

COMPARISON OF EFFECTIVENESS OF ULTRASOUND THERAPY AND MULLIGAN'S MOVEMENT WITH MOBILIZATION VERSUS CYRIAX'S DEEP TRANSVERSE FRICTION IN THE MANAGEMENT OF LATERAL EPICONDYLITIS: A TRUE EXPERIMENTAL STUDY

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Abstract

Objectives: Comparison of Effectiveness of Ultrasound Therapy and Mulligan's Movement with Mobilization versus Cyriax's Deep Transverse Friction in the Management of Lateral Epicondylitis. **Design:** A true experimental study, in Physiotherapy and rehabilitation centre. **Subjects:** This study was carried out with 30 patients of age between 30-60 years who are positive for Cozen's test. **Intervention:** Experimental Group A (N=15 received Ultrasound Therapy with Mulligan Movement with Mobilization and Control Group B (N=15 received Cyriax Deep Transverse Friction. All patients received treatment for a period of three weeks. **Outcomes:** Pain, Grip strength and Functional ability was evaluated using Visual Analogue Scale, Patient Rated Tennis Elbow Evaluation Questionnaire and Sphygmomanometer in patients with lateral epicondylitis which were recorded at the base line and at the end of third week. **Results:** Both the Mulligan's Movement with Mobilization along with Ultrasound Therapy and Cyriax's Deep Transverse Friction were found to be significantly effective in the Management of Lateral Epicondylitis. Mulligan's Movement with Mobilization along with Ultrasound Therapy resulted in greater improvement in comparison to those who received Cyriax's Deep Transverse Friction. **Conclusion:** The result of this experimental study demonstrates that the Ultrasound Therapy along with the Mulligan movement with mobilization is an effective treatment program for Lateral epicondylitis patients in reducing pain and improving functional activity and grip strength.

Keywords: Lateral epicondylitis, Ultrasound Therapy, Mulligan movement with mobilization, Cyriax's Deep Transverse Friction.

INTRODUCTION

Lateral Epicondylitis is a lesion affecting the common tendinous origin of the wrist extensors. It was first differentiated from writer's cramp by Runge in 1873 and Winckworth (1883) are responsible for coining the term TENNIS ELBOW. It is a common complaint among sports people and manual workers often experienced by but not exclusive to tennis players during back hand stroke. The most common description of the primary pathological process refers to degeneration (tendinosis) of the extensor carpi radialis brevis tendon (ECRB) usually within 1-2cms of its attachment to the lateral epicondyle of the humerus which results in Lateral Epicondylitis. Being primarily a mechanical type of overuse injury, pain associated with and aggravated by movement particularly of the wrist and decreasing in grip strength. The annual incidence of tennis elbow in general practice is 4-7 cases per 1,000 patients, with a peak in patients 35-54 years of age. Location of the pain -Lateral Epicondyle 75% and lateral muscle mass musculotendinous junction of common extensor just proximal to radial head 17%. Studies have shown that Extensor carpi radialis brevis (ECRB) is active during all grasp and release activities of the hand, except those performed in supination. Extensor carpi radialis longus (ECRL) shows increased activity when there is a radial deviation or when forceful finger flexion motions are performed. The ongoing activity of ECRB makes it vulnerable of overuse and is more likely than the quieter ECRL to be inflamed in lateral epicondylitis.

Cyriax deep transverse friction is performed only at the exact site of the lesion, with the depth of friction tolerable to the patient. It must be applied transversely to the specific tissue involved, unlike superficial massage given in the longitudinal direction parallel to the vessels, which enhances circulation and return of fluids. It is applied for 10 minutes, after the numbing effect has been achieved at a minimum interval of 48 hours. Contra indications are Active infections, Bursitis, Disorders of nerve structures or active rheumatoid arthritis, fragile skin or the patient is having anticoagulant treatment. Ultrasound therapy refers to mechanical vibrations which are essentially the same as sound waves but of higher frequency. The therapeutic frequency used for physiotherapy is of 0.5 – 5 Megahertz. Its effect of resolution of inflammation and proliferation, it repairs and reduces the inflamed tissue in lateral epicondylitis. Thereby it helps reducing the pain and improving the patient ability. Mulligan movements with the mobilization technique concept is related to minor positional faults that occur secondary to injury and that lead to maltracking of the joint, resulting in symptoms such as pain, stiffness, or weakness.

It corrects this by repositioning the joint, causing it to track normally. Mulligan's explains that Movement with mobilization with passive overpressure is the key to success. Movement with mobilization are all biomechanically based and when the correct Movement with mobilization is repeated several times the joint's option to stay on track seems to return. Movement with mobilization address the problems of movement pain and restriction and when treated they are painless

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Aim

The purpose of the study was to compare the effectiveness of Ultrasound Therapy along with the Mulligan's Movement with Mobilization versus Cyriax's Deep Transverse Friction in the Management of Lateral epicondylitis.

MATERIALS AND METHODS

A True Experimental study with Simple Random Sampling Technique was conducted between January 2020 and February 2020 in an outpatient department, Physiotherapy and Rehabilitation Center, National Guard Hospital, Al ahsa, Saudi Arabia. Participants were referred from Physiotherapy department and also volunteers for the research. Participants were included if they were between 30 to 60 years of age, both male and female genders, Sample Size: 15 patients in each group. 30 patients with lateral epicondylitis were selected after orthopaedic physiotherapy evaluation. Materials used: Ultrasound therapy, Mulligan Belt, Couch.

Inclusion criteria

- Patient's between 30-60 years of age.
- Patients who are positive for Cozen's test.
- Pain over the lateral side of the elbow that was provoked by palpation of the lateral epicondyle region and gripping tasks.
- Pain had to be experienced over the lateral epicondyle during at least one of the following: resisted static contraction of the wrist extensors or ECRB muscle or stretching of the forearm extensor muscles.

Exclusion criteria

- Cervical spine or upper limb problems (referred pain).
- Neurological impairments.
- Cardiovascular diseases.
- Neuromuscular diseases.
- Osteoporosis.
- Recent steroid infiltration.
- Active infection.
- Rheumatoid arthritis.
- Ossification and Calcification of the soft tissues.
- Acute lateral epicondylitis.
- Malignancies.
- Haemophilia.
- Aversion to manual contact.
- Previous therapy for the elbow joint.

TREATMENT

Ultrasound therapy

Explain the treatment procedure to the patient about the effect and duration of the treatment session, co-operation to be given by the patients should be explained. In sitting position with elbow flexed to 90 degree and supported in a pillow. Therapist sits at the front of the patient. Parameters are 0.8 W/cm² intensity, 10 minutes duration, once daily session, 3 MHz frequency, Continuous mode.

Mulligan movement with mobilization (MWM)

The patient is lying on his back with his arm on the plinth and forearm supinated. Wrap the Mulligan's belt around the

therapist waist and patient's forearm so that the proximal edge is in level with the elbow joint. The therapist stabilizes the lower end of patient's humerus with one hand and support the forearm with the other. The stabilizing hand and forearm lie within the belt and elbow should rest in the flexor crease of the hip.

Technique: Now glide the ulna laterally with the belt by moving the waist gently upwards little force is used. Provided there is no pain the patient then actively bends or extends his elbow while maintaining the mobilization. When MMWM has been repeated 10 times he should then be able to clench the fist with less discomfort without the concurrent mobilization. Treatment Dosage is 3 sets of 10 glides are applied for a day on thrice a week basis.

Cyriax Deep Transverse Friction

Patient sits comfortably with the elbow fully supinated and in 90 degree of flexion.

Technique: Locate the anterolateral aspect of the lateral epicondyle, where the ECRB originates and identify the area of tenderness. Apply DTF with the side of the thumb tip applying the pressure in a posterior direction on the teno-osseous junction. Maintain this pressure while imparting DTF in a direction towards your fingers, which should be positioned on the other side of the elbow for counter pressure. DTF is applied for 10 minutes.

Outcome measures: Outcome measures used in this study is Visual Analogue Scale, Patient Rated Tennis Elbow Evaluation Questionnaire and Sphygmomanometer for the measurement of pain, disability and grip strength of patients with lateral epicondylitis

Data Analysis

Data analysis was performed with SPSS version 16.0. Statistical analysis including mean and standard deviation was calculated for all measurement. The mean differences with standard deviation for outcome measures of Visual Analogue Scale, Patient Rated Tennis Elbow Evaluation Questionnaire and Sphygmomanometer was calculated by pre and post assessment of the therapy (Before starting therapy (pre-test) and after finishing the 3 weeks treatment sessions (post-test) for both group A & B).

RESULTS

In Group A: The subjects underwent Ultrasound therapy and Mulligan's Movement with Mobilization statistical analysis with paired 't' test reveals a significant reduction in pain, improving functional ability and Grip strength.

In Group B: The subjects underwent Cyriax's Deep Transverse Friction with statistical analysis with paired 't' test reveals a significant reduction in pain, and improving functional ability.

Two sample's 't' test is used to compare Group A and Group B, it showed there is a significant difference between Group A and Group B at $P < 0.05$ in terms of functional ability and grip strength, but there is no significant difference between the Groups in terms of pain.

Table 1. Mean value of visual analogue scale

Analysis of pain relief was done by subjective VAS by statistical mean. Mean and standard deviation of pain.

Results	Visual Analogue Scale	
	Pre-test	Post-test
Mean value Group A	7.7(1.54)	5.7(1.16)
Mean value Group B	7.6(1.55)	5.7(1.59)

Table 2. Mean value of patient rated tennis elbow evaluation questionnaire

Analysis of functional ability was done by subjective PRTEEQ by statistical mean. Mean and standard deviation of functional ability.

Results	Prteeq	
	Pre-test	Post-test
Mean value Group A	59.17(7.32)	20.97(6.91)
Mean value Group B	59.13(9.24)	38.2(8.70)

Table 3. Mean value of grip strength using sphygmomanometer

Analysis of Grip strength was done by subjective Sphygmomanometer by statistical mean. Mean and standard deviation of Grip strength.

Results	Grip strength	
	Pre-test	Post-test
Mean value Group A	103.33(19.15)	144.67(23.56)
Mean value Group B	100.67(18.31)	121.3(18.07)

DISCUSSION

In our daily activities or any mechanical work, the biomechanical errors can be multifactorial. Distal kinetic change errors can cause the elbow to be the victim in many cases. Most often the poor scapular stabilization and does not generate the proper power from their rotator cuff, so they attempt to compensate by either snapping their wrist. This study proved that Mulligan's movement with mobilisation along with ultrasound therapy was more effective than Cyriax's Deep Transverse Friction in reducing pain, functional ability and Grip strength. In Group A patients were given Ultrasound therapy which gives the healing effect of the soft tissue followed by Mulligan's manual technique is given. Due to this the soreness and pain caused by Mulligan's technique will be alleviated by the effect of Ultrasound Therapy. But in case of Group B patients who received Deep Transverse Friction, the technique causes minor lesion in the tissues which is allowed to heal itself without any modalities. This will produce a detrimental effect over the patients.

Limitations

- Doesn't consider the duration of the condition.
- It does not select the subjects based on the occupational causes.
- The home advice is not detailed.

Suggestions

- New techniques can be studied for lateral epicondylitis.

- Can be done with large populations.
- Disability scale should be appropriate for the Saudi populations.

Conclusion

- Since the mean of VAS is less in case of Ultrasound therapy and Mulligan's Mobilization with Movement compared to Cyriax Physiotherapy and mean score of Grip strength is high in case of Mulligan's Mobilization with Movement as compared to Cyriax Physiotherapy.
- Thus it can be concluded that the Mulligan's Movement with Mobilization along with Ultrasound therapy is an effective treatment program for Lateral epicondylitis patients in reducing pain and improving functional activity and grip strength.

Conflicts of Interests: The authors declare that there is no conflict of interests.

Ethics: Approval will be obtained from King Abdullah International Medical Research Center (KAIMRC) IRB Committee, which is the authorized department to allow conducting research in MNGHA. The article was financed by self-funding. Ethical approval was given by the Physiotherapy and Rehabilitation Center, National Guard hospital, Alahsa. Each participant was given an information sheet and signed an informed consent form

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