

Sports Physiotherapeutic Effects of Thrower's Ten Training on Shoulder Performance Novice Badminton Players

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Abstract: Novice Badminton is a sport that requires a lot of overhead motion, with shoulder in abduction / external rotation. Analyzing the badminton smash shot biomechanically has revealed that during this phase there is a powerful inward rotation of the arm, followed by inward rotation of forearm and lastly a flexion of the hand. The impact with the shuttle occurs high and slightly in front of the body.

Objectives: To find out the effectiveness of thrower's ten exercise program in throwing distance among badminton players, to find out the effectiveness of thrower's ten exercise program in throwing accuracy among novice badminton players.

Background: Badminton is a sport that requires a lot of overhead motion with shoulder in abduction/external rotation. Analyzing the badminton smash shot biomechanically has revealed that during this phase there is a powerful inward rotation of the arm, followed by inward rotation of forearm and lastly a flexion of the hand.

Method: Thrower's ten program incorporates throwing motion specific exercises and movement patterns performed in a discrete series by using variables of Throwing distance & Throwing accuracy and administered by functional throwing performance index, medicine ball throw test & Thrower's ten exercise program.

Results: Analysis of dependent variable throwing accuracy, the calculated paired 't' value is 12.10 and the 't' table value is 3.250. Since the calculated 't' value is more than 't' table value, there is significant difference in throwing accuracy following thrower's ten exercise program among badminton players.

Analysis of dependent variable throwing distance, the calculated paired 't' value is 12.45 and the paired 't' table value is 3.250. Hence the calculated 't' value is greater than 't' table value. There is significant difference in throwing distance following thrower's ten exercise program among badminton players.

Conclusion: The author concluded that there is significant difference in throwing accuracy and throwing distance among 10 badminton players.

Keywords: Sports Physiotherapeutic, Novice Badminton, Thrower's Ten Training, badminton players.

1. INTRODUCTION

Badminton is a sport that requires a lot of overhead motion, with shoulder in abduction / external rotation. Analyzing the badminton smash shot biomechanically has revealed that during this phase there is a powerful inward rotation of the arm, followed by inward rotation of forearm and lastly a flexion of the hand. The impact with the shuttle occurs high and slightly in front of the body (Tang 1995).

The overhead motion such as throwing, serving in tennis, javelin and badminton etc are highly skilled movements. Such movements require flexibility, muscular strength, co-ordination, synchronicity and neuromuscular control of arm (Keith 2000)

Shoulder injuries amongst badminton players are extremely common. Badminton places a high and very sport specific demand to the sporting shoulder. In mechanical terms the shoulder has to deliver highly repetitive arm actions, performed at high speed and high force. This is also combined with reaching for the shuttle which may place the arm, shoulder girdle and trunk at extreme ranges of movement which may place the shoulder at increased risk of injury (Jorgensen 1987).

Musculoskeletal injuries are common among badminton players. Certain studies reported shoulder injuries as the primary upper limb injury in Malaysian badminton players. Rotator cuff tendinopathy, Biceps tendinopathy, Muscle strains of deltoid, trapezius and triceps, Acromioclavicular joint strains are the commonest shoulder injuries to the badminton players (Sharif 2009).

Muscle power is considered as an important parameter responsible for successful rapid movements performed with maximum effort, such as throwing. The Thrower's ten exercise programme is designed to exercise the major muscles necessary for throwing. All exercises included are specific to the thrower and are designed to improve strength, power and endurance of the musculature of the shoulder complex (Newton 1995).

Exercises used in Thrower's ten programme are most effective in activating the muscle important to the throwing motion and may be beneficial for athlete's pre-throwing warm up routine (Myers et-al 2005).

Overhead throwing motion is a high velocity, extremely stressful athletic movement. Its repetitive nature places tremendous demands on the entire body, frequently resulting in injury to the throwing shoulder. Such injuries whether managed non-operatively or surgically, require a multiphased approach beginning with exercises to restore muscle strength and proprioception and advancing to more demanding exercises to improve power, endurance and dynamic control. Thrower's ten programme incorporates throwing motion specific exercises and movement patterns performed in a discrete series, utilizing principles of co-activation, high level neuromuscular control, dynamic stabilization, muscular facilitation, strength, endurance and co-ordination which all serve to restore muscle balance and symmetry in overhead athletes (Wilk 2008).

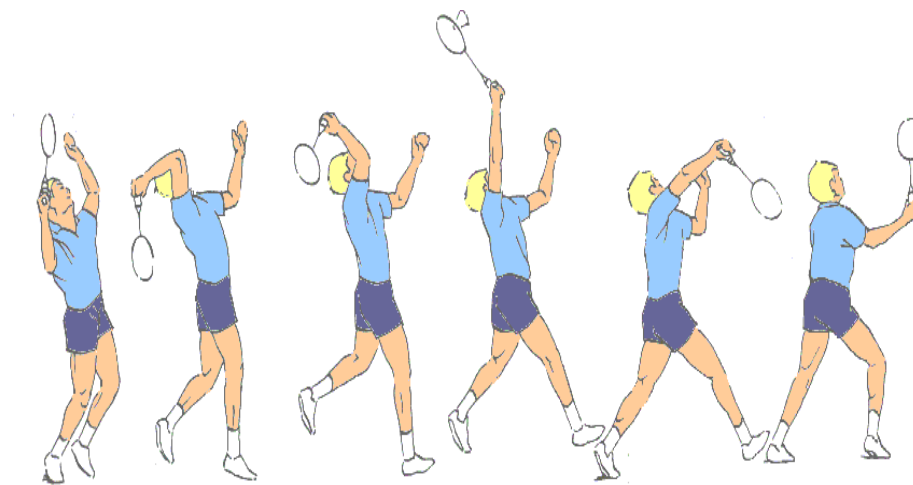


Figure 1: over head performance in badminton players

Statement of the study:

A study to find out the effectiveness of thrower's ten exercise programme in shoulder performance among novice badminton players.

Objectives of the study:

1. To find out the effectiveness of thrower's ten exercise programme in throwing distance among novice badminton players.
2. To find out the effectiveness of thrower's ten exercise programme in throwing accuracy among novice badminton players.

Need of the study:

This study was aimed to introduce thrower's ten exercise programme in shoulder performance among badminton players. The other motive was to popularize this technique among sports physiotherapy population.

2. METHODOLOGY

Selection of subjects:

20 Subjects were randomly selected who fulfilled the inclusion criteria.

Variables:

Dependent variables

1. Throwing distance
2. Throwing accuracy

Independent variables

Thrower's ten exercise program

Study design:

The study design used was pre-test and post-test experimental design.

Inclusion criteria:

1. Novice badminton players
2. Novice badminton players only Males
3. Novice badminton players with 20-25 years
4. Novice badminton players being engaged in sport that required athletes arm to be above shoulder height on a repetitive basis during throwing.
5. Novice badminton players Duration of sporting activities for 2 year with at least 6 months a year and a frequency of minimum 40 minutes thrice a week.

Exclusion criteria:

1. Novice badminton players with history of upper limb fracture with in past two months.
2. Novice badminton players Novice badminton players with Shoulder or neck musculoskeletal surgery in past 6 months.
3. Novice badminton players with Rotator cuff tears.
4. Novice badminton players Cervical spine pathology.
5. Novice badminton players Spinal deformity.
6. Novice badminton players with Glenohumeral subluxation.
7. Novice badminton players with Glenohumeral dislocation.

Orientation to the subjects:

Before collection of data, all the subjects were explained about the purpose of the study. The investigators have given a detail orientation to the various test procedures, such as FTPI to measure throwing accuracy and medicine ball throw test to measure throwing distance. The concern and full cooperation of each participants was sought after complete explanation of the condition and demonstration of the procedures involved in the study.

Materials used:

1. Data collection sheet
2. Evaluation chart
3. Thera band
4. Dumbbell
5. Medicine ball

6. Measuring tape
7. Rubber ball
8. Client concern chart
9. Test administration:

Functional Throwing Performance Index (FTPI)

Functional ability of the shoulder joint was assessed using FTPI. The subject stood 4.57 m from a target, a 30.48 x 30.48 cm square on a wall at a height of 1.22m from the floor. The object of the test was to throw a rubber playground ball into the target as many times as possible over 30 second trials. Before testing, subjects performed 8 throws as a warm-up. Test began immediately after the warm up and consisted of the subject throwing the ball into the target, catching the rebound of the wall, and repeating as many times as possible within 30 seconds. The FTPI was calculated as the number throws within the target divided by total number of balls thrown. To avoid any discrepancies in judgements, the same examiner determined the accuracy of all throws.

Medicine ball throw test

Medicine ball throw test was used to assess upper-body explosive power. Many athletic skills also involve generating or transferring explosive power through the upper extremities and trunk musculature. Throwing distance was measured by using the medicine ball throw test. In this test, participants were instructed to throw a medicine ball as far as they could, in a kneeling position on the floor, holding the ball overhead with the dominant hand. The medicine ball used had a mass of 2 kg and diameter 56 cm. each subjects performed five trials with one minute rest between trials. The distance in meter to which the subject threw the medicine ball was measured with a measuring tape. The best of five trials was taken and used for further analysis.

Procedure:

Thrower's ten exercise program

The thrower's ten exercise program is designed to exercise the major muscles necessary for throwing. The program's goal is to be an organized and concise exercise program. All exercises include are specific to the thrower and are designed to improve strength, power and endurance of the shoulder complex musculature.

Figure 2: diagonal pattern D2 extension



Figure 3: diagonal pattern D2 flexion



Figure 4: external rotation at 0 degree abduction



Figure 5: internal rotation at 0 degree abduction



Collection of data

10 subjects were performed thrower’s ten exercise program thrice a week for four weeks. The training volume ranges from 8 to 10 repetitions per set including 3 sets of all exercises per session followed by a 30 second rest period in between set of exercises. Before and after the intervention, throwing accuracy was evaluated by FTPI and throwing distance was evaluated by medicine ball throw test and recorded.

Statistical technique

The collected data were analyzed by paired ‘t’ test to find out significant difference between pre-test and post-test values.

3. RESULT

Table 1: The table shows mean value, mean difference, standard deviation and paired ‘t’ value between pre-test and post-test scores of throwing accuracy among badminton players.

Variable	Mean	Mean Difference	Standard deviation	Paired ‘t’ value
Pre-test	0.46	0.13	0.033	12.10*
Post-test	0.59			

*0.005 is the level of significant

The calculated paired ‘t’ value is 12.10 and ‘t’ table value is 3.250 at

0.005 level. Since the calculated ‘t’ value is more than ‘t’ table value. The above value shows that there is significant difference in throwing accuracy following **Thrower’s ten exercise program among badminton players.**

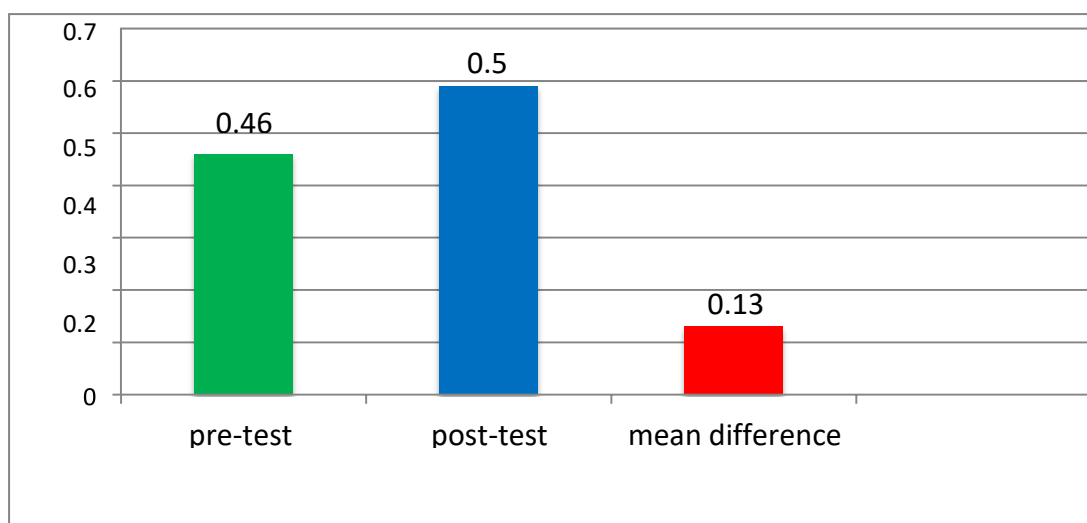


Figure 6: shows the graphical representation of pre-test and post-test mean values of throwing accuracy.

Table 2: The table shows mean value, mean difference, standard deviation and paired ‘t’ value between pre and post test scores of throwing distance among badminton players.

variable	mean	Mean difference	Standard deviation	Paired ‘t’ value
Pre test	6.42	0.56	0.14	12.45*
post test	6.98			

*0.005 is the level of significant

For the throwing distance the calculated paired ‘t’ value is 12.45 and ‘t’ table value is 3.250 at 0.005 level. Since the calculated t’ value is more than ‘t’ table value. The above value shows that there is significant difference in throwing distance following thrower’s ten exercise program among badminton players.

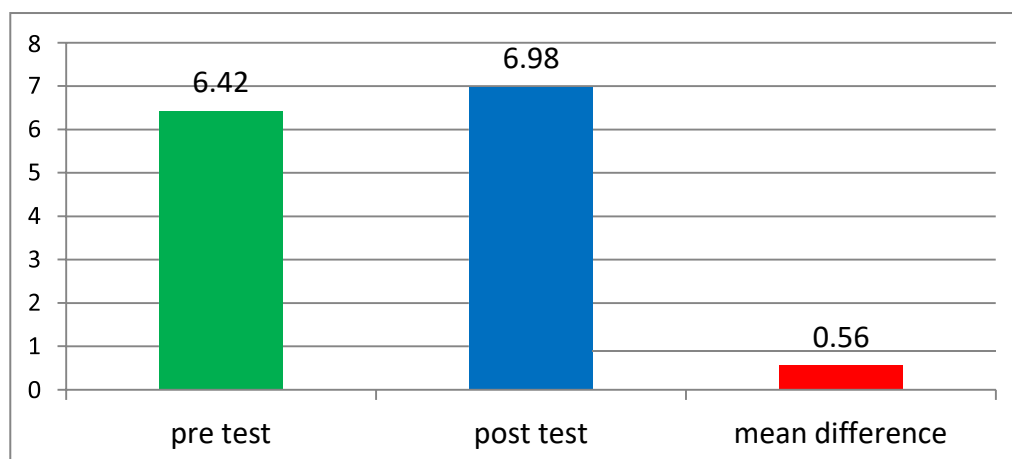


Figure 7: shows graphical representation of pre and post mean values of throwing distance among badminton players.

Results

Ten no-vice badminton players were taken for the study. The subjects were received thrower's ten exercise program. The throwing accuracy and throwing distance were measured before and after the treatment.

Analysis of dependent variable throwing accuracy, the calculated paired 't' value is 12.10 and the 't' table value is 3.250. Since the calculated 't' value is more than 't' table value, there is significant difference in throwing accuracy following thrower's ten exercise program among badminton players.

Analysis of dependent variable throwing distance, the calculated paired 't' value is 12.45 and the paired 't' table value is 3.250. Hence the calculated 't' value is greater than 't' table value. There is significant difference in throwing distance following thrower's ten exercise program among badminton players.

4. DISCUSSION

The thrower's ten exercise programme has been designed to exercise the major muscles necessary to return to throwing. The programme's goal is to be an organised and precise exercise programme specific to the thrower to improve strength, power, and endurance of the shoulder musculature. The aim of the study was to assess the effectiveness of thrower's ten exercise program in components of shoulder performance such as throwing accuracy and throwing distance among badminton players. 10 badminton players selected for the study and received thrower's ten exercise program.

The result of the present study shows that there is significant difference in throwing accuracy and throwing distance. Newton (1995) stated that muscle power is considered as an important parameter responsible for successful rapid movements performed with maximum effort, such as throwing. All exercises included are specific to the thrower and are designed to improve strength, power and endurance of the musculature of the shoulder complex. Kevin E Wilk(2008) stated that thrower's ten programme incorporates throwing motion specific exercises and movement patterns performed in a discrete series, utilizing principles of co-activation, high level neuromuscular control, dynamic stabilization, muscular facilitation, strength, endurance, and co-ordination which all serve to restore muscle balance and symmetry in overhead athletes.

5. CONCLUSION

The study was conducted to investigate the effectiveness of thrower's ten exercise program on throwing accuracy and throwing distance among badminton players. 10 no-vice badminton players were included in the study and received thrower's ten exercise programs for six weeks. The throwing accuracy was measured before and after by Functional Throwing Performance Index (FTPI) and throwing distance was measured before and after by Medicine Ball Throw Test. From the statistical results, it can be concluded that there is significant difference in throwing accuracy and throwing distance among 10 badminton novice players.

Limitations

- ❖ Sample size of subjects was small
- ❖ Lack of investigator findings

- ❖ Follow up was not done, so this study cannot comment on long term result
- ❖ The study was done for short period

Suggestions

- ❖ A large sample size is highly suggested to make the study more reliable
- ❖ Research can be conducted for various age groups
- ❖ Duration of the study should be increased

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