



PROGRESSIVE STRENGTHENING EXERCISE AND ULTRASOUND FOR CHRONIC LATERAL EPICONDYLITIS

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ABSTRACT

OBJECTIVE: To find out the effectiveness of progressive strengthening exercise and ultrasound in the treatment of chronic lateral epicondylitis

DESIGN: Experimental design

HYPOTHESIS: Progressive strengthening exercises combined with ultra sound are more effective than the ultrasound treatment alone in chronic lateral epicondylitis

SETTING: The study was conducted in physiotherapy outpatient department in SRI VENKATESHWARA RAMNARAYAN RUIA GOVERNMENT GENERAL HOSPITAL (S.V.R.R.G.G.H) TIRUPATHI.

SAMPLE SIZE: 30 subjects with chronic lateral epicondylitis were taken for this study. They were divided by simple random sampling in to 16 subjects for experimental group, 14 subjects for control group

METHODS: Experimental group was trained in a four-step home exercise programme along with pulsed ultrasound. Control group was given pulse ultrasound only. Pain intensity at rest and strain was assessed by VAS, grip strength was analysed by dynamometer and the pre and post values are analysed.

RESULTS: Statistical analysis shows that both experimental and control group had significant reduction of pain at rest and strain. More increased grip strength is found in experimental group.

CONCLUSION: The results indicate that progressive strengthening exercises combined with U.S are more effective than pulsed ultrasound alone in treating chronic lateral epicondylitis.

Keywords: lateral epicondylitis, ultrasound, pain, strengthening exercises

INTRODUCTION

Tennis elbow syndrome, or lateral epicondylitis, is a common work-related or sports-related injury causing pain in the arm's extensor origin. It's often due to repetitive wrist and forearm movements, leading to muscle rupture, inflammation, and pain. Treatment options include anti-inflammatory drugs, corticosteroid injections, physical therapy, and manipulative therapy. However, chronic cases are challenging to treat and may cause prolonged disability.

Research shows conflicting results for various treatments, including ultrasound therapy. A systematic review found insufficient evidence to support one therapy over another. Clinically, patients experience persistent pain

and tenderness at the extensor origin. Treatment typically combines therapies, making it difficult to assess individual effects.

This study aims to investigate the efficacy of progressive strengthening exercises and pulsed ultrasound in treating chronic lateral epicondylitis. Previous research suggests strengthening damaged attachments and promoting tissue healing through continuous passive movement may be beneficial. The study compares the effects of these treatments to local pulsed ultrasound application.

Key findings: Tennis elbow syndrome causes significant pain and disability, treatment options are varied, with limited scientific evidence, strengthening exercises and pulsed ultrasound show potential benefits and further research is needed to determine effective treatments.

AIM OF THE STUDY

To compare the effectiveness of progressive strengthening exercise and ultrasound versus local ultrasound alone in reducing pain at rest and strain and in improving grip strength in patients with chronic lateral epicondylitis.

METHODOLOGY

RESEARCH DESIGN: Design of the study is randomized experimental design

SETTING: Physiotherapy outpatient department of SRI VENKATESWARA RAMNARAYANA RUIA GOVERNMENT GENERAL HOSPITAL, TIRUPATHI.

POPULATION: Subjects with chronic lateral epicondylitis were included in this study

SAMPLE AND SAMPLING METHODS: Sampling size of 30 subjects comprising of two groups – 14 subjects in control group, 16 subjects in experimental group were selected by simple random method

SELECTION CRITERIA

INCLUSION CRITERIA:

1. Patients with positive Mill's test
2. Pain over the lateral epicondyle during resisted wrist or middle finger extension
3. Local tenderness on palpation over the lateral epicondyle

EXCLUSION CRITERIA:

1. cubital osteoarthritis
2. carpal or radial tunnel syndrome
3. Rheumatoid arthritis
4. Cervical radicular syndrome
5. Painful shoulder or rotator cuff tendinitis
6. Previous fractures of arm causing limitation in arm functioning

PROCEDURE: Thirty patients [age between 30-55 years] with clinically diagnosed chronic lateral epicondylitis took part in the study. All of them had symptoms for over three months, pain at rest and strain was assessed using VISUAL ANALOG SCALE, and the patient indicates intensity of the pain on a 10 CM long non segmented line. The pain was assessed under strain during testing of muscle strength. The grip strength was assessed using hand held dynamometer. The patients were randomly allocated into experimental and control groups by drawing lot method. Prior informed consent was taken from the patients before the commencement of the study; sixteen patients in the experimental group were trained in a four-step home exercise programme along with ultrasound. They visited the department twice in a week for follow-up examination and received a new more intensive programme.

PROGRESSIVE EXERCISE PROGRAMME

STEP 1:

- Clenching fist strongly
- Resisted wrist extension
- Resisted wrist flexion
- Wrist rotation with a stick

Towards the little finger

Towards the thumb

STEP 2:

Exercises against an elastic band for

Wrist extension

Wrist flexion

Wrist radial deviation

Wrist ulna deviation

STEP3:

Combined wrist rotator movements

Using edge table top as a support

Upwards resisted from elbow

Towards the little finger

Towards the thumb

Downwards resisted from above

Towards the little finger

Towards the thumb

Pressing hands against a wall

STEP 4:

An occupational training programme including

Soft ball compressing exercises

Transferring buttons from cup into another

Twisting a towel into a roll

Rotating hand on a table in both directions

This programme can be performed with one of steps 1- 3

Each separate movement and exercise in each step must be done while slowly counting to eight. They also received local pulsed ultrasound from 0.3 to 0.7W/cm² three times a week. The pulse ratio was 1:5 the duration of pulse is 2ms. The frequency is 1MHZ. The radiated area was 5 cm over the common extensor origin. Treatment time was 10 to 15 minutes. The control group received only ultrasound of the same parameters. Treatment for each group was continued for 8 weeks during which time they had no other treatment. The patients under both the group were evaluated for pain at rest using visual analogue scale before and after the completion of treatment and the values are recorded. Visual analogue scale is a very valued and reliable method of evaluation of pain for patients with lateral epicondylitis. Grip strength was assessed before and after the treatment using hand held dynamometer

DATA ANALYSIS

The data analysis was done using MS EXCEL PACKAGE. Changes in the perceived level of pain at rest and strain were calculated from the data and compared between two groups. Statistically the data was compared using paired T-test Both the groups were evaluated for pain at rest and under strain using visual analogue scale. The grip strength was evaluated using hand held dynamometer.

The results show that there is significant difference between experimental and control group in grip strength. There is significant reduction of pain at rest and strain in both the groups.

RESULTS

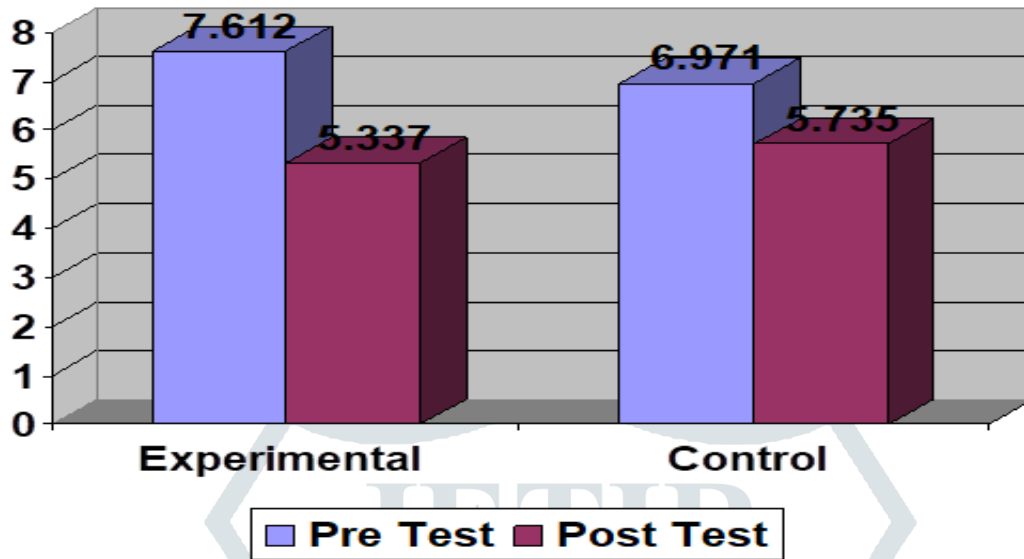
Visual analogue scale and grip strength are used as outcome measure to find out the effectiveness of treatment in both control and experimental group. The data collected is compared within the groups for improvement and between the groups to find the better one. The results obtained are shown as follows.

TABLE1: Comparison of difference in pain at rest between experimental group and control group.

	N	Mean
Pretest experimental group	16	7.612
Pretest control group	14	6.971

Post test experimental group	16	5.337
Post test control group	14	5.735

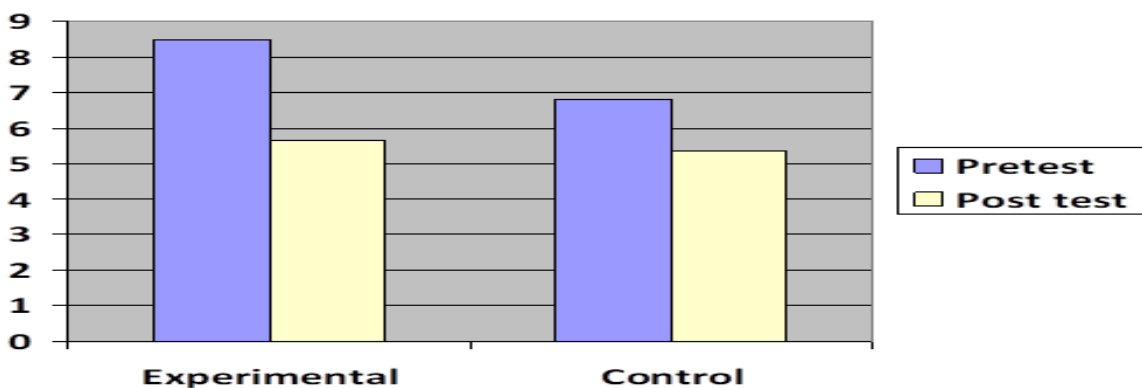
GRAPH : 1



From the above graph we can infer that both groups showed reduction in pain level. There is no significant difference between experimental and control group

GRAPH 2: Comparisons of pain at strain between experimental and control group

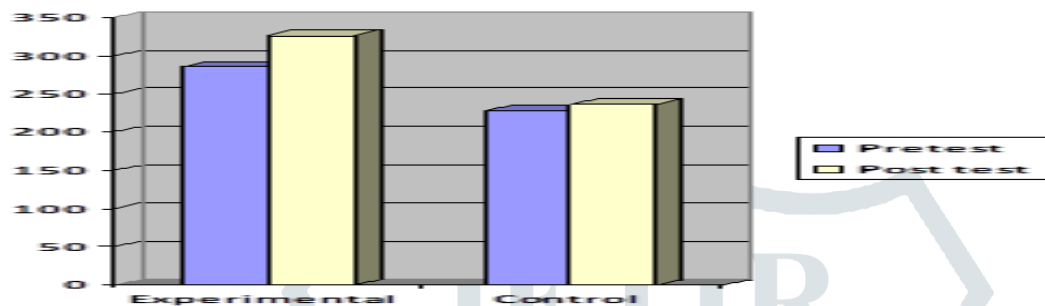
	N	Mean
Pretest experimental group	16	8.481
Pretest control group	14	6.8
Post test experimental group	16	5.675
Post test control group	14	5.371



From the above graph we can infer that there is significant level of pain reduction in both the groups when tested under strain but there is no significant difference between experimental and control groups.

Table : 3 Comparison of grip strength between experimental and control group

	N	Mean
Pretest experimental group	16	285.6
Pretest control group	14	227.64
Post test experimental group	16	326.62
Post test control group	14	235.8



From the above graph we infer that there is significant increase in grip strength in experimental group than control group

DISCUSSION

The study fulfilled the aims of exploring the effects of progressive exercise therapy along with ultrasound on chronic lateral epicondylitis and comparing these effects with outcomes from local pulsed ultrasound application. The combined progressive strengthening and ultrasound therapy resulted in significantly better subjective and objective short-term outcomes than pulsed ultrasound therapy alone. It reduced pain at rest and under strain. Results of grip strength improved in the experimental group showing a good correlation with the improvement in strength. This is important in the prevention of prolonged disability.

CHANGES IN LEVEL OF PAIN, FUNCTION AND ABILITY TO WORK:

The main purpose of statistical analysis was to identify significant changes in pain, at rest and under strain and grip strength within and between the treatment groups and to compare differences between the groups. Therefore, the extent of change, not the level of initial values is the important factor. Pain at rest declined significantly more in the experimental group. This shows that active exercise may have an effect on pain experience in patients. Reported pain under strain represents both painful isometric and isokinetic muscle work. Pain has an important role underlying decreased muscle function and cannot be ignored in analysis of results from muscle function test.

Additionally, characteristics of a patient's occupation affect the ability to work. Different types of work produce different strains on the upper limb in different patients. Finally, while the results are over whelming in Favor of exercise therapy, combined with ultrasound. Tennis elbow syndrome is reported to be a self-limiting disorder in some cases.

The program of progressive therapy used in this study appears to offer considerable health gain. It is inexpensive, because it takes an active role and requires few treatments and only four follow up visits to a physiotherapist. It aims to strengthen damaged tissues. Using slow repetitive exercise movements for strengthening the soft tissues of the upper limb appears to have beneficial effects in treating chronic strain injuries. As the aetiology of strain injuries such as the tennis elbow syndrome may be repeated rapid movements, slow progressive exercise may allow tissue healing.

Eccentric exercise seems to be stressful to the myotendinous unit results in avulsion-type failures in immobilization, to insertion and midsubstance-type failures in remobilization, has been noted in animal knee ligament studies. Therefore, a progressive step wise exercise program can promote healing without Traumatizing the damaged tendon. Epicondylar attachment area is an Osteopenia region with the properties of inflamed and Atrophied tendon and in prolonged cases, bony atrophy too results TIPTON et al 1987 say that prescribing exercises which increases the forces being transmitted to ligaments, tendons and bones will maintain and generally increased the strength and functional capacity of these structures. The same principles

can be followed in the treatment of chronic tennis elbow syndrome. The progressive exercise treatment used in this study started with slow soft tissue-strengthening exercise.

The whole program exercised muscles tendons and ligaments and also the Osteotendinous insertion region, and the fourth step was a more intensive occupational program to promote patients daily living and ability to work.

Pulsed ultrasound was not found to be effective as a sole treatment in treating chronic epicondylar pain. Although pulsed ultrasound 1.MH z/0.5 W/cm² has been found to have beneficial effects on protein synthesis (HARVEY et al, 1975: DYSON and SUCKLING, 1978). The treatment procedure was similar to the procedure used in the study by HAKER and LUNDEBERG (1991) in which they reported no beneficial effect for pulsed ultrasound over Placebo ultrasound. In this study there is a reduction in pain using pulsed ultrasound which may be due to its effect on protein synthesis which leads to better healing of soft tissues.

Peter Malliaras et al., has done a systemic review to find out the effectiveness of strengthening programme alone without stretching and whether it is effective in reducing pain in patients with lateral epicondylitis and he has found results which supports this study where progressive strengthening program was given to reduce pain.

Thus, progressive strengthening program along with ultrasound is an effective way of decreasing pain and improving strength in patients with chronic lateral epicondylitis. Ultrasound alone has no significant effect on improving grip strength.

CONCLUSION

The results indicate that progressive strengthening exercises combined with ultrasound is more effective than pulsed ultrasound alone in the treatment of chronic lateral epicondylitis.

RECOMMENDATIONS

More outcome measures can be included in future studies and Long-Term studies can be done to find out the sustainability of the treatment program.

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