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COMPARATIVE EVALUATION OF EXTRACORPOREAL SHOCKWAVE THERAPY AND PHYSICAL THERAPY IN LATERAL EPICONDYLITIS

Sports Science

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ABSTRACT

INTRODUCTION: Lateral epicondylitis or tennis elbow is one of the most common tendinopathy of the upper limb. Electrotherapy, commonly Extracorporeal shock wave therapy (ESWT) is used in treatment of tennis elbow.

AIM: To compare the therapeutic effects of ESWT with physical therapy in patients of lateral epicondylitis.

Design: Prospective, randomised (single blind) clinical trial.

METHODS: 60 patients were randomised into 2 groups of 30 each. Group A patients were treated with ESWT along with physical therapy, while group B patients treated with physical therapy alone. ESWT was given 3 times per week for 3 weeks. Follow up was taken at 3, 6 and 12 weeks following completion of therapy with Visual analogue scale (VAS) and MAYO elbow score.

RESULTS: Decreased intensity of pain and improvement in function was seen in both the groups. Mean VAS scores were significantly better in patient treated with ESWT as compared to physical therapy at 3,6 and 12weeks ($p<0.0001$) follow up. Meanwhile MAYO score were also statistically significant in ESWT group at each follow up ($p<0.0001$) compared to patients treated with physical therapy.

CONCLUSION: ESWT in patients of lateral epicondylitis was found to be more effective than physical therapy.

KEYWORDS

Lateral epicondylitis, ESWT, physical therapy.

INTRODUCTION

Tennis elbow is defined as pain at the lateral epicondyle, which is reproduced by digital palpation , resisted wrist extension, resisted middle finger extension, and gripping.(1-3) The dominant arm is commonly affected, with a prevalence of 1–3% in the general population, but this increases to 19% in 30–60 years old individuals and appears to be more long standing and severe in women.(4-7)

It is generally a work related or sport related disorder of the common extensor origin of the arm, usually caused by excessive, quick, monotonous, repetitive movements of the wrist, especially in eccentric contractions and gripping activities causing macroscopic and microscopic tears in the extensor carpi radialis brevis tendon, the most commonly affected structure.(8-10)

ESWT has emerged as an acceptable and popular non-invasive management option for tendon and other pathologies of the musculoskeletal system.(11-13) It mechanisms of action includes direct stimulation of the healing processes, neovascularization, disintegration of calcium and neural effects.(14) It may have direct suppressive effect on nociceptor and hyperstimulation mechanisms which blocks the gate control mechanism.(15)

Physical exercise may counteract the failed healing response, by promoting the collagen fibre cross- linkage formation within the tendon, thereby facilitating tendon remodelling.(16) The aim of this study was to clinically compare the therapeutic effects of ESWT versus physical therapy (Ice packs, NSAIDs, Exercises) in Lateral epicondylitis.(17)

MATERIAL AND METHODS

This study was a prospective randomised control trial conducted from 2016-2018 at the Sports Injury Centre, VMMC and Safdarjung hospital, New Delhi. The patient with pain localised to lateral epicondyle, age more than 18 years and not responding to physical therapy for 2weeks were included in the study. Patients with any evidence of Neuropathy/ Radiculopathy, history of fracture of affected elbow, untreated infection of involved arm, coagulation disorders, tumours of limb, previous surgery or steroid injection for lateral epicondylitis and poor skin condition were excluded from the study.

A total of 60 patients were divided into two groups of 30 each by computer block randomisation method. Patients of group A were treated with ESWT and physical therapy and patients of group B were only treated with Physical therapy alone. Informed consent was signed by all the patients prior to participation.

Extracorporeal shockwave therapy (ESWT) was given 3 times per week for 3week, in dose of 1 mJ/mm2, at the rate of 1000 shock or impulse. Follow up was taken at 3, 6, & 12 week after completion of treatment. Physical therapy given to the patients includes Ice packing, analgesics, and following of eccentric exercise protocol.

Patients were assessed for Functional outcome using the Mayo elbow score or Mayo elbow performance score (MEPS) which tests the limitations of the elbow during activities of daily living using 4 subscales. Pain relief was considered the secondary outcome and was measured using the Visual Analogue Scale. It is a subjective scale whose left and right side corresponds to no pain (0) and unbearable pain (10). Patient marked the scale to indicate their current level of pain.

STATISTICAL ANALYSIS

Categorical variables were presented in number and percentage (%) and continuous variables were presented as mean ± SD and median. Normality of data was tested by Kolmogorov-Smirnov test. Data was found to be normally distributed. Quantitative variables were compared using unpaired t-test between the two group. Qualitative variables were considered using Chi-Square test. A p value of <0.05 was considered statistically significant. The data was entered in MS EXCEL spreadsheet and analysis was done using Statistical Package for Social Sciences (SPSS) version 21.0.

RESULTS

The 60 patients of tennis elbow were divided into two groups of 30 each. The mean age group was 42.73±5.3 and 37.77±7.41 in group A and B respectively. There were 14 female and 16 males in group A and 6 females and 24 males in group B. The population under study however randomised had a statistically significant difference with respect to the gender of the patients ($p=0.028$).

The pain levels were evaluated using VAS score at every follow up in all the patients of both groups. There was no difference in both the groups on their first presentation after inclusion in the study. There was a statistically significant difference in both groups in pain relief at all follow up visits from their previous values. Also, there was a statistically significant difference between the case and the control group with a mean VAS score of 2.53±0.68 & 3.9±0.84 respectively at

3 weeks, 0.87±0.51 and 2.13±0.63 at 6 weeks and 0.33±0.48 & 0.83±0.53 at 12 weeks. The difference between the two groups was significant at all the subsequent visits.

To evaluate the functional improvement, MAYO elbow score was taken at 3, 6 and 12 weeks and compared in both the groups. The initial evaluation revealed no significant difference in both the groups with respect to Mayo elbow score. The scores in both the cases and control improved with subsequent therapy. Although patients in group A, had better mean score of 72.5± 4.31 as compared to control group with a mean score of 71.33± 3.7 but it is found to be statistically non-significant($p<0.311$). There were improvement in Mayo elbow score with a mean value of 81.67± 3.56 & 76± 3.32 at 6 weeks and 88± 2.82 & 84± 2.75 at 12 weeks and was found to be statistically significant ($p<0.0001$).

Table 1: VAS score trend at each follow up

VAS(first visit)			
Sample size	30	30	0.106
Mean ± Stdev	7.13 ± 0.78	7.5 ± 0.86	
Median	7	8	
Min-Max	6-8	6-9	
Inter quartile Range	7 - 8	7 - 8	
VAS (3 weeks)			
Sample size	30	30	<.0001
Mean ± Stdev	2.53 ± 0.68	3.9 ± 0.84	
Median	2	4	
Min-Max	2-4	3-6	
Inter quartile Range	2 - 3	3 - 4	
VAS(6 Weeks)			
Sample size	30	30	<.0001
Mean ± Stdev	0.87 ± 0.51	2.13 ± 0.63	
Median	1	2	
Min-Max	0-2	1-4	
Inter quartile Range	1 - 1	2 - 2	
VAS(12 Weeks)			
Sample size	30	30	0.001
Mean ± Stdev	0.33 ± 0.48	0.83 ± 0.53	
Median	0	1	
Min-Max	0-1	0-2	
Inter quartile Range	0 - 1	1 - 1	

Table 2: Mayo elbow score trend at each follow up

Mayo elbow score(first visit)			
Sample size	30	30	0.077
Mean ± Stdev	63.5 ± 4.38	65.67 ± 4.3	
Median	65	65	
Min-Max	55-70	60-75	
Inter quartile Range	60 - 65	60 - 70	
Mayo elbow score(3Weeks)			
Sample size	30	30	0.311
Mean ± Stdev	72.5 ± 4.31	71.33 ± 3.7	
Median	70	70	
Min-Max	65-80	65-80	
Inter quartile Range	70 - 75	70 - 75	
Mayo elbow score(6 Weeks)			
Sample size	30	30	<.0001
Mean ± Stdev	81.67 ± 3.56	76 ± 3.32	
Median	80	75	
Min-Max	75-85	70-80	
Inter quartile Range	80 - 85	75 - 80	
Mayo elbow score(12 Weeks)			
Sample size	30	30	<.0001
Mean ± Stdev	88 ± 2.82	84 ± 2.75	
Median	90	85	
Min-Max	85-95	80-90	
Inter quartile Range	85 - 90	80 - 85	

Figure 1: VAS trend at each follow up.

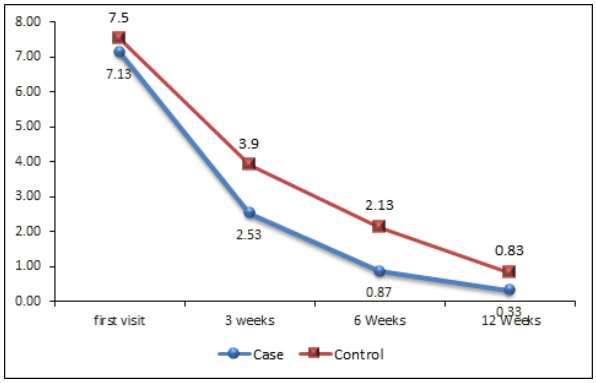
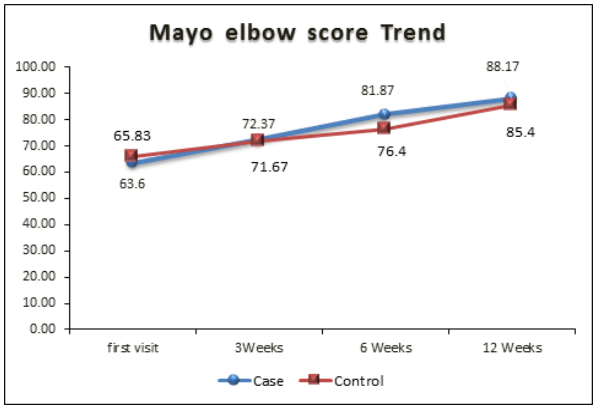


Figure 2: Mayo elbow score at each follow up.



DISCUSSION

The study throws light on ESWT, proving it to be an effective modality of treatment in cases of lateral epicondylitis. Literature has documented the role of ESWT in providing analgesia in these patients with an early recovery and better functional outcomes in patients supplemented with ESWT along with physical therapy. In both groups, pain intensity was similar pre-treatment but post-treatment and 6 weeks post-treatment, significant decreases of pain were observed in the ESWT group than the physical therapy group.

This is in coherence with Spacca et al.(18) compared therapeutic effects of active radial shockwave therapy (RSWT) with sham RSWT. Subjects received 4 RSWT or sham sessions once per week. The RSWT group received 2,000 impulses (1.2 bar at 4 Hz for 500 impulses, and 1 bar at 10 Hz for 1,500 impulses). Meanwhile, the sham RSWT group received 20 impulses (1.2 bar at 4 Hz for 5 impulses, and 1 bar at 10 Hz for 15 impulses). The RSWT group showed a significantly greater decrease of pain and greater increase of pain-free grip strength post-treatment than the sham RSWT group.

In the present study, pain decreased to a significantly greater extent in the ESWT group than in the control group. Furthermore, the therapeutic effect made significant difference in functional scores at 3 and 6 weeks post-treatment, indicating the effectiveness of the ESWT treatment protocol. However, the results were not consistent at the first exposure of the patient. They were almost comparable to patients treated with physical therapy alone. There are studies which have also compared the efficacy of ESWT with US therapy, acupuncture, Physical therapy, Intra-lesional steroids etc. (19,20)

Rompe J D. et al. (21) performed a placebo-controlled trial using repetitive low-energy shock wave treatment in 2004 due to the conflicting evidence regarding ESWT for chronic tennis elbow. The treatment was performed with patients with recalcitrant MRI-confirmed tennis elbow of at least 12 months duration and the follow-up was performed at 3 and 12 months. Thomsen test, Roles and Maudsley score, Upper Extremity Function Scale were used to score the patients. 65% of the active group and 35% of placebo group were able to perform activities at the desired level and achieved at least 50% reduction of pain. The conclusions of the authors agreed, that there is a significant benefit of low-energy ESWT as applied when compared to sham treatment for tennis elbow 3 months after intervention.

Authors had similar results to the fore-mentioned studies where they concluded that the functional & pain scores of ESWT at 3 weeks, 6 weeks & 12 weeks were better when compared to the control group. This probably proved that ESWT had a long lasting effect comparison to physical therapy along with an accelerated recovery in acute stages.

CONCLUSION

ESWT has been a time tested modality in treatment of lateral epicondylitis. The study suggests a better short term (3 & 6 weeks) as well as long term (12 weeks) response, which may become comparable in long run when compared to physical therapy alone. The study also throws light on the fact that standardisation of ESWT is of utmost importance to compare results. The dose-response relationship needs further assessment. The efficacy of ESWT in preventing recurrence in chronic cases also needs long term randomised control trials.

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