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Review Article

Over half of badminton players suffer from shoulder pain: Is impingement to blame?

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ABSTRACT

Background/objectives: Badminton is one of the most widely played sports in the world and is considered a relatively safe sport. Despite this many badminton players report shoulder pain. The aim of this review is to summarize the available literature on current state of understanding for shoulder pain among badminton players.

Method/materials: MEDLINE and EMBASE (Search terms: "badminton" AND "shoulder injuries"; "badminton" AND "rotator cuff tears"; "badminton" AND "impingement"; and associated synonyms) were performed in March 2014. The authors further canvassed the reference list of selected articles and online search engines such as Google Scholar. Inclusion criteria were studies that assessed shoulder injuries among badminton players. A total of 4 studies were identified on primary search, and later expanded to 10 studies.

Results/discussion: Shoulder pain affects or had affected over 50% of recreational and elite badminton players, with 20% reporting ongoing shoulder pain. There was no difference for shoulder pain prevalence between males and females. Most continue to play through the pain but report an impact on training, competition and activities of daily living. Shoulder kinematics were different for dominant and non-dominant shoulders, however the direction of difference is controversial.

Conclusion: Over half of recreational and elite badminton players report previous or current shoulder pain, most likely the result of subacromial impingement, instability or scapulothoracic dyskinesia. There appears to be no difference for shoulder pain prevalence or shoulder kinematics between male and female players. Further work is needed to better define shoulder kinematics and study the underlying pathophysiology of shoulder pain among badminton players.

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1. Background

Badminton is one of the most widely played sports in the world. The Badminton World Federation estimated that about 150 million people play the game worldwide and that more than 2000 players participate in international competitions. Badminton, a non-contact sport, has been considered a very safe sport.[1] Despite its global following, studies into medical problems among badminton players are sparse. This review explores our current state of understanding of shoulder pain in badminton players.

2. Method/materials

MEDLINE and EMBASE (Search terms: "badminton" AND "shoulder injuries"; "badminton" AND "rotator cuff tears"; "badminton" AND "impingement"; and associated synonyms) were performed in March 2014. The authors further canvassed the reference list of selected articles and online search engines such as Google Scholar. Inclusion criteria were studies that assessed shoulder injuries among badminton players. A total of 4 studies were identified on primary search, and later expanded to 10 studies.

2.1. *Injuries among badminton players*

Although badminton is widely accepted as a safe sport, it does carry injury burden. Previous studies, mostly in Europe, have demonstrated risk of injury in badminton to be 1.6–2.9 injuries per 1000 h of play.[2,3]

In their review conducted in 1990, Jorgensen and Winge showed that most injuries in badminton were localized to the foot and ankle.[4] The most frequent injuries were Achilles tendinitis and tennis elbow. They also showed that men have higher injury risk than women, and that recreational players are more prone to injury than elite players.[4] A more recent Scandinavian study found that the lower extremity is the site of injury in over 90% of players, with Achilles tendon ruptures and ankle sprains/fractures the two most common acute injury patterns.[5]

Recently, epidemiological studies outside of Europe have contradicted this finding. A retrospective survey of Malaysian badminton players over a two and a half year period found that the majority of injuries occur in the knee and are categorized as mild overuse injuries. The majority of injuries were diagnosed in younger players and occurred during training/practice sessions. There was no difference between male and female players.[6] A retrospective study of 44 Hong Kong elite badminton players found that incidence rate of injuries was 5.04 per 1000 h of play, and the back was the most frequently affected location, followed by the shoulder, thigh and knee.[7]

This suggests that injuries sustained by badminton players are different in different geographical locations and perhaps the underlying mechanism of injury may also be different.

Of note, a large proportion of badminton players continue to play despite being injured. 17–28% of badminton players play with an ongoing injury, but in 92% of cases the injury does not prevent the player from playing but may adversely affect the quality of their performance.[2] The effect of playing with injury on long term performance and worsening of injury among badminton players needs to be studied.

2.2. *The shoulder problem*

Badminton is a sport that requires a lot of overhead shoulder motion, with the shoulder in abduction and external rotation. Overhead shots are estimated to constitute 30% of shots played by badminton players (unpublished study data from International Badminton Federation), with female players having a higher percentage of overhead shots compared to their male counterparts.

In the normal population, shoulder pain is a musculoskeletal problem with a prevalence of 12% in the age group 16–44 years and 19% in the age group 45–64 years.[8] Shoulder injuries accounted for 19% of all injuries in a study of 44 elite Hong Kong badminton players.[7]

According to a survey study of 188 international elite badminton players (mean age = 24) during the World Mixed Team Championship in 2003, previous or current shoulder pain on the dominant side was reported by 52% of players, with 37% of players reporting previous shoulder pain and 20% ongoing pain.[9] There was no difference between male and female players and the majority of shoulder pain was of insidious onset. There was a common association with stiffness, and impact on training and competition, as well as activities of daily living.

A Swedish study of 99 recreational badminton players (mean age = 43) found that 52% of them had previous or present pain in the dominant shoulder with 16% having ongoing pain.[10] The majority of players reported that the pain affected their training habits, but they continued to play through the symptoms.

Thus, over half of badminton players, both recreational and elite, have a previous or current painful shoulder but many continue to play despite it. At any given point in time roughly 1 in 5 players have ongoing shoulder pain, comparable to norms in the general population. There appears to be no difference in shoulder pain prevalence between male and female players, despite female players having more overhead shots than their male colleagues. This may suggest that the painful shoulder in these players is not directly related to badminton, however, the large burden load among badminton players points to the contrary.

2.3. *The cause of the painful shoulder?*

During the overhead throwing/hitting motion the shoulder complex functions as a regulator of forces generated by the legs and the trunk.[11] It is this regulating function as well as the high velocities that accompany the hitting motion that places large forces across the glenohumeral joint.[12] These forces as well as the frequent repetition of the overhead hitting action produce severe stresses on the muscles, bones and joints of the upper extremity.[13]

Shoulder pain and impingement of the rotator cuff caused by anterior instability of the shoulder are frequent problems for athletes engaged in overhead sports.[11,14–16]