PHYSIOTHERAPY TREATMENT OPTIONS FOR TENNIS ELBOW

NHS Lothian

Introduction:

Tennis elbow, also known as 'lateral epicondylitis', 'lateral elbow pain' or 'lateral elbow tendinopathy', is a common musculotendinous disorder of the extensor origin at the lateral humeral epicondyle. The condition is considered to be a 'partially reversible but degenerative overuse – underuse tendinopathy' (Orchard and Koutouris, 2011). The question of the pain of tendinopathy, physiological or pathophysiological, remains unanswered; however there is evidence for both – tendon based nociceptive contributions and mechanisms within the periphery and the central nervous system (Rio et al. 2014).

Typical symptoms include lateral elbow pain and tenderness, pain with wrist extension / supination and reduced grip strength. Tennis elbow affects between 1-3% of the general population, with men and women being equally affected (Tosti et al. 2013). It is most prevalent between ages 35-54 years (McMurtie & Watts 2012). There is some evidence of higher incidence of tennis elbow in amateur tennis players and those with manually intensive occupations (Coombes et al. 2008).

Aim:

The aim of this guideline is to provide NHS Lothian physiotherapy staff with options from research findings to assist them in the management of patients with tennis elbow. A previous version of this guideline 'Treatment Options for Tennis Elbow' was written in 2014. This version of the guideline is an updated guideline, written in 2021. An incremental approach to the guideline update was adopted as per the *Cochrane Handbook for Systematic Reviews of Interventions* (Cumpston et al. 2022). This update retains previous text from the 2014 edition and adds new research evidence from studies published between 2014 and 2020.

Scope of practice and limitations:

These treatment options are suggestions to guide physiotherapists when treating patients with tennis elbow. The guidelines are written by a team of physiotherapy clinicians and were produced by a process of review of the research literature and peer consultation. While best efforts were made to include all relevant literature and use comprehensive search methods, the production process has not undergone the same process of academic scrutiny as that of a National Clinical Guideline or a published systematic review. Research included in the guideline is of variable quality and may have a high risk of bias. Any treatment options should be used in conjunction with the clinical reasoning skills of the physiotherapist and patients should always be treated on a case-by-case basis.

Literature review question:

What is the best available evidenced physiotherapy treatment for tennis elbow?

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Next review:2027

Literature Search Databases:

Original Guideline (2014)

Database	Dates	Limitations
CINAHL	2006 to 2014	English
Ovid	2006 to 2014	English

Updated Version (2021)

Database	Dates	Limitations
Medline	2014 to 2020	English
SportDiscus	2014 to 2020	English
CINAHL	2014 to 2020	English
Ebsco host	2014 to 2020	English
Cochrane	2014 to 2020	English

Keywords:

Original Guideline (2014)

Lateral epic*	Physical Therapy
Tennis elbow	Treat
Therapy	Physio
Rehab	Friction
Taping / strapping / bandages / strapping	Anti inflammatory agents
Steroidal Injections	Ultrasonic therapy

Updated Version (2021)

Tennis Elbow or Lateral Epicondylitis or Lateral Tendinopathy or Lateral Elbow Pain	Therapy
Electrotherapy	Management
Massage	NSAIDS or Non-steroidal AIDs
Strength or strengthening	Support
Treatment	Taping or strapping
Intervention	Electrotherapy

Literature Search Results:

In both the original and updated version of this guideline, research articles were assigned levels of evidence according to 'Sign 50: A guideline developer's handbook'. See reference list for assigned levels.

There was no detail on the criteria for exclusion of studies in the 2014 version of this guideline. In the updated version, only research articles of SIGN level 3 and above were included in the guideline, and those considered relevant to the research question.

Critical Appraisal Skills Programme (CASP) checklists were used to assist with article appraisal.

Original Guideline (2014)

Total number of articles in the search	26
Total number of articles discarded	4
Total number of articles reviewed	22

Updated Version (2021)

Total number of articles in the search	49
Total number of articles discarded	38
Total number of articles reviewed	11

RECOMMENDATIONS:

Summary:

Many non-operative treatments have been suggested for tennis elbow. Conservative management strategies considered in this guideline include: advice, exercise, manual therapy, electrotherapy, acupuncture, taping and supports, ice, corticosteroid injections and non-steroidal anti-inflammatory drugs (NSAIDs). In both the original guideline (2014) and this updated version (2021), there are wide ranging evidence levels. Details on research and recommendations for each management strategy can be found in the body of this guideline. The mechanism of action for each management strategy is not discussed in this guideline, however, are likely to have an effect both locally at the site of the extensor tendon and on the central nervous system (Rio et al. 2014).

Tennis elbow may also be considered a self-limiting disorder (Shiri and Viikari-Juntura, 2011). Effective conservative treatment generally includes interventions to 'relieve pain, control inflammation, promote healing, improve local and general fitness and control force loads' (Waseem et al. 2012). Patients may improve with non-operative measures (Tosti et al. 2013), while there is also some evidence to suggest that approximately 90% of patients with tennis elbow are symptom free after 12–24 months, some without any intervention (Bisset et al. 2006, Coombes et al. 2013).

1. Exercise and Advice

Consideration should be made regarding the impact of repetitive movements of the hand and wrist, and activities that load the extensor tendons (Shiri & Viikari-Juntara, 2011, Tosti et al. 2013, McMurtie et al. 2011). An ergonomic assessment may be beneficial for patients, and for those whose lifestyle is more sedentary, for example office workers (Shiri & Viikari-Juntara, 2011, Waseem et al. 2012). Several authors recommend examination of daily gripping / pronating / supinating actions and how these may be modified to change the load on the tendons (Forogh et al. 2012, Waseem et al. 2012, Tosti et al. 2013, Shiri & Viikari-Juntara 2011, and De Smedt et al. 2007).

Some research evidence suggests that a rehabilitation program that consists of a mixture of stretching and loading exercise could reduce pain and improve pain-free strength and function in people presenting with tennis elbow (Waseem et al. 2012, Raman et al. 2012, Croisier et al. 2007, Ortega-Castillo & Medina-Porqueres 2016, Stansinopoulos et al. 2010, Keating et al. 2020, Tiwari 2018).

There is mixed evidence as to whether eccentric loading is more beneficial than concentric isometric exercise (Waseem et al. 2012, Raman et al. 2012, Croisier et al. 2007, Ortega-Castillo & Medina-Porqueres 2016).
Exercise programmes in these studies are varied but most commonly consist of three sets of fifteen repetitions, carried out twice daily (Ortega-Castillo & Medina-Porqueres 2016). There is however very little high-quality evidence that conclusively supports this number of repetitions / sets / frequency. One RCT suggested an exercise program carried out three days per week for the first three weeks, followed by six days per week for the remaining three weeks (Lee et al. 2014).

The position of loading assessed in research studies is most frequently with elbow in full extension or flexed, forearm in pronation, arm supported, and wrist extended with hand hanging over the edge (Waseem et al. 2012, Stansinopoulos et al. 2010 and Raman et al. 2012).

Previous guidelines suggested exercising in a pain-free range (Waseem et al. 2012) whereas newer literature from the 2020 search has shown an effective outcome with exercise that allowed for mild discomfort (Keating et al. 2020). Waseem et al. (2012) and Stansinopoulos et al. (2010) suggest three repetitions of a 30-45 second stretch before and after strength training. In these studies, the extensor muscles were stretched with the elbow in full extension, forearm pronated, wrist flexed with ulnar deviation.

2. Joint Mobilisations

Many studies have shown positive effects on pain and grip strength with the application of mobilisations with movement (Amro et al. 2010, Bisset et al. 2006, Vicenzino et al. 2008, Bagade and Verma 2015, Hsu et al. 2016 and Lucado et al. 2018). A small study showed an increase in pain-free grip strength for patient with tennis elbow after T5 joint mobilisation (Zunke et al. 2020), however further research is required to support these isolated findings.

3. Soft Tissue Techniques

The Cochrane review on Deep Transverse Friction Massage for treating Tennis Elbow (Loew et al. 2014) concluded: "We do not have sufficient evidence to determine the effects of deep transverse friction on pain, improvement in grip strength, and functional status for patients with lateral elbow tendinitis as no evidence of clinically important benefits was found". However, there is mixed evidence to suggest that transverse frictions could be beneficial in the treatment of tennis elbow (Coombes et al. 2008 and Yi, Bratchenko and Tan 2018).

4. Taping and Strapping

The effectiveness of orthotic devices has not been firmly concluded (Coombes et al. 2008). It is suggested that a forearm support reduces the stress around the origin of the wrist extensors at the point of attachment to the epicondyle.

A study by Takasaki et al. (2008) found that positioning the clasp over the proximal 1/5th of the forearm was effective at reducing stress on the extensor carpi radialis brevis. There is low quality evidence to suggest that splinting and taping interventions may have short-term benefits on pain relief and arm function in the management of tennis elbow (Akkurt et al. 2018, Bhambhani et al. 2016, Cho et al. 2018, Guler and Yildirim 2020**,** Nowotny et al. 2018, Kachanathu et al. 2019, Giray et al. 2019**,** Shakeri et al. 2018, Vellilappilly et al. 2017). However, this effect on pain, function and strength was relatively short-lived and research suggests that benefits do not extend beyond twelve weeks after treatment (Shahabi et al 2020). This research may not therefore advocate the use of an epiclasp on an ongoing basis. One RCT reported no significant difference between counterforce brace and kinesio-taping at six weeks (Phadk and Desai 2017).

5. Acupuncture

Bisset et al. (2005) conducted a meta-analysis of clinical trials on physical interventions for tennis elbow. In this paper they included four research studies deemed of sufficient methodology quality to be included in the review. The authors conclude that there appears to be some evidence to support the efficacy of acupuncture over placebo as a treatment for tennis elbow pain in the short-term. However, this benefit appears to be short-lived, that is, two to eight weeks.

An audit of acupuncture practice by fourteen 'expert' physiotherapists in managing tennis elbow in 30 patients demonstrated a low level of consistency in practice and application of up to 103 different points (Alvim and Ferreira 2018). The most common of these were LI-11 (297 of 420) and LI-4 (160 of 420). There is no evidence that supports the use of particular acupuncture points in the management of tennis elbow, however a low-quality study by Jeon et al. (2017) suggested that a single treatment of acupuncture (points LI-4, TE-5, LU-5, LI-10, LI-12, SP-6, GB-34) may be effective in providing a small but significant reduction in pain immediately following acupuncture. There was no change in pain-free grip strength and the authors conclude that the use of acupuncture is unlikely to enhance the ability of people with tennis elbow to engage with pain-free rehabilitation.

Studies that examined the use of electroacupuncture, dry point needling and percutaneous tendon needling were excluded from this guideline due to their limited availability to be practised in NHS Lothian.

6. Ice

Several review articles have supported the use of ice packs in tennis elbow as a pain-relieving modality (Waseem et al. 2012, Walz et al. 2010). However there appears to be a lack of research to fully support the use of cryotherapy as a disease-modifying modality.

7. Electrotherapy

There is research comparing Ultrasound and ESWT in treating tennis elbow that shows significant improvement with both techniques, but neither have been shown to be superior to the other (Lizis 2015, Yalvaç et al. 2018, Dedes et al. 2020).

Köksal et al. (2015) suggest Extracorporeal Shockwave Therapy (ESWT) is clinically effective in treating acute and persistent tennis elbow, showing a significant reduction in pain and improvement in function. While Razavipour et al. (2018) show a significant reduction in pain and improvement in Disabilities of the Arm, Shoulder and Hand (DASH) scores at 30 and 60 days after one week of daily application of ESWT. Aydin et al (2018) suggest that ESWT should be used in conjunction with traditional conservative management techniques rather than in isolation.

8. Non-Steroidal Anti-Inflammatory Drugs (NSAIDs)

The use of NSAIDs is not supported in the long term due to potential side-effects and complications (Orchard & Koutouris 2011). However, there is some evidence to support their use in the short term (Shiri & Viikari-Juntara 2011, Waseem et al. 2012).

A Cochrane review on the effects of NSAIDs on tennis elbow (Pattanittum 2013) concluded: "There remains limited evidence from which to draw firm conclusions about the benefits or harms of topical or oral NSAIDs in treating lateral elbow pain. Although data from five placebo-controlled trials suggest that topical NSAIDs may be beneficial in improving pain (for up to four weeks), non-normal distribution of data and other methodological issues precluded firm conclusions. Some people may expect a mild transient skin rash. Evidence about the benefits of oral NSAIDs has been conflicting, although oral NSAID use may result in gastrointestinal adverse events in some people. No direct comparisons between oral and topical NSAIDs were available. Some trials demonstrated greater benefit from glucocorticoid injection than from NSAIDs in the short term, but this was not apparent in all studies and was not apparent by 6 months in the only study that included longer-term outcomes."

9. Cortico-Steroid Injections

Moderate evidence exists which supports the use of Cortico-Steroid Injections (CSI) for short-term pain relief and improvement in self-reported function (Snyder and Todd 2012, Coombes et al. 2013, Beyazal & Devrimsel 2015, Barnett et al. 2019, Xiong et al. 2019).

Lin-Fen Hsieh et al. (2018) suggests there is no short-term significant difference between a CSI and lidocaine injection for Tennis Elbow.

Long-term studies by Bisset et al. (2006) and Coombes et al. (2013) report worse clinical outcomes and a higher incidence of recurrence of symptoms when CSI is the initial line of treatment. Regenerative injections and ESWT have been shown to have significant results compared with CSI up to two years post-treatment (Barnett et al. 2019 and Xiong et al.2019).

Coombes et al. (2015) demonstrates that CSI is associated with great variability, and a low probability of being cost-effective. They concluded that physiotherapy should be used as first line intervention before considering CSI.

10. Surgery

Less than 5% of patients fail to respond to conservative treatment (Tosti et al. 2013). Waseem et al (2012) suggest that surgery may be considered if conservative therapy has been unsuccessful over prolonged periods in those people where there is evidence of extra-articular calcification or there are multiple areas of tendonitis.

References

Level of Evidence	Reference
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1+	Xiong, Y., Xue, H., Zhou, W., Sun, Y., Liu, Y., Wu, Q., Liu, J., Hu, L., Panayi, A.C., Chen, L. and Yan, C., 2019. Shock-wave therapy versus corticosteroid injection on lateral epicondylitis: a meta-analysis of randomized controlled trials. The Physician and sportsmedicine, 47(3), pp.284-289.
1+	Yalvaç, B., Mesci, N., Külcü, D.G. and Yurdakul, O.V., 2018. Comparison of ultrasound and extracorporeal shock wave therapy in lateral epicondylosis. Acta orthopaedica et traumatologica turcica, 52(5), pp.357-362.
2++	Yi, R., Bratchenko, W.W. and Tan, V., 2018. Deep friction massage versus steroid injection in the treatment of lateral epicondylitis. Hand, 13(1), pp.56-59.
1+	Zunke, P., Auffarth, A., Hitzl, W. and Moursy, M., 2020. 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 musculoskeletal disorders, 21(1), pp.1-11.

Key: Levels of Evidence from: 'SIGN 50: A guideline developer's handbook'.

1++ High quality meta-analyses, systematic reviews of RCTs, or RCTs with a very low risk of bias
1+ Well conducted meta-analyses, systematic reviews, or RCTs with a low risk of bias
1-Meta-analyses, systematic reviews, or RCTs with a high risk of bias
2++ High quality systematic reviews of case control or cohort studies. High quality case control or cohort studies with a very low risk of confounding or bias and a high probability that the relationship is causal
2+ Well conducted case control or cohort studies with a low risk of confounding or bias and a moderate probability that the relationship is causal
2-Case control or cohort studies with a high risk of confounding or bias and a significant risk that the relationship is not causal
3 Non-analytic studies, eg case reports, case series
4 Expert opinion