Effectiveness of Manual Mobilization with Movement on Pain and Strength in Adults with Chronic Lateral Epicondylitis

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Abstract: ***Objective: Tennis elbow is an inflammatory condition of the common extensor origin over the lateral epicondyle. This condition does not affect tennis players only. It often follows an injury or sudden contraction of the common extensor origin.There is many treatments and approaches towards Tennis elbow but physiotherapy is the best modern conservative treatment. The aim of this study is to evaluate the effectiveness of movement with mobilization in reducing pain and increasing strength in patients with chronic lateral epicondylitis. Design and setting: A randomized controlled study design was used to examine the differences between conventional physical therapy and physical therapy with manual mobilization approach for study duration of 15 days. Subjects: Twelve subjects of both male and female gender were divided into 2 groups. Experimental group treated with ultrasound therapy, mobilization and progressive resisted exercises. Control group treated with ultrasound therapy and progressive resisted exercises only the results were analyzed. The procedure was done in Physiotherapy Department at Masterskill college of Nursing and health. Outcome Measurement: Two outcome measures were used. NPRS for the measurement of severity of pain and various weighted sand bags (0.25 kg to 2kg) were used to measure the strength. Results: The data shows a significant difference in the post test values of pain and strength between experimental group and control group. Experimental group shows much decrease in pain and increase in strength than the control group. Conclusion: The study concludes that the manual mobilization with movement along with ultrasound therapy and progressive resisted exercises is effective in reducing pain and increasing strength than that of progressive resisted exercise along with ultra sound therapy in adults with chronic lateral epicondylitis.***

Keywords: Epicondylitis, Manual Mobilization, NPRS Scale.

1. Introduction

Tennis elbow is an inflammatory condition of the common extensor origin over the lateral epicondyle. This condition does not affect tennis players only. It often follows an injury or sudden contraction of the common extensor origin[1]. The exact etiology is not known. It may be a partial tear of the fibers of origin of the extensor muscles. Tennis elbow is an inflammation of several structures of elbow these includes muscles, tendons, bursa, periosteum and epicondyle (Medical Dictionary, WHO). It was first described from the writer's cramps by Range in 1873. It was Madris who called it as "Tennis Elbow" shortly thereafter. The Epidemiology of annual incidence in tennis elbow in general practice is 4-7 cases per 1,000 patients with a peak in patients 35-54 years of age. The peak incidence is between 40 and 50 years age.

Tennis elbow is caused by overuse. Probably fewer than 10% of patients with this condition actually acquire it while playing tennis. Many other activities can cause tennis elbow, including job and recreational activities such as gardening, lifting full grocery bags, and participating in various athletics[5,7]. The pain is caused by inflammation and degeneration of the common extensor tendon, one of the tendons in the forearm. Tendon tears may be the cause of chronic forms of tennis elbow[3]. It leads to single (or) multiple tears in the common extensor origin, periosteities, angiofibroblastic proliferation of extensor carpi radialis brevis etc. Inflammation of adventitious bursa between the common extensor origin and radiohumeral joint along with Calcified deposits within the common extensor tendon. Painful annular ligament is due to hypertrophy of synovial fringe between the radial head and the capitulum. Clinical Tests done in diagnostic tools in tennis elbow is through finding out Local tenderness on the outside of the elbow at the common extensor origin with aching pain in the back of the forearm[2]. Painful resisted extension of the wrist with elbow in full extension elicits pain at the lateral elbow[10]. Elbow held in extension, passive wrist flexion and pronation produces pain.

The most important part of treatment is resting the elbow by avoiding repetitive movements that aggravate the tendon strain. Certain elbow braces are commonly used during activities[8]. A tennis elbow strap is a band that wraps around the forearm just below the elbow and is used for the healing stages during activities and as a prevention technique after healing [10]. A wrist brace that prevents wrist extension can be helpful in resting the elbow, as the tendons that extend the wrist are those injured in tennis elbow. Prescription or over-the-counter NSAIDs (non- steroidal anti-inflammatory drugs) are commonly prescribed. These should be taken with food to minimize stomach irritation. Physical therapy is a standard part of treatment for tennis elbow. Improper tennis-stroke mechanics often contribute to injury in tennis players, and correcting the improper technique is critical to being able to return to the sport[8]. Local steroid injections may be used for pain control, but they do not heal the injury, and symptoms generally recur if other interventions are not used. Surgery is not usually necessary but can be performed in severe situations if other treatments, including physical therapy, are ineffective[10]. Home remedies for tennis elbow include resting the elbow by avoiding movements that aggravate the pain. Elbow braces (tennis elbow bands) may

be helpful to reduce the stress on the elbow. Non- steroidal anti-inflammatory medications such as ibuprofen (Advil) and naproxen sodium (Aleve) help decrease inflammation in the tendons and decrease pain [16]. Applying ice packs regularly, such as 20 minutes two or three times daily, also reduces inflammation and pain. The most effective and reliable Conservative treatment is Physiotherapy and Rehabilitation which is effective and is given through various modalities and techniques.

Complete rest is obtained with a posteriors molded cast (or) split, maintaining relaxation of the extensors by flexion at the elbow, and supination and extension at the wrist. The fingers may be left free for movement. The cast should be removed daily for gentle exercises to avoid elbow stiffness. Moist compression or short-wave diathermy is used in this form of conservative treatment. Dry needling is given through multiple punctures are made in the tender area and are repeated at intervals of 5 days to a week.

Laser Radiation Therapy is given through three treatments of 200 radius in air to each of three fields – anterior, posteriors and lateral[15]. One field is treated every other day. (Modality 220 KV, 0.5 mm copper, 1.0 aluminum filter with a half values layer of 1.2 mm copper). Ultrasonic therapy has produced equivocal results. Phenylbutazone produces excellent results in reported cases but is not commended in view of its potential toxicity local injection of hydro cortisone gives results no different from needling under local anesthesia[14]. Manipulative therapy too is given to convert the partial tear of the conjoined tendon into a complete tear there by detaching the tendon from the chronically inflamed periosteum[13]. Surgical treatment usually gives immediately and lasting relief of symptoms. It is indicated only when conservative treatment fails. Though this we are to evaluate the effectiveness of movement with mobilization in reducing pain and increasing strength in patients with chronic lateral epicondylitis.

2. Methodology

The sample size was twelve. Six subjects in experimental group and six in control group within the age group of 25-55 years of both genders with Symptomatic lateral epicondylitis of 1-3 months old and shows Positive Cozen's test or Mill's test. Subjects with history of trauma, surgery, acute infection and under steroid injection were excluded. The subjects were selected by simple random sampling method by alternately placing them in the two groups in a experimental design with the one experimental and one control group. The design comes under the category of clinical trial. The duration of the study is for 15 days.

2.1 Procedure

Subjects signed a consent form to participate in the study. Before starting the treatment the complete procedure was explained to the patient. Subjects were advised not to take any drug or treatment during the study period. Subjects were instructed to lie supine on the treatment table. Patient was assessed what type of movement reproduces the elbow pain. Wrist extension was observed in the patient along with making fist causes pain. The pain was measured using NPRS. Resisted wrist extension was measured with sandbags with the arm approximately at 30° of shoulder abduction elbow extended and fore arm was in pronation. Both the pretest values were recorded. After this technique was applied for both the groups separately.

2.1.1 Experimental Group

Then the patient was given pulsed ultra sonic therapy at 20% duty cycle with a frequency of 3 MHz and intensity of 1.2 w/cm^2 for 5 min. The technique was given to the patient by applying the lateral gliding force against the proximal forearm and the patient was asked to repeat the gripping by squeezing a ball/inflatable bulb. Both the lateral glide force and the muscle contractions were pain free. The patients were also taught a graduated exercise therapy regimen including stretching exercises and progressive resisted exercises. The stretch was given at forearm pronated and elbow extended the wrist being palmar flexed using the other hand of patient or with the help of wall. This was held for few seconds and then released. A total of 10 stretches were given per session. Progressive resisted exercises including isometric contractions with elbow flexed to 90° with the hand of unaffected arm applying manual resistance over the dorsum of the supinated arm of affected side. Pain free isometric contraction of the wrist extensors initiated and held for 5 to 10 seconds. In one session 15 contractions were given progression included forearm pronation as the starting position and increasing resistance. Fifteen sessions are given (15 days) each session lasts approximately 30 seconds.

2.1.2 Control Group

Then the patient was given pulsed ultra sonic therapy at 20% duty cycle with a frequency of 3 MHz and intensity of 1.2 w/cm^2 for 5 min. The patients were also taught a graduated exercise therapy regimen including stretching exercises and progressive resisted exercises. The stretch was given at forearm pronated and elbow extended the wrist being palmar flexed using the other hand of patient or with the help of wall. This was held for few seconds and then released. A total of 10 stretches were given per session. Progressive resisted exercises including isometric contractions with elbow flexed to 90° with the hand of unaffected arm applying manual resistance over the dorsum of the supinated arm of affected side. Pain free isometric contraction of the wrist extensors initiated and held for 5 to 10 seconds. In one session 15 contractions were given progression included forearm pronation as the starting position and increasing resistance. Fifteen sessions are given (15 days) each session lasts approximately 30 seconds.

3. Statistical Analysis

The data was analyzed using Numerical Pain Rating Scale for pain and various weighted sand bags for strength. The values are compared between the control group & Exp. Group.

3.1 Numerical pain rating scale

The data was analyzed using Numerical Pain Rating Scale for pain and various weighted sand bags for strength. The values are compared between the control group & Exp. Group.

3.1.1 Experimental Group

Mean Pre test value for pain by NPRS – 7.16
Mean Post test value for pain by NPRS – 1.3
Mean reduction of pain by NPRS – 5.86

Table 1

Sr. No.	*Pre-test*	*Post test*	*Difference*
1.	7	2	5
2.	6	0	6
3.	8	2	6
4.	7	1	6
5.	7	1	6
6.	8	2	6
Avg.	7.16	1.3	5.86

3.1.2 Control Group

Mean Pre test value for pain by NPRS – 7.83
Mean Post test value for pain by NPRS – 3.50
Mean reduction of pain by NPRS – 4.17

Table 2

S.No.	*Pre-test*	*Post test*	*Difference*
1.	7	3	4
2.	8	4	4
3.	8	3	5
4.	7	3	4
5.	7	4	5
6.	7	4	3
Avg.	7.83	3.50	4.17

3.1.3 Pain by NPRS

Table 3

Group	*Pre test*	*Post test*	*Difference*
Experimental Group	7.16	1.30	5.86
Control Group	7.83	3.50	4.17

3.2 Numerical pain rating scale

The data was analyzed using Numerical Pain Rating Scale for pain and various weighted sand bags for strength. The values are compared between the control group & Exp. Group.

3.2.1 Experimental Group

Mean Pre test value of strength – 0.33
Mean Post test value of strength – 1.91
Mean difference – 9.50

Table 4

S.No.	*Pre-test*	*Post test*	*Difference*
1.	0.25	2	1.75
2.	0.50	2	1.50
3.	0.25	1.75	1.50
4.	0.25	2	1.75
5.	0.50	2	1.50
6.	0.25	1.75	1.50
Avg.	0.33	1.91	9.50

3.2.2 Control Group

Mean Pre test value of strength – 0.33

Mean Post test value of strength – 1.25
Mean difference – 0.96

Table 5

S.No.	*Pre-test*	*Post test*	*Difference*
1.	0.50	1.50	1.0
2.	0.25	1.256	1.0
3.	0.25	1.255	1.0
4.	0.50	1.25	0.75
5.	0.25	1.25	1.0
6.	0.25	1.25	1.0
Avg.	0.33	1.25	0.96

3.2.2 Strength by Various Weighted Sand Bags

The difference between the mean difference of various weight sand bags between the experimental group and control group.

Table 6

	Pre test	*Post test*	*Difference*
Experimental Group	0.33	1.91	9.50
Control Group	0.33	1.25	0.96

3.3 Results

Twelve patients met the inclusion criteria they were group in to two groups six each. NPRS and various weighted sand bags were used to measure the severity of pain and strength in the groups. The treatment was given and the data was analyzed after 15 sessions of treatment. In control group there were six patients treated by using ultra sound therapy and progressive resisted exercises at the end of 15 days the severity of pain and strength were analyzed. The data showed a significant difference between pre test (NPRS-7.83 and strength 0.33 kg) and post test (NPRS – 3.5 and strength 1.25 kg) values. The mean difference is significant (NPRS – 4.17 and strength 0.96 kg). In experimental group there were six patients. They were treated by using ultrasound and mobilization, progressive resisted exercise at the end of 15 days the severity of pain and strength were analyzed. The data showed a significant difference between pretest (NPRS - 7.16 and strength – 0.33 kg) and post test values (NPRS – 1.3 and strength 1.91 kg). The mean difference is significant

(NPRS – 5.86 and strength - 1.58 kg). The data showed that there is a significant difference in the values of both severity of pain and strength between experimental group and control group. This significant difference indicates that the mobilization along with ultra sound therapy and progressive resisted exercises was effective in treating chronic lateral epicondylitis.

4. Conclusion

The study concludes that the manual mobilization with movement along with ultrasound therapy is effective in reducing pain and increasing strength than that of progressive resisted exercises along with ultrasound therapy in adults with chronic lateral epicondylitis.

5. Discussion

Pain is felt by all the individuals minimum once in their life time. Pain is a common growing problem in our society. It is frequently associated with intentional and unintentional injuries, as well as illness and diseases that occur over a normal life span. Pain is an intensely personal experience with major emotional and sensory component. Tennis elbow is one of the most prevalent conditions one could experience at least once in their life time. The incidence of lateral epicondlylitis in Dutch medical journal practice is approximately 4-7 cases per 1000 patients in a year. Tennis elbow occurs in over 50% of tennis players at some time in their career generally occurring between 30 to 40 years of age. This condition rarely occurs before the age of 20 years it occurs not only in sports people but also in manual workers where repetitive arm movements are a common occupational hazard. The causes of tennis elbow is multifactorial either prolonged repetitive use of the wrist extensors, as may occur in lifting parts off an assembly line or sustained contraction as may occur with gripping a hammer or a tennis rocket can lead over use injury eccentric loading in the case of tennis elbow means that the wrist is forcibly palmar flexed or ulnar deviated against the pull of the extensor muscles. The extent that on activity involves a power grip impact (or) eccentric loading of the wrist extensors is likely to cause tennis elbow. Gripping the hammer too tightly, an improper grip size excessive hammer weight or a faulty back hand technique, can lead to tennis elbow. In the acute stage there will be some centrally mediated pain (or) secondary hyperalgesia, however this is not the most significant underlying pain mechanism.

As healing progresses the injured tissue become sub acute where the inflammation subside but the tissue damage and weakness are present during acute and sub acute stage of injury the predominant focus of treatment needs to be an facilitating healing of the damaged tissue and influencing the nociceptive pain mechanism where this not achieved and symptoms are ongoing they a referred to as chronic. The chronic pain is particularly complex and in the case of tennis elbow, it is likely include either both chronic nociceptive pain or centrally mediated chronic pain. These elements on whether there is an ongoing inflammatory process at the elbow. Continuing to activates nociceptors or if the pain is being generated in the central nervous system. According to the literature many treatments are available for treating lateral epicondylitis. They are Rest, cryotherapy, ultra sound therapy, friction massage, shock wave therapy, Hydrocortisone injection etc. If these treatments fail to resolve the problem surgical treatment of extensor carpi radialis brevis repair is also effective for lateral epicondylitis. In 1993, Mulligan's had introduced new technique for the treatment of chronic lateral epicondylitis. According to Mulligan's concept of malalignment is the cause for the lateral epicondylitis. By doing mobilization with movement the normal alignment can be restored.

References

[1] J.Timothy Noteboom, Rob Cruver, Tennis Elbow .JosPt A Review 1994, vol 19
[2] Gouging JP, Rush Lateral epicondylitis – what is it really? Current orthop 2003; 17:386-389
[3] Norris C. sports injuries – diagnosis and management. Butterworth Heinemann 3rd ed. 2005; the elbow: 412-17.
[4] Ctherine Burt Driver, MD ,Tennis Elbow .onhealth William C.Shiel Jr.,2013
[5] Planeher KD. Medical and lateral epicondy litis in the Athletes. Clin sports Med 1996; 290-305
[6] Wright A, vicenzino B. Lateral epicondylagia: therapeutic management. Phys ther 1997; 2:39-48
[7] Cyriax JH, the pathology and treatment of tennis elbow, J Bone joint Surg 1936; 921-948
[8] Kochhar M, dogra A. Efectiveness of a specific Physitherapy reginen on patients with tennis elbow. Physiotherapy 2002; 333-341.
[9] Kisner C, Colby LA. Therapeutic exercise:foundation and techniques. 5th ed. Philadelphia: FA Davis Co.2002.
[10] Binder A, Hodge G. Is therapentic ultrasound effective in treating soft tissue lesion? Br Med J 1985; 290:512-513
[11] Smidt N, Assendelft WJ.Effectiveness of physiotherapy for lateral epicondytitis – a systemic review. Ann Med – 2003; 35:51-62.
[12] Lundeberg T, Haker E.A comparative study of continuous Wtrasound and rest in cpicondylagia. Scand J Rehabil Med 1988; 20:99-1010.
[13] Miller J. Case study: Mulligan concept management of tennis elbow ortho Div Rev 200 June;
[14] Pienimaki T.T. Progressive strengthening and stretching exercise and ultrasound for chronic lateral epicondylitis, physiotherapy. 1996-82, 522-530.
[15] Darlene her tling, Randolph, Ktssler management of common musculo skeletal disorders physical therapy principle and methods 3rd edition page (222-223)
[16] Robert Dona velli & Michael Wooedn orthopaedic physical therapy – 2nd edition