Elbow tendinopathy: lateral epicondylalgia

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**INTRODUCTION**

The common tendon of the extensor muscles of the wrist and fingers is the most frequently implicated tendon in elbow tendinopathy and will be the focus of this chapter. There is contention as to the correct nomenclature for the tendinopathy of the extensor muscles of the wrist and fingers. A number of terms are used in reference to this tendinopathy, such as, tennis elbow, lateral epicondylitis, lateral epicondylisis and lateral epicondylalgia. Tennis elbow is frequently used colloquially, but this term confuses many patients, as the condition is also very prevalent in those patients who do not play tennis. Epicondylitis infers inflammation, which has long been shown not to be the case (Nirschl & Pettrone 1979, Regan et al 1992, Potter et al 1995, Kraushaar & Nirschl 1999, Alfredson et al 2000). Epicondylisis or tendinosis connotes a degenerative change, but whilst there has been identified elements of disarray, breakdown or degeneration of collagen fibrils in such tendons (Regan et al 1992, Kraushaar & Nirschl 1999), the relationship to presenting pain symptoms and associated clinical signs is not clear (Khan & Cook 2000).

Lateral epicondylalgia indicates that there is pain over the lateral epicondyle which may be an accurate term to use for the patient presenting with pain over the lateral epicondyle, but it provides little information about the underlying pathology. Recent reports of neovascularization and associated increased concentrations of algogenic mediators such as glutamate, substance P and calcitonin gene-related peptide (Ljung et al 1999, 2004, Alfredson et al 2000, Zeisig et al 2006, du Toit et al 2008) suggests that tendinopathy is far more complex than any of these commonly used terms suggest. For this chapter, the term lateral epicondylalgia will be used to describe the patient who attends the clinic with pain over the lateral epicondyle, as will be highlighted, this may be due to some pathology in the tendon, that is, tendinopathy, but the pain may also be associated with other conditions, which need to be considered to fully rehabilitate the patient.

Although there is no definitive evidence, the incidence of lateral epicondylalgia varies from 1% to 3% in the general population (Allander 1974, Verhaar 1994), which contrasts to reports of prevalence rates as high as 35–64% in occupations requiring repetitive manual tasks (Kivi 1982, Dimberg 1987, Feuerstein et al 1998), where it is one of the most costly of all work-related injuries (Kivi 1982, Dimberg 1987, Feuerstein et al 1998). A survey of United States of America Department of Labor, Office of Worker’s Compensation Programs, accepted claims of occupational upper extremity disorders demonstrated that lateral epicondylalgia was responsible for approximately 27% and 48% of all work related claims for upper limb tendinopathies and enthesopathies, respectively (Feuerstein et al 1998). This chapter focuses on the most common tendinopathy about the elbow, lateral epicondylalgia, with specific consideration of the...
Lateral epicondylalgia is by definition a clinical entity not usually requiring confirmatory diagnostic imaging or other medical pathology tests. Diagnostic imaging is likely more helpful in excluding differential diagnoses. For example, radiographs may be used to identify injuries of bone, such as, fractures, apophysitis and sub-chondral arthritic changes. Ultrasound has taken on a greater role in the direct identification of grey scale hypoechoic lesions, which imply dysfunction in the connective tissues. These grey scale changes are not necessarily linked to pain in the tendon (Cook et al 2001, 2004, du Toit et al 2008) and so they could be legitimately termed tendinopathy, meaning some pathology in the tendon, and is most likely due to degenerative breakdown of collagen fibrils (epicondylitis), though fusiform swelling may be more indicative of cellular and matrix dysfunction (Cook & Purdam 2009). Increasingly, evidence is pointing towards a link between neovessels and symptoms, namely pain (Cook et al 2001, 2004, du Toit et al 2008), with a recent study showing that in a patient with longstanding lateral elbow pain, which has failed to respond to treatment, the lack of neovessels strongly indicates that the pain is not due to tendinopathy, thus prompting the practitioner to consider other diagnoses (du Toit et al 2008). Magnetic resonance imaging may be used to follow up recalcitrant cases where there are no radiographic or ultrasonographic changes present, but these cases will be in the minority.

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short period of absence from the increased loading activities before restoring pain free function. Consequently the classic presentation of lateral epicondylalgia is not likely to fall into this category, though it is important to keep this category in mind for younger athletes such as tennis players or manual labourers, as well as patients who present with pain after an acute traumatic blow to the common extensor origin at the elbow. At the other end of the spectrum the degenerative phase is characterized by angiofibroblastic hyperplasia changes, with considerable breakdown in the collagen framework and neovascularization. This tends to occur with chronic overloading in the older person; hence more appropriately fits that which is likely to be present in a classical presentation of lateral epicondylalgia. There is a sound argument that exercises need to be a fundamental inclusion in the treatment plan for degenerative tendinopathy (Cook & Purdam 2009, Khan & Scott 2009).

### PROGNOSTIC CONSIDERATIONS

Lateral epicondylalgia is widely regarded as being self-limited and resolving within 6 months to 2 years, however this is low-level evidence as the natural history of this condition has not been definitively determined. Notwithstanding this, recently a number of randomized clinical trials that have followed cases over 12 months (Smidt et al 2002, Bisset et al 2006, 2007, Smidt & van der Windt 2006) and provide data that may be used in determining prognosis.

The evidence from two randomized clinical trials (n = 383) (Smidt et al 2002, Bisset et al 2006), which included randomizing a group of patients to following a wait-and-see policy indicates that 87% of patients reported being much improved or completely recovered 12 months after inclusion into the study (Bisset et al 2007). When considering that patients had on average approximately 6 months duration of pain at inclusion into the study (Bisset et al 2007), an approximate indicative natural history of the condition is in the order of 18 months for the majority of sufferers. It is important to keep in mind that the patients allocated to the group following the wait and see policy were given advice on avoiding aggravating activities (e.g. ergonomic advice on how to lift objects and manipulate implements without aggravating pain) as well as being closely monitored in a clinical trial (and thereby prone to the Hawthorne effect), which is not necessarily the same as a person with lateral epicondylalgia not seeking out advice and doing nothing about the condition. Furthermore, Bisset et al (2006) reported that those in the group allocated to wait and see policy were 2.7 times more likely to seek out other treatments than those allocated to a mobilization with movement and exercise group (OR, 95% CI: 4.7, 2.1–10.3), which is not the same as doing nothing about the lateral epicondylalgia. To the contrary it tends to indicate that despite being recruited into a clinical trial and being closely monitored patients do not feel comfortable in doing nothing about their condition.

Smidt et al (2006) prospectively followed 349 patients from two randomized clinical trials (Hay et al 1999, Smidt et al 2002) over a 12-month period and found that those who had more severe pain of longer duration had greater likelihood of a worse outcome (more severe pain) at 12 months. Another prognostic factor of poor outcome was concomitant neck pain (Smidt et al 2006). This finding is interesting because it indicates that the patient pool recruited in this study had a heterogenic pain presentation, including cases with more complex presentations (e.g. lateral epicondylalgia plus neck pain) and did not consist solely of patients with isolated lateral epicondylalgia.

### CONSIDERATIONS IN CONSERVATIVE TREATMENT

A wide range of conservative treatments, such as, medication, electrophysical agents, exercise and manual therapy are advocated for lateral epicondylalgia, which usually is an indication that no one treatment has proven superiority, but also in part a product of an inconclusive understanding of the underlying pathology of the condition.

Corticosteroid injections are the most common conservative medical intervention for lateral epicondylalgia and accordingly they have been studied the most in high quality rigorous clinical trials. There is level 1 evidence from a number of randomized clinical trials of short term efficacy with success rates over 80% in the first 4–6 weeks (Hay et al 1999, Smidt et al 2002, Bisset et al 2006, 2007, Smidt & van der Windt 2006), but this needs to be considered in light of post-6 weeks poorer outcomes in the form of lower success rates compared to the adoption of a wait and see policy (Smidt et al 2002, Bisset et al 2006, 2007, Smidt & van der Windt 2006), higher recurrence rates (70% vs 8%) and greater use of other not per protocol co-interventions (49% vs 21%) than those patients undergoing mobilization with movements and exercise intervention (Bisset et al 2006, 2007). The poorer downstream effects are sufficient to prompt caution in their use and some have advocated against their use in lateral epicondylalgia (Young et al 1954, Osborne 2009, Vicenzino 2009), at least in the first instance without a concerted attempt at other interventions that do not have such a poor longer-term effect on the condition. Others have advocated combining the use of these injections with physiotherapy (Coombes et al 2009a, Olaussen et al 2009), but there has not been the same level of enquiry.

There is a sound level of evidence in support of exercise in treating lateral epicondylalgia, but unlike in lower limb
Elbow tendinopathy, eccentric exercise is not necessarily better than concentric exercise (Woodley et al 2007). Perhaps the most illustrative evidence comes from a randomized clinical trial comparing an exercise programme versus ultrasound in a group of patients who had recalcitrant lateral epicondylalgia having failed other treatments including corticosteroid injections and other common modalities (Pienimaki et al 1996). Follow up some 3 years later revealed that the exercise group required fewer medical consultations, had less surgery (NNT 3 years later was 3) and 586 fewer sick days than the group that had ultrasound (Pienimaki et al 1998). The exercise programme was graduated and progressive from isometric to isotonic contractions of the wrist and forearm muscles, culminating in pragmatic exercises that replicated patient’s required function. It was supervised two times per week for approximately 8 weeks. A recent study has shown that supervision of the exercise programme returns superior effects approximately 8 weeks after treatment that persisted at 6 months. In a retrospective case audit of 112 cases, Cland et al (2004) showed significantly fewer treatments were required for those (n = 51) who received additional manual therapy to the cervical spine in the form of non-thrust oscillatory manipulations, mobilization with movements and/or muscle energy techniques. More recently in a pilot trial of 10 cases, Cland et al (2005) reported a better result on pain free grip force and the Disability of the Arm, Shoulder and Hand questionnaire. Furthermore, there are a number of studies that show both high and low-velocity manipulations of the cervical spine produce an initial improvement in pain at the elbow (Vicenzino et al 1996, 1998, Fernández-Carnero et al 2008). This evidence provides a basis for the cervical spine to be treated if found to be implicated on physical examination, especially since there have been reported significant differences in pain provocation on manual examination of the cervical spine and significant reductions in sagittal plane motion in patients with lateral epicondylalgia when compared to age-matched controls (Waugh et al 2004, Berglund et al 2008).

The challenge facing the practitioner is how to best select a treatment approach for each individual patient, who is likely to be somewhat different in their individual clinical presentations. The continuum model of presentation of tendinopathy (Cook & Purdam 2009) outlined above along with the proposed integrative model of lateral epicondylalgia (Coombes et al 2009b) may provide some guidance on how the practitioner may wish to select from the many proposed treatments. In brief, Coombes et al (2009b) propose that each patient presents with a different proportional representation of dysfunction in the pain and motor systems as well as in tendon structure and physiology, which could be used to select specific interventions. For example, if a patient presents with relatively greater pain system impediment as would be seen clinically with large deficits in pressure pain thresholds and high pain severity scores, then pain relieving medications, electrophysical agents and manual therapy should be favoured. In contrast, a patient who presented with a progressed stage of degenerative tendinopathy with moderate to low levels of pain would be managed more so with specific exercise (Coombes et al 2009b, Khan & Scott 2009) and possibly injections of medication/materials (Rabago et al 2009) or glyceryl trinitrate transdermal patches (Paoloni et al 2003, 2009, Murrell 2007) that promote collagen synthesis. Further detail regarding the integrative model of lateral epicondylalgia can be found in Coombes et al (2009b).
CONCLUSION

Tendinopathy at the elbow is commonly experienced over the lateral epicondyle. Over the past decade there has been an increase in the knowledge of our understanding of the underlying pathology, conservative management and prognosis of this pain condition. While this has provided more information and data for practitioners to consider when treating patients with lateral epicondylalgia, the challenge still remains to selectively apply specific treatments to individual patients in order to drive optimum outcomes. This chapter provides a synopsis of the recent evidence and some indication of possible means by which to apply such evidence clinically.


Osborne, H., 2010. Stop injecting corticosteroid into patients with tennis elbow, they are much more likely to get better by themselves!. J. Sports Sci. Med. 13 (4), 380–381.


