

## **A randomised controlled trial to study the efficacy of mobilization with movement combined with low level laser therapy in lateral epicondylitis**

**Lalit Arora and Reena Arora**

*University College of Physiotherapy, Baba Farid University of Health Sciences, Faridkot, Punjab, India*

### **ABSTRACT**

*To investigate the combined effectiveness of mobilization with movement (MWM) and low level laser therapy (LLLT) in treatment of lateral epicondylitis. Both MWM and LLLT are commonly used treatment for lateral epicondylitis. No study has investigated the effectiveness of MWM combined with LLLT. Thirty subjects with lateral epicondylitis were randomized to either experimental group (n=15), which received MWM combined with low level laser therapy or control group (n=15), which received only low level laser therapy. Treatment was given for 5 days per week for total three weeks. Outcome measures that are PRTEE scoring and grip strength were assessed at day 1 and after every 5 days for 3 weeks for both the groups. Group A which received movement with mobilization with laser therapy showed highly significant improvement in grip strength, functional status and reduction of pain at 2nd & 4th week of treatment with statistically significance of  $p < 0.001$ . Our study showed that both the groups were effective in reducing pain and improving grip strength and functional status. However, it can be concluded that movement with mobilization combined with low level laser therapy provide better results for lateral epicondylitis*

**Key words:** Mulligan's mobilization, movement with mobilization, Low level laser therapy, randomized controlled trial, lateral epicondylitis.

### **INTRODUCTION**

Lateral epicondylitis is the most common lesion of the elbow [1]. Lateral epicondylitis is usually defined as the tendinitis of the extensor carpi radialis brevis (ECRB) [1,2,3]. The term lateral epicondylitis or tennis elbow is widely used to describe an overuse injury that is characterized by pain and tenderness over the lateral epicondyle [4]. The annual incidence of lateral epicondylitis in general practice is four to seven cases per 1000 patients, with a peak in patients 35-54 years of age. Dominant arm involvement is most common [2]. Men and women are equally affected [5].

The main clinical presentation in tennis elbow are decreased grip strength, decreased functional activities, and increased pain, which may have significant impact on activities of daily living. The diagnosis of tennis elbow can be made simple, and it may be confirmed by test which would elicit the pain, tenderness over on the facet of the lateral epicondyle on palpation, resisted wrist extension, resisted middle finger extension, and passive wrist flexion [6].

Different treatment regimens including immobilization, splinting, heat, cold, ultrasound, laser, electrical stimulation, acupuncture, low-dose pulsed electromagnetic field therapy, exercise, manipulation techniques, iontophoresis, non-steroidal anti-inflammatory drugs (NSAIDs) local injections and surgical procedures are used in the treatment of lateral epicondylitis [7].

Mulligan has proposed the use of mobilization with movement for lateral epicondylitis. Mobilization with movement is a technique of manual therapy interventions that combines sustained manual accessory joint gliding with the physiological movement of the joint [8]. The technique is indicated if during its application, it enables the impaired joint to move freely without pain [9]. Immediate reduction in pain and earlier return to function are

claimed as results of Mulligan's mobilization with movement which is widely used in management of musculoskeletal disorders [10, 11]. Mobilization with movement is effective in the treatment of lateral epicondylitis [12].

Low level laser therapy is a modality used for the management of lateral epicondylitis. Low level laser therapy revealed its efficacy in reducing pain and improving grip strength and the subjective rating of physical function [13]. Low level laser therapy seems to be effective in promoting tissue healing and pain control.

Various studies had been done for the treatment of lateral epicondylitis, including mobilization with movement and low level laser therapy, but no study has compared these two. The purpose of this study is to reduce pain, improve grip strength and physical function by mobilization with movement and low level laser therapy in treatment of lateral epicondylitis.

## MATERIALS AND METHODS

This was a randomized controlled trial with equal randomization (1:1 for two groups). 30 subjects participated in this study.

Inclusion criteria:-

1. Patients between ages 30-60 years.
2. Both males and females.
3. Unilateral Lateral epicondylitis with symptoms between one to three months (either left or right arm).
4. Tenderness upon palpation over lateral epicondyle.
5. Patients with positive Cozen's test or Mill's test.
6. Patients who are having either two of the following symptoms:-
  - Pain with gripping.
  - Pain with Passive wrist flexion with elbow extension.
  - Pain with resisted wrist extension.

Exclusion Criteria:-

Previous surgery or trauma at elbow, Medial epicondylalgia, Cervical radiculopathy, Patients undergone Corticosteroid injection therapy, peripheral nerve entrapment/injury, subjects who received any medical or physiotherapy treatment previously for lateral epicondylitis.

Procedure

This study was approved by research and ethical committee of University College of Physiotherapy, Faridkot.

30 subjects have been taken from the OPD of University College of Physiotherapy, Faridkot referred from the Orthopedic Department of GGS Medical College and Hospital Faridkot, based on inclusion and exclusion criteria. Informed consent was signed from each participant. Initial assessment was taken at baseline for PRTEE scoring and grip strength. Grip strength was measured in pounds with hand held dynamometer and subjects were instructed to squeeze the dynamometer to the point where they first experience the pain and then release. Total of three measures were taken with 30 seconds rest intervals between each. The mean value of the repetitions was calculated and represented the patient's pain free grip strength. Then follow up assessment was taken at 2<sup>nd</sup> week and 4<sup>th</sup> week. Subjects were divided into two groups based on randomization. Randomization was done by using Random number tables, with allocation concealment by opaque sequentially numbered sealed envelopes.

GROUP A: 15 subjects received combination of mobilization with movement and low level laser therapy.

GROUP B: 15 subjects received low level laser therapy.

GROUP A (EXPERIMENTAL GROUP):

**MOBILIZATION WITH MOVEMENT:** The subjects were positioned in supine. Subjects received mobilization with movement with their elbow extended and forearm pronated. The therapist stabilized the distal part of the arm and a sustained lateral glide of the proximal forearm was applied. The subjects made a fist as the therapist maintained the lateral glide. The dosage was 12 repetitions in one set with a short rest period (a few seconds) in between each set, 3 sets per session for 5 days per week. Total of 15 sessions were given in 3 weeks [12].

**LOW LEVEL LASER THERAPY:** The subjects will be in comfortable sitting position. Ga/As semiconductor laser (Wuhan Guangdun Technology Co. Ltd.) was used to deliver low level laser therapy. The low level laser

therapy will be given at lateral epicondyle at following parameters: wavelength of 808 nm, power 5 mW with an irradiation time of 15 minutes under pulse mode with 0.5 sec. The treatment will be given for 5 days per week and a total of 15 sessions will be given in 3 weeks.

GROUP B (CONTROL GROUP):

LOW LEVEL LASER THERAPY:

The low level laser therapy was given for 5 days per week and a total of 15 sessions were given in 3 weeks.

Outcome measures that are PRTEE scoring and grip strength were assessed at day 1 and after every 5 days for 3 weeks for both the groups.

## RESULTS

The mean age of subjects in group A was 49.47 and that of group B was 48.47 respectively. The unpaired t test value was 0.4301 ( $P = 0.6754$ ). There was no significant difference in the age group.

Unpaired t test was done to check significant improvement in pain free grip strength and pain and functional status between group A and group B with variables grip strength and PRTEE scoring. There was significant difference in pain free grip strength with Mean difference of 2.23 between the pre values, 9.01 between post 2 values, 19.29 between post 4 values of both the groups with  $p < 0.001$ . (Table I) There was significant difference in PRTEE scoring with Mean difference of 0.067 between pre values, 9.700 between post 2 values and 20.167 between post 4 values of both the groups with  $p < 0.001$  (Table II)

Group A shows highly significant improvement than group B in grip strength with mean value of 112.86 (Group A), 93.57 (Group B) (Fig 1) and PRTEE scoring with mean value of 9.733 (Group A), 29.90 (Group B) (Fig 2).

**Table I Intergroup comparison (Pain free Grip strength)**

	PRE		POST-2		POST-4	
	PAIN FREE GRIP STRENGTH		PAIN FREE GRIP STRENGTH		PAIN FREE GRIP STRENGTH	
	GROUP A	GROUP B	GROUP A	GROUP B	GROUP A	GROUP B
MEAN	69.41	71.64	91.19	82.18	112.86	93.57
MEAN DIFFERENCE	2.23		9.01		19.29	
NUMBER	15	15	15	15	15	15
S.E.M.	5.68	5.46	6.010	5.209	6.182	4.819
T VALUE	0.2826		1.133		2.4613	
P VALUE	0.7796		0.0001		0.0001	
S.D	22.001	21.15	23.27	20.175	23.944	18.664
dF	28		28		28	
T value at 0.05	2.05		2.05		2.05	

**Table II Intergroup comparison (PRTEE)**

	PRE		POST-2		POST-4	
	PRTEE		PRTEE		PRTEE	
	GROUP A	GROUP B	GROUP A	GROUP B	GROUP A	GROUP B
MEAN	45.967	45.90	27.43	37.13	9.733	29.90
MEAN DIFFERENCE	0.067		9.700		20.167	
NUMBER	15	15	15	15	15	15
S.D.	8.507	12.998	6.256	12.257	4.191	10.463
T VALUE	0.0166		2.7300		6.9297	
P VALUE	0.9869		0.0108		0.0001	
S.E.M	2.197	3.356	1.615	3.165	1.082	2.701
dF	28		28		28	
T value at 0.05	2.05		2.05		2.05	

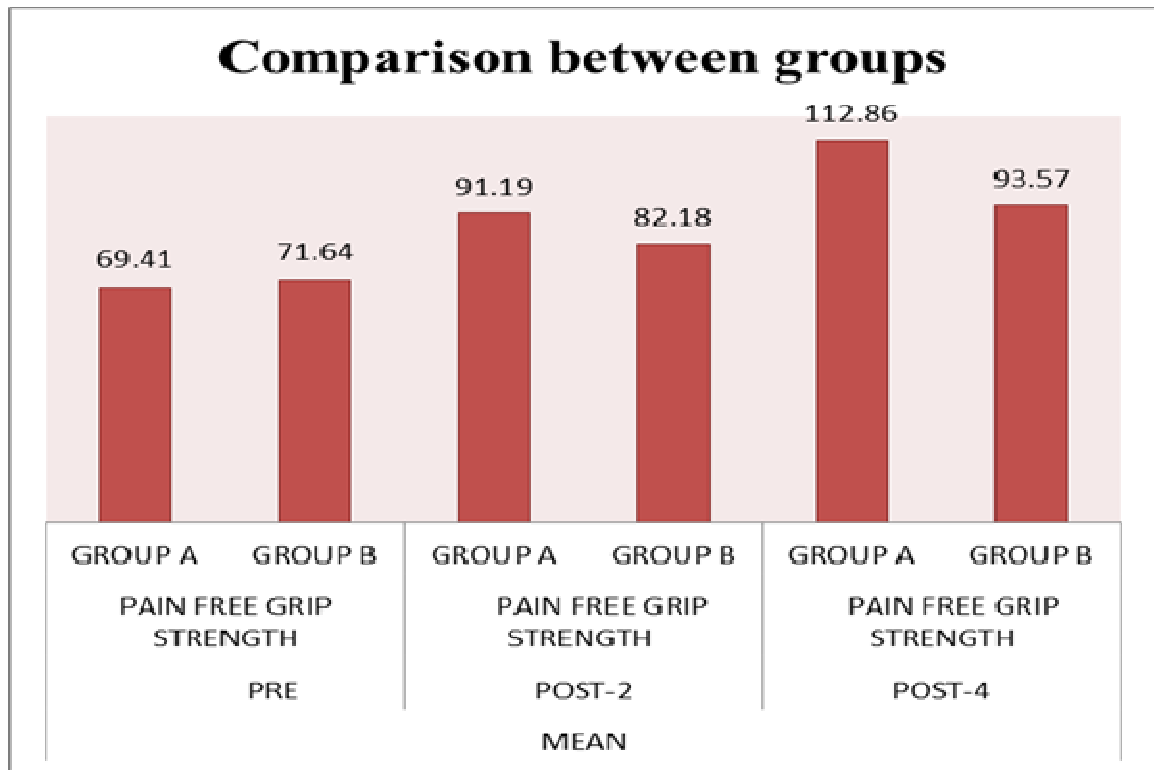


Fig.I Comparison between Group A and B (Pain free Grip strength)

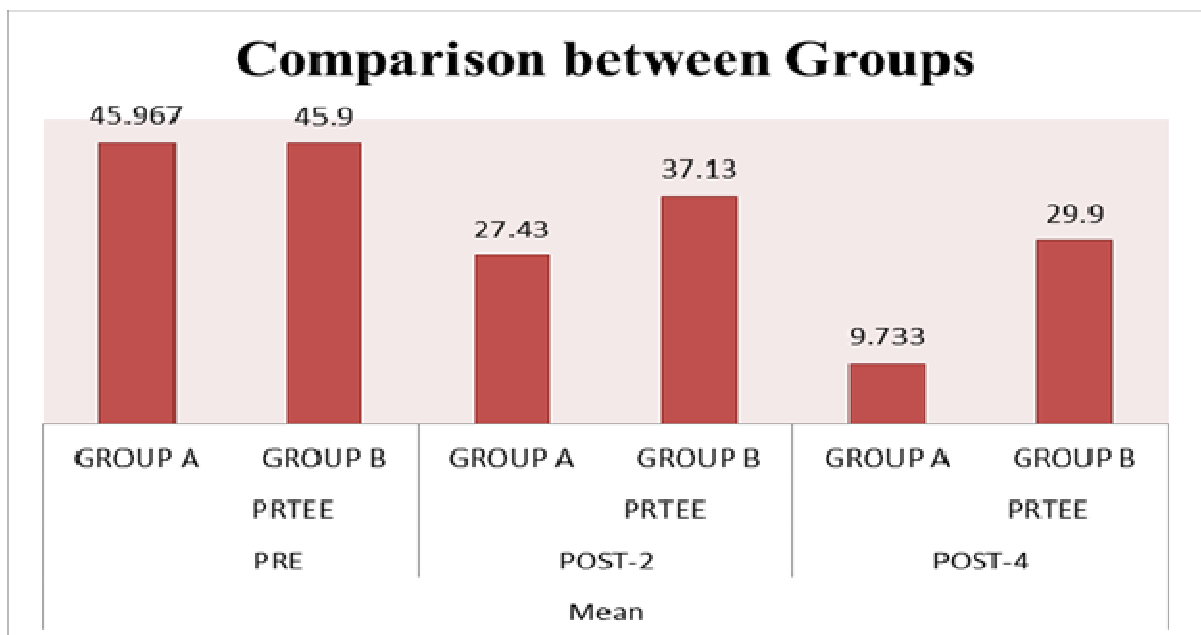


Fig. II Comparison between Group A and Group B (PRTEE)

**DISCUSSION**

Our study showed that both the groups were effective in reducing pain and improving grip strength and functional status.

However, it can be concluded that movement with mobilization combined with low level laser therapy provide better results for lateral epicondylitis. Group A who received movement with mobilization with laser therapy show highly significant improvement in grip strength, functional status and reduction of pain at 2nd & 4th week of treatment with statistically significance of  $p < 0.001$ .

The results of our study are consistent with that of Abott et al[13] who investigated the effect of a single intervention of MWM on pain, pain free grip strength and maximum grip strength on patients with lateral epicondylitis. The results showed that about 92% responded favourably to MWM with decrease in pain, increase in pain free grip strength (17%) and the maximum grip strength (5%) on the affected side. However, the results cannot be generalized as clinically significant owing to single group design.

Another study was conducted by Kocher & Dogra[14] on 66 patients diagnosed with lateral epicondylitis, divided into 3 groups- Mulligan's MWM; ultrasound and control. The variables measured included VAS, weight test, isometric grip strength, patient assessment at baseline, 1,2,3 & 12 weeks. The patient were given 10 treatment sessions over 3 weeks. The authors reported significant change at the final assessment on VAS(97%), weight lift(4.4 kg) and grip strength(9 kg) in MWM group.

Vicenzino et al [15] conducted a randomized, repeated measures double blind, placebo controlled trial on 24 patients with chronic lateral epicondylitis. The study aimed to evaluate the pain relieving effects of MWM as compared to placebo or control conditions. The results showed a significant important change in pain free grip strength and pain pressure threshold as compared to control and placebo.

In a recent study by Deepak et al[16], 40 subjects were randomly assigned into 2 groups. One group was given MWM along with conventional physiotherapy and the other received conventional physiotherapy alone. They concluded that MWM treatment technique produced significant improvement in Pain free grip strength combined with the conventional physiotherapy ( $t=5.45, p<0.01$ ).

Our results are in agreement with the findings of Geetu & Deepak [17], who found that MWM led to statistically significant improvement in functional performance. Similar findings were demonstrated by Miller, who showed that full function was achieved among those lateral epicondylitis patients who received MWM.

The positive effects of low level laser therapy in the management of lateral epicondylitis are consistent with the study by Lam & Cheing[18] who compared LLLT with placebo. Significantly greater improvements were shown in laser group in relieving pain, increasing grip strength and improving subjective rating of physical function.

#### Limitations

A randomized controlled trial with a larger sample size is required to further investigate the effects of Mulligan's mobilisation in patients with lateral epicondylitis.

### CONCLUSION

Both the laser therapy and Mulligan mobilization can induce a significant improvement in daily function and grip strength in patients with lateral epicondylitis. Moreover, combining MWM with laser therapy is more superior to laser therapy alone in improving pain and daily function.

### REFERENCES

- [1] Gouging JP, Rush, *Current Orthop*, **2003**,17, 386
- [2] Norris C, Sports injuries-diagnosis and management. 3rd ed; the elbow Butterworth Heinemann, **2005**
- [3] Greenbaum b, Hammura J, *J Bone Joint Surg*, **1999**,81,926
- [4] Carol C, Garrett WE, *J Bone Joint Surg*, **1997**,79,138
- [5] Greenfield C, Webster V, Chronic lateral epicondylitis. *Physiotherapy*, **1988**, 10, 578
- [6] E. Haker, *Critical Reviews in Physical and Rehabilitation Medicine*, **1993**, 5, 129-154
- [7] R. Nesrin Demirtas, Cengiz Oner, *Clinical Rehabil* **1998**,12,23
- [8] Mulligan RB, Manual therapy "NAGS", "SNAGS", "MWMS", etc: 3rd ed. Wellington, New Zealand: Plane view service, **1995**
- [9] Vicenzino B, Wright A, *Manual Therapy*, **1995**,1,30
- [10] Mulligan BR, *New Zealand Journal of Physiotherapy*, **1992**, 9,122
- [11] Mulligan BR, *J of Manual and Manipulative Therapy*, **1993**,1,154
- [12] A Amro et al, *Manual Therapy*, **2010**, 28,19
- [13] Abbott et al, *Manual Therapy*, **2001**,6,163
- [14] Kocher, Dogra, *Physiotherapy*, **2002**, 88, 333
- [15] Vicenzino L, *Manual Therapy*, **2001**,6,205
- [16] Deepak B Anap, *J Nov Physiother*, **2012**, 2, 1
- [17] Geetu M, Deepak G, *Indian J Physiother Occup therapy*, **2008**, 2, 3

[18] Liz Kityin Lam, Gladys Cheing, *Photomedicine and Laser Surg*, **2001**, 25, 65