Back Injuries To Fast Bowlers In Cricket: A Prospective Study.

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Abstract
Eighty-two high performance young male fast bowlers (mean age 16.8 years) were tested immediately prior to the season for selected kinanthropometric and physiological data. Subjects were also filmed both laterally (200 Hz) and from above (100 Hz) while bowling so that their front foot impacted a force platform during the delivery stride. The players then completed a log book over the ensuing season that detailed their training and playing programs. All cricket related injuries over this season were assessed by a sports physician who used computerized tomography to assist in the diagnosis of spinal injuries. At the completion of this season the players were grouped according to their injury status (Group 1--bony injury to a vertebra; Group 2--soft tissue injury to the back that caused the player to miss at least one game, and Group 3--no injuries). A one-way analysis of variance was used to identify if any variables were significantly (P less than 0.05) different between the three groups, and a Scheffe post hoc comparison was used to determine which groups were significantly different.
Eleven percent of the players sustained a stress fracture to a vertebra (e) (L4 to S1), while 27% sustained a soft tissue injury to the back. Bowlers with a low longitudinal foot arch were more likely to develop a stress fracture than those with a high arch. Shoulder depression and horizontal flexion strength for the preferred limb and quadriceps power in the non-preferred limb were also significantly related to back injuries. Bowlers who rotated the trunk to re-align the shoulders by more than 40^{o} to a more side-on position between back foot impact and front foot impact, in the delivery stride were more likely to sustain back injuries. No significant relationship was determined between peak vertical (5.4 BW) or horizontal (-2.5 BW) ground reaction forces at front foot impact, however, these forces may predispose a bowler to back injuries if the person is required to bowl for long periods. Nineteen of 32 players (59%), who bowled in excess of the mean number of matches for the group, suffered a stress fracture or soft tissue injury to the back compared to the 38% injury frequency for the total group. A greater release height when expressed as a percentage of standing height was also significantly related to back injuries. Results suggest that players with the above physical characteristics, who bowl with these biomechanical techniques for extended periods, may pre-dispose the bowler to back injuries.
Despite its long history and global appeal, relatively little is known about the physiological and other requirements of cricket. It has been suggested that the physiological demands of cricket are relatively mild, except in fast bowlers during prolonged bowling spells in warm conditions. However, the physiological demands of cricket may be underestimated because of the intermittent nature of the activity and the generally inadequate understanding of the physiological demands of intermittent activity. Here, we review published studies of the physiology of cricket. We propose that no current model used to analyses the nature of exercise fatigue (i.e. the cardiovascular–anaerobic model, the energy supply–energy depletion model, the muscle power–muscle recruitment model) can adequately explain the fatigue experienced during cricket. A study of players in the South African national cricket team competing in the 1999 Cricket World Cup revealed that, in a variety of measures of explosive ('anaerobic') power and aerobic endurance capacity, they were as 'fit' as South African national rugby players competing in the 1999 Rugby World Cup. Yet, outwardly, the physiological demands of rugby would seem to be far greater than those of cricket. This paper provides an in-depth analysis of the prevalence, causes, mechanisms, and prevention strategies for back injuries in fast bowlers in cricket. It reviews existing literature, highlights risk factors, biomechanical considerations, and rehabilitation techniques, aiming to enhance the understanding and management of this prevalent issue in the sport

Keywords: Ki anthropometric, Physiological variables, Sports Injury etc.

Introduction

I don't have access to specific research articles or studies conducted after my last knowledge update in January 2022. However, I can provide you with general information about fast bowlers' back injuries in cricket based on what was known at that time.
Back injuries are common among fast bowlers in cricket due to the high levels of physical stress and strain placed on their bodies. Some common types of back injuries in fast bowlers include stress fractures, disc injuries, and muscle strains.

Fast bowling involves a complex sequence of movements that puts significant pressure on the spine. The repeated, forceful action of bowling can lead to overuse injuries, especially in the lower back area. Stress fractures, particularly in the lower back vertebrae, are one of the most common injuries.

To better understand and prevent such injuries, prospective studies are often conducted. These studies involve following a group of fast bowlers over time and collecting data on their bowling techniques, training regimens, physical condition, and any injuries they may develop. By analyzing this data, researchers and sports medicine experts can identify risk factors and develop strategies to reduce the incidence of back injuries among fast bowlers.

It's important to note that there have been ongoing efforts to improve biomechanics and training techniques for fast bowlers to reduce the risk of back injuries. Cricket boards and governing bodies have also implemented workload management strategies to ensure that bowlers are not overexerted, which can contribute to injury.

To access a specific prospective study on back injuries to fast bowlers in cricket conducted after my last knowledge update, you may need to search in academic databases or consult recent sports medicine journals. Researchers and medical professionals continually work on this issue to improve the safety and performance of fast bowlers in cricket.

Review of Literature

The review of related literature was accumulated through two procedures. One was anelectronic database search and another was a cross-referencing search. Two electronic databases were searched in making the review of the literature. These were Google Scholar and PubMed. The search period selected for this review is last two years. The Boolean searching technique (https://libguides.mit.edu) was used to search the review of literature from the electronic databases. Some keywords were used for searching the literature. These were sports injury, sports injury patterns, and sports injury surveillance, sports injury in football, sports injury in soccer, and sports injury in cricket.

A legend former Australian fast bowler and international bowling coach, Dennis Lillie, stated that " Fast bowling is the toughest job on the cricket field and that a pace bowler had to be stronger than the rest of the team". Calling fast bowling the toughest job on a cricket field, Lillee stated that a paceman had to be stronger than the rest. "He is like the centre-forward in a football team. No matter how fit you are, you can always get injured. Some withstand the pain more, others succumb. As you get tired, your technique can break down."He believed that trunk strength was vital for paceman and recommended Swiss ball exercise. A fast bowler should be perfectly balanced at the point of delivery6 . (S.Dinakar, Vol. 24 :: No. 41 :: Oct. 13 - 19, 2001)

Success in the fast bowling is determined by a combination of many factors, one imperative variable being the speed at which the ball is released. A quick ball release speed reduces the time available for the batsman to make a correct decision about the path of the ball, thus increasing the demands on the effector mechanism responsible for executing the exact shot. An optimal fast bowling technique could be defined as one that allows the bowler to bowl fast with relatively low injury risk7 . (Bartlett RM, 1996.

The importance of the function of the central core of the body for stabilization and force generation in all sports activities is increasingly recognized. 'Core stability' is seen as being pivotal for an efficient biomechanical function to maximize force generation and minimize joint loads in all types of activities ranging from running to throwing. However, there is less clarity about what exactly constitutes 'the core', either anatomically or physiologically, and physical evaluation of core function is also varied 8 . (Kibler WB, 2006)

The function of the local muscle system, according to Lee and Vleeming (2003), is to stabilize the joints of the spine and pelvic girdle in preparation or in response to external loads. This can be achieved through several mechanisms; increase in intra-abdominal pressure, increase in tension of the thoracodorsal fascia and increase in the articular stiffness.

R.M. Bartlett, N.P. Stockill, B.C. Elliott And A.F. Burnett (1996)7 Did a study on "The Biomechanics of fast bowling in men's cricket: A review" .This review concentrates on synthesizing and analyzing the biomechanical research which has been carried out on fast bowling in men's cricket. Specifically, it relates to those elements of the bowling technique which contribute towards a fast ball release, the aerodynamics and technique of swing bowling, and the association between fast bowling and lower back injury. With regard to bowling technique, no firm conclusions are drawn on the relationships between elements of the fast bowling technique and ball release speed.

Local stability refers to the deep intrinsic muscles of the abdominal wall, such as transverse abdominus, and mutlifidus. These muscles are associated with segmental stability of the lumbar spine during gross whole body movements (Marshall and Murphy, 2005). According to Stevens et al. (2006)28, local muscles of the trunk, such as transverse abdominus and multifidus, with their vertebra to vertebra attachments, are supposed to control the fine tuning of the positions of adjacent vertebra (segmental stabilization).

Conclusion

The distribution of sports injuries depends upon the nature of sports and training procedures. The footballers and cricketers at district level, have a high risk of sports injuries. From the present study, the following conclusions are highlighted.

1. District level footballers have a high risk of lower limbs injuries and there is a need for proper implementation of prevention strategies and they require proper develop the all fitness components.
2. The district-level footballers and cricketers occur mostly in skeletal muscle injuries due to insufficient growth of the muscle. The coaches should look into this to prevent injuries to minimize the loss of player power by administrating training to build up the muscle strength.
3. In training period coaches and both footballers and cricketers have to give more attention on how to prevent

injuries and they require proper strategies of training plan to prevent the injuries.
4. District level footballers and cricketers have a high risk to occur acute injuries. They require proper maintains of safety measures.

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