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EFFECTIVENESS OF DRY NEEDLING IN BRACHIORADIALIS TRIGGER POINT AMONG LATERAL EPICONDYLITIS PATIENTS

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Abstract

Background: *Lateral epicondylitis (LE), or tennis elbow, is a common tendinosis of the lateral epicondyle often resulting from activities like typing, tennis, smoking, and obesity. Treatments such as corticosteroid injections, Botulinum toxin, and physiotherapy including dry needling are effective for pain reduction and tendon repair.*

Aim: *To determine the effectiveness of dry needling in improving pain, elbow, forearm and wrist range of motion and brachioradialis trigger points among lateral epicondylitis patients.*

Methodology: *The single blinded RCT study conducted at the Ghurki Trust Teaching Hospital in Lahore based on inclusion and exclusion criteria. Sample size of 40 patients collected through convenient sampling technique, divided into two groups, A (Dry needling) and B (stretching of brachioradialis muscles) respectively. VAS, Myofascial diagnostic scale and goniometer were used to assess the pain, reduction in trigger point and Range of motion (ROM) of patients.*

Result: *The study results demonstrated that dry needling significantly improved MDS scores reduced from 14.70 ± 1.86 to 6.00 ± 1.34 and VAS from 8.40 ± 1.18 to 1.95 ± 0.76 ($p = 0.00$). ROM gains in the experimental group were marked, including elbow flexion, extension, and forearm supination and pronation, along with wrist ROM improvements, surpassing the control group's moderate changes ($p < 0.05$).*

Conclusion: *The study concluded dry needling is easy, feasible, and new effective treatment innovation in improving pain, ROM of elbow joint, forearm, and wrist joint and reducing the number of trigger points in the brachioradialis muscle.*

INTRODUCTION

Lateral epicondylitis (LE) or Tennis elbow a common musculoskeletal issue of elbow pain occurs at the lateral side due to repetitive and recurrent stress of extensor muscles at the lateral epicondyle during griping activities (1). LE prevalence varies in different population or cases as 1% to 10% prevalence between 30 to 50 ages in both genders of healthcare workers and 26% in computer users, (Mukhtar, 2018) while 1% prevalent in 35 and 55 ages globally (2-5). Despite of playing tennis; Obesity, smoking, playing an instrument, or typing, Rheumatoid Arthritis, obesity, smoking, rotator cuff pathology, carpel tunnel syndrome, De Quervain pathology, hyperglycemia, hypertension, dyslipidemia, rotator cuff tear and Achilles tendinopathy are the major contributing factors of LE (6).

The continuous repetitive movements or stress on Extensor carpi radialis longus, supinator, extensor digitorum, extensor digiti minimi, and extensor carpi ulnaris produce degenerative changes in tendons or tendinosis. Collagen deposition, cross-linkages, micro-tearing and tendon vascularization deficiency cause ischemia of the tendon further aggravate LE and pain (6). Continuous, severe and radiating pain felt at lateral elbow, upper half and in plane of extensor muscles while doing household chores, carrying heavy bags, with bike riding, and playing badminton and cricket (7). Painful elbow extension with the forearm pronation, local tenderness aggravated with Cozens /Mill's test, sleep disturbance, and boney prominence are the major diagnostic factors (8, 9).

Thickening, or thinning with extensor tendon tearing, marked soft tissues and extensors calcification, synovitis, muscle edema, bony irregularities, joint effusion, cartilaginous defects, myofascial trigger points and other ligament defects are the identified structural features through MRI and Ultrasound (6, 10).

In LE, myofascial trigger point is major complication that is 82.5% prevalent in brachioradialis muscle where the pain initially manifests. The active hypersensitive area, is trigger point that is localized and palpable in the brachioradialis muscle bulk. In affected muscles, trigger points result in motor dysfunctions, muscle weakness, inhibition, increased motor excitability, spasms, and imbalances (7). Conservative treatment including NSAIDs, rest, cryotherapy, analgesics, topical corticoid injection, Botulinum toxin, acupuncture, kinesitherapy, physical therapy (including ultrasound, iontophoresis, shock wave, laser therapy, manual therapy, deep transverse therapy, and muscle strengthening exercises) played an important role in pain reduction, postoperative healing process, repairing the affected extensor tendon, restoring joint function, improving muscular strength and range of motion, and prevent contractures (10, 11) (Kim, 2019, Uygur, 2017).

Dry needling another technique is effective in managing trigger point. In this procedure, tiny needles are used that penetrate skin, tissue, and muscles and release myofascial trigger points (12). Application of dry needling activates the mechanoreceptors that slow down the conducting system causing reduction in pain intensity (11). Furthermore, it shortens the actin and myosin filament overlap, breaks up contraction knots, and stretches the assembly of contracture sarcomeres leading to reducing pain and muscle tone, and also improves the range of motion and Pressure Pin Threshold (PPT)(12). X Ma et al. (2024) supported targeting the trigger point with dry needling effectively reduce the intensity of the pain while simultaneously improving function and grip strength (13).

Similarly, S Radhakrishnan et al. (2024) and Nagarajan et al (2022) reported dry needling is more effective in reducing discomfort and improving mobility, with $p<0.0001$ for the VAS and $p<0.0001$ for the PRTEE within fourth and eighth-week follow ups (14, 15). Additionally; ZAIB-UN-NISA et al (2022), E Güngör, et al (2022) and R Gupta et al. (2021) mentioned marked improvement in PRTEE scoring within first to six months of sessions of LE patients compared to medication and injections (16-18). However, the former studies majorly focus on conservative management of LE and overlook brachioradialis trigger point, which lateral epicondylitis patients frequently experience. Therefore, in order to managing the lack of brachioradialis trigger point management, the current study design with an aim to evaluate the efficacy of dry needling on improving pain, ROM and

reduction in number of trigger points in the brachioradials muscle among LE patients. This further provide awareness and establish an effective physiotherapy treatment plan that improves the prognosis rate of such patients.

Material & Methodology:

This was an RCT study conducted at Ghurki Trust Teaching Hospital, Pakistan over a period of six months. The ethical approval of this study was sought from the ethical committee of the Institute of Leadership and Management before the exercise commenced. The anticipated sample size was determined to be 40 participants with a 0.80 power of, 0.05 α, and 95% CI, d of 0.846, δ of 2.87, a critical t-value of 2.02, and DF of 44 in G*Power Analysis Software, version 3.1.9.2, based on the RPE scale (18), Convenience sampling that is not purposive was used in selection of participants. More specifically, inclusion criteria involved female housewives with an age of 25-45 years, meeting the Cozen and Mill's test, and presenting brachioradialis trigger point (18). The exclusion criteria included any patients who had a fracture, shoulder pathology, cervical radiculopathy, any congenital or acquired abnormality in the upper limb or an open wound or active infection in the elbow in the previous 3 months (18).

The study included two groups: In the Group A, dry needling was performed to treat lateral epicondylitis by accessing the trigger point of the brachioradialis. The myofascial trigger points of the muscle were assessed clinically by palpation after which pain was elicited from the area before it was wiped with 70% isopropyl alcohol. Needle were then punctured at the trigger point, retained for 3–5 min in in 3 cycles and then removed based on the safety guidelines. During the intervention, patients were instructed to indicate whether they feel any discomfort (18)

In Group B, participants performed stretching exercises for the brachioradialis muscle. Each session comprised of 5 sets with 10 seconds hold for each day and the involved arm's wrist was turned inward and bent using the opposite hand (19). In this study, participants received 12 sessions three days per week over a consecutive four-week period.

As outcome measures the following tools were used after the intervention with post-intervention measurements: Visual Analogue Scale (VAS), goniometer and Myofascial Diagnostic Scale. On the VAS scale every patient was assessed for pain intensity, where 0 was no pain and 10 referred to severe pain; the results showed a high content validity 0.9–0.95, construct validity 0.8–0.9, as well as criterion validity 0.85–0.95, Intra-class correlation coefficient in the reliability analysis showed intra-rater (0.9 – 0.98) and inter-rater (0.8 – 0.9) (20).

The goniometer measured range of motion (ROM) in patients with lateral epicondylitis, demonstrating high content validity (0.8–0.9), strong construct validity (0.7–0.8), and excellent reliability ICC 0.80–0.95 making their functional improvement assessment quite consistent (21). Myofascial Pain Syndrome intensity was assessed by the Myofascial Diagnostic Scale (MDS) which includes taut bands, local twitch response, focal tenderness, and referred pain according to Travell and Simons' (1983) classification (22).

Data Analysis was done using SPSS version 26 as independent variable were classified into either continuous or categorical variables. Quantitative data presented by mean and standard deviation while qualitative was expressed in frequency (%). The normality of test assessed by Shapiro Wilk test supported both Paired T-test, and Independent T-test used for within and across the group analysis; having p-value < 0.05.

RESULT

The results about the effectiveness of dry needling in managing brachioradalis trigger point in tabulated form. Table 1 mentioned the demographic analysis showed that the age in the experimental group was 30.95±5.74 years, and 34.95±7.47 years in the control group and the participant must be between 25 to 45 years old. Of the 40 females, 35 had exclusive involvement of the right arm and, of them, 16 (80%) belonged to the experimental group, and 19 (95%) belonged to the control section. Table 2 reported within-group analysis adopting Myofascial Diagnostic Scale, the experimental group showed a significant reduction of the average trigger point score rating from 14.70 ±1. 86 pre and 6.00 ± 1.34 post intervention and the control group from 14.80 ±1.54 pre and 9.00 ±2.13 post intervention respectively at p = 0.00. Likewise, the VAS pain score reduced

significantly for the experimental group from 8.40 ± 1.18 to 1.95 ± 0.76 and the control group 8.30 ± 1.38 to 5.50 ± 2.21 (p = 0.00).

In the assessment of the ROM, the experimental group showed significant increase in the elbow flexion (113.40 ± 4.16 to 138.65 ± 2.25) and extension (75.95 ± 3.89 to 35.05 ± 11.16) as compared to the control group (p = 0.00). Comparable pronounced changes were found in the forearm supination (81.50 ± 7.41 to 88.70 ± 2.90) and forearm pronation (84.30 ± 5.65 to 89.70 ± 1.22) and the control group displayed only moderate changes. There was also a similar statistically significant increase in Wrist ROM in the experimental group as compared with the control group for wrist flexion, extension, radial, and ulnar deviations (p = 0.00 for all).

Additionally the Inter group comparisons mentioned in Table 3; revealed that there was no statistically significant difference in the initial score of Myofascial Diagnostic Scale, VAS and ROM (p > 0.05) but after the treatment the post test results were significantly better in the experimental group in terms of pain, elbow and forearm movement and wrist flexibility.

Table 1: Demographics of patients

Variable		Experimental Group (n=20)	Control Group (n=20)
		Mean ± S.D	Mean ± S.D
Age		30.95± 5.74	34.95± 7.47
Involved arm	Right Arm	16 (80%)	19 (95%)
	Left Arm	4 (20%)	1 (5%)

Table 2: Paired T-test of Experimental and Control group analysis:

Variables		Experimental Group (n=20)				Control Group (n=20)			
		Pre	Post	Mean difference	p	Pre	Post	Mean difference	p
		Mean ± S.D	Mean ± S.D			Mean ± S.D	Mean ± S.D		
MDS		14.70±1.86	6.00±1.34	8.70	0.00	14.80±1.54	9.00±2.13	5.80	0.00
VAS		8.40±1.18	1.95±0.76	6.45	0.00	8.30±1.38	5.50±2.21	2.80	0.00
Elbow ROM	Flexion	113.40±4.16	138.65±2.25	-25.25	0.00	114.10±4.10	131.95±3.76	-17.85	0.00
	Extension	75.95±3.89	35.05±11.16	40.90	0.00	78.70±3.29	52.20±6.75	26.50	0.00

Forearm ROM	Supination	81.50±7.41	88.70±2.90	-7.20	0.00	82.10±8.28	85.35±4.46	-3.25	0.00
	Pronation	84.30±5.65	89.70±1.22	-5.40	0.00	84.15±6.32	82.90±6.94	1.25	0.00
Wrist ROM	Flexion	77.45±3.31	83.85±3.57	-6.40	0.00	77.00±4.47	78.35±4.19	-1.35	0.00
	Extension	63.85±5.77	75.50±5.86	-11.65	0.00	66.45±4.28	67.65±4.39	-1.20	0.00
	Radial Deviation	12.40±1.57	16.40±1.98	-4.00	0.00	12.40±1.66	11.80±1.79	0.60	0.00
	Ulnar Deviation	28.60±9.25	31.25±2.35	-2.65	0.00	26.85±2.15	25.45±2.95	1.40	0.00

Table 3: Independent T-test of Post-Treatment Experimental and Control group analysis:

Variable		**Experimental Group (n=20)**	**Control Group (n=20)**	**Mean difference**	**p-value**
		Mean ± S.D	Mean ± S.D		
MDS		6.00±1.34	9.00±3.13	-3.00	0.000
VAS		1.95±0.76	5.50±2.21	-3.55	0.000
Elbow ROM	Flexion	138.65±2.25	131.95±3.76	6.700	0.00
	Extension	35.05±11.16	52.20±6.75	-17.15	0.00
Forearm ROM	Supination	88.70±2.90	85.35±4.46	3.35	0.005
	Pronation	89.70±1.22	82.90±6.94	6.80	0.000
Wrist ROM	Flexion	83.85±3.57	78.35±4.19	5.50	0.000
	Extension	75.50±5.86	67.65±4.39	7.85	.000
	Radial Deviation	16.40±1.98	11.80±1.79	4.60	0.000
	Ulnar Deviation	31.25±2.35	25.45±2.95	5.80	0.000

DISCUSSION

The current study was conducted with an aim of analyzing the Effectiveness of dry needling in brachioradialis trigger point among lateral epicondylitis patients. The study results showed patients managed by Dry needling and stretching played significant role in improving the designed outcomes as releasing and reducing the number of the trigger point (myofascial diagnostic scale), reduced the intensity of pain (Visual Analogue scale (VAS), and improving the range of motion of Forearm (Supination and pronation), elbow joint (elbow flexion and extension), and wrist joint (wrist flexion and extension, radial and ulnar deviation) among the housewives of lateral epicondylitis with p-value <0.05. However, on comparison dry needling

produced statistically significant results in improving formers descried variables having p <0.05 confirming dry needling is the easy, feasible and new treatment innovation in managing the brachioradialis trigger point among lateral epicondylitis patients in housewives.

In current study, Dry Needling lead to produced marked improvement in the Pain, in the range of motion ROM of forearm (Supination and pronation), elbow joint(elbow flexion and extension) and wrist joint(wrist flexion and extension, radial and ulnar deviation) and reducing the number of trigger point to 1.95±0.76, 88.70±2.90, 89.70±1.22, 138.65±2.25, 35.05±11.16, 83.85±3.57, 75.50±5.86, 16.40±1.98, 31.25±2.35, and 6.00±1.34 with p-value <0.05 respectively as compared to Group B managed with Stretching of brachioradialis muscle having 5.50±2.21, 85.35±4.46, 82.90±6.94, 131.95±3.76, 52.20±6.75, 78.35±4.19, 67.65±4.39, 11.80±1.79, 25.45±2.95 and 9.00±2.13 . The analysis confirmed Dry needling is highly effective in improving the Pain, ROM of forearm, elbow, and wrist joint and reducing the number of trigger point among the housewives as compared to only stretching.

S Radhakrishnan et al. conducted a study in 2024 about the effectiveness of dry needling on lateral epicondylitis patients compared to ultrasound therapy. The study concluded that dry needling was more effective than ultrasound therapy in reducing pain and improving the functional status assessed by the VAS and PRTEE having p<0.0001 (14). And that study highly supported the current result of LE housewives showed improvement in pain measure by VAS, reducing the number of trigger point by myofascial diagnostic scale, and also improvement in the ROM of forearm, elbow joint and wrist joint.

X Ma et al. conducted a study in 2024 about the therapeutic effect of dry needling in LE. The study concluded that dry needling has good therapeutic effects on reduced pain intensity within 1 week after treatment, and also showed improvement in elbow disability in <1 week (13). That study highly supported the current result of LE housewives showed improvement in pain measured by VAS, reducing the number of trigger points assessed by the myofascial diagnostic scale, and also showed improvement in the ROM of the forearm, elbow joint, and wrist joint assessed by goniometer confirming that dry needling is easy, feasible and new treatment innovation in managing LE.

These results are highly in concurrent with Gupta et al. conducted a study in 2021 about dry needling in lateral epicondylitis. This study aimed to see the pain relief and improvement in functional disability with a comparative effect of dry needling (group 1) and NSAIDS with a brace (group II). After checking the score on PRTEE (Patient rated tennis elbow evaluation score), that study concluded that The first group Dry needling showed effective results at three and six months and the second group NSAIDS with a brace showed no effect at 6 months (18). So in this way that study highly supported the current result of LE housewives showed improvement in pain measure by VAS, reducing the number of trigger point assessed by myofascial diagnostic scale, and also showed improvement in the ROM of the forearm, elbow joint and wrist joint assessed by goniometer confirming that dry needling is a time saving and feasible treatment approach in current technological era.

Similarly, like previous literature, MJ Navarro et al. 2020 reported in its review about the effect of trigger point dry needling in LE of musculoskeletal origin. The study concluded that dry needling reduced pain intensity and related disability with large effect sizes. Dry needling also increased pressure pain thresholds (PPT) with a large effect size but grip strength with a small effect size (23). That study highly supported the current result of LE housewives showed improvement in pain measure by VAS, reducing the number of trigger points assessed by the myofascial diagnostic scale, and also showed improvement in the ROM of forearm, elbow joint, and wrist joint assessed by a goniometer. Still, the current study showed a significant improvement by dry needling compared to other groups.

Furthermore, Uygur et al. conducted a study in 2017 about dry needling in lateral epicondylitis in which the patients were evaluated after three weeks and six months by applying the dry needling in experimental group and used the first line of treatment including ibuprofen and a forearm brace in other group (11). Although both treatment methods were effective at three weeks, but dry needling was significantly more effective than the first-line treatment at six months. That study highly supported the current result of LE

housewives showed improvement in pain measure by VAS, reducing the number of trigger points assessed by the myofascial diagnostic scale, and also showed improvement in the ROM of forearm, elbow joint, and wrist joint assessed by a goniometer. Due to the low complication rate, dry needling is a safe method, and it is an effective treatment option for LE.

GK Sharma et al. conducted a study in 2024 conclude a significant improvement in the pain score assessed by visual analogue scale in PRP group compared to the dry needling group at 6 months. The improvement showed in common extensor tendon thickness in PRP group at 6 months was slightly better than dry needling at 6 months. However, after follow up of 6 months, PRP showed significant healing in tear compared to dry needling when there were tears of the common extensor tendon (24). That study is in contrast to the current results as dry needling produced marked improvement in pain, and ROM and reduction of trigger point. The major difference exist between the study is that there was tears of the common extensor tendon due to which dry needling not heal it properly and platelet rich plasma injection showed a significant result another reason is that there was small duration of dry needling application in current result 2weeks but that study prolonged duration of 6 months.

Therefore, this study concluded that dry needling was effective in improving pain, ROM and reducing the trigger point number. However; dry needling is an effective treatment protocol in managing lateral epicondylitis by increasing patient's awareness about the dry needling. This awareness helps in performing the dry needling that ultimately improve patient's outcomes. So, dry needling should be considered as an effective treatment protocol for clinical management of lateral epicondylitis patients.

There were also some limitations to this study; first, data were collected from one hospital and second, the study participants were only housewives, and thus, the generalization of the findings might be limited. However, the sample used in the study and the period of the study was limited to this restrained the scope of the findings. Therefore; for future investigations with additional patients in different clinical and spinal cord stimulation training facilities, to reveal more about dry needling and its effects. It would be useful to extend the sample to men and women so that between-group differences in treatment efficacy could be examined. It would also be beneficial to future research to look at the drying needling as a treatment and then compare it to other types of treatment and or technologies. Last, evaluating the applicability of dry needling on muscle tears in obesogenic and non-obesogenic population would increase the validity of dry needling as a therapeutic approach.

CONCLUSION

The study conclude that dry needling is an effective in improving pain, ROM of elbow joint, forearm, and wrist joint and reducing the number of trigger point in brachioradialis muscle.

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