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Original Research Article

Foot Posture of Pace Bowlers and Spinners in Cricket

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ABSTRACT

The objective of the study was to determine the effect of bowling on foot posture of pace and spin bowlers in cricket.

Methodology: A cross sectional survey was carried out on 100 cricket bowlers, between 18-20 years of age which includes 50 pace bowlers (Group A) and 50 spinners (Group B). Their foot posture was evaluated in both the groups using a Foot Posture Index -6 scale.

Result: In Group A (Pace bowlers) among 50 players 18(36%) players were seen with a pronated left foot while on the right leg 15(30%) players had pronated foot and 2(4%) had supinated foot. In Group B (spinners) among the 50 players, 17(34%) players had supinated foot and 6(12%) pronated foot in the left leg and in the right leg 16(32%) players had a supinated foot and 2(4%) players had a pronated foot.

Conclusion: The study concludes that among cricket bowlers, pronated foot was seen more in pace bowlers (Group A) and supinated foot was seen more in the spin bowlers (Group B). This study also concludes that the type of bowling affects the foot posture in cricket players.

Keywords: Foot posture index -6 scale, pace bowlers, spinners, cricket players.

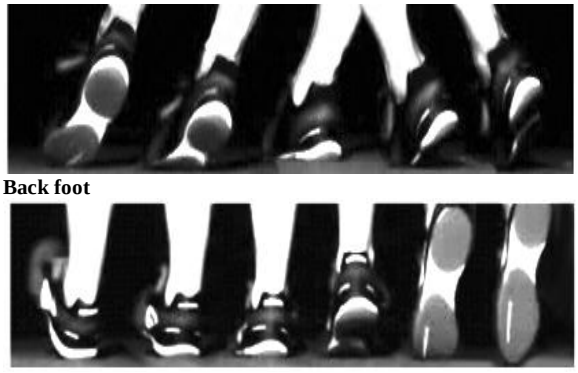
INTRODUCTION

Cricket is one of the world's major team sports, with a passionate following in the subcontinent. Since 1983, cricket has become the most popular sport in India and is gaining in importance in all South-East Asian countries**.** [1] In the sport of cricket, the bowling action is a set of movements that result in the bowler releasing the ball in the direction of the batsman. A bowling delivery consists of 4 main phases: 1) run-up to back foot contact, 2) pre-delivery, 3) delivery stride and 4) follow through. [1] Bowlers in cricket are broadly classified as spin and pace bowlers. According to the patterns and speed they are further classified into: off-spinner, leg-spinner, med-pace bowler and fast bowler.

Recent increase in playing hours and increased performance expectations has led to greater demands on cricketers. This increased demand has further led to an increased incidence of injuries worldwide. [3] Young bowlers who bowl in more than 17 matches per year have a higher prevalence of overuse injuries in the lower limb compared to any other bowlers. [4] Stretch (1995) found that the most common sites for injury were the back and trunk (33.5%), upper limbs (24.6%) and the lower limbs (22.8%). Bowlers (47.4%) were more prone to injury than batsmen (29.8%) and fielders (22.8%). [5] In fast bowlers, a player absorbs vertical and horizontal components of the ground reaction force that are approx 5 times the body weight in front foot and 2

times in the rear foot impact respectively. [6] Bartlett et al. (1996) and Orchard and James (2002) have recorded incidences of ankle ligament sprains as well as tibialis anterior strains. [7]

Hurrion *et al.* (2000) [8] established that impact forces during the delivery stride are in the region of 2.37 times body weight (BW) vertically and 0.94 BW horizontally for the back foot and 5.7 BW vertically and 3.5 BW horizontally during front foot impact, which may be modified by footwear (Shorter *et al.*, 2008). [9] Whilst it is assumed that the front foot would be at greater risk of injury due to larger impact forces, contrasting foot movement during the delivery stride as depicted in Figure 1 would suggest that the nature and susceptibility of injuries may vary between the back and front foot.



Back foot

Front foot

Figure 1: Pictorial description of back and front foot contact from heel strike to toe-off during the delivery stride. [10]

The foot posture index (FPI-6) is a diagnostic clinical tool which aims at qualifying the degree to which foot can be considered to be in a pronated, supinated or neutral position and intends to be a simple method of scoring the various features of the foot posture into a single quantifiable result, which in turn gives an indication of the overall foot posture. Hence, the purpose of study is to rule out various foot postures in cricketers.

METHODOLOGY

Study Population: Cricket players
Sample Size: 100
Sampling Technique: Purposive Sampling

Study Setting:

1. Payade sports academy- Kandivali, Mumbai.
2. Poisar gymkhana-Kandivali, Mumbai.
3. Achiever's Academy-Chembur, Mumbai.

Inclusion criteria:

1) Spinners and pace bowlers who are playing cricket for minimum of 3- 5 years.
2) Age group: 18-20yrs

Exclusion criteria:

Players who had recent musculoskeletal problems.

Ethical approach:

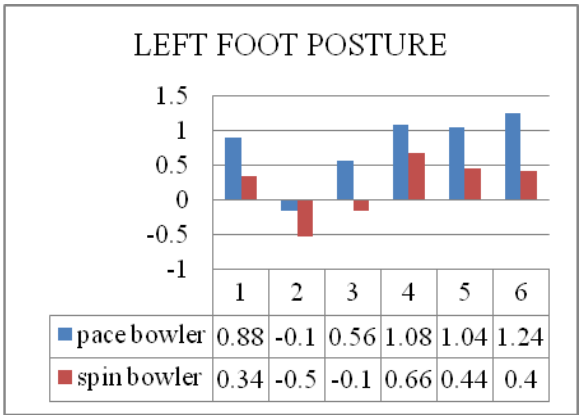
The study was approved by the Institutional Ethics and Research Committee at D Y Patil University. Written informed consent was taken from all the subjects and their identification information that was collected during the study was kept strictly confidential.

Procedure:

Among the subjects, demographic details such as age, height, and weight were taken and the BMI was calculated. The players were divided into 2 groups. Group A had pace bowlers and Group B had spinners. A foot posture index scale was used and a full explanation of each of its constituent was given to the individual subjects. The subject should stand in their relaxed stance position with double limb support. The subject should be instructed to stand still, with arms by the side and looking straight ahead. It may be helpful to ask the subject to take several steps, marching on the spot, prior to settling into a comfortable stance position. During the assessment, it was important to ensure that the subject does not swivel to try to see what was happening for them, as this will significantly affect the foot posture. The subject needs to stand still for approximately two minutes in total, in order for assessment to be conducted. The assessor needs to be able to move around the subject during the assessment and to have uninterrupted access to the posterior aspect of the leg and foot.

RESULT

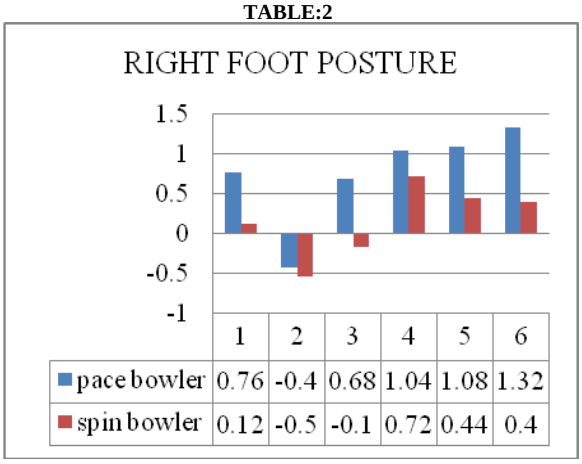
TABLE: 1



	1	2	3	4	5	6
pace bowler	0.88	-0.1	0.56	1.08	1.04	1.24
spin bowler	0.34	-0.5	-0.1	0.66	0.44	0.4

Inference: Table 1 shows the results of left foot according to the foot posture index scale in pace bowlers and spinners.

TABLE:2



	1	2	3	4	5	6
pace bowler	0.76	-0.4	0.68	1.04	1.08	1.32
spin bowler	0.12	-0.5	-0.1	0.72	0.44	0.4

Inference: Table 2 shows the results of right foot according to the foot posture index scale in pace bowlers and spinners.

DISCUSSION

This study was conducted among 100 male cricket bowlers of the age 18-20years with similar BMI. The objectives of this study were: a) To determine the effect of bowling on foot posture in pace and spin bowlers in cricket using a foot posture index scale. b) To compare the foot posture in them.

According to the first objective, foot posture index score revealed that the 1st, 3rd, 4th, 5th and 6th components are showing a positive higher value both on the right as well as left foot of the pace bowlers while 2nd component shows mild negative value thus favoring towards pronation. In spinners, the foot posture index score revealed that the 1st, 4th, 5th and 6th components shows a positive value which was significantly less than the pace bowlers and also the 2nd ,3rd components are found to be strongly negative. This result favors supinated foot in spinners.

According to the data collected among the 50 players of GROUP A, the players with neutral foot posture index score was 32 followed by 18 players with pronation foot on the left foot, while in the right foot, the neutral foot posture index score was seen in 33 players followed by 15 players with pronation foot and 2 players supination foot as shown in the table 1& table 2 respectively.

In GROUP B, among the 50 players, 27 players fall in the category of neutral foot posture according to foot posture index followed by 17 players with supinated foot and a 6 players with pronated foot in the left foot, while in the right foot 31 players had neutral foot posture index score followed by 16 players with supinated foot and 2 player with pronated foot as shown in the table 1& table 2 respectively.

As per the above statistics it is significant that there are abnormal foot posture seen in the bowlers and thus the prevalence of ankle injuries are more. [11-13] According to the British study, [14] most injuries in cricket occurred to the lower limbs (44.9%) with calf and thigh (24.6%), knee (9.9%) and foot and ankle as major sites (8.7%). The injuries were sustained while bowling (45%), batting (21%), fielding (23%) and wicket-keeping (2%). The incidence of injuries to shin/foot/ankle area was consistently ranked in three most frequently injured anatomical sites accounting for 17% (range 10.9%- 23.8%) injury incidence. [15] The primary foot and ankle injuries were contusions/ haematomas (41%) and ligament/joint sprains (29%). [14]

Pronation or supination is considered abnormal if it is excessive or occurs out of its respective phase during the gait cycle. Abnormal pronation or supination is thought to be a compensation for osseous or functional abnormalities of the lower

extremities. [16] Laurie et al [17] reported that athletes with pronated and supinated feet had significantly more knee pain than the neutral group. Pronated foot posture was found to be associated with arch pain and also has a risk factor for the development of Medial tibial stress syndrome (MTSS) 11.5% to 44.1%; [18-27] Patello-femoral pain 3.0% to 15.7%. [28-30] While a prolonged supinated foot cause increased risk of lateral ankle sprain.

CONCLUSION

The above study concludes that the type of bowling affect the foot posture. It also concludes that pronated foot is seen more in pace bowlers while supinated foot is seen more in spin bowlers. Thus preventive measures can be taken to reduce the occurrence of ankle and foot injuries in cricket players by prior evaluation of foot posture.

Conflict of Interest: None

REFERENCES

1. Dhillon MS, Garg B, Soni RK, Dhillon H, Prabhakar S. Nature and incidence of upper limb injuries in professional cricket players a prospective observation. BMC Sports Sci Med Rehabil 2012;4(1):42.
2. McGrath, A.C., & Finch, C.F. (1996). Bowling cricket injuries over: a review of the literature. Monash University Accident research centre, report 105
3. Finch CF, Elliott BC, Mcgrath AC. Measures to prevent cricket injuries. Sports Med 1999 Oct; 28(4):263-272.
4. Elliott, B.C., John, D. & Foster, D. (1989). Factors which may predispose a bowler toinjury. In: B. Elliott, D. Foster and B. Blanksby (eds.), Send the Stumps Flying:The Science of Fast Bowling, 54-59.
5. Stretch, R.A. (1995). The seasonal incidence and nature of injuries in schoolboy cricketers. South African Medical Journal, 85(11):1182-1184.
6. Foster, D., John D., Elliott, B., Ackland T., & Fitch, K. (1989). Back injuries to fastbowlers in cricket: A prospective study. British Journal of Sports Medicine, 23,150-154.
7. Bartlett, R.M., Stockill, N.P., Elliot, B.C. & Burnett, A.R. (1996). The biomechanics of fast bowling in men's cricket: A review. Journal of Sport Sciences, 14:403-424
8. Orchard, J.; James, T.; Alcott, E.; Carter, S. & Farhart, P. (2002). Injuries in Australian cricket at first class level 1995/1996 to 2000/2001. British Journal of Sports Medicine, 36:270-275.
9. Hurrion, P., Dyson, R., Hale, T. (2000). Simultaneous measurement of back and front foot ground reaction forces during the same delivery stride of the fast-medium bowler. Journal of Sports Sciences, 18, 993-997.
10. Shorter, K., Smith, N., Dyson, R. (2008). Kinetic and kinematic changes associated with altering heel height during cricket medium-fast cricket bowling. Proceedings of International Society for Biomechanics in Sports. p.279.
11. Coplan /A: Rotational motion of theknee: a comparison of normal andpronating subjects. I Orthop Sports Phys Ther 10:366-369, 1989.
12. Hunt CC: Subtalar joint pronation: influence of balanced insoles. Unpublished thesis. University of Maryland, College Park, MD, 1980.
13. McPoil TC, Brocato RS: The foot and ankle: biomechanical evaluation and treatment. In Could JA, Davies GI (eds), Orthopedic and Sports Physical Therapy, pp 3 13-34 1. St. Louis, MO:CV Mosbv Co.. 1985
14. Leary T, White J. Acute injury incidence in professional country club cricket players (1985-1995).Br J Sports Med 2000; 34:145-7.
15. Orchard J, Newman D, Stretch R, FrostW, Mansingh A, Leipus A. Methods for injury surveillance in international cricket. J Sci Med Sport 2005;8(1):1-
16. Root ML, brien WP, Weed IH, Hughes RI: Biomechanical Examination of the Foot. Los Angeles, CA: Clinical Biomechanics Corp., 197 1
17. laurie K. Dahle, Michael Mueller, Anthony Delitto: Visual Assessment of Foot Type and Relationship of Foot Type to lower Extremity Injury. J Orthop Sports Phys Ther 1991.14:70-74.
18. Yalcin N, Esen E, Kanatli U, Yetkin H. Evaluation of the medial longitudinal arch: a comparison between the dynamic plantar

pressure measurement system and radiographic analysis. Acta Orthop Traumatol Turc. 2010;44:241–245.
19. Murley GS, Menz HB, Landorf KB. A protocol for classifying normal- and flat-arched foot posture for research studies using clinical and radiographic measurements. J Foot Ankle Res. 2009; 2:22.
20. Song J, Hillstrom HJ, Secord D, Levitt J. Foot type biomechanics: a comparison of planus and rectus foot types. J Am Podiatr Med Assoc. 1996; 86:16–23.
21. Humphrey GM. A lecture on flat-foot and the construction of the plantar arch. Lancet. 1886; 127:529–531.
22. Ilfeld FW. Pes planus military significance and treatment with simple arch support. JAMA. 1944; 124:281–283.
23. Cowan DN, Jones BH, Robinson JR. Foot morphologic characteristics and risk of exercise-related injury. Arch Fam Med. 1993; 2:773–777.
24. Simkin A, Leichter I, Giladi M, Stein M, Milgrom C. Combined effect of foot arch structure and an orthotic device on stress fractures. Foot Ankle. 1989; 10:25–29.
25. Messier SP, Pittala KA. Etiologic factors associated with selected running injuries. Med Sci Sports Exerc. 1988; 20: 501–505.
26. Kogler GF, Solomonidis SE, Paul JP. In vitro method for quantifying the effectiveness of the longitudinal arch support mechanism of a foot orthosis. Clin Biomech. 1995; 10:245–252.
27. Kitaoka HB, Luo ZP, An KN. Mechanical behavior of the foot and ankle after plantar fascia release in the unstable foot. Foot Ankle Int. 1997; 18:8–15.
28. Kitaoka HB, Luo ZP, An KN. Contact features of the talonavicular joint of the foot. Clin OrthopRelat Res. 1996; 325:290–295.
29. Fujii T, Uchiyama E, Kitaoka HB, Luo ZP, Zhao KD, An KN. The influence of flatfoot deformity on the gliding resistance of tendons about the ankle. Foot Ankle Int. 2009; 30:1107–1110.
30. Menz HB, Morris ME. Footwear characteristics and foot problems in older people. Gerontology. 2005; 51:346–351.

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