



To Study the Effects of Retro Walking on Balance of District and State Level Badminton Players

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Abstract

Badminton, with its demands for rapid movements and precise footwork, highlights the crucial role of balance in enabling players to maintain stability and execute effective shots. This balance not only contributes to on-field success but also helps in reducing the risk of injuries. Additionally, retro walking, a movement characterized by walking in the opposite direction to traditional forward walking, has garnered scientific interest. Several studies have explored its potential physiological and psychological benefits, making it a focal point for athletic enhancement and injury mitigation strategies.

This study sought to validate the hypothesis that retro walking could enhance the balance of badminton players. Thirty district and state-level badminton players aged 14-18 participated in a pre and post-test experimental design study, undergoing balance assessments using the Y balance scale for dynamic balance and a single-leg standing test for static balance. Participants engaged in four weeks of retro walking intervention during warm-up routines, gradually increasing from 10 to 25 minutes.

Analysis of pre and post-intervention data revealed significant improvements in both static and dynamic balance.

The results underscore the potential of retro walking as an effective intervention for enhancing balance in badminton players, thereby reducing the risk of injuries and improving overall performance. Incorporating retro walking into training regimens may offer athletes a competitive advantage and contribute to long-term athletic development.

However, limitations such as small sample size and challenges in securing cooperation from athletes and academies underscore the need for further research with larger sample sizes and improved collaboration. Additionally, the absence of specific instruments, such as the Biodex balance system, necessitated manual balance assessments using basic tools like stopwatches, potentially introducing measurement variability.

Future research could explore the optimal duration and frequency of retro walking sessions for maximizing balance improvements in badminton players. Additionally, investigating the transferability of balance enhancements to on-court performance would provide valuable insights into the practical implications of retro walking training.

In conclusion, the study provides valuable insights into the effectiveness of retro walking in improving the balance of young badminton players, offering a simple yet impactful intervention for optimizing athletic performance and reducing injury risks in the sport. Future research endeavors hold promise for elucidating the full potential of retro walking in athletic development across various sports contexts.

Keywords: Y Balance Scale; Single Leg Standing Test; Retro Walking; Static Balance; Dynamic balance; Eccentric Contraction (loading); Concentric Contraction (loading)

Introduction

Badminton is one of the quickest racquet sports worldwide that requires quick and strong shots and very agile footwork. Badminton players should respond to moving shuttlecock and change their body position quickly and ceaselessly all through the game [1].

To maintain their balance, players must keep their Centre of gravity within the base of support while performing agile and quick movements. Therefore, it is very crucial for these players to have good balance training which will increase their on-field performance and reduces the risks of injury. Balance being an imperative part of game assists the player in moving swiftly and quickly across the court allowing them to hit the shuttle to best of their ability and be accurate in their game [2,3].

A person's capability to hold line of gravity within the base of support (BOS) or to maintain equilibrium is termed balance.

Balance can also be defined as postural control, Stability, or equilibrium [2].

The body balance is maintained through three systems

- Visual system
- Vestibular system
- Proprioceptive system [2]

Retro walking as opposed to forward walking, improves balance, motor control and posture of an individual. During gait cycle of forward walking, heel strikes the ground first and ends with toe being lifted off the ground (Toe off). On the contrary, during backward walking toes come in contact with the ground first and at the end of the cycle, heel is being lifted off the ground. The entire lower limb kinematics during backward walking is being reversed [5]. Muscle contraction of the lower limb muscles is also being reversed during backward walking [15]. There is an eccentric contraction of quadriceps muscle and concentric contraction of hamstring muscle during the loading phase of forwarding walking [8]. Whereas during retro walking, whole dynamics of muscle contraction is being reversed [4,13].

There are various studies showing that there has been a significant improvement in the balance and motor control of individuals

who have adopted backward walking as part of their physical training. Hence improving performance and reducing the risk of injuries [6-9,12].

Backward walking, as compared to forward walking, reduces the compression forces at patellofemoral joint and decreases the force absorption at knee [5]. This is mainly because of the reduced eccentric function of quadriceps muscle. In various research papers it was concluded that backward walking was different from forward walking [7]. They reported that backward walking was associated with increased cadence and decreased stride length when compared with forwarding walking. There was also an observation of a significant increases in muscular strength of knee extensors within backward walking group as a result of backward walking training [8]. Backward walking also prevents overstretching of anterior cruciate ligament due to the decreased quadriceps activity [6,9]. Another benefit of retro motion includes practice and training of skills used in specific sports. Many courts and field sports incorporate backward running during competition. Performing the activity during training may allow one to improve performance and/or reduce the potential for injuries [8,14].

Aim

To study the effects of retro walking on balance of district and state level badminton players.

Objective

- To assess static and dynamic balance in badminton players.
- To improve static and dynamic balance.
- Avoiding injury in badminton players E.g. Ankle instability, Ankle sprains

Need of the study

To study the effects of retro walking on static and dynamic balance on badminton players between the age group of 14-18, both male and females included.

Significance of study

Studying the impact of backward walking on badminton payers. Using proper protocols that will allow us to observe the effect of intervention on athletes.

Material and Method

- **Study design:** Pre and Post-test experimental design.
- **Study population and sample:** District and state-level badminton players.
- **Place of data collection:** Sports academies and clubs-Siri fort sports complex, vasant vihar sports club Clinic - Dr. Ajeeta Goel sports injury clinic.

Sampling method

Criteria based study.

Sample Size: 30.

Selection criteria

Inclusion criteria

- Age: 14-18
- Both male and female
- District level and state level players
- Regularly trained badminton players
- Normal BMI

Exclusion criteria

- Any recent injuries
- Hypermobility
- Regularly participated in a particular sport other than badminton.
- Significant history for cardiorespiratory, visual, neurological disorder
- National level players
- **Independent Variable:** Retro walking
- **Dependent Variable:** Y balance scale for testing dynamic balance, single leg standing test for testing static balance.

Instruments Required

- Rigid tape
- Stopwatch
- Measuring tape
- Goniometer

Data analysis

It was done using Microsoft excel.

Procedure

- 30 district and state-level badminton players are being selected for this study. A proper consent form is being filled out by the participants.

- Initially, each athlete's name, age, gender height, weight, and limb length were noted down. Both inclusion and exclusion criteria were kept in mind before proceeding with the study.
- Two scales were used to assess the balance of athletes.
- Y balance scale is being used to assess the dynamic balance and one-leg standing balance test for evaluating static balance [10,12].
- Firstly, we will be assessing balance of all the 30 athletes in a systematic way.
- Single leg standing test is being performed by asking the individual to stand on one leg with hands on the waist and eyes open [12].
- We will start the stopwatch and observe for any sway or movement. As soon as any movement or sway is being observed the timer is being stopped and observation are being noted down.
- Same procedure is being followed with the other leg.
- Now we will ask the individual to follow same steps but with eyes closed.
- Proper readings are jotted notes down.
- For Y balance scale, we will be using a rigid tape to mark three lines on the floor. Keeping proper measurements in mind we will mark and stick the rigid tape in the anterior direction, posterior medial direction and posterior lateral direction.
- Now the individual has to stand at the center of Y-balance scale but test leg should not be touching the ground. (Test leg is off the ground) [10].
- Reach to the max distance in anterior, posterior medial and posterior lateral direction. The individual should keep all the error or faulty movements in mind before performing the test.
- Examiner is supposed to stay vigilant while individual is performing the test in order to avoid any error and compensatory movements.
- Jot down the observation (Reach distance) carefully.
- Now, athletes are being taught and instructed to include backward walking during their warm-up session.
- Initially, the athletes will be asked to do backward walking for a duration of 10 minutes. During the 2nd week, we will ask them to increase the time duration of backward walking from 10 to 15 minutes [8].
- The same procedure will be followed for 4 weeks.
- During the 4th week the duration of retro walking will reach up to 25 mins
- Follow ups were being taken.

Result

In this study we assessed the static and dynamic balance of badminton players who were between the age group of 14 - 18. Retro walking was being taken as an intervention in this study to analyse its effect on balance.

The findings of this study show that there has been an incremental change in the pre-intervention data and post intervention data in both Y balance as well as in single leg standing balance test.

Single leg standing balance test was done to assess the static balance of athletes pre and post intervention. While standing on the right leg with eyes open and eyes closed there has been a percentage increase of 20.94 and 52.62 respectively.

While standing on left leg with eyes open and close, a significant increase in percentage of 19.40 and 65.98 respectively has been observed.

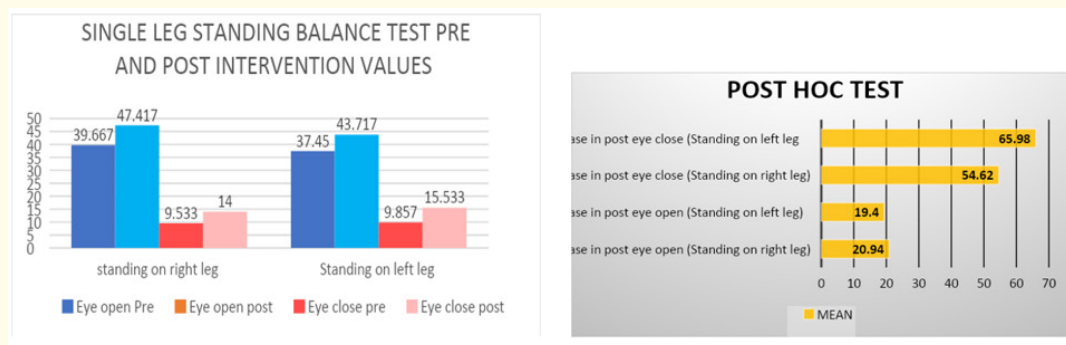


Figure 1

The data reveals a significant percentage increase in eye close as compared to eye open post intervention (Retro walking).

The Y balance test was carried out in order to assess the dynamic balance of athletes pre and post intervention.

With the following data it can be easily inferred that there has been a marked increase in composite values pre-intervention and post intervention.

Right leg being the test leg, a mean distance of 73.988 pre-intervention and 81.340 post intervention is being observed.

With the left leg being the test leg, a mean distance of 72.598 pre-intervention and 80.332 post intervention is being observed.

On comparison of both pre and post intervention data the results of both the scales are significant ($P < 0.001$).

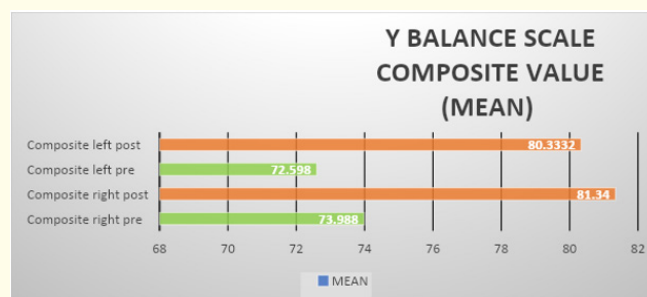


Figure 2

Discussion

Badminton is one of the quickest racquet sports worldwide that requires quick and strong shots and very agile footwork. Badminton players should respond to the moving shuttlecock and change their body position quickly and ceaselessly all through the game. To maintain their balance, players must keep their Centre of gravity within the base of support while performing agile and quick movements [2]. Therefore, it is very crucial for these players to

have good balance training which will increase their on-field performance and reduces the risks of injury [1,3].

Retro walking exercise has been the focal point of many studies because of its effectiveness⁽⁴⁾⁽⁵⁾⁽⁷⁾. There are various studies that show that there has been a significant improvement in the balance and motor control of individuals who have adopted backward walking in their training. Hence improving their performance and reducing the risk of injuries [6-8].

In this paper, we studied and tested the hypothesis that retro walking can improve balance of badminton players. The result of this study shows a marked increase in balance of the athletes after 4 weeks of retro walking which was included in their warm up sessions.

The intervention is simple and does not require any specific tool or equipment.

The results of the study proved the hypothesis that retro walking improves the balance (static and dynamic) of young badminton players.

Due to certain limitation during the study like small sample size, cooperation from the athletes and academy, unavailability of proper equipment.

Therefore, more accurate results from this study can be obtained in future if the sample size gets increased, specific instruments required during assessment are available, proper protocol while assessing is being followed and with the full corporation from the academies and athletes.

Limitation of Study

- Due to non-availability of a proper instrument (Biodex balance system) for checking balance, we tested and observed balance of athletes manually by using a stopwatch and checking sway manually by observation.
- Sample size.

Conclusion

The study indicates that there has been a significant increase in static and dynamic balance of young badminton players. A marked increase pre-intervention data and post intervention data has been observed.

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