ORIGINAL RESEARCH PAPER

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KEY WORDS: Elastic resistance band, Free weights, Over Head atheletes, Rotator cuff muscle injury.

EFFECTS OF ELASTIC RESISTANCE BAND TRAINING VERSUS FREE WEIGHTS TRAINING ON ROTATOR CUFF MUSCLE INJURY IN MALE OVER HEAD ATHELETES

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ABSTRACT

Aim: To find out the A comparative study on elastic resistance band training versus free weights resistance training on rotator cuff muscle injury in over Head atheletes. **Materials and Methods:** A total of 30 subjects consisting of males in the age group of 18-45 years were included in the study based on inclusion and exclusion criteria .The inclusion criteria were subjects diagnosed with rotator cuff teared over Head atheletes confirmed by the physiotherapist, subjects who provided informed consent,and those willing to participate in the study. **Results:**The statistical analysis shows that both groups have significant improvement in their symptoms. Group A has greater improvement than Group B which is statistically significant. **Conclusion:** This study concluded that elastic resistance training is more effective in comparison to free weights resistance training on rotator cuff muscle injury in male over Head atheletes.

INTRODUCTION

The overhead throwing motion is an intricate, highly coordinated musculoskeletal sequence placing multi-directional and supraphysiological forces on the shoulder. The repetitive and highly demanding action results in adaptive structural changes allowing the athlete to effectively perform the overhead athletic motion; however, this is often at the expense of the normal kinematics of the glenohumeral joint. Abnormal kinematics coupled with altered motion could result in a variety of pathologic changes and injuries at the shoulder including; scapular dyskinesia, glenohumeral internal rotation deficit (GRID), superior labral anterior posterior (SLAP) tears, and rotator cuff tears. Because of the continued prevalence of injury in this athletic population, it is important to understand the biomechanics of throwing, how to physically evaluate and work–up these athletes, and subsequently determine the best treatment options.

The most common cause of shoulder pain and injuries are rotator cuff disorders. Research shows that rotator cuff strengthening exercises to enhance scapulothoracic stability are effective to reduce pain and strengthen and reconditioning rotator tendons 8-15. The function of the rotator cuff is to stabilize the head of the humerus in the socket of the shoulder blade. A strong and functional rotator cuff widen the subacromial space during the shoulder flexion and abduction which are frequently takes place while playing the badminton and prevents rub of the rotator cuff tendon against the acromion. Rotator cuff exercises will improve shoulder function and prevent rotator cuff impingement. Shoulder rotator cuff strengthening can be done by using various resistance devises like dumbbells, springs, therabands, barbells, weight cuffs.

This study is conducted to know the effectiveness of theraband and dumbbells resistance training Therabands are being used from almost a century to do elastic resistance exercises. The elastic resistance and free weight resistance (barbells and dumbbells) have similar properties those are, 1) both provide resistance. 2) both allow free range of motion. 3) both allow different speed of movement. 4) both allow progressive resistance all these four properties are critical for the offered by effective resistance training program.

MATERIALS AND METHODS

Selection of Subjects

This work has been conducted in the Outpatient Department of Thanthai Roever College Of Physiotherapy,Perambalur. The study design was experimental, and randomization of the individuals was done by using a simple random method. A total of 30 subjects consisting of males in the age group of 18-45 years were included in the study based on inclusion and exclusion criteria . The inclusion criteria were subjects diagnosed with rotator cuff teared over Head atheletes confirmed by the physiotherapist, subjects who provided informed consent,and those willing to participate in the study. The exclusion criteria included Female, Shoulder pain, Any history of falls, Subjects, who are undergoing, any strength training, Age less than 18 years.

Procedure

After a thorough explanation of the protocols to all the participants, they were provided with a consent form approved by the ethical committee. Then, subjects were assigned into two groups of 15 each. Group A subjects were trained with theraband and Group B subjects were trained with dumbbell . The duration of the intervention was 6 weeks with a frequency of 3 days a week . All 30 subjects in both groups were screened for pre and post-intervention assessments using outcome measures of Numerical pain rating scale for pain, hand dynamo meter for grip strength, range of motion for functional performance.

Intervention

Elastic Resistance Band Training : For Group A
Dumbbell Resistance training: Initially 1RM was calculated for each subject to decide the poundage for the intervention. The poundage given was 50% resistance of 1RM during the first two weeks, 75% resistance of 1RM was given during 3rd and 4th week and 100% resistance of 1RM was given during the 5th and 6th week.

Free Weights Resistance Training : For Group B
Initially the yellow colour band was used for first 2 weeks, and then green during the 3rd and 4th week and black for the last 2 weeks. The total duration of the training was 6 weeks, 3days/ week, and 1 session/day and each session lasting for 40 minutes (10 minutes warm up, 25 minutes exercise protocol and 5 minutes cool down) as follows.

Outcome Measures

- Numerical Pain Rating Scale
- Hand Dynamo Meter
- Range Of Motion

RESULTS

Group A (pre value)
At the begging the mean values of NPRS is 8.2, hand dynamometer is 28.8 and goniometer value of flexion is 32, extension 15, adduction 17.6, abduction 29.2, medial rotation 19.6, lateral 20.6.
Group B (post value)
At the end the mean Value of NPRS is 2.5, hand dynamo meter is 38.8 and goniometer value of flexion is 49, extension 26,

adduction 30, abduction 53.3, medial rotation 30, lateral rotation 31.3

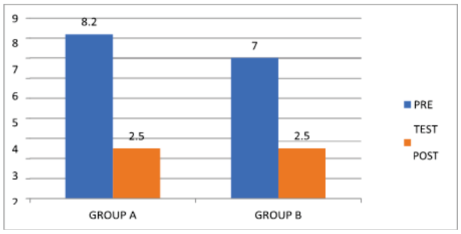
Group A (pre value)
At the begging the mean values of NPRS is 7.0, hand dynamometer is 20.16and goniometer value of flexion is 32, extension 18.6, adduction 17.8, abduction 32.7, medial rotation 19.6, lateral 20.6.
Group B (post value)
At the end the mean Value of NPRS is 2.3, hand dynamo meter is 41.33 and goniometer value of flexion is 41.2, extension 39.2, adduction 32.2, abduction 51.2, medial rotation 50, lateral rotation 50.6.

Table 1: Mean Value Of NPRS (group A)

	N	MEAN	MEAN DIFFERENCE
PRE	15	8.2	5.7
POST	15	2.5	

Table 2: Mean Value Of NPRS (group B)

	N	MEAN	MEAN DIFFERENCE
PRE	15	7.0	4.7
POST	15	2.3	



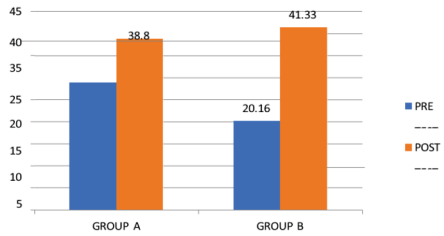
Graph 1: Mean Value Of NPRS Group A & B

Table 3: Mean Value Of Hand Dynamometer (group A)

	N	MEAN	MEAN DIFFERENCE
PRE	15	28.8	25
POST	15	38.8	

Table 4: Mean Value Of Hand Dynamometer (group B)

	N	MEAN	MEAN DIFFERENCE
PRE	15	20.16	21.17
POST	15	41.33	



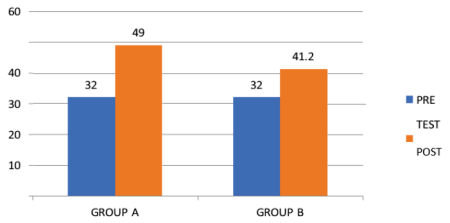
Graph 2: Mean Value Of Hand Dynamometer (group A & B)

Table 5: Mean Value Of Shoulder Range Of Motion (group A)

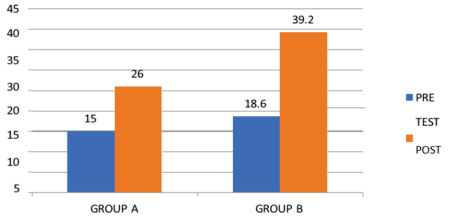
ROM	Flexion	Extension	Adduction	Abduction	Medrotation	Latrotion
PRE TEST	32	15	17.6	29.2	19.6	20.6
POST TEST	49	26	30	53.3	30	31.3
MEAN DIFFE	17	31	12.4	24.1	10.4	10.7

Table 6: Mean Value Of Shoulder Range Of Motion (group B)

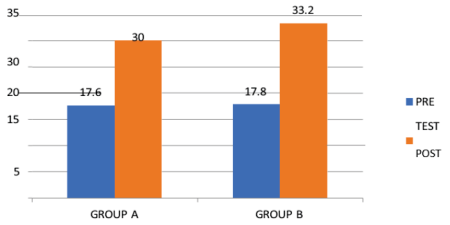
ROM	Flexion	Extension	Adduction	Abduction	Medrotation	Latrotion
PRE TEST	32	18.6	17.8	32.7	19.6	20.6
POST TEST	41.2	39.2	32.2	51.2	50	50.6
MEAN DIFFE	9.2	20.6	14.4	18.5	30.4	30



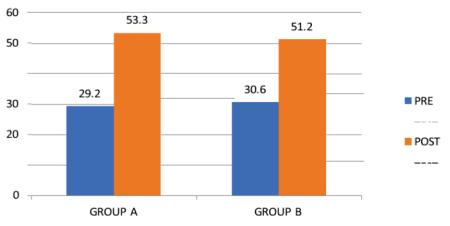
Graph: 3 Pre And Post Mean Value Of Shoulder Flexion



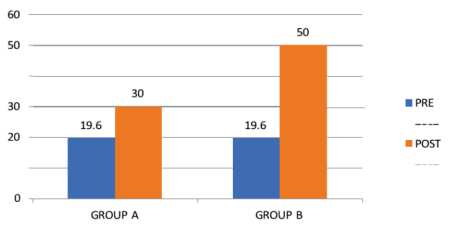
Graph: 4 Pre And Post Mean Value Of Shoulder Extension



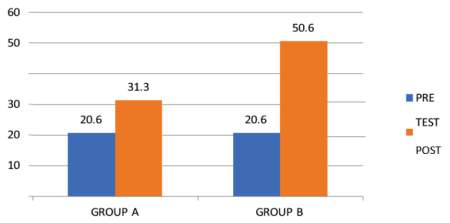
Graph: 5 Pre And Post Mean Value Of Shoulder Adduction



Graph: 6 Pre And Post Mean Value Of Shoulder Abduction



Graph: 7 Pre And Post Mean Value Of Shoulder Medial Rotation



Graph: 8 Pre And Post Mean Value Of Shoulder Lateral Rotation

DISCUSSION

In the present study, out of 30 Male over head atheletes, 15 playerswere selected for RT using therabands and 15 players were selected for RTusing dumbbells. The strength of shoulder IR and ER showed significant improvement after 6 weeks of resistance training with theraband and dumbbell

The results in the table 1 shows that there was significant improvement in the strength (peak torque) of shoulder ER after 6 weeks in the theraband RT group.A study conducted by Frank A Trieber et al (1998) concluded that resistance training by using theraband tubing and light weight dumbbells increase the shoulder internal and external rotator torque and serve performance.

Andre Nunes et.al., (2008) concluded that with Portuguese junior over head atheletes confirm adaptive changes in the dominant arm of tennis players between 16-45 years in terms of strength and flexibility of shoulder rotation movements. Deficit in external rotator strength combined with loss in stretching capacity may predispose the tennis player to shoulder instability and injury

The improvement of muscle strength after the resistance training may be due to the changes induced in the central nervous system which can increase the number of motor units recreated to alter motor neuron firing rate. This will enhance motor unit synchronization during particular movement patterns and results in the removal of neural inhibition concluded that subjects who undergone RT using theraband have more improvement of strength of IR and ER than the subjects who undergone RT using dumbbell concluded that resistance training by using theraband tubing and light weight dumbbells increase the shoulder internal and external rotator torque and serve performance.

CONCLUSION

There was improvement of strength of shoulder internal rotation, external rotation, Flexion, extension, and abduction in both the groups. But the subjects who have undergone RT using theraband have more improvement of strength of internal rotation, external rotation, flexion, extension and abduction than the subjects who undergone RT using dumbbells. Hence, the null hypothesis is rejected and the alternative hypothesis is accepted.

The study concluded that elastic resistance training is more effective in comparison to free weights resistance training on rotator cuff muscle injury in male over Head atheletes.

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Conflicts of Interest

There are no conflicts of interest.

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