) adj3 (review* or overview*)).ti,ab,kf. or ((structured or systemic*) adj3 (review* or overview* or synth*) adj3 literature).ti,ab,kf. or (systemic* adj1 review*).ti,ab,kf. or ((systemati* or literature or database* or data base*) adj10 search*).ti,ab,kf. or ((structured or comprehensive* or systemic*) adj3 search*).ti,ab,kf. or ((literature adj3 (review* or overview*)) and (search* or database* or data base*)).ti,ab,kf. or ((data extraction* or data source*) and (study selection* or studies selection*)).ti,ab,kf. or (search strateg* and selection criteria*).ti,ab,kf. or (data source* and data synth*).ti,ab,kf. or (medline* or pubmed* or pub med* or embase or cochrane*).ti,ab,kf. or cochrane.jw. or ((critical* or rapid*) adj2 (review* or overview* or synth*)).ti. or (((critical* or rapid*) adj3 (review* or overview* or synth*)) and (search* or database* or data base*)).ab. or metasynth*.ti,ab,kf. or meta synth*.ti,ab,kf.	807513
7	exp clinical trial/ or randomized controlled trial/ or exp clinical trials as topic/ or randomized controlled trials as topic/ or Random Allocation/ or Double-Blind Method/ or Single-Blind Method/ or (clinical trial, phase i or clinical trial, phase ii or clinical trial, phase iii or clinical trial, phase iv or controlled clinical trial or randomized controlled trial or multicenter study or clinical trial).pt. or random*.ti,ab. or (clinic* adj trial*).tw. or ((singl* or doubl* or treb* or tripl*) adj (blind\$3 or mask\$3)).tw. or Placebos/ or placebo*.tw.	283350 4
8	5 and 6 - SR	109
9	(5 and 7) not 8 - RCT	125
10	8 or 9 - Totaal	234

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5 Module 5 Prognose

De module Prognose bestaat uit de volgende onderwerpen:

- Risicofactoren voor ontstaan
- Risicofactoren voor langdurige klachten (prognostische factoren)

10 Submodule 5.1 Risicofactoren

Uitgangsvraag

Wat zijn risicofactoren voor het ontstaan van laterale epicondylaire tendinopathie of mediale epicondylaire tendinopathie?

15

Introduction (English)

The exact etiology of lateral and medial epicondylar tendinopathy is unknown, but it is likely related to overuse. Identifying risk factors may provide insight into which activities cause these conditions. This insight can contribute to the development of preventive measures, the optimization of treatments, and the reduction of the likelihood of recurrence.

20

Search and select

A systematic review of the literature was performed to answer the following question(s):
What are risk factors for primary development of lateral epicondylar tendinopathy and medial epicondylar tendinopathy?

25

Table 1. PICO

Patients	Individuals at risk of lateral epicondylar tendinopathy or medial epicondylar tendinopathy
Intervention	Age, gender, BMI, history of elbow- and shoulder complaints/injury, smoking, other comorbidities (diabetes mellitus, rheumatic diseases), work- and sport-related risk factors
Control	Absence of factors
Outcomes	...
Other selection criteria	<ul style="list-style-type: none">• Study design: systematic reviews and comparative observational study designs• At least 10 patients• At least adjustment for age and sex as confounders

30 Relevant outcome measures

The guideline panel defined a relative risk (RR) of ≥ 1.2 as risk factor. A RR between 0.8 and 1.2 is defined as no association and a RR < 0.8 is defined as a lower risk.

Search and select (Methods)

35

A systematic literature search was performed by a medical information specialist using the following bibliographic databases: Embase.com and Ovid/Medline. Both databases were searched from 2005 to the 7th of May 2025 for systematic reviews and observational studies. Systematic searches were completed using a combination of controlled vocabulary/subject headings (e.g., Emtree-terms, MeSH) wherever they were available and natural language keywords. The overall search strategy was derived from two primary search concepts: (1) lateral/ medial epicondylitis; (2) risk factors. Duplicates were removed using EndNote software. After deduplication a total of 454 records were imported for

40

5 title/abstract screening. Initially, 26 studies were selected based on title and abstract screening. After reading the full text, 25 studies were excluded (see the exclusion table under the tab ‘Evidence tabellen’), and one study was included (Chiarotto, 2023).

Summary of literature

10 Description of studies

One study was included in the analysis of the literature. Important study characteristics and results are summarized in table 2. No studies with long-term follow-up were identified that evaluated the effectiveness of interventions related to work or physical activity. In addition, no studies were found in which multifactorial models were applied and externally validated
15 in other populations. Nevertheless, to provide practical guidance, the guideline panel identified studies in which such recommendations have been implemented in clinical practice. As these studies do not allow for causal inferences, this question was not assessed using the GRADE methodology.

20 **Chiarotto (2023)** published an updated version of a previous systematic review examining work-related physical and psychosocial risk factors for elbow disorders. Searches were conducted in the databases Medline, Embase, Web of Science Core Collection, Cochrane Central and PsycINFO from their inception through January 2020. Studies were eligible if they provided sufficient data to quantify associations between work-related physical or
25 psychosocial exposures and elbow musculoskeletal conditions, defined for the purpose of this module as lateral or medial epicondylar tendinopathy. Physical work-related exposures included (1) force (e.g., heavy physical work, lifting, pushing, pulling), (2) awkward postures (e.g., working with the hands above shoulder level), (3) vibration, (4) repetition, and (5) combined exposure incorporating these factors. Exposures assessed in terms of duration,
30 intensity, or frequency—whether self-reported, observer-rated, or quantitatively measured—were considered eligible. Psychosocial work-related exposures included social support, job demands, job control, decision latitude, job satisfaction, job security, time pressure, periodic interruptions, and work-related psychosocial distress. Psychosocial exposures assessed using validated or non-validated questionnaires as well as self-
35 constructed survey items were included. Studies in which exposures were inferred solely from job titles were excluded. This review included 17 studies comprising longitudinal cohort studies, case-control studies and cross-sectional studies. For the purpose of this module, only four longitudinal cohort studies that adjusted for confounders were considered relevant
40 (Bugajska, 2013; Descatha, 2013; Garg, 2014; Herquelot, 2013).

5

Table 2. Characteristics of included studies

Study	Participants	Disorder	Follow-up	Confounders	Exposure	Risk of bias (per outcome measure)*
<i>Included in systematic review Chiarotto, 2023</i>						
Bugajska, 2013	Employees: 725 at first measurement, 542 at second measurement 77% female Mean age: 43 years	LET & MET	12 months	Individual variables (age and gender), organizational and physical factors (working hours, repetitive work, force) were controlled in all analyses	Physical job demands	See risk of bias assessment in Chiarotto 2023
Descatha, 2013	Workers: 699 250 females	LET & MET	36 months	Adjusting for age, lack of social support and obesity	For LET: bending, gripping, bending ≥ 4 h/day & rotating ≥ 2 h/day For MET: bending, rotating, gripping, bending ≥ 4 h/day & rotating ≥ 2 h/day	See risk of bias assessment in Chiarotto 2023
Garg, 2014	495 workers 329 females Mean age: 41.9 years	LET	48 months	Single initial multivariable model was built using covariates (i.e., non-physical exposure factors) that were: (i) not collinear, (ii) biologically plausible, and (iii) had a univariate P-value 0.20.	Peak force, hand activity level (HAL), typical hand/wrist posture, strain index	See risk of bias assessment in Chiarotto 2023
Herquelot, 2013	Workers: 3231 workers without elbow pain at baseline; 1046 of these with complete follow up in 2007–2010 out of a total of 3710 initially assessed in 2002–2005; multiple imputation was used	LET	60 months	Model 3: adjusted for age, combined physical work exposure, and repetitiveness.	Doing repetitive tasks (>4 h/day), elbow-specific combined physical exposure	See risk of bias assessment in Chiarotto 2023

Abbreviations: BMI, body mass index; HAL, hand activity level; LET, lateral epicondylar tendinopathy; MET, medial epicondylar tendinopathy; NR, not reported

5 **Results**

Lateral epicondylar tendinopathy (LET)

Four studies reported on risk factors for LET (Bugajska, 2013; Descatha, 2013; Garg, 2014; Herquelot, 2013) (Table 3).

10 **Bugajska (2013)** reported that higher physical job demands were associated with a lower risk of LET.

Descatha (2013) found that bending for 2-4 hours per day and for ≥ 4 hours per day was associated with a higher risk of LET. In contrast, bending for 1-2 hours per day was associated with a lower risk, while no association was observed for no bending or for < 1 hour per day.

Gripping was associated with a higher risk of LET when performed for 1-2 hours per day, 2-4 hours per day or ≥ 4 hours per day; no association was found for no gripping or gripping for < 1 hour per day. Combined exposure to bending for ≥ 4 hours per day and rotation for ≥ 2 hours per day was also associated with a higher risk.

Garg (2014) reported that higher hand activity level (HAL), very poor typical hand/wrist posture, and a strain index ≥ 6.1 were associated with an increased risk of LET. In contrast, a good and poor typical hand/wrist posture were associated with a lower risk. No associations were observed for peak force, fair typical hand/wrist posture, or a strain index ≤ 6.1 .

Herquelot (2013) reported that performing repetitive tasks for more than 4 hours per day was associated with a higher risk of LET in both men and women when exposure occurred during the first phase only (baseline) or during both the first and second phases (baseline and follow-up). No association was observed among men or women who were never exposed or exposed during the second phase only.

For elbow-specific combined physical exposure, exposure during the second phase and during both phases was associated with a higher risk for LET in men, whereas in women, exposure during the first phase only and during both phases was associated with a higher risk. No association was found among participants who were never exposed.

Table 3. Mechanical risk factors for lateral epicondylar tendinopathy.

Study	Exposure	Measure of association (95% CI)	Summary
Bugajska (2013)	Physical job demands	OR=0.74 (0.44 to 1.26)	Lower risk
Descatha (2013)	Bending	no or < 1 h/day: OR = 1.0 1-2 h/day: OR=0.8 (0.1 to 7.4) 2-4 h/day: OR=2.8 (0.7 to 10.5) ≥ 4 h/day: OR=4.4 (1.5 to 13.1)	No association Lower risk Higher risk Higher risk
	Gripping	no or < 1 h/day: OR=1.0 1-2 h/day: OR=1.3 (0.4 to 4.2) 2-4 h/day: OR=1.5 (0.5 to 4.3) ≥ 4 h/day: OR=1.7 (0.7 to 4.0)	No association Higher risk Higher risk Higher risk
	Bending ≥ 4 h/day & rotating ≥ 2 h/day	OR=3.0 (1.4 to 6.1)	Higher risk
Garg (2014)	Peak force	HR: 1.1 (0.89 to 1.35)	No association
	HAL	HR: 1.2 (0.98 to 1.36)	Higher risk

	Typical hand/wrist posture	good: HR=0.2 (0.03 to 1.60) fair: HR=1.0 (-) poor: HR=0.7 (0.31 to 1.40) very poor: HR=1.4 (0.19 to 9.85)	Lower risk No association Lower risk Higher risk
	Strain index	≤6.1: HR=1.0 ≥6.1: HR=2.6 (1.26 to 5.28)	No association Higher risk
Herquelot (2013)	Doing repetitive tasks (>4 h/day)	IRR men: <ul style="list-style-type: none"> • never: 1.0 • first: 1.2 (0.4 to 3.6) • second: 1.1 (0.4 to 3.4) • both: 2.6 (1.2 to 5.7) IRR women: <ul style="list-style-type: none"> • never: 1.0 • first: 2.5 (1.0 to 6.7) • second: 1.1 (0.3 to 4.0) • both: 2.3 (0.8 to 6.5) 	No association Higher risk No association Higher risk No association Higher risk No association Higher risk
	Elbow-specific combined physical exposure	IRR men: <ul style="list-style-type: none"> • never: 1.0 • first: N.A. (no complete cases available) • second: 2.5 (1.1 to 5.8) • both: 2.9 (1.4 to 5.9) IRR women: <ul style="list-style-type: none"> • never: 1.0 • first: 1.5 (0.5 to 4.7) • second: N.A. (no complete cases available) • both: 3.2 (1.4 to 7.5) 	No association N.A. Higher risk Higher risk No association Higher risk N.A. Higher risk

5 Abbreviations: OR, odds ratio; CI, confidence interval; HAL, hand activity level; HR, hazard ratio; IRR, incidence rate ratio

Medial epicondylar tendinopathy (MET)

Two studies reported on risk factors for MET (Bugajska, 2013; Descatha, 2013) (Table 4).

10

Bugajska (2013) reported no association between physical job demands and MET.

15

Descatha (2013) reported that combined exposure to bending and rotating for 2-4 hours per day and for ≥4 hours per day was associated with a higher risk of MET, whereas no association was observed for no exposure or exposure for <1 hour per day or for 1-2 hours per day. Rotating for 1-2 hours per day was associated with a lower risk, while no association was found for no rotation or for <1 hour/day. In addition, gripping for 1-2 hours per day, 2-4 hours per day and ≥4 hours per day, whereas no association was observed for no gripping or gripping for <1 hour per day. Combined exposure to bending for ≥4 hours per day and rotation for ≥2 hours per day was also associated with a higher risk.

20

Table 4. Mechanical risk factors for medial epicondylar tendinopathy

Study	Exposure	OR (95% CI)	Summary
Bugajska (2013)	Physical job demand	1.01 (0.67 to 1.52)	No association
Descatha (2013)	Bending	no or <1 h/day: 1.0 1-2 h/day: 1.0 2-4 h/day: 4.9 (1.1 to 20.7) ≥4 h/day: 8.2 (2.4 to 27.9)	No association No association Higher risk Higher risk

	Rotating	no or < 1 h/day: 1.0 1-2 h/day: 0.5 (0.1 to 3.9) 2-4 h/day: 2.8 (1.0 to 7.7) ≥4 h/day: 2.5 (1.0 to 5.8)	No association Lower risk Higher risk Higher risk
	Gripping	no or < 1 h/day: 1.0 1-2 h/day: 2.1 (0.6 to 7.2) 2-4 h/day: 1.9 (0.5 to 6.5) ≥4 h/day: 3.8 (1.5 to 9.6)	No association Higher risk Higher risk Higher risk
	Bending ≥4 h/day & rotating ≥2 h/day	3.6 (1.7 to 7.7)	Higher risk

5 Abbreviations: OR, odds ratio; CI, confidence interval

Overwegingen – van bewijs naar aanbeveling (NL)

Balans tussen gewenste en ongewenste effecten

10 Er is literatuuronderzoek uitgevoerd naar het identificeren van risicofactoren van het ontstaan van een laterale of mediale epicondylaire tendinopathie (LET of MET), omdat kennis hierover kan bijdragen aan gerichte preventieve adviezen en optimalisatie van belasting. Voor deze module is één systematisch review gevonden dat onderzoek deed naar de associatie tussen fysieke en psychosociale factoren en LET en MET. Hieruit kan worden geconcludeerd dat >2u/dag buigen, >1u/dag knijpkracht, het ≥4u/dag buigen en ≥2u/dag roteren van de elleboog (hierna gedefinieerd als: frequente fysieke belasting), geassocieerd is met een hoger risico op ontwikkeling van LET of MET. Hand activity level, een hoge belasting van pols of elleboog (strain index ≥6.1), langdurig repetitieve belasting (>4u/dag) en gecombineerde biomechanische blootstelling was alleen geassocieerd met een hoger risico op ontwikkeling van een LET.

20 De mogelijke voordelen van voorlichting en aanpassing van werk- of sportbelasting liggen in preventie en reductie van blootstelling aan risicofactoren. Potentiële ongewenste effecten betreffen met name praktische en psychosociale consequenties van dergelijke werk- of taakaanpassingen. De balans tussen gewenste en ongewenste effecten wordt positief ingeschat, gezien de lage risico's van voorlichting en belastingadvies en de plausibele preventieve waarde hiervan.

Gewenste effecten

30 Het systematisch inventariseren en reduceren van risicofactoren zoals langdurige repetitieve belasting, geforceerde polspositie en gecombineerde biomechanische blootstelling kan mogelijk bijdragen aan vermindering van incidentie van LET of MET. Het bewijs hiervoor is heden beperkt en voornamelijk gebaseerd op werkpopulaties.

Ongewenste effecten

35 Preventieve belastingadviezen en werkaanpassingen kunnen leiden tot tijdelijke productiviteitsvermindering of psychosociale spanning. Deze nadelen wegen minder zwaar gezien het relatief lage risico op productiviteitsvermindering of psychosociale spanning en de mogelijke preventieve meerwaarde ervan.

Aanpalende literatuur

40 Chen (2024) voerden een meta-analyse uit naar risicofactoren voor LET, waarin 22 observationele studies werden geïncludeerd. De auteurs rapporteerden dat vrouwelijk geslacht (OR 1,33), roken (OR 1,46), fysieke belasting (OR 2,39) en hypercholesterolemie (OR 1,67) significant geassocieerd waren met een verhoogd risico op het ontstaan van klachten passend bij een LET. Aanvullend daarop suggereert de cohortstudie van Kwak (2023) inderdaad dat statinegebruik gerelateerd is aan de ontwikkeling van LET. De artikelen zijn

5 echter binnen deze module niet uitgebreid uitgewerkt, omdat ze niet voldeden aan de vooraf vastgestelde kwaliteitscriteria (onduidelijk of er is gecorrigeerd voor confounders in de meta-analyse van Chen (2024) en omdat statinegebruik niet overeenkomt met de I in de PICO (Kwak, 2023)). Zie ook tabel 5 voor een overzicht van de gevonden (niet)-beïnvloedbare risicofactoren.

10

Tabel 5. Aanvullende niet-beïnvloedbare en beïnvloedbare risicofactoren voor de ontwikkeling van LET.

Risicofactoren
<i>Niet-beïnvloedbaar</i>
Vrouwelijk geslacht
<i>Beïnvloedbaar</i>
Fysieke belasting
Roken
Hypercholesterolemie

Kwaliteit van bewijs

15 Niet van toepassing.

Waarden en voorkeuren van patiënten (en eventueel hun naasten/verzorgers)

Patiënten verschillen in de mate waarin zij bereid en mogelijk zijn werkbelasting of sportbelasting aan te passen ter preventie van klachten. Voor sommige patiënten weegt behoud van werk, inkomen of sportprestatie zwaarder dan risicoreductie. Het bespreken van individuele doelen en context (werk, sport, thuissituatie) is daarom essentieel. Shared decision-making ondersteunt een haalbare en proportionele aanpak.

20

Kostenaspecten

25 Kosten kunnen ontstaan door extra consulttijd, ergonomische beoordeling en eventuele werkplekaanpassingen. Voor de patiënt kunnen indirecte kosten optreden, zoals verminderde inzetbaarheid of aanvullende zorgkosten. Daartegenover staan potentiële maatschappelijke besparingen door vermindering van incidentie en arbeidsverzuim, evenals mogelijke individuele baten in de vorm van klachtenpreventie, behoud van functionele inzetbaarheid en vermindering van toekomstige zorgconsumptie.

30

Gelijkheid ((health) equity/equitable)

Niet iedere patiënt heeft gelijke mogelijkheden om blootstelling aan risicofactoren te verminderen. Patiënten met een lage sociaaleconomische positie, beperkte beslissingsbevoegdheid of tijdelijk contract hebben mogelijk minder ruimte voor aanpassingen. Dit kan leiden tot verschillen in preventieve kansen. Actieve betrokkenheid van werkgever en bedrijfsarts kan deze ongelijkheid beperken.

35

Aanvaardbaarheid

40 *Ethische aanvaardbaarheid*

Voorlichting en bespreking van risicofactoren zijn aanvaardbaar. Werkgerelateerde adviezen kunnen echter invloed hebben op werkzekerheid en inkomen, derhalve is gezamenlijke besluitvorming belangrijk. Er zijn geen directe medisch ethische bezwaren.

45 Haalbaarheid

5 Het inventariseren van fysieke/werkgerelateerde en psychosociale factoren is in de spreekkamer uitvoerbaar. Implementatie van aanpassingen is afhankelijk van werksituatie, werkgever en beschikbaarheid van bedrijfsgezondheidszorg. In sportcontext zijn preventieve aanpassingen doorgaans goed haalbaar via coaching en techniek- en loadmanagement. Een gefaseerde en context-specifieke aanpak vergroot de uitvoerbaarheid.

10

Aanbeveling

Rationale van de aanbeveling: weging van argumenten voor en tegen de interventies

15 De aanbeveling om patiënten te informeren over risicofactoren en om mechanische belasting tijdelijk te reduceren is gebaseerd op observationeel bewijs dat langdurige repetitieve en gecombineerde biomechanische blootstelling geassocieerd is met een verhoogd risico op LET en MET, terwijl de aanpassing in bovengenoemde factoren laag-risico en goed uitvoerbaar is. Gezien de plausibele preventieve waarde en beperkte nadelen weegt de werkgroep de balans positief en adviseert zij actief voorlichting over deze factoren en belastingoptimalisatie.

20

Eindoordeel:

Sterke aanbeveling vóór het geven van voorlichting aan patiënten met LET of MET over geassocieerde risicofactoren.

Geef informatie en educatie over het ontstaan van laterale en mediale epicondylaire tendinopathie bij patiënten en besteed hierbij ten minste aandacht aan de volgende onderwerpen:

- Geassocieerde risicofactoren: frequente fysieke belasting, vrouwelijk geslacht, roken en hypercholesterolemie;
- Consequenties met betrekking tot werk- en sportbelasting.

25

Kennisvragen

Tijdens de ontwikkeling van deze module is gebleken dat er binnen deze module nog te weinig bewijs is voor de onderbouwing van de aanbeveling en er dus kennisvragen bestaan. De werkgroep meent dat (vervolg)onderzoek wenselijk is om in de toekomst een duidelijker antwoord te kunnen geven op vragen uit de praktijk.

30

Kennisvragen:

35 Welke fysieke en psychosociale risicofactoren zijn onafhankelijk geassocieerd met het ontstaan van een laterale of mediale epicondylaire tendinopathie in zowel werk- als sportpopulaties?

Leidt gerichte reductie van geïdentificeerde risicofactoren (bijvoorbeeld repetitie, niet-neutrale polspositie, hoge biomechanische belasting) tot een lagere incidentie van epicondylaire tendinopathie?

40

Toelichting:

Het huidige bewijs is voornamelijk afkomstig uit werkgerelateerde cohortstudies met variatie in blootstellingsmetingen. Grootschalige, prospectieve studies met gestandaardiseerde blootstellingsdefinities en adequate correctie voor confounders zijn nodig. Daarnaast ontbreekt direct bewijs dat aanpassing van risicofactoren daadwerkelijk preventief werkt. Interventiestudies of preventietrials zijn nodig om causaliteit en effectiviteit te onderbouwen.

45

Implementatieplan

5 Implementatietabel

Vraag	Antwoord: <i>Kruis aan en licht toe/ beschrijf</i>		Toelichting keuze:
11. Wat was het onderliggende probleem om deze uitgangsvraag uit te werken?		Ongewenste praktijkvariatie	
		Nieuwe evidentie	
	X	Anders	Er is behoefte naar inzicht in risicofactoren voor het ontstaan van LET of MET, zodat preventieve adviezen gegeven kunnen worden. De belangrijkste risicofactoren zijn nog onbekend.
12. Maak een inschatting over hoeveel patiënten het ongeveer gaat waar de aanbeveling betrekking op heeft?		< 1000	
		< 5000	
	X	5000-40.000	
		> 40.000	
13. Is de aanbeveling onderdeel van een bredere set interventies of verwant aan andere richtlijnen of modules? Zo ja, hoe verhoudt zij zich daartoe en moet hiermee rekening worden gehouden bij de implementatie, of kan de aanbeveling als losstaand worden beschouwd?		Ja	
	X	Nee	
14. Belemmeringen en kansen op verschillende niveaus voor landelijke toepassing van de aanbeveling:		Belemmerende factoren	Bevorderende factoren/ kansen
Richtlijn/ klinisch traject (innovatie)	X	Bewijs is observationeel, dus mogelijk minder gevoel van urgentie	Aanbeveling is laag-risico en eenvoudig te integreren in consult
Zorgverleners (artsen en verpleegkundigen)	X	Beperkte consulttijd, onzekerheid rolverdeling (medisch specialist vs bedrijfsarts/fysiotherapeut)	Eenvoudig te integreren in consult
Patiënt/ cliënt (naasten)	X	Onwil of onvermogen om werk of sportbelasting aan te passen, angst voor inkomensverlies, gebrek aan motivatie voor leefstijlverandering	Educatie vergroot begrip en zelfregie, shared decision making verhoogt therapietrouw
Sociale context	X		Betrokkenheid bedrijfsarts, toenemende aandacht voor duurzame inzetbaarheid

Organisatorische context	X	Geen standaard workflow voor ergonomische screening	Past binnen preventie en zelfmanagement
Financiële en juridische context	X	Extra consulttijd wordt niet altijd vergoed, werkplekaanpassingen kunnen kosten met zich meebrengen, indirecte kosten voor patiënt (tijdelijke werkreductie)	Potentiele besparing door minder verzuim en minder recidief, werkgevers hebben belang bij duurzame inzetbaarheid
15. A) Welke personen/partijen zijn van belang bij het toepassen van de aanbeveling in de praktijk? (kruis aan) B) Wat is er nodig van deze personen/partijen om de aanbeveling in de praktijk te kunnen brengen? Denk aan aanpassingen in gedrag, werkwijzen, beleid, samenwerking of andere randvoorwaarden.	A		B
		Patiënt/ cliënt (naaste)	
	X	Professional	Gerichte kennis, consulttijd voor educatie, actieve, multidisciplinaire en patiëntgerichte benadering
		Beroepsvereniging, nl	
		Ziekenhuis (raad van bestuur/UMCNL (voorheen NFU)/NVZ)	
		Zorgverzekeraars/ NZa	
		Zorginstituut [duiding nodig]	
	Anders		
16. Binnen welk tijdsbestek moet de aanbeveling zijn geïmplementeerd?	X	< 1 jaar	
		binnen 2-3 jaar	
17. Conclusie: is er extra actie en/of ondersteuning nodig voor implementatie van de aanbeveling? <i>De reguliere implementatieroutes (publicatie en disseminatie via officiële kanalen, opname in professionele standaarden, scholing en nascholing, gebruik van bestaande ICT systemen, audits en visitaties) van de richtlijnmodule alleen is onvoldoende.</i>		Ja	
	X	Nee	De reguliere implementatieroutes van de richtlijnmodule is voldoende.
18. Plaatsing op de Landelijke Implementatieagenda Medisch Specialistische zorg is gewenst. Het gaat om zorg die (grotendeels) wordt uitgevoerd binnen de ziekenhuismuren. Succesvolle implementatie vraagt om actieve betrokkenheid en samenwerking van meerdere relevante partijen binnen de zorgpraktijk.		Ja *	
	X	Nee	Zie boven, implementatie kan via reguliere kanalen plaatsvinden.

5 *Deze aanbeveling komt mogelijk in aanmerking voor plaatsing op de Landelijke Implementatieagenda van het programma Zorg Evaluatie & Gepast Gebruik (ZE&GG), waarin alle betrokken partijen in de medisch-specialistische zorg samenwerken aan de implementatie van bewezen beste zorg. De Federatie levert namens het veld goed onderbouwde aanbevelingen aan, die zijn getoetst op de behoefte aan een implementatie-impuls. De

5 *onderwerpen op de Implementatieagenda zijn onderdeel van landelijke zorginkoopafspraken tussen zorgverzekeraars en zorgaanbieders. Voor de beoordeling van aanbevelingen uit richtlijnen wordt gebruikgemaakt van de implementatietabel. Op basis hiervan kunnen we de andere partijen goed informeren en gezamenlijk besluiten of plaatsing op de Implementatieagenda passend is.*

10 **Literatuur**

Chen Q, Shen P, Zhang B, Chen Y, Zheng C. A meta-analysis of the risk factors for lateral epicondylitis. *J Hand Ther.* 2024 Jan-Mar;37(1):44-52. doi: 10.1016/j.jht.2023.05.013. Epub 2023 Aug 12. PMID: 37580201.

15 Chiarotto A, Gerger H, van Rijn RM, Elbers RG, Sjøgaard K, Macri EM, Jackson JA, Burdorf A, Koes BW. Physical and psychosocial work-related exposures and the occurrence of disorders of the elbow: A systematic review. *Appl Ergon.* 2023 Apr;108:103952. doi: 10.1016/j.apergo.2022.103952. Epub 2022 Dec 6. PMID: 36493677.

20 Kwak D, Moon SJ, Park JW, Lee DH, Lee JI. Effects of Statin Treatment on the Development of Tendinopathy: A Nationwide Population-Based Cohort Study. *Orthop J Sports Med.* 2023 Jul 14;11(7):23259671231167851. doi: 10.1177/23259671231167851. PMID: 37465206; PMCID: PMC10350772.

5 Bijlagen bij submodule Risicofactoren

Table of excluded studies

Reference	Reason for exclusion
Afzal, M., Zakaullah, S., Memon, S. I., Nisar, A., Touqeer, H., & Shabir, H. (2021). Prevalence and risk factors of lateral epicondylitis among restaurant cooks at district Gujranwala: A cross-sectional study. <i>Rawal Med J</i> , 46(2), 338.	Doubt about the correctness of statistical analysis
Bao SS, Kapellusch JM, Merryweather AS, Thiese MS, Garg A, Hegmann KT, Silverstein BA, Marcum JL, Tang R. Impact of Work Organizational Factors on Carpal Tunnel Syndrome and Epicondylitis. <i>J Occup Environ Med</i> . 2016 Aug;58(8):760-4. doi: 10.1097/JOM.0000000000000790. PMID: 27414007; PMCID: PMC4980299.	Cross-sectional design
Bretschneider SF, Los FS, Eygendaal D, Kuijer PPFM, van der Molen HF. Work-relatedness of lateral epicondylitis: Systematic review including meta-analysis and GRADE work-relatedness of lateral epicondylitis. <i>Am J Ind Med</i> . 2022 Jan;65(1):41-50. doi: 10.1002/ajim.23303. Epub 2021 Oct 21. PMID: 34674287; PMCID: PMC9297967.	More recent SR available (Chiarotto, 2023)
Chen Q, Shen P, Zhang B, Chen Y, Zheng C. A meta-analysis of the risk factors for lateral epicondylitis. <i>J Hand Ther</i> . 2024 Jan-Mar;37(1):44-52. doi: 10.1016/j.jht.2023.05.013. Epub 2023 Aug 12. PMID: 37580201.	Does not match the predefined selection criteria (not clear whether risk estimates are adjusted for confounders or not)
Chung YC, Hung CT, Li SF, Lee HM, Wang SG, Chang SC, Pai LW, Huang CN, Yang JH. Risk of musculoskeletal disorder among Taiwanese nurses cohort: a nationwide population-based study. <i>BMC Musculoskelet Disord</i> . 2013 Apr 23;14:144. doi: 10.1186/1471-2474-14-144. PMID: 23617330; PMCID: PMC3637823.	Not about risk factors
Curti S, Mattioli S, Bonfiglioli R, Farioli A, Violante FS. Elbow tendinopathy and occupational biomechanical overload: A systematic review with best-evidence synthesis. <i>J Occup Health</i> . 2021 Jan;63(1):e12186. doi: 10.1002/1348-9585.12186. PMID: 33534951; PMCID: PMC7857538.	More recent SR available (Chiarotto, 2023)
Daliri M, Khosravi F, Shakeri MT, Ebrahimzadeh MH, Moradi A. Pairwise association of upper extremity musculoskeletal conditions: large population investigation from PERSIAN cohort study. <i>J Orthop Surg Res</i> . 2023 Aug 26;18(1):626. doi: 10.1186/s13018-023-04108-6. PMID: 37633940; PMCID: PMC10463289.	Wrong study design: cross-sectional study
Hegmann KT, Thiese MS, Kapellusch J, Merryweather A, Bao S, Silverstein B, Wood EM, Kendall R, Foster J, Drury DL, Garg A. Association between Epicondylitis and Cardiovascular Risk Factors in Pooled Occupational Cohorts. <i>BMC Musculoskelet Disord</i> . 2017 May 30;18(1):227. doi: 10.1186/s12891-017-1593-2. PMID: 28558776; PMCID: PMC5450050.	Cross-sectional study design
Herquelot E, Guéguen A, Roquelaure Y, Bodin J, Sérazin C, Ha C, Leclerc A, Goldberg M, Zins M, Descatha A. Work-related risk factors for incidence of lateral epicondylitis in a large working population. <i>Scand J Work Environ Health</i> . 2013 Nov;39(6):578-88. doi: 10.5271/sjweh.3380. Epub 2013 Aug 26. PMID: 23979496.	Included in SR Chiarotto (2023)

Ikeda K, Yoshii Y, Kohyama S, Ikumi A, Ikeda R, Yamazaki M. Sex differences in wrist torque and endurance-Biomechanical factors associated with developing lateral epicondylitis of the humerus. <i>J Orthop Res.</i> 2023 Aug;41(8):1670-1677. doi: 10.1002/jor.25506. Epub 2023 Jan 7. PMID: 36573481.	Used a "wrist torque" for force measurements
Kekelekis A, Nikolaidis PT, Moore IS, Rosemann T, Knechtle B. Risk Factors for Upper Limb Injury in Tennis Players: A Systematic Review. <i>Int J Environ Res Public Health.</i> 2020 Apr 16;17(8):2744. doi: 10.3390/ijerph17082744. PMID: 32316156; PMCID: PMC7215945.	Wrong condition (upper limb injury; LET is not separately investigated)
Kwak D, Moon SJ, Park JW, Lee DH, Lee JI. Effects of Statin Treatment on the Development of Tendinopathy: A Nationwide Population-Based Cohort Study. <i>Orthop J Sports Med.</i> 2023 Jul 14;11(7):23259671231167851. doi: 10.1177/23259671231167851. PMID: 37465206; PMCID: PMC10350772.	About statins
Lee SY, Chieh HF, Lin CJ, Jou IM, Kuo LC, Su FC. The Potential Risk Factors Relevant to Lateral Epicondylitis by Wrist Coupling Posture. <i>PLoS One.</i> 2016 May 12;11(5):e0155379. doi: 10.1371/journal.pone.0155379. PMID: 27171198; PMCID: PMC4865201.	Wrong population
Leifer S, Choi SW, Asanati K, Yentis SM. Upper limb disorders in anaesthetists - a survey of Association of Anaesthetists members. <i>Anaesthesia.</i> 2019 Mar;74(3):285-291. doi: 10.1111/anae.14446. Epub 2018 Oct 12. PMID: 30311637.	No regression analyses performed
Nordander C, Ohlsson K, Akesson I, Arvidsson I, Balogh I, Hansson GÅ, Strömberg U, Rittner R, Skerfving S. Exposure-response relationships in work-related musculoskeletal disorders in elbows and hands - A synthesis of group-level data on exposure and response obtained using uniform methods of data collection. <i>Appl Ergon.</i> 2013 Mar;44(2):241-53. doi: 10.1016/j.apergo.2012.07.009. Epub 2012 Aug 29. PMID: 22939526.	Wrong study design (synthesis of cross-sectional studies)
Pullopissakul S, Ekpanyaskul C, Taptagaporn S, Bundhukul A, Thepchatri A. Upper extremities musculoskeletal disorders: prevalence and associated ergonomic factors in an electronic assembly factory. <i>Int J Occup Med Environ Health.</i> 2013 Oct;26(5):751-61. doi: 10.2478/s13382-013-0150-y. Epub 2014 Jan 25. PMID: 24264438.	Included in SR Chiarotto (2023)
Roquelaure Y, Ha C, Rouillon C, Fouquet N, Leclerc A, Descatha A, Touranchet A, Goldberg M, Imbernon E; Members of Occupational Health Services of the Pays de la Loire Region. Risk factors for upper-extremity musculoskeletal disorders in the working population. <i>Arthritis Rheum.</i> 2009 Oct 15;61(10):1425-34. doi: 10.1002/art.24740. PMID: 19790112; PMCID: PMC3189514.	LET and MET not separately investigated
Sayampanathan AA, Basha M, Mitra AK. Risk factors of lateral epicondylitis: A meta-analysis. <i>Surgeon.</i> 2020 Apr;18(2):122-128. doi: 10.1016/j.surge.2019.08.003. Epub 2019 Sep 19. PMID: 31543312.	Only unadjusted estimates reported
Seidel DH, Ditchen DM, Hoehne-Hückstädt UM, Rieger MA, Steinhilber B. Quantitative Measures of Physical Risk Factors Associated with Work-Related Musculoskeletal Disorders of the Elbow: A Systematic Review. <i>Int J Environ Res Public Health.</i> 2019 Jan 5;16(1):130. doi: 10.3390/ijerph16010130. PMID: 30621312; PMCID: PMC6339038.	More recent SR available (Chiarotto, 2023)

Tajika T, Kobayashi T, Yamamoto A, Kaneko T, Takagishi K. Prevalence and risk factors of lateral epicondylitis in a mountain village in Japan. J Orthop Surg (Hong Kong). 2014 Aug;22(2):240-3. doi: 10.1177/230949901402200227. PMID: 25163965.	Small, very specific population from Japan
Titchener AG, Fakis A, Tambe AA, Smith C, Hubbard RB, Clark DI. Risk factors in lateral epicondylitis (tennis elbow): a case-control study. J Hand Surg Eur Vol. 2013 Feb;38(2):159-64. doi: 10.1177/1753193412442464. Epub 2012 Apr 4. PMID: 22490998.	Wrong study design: case-control study
Ulusoy I, Kıvrak A. Is blood group a risk factor in lateral epicondylitis? Eur Rev Med Pharmacol Sci. 2023 May;27(9):3947-3956. doi: 10.26355/eurrev_202305_32301. PMID: 37203819.	Wrong statistical analyses used (no regression analyses, no multivariable models)
van der Molen HF, Hulshof CT, Kuijjer PPF. How to improve the assessment of the impact of occupational diseases at a national level? The Netherlands as an example. Occup Environ Med. 2019 Jan;76(1):30-32. doi: 10.1136/oemed-2018-105387. Epub 2018 Oct 8. PMID: 30297528; PMCID: PMC6327862.	Wrong study design (more recent SR available)
Yanai K, Tajika T, Arisawa S, Hatori Y, Honda A, Hasegawa S, Nakajima I, Goto W, Chikuda H. Prevalence and factors associated with lateral epicondylitis among hospital healthcare workers. JSES Int. 2024 Feb 8;8(3):582-587. doi: 10.1016/j.jseint.2024.01.008. PMID: 38707555; PMCID: PMC11064715.	Wrong study design: cross-sectional study
Zamudio-Muñoz LA, Urbiola-Verdejo M, Sánchez-Vizcaíno PM. Factores sociodemográficos y laborales asociados con epicondilitis lateral de codo [Social, demographic and laboral factors associated with the presence of lateral elbow epicondylitis]. Rev Med Inst Mex Seguro Soc. 2011 Jan-Feb;49(1):59-64. Spanish. PMID: 21513662.	Article in Spanish

5

Literature search strategy

Algemene informatie

Cluster/richtlijn: Tennisarm en Golfarm - UV5.1 Risicofactoren	
Uitgangsvraag/modules: Wat zijn risicofactoren voor het ontstaan van laterale epicondylaire tendinopathie of mediale epicondylaire tendinopathie?	
Database(s): Embase.com, Ovid/Medline	Datum: 7 mei 2025
Periode: vanaf 2005	Talen: geen restrictie
Literatuurspecialist: Esther van der Bijl	Rayyan review: https://new.rayyan.ai/reviews/1443679/overview
BMI-zoekblokken: voor verschillende opdrachten wordt (deels) gebruik gemaakt van de zoekblokken van BMI-Online https://blocks.bmi-online.nl/ Deduplication: voor het ontdubbelen is gebruik gemaakt van http://dedupendnote.nl/	
Toelichting: Voor deze vraag is gezocht op de elementen tennisarm/ golfarm EN risicofactoren . De sleutelartikelen worden gevonden met deze search.	

Te gebruiken voor richtlijntekst:

A systematic literature search was performed by a medical information specialist using the following bibliographic databases: Embase.com and Ovid/Medline. Both databases were searched from 2005 to the 7th of May 2025 for systematic reviews and observational studies. Systematic searches were completed using a combination of controlled vocabulary/subject headings (e.g., Emtree-terms, MeSH) wherever they were available and natural language keywords. The overall search strategy was derived from two primary search concepts: (1) lateral/ medial epicondylitis; (2) risk factors. Duplicates were removed using EndNote software. After deduplication a total of 454 records were imported for title/abstract screening.

5

Zoekopbrengst - 7 mei 2025

	EMBASE	OVID/MEDLINE	Ontdubbeld
SR	164	126	176
Observationele studies	255	144	278
Totaal	419	270	454*

*in Rayyan

Zoekstrategie - 7 mei 2025

10

Embase.com

No.	Query	Results
#1	'tennis elbow'/exp OR 'medial epicondylitis'/exp OR (((tennis* OR golf*) NEAR/3 (arm* OR elbow*)):ti,ab,kw) OR (((epicondylit* OR epycondylit* OR epicondylitid* OR epycondylitid*) NEAR/3 (humer* OR lateral* OR external* OR radiohumer* OR medial*)):ti,ab,kw) OR (((elbow* OR epicondyl* OR ecrb) NEAR/7 (tendinopath* OR tendonopath* OR tendinos*)):ti,ab,kw) OR (((lateral* OR medial*) NEAR/3 elbow* NEAR/3 pain*):ti,ab,kw) OR epicondylalg*:ti,ab,kw OR epicondylalg*:ti,ab,kw	5000
#2	'risk'/exp OR 'prediction'/exp OR (((factor* OR indicator*) NEAR/4 (predict* OR contribut* OR predispos* OR caus* OR underly* OR associat* OR influenc*)):ti,ab,kw) OR risk*:ti,ab,kw OR contributor*:ti,ab,kw	7122433
#3	#1 AND #2	738
#4	#3 AND [2005-2025]/py NOT ('conference abstract'/it OR 'editorial'/it OR 'letter'/it OR 'note'/it) NOT (('animal'/exp OR 'animal experiment'/exp OR 'animal model'/exp OR 'nonhuman'/exp) NOT 'human'/exp)	539
#5	'meta analysis'/exp OR 'systematic review'/exp OR 'scoping review'/exp OR 'rapid review'/exp OR 'umbrella review'/exp OR 'cochrane database of systematic reviews'/jt OR 'network meta-analysis'/exp OR 'networkmeta analy*':ti,ab,kw OR 'networkmetaanaly*':ti,ab,kw OR metaanaly*:ti,ab,kw OR 'meta analy*':ti,ab,kw OR metanaly*:ti,ab,kw OR prisma:ti,ab,kw OR prospero:ti,ab,kw OR metaanali*:ti,ab,kw OR 'meta anali*':ti,ab,kw OR metanali*:ti,ab,kw OR (((systemati* OR scoping OR umbrella OR 'structured literature') NEAR/3 (review* OR overview*)):ti,ab,kw) OR (((structured OR systemic*) NEAR/3 (review* OR overview* OR synth*) NEAR/3 literature):ti,ab,kw) OR ((systemic* NEAR/1 review*):ti,ab,kw) OR (((systemati* OR literature OR database* OR 'data base*') NEAR/10 search*):ti,ab,kw) OR (((structured OR comprehensive* OR systemic*) NEAR/3 search*):ti,ab,kw) OR (((literature NEAR/3 (review* OR overview*)):ti,ab,kw) AND (search*:ti,ab,kw OR database*:ti,ab,kw OR 'data base*':ti,ab,kw)) OR (('data extraction*':ti,ab,kw OR 'data source*':ti,ab,kw) AND ('study selection*':ti,ab,kw OR 'studies selection*':ti,ab,kw)) OR ('search strateg*':ti,ab,kw AND 'selection criteria*':ti,ab,kw) OR ('data source*':ti,ab,kw AND 'data synth*':ti,ab,kw) OR medline*:ti,ab,kw OR pubmed*:ti,ab,kw OR 'pub med*':ti,ab,kw OR embase:ti,ab,kw OR cochrane*:ti,ab,kw OR (((critical* OR rapid*) NEAR/2 (review* OR overview* OR synth*)):ti) OR (((critical* OR rapid*) NEAR/3 (review* OR overview* OR synth*)):ab) AND (search*:ab OR database*:ab OR 'data base*':ab)) OR metasynth*:ti,ab,kw OR 'meta synth*':ti,ab,kw OR 'review* of review*':ti,ab,kw	1108719

#6	'major clinical study'/de OR 'clinical study'/de OR 'family study'/de OR 'longitudinal study'/de OR 'retrospective study'/de OR 'prospective study'/de OR 'cohort analysis'/de OR 'case control study'/de OR 'comparative study'/exp OR 'control group'/de OR 'controlled study'/de OR 'controlled clinical trial'/de OR 'crossover procedure'/de OR 'double blind procedure'/de OR 'phase 2 clinical trial'/de OR 'phase 3 clinical trial'/de OR 'phase 4 clinical trial'/de OR 'pretest posttest design'/de OR 'pretest posttest control group design'/de OR 'quasi experimental study'/de OR 'single blind procedure'/de OR 'triple blind procedure'/de OR ((cohort NEAR/1 (study OR studies)):ab,ti) OR (('case control' NEAR/1 (study OR studies)):ab,ti) OR (('follow up' NEAR/1 (study OR studies)):ab,ti) OR (observational NEAR/1 (study OR studies)) OR ((epidemiologic NEAR/1 (study OR studies)):ab,ti) OR (('cross sectional' NEAR/1 (study OR studies)):ab,ti) OR (((control OR controlled) NEAR/6 trial):ti,ab,kw) OR (((control OR controlled) NEAR/6 (study OR studies)):ti,ab,kw) OR (((control OR controlled) NEAR/1 active):ti,ab,kw) OR 'open label*':ti,ab,kw OR (((double OR two OR three OR multi OR trial) NEAR/1 (arm OR arms)):ti,ab,kw) OR ((allocat* NEAR/10 (arm OR arms)):ti,ab,kw) OR placebo*':ti,ab,kw OR 'sham-control*':ti,ab,kw OR (((single OR double OR triple OR assessor) NEAR/1 (blind* OR masked)):ti,ab,kw) OR nonrandom*':ti,ab,kw OR 'non-random*':ti,ab,kw OR 'quasi-experiment*':ti,ab,kw OR crossover:ti,ab,kw OR 'cross over':ti,ab,kw OR 'parallel group*':ti,ab,kw OR 'factorial trial':ti,ab,kw OR ((phase NEAR/5 (study OR trial)):ti,ab,kw) OR ((case* NEAR/6 (matched OR control*)):ti,ab,kw) OR ((match* NEAR/6 (pair OR pairs OR cohort* OR control* OR group* OR healthy OR age OR sex OR gender OR patient* OR subject* OR participant*)):ti,ab,kw) OR ((propensity NEAR/6 (scor* OR match*)):ti,ab,kw) OR versus:ti OR vs:ti OR compar*:ti OR ((compar* NEAR/1 study):ti,ab,kw) OR (('observational study'/de OR 'cross-sectional study'/de OR 'multicenter study'/de OR 'correlational study'/de OR 'follow up'/de OR cohort*:ti,ab,kw) OR 'follow up':ti,ab,kw) OR followup:ti,ab,kw) OR longitudinal*:ti,ab,kw) OR prospective*:ti,ab,kw) OR retrospective*:ti,ab,kw) OR observational*:ti,ab,kw) OR 'cross sectional*':ti,ab,kw) OR cross?ectional*:ti,ab,kw) OR multicent*:ti,ab,kw) OR 'multi-cent*':ti,ab,kw) OR consecutive*:ti,ab,kw) AND (group:ti,ab,kw) OR groups:ti,ab,kw) OR subgroup*:ti,ab,kw) OR versus:ti,ab,kw) OR vs:ti,ab,kw) OR compar*:ti,ab,kw) OR 'odds ratio*':ab) OR 'relative odds':ab) OR 'risk ratio*':ab) OR 'relative risk*':ab) OR 'rate ratio':ab) OR aor:ab) OR arr:ab) OR rrr:ab) OR (((('or' OR 'rr') NEAR/6 ci):ab)))	18133082
#7	#4 AND #5 - SR	164
#8	#4 AND #6 NOT #7 - Observatieel	255
#9	#7 OR #8 - Totaal	419

5

Ovid/Medline

#	Searches	Results
1	exp Tennis Elbow/ or exp Elbow Tendinopathy/ or ((tennis* or golf*) adj3 (arm* or elbow*)):ti,ab,kf. or ((epicondylit* or epycondylit* or epicondylitid* or epycondylitid*) adj3 (humer* or lateral* or external* or radiohumer* or medial*)):ti,ab,kf. or ((elbow* or epicondyl* or ecrb) adj7 (tendinopath* or tendonopath* or tendinos*)):ti,ab,kf. or ((lateral* or medial*) adj3 elbow* adj3 pain*)):ti,ab,kf. or epicondylg*.ti,ab,kf.	3490
2	exp Risk Factors/ or exp Health Risk Behaviors/ or Risk/ or ((factor* or indicator*) adj4 (predict* or contribut* or predispos* or caus* or underly* or associat* or influenc*)):ti,ab,kf. or risk*.ti,ab,kf. or contributor*.ti,ab,kf.	4387679
3	1 and 2	474
4	limit 3 to yr="2005 -Current"	374
5	4 not (comment/ or editorial/ or letter/) not ((exp animals/ or exp models, animal/) not humans/)	370

6	exp Meta-Analysis/ or exp Network Meta-Analysis/ or exp Systematic Review/ or (networkmeta analy* or networkmetaanaly* or metaanaly* or meta analy* or metanaly* or prisma or prospero or metaanali* or meta anali* or metanali*).ti,ab,kf. or ((systemati* or scoping or umbrella or structured literature) adj3 (review* or overview*)).ti,ab,kf. or ((structured or systemic*) adj3 (review* or overview* or synth*) adj3 literature).ti,ab,kf. or (systemic* adj1 review*).ti,ab,kf. or ((systemati* or literature or database* or data base*) adj10 search*).ti,ab,kf. or ((structured or comprehensive* or systemic*) adj3 search*).ti,ab,kf. or ((literature adj3 (review* or overview*)) and (search* or database* or data base*)).ti,ab,kf. or ((data extraction* or data source*) and (study selection* or studies selection*)).ti,ab,kf. or (search strateg* and selection criteria*).ti,ab,kf. or (data source* and data synth*).ti,ab,kf. or (medline* or pubmed* or pub med* or embase or cochrane*).ti,ab,kf. or cochrane.jw. or ((critical* or rapid*) adj2 (review* or overview* or synth*)).ti. or (((critical* or rapid*) adj3 (review* or overview* or synth*)) and (search* or database* or data base*)).ab. or metasynth*.ti,ab,kf. or meta synth*.ti,ab,kf.	832507
7	Case-control Studies/ or clinical trial, phase ii/ or clinical trial, phase iii/ or clinical trial, phase iv/ or comparative study/ or control groups/ or controlled before-after studies/ or controlled clinical trial/ or double-blind method/ or historically controlled study/ or matched-pair analysis/ or single-blind method/ or (((control or controlled) adj6 (study or studies or trial)) or (compar* adj (study or studies)) or ((control or controlled) adj1 active) or "open label*" or ((double or two or three or multi or trial) adj (arm or arms)) or (allocat* adj10 (arm or arms)) or placebo* or "sham-control*" or ((single or double or triple or assessor) adj1 (blind* or masked)) or nonrandom* or "non-random*" or "quasi-experiment*" or "parallel group*" or "factorial trial" or "pretest posttest" or (phase adj5 (study or trial)) or (case* adj6 (matched or control*)) or (match* adj6 (pair or pairs or cohort* or control* or group* or healthy or age or sex or gender or patient* or subject* or participant*)) or (propensity adj6 (scor* or match*)).ti,ab,kf. or (confounding adj6 adjust*).ti,ab. or (versus or vs or compar*).ti. or exp cohort studies/ or epidemiologic studies/ or ((multicenter study/ or observational study/ or seroepidemiologic studies/ or (cohort* or 'follow up' or followup or longitudinal* or prospective* or retrospective* or observational* or multicent* or 'multi-cent*' or consecutive*).ti,ab,kf.) and ((group or groups or subgroup* or versus or vs or compar*).ti,ab,kf. or ('odds ratio*' or 'relative odds' or 'risk ratio*' or 'relative risk*' or aor or arr or rrr).ab. or (('OR" or "RR") adj6 CI).ab.)) or Case control.tw. or cohort.tw. or Cohort analy\$.tw. or (Follow up adj (study or studies)).tw. or (observational adj (study or studies)).tw. or Longitudinal.tw. or Retrospective*.tw. or prospective*.tw. or consecutive*.tw. or Cross sectional.tw. or Cross-sectional studies/ or historically controlled study/ or interrupted time series analysis/	8040735
8	5 and 6 - SR	126
9	(5 and 7) not 8 - Observatieel	144
10	8 or 9 - Totaal	270

5

5 Submodule 5.2 Prognostische factoren

Uitgangsvraag

Wat zijn behandelbare prognostische factoren bij patiënten met een laterale of mediale epicondylaire tendinopathie die voorspellend zijn voor langdurige klachten?

10

Introduction (English)

It is unclear which (modifiable) factors lead to long-term symptoms (> 1 year). Treating modifiable factors enhances recovery and reduces the risk of recurrence. Providing education to patients about these factors support recovery.

15

Search and select

A systematic review of the literature was performed to answer the following question(s): Which treatable prognostic factors could predict lateral epicondylitis or medial epicondylitis with a duration >1 year?

20

Table 1. PICO

Patients	Patients with lateral or medial epicondylar tendinopathy complaints > 1 year, lateral humeral epicondylitis, medial humeral epicondylitis
Intervention	Age, gender, change in BMI, smoking, other comorbidities (diabetes mellitus, rheumatic diseases), work- and sport-related risk factors, depression, anxiety, load.
Control	Patients who recovered < 1 year
Outcomes	Clinical outcome measures, such as disease duration, chance of recurrence, treatment, return to sports/work
Other selection criteria	Study design: systematic reviews and other comparative reviews Minimal follow-up: > 1 year

Relevant outcome measures

25 The guideline panel defined an odds ratio (OR) of >1.0 as prognostic factor.

Search and select (Methods)

A systematic literature search was performed by a medical information specialist using the following bibliographic databases: Embase.com and Ovid/Medline. Both databases were searched from 2005 to the 7th of May 2025 for systematic reviews and observational studies. Systematic searches were completed using a combination of controlled vocabulary/subject headings (e.g., Emtree-terms, MeSH) wherever they were available and natural language keywords. The overall search strategy was derived from two primary search concepts: (1) lateral/ medial epicondylitis; (2) risk factors. Duplicates were removed using EndNote software. After deduplication a total of 454 records were imported for title/abstract screening. Initially, 71 studies were selected based on title and abstract screening. After reading the full text, 70 studies were excluded (see the exclusion table under the tab 'Evidence tabellen'), and one study was included.

30

35

40 Summary of literature

Description of studies

One study was included in the analysis of the literature. Important study characteristics and results are summarized in table 2. No GRADE assessment was performed, as no studies were

5 identified that used internally and externally validated multifactorial models. To provide some direction for the literature analysis, the study by Werner (2005) was included because it aligns with the PICO question.

10 **Werner (2005)** performed a prospective cohort study to assess a cohort of automobile assembly workers, representing a moderately high-risk occupation, over a one-year period to determine factors influencing the persistence of active elbow pain. This study compared active workers with medial or lateral epicondylar tendinopathy whose symptoms resolved after baseline with those who had persistent elbow pain. Subjects were classified as having lateral or medial epicondylar tendinopathy if they reported elbow pain, aching, stiffness, or burning and demonstrated symptom reproduction on physical examination with resisted loading of the muscles attaching to the medial or lateral epicondyle, or tenderness on palpation of the medial or lateral epicondyle. Cases were classified as resolved if participants reported complete symptom resolution at 6 or 12 months following study entry. Follow-up data were collected using a self-administered questionnaire that asked about elbow or forearm discomfort occurring three or more times or lasting longer than one week during the preceding six months. In total, 45 workers with active elbow tendinopathy were included. Nineteen participants had persistent complaints and 26 cases resolved. Persistent symptoms were more common among women. The groups did not differ in hand dominance or rheumatoid arthritis, while diabetes prevalence and BMI tended to be higher in persistent cases. Symptoms in other upper-extremity regions and the prevalence of carpal tunnel syndrome were similar between groups. Psychosocial variables were comparable between groups, with the exception of perceived coworker support and decision authority, both of which were lower among subjects with persistent symptoms. Rates of visits to the in-plant medical department and numbers of workers' compensation cases were similar in both groups. Ergonomic factors were largely comparable, although workers with persistent symptoms demonstrated higher hand repetition rates and tended to exhibit greater deviation of the wrist from a neutral posture.

Table 2. Characteristics of included studies

Study	Participants	Follow-up	Confounders	Exposure
Werner, 2005	N=45 workers: 26 resolved cases 19 persistent cases <u>Age (y)</u> Overall: 48 Resolved cases: 47.7 Persistent cases: 49.0 <u>BMI (kg/m²)</u> Overall: 29.2 Resolved cases: 28.3 Persistent cases: 30.9 <u>Sex (% female)</u> Overall: 40% Resolved cases: 23.1% Persistent cases: 52.6%	Mean: 13 months	Demographic, ergonomic, and medical history variables with p < 0.15	Factors related to persistent symptoms

35

5 **Results**

Disease duration

Werner (2005) reported that an older age, higher hand repetition level for their job(s), more deviation from a neutral wrist position during the work activity, and lower perceived decision authority on the job were predictive of persistent symptoms (>1 year) for LET (table 3). The model demonstrated relatively high sensitivity (80%) and specificity (78%), with an area under the receiver operating characteristic curve of 0.86.

Table 3. Prognostic factors for persistent symptoms (>1 year) of LET

Prognostic factor	OR (95% CI)
Age	1.1 (0.99 to 1.33)
Repetition	2.5 (1.00 to 6.25)
Peak wrist flex/ext	2.0 (0.80 to 5.56)
Decision authority	0.9 (0.79 to 0.98)

15

Chance of recurrence

Not reported.

Treatment

20

Not reported.

Return to sports/work

Not reported.

25

Overwegingen – van bewijs naar aanbeveling (NL)

Balans tussen gewenste en ongewenste effecten

30 Ter bevordering van het herstel van patiënten met langdurige klachten (>1 jaar) omtrent een laterale of mediale epicondylaire tendinopathie is literatuuronderzoek gedaan naar beïnvloedbare prognostische factoren. De gevonden literatuur suggereert dat het aanpassen van belastende activiteiten kan worden geadviseerd met nadruk op het (tijdelijk) reduceren van repeterende handbelasting en het bevorderen van een neutrale polspositie. Daarnaast is het van belang werkbelasting en beslissingsbevoegdheid te bespreken en zo nodig door te verwijzen naar de bedrijfsarts. Houd ook rekening met niet-beïnvloedbare factoren die het herstel kunnen vertragen, zoals hogere leeftijd. Voorlichting en belastingadviezen zijn
35 aangewezen bij alle patiënten, ongeacht de ernst en duur van de klachten.

Gewenste effecten

Het systematisch nagaan en bespreken van beïnvloedbare prognostische factoren (met name repeterende handbelasting en niet-neutrale polspositie) kan leiden tot betere
40 afstemming tussen belasting en belastbaarheid. Dit kan bijdragen aan vermindering van provocerende belasting, herstelbevordering en mogelijk minder persisterende klachten. Het bewijs hiervoor is beperkt en gebaseerd op één prospectieve cohortstudie. Desondanks zijn voorlichting en praktische adviezen over belasting, laagdrempelige interventies die aansluiten bij principes van load-management.

45

Ongewenste effecten

Belastingadviezen en/of werkaanpassingen kunnen leiden tot tijdelijke beperkingen in werk of sport, met mogelijke psychosociale en financiële consequenties en spanningen op de

5 werkvloer. Heldere communicatie en gezamenlijke besluitvorming kunnen deze nadelen beperken.

Kwaliteit van bewijs

Niet van toepassing.

10

Waarden en voorkeuren van patiënten (en eventueel hun naasten/verzorgers)

Patiënten kunnen verschillen in de mate waarin zij tijdelijke aanpassing van werk/sportbelasting acceptabel vinden, zeker als dit gevolgen heeft voor functioneren, inkomen of sportdeelname. Sommige patiënten geven prioriteit aan snel klachtenvrij worden, anderen aan zo veel mogelijk doorwerken/doorgaan met sport. Het bespreken van persoonlijke doelen en randvoorwaarden (werk, sport, thuissituatie) is daarom belangrijk voor passende belastingadviezen. Shared decision-making helpt om realistische verwachtingen en een haalbaar plan te maken.

20

Kostenaspecten

Kosten kunnen ontstaan door extra benodigde consulttijd, verwijzing naar de bedrijfsarts en eventuele aanpassingen op de werkplek. Voor de patiënt kunnen daarnaast indirecte kosten optreden, zoals inkomensverlies bij (tijdelijke) werkreductie of kosten voor aanvullende zorg die niet volledig wordt vergoed. Daartegenover staan potentiële maatschappelijke besparingen door vermindering van klachtenduur en arbeidsverzuim, evenals mogelijke individuele baten in de vorm van sneller functioneel herstel en behoud van inzetbaarheid.

25

Gelijkheid ((health) equity/equitable)

Mogelijk heeft niet iedere patiënt gelijke mogelijkheden om repeterende belasting te verminderen of werk aan te passen. Patiënten met een lage sociaaleconomische positie, tijdelijk contract, beperkte beslissingsbevoegdheid of beperkte toegang tot bedrijfsgezondheidszorg en ergonomische ondersteuning hebben mogelijk minder ruimte voor taakaanpassing. Dit kan onbedoeld leiden tot verschillen in herstelkansen en gezondheid. Het actief betrekken van de bedrijfsarts en het formuleren van haalbare, context-specifieke adviezen is daarom belangrijk om ongelijkheid te beperken.

35

Aanvaardbaarheid

Voorlichting, belastingadvies en het bespreekbaar maken van werkfactoren zijn aanvaardbaar. Adviezen kunnen invloed hebben op autonomie, werkzekerheid en inkomen, derhalve is gezamenlijke besluitvorming belangrijk. Verwijzing naar de bedrijfsarts kan helpen bij een zorgvuldige afweging tussen gezondheid en werk.

40

Haalbaarheid

Het inventariseren van repeterende handbelasting, polspositie en psychosociale werkfactoren is in de spreekkamer goed uitvoerbaar. De implementatie van aanpassingen is afhankelijk van de werksituatie, medewerking van de werkgever en betrokkenheid van de bedrijfsarts. In de sportcontext zijn aanpassingen doorgaans haalbaar via coaching, techniekoptimalisatie en loadmanagement. Een gefaseerde aanpak met concrete, meetbare adviezen vergroot de uitvoerbaarheid.

50

Aanbeveling

Rationale van de aanbeveling: weging van argumenten voor en tegen de interventies

Het beperkte bewijs bestaande uit één kleine prospectieve cohortstudie suggereert dat repeterende handbelasting en een niet-neutrale polspositie geassocieerd zijn met

55 persisterende klachten van LET of MET. Echter zijn voorlichting en belastingaanpassing laag-

5 risico interventies die aansluiten bij loadmanagement. Daarom weegt de werkgroep de potentiële voordelen van voorlichting over deze prognostische factoren zwaarder dan de nadelen en doet zij een (zwakke) aanbeveling om deze factoren systematisch tijdens een consult te bespreken.

10 Eindoordeel:

Sterke aanbeveling voor het geven van voorlichting aan de patiënt met LET of MET over prognostische factoren voor langdurige klachten.

Informeert de patiënt over de volgende prognostische factoren die het herstel van een laterale of mediale epicondylaire tendinopathie kunnen vertragen:

- Repeterende belasting op de hand;
- Het gebruik van een niet-neutrale polspositie;
- Hogere leeftijd.

15 **Kennisvragen**

Tijdens de ontwikkeling van deze module is gebleken dat er binnen deze module nog te weinig bewijs is voor de onderbouwing van de aanbeveling en er dus kennisvragen bestaan. De werkgroep meent dat (vervolg)onderzoek wenselijk is om in de toekomst een duidelijker antwoord te kunnen geven op vragen uit de praktijk.

20

Kennisvragen:

Welke (beïnvloedbare) prognostische factoren zijn onafhankelijk geassocieerd met persisterende klachten (>1 jaar) bij laterale of mediale epicondylaire tendinopathie? Leidt het gericht adresseren van geïdentificeerde prognostische factoren (bijvoorbeeld reductie van repeterende belasting of optimalisatie van polspositie) tot een vermindering van persisterende klachten of recidief?

25

Toelichting:

Het huidige bewijs is gebaseerd op één kleine beroepscohortstudie (n=45). Grootschalige, prospectieve cohortstudies in zowel werk- als sportpopulaties zijn nodig om onafhankelijke prognostische factoren te identificeren en voor confounding adequaat te corrigeren. Daarnaast is er geen bewijs dat het aanpassen van deze factoren daadwerkelijk het beloop beïnvloedt. Interventiestudies of pragmatische trials zijn nodig om te onderzoeken of prognostisch gestuurde belastingaanpassing leidt tot betere klinische uitkomsten.

35

Implementatieplan

Implementatietabel

Vraag	Antwoord: <i>Kruis aan en licht toe/ beschrijf</i>		Toelichting keuze:
I1. Wat was het onderliggende probleem om deze uitgangsvraag uit te werken?		Ongewenste praktijkvariatie	
		Nieuwe evidentie	
	X	Anders	Er was onvoldoende inzicht in factoren die geassocieerd zijn met langdurige klachten (>1j) van een tennis- of golfarm.
	< 1000		

12. Maak een inschatting over hoeveel patiënten het ongeveer gaat waar de aanbeveling betrekking op heeft?		< 5000	
	X	5000-40.000	
		> 40.000	
13. Is de aanbeveling onderdeel van een bredere set interventies of verwant aan andere richtlijnen of modules? Zo ja, hoe verhoudt zij zich daartoe en moet hiermee rekening worden gehouden bij de implementatie, of kan de aanbeveling als losstaand worden beschouwd?		Ja	
	X	Nee	
14. Belemmeringen en kansen op verschillende niveaus voor landelijke toepassing van de aanbeveling:		Belemmerende factoren	Bevorderende factoren/ kansen
Richtlijn/ klinisch traject (innovatie)	X	Bewijs is grotendeels observationeel, waardoor urgentie of prioriteit kan verschillen.	Laag-risico en eenvoudig toepasbare adviezen die uniformiteit in voorlichting bevorderen.
Zorgverleners (artsen en verpleegkundigen)	X	Beperkte consulttijd	Adviezen zijn makkelijk te integreren in het standaardconsult en versterken verwachtingsmanagement en zelfmanagement
Patiënt/ cliënt (naasten)	X	Moeite met aanpassen van werk- of sportbelasting en mogelijke demotivatie bij informatie over langduriger herstel op hogere leeftijd.	Duidelijke uitleg en begeleiding vergroot inzicht in de klachten, therapietrouw (tijdelijk) aanpassingsvermogen en actieve betrokkenheid bij herstel.
Sociale context	X	Werkdruk, beperkte autonomie en sportcultuur gericht op doorbelasting.	Aandacht voor duurzame inzetbaarheid en betrokkenheid van werkgever, bedrijfsarts of coach kan herstel ondersteunen.
Organisatorische context	X		Eenvoudig te implementeren via vaste consultstructuur of standaardvoorlichtingsmateriaal
Financiële en juridische context	X	Tijdelijke werkreductie of werkplekaanpassingen kunnen kosten met zich meebrengen. Werkgerelateerde adviezen kunnen arbeidsrechtelijk gevoelig liggen.	Preventieve adviezen kunnen langdurige klachten en verzuim verminderen. Goede dossiervoering en gezamenlijke besluitvorming beperken risico's en vergroten transparantie.
15. A) Welke personen/partijen zijn van belang bij het		A	B
		Patiënt/ cliënt (naaste)	

toepassen van de aanbeveling in de praktijk? (kruis aan) B) Wat is er nodig van deze personen/partijen om de aanbeveling in de praktijk te kunnen brengen? Denk aan aanpassingen in gedrag, werkwijzen, beleid, samenwerking of andere randvoorwaarden.	X	Professional	De zorgprofessional moet kennis hebben van prognostische factoren, deze systematisch uitvragen, duidelijke voorlichting geven en samen met de patiënt haalbare afspraken maken over belastingaanpassing, zo nodig in samenwerking met andere disciplines.
		Beroepsvereniging, nl	
		Ziekenhuis (raad van bestuur/UMCNL (voorheen NFU)/NVZ)	
		Zorgverzekeraars/ NZa	
		Zorginstituut [duiding nodig]	
		Anders	
16. Binnen welk tijdsbestek moet de aanbeveling zijn geïmplementeerd?	X	< 1 jaar	Eenvoudig te integreren in consult
		binnen 2-3 jaar	
17. Conclusie: is er extra actie en/of ondersteuning nodig voor implementatie van de aanbeveling? <i>De reguliere implementatieroutes (publicatie en disseminatie via officiële kanalen, opname in professionele standaarden, scholing en nascholing, gebruik van bestaande ICT systemen, audits en visitaties) van de richtlijnmodule alleen is onvoldoende.</i>		Ja	
	X	Nee	De reguliere implementatieroutes van de richtlijnmodule is voldoende.
18. Plaatsing op de Landelijke Implementatieagenda Medisch Specialistische zorg is gewenst. <i>Het gaat om zorg die (grotendeels) wordt uitgevoerd binnen de ziekenhuismuren. Succesvolle implementatie vraagt om actieve betrokkenheid en samenwerking van meerdere relevante partijen binnen de zorgpraktijk.</i>		Ja *	
	X	Nee	Zie boven, implementatie kan via reguliere kanalen plaatsvinden.

5 *Deze aanbeveling komt mogelijk in aanmerking voor plaatsing op de Landelijke Implementatieagenda van het programma Zorg Evaluatie & Gepast Gebruik (ZE&GG), waarin alle betrokken partijen in de medisch-specialistische zorg samenwerken aan de implementatie van bewezen beste zorg. De Federatie levert namens het veld goed onderbouwde aanbevelingen aan, die zijn getoetst op de behoefte aan een implementatie-impuls. De

10 onderwerpen op de Implementatieagenda zijn onderdeel van landelijke zorginkoopafspraken tussen zorgverzekeraars en zorgaanbieders. Voor de beoordeling van aanbevelingen uit richtlijnen wordt gebruikgemaakt van de implementatietabel. Op basis hiervan kunnen we de andere partijen goed informeren en gezamenlijk besluiten of plaatsing op de Implementatieagenda passend is.

5 **Literatuur**

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10

5 Bijlagen bij submodule Prognostische factoren

Table of excluded studies

Reference	Reason for exclusion
Aben A, De Wilde L, Hollevoet N, Henriquez C, Vandeweerd M, Ponnet K, Van Tongel A. Tennis elbow: associated psychological factors. <i>J Shoulder Elbow Surg.</i> 2018 Mar;27(3):387-392. doi: 10.1016/j.jse.2017.11.033. PMID: 29433642.	Not about long-term complaints >1 year
Ackermann PW, Renström P. Tendinopathy in sport. <i>Sports Health.</i> 2012 May;4(3):193-201. doi: 10.1177/1941738112440957. PMID: 23016086; PMCID: PMC3435934.	Narrative review
Afzal M, Zakauallah S, Memon SI, Nisar A, Touqeer H, Shabir H. Prevalence and risk factors of lateral epicondylitis among restaurant cooks at district Gujranwala: A cross-sectional study. <i>Rawal Med J.</i> 2021 Jun 12;46(2):338.	Not about long-term complaints >1 year
Alakhdar Mohmara Y, Cook J, Benítez-Martínez JC, McPeck ER, Aguilar AA, Olivas ES, Hernandez-Sanchez S. Influence of genetic factors in elbow tendon pathology: a case-control study. <i>Sci Rep.</i> 2020 Apr 16;10(1):6503. doi: 10.1038/s41598-020-63030-7. PMID: 32300121; PMCID: PMC7162873.	Not about long-term complaints >1 year
Altinisik J, Meric G, Erduran M, Ates O, Ulusal AE, Akseki D. The BstUI and DpnII Variants of the COL5A1 Gene Are Associated With Tennis Elbow. <i>Am J Sports Med.</i> 2015 Jul;43(7):1784-9. doi: 10.1177/0363546515578661. Epub 2015 Apr 20. PMID: 25896984.	Not about long-term complaints >1 year
Altintas B, Greiner S. Lateral epicondylitis: conservative-operative. <i>Der Orthopade.</i> 2016 Oct 1;45(10):870-7.	Foreign language
Amaro AM, Paulino MF, Neto MA, Roseiro L. Hand-Arm Vibration Assessment and Changes in the Thermal Map of the Skin in Tennis Athletes during the Service. <i>Int J Environ Res Public Health.</i> 2019 Dec 14;16(24):5117. doi: 10.3390/ijerph16245117. PMID: 31847390; PMCID: PMC6949913.	Not about prognostic factors
Amjad F, Matloob M, Javed NU, Hashim A, Chaudhry A, Zafar B, Khan K. Work-related risk factors for lateral epicondylitis in chef in Lahore. <i>Pakistan Journal of Medical & Health Sciences.</i> 2023 Feb 21;17(01):241	Not about long-term complaints
Arirachakaran A, Sukthuyat A, Sisayanarane T, Laoratanavoraphong S, Kanchanatawan W, Kongtharvonskul J. Platelet-rich plasma versus autologous blood versus steroid injection in lateral epicondylitis: systematic review and network meta-analysis. <i>J Orthop Traumatol.</i> 2016 Jun;17(2):101-12. doi: 10.1007/s10195-015-0376-5. Epub 2015 Sep 11. PMID: 26362783; PMCID: PMC4882297.	Intervention effectiveness
Benjamin M, Toumi H, Ralphs JR, Bydder G, Best TM, Milz S. Where tendons and ligaments meet bone: attachment sites ('entheses') in relation to exercise and/or mechanical load. <i>J Anat.</i> 2006 Apr;208(4):471-90. doi: 10.1111/j.1469-7580.2006.00540.x. PMID: 16637873; PMCID: PMC2100202.	Narrative review
Bretschneider SF, Los FS, Eygendaal D, Kuijer PPFM, van der Molen HF. Work-relatedness of lateral epicondylitis: Systematic review including meta-analysis and GRADE work-relatedness of lateral epicondylitis. <i>Am J Ind Med.</i> 2022 Jan;65(1):41-50. doi: 10.1002/ajim.23303. Epub 2021 Oct 21. PMID: 34674287; PMCID: PMC9297967.	Not about long-term complaints >1 year

Bugajska J, Zołnierczyk-Zreda D, Jędryka-Góral A, Gasik R, Hildt-Ciupińska K, Malińska M, Bedyńska S. Psychological factors at work and musculoskeletal disorders: a one year prospective study. <i>Rheumatol Int.</i> 2013 Dec;33(12):2975-83. doi: 10.1007/s00296-013-2843-8. Epub 2013 Aug 11. PMID: 23934521; PMCID: PMC3832752.	Not about long-term complaints >1 year
Chen Q, Shen P, Zhang B, Chen Y, Zheng C. A meta-analysis of the risk factors for lateral epicondylitis. <i>J Hand Ther.</i> 2024 Jan-Mar;37(1):44-52. doi: 10.1016/j.jht.2023.05.013. Epub 2023 Aug 12. PMID: 37580201.	Not about long-term complaints >1 year
Chiarotto A, Gerger H, van Rijn RM, Elbers RG, Sjøgaard K, Macri EM, Jackson JA, Burdorf A, Koes BW. Physical and psychosocial work-related exposures and the occurrence of disorders of the elbow: A systematic review. <i>Appl Ergon.</i> 2023 Apr;108:103952. doi: 10.1016/j.apergo.2022.103952. Epub 2022 Dec 6. PMID: 36493677.	Not about long-term complaints >1 year
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Fan ZJ, Silverstein BA, Bao S, Bonauto DK, Howard NL, Smith CK. The association between combination of hand force and forearm posture and incidence of lateral epicondylitis in a working population. <i>Hum Factors.</i> 2014 Feb;56(1):151-65. doi: 10.1177/0018720813492327. PMID: 24669550.	Not about long-term complaints >1 year, but incidence of new cases
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Garg A, Kapellusch JM, Hegmann KT, Thiese MS, Merryweather AS, Wang YC, Malloy EJ. The strain index and TLV for HAL: risk of lateral epicondylitis in a prospective cohort. <i>Am J Ind Med.</i> 2014 Mar;57(3):286-302. doi: 10.1002/ajim.22279. Epub 2013 Nov 16. PMID: 24243166.	Not about long-term complaints >1 year, but incidence of new cases
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Kholinne E, Liu H, Kim H, Kwak JM, Koh KH, Jeon IH. Systematic Review of Elbow Instability in Association With Refractory Lateral Epicondylitis: Myth or Fact? <i>Am J Sports Med</i> . 2021 Jul;49(9):2542-2550. doi: 10.1177/0363546520980133. Epub 2021 Jan 12. PMID: 33433240.	The focus is on diagnostic approaches and surgery, not really on risk factors as intended in the established PICO
Kim M, Yoo JI, Kim MJ, Na JB, Lee SI, Park KS. Prevalence of Upper Extremity Musculoskeletal Diseases and Disability among Fruit Tree Farmers in Korea: Cross-Sectional Study. <i>Yonsei Med J</i> . 2019 Sep;60(9):870-875. doi: 10.3349/ymj.2019.60.9.870. PMID: 31433585; PMCID: PMC6704024.	Not specifically about epicondylitis but about upper extremity musculoskeletal diseases
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Mallows A, Debenham J, Walker T, Littlewood C. Association of psychological variables and outcome in tendinopathy: a systematic review. <i>Br J Sports Med</i> . 2017 May;51(9):743-748. doi:	Not about long-term complaints >1 year

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Ryall C, Coggon D, Peveler R, Poole J, Palmer KT. A prospective cohort study of arm pain in primary care and physiotherapy-- prognostic determinants. <i>Rheumatology (Oxford)</i> . 2007 Mar;46(3):508-15. doi: 10.1093/rheumatology/kel320. Epub 2006 Sep 14. PMID: 16973688.	Analysed separately a group with unremitting pain but not reported separately for epicondylitis (although this group is included)
Šarčević Z, Stanković M, Tepavčević A. Lateral Epicondylalgia and Thoracic Kyphosis: A Study on Young Athletes. <i>Clin J Sport Med</i> . 2024 Nov 1;34(6):537-542. doi: 10.1097/JSM.0000000000001232. Epub 2024 May 29. PMID: 38810134.	Probably not about long-term complaints >1 year, 10 to 15 year olds
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Seidel DH, Ditchen DM, Hoehne-Hückstädt UM, Rieger MA, Steinhilber B. Quantitative Measures of Physical Risk Factors Associated with Work-Related Musculoskeletal Disorders of the Elbow: A Systematic Review. <i>Int J Environ Res Public Health</i> . 2019 Jan 5;16(1):130. doi: 10.3390/ijerph16010130. PMID: 30621312; PMCID: PMC6339038.	Not about long-term complaints >1 year
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Soto-Quijano DA, Rivera-Tavarez CE. Work-related musculoskeletal disorders of the upper extremity. <i>Critical Reviews™ in Physical and Rehabilitation Medicine</i> . 2005;17(1).	Narrative review
Sun K, Ming Y, Wu Y, Zeng Y, Xu J, Wu L, Li M, Shen B. The Genetic Causal Association between Educational Attainment and Risk of 12 Common Musculoskeletal Disorders: A Two-Sample Mendelian Randomization. <i>Orthop Surg</i> . 2023 Nov;15(11):2814-2821. doi: 10.1111/os.13821. Epub 2023 Sep 7. PMID: 37675772; PMCID: PMC10622299.	Not about long-term complaints >1 year
Tajika T, Kobayashi T, Yamamoto A, Kaneko T, Takagishi K. Prevalence and risk factors of lateral epicondylitis in a mountain village in Japan. <i>J Orthop Surg (Hong Kong)</i> . 2014 Aug;22(2):240-3. doi: 10.1177/230949901402200227. PMID: 25163965.	Not about long-term complaints >1 year

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Titchener AG, White JJ, Hinchliffe SR, Tambe AA, Hubbard RB, Clark DI. Comorbidities in rotator cuff disease: a case-control study. <i>J Shoulder Elbow Surg.</i> 2014 Sep;23(9):1282-8. doi: 10.1016/j.jse.2013.12.019. Epub 2014 Mar 4. PMID: 24618192.	No epicondylitis
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Vaughn NH, Stepanyan H, Gallo RA, Dhawan A. Genetic Factors in Tendon Injury: A Systematic Review of the Literature. <i>Orthop J Sports Med.</i> 2017 Aug 23;5(8):2325967117724416. doi: 10.1177/2325967117724416. PMID: 28856171; PMCID: PMC5571768.	One study about epicondylitis; not about long-term complaints >1 year
Walker-Bone K, Palmer KT, Reading I, Coggon D, Cooper C. Occupation and epicondylitis: a population-based study. <i>Rheumatology (Oxford).</i> 2012 Feb;51(2):305-10. doi: 10.1093/rheumatology/ker228. Epub 2011 Oct 22. PMID: 22019808; PMCID: PMC3427015.	Not about long-term complaints >1 year
Yanai K, Tajika T, Arisawa S, Hatori Y, Honda A, Hasegawa S, Nakajima I, Goto W, Chikuda H. Prevalence and factors associated with lateral epicondylitis among hospital healthcare workers. <i>JSES Int.</i> 2024 Feb 8;8(3):582-587. doi: 10.1016/j.jseint.2024.01.008. PMID: 38707555; PMCID: PMC11064715.	Not about long-term complaints >1 year, but >2 weeks
Yolaçan H, Güler S. Effect of elbow carrying angle on lateral epicondylitis development. <i>Medicine (Baltimore).</i> 2023 Oct 27;102(43):e35789. doi: 10.1097/MD.00000000000035789. PMID: 37904384; PMCID: PMC10615423.	Not about long-term complaints >1 year
Zamudio-Muñoz LA, Urbiola-Verdejo M, Sánchez-Vizcaíno PM. Factores sociodemográficos y laborales asociados con epicondilitis lateral de codo [Social, demographic and laboral factors associated with the presence of lateral elbow epicondylitis]. <i>Rev Med Inst Mex Seguro Soc.</i> 2011 Jan-Feb;49(1):59-64. Spanish. PMID: 21513662.	Foreign language

5

Literature search strategy

Algemene informatie

Cluster/richtlijn: Tennisarm en Golfarm - UV5.1 Risicofactoren
Uitgangsvraag/modules: Wat zijn risicofactoren voor het ontstaan van laterale epicondylaire tendinopathie of mediale epicondylaire tendinopathie?

Database(s): Embase.com, Ovid/Medline	Datum: 7 mei 2025
Periode: vanaf 2005	Talen: geen restrictie
Literatuurspecialist: Esther van der Bijl	Rayyan review: https://new.rayyan.ai/reviews/1443679/overview
BMI-zoekblokken: voor verschillende opdrachten wordt (deels) gebruik gemaakt van de zoekblokken van BMI-Online https://blocks.bmi-online.nl/ Deduplication: voor het ontdubbelen is gebruik gemaakt van http://dedupendnote.nl/	
Toelichting: Voor deze vraag is gezocht op de elementen tennisarm/ golfarm EN risicofactoren . De sleutelartikelen worden gevonden met deze search.	
Te gebruiken voor richtlijntekst: A systematic literature search was performed by a medical information specialist using the following bibliographic databases: Embase.com and Ovid/Medline. Both databases were searched from 2005 to the 7 th of May 2025 for systematic reviews and observational studies. Systematic searches were completed using a combination of controlled vocabulary/subject headings (e.g., Emtree-terms, MeSH) wherever they were available and natural language keywords. The overall search strategy was derived from two primary search concepts: (1) lateral/ medial epicondylitis; (2) risk factors. Duplicates were removed using EndNote software. After deduplication a total of 454 records were imported for title/abstract screening.	

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Zoekopbrengst - 7 mei 2025

	EMBASE	OVID/MEDLINE	Ontdubbeld
SR	164	126	176
Observationele studies	255	144	278
Totaal	419	270	454*

*in Rayyan

Zoekstrategie - 7 mei 2025

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Embase.com

No.	Query	Results
#1	'tennis elbow'/exp OR 'medial epicondylitis'/exp OR (((tennis* OR golf*) NEAR/3 (arm* OR elbow*)):ti,ab,kw) OR (((epicondylit* OR epycondylit* OR epicondylitid* OR epycondylitid*) NEAR/3 (humer* OR lateral* OR external* OR radiohumer* OR medial*)):ti,ab,kw) OR (((elbow* OR epicondyl* OR ecrb) NEAR/7 (tendonopath* OR tendonopath* OR tendinos*)):ti,ab,kw) OR (((lateral* OR medial*) NEAR/3 elbow* NEAR/3 pain*)):ti,ab,kw) OR epicondylalg*:ti,ab,kw OR epicondylalg*:ti,ab,kw	5000
#2	'risk'/exp OR 'prediction'/exp OR (((factor* OR indicator*) NEAR/4 (predict* OR contribut* OR predispos* OR caus* OR underly* OR associat* OR influenc*)):ti,ab,kw) OR risk*:ti,ab,kw OR contributor*:ti,ab,kw	7122433
#3	#1 AND #2	738
#4	#3 AND [2005-2025]/py NOT ('conference abstract'/it OR 'editorial'/it OR 'letter'/it OR 'note'/it) NOT (('animal'/exp OR 'animal experiment'/exp OR 'animal model'/exp OR 'nonhuman'/exp) NOT 'human'/exp)	539

#5	'meta analysis'/exp OR 'systematic review'/exp OR 'scoping review'/exp OR 'rapid review'/exp OR 'umbrella review'/exp OR 'cochrane database of systematic reviews'/jt OR 'network meta-analysis'/exp OR 'networkmeta analy*':ti,ab,kw OR 'networkmetaanaly*':ti,ab,kw OR metaanaly*':ti,ab,kw OR 'meta analy*':ti,ab,kw OR metanaly*':ti,ab,kw OR prisma:ti,ab,kw OR prospero:ti,ab,kw OR metaanali*':ti,ab,kw OR 'meta anali*':ti,ab,kw OR metanali*':ti,ab,kw OR (((systemati* OR scoping OR umbrella OR 'structured literature') NEAR/3 (review* OR overview*)):ti,ab,kw) OR (((structured OR systemic*) NEAR/3 (review* OR overview* OR synth*) NEAR/3 literature):ti,ab,kw) OR ((systemic* NEAR/1 review*):ti,ab,kw) OR (((systemati* OR literature OR database* OR 'data base*') NEAR/10 search*):ti,ab,kw) OR (((structured OR comprehensive* OR systemic*) NEAR/3 search*):ti,ab,kw) OR (((literature NEAR/3 (review* OR overview*)):ti,ab,kw) AND (search*':ti,ab,kw OR database*':ti,ab,kw OR 'data base*':ti,ab,kw)) OR (('data extraction*':ti,ab,kw OR 'data source*':ti,ab,kw) AND ('study selection*':ti,ab,kw OR 'studies selection*':ti,ab,kw)) OR ('search strateg*':ti,ab,kw AND 'selection criteria*':ti,ab,kw) OR ('data source*':ti,ab,kw AND 'data synth*':ti,ab,kw) OR medline*':ti,ab,kw OR pubmed*':ti,ab,kw OR 'pub med*':ti,ab,kw OR embase:ti,ab,kw OR cochrane*':ti,ab,kw OR (((critical* OR rapid*) NEAR/2 (review* OR overview* OR synth*)):ti) OR (((critical* OR rapid*) NEAR/3 (review* OR overview* OR synth*)):ab) AND (search*':ab OR database*':ab OR 'data base*':ab)) OR metasynth*':ti,ab,kw OR 'meta synth*':ti,ab,kw OR 'review* of review*':ti,ab,kw	1108719
#6	'major clinical study'/de OR 'clinical study'/de OR 'family study'/de OR 'longitudinal study'/de OR 'retrospective study'/de OR 'prospective study'/de OR 'cohort analysis'/de OR 'case control study'/de OR 'comparative study'/exp OR 'control group'/de OR 'controlled study'/de OR 'controlled clinical trial'/de OR 'crossover procedure'/de OR 'double blind procedure'/de OR 'phase 2 clinical trial'/de OR 'phase 3 clinical trial'/de OR 'phase 4 clinical trial'/de OR 'pretest posttest design'/de OR 'pretest posttest control group design'/de OR 'quasi experimental study'/de OR 'single blind procedure'/de OR 'triple blind procedure'/de OR ((cohort NEAR/1 (study OR studies)):ab,ti) OR (('case control' NEAR/1 (study OR studies)):ab,ti) OR (('follow up' NEAR/1 (study OR studies)):ab,ti) OR (observational NEAR/1 (study OR studies)) OR ((epidemiologic NEAR/1 (study OR studies)):ab,ti) OR (('cross sectional' NEAR/1 (study OR studies)):ab,ti) OR (((control OR controlled) NEAR/6 trial):ti,ab,kw) OR (((control OR controlled) NEAR/6 (study OR studies)):ti,ab,kw) OR (((control OR controlled) NEAR/1 active):ti,ab,kw) OR 'open label*':ti,ab,kw OR (((double OR two OR three OR multi OR trial) NEAR/1 (arm OR arms)):ti,ab,kw) OR ((allocat* NEAR/10 (arm OR arms)):ti,ab,kw) OR placebo*':ti,ab,kw OR 'sham-control*':ti,ab,kw OR (((single OR double OR triple OR assessor) NEAR/1 (blind* OR masked)):ti,ab,kw) OR nonrandom*':ti,ab,kw OR 'non-random*':ti,ab,kw OR 'quasi-experiment*':ti,ab,kw OR crossover:ti,ab,kw OR 'cross over':ti,ab,kw OR 'parallel group*':ti,ab,kw OR 'factorial trial':ti,ab,kw OR ((phase NEAR/5 (study OR trial)):ti,ab,kw) OR ((case* NEAR/6 (matched OR control*)):ti,ab,kw) OR ((match* NEAR/6 (pair OR pairs OR cohort* OR control* OR group* OR healthy OR age OR sex OR gender OR patient* OR subject* OR participant*)):ti,ab,kw) OR ((propensity NEAR/6 (scor* OR match*)):ti,ab,kw) OR versus:ti OR vs:ti OR compar*':ti OR ((compar* NEAR/1 study):ti,ab,kw) OR (('observational study'/de OR 'cross-sectional study'/de OR 'multicenter study'/de OR 'correlational study'/de OR 'follow up'/de OR cohort*':ti,ab,kw OR 'follow up':ti,ab,kw OR followup:ti,ab,kw OR longitudinal*':ti,ab,kw OR prospective*':ti,ab,kw OR retrospective*':ti,ab,kw OR observational*':ti,ab,kw OR 'cross sectional*':ti,ab,kw OR cross?ectional*':ti,ab,kw OR multigent*':ti,ab,kw OR 'multi-cent*':ti,ab,kw OR consecutive*':ti,ab,kw) AND (group:ti,ab,kw OR groups:ti,ab,kw OR subgroup*':ti,ab,kw OR versus:ti,ab,kw OR vs:ti,ab,kw OR compar*':ti,ab,kw OR 'odds ratio*':ab OR 'relative odds':ab OR 'risk ratio*':ab OR 'relative risk*':ab OR 'rate ratio':ab OR aor:ab OR arr:ab OR rrr:ab OR (('or' OR 'rr') NEAR/6 ci):ab))	18133082
#7	#4 AND #5 - SR	164
#8	#4 AND #6 NOT #7 - Observatieel	255
#9	#7 OR #8 - Totaal	419

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Ovid/Medline

#	Searches	Results
1	exp Tennis Elbow/ or exp Elbow Tendinopathy/ or ((tennis* or golf*) adj3 (arm* or elbow*).ti,ab,kf. or ((epicondylit* or epycondylit* or epicondylitid* or epycondylitid*) adj3 (humer* or lateral* or external* or radiohumer* or medial*).ti,ab,kf. or ((elbow* or epicondyl* or ecrb) adj7 (tendinopath* or tendonopath* or tendinos*).ti,ab,kf. or ((lateral* or medial*) adj3 elbow* adj3 pain*).ti,ab,kf. or epicondylalg*.ti,ab,kf.	3490
2	exp Risk Factors/ or exp Health Risk Behaviors/ or Risk/ or ((factor* or indicator*) adj4 (predict* or contribut* or predispos* or caus* or underly* or associat* or influenc*).ti,ab,kf. or risk*.ti,ab,kf. or contributor*.ti,ab,kf.	4387679
3	1 and 2	474
4	limit 3 to yr="2005 -Current"	374
5	4 not (comment/ or editorial/ or letter/) not ((exp animals/ or exp models, animal/) not humans/)	370
6	exp Meta-Analysis/ or exp Network Meta-Analysis/ or exp Systematic Review/ or (networkmeta analy* or networkmetaanaly* or metaanaly* or meta analy* or metanaly* or prisma or prospero or metaanali* or meta anali* or metanali*).ti,ab,kf. or ((systemati* or scoping or umbrella or structured literature) adj3 (review* or overview*).ti,ab,kf. or ((structured or systemic*) adj3 (review* or overview* or synth*) adj3 literature).ti,ab,kf. or (systemic* adj1 review*).ti,ab,kf. or ((systemati* or literature or database* or data base*) adj10 search*).ti,ab,kf. or ((structured or comprehensive* or systemic*) adj3 search*).ti,ab,kf. or ((literature adj3 (review* or overview*)) and (search* or database* or data base*).ti,ab,kf. or ((data extraction* or data source*) and (study selection* or studies selection*).ti,ab,kf. or (search strateg* and selection criteria*).ti,ab,kf. or (data source* and data synth*).ti,ab,kf. or (medline* or pubmed* or pub med* or embase or cochrane*).ti,ab,kf. or cochrane.jw. or ((critical* or rapid*) adj2 (review* or overview* or synth*).ti. or (((critical* or rapid*) adj3 (review* or overview* or synth*)) and (search* or database* or data base*).ab. or metasynt*.ti,ab,kf. or meta synth*.ti,ab,kf.	832507
7	Case-control Studies/ or clinical trial, phase ii/ or clinical trial, phase iii/ or clinical trial, phase iv/ or comparative study/ or control groups/ or controlled before-after studies/ or controlled clinical trial/ or double-blind method/ or historically controlled study/ or matched-pair analysis/ or single-blind method/ or (((control or controlled) adj6 (study or studies or trial)) or (compar* adj (study or studies)) or ((control or controlled) adj1 active) or "open label*" or ((double or two or three or multi or trial) adj (arm or arms)) or (allocat* adj10 (arm or arms)) or placebo* or "sham-control*" or ((single or double or triple or assessor) adj1 (blind* or masked)) or nonrandom* or "non-random*" or "quasi-experiment*" or "parallel group*" or "factorial trial" or "pretest posttest" or (phase adj5 (study or trial)) or (case* adj6 (matched or control*)) or (match* adj6 (pair or pairs or cohort* or control* or group* or healthy or age or sex or gender or patient* or subject* or participant*)) or (propensity adj6 (scor* or match*))).ti,ab,kf. or (confounding adj6 adjust*).ti,ab. or (versus or vs or compar*).ti. or exp cohort studies/ or epidemiologic studies/ or ((multicenter study/ or observational study/ or seroepidemiologic studies/ or (cohort* or 'follow up' or followup or longitudinal* or prospective* or retrospective* or observational* or multicent* or 'multi-cent*' or consecutive*).ti,ab,kf.) and ((group or groups or subgroup* or versus or vs or compar*).ti,ab,kf. or ('odds ratio*' or 'relative odds' or 'risk ratio*' or 'relative risk*' or aor or arr or rrr).ab. or (("OR" or "RR") adj6 CI).ab.)) or Case control.tw. or cohort.tw. or Cohort analy\$.tw. or (Follow up adj (study or studies)).tw. or (observational adj (study or studies)).tw. or Longitudinal.tw. or Retrospective*.tw. or prospective*.tw. or consecutive*.tw. or Cross sectional.tw. or Cross-sectional studies/ or historically controlled study/ or interrupted time series analysis/	8040735
8	5 and 6 - SR	126
9	(5 and 7) not 8 - Observationeel	144
10	8 or 9 - Totaal	270

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