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Masterclass

Shoulder injuries in rugby players: Mechanisms, examination, and rehabilitation

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ABSTRACT

Background: The sport of rugby is growing in popularity for players at the high school and collegiate levels.
Objective: This article will provided the sports therapist with an introduction to the management of shoulder injuries in rugby players.
Summary: Rugby matches results in frequent impacts and leveraging forces to the shoulder region during the tackling, scrums, rucks and maul components of the game. Rugby players frequently sustain contusion and impact injuries to the shoulder region, including injuries to the sternoclavicular, acromioclavicular (AC), and glenohumeral (GH) joints. Players assessed during practices and matches should be screened for signs of fracture, cervical spine and brachial plexus injuries. A three phase program will be proposed to rehabilitate players with shoulder instabilities using rugby specific stabilization, proprioception, and strengthening exercises. A plan for return to play will be addressed including position-specific activities.

1. Mechanisms of shoulder injuries

The sport of rugby or rugby union is characterized by frequent physical contact with other players and tackling that results in falls to the ground. (Crichton, Jones, & Funk, 2012; King, Hume, & Clark, 2012; McIntosh, Savage, McCrory, Fréchède, & Wolfe, 2010) Rugby players do not wear helmets and may have minimal padding to protect the upper extremities as found in American football. The incidence rate for upper extremity injuries during rugby matches has been estimated at 9.84 injuries per 1000 athletic exposures (95% CI 9.06–10.62), where each exposure is equal to one player participating in one match (Usman & McIntosh, 2013) Shoulder injuries make up half to two thirds of the injuries to the upper extremities and may involve a number of structures about the shoulder region with acromioclavicular and glenohumeral joints the most frequently injured. Many of these injures are significant resulting in lost match and practice participation for a 2–4 week period. (Headey, Brooks, & Kemp, 2007) The rate of injuries during rugby practice have been estimated to be significantly less (.10/1000 of practice) than during matches but can still be prevalent during practice sessions that involve tackling and defensive drills. (Headey et al., 2007)

The incidence of upper extremity injuries has been studied in different levels of rugby play with more shoulders injuries occurring at college and higher levels of play. (Usman & McIntosh, 2013) Players in back positions that require more frequent tackles and tackling of opponents who are running at top speed are at a greater risk of shoulder dislocations than players in forward positions. (King, Hume, & Clark, 2011; Sundaram, Bokor, & Davidson, 2011) The rate of injuries for female rugby teams is generally considered to be significantly less than male teams with more injuries to the lower extremities, especially the knee joint. (Taylor, Fuller, & Molloy, 2011)

Rugby "League" and "Sevens" are variations on the game of rugby played with similar rules but with 13 players for League matches and only seven players for Sevens matches. Rugby league is predominantly played in England, Australia, and in Pacific Island countries. Rugby sevens is increasing in popularity in the United States and will be added as a sport for the 2016 Summer Olympic Games. The length of Sevens matches are shortened to two seven minute halves and are typically played during one or two day tournaments with a number of matches played each day.

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These games emphasize a faster style of play with more passing, open field running and tackling compared to rugby union. Rugby league matches result in injuries to the shoulder, but mostly to the head and neck region. (Gabbett, 2004) Limited data is available on injuries during rugby Sevens, surveys from collegiate and international tournaments also indicate a high injury rate with a majority of injuries to the upper extremities, head and face. (Fuller, Taylor, & Molloy, 2010; Lopez et al., 2012)

A number of mechanisms have been identified for injuries to the shoulder and upper extremities. During a rugby match, tackling of an opponent can result in a number of impacts and forces to the shoulder and upper extremities (Figs. 1–5). McIntosh et al. identified six different tackling methods all resulting in impact or leveraging forces upon the shoulder. (McIntosh et al., 2010) A player being tackled can also sustain impact injuries or be injured by landing on the ground or bracing themselves with an outstretched arm. (McIntosh et al., 2010) The most common method for tackling is performed from a crouched position with the arms abducted in attempt to reach around the opponent's trunk. This usually results in an impact directed to the anterior-superior surface of the shoulder and arms. This mechanism can result in a posteriorly directed force resulting in horizontal abduction of the arms and leveraging forces over the glenohumeral joint. The mechanisms of direct impact and leveraging forces can result in glenohumeral dislocations, labral tears, acromioclavicular joint separations, and clavicular and scapular fractures. (Badge, Tambe, & Funk, 2009; Crichton et al., 2012) The other common tackling method is described as "arm tackling" where the players attempt to tackle the opponent by diving and reaching outwards to grab the ankle for a tripping tackle or grabbing the trunk to slow down or change the direction of the ball carrier. (McIntosh et al., 2010) Another method of tackling is described as "smothering" where the tackle is attempted from an upright position wrapping the arms around ball carrier's trunk and arm to trap the ball, so that the ball carrier is unable to pass the ball during the tackling maneuver (Fig. 4).

Forces placed upon the shoulder during a rugby tackle have been measured to be over 1600 N, which is usually tolerated by most tissues of the shoulder. (Usman, McIntosh, & Fréchède, 2011)

Fig. 1. Tackling Mechanism for Shoulder Injuries: An arm tackle creates a leveraging force across the anterior shoulder.

Fig. 2. Tackling Mechanism for Shoulder Injuries: The tackler encounters an impact force to the anterior shoulder and a leveraging force across the shoulder.

Interestingly, tackling without shoulder pads results in similar levels of force applied to the shoulder structures as when tackling while wearing shoulder pads. (Usman et al., 2011). A number of other factors can come into play for injury risk during a tackling episode, including the relative size and speed of the opponent, the direction of movement of the tackler as they approach their opponent and the forces delivered by other team members who are also attempting a tackle. Fuller et al. and King et al. have identified greater risks for injuries when two tacklers are involved and when approaching the ball carrier from the side. (Fuller, Ashton, et al., 2010; King et al., 2012)

Fig. 3. Tackling Mechanism for Shoulder Injuries: Impact forces are sustained to the tackler and ball carrier.