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An Observational Study of Results of Dry Needling in Lateral Epicondylitis

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Abstract: ***Background: Lateral epicondylitis is also known as a Tennis elbow is a common disease of middle age which is painful and functionally limiting entity affecting the upper extremity & causes decreased productivity. The first line treatment for LE is topical and oral anti-inflammatory drugs from ice applications and brace used. If the 1st line treatment fails second line treatment generally invasive are offered and second-line therapeutic regimens include saline, corticosteroid or platelet-rich plasma injections. Dry needling is relatively new for treating the same. Here we will observe and analyze the results of dry needling in lateral epicondylitis. Methods: The study involved 30 patients having lateral epicondylitis. The patients were evaluated after 2 and 4 weeks on the bases of Patients – rated tennis elbow evaluation score (PRTEE). Results: Dry needling was very effective at 2 and 4 weeks. Also, dry needling has very less complications. So is now a preferred method of 2nd line treatment in lateral epicondylitis. Conclusion: Dry needling is a safe method, and it might be an effective treatment option for LE same as the second line treatment because of the low complication rate.***

Keywords: Tennis elbow, lateral epicondylitis, Dry Needling

1. Introduction

Lateral epicondylitis (LE), a common disease, especially in middle age [1–3], causes decreased productivity and functional ability [4,5]. The first-line treatment for LE is conservative, consisting of topical and oral anti-inflammatory drugs, ice application, and brace use. This treatment might fail to resolve the complaints of some patients, and second-line therapy modalities, which are generally invasive, are offered. Second-line treatments include saline, corticosteroid, or platelet-rich plasma injections [6, 7]. Dry needling is relatively new. Although it has been used in the management of myofascial pain [8], low back pain [4], trigger points [9], and rotator cuff tears [9], there are only two reports of dry needling in LE [3, 10]. Here we will observe and analyze the results of dry needling in lateral epicondylitis.

Dry needling involves the insertion of thin monofilament needles without injectate into, alongside, or around nerves, muscles, or connective tissues.

2. Materials and Methods

The study involved 30 patients having lateral epicondylitis. The patients were evaluated after 2 and 4 weeks on the bases of Patients – rated tennis elbow evaluation score (PRTEE). Informed consent was obtained from all of the participants, and the rights of the subjects were protected. After Institutional Review Board approval was obtained for the study, patients who had pain at the lateral epicondyle for more than three months and who had pain during forced forearm supination, forced wrist extension, and forced third finger extension on physical examination were diagnosed with lateral epicondylitis. Direct x-rays of the elbow were obtained to rule out radio-humeral joint arthritis, osteochondritis dissecans, or osteonecrosis. Patients with cervical radiculopathy or posterior interosseous nerve entrapment were excluded from the study.

Inclusion Criteria

1) Patients who had pain at lateral epicondyle for more than 3 months.
2) Age more than 25 years.
3) Patients not getting any benefit from 1st line treatment of lateral epicondylitis.
4) Patients who had pain during forced forearm supination, forced wrist extension, and forced third finger extension for more than 3 months.

Exclusion Criteria

1) Patients who had other co-morbidities than the pain at lateral epicondyle.
2) Patients who have high RBS.
3) Patients having osteochondritis, dissecans, or osteonecrosis.

After the Patient-rated Tennis Elbow Evaluation (PRTEE) score was determined, dry needling was performed on the patients

After cleaning the skin with povidone-iodine, we inserted five 0.25 × 25-mm stainless steel needles (Yao Tong, Barcelona, Spain) in the trigger point regions, which were the most painful areas at the lateral epicondyle

The needles were directed through the skin and fascia to the bone (3–5 mm). They were rotated three to four times and left in place for ten minutes. Following needle withdraw, the insertion site was compressed firmly to avoid excessive bleeding. Applications were repeated twice per week for a total of five sessions. All interventions were performed by a single, experienced orthopaedic. Patients were not allowed to take any other medication during the trial.

The patients were told not to use any other treatment, including ice application, topical nonsteroidal anti-inflammatory drugs, or other oral medications, during the

trial so as not to affect the outcomes during follow up. Patients were told that they would be excluded from the study if they did not comply with this prohibition.

The clinical evaluation was performed by authors who did not participate in the intervention. Patients were evaluated using the PRTEE score at three weeks and six months. The third week corresponded to seven days after the last needling.

PRTTE score includes

1) Pain at the affected part
2) Functional disability which include

(A) Specific Activities (B) Usual activities
Total Score = Pain Subscale + Function Subscale
Best Score – 0, Worst Score – 100
A p-value of less than 0.05 was considered statistically significant. The data was analyzed and evaluated and t test was applied, to check for the outcome of the study.

3. Results and Observation

Although we planned to enroll 30 patients, the study was completed with 25 patients. One (3.3%) patients in the dry needling group could not tolerate the intervention, one (3.3%) had a local haemorrhage, and one(3.3%) was lost to follow up. In the control group, 2 (7%) patients tried other therapies during the six month follow-up period. Therefore, 5 patients were excluded from the study.

The mean age of the patients was 47.7 years in group. Overall, 78% of the patients were female, and 22% of the study group suffered LE in their dominant arms.

A significant difference ($p < 0.05$) in PRTEE (pain and function) scores was detected between before and after treatment at three weeks. Two patients (7%) from had complications: one patient could not tolerate the pain during the intervention and one had a local hemorrhage.

4. Discussion

Lateral epicondylitis (LE), which is also known as tennis elbow, periostitis, extensor carpi radialis brevis-tendinosis, and epicondylalgia, is obscure and controversial. Because inflammatory cells are absent in LE, the term periostitis has fallen into disuse [5, 12]. LE is common, especially in middle age [12]. Studies report no gender difference, whereas tobacco consumption and forceful supination activities are risk factors [12]. Another controversial issue in LE is its pathophysiology. Although some publications advocate that the cause of LE is overuse trauma [3, 6, 12], recent publications do not confirm this understanding. New studies show that the main pathophysiological hallmark of tendinopathy is neovascularity and disorganized collagen fibers. However, the cause of the degenerative changes and pain is unclear. Mechanical, neural, and vascular problems and healing failure are blamed for the pathophysiology of LE [5, 10, 13].

Finally, the treatment in LE is also controversial. The main treatment of LE is non-surgical and involves antiinflammatory drugs, brace use, corticosteroid and/or local anesthetic injection, and extracorporeal shock wave therapy [3, 5, 6, 10]. However, these methods have not been shown to be more effective in the long-term than watchful waiting [13–16]. When non-surgical methods are not effective, invasive techniques, such as dry needling, platelet-rich plasma injections, and surgical intervention, are an option [10]. However, the best treatment must be effective, practical, and inexpensive to enable better recovery and a rapid return to work. Dry needling involves the insertion of thin monofilament needles without injectate into, alongside, or around nerves, muscles, or connective tissues for the management of pain and dysfunction in neuromusculo skeletal conditions [3, 17, 18]. Over the years, dry needling has become popular. However, the support for dry needling in the literature remains insufficient [4, 17, 19, 20]. Moreover, the method of dry needling is controversial [19], including where the needles should be inserted, which type of needle or how many needles should be used, how much time should be waited after inserting the needles, and how often needling should be performed. The literature includes two trials of dry needling in LE. Stenhouse et al. compared the outcomes of dry needling with those of dry needling combined with autologous conditioned plasma injections in 28 patients who had refractory LE. They performed dry needling with a 23-gauge injector needle as a peppering

	N= 25 patients	Mean	Std. Dev.	P value
PRTEE pain score	Pre treatment	30.84	6.7	<0.01
	3rd week	16.03	5.44	
	Pre treatment	30.84	6.7	<0.01
	6th mo	10.76	8.94	
	3rd week	16.03	5.44	<0.01
	6th mo	10.76	8.94	
PRTEE functional score	Pre treatment	60.9	12.89	<0.01
	3rd week	17.05	6.06	
	Pre treatment	60.9	12.89	<0.01
	6th mo	10.6	4.98	
	3rd week	17.05	6.06	<0.01
	6th mo	10.6	4.98	

Table 1 Before and after treatment values of PRTEE score (N= 25 patients) technique in which the needle perforated the tendon 40–50 times within about two minutes [3]. Mishra et al. recruited 225 refractory LE patients to compare the outcomes of platelet-rich plasma and dry needling. They applied dry needling as a peppering technique in which a 10-L injector needle penetrated the tendon five times [10]. Both studies reported that the outcome of autologous blood injection techniques was not significantly superior to that of dry needling [3, 10]. Our study differed from these two in the style of needling, the exclusion of refractory cases, and the use of dry needling in the study group (rather than in a control group). The previous studies used thick needles, whereas we used thin ones because we think that thin needles reflect dry needling better. Our study is unique in the literature as it investigated the effectiveness of the real dry needling.

Since we demonstrated the effectiveness of this approach, subsequent studies should compare second-line treatments, such as corticosteroid or platelet-rich plasma techniques, with dry needling. Another essential difference from other studies is that, to avoid the effects of the previous interventions on our results, we did not enroll refractory cases. Dry needling procedures can involve remote needling and needling at trigger points [21–23]. We considered the trigger point of LE to be the most painful area in that region and inserted the needles there (Fig. 1). Deep dry needling was performed, and the needles were rotated three to four times after penetration. Mouse studies have shown that the manipulation techniques used when performing dry needling have different effects. Langevin et al. indicated that rotational needle manipulation leads to significantly greater fibroblastic activity in tendons [24]. Although the exact mechanism by which dry needling works is not clear, it has been suggested that this technique reduces peripheral and central sensitization [17, 18, 20, 23], which positively influences tendon healing due to increasing blood flow via local vasodilatation and collagen proliferation [7, 17, 18]. Therefore, it may be possible to restore the range of motion and reduce the local and widespread pain of LE patients. Dry needling is generally safe. Reported complications of dry needling include soreness at the needling area, syncope responses, and local haemorrhage [4]. We encountered only one patient who had local haemorrhage. After the second intervention, she had to be excluded from the study.

One limitation of this study was the relatively small patient group, which was primarily the result of the difficulty of convincing patients to adhere to the study protocols. A second limitation is the standardization of dry needling. Although we found successful results for dry needling, outcomes may change as a function of the technique used.
Further investigations with larger groups are needed to compare dry needling in LE. Ultrasonographic follow-up could be performed in every patient. We also believe that dry needling would be an effective treatment option in other tendinopathies.

5. Conclusion

Dry needling is a safe, effective treatment method for LE. Comparative studies should be conducted to compare dry needling with other treatment modalities.

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