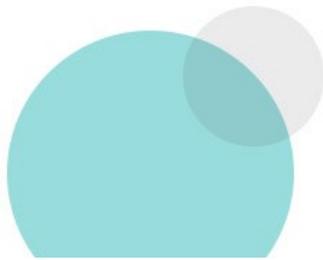


“EFFECTIVENESS OF TENDON RELEASE THERAPY WITH AND WITHOUT ECCENTRIC EXERCISE FOR TRICEPS TENDINOPATHY IN BADMINTON PLAYERS”

(SPORTS MANAGEMENT)

Chapter-I

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ABSTRACT

BACKGROUND & PURPOSE: Triceps Tendinopathy is commonly seen in basketball players, weight lifters and even in Badminton players also. Many studies are available in the literature on Tendinopathies, very few are there on Triceps tendinopathy. No studies are there on Tendon release therapy with and without Eccentric exercise. So, purpose of this study is to compare the effectiveness of Tendon release therapy in combination with Eccentric Exercise and without Eccentric exercise in triceps tendinopathy.

METHODOLOGY: It is an experimental study which was conducted on thirty athletes who were randomly assigned into Tendon release therapy (TRT)Group-A and Tendon Release therapy with Eccentric exercise(TRTE) Group-B. Group A received only TRT and Group B received Tendon Release Therapy with eccentric exercise. TRT for 5min daily one session, Eccentric Exercise for 10 repetitions daily one session. Total duration of study is for 12 weeks. Both groups ROM, MMT and PREE values are recorded on first day of treatment and after 12 weeks. Values were analyzed statistically, the pre-post values of both the groups were analyzed by using students ‘t’ test and post-post values were analyzed using ANOVA.

RESULTS: Both groups showed decrease in pain and improvement in strength, ROM and function, whereas tendon release therapy with Eccentric exercise group-B showed significant decrease in pain, improved muscle strength, ROM and overall function of Elbow with a P value of P<0.0001.

CONCLUSION: The results suggest that Tendon release therapy with eccentric exercise gave superior result in decreasing in pain, improving ROM, Strength and overall performance of elbow.

KEYWORDS:

Tendon release therapy, Eccentric exercise, Manual muscle testing, Range of motion, Patient rated elbow evaluation, Triceps tendinopathy.

I. INTRODUCTION

Triceps tendon rupture/avulsion is a rare injury⁽ⁱ⁾. Rupture most commonly occurs from the osseous tendon insertion in the olecranon or rarely through the muscle or its myotendinous junction. High-risk populations include men and professional players. Although most ruptures occur at the insertion to the olecranon, partial tears, musculotendinous junction tears, and muscle belly tears have also been described⁽ⁱⁱ⁾. Tendon overuse injuries are common in many sports and activities.

The triceps is composed of the long, lateral, and medial heads. The long head originates from the infra-glenoid tuberosity on the scapula, and the lateral head, from the posterior-lateral portion of the humerus and the lateral intramuscular septum. The medial head extends from distal to the spiral groove to within 2.5 cm of the trochlea on the posterior aspect of the humerus⁽ⁱⁱⁱ⁾.

People who use steroids, people with a reduced strength or flexibility and simply lifting heavy objects increase the risk at tendonitis of the triceps. If not treated properly, the recovery process is lengthened^(iv).

Athletes routinely describe pain and/or weakness with activities of elbow extension. Tenderness to palpation occurs at the triceps insertion on the olecranon. In the setting of chronic repetitive injury, plain radiographs may reveal a traction osteophyte on the olecranon. As mentioned, triceps avulsions from the olecranon or intratendinous ruptures are the result of a traumatic injury.

Physical examination may reveal swelling, tenderness, ecchymosis, and a palpable defect just proximal to the olecranon. Strength testing will show weakness of elbow extension, but it is important to note that the ability of a patient to extend his or her elbow does not exclude triceps rupture, because elbow extension can be preserved in cases of partial tears or though the lateral expansion of the triceps fascia.

Histopathologic changes associated with tendinopathy include degeneration and disorganization of collagen fibers, increased cellularity and minimal inflammation⁵. Macroscopic changes include tendon thickening, loss of mechanical properties, and pain^(vi).

Imaging is an essential component of evaluation. Plain radiographs must be obtained. Osseous flakes, referred to as the "flake sign," are pathognomonic for triceps avulsion injuries⁷. Evidence of other or concomitant osseous injury or mal-alignment may also be evident on plain radiograph. MRI or ultrasound⁸ can be helpful in differentiating between partial and complete injury. A differentiating finding for partial triceps tendon tears (specifically, the medial head triceps tendon) is weakness with resisted elbow extension in a flexed position ($> 90^\circ$). Several studies demonstrate little or no inflammation is actually present in tendons exposed to overuse^(ix).

Athletes with triceps tendinosis are initially managed non-operatively with activity modification, non-steroidal anti-inflammatory medications, and physical therapy for stretching and range of motion. Symptomatic resolution may take months. Operative management, consisting of olecranon osteophyte excision and triceps repair is reserved for refractory cases that fail conservative management.

Eccentric strengthening programs have recently been advocated in the treatment of tendinopathy. A literature review identified 16 controlled clinical trials and systematic reviews evaluating this modality. One of these studies had a control group that received no treatment¹⁰. This study showed improvement in the eccentric strengthening group compared to a "wait and see" group at 4 months.

Samuel A. Taylor, et al¹¹, 2012, suggested about use of stretching for triceps tendinopathy. Robertson VJ, Baker KG. A review of therapeutic ultrasound: effectiveness studies ultrasound for treating people with pain or a range of musculoskeletal injuries or for promoting soft tissue healing^(xii).

Deep Friction Massage to Treat Tendinopathy: A Systematic Review of a Classic Treatment in the Face of a New Paradigm of Understanding Michael F. Joseph. et al. Studies examining treatment for supraspinatus outlet impingement have combined DFM to the supraspinatus with joint mobilization and exercise. Two randomized clinical trials from a single institution have been published evaluating hyperthermia compared to therapeutic ultrasound in the treatment of tendinopathy.^(xiii,xiv)

Currently there are no studies on Tendon release therapy with and without eccentric exercise in Triceps tendinopathy. So, purpose of this study is to know the effectiveness between tendon release therapy and tendon release therapy with eccentric exercise in Triceps tendinopathy.

AIMS

To know the effectiveness of Tendon release therapy with and without Eccentric Exercise for Triceps tendinopathy in Badminton players.

- To reduce pain
- To improve Range of Motion
- To improve Muscle strength
- To improve function of Elbow

OBJECTIVES

- PREE score for Pain and Function
- Goniometer to know the Range of motion
- Kendall's manual muscle testing system to know the muscle strength

II. MATERIALS AND METHODOLOGY

Study design: Experimental study
Sampling technique: Convenient Random sampling.
Sample size: 30 subjects.(Group-A 15, Group-B 15)
Duration of study: 12 weeks of treatment for both groups.
Source of Data: The subjects will be considered for this study only after they sign on an approved consent form.
Inclusion Criteria:
 Age group:14-29 years.
 20 male and 10female athletes with clinical diagnosis of Triceps tendinopathy.
 Athletes with pain and disability (50-60) on PREE
 Participants willing to participate in the study.
Exclusion Criteria:
 Participants with open wounds around elbow.
 History of recent fractures or surgeries around Olecranon.
 Neurological and orthopedic deformities.
 Elbow joint effusion.
 Athletes under Drug therapy.
Outcome Parameters:
 Pain and disability is tested using PREE
 ROM is tested using Goniometer
 Muscle strength is tested using (kendalls) Manual muscle testing scale.
 Materials used for the study:
 Goniometer
 Weight cuff
 Treatment Couch with pillows
 Chair
 Data collection sheet

METHODOLOGY-The present study was done on 30 individuals. All the individuals were randomly divided into two groups. Group-A received Tendon Release therapy and Group-B received Tendon release therapy with Eccentric exercise, Tendon release therapy was done for 5 min daily for 12 weeks and Eccentric exercise training is given after Tendon release therapy. After 12 weeks ROM, Strength, Pain & function were measured with Goniometer¹⁵, Manual Muscle testing scale by Kendall¹⁶, PREE(Joy MacDermid)¹⁷ respectively.

PROCEDURE:

Tendon release Therapy described by Thomas Giammatteo¹⁸, applied for 1-2mins for4-5 repetitions. Patient is in prone lying with upper limbs placing beside the trunk.

Procedure is as follows:

Place the index finger (or the index finger plus the third finger) pad of the distal phalanx of the caudal hand over the place of insertion of the inferior end of the tendon. Place the index finger (or the index finger plus third finger) pad of the distal phalanx of the superior hand over the musculotendinous interface of the muscle tendon, at the superior aspect of the tendon.

Push on the tendon tissue with both hands (fingers) with 1 lb. force perpendicular onto the bone.

Then compress the superior aspects and inferior aspects of the tendon together with 1 lb. force, bringing the proximal and distal ends of the tendon close together.

Maintain these (4) compressive forces for one minute for the Advanced Strain and Counterstrain.

If fascial unwinding is perceived, maintain the compressive forces during a de-facilitated Fascial Release.

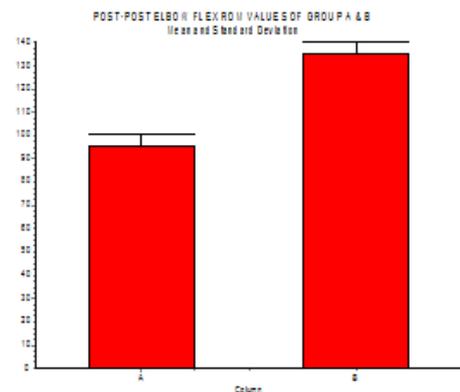
ECCENTRIC EXERCISE

In addition to this, Group “B” is given Eccentric Exercise¹⁹ for patient in supine position with shoulder flexed 90°, elbow extended and forearm in Supination
 Elbow is flexed& returned to starting position which is repeated for 10times, 3 sets daily once for 12 weeks; gradually resistance is added. Along with this another variant of triceps eccentric exercise is also administered Patient is asked to sit grasping a weight cuff with the affected hand. Reach toward the ceiling. Bending the involved elbow, slowly lower the weight behind the head until the weight touches upper back. Lift the weight up over head and reach toward the ceiling again²⁰. Repeat 10 times.

After completion of 12 weeks study duration values of pre-treatment (measured on 1st day of treatment) and post-treatment ROM, MMT, and PREE were analyzed statistically by using student t- test.

III. STATISTICAL ANALYSIS

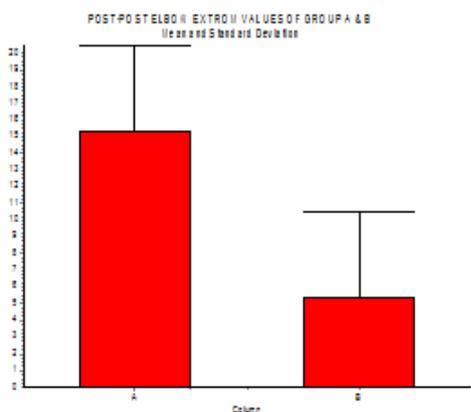
POST-POST ELBOW FLEX ROM VALUES OF GROUP A & B



The two-tailed P value is < 0.0001, considered extremely significant.

Parameter	TRT	TRT+EE
Mean	95.333	135.33
Std. deviation	5.164	5.164
Std. error	1.333	1.333
T value	21.213	
F value	1.000	

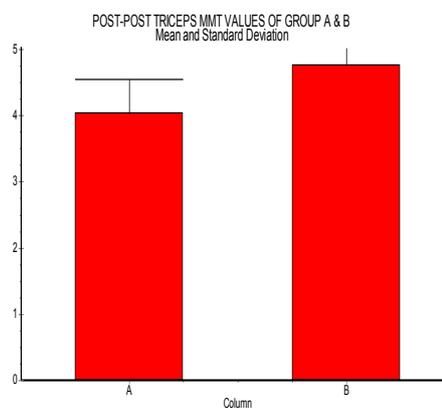
POST-POST ELBOW EXT ROM VALUES OF GROUP A & B



The two-tailed P value is < 0.0001, considered extremely significant.

Parameter	TRT	TRT+EE
Mean	15.333	5.333
Std.deviation	5.164	5.164
Std.error	1.333	1.333
T value	5.303	
F value	1.000	

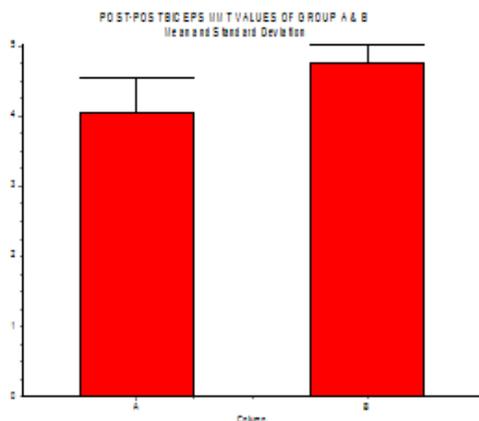
POST-POST TRICEPS MMT VALUES OF GROUP A & B



The two-tailed P value is < 0.0001, considered extremely significant.

Parameter	TRT	TRT+E.E
Mean	4.033	4.767
Std. Deviation	0.5164	0.2582
Std. Error	0.1333	0.06667
T value	4.919	
F value	4.000	

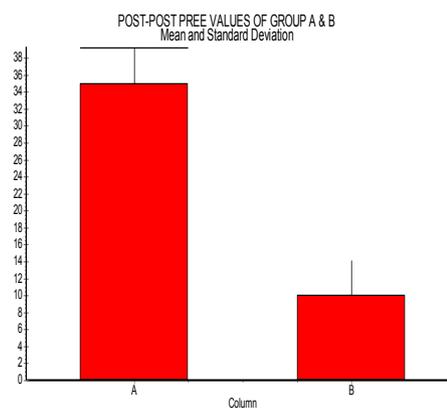
POST-POST BICEPS MMT VALUES OF GROUP A & B



The two-tailed P value is < 0.0001, considered extremely significant.

Parameter	TRT	TRT+EE
Mean	4.033	4,767
Std.deviation	0.5164	0.2582
Std.Error	0.1333	0.06667
T value	4.919	
F value	4.000	

POST-POST PREE VALUES OF GROUP A & B



The two-tailed P value is < 0.0001, considered extremely significant.

Parameter	TRT	TRT+E.E
Mean	35.000	10.000
Std. Deviation	4.226	4.226
Std. Error	1.091	1.091
T value	16.202	
F value	1.000	

IV. RESULTS

This study on 30 badminton athletes with Triceps tendinopathy both male & female for 12 weeks of duration showed significant difference between Tendon release therapy & Tendon Release therapy with Eccentric Exercise with $P < 0.0001$ which is considered extremely significant in decreasing pain, improving ROM, strength and overall function of elbow in Triceps tendinopathy suggesting Tendon release therapy with eccentric exercise is better than Tendon release therapy alone.

V. DISCUSSION

Results of the present study for 12 weeks of duration showed significant difference between Tendon release therapy & Tendon Release therapy with Eccentric Exercise with $P < 0.0001$ in decreasing pain, improving ROM, strength and overall function of elbow in Triceps tendinopathy.

D. Hopper et al²¹ in their study revealed that Soft tissue Manipulation significantly increased hamstring flexibility which increased hip flexion angle and M.A Young et al²², concluded that declined squat exercise by progressing with load offers greater clinical gains in relation to knee function in patellar tendinopathy. Similarly in the present study there is a noticeable increase in flexibility of elbow which was due to increase in extensibility of collagen fibers over the myotendinous region of Triceps by tendon release therapy with eccentric exercise.

In another study by P.M Tiduset al²³ who said that STM was not an effective treatment for enhancing long term restoration of post exercise muscle strength. Whereas Vasseljen, et al²⁴ improvements in pain-free wrist extension strength is possible when STM is applied in combination with other Physical modalities. Karsten Knobloch et al²⁵ concluded that eccentric exercise training program performed daily over 12 weeks was beneficial in increasing micro circulation which increases muscle strength. In this study it is observed that there is gradual increase in muscle strength as the pain is reduced by the end of 12 weeks which resulted from eccentric exercise & soft tissue Manipulation due to increased local blood flow to the area & increased metabolic rate in the exercised muscles.

Michael F Joseph et al²⁶ suggested that Soft tissue Manipulation as a single modality of treatment in comparison with other methods has not been showed its isolated efficacy in relation to overall function whereas Manual therapy along with supervised exercise will decrease pain, increase strength & function (Michael D. Bang)²⁷. PREE in this study in both groups showed improvement but when compared in between both of them, Tendon release therapy with eccentric exercise acquired significant result in relation to pain, function around elbow which may be due to increase in both local circulatory as well as metabolic changes by Tendon release therapy and improvement in joint flexibility, strength of elbow musculature because of eccentric exercise by increasing extensibility & force of contraction of muscles around elbow. Both of these effects by soft tissue manipulation and eccentric exercise improved overall function in Triceps Tendinopathy.

VI. CONCLUSION

In Triceps tendinopathy, Tendon release therapy with Eccentric exercise has beneficial effect when compared with Tendon release therapy alone in terms of decreasing pain, improving Range of motion, Strength and overall performance of elbow which helped players to return to their sport as early as possible.

LIMITATIONS & SUGGESTIONS

Sample studied was small and the study reduces the generalization, therefore study with a larger population is recommended.

No equal distribution of gender (male: female ratio in both groups).

Age limit (younger and veteran athletes).

Hand dominance was not considered which may have an impact on treatment duration.

VII. IMAGES



TENDON RELEASE THERAPY



ECCENTRIC EXERCISE TRAINING



ECCENTRIC TRAINING WITH WEIGHT CUFF

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