Original Article

Mulligan Mobilisation With Movement Versus Deep Friction Massage In Patients With Lateral Epicondylitis

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Abstract

Background: Individuals who tend to work in occupations that frequently require forearm rotation and extensor muscle contraction suffer from lateral epicondylitis. **Aim**: The major objective of the current academic work is to elaborate on the results of Mulligan Mobilization with Movement (MMWM); a contemporary manual technique, with deep Transverse friction massage (DTFM), the most traditional approach, in terms of lessening pain, enhancing grip strength, and increasing functional performance in lateral epicondylitis cases. **Subjects and methods:** In this work, two equal study categories of forty tennis elbow cases were randomly assigned. Group (A) received a treatment plan in the form of MMWM and had a mean age of 35.1. The proximal attachment of the wrist extensor muscles underwent DTFM for Group (B), which had a mean age of 37.5. For four weeks, each group obtained three sessions of ultrasonic therapy with active wrist and elbow range of motion exercise. The visual analog scale, a squeeze dynamometer, and a patient-rated tennis elbow evaluation questionnaire were used as outcome measures.

Results: According to the study outcomes, both groups remarkably improved in terms of handgrip strength, specialized and routine functional tasks, and pain reduction. In comparison to the first group, the second group had a much larger improvement in hand grip strength and functional performance. **Conclusion:** It is determined that MMWM is less effective than deep friction massage in the treatment of people with lateral epicondylitis in improving function and hand grip.

KEYWORDS: Mulligan Mobilization with Movement (MMWM), Deep Transverse Friction Massage (DTFM), Lateral epicondylitis, tennis elbow.

INTRODUCTION:

lateral epicondylitis, is one of the most common reasons for elbow and back of forearm discomfort. It is distinguished by stiffness and discomfort caused by inflammation of the outside of the elbow, also known as tennis elbow. Elbow pain has been connected to resistance to wrist or finger extension and grasping exercises [1]. In the general population,

the prevalence of the dominant side arm is 1-3%, it rises to 19% in adults aged 30 to 60, and it appears to be more chronic and severe in women [2,3].

Physical trauma, repetitive strain damage, and inflammation are all thought to diminish the length and suppleness of fascial tissue and produce fascia constriction [4]. Lateral epicondylitis is distinguished by a poor tendon healing response, an increase in fibroblasts, vascular hyperplasia, and disordered collagen at the origin of the extensor carpi radialis-brevis, the most usually afflicted component [5].

Lateral epicondylitis is one of the most common disorders that require physical therapy in addition to medical treatment. Non-steroidal anti-inflammatory drugs and corticosteroid injection [6,7] while [8,9] have both been reported and used to treat this condition, as have rest, acupuncture [10,11], electrical stimulation [12], laser [13], counterforce bracing [14,15], shock wave therapy [16], lateral extensor release [17], and ultrasound (US) [18]. Therapeutic ultrasound is one of the more established and most widely used of the electro physical agents[19] .

We need to have a more observable physical therapy regimen and choose the right manual therapy approach. In order to have the best results in treating lateral epicondylitis with all those treatment options.

In contrast to the conventional approaches for treating lateral epicondylitis, Mulligan created a contemporary technique called mobilization with movement years ago. A persistent lateral glide to the elbow joint is used along with a concomitant physiological movement in this type of manual therapy approach [20]. In the treatment of musculoskeletal disorders like tennis elbow, this mobilization technique is frequently used to adjust the elbow's incorrect position and subsequently mobilize the radius laterally where the extensor carpi-radialis brevis is inserted [21,22]. This technique reduces pain and improves pain-free grip strength.

The MMWM approach restores the normal tracking of the radius across the capitulum, allowing forearm muscle growth without unpleasant side effects and resulting in pain-free grip strength [23]. Additionally, it generates sensory information that is sufficient to draw in and activate descending pain inhibitory circuits, which relieves pain [24].

One of the most well-known physical therapy treatments for treating lateral epicondylitis involves deep tissue friction massage, which loosens underlying adhesions and increases blood flow to the nearby common extensor tendon [25]. This form of intervention can increase the wrist extensor muscle group's flexibility, strength, and stamina [26] and returned the fascial tissue to its natural length to restructure the collagen, which relieves discomfort [27].

Since lateral epicondylitis is a fairly self-limiting ailment, it is crucial to choose the appropriate treatment. This study compares the effects of MMWM, a more modern manual technique, with deep friction massage, an older approach, on pain relief, strengthening grip ability, and functional performance in lateral epicondylitis patients.

Materials and Methods
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Subjects:

Forty male and female patients participated in a comparative study. Between the ages of 30 and 40 years old. The physical therapist identified them as having chronic lateral epicondylitis . All of them suffered from pain, hand grip weakness, and limitations in their elbow and hand functional activities (3-6 months ago). Any patient with Neuromuscular disorder, ankylosed joint, vascular or infectious diseases affecting joint were excluded.

The forty patient divided into two groups. Group (A) 20 patient received Mulligan Mobilization with Movement. While, Group (B) 20 patient received Deep friction massage technique. Both groups performed a physical treatment regimen that included ultrasound therapy device with active wrist and elbow range of motion exercise. They were rounded up from the physical therapy outpatient clinic of both Kasr El-Ainy, Cairo University Hospitals, Egypt and Modern University for technology and information.

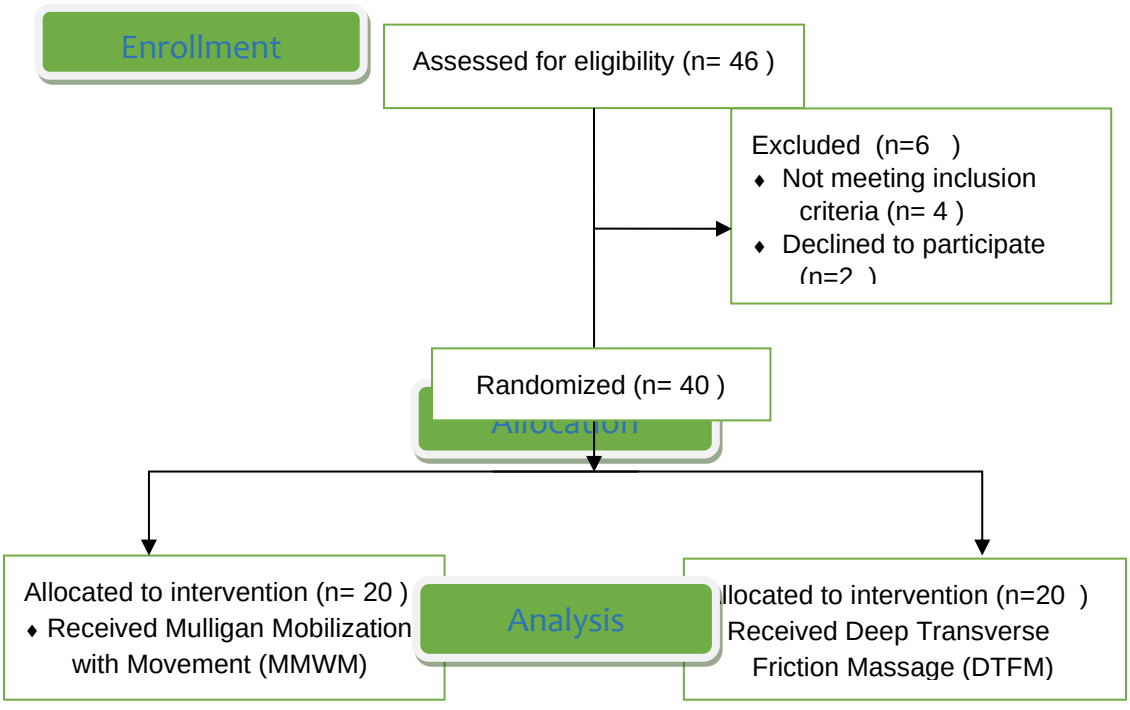
They were allocated to two groups by sequential allocation, the first patient was assigned to the MMWM group, the second patient to the Deep friction massage group, and so on. Prior to treatment, each patient signed an informed consent form.

Ethical approval for the study

This study was approved by the ethical research committee, faculty of physical therapy, Cairo University (No: P.T.REC/012/003997) and was conducted according to the code of ethics of Declaration of Helsinki.

Sample size calculation:

The sample size was calculated as a sensitivity analysis to determine the required effect size (between group differences in mean change) given alpha (0.05), and sample size (n=40, for both groups) and to achieve a power of 80%. This analysis revealed that effect size d of 0.9 is required to achieve the required power at the chosen sample size. Power analysis was done using G*power software (version 3.1.)



Assessment Procedures: Prior to the therapy plan, all cases were examined, and they were then revisited after 4 weeks using:

1) Lateral epicondylities: It diagnosed with pain reproduced over the common extensor origin through palpation over facet of lateral epicondyle of humerus, Cozen's test by resisted wrist extension and Maudsley's test which means resisted middle finger extension.

2) Pain: The pain severity was measured using a visual analog scale (VAS), which ranges from 0 to 10, with 0 denoting no discomfort and 10 denoting extreme agony. The cases were instructed to mark the specific intensity of their discomfort on the 10 cm horizontal line with a dash. [28]

3) Maximum grip strength: hand grip dynamometer was used to assess the grip's strength. Before and after the treatment plan, the dynamometer's pressure was measured. The Hand Dynamometer was used to assess grip strength with participants seated, their elbows at right angles to their sides, their wrists neutral. It is accurate to calculate the mean of three trials of grip strength for the affected hand. [29]

4) Function: Tennis Elbow Evaluation Based on Patient Ratings is the rating of functional difficulties while carrying out specified and routine functional activities, is a valid, reliable, and sensitive outcome measure. The Patient-Rated Forearm Evaluation Questionnaire (PRFEQ), originally known as the PRTEE, was created to assess forearm discomfort and disability in people with lateral epicondylitis, often known as "tennis elbow," although only specified and regular functional activities were looked at for each case. Additionally, on a scale of 100 (0 = no impairment), a total score was calculated [30]. The Sum of the 10 function components is the function score (out of 100). The worst score is 100, while the best score is 0. A skilled physiotherapist conducted the entire evaluation and treatment process. [31]. It encompasses two sections: A. specific (6) and B. usual (4) activity items.

A. Functional Specific Activities

The items of the scale include: Turn a doorknob or key, Lifting a grocery bag, Carry a full coffee cup to your mouth, Open a jar, Pull up pants, Wring out a washcloth or wet towel.

B. Functional Usual Activities

The activities the case engaged in prior to developing an arm issue are referred to as her "usual activities." These routine activities encompass: Personal activities (dressing, washing), Household work (cleaning, maintenance), Work (your job or everyday work), Sporting workouts.

The case is rating the level of difficulty she encountered while carrying out each of the following tasks over the course of the previous week by indicating the difficulty on a scale of 0 to 10. A score of zero (0) indicates that the case had no trouble, while a score of ten (10) indicates that it was so challenging that she was completely unable to proceed with it.

Treatment procedure:

Group A has experienced Mulligan Mobilization with Movement: The case was mobilized on his back with his forearm pronated and elbow extended. The patient being treated was positioned at elbow height by the therapist. The belt was wrapped around the patient's forearm and the shoulder of the therapist just below the elbow joint line. In order to mobilize the proximal forearm, the therapist asked the patient to produce a pain-free fist while utilizing the belt to assist the lateral glide of the pronated forearm. Each workout included three sets of 10 mobilizations with movement, a rest interval of 15-20 seconds between each repetition

Group B has obtained a deep transverse friction massage using the palmar surface of the therapist's thumb at the site of the upper attachment of the common extensor's tendon, which is at the level of the damaged elbow's lateral epicondyle, move transversely across it, forwards and backwards six to eight times. Release and repeat .As the patients

were positioned comfortably in sitting & holding their forearm 45 degrees short of full extension & in nearly full pronation at the elbow joint.

Both group received physical therapy regimen included:
1) Continuous ultrasound therapy for 4 minutes at 1.5 w/cm2 at the site of lesion.

2) Wrist and Elbow Active Range of Motion (AROM) exercises with 10 repetitions were performed during the session and as home program.

Over the course of the 4 weeks of treatment, there were a total of 12 sessions for both groups.

Data Analysis

1-The current study employed mean and standard deviation (SD) for its descriptive statistics.
2-Using two tail-paired t-tests, the pre-and post-treatment values in the same research domain were compared.
3-We compared the disparity between the two research domains using two tail-unpaired t-tests with a 0.05 level of confidence. SPSS software, version 18, was used to analyze all data.

Results

Data Analysis

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Baseline characteristics:

Descriptive analysis of baseline characteristics for the demographic and clinical data of the patients in both groups was presented in table (1). There were no clear differences between both groups (P-value>0.4) (Table1).

Table 1. Baseline characteristics of all patients:

Variable	Group A (Mean ±SD)	Group B (Mean ±SD)	T	p-value	S
Age	35.1 ± 0.32	37.5 ± 0.31	0.67	0.4	NS
Weight (Kg)	69.7±7.22	71.3±7.77	0.52	0.6	NS
Height (Cm)	159.8±4.11	162.8±8.11	0.44	0.6	NS
BMI (Kg/m2)	27.29±4.73	26.90±9.91	0.25	0.8	NS
Pain	7.5±0.5	7.4±0.6	0.4	0.6	NS
Grip strength	29.1±1.7	28.4±2.4	0.7	0.4	NS
Function	49.5±1.58	49.8±1.3	0.4	0.6	NS

NS: non-significant

Within-groups comparisons:

Group (A): There was a remarkable improvement in all outcomes (P-value<0.012 for strength, <0.001 for pain and function). Mean pain values varied from (7.2±0.5) to (2.2±0.7). Mean values of strength of the hand grip after treatment was increased from (29.1±1.7) to (34±1.9). Mean values of functionchanged from (49.5±1.58) to (23±2.7) as highlighted in (Table 2).

Group (B): There was a clear improvement in all outcomes (P-value<0.001). Mean pain values varied from (7.2±0.6) to (2.2±1.1). Mean values of the hand grip after treatment was increased from (28.4±2.4) to (50.2±2.5). Mean values of function changed from (49.8±1.3) to (19.3±2.1) as highlighted in (Table 2).

Table 2 Shows within-group comparisons of pain, grip strength, and function.

Group	Outcome measure	Pre (Mean ±SD)	Post (Mean ±SD)	P value	S
Group A	**Pain**	7.4±0.5	2.2±0.7	<0.001	S
	Grip strength	29.1±1.7	34±1.9	0.012	S
	Function	49.5±1.58	23±2.7	<0.001	S
Group B	**Pain**	7.2±0.6	2.2±1.1	<0.001	S
	Grip strength	28.4±2.4	50±2.5	<0.001	S
	Function	49.8±1.3	19.3±2.1	<0.001	S

Between- Groups comparisons:

There is no noticeable disparity between the post-measures of Group (A) and (B) in pain (P-value=0.76). However, a clear difference was detected between both groups in hand grip strength (P-value<0.001) and function (P-value=0.025) in favor of group B that had more strength and less disability post-treatment, as depicted in (Table 3).

Table 3: Shows a comparison of post-treatment values of pain, grip strength, and function between both groups.

Outcome measure	Group A (Mean ±SD)	Group B (Mean ±SD)	P-value	S
Pain	2.2±1.1	2.2±0.7	0.760	NS
Grip strength	34±1.9	50.2±2.5	<0.001	S
Function	23±2.7	19.3±2.1	0.025	S

Discussion

Lateral epicondylitis is caused by repeated strain damage and causes pain on the lateral portion of the elbow, particularly when gripping.

Laurianne M Loew et al,(2014) studies that there were no sufficient evidence to detect the effects of (DTFM) on pain, functional status and grip strength improvement for patients with lateral elbow tendinitis or knee tendinitis [32].

In this work, the effect of MMWM and deep friction massage on pain relief, grip strength, and functional performance in individuals with lateral epicondylitis had been examined and when the data from both groups were analyzed separately, the findings revealed that there had been considerable improvements in pain relief, handgrip strength, and functional restriction. The effect of MMWM and deep friction massage are the same for pain relief but deep friction massage (Group B) is more effective in improving hand grip strength and functional performance for patients with lateral epicondylitis.

Gobal et al, (2018) studied the additive effect of deep transverse friction massage in patients with lateral epicondylitis, agreed with our study in which they found that DTFM along with ultrasound and exercises produced a statistically significant decline in the pain intensity and improvement in function, grip strength [33].

Furthermore, Stasinopoulos and Johnson (2004) reported a typical clinical observation: intense friction massage provides instant pain alleviation. DTFM and US break down the strong cross-links or adhesions that have formed, softening the scar tissue and mobilizing the cross-links between the collagen fibers and surrounding tissues. As, the micro-massage effect of ultrasonic treatment helps relax stiff soft tissues [34].

Reliving pain after DTF may be due to modulation of the nociceptive impulses at the level of the spinal cord, the "Gate control theory" The centripetal projection into the dorsal horn of the spinal cord from the nociceptive receptor system is inhibited by the concurrent activity of the mechanoreceptors located in the same tissues [35].

On another level, there was a clear disparity in the improvement of hand grip strength and functional performance for those who received MMWM versus those who received deep friction massage. This could be related to over tightening of the wrist extensor muscles, which is a key pathogenic component in lateral epicondylitis. Mean while, a significant improvement in hand grip strength and functional performance was more in the second research domain that got deep friction massage using the previously indicated technique.

The results confirmed Saher Hassan's (2016) comparison of the effects of deep friction massage and wrist extensor muscle stretching in the management of tennis elbow patients, which found that deep friction massage and ultrasonic therapy are effective physical therapy treatment methods for pain relief and improved muscle function [36].

Karthika Prasad (2019) examined immediate MMWM and myofascial release and discovered a notable influence on pain, grip strength, and functional performance in individuals with lateral epicondylitis when analyzed independently. In contrast, when a between-groups comparison was performed, the MMWM produced less benefits in grip strength and functional limits [37].

Kochar and Dogra (2002), concluded that MMWM group demonstrated a 97% improvement in VAS when compared with the US and the exercise group [38]. Furthermore, the results are also consistent with those of Miller (2000), who also found that the MMWM is effective in relieving pain in patient with lateral epicondylities [39].

Kumaran et al,.(2013) showed that MMWM produces hypoalgesic effects during and following the application, as well as sympatho excitatory effects. Similarly the present study has given significant results due to the previously mentioned mechanism with which Mulligan mobilization works [40].

The present study has given significant improvement in pain and grip strength using MMWM agreed with Geetu M, Deepak G (2008), showed that tracking of the radius over the capitulum was restored through MMWM technique which mean pain-free grip strength [41].

In a nutshell, the current study's consequences are consistent with prior research, which concluded that physical therapy treatment methods such as deep friction massage treatment plans are beneficial in reducing pain and improving function in the management of tennis elbow.

Conclusion: This study concluded that MMWM is less effective than deep friction massage in the treatment of disability and grip weakness in people with lateral epicondylitis. However, both treatments were similar in treating the pain that was associated with this problem.

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