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A Comparative Study on Effectiveness of Therapeutic Ultrasound And Kinesio Tape In Treatment of Tennis Elbow

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ABSTRACT

Background: Tennis elbow is a painful condition of the elbow caused by overuse. It effects the tendons near the origin of the wrist extensor muscles, which results in the functional loss in the affected limb. This leads to pain and tenderness on the outside of the elbow

Methods: 20 males and females patients with age from 20-50 years were included in this study and were divided into two groups. Group A received ultrasound and exercises and Group B received Kinesio tape and exercises. The wrist joint strength was measured using a dynamometer, with pressure measured in kilograms, and pain severity measured using a VAS scale. Duration of the study was 4 weeks. Patients were assessed at 0th day and at the end of 4th week

Result: Both Group A and Group B showed significant difference in wrist strength and VAS. However in the examination of pre- and post-tests, wrist strength in Group A exhibited a more significant difference than Group B. VAS also revealed a significant high dif-ference in Group A as compared to Group B

Conclusion: This investigation came to conclusion that Group A displayed a significantly higher difference. Therefore, in the treat-ment of lateral epicondylitis, ultrasound is more beneficial than kinesio taping.

1. Introduction

Tennis elbow is a painful condition of the elbow caused by overuse, leads to pain and tenderness on the outside of the elbow. It effects the tendons near the origin of the wrist extensor muscles, which results in the functional loss in the affected limb (Shaheen et al., 2019; De Smedt et al., 2007; Lee et al., 2011). Tennis elbow starts as a micro-tear of the wrist extensor muscles origin which affects the granulation tissue formation (Cullinane et al., 2014; Shamsoddini et al., 2013; Van der Worp et al., 2013; Galloway et al., 2013). The affected tendons would not be able to do the activity as well functions which involve: Wrist Extension, Repeated Gripping, Forearm Pronation and Supination. There are various strategies for treating tennis elbow, and each of these mechanisms aims to reduce pain and enhance functionality (Robertson et al., 2005; Jafarian et al 2009). The most popular types of therapy are strengthening and stretching, and the physiotherapists used a variety of modalities in these programmes, including heat, Iontophoresis, splinting, low-level laser therapy, and Kinesio taping (Kachanathu et al., 2013; Zhu et al., 2008). Therapeutic ultrasound is widely used in physiotherapy and sports medicine to treat different injures, and this method is focused on changing the extensibility of the collagenous tissues to improve range of motion. Ultrasound waves are generated by a piezoelectric effect caused by vibration of crystals within the head[5]. Frequency of therapeutic ultrasound ranges from 0.5-3.0 MHz (Stasinopoulos et al., 2010; Green et al., 1996). The Kinesio taping is used to provide support and protection for the joint while permitting the optimal movement for it. The taping technique consisted of 10-15 cm long, 5cm in width. Elbow taping was fixed in the fit place in all treatment session, expect if there was an adverse skin reaction (Watson et al., 2008; Singhal et al., 2010).

2. Methodology

2.1. Study Design

Quasi Experimental

2.2. Duration of the Study:

4 weeks

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2.3. Aim of the Study

The aim of the study is to compare the effectiveness of therapeutic ultrasound and kinesio tape in treatment of tennis elbow

2.4. Participants

It was conducted in the Out-patient Department of of University College of Physiotherapy, Faridkot. 20 subjects who fulfilled the inclusion and exclusion criteria were equally divided into two groups by random sampling method. The total duration of study was 4 weeks. An informed consent was taken from each subject prior to participation. Each patient had VAS and hand grip measures completed before and after the initial tape application, and all the patients were informed about the study steps. The pain intensity assessment was performed by Thomsen test by active dorsiflexion of the wrist of the affected arm against resistance with the patient comfortably sitting, elbow extended and forearm pronated.

- **Inclusion Criteria:** Age 20-50 years, Both males and females, Chronic pain over lateral epicondyle, Dominant hand affected, Patients able to follow the simple instructions
- **Exclusion Criteria:** Patients with polyarthritis, acute lateral epicondylitis, carpal tunnel syndrome, ro tator cuff tendonitis, cervical spondylosis and neurological abnormalities in a afected area, Osteoporotic and rheumatoid arthritis patients, Old fracture at the affected arm

2.5. Study Procedures

A total of 40 subjects (20 in each group) were included in the study with the age group of 20-50 years, both males and females with confirmed diagnosis of tennis elbow based on inclusion and exclusion criteria. They were divided into two equal grou-ps by simple random sampling procedure; Group A and Group B. Patients were assessed at 0 day before giving treatment and re-assessment of patients was done at the end of 4th week after completing the treatment for comparison. The effectiveness of VAS (Visual Analogue Scale) and goniometer was checked out before and after the treatment

2.6. Intervention

- **Group A -** Ultrasound with Intensity 1.5 w/cm2, Frequency 1MHz, Duration for 5 minutes/session and exercises
- **Group B -** Kinesio tape and exercises

a) *Slow Fist Clenching:* The patient was asked to clench his hand eight times while sitting with his elbow extended and his forearm comfortably pronated on the treatment table. After the therapists applied resistance force to the patient's hand, including the dorsal surface and palmar surface, the patient was then asked to extend his wrist eight times
b) The patient was directed to flex his wrist while holding the other end of an elastic band for wrist flexion exercises. This was done while the patient was sitting with his elbow partially bent, his forearm supinated, and his hands resting on the treatment table
c) Exercises involving compressing a soft ball and rolling a towel were given to the patient, who was told to use both hands to do both

2.7. Outcome Measures:

Before the beginning of the study and after the 4 weeks of treatment, all the patients were evaluated in the following outcome measures:

- Visual Analogue Scale (VAS)
- Hand grip strength using hand-held dynamometer (Jamar)

3. Results:

The study included a total of 20 patients with tennis elbow who met the inclusion criteria (10 men and 10 women, mean age 25.353.25 years). 17 individuals were right dominant hand and 3 individuals were left-handed. Their tennis elbow ailment lasted on average (SD) 5.1 ± 1.1 weeks. Randomly selected patients were divided into two groups:

- *Group (A):* Ten patients were included in this group. The data in Figure 1 represented their mean age (38.60. ±8.934) years, mean weight (87.9±18.18) kilograms (Kg), mean height (1.725±0.072) centimeters (cm), and mean BMI (0.034±0.006) Kg/m^2
- Group (B): Ten patients were included in this group. The data in figures 2 represented their mean age (26.90±8.157) years, mean weight (68.50±11.167) kilograms (Kg), mean height (1.709±0.092) cent meters (cm), and mean BMI (0.043±0.007) Kg/m^2

Figure 3 shows the results of the hand grip strength for group A and it indicated that there was significant differences between the pre and posttest, and the differences were for the post test, which shows more grip strength by mean equal to (31.59), compared to the pre-test (27.35).

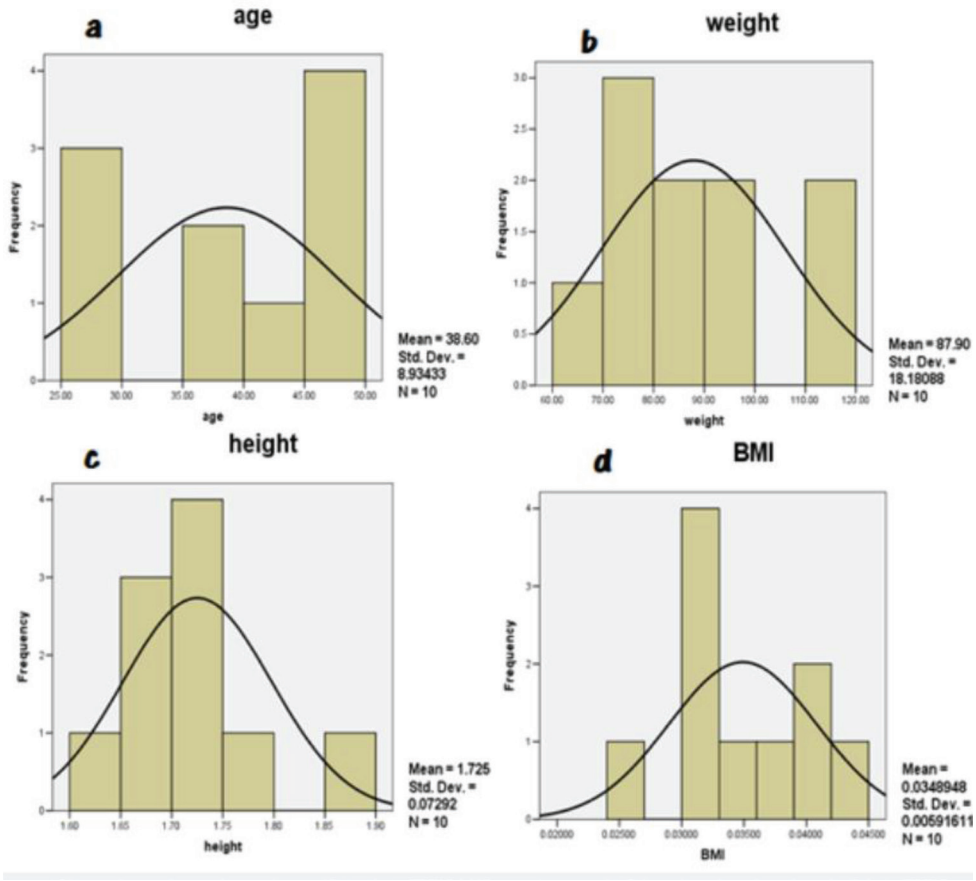

Figure 1: The sample in group A represents: (a) the mean age, (b) mean weight, (c) mean height and (d) the mean BMI.

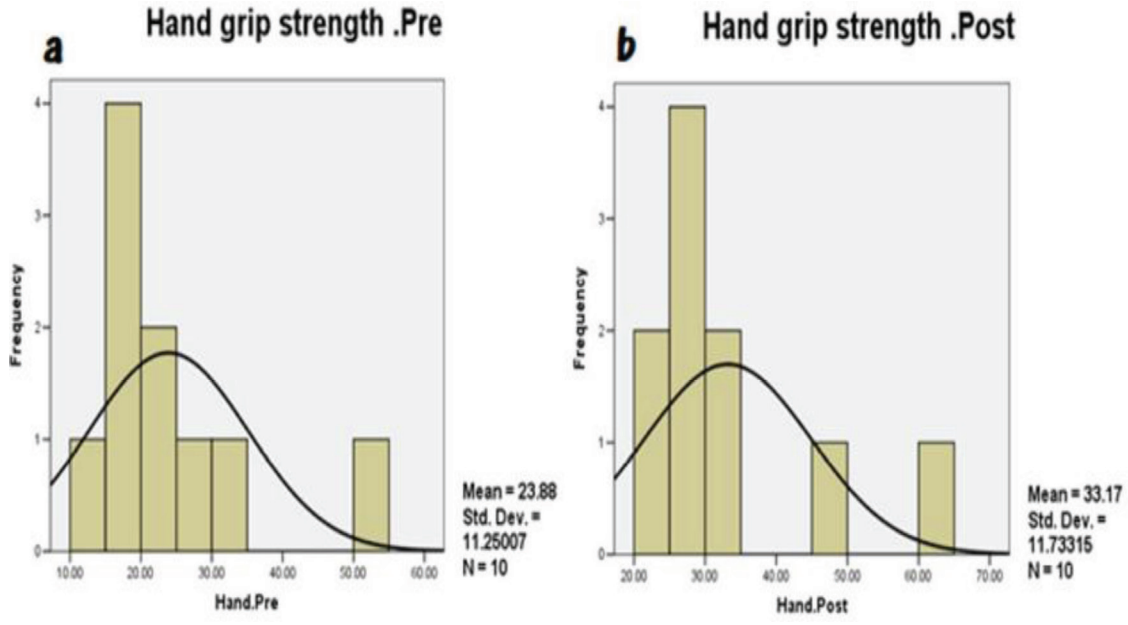

Figure 2: The effectiveness of the treatment for the hand grip in group A: (a) pre-treatment and (b) post treatment.

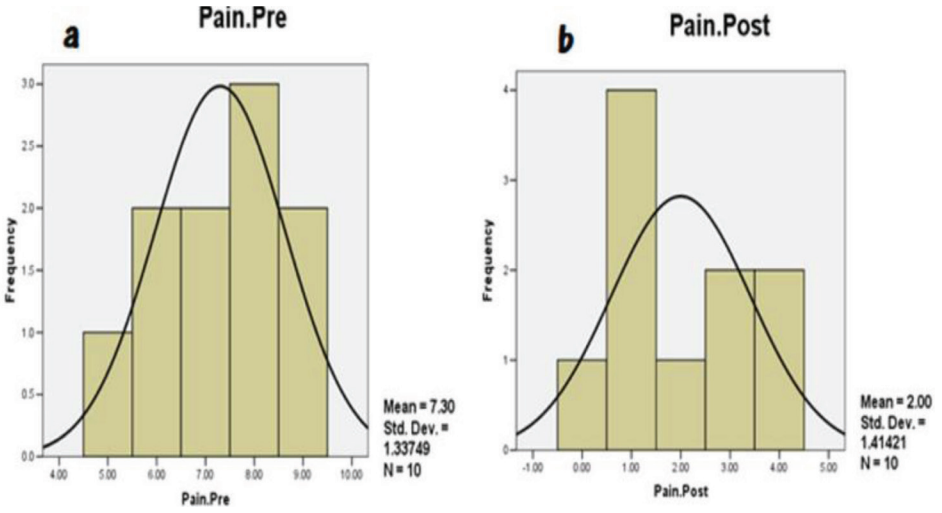

Figure 3: The differences of the pain for the group A between: (a) pre-treatment; and (b) post treatment.

Figure 4 & 5 shows the results of the hand grip strength for group B and it indicated that there was significant differences between the pre and posttest, and the differences were for the post test

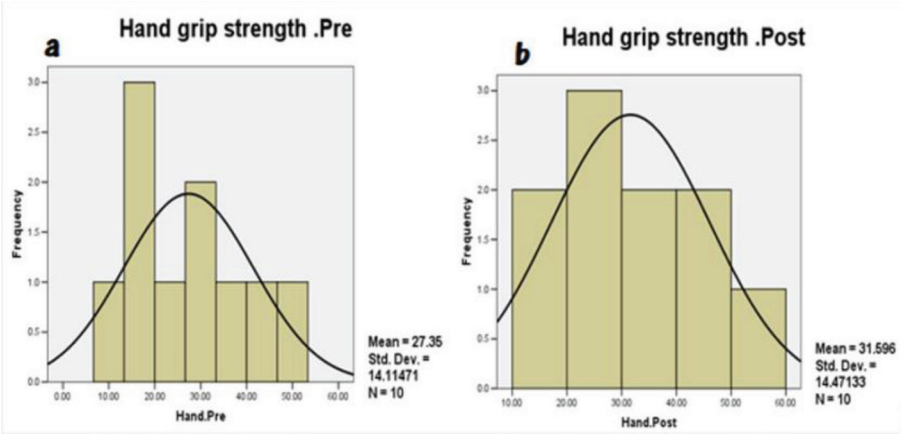

Figure 4: The effectiveness of the treatment for the hand grip in group B: (a) pre- treatment and (b) post treatment.

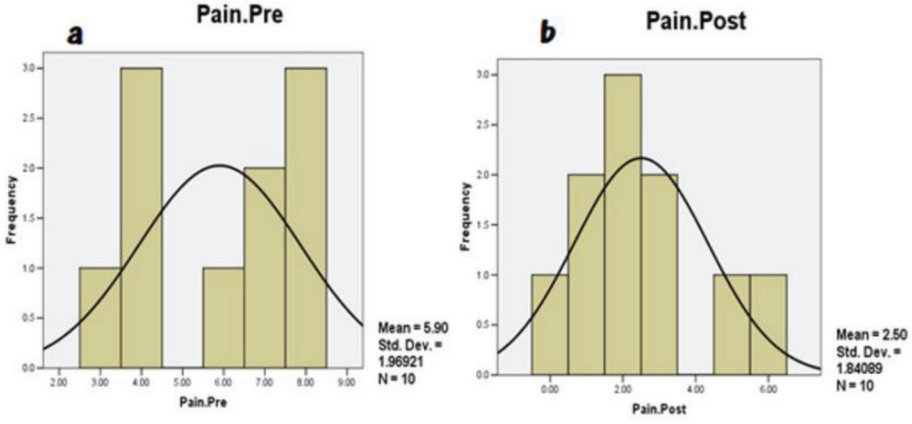

Figure 5: The differences of the pain for the group B between: (a) pre-treatment and (b) post treatment.

4. Discussion

There was no significant difference between both groups in their demographic data (ages, weights, heights, and BMI where their t and P-values were (0.8, 0.43), (0.03, 0.97), (0.98, 0.33), and (0.9, 0.37) respectively). There was significant difference between group (A) and group (B) as regard to pain reduction. Also, there was significant difference between (A) and (B) as regard to grip strength improvement in both groups, which Group (A) allows a greater degree of pain relief and allows a greater improvement in grip strength than Group (B). The goal of this study was to compare the effects of therapeutic ultrasound and kinesio taping on pain relief and hand grip strength in tennis elbow patients. The main objective of lateral epicondylitis rehabilitation is to return complete function to the wrist and hand. The current study found that patients with tennis elbow who received either therapeutic ultrasound or kinesio taping along with exercises for four weeks experienced a significant increase in hand grip strength after treatment, which was accompanied by a significant decrease in pain intensity in both groups.

Additionally, it was discovered that there were substantial differences between therapeutic ultrasound and kinesio taping in terms of pain alleviation and better grip strength, with ultra sound allowing for larger levels of pain relief and strength improvement than kinesio tape. This effect on pain can be explained as suggested by Wilkin and Greg ultrasound is vibration of the tissue causing microscopic bubbles to form, which transmit the vibrations in a way that directly stimulates cell membranes. This physical stimulation appears to enhance the cell-repair effects of the inflammatory response and thereby reducing pain.

4.1. Limitation of the Study

- The sample size for each group was small
- Study period was less
- There was no longer follow up

4.2. Future Scope

- Study can be done on large sample size in each group
- Further studies could include long follow up
- Different outcome measures could be included

5. Conclusion

The conclusion of the study is that the therapeutic ultrasound combined with exercises was effective in improving pain intensity and increasing hand grip strength. Kinesio tape combined with exercises was effective in improving pain intensity and increasing hand grip strength. There was significant difference between ultrasound and kinesio tape as regard to pain reduction and improvement grip strength where Ultrasound allows a greater degree of pain relief and greater improvement of grip strength than the kinesio tape.

6. Competing Interests

The authors have declared that no competing interests exist

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