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Mechanical solution for a mechanical problem: Tennis elbow

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Abstract

Lateral epicondylitis is a relatively common clinical problem, easily recognized on palpation of the lateral protuberance on the elbow. Despite the “itis” suffix, it is not an inflammatory process. Therapeutic approaches with topical non-steroidal anti-inflammatory drugs, corticosteroids and anesthetics have limited benefit, as would be expected if inflammation is not involved. Other approaches have included provision of healing cytokines from blood products or stem cells, based on the recognition that this repetitive effort-derived disorder represents injury. Noting calcification/ossification of tendon attachments to the lateral epicondyle (enthesitis), dry needling, radiofrequency, shock wave treatments and surgical approaches have also been pursued. Physiologic approaches, including manipulation, therapeutic ultrasound, phonophoresis, iontophoresis, acupuncture and exposure of the area to low level laser light, has also had limited success. This contrasts with the benefit of a simple mechanical intervention, reducing the stress on the attachment area. This is based on displacement of the stress by use of a thin (3/4-1 inch) band applied just distal to the epicondyle. Thin bands are required, as thick bands (e.g., 2-3 inch wide) simply reduce muscle strength, without significantly reducing stress. This approach appears to be associated with a failure rate less than 1%, assuming the afflicted individual modifies the activity that repeatedly stresses the epicondylar attachments.
Keywords: Epicondylitis, Tennis elbow, Adaptive equipment, Mechanical overload, Elbow, Inflammation

Core tip: Lateral epicondylitis is a mechanical problem with a mechanical solution. While there have been many approaches, some quite exotic, to this phenomenon, there is a very effective non-invasive treatment: application of a 3/4-1 inch forearm band just below the elbow, of course associated with modification of the activity that is stressing the epicondylar attachments.

CHARACTER OF LATERAL EPICONDYLITIS

Popularly referred to as tennis elbow, lateral epicondylitis is a relatively common clinical problem[1,2] that has apparently confounded many attempts at its resolution. Easily recognized on induced pain/replication of symptoms by palpation of the lateral protuberance on the elbow, the term lateral epicondylitis identifies a disorder localized to that lateral epicondyle. The “itis” suffix in the term epicondylitis is misleading. Histological evaluation does not support categorizing it as an inflammatory process[3-5]. Microscopic examination actually reveals angiofibroblastic and mucoid degeneration, attributed to mechanical overloading[3]. Indeed, ultrasound evaluation reveals mechanical damage to tendons[6-9].

ANALGESIC AND ANTI-INFLAMMATORY INTERVENTION

The multitude of approaches to management of a clinical problem suggests either that it is quite responsive to intervention or that the optimal approaches have yet to be identified. Many of the approaches to treatment of lateral epicondylitis seem to be predicated on the subsequently falsified hypothesis that the epicondylitis represented an inflammatory process[3-9]. These attempts have included use of oral or topical non-steroidal anti-inflammatory drugs[10-12], injections[13] of corticosteroids[10,13-20], anesthetics (e.g., bupivacaine)[21] or even botulinum toxin[22] injection, none of which have had documented long-term clinical benefit[3]. Simply treating the pain symptom with analgesics has also provided inadequate relief[10,11,21,23].

INJURY-PREDICATED INTERVENTION

Based on recognition that epicondylitis represents an injury, another approach has been to inject autologous blood[24-27] or platelet-rich plasma[3,18,21,24,28,29]. This is predicated on the hypothesis that these injections provide growth factors, which stimulate healing. Similarly, skin-derived stem cells have been injected with this goal[30]. The enthesitis (irritation of tendon insertions) occasionally leads to calcification/ossification of those attachments. Speculation that the ossification/calcification process is the source of pain, radiofrequency[31] and shock wave[32,33] treatments have also been pursued. Surgical approaches have included percutaneous tenotomy and arthroscopic approaches[23,26,34-39].

PHYSIOLOGIC APPROACHES

More physiologic approaches have included physiatric/physical therapy techniques including manipulation, therapeutic ultrasound, phonophoresis, iontophoresis, acupuncture and exposure of the area to low-level laser[11,19,38,40-43]. An intriguing approach has been dry needling[25,34]. This is especially remarkable, as the lateral epicondyle has been listed[44], I believe erroneously[45], as a fibromyalgia trigger point and needling has been utilized as an approach to treatment of fibromyalgia[46]. The efficacy of all these approaches has been limited[3,13-16,25,28,29,38,47]. The study by Creaney et al[25] showed statistically significant clinical improvement in 60%-72%, but not complete relief. This is a greater response than with other approaches, but none identify complete resolution.

MECHANICAL INTERVENTION

The efficacy of these variably invasive approaches contrasts with a simple mechanical intervention. The irritation that appears to be the source of the pain derives from stresses produced by the muscles which attach to the lateral epicondyle[48]. Reducing the stress on the attachment area seems a reasonable approach. Logically, a band applied to the forearm, just distal to the elbow, would be expected to reduce stress on muscle attachment to the epicondyle, and it does. Early attempts to utilize this approach, however, were only marginally effective, because commercially available bands have an unintended effect. Those several inch wide bands only reduced effective muscle strength. The reduced available muscle power did reduce stress on the epicondyle, but did so inadequately and use of such armbands was less effective than immobilization of the elbow[12]. The latter, of course, results in muscle atrophy and loss of strength.

My personal approach has been to utilize Velcro bands of 0.75 to 1 inch in width and to assure their application 1 inch below the epicondyle. That position is critical. Such placement has no effect on muscle strength, but displaces the stresses on the epicondyle, such that it was now at the site of the band and thus distal to the epicondyle. Pain was immediately reduced and eliminated within several weeks. Patients were advised to wear the bands continually, except when sleeping, and to continue their use for two weeks beyond their perception of any residual elbow pain. Recurrences have responded equally well, once the activity responsible for the epicondyle stress is modified. I have had only 5 patients who have not responded (with complete resolution of elbow symptoms) in the three decades that I have utilized this approach. That represents less than 1% failure rate, and that was in individuals who would or could not modify the activity[2,42,49,50] that was repeatedly stressing the epicondylar attachments.

Footnotes

P- Reviewer Nader ND S- Editor Gou SX L- Editor A E- Editor Zhang DN

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