

Effect Of Ischemic Compression Therapy with Eccentric Exercises on Selected Outcome Variables in Tennis Elbow Patients - A Pilot Study

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Background

Tennis elbow is the condition characterized by pain and tenderness over the lateral epicondyle of elbow caused due to repetitive movements of wrist and forearm. It is a painful condition which needs early intervention for optimal recovery.

Objective: To assess the effectiveness of the ischemic compression therapy with eccentric exercise on pain, grip strength and amount of difficulty in activities among tennis elbow patients.

Methods: 10 subjects, 6 females and 4 males were recruited for study. The study duration was three weeks and age group from 30 to 45 years were included for the study. All patients received ischemic compression therapy at with the respective painful site followed by eccentric exercises. The outcome measures were pain, grip strength and difficulty in activities, tools used to measure were visual analog scale (VAS), hand grip strength dynamometer and patient-rated tennis elbow evaluation respectively.

Results: Mean difference values of visual analog scale, hand grip strength dynamometer and patient-rated tennis elbow evaluation were 7.40 ± 3.00 , 13.80 ± 23.60 and 65.00 ± 22.00 . All outcome measures were highly significant with $p < 0.0001$.

Conclusion: This study concludes that there is significant improvement in pain, grip strength and amount of difficulty in activities in subjects with tennis elbow following ischemic compression therapy and eccentric exercises.

Key Words: Ischemic compression therapy, Eccentric exercises, Tennis elbow, Pain, Hand grip strength, Amount of difficulty in activities.

Introduction

Lateral epicondylitis also termed as “tennis elbow,” was first described by Runge in 1873¹. Tennis elbow (TE) is regarded as a repetitive overuse injury in the tendons that attach the extensor carpi radialis brevis (ECRB), and the extensor digitorum communis muscles to the lateral epicondyle².

It is a painful condition on and around the bony prominence on the lateral side of the elbow. Hence this painful condition is called as lateral elbow tendinopathy. TE is one of the most often diagnosed disorders of the upper extremity^{3,4}.

It was described as a chronic symptomatic degeneration of the wrist extensor tendons involving their attachment to

the lateral epicondyle of the humerus. It is a common condition, affecting four to seven cases per 1000 patients in general practice⁵, generally affecting the middle-aged without gender predisposition. Despite its relatively high prevalence, there is no single effective and consistent algorithm of management.

Fortunately, most cases are self-limiting and well-managed with simple pain medication, with 90% of patients recovering within one year. Patients with severe or persistent symptoms are suitable for treatment with further conservative or operative options⁶.

Few of the treatments used rest on scientific evidence and none has been proven and generalized more effective than the others. Interpretation as to the success or failure of treatment outcome for TE is difficult because there is no consensus on how to measure treatment outcome in a standardized manner⁷.

The incidence is 1–3% in the population and peak prevalence is between 35 and 45 years of age^{8,9}. The cause is primarily repetitive overuse, and heavy manual labour increases the risk of being affected^{10,11,12,13}.

Ischemic compression, technique help to reduce the trigger points. In this technique pressure is progressively applied over the trigger point area or nodule or taut band in the muscle. The pressure is maintained until the tension is released and treated area felt looser or softer to touch.¹⁴.

Eccentric exercise concept suggested that greater load in the tendon occurs during eccentric training and this stimulates the tendon to undergo structural adaptation, sometimes referred to as “hypertrophic” change, exercise using the elongation phase of muscle activity by lowering weights as treatment for chronic tendon pain was well defined by many researchers^{15,16,17}.

Exercise programmes incorporating eccentric muscle activity are becoming increasingly popular as they are considered to provide a more effective treatment than other forms of exercise therapy^{18,19}. The role of eccentric exercise in the treatment of lateral epicondylitis is not entirely clear. A systematic review showed promising results in support of

eccentric exercise as a treatment for lateral epicondylitis²⁰.

Hence study is intended to find the effectiveness of the ischemic compression therapy along with eccentric exercise on tennis elbow.

Materials and Methods

10 clinically diagnosed lateral epicondylitis subjects of age between 30 to 45 of both sex from KIMS Hospital, Bengaluru, were recruited for this experimental study. Approval for the study was obtained from institutional ethical committee. Written Informed consent was obtained from the participants who volunteered and were willing to take part in the study. Patient information sheet was provided and confidentiality and ethical principles were followed as required for the study. The subjects were assigned consecutively all the extraneous variable were clearly identified and excluded from the study.

The demographic data's were obtained and documented. The pre-test values of pain, grip strength and amount of difficulty in activities were collected before commencement of ischemic compression therapy and eccentric exercise, and post treatment measurement after the three-week treatment sessions. Outcome measures pain, grip strength and amount of difficulty in activities were measured by visual analog scale (VAS), hand grip strength dynamometer and patient-rated tennis elbow evaluation respectively. Participants were treated with ischemic compression therapy along with eccentric exercise for totally 9 sessions (3 sessions per week on alternate days for total of 3 weeks) and each session lasted for 20-30 minutes of structured ischemic compression therapy along with eccentric exercise.

In ischemic compression therapy technique pressure is applied over the trigger point area or nodule or taut band in the muscle. The pressure is maintained until the tension is released. The pressure is applied by the therapist thumb, finger pad, knuckles and elbow. The pressure is applied 60 seconds maximum but mostly the desired effect is achieved in 10 – 20 seconds and repeated for 3 or 4 times. Perhaps, moving to another part of the muscle, if the treated area felt looser or

softer to touch¹⁴.The treatment programme is incorporated with eccentric exercises.

Results

10 participants 6 females and 4 males mean age \pm SD age, 34.77 ± 3.204 were participated in the study. Statistical analysis was performed using the Graph Pad In Stat 3

software, version 16 Mean, standard deviations and mean difference were calculated for each variable. Paired t-test was performed to find the significance between pre and post test values with 95% confidence interval with significance level of $p < 0.001$. Pre & post test analysis and paired t-test results showed significant improvement in all the selected variables (Table 1).

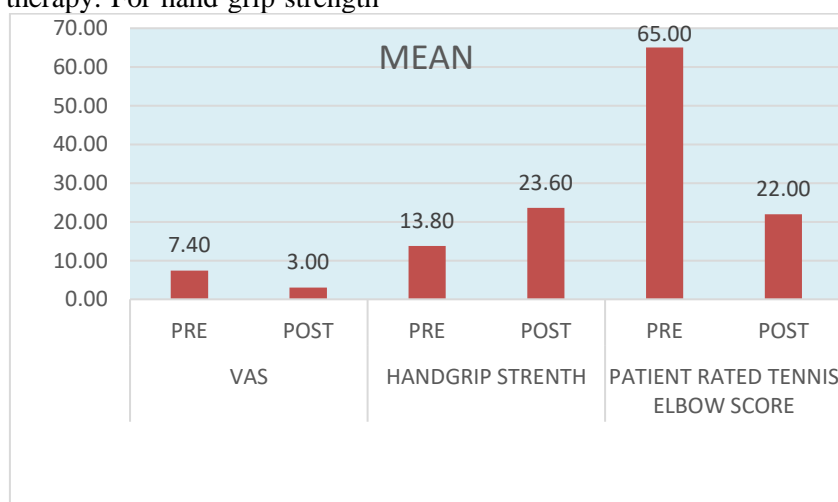
Table 1: Pre-test mean, post-test mean and mean difference and paired ‘t’ values of pain, grip strength and amount of difficulty in activities.

PERIOD	Pain	Grip Strength	Amount of Difficulty in Activities
Pre test mean	7.43 ± 0.843	13.30 ± 1.751	65.00 ± 5.270
Post test mean	3.00 ± 0.89	23.60 ± 1.578	22.00 ± 6.325
Mean difference	4.40	9.80	43.00
T Value	14.402	18.375	20.146
P Value	$<0.001^*$	$<0.001^*$	$<0.001^*$

Table 1 shows the pre test mean, post test mean and mean difference \pm SD values of visual analog scale, hand grip strength dynamometer, patient-rated tennis elbow evaluation.

The pre-test mean \pm standard deviation value for visual analog scale was 7.43 ± 0.843 which reduced to 3.00 ± 0.89 following post therapy. For hand grip strength

dynamometer, the mean value increased from 13.30 ± 1.751 to 23.60 ± 1.578 . Mean pre test value for patient-rated tennis elbow evaluation score 65.00 ± 5.270 was reduced to 22.00 ± 6.325 in post test. Hence pain, hand grip strength and amount of difficulty in activities scores were highly significant following post ischemic compression therapy and eccentric exercises with p value=0.0001.



Graph 1: Shows the pre and post-test values of visual analog scale, hand grip strength dynamometer and patient-rated tennis elbow evaluation.

Discussion

The present three-week study was conducted to determine the effects of ischemic compression therapy and eccentric exercises on the selected variables of tennis elbow patients. The finding of the study shows that the combined therapy significantly reduces pain and improves both hand grip strength and amount of difficulty in activities of patients with tennis elbow.

Ischemic compression technique helps to reduce the trigger points. Trigger points can be deactivated by

allows the formation of new fibrous tissue at the musculotendinous unit, making it temporarily occluding their blood supply and causing a reactive hyperaemia, effectively flushing out the muscle of inflammatory exudates and pain metabolites, breaking down scar tissue, and reducing muscle tone. The muscle is nourished by the extra blood flow, nerve endings are desensitized and scar tissue is broken down so that the muscle fibre can move better. In this technique pressure is progressively applied over the trigger point area or nodule or taut band in the muscle¹⁴.

The tension created through eccentric contractions more resistant to damage. Other possible explanations for the positive effects of eccentric training on tendonitis include “lengthening” of the muscle-tendon unit, which might result in less strain during elbow joint motion, or “loading” of the muscle-tendon unit, which might increase the tensile strength of the tendon and cause hypertrophy of the muscle belly²¹. In the present study there is no clear evidence to differentiate or measure the amount of involvement of ischemic compression technique and eccentric exercises over the selected variables among tennis elbow subjects.

Conclusion

The results of the present study demonstrate that there is significant improvement in pain, hand grip strength and amount of difficulty in activities following the three weeks of ischemic compression technique and eccentric exercises among patients with tennis elbow.

Conflict of Interest

The authors are responsible for the content and writing of this article. The authors declare that there is no conflict of interest.

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