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The Effectiveness of Movement with Mobilization in Management of Tennis Elbow

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Abstract: ***Background and purpose: Tennis elbow is the inflammation of lateral epicondyle which causes pain, reduced grip strength and in turn affects the daily activities of the subjects. Many studies have been done to evaluate the effectiveness of traditional treatment on lateral epicondylitis. But very few studies identify the relative benefit of each treatment approaches on outcome measures and on comparing their effects. The purpose of the study is to find out the effectiveness of movement with mobilization in the management of lateral epicondylitis. Subjects: 06 subjects with Symptomatic Lateral Epicondylitis were included. Method: Group A (n=3): Grip strength of patients was assessed by using hand held dynamometer and pain assessment was done using VAS scale. Patients received pulsed Ultrasound therapy with a frequency of 1.2W/cm^2 for 5min given at the teno-periosteal junction of ECRB followed by mulligan mobilization. Group B (n=3): Grip strength of patients was assessed using hand held dynamometer and pain assessment was done using VAS scale. Patients received ultrasonic therapy with a frequency of 1.2W/cm^2 for 5min given at the teno-periosteal junction of ECRB followed by cryotherapy and exercises. In addition, both the groups received a graduated exercise therapy regimen including stretching exercises and progressive resisted exercises (PRE's). 10 treatment sessions are given. Each session lasts for approximately 30minutes. Result: Patients showed statistically significant reduction of pain and improvement in grip strength in Group A. Conclusion: The study found that the group which received mulligan mobilization showed a significant improvement in grip strength and pain relief in short span of time when compared to the other group to which physiotherapy modalities like ultrasound therapy, cryotherapy and exercises were given.***

Keywords: Lateral Epicondylitis, Mulligan Mobilization, PRE's, Hand held dynamometer, VAS, Grip strength

1. Introduction

"TENNIS ELBOW" or "LATERAL EPICONDYLITITS" is a term widely used to describe an overuse injury that is characterised by pain and tenderness over the lateral epicondyle of elbow. Tennis elbow is degeneration or inflammation of the Extensor Carpi Radialis Brevis (ECRB) tendon attached to the lateral epicondyle of the elbow. It is also known as Lateral Epicondylitis or Pitcher's Elbow or Little league elbow or Lateral humeral epicondylalgia or Tennis elbow. The common muscle involved is Extensor Carpi Radialis Brevis. Less frequently Extensor Carpi Radialis Longus is affected in its attachment to the supracondylar ridge or sometimes the anterior portion of Extensor Digitorum Communis.

The onset of lateral epicondylitis is gradual or sudden. This is most commonly an idiopathic or a work-related condition. There is no much difference in incidence between men and women or any association between the dominant arm. Numerous intrinsic and extrinsic factors lead to lateral epicondylitis.

Boyer and Hastings suggested that most of the cases diagnosed as tennis elbow is the result of a work-related "Repetitive Strain Injury".

Putman and Cohen reported that the activities in which the load is greater than that which can be withstood by the muscle origin either from an individual load or more commonly over a period of time are responsible for causing lateral epicondylitis and that these injuries can occur either from concentric or eccentric contractions.

Caldwell and Safran found that stroke mechanics of backhand in tennis is one of the other causes which contribute in the development of tennis elbow. In the backhand, the wrist is maintained in extension and radial deviation with the highest electromyographic activity noted in ECRB during the acceleration and follow through phases. The main causes of lateral epicondylitis are believed to be the result of microtrauma, the overuse generated by the impact between racquet and ball and vibrations that are transferred to the arm. When the racquet hits the ball, the wrist muscles are contracted to stabilise the wrist and hold the racquet. Repetitive concentric contraction of these muscles shortens as they maintain tension to stabilize the wrist produces chronic overload.

The incidence of lateral epicondylitis is also elevated with the use of increased racquet weight and string tension, wet ball, size of grip, which may lead to great force being impacted on wrist extensors. Flexibility deficiencies in the forearm extensor muscle or inadequate forearm extensor power and endurance to withstand normal forceful repetitive movements placed against forearm flexors is also one of the causes of lateral epicondylitis, Entrapment neuropathy of radial nerve, Radio humeral bursitis, periostitis of the common extensor tendon, Myofascitis calcification, hyperemic synovial fringe, inflammation of annular ligament, anconeus compartment syndrome and cervical radiculopathy. Repetitive strain over lateral aspect of the elbow due to repeated extension and supination at wrist joint. A faulty grip can also lead to this condition. Also due to inadequate forearm extensor power and endurance to withstand normal forceful repetitive movements placed against the forearm flexors.

The possibility of an inflammatory cause in majority of patient's histology reveals a degenerative process within ECRB tendon and the histological appearances remarkably similar to tendinopathy at other sites. Characteristically, the

abnormal region of tendon is gray compared with the surrounding normal tendon and may be slightly edematous. It is also frequently friable and may contain small flecks of calcification.

Histology is consistent with disordered healing superimposed on a degenerative process, lacking the classical features of acute inflammation. A granulation type of tissue containing fibroblasts is visualized and is referred to as "Angioblastic hyperplasia". Adjacent to this abnormal tissue, the neighbouring tendon is hyper cellular containing histiocytes, lymphocytes and occasional polymorph nuclear leukocytes interspersed with small areas of localised degeneration. The most common situation in which tennis elbow develops is following unaccustomed strenuous activity involving arm and hand. This could be activity such as using screw driver to place a few dozen screws or scrubbing a floor vigorously. It also commonly develops in people who are increasing their level of activity in work or recreation that requires wrist extension or firm grip.

It is quite common in people who use computer a lot, using vibrating equipment such as strimmers, repeated use of scissors or shears, regular gardening, manual work that involves repetitive twisting and lifting of the wrist and playing musical instrument.

The signs and symptoms are gradual onset of aching type of pain in the region of the lateral epicondyle and in the proximal muscles of the forearm. The pain is often related to the flexion and extension of the wrist and to pronation and supination activities. Pain is usually aggravated by any forceful gripping and lifting with the hand in certain positions (palm down). The pain may also radiate proximal and distal to elbow joint.
Physical examination will confirm:

a) Tenderness over the common extensor origin often localised to the ECRB. The area of maximal discomfort is located up to 5mm distal and anterior to the lateral epicondyle. Pain may increase with the resisted wrist or finger extension particularly with the forearm in pronation.
b) The Grip becomes weak due to voluntary diminution of effort to avoid undue pain and wasting of the affected muscles.
c) On examination, Cozen's test, Maudsley's test and Mill's test are positive.

Oblique radiographs occasionally demonstrate calcification in the region of lateral epicondyle. Traditional treatment program for people with lateral epicondylitis have focused primarily on the pain control by Ultrasound, anti-inflammatory medication, iontophoresis or phonophoresis followed by rehabilitation program which ranges from flexibility to strengthening and endurance training. Numerous treatments have been tried for lateral epicondylitis including drug therapies, corticosteroid injection, electrical stimulation, laser, acupuncture, counterforce bracing, ergonomics, splintage etc.

However, no one treatment has been found to be universally efficacious. Surgical treatment is needed in 5-10% who did not respond after many months to conservative treatment. Mulligan has proposed the use of movement of mobilization (MWM) for lateral epicondylitis.

Brain Mulligan introduced the concept of MWM. MWM's are based on the principles of joint mobilisation originated by Kaltenborn.

Mulligan has devised number of guidelines when applying these techniques.

- The patient is positioned in weight bearing position.
- When treating hinge joints, the sustained glide or mobilization should be at right angles to the glide that usually occurs with movement.
- The glide mobilization is always successful in one direction only. The successful glide mobilization is applied 10 times before reassessing.
- Over pressure should be applied at the end range of available active ROM.

Other interventions should be used in conjunction with these techniques.

The purpose of this study is to find out the effectiveness of movement with mobilization in the management of Lateral epicondylitis.

2. Materials and Methods

Study design: Experimental study

Duration of Study: 4weeks

Study Setting: The study is conducted at the Physiotherapy department of J.S.S. Hospital, Mysore.

Tools: Mulligan belt, Ultrasound machine, Hand-held dynamometer, Couch, Ice packs.

Sample size: 6 subjects with symptomatic lateral epicondylitis who volunteered to participate and those fulfilling the inclusion criteria were included in the study. Subjects were then randomly assigned to 2 groups. They are Group A and Group B.

Inclusion Criteria:

1) Subjects between ages 25-60yrs with symptomatic lateral epicondylitis.
2) Both males and females
3) Clinical symptoms should be 1-3months old
4) A positive Cozen's test or Mills test reinforced the presence of lateral epicondylitis.

Exclusion Criteria:

1) History of trauma, surgery, acute infections or any systemic disorders.
2) Steroid injections within last 30 days in elbow joint
3) Cervical joint dysfunction, Radial tunnel syndrome or posterior interosseous nerve syndrome.

Outcome measure: The outcome measure is made by using Visual Analogue Scale for assessing pain and grip strength is measured by Hand held dynamometer

1) A Visual Analogue Scale (VAS)

2) Grip Strength is measured using Hand held dynamometer.

3. Methodology

Group A (n=3): Grip strength of patients was assessed by using hand held dynamometer and pain assessment was done using VAS scale. Patients received pulsed Ultrasound therapy with a frequency of 1.2W/cm^2 for 5min given at the teno-periosteal junction of ECRB followed by mulligan mobilization.

Mulligan mobilization is given with the patient lying in supine position having their elbow extended and forearm pronated. The mulligan belt is put around the therapist's waist and a lateral glide is given to the proximal part of the patient's elbow joint.

During the lateral glide, the patient is asked to perform the pain producing movement such as gripping or resisted wrist extension. If the glide is applied correctly then the patient will not feel any pain. The dosages are 10MWM in one set, 3sets per session were given and a total of 10 sessions were given. After treatment, grip strength and pain score is noted.

Group B (n=3): Grip strength of patients was assessed using hand held dynamometer and pain assessment was done using VAS scale. Patients received ultrasonic therapy with a frequency of 1.2W/cm^2 for 5min given at the teno-periosteal junction of ECRB followed by cryotherapy and exercises.

In addition, both the groups received a graduated exercise therapy regimen including stretching exercises and progressive resisted exercises (PRE's). The stretch was given by palmar flexing the wrist with the other hand of the patient while keeping the forearm pronated and elbow extended. This is held for few seconds and then released. A total of 10 stretches were given per session.

PRE's included isometric contractions with elbow flexed to 900, with the hand of unaffected arm applying manual resistance over the dorsum of the supinated arm of affected side. Pain free isometric contractions of the wrist extensors initiated and held for 5 to 10 seconds. In one session, 15 contractions are given. Progression included forearm pronation as the starting position and increasing resistance.

10 treatment sessions are given. Each session lasts for approximately 30minutes.

4. Results

Group A

Parameters	Day 1		Day 10		't' value	'p' value
	Mean	SS1	Mean	SS2		
VAS	7.33	0.67	3.66	2.67	7.48	p<0.005
GRIP Strength	20	8	29	26	5.92	p<0.005

Group B

Parameters	Day 1		Day 10		't' value	'p' value
	Mean	SS1	Mean	SS2		
VAS	7.3	8.67	3.6	0.67	3.13	p<0.050
GRIP Strength	19	26	21.3	16.7	0.36	p<0.500

The above table shows scores of pain and grip strength Pre and Post treatments. All the values were statistically analysed using independent 't' test.

5. Discussion

The purpose of the study was to know the effectiveness of movement with mobilization for the management of Tennis elbow. This was an experimental study. A total of 6 patients were included in the study and were randomly assigned into 2 groups. The two groups were group A and Group B.

The subjects in Group A received Ultrasound therapy, stretching and strengthening exercises in addition to mulligan mobilization and Group B received Ultrasound therapy, cryotherapy, stretching and strengthening exercises.

The results of the study showed that there was significant reduction of pain and improvement in grip strength in Group A. Group B showed significant reduction of pain however no significant improvement was noted in the grip strength.

The reduction of pain in Group A (P<0.005) subjects may be attributed to mulligan mobilization which is thought to produce sensory input sufficient to recruit and activate descending pain inhibitory systems that result in pain relieving effects. MWM is also known to produce concurrent hypoalgesic effects during and following its application as well as altering the sympathetic nervous system function.

The improvement of grip strength in Group A (P<0.005) may be due to the tensile forces that encourage alignment of collagen and decreases randomised and interlinking collagen formation. More uniform alignment of collagen gives greater strength and extensibility to connective tissue (Threlkeld p 900).

In group B (P<0.050), the reduction of pain may be due to ultrasound therapy and cryotherapy which help in connective tissue repair in stimulating phagocytosis, in prevention of adhesive formations and also induces traumatic hyperemia (CYRIAX PHYSIOTHERAPY).

The advantages of the mulligan mobilization are the potential effectiveness over the short term and the ability for the patient to maintain his or her daily activities without restrictions. In addition, mulligan mobilization might be more cost effective due to reduction in the number of treatments needed. Considering the relatively high prevalence of injury, this cost effectiveness might lead to a major cost reduction for payers.

6. Limitation and Conclusion

1) Sample size was very small
2) The study was done in a small period of time

6.1 Conclusion

The study found that the group which received mulligan mobilization showed a significant improvement in grip

strength and pain relief in short span of time when compared to the other group to which physiotherapy modalities like ultrasound therapy, cryotherapy and exercises were given. In addition to the analysis of the effectiveness of the compared intervention strategies, a cost effectiveness analysis should be incorporated in the trial, because reduced costs are an important advantage of the mobilization treatment.

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