Effectiveness of Corticosteroids in the Treatment of Lateral Epicondylitis

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Clinical Scenario
Persistent pain at the common wrist-extensor origin, often diagnosed as tendinopathy, lateral epicondylitis, or “tennis elbow,” is a frequent complaint in sports rehabilitation. The pain and dysfunction can lead to activity limitation in sports, recreation, and daily activities. The primary short-term goal in treating common wrist-extensor pain is immediate pain relief, with the long-term goals of both sustained relief and a full return to functional and participation status. A conventional approach to treating wrist-extensor pain includes corticosteroid injections. However, the treatment’s long-term efficacy has been questioned.

Focused Clinical Question
Are corticosteroid injections more effective than other interventions (therapy, nonsteroidal anti-inflammatory drugs [NSAIDs], “wait-and-see”) in the short- and long-term treatment of common wrist-extensor pain?

Summary of Search, Best Evidence Appraised, and Key Findings
• The literature was searched for randomized controlled trials that compared corticosteroid injections with either a control or placebo intervention in the treatment of common wrist-extensor pain. The purpose of a CAT is to review recent studies on a specific topic. A systematic review was published in 2005; therefore, articles included in that review or published prior to it were not included in this CAT.
• The systematic literature review published in 2005,1 which summarized 18 studies related to this CAT, the latest from 2003, was incorporated to allow for comparisons drawn from previous research to the present.
• Four randomized controlled trials were included that compared injections with no treatment (control) or placebo and an additional therapeutic intervention or NSAIDs.
• The primary outcomes that were common in these 4 studies were pain and function. Corticosteroid injections appear to be effective in the short-term relief of common wrist-extensor pain. Short-term measurements were taken at 7 weeks,2 6 weeks,3 5 days,4 and 3 weeks.5
• Corticosteroid injections do not appear to be as effective in the long-term (3 mo5 or 52 wk3) treatment of common wrist-extensor pain and may even be detrimental compared with other interventions (therapy, NSAIDs) or no treatment.3

Clinical Bottom Line
There is moderate evidence to support corticosteroid injections for the short-term relief of common wrist-extensor pain. However, there is no evidence to support their long-term efficacy. Other therapeutic interventions, NSAIDs, and no treatment appear to be more effective in long-term relief than corticosteroid injections.

Search Strategy
Terms Used to Guide Search Strategy
• Patient/Client group: common wrist extensor pain or tendinitis, lateral epicondylitis, lateral epicondylitis, or tennis elbow
• Intervention: corticosteroid injection or steroid injection
• Comparison: physiotherapy, no treatment, wait-and-see, or NSAIDs
• Outcome(s): pain and function

Sources of Evidence Searched
• MEDLINE/PubMed
• CINAHL
• Cochrane Library
Inclusion and Exclusion Criteria

Inclusion Criteria

- Included participants with lateral epicondyltosis, common wrist-extensor pain, tendinitis, or tennis elbow
- Compared the use of corticosteroids with at least 1 other treatment and a control or placebo group
- Published in 2005 or later
- Human subjects
- Published in English
- Randomized controlled trial

Exclusion Criteria

- Published before 2005
- Included uninjured participants
- Nonrandomized control design
- Not available in English

Results of Search

Four relevant studies were located and categorized as shown in Table 1 (based on levels of evidence, Centre for Evidence Based Medicine, 1998).

Best Evidence

The studies in Table 2 were identified as the best evidence and selected for inclusion in this CAT. Reasons for selecting these studies were that they used a randomized controlled design; included participants with common wrist-extensor pain, tendinitis, or lateral epicondyltosis; and compared corticosteroid injection with at least 1 other intervention and a control or placebo.

Implications for Practice, Education, and Future Research

A review that included research published through 2003 led us to conclude that in the short term, corticosteroids are an effective treatment option. The studies included in this appraisal supported the short-term efficacy of corticosteroid injection in the treatment of common wrist-extensor pathology. Injections provided better short-term outcomes than other treatments (outcomes: pain, pain-free grip strength, Patient-Related Forearm Evaluation Questionnaire [PRFEQ] pain, PRFEQ function, extensor weight strength, assessor’s rating of severity, elbow disability, NSAIDs (outcomes: pain, number of pain killers consumed), and no treatment or “wait-and-see” (outcomes: pain, global improvement, pain-free grip strength, assessor’s rating of severity, severity of elbow complaints, elbow disability). However, in addition to investigating short-term symptom relief, Bisset et al followed their participants for 1 year. They found that patients who were treated with physiotherapy or wait-and-see demonstrated better outcomes (global improvements, pain-free grip strength, assessor’s rating of severity, elbow disability, pain13) than those treated with corticosteroid injection (Table 2). In addition, Bisset et al found at 52-week follow-up that the subjects in the corticosteroid-injection group were worse than those in the physiotherapy group on all outcomes and were worse than the wait-and-see group on 2 of 3 outcomes. Thus, it appears that if the objective is merely to reduce symptoms of lateral epicondyltosis in the short term, corticosteroid injections are effective relative to other treatments. Conversely, similar long-term benefits of corticosteroid injections have not been established.

It is important for sports rehabilitation providers to appreciate that although corticosteroid injections seem to provide short-term pain relief, their long-term outcomes do not necessarily support their short-term use. Long-term outcomes may, in fact, be worse when the initial treatment includes corticosteroid injections. This should prompt providers to choose alternative initial treatment methods rather than opt for the immediate, yet unsustainable, benefits of corticosteroid injections.

An interesting point for future consideration is the description of the wait-and-see or control groups employed in this type of research. Specifically, it is unclear what type of activity modification was included for each group. Bisset et al indicated that their wait-and-see group received instructions on activity modification, avoiding painful activities, analgesic drugs, cold, and heat, and Lewis et al provided standard advice and NSAIDs. Because activity modification and NSAIDs can be considered interventions, it may be misleading to suggest that no treatment or the wait-and-see approach is more effective than injections. It may be that activity modification or pain medications are important treatment components and future research should consider a more precise description of activity modification and medication use in controls. This should allow more specific conclusions as to the long-term effectiveness of interventions for common wrist-extensor pain. In short, clinicians should examine the risks and benefits of using corticosteroid injections to treat lateral epicondyltosis. Although the short-term effects may be beneficial, the long-term effects are potentially detrimental.
### Table 2  Characteristics of Included Studies

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<th>Study design</th>
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<td>Prospective RCT</td>
<td>48 male and female patients (mean age 44.3 y) diagnosed with lateral epicondylitis by general practitioner. Randomized into 4 groups. Participants were included if they had no treatment in previous 6 mo, painful palpation of common extensor origin, pain with resisted extension of the wrist while elbow extended. Participants were excluded if they had injury to involved elbow in previous 6 mo, had past history of elbow instability, had previous elbow surgery, had bilateral symptoms, had any other pathology of involved limb, had concomitant cervical-spine pathology, had physiotherapy or steroid injection of involved elbow in previous 6 mo, were currently taking oral or systemic steroids, had contraindication to injection therapy. 77.1% were available for follow-up at 7 wk.</td>
<td>Pragmatic single-blind RCT</td>
<td>198 male and female participants (mean age 47.6 y, 35% women) diagnosed with lateral epicondylitis of at least 6 wk duration. Participants were similar at baseline and randomized via telephone into 3 groups. Participants were included if they reported pain over the lateral epicondyle increased with palpation, gripping, or resisted wrist, second-finger, or third-finger extension and had experienced pain for last 6 mo. Participants were excluded if they had any treatment in previous 6 mo; had bilateral symptoms; had cervical radiculopathy; had other elbow pathology; had peripheral nerve involvement; had prior elbow surgery; had prior elbow dislocation, fracture, or tendon rupture; had neurological disorder; had other limb pathology; had contraindications to corticosteroids. 96% were available for follow-up at 52 wk.</td>
<td>Multicenter pragmatic RCT</td>
<td>164 male and female participants age 18–70 y diagnosed with a new episode of lateral epicondylitis. Participants were similar at baseline, except in terms of pain score. The injection group had a slightly higher pain score at baseline, and more participants in the injection group had taken painkillers in the previous 48 h. Randomized into 3 groups. Participants were included if they had pain and tenderness of the lateral epicondyle, had pain with resisted isometric contraction of wrist extensors, had no consultation with same symptoms on involved elbow in previous 12 mo. 100% were available for 5-d follow-up.</td>
<td>RCT</td>
<td>60 male and female participants (mean age 48.6 y, 75% women) reporting lateral elbow pain. Randomized into 3 groups. Participants were included if they reported pain over the lateral aspect of the elbow and forearm for more than 6 wk, along with pain at the ECRB origin, increased with resisted wrist extension. Participants were excluded if they had accompanying painful conditions, accompanying medial epicondylitis, contraindications for electrotherapy, contraindications for corticosteroid injections. 100% were available for follow-up at 52 wk.</td>
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<th>Intervention investigated</th>
<th>Tonks et al&lt;sup&gt;2&lt;/sup&gt;</th>
<th>Bisset et al&lt;sup&gt;3&lt;/sup&gt;</th>
<th>Lewis et al&lt;sup&gt;4&lt;/sup&gt;</th>
<th>Uzunca et al&lt;sup&gt;5&lt;/sup&gt;</th>
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<td>Patients were randomized into 1 of 4 groups; observation, injection therapy only, physiotherapy, or injection and physiotherapy. Injection therapy included 1 injection of 10 mg of triamcinolone acetonide and 2% lignocaine hydrochloride, which made 1 ml and was injected into the tender area of the common extensor origin. Physiotherapy included progressive slow, repetitive wrist and forearm stretches and strengthening, which progressed in 4 stages.</td>
<td>A blinded examiner made the final diagnosis. Participants were randomized into 1 of 3 groups: wait-and-see, physiotherapy, or injection. Patients in the wait-and-see group were instructed on the use of analgesic drugs, heat, cold, and braces. Injection therapy included 1 preliminary injection and another injection 2 wk later if thought necessary by the medical practitioner. The injection was composed of 1 ml of 1% lidocaine with 10 mg of triamcinolone acetonide in 1 ml. One of the 2 practitioners involved in the study administered the injections. Physiotherapy included 8 treatments, manipulation and therapeutic exercise over 6 wk. Patients were instructed on home exercise and self-manipulation. One of 6 postgraduate physiotherapists provided the treatments.</td>
<td>Participants were randomized into 1 of 3 groups: injection, naproxen, or placebo. Injection therapy included 1 injection of 20 mg methylprednisolone and 0.5 mL 1% lignocaine. The naproxen group was given 500 mg twice daily for 2 wk. The placebo group was given unmarked vitamin C twice daily for 2 wk. Each participant was provided with an advice sheet and a codeine phosphate and paracetamol combination as needed.</td>
<td>Patients were randomized into 1 of 3 groups: pulsed electromagnetic field (PEMF), sham PEMF, or injection. Patients in the PEMF group received the PEMF at frequencies of 25 and 4.6 Hz consecutively. Thirty-min therapy sessions were administered 5 times/wk for 3 wk. Patients in the sham group were positioned in the same manner as those in the PEMF group and received the same auditory and visual sensory input, but they did not receive PEMF treatment. Injection therapy included 1 injection composed of 1 cc of methylprednisolone acetate (40 mg) and 1 cc of prilocaine hydrochloride (20 mg).</td>
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<td>Outcome measures</td>
<td>Primary Outcome: PFGS measured in kg using a hydraulic hand dynamometer. The average of 3 trials was recorded. Secondary Outcomes: extensor weight strength (maximum about of pain-free weight patient could lift using a floor-mounted spring weight balance), pain score on the Patient Related Forearm Evaluation Questionnaire (PRFEQ; 5 items), function score of the PRFEQ (10 items), total score on the PRFEQ (15 total items, scale of 0–10 for each, high score = greater pain), complications of treatment. All outcomes were measured by the research physiotherapist before randomization and 7 wk after the initiation of treatment.</td>
<td>Primary Outcomes: global improvement (6-point Likert scale: completely recovered to much worse), PFGS (digital grip dynamometer, average of 3 trials, calculated ratio of affected to unaffected side), and assessor’s rating of severity (blinded examiner rated severity of complaints on a VAS, 0 = none, 100 = maximum severity). Secondary Outcomes: severity of pain in previous 7-d period (VAS) and elbow disability as measured with the Pain-Free Function Questionnaire (dichotomous 8-item scale). All outcomes were measured before randomization and at 3, 6, 12, 26, and 52 wk after randomization by a blinded assessor.</td>
<td>Primary Outcomes: pain severity on each of 5 d directly after randomization and number of painkillers taken on each of those 5 d. The outcomes data were obtained via a self-report diary in which subjects were asked to do the following: “For the first 5 d from the start of your treatment, please mark how much pain you have had and how many painkillers you have taken.” The severity of pain was assessed using a 10-point scale in which 0 = no pain and 9 = worst possible pain.</td>
<td>Primary Outcomes: pain at rest, activity of painful elbow, nighttime pain, pain during resisted wrist extension and forearm supination, as measured via VAS (0 = no pain, 10 = unbearable pain). Pain threshold at the elbow was measured with Fischer’s algometer.</td>
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Main findings

Significant improvement in PFGS in patients receiving injection therapy at 7 wk (\(P = .045\), 95% CI = 0.15–12.33). No significant improvement in physiotherapy group (\(P = .73\)), and no interaction occurred between physiotherapy and injection (\(P = .42\)).

Patients receiving injections improved significantly in all outcome measures at 7 wk, whereas there were no significant improvements in the physiotherapy group. There were no significant interactions between physiotherapy and injection.

One complication (skin depigmentation and atrophy in 1 patient in the injection-only group) occurred.

Significant reductions in mean pain scores were seen by day 3 in the injection and naproxen groups (\(P < .01\); CI not reported).

The injection group showed significantly greater reduction in pain score compared with baseline than either other group, by day 3 compared with the placebo group (\(P < .05\)) and day 4 compared with the naproxen group (\(P < .01\); CI not reported).

Significantly fewer patients in the naproxen group were taking painkillers on day 1. Significantly fewer patients in the injection group were taking painkillers by day 3. Recurrences after injection were significantly greater than recurrences after physiotherapy (CI = 0.6–1.1) or wait-and-see (CI = 0.6–1.1).

Level of evidence

2b

Validity score

6 (PEDro score)

Conclusion

Steroid injections are effective as a first-line treatment of acute lateral epicondylitis in terms of pain relief, return to function, and time- and cost-effectiveness.

RCT, randomized controlled trial; ECRB, extensor carpi radialis brevis; PFGS, pain-free grip strength; VAS, visual analogue scale.
References