International Journal of Yoga, Physiotherapy and Physical Education
www.sportsjournal.in
ISSN: 2456-5067
Received: 02-11-2021, Accepted: 18-11-2021, Published: 03-12-2021
Volume 6, Issue 6, 2021, Page No. 1-3

Comparission of swiss ball exercises versus floor exercises on improving core muscle strength in male cricketers

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Abstract
Introduction: Cricket is one of the most popular game in India played by men and women of all ages. The increased physical demands on the players may be associated with an increased risk of injuries. This is because the demands on the body from playing cricket are extremely varied as players are required to bat, bowl and field various times throughout the game. 'Core stability' is defined as the ability to control the position and motion of the trunk over the pelvis to allow optimum production, transfer and control of force and motion to the terminal segment in integrated athletic activities.
Aim: To assess the effectiveness of swiss ball exercises versus floor exercises on improving core muscle strength in cricketers.
Methodology: Total number of students in this study were 30 cricketers between 19-22 years out of which 15 subjects were included each in group A(n=15)and group B(n=15). The shuttle run test is used to assess the speed ahd the modified sphygnomano meter test is used to assess the core strength.
Result: After the result of the study shows that swiss ball exercises has more improvement than floor exercises.
Conclusion: It concluded that swiss ball exercises has more improvement compare to floor exercise. Hence it is recommended swiss ball exercises is good for core strengthening to enhance performance in cricketers.

Keywords: swissball exercise, floor exercise, core strength, speed, cricketers

Introduction

Cricket is one of the most popular game in India played by men and women of all ages. The increased physical demands on the players may be associated with an increased risk of injuries. This is because the demands on the body from playing cricket are extremely varied as players are required to bat, bowl and field various times throughout the game.

The incidence and nature of cricket injuries during a season have been documented in well-conducted studies. Anatomically, the sites of injuries in cricket have been reported in a number of studies. Cricketers are sustained by back and trunk injuries by 14-18%. The frequency of lower limb injuries varies from 25% to 30% has been reported.2The major cause of injuries was found to be bowling. 38% of young school boy bowlers3 and 65.7% of provincial bowlers2 suffer from back injuries. These are mostly lower back injuries.

Core strength

The lumbar spine functions as a complex interplay of musculoskeletal and neurovascular structures creating a mobile yet stable transition between the thorax and pelvis. 'Core stability' is defined as the ability to control the position and motion of the trunk over the pelvis to allow optimum production, transfer and control of force and motion to the terminal segment in integrated athletic activities.

Low back pain (LBP) is one of the most common complaints seen in primary care, with 60-85% of adults experiencing it at some time in their lives. Athletes are no exception, with the added strain of long training period contributing to the problem, especially in adolescents. In addition, athletes are at high risk of back pain both from trauma and from overuse injuries, especially in sports requiring hyperextension, flexion and rotation.

Approximately 75% of elite athletes are experiencing back pain. In young adults, intervertebral discs are so strong that it first damages the adjacent bone after a traumatic injury. Only forcible flexion can damage a healthy disc. Then comparatively minor strains may cause internal derangement with eccentric displacement of the nucleus pulposus or external derangement, the nucleus pulposus then bulges or bursts through the annulus fibrosis.

Swiss ball

The swiss ball is an extremely popular apparatus used for core stability training in populations as varied as spinal disorders to elite athletes. The majority of the research involves abdominal muscle exercises comparing them to the traditional mat (stable surface) styles, however the benefits of swiss ball exercises appear to have been applied to whole body exercises equally. Performing strength exercises on swiss balls has been advocated that a labile surface will provide a greater challenge to the trunk musculature, increase the dynamic balance of the subject and possibly train subjects to stabilize their spines to prevent and treat injury. The most common injury from cricket is lower back strain from different activities of cricket such as bowling, batting and fielding. This is because the repetitive activities of all the above components place considerable stress on the back. In addition, core strength is very essential in all fields of cricket to prevent the injuries. Concentrating mainly on core muscles strengthening along with abdominal drawing

in maneuver technique helps to activate all the core muscles which enhances the prevention of injuries.
Core muscle strength is important to prevent risk of injuries in elite cricketers. The beginners in the cricket must have enough strength of core muscles, as core is the bridge between upper limbs and lower limbs. So, it should be strong enough to prevent low back injuries, lower limb injuries in cricketers.

Need for study
Although there is general fitness training, concentrating the core muscles is lagging in the training. Hence, there is a possibility of back and lower limb injuries in cricketers at the time of game or after the game. So, the present study concentrated mainly on the core muscle stability with the help of swiss ball and floor exercises. The need of the study is to determine and compare the effects of swiss ball exercises and floor exercises in improving core muscle strength in cricketers.

Materials and Methodology
Materials required
- Measuring tape
- Weighing machine
- Swiss ball
- Mat
- Cones
- Sphygnomanometer
- Written informed consent
- Data collection tool

Source of data
Subjects will be collected from Roever College of physiotherapy in Perambalur.

Study design
Comparitive study design

Sample technique
Purposive sampling

Duration of study
1 month

Statistical tool
- 4x10m shuttle run test.
- Modified sphygmomanometer test.

Sample size
The subjects selected for this study were divided into 2 groups.
- Group A consists of 15 subjects - undergone for swiss ball exercise programme.
- Group B consists of 15 subjects- undergone for floor exercise exercise programme.

Inclusion criteria
- Male cricketers
- Age between 19-22yrs
- Both right and left batsman

Exclusion criteria
- Female cricketers
- any associated neuromuscular conditions
- any musculoskeletal injuries
- any injuries to lower limbs

Procedure
Thirty subjects fulfilled the inclusion criteria are taken for exercise programme. The received visual and verbal instructions about the exercise programme given.

Exercise programme
Floor exercise group
This group received floor exercises. The exercises includes pelvic bridging, quadruped position, prone cobra, prone plank bridge, side plankbridge. Ten repetitions of each exercise were performed with 10 seconds hold of three sets.

Table 1

S no,	Exercise	Holding	Repetitions	Sets
1.	pelvic bridging	10sec	10rep	3
2.	quadruped position	10sec	10rep	3
3.	prone cobra	10sec	10rep	3
4.	prone plank bridge	10sec	10rep	3
5.	side plank bridge	10sec	10rep	3

Swiss ball exercise group
This group received swiss ball exercises. The exercises includes stability bridge, stability ball crunch, stability ball diagonal long lever crunch, stability ball push-up, stability ball hamstring curl. Ten repetitions of each exercise were performed with 10 seconds hold of three sets.

Table 2

S no	Exercise	Holding	Repetitions	Sets
1.	stability bridge	10sec	10rep	3
2.	stability ball crunch	10sec	10rep	3
3.	stability ball diagonal long lever crunch	10sec	10rep	3
4.	stability ball push-up	10sec	10rep	3
5.	stability ball hamstring curl	10sec	10rep	3

4x10m shuttle run test
This test requires the person to run back and forth between two parallel lines as fast as possible. Set up two lines of cones 10 feet apart or use line markings, and place two blocks of wood or a similar object behind one of the lines. Starting at the line opposite the blocks, on the signal "Ready? Go!" the participant runs to the other line, picks up a block and returns to place it behind the starting line, then returns to pick up the second block, then runs with it back across the line.

Modified sphygmomanometer test
The back strength was measured by isokinetic analyzer and double leg lowering test (DLLT). Sphygmomanometer is used in double leg lowering test (DLLT) to assess the core strength. The individual is placed supine. Sphygmomanometer cuff is placed under the lumbar spine at approximately L4-L5.The cuff pressure is raised to 40 mm hg. The individual's legs are maintained in full extension while flexing the hips to 90 degrees. The individual is instructed to perform a abdominal drawing in maneuver and then flatten the back maximally into the table and pressure cuff.

Data analysis

Table 3: 4×10m shuttle run test

Group	Mean	Standard deviation	Standard Error	t- Value	P-Value
Group A	12.79	1.846	0.4768	t=8.286	p =0.000
Group B	8.688	1.102	0.2845		

Table 4: Modified spignomanometer test

Group	Mean	Standard deviation	Standard error	t-Value	p-Value
Group A	176.3	16.57	4.278	t = -1.961	p =0.070
Group B	199.5	49.99	12.91		

Results

1. In post test the effect of the speed is increased by the floor exercises and the mean value is 12.79
2. In the post test speed is increased by the floor exercises and the mean value is 8.688
3. In the post test the strength is increased by the swiss ball exercises and the mean value is 176.3
4. In post test the effect of the strength is increased by the swiss exercises and the mean value is 19.5

Discussion

The present study is carried out to find the effectiveness of floor exercises and swiss ball exercises on core muscle strength in elite cricketers. The total number of subjects were 30, 15 subjects were allotted into floor exercise group and 15 subjects were allotted into swiss ball group. The protocol was given for 6 weeks.

Core stability is an important factor in all sports persons especially in cricketers to prevent the risk of injuries. However, the evidence about the effects of core stability exercises using swiss ball and floor exercises in cricketers has limited studies.

Our results show that an exercise programme on swiss ball of 6 weeks duration improves strength of the core muscles and finally decreases the risk of injuries in elite cricketers in both groups but compared to the floor exercise group, more significant changes seen in swiss ball group.

The technique behind the swiss ball training is to concentrate and shift the weight to maintain stability on the ball, which will not occur in traditional weight training exercises. Postural control during balancing on a swiss ball consists of adapting the motor program to maintain stability, while the overall postural strategy is maintained. Swiss ball training improves nervous system function that results in functional strength gain.

The benefits of performing resistance exercises on unstable equipment originated from research on muscle activation and methods of preventing or rehabilitating low back, knee and ankle injuries. Even though the movement patterns on the swiss ball and floor exercises group may look similar, the underlying neural adaptations such as the increase in nervous system activation, more efficient neuromuscular recruitment patterns, improved synchronization of motor units, lowering of neural inhibitory reflexes and proprioceptive feedback may be completely different

Conclusion

1. With the limitation of the study, the following conclusion was drawn.
2. The effectiveness of swiss ball exercises in increasing the speed in significant level.
3. The effectiveness of swiss ball exercises in increasing the l4*10m shuttle run test in significant level.
4. The effectiveness of swiss ball exercises in increasing the strength in significant level.
5. From the study concluded that the swiss ball exercise is better than the floor exercises in core strength in cricketers.

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