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"COMPARATIVE EFFICACY OF MYOFASCIAL RELEASE TECHNIQUE (MFR) WITH ULTRASOUND VS STRETCHING WITH ULTRASOUND IN CHRONIC TENNIS ELBOW CONDITION"

Physiotherapy

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ABSTRACT

One of the most prevalent lesions of the arm is lateral epicondylitis, often known as tennis elbow or Lateral Elbow Tendinopathy (LET). At the lateral epicondyle of the humerus, there occurs a painful condition called lateral epicondylitis. The extensor carpi radialis brevis tendon is the major site for this extraarticular affection, which is characterised by pain and tenderness near the origin of the forearm's extensor muscles. A Comparative study design. This study included 30 subjects with Lateral Epicondylitis. They were divided into two groups (Group A and Group B). Stretching was administered to Group A and Myofascial Release Technique (MFR) was administered to Group B while using ultrasonography in both groups. The post mean score of PRTEE questionnaire were compared for these two different treatment methods (Myofascial release technique, stretching and Ultrasound) of these independent groups. This study shows that Myofascial release with ultrasound has shown statistically significant improvement in reducing Lateral Epicondylitis when compared to the stretching with Ultrasound.

KEYWORDS

Lateral Epicondylitis, Lateral Epicondylgia, Tennis elbow, PRTEE (Patient – rated tennis elbow evaluation) questionnaire.

INTRODUCTION

Lateral Epicondylitis is an overuse injury of the forearm and the wrist extensor muscle, which cause pain at the lateral elbow. Tennis elbow is hypothesised to be caused by repetitive microtrauma to the extensor carpi radialis brevis (ECRB) muscle, which leads to a primary tendinosis of the ECRB, with or without extensor digitorumcommunis (EDC) involvement. Both genders are affected equally[6]. Tennis players make up only about 5% of all suffers of Lateral Epicondylitis, so the term "tennis elbow" is deceiving. The incidence of Lateral Epicondylitis (LE), also known as tennis elbow, varies from about 1-3% in the general population to more than 50% among untrained tennis players.Equally prevalent in men and women, white people, and the dominant arm, lateral epicondylitis increases with age, peaking between the ages of 30 and 50, with a mean age of 42.

Pathophysiology:

Lateral Epicondylitis refers to a number of distinct conditions affecting the elbow's lateral compartment. Extensor carpi radialis brevis (ECRB), the wrist extensor most frequently afflicted by diseases, is located at or close to its lateral epicondylar origin. The extensor carpi radialis longus, extensor digitorum communis, and (occasionally) the extensor carpi ulnaris are muscles that are less frequently affected.LE's pathogenesis is still poorly understood and controversial. It is acknowledged, however, that the first signs of LE are microscopic and macroscopic tears at the lateral epicondyle in the origins of the ECRB and other extensors. Following this ripping, granulation tissue and fibrosis occur. According to Nirschl, the primary cause is angio-fibroblastic hyperplasia, which is brought on by avascular compromise and consequent microtears in the origin of the ECRB[19].Pain and tenderness are the most common features in Lateral Epicondylitis.The wrist extensors' weakness can be found out by performing muscle strength tests. According to the "Mills' test," full pronation paired with full wrist and finger flexion prohibits full elbow extension or, at the very least, causes resistance at the elbow and pain at the epicondyle. When the forearm is pronated and the elbow is fully extended, "Maudsley's test"[22] induces discomfort at the lateral epicondyle.

MFR is a therapy, a method of treatment, and a tool for rehabilitation. It is a hands-on therapy, which means the therapist puts pressure on and into the client's body using their hands. The therapist looks for tightness, limitations, and adhesions in the tissue barrier of resistance in any plane that might be contributing to pain or dysfunction. MFR methodology depends on one another. The manual application of the procedures, Myofascial rebounding, and Myofascial unwinding are the three components. These three components come together to make a triangle. The hands-on approach is actually used by applying steady, continuous pressure at the tissue resistance barrier for at least five minutes without falling off the skin. Fascia resists because of its viscoelastic properties. Myo and fascia both refer to muscles or bands. A web-like, three-dimensional matrix known as fascia, an embryologic tissue also known as connective tissue, intertwines, surrounds, safeguards, and supports every other structure in the human body. Because it touches every other component in the body, the fascia has been called the biggest system in the human body. "The fascilitation of mechanical, neural and psycho physiological adaptive potential as interfaced by the Myofascial system"[37] is how myofascial therapy is defined. Every structure has fascia, a fluid-filled network that is dynamic, ever-changing, and adaptable.

Ultrasound therapy is an application of mechanical vibration, produced electrically. It is high frequency ultrasonic waves that are effective in treating local painful area of the body part. Ultrasound produces micro massaging effects there by reducing pain.It is a deep penetrating modality capable of producing changes in tissue through age. These above effects of ultrasound therapy help in reducing pain and improve healing.

Stretching is a generic phrase used to describe any treatment technique intended to increase the soft tissue's extensibility, which will increase flexibility and range of motion (ROM) by elongating structures that have gradually become hypomobile due to adaptive shortening. The stretching interventions are designed to improve the extensibility of the contractile and non-contractile components of muscle-tendon units and periarticular structures. By using a stretching technique selectively to particular muscles and joints while allowing a limitation of motion to form in other muscles or joints, selective stretching allows a patient's total function to be enhanced.The methods used to promote soft tissue extensibility are: Static stretching (active or passive), Dynamic stretching (active or ballistic), Pre-contraction stretching (Proprioceptive Neuromuscular Facilitation or Muscle Energy Techniques), Manual or Mechanical / Passive or Assisted.

Aim of the study:

The aim of the study is to comparative efficacy of myofascial release technique (mfr) with ultrasound vs stretching with ultrasound in chronic tennis elbow condition.

METHODOLOGY:

Prospective study design**.** This study was approved by ethical committee of Pacific Medical University. During the period of study, ethical issues will be followed with utmost care and due respect towards the maintenance of privacy of the patients. Each patient will be given detailed explanation about both beneficial and potential harmful effects (if any) of the treatment which he/she supposed to receive. The participants will be explained about the purpose of the trail. The request for termination of the treatment by the patient at any time of the study shall never be denied. Simple Random method. 30 subjects. Materials used:Informed consent, pen, paper, stop watch, assessment form, PRTEE (Patient – Rated Tennis Elbow Evaluation) questionnaire

Inclusion criteria:

Lateral Elbow pain for more than 2 months; Age group (> 40 years), both male and female patients; Will consider only chronic tennis elbow conditions; Intent to take part in the study.Exclusion criteria: Subjects who has past history of elbow injuries (RTA, Radius and Ulna bone fractures); Any open wounds on the Elbow joint; Malignancy; Recent surgery of the Elbow joint; Any deformity in elbow or upper limb; Dislocation of elbow joint Parameters: Pain, physical function will be assessed in PRTEE (Patient-Rated Tennis Elbow Evaluation) Questionnaire.

Procedure:

30 subjects had chronic tennis elbow based on their medical history and examination findings. (Lateral Epicondylitis) were participated in the study. Informed consent form was taken from the patients. Before start of the treatment the patient was positioned comfortably and assessed thoroughly about his or her condition, shown in the proforma. The special test done for conforming Lateral Epicondylitis are Cozen's test, Mill's test and Mauldey's test. On the basis of inclusion criteria and exclusion criteria. All the subjects were explained about the purpose and the test procedures involved in the study before their enrolment in the study. Demographic data and details of patients were taken before the tests and written consent was obtained. Patient – Rated Tennis Elbow Evaluation (PRTEE) questionnaire is given to participants which is a self-administered and assesses three components: Pain, Swelling, Physical Function. 30 were divided in groups i.e 15 in each group. Group A received stretching with ultrasound and group B received myofascial release with ultrasound.

Intervention

Myofascial release technique procedure:

With one hand on the patient, the procedure is started. Applying sufficient pressure will take up the skin's slack. The supporting surface should receive the pressure. The system becomes more fluid as a result of the therapist's touch, which raises body warmth and tissue energy levels. The individuals were supine, with the affected side shoulder internally rotated, the elbow flexed to around 15 degrees, palm flat on table, and pronation. The therapist faces the ipsilateral hand while standing at the side of the table near the shoulder. Step 1: On the humerus, close to the lateral epicondyle, the common extensor tendon (CET) and extensor retinaculum (ER) of the wrist were treated. periosteum with the fingertips, carrying this touch inferior to the common extensor tendon before descending to the extensor retinaculum of the wrist (5 minutes, 2 repetitions). During this technique, the patient slowly flexes and extends their elbow between 5° and 10°.Treatment step two involves working over the ulna's periosteum with the hand's knuckles for five minutes, twice. The patients then alternated wrist deviations in the ulnar and radial directions. Step 2: Spreading the radius from the ulna, contact the head of the ulna with the pads of one hand's finger and the dorsal tubercle of the radius with the pads of the other hand. The therapist applied a line of stress in a lateral and distal direction, engaging through to the periosteum. With a firm intention to spread the bones, it is carried for only a few centimetres (5 minutes, 2 repetitions).dosage of three 30-minute sessions every week for four weeks.

Ultrasound Treatment:

Before the procedure began, the patient was informed of what to expect in terms of sensation. During the operation, the patient can feel a slight warmth. The foundation of the modality's treatment is the comfort of the patient. Patient position: The patient is seated in a chair with their forearms pronated and their elbows flexed. A pillow is on their lap. The position of the therapist is to sit in front of the patient. Technique: Time and intensity should be "0" (zero) before turning on the main power. All of the parameters were chosen, and the ultrasound machine was turned on. The transducer head is then covered with the coupling medium, and the machine is turned on. The region to be treated is covered with a thin layer of a water-soluble gel, and the ultrasound transducer head is placed in contact with the gel. The common extensor origin of the forearm was the area where the transducer head was moved in a circular motion. Frequency: 1MHz; Intensity: 1 W/cm^2 Mode : Continuous; Treatment time : 5 minutes; Duration time: 6 weeks (3 times per week).

Stretching:

Stretching exercise for wrist extensor stretch and thumb stretch were given to patients of group A. Time of treatment: 15 to 30 seconds; Repetitions: 5 times, twice daily. Patient positionThe individuals were supine, with the affected side shoulder internally rotated, elbows flexed to around 15°, and palms flat on the table. The therapist faces the ipsilateral hand while standing at the side of the table near the shoulder. Technique for stretching: Slowly extend the extremities' range of motion until tissue constriction is reached. Take hold of the proximal and distal joints where the motion will take place.Move the distal segment while firmly stabilising the proximal segments. Apply a low-intensity stretch slowly and continuously. The line of pull of the muscle whose range of motion is restricted is immediately opposed to the direction of the stretching motion. To relieve muscle tension, keep the extended position for the necessary amount of time.Procedure 1:(wrist extensor stretch); Hand placement and stabilization. Stabilize the forearm aganist the table and grasp the dorsal aspect of patient's hand. Then flex thepatient's wrist and allow the fingers to extend passively. Extend the patients elbow to futher elongate the wrist extensors. Procedure 2: (thumb stretch)Placement and support of the hands. Use your thumb and index finger to hold the trapezium steady. Grab the first metacarpal once again between your thumb and index finger. Move the thumb in flexion and adduction to extend the thumb extensors.

Statistical Analysis:

In this study, PAIRED T-TEST was used to analyse the improvements of the treatment within the groups. UNPAIRED T-TEST was used to compare both the groups. Paired t – test: The paired t-test is performed when the samples typically consist of matched pairs of similar units, or when there are cases of repeated measures. The below mentioned formula is used for undertaking paired t – test: Further, we have considered right tailed paired t test with level of significance i.e., $p \leq = 0.05$. Using the aforementioned formula, the statistical analysis of measurement of subscale of PRTEE questionnaire is performed and thereafter, statistical analysis of PRTEE score on totality is undertaken.

RESULTS:

30 individuals with lateral epicondylitis had participated in the study (group -A 15 members were given stretching with ultrasound and group -B 15 members were given MFR with ultrasound). The pre-test and post-test values are taken based on the pain rated tennis elbow evaluation scale. There is a variable difference in group-A and group -B while the standard deviation 2.469 and 3.441 respectively. The mean difference is also compared between the both groups. There is a significant difference noted in the mean value as 52.33 in group A and 46.33 in group B. From the above data, Group-B showed lower mean compared to Group-A at the end of treatment phase. The results show that MFR with ultrasound given in group B is more effective than the stretching with ultrasound given in group A.

DISCUSSION

The present study was intended to investigate the effectiveness of Myofascial release technique with Ultrasound and stretching with ultrasound in patients with Tennis Elbow. The study was detailed and tailored to find whether the treatment of Myofascial release technique or stretching in combination with ultrasound has shown beneficial effects in the field of Rehabilitation. Lateral Epicondylitis is an overuse injury of the forearm and the wrist extensor muscle, which cause pain at the lateral elbow. Tennis elbow is thought to result from overuse of the extensor carpi radialis brevis (ECRB) muscle by repetitive microtrauma resulting in a primary tendinosis of the ECRB, with or without involvement of the extensor digitorumcommunis (EDC). Both genders are affected equally[6]. In LE, there is painusually in the dominant arm, around the distal lateral humerus. The pain is usually sharp, is intermittent, and radiates down the extensor surface of the forearm as far as the wrist. Its onset is gradual though acute pain can recur after exacerbating activities that involve excess pronation of the forearm with the elbow in extended position.To rule out this potential diagnosis, there should be tenderness over the lateral epicondyle and trigger points that are diagnostic of fibromyalgia should not be present. Range of motion of the elbow is usually painless, though some pain could occur with complete extension, especially if the forearm is pronated[21].

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Myofascial treatment is known as “the fascilitation of mechanical, neural and psycho physiological adaptive potential as interfaced by the Myofascial system”[37]. Since it has 10 times more sensory nerve receptors than its muscle equivalent, it has been advertised as a mechanosensitive signalling system with an integrated function similar to that of the neurological system (vanderWal 2009). Fascia is a fluid-filled, dynamic network that surrounds and surrounds each structure in the human body.Myofascial therapy can be defined as “the facilitation of mechanical, neural and psycho physiological adaptive potential as interfaced by the myofascial system”. One hand is placed on the patient to start the procedure; enough pressure should be used to take up the skin's laxity.The pressure should be directed towards the supporting surface. The skin underlying the tissues should be felt like soft cushion. The body's connective tissue responds to pressure, traction (stretch) and the friction they generate.

Therapist's touch increases body temperature and the energy level of the tissue, creating a greater degree of fluidity to the system. MFR is the term for the administration a stretch with a modest load and a long duration to the myofascial complex with the goals of restoring ideal length, reducing pain, and enhancing function. Myofascial practitioners believe that by restoring the length and health of restricted connective tissue, pressure can be relieved on pain sensitive structures such as nerves and blood vessels. MFR generally used are either by direct technique MFR or indirect technique MFR. The rationale for these techniques can be traced to various studies that investigated plastic, viscoelastic, and piezoelectric properties of connective tissue. In this study direct technique MFR detailed by Stanborough was used through fingertips and knuckles in CLE subjects. Therefore, our purpose was to find the effectiveness of MFR Technique on pain, functional performance and grip strength in CLE subjects. So the result of this study could be implicated in clinical practice. We hypothesized that MFR would be effective in CLE subject**.**

Ultrasound is a form of mechanical vibration at increasing frequencies is known as sound energy. The normal human sound range is from 16Hz- 20,000Hz (in children and young adults). Beyond this upper limit, the mechanical vibration is known as Ultrasound. Typically, frequencies utilised in therapy range from 1.0 to 3.0MHz (1MHz = 1,000,000 cycles per second). Longitudinal waves, like sound waves, have zones of compression and rarefaction. Since its introduction as a therapeutic tool in physiotherapy, ultrasound (US) has been widely used to treat a variety of injuries and musculoskeletal conditions. The technique focuses on modifying the extensibility of the collagenous tissues to increase range of motion.The dense collagenous tissues will be heated most effectively by US when it is operating in thermal mode; this result will necessitate a relatively high intensity, ideally in continuous mode. A combination of CAVITATION and ACOUSTIC STREAMING is now predominantly blamed for the non-thermal effects of US (terHaar 1999, 2008 Baker et al 2001, Williams 1987). Despite seeming somewhat attractive, there doesn't seem to be any evidence to back up the idea of MICROMASSAGE. US stimulates mast cells, platelets, white blood cells with phagocytic functions, and macrophages during the inflammatory phase. For example, the application of ultrasound induces the degranulation of mast cells, causing the release of arachidonic acid which itself is a precursor for the synthesis of prostaglandins and leukotreine – which act as inflammatory mediators. The stretching interventions are designed to improve the extensibility of the contractile and noncontractile components of muscle-tendon units and periarticular structures. By using a stretching technique selectively to particular muscles and joints while allowing a limitation of motion to form in other muscles or joints, selective stretching allows a patient's total function to be enhanced.By activating extrafusal muscle fibres through spinal cord's alpha motor neurons when a stretch force is applied to a muscle-tendon unit, the primary and secondary afferents of intrafusal muscle fibres detect length changes, triggering the stretch reflex and increasing (facilitating) tension in the muscle being stretched. The efficiency of the stretching method is believed to be compromised by the increased stress, which creates resistance to lengthening. When soft tissue is stretched, elastic, viscoelastic, or plastic alterations happen. Both contractile and noncontractile tissues have elastic and plastic properties, but only noncontractile connective tissues—not the contractile parts of muscle—have viscoelastic characteristics.

The positioning of collagen and elastin fibres as well as their structural orientation determine the mechanical behaviour of certain noncontractile tissues.High collagen fibres are found in tissues that can tolerate high tensile stresses; higher proteoglycan concentrations are found in tissues that can withstand high compressive loads. When the load changes, the composition alters.The stress-strain curve demonstrates the structures' mechanical strength.

30 were divided in groups ie 15 in each group . Group A received stretching with ultrasound and group B received myofacial release with ultrasound.

Subjects were re-assessed after 6 weeks of treatment protocol using Patient-Rated Tennis Elbow Evaluation as parameter. The pre and post experimental values were statistically analyzed using repeated measures of student's unpaired 't' test. In the present study, we found that there were significant differences between pre and post intervention measures. The results and mean values of the data were significant at p=0.00 which indicates that there is reduction of pain and difficulty in physical function. The results of this study indicate that Myofascial release technique with ultrasound is effective as a Rehabilitation tool(Therapeutic technique) in treating Tennis Elbow.

Limitations:

The same study can be repeated in large number of samples; Treatment time in session may be increased for better functional outcomes; Carrying angle was not considered, decrease in carrying angle may produce undue strain on the tendinous junction that might have interfered the study

Recommendations:

The same study can be repeated as follow up studies,to find out the long term effectiveness of Myofascial release technique with Ultrasound and stretching with ultrasound.The effectiveness of the same combination treatment can be performed for some other elbow problems like Golfer's Elbow.

CONCLUSION:

From this experimental study it is concluded that Myofascial release technique (MFR) with ultrasound is more effective than Stretching with Ultrasound in treating chronic Tennis Elbow condition.The study was carried out to analyze the improvement in patients with tennis elbow by the use of Myofascial release technique and Ultrasound. 30 patients with tennis elbow were selected for the study. The Group A consists of 15 patients who were received with stretching with ultrasound as a treatment and the Group B consists of 15 patients who were received myofascial release with Ultrasound as a treatment. The measurement for pain was done by PRTEE (Patient – Rated Tennis Elbow Evaluation). All the measures were statistically analyzed.

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