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Relationship between core stability and performance in recreational cricket players

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Abstract
Background: Core stability is gained by internal stabilization of one's torso therefore allowing enough control on production, control and transfer of force during movements. Core stability act as an important segment when executing a forceful movement or activity. It has been suggested by researchers that core stability helps in execution of sporting activity which involves great amount of energy and strength since force generated from trunk can be dispersed to upper limb via kinetic chain activity. Core stability even included as integral part of rehabilitation programs where it exhibits excellent results in improvement of performance among sports players. Since kinetic chain facilitation helps in improving performance of sports personals in several sports. Hence intent of present study was to find out relationship of core stability with performance among cricket players.
Aim and objective: the main objective was to study the core stability and its relationship with performance among cricket players.
Methodology: study was performed among recreational cricket players who fall under 18- 29 years of age. Core stability of cricket players was examined by flexor endurance test and Side bridge test, followed by assessment of performance using Backward overhead medicine ball throw test BOMB and single leg squat test SLS.
Results: from the study exhibits significant positive relationship exist between core stability and performance among recreational cricket players.
Conclusion: Since positive relationship exist between performance and core stability hence core stability muscle training must be considered as integral part rehabilitation as well as training.

Keywords: core stability, performance, SLS, BOMB, T-Run

Introduction

Core muscle strength plays integral part in performance and execution of sports activity. Since kinetic chain activity exhibits beneficial effect in performance especially overhead activity and throwing activity hence good core muscle strength may be helpful for the overall performance of sports players.[1] Weak strength of core muscles affects the transfer of energy which results in poor performance on field because of this it can be assumed that core muscle strength may affect and help in improving the performance of the sports players. Hence sport specific training must be initiated and incorporated in the regime of training for sports players wherever required. Several researches have been performed where importance of core muscle strength was explained and its effects were studied which shows excellent results in enhancing human performance significantly due to facilitation of kinetic chain during distribution and execution of task [1, 2] Several studies have demonstrated that how core stability contributes in production of force since it is generated from trunk and gets transferred as in kinetic chain to the limbs [2].

Spinal stabilizers play important role in the coordinated and controlled movement in order to enhance the performance of daily activities. However, core stability is dependent on various factors like strength of abdominals, strength of paraspinals and activity level of the person as in requirement of core stability and strength is highly dependent on the activity level, age of the person [2].

It is reported that sports athletes who are involved in high intensity sports, and endurance sports requires strong core muscle strength to perform as compared to some who isn't involved in any sporting activity.[3] Since core muscles involves in controlling and transferring force from trunk to extremities to allow better performance good strength is required [3]

Core muscles are divided into two categories as in global and local muscles. Hence training must be targeted to improve strength of both group of core muscles. With good strength good mobility is also required which helps in delivering desired performance. Performance required during any event depends on several factors and each one must be considered as equally important [4]. Core muscles follows length dependent and force dependent activation pattern muscles working on length dependent patterns were of small muscles typically crossing one joint, whereas force dependent muscles tend to cross multiple joints hence stability and mobility occurs when both are working together [5]. Hip joint and pelvic muscles serve as base of support for core muscle group. Hip joint muscles consist of large cross-sectional area which is further involved in providing stability to pelvis and core to stabilize trunk and execute force towards extremities [6]. Present research work was intended to understand the relationship of between core muscle strength and performance among cricket players since we don't have enough literature where

relationship between core muscle strength and performance among cricket players was considered.

Methodology

Participants were appraised about intension of the study with its potential risks, benefits and subjects who gave their consent and falls under inclusion criteria were became part of study. On first day subjects familiarized about the procedure and demographic data was collected. Dominant leg was assessed by using any of the three techniques mentioned below

- Recovery from off-balance after push from posterior direction
- Step up on 20 cm step
- Kicking an football through 10m from participant

On second day participants were asked to perform warm up for 5 min which includes little jogging, stretching of upper limb, lower limb and trunk musculature. After that core muscle and performance was examined. Mac gill trunk muscle endurance tests were used to assess core stability [1, 7, 8, 9]

- **Flexor endurance test**: The test began with the participant in the sit-up position with their trunk supported at 60° of trunk flexion. Participants have to keep their knee joint and hip joint at 90 degrees and have to place their arms around their chest keeping feet placed on the couch. The support of the trunk was then removed, and the participant held the position for as long as possible. The test was terminated when the participant was no longer able to hold position.

- **Side bridge (right and left) test:** The test was performed in the side-lying position on a treatment table or over adjustable couch. The subject's knees were extended with the top foot placed in front of the lower foot. The participant supported their weight only on their lower elbow and feet while lifting their hips off the treatment table [7, 8, 9]

Performance assessment

- Backward overhead medicine ball throw (BOMB) [12, 10]
- Single leg squat (SLS) [11, 13]

Backward overhead medicine ball throw (BOMB): The BOMB was performed to assess total-body power [14, 15]. The test was performed using 2 kg medicine ball. Participants were familiarized initially as test consist of four phases. Which includes preparatory phase, countermovement phase, acceleration phase, and deceleration phase. Subjects were asked to throw the ball as far as possible, two trials were given to the participants and best reading was recorded for data analysis.

Single leg Squat test (SLS): Test was used to examine the endurance of muscles of lower extremity specifically. Here only dominant leg endurance was examined without shoes. Participants were asked to hold a squat position at 60 degrees of knee flexion and returned back to normal standing position. Examiner must stand beside the participant to support if required [16, 17].

Result

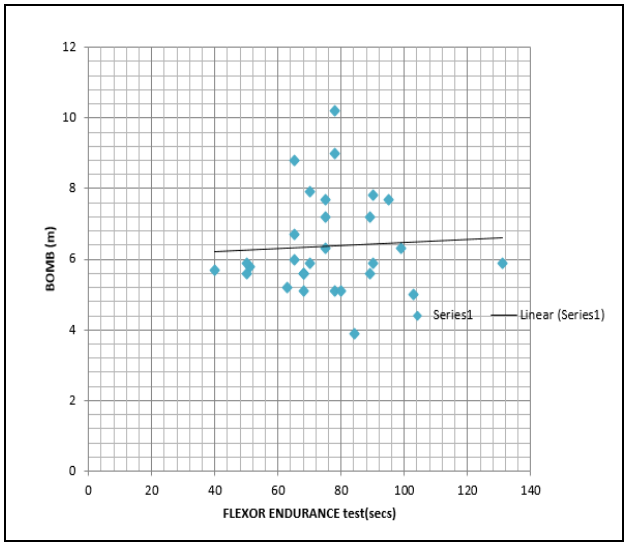
Total of 30 subjects were studied for the study of young adults of 18-28 years of age. There were 5 males and 25 females.

Correlation between BOMB and CORE Stability: In present study it was found that BOMB (backward overhead medicine ball throw test) was found to be positively correlated with Flexor (r= 0.055 p= 0.772). However it was not statistically significant. Therefore in studied population BOMB was not correlated with flexor in age of selected young Indian adults. BOMB was found to negatively correlated with SBRT (r = -0.281& p = 0.133), however it was not statistically significant. Therefore in studied population BOMB was not correlated with SBRT in age of selected young Indian adults. BOMB was found to negatively correlated with SBLT (r =- 0.196 , p = 0.298), however it was not statistically significant. Therefore in studied population BOMB was not correlated with SBLT in age of selected young Indian adults.

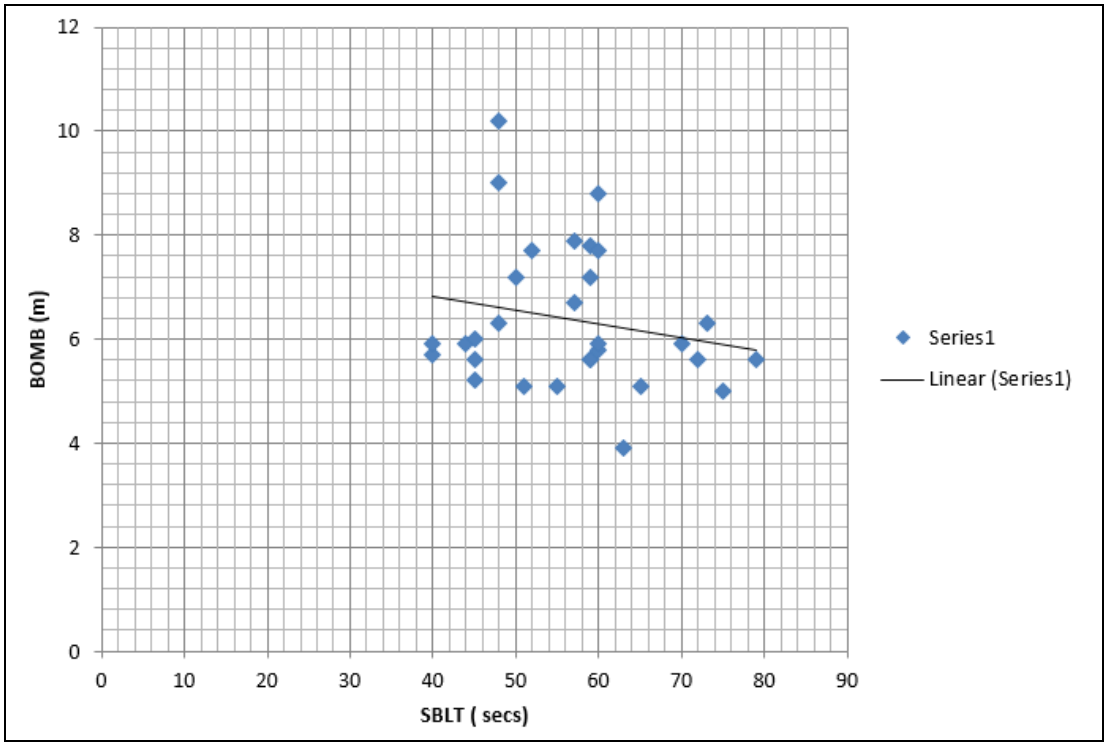
Correlation between. **Correlation between SLS and CORE Stability:** SLS was found to be positively correlated with SBRT (r = 0.783, p = 0.000) & with SBLT (r = 0.670, p = 0.000) and it is statistically significant. Therefore in the studied population SLS was significantly correlated to SLS in age of selected young Indian adults. SLS was found to be positively correlated Flexor (r = 0.311, p = 0.095 it is not statistically significant. Therefore in the studied population SLS was not significantly correlated to Flexor endurance test in age of selected young Indian adults.

Table 1: Description of relationship between BOMB test and core stability.

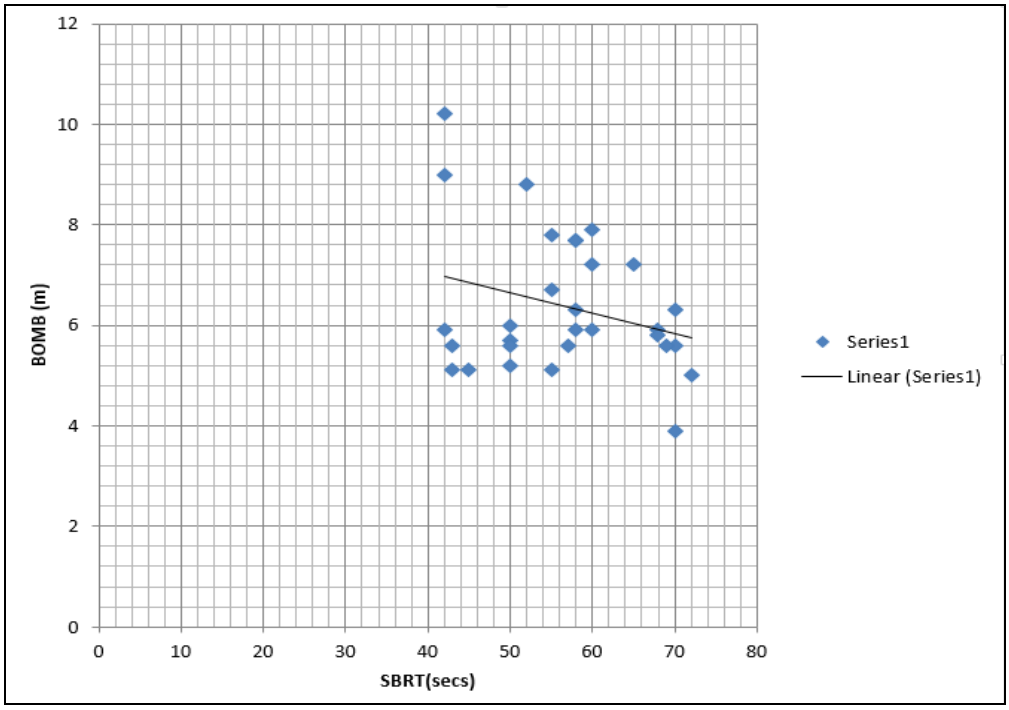
Core Stability		Bomb		
Variables	**Mean**	**Mean**	**r-value**	**p-value**
FLEXOR	75.66	6.37	0.055	0.772
SBRT	56.50	6.37	-0.281	0.133
SBLT	56.60	6.37	-0.196	-0.642



Graph 1: shows correlation between BOMB and FLEXOR endurance test



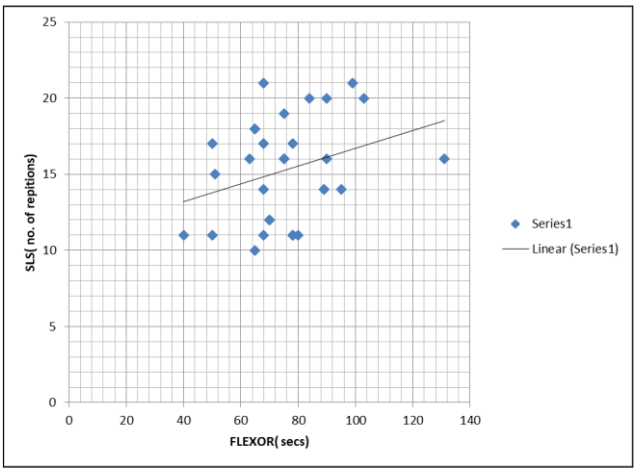
Graph 2: Shows correlation between BOMB and SBLT



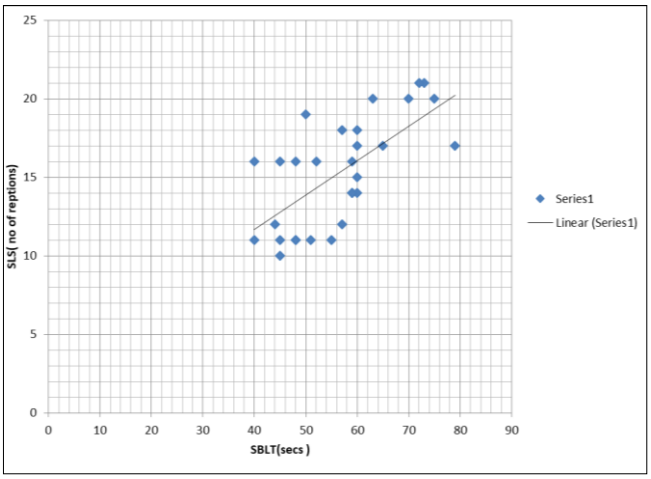
Graph 3: Shows correlation between BOMB and SBRT

Table 2: Description of core stability and Single leg Squat test

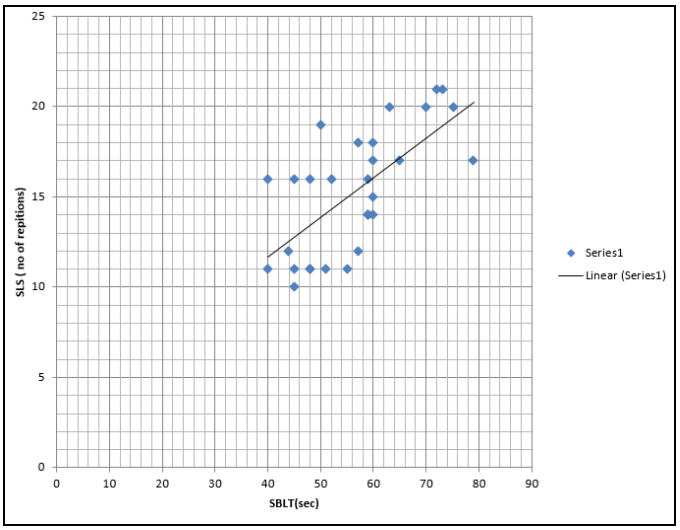
Core Stability		**SLS**		
VARIABLES	Mean	Mean	**r –value**	**p-value**
FLEXOR	75.66	15.30	0.311	0.95
SBRT	56.50	15.30	0.783**	0.000
SBLT	56.60	15.30	0.676*	0.000



Graph 4: Shows Correlation Between Sls Test And Flexor Endurance Test



Graph 5



Graph 6: Shows correlation between SLS and SBLT

Discussion

The primary purpose of this study was to determine the relationship between core stability and performance and the secondary purpose was to identify assessment test that best represent performance. We assured core stability through test that elicited isometric muscle contraction of the trunk musculature. The performance test was selected on the basis of required movements and muscle groups involved [1]

The BOMB test was used to total body power through the transfer of ground forces through the legs and torso to the upper body.

Several significant correlations were identified between core stability & performance variable.

SLS was found significant positively correlated with SBRT and SBLT. Mario A. Dimattia explained the single leg squat (SLS) is test used by investigators to assess general leg strength and muscle endurance. This test can be used to decide when an athlete can return to play or advance further in a rehabilitation progression [41]. The primary lateral stabilizer of the spine (used in Side brigde) is quadratus lumborum and has been shown to greatly contribute to spinal stability. In SLS test, there will be dynamic movement of lower limb and simultaneously Isometric contraction of core muscles (Quadratus lumborum). The possible reason behind this positive relationship is that Core muscles were contracted throughout the SLS test despite the dynamic movement of the lower extremity which means that Subjects have to use their trunk muscles (quadratus lumborum) to stabilize their upper body in an upright position during SLS test. So the isometric training of SBRT and SBLT can enhance the score of SLS which further lead to better leg strength and endurance which is essential for sports like football and after ACL rehabilitation progression.

Conclusion

Results from present study positive relationship was observed between SLS concludes Positive correlation between SLS and SBRT, SBLT

References

1. Tomoko okada, kelle C Huxel, Thomas W. Nesser; Relationship between core stability, Functional movement and performance.J Strength Cond Rsch. 2011; 232-261(25).
2. Hibbs AE, Thompson KG, French D, Wrigley A, Spears I. Optimizing performance by improving core stability and core strength. Sports Medicine. 2008; 38(12):995-1008.
3. Panjabi M. The stabilizing system of the spine, part I: function, dysfunction, adaptation and enhancement. J Spinal Disord. 1992; 5:383-389
4. Bergmark A. Stability of the lumbar spine: a study in mechanical engineering. Acta Orthop Scand Supp. 1989; 230:51-54.
5. Nichols TR. A biomechanical perspective on spinal mechanisms of coordinated muscle activation. Acta Anat. 1994; 15:1-13. [PubMed]
6. Hodges PW. Core stability exercise in chronic low back pain. Orthop Clin N Am. 2003; 34:245-254
7. Mark Hoffman, John. unilateral postural control of the functionality dominant & non- dominant extremities of healthy subject,33(4):319-322. Journal of athletic Training.
8. Mc Gill M. ultimate back ftness and performance water

ON: wabuno, 2004, 100.
9. Doncan MJ, Al Nakeeb Y. influence of familiarization on backward, overhead medicine Ball explosive power test res. Sports med. 2005; 13:345-352.
10. Kathryln L. Dan's; validity & reliability of the medicine ball throw for kindergarten Children; Dep. Of Ex.. & sports science; j of strength, 1958-1963.
11. Pauole K, madole K garchaminis J, lacours M, rozenenk R. reliability and validity of T test as measure of agility. Leg power and leg speed in college aged men n women, j strength cond. 2000; 14:443-450.
12. Sohail H, fadhlon M. Relationship between agility T- Test & Physician fitness measure as indicators of performance in elite handball players. (United Arab Emirates ; Military centers of Physical Education & sport), 2011.
13. Livengood AL, dimattia VL "dynamic trendlen burg: single leg squat test for gluteus medius strength athletic the today. 2004; 9:24-25.
14. Waren young Damian Farron; Validity & Reliability of agility tests in junior Australian Footballers, J Research,25(12):3399-3403.
15. TSE MA, McManus MA, Masters RS. Development and validation of a core endurance intervention program: Implications for performance in college age rowers. J Strength and Conditioning Res.2005; 19:547-552
16. Mario Ann. Livengood; what are the validity of the single leg squat test & its Relationship to hip abduction strength ; J sport. 2005; 14:108:123.
17. Mc Gill SM, Childs A, Liebson C. Endurance test for low back stabilization exercises; Clinical targets for testing & Training from a normal database. Arch Phys Med Rehabilitation,80:971-944