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Dry needling in lateral epicondylitis: A prospective controlled study

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Abstract
Lateral epicondylitis is a chronic disease characterized by inflammation and pain at origin of extensor muscles of forearm. Anti-inflammatory drugs, brace, physiotherapy and curtailing repetitive activities are some of the conservative first line treatment options available. Our study compared the pain relief and the improvement in functional disability with dry needling (group I) as compared to NSAIDS with brace (group II) in lateral epicondylitis patients. Patients were enrolled consecutively and randomized into two groups. After calculating and noting PRTEE (Patient rated tennis elbow evaluation score) scores in both groups, patients in group I were treated with dry needling and patients in group II were given NSAIDS with brace. Patients were instructed not to use any other measure for relief of pain. They were re-evaluated at 3 weeks and 6 months using PRTEE. The statistical analysis was performed using SPSS software. In both groups significant differences were detected at 3 weeks follow up. Dry needling was found to be effective at both 3 weeks and 6 months but the group II (NSAIDS and forearm brace) showed no effects at 6 months follow up. We conclude that dry needling is a viable treatment modality for lateral epicondylitis.

Keywords: lateral epicondylitis, tennis elbow, dry needling

Introduction
Lateral epicondylitis is a chronic disease, especially prevalent in age groups of 40-55 [1-4], causing lot of distress to the patient and economy [5, 6]. It is characterized by pain at origin of extensor carpi radialis brevis tendon, usually after unaccustomed activity. Anti-inflammatory drugs, brace, physiotherapy and curtailing repetitive activities are some of the conservative first line treatment options available. Though dry needling has been tried in treatment of myofascial pain [7], low back pain [5], trigger points [8] etc. but its use in lateral epicondylitis treatment has been reported in few cases [3, 4].
This study compared the pain relief and the improvement in functional disability with dry needling as compared to NSAIDS with brace in lateral epicondylitis patients.

Methods
We enrolled 100 patients in our study (after obtaining approval from ethical committee of Maharishi Markandeshwar Medical college, Solan MMMCH/IEC/20/251) conducted from March 2020 to February 2021.

Inclusion criteria
Patients with more than 3 months duration of pain on the lateral epicondyle of elbow by provocative manoeuvres such as resisted middle finger extension or elbow extension in pronation with a flexed wrist.

Exclusion criteria
Patients with radio-humeral joint arthritis, osteochondritis dissecans, osteonecrosis, cervical radiculopathy and interosseous nerve entrapment.
The PRTEE is a 15-item questionnaire designed to measure forearm pain and disability in patients with lateral epicondylitis [9]. It allows patients to rate their levels of tennis elbow pain and disability from 0 to 10, and consists of 2 subscales:

1. Pain subscale (0 = No pain, 10 = Worst imaginable)
2. Pain - 5 items
3. Function subscale (0 = No difficulty, 10 = Unable to do)

Specific activities - 6 items
Usual activities - 4 items
The total score can be computed on a scale of 100 (0 = No disability), where pain and functional problems are weighted equally.
Patients were enrolled consecutively and randomized into two groups using online randomization software [10]. After calculating and noting PRTEE scores in both groups, patients in group I were treated with dry needling and patients in group II were given NSAIDS with brace. After painting with betadine, a 22 gauze needle was inserted into the most tender areas of lateral condyle of elbow of group I patients. The needle was inserted through the skin and extensor carpi radialis brevis tendon up to the bone. Needling of the tendon was done repeatedly 5 to 6 times without ultrasound guidance and kept there for 10 minutes. After withdrawing the needle, the site was compressed firmly. Applications were repeated twice a week for a total of 5 sessions. Patients were forbidden from taking any other medications during trial. Treatment given to group II patients consisted of NSAIDS and forearm brace for 3 weeks. Patients were instructed not to use any other measure for relief of pain. Patients were evaluated at 3 weeks and 6 months using PRTEE (Patient rated tennis elbow evaluation score). The 3rd week corresponded to7 days after the last needling session in group I and last day of the first line treatment (NSAIDS and forearm brace) in group II. The statistical analysis was performed using SPSS (Statistical package for the social sciences; SPSS, Chicago, Il, USA). A p value of less than 0.05 was considered statistically significant. Needling data were compared before and after using the paired sample t test, and differences between groups were analyzed with independent t test.

Results

We had enrolled 100 patients in our study, but 6 patients in group 1 and 10 patients in group 2 were lost to follow up, so the study was done in 84 patients. There were no differences between groups in terms of sex, age, dominant arm and PRTEE scores before the treatment. The mean age of patients in group 1 was 48.1 years and 47.4 in group 2 patients. 68% of patients were female, and 58% of patients had lateral epicondylitis in their dominant arms. In both groups significant differences were detected at 3 weeks follow up (table1). Dry needling was found to be effective at both 3 weeks and 6 months but the group II showed no effects at 6 months follow up.

Table 1: PRTEE scores before and after treatment

		Group I (Needling)			Group II (Control)		
		Mean	**Std. Dev.**	**P value**	**Mean**	**Std. Dev.**	**P value**
PRTEE pain score	Pre-treatment	30.73	5.36	<0.01	31.50	5.27	<0.01
	3rd week	20.11	4.34		23.50	5.03	
	Pre-treatment	30.72	5.36	<0.01	31.50	5.27	0.91
	6th month	10.97	3.15		31.45	5.47	
	3rd week	20.11	4.34	<0.01	23.43	5.03	<0.01
	6th month	10.97	3.15		31.43	5.45	
PRTEE functional score	Pre-treatment	31.43	5.31	<0.01	31.53	5.20	<0.01
	3rd week	21.00	4.80		23.50	3.73	
	Pre-treatment	31.43	5.31	<0.01	31.53	5.20	<0.65
	6th month	9.70	3.16		31.63	4.87	
	3rd week	21.00	4.80	<0.01	21.05	4.10	<0.01
	6th month	9.70	3.16		31.63	4.87	

Table 2: Comparison of both groups in terms of PRTEE score in 3rd week and 6 months

			N	**Mean**	**Std. Dev.**	**P value**
PRTEE pain score	3rd week	Group I	44	20.11	4.34	<0.01
		Group II	40	23.43	5.03	
	6th month	Group I	44	10.97	3.15	<0.01
		Group II	40	31.45	5.47	
PRTEE functional score	3rd week	Group I	44	21.0	4.80	<0.01
		Group II	40	23.50	4.10	
	6th month	Group I	44	9.70	3.16	<0.01
		Group II	40	31.63	4.87	

Discussion

Lateral epicondylitis is a tendinopathy characterized by chronic pain and tendon thickening. It occurs commonly due to overuse and it occurs in many patients who are engaged in strenuous physical activity such as labourers and athletes. Some studies have implicated tobacco consumption and repetitive supination activities as risk factors [11]. It is often self-limiting or responsive to first line therapies *viz*. NSAIDS, physiotherapy, brace etc.
Pathophysiology of lateral epicondylitis is controversial. Some publications implicate overuse trauma in causation of lateral epicondylitis [3, 11], whereas other studies point out neovascularity and disorganized collagen fibres to be the underlying pathology. Still others consider it to be a type of myofascial pain arising from muscles which contain myofascial trigger points (MTrP). MTrP is a highly localized, irritable spot in skeletal muscle fibres [11]. When MTrP is stimulated, 2 important clinical phenomena are elicited-referred pain and local twitch response.
Epidemiological studies from United States have shown that MTrPs were the primary source of pain in 30% to 85% of patients presenting in a primary care setting because of pain

[13] and in 74% of 96 patients with musculoskeletal pain who were seen by a neurologist in a community centre [14].

Therefore MTrPs constitutes a substantial burden for both individual patients and for society as a whole.

Dry needling is a minimally invasive procedure in which a needle is inserted directly into MTrP located in a muscle. Since this is a new procedure literature regarding its use is limited. Stenhouse *et al.* compared outcomes of dry needling with those of dry needling combined with autologous conditioned plasma injections in 28 patients who had refractory lateral epicondylitis [3]. Mishra *et al.* in their study compared outcomes of platelet rich plasma and dry needling [14]. Both studies showed that outcome of autologous blood injection techniques was not significantly superior to that of dry needling [3, 15].

It has been hypothesized that dry needling reduces peripheral and central sensitization [16-19] which helps tendon healing due to increased blood flow because of local vasodilatation and collagen proliferation.

Complications of dry needling are soreness at needling site, syncope and local haemorrhage [5]. In our study 2 patients had soreness at needling site which gradually subsided without employing any additional measures.

In studies using dry needling as treatment modality till now, there is no standardization as to the needling technique to be adopted regarding the number of times the tendon requires to be pierced, type and size of needles to be used, location of fenestration (whether tendon only or both tendon and bone) and duration of needle insertion.

Our study shows that in comparison to NSAIDS and forearm brace, the dry needling is effective not only at 3 weeks but also after 6 months as a treatment modality. Our study is different from other studies in not using any medications like steroids or platelet rich plasma along with dry needling and thus establishes the effectiveness of dry needling as a standalone procedure in treatment of lateral epicondylitis.

We did not use ultrasound guidance in our needling technique. Its use could have helped us localizing the extensor radialis tendon more accurately and bringing more accuracy to our results.

Our study had one limitation of small sample size as it is difficult to convince patients to undergo treatment due to its invasive nature. 16 patients were lost to follow up. Our study shows that dry needling promises to be an effective treatment option among various arsenal of treatment modalities available for use in treatment of lateral epicondylitis. Studies with larger sample size are required to establish dry needling as an effective modality of treatment.

Conclusion

Dry needling is a viable alternative to conservative treatment for lateral epicondylitis.

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