

Comparing the Effect of Swiss Ball and Mckenzie Exercise among Football Players with Non-Symptomatic Anterior Pelvic Tilt

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Abstract

Background: The anterior pelvic tilt is characterized by ASIS rotating inferiorly in relation to the PSIS or being positioned lower than the PSIS in the sagittal plane. When compared to non-athletes, football players are more likely to have a higher anterior pelvic tilt angle. The anterior pelvic tilt experienced by football players may make them more prone to musculoskeletal problems.

Purpose: This study is intended to compare the effects of Swiss ball and McKenzie exercise on a sample of football players who have an anterior pelvic tilt without any symptoms.

Materials and Methods: 30 Subjects who were selected in the stadium under Shai physio clinic based on inclusion criteria. They were divided equally among two groups. Group A (n=15) subjects were managed with Swiss Ball exercise and Group B (n= 15) subjects were managed with McKenzie exercise. The subjects were evaluated using Angulus ROM software. Study period:October 2022 to June 2023.

Results: In Group A (Swiss Ball), the post-test mean value was 10.80 (2.27), significantly lower compared with Group B (Mckenzie Exercise), 16.33 (3.04). This demonstrates the correction of excessive anterior tilt among football players in Group-A following Swiss Ball Therapy. However, the subjects in both groups were found to have a significantly decreased anterior tilting of the pelvis now exists following the interventions in Group A (Swiss Ball) and Group B (Mckenzie Exercise).

Conclusion: According to the present study's findings, participants with anterior pelvic tilt responded well to both the interventions. Nonetheless the subjects who used a Swiss ball exercise were found to have correction in anterior pelvic tilt more quickly than those who performed the McKenzie exercise.

Key Word: Exercise, Football, Pelvis, core stability

Introduction

The term "pelvic tilt" in research often is rarely used to describe frontal plane pelvic motion, the term can also refer to the position or Pelvis mobility

in the sagittal direction.^{1,2} A horizontal line and a line separate the posterior superior iliac spine (PSIS) from the anterior superior iliac spine (ASIS) in the sagittal plane. Generate what is known as

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a pelvic tilt, a common angle in physical therapy parameters.^{3,4} The anterior pelvic tilt is characterized by ASIS rotating inferiorly in relation to the PSIS or being positioned lower than the PSIS in the sagittal plane.⁵ The anterior pelvic tilt, also known as forward rotation, causes an increase in lumbar lordosis in the pelvis and is thought to be linked to several common musculoskeletal diseases. Additionally, there is a connection between diminished core stability and anterior pelvic tilt, hence core strength has been evaluated by the degree of anterior pelvic tilt.⁶ The literature does not specify a clear cut-off threshold for excessive anterior pelvic tilt, hence an anterior angle greater than 8 degrees is defined in this study.⁷ When doing an athletic activity, core stability is the ability to properly retain the trunk in the upper pelvic position producing, transferring, and controlling force and motion to the terminal segments.⁸

Swiss-ball core training has made its way from 1960s hospitals to modern-day gyms. Here are some of the most well-liked trends in physical therapy and fitness in addition to strength. It is well known that the Swiss ball (also known as a gym ball) can be used as a training tool for core stability exercises in a recreational training environment.⁹

The McKenzie back exercises are a part of a protocol of exercises developed in the 1950s by physiotherapist robin Anthony McKenzie, who rose to fame in 1985.¹⁰ Mechanical diagnosis (MDT) and therapy, another name for the McKenzie approach, is a well-liked classification system for the identification and treatment of several musculoskeletal problems.¹¹

Aim

The study is intended to compare the effects of a Swiss ball and McKenzie exercise on selected football players who have an anterior pelvic tilt without any symptoms

Material and Method

Using inclusion and exclusion criteria, 30 football players were chosen in the Stadium under Shai Physio Clinic. Before recruitment of participants by the Institutional scientific review board 03/089/2022/ISRB/SR/SCPT approval was obtained. There are two groups made up of the participants. utilising the relevant sampling method. Study period: October 2022 to June 2023.

Inclusion Criteria:

1. football players who have been exposed at least twice a week for three months.
2. Age.: 18 to 25
3. Gender: Male
4. Anterior angle greater than 8 degree

Exclusion Criteria:

1. Subject with low back pain
2. Present or previous core strengthening experience
3. Current participation in any fitness program
4. History of fracture (spine, rib) or injury, a systemic illness, or disc or spinal pathology

Outcome Measures:

At the beginning of the study and four weeks later, assessments were carried out.

- Angulus ROM software (Goniometer based software) used to measure the pelvic angle.¹²

Procedure

In terms of the inclusion and exclusion criteria, participants were included. The individuals and their caretakers were educated well about the study and formal written informed consent was obtained. The participants were split into two groups Using the convenient sampling technique. The subjects were evaluated using Angular ROM software and the values were taken as pre- test measurements. After obtaining baseline measurement GROUP A (n=15) subjects were subjected to a Swiss ball programme and GROUP B (n=15) subjects were given McKenzie exercise. Subjects ask to come weekly 5 times for 4 weeks for a follow-up. Measurements of the Angulus ROM were done four weeks following the post-test.

Group A: (Swiss Ball Exercise)

Protocol: Training with a Swiss ball for 20 minutes, five days a week, for four weeks.

Training Procedure:

1. **Sitting on Swiss Ball With Both Arms Raising In The Sagittal Plane.**

Procedure: A participant was instructed to sit on a ball and lift either one or both arms.

2. **Sitting on Swiss Ball With 90 Degree Hip And Knee Flexed.**

Procedure: Asked to position themselves on a ball with their feet (heels & soles) on the ground, bend their hips and knees at a 90-degree angle, and hold their position for 20 seconds.

3. **Anterior / Posterior and Lateral (Right & Left Side) Pelvic Tilt**

Procedure:

STEP 1: Place your feet hip-width apart on the floor while seated on a Swiss ball. The feet should be immediately beneath the knees at a 90-degree angle.

STEP 2: To begin the exercise, inhale while rolling your tailbone forward, halt, and then roll back as you exhale. For 45 to 60 seconds, repeat this activity.

4. **Bird Dog Exercise Using Swiss Ball**

Procedure:

STEP 1: Place a Swiss ball under the abdomen as face laying down on it.

STEP 2: The exercise is to inhale deeply before lifting the subject's left arm and right leg.

STEP 3: Take a breath, then let it out as the person lowers them again. Move your arms and legs in succession.

5. **Plank on Swiss Ball**

Procedure:

STEP 1: Put the hands on the ground in front of you with the arms straight and at shoulder-width distance.

STEP 2: Place the legs on the ball by raising them. The shin should be in the center of the ball.

STEP 3: Maintain the plank position for 30 seconds at a time, and as you get more comfortable, extend your holds by another 30 seconds.

Group B: Mckenzie Exercise

Protocol: 3 sets of 10 repetitions. Depending on the patient's response, repetitions could be spaced out throughout the day or performed back-to-back with a little pause in between.

1. **Trunk Flexion:**

Lying Down:

The patient raises their knees towards their chest while flexing their hips and knees. The patient then uses their hands to apply further pressure.

Seated:

The patient bends forward while seated in a chair, flexing his or her hips and knees to a 90-degree angle. The patient's hands should be as close to the floor as they may be. The patient's trunk can be brought even closer to the knees by holding onto the ankles.

Standing:

In a standing position, the patient places their feet shoulder-width apart and lays their fingers on the tips of their toes while gliding their hands towards the ground and maintaining their knees extended.

2. **Trunk Extension:**

Lying Down:

The patient starts in a prone posture, with the palms of their hands resting immediately in front of their shoulders on the floor. The patient relaxes her pelvis and thighs while extending her elbows, lifting her upper body.

Standing:

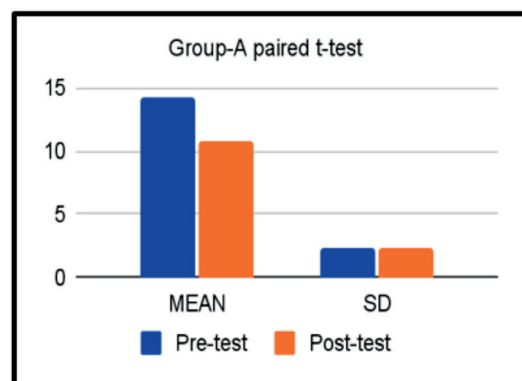
The patient places their hands at the base of their lower back with their fingers pointing down towards the ground. They then extend their trunks back as far as they can while maintaining their neck relaxed

3. **Lateral Shift:**

Standing With Upper Arm Support:

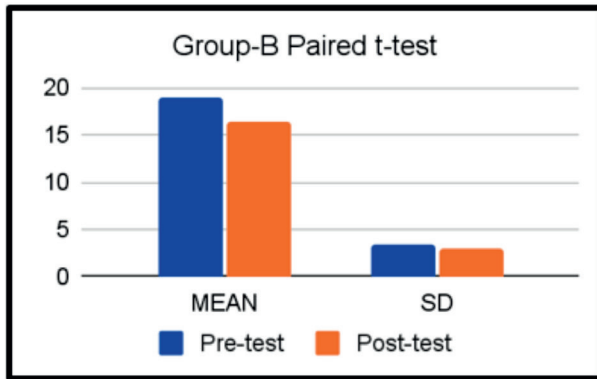
Place the feet shoulder-width apart, bend the upper arm at the elbow to 90 degrees, and place the hand on the side of the trunk. The patient physically transfers the pelvis to the other side using the hand supported by the upper arm.

Data Analysis



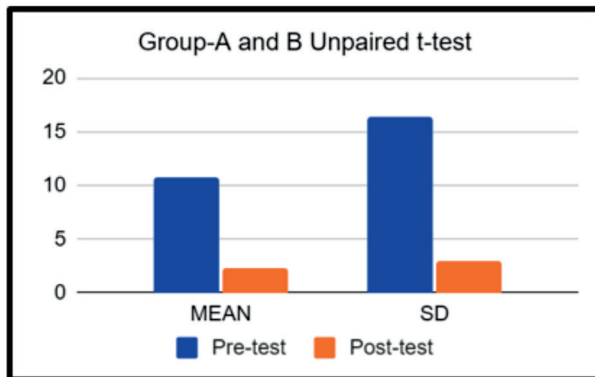
Graph No. 1

Interpretation: Graph No.1 shows that the values are extremely statistically significant.



Graph No: 2

Interpretation: Graph No.2 shows that the values are extremely statistically significant.



Graph No: 3

Interpretation: Graph No.3 shows that the values are extremely statistically significant

Result

The investigation included thirty individuals. Each group contained 15 people.

Graph 1 the average Angulus ROM pre- and post-test values Group A are 14.20 (2.37) and 10.80(2.27) respectively, The t value is 11.7444, and the p (<0.0001) which demonstrates that the outcome was extremely statistically significant

Graph 2 shows the mean pre-test and post-test scores for Angulus ROM Group B, which are respectively 18.93 and 16.33. The p-value of (0.0001) and the t value of 13.6671, however, indicate that the finding was extremely statistically significant.

The comparison of the Group A and B differences in Graph 3 demonstrates the average Angulus ROM pre- and post-test values in Groups A and B are (10.80) and (16.33), respectively, $t = 5.6456$ and $p (< 0.0001)$ which shows that the result was very statistically significant.

Discussion

The purpose of the study was to find out whether football players with anterior pelvic tilt responded in any way to the Swiss Ball and McKenzie Exercise. According to this study The Swiss Ball is an excellent therapeutic rehabilitation exercise tool in correcting the altered pelvic tilt and preventing further musculoskeletal problems. The pre-intervention mean of the Angulus ROM software in the Swiss ball group was 14.20 (+2.37). The mean value of the Angulus ROM software was reduced by 10.80 (+2.27), which indicates statistically significant differences between the groups after the participant had Swiss ball exercise. In contrast to the patients in the McKenzie group who got McKenzie exercise, subjects in the Swiss ball exercise had greater improvement in the Angulus ROM program.

In a previous study, Kuegler P et al. (2015) conducted a study using 16 goniometer apps and reported that a comprehensive list of all applications categorised as "ROM" or "range of motion" was also provided. This study referred to Angulus software as Angulus ROM software in this investigation in accordance with the study.¹³

In a previous study by Daroszewski M et.al (2013) it was found that the Right and left tracheobronchial angles (TBAr, TBAI) were assessed. Angulus software, digital analyses were performed.¹⁴ Similarly in this study we included Angulus software to measure the excessive anterior pelvic tilt among football players.

Sea Hyun Bae, Hong Gyun Lee et.al 2013 the study concluded balance ability significantly more than exercise on the stable support. As per the study, the selected participants who practise on an uncertain surface like Swiss ball are more effective in correcting the excessive Anterior pelvic tilt by enhancing the trunk and core stabilization.¹⁵

Kothalanka Viswaja et.al (2015) concluded that posture issues in the trunk muscles could be brought

on by physio balls. In order to preserve the right postural stability, the trunk muscles react defensively to the postural disruption caused by the physio ball beneath the patient. The trunk moves in response to a change in weight in any plane, per biomechanical principles, to balance the change in the centre of gravity.¹⁶

Wonjong Yu et.al (2017) concluded that Swiss-ball exercise has been speculated to contain many exercises to stimulate the core muscle as they mentioned exercise performed on the Swiss ball stimulates the core strengthening.¹⁷

According to McKenzie, 90% of people react quickly to manual correction, particularly if the change is contralateral. McKenzie created the manual shift correction technique.¹⁸ With the guidance of McKenzie this study conducted among football players to correct the excessive anterior pelvic tilt using McKenzie will also show positive effect but not as much as the Swiss ball group.

Limitations:

1. Participants of the study are very few.
2. The outcome measure for this study is less and also includes outcome measures such as kinovea software and pelvic inclinometers.

Recommendations:

1. Can be done for players with pelvic tilt in other sports like basketball, tennis and badminton.
2. Outcome measures can also evaluate the increasing muscle strength, endurance, coordination, and flexibility, as well.

Conclusion

According to the study's conclusions, patients with anterior pelvic tilt who use a Swiss ball can increase their core stability earlier compared with McKenzie exercise. Swiss ball exercises are simple to adapt for the participants after one or two sessions of training. Swiss ball core exercises can therefore aid in enhancing core stability, which aids in enhancing performance, and modify the pelvic tilt as necessary. The Swiss-ball workout might be beneficial in correcting non-symptomatic anterior pelvic tilt among football players.

Ethical Clearance: Taken from the institutional ethical committee. ISRB Number: 03/089/2022/ISRB/SR/SCPT.

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Conflict of Interest: Nil

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