

Effectiveness of Therapeutic Ultrasound with and without Mulligan Mobilization in Lateral Epicondylitis

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Abstract

Background and Introduction: Mechanical malfunction of elbow joint is the usual cause of lateral elbow pain. Even though varied procedures have suggested for maximizing elbow movements and decreasing elbow pain but mobilization of joints has validated the most efficacious technique. The outcome of manual therapy procedure i.e. Mulligan Mobilization along with Therapeutic ultrasound in lateral epicondylitis to reduce pain and recovery of function had been assimilated in this recent research.

Methods: Study is true experimental in nature, randomized control trial adopted to select the subjects with lateral epicondylitis. Thirty patients 15 in each group having LE were chosen Simple random sampling technique and arranged into two groups as guided by CONSORT (Consolidated Standards of Reporting

Trials) guidelines. Group A received Ultrasound therapy with intensity of 1.2 W/cm² with pulsed mode (3MHZ) and duration is 5 minutes .Group B received Ultrasound therapy with an intensity of 1.2 W/cm with pulsed mode (3MHZ) for 5 minutes and MWM applied on elbow in supine position shoulder positioned as internal rotation, forearm pronation and elbow extension with 10 repetition for 6 seconds with 15 seconds duration of rest. Total 12 sessions was conducted in duration of 4 weeks after including the patient in study. Four questionnaires was asked to fill i.e. one after every 3 sessions Pain and functional activities were evaluated by PRTEE. Repeated measure ANOVA was used to compare the significance at different time intervals.

Results: The results exhibited that The P-value for PRTEE (patient – rated tennis elbow evaluation) in group A using Therapeutic Ultrasound and was after four weeks of treatment which was less than the level of significance 0.05. So Therapeutic Ultrasound with Mulligan mobilization was more effective than Therapeutic Ultrasound to reduce pain and restoration of function.

Conclusion: It was concluded that combination of mobilization of Mulligan and Therapeutic ultrasound was more effective compared with Therapeutic Ultrasound in and PRTEE scores in sufferers of lateral epicondylitis.

Key Words: Lateral Epicondylitis, Therapeutic Ultrasound, Mulligan mobilization, PRTEE.

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Introduction

Lateral Epicondylitis has many analogous terms in addition to tennis elbow, peritendinitis of the elbow, lateral elbow pain, lateral epicondylalgia, lateral epi-

condylitis, and tendonitis of the common extensor origin. Lateral Epicondylitis presents with tenderness and pain on the lower end of the humerus known as lateral epicondyle and pain increases when resistance is tested on the extension of the middle finger, wrist and mostly both.¹ Because of deprivation of adequate understanding related to pathophysiology give rise to a wide range of treatment options in routine physiotherapy practice along with electrotherapeutic modalities with manual therapy techniques and exercise interventions.² Predominantly the dominant arm is more frequently affected with tennis elbow and from 1000 patients almost 4 to 7 present with this condition, the annual occurrence in the general population is of 1 – 3% which has increased up to 19% in the population of 30 – 60 years.³

The principal site of pathological changes are evident on extensor carpi radialis brevis tendon along with pathological changes are identified at extensor digitorum communis extensor digitorum longus. The small origin of Extensor carpi radialis brevis shares great amount of forces along its tendon with repeated grasping movement. It is implicated that during all the movements of the forearm as being assailable during shearing stresses. The onset of lateral epicondylitis is not affirmed but it is generally recognized that the repetitive micro trauma or overuse is the cause of tennis elbow.⁴⁻⁶

Though stereotypically, the extensor carpi radialis brevis is disturbed, although others may comprise along with extensor digitorum and extensor carpi ulnaris. The region of utmost soreness is archetypally a zone just far to the preliminary mark of the forearm's extensor muscles on the lateral epicondyle. Posterior interosseus nerve and superficial radial at the radiocarpal joint are the extensions of radial nerve. Pericapsular structures entrapped the Posterior interosseus nerve thus cause the tunnel syndrome The mechanism of injury is increased in tension due to overloading on soft tissue around radial head lack of endurance of muscles in forearm. The development of tennis elbow occurs due to repetition of wrist extensors or the highest degree of torque and abrupt increase in activity with improper surface or equipment.⁴

Mobilization with movement is therapeutic manual therapy procedure used to decline the pain and immediate improvement in functional activities and range of motion.⁷⁻⁹ Repositioning of positional faults is proposed in the improvement of lateral epicondylitis by Mobilization with movement. In randomized clinical

trials the effectiveness of manipulative therapy has been corroborated which appears to improve in terms of decrease in pain and more early gain in of functional restoration. MWW is evident to improve pain and functional activities like every day work related to job, dressing activities, washing the clothes, lifting a cup while drinking tea and glass of water these may be integrated into the treatment plan for the individuals coming with tennis elbow.¹⁰

Most commonly used modality in Physiotherapy practice is Therapeutic Ultrasound “to treat musculoskeletal and conditions related to sports injuries and overuse syndromes, for example tendinopathy like rotator cuff, medial epicondylitis and other tendon injuries. Tendon healing is promoted by ultrasound because it stimulates collagen synthesis the tendon cells by stimulating cell migration and proliferation that may benefit tendon healing.¹¹⁻¹³

Therapeutic ultrasound can be used on two different modes continuous and pulsed mode both used for acute and chronic conditions like rotator cuff tendinopathy, tennis elbow and other conditions of musculoskeletal tissues. It is used on two different frequencies on 3 MHz and 1 MHz In practice 1 and 3 MHz are used for deep and superficial tissue injuries respectively. Intensities of therapeutic ultrasound varies from 0.1 to 1.0 W/cm² according to tissue depth and type of injury. Duration of application of Therapeutic ultrasound ranges between 2 and 5minutes and applying in circular manner by the physiotherapist.¹³

Material and Methods

Study Design: Study is true experimental in nature, randomized control trial adopted to select the subjects with lateral epicondylitis.

Setting: Data was collected from Services and Alshafi Hospital Allma Iqbal Town Lahore. It is comparative study design randomized clinical trials. Subjects with lateral epicondylitis in the physiotherapy department.

Duration: It was completed within 6 months after the approval from Technique Review committee.

Sample Size: Sample size of 30 subjects (15 in each) was taken in each group using 5% level of significance and 80% power of test.

$$m = c \times \frac{\pi_1(1-\pi_1) + \pi_2(1-\pi_2)}{(\pi_1 - \pi_2)^2}$$

$c = 7.9$ at 80% power of test

π_1 = Estimated proportion of success of standard therapy.

π_2 = Proportion of total successful outcome.

According to this formula “m” = 15 + 15 (per each group) = 30.

Sample Technique: Simple random sampling technique was used.

Sample Selection Criteria

- Inclusion Criteria:
- Referred patients having lateral epicondylitis.
- The age between 20 – 50 years.
- Patient’s willingness in participation in this study.

Exclusion Criteria

- Skin infection.
- Recent trauma to elbow.
- Infection in or surrounding the elbow.
- Any type of peripheral nerve injury or involvement in upper extremity.
- Cervical radiculopathy.
- Stroke.
- Head injury.
- Elbow joint dislocation.
- Fractures of radius humerus and ulna.
- Rheumatoid arthritis.
- Tumors.

Methodology

Thirty patients was selected randomly and randomly allocated into two groups 15 in each as per Consort Guidelines.¹⁴ Group A received Ultrasound therapy with intensity of 1.2 W/cm with pulsed mode (3MHZ) and duration is 5 minutes.

Group B received Ultrasound therapy with an intensity of 1.2 W/cm with pulsed mode (3MHZ) for 5 minutes and MWM applied on elbow in supine position shoulder positioned as internal rotation, forearm pronation and elbow extension with 10 repetition for 6 seconds with 15 seconds duration of rest.

Data Collection Procedure: Thirty patients who completed the selection criteria were enrolled in this

study. Written informed consent was taken from every individual participating in this study prior to performing any examination. Allocation of patients in two groups had done by simple random sampling to assure external validity as per CONSORT guidelines 2010. Group A was treated with Ultrasound therapy group B with Ultrasound Therapy Mulligan mobilization. Both groups were received the conventional therapy, which was remained same throughout the study. The conventional therapy was included Ultrasonic Therapy (ITO US-100) with intensity of 1.2 W/cm² with pulsed mode (3MHZ) and duration is 5 minutes.

Group A was received Ultrasound therapy plus Mulligan mobilization applied on elbow in supine position shoulder positioned as internal rotation, forearm pronation and elbow extension with 10 repetition for 6 seconds with 15 seconds duration of rest. Pain intensity and functional activities were appraised by PRTEE. All this information was gathered by using a pre-designed questionnaire as PRTEE. Confounding variables were controlled by randomization and restriction methods. All treatment was applied by single handed for controlling bias.

Results

There were total 30 cases who were enrolled in this study. The mean age of the cases was 34.33 ± 8.80 of which 53% were male and 47% were female cases. There were 8 (53%) were male and 7 (46%) were female in group one 7 (46%) male and 8 (53%) female in group 2. and Overall baseline pain score for repeating arm movement was 6.00 ± 1.50 , when carrying plastic bag was 7.13 ± 1.38 and when pain was at its worse was 8.60 ± 1.27 . Functional disability score was 6.10 ± 1.62 in cases who were have issue even in turning the knob of door, 7.13 ± 1.10 rate was given by those who carry bag, cases who were noted during opening a jat 7.73 ± 1.11 score and wring out washing cloth of towel has 5.33 ± 1.15 score. Usual activity score at base line on personal activity, household work, work, recreational sporting was 7.03 ± 1.82 , 7.00 ± 1.76 , 7.06 ± 1.18 and 5.23 ± 1.85 respectively. There was significant decrease in the pain score, functional ability score and usual activity as per presented in the tables for the both groups (Table 17 to 26). All the p-value for the groups comparison were significant (p value < 0.005).

Table 1: Baseline Pain Score in different categories.

		Pain: When doing a Task with Repeated Arm Movement	Pain: When Carrying Plastic Bag of Groceries	Pain: When your Pain was at its Worst
N		30	30	30
Mean		6.0000	7.1333	8.6000
Std. Deviation		1.50860	1.38298	1.27577
Minimum		3.00	4.00	4.00
Maximum		8.00	9.00	10.00

Table 2: Baseline Functional Disability Score.

		Turn a Doorknob or Key	Carry a Grocery Bag or Briefcase by the Handle	Open a Jar	Wring out a Wash Cloth or Wet Towel
N		30	30	30	30
Mean		6.1000	7.1333	7.7333	5.3333
Std. Deviation		1.62629	1.10589	1.11211	1.15470
Minimum		4.00	4.00	4.00	3.00
Maximum		9.00	9.00	9.00	8.00

Table 3: Baseline Usual Activity score.

		Usual Activities: Personal Activities (Dressing, Washing)	Usual Activities: Household Work (Cleaning, Maintained)	Usual Activities: Work (Your Job or Everyday Work)	Usual Activities: Recreational or Sporting Activities
N		30	30	30	30
Mean		7.0333	7.0000	7.0667	5.2333
Std. Deviation		1.82857	1.76166	1.81817	1.95965
Minimum		4.00	4.00	4.00	3.00
Maximum		9.00	9.00	9.00	9.00

Table 4: Pain score at 1st Follow-up.

		Pain: When Doing a Task with Repeated Arm Movement 1st Follow-up	Pain: When Carrying Plastic Bag of Groceries 1st Follow-up	Pain: When Your Pain was at its Worst 1st Follow-up
N		30	30	30
Mean		5.3000	6.3000	7.5667
Std. Deviation		1.46570	.98786	1.25075
Minimum		3.00	5.00	4.00
Maximum		8.00	8.00	9.00

Table 5: Functional disability score at 1st follow-up

		Functional Disability: Turn a Doorknob or Key 1st Follow-up	Functional Disabilities: Carry a Briefcase or Grocery Bag by the Handle 1st Follow-up	Functional Disabilities: Open a Jar 1st Follow-up	Functional Disability: Wring out Wet Towel or Washcloth 1st Follow-up
N		30	30	30	30
Mean		5.1667	5.9667	6.9667	4.7333
Std. Deviation		1.26173	1.18855	1.12903	1.14269
Minimum		3.00	3.00	4.00	2.00
Maximum		8.00	8.00	9.00	7.00

Table 6: Usual activity score at 1st follow-up.

		Usual Activities: Personal Activities (Dressing, Washing) 1st Follow-up	Usual Activities: Household Work (Cleaning, Maintained) 1st Follow-up	Usual Activities: Work (Your Job or Everyday Work) 1st Follow-up	Usual Activities: Recreational or Sporting Activities 1st Follow-up
N		30	30	30	30
Mean		6.1000	6.1667	6.3000	4.7667
Std. Deviation		1.18467	1.55549	1.53466	1.59056
Minimum		3.00	3.00	3.00	3.00
Maximum		8.00	8.00	8.00	8.00

Table 7: Pain score at 2nd Follow-up.

		Pain: When Doing a Task with Repeated Arm Movement 2nd Follow-up	Pain: When Carrying a Plastic Bag of Groceries 2nd Follow-up	Pain: When Your Pain was at its Worst 2nd Follow-up
N		30	30	30
Mean		4.8333	6.1000	7.7667
Std. Deviation		1.14721	.75886	.89763
Minimum		3.00	5.00	6.00
Maximum		7.00	7.00	9.00

Table 8: Functional disability score at 2nd Follow-up.

		Functional Disability: Turn a Doorknob or Key 2 nd Follow-up	Functional Disabilities: Carry Briefcase or a Grocery Bag or by the Handle 2 nd Follow-up	Functional Disabilities: Open a Jar 2 nd Follow-up	Functional Disability: Wring Out Wet Towel or a Washcloth or 2 nd Follow-up
N		30	30	30	30
Mean		4.9333	5.3333	5.5000	4.2667
Std. Deviation		1.38796	1.53877	1.25258	1.04826
Minimum		2.00	2.00	3.00	2.00
Maximum		7.00	9.00	8.00	6.00

Table 9: Usual activity score at 2nd Follow-up.

		Usual Activities: Personal Activities (Dressing, Washing) 2nd Follow-up	Usual Activities: Household Work (Cleaning, Maintenance) 2nd Follow-up	Usual Activities: Work (Your Job or Everyday Work) 2nd Follow-up	Usual Activities: Recreational orr Sporting Activities 2st Follow-up
N		30	30	30	30
Mean		5.6000	5.1333	5.4000	4.0000
Std. Deviation		1.32873	1.50249	1.40443	1.28654
Minimum		3.00	3.00	3.00	2.00
Maximum		8.00	8.00	8.00	7.00

Table 10: Pain score at 3rd follow-up.

		Pain: When doing a Task with Repeated Arm Movement 3rd Follow-up	Pain: When Carrying a Plastic Bag of Groceries 3rd Follow-up	Pain: When Your Pain was at its Worst 3rd Follow-up
N		30	30	30
Mean		3.6333	5.6667	7.2667
Std. Deviation		.96431	.80230	.86834
Minimum		2.00	4.00	6.00
Maximum		5.00	7.00	9.00

Table 11: Functional disability score at 3rd follow-up.

		Functional Disability: Turn a Doorknob or Key 3 rd Follow-up	Functional Disabilities: Carry Briefcase or a Grocery Bag by the Handle 3 rd Follow-up	Functional Disabilities: Open a Jar 3 rd Follow-up	Functional Disability: Wring Out Wet Towel or a Washcloth 3 rd Follow-up
N		30	30	30	30
Mean		3.7000	4.1000	5.3667	3.7333
Std. Deviation		1.08755	1.53914	1.15917	1.25762
Minimum		2.00	2.00	3.00	2.00
Maximum		6.00	8.00	8.00	7.00

Table 12: Usual activity score at 3rd follow-up.

		Usual Activities: Personal Activities (Dressing, Washing) 3 rd Follow-up	Usual Activities: Household Work (Cleaning, Maintenance) 3 rd Follow-up	Usual Activities: Work (Your Job or Everyday Work) 3 rd Follow-up	Usual Activities: Recreational orr Sporting Activities 3 rd Follow-up
N		30	30	30	30
Mean		4.9000	4.2667	4.4000	3.0667
Std. Deviation		1.32222	1.04826	1.32873	1.38796
Minimum		2.00	3.00	2.00	1.00
Maximum		8.00	6.00	7.00	6.00

Table 13: Distribution according to Age.

Age of Patients	
N	30
Mean	34.3333
Std. Deviation	8.80569
Minimum	21.00
Maximum	48.00

Table 14: Comparison of mean pain when doing a task with repeated arm movement at different follow-up.

(I) pain	(2) pain	Mean Difference (I-J)	Std. Error	Sig. ^a
1	2	.700*	.199	.001
	3	1.167*	.315	.001
	4	2.367*	.327	.000
2	1	-.700*	.199	.001
	3	.467	.328	.165
	4	1.667*	.350	.000
3	1	-1.167*	.315	.001
	2	-.467	.328	.165
	4	1.200*	.169	.000
4	1	-2.367*	.327	.000
	2	-1.667*	.350	.000
	3	-1.200*	.169	.000

Table 15: Comparison of mean pain when carrying a plastic bag of groceries at different follow up:

(I) pain	(2) pain	Mean Difference (I-J)	Std. Error	Sig. ^a
1	2	.833*	.198	.000
	3	1.033*	.265	.001
	4	1.467*	.270	.000
2	1	-.833*	.198	.000
	3	.200	.169	.246
	4	.633*	.217	.007
3	1	-1.033*	.265	.001
	2	-.200	.169	.246
	4	.433*	.157	.010
4	1	-1.467*	.270	.000
	2	-.633*	.217	.007
	3	-.433*	.157	.010

Table 16: Comparison of mean pain when your pain was at worst at different follow-up

(I) pain	(2) pain	Mean Difference (I-J)	Std. Error	Sig. ^a	95% Confidence Interval for Difference ^a	
					Lower Bound	Upper Bound
1	2	1.033*	.169	.000	.687	1.380
	3	.833*	.235	.001	.352	1.315
	4	1.333*	.205	.000	.913	1.753
2	1	-1.033*	.169	.000	-1.380	-.687
	3	-.200	.206	.339	-.621	.221
	4	.300	.210	.163	-.129	.729

3	1	-.833*	.235	.001	-1.315	-.352
	2	.200	.206	.339	-.221	.621
	4	.500*	.093	.000	.310	.690
4	1	-1.333*	.205	.000	-1.753	-.913
	2	-.300	.210	.163	-.729	.129
	3	-.500*	.093	.000	-.690	-.310

Table 17: Comparison of mean functional ability score when turning a door knob at different follow-up.

(I) Functional	(2) Functional	Mean Difference (I-J)	Std. Error	Sig. ^a
1	2	.933*	.271	.002
	3	1.167*	.307	.001
	4	2.400*	.379	.000
2	1	-.933*	.271	.002
	3	.233	.257	.371
	4	1.467*	.295	.000
3	1	-1.167*	.307	.001
	2	-.233	.257	.371
	4	1.233*	.266	.000
4	1	-2.400*	.379	.000
	2	-1.467*	.295	.000
	3	-1.233*	.266	.000

Table 18: Comparison of mean functional ability score when carrying grocery bag by handle at different follow-up

(I) Functional	(2) Functional	Mean Difference (I-J)	Std. Error	Sig. ^a
1	2	1.167*	.209	.000
	3	1.800*	.363	.000
	4	3.033*	.394	.000
2	1	-1.167*	.209	.000
	3	.633*	.256	.019
	4	1.867*	.310	.000
3	1	-1.800*	.363	.000
	2	-.633*	.256	.019
	4	1.233*	.302	.000
4	1	-3.033*	.394	.000
	2	-1.867*	.310	.000
	3	-1.233*	.302	.000

Table 19: Comparison of mean functional ability score when opens a jar at different follow-up.

(I) Functional	(2) Functional	Mean Difference (I-J)	Std. Error	Sig. ^a
1	2	.767*	.184	.000
	3	2.233*	.274	.000
	4	2.367*	.265	.000
2	1	-.767*	.184	.000
	3	1.467*	.287	.000
	4	1.600*	.282	.000
3	1	-2.233*	.274	.000
	2	-1.467*	.287	.000
	4	.133	.266	.620
4	1	-2.367*	.265	.000
	2	-1.600*	.282	.000
	3	-.133	.266	.620

Table 20: Comparison of mean functional ability score when wring out a washing cloth or towel at different follow-up.

(I) Functional	(2) Functional	Mean Difference (I-J)	Std. Error	Sig. ^a
1	2	.600*	.207	.007
	3	1.067*	.275	.001
	4	1.600*	.324	.000
2	1	-.600*	.207	.007
	3	.467	.229	.050
	4	1.000*	.244	.000
3	1	-1.067*	.275	.001
	2	-.467	.229	.050
	4	.533	.270	.058
4	1	-1.600*	.324	.000
	2	-1.000*	.244	.000
	3	-.533	.270	.058

Table 21: Comparison of mean usual activity score during personal activity at different follow-up.

(I) Usual Activity	(2) Usual Activity	Mean Difference (I-J)	Std. Error	Sig. ^a
1	2	.933*	.253	.001
	3	1.433*	.389	.001
	4	2.133*	.403	.000

2	1	-.933*	.253	.001
	3	.500	.248	.053
	4	1.200*	.293	.000
3	1	-1.433*	.389	.001
	2	-.500	.248	.053
	4	.700*	.268	.014
4	1	-2.133*	.403	.000
	2	-1.200*	.293	.000
	3	-.700*	.268	.014

Table 22: Comparison of mean usual activity score during household work at different follow-up.

(I) Usual Activity	(2) Usual Activity	Mean Difference (I-J)	Std. Error	Sig. ^a
1	2	.833*	.152	.000
	3	1.867*	.358	.000
	4	2.733*	.386	.000
2	1	-.833*	.152	.000
	3	1.033*	.309	.002
	4	1.900*	.350	.000
3	1	-1.867*	.358	.000
	2	-1.033*	.309	.002
	4	.867*	.287	.005
4	1	-2.733*	.386	.000
	2	-1.900*	.350	.000
	3	-.867*	.287	.005

Table 23: Comparison of mean usual activity score during work (job or everyday work) at different follow-up.

(I) Usual Activity	(2) Usual Activity	Mean Difference (I-J)	Std. Error	Sig. ^a
1	2	.767*	.124	.000
	3	1.667*	.221	.000
	4	2.667*	.333	.000
2	1	-.767*	.124	.000
	3	.900*	.194	.000
	4	1.900*	.285	.000
3	1	-1.667*	.221	.000
	2	-.900*	.194	.000
	4	1.000*	.249	.000

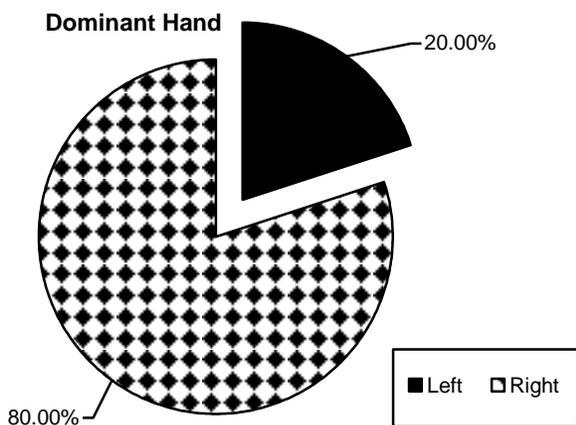
4	1	-2.667*	.333	.000
	2	-1.900*	.285	.000
	3	-1.000*	.249	.000

Table 24: Comparison of mean usual activity score during recreational or sports activity at different follow-up.

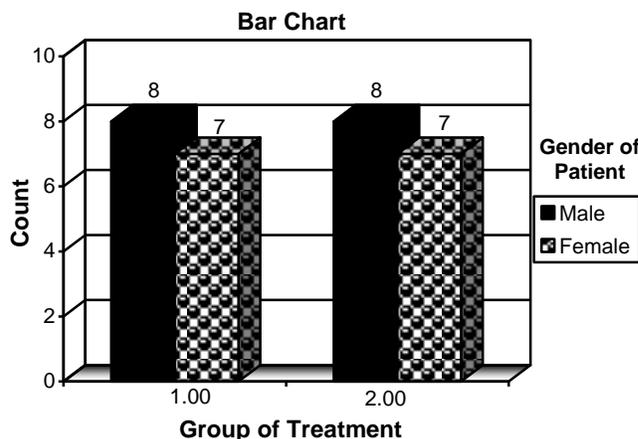
(I) Usual Activity	(2) Usual Activity	Mean Difference (I-J)	Std. Error	Sig. ^a
1	2	.467*	.142	.003
	3	1.233*	.228	.000
	4	2.167*	.437	.000
2	1	-.467*	.142	.003
	3	.767*	.202	.001
	4	1.700*	.356	.000
3	1	-1.233*	.228	.000
	2	-.767*	.202	.001
	4	.933*	.314	.006
4	1	-2.167*	.437	.000
	2	-1.700*	.356	.000
	3	-.933*	.314	.006

Discussion

Purpose of this research was to conclude the comparative effectiveness of Mulligan Mobilization and Therapeutic ultrasound for the treatment of lateral epicondylitis pain regarding reduction of pain and restoration of function. In the present research both of these treatment methods have been used as an intervention to treat the patients with this condition.



Graph 1: Distribution according to Dominant Hand.



Graph 2: Distribution according to Gender.

Patients with lateral epicondylitis were divided randomly into two groups. In ‘group A’ Therapeutic Ultrasound was applied to the subjects having LE while in ‘group B’ technique Mulligan mobilization with Ultrasound Therapy was applied on the elbow.

The questionnaire PRTEE used to assess the patient Total 12 sessions was conducted in duration of 4 weeks after including the patient in study. Four ques-

tionnaires was asked to fill that was one after every 3 sessions. Overall baseline pain score for repeating arm movement was 6.00 ± 1.50 , when carrying plastic bag was 7.13 ± 1.38 and when pain was at its worse was 8.60 ± 1.27 . Functional disability score was 6.10 ± 1.62 in cases who were have issue even in turning the knob of door, 7.13 ± 1.10 rate was given by those who carry bag, cases who were noted during opening a jar 7.73 ± 1.11 score and wring out washing cloth of towel has 5.33 ± 1.15 score. Usual activity score at base line on personal activity, household work, work, recreational sporting was 7.03 ± 1.82 , 7.00 ± 1.76 , 7.06 ± 1.18 and 5.23 ± 1.85 respectively. There was significant decrease in the pain score, functional ability score and usual activity score. Both of group showed decrease in mean score but group B had a significant decrease. So it proved that intervention given to group B was more effective than intervention given to group A.

Our conclusion conform formerly issued trials on patients having lateral epicondylitis pain. Similar study was conducted by Hyunsu Choi (2012) the Experimental group was treated with MWM and Ultrasound Therapy revealed a significant change in the improvements was of 39.13 – 51.42%, On the other hand the Placebo Control group where without MWM the group did not show any remarkable change in pain and disability with the percentage of 10.71 – 19.35.¹⁴ Another identical study in 2009 Owens and Radpasand also showed the similar results in which they concluded the improvement in pain and specific activities in lateral epicondylitis was more than 70% with Mulligan Mobilization.¹⁵

Forty subjects were taken and randomly divided in to two groups received Group A was administered with routine Physiotherapy and Group B with routine Physiotherapy and MWM as well by Deepak B Anap (2012). The reevaluation showed more decline in pain and betterment other functional movements in group B which gained the routine Physiotherapy with MWM.¹⁵

The benefit of the Mulligan mobilization showed a marked decline in pain and PRTEE scores in support of existing result, with respect to the research, the effectiveness of Mulligan's mobilizations techniques have been settled for amending joint function, with a number of hypotheses for its cause and effect. More recent researches have proved further methods that includes the hypoalgesic and sympathetic nervous system excitation effects.

Hence from the accessible studies and the statisti-

cal results of data obtained following the treatment deduces that, "Mulligan mobilization technique is a way better than Only Therapeutic ultrasound technique in improving Pain, and disability.

Conclusion and Recommendation

Combination of Ultrasound Therapy and Mulligan mobilization technique for the cure of lateral epicondylitis has confirmed to be more helpful in aiding pain, and functional impairment in patients having lateral epicondylitis than Ultrasound Therapy without Mulligan Mobilization. The results of this clinical analysis aids in explaining the employment of manual physical therapy in patients with lateral elbow pain. For the true effect of this regimen, future exploration should comprise well – planned randomized control trials with extended treatment durations, longer patient follow-up periods, larger sizes of samples, and self-reported measures of function.

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