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WBSC Medical Commission Report

on injuries and risk factors

in baseball and softball

30th October 2021

REPORT

The WBSC Medical Commission is particularly attentive to all risk factors that can cause injuries in baseball and softball.

In the past, during the previous Olympic Games in Sydney and Athens, and also during international youth events, injuries occurred during the tournament with particular regard to the shoulder of the pitcher.

The Medical Commission is particularly careful in following the scientific literature and publications relating to the subject, considering all traumatic risk factors and possible strategies to prevent injuries in all categories and especially in the youth.

The main risk factors we found are related to physical characteristics, pitching mechanics, performance, behavioural, psychosocial, biological, developmental, and environmental factors.

Studies were consistent in supporting limited shoulder range of motion (ROM) and player positions (pitchers or catchers) as risk factors for shoulder injuries. For elbow injuries being pitchers or catchers and working with higher throwing velocity can be risk factors. Potential consequences of shoulder and elbow injuries include time lost from the sport, lower performance, surgical interventions, and early retirement. These can have detrimental impacts on future careers of baseball and softball players.

Recent systematic reviews for baseball suggest that increased mechanical load (measured by pitch count or training hours), higher pitching velocity, and decreased shoulder range of motion (ROM), especially in flexion, internal rotation, and horizontal adduction, are potential risk factors for both shoulder and elbow injuries.

The most common risk factors for shoulder injuries were suboptimal scapular kinematics during throwing, glenohumeral internal rotation deficit (GIRD), decreased range of motion, capsuloligamentous laxity, poor throwing mechanics, excessive workload, decreased rotator cuff strength, inefficient kinetic chain from lower limbs and trunk, decreased scapular muscle strength, decreased lower limb muscle strength, decreased trunk strength, decreased hip mobility, and immature skeletons for specific osteochondral problems among young players.

The most common potential risk factors for elbow injuries were immature skeletons for specific osteochondral issues among youth players, excessive workload, poor throwing mechanics, decreased wrist flexor strength, capsuloligamentous laxity, and playing the pitcher or catcher's positions.

Also softball pitchers are at risk for developing overuse injuries in the throwing arm. Improper mechanics and lack of pitch counts may increase the risk for developing a pitching-related injury. Softball-related overuse injuries include proximal biceps tendinitis, upper extremity stress fractures, and ulnar neuritis. Acute injuries commonly

occur in the lower extremity and include both fractures and ligamentous injuries.

Off-season programs should stress proper throwing and sliding mechanics, core conditioning, and a lower extremity neuromuscular education program. Decreased range of motion (ROM) in both the upper and the lower extremities, unbalanced muscular strength, and fatigue were identified as risk factors for throwing injuries in softball players. Within the upper extremity, strength and ROM of the rotator cuff muscles, biceps, and extensors of the forearm were emphasised.

The main focus of the lower extremity was the strength of the gluteal muscles and ROM of the lumbopelvic-hip complex.

The WBSC Medical Commission intends to promote a trial to promote a more effective culture of injury prevention in baseball and softball by continuing to investigate risk factors and mechanisms that lead to injuries and by developing a program of both prevention and screening that leads to early identification of the various risk factors.

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35. Injury Prevention Programs for Throwing Injuries in Softball Players: A Systematic Review Jonathan Paul 1, Symone M Brown 2, Mary K Mulcahey 2