

A Survey of Fellowship-Trained Upper Extremity Surgeons on Treatment of Lateral Epicondylitis

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Abstract

Background: The aim of the study is to investigate current management strategies for lateral epicondylitis by fellowship-trained upper extremity surgeons. **Methods:** A 17-question survey of treatment approaches and outcomes related to lateral epicondylitis was sent to 3354 surgeons using the American Society for Surgery of the Hand and American Shoulder and Elbow Surgeons member databases. **Results:** Six hundred twelve upper extremity surgeons completed the survey. The 6 most frequently prescribed nonoperative treatments for lateral epicondylitis were home exercise program/stretching (81%), nonsteroidal anti-inflammatory drugs (75%), steroid injection (71%), counterforce bracing (68%), formal physical therapy (65%), and wrist brace (47%). Less commonly performed nonoperative treatment measures included platelet-rich plasma injection (16%), Tenex procedure (6%), and iontophoresis (2%). **Conclusions:** There is a lack of consensus in the literature for the management of lateral epicondylitis, which is reflected by individual variation in clinical treatment among the experts. Future prospective randomized control studies are needed to establish evidence-based practice standards for this common diagnosis.

Keywords: lateral epicondylitis, tennis elbow, survey

Introduction

Epicondylitis is a common musculoskeletal disorder of the upper extremity for which patients commonly present to primary care and orthopedic providers. Lateral epicondylitis (LE) or “tennis elbow” refers to subacute or chronic pain at the lateral epicondyle of the humerus due to tendinosis of the extensor tendons. Reports from various studies cite the incidence as 1% to 3% annually.² The disability that results from the pain of this condition has direct impact on the functional capacity to work and has financial implications. For example, in Washington State, epicondylitis had annual workers’ compensation claims incidence rate of 4.7 per 10 000 full-time employees, resulting in an average annual direct cost of more than \$12 million.³

The etiology of LE is multifactorial but generally occurs with repetitive movements in which the wrist deviates from neutral. There is a predilection for LE among those participating in specific activities and in certain sports, including tennis. The extensor carpi radialis brevis muscle is most commonly involved. The diagnosis of LE is based upon the clinical findings of localized tenderness over the lateral epicondyle and pain with resisted wrist extension.

Various management strategies for LE have been proposed; however, no generalized consensus exists and current practice patterns are poorly understood. Conservative strategies are typically the first approach, including nonsteroidal anti-inflammatory drugs (NSAIDs), home exercises or physical therapy (PT), counterforce or wrist braces, various anti-inflammatory injections, and iontophoresis, among others. A systematic review of 58 randomized controlled trials on nonsurgical management of LE did not find conclusive evidence for a dominant conservative treatment approach.⁴ Surgical intervention is generally reserved for patients who have failed conservative means. There are numerous surgical methods used by orthopedic surgeons

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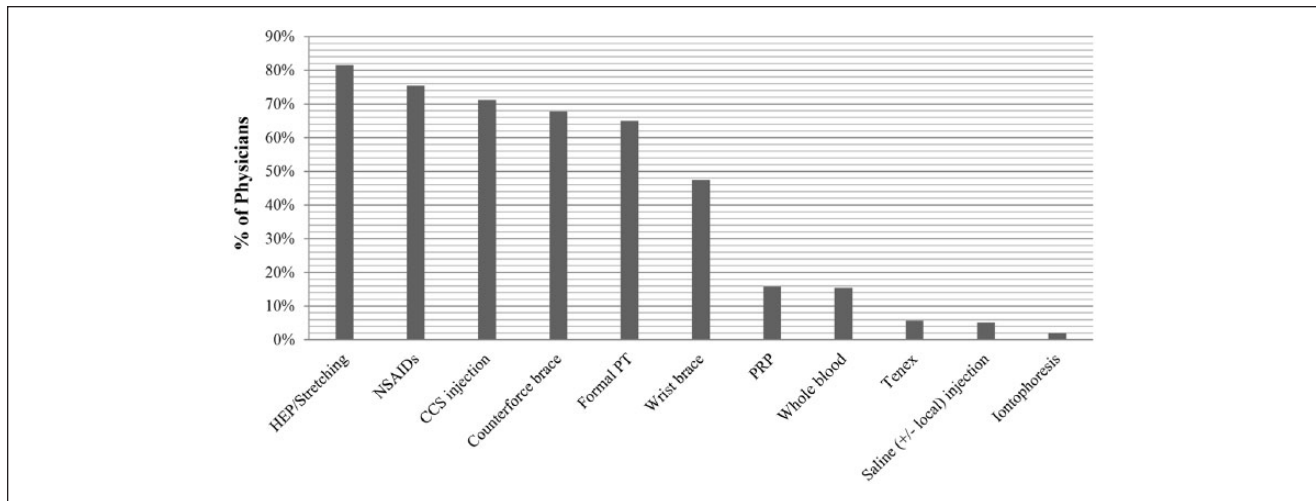


Figure 1. Nonoperative treatment modalities prescribed for lateral epicondylitis by fellowship-trained surgeons.

Note. HEP = home exercise programs; NSAIDs = nonsteroidal anti-inflammatory drugs; CCS = corticosteroid; PT = physical therapy; PRP = platelet-rich plasma.

including open debridement, percutaneous tenotomy, and arthroscopic approaches. Unfortunately, studies performed to date provide conflicting conclusions on the effectiveness of specific surgical approaches for epicondylitis.¹

The lack of consensus for optimally treating LE leaves providers with a wide range of options for their patients. This study was designed to determine current standards of LE management among expert upper extremity surgeons.

Methods

A survey consisting of 17 multiple-choice and fill-in-the-blank questions was emailed to 3354 upper extremity surgeons in the United States (see online appendix). Participants were identified from the American Society for Surgery of the Hand and American Shoulder and Elbow Surgeons databases. Surveys not returned were re-sent once. Respondents were first asked to identify their subspecialty as hand/upper extremity surgery, shoulder and elbow surgery or sports medicine surgery. They subsequently quantified the number of years they have been in clinical practice and estimated the number of patients they saw in the past year with LE.

The remaining questions addressed the surgeons' preferences regarding nonsurgical and surgical treatments for LE, and the role of imaging. Specifically, we surveyed the imaging modalities used prior to surgery, the type of surgical procedure performed, the number of surgeries performed in the past year, and the type of immobilization implemented postoperatively. Finally, respondents were asked about their perceptions of success rates of various interventions. Physicians estimated the time it took for patients to reach 50% and 90% benefit with conservative and surgical treatment.

Surgeons then projected the percentage of patients they felt were pleased with the outcome of either nonoperative or surgical treatment. The results were analyzed using pivot tables and multivariate analysis.

Results

There were a total of 612 respondents. Five hundred six (86%) participants were hand-surgery fellowship trained, 62 (10%) were shoulder and elbow fellowship trained, and 17 (4%) were trained in sports medicine fellowships. One hundred ninety-six (33%) participants had been in practice fewer than 10 years, while 389 (67%) had been in practice for more than 10 years.

Nonoperative Treatment

Nearly 82% of surgeons surveyed prescribed home exercise programs (HEP) and stretching, the most commonly prescribed nonoperative treatment. In addition, of the respondents, 75% prescribed NSAIDs, 71% corticosteroid injections (CCS), 68% counterforce bracing, 65% formal PT, 47% wrist brace, 16% platelet-rich plasma, 15% whole blood, 6% Tenex (Tenex Health, Lake Forest, California), 5% saline (\pm local anesthesia) injection, and 2% iontophoresis (Figure 1). Before proceeding to operative treatment for LE, 41% of surgeons obtain a radiograph of the elbow, 33% obtain a magnetic resonance imaging (MRI) of the elbow, 13% obtain no imaging, and 4% obtain an ultrasound.

The duration of nonoperative treatment that surgeons utilize prior to progressing to an operative intervention was variable. Only 2% will move to operative intervention after 6 weeks, 11% after 3 months, 42% after 6 months, 35%

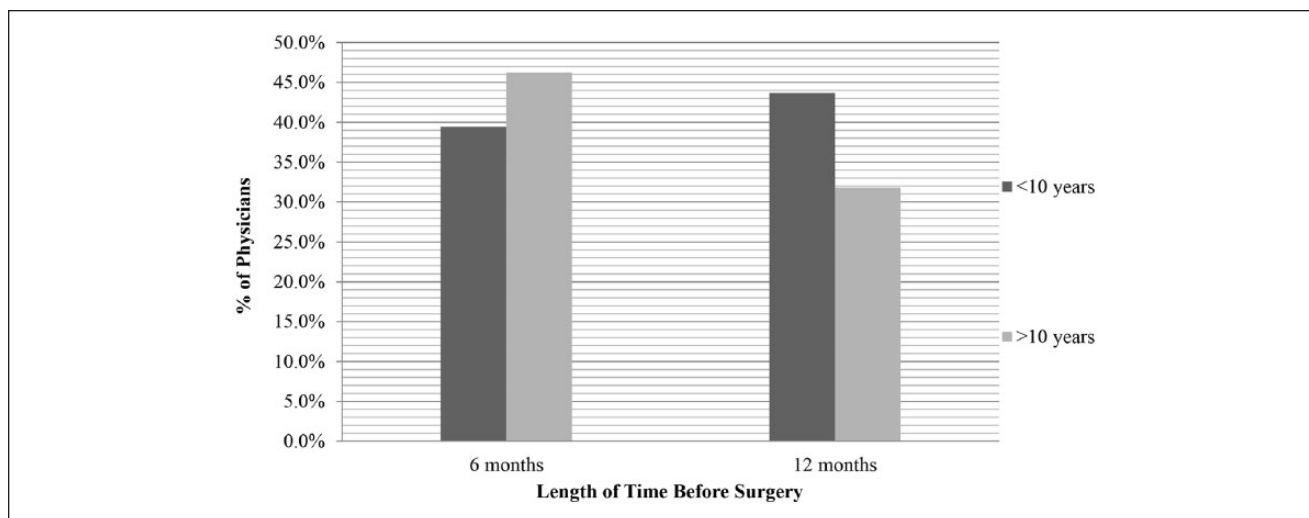


Figure 2. Length of nonoperative treatment attempted prior to surgical intervention. Surgeons with less than 10 years' experience (dark bar) compared with surgeons with greater than 10 years' experience (light bar).

after 1 year, 10% do not offer operative treatment, and only 1 respondent proceeds directly to surgery. The length of nonoperative treatment also differed according to length of time in practice (Figure 2).

Diagnosis

The number of patients whom surgeons saw per year varied significantly, ranging from less than or equal to 10 cases per year in 14% of respondents to more than 100 cases per year in 13% of respondents, with the majority falling in the 11 to 100 cases per year range (11-20 per year in 16% of surgeons, 21-30 per year [14%], 31-50 per year [23%], 51-100 per year [21%]).

We also surveyed the frequency with which associated diagnoses occur with LE. Twenty-nine percent of surgeons diagnosed concomitant radial tunnel syndrome in 3% to 5% of their patients, and 14% of surgeons made the diagnosis in more than 10% of patients. Thirty percent of surgeons diagnosed lateral ulnar collateral ligament (LUCL) insufficiency in 3% to 5% of their patients, and 10% diagnosed this condition in more than 10% of patients. Forty-two percent of surgeons reported making a diagnosis of elbow arthritis in 2% to 5% of patients with LE, while 12% of surgeons felt that elbow arthritis accompanied the primary diagnosis of LE more than 10% of the time.

Operative Treatment

The number of surgical procedures performed per year for LE was variable. Thirty-seven percent perform 1 or none per year, 22% 2 to 3 per year, 16% 4 to 5 per year, 14% 6 to 10 per year, and 12% more than 10 per year. Fifty-six out of 387 (14.5%) surgeons with more than 10 years in practice performed more than 10 procedures per year, while 13 out

of 190 (6.8%) surgeons with fewer than 10 years in practice operate more than 10 times per year ($P = .008$).

Five percent of surgeon respondents do not offer surgery for LE. Of the 581 surgeon respondents who offer surgery as a treatment, 75% will perform some type of open debridement. Forty-five percent perform open debridement with side-to-side repair, 17% perform open debridement with reattachment of the extensor mass to the lateral epicondyle, 13% perform open debridement without side-to-side repair, 10% will perform arthroscopic debridement, and 15% will perform another type of procedure (Figure 3).

Immobilization after surgery was highly variable, ranging from long arm splint for 2 weeks (22%) to short arm splint for 2 weeks (17%) to the majority who do not immobilize postoperatively at all (34%). Other forms of postoperative immobilization included short arm splint for 4 to 6 weeks (7%), long arm splint for 4 to 6 weeks (4%), long arm splint for 1 week (2%), sling (2%), long arm splint for less than 1 week (1%), and wrist brace, bulky dressing, wrist splint, long arm cast, and miscellaneous all with less than 1%.

Patient Satisfaction

Surgeons were asked to estimate patient satisfaction with nonoperative or operative management (Figure 4). With paired statistical analysis, 40.2% of surgeons believe that patients treated nonoperatively are often lost to follow-up or do not return to clinic, while only 11.0% of surgeons believe their patients treated operatively are lost to follow-up ($P < .001$). Surgeons believe that 79.8 ($\pm 15.5\%$) of their patients are satisfied with nonoperative measures, whereas 83.6% ($\pm 12.4\%$) are satisfied with operative management ($P < .001$). The surgeon-perceived success for various surgical techniques varied (Table 1).

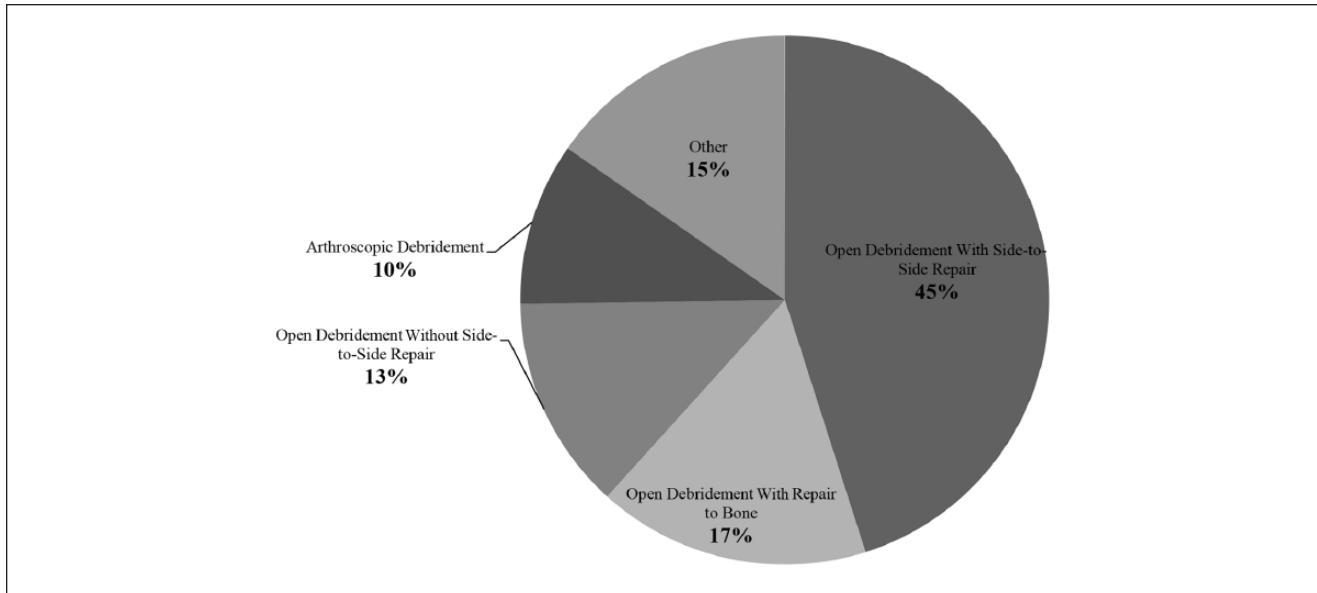


Figure 3. Types of operative management used for lateral epicondylitis. The category labeled “Other” includes percutaneous release of the extensor tendon, Tenex, open release with pin release, anconeus muscle flap, and radial nerve release.

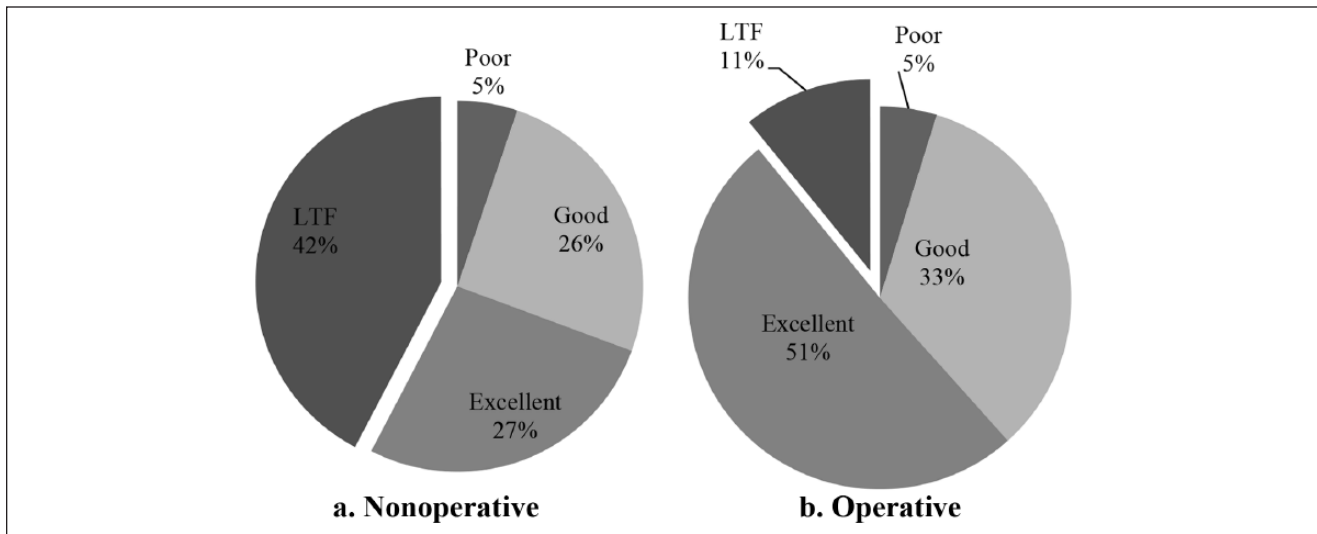


Figure 4. Estimates of patient satisfaction with nonoperative (Panel a) and operative management (Panel b). LTF represents those patients who were lost to follow-up.

Table 1. Surgeon-Perceived Success When Performing Surgery for Lateral Epicondylitis.

Procedure	Percentage of patients satisfied
Open debridement only	79.2 ± 13.8
Open debridement with side-to-side repair	84.2 ± 12.3
Open debridement with repair to bone	85.3 ± 10.4
Arthroscopic debridement	84.7 ± 10.6
Percutaneous release	81.4 ± 17

Seventy-three percent of surgeons who operate more frequently (more than 5 times in a given year) compared with 42% of surgeons who operate less frequently believe that more than 80% of their patients are satisfied with operative management ($P < .05$).

Timing of Patient Benefit

We also asked the surgeons when they believed the patient achieved 90% benefit (relative to disease-free function) after nonoperative and operative management (Table 2).

Table 2. Surgeon Perception of When Patients Reach 90% Benefit With Nonoperative and Operative Management.

Time	Nonoperative (%)	Operative (%)
2 Weeks	0.9	0.4
6 Weeks	4.0	6.7
3 Months*	20.4	42.8
6 Months*	36.6	31.1
12 Months	31.3	17.0
18 Months	6.9	2.1

*Represents statistically significant results ($P < .05$).

Discussion

This study is a survey of 612 fellowship-trained hand and upper extremity surgeons on management of a common diagnosis, LE. Despite the lack of strong scientific evidence to support a specific management strategy for LE, this survey demonstrates that experts in the field agree on certain aspects of care based on their own clinical experience. However, the survey also shows that there is a large variation in other aspects with respect to management of LE. The vast majority of surgeons attempt nonoperative treatment for 6 to 12 months. For resistant cases, most surgeons proceed with imaging prior to surgical intervention. When surgery is indicated, surgeons prefer a type of open debridement.

Our study has a number of limitations. The survey design made it somewhat difficult to draw conclusive results. In addition, there was a relatively low response rate of approximately 20% and 5% margin of error, which left the results more prone to selection bias and may not scientifically reflect the overall population's views. Although the e-mails were re-sent once if no response was submitted, there is no way to know whether or not surgeons received the study due to spam filters or other blocking mechanisms. Another limitation is the lack of conclusive randomized controlled trials supporting a specific treatment algorithm for LE. Further studies are needed to determine whether the clinical preferences identified in this study are supported by scientific evidence. In addition, there is limited research on the newer modalities for treatment of LE, including Tenex which is a minimally invasive option. A prospective randomized controlled trial comparing open debridement with Tenex would help elucidate whether surgeons should be considering this newer option more often.

This study provides insight into the preferences of management of LE among upper extremity surgeons, which may help direct clinical decision making for other providers. For nonoperative management, fellowship-trained surgeons

preferably chose NSAIDs, bracing, CCS, and PT. Survey results suggest attempting these modalities for 6 to 12 months prior to surgery. More than 85% of surgeons ordered imaging preoperatively, namely radiograph or MRI. With regard to operative technique, surgeons prefer open debridement and most commonly perform open debridement with side-to-side repair. In addition, surgeons felt that patient satisfaction was very high with surgical interventions, highlighting that this technique has perceived good outcomes. Moving forward, many questions remain unanswered in the literature with regard to the specific treatment modalities for LE. Adequately powered prospective clinical trials are needed to confirm the clinical practice tendencies that have been identified by expert surgeons in this study.

Ethical Approval

This study did not require approval by our institutional review board.

Statement of Human and Animal Rights

This article does not contain any studies with human or animal subjects.

Statement of Informed Consent

The study did not involve human subject data and thus did not require informed consent.

Declaration of Conflicting Interests

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

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