Evidence-informed approach to managing chronic tennis elbow: injections, physiotherapy or wait it out?

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Chronic tennis elbow can be challenging to manage. Evidence from high quality clinical trials indicates that, while steroid injections improve the condition in the short term, the longer term outcome is worse than if the patient was to adopt a wait-and-see policy. Physiotherapy, consisting of exercise and manual therapy, has been shown to speed up resolution of the condition compared to wait-and-see, but without the longer term deleterious effects of steroid injections. This article presents the proposition that managing chronic tennis elbow might be optimised if the presenting patient features are considered. For example, evidence suggests that patients who have worse pain and disability, concomitant neck and shoulder pain, or evidence of central sensitisation are likely to have a worse prognosis. The proposition is that patients with a poor prognosis be more carefully examined and worked up in terms of management. In contrast, those who have low pain and disability, and low manual task requirements at work and home could achieve a good outcome with adopting a wait-and see policy. The majority will benefit with an appropriately metered exercise programme.

LEARNING OUTCOMES

1 Understand the evidence underpinning a clinical reasoning approach to managing chronic tennis elbow.
2 Understand the role of exercise and manual therapy in the treatment of chronic tennis elbow.
3 Understand that not all cases of tennis elbow should be treated the same.

Introduction

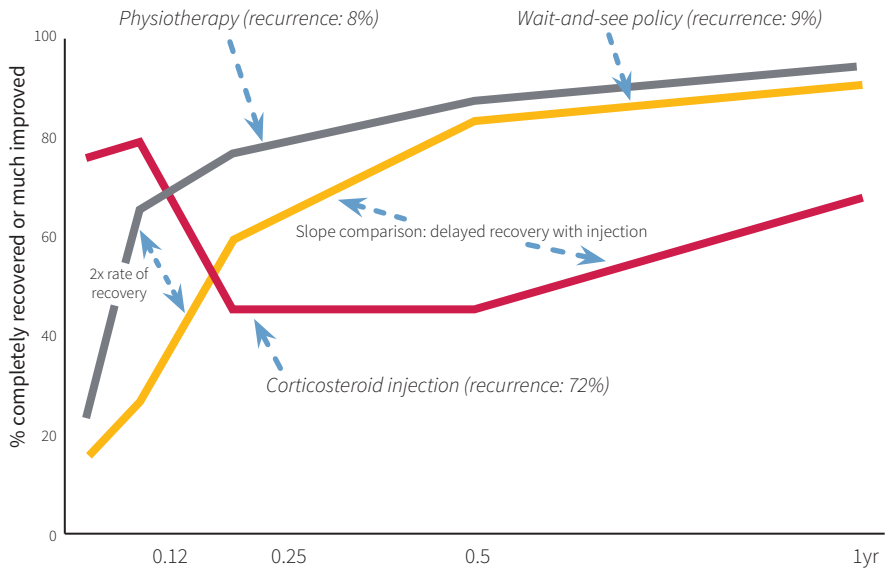
Tennis elbow, lateral epicondylalgia or lateral elbow tendinopathy is easily recognised clinically without the need for diagnostic imaging (Heales *et al* 2014). The patient presents with pain over the lateral elbow that occurs when gripping or manipulating objects with the hand, e.g. when shaking hands, opening a door, lifting a bag etc. It occurs equally in both males and females, but mainly in midlife. The pain does not spread beyond the wrist and proximal to the elbow. The onset is usually insidious and related to increased loading of the forearm muscles and associated tendons at the elbow such as unaccustomed gardening or a return to playing a racket sport. Physical examination reveals tenderness over the common extensor origin at the lateral epicondyle and pain with wrist extension and gripping.

The condition is reported to have prevalence of about 1-3% in general population increasing to circa 15% in at-risk contexts such as tennis players (Coombes *et al* 2015a). It is widely regarded that a patient presenting to a general medical practitioner will likely be prescribed a steroid injection or physiotherapy, or alternatively counselled that the condition is self-limiting and waiting it out is the best option. A recent network analysis identified that exercise, acupuncture, laser treatment, manual therapy and some combinations of physical therapies are superior to placebo-treated or control groups (Bisset & Vicenzino 2015). Exercise and load management is currently regarded as the key to managing tendinopathy (Cook & Vicenzino 2009).

This article focuses on the evidence pertaining to injections, physiotherapy and "wait-and-see", and provides some indication of future directions in the management of tennis elbow.

Short-term gain, long-term pain

Several clinical trials of the effects of corticosteroid injections in tennis elbow have been conducted in different countries and have shown remarkably similar patterns of effect (Coombes *et al* 2010). In a randomised clinical trial, 65 participants received steroid injection, and 67 were allocated to a wait-and-see approach (Bisset *et al* 2006) which involved general advice to remain active but not to undertake tasks that would flare or exacerbate elbow pain. They were asked not to immobilise the upper limb or elbow, but to take over-the-counter pain relief medication as required.



Bisset et al 2006

FIGURE 1: Recovery profile of patient rated global rating of change over a year follow-up

> "AT SIX WEEKS, THE PHYSIOTHERAPY SUCCESS RATE OF 65% WAS NOT DIFFERENT TO THAT OF THE INJECTION GROUP, BUT WAS MORE THAN DOUBLE THAT OF THE WAIT-AND-SEE GROUP"

All participants in the clinical trial were given advice on how to lift and manipulate objects in such ways to minimise flaring or exacerbating lateral elbow pain. Those allocated to the wait-and-see approach had a session with a trial physiotherapist who, in addition to delivering the above information and answering any questions regarding adhering to this approach, reassured the participant that the condition would settle within 3-12 months. Those allocated to injection received it from a medical practitioner. They were also advised that it was likely that they would experience a good relief of pain after the injection and to build up their elbow activity levels gradually in order to avoid exacerbating the condition. Only one injection was provided to each participant in the trial. Follow-up was on a range of outcome measures, at multiple time points, over 52 weeks.

In terms of their global rating of change scores (figure 1), substantially more success (78%) was reported in the participants who received injections at the six weeks stage, than in the wait-and-see group (27%) but this was reversed by the 26 weeks stage with the injection group now being inferior to the wait-and-see approach (45% v 83%). The trajectory of recovery after 26 weeks for injection was similar to the wait-and-see group over the preceding 12 to 26-week period with only 68% of the injection group, compared to 90% of the wait-and-see group, reporting success at 52 weeks.

In addition to the global rating of change, we looked at the recurrence rate and found that 72% of the injected group experienced recurrence compared with only 9% of the wait-and-see group. This pattern of steroid injection providing short-term improvements followed by longer-term delayed recovery, higher recurrence rate and generally poorer outcome has been mirrored in other clinical trials of tennis elbow in the UK and the Netherlands (Smidt & van der Windt 2006).

Physiotherapy for tennis elbow

We also randomised a group to receive a physiotherapy intervention, which consisted of mobilisation with movement techniques and exercise (Vicenzino 2003, 2007). The emphasis was on ensuring that exercise was the key element, with the mobilisation with movement manual therapy techniques being used to manage pain and improve pain-free exercise capacity of the individual. The participant had eight 30-minute sessions over six weeks with a physiotherapist. The mobilisation with movement techniques involved the lateral elbow glide, radial head glide plus or minus wrist, and distal radio-ulnar glides if required. The key issue with the manual therapy was that the patient was to self-treat with the techniques. Taping was also provided where required in order to augment the manual therapy. Exercise is critical for two reasons:

(a) because the forearm muscles involved in gripping tasks are weak and pain-free grip reduced (Pienimäki *et al* 1997)
(b) because there is evidence that exercise provides superior efficacy and prevention of occurrences in severe cases (Pienimäki *et al* 1998).

It is also important to consider exercises more broadly for the upper limb because many of the other upper limb muscles are deconditioned (Alizadehkhaiyat *et al* 2007a).

At six weeks, the physiotherapy success rate of 65% was not different to that of the injection group, but was more than double that of the wait-and-see group (figure 1), thereby representing a speeding up of recovery compared to the latter (Bisset *et al* 2006). However, at the 52 weeks stage the success rate for physiotherapy was 94% and recurrence was at 8%, which is much like the results shown in the wait-and-see group. An interesting finding from the diaries

> "THE GROUP THAT HAD RECEIVED THE PLACEBO INJECTION AND PHYSIOTHERAPY HAD A 100% RECOVERY RATE AT 52 WEEKS"

taken throughout the 52 weeks, and then from the exit questionnaires, was that physiotherapy participants were significantly less likely to have sought out other treatments, with only 21% of the group seeking other non-per protocol treatments compared to 55% in the wait-and-see group, and 49% in the injection group. It seems, therefore, to avoid the short-term gain, long-term pain outcome that is very likely to occur with injections, patients ought to be counselled against this treatment and advised to undertake physiotherapy, or in some cases to adopt a wait-and-see approach instead.

A comment that was often raised when we presented our first clinical trial results, particularly at sports medicine type conferences, was that injections were rarely given in isolation, but rather in combination with physiotherapy. This intuitively seems a sensible approach in managing this condition, so in a follow-up randomised clinical trial we tested it (Coombes 2013; Coombes *et al* 2009). In order to test the proposition that adding physiotherapy to steroid injection would result both in short- and long-term benefits, we added a placebo injection to test the specific effects of the medication in the steroid injection. To do this we enacted a two-by-two factorial design in which there were four groups as follows:

1. Steroid injection
2. Placebo injection
3. Steroid injection plus physiotherapy
4. Placebo injection plus physiotherapy.

Thus we had a steroid versus placebo injection comparison and a physiotherapy versus no physiotherapy comparison. Importantly, before their injection, all patients receiving physiotherapy visited the physiotherapist, who was blind to which injection the patient was to receive, for an initial assessment, education and information about the time course of re-introducing activity after the injection, plus they were taught their exercises and advised of the manual therapy that would be performed after the injection. In this way, we attempted to prevent patients from overextending themselves after the injection when they were likely to feel much better.

We followed our participants up in much the same way as our first trial. The main finding was that physiotherapy did not alter the time course pattern of effect of steroid injections, i.e. there was still an early high proportion of success rate of 71% without the physiotherapy and 68% with it, followed by a trough at around 26 weeks of 56% and 54% respectively, before it became a more gradual slope representing delayed recovery, as per the initial trial (Coombes 2013). The group that had received the placebo injection and physiotherapy had a 100% recovery rate at 52 weeks compared to 93% who just received the placebo injection, 84% of participants receiving the steroid injection, and 82% with the combined steroid injection-physiotherapy treatment. The take-home message from this trial was that the steroid medication appears a significant driver of the long-term pain part of the short-term gain, long-term pain pattern of effect.

Two common points raised were with regard to the higher recurrence rate after injections. Firstly, that it was not unusual to see recurrences in clinic and, secondly, that the reason for this recurrence was that patients, having experienced a dramatic reduction in pain following the injection, "did too much" leading them to re-injure themselves.

Despite our studies taking the approach of providing written and verbal advice regarding the post-injection period and, more importantly in our most recent clinical trial, arranging for each patient undergoing either the placebo or steroid injection to be carefully advised and guided into gradual re-introduction of exercise and activities with a "trial" physiotherapist, the recurrence rate following steroid injections both with and without physiotherapy was no different (54% v 55%) and much higher than the 8% for physiotherapy or 9% in the wait-and-see results in our previous trial (Coombes 2013).

Interestingly, the placebo injection group reported a 20% recurrence rate, which indicates that the act of injecting (anything) into the tendon might well be fraught with this issue of recurrence (*is this a cautionary note for needling treatments?*). The evidence is that in the type of population of tennis elbow recruited in our clinical trials, corticosteroid injections are not indicated.

An important aspect of any implementation of clinical trial data and findings in evidence-based practice is to ensure that the patients enrolled in the trial represent, as best as possible, the patient sitting in front of us at the clinical consultation. So, possibly the strongest caveat that goes with our clinical trials is that all patients entered into the trial had had their condition for at least six weeks although, in reality, the median duration of the condition, across our trials, was approximately 16-22 weeks (Bisset *et al* 2006; Coombes 2013), which implies that our participants were not in a reactive phase of tendinopathy. The reactive phase of tendinopathy usually occurs quite soon after its inception (or flare), for which there are clinical recommendations of the benefits of tenocyte and aggrecan inhibiting agents, many of which are recognised as anti-inflammatory agents, i.e. NSAID, steroid injections (Cook & Purdam 2009).

Prognostic factors

Apart from providing a diagnosis and discussing the management approach with patients, the clinician will also need to consider the overall prognosis. Several factors have been identified as associated with a poor outcome in those who present with tennis elbow. The commonly reported prognostic factors from a number of studies are:

- higher pain severity and disability
- evidence of central sensitisation (widespread cold and mechanical hyperalgesia)
- concomitant neck or shoulder pain
- work-related factors, e.g. handling tools and heavy loads, repetitive movements, low job control
- substantial tendon and lateral collateral ligament tears (Coombes *et al* 2015a).

We have recently shown that a subgroup of severe tennis elbow as (>54/100) delineated on the Patient Rated Tennis Elbow Evaluation questionnaire (Rompe *et al* 2007) exhibited cold hyperalgesia in both the affected and unaffected elbows (Coombes *et al* 2012). Cold hyperalgesia measured at baseline was also significantly associated with pain, disability and mechanical hyperalgesia at the affected elbow at 52 weeks (Coombes *et al* 2015b). This might hold promise as a means by which to identify those who are more likely to have a poor outcome and be in need of some earlier extra attention.

Proposal for managing the spectrum of presenting severity of tennis elbow

Regarding the response to treatment, particularly in the wait-and-see approach, together with our knowledge of the factors associated with more severe cases and poorer outcomes, it seems likely that not all cases of tennis elbow need or ought to be managed in the same way. For example, if a patient has a low level of pain and disability, as measured on the Patient Rated Tennis Elbow Evaluation, of at least lower than 54 (/100) and no cold hyperalgesia, is not a manual worker and has no concomitant issues with their neck, then a wait-and-see approach, ensuring good education about loading and activity levels, possibly with some simple, pain-free and graduated strengthening exercises for the forearm muscles will be sufficient (Coombes *et al* 2015b). This would appear to be not only cost effective, but it would lessen the risk of the patient being trapped in a cycle of iatrogenic induced reliance on passive therapies, e.g. injection, that could potentially have deleterious outcomes as explained earlier.

Clinicians, freed from repeat visits with these less severe cases, will allow for more focused attention on those who we can identify early to be at risk of a worse outcome. Currently, the evidence suggests that these are those who have more severe pain and disability, do manual work, have widespread hyperalgesia (cold and mechanical) and concurrent neck symptoms. Psychosocial factors are a notable omission from this list of possible factors. It is likely that this reflects that psychosocial factors in tennis elbow have not been comprehensively studied, and that there are some conflicting findings reported to date.

Our study of 164 patients with unilateral tennis elbow and 62 healthy controls did not identify any differences on measures of anxiety, depression and kinesiophobia, but we did identify poorer quality of life in the more severe subgroup (Coombes *et al* 2012). On the other hand, there have been two smaller studies (n=46 & 54) that reported higher anxiety and depression scores in those with higher scores of pain and disability (Garnevall *et al* 2013; Alizadehkhaiyat *et al* 2007b). It would seem reasonable to expect that the more severe cases are likely to require more frequent and in-depth treatment sessions with input from a range of health professions.

Conclusion

There are some clear directions emanating from clinical research that should improve the outcome of patients who have tennis elbow.

- Steroid injections are not the solution, even when combined with efficacious physiotherapy.
- The wait-and-see approach might have a role in managing less severe cases where the pain is localised and the patient's day-to-day life involves a low level of manual intensive tasks.
- Physiotherapy that focuses on graduated and progressive exercises is key.
- Manual therapy that the patient can self-administer and that directly improves their ability to perform the exercises appears to accelerate resolution.
- Importantly, not all cases should be treated the same.

About the author

Bill is a clinician scientist, Professor in Sports Physiotherapy and Director of Master of Physiotherapy (Musculoskeletal, Sports) at the University of Queensland. He leads a team of very talented and hardworking individuals that have evaluated common and often frustrating musculoskeletal

> "STEROID INJECTIONS ARE NOT THE SOLUTION, EVEN WHEN COMBINED WITH EFFICACIOUS PHYSIOTHERAPY"

conditions such as chronic tennis elbow and patellofemoral pain. He has conducted a number of randomised clinical trials attracting National Health and Medical Research Council of Australia, Australian Research Council and industry funding. His seminal trial on steroid injections versus exercise+MWM for tennis elbow (BMJ) was in the top 15 of 28,000 PEDro-trials. Bill has communicated his research findings in more than 150 peer reviewed publications, two books, 27 book chapters and more than 300 invited workshop / conference presentations.

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