Original Article

# To study the effect of tricep strengthening in lateral epicondylitis

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## Abstract

**Aim:** "To Study the effect of tricep strengthening in lateral epicondylitis" **Objectives:** To study the effect of tricep srtenghthening on pain relief. To study the effect of tricep strenghthening in functional activities. To study the effect of conventional therapy on pain relief. To study the effect of conventional therapy on functional activities. To compare the effect of tricep strength thening and conventional therapy on pain and functional activities. **Procedure:** 30 Samples were collected according to inclusion and exclusion criteria. Then Consent was taken from the respective subjects to conduct the study. Respective protocol was followed for Group A and Group B; and treatment protocol was followed for 2 weeks. Pre and post values of subjects was assessed by numerical pain rating scale, strength of elbow flexors with 10 RM, isometric strength of triceps was reassessed by Jamar dynamometer, and pain and functional assessment with patient rated tennis elbow evaluation questionnaire. Data was collected and analyzed statistically. **Results**: t value for NPRS comparion between group A and B is 0.871. At p value 0.391: considered Significant at p≤ 0.05 with 95 % confidence interval. t value for 10RM in group A and B in pre and post treatment is -1.169. At p value 0.252: considered Significant at p≤ 0.05 with 95 % confidence interval. t value for isometric strength of right triceps with jamar dynamometer is-0.561. At p value 0.579: considered Significant at p≤ 0.05 with 95 % confidence interval. t value for isometric strength of left triceps with jamar dynamometer is 0.469. At p value 0.643: considered Significant at p≤ 0.05 with 95 % confidence interval. t value for comparison between PRTEEQ in group A and B is 0.871. At p value 0.391: considered Significant at p≤ 0.05 with 95 % confidence interval. Conclusion: This study concludes that triceps strengthening along with conventional physiotherapy program has shown better improvement on NPRS,10RM, (Triceps) Isometric strength with JAMAR DYNAMOMTERE score as compared to conventional physiotherapy alone over 2 week of training program.
**Keywords:** lateral epicondylitis, triceps, strengthening, 10 RM, patient rated tennis elbow evaluation questionnaire.

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## INTRODUCTION

Lateral Epicondylitis (Le) Or "Tennis Elbow" was first described by Runge in 18731(Runge, 1873). It is an injury at the insertion of the extensor carpi radialis brevis and the extensor digitorum. It is characterized by pain at the external aspect of the elbow exacerbated during extension of the elbow with the wrist in flexion or during resisted extension of the wrist with the elbow in extension[2]. Lateral epicondylalgia (LE) is one of the most common elbow problems in athletes, with 14.1% of tennis players reporting current LE and 39.7% reporting current or previous problems[1]. Lateral epicondylitis, commonly referred to as tennis elbow, affects 1% to 3% of the population. It is thought to be an overuse injury, originating in the wrist extensor muscles, rather than an inflammatory problem[3]. It is brought on by occupational activities and sports that involve a repetitive wrist motion or a power grip. The condition is most commonly associated with work-related activities, such as cutting meat, plumbing, and working on cars, rather than with playing tennis. Lateral epicondylitis is pain over the bone on the outside of the elbow[4]. The piece of bone that can be felt on the outside of the elbow is called the lateral epicondyle. When the tendons attached to this bone are overused, they can deteriorate and become painful[4]. Lateral epicondylitis is commonly called tennis elbow,

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but it is not restricted to people who play tennis[5]. It occurs in people who do manual labor with their hands, such as roofers and carpenters. It should be noted that the term "tennis elbow" is inappropriate because tennis players represent only 5 to 10% of cases, however the practice of racket sports increases the risk of developing and 40 to 50% of players may develop this condition[6]. The term tendinitis is also inappropriate to describe the chronic presentation of this disease because no histological inflammatory reaction has been found in patients treated surgically for chronic LE. The term tendinosis should be utilized preferentially since it refers to degenerative tendinopathy (angiofibroblastic hyperplasia as seen in this condition[7]. Lateral epicondylitis most often occurs related to overuse. Any activity that over stresses the involved tendon, the extensor carpi radialis brevis, can cause the disorder. These activities include repetitive work, gardening, tennis, and golf[8]. Of note, a separate entity termed golfer's elbow or medial epicondylitis causes pain on the inside of the elbow[9]. Lateral epicondylitis can also be related to direct trauma to the outside portion of the elbow. It is believed that overuse or trauma causes a microscopic tear in the origin of the extensor carpi radialis brevis muscle[14]. Although lateral epicondylitis is termed a tendonitis there are few inflammatory changes in the tissue and therefore it is considered more of a mechanical problem with degeneration of the tendon. Recent literature reviews have listed more than 40 different treatment methods for this condition[10]. The majority of studies reported inconsistent results and no therapeutic modality seems to stand out or alter the natural history of the disease. Surprisingly, despite the multitude of studies, there is not enough evidence to currently recommend the use of one treatment modality over another[13]. This can be explained by the limited usage (fewer than the half of the experimental studies) of assessment instruments, with adequate psychometric properties (valid, reliable, and sensitive to change), that limit the power and validity of studies on lateral epicondylitis[9]. Grip strength is commonly measured to quantify the progression of LE. Several variations of grip strength testing are found in the literature. Healthy subjects demonstrate stronger maximal grip when measured with the elbow bent at 90 degrees than when measured with the elbow extended

## MATERIAL AND METHOD

A pre and post experimental study was conducted in an outpatient department in Pune, Maharashtra, India. Individuals were included with age between 18-50 years. Subjects who are having positive lateral epicondylitis test (Cozen's test), Pain or tenderness when the tendon is gently pressed near where it attaches to the upper arm bone, over the outside of the elbow. Pain near the elbow when the wrist is bent backwards. Subjects who were willing to participate. Subjects who had an ability to communicate and follow command. Exclusion criteria was Any History of inflammatory arthritis. Any Previous elbow surgery. Any fracture of lower end of humerus. Any gross structural abnormality of elbow. Patients on oral or systemic steroids. Ethical clearance was taken from the ethical committee of Dr. D Y Patil college of physiotherapy, Pune. Total 30 Samples were randomly allocated in respective Groups i.e Group A and Group B. Subjects were collected according to inclusion and exclusion criteria. Then Consent was taken from the respective subjects to conduct the study. Respective protocol was followed for Group A and Group B; and protocol was followed on daily basis up to 2 week. Pre and post values of subjects was assessed by numerical pain rating scale, strength of elbow flexors with 10 RM, isometric strength of triceps was reassessed by Jamar dynamometer, and pain and functional assessment with patient rated tennis elbow evaluation questionnaire. Data was collected and analysed statsically.

## RESULT

Data was analyzed by using paired' test and unpaired 't' test. In between group (Group A and Group B comparison) significance was calculated by using unpaired't' test and within the group (pre and post treatment comparison of Group A and B) significance was calculated by using paired 't' test to compare the effect of triceps strengthening along with conventional therapy and conventional therapy alone on subjects.

**Table 1:** Comparision between numerical pain rating scale in group a and b

| GROUP | PRE±SD | POST±SD | PAIRED T TEST | UNPAIRED T TEST |
|---|---|---|---|---|
| A | 5.4±1.30 | 1.6±0.7 | t = 15.0, P = 0.0 | t = 0.871, P = 0.391 |
| B | 4.6±0.82 | 1.4±0.5 | t = 22.1, P = 0.0 | |

Significant at p≤ 0.05 with 95 % confidence interval

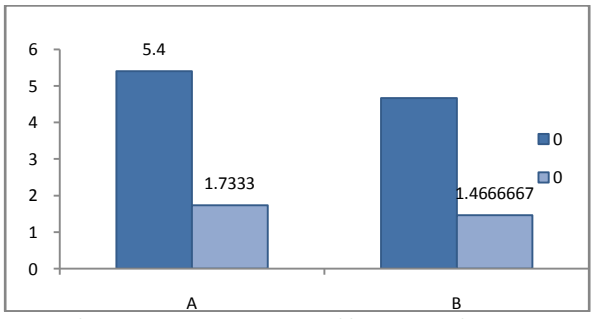


**Figure 1:** Showing nprs in group a and b in pre and post treatment

**Table 2:** Comparision between 10 rm in group a and b

| GROUP | PRE±SD | POST±SD | PAIRED T TEST | UNPAIRED T TEST |
|---|---|---|---|---|
| A | 1.6±0.7 | 1.9±0.6 | t = 1.7 P = 0.10 | t = -1.169 P = 0.252 |
| B | 1.4±0.5 | 2.1±0.5 | t = 7.9 P = 0.0 | |

Significant at p≤ 0.05 with 95 % confidence interval

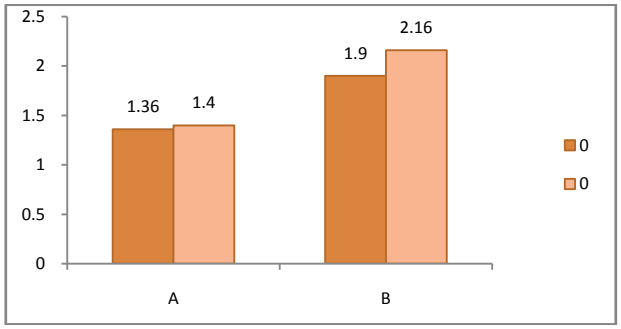


**Figure 2:** Showing 10 rm in group a and b in pre and post treatment

**Table 3:** Comparision between isometric strength of rt tricep with jamar daynamometer in group a and b

| GROUP | PRE ±SD | POST±SD | PAIRED T TEST | UNPAIRED T TEST |
|---|---|---|---|---|
| A | 39.3±17.5 | 43.4±17.5 | t = 4.54 P = 0.000 | t = -0.561 P = 0.579 |
| B | 42.1±19.2 | 46.4±16.8 | t = 2.83 SP = 0.013 | |

Significant at p≤ 0.05 with 95 % confidence interval

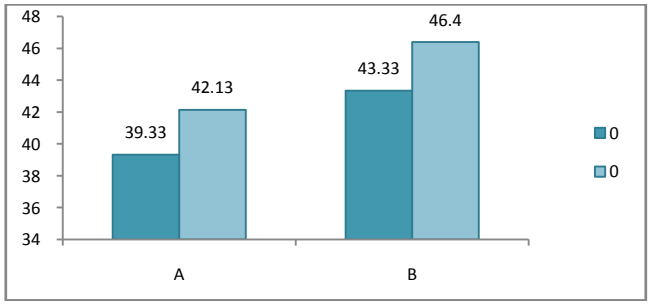


**Figure 3:** Showing (rt) jamar in group a and b in pre and post treatment

**Table 4:** Comparision between isometric strength of lt tricep with jamar daynamometer in group a and b

| GROUP | PRE±SD | POST±SD | PAIRED T TEST | UNPAIRED T TEST |
|---|---|---|---|---|
| A | 45.2±19.9 | 48.0±19.5 | t = 2.41 P = 0.03 | t = 0.469 P = 0.643 |
| B | 40.0±15.0 | 45.1±14.3 | t = 3.12 P = 00. | |

Significant at p≤ 0.05 with 95 % confidence interval

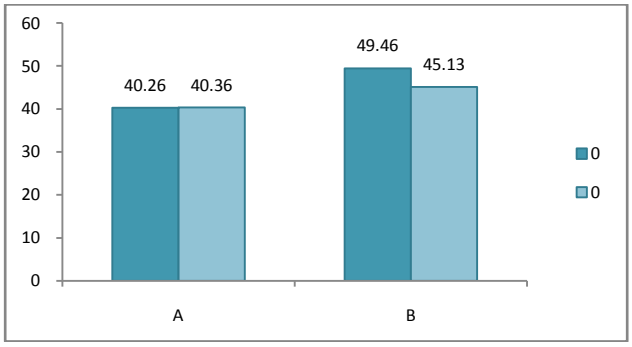


**Figure 4:** showing (lt) jamar in group a and b in pre and post treatment

**Table 5:** Comparision between patient rated tenis elbow evaluation questionnaire in group a and b

| GROUP | PRE±SD | POST±SD | PAIRED T TEST | UNPAIRED T TEST |
|---|---|---|---|---|
| A | 57.0±12.6 | 28.6±5.4 | t = 10.50 P = 0.00 | t = 0.088 P = 0.931 |
| B | 57.7±13.1 | 28.4±10.4 | t = 7.18 P = 0.000 | |

Significant at p≤ 0.05 with 95 % confidence interval

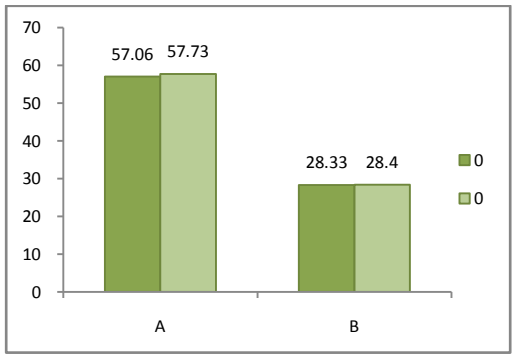


**Figure 5:** Showing prteeq in group a and b in pre and post treatment



## DISCUSSION

Our study is the first to document that people with LE exhibit significant deficits of elbow extensors[2]. Lateral epicondylalgia (LE) is one of the most common elbow problems. Almost all patients with LE suffer from pain, tenderness over the lateral epicondyle, pain from gripping and movements of the wrist, especially wrist extension and lifting movements, pain increases when shaking hands, turning doorknobs, picking up objects with your palm down, hitting a backhand in tennis, swinging a golf club, pressing on the outside of the elbow[1,2,9]. These impairments are most frequently reported by patients in terms of the disabilities they cause, such as difficulties in doing work. Mechanisms underlying elbow weakness: It is interesting to speculate on the mechanisms underlying these findings. Decreased maximal knee extension strength following experimentally induced extensor muscle pain has been found to be attributed to central mechanisms. In our study, pain scores during elbow strength testing were low and not correlated with elbow strength measures, suggesting that pain inhibition is less likely to be the cause of observed weakness. Fear of movement (re)injury and pain may also limit performance during maximal muscle testing. Patients with more pain may consciously or unconsciously anticipate an increase in pain and protect themselves by performing sub maximally. Study of patients with low back pain found those who reported increased psychological distress and a higher level of current pain showed increased inhibition of muscle activity, leading to sub maximal performance. Disuse or physical deconditioning may be either a cause or a result of LE, regardless of which might provide a perpetuating factor for chronicit [1,2,9,11]. Altered use of the affected arm as a result of elbow pain could account for disuse-related changes found throughout the whole upper limb. Greater weakness was evident in LE participants with greater pain and disability. However, the size of these associations were weak, indicating that little of the variation in a patient's pain and disability scores could be explained by elbow and grip strength[44]. This may reflect the complexity of ways in which motor function interacts with and reflects pain and disability. Patient rated outcomes: Since both the NPRS and the PRTEE showed significant improvement after 2 weeks, it is reasonable to consider that the subject's LE improved during that period of time. The Canadian French version of the PRTEE has demonstrated good acceptability, construct validity, internal consistency and responsiveness[28]. In 2005,the first English version of the PRTEE, the Patient-rated Forearm Evaluation Questionnaire (PRFEQ. In 2005, the PRFEQ was updated to the actual PRTEE to accommodate findings from different research groups and to improve its clarity. The use of PRTEE as a standard outcome measure in research may help determine best practice approaches for lateral epicondylitis. NPRS showed significant improvement after 2 weeks protocol. Pain was decreased in both the group. But group A shows more improvement compared to group B as shown in graph no1. The functional state was improved after interventions for 2 weeks in both the group. But group A showed more significant improvement when compared to group B as shown in graph no5. Strength: In order to quantify the functional capacity of subjects, several measures of strength involving the for elbow muscles were used. Measuring the maximal isometric strength of the elbow extension seemed logical, and our results showed significant difference between the healthy and the affected elbows. An increase in the maximum isometric strength during extension of both elbows was observed after 2 weeks. Our results showed an increase of isometric strength of triceps assessed using Jamar Dayanamoeter after 2 weeks. There was significant improvement in strength of elbow extensors in group A compared to group B as shown in graph no3 and 4. Patients also shown improvement in 10 RM which was assessed pre and post treatment. Their was significant improvement in 10 RM after 2 weeks treatment protocol in group A compared to B as shown in graph no 2. In our study, the sample size was taken small, so a further study with a larger sample would provide a better generalization of the results.

## CONCLUSION

This study concludes that triceps strengthening along with conventional physiotherapy program has shown better improvement on NPRS, 10 RM, (Triceps) Isometric

strength with JAMAR DYNAMOMTERE score as compared to conventional physiotherapy alone over 2 week of training program. Hence this study accepts the hypothesis that "triceps strengthening along with conventional physiotherapy is more effective than conventional physiotherapy alone on lateral epicondylitis patient". Suggestion: Further studies are also recommended using protocols of 2 week for longer durations, with subsequent follow ups. Moreover, further studies could be designed by using a more dynamic and functional outcome measure.

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