Update for chapter 18: How Do We Treat Tennis Elbow?

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Introduction

Since we originally wrote the chapter on ‘How do we treat Tennis Elbow?’, there have been a number of high quality publications on the treatment options available. A number of these have been prospective and randomised, which gives us quality information with regard to the scientific evidence available to judge our therapeutic regimens. In particular, two interesting treatment modalities have been discussed in detail in the literature, namely extracorporeal shockwave therapy (ESWT) and botulinum toxin (BoTox) treatment.

Extracorporeal Shockwave Therapy (ESWT)

Numerous investigators have recommended extracorporeal shock wave therapy as an alternative treatment for chronic lateral epicondylosis of the elbow. Ko et al reported 31% of patients rated as ‘excellent’ at six weeks after ESWT treatment, with further improvement up to six months and with no side effects.1 This suggests that shock wave therapy may offer a safe non-operative treatment for lateral epicondylosis. However, as with a number of other treatment forms, recommendations for ESWT have been based largely on observational or non-randomised trials.

The mode of action of ESWT is uncertain. It has been used by urologists in the treatment of urinary calculi for over twenty years and more recently in orthopaedics for calcific tendonitis, plantar fasciitis and non-union of fractures amongst others. It may work by relieving pain by hyperstimulation analgesia, ascribed to mechanisms in the brain stem exerting a descending inhibitory control of transmission, but the details of the electrophysiological pathways and molecular mechanisms of the anti-nociceptive effect is still unknown.

The extracorporeal shockwave therapy clinical trial group, led by Haake, undertook a blinded randomised, controlled, multi-centre trial comparing ESWT with placebo shockwave therapy.2 Two-hundred and seventy-two patients, with chronic symptoms, were randomised to receive local anaesthetic and then either extracorporeal shock wave therapy or placebo therapy. The success rate was 25.8% in the group treated with ESWT and 25.4% in the placebo group. None of the measured criteria showed any significant difference between the groups, but improvement was observed in two-thirds of the patients from both groups at twelve months. They concluded that ‘extracorporeal shock wave therapy…was ineffective in the treatment of lateral epicondylitis.’

The group described the various side-effects they had recorded in their trials, totalling 399 ESWT and 402 placebo treatments.2,3 There were more side-effects documented in the ESWT than the
placebo group with 21% of patients having transitory reddening of the skin. Other side-effects included pain, haematomas, migraine and syncope.

Speed et al undertook a similar study, randomising 75 patients with chronic tennis elbow to receive either ESWT or sham therapy. The symptoms lasted for a mean of 16 months in the ESWT group and 12 months in the sham group, with both groups showing significant improvements from two months onwards. Both groups showed improvements in mean pain scores from three months, but these were not significantly different. The authors concluded that there appeared to be a significant placebo effect of moderate dose ESWT and there was no evidence of added benefit of treatment when compared to sham therapy.

Crowther et al prospectively randomised 93 patients, with chronic tennis elbow, to either a single injection of triamcinolone and lignocaine or ESWT. Only 73 completed the study, with 48 receiving ESWT and 25 receiving injections. At six weeks, using pain scores, the improvement with the injection group was significantly greater than in the ESWT group. After three months, 84% of patients with the injection treatment were considered to have had successful treatment compared with 60% of patients with ESWT. The authors concluded that in the medium term local injection of steroid is more successful and 100 times less expensive than ESWT in the treatment of tennis elbow.

One can critically analyse all the above papers with regard to their design and in some the addition of local anaesthetic to the area of pain – are we testing ESWT or just the response to local anaesthetic? However, the designs are largely of high quality and local anaesthetic is widely used in addition to ESWT in clinical practice. Hence we conclude that although there are many recommendations for the efficacy of ESWT in the treatment of lateral epicondylitis, there is little scientific evidence to support its use as a treatment modality.

**Botulinum Toxin Therapy**

Botulinum toxin is used in the treatment of various spastic and muscle tone disorders, such as torticollis, strabismus and fissura ani. The toxin irreversibly binds to specific receptors at the pre-synaptic cholinergic endplate membrane and inhibits the release of acetylcholine at the neuromuscular junction leading to paresis. New axons sprout and form new junctions and lead to a full recovery in two to six months. The theory behind the therapy regime is that complete rest of Extensor Carpii Radialis Brevis, through botulinum toxin induced paralysis, may lead to a normal repair mechanism of the muscle by preventing continued tensile forces acting through the abnormal tissue.

Keizer et al published a prospective, randomised, pilot study comparing treatment with botulinum toxin infiltration and surgery. The authors recruited 40 patients who had had symptoms for over six months and had failed to respond to conservative measures. Twenty patients underwent surgery and 20 patients were treated with botulinum toxin. At one year, 13 patients in the botulinum toxin group and 15 patients in the surgical group had ‘good’ or ‘excellent’ results. At two years, 15 patients in the botulinum toxin group and 17 patients in the surgical group had ‘good’ or ‘excellent’ results. Four patients required surgical intervention after initial treatment with botulinum toxin. The authors found no differences between the two forms of treatment and concluded that botulinum toxin infiltration, a less invasive technique, may be an alternative for surgical treatment of tennis elbow.
Hayton et al ran a prospective, randomised, double-blinded trial to compare botulinum toxin injections to placebo injections. They recruited 70 patients, who had chronic, unremitting symptoms, were randomised into two groups. Eighteen received 50 units of botulinum toxin and 19 received normal saline. Three patients withdrew prior to completion of the study. At three months after the injection, there was no significant difference between the two groups, although the botulinum toxin group had a greater improvement in grip strength. The authors concluded that there was no evidence to 'propose the use of botulinum toxin treatment over placebo'.

These two papers are well designed, but have small numbers as both are pilot studies. However, both show no benefit of botulinum toxin over surgery or placebo. This may represent the small numbers involved (type II or beta error) and that conclusions cannot be drawn until a larger trial is undertaken – a minimum of 300 patients would be required to show a difference in Hayton’s trial. However, from the data available, botulinum toxin does not offer any advantage in treatment over placebo or surgery.

**Steroid Injections**

In our previous edition, we concluded that there was no evidence to support the long-term efficacy of steroid injections in the treatment of tennis elbow. Since then there have been three publications, which have re-examined this treatment form.

Newcomer et al undertook a randomised, controlled, double-blinded study comparing a corticosteroid injection and early rehabilitation, with a control injection and rehabilitation. They recruited 39 patients, all of whom had had symptoms for less than four weeks. Nineteen received a sham injection with 20 receiving a corticosteroid injection; all 39 had rehabilitation. They found no significant differences between the two groups with the exception of an improvement in the visual analogue pain scale in the corticosteroid group. In both groups, outcome measurements improved significantly over time and over 80% of the subjects reported improvements from baseline to 6 months for all scales. They concluded that a corticosteroid injection did ‘not provide a clinically significant improvement…and rehabilitation should be the first line of treatment in patients with a short duration of symptoms.’

Nirschl undertook a randomised, double-blinded, placebo-controlled study comparing a dexamethasone injection with a placebo injection, in both medial and lateral epicondylitis. One hundred and ninety-nine patients were recruited to receive six injections of either active or placebo treatment. Using a 100mm visual analogue scale, patients who had had the dexamethasone injection produced a significant 23mm improvement, compared with a 14mm improvement for the placebo injections at 2 days; and 24mm compared with 19mm at 1 month. At two days, 52% treated with dexamethasone scored ‘moderate’ or better compared with 33% of those treated with placebo. At one month, the difference was not significant, with 54% of the steroid group scoring ‘moderate’ or better compared to 49% of the placebo group. It was noted that patients completing six treatments in ten days or less had better results than those treated over a longer period. He concluded that ‘iontophoresis treatment was well tolerated by most patients and was effective in reducing symptoms of epicondylitis at short-term follow-up.’

The Dutch College of General Practitioners recommends a ‘wait-and-see’ policy rather than steroid injections or physiotherapy for the treatment of tennis elbow. Smidt et al compared the efficacy of these treatment regimes by randomising 185 patients to six weeks of treatment with either corticosteroid injections; physiotherapy and ultrasound; or a wait-and-see policy. At six weeks,
corticosteroid injections were significantly better than the other therapy options for all outcome measures, with success rates of 92% compared with 47% for physiotherapy and 32% for the ‘wait-and-see’ policy. However, recurrence rate in the injection group was high and success rates at 52 weeks were 69% for injections, 91% for physiotherapy, and 83% for a ‘wait-and-see’ policy. The latter two showed no significant difference. The authors concluded that ‘patients should be properly informed about the advantages and disadvantages of the treatment options for lateral epicondylitis’ and that ‘the decision to treat with physiotherapy or to adopt a wait-and-see policy might depend on available resources, since the relative gain of physiotherapy is small.’

These three papers support the previously documented evidence that steroid injections may offer improvement of symptoms in the short term, perhaps for reasons outlined in the main chapter, but do not offer any additional benefit over less invasive treatment forms in the medium and longer term.

**Acupuncture**

The role of acupuncture has long been used in China and more recently in Western countries as a first line treatment for various musculoskeletal disorders. The evidence to support acupuncture has been assessed by Green et al for the Cochrane database. They included four small randomised controlled trials by Molsberger, Haker (two trials) and Wang, but due to flaws in the study designs and clinical differences between the trials, data could not be combined in a meta-analysis. Molsberger found that needle acupuncture resulted in relief of pain for significantly longer than placebo and was more likely to result in a 50% or greater reduction in pain after one treatment. Haker demonstrated needle acupuncture to be more likely to result in an overall improvement, as reported by the participant, than placebo in the short term, but no significant differences were found after three or 12 months. In a separate trial by Haker, there was no difference between laser acupuncture and placebo with respect to overall benefit. Wang demonstrated no difference between vitamin B12 injection plus acupuncture with vitamin B12 injection alone.

The conclusions from this review were that there was ‘insufficient evidence to either support or refute the use of acupuncture (either needle or laser) in the treatment of lateral elbow pain.’ The review demonstrated needle acupuncture to be of short-term benefit with respect to pain, but this was based on the results of two small trials, ‘the results of which were not able to be combined in meta-analysis.’ Hence no substantial ‘conclusions can be drawn regarding the effect of acupuncture on tennis elbow.’

**Summary:**

Tennis elbow is a non-inflammatory process of degenerative change in the extensor tissues at the elbow. For this reason, and perhaps due to its relapsing nature, the clinical course seems to be unchanged by a variety of standard non-surgical interventions. This has lead many clinicians to adopt a ‘wait and see’ policy. There are new trials studying extracorporeal shockwave therapy and botulinum toxin administration as well as traditional methods with steroid injections and even acupuncture. None of these trials have shown significant evidence to propose any of the above regimens over any other. Injections can lead to potential harm, as can operations. The mechanism of ESWT is still unknown and has a number of mild side-effects, and botulinum toxin can have significant short-term side effects. It seems that the ‘wait and see’ policy may still be appropriate, coupled with simple measures as outlined in our original chapter.
Summarising the evidence:

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