Common Basketball Injuries and Their Prevention

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Abstract:

The aim of this study is to analyze and review the current literature regarding the common occurrence of injuries in basketball as well as the various theories concerning how and why these injuries occur and how they can be best prevented. This study will seek to analyze and review the current literature regarding the common occurrence of injuries in basketball as well as the various theories concerning how and why these injuries occur and how they can be best prevented. While chronic injuries are also a major factor within the game of basketball, this paper will specifically focus on acute injuries and will analyze both what the current literature knows regarding these topics as well as what questions have yet to be answered.

I. Introduction

Sports are designed to test the capabilities of the human body and constantly strive to push beyond the perceived limits in order to achieve success. However with this success comes the risk of injury. Whether it comes as the result of a collision or fall the physical load placed on the body when playing sports is sometimes too great to overcome and as a result leads to broken bones or torn ligaments, as is all too common in sports. Researchers are constantly striving to explain exactly why, and how, particular injuries occur in order to reduce their rate of occurrence. With basketball, in particular, the number of injuries that occur annually have increased due to the games increasing physicality and level of performance and training required. Over the last decade researchers have analyzed these injuries to look for common patterns and modes of injury in order to determine how they can be prevented. While most studies agree on what the most common injuries are in basketball there is a lot of disagreement within academia over why these particular injuries occur and likewise, how they can be prevented. This study will seek to analyze and review the current literature regarding the common occurrence of injuries in basketball as well as the various theories concerning how and why these injuries occur and how they can be best prevented. While chronic injuries are also a major factor within the game of basketball, this paper will specifically focus on acute injuries and will analyze both what the current literature knows regarding these topics as well as what questions have yet to be answered.

II. Most Frequent Injuries

Basketball is a complex sport which incorporates a variety of dynamic movements, from running and jumping to quick sharp changes in direction and defensive slides. In addition to the multitude of movements performed throughout the game, basketball
also incorporates a large amount of physical contact and collisions. Therefore it comes as no surprise that basketball also comes with a high injury rate. Although some researchers have investigated how playing basketball affects the development of children (Cheon & Kim 2009; Cho 2015; Kim & Ahn 2011; Koo & Hong 2013), there have been several studies over the last decade which have studied the prevalence of basketball injuries amongst both college and professional players. While the methodology and populations studied differed between each study, the overall results remained fairly consistent. In an epidemiological study conducted by Julie Agel and colleagues on injuries amongst collegiate female basketball players from 1988 to 2004, it was seen that over 60% of all injuries occurred to the lower extremities. In this study, the most common injury amongst the female players were ankle ligament sprains and injuries to the knee joint (Agel et al., 2007). This same study was also applied to male collegiate basketball players during this time period and found that an overwhelming amount of injuries, about 60%, occurred to the lower extremities with ankle ligament sprains and knee injuries again being the two most common (Dick et al., 2007). These findings were consistent across several other studies found within academia. Gordon and colleagues found that amongst WNBA players, 69.11% of them reported to have suffered an ankle sprain throughout their career while common knee injuries such as meniscal tears, patellar tendinopathy and ACL tears were found to have occurred in around 30% of WNBA players respectively (Gordon et al., 2014). A separate study which examined injury prevalence amongst university players in South Africa again found that the predominant injuries occurred to the ankle at 27.92% and the knee at 18.91% of the total injuries (Ellapen et al., 2012). One aspect this study looked at was overseen in the previous studies was the mechanisms which produced these musculoskeletal injuries. According to this study 48.57% of the mechanisms producing these injuries were “rapid, rotational changing of direction while playing” and 37.14% from colliding with another player (Ellapen et al., 2012). While it is clear from this current literature that injuries to the lower extremities are the most prevalent within basketball, it is not as clear exactly why this is the case.

III. Injury Mechanism

1. Knee

As the findings from Ellapen and colleagues touched upon briefly, the primary mechanisms which produce these injuries are from the rapid changes in direction and speed that are required in basketball, as well as, collisions with other players. While the injuries that occur from the shear impact of collision between players cannot be avoided, a closer look into the literature concerning the injuries which occur while performing common basketball movements can help to give a clearer picture of why they occur and how they can be better prevented. As they tend to be the more serious of the lower extremity injuries that occur in basketball, the majority of the research about mechanism of injury focuses specifically on tears of the anterior cruciate ligament. Specifically, research has focused primarily on this particular injury amongst female basketball players as the prevalence of ACL tears is significantly higher in females than males (Agel, 2007). However while research is clear that ACL injuries are one of the more common injuries in basketball, especially amongst females it is not clear exactly why this is so. Analysis of ACL injury episodes have shown common themes such as decreased knee flexion and increased knee valgus, internal rotation during landing and increased hip adduction as possible causes of increased strain on the ACL which could result in injury or tear (Boden et al., 2000; Hewett et al., 2009; Koga et al., 2010). Using these principles Munro and colleagues compared the landing knee valgus angle between female basketball and female soccer players in order to explain the higher incidence of ACL tears in basketball players compared to soccer players. Munro found that female basketball players landed with a significantly greater frontal plane projection angle during unilateral landing tasks than the female soccer players which he suggested could reflect the reason for a greater ACL injury rate in this particular population. A second study which used video analysis of actual ACL injuries found that female players also landed with significantly more knee and hip flexion than male basketball players did (Krosshaug, 2007). One significant finding of this particular study was that while the majority of the injuries observed did not result from direct contact, more than half of them did occur immediately following some form of contact or disturbance of movement from an opposing players. This supports the finding of several other studies which suggest that the majority of injuries occurred when normal movement patterns were disturbed or altered by an opponent (Boden et al., Ebstrup et al. 2000).

2. Ankle

While there is a significant amount of research on ACL specific injuries within basketball, the majority of the research found on the mechanism of injury for ankle sprains incorporated a wide variety of sports and physical activity as a whole. From a biomechanical perspective the ankle joint is believed to be one of the most vulnerable joints in the body as it must withstand a significantly high amount of torque about the joint when landing or quickly changing directions (Wei, 2014). One of the primary factors seen in acute ankle injuries occurs from improper landing techniques, or landing in an unbalanced manner, which creates an uneven force about the joints. This has been shown to force...