



Original Article

Comparison of Combined Isotonic and Deep Friction Soft Tissue Technique on Pain and Function In Patient with Chronic Lateral Epicondylitis

Aleena Bashir¹, Sana Hafeez^{2*}, Khurram Sarfraz², Anum Bashir¹, Samra Anwar³ and Farwa Asad⁴¹Mednic Clinic, Gujranwala, Pakistan²Riphah College of Rehabilitation and Allied Health Sciences, Lahore, Pakistan³Johar Hospital, Lahore, Pakistan⁴Jinnah Hospital, Lahore, Pakistan

ARTICLE INFO

Key Words:

Lateral epicondylitis, deep friction soft tissue technique, combined isotonic technique.

How to Cite:

Bashir, A. ., Hafeez, S. ., Sarfraz, K. ., Bashir, A. ., Anwar, S. ., & Asad, F. (2022). Comparison of combined isotonic and deep friction soft tissue techniques on pain and function in patients with chronic lateral epicondylitis: Patient with chronic lateral epicondylitis. *Pakistan BioMedical Journal*, 5(2). <https://doi.org/10.54393/pbmj.v5i2.276>

*Corresponding Author:

Sana Hafeez

Riphah College of Rehabilitation and Allied Health Sciences, Lahore, Pakistan

drsana140@gmail.com

ABSTRACT

Lateral epicondylitis is the painful musculotendinous condition located at the lateral side of elbow also known as "tennis elbow". **Objective:** To determine the effects of combined isotonic and deep friction soft tissue techniques on pain and function in patient with chronic lateral epicondylitis. **Methods:** Quasi Experimental study was conducted on twenty-two patients of chronic lateral epicondylitis. Data was collected from Mednic clinic and services hospital Lahore, for 6 months of duration. Participants were allocated to either combined isotonic technique group and deep friction soft tissue technique group, both groups were treated for 12 sessions in 4 weeks. NPRS and PRTEE scale were used to measure the treatment effect before and after treatment of 3 session per week, total 12 sessions in 4 weeks to each participant. Data was analyzed by SPSS 21. **Results:** Total participants 22 were classified into two groups, Group A (combined isotonic technique) and Group B (deep friction soft tissue technique group). Minimum age was 30, maximum age was 46, mean age 37 and standard deviation was ± 4.93 . The significance as greater than 0.05 which mean the data is normally distributed as the value of Shapiro wilk test for NPRS .88 and for PTREE was .208, therefore parametric test (paired and independent T test) was applied. The significance values for all statistical tests were set to 0.05. Paired sample T test for NPRS mean difference reading for group A was 2.63 ± 9.244 and group B was 1.09 ± 3.015 and for PRTEE mean difference for group A was 14.09 ± 7.8288 and group B was 5.81 ± 3.945 showed that although in both group changes were significant but difference of mean was greater in Combined isotonic technique group. Independent T test comparison of mean score of NPRS and PRTEE between Group A and Group B showed that there was significant difference in value, pretreatment NPRS mean difference was .011 and post treatment NPRS score was 1.54. pretreatment PRTEE mean difference was 1.90 and post treatment NPRS score was 6.36 so combined isotonic technique showed greater mean difference after treatment. **Conclusion:** The study concluded that combined isotonic exercises group showed better results than the deep friction soft tissue technique group for improvement of pain and functional disability in lateral epicondylitis patients.

INTRODUCTION

Lateral epicondylitis (LE) is characterized by the fingers and wrist extended by forearm muscles due to common origin of muscles on lateral side of elbow. The extensor muscles of wrist and forearm are affected by it but most common muscle involve is extensor carpi radialis brevis (ECRB). Overuse of this muscle rub against the bony bumps. Gradually muscle wear and tear over time. It is more common in younger population between 18-40

years. More common in males than females [1]. Common symptoms are tenderness over the lateral side of elbow. Pain radiates down to forearm. Activities of daily living related to wrist and forearm become painful and wasting of muscles occur if condition persist for long duration. LE becomes chronic if symptom persist even after 3 months. Patients complain of burning sensation over the lateral aspect of elbow at common extensor muscles. Loss of

grip strength, pain during shaking hands, turning door knobs and grasping objects. It can affect either the dominant or non-dominant arm, or both arms simultaneously. Sometimes pain worsens at night. More common in prominent forearm [2]. It is common among construction workers, badminton or racket players, student, and housewives and in people who perform repetitive and forceful extension of elbow. Also known as Overuse syndrome [3]. Vocational tasks like hammering, diving, painting and using heavy spanners are thought to be the root cause of pain occur during writing, lifting a cup, opening the door knob and even performing simple basic activities of daily living. Repetitive activities cause decrease vascularization and muscle ischemia and increase temperature of tendon which may further lead to injury. Sometimes patients develop LE without any repetitive activity or history. Causes of LE are a cycle of excessive loading, misuse, and repetitive activities result in elbow diseases, including hardening of the common extensor tendon, tendon thickening, and nearby bone abnormality. In general population, approximately 40 % individuals will experience it at some point of their life. More common in tennis player's up to more than 50% experience elbow pain [4]. Depression and anxiety cause the delayed recovery and enhance patient perception of pain. Obesity and smoking have been recognized as major risk factors. Current and prior tobacco user have high risk of developing lateral epicondylitis. LE is influenced by a number of factors but major contributor is physical exertion [5]. There are a lot of treatment options available for lateral epicondylitis medicines, physiotherapy, corticosteroids injections and surgery. In physiotherapy manual therapy and acupuncture are safe and most common method use to relief pain [6]. A variety of treatment options available for LE are oral nonsteroidal anti-inflammatory drugs, mobilization iontophoresis, ultrasound, bracing, phonophoresis, transdermal patch, shock wave therapy, dry needling. Initially lateral epicondylitis was treated with ice and rest by bracing and injections have high success rates. Vibrator and massage are also beneficial for pain and tenderness at elbow [7]. Dry needling is cost effective and safe treatment for lateral epicondylitis [8]. Shock wave therapy may provide a novel and safer nonsurgical treatment option for lateral epicondylitis of the elbow [9]. Mulligan has advocated that LE be approached by mobilization with movement. MWM in combination with exercise and cold therapy is a safe and effective treatment option that improves elbow pain, functional capacity, and pain-free, maximal grip strength [10]. A special type of forearm brace called tennis elbow brace provides counter-force to stabilize the muscles from excessive use commonly worn at night.

Proximal forearm strap and wrist extension splints are commonly used braces for LE treatment [11]. Severe or chronic cases of LE may require surgery but initial treatment started with physical therapy. Coordinated rehabilitation programs comprising of strengthening exercises, range of motion, and counterforce bracing are performed when initial treatment fails. Augmented soft tissue mobilization is beneficial for LE patients it regenerates healthy soft tissues reduces scar tissue that may be causing restriction in movement [12]. Sometimes LE heals on its own untreated, the duration of lateral epicondylitis ranges from six to twenty-four months on average [13]. Diagnosis of LE initially is clinically in nature and special tests are not always required. Magnetic resonance imaging is a reliable imaging technique for assessing the severity of LE. Mills test, Cozen test, and Maudsley's test are provocative tests used to confirm LE [14-15]. When the patient is seated, the Mills test is conducted. The therapist uses one hand to palpate the patient's lateral epicondyle while pronating the patient's forearm, fully flexing the wrist and extending the elbow. The recurrence of pain in the location of the insertion at the LE suggests a positive test. Mills test has good diagnostic accuracy than the other 2 tests. Musculoskeletal ultrasonography is an ideal tool in the identification of LE which detects structural changes, bone irregularities, and calcific deposits for capsular tear CT arthrography is more effective than MRI [16]. Deep friction massage increases local inflammation, which starts the process of healing the tendon. Deep circular motions with the fingertips across the area of maximum tenderness were used in the friction massage. The extensor tendons, their origins, and the musculotendinous (MTJ) junction between the underlying bone and the fingertips were all compressed with firm pressure. For a total of 5 minutes, the massage was given [17]. The Combined isotonic technique (CIT) usually applied for proprioceptive neuromuscular facilitation includes concentric, eccentric, and static contraction of muscles. CIT and taping are both very cost-effective, with minimal side effects and a simple self-application process that may be done after a little practice [18]. The aim of the current study was to determine which treatment option, the combined isotonic or deep friction soft tissue is better for chronic LE. There was not enough literature on the comparison of the combination of isotonic techniques with deep friction soft tissue techniques to improve pain and function.

METHODS

Participants were allocated into 2 groups Group A received combined isotonic exercises and Group B received deep

friction soft tissue techniques. Deep friction soft tissue technique, therapist apply transverse soft tissue technique on the lateral side of the elbow at common extensor origin. Both the therapist's fingertips and the patient's skin must move in synchrony. The friction massage must be smooth and deep enough for a maximum of five minutes. CIT (concentric, eccentric, and static contraction) on the wrist extensor with the affected side wrist in flexion and ulnar deviation to a range without pain. CIT for the wrist consisted of a single application for 15 sec, with 10 repetitions, for a maximum of 5 min. Both groups received conventional treatment cold pack for 5 min and were instructed how to ice, avoid unpleasant and rigorous activities. Pre and post treatment values after 4 weeks of intervention were taken. Treatment was given for 4 weeks, 3 session per weeks each participant received total 12 sessions. Numeric Pain Rating Scale and patient rated tennis elbow evaluation scale was used. The inclusion criteria: Age from 30yrs to 50yrs, Both male and female, tenderness over lateral epicondyle, elbow pain for more than 3 months, pain with gripping and only one-sided elbow pain, positive cozen test. exclusion criterion: History of neurological disorders, History of aversion to manual touch, History of trauma on the previous elbow area, History of previous elbow surgery, History of corticosteroid injections within 6 months. Numerical Pain Rating Scale (NPRS): is an abstract measure scales in which patient rate their pain on an eleven-point mathematical scale. On the scale 0 (no pain), 5 (moderate pain) and 10 (pain as bad as u can imagine) Patient Rated Tennis Elbow Evaluation: a scale of 0-10 patient rate average arm symptoms over the past week. A (0) indicates no pain, while a (10) indicates the most severe pain possible. The scale is divided into two subscales, one for pain and the other for functional disability. Statistics: Data analysis was done using SPSS-24.

RESULTS

Table 1 shows Descriptive statistics of Participants while Table 2 shows Within group paired sample statistic of NPRS and PRTEE (paired sample T-test) and Table 3 shows across the group NPRS and PRTEE (independent sample T- test). Among 22 participants, mean age of GROUP A participants of the study was $38 \pm .567$ years while mean age of GROUP B participants of the study was 36.27 ± 4.14 . In this study minimum age was 30 years and maximum age of the participants was 50 years. mean gender of both male and female participants of the study was $1.45 \pm .522$ year.

Study group		N	Mean	SD
Group A	Gender	11	1.45	.522
	Age	11	38.00	5.67
Group B	Gender	11	1.45	.522
	Age	11	36.27	4.14

Table 1: Descriptive statistics of Participants

Variables	GROUP A (n=11)		GROUP B (n=11)			
	Mean	diff ±SD	P value	Mean diff ±SD	P value	
Pre and post NPRS	2.63	±.9244	<0.05	1.090	±.3015	<0.05
PRE _post PRTEE	14.09	±7.8288	<0.05	5.818	±3.9450	<0.05

Table 2: Within group paired sample statistic of NPRS and PRTEE (paired sample T test)

Sig. values less than 0.05 indicates that there is statistically significant difference between the two groups. Since the mean difference of group, A was greater than group B, combined isotonic technique was found to be more effective than deep friction soft tissue technique.

Variables	Mean difference	Significant difference
Pre-Treatment NPRS score	.011	1.00
Post-Treatment NPRS score	1.54	0.01
Pre-Treatment PRTEE score	1.90	.45
Post-Treatment PRTEE score	6.36	.05

Table 3: ACROSS THE GROUP NPRS AND PRTEE (INDEPENDENT T TEST)

sig. values less than 0.05 indicates that there is a statistically significant difference between the two groups

DISCUSSION

In the current study, there was a comparison of two techniques that are more beneficial for pain relief and improvement in function for treatment of chronic lateral epicondylitis. There was a total of 22 participants that were randomized into two groups. One is a combined isotonic technique and the other is the deep friction soft-tissue technique. Both groups contain 11 participants each. The outcome measures were pain and functional disabilities. Numeric pain rating scale (NPRS) and Patient Rated Tennis Elbow Evaluation scale (PRTEE) were used to assess patients. The outcome measures were taken at baseline before treatment and at 4 weeks after treatment. parametric tests were applied, Independent T-test and paired sample T-test for analysis. the significance level was set at 0.05. The study concluded Combined isotonic group showed more improvement in pain and functional disability

than the deep friction soft tissue technique group. but still, there is conflicting evidence so further studies with long-term follow-up will be needed for in the future. In another study conducted in 2019, Kim BR revealed that using the Combined isotonic technique and taping had shown significant improvements in pain and grip strength in patients of lateral epicondylitis after 1 month intervention [18]. Another study was conducted in 2018 describe in individuals with persistent lateral epicondylitis, kinesio-taping improves elbow pain during resisted wrist extension. Total 15 Chronic lateral epicondylitis were selected in the study. All subjects had two taping sessions, one with KT and the other with sham taping, in random order with a three-day delay between them. Before and 15 minutes after the tape was administered, the pain was evaluated during resisted wrist extension and at rest using the numeric rating scale (NRS) and pain-free grip strength. KT show improved symptoms than sham taping [19]. In 2018, rosemary yi conducted a study on chronic lateral epicondylitis concluded that for a shorter duration deep friction soft tissue technique does not prove to be an effective treatment plan for a short duration while early pain relief cortisone group showed significant improvement in pain. While the current study concluded that in long term, the deep friction soft tissue technique was effective for pain relief and function improvement [12]. Another study by J puri et al., in 2014 concluded that pain and functional disability levels of chronic lateral epicondylitis were reduced by performing deep friction massage technique rather than sham treatment (ultrasound) after 1 week of intervention [20].

CONCLUSION

Across the group, both techniques CIT and deep friction soft tissue technique had shown statistically significant results. But in within-group comparison, combined isotonic exercises had shown more statistically significant results as compared to deep friction soft-tissue technique.

REFERENCES

- [1] Lai WC, Erickson BJ, Mlynarek RA, Wang D. Chronic lateral epicondylitis: challenges and solutions. *Open access journal of sports medicine*. 2018;9:243. doi.org/10.2147/OAJSM.S160974
- [2] Jobe FW, Ciccotti MG. Lateral and medial epicondylitis of the elbow. *JAAOS-Journal of the American Academy of Orthopaedic Surgeons*. 1994;2(1):1-8. doi.org/10.5435/00124635-199401000-00001
- [3] Haahr J, Andersen J. Physical and psychosocial risk factors for lateral epicondylitis: a population based case-referent study. *Occupational and environmental medicine*. 2003;60(5):322-9. doi.org/10.1136/oem.60.5.322
- [4] Levin D, Nazarian LN, Miller TT, O'Kane PL, Feld RI, Parker L, et al. Lateral epicondylitis of the elbow: US findings. *Radiology*. 2005;237(1):230-4. doi.org/10.1148/radiol.2371040784
- [5] Shiri R, Viikari-Juntura E, Varonen H, Heliövaara M. Prevalence and determinants of lateral and medial epicondylitis: a population study. *American journal of epidemiology*. 2006;164(11):1065-74. doi.org/10.1093/aje/kwj325
- [6] Tang H, Fan H, Chen J, Yang M, Yi X, Dai G, et al. Acupuncture for lateral epicondylitis: a systematic review. *Evidence-based complementary and alternative medicine*. 2015;2015. doi.org/10.1155/2015/861849
- [7] Salib PI. Treatment of lateral epicondylitis: try it, what do you lose? *Journal of surgical orthopaedic advances*. 2004;13(1):49.
- [8] Uygur E, Aktaş B, Özkut A, Erinc S, Yilmazoglu EG. Dry needling in lateral epicondylitis: a prospective controlled study. *International orthopaedics*. 2017;41(11):2321-5. doi.org/10.1007/s00264-017-3604-1
- [9] Ko J-Y, Chen H-S, Chen L-M. Treatment of lateral epicondylitis of the elbow with shock waves. *Clinical Orthopaedics and Related Research (1976-2007)*. 2001;387:60-7. doi.org/10.1097/00003086-200106000-00008
- [10] Reyhan AC, Sindel D, Dereli EE. The effects of Mulligan's mobilization with movement technique in patients with lateral epicondylitis. *Journal of back and musculoskeletal rehabilitation*. 2020;33(1):99-107. doi.org/10.3233/BMR-181135
- [11] Joshua Ezhil Selvan J. Comparison of the Effectiveness of Bracing [COUNT'R-Force Forearm Brace] Vs. Tapping [MACDONALD] in Patients with Lateral Epicondylitis: Nandha College of Physiotherapy, Erode; 2012.
- [12] Sevier TL, Wilson JK. Treating lateral epicondylitis. *Sports Medicine*. 1999;28(5):375-80. doi.org/10.2165/00007256-199928050-00006
- [13] Hong QN, Durand M-J, Loisel P. Treatment of lateral epicondylitis: where is the evidence? *Joint Bone Spine*. 2004;71(5):369-73. doi.org/10.1016/j.jbspin.2003.05.002
- [14] Saroja G, Aseer PAL, Venkata Sai P. Diagnostic accuracy of provocative tests in lateral epicondylitis. *Int J Physiother Res*. 2014;2(6):815-23. doi.org/10.16965/ijpr.2014.699
- [15] Walton MJ, Mackie K, Fallon M, Butler R, Bredahl W, Zheng MH, et al. The reliability and validity of

- magnetic resonance imaging in the assessment of chronic lateral epicondylitis. *The Journal of hand surgery*. 2011; 36(3): 475-9. doi.org/10.1016/j.jhsa.2010.11.040
- [16] VCIII D, Grimmer K, Milanese S, Kumar S. The sensitivity of the provocation tests in replicating pain on the lateral elbow area of participants with lateral epicondylalgia. *J Case Rep Clin Res Stud*. 2014;1(1):1.
- [17] Yi R, Bratchenko WW, Tan V. Deep friction massage versus steroid injection in the treatment of lateral epicondylitis. *Hand*. 2018;13(1):56-9. doi.org/10.1177/1558944717692088
- [18] Kim B-R, Yi D-H, Yim J-E. Effect of the combined isotonic technique for proprioceptive neuromuscular facilitation and taping on pain and grip strength in patients with lateral epicondylitis: a randomized clinical trial. *Journal of exercise rehabilitation*. 2019;15(2):316. doi.org/10.12965/jer.1938078.039
- [19] Cho Y-T, Hsu W-Y, Lin L-F, Lin Y-N. Kinesio taping reduces elbow pain during resisted wrist extension in patients with chronic lateral epicondylitis: a randomized, double-blinded, cross-over study. *BMC musculoskeletal disorders*. 2018;19(1):1-8. doi.org/10.1186/s12891-018-2118-3
- [20] Puri J, Ahmed N. Effects of deep friction massage on tendinitis (Lateral epicondylitis) in comparison to ultrasound therapy. *Pakistan Journal of Rehabilitation*. 2014; 3(2): 36-40. doi.org/10.36283/pjr.zu.3.2/008