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Comparative Study - To Analyze Effect of Ultra Sound and Ultrasound, Along With Therapeutic Taping On Pain and Hand Grip Strength in Patients with Tennis Elbow.

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Abstract

Purpose: The objective of the present study is to compare the effect of ultrasound and ultrasound along with therapeutic taping on pain and hand grip strength in patients with tennis elbow.

Methods: The study was conducted by using a quantitative true experimental design with two different subjects groups. group a received ultrasound therapy and group b received ultrasound along with taping. a pre test and post test was administered with each subject of both groups to compare the pain and grip strength effects before and after the treatment. pain assessment using visual analog scale (vas) and grip strength measured by hand held dynamometer.

Keywords: Dynamometer, Therapeutic Taping.

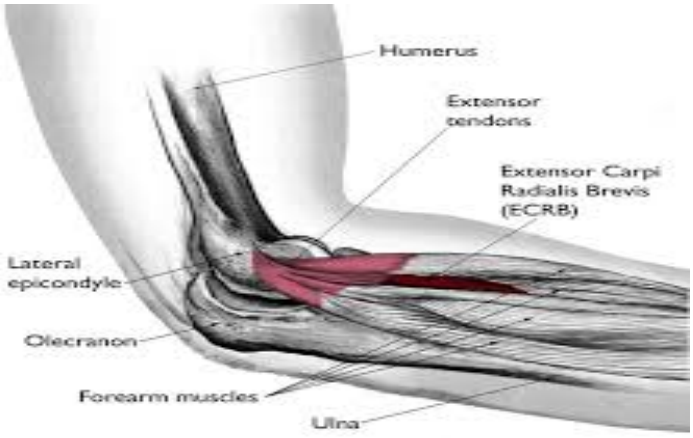
Introduction

Soft tissue are the injury of the muscle, tendon, ligament, synovial membrane and nerves . Direct or indirect trauma is the principal cause. Elbow joint is synovial joint of the hinge verity . The articular surface of the elbow joint includes upper surface of the hand of radius articulates with the capitulum and trochlear notch of the ulna articulates with trochlea of the humerus . The elbow joint complex allow two type of motion flexion – extension and pronation – supination the humeroulnar and humeroradial articulation allow elbow flexion and extension the proximal radioulnar articulation allow forearm pronation and supination. The elbow joint complex when considered in its entirety is therefore a trochleoginglymoid joint. Lateral epicondylitis is a soft tissue injury that is characterized by pain and tenderness at the lateral epicondyle of the humorous .due to nonspecific inflammation at origin of the extensor muscle of the forearm ,it is also called tennis elbow . Pain over the lateral epicondyle , which is exacerbation by work or recreational activity that involve gripping action of the hand such as holding tools, shaking hand, and lifting a kettle, usually signals that the individuals has a condition termed lateral epicondylalgia, epicondylitis and tennis elbow.

This condition was first named by morris 1882 who called lawn tennis arm. It is a degenerative or failed healing tendon response characterised by increased presence of fibroblasts , vascular hyperplasia , and disorganized collagen in the origin of the extensor radialis brevis , the most commonly affected structure .

It is generally a work related or sports related pain disorder with macroscopic tear in the extensor carpi radialis brevis ,usually coused by excessive quick, monotonous, repetitive eccentric contraction and griping activity of the wrist .the dominant arm is commonly affected ,with a prevalence of 1-3 %in the general population, but this increase to 19 % at 30-60 years of age

and appears to be more long standing and severe in women .



In the study of rehabilitation, tennis elbow is a frequently employed clinical model of musculoskeletal pain (Shamsoddini et al, 2010), treated by many physical therapists in a variety of clinical settings and the successful conservative treatment of lateral epicondylitis generally aims to relive pain, control inflammation, promote healing, improve local and general fitness.

Ultra sound is mechanical radiant energy derived from the application of an elastic current on a crystal which result in a vibrating motion .the motion is then applied to particles of medium through which its travels in frequency of 1mhz or 3mhz. Ultrasound may used in a continuous mode where the treatment head continuous produces energy, or pulsed where the period of ultrasound are separated by period of silence .

Wood and lomis first investigated the interaction between ultrasound and living tissue .Ultrasound is effective with vibration (micromassage) but primarily through heat in the lateral epicondylitis. With its thermal and mechanical effects , it is increase local metabolism ,blood flow , soft tissue flexibility , and regeneration ,and membrane permeability , and changes and nerve conduction ,it reduces pain .

Elbow tapping technique that was newly used for the treatment of tennis elbow may facilitate the compliance to exercise rehabilitation programme. It is proposed the application of tape, aim to alleviate pain ,improve muscle function, and restore functional movement, taping facilitates the compliance to exercise rehabilitation programs by minimizing the symptoms during performance of therapeutic exercise (Vicenzino et al ,2003) The objective of taping is to support a weakened part of body without limiting the function , by preventing movements that would stress the weakened area and the primary purpose is to provide semi rigid or rigid splint around a joint or surrounding tissue (Sharath,2005). Lateral epicondylitis is a condition of chronic musculoskeletal pain state and dysfunction of muscle system (vicenzino et al2003)

Taping is not a substitute for treatment and rehabilitation , but is an adjust to the total injury care program (Macdonald,1994). There are several taping technique exist established by different author for different purposes .Mc-Connell taping is one of them ,mainly aim to reduce pain , to improve function and biomechanics (Alam,2008). Diamond tape could be used to facilitate the pain free implementation of upper limb activity and exercise rehabilitation program for chronic lateral epicondylitis . Mc-connell is the originator of the mode of taping ,who stated stated that the main mechanism of action of this treatment is to provide pain relief that allows for improved movement and function .the taping technique for the tennis elbow is considered a useful adjunct to exercise and effective in reducing pain with improving forearm muscle activity (Vicenzino et al ,2003)

Procedure

30 subject age between 30-50 with lateral epicondylitis were selected based on inclusion and exclusion criteria and divided in to two group. Group A and group B off 15

subject each all these subject were assessed using a general assessment performance that recorded the pre test value of pain and grip strength of the hand. Pain and grip strength for subject of both group were measured by using visual analogue scale and hand held dynamometer respectively the same was recorded as pre test score.

Group A

Group A subject received ultra sound therapy as per the following procedure patient were seated in a comfortable position and exposed and cleaned the patient skin with cotton, removal all jewelry interfered with the application . treatment has given pulsed with an on to off ratio one two four ratio and frequency of 1 mhz . it was given in contact, using ultrasonic coupling medium and the average intensity was 1 w per cm square and duration of treatment

Ultrasound Therapy Along With Taping(Vas) Group 2	Median
PRE	7
WEEK1	5
WEEK2	2

is 10 minutes treatment was given in circle method, this treatment was carried out daily for a period of two weeks. Post test measurement for pain and grip strength were measured and recorded at the end of 1st and 2nd week A subject of group a treated using ultrasonic therapy.

Group B

Group B subject received ultrasound along with taping Following procedure patient seated comfortable position and exposed and cleaned the patients skin with cotton removed of all jewelry interfered with the application . Treatment was given with on off ratio of one to four and frequency is 1.0 mhz it was given in contact, using electro medical supplies ultrasonic coupling medium the space averaged intensity was increased 1w per cm square. and duration of the treatment was 10 minutes . treatment was given circular method.

And after ultrasonic therapy subject received taping technique as per the following procedure patient is in a supine lying with elbow in a slightly flexed position .

Results and interpretation

Data collection for the study were analyzed using appropriate statistical test and results are given in the terms of tables and figures in the following pages .

table 1.1 and 1.2 shows the median of pre and post test value for pain score of ultrasound therapy (GROUP A) And Ultrasound Along With Taping (Group B)

Median of pre and post test value for pain score of group A

Ultrasound Therapy (Vas)Group A	Median
PRE	5
WEEK1	4
WEEK2	3

TABLE 1.2 Median of pre and post test value for pain score group B

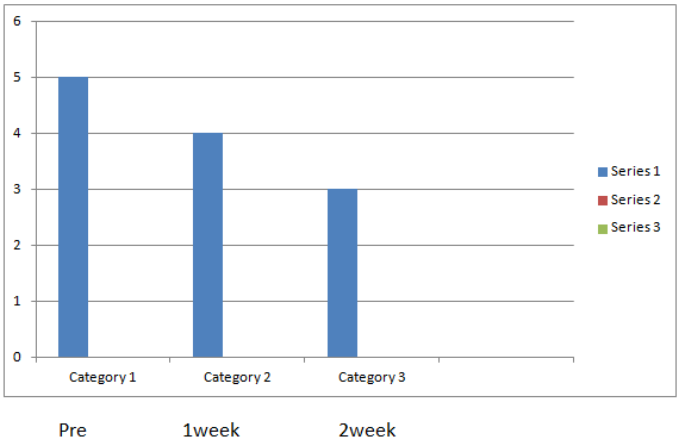


Figure 1 : Ultrasound (vas)

Median of pre and post test value for pain score group A

Median of pre or post test values for pain score group B

Ultrasound along with taping(vas)

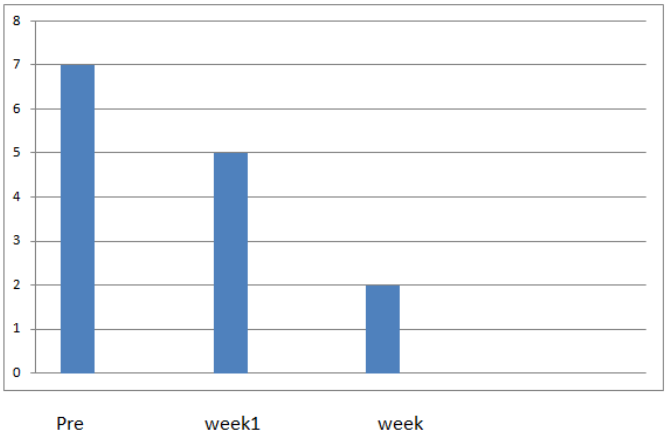


Table 2.1 and table 2.2 show the mean value with sd of pre and post test for grip strength for ultrasound therapy (group A) and ultrasound along with taping (group B).

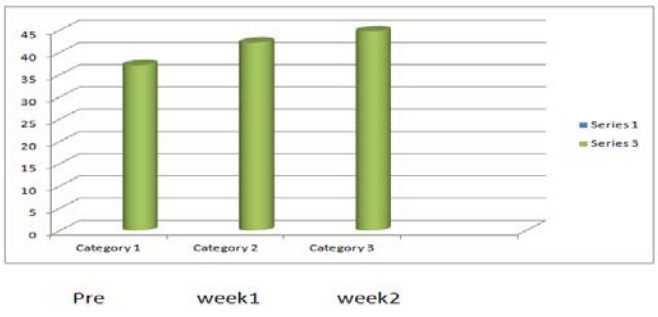
Table 2.1:Mean and SD value of pre and post test for grip strength of group A

Ultrasound (grip strength)	Mean	SD
Pre	38.13	4.969
Week1	42.2	6.235
Week2	44.73	5.3

Table 2. Mean and SD value of pre and post test for grip strength of group B

Ultrasound along with taping (grip strength)	Mean	SD
Pre	35.8	3.74
Week1	41.93	4.19
Week 2	49.0	5.24

Mean and SD values of pre and post test for grip strength of group A.



Mean and sd value of pre and post test for grip strength of group B

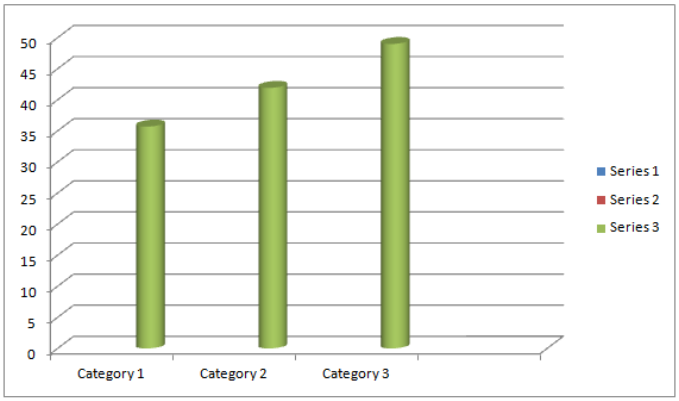


Table 3.1 and table 3.2 shows t value and p value of grip strength in ultrasound therapy technique (group a) and ultrasound along with taping technique (group b).the statistical tool used in this analysis was paired t test . this test was used to find out the significance in the grip strength within the same group .an alpha level of p 0.05 was the level of significance for the test.

Table 3.1 : Paired t test performed with pre and post test value of grip strength for significance within group a

Ultrasound therapy (grip)	Average difference	t-value	P value
Pre-week1	4.7	3.0455	0.000
Pre-week2	6.17	9.7819	0.000
Week1-week2	2.53	4.9175	0.000227

Interpretation

The above the table show pre and post comparison. in this the table pretest-week 1 is 3.0455 and the p value 0.000 which means p<005, the t value of pretest-week 2 is 9.7819 and the p value is 0.000 which means p<0.05,the t value of week 1-week 2 is 4.9175 and the p value is 0.00 which means p<o.05. this show that there is significance improvement in the grip strength after the ultrasound therapy treatment technique .

4.2 table:Paired t test performed with pre and post test values of grip strength for significance within group b

Ultrasound therapy with taping (grip)	Average difference	T value	P value
Pre-week1	5.33	10.294	0.000
Pre-week2	13.2	11.503	0.000
Week1-week2	7.07	10.044	0.000

Interpretation

The above table show pre and post comparison .in the table t value of pretest –week 1 is 10.294 and the p value is 0.000 which means p<0.05. The t value of pretest-week 2 is 11.503 and p value is 0.000 which means p<0.05 .the t value of week1- week2 is 10.044 and p value 0.000 which means p<0.05 .this show that there is significant improvement in the grip strength after the treatment of ultrasound therapy with taping .

Wilcoxon mann –whitney test performed with pre and post test values of pain scores for significance between groups

vas	Average difference in us	Average difference in us with taping	u-value	p-value
Pre-week1	1	2	59.0	0.024
Pre-week2	2	5	10.5	0.000
Week1-week2	1	3	45	0.003

Interpretation

The above table show pre and post comparison between groups in this the table u value of pretest week 59.0 and value is0.024 which means p<0.05.the u value of pretest-week 2 is 10.5 and p value is 0.000 which means p<0.05. the u value of week1–week 2 is 45 and the p value is 0.003 which means p<0.05.this show that there is significant improvement in the reduction of pain after ultrasound therapy with taping.

Unrated t test performed with the pre and post test of grip strength for significance between groups

Grip strength	**Average difference in ultra sound therapy**	**Average difference in us with taping**	**T – value**	**p-value**
Pre-week1	4.7	5.33	4.06	0.000
Pre-week2	6.17	13.2	5.77	0.000
Week1-week2	2.53	7.07	5.74	0.000

Interpretation

The above table shows pre-post comparison between groups . in this table the t value of pretest week 1 is 4.06 and the p value is 0.000 which means p<0.05.the t value pretest –week 2is 5.88 and the p value is 0.000 which means p<0.05.the t value of week1 –week2 is 5.74 and p value is 0.000 which means p<0.05.this show that there significant improvement in the grip strength between the groups after the treatment but average improvement shows it is more in ultrasound along with taping group.

Average difference in the parameter of pain between group A and group B

vas	Average difference in ultra sound	Average difference in ultrasound with taping

Pre –week1	1	2
Pre-week2	2	5
Wee11-week2	1	3

Graphical representation of average difference in the parameter of pain between group A and group B

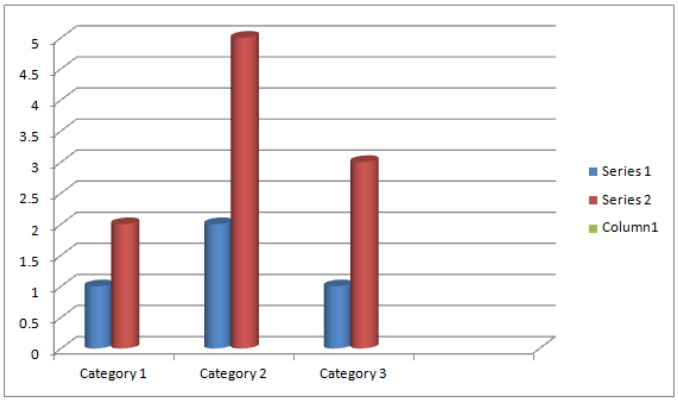
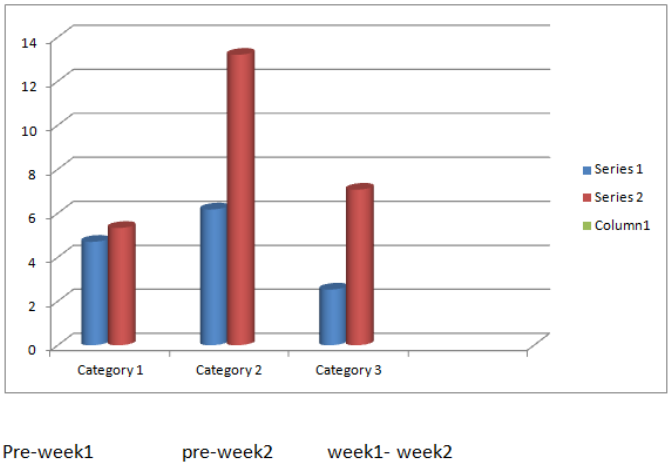


Table 5.2:Average difference in the parameters of grip strength between group A and group B

Grip strength	Average difference in ultrasound therapy	Average difference in taping
Pre-week1	4.7	5.33
Pre-week2	6.17	13.2
Week1-week2	2.53	7.07

Graphical representation of average difference in the parameters of grip strength between group A and group B



Interpretation of statistical results

The study was done 30 subjects allotted into two groups namely group a and group b consisting of 15 each .two know the effectiveness of ultra sound therapy with taping technique over ultra sound therapy two decrease the parameter of pain and improve the parameters of grip strength in subject with lateral epicondylitis .

The parameter used were pain assessed using vas and grip strength assessed using hand held dynamometer .it was before the treatment and after 1st week and 2nd week of the study period . the data were analyzed paired t test out the significance of the intervention within the groups and wilcoxon mann –whitney test u test or unrated t test were used for the above mention parameter to find the significance between the groups .

The pair t test sowed significance for both groups of patients with lateral epicondylitis . The statistical analysis of wilcoxon mann-whitney test were found to be significant in group b the u value of pretest week 1 is 59.0 and the p value is 0.024 which means $p<0.05$.the u value of pretest –week2 is 10.5 and the p value 0.024 which means $p<0.05$ .and the u value of week1-week2 is 45 and the p value 0.003 which means $p<0.05$ .this shows that significant improvement in the reduction of pain after the treatment of ultrasonic therapy along with taping .

But unrated t test the t value of pretest - week 1 is 4.06 and the p value is 0.000 which means $p<0.05$,the t value of pre-week2 is 5.88and the p value is 0.000 which means $p<0.05$ .the t value of week1- week2 is 5.74 and the p value is 0.000 which means $p<0.05$ this show the there is significant improvement in the grip strength between the groups after the treatment .

But average improvement show it is more in ultrasound along with taping group .this states that there is significant effect when using ultrasound therapy along with taping in

decreasing the pain and improve the grip strength of patients with lateral epicondylitis .

Discussion

Lateral epicondylitis is a soft tissue injury that is characterized by pain and tenderness at the lateral epicondyle of the humerus , due to non specific inflammation at the region of the extensor muscles of the forearm . in this study the researcher aims to analyze better improvement in functional outcome by using ultrasound along with taping technique over ultrasound therapy .this study was done in 30 subjects with the age 30-50 years who were divided into to group a a(ultrasound therapy technique)and group b (ultrasound therapy along with taping technique)by convenience sampling .

This study show significant changes in the assessment of pain and grip strength by using ultrasound therapy along with taping as treatment program . this study showed significant changes in the assessment of grip strength by using ultrasound therapy technique as a treatment program but average differences showed there is average improvement in the ultrasound along with taping technique.

Conclusion

The result were found to be significant stating that there is decrease in pain parameters and improvement in grip strength using ultrasonic therapy along with taping then ultrasonic therapy technique in subject with lateral epicondylitis .

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