Original Article

Effect of Task Oriented Exercise with Wrist Flexibility Training among Badminton Players to Improve Wrist Mobility and to Prevent Wrist Injury: Comparative Study

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Abstract

Background: This study was conducted explicitly on the efficacy of task-oriented exercises paired with wrist flexibility training on enhancing wrist mobility and reducing wrist injuries in badminton players.

Purpose: The purpose of this study was to see how a structured intervention integrating task- oriented exercises and wrist flexibility training benefited wrist mobility and injury prevention in badminton players.

Materials and Methods: A randomized controlled trial design was used, with a sample of 70 intermediate- level badminton players participating. The participants were split into two groups: conventional and intervention. The intervention group participated in a four-week programme that included task-oriented workouts with badminton movements and targeted wrist flexibility training. The typical group continued with their regular training schedule, with no wrist mobility modification. Validated metrics - ROM and Quick DASH score - were used to assess wrist mobility and function.(Study period : September 2022-May 2023)

Result: Preliminary research found that the intervention group had significantly better wrist mobility than the control group. They also demonstrated enhanced ROM, flexibility, and functional performance of the wrist joint, as well as a significant decrease in wrist injury occurrence.

Conclusion: These data indicate that combining task-oriented exercises with wrist flexibility training in badminton players can successfully improve wrist mobility and lower the incidence of wrist injuries.

Key words: Badminton players, Task oriented-exercises, Wrist flexibility training, wrist mobility, wrist injury.

Introduction

All ages can participate at an elite level in the well-liked sport of badminton. Aerobic power, agility, strength, explosive power, speed, flexibility, balance, and coordination are the key physical attributes needed by a badminton player to be proficient in the sport. [1, 2] The game is characterized by fast racket and shuttlecock play, with elite-level matches including shuttles hit at speeds surpassing 250 km/h. In Olympic level badminton matches over the last few decades, decreased effective playing time and rising shot frequency show that the game

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has gotten faster.[3-6] Improved control of jumping, sprinting to smash, and lunging has been linked directly to the capacity to sustain dynamic balance [7] across a variety of sports. Badminton has received minimal sports medicine attention while being one of the most widely practiced sports in the world. The few available studies on badminton injuries indicate that it is a relatively low-risk sport compared to others and that overuse injuries predominate.[8-9] Even though the injury typically lasts a long time, just a few days of work are lost. Anatomically, injuries mostly affect the foot and ankle. The two most frequent wounds are tennis elbow and achilles tendinitis. Rarely occurring, Achilles tendon rupture often affects senior leisure athletes. Men are proven to have a higher injury risk than women when exposure time is taken into account, and average players have a higher damage risk than elite players.[10] The proportional risk of injury is higher during training than during competition, in contrast to many other sports. The following preventive strategies are suggested based on the proposed mechanisms causing damage and injury, the established injury tendency of badminton, and the proposed sources of damage and processes. A higher heel with shock absorption and a stiffer, anatomically appropriate heel counter for badminton shoes; B changes to the impact between individual shoe-soles and playing surfaces; and C particular badminton training, such as conditioning and stretching of the triceps surae and the muscles responsible for the internal and external rotation of the shoulder and elbow throughout badminton strokes.[11-16] Badminton is a fast-paced and dynamic activity that puts a lot of strain on the upper extremities, especially the wrist joint. Wrist mobility is critical in badminton for producing power, performing precise strokes, and sustaining overall performance. However, because badminton actions are repeated and strong, players are more likely to get wrist ailments such as sprains, strains, and overuse injuries. Various training methods have been investigated to address the relevance of wrist mobility and avoid wrist injuries in badminton players. Task-oriented exercise and wrist flexibility training have received attention as viable techniques to increase wrist mobility and reduce the risk of injury. Wrist flexibility training focuses on improving the range of motion and flexibility of the wrist joint, whereas task-oriented exercise entails practicing specific badminton actions or drills that imitate game-like conditions. The goal of this study was to look at the effects of task-oriented exercise combined with wrist flexibility training on badminton players.

Aim

The aim of incorporating Task oriented exercise with wrist flexibility training among badminton players is two-fold: To improve wrist mobility and to prevent wrist injury.

Material and Method

It was a comparative study conducted during September 2022 - May 2023 on 70 subjects, aged 15-35. Random sampling technique was used in the study.

Inclusion Criteria

1. Age :15-35
2. Both male and female
3. Skill level: Intermediate level players

Exclusion Criteria

1. Players with early stages of recent wrist injury.
2. Players with any chronic conditions like severe arthritis, uncontrolled hypertension or any CVS conditions.
3. Recent wrist surgery.

Outcome Measures

The assessment was performed at baseline (before starting treatment) and after four weeks of study. ROM and Quick DASH score were used to evaluate wrist mobility and total wrist function.

Procedure

In this study, seventy players with ages ranging from 15 to 35 were chosen as a sample from the Aadukalam Multi-Sports facility and training center in Chennai based on inclusion criteria and exclusion criteria. Following that, there were two groups created from the subjects, both Groups A and B. Group -A as convention group and group-B as intervention group. In each group, there were 35 players. Wrist range of motion (ROM), and a Quick DASH score were used to evaluate wrist mobility and total wrist function at

baseline and after the intervention.

Group-A (Conventional group)

In Group A the participants of intermediate level were asked to perform their normal routine which included specified allocated time for Stretching before running, warm up, aerobic exercises which includes running and skipping, practice matches or doubles drill and cool down. An exercise Protocol was made, and the participants had to follow it 5 times a week for 1 ½ hours.

Group-B (Intervention group)

In Group B the participants of intermediate level are given task-oriented exercise and wrist flexibility training for 4 weeks, 5 days a week except Saturday and Sunday. Exercises lasted 30 minutes per day, were performed three times for 30 seconds each, and required 10 to 20 seconds of rest in between each session. A quick warm-up (10 minutes) was performed before the exercises begin. A cool-down phase of 10 minutes should be included after the task-oriented exercise and wrist flexibility training routine. This time should include static stretching exercises to target major muscle groups, particularly the shoulders, arms, wrist, hips, and lower body, as well as relaxing postures. Wrist flexibility training includes wrist flexor and extensor movement using racket, wrist circles using racket and resistance band exercises whereas task oriented exercises includes shuttle pick up, smash follow through , net shot practice and wall tapping.

Data Analysis

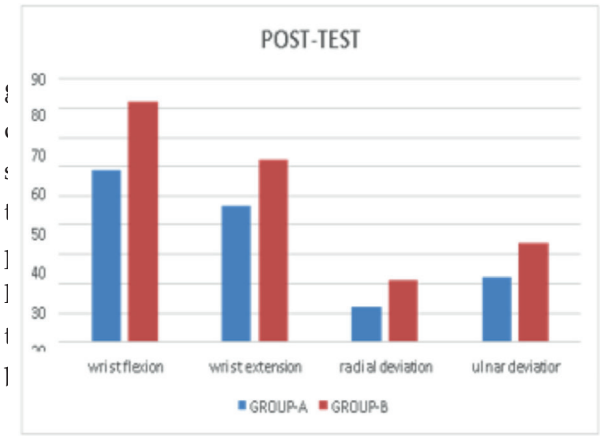

Fig-1 Comparison of post-test values using ROM for Group-A and Group-B.

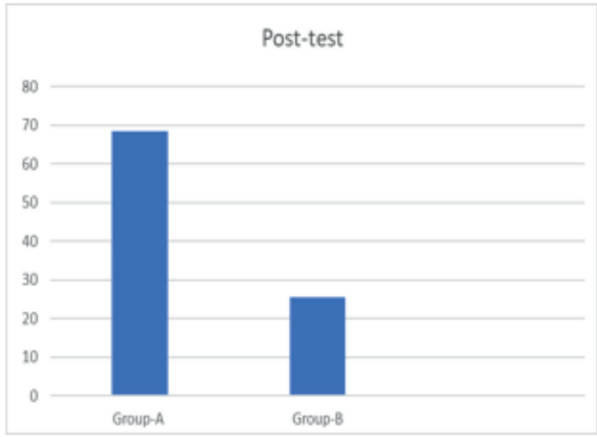

Fig-2 Comparison of post-test values using Quick DASH score for Group-A and Group-B.

Result

Statistical analysis of data revealed a statistically significant difference in values between the convention group and the group that received task-oriented exercise with wrist flexibility training. Statistics, both descriptive and interferential, were used to tabulate and analyze the data that had been obtained. Fig 1 represents the comparison of posttest values using ROM. Fig 2 represents the comparison of posttest values using quick DASH score. The mean and standard deviation (SD) for each parameter were computed. In order to examine the effectiveness of the treatment measures between the group's pre- and post-training, Unpaired t-test and Paired t-test were utilized.

Discussion

The purpose of this study is to discover and compare the effect of task-oriented exercise versus wrist flexibility training on wrist mobility and injury prevention in badminton players.Wrist flexibility training combined with task-oriented exercises that imitate certain badminton actions can provide a holistic strategy to improving wrist mobility and reducing injuries. Task-oriented exercises imitate the functional demands of badminton by requiring players to undertake motions that mimic the actions performed during gaming. The needs of badminton

players are further targeted by including wrist flexibility training. The wrist joint's range of motion, joint stability, and muscle flexibility and strength are the main goals of this training. The risk of overuse injuries can be reduced, muscle imbalances can be reduced, and wrist mobility can be improved by performing certain stretching and strengthening exercises. When task-oriented exercises are paired with wrist flexibility training, badminton players can improve wrist mobility and reduce their risk of wrist injuries. Players who took part in organized therapies reported having more range of motion, more flexibility, and better wrist movement control. These enhancements led to improved shot execution, a greater diversity of shots, and a lower risk of wrist-related injuries. Rahul modi et al., concluded that although badminton is a non-contact sport, there is a significant risk of injuries. This prevalence of injuries is much higher than commonly assumed, and is almost similar to the incidence of injuries in other racquet sports such as tennis and squash. The majority of badminton injuries are secondary to overuse and are a result of excessive cumulative loads. Badminton coaches and trainers should note these observations and consider an alteration in the training workload of badminton players to allow the body to recover, and break the repetitive cycle leading to overuse injuries.[17] Stewart kerr et al., concluded that in one third of the injuries a player had lasting limitations or pain. A concerning number of players reported stress fractures and it may be a serious underestimated problem in badminton.[18]

Conclusion

According to this research, task-oriented exercise and wrist flexibility training can be an efficient strategy for enhancing wrist mobility and reducing wrist injuries in badminton players. According to the studies, this intervention may result in benefits including enhanced wrist mobility, a wider range of motion, a lower risk of injury and an overall performance among badminton players.

Ethical Clearance: The ISRB committee of a private hospital and institution in Chennai has provided its clearance for the conduct of human research that complies with all applicable national laws, institutional regulations. (Application Number 03/072/2022/ISRB/SR/SCPT).

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Conflict of Interest: The authors state that there is no conflict of interest.

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