

TO EVALUATE AND COMPARE DYNAMIC BALANCE BETWEEN CRICKETERS AND NON-CRICKETERS USING STAR EXCURSION BALANCE TEST

Ruchi Choudhary.

Assistant Professor, MPT Neurology, Teerthanker Mahaveer University, Moradabad, India.

ABSTRACT

Background: Exercise and sports are considered important for quality life. In athletes, high level of lower limb strength and balance are important prerequisites for the independent and successful performance during sports. To move efficiently, one requires control of the body's postural alignment. In other words, a strong balance is needed to move efficiently. Impaired balance is one of the several risk factor that have been associated with increased risk of lower extremity injuries

Method: Total 50 subjects were included in the study. 25 Cricketers from Teerthanker Mahaveer University Cricket Academy and 25 non-cricketers from different colleges of Teerthanker Mahaveer University, Moradabad, U.P. Age of the subject range from 18-24 years. The informed consent was taken and Star Excursion Balance Test were performed. The data obtained was analyzed using independent t- test.

Result: Our result indicates that there is significant difference between the reach distance of cricketers and non-cricketers of both dominant and non-dominant legs.

Conclusion: The result of the study showed better dynamic balance in cricketers than non-cricketers in dominant leg and non-dominant leg. It is recommended to incorporate star excursion balance test in cricketers training program for measuring dynamic balance.

KEY WORDS: Star excursion balance test, Dynamic balance, Cricketer.

Address for correspondence: Dr. Ruchi Choudhary. PT., Assistant Professor, MPT Neurology, Teerthanker Mahaveer University, Moradabad, India. **E-Mail:** ruchichoudhary.physio@gmail.com

Access this Article online	Journal Information
Quick Response code  DOI: 10.16965/ijpr.2019.165	International Journal of Physiotherapy and Research ICV for 2016 86.93 ISSN (E) 2321-1822 ISSN (P) 2321-8975 https://www.ijmhr.org/ijpr.html DOI-Prefix: https://dx.doi.org/10.16965/ijpr 
	Article Information
	Received: 12 Jun 2019 Peer Review: 13 Jun 2019 Revised: None
	Accepted: 14 Aug 2019 Published (O): 11 Sep 2019 Published (P): 11 Oct 2019

INTRODUCTION

Exercise and sports are considered important for quality life. In athletes, high level of lower limb strength and balance are important prerequisites for the independent and successful performance during sports. To move efficiently, one requires control of the body's postural alignment. In other words a strong balance is needed to move efficiently [1].

Balance can be defined as the ability to maintain a base of support with minimal movement as well as the ability to perform a task while maintaining a stable position [2] and keep

the body's centre of gravity within the base of support with minimum sway [3] COG is generally located 2 inches anterior to the spine, but varies by gender, body shape, body size, even age.

The COG in males tends to be slightly higher than in female due to typically greater quantities of the upper body musculature. It is well know that both sensory and motor systems contribute to the ability to maintain balance. Inputs from sensory system are necessary to detect unstable condition and from motor are vital to initiate timely and appropriate

the responses to counteract these perturbations [1].

There are two types of balance: static and dynamic. Static balance is defined as the ability to maintain an upright posture and to keep the line of gravity within the limits of the base of support (i.e., quiet standing). Dynamic balance is defined as the ability to maintain stability during weight shifting, often while shifting the base of support [4].

Balance is ability of antigravity muscles to maintain posture. Sensory information obtained from somatosensory, vestibular and visual systems and motor responses that affect joint, range of motion, coordination and strength are the factor influencing balance [2]. The visual system of an individual is the first sensory information that needs to keep postural balance.

Athletes from different sports require balance control for their better performance depending on game type they involved. Cricket is a popular sport played in many countries. The game of cricket has historically been known as "Gentleman's Game". Traditionally, Cricket has been a relatively mild sport from a physiological point of view. The intermittent nature of the game with its long rest intervals provides plenty of recovery time between any short spells of higher intensity activity. Sprints during cricket are often centred about crucial match situation such as running between wickets, the run -up and delivery during fast bowling, or sprinting to field a ball which lays a high demand of dynamic stability in cricketers. In cricket not only players will bowl, while certain players will have greater responsibility to score runs when batting. However, all cricketers must field, and complete maximal sprints when fielding [5-8].

Assessment of postural control is an important measure in athletic populations for establishing levels of balance and neuromuscular co-ordination for the purposes of injury prevention and rehabilitation. Numerous tests have been developed to assess dynamic postural control in athletic population. However, the space and cost requirements associated with balance measuring devices are not affordable or feasible for many clinical setting or during on-field

assessments. The star excursion balance test (SEBT) challenges an athlete's dynamic postural control system [8].

The environmental demands and skill requirement in cricket likely induces different challenges to the sensory-motor systems that cumulatively might have influenced the abilities of balance in trained athletes. Thus, balance testing becomes imperative to detect these features of how cricketers perform in balance test. Cricket is played with three skills; batting, fielding and bowling, which requires a good focus, postural control, strength, muscular endurance, explosive bursts and fitness [8].

SEBT is a reliable measure and a valid dynamic test that requires strength, flexibility, and proprioception. The SEBT has been used to measure physical performance, compare balance ability among different sports, and identify individual who have

chronic ankle instability, and identify athletes at greater risk for lower extremity injury. Researchers have suggested using the SEBT as a screening tool for sport participation and as a post-rehabilitation test to ensure dynamic functional symmetry.

MATERIALS AND METHODS

A sample of 50 subjects were included in the study. 25 Cricketers from Teerthanker Mahaveer University Cricket Academy and 25 non-cricketers from different colleges of Teerthanker Mahaveer University, Moradabad, U.P. Age of the subject range from 18-24 years.

Statistics were performed using SPSS Software Version 21. An independent t-test was used to analyze the difference between the performance of cricketers and non-cricketers.

RESULTS

The cricketer group participants consisted of 25 male subjects with the mean and S.D age of 20.2 ± 1.68 , mean and S.D height of 5.51 ± 0.24 , and mean and S.D weight of 59.4 ± 6.04 .

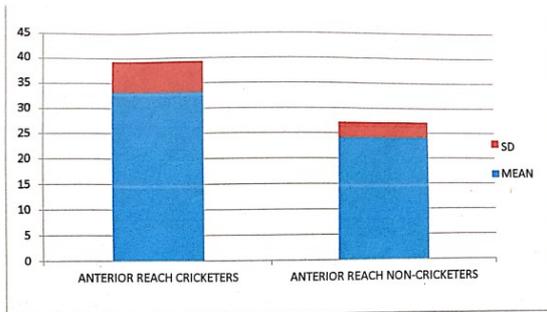
The non-cricketers group participants consisted of 25 male subjects with the mean and S.D age of 20.4 ± 1.23 , mean and S.D height of 5.70 ± 0.22 and The cricketer group participants consisted of 25 male subjects with the mean and S.D age of 20.2 ± 1.68 , mean and

S.D height of 5.51 ± 0.24 , and mean and S.D weight of 59.4 ± 6.04 .

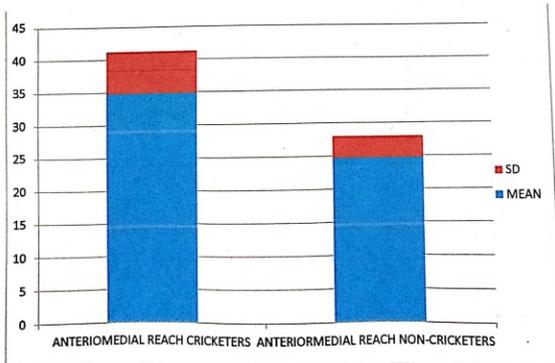
The non-cricketers group participants consisted of 25 male subjects with the

mean and S.D age of 20.4 ± 1.23 , mean and S.D height of 5.70 ± 0.22 and mean and S.D weight of 59.04 ± 6.45 . mean and S.D weight of 59.04 ± 6.45 .

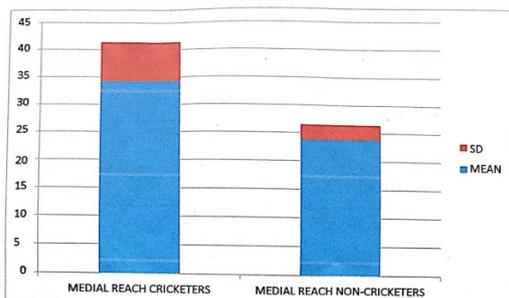
GRAPH 1 - DEPICTS THE MEAN AND STANDARD DEVIATION OF ANTERIOR REACH IN CRICKETERS AND NON-CRICKETERS.



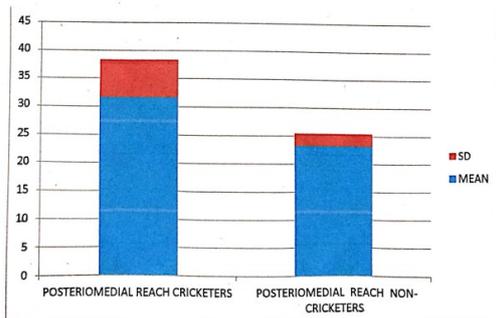
GRAPH 2- DEPICTS THE MEAN AND STANDARD DEVIATION OF ANTEROMEDIAL REACH IN CRICKETERS AND NON-CRICKETERS.



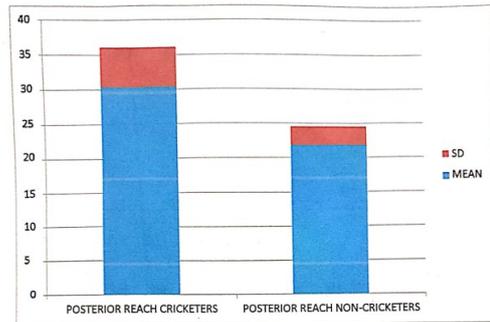
GRAPH 3 - DEPICTS THE MEAN AND STANDARD DEVIATION OF MEDIAL REACH IN CRICKETERS AND NON- CRICKETERS.



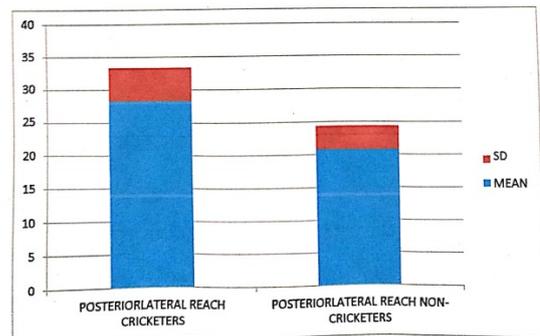
GRAPH 4- DEPICTS THE MEAN AND STANDARD DEVIATION OF POSTEROMEDIAL REACH IN CRICKETERS AND NON- CRICKETERS.



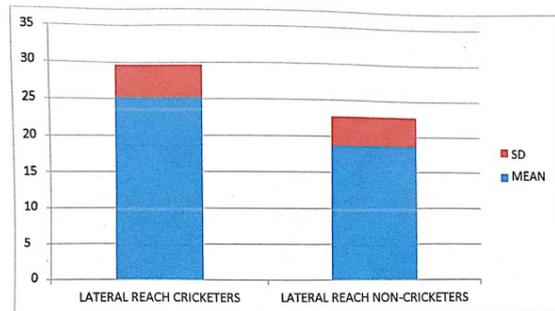
GRAPH 5 - DEPICTS THE MEAN AND STANDARD DEVIATION OF POSTERIOR REACH IN CRICKETERS AND NON- CRICKETERS.



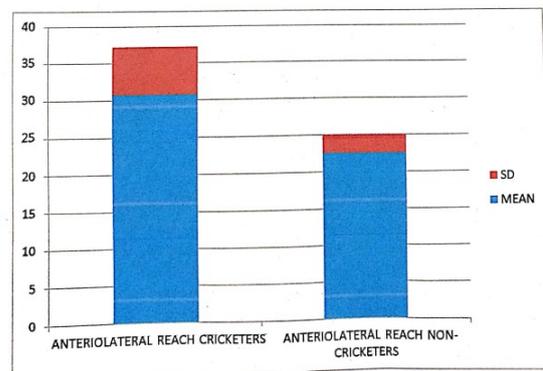
GRAPH 6 - DEPICTS THE MEAN AND STANDARD DEVIATION OF POSTERIORLATERAL REACH IN CRICKETERS AND NON- CRICKETERS.



GRAPH 7 - DEPICTS THE MEAN AND STANDARD DEVIATION OF LATERAL REACH IN CRICKETERS AND NON- CRICKETERS.



GRAPH 8- DEPICTS THE MEAN AND STANDARD DEVIATION OF ANTERIOLATERAL REACH IN CRICKETERS AND NON- CRICKETERS.



DISCUSSION

The purpose of this study was to determine the difference of dynamic balance as well as the difference of strength, flexibility and lower extremities coordination between cricketer and non-cricketers using SEBT.

Our result indicates that there is significant difference between the reach distance of cricketer and non-cricketers of both dominant and non-dominant legs. Completion of the SEBT requires many attributes including strength, flexibility, neuromuscular control, and core stability, range of motion, balance and proprioception.

This study revealed that cricketer has increased reach distance in all the eight directions. However higher excursion reach distance was found in anterior, anteromedial and medial reach. In the anterior reach direction, participant received visual feedback from the reach leg as they move and can observe the scored reach distance, so the excursion tests in this direction are more. The difference observed between cricketer and non-cricketers may be due to different daily routine of athletes as compare to non-cricketers. Cricketer used to involve themselves in physical activities including balancing activities, skill training etc. which leads to improve joint strength, ROM of joints and neuromuscular conditions. This supports the result of the study. A similar comparison on static balance and dynamic balance was done by Eadric et al; 2007 on female collegiate level soccer, Basketball and gymnastics athletes. They reported significant difference between gymnasts and soccer players in terms of their static and dynamic balance; in contrast basketball players displayed inferior dynamic balance when compared with soccer players. Studies have also reported reasons for acquiring superior balance in trained and experienced cricketer. Which up-to maximum extent depends on the nature of repetitive training experiences which ultimately influences the motor responses rather than the sensitivity of the vestibular system Balter et al: 2004 [9]. The training experiences responsible for attaining superior balance in experienced athletes influences individuals ability to attend proprioceptive and visual cues Ashton et al: 2001 [10]. In the height of these studies it was seen that balance performance is influenced by both sensory and motor system.

The specific sensorimotor system changes that resulted from sport participation are multifaceted. Evidence suggested that the improvement

in the joint proprioception after skill training and learning to pay attention to biomechanical cues (e.g. joint acceleration) may be one of the mechanisms for this change. Sports training improve neuromuscular co-ordination, ROM, and joint strength are also likely mechanism that leads to improved balance. Hence balance scores difference between cricketer and non-cricketers may be due to differences in joint strength. There is requirement of good dynamic balance in cricketer such as running between wicket and hand eye coordination is require during fielding and batting. A batsman requires a good balance to play shots; poor balance may lead to loss in power that might cause an out. However, motor control and biomechanics of batting along with fitness are poorly understood in cricket and more research are suggested. The above factors justify the reason for the significant difference in the static and dynamic balance [11,12].

Conflicts of interest: None

REFERENCES

- [1]. Lawrence EL, Cesar GM, Bromfield MR, Valero-Cuevas FJ, Sigward SM. Strength, multijoint coordination and sensorimotor processing are independent contributors to overall balance ability. *Biomed research internation* 2015.
- [2]. Pandey A, Venugopal R. Comparison of dynamic balance using SEBT between athletes and non-athletes. *International Journal of Physical Education*.2016;3(2):238-40.
- [3]. Golshaei BA. Dynamic and static balance differences based on gender and sport participation. *Middle East Technical University*.2013.
- [4]. Dunskey A, Zeev A, N etz Y. Balance performance is task specific in older adults. *BioMed research international*.2017.
- [5]. Bartlett RM. The science and medicine of cricket: an over view and update. *Journal of sports and science*. 2003;21(9): 733-752.
- [6]. Duffield R, Carney M, Karppinen S. Physiological responses and bowling performance during repeated spells of medium-fast bowling. *Journal of Sports Sciences*. 2009 Jan 1;27(1):27-35.
- [7]. Robert GL, Callaghan SJ, Jeffriess MD. Acceleration kinematics in cricketers: implications for performance in the field. *Journal of sports science & medicine* 2014;13(1):128.
- [8]. Khuman PR, Kamlesh T, Surbala L. Comparison of static and dynamic balance among collegiate cricket, soccer and volleyball male players. *International journal of health & allied sciences*.2014;1:3(1):9.

- [9]. Balter SGT, Stokroos RJ, Akkermans E. Habituation to galvanic vestibular stimulation for analysis of postural control abilities in gymnasts. *Neurosci Lett* 2004; 366:71-75.
- [10]. Ashton-Miller JA, Wojtys EM, Huston LJ, Fry-Welch D. Can proprioception really be improved by exercises? *Knee Surg Sports Traumatol Arthrosc* 2001;9:128-136.
- [11]. Gribble PA, Robinson RH, Hertel J, Denegar CR. The effect of gender and fatigue on dynamic postural control. *Journal of sport rehabilitation* 2009;18(2):240-57
- [12]. Gribble PA, Hertel J, Plisky P. Using the Star Excursion Balance Test to assess dynamic postural-control deficits and outcomes in lower extremity injury: a literature and systematic review. *Journal of athletic training* 2012; 47(3):339-57.

How to cite this article:

Ruchi Choudhary. TO EVALUATE AND COMPARE DYNAMIC BALANCE BETWEEN CRICKETERS AND NON-CRICKETERS USING STAR EXCURSION BALANCE TEST. *Int J Physiother Res* 2019;7(5):3215-3219. DOI: 10.16965/ijpr.2019.165