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Original Research Article

EFFECTIVENESS OF MULLIGAN MOBILISATION WITH MOVEMENT COMPARED TO SUPERVISED EXERCISE PROGRAM IN SUBJECTS WITH LATERAL EPICONDYLITIS

Hafizur Rahman [1], Pilladi A Chaturvedi *[2], Patchava Apparao [3], Pilladi R Srithulasi [4].

[1] Post Graduate Student, Swatantra Institute of Physiotherapy and Rehabilitation, Rajahmundhry, Andhra Pradesh, India.

*[2] Vice Principal, Swatantra Institute of Physiotherapy and Rehabilitation, Rajahmundhry, Andhra Pradesh, India.

[3] Principal, Swatantra Institute of Physiotherapy and Rehabilitation, Rajahmundhry, Andhra Pradesh, India.

[4] Assistant Professor, Swatantra Institute of Physiotherapy and Rehabilitation, Rajahmundhry, Andhra Pradesh, India.

ABSTRACT

Background and Purpose: Lateral epicondylitis commonly referred to as lateral elbow Tendinopathy or tennis elbow is one of the most common lesions of the arm. Men and women are equally affected. There are many treatment options available for tennis elbow; an exercise program is used as the first treatment option. Mulligan has proposed the use of mobilization with movement for lateral epicondylitis. The main Purpose of the study is to compare the effects of mulligan mobilization with movement and supervised exercise program in subjects with lateral epicondylitis.

Materials and Methods: 60 Subjects fulfilled the inclusive criteria and were randomly assigned into two groups. Group A were given Mobilization with movement and Group B performed Supervised Exercise Program. Both groups performed three sessions per week for the duration of 4 weeks. After the treatment, subjects were evaluated for their pain profile using visual analogue scale, and grip strength by Hand grip dynamometer.

Results: Paired t-test analysis is used within group and Independent t-test is used for between group comparisons. At the end of 4 weeks Mulligan mobilisation with movement group showed significant improvement in VAS and hand grip strength scores than the supervised exercise program group ($P<0.000$).

Conclusion: It is concluded that both techniques showed improvements in hand grip strength and VAS. The group that performed mulligan mobilisation with movement showed significantly greater improvement in reduction of pain and increase in hand grip strength than the supervised exercise program.

KEYWORDS: Mulligan Mobilization with Movement (MWM), Visual Analogue Scale (VAS), Hand Grip Dynamometer (HGD).

Address for correspondence: Dr. Pilladi A Charturvedi, MPT Sports, Vice Principal, Swatantra Institute of Physiotherapy and Rehabilitation, Rajahmundhry, Andhra Pradesh, India. **E-Mail:** chaturvedipilladi@gmail.com

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INTRODUCTION

Lateral epicondylitis commonly referred to as lateral elbow Tendinopathy or Tennis elbow is one of the most common lesions of the arm. Lateral Epicondylitis is a form of repetitive strain injury resulting in pain at the lateral aspect of

the elbow, especially in gripping activities and when resistance is applied to the extensor muscles of the forearm [1].

Lateral epicondylitis is a degenerative or failed healing tendon response characterised by the increased presence of fibroblasts, vascular hyperplasia, and disorganised collagen in the origin of the extensor carpi radialis brevis (ECRB), the most commonly affected structure [2].

It is very common in individuals whose jobs necessitate frequent rotary motion of the forearm (e.g., tennis players and carpenters). It is commonly due to more quick, monotonous, cyclic eccentric contractions and wrist griping activities. The average period of an episode of lateral epicondylitis ranges between 6 months and 2 years.

The Epidemiology of annual incidence in tennis elbow in general practice is 4-7 Cases per 1,000 patients. The peak incidence is between 40 and 50 years age [3]. Men and women are equally affected. Histological studies suggest that lateral epicondylitis involves a degenerative process, citing the presence of disorganized collagen as opposed to inflammatory cells [4].

Acupuncture, orthotics, taping, extra corporeal shock wave therapy, LASER and ionization are considered for managing lateral epicondylitis. Activity modifications such as avoidance of grasping in pronation and substituting controlled supination during lifting may relieve symptoms [5].

An exercise program is used as the first treatment option for patients with lateral epicondylitis. There are two types of exercise programme-home exercise programmes and exercise programmes carried out in a clinical setting.

A home exercise programme is commonly advocated for patients and can be performed any time during the day without requiring supervision from a practitioner, whereas the exercise programmes carried out in a clinical setting is called as supervised exercise programme [6].

Stasinopoulos Dimitro (2013) showed in their study that a specific supervised exercise program is superior to a specific home exercise program in reducing pain and improving function in patients with lateral epicondylitis [6]. The supervised exercise program of tennis elbow is most often accompanied by strengthening, flexibility, or endurance training [7].

Mobilization with Movement (MWM) is a modern technique developed by Mulligan for treating lateral epicondylitis. MWM is a form of manual therapy that includes a sustained lateral glide to the elbow joint with concurrent physiological movement. This mobilisation technique is often used to correct the faulty position of the elbow joint is being widely used in management of musculoskeletal disorders.

Miller (2000) described in his case report the use of the MWM for lateral epicondylitis resulting in reduced pain, improvement of pain-free grip strength (PFGS), and increased ability to tolerate resisted isometric wrist extension [13].

The purpose of this study is to compare the effects of Mulligan Mobilisation with Movement and supervised exercise program in the reduction of pain and improving grip strength in subjects with lateral epicondylitis.

MATERIALS AND METHODS

Present study is designed as an experimental design, data was collected from the GSL general hospital, Rajahmundry and in and around the Rajahmundry, Andhra Pradesh, India. Duration of the study was for 4 weeks. Patients with Pain with gripping, pain with resisted wrist extension, pain with passive wrist flexion with the elbow extension, and tenderness on palpation over the lateral epicondyle of humerus were included in the study where as patients with previous surgery to the elbow region, peripheral nerve entrapment, cervical radiculopathy, corticosteroid injection within 6 months, previous therapy for elbow joint (minimizing expectation bias) , neurological or nuero-muscular impairments, aversion to manual contact, cardiovascular diseases were excluded from the study,

Sampling Method: Simple random sampling, sample size was limited to 60 subjects, Materials included were collection sheet, Recording sheet / evaluation chart, mulligan belt, dumbbells of different weight.

Outcome Measures:

1 Pain intensity: Measured by means of Visual Analogue Scale (VAS).

2 Hand grip strength: Measured by means of Hand grip Dynamometer.

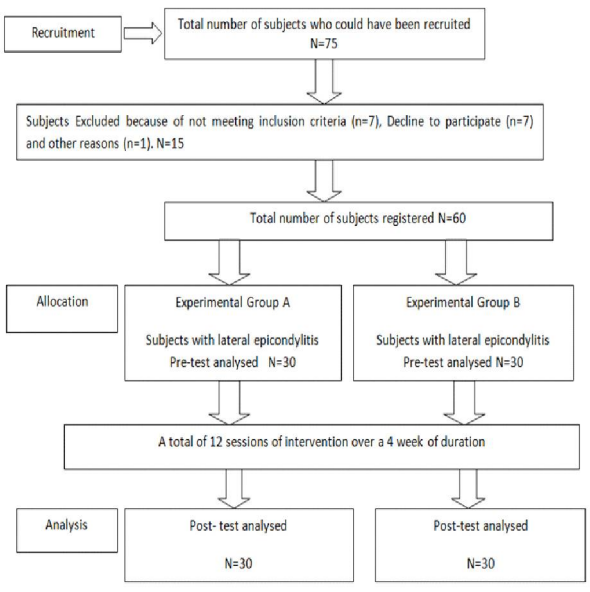
Methodology: A total of 60 subjects meeting the inclusion criteria were recruited for study. All the patients were recruited from the GSL general hospital, in and around the Rajahmundry. After obtaining the informed consent from the patients they were randomly assigned into two groups, Group A and Group B respectively, having 30 subjects in each group.

Permission from the ethical committee was taken. The purpose of the study was explained to all the subjects who were taking part in the study.

Initial evaluation of their pain profile was measured using visual analogue scale and Hand Grip strength by Dynamometer. Each subject holds the dynamometer in the hand to be tested, and the subjects were asked to squeeze the handle grip of dynamometer with maximum effort which is maintained for about 5 seconds. Pain intensity is measured using Visual Analogue Scale (VAS), the subjects were asked to mark their intensity of pain on a 10 centimetre long line marked with numbers 0-10 where 0 indicated no pain and 10 maximum pain.

Intervention: After the initial measurements, the subjects are randomly assigned into 2 groups.

Fig. 1: Showing the flow chard for methodology.



Group A:

Mulligan Mobilization with Movement: Mobilization with movement is performed with subject lying in supine position having their elbow extended and forearm pronated. The therapist is standing at side of subject to be treated. Placing the belt around therapist shoulder and subject's forearm, belt placed closed to elbow joint line. The therapist performs the lateral glide of forearm using belt sustaining this glide, subjects are asked to perform fist without pain. Mobilizations with movement performed 10 times in one set and 3 sets were given per session. Total Treatment includes 12 sessions.

Group B:

Supervised Exercise Programme: Supervised Exercise programme includes static stretching of the Extensor Carpi Radialis Brevis followed by eccentric strengthening of the wrist extensors. Static stretching was performed in the seated position with elbow extension, forearm pronation, and wrist flexion with ulnar deviation. Stretch force was applied according to the patient tolerance and the position was held for duration of 30–45 seconds performed 3 times before and 3 times after the eccentric exercise portion of the treatment for a total of 6 repetitions. There was a 30-second rest interval between each bouts of stretching.

Eccentric strengthening exercise was performed in the seated position with full elbow extension, forearm pronation, and maximum wrist extension. From this position, the patient slowly lowered wrist into flexion for a count of 30, using the contra lateral hand to return the wrist to maximum extension. Patients were instructed to continue the exercise even when they experience mild discomfort and to stop the exercise if the pain worsens and becomes disabling. The load was increased using free weights based on the patients 10 RM (Repetition Maximum).

Three sets of ten repetitions were performed during each treatment, with a one-minute rest interval between each set. Patients were also provided with education manual regarding ergonomics and activity modification technique to avoid aggravation of symptoms.

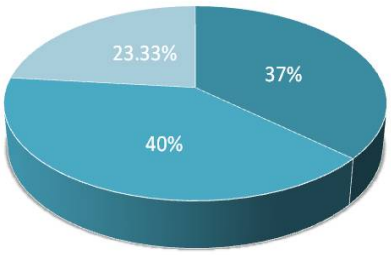
RESULTS

Data Analysis

Table 1: Distribution of study samples according to age (in years) in group A and group B.

	Age group	%
Group A	20-35	36.66%
	36-50	40%
	51-65	23.33%
Group B	20-35	56.66%
	36-50	33.33%
	51-65	10%

Graph 1A



Graph 1B

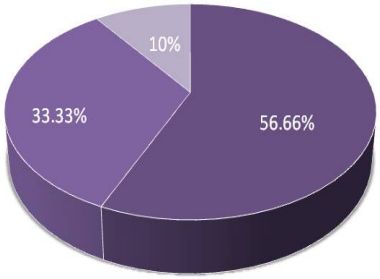
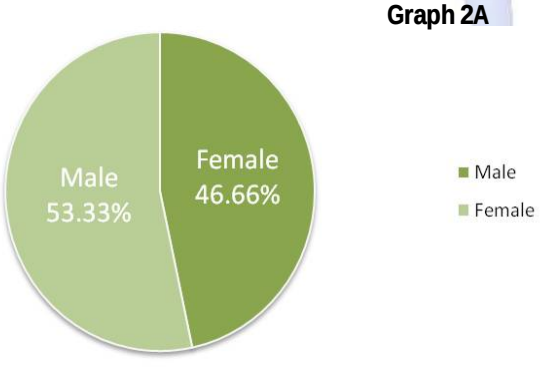


Table 2: Distribution of study samples according to male and female in group A and group B.

GENDER	Group A	%	Group B	%	Total	%
Male	14	46.66	10	33.33	24	40
Female	16	53.33	20	66.66	36	60
Total	30	100	30	100	60	100

The above table represents the gender distribution of subjects. 40% male and 60% female in Group A and Group B respectively.

Graph 2A



Graph 2B

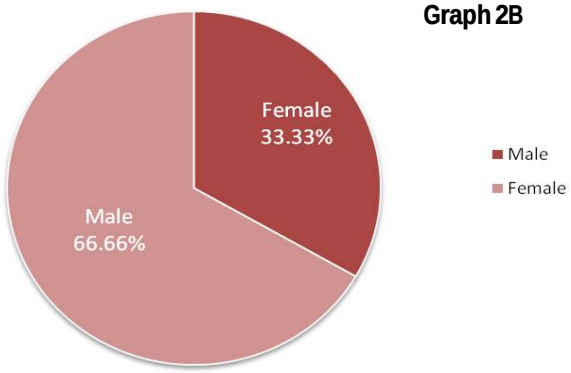
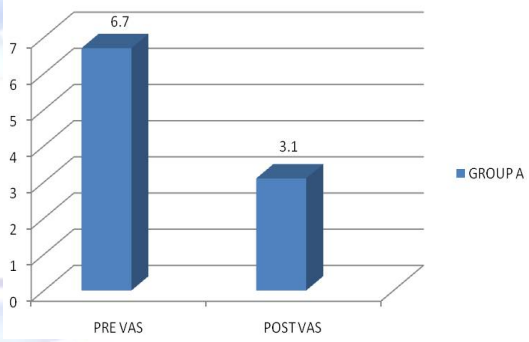


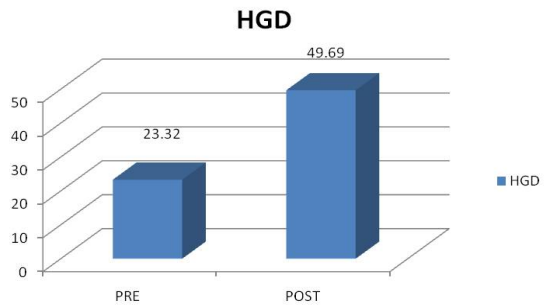
Table 3: Pain Relief (Mean changes in VAS: Hand grip strength (Mean changes in HGD Score).

Groups		Pre Treatment		Post Treatment		p value	Inference
		Mean	SD	Mean	SD		
Group A	VAS	6.76	0.76	3.1	0.75	0.02	Significant
	HGD	23.88	3.73	55.37867	6.09	0.01	Significant
Group B	VAS	6.8	0.76	3.8	0.75	0.04	Significant
	HGD	23.32233	3.73	49.69367	6.09	0.03	Significant

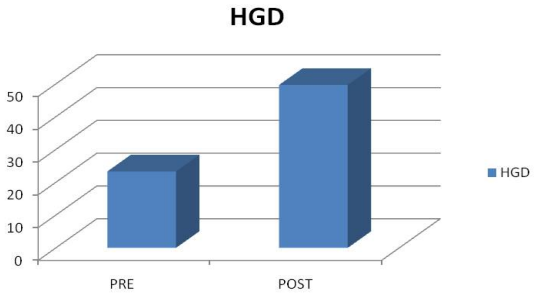
Graph 3A: Pre and Post Vas within Group A.



Graph 3B: Pre and Post HGD within Group A.



Graph 4A: Pre and Post Mean HGD within Group B.



Graph 4B: Pre and Post VAS within Group B.

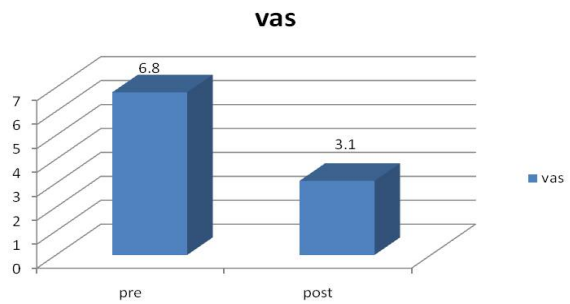


Table 4: Post VASs Mean Between Group A and Group B.

GROUP	MEAN OF POST VAS	SD	P VALUE	INFERENCE
A	3.1	0.75	0.01	Significant
B	3.8	0.76		

Graph 5: Post VASs Mean Between Group A and Group B.

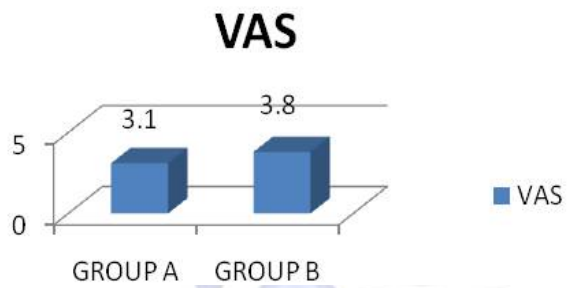
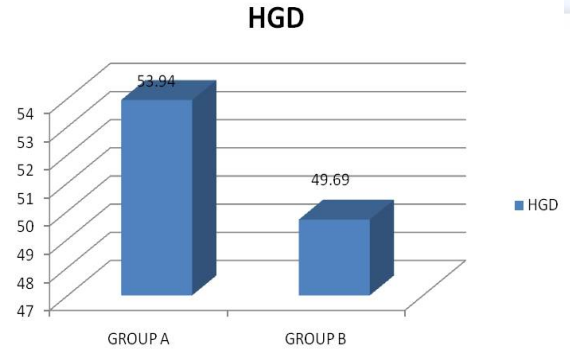


Table 5: Post HGD Mean Between Group A and Group B.

GROUP	MEAN OF POST HGD	SD	P VALUE	INFERENCE
A	53.94	6.09	0.01	Significant
B	49.69	3.73		

Graph 6: HGD Between Group A and Group B.



Hand grip strength (HGS) was measured by the means of hand grip dynamometer. For this HGS score was noted on the first day and the last day (After 4 weeks) of the treatment for all the subjects. However the difference between the 2 scores was considered for analysis of difference between the two groups.

Between group post test analysis of VAS P-value is <0.01, and HGD is <0.02.

DISCUSSION

The study focused in comparing the effectiveness of MWM and supervised exercise program in patients with tennis elbow. There was a significant change in terms of reducing pain and increasing hand grip strength in Group A compared to group B.

The result of this study demonstrated that both mulligan mobilisation with movement (Group A) and the supervised exercise program treatment (Group B) groups experienced significant improvements in pain and grip strength following 4 weeks treatment sessions. The mulligan mobilisation with movement group experienced greater outcomes for all variables in comparison to those receiving supervised exercise program treatment. The reported success of mulligan mobilisation with movement program in this study is consistent.

A Paungmali (2004) showed that MWM produces sensory input sufficient to recruit and activate descending pain inhibitory systems that result in some or all of the pain relieving effects. It produces hypoalgesic effects during and following its application, as well as sympatho-excitatory effect [8].

In a recent study by Anap DB et al [9], 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).

Stasinopoulus et al. compared the effectiveness of supervised exercise, Cyriax physiotherapy, and treatment with polychromatic non-coherent light in managing tennis elbow. They concluded that supervised exercise consisting of static stretching and eccentric strengthening produced the largest effect in reducing pain and improving function [2].

The early return of functional status is very useful for a sports person, as it will facilitate his/her return to sports in less duration. This improvement in functional status will also prevent disuse atrophy or muscle weakness resulting from less or no activity due to pain and

disability caused by tennis elbow. It has been assumed that the underlying mechanism of pain relief secondary to friction massage may be due to modulation of pain impulses at the spinal cord level [10,11].

Kochar and Dogra (2002) [12], who concluded that MWM and US group demonstrated a 97% improvement in VAS when compared with the US and control group. Furthermore, the results are also consistent with those of Miller (2000) [13] who also found that the use of the MWM for LE as the primary modality for the correction of "positional fault" of the elbow joint is effective in relieving pain.

Results highlighted the effect of Mulligan techniques in increasing functional activities, as the experimental group showed more improvement of PRTEE (patient rated tennis elbow evaluation) than the control group. Our results are, thus, in agreement with the of Geetu and Deepak (2008) [14] who found that MWM led to statistically significant improvement in functional performance.

Although a home exercise programme can be performed any time during the day without requiring supervision from a therapist, clinical experience has shown that patients fail to comply with the regimen of home exercise programmes. It is believed that this problem can be really solved by the supervised exercise programmes performed in a clinical setting under the supervision of a therapist.

Eccentric and static stretching exercises appear to reduce the pain and improve function, reversing the pathology of lateral epicondylitis [15,6] as supported by experimental studies on animals [17]. The way that eccentric training achieves the goals remains uncertain, as there is a lack of good quality evidence to confirm that physiological effects translate into clinically meaningful outcomes and vice versa.

Limitations of this study are that the group assignment was not done randomly, No follow-up data was collected; therefore, the long-term effects of the interventions in the present study remain unknown and Absence of true control group affects the internal validity of the study.

Further Recommendation: The study can be conducted with larger sample size, longer duration and with a control group.

CONCLUSION

This study concluded that a 4 weeks treatment programme using both MWM and supervised exercise program are effective in reducing pain and increasing hand grip strength in patients with lateral epicondylitis.

However there is a significant change in reducing pain and increasing hand grip strength in group A (MWM) than group B (supervised exercise program). Hence we reject the null hypothesis. The groups that performed mulligan mobilisation with movement for 4 weeks showed significantly greater improvement in reduction of pain and increasing hand grip strength than the supervised exercise program.

Conflicts of interest: **None**

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