

# “To compare the effect of mulligan’s mobilization with mulligan’s taping and diamond taping on grip strength in patients with chronic lateral epicondylitis”: A randomized clinical trial.

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## Abstract

**Background and objectives:** Lateral epicondylalgia or tennis elbow is a prevalent musculoskeletal disorder that is characterized by lateral elbow pain often associated with gripping tasks. This study was done to compare the effect of Mulligan’s mobilization with Mulligan’s taping and Diamond taping in chronic lateral epicondylitis grip strength.

**Methods:** Forty (n=40) participants with chronic lateral epicondylitis were randomly allocated in two groups. Group ‘A’ received Mulligan’s mobilization with Mulligan’s taping and Group ‘B’ received Diamond taping and both the group received stretching exercise of the common extensors muscle of wrist prior to taping technique. The outcome measure was assessed in terms of Pain free grip strength (PFGS) for grip strength.

**Results:** 20 subjects (n=20) were taken in both the groups with a mean age of 39.3 years in Mulligan’s Mobilization group and 41.95 years in Diamond taping group. Comparison of the pre and post values showed significant improvement ( $p < 0.05$ ) in grip strength in both the groups. When comparison of pre-test grip strength were done, there was no significant difference ( $p > 0.05$ ) in both the groups, this proves the fact that both the group started with the same intensity of grip strength while the post intervention comparison showed a significant improvement in grip strength ( $p < 0.05$ ) in both the groups.

**Conclusion:** Mulligan’s Mobilization and Diamond taping intervention were equally beneficial in improvising the grip strength in patients with lateral epicondylitis.

**Key words:** Lateral epicondylalgia, Mulligan’s Mobilization with movement, Diamond taping, grip strength.

## Introduction

“Lateral epicondylitis” is popularly known as “tennis elbow”, otherwise called as “lateral epicondylitis” or “lateral elbow tendinosis” or “lateral epicondylalgia”. It can be defined as a lesion affecting the tendinous origin of wrist extensors. It can also be defined as a common inflammation of origin of extensor carpi radialis brevis. It was first distinguished from writer’s cramp by Runge in 1873, it was named as “lawn tennis arm” by Morris<sup>[1,2]</sup>.

In the study of world class tennis players, about 13% had current symptoms and more than half had suffered from lateral epicondylitis at one time or the other. Both the sexes are affected equally and the condition rarely occurs before the age of 20 years<sup>[1,3]</sup>.

The peak incidence of this condition occurs between the ages of 35 to 50, more frequent in males than females<sup>[4,5]</sup>.

As the age advances the mucopolysaccharide like chondroitin sulfate goes on decreasing leading to loss of extensibility of the tendon. Hence, the condition is seen more commonly in patient above 35 years<sup>[6]</sup>.

Various causes of lateral epicondylitis are Racket sports such as squash, badminton, table tennis, electricians, carpenters or leisure activities like needle working, knitting, gardening and pipe fitters. It is also caused by excessive quick, monotonous, repetitive eccentric contraction and gripping activities of wrist<sup>[7,8,9]</sup>.

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The main factors in the pathogenesis of tennis elbow are overuse, inflammation and degeneration. Overuse of muscle encounters the physiological healing there by healing capacity of muscle will become slow behind and there will be ones again micro trauma occurring with the repetitive action<sup>[10,11]</sup>.

Studies have shown that in lateral epicondylitis, the treatment combination of Mulligan's mobilization with movement is advocated for pain. Clinical benefits such as immediate decrease in pain and an earlier return to function are claimed to result from Mulligan's mobilization with movement treatment and diamond taping. There is little substantial evidence on this effect, hence the present study is done to see the effect of Mulligan's mobilization with movement treatment approach in combination with Mulligan taping and its comparison with diamond taping alone.

### Materials and Methods:

After obtaining institutional ethical clearance, the present study was carried out in 40 patients with lateral epicondylitis diagnosed by an orthopedician, who were aging between 24 to 61 years of either gender. The procedure was explained to all subjects and their demographic data was collected and the outcome measures were assessed before the intervention on 1<sup>st</sup> session and after the intervention on 8<sup>th</sup> session. 40 patients were divided into 2 groups; in each group 20 patients were allocated randomly.

Pain free grip strength (PFGS) was assessed with the hand dynamometer and the readings were recorded on pre-treatment session of day one and after post treatment of 8<sup>th</sup> sessions (4sessions for 2weeks)<sup>[12,13]</sup>.

Group A: Received combination of Mulligan's mobilization with movement and Mulligan taping. A sustained laterally directed glide was performed for 3sets of 10 repetitions and mulligans taping were done immediately after mobilization over the course of 8 sessions (4 sessions for 2 weeks).

Group B: Received diamond taping alone

We excluded patients complaining of cervical spine dysfunction, inflammatory (eg:-Rheumatoid arthritis), degenerative and infectious conditions of joints, ligament injuries of elbow, radial tunnel syndrome, subjects allergies to adhesive tape, history of fractures around the elbow, deformities of elbow, subject who are receiving medications for the same.

The procedure for pain free grip strength readings were taken as per the American Society of Hand therapists (ASHT). The subject is asked to do one maximal trial and the readings were recorded. Hand dynamometer was recorded on pre-treatment session of day one and after post treatment of 8<sup>th</sup> session (4

sessions for 2weeks).

Preparation for taping was done prior to the treatment. Dirty skin was cleaned gently with a liquid antiseptic soap, wet skin is dried gently using gauze, oily skin was be wiped with rubbing alcohol-soaked gauze, hair was shaved at the area where the tape was supposed to be applied and irritated skin was applied with a small amount of antibiotic ointment<sup>[14]</sup>.

Group A Received combination of Mulligan's mobilization with movement along with Mulligan's taping (MWM). Here the subject was instructed to clench his fist while the therapist provided a laterally directed glide to the elbow using a belt and repeated for 3 sets of 10 repetitions. Here, therapist's right hand stabilizes distal humerus and left hand maintains the forearm position. The therapist is in a walk stand position facing across the subject and towards the subject feet in a position such that the belt is over the therapist shoulder and the shoulder is directly over the elbow (i.e upper end of radio ulnar joint). The treatment belt force is almost vertically up from the floor such that a small knee bends and extension as the therapist exerts the desired treatment force at the elbow<sup>[3]</sup>.

Group B: Received diamond taping. The position of subject was supine with elbow being slightly flexed. Anchor the tape on or close to the midline of the forearm. Another tape was run diagonally across the longitudinally axis of the forearm. The starting part of tape was anchored to the subject skin with the thumb. With the other hand apply a tensing force longitudinally along the direction of the tape. The strips were overlapped at their ends & were secured with an additional 4 tape strips, giving rise to a bulging tissue that has a characteristic "Orange peel" appearance. The tape appears in the form of diamond shape at the end of the technique. Taping was done for 8 sessions (4 sessions for 2 weeks)<sup>[12]</sup>.

Both the group received stretching exercise of the common extensors muscle of wrist prior to taping technique. Stretching is done for 6 repetitions with 30 seconds hold with approximate rest of 1minute between each repetition. Stretching was done for 8 sessions (4 sessions for 2 weeks)<sup>[3,15]</sup>.

### Result

The outcome measures were pain rating scores by grip strength - PFGS. Treatment was given for a period of 8 sessions in 2 weeks (4 sessions per week). These measures were assessed on pretreatment of day 1 and on 8<sup>th</sup> session post treatment.

**Table 1:** Comparison of pre and post test PFGS scores in Mulligan's technique group by Paired 't' test by ranks

Treatment	Mean	DF	Paired "t"-value	p-value
Pre	8.75±2.12	19	12.05	< 0.001
Post	12.65±2.75			

p value\* $<0.05$ , Significant

Table 1 shows a significant difference ( $p<0.001$ ) between pre and post intervention of PFGS in group that received Mulligan's technique.

**Table 2:** Comparison of pre and post test PFGS scores in Diamond technique group by paired't' test:-

Treatment	Mean	DF	Paired "t"-value	p-value
Pre	9.35±2.58	19	7.270	< 0.001
Post	11.2±2.5			

p value $<0.05$ , Significant

Table 2 shows a significant difference ( $p<0.05$ ) between pre and post intervention of PFGS in group that received Diamond taping technique.

Comparison of pre-post intervention pain free grip strength in both the groups showed a significant reduction of pain ( $P<0.05$ ) and improvement in grip strength, the results suggest that both the forms of treatment have benefitted the patients and reduced the symptoms of pain with improvement in grip strength.

## Discussion

Vicanzino B stated that MWM can be one of the treatment approach applied to elbow and has proved extremely beneficial in relieving pain and restoring function in tennis elbow. Application of rigid sports adhesive tape and applied manual therapy treatment can be achieved to the subject in the event of an exacerbation of condition outside of scheduled visits to the clinic. Hence in our study we have maintained a corrected positional fault of radius with a sports adhesive tape. This tape replicates the force applied during sustained lateral glide with pain free grip given to the radius.<sup>[8]</sup> In a study done on 14 subjects of chronic lateral epicondylitis, diamond taping produced a substantial improvement in pain free grip strength and to a lesser extent pressure pain threshold.<sup>[3]</sup>

Similar effects were found by Stratford P et al, he has demonstrated that a single application of MWM for tennis elbow results in an immediate increase in pain free grip force (strength)<sup>[16]</sup>. Jack Miller et al in his case study on tennis elbow, had given MWM as a treatment program. When review was done after 2 days the subject had approximately 50% relief of pain with work and ADL's. Reexamination revealed a significant improvement in pain free grip and notable

improvement in ability to tolerate restricted isometric wrist extension<sup>[17]</sup>.

## Conclusion

Mulligan's Mobilization with Mulligan's taping and Diamond taping technique have been proved equally effective, showed improvement in pain free grip strength in patients with lateral epicondylitis.

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