Mechanism of anterior cruciate ligament injury in sport

Miroslav Milankov, University of Novi Sad, Serbia

Summary:
The number of anterior cruciate ligament (ACL) injuries is on permanent increase, particularly in sport activities. Namely, participation in sports involves a significant risk of injuries for both professional and recreational athletes. ACL injuries mostly occur in sports in which there is a twist in the knee joint, such as football, handball, basketball and skiing. Majority of these injuries are caused by contactless mechanisms of injuring, such as landing and direction change. The aim of this research is to analyze the injury mechanisms in respondents diagnosed with ACL injury and their relationship with risk factors. The research is conducted as a retrospective study at The Clinic for Orthopedic Surgery and Traumatology in Novi Sad, with the prior permission of the Ethics Committee of the Clinical Center of Vojvodina. The study included 1,471 patients diagnosed with an ACL injury who were surgically treated in the period from the end of January 2012 to the middle of June 2018. Out of the total number of respondents, there were 1,192 men and 279 women. The age of the respondents ranged from 13 to 57 years. The mean age of the examined patients was 25.33 ± 7.79 years. Most respondents are in the under-21 group - 39.2%. The average weight of the patients is 80.96 ± 14.61 kg, and the average height is 180.75 ± 8.54 cm. The mean BMI is 24.68 ± 3.75. We collected the data by reviewing medical records and analyzed the following parameters for each patient: gender structure, age structure, body weight and height, side of injury, activity during which the injury occurred, level of sports activity, level of competitive activity, type of sport, place of occurrence of injury, mechanism of injury, time of injury occurrence, and type of surface. The largest number of injuries occurred during sports activities (93%), and the most common sports are football (48.2%), basketball (15.4%) and handball (10%). Most injuries were caused by a non-contact mechanism (80%), when changing direction (47%) and landing (30.5%). The surface on which ACL injuries most often occurred was grass - in 39% of cases, considering the fact that the most common sport in which the ACL injury occurs is football. It is further followed by parquet in 28% of cases, then concrete in 12% of cases, mats and taraflex in 4% of cases, and other surfaces with a share of 13%. Grass was the most risky surface for contact injuries (28%), while the number of injuries during landing was most recorded on concrete and parquet (41%). The rupture of the ACL usually occurs due to hyperextension of the knee with internal rotation of the tibia or due to valgus position of the knee with external rotation of the tibia. The mechanism of injury was influenced by gender, side of the injury, level of sports activity, type of sport, part of the training on which the injury occurred, and the type of surface.