



Internal shoulder impingement in overhead athletes: an ultrasound imaging proposal

ULTRASONOGRAPHY

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As described by Walch et al. [1], internal impingement is a clinical condition characterized by a lesion in the rear glenoid labrum and a rotator cuff injury without the presence of Bankart or superior labral tear from anterior to posterior (SLAP) lesions. It is clinically identified by a procedure that is considered to yield a positive result when pain is reproduced upon passively abducting the arm up to 150° while maintaining the arm in full external rotation [2]. In the literature, some imaging methods have been proposed for diagnosing internal shoulder impingement. Such studies seem to recognize magnetic resonance (MR) imaging and, above all, MR arthrography as the methods of choice for diagnosing glenoid labrum pathologies. However, these methods are not free of risks, are very expensive, and are not easily repeated [3]. Some authors have performed preliminary studies on the use of ultrasonography to display the glenoid labrum by using software and complex devices on large series of patients in everyday clinical practice [4,5]. Herein, we propose that it is possible to identify internal impingement in its early phase by ultrasound examination through a technique that can be easily repeated and follows precautionary therapeutic protocols.

The subject of this study was a professional javelin thrower aged 18, who was right-handed and reported medium-level pain in his right shoulder. His range of motion data was normal, with a Constant scale score of 95/100. The physical findings were a positive sulcus sign and Walch manoeuvre, which suggested a diagnosis of internal impingement. An ultrasound examination (Esaote Mylab 25 Gold) was performed, with the subject's arm abducted up to 150° while maintaining its external rotation. The linear probe was positioned in a coronal view from the glenohumeral joint using a rear approach (Supplementary Fig. 1). The results showed the distance between the glenoid cavity and the head of the humerus in its static phase and under stress in full external rotation, considering the dynamics of the head compared to the glenoid cavity. The examination was performed on both shoulders to make a bilateral comparison of the above-described parameters (Supplementary Fig. 2). A remarkable portion of the labrum on the affected side appeared hypoechogenic, with a discontinuous profile (Supplementary Fig. 3). The long head of the biceps did not show alterations when it was examined in transversal and longitudinal views. Such data excluded indirect signs of a SLAP lesion (Supplementary Fig. 4).

Therefore, according to this study, an ultrasound pattern indicative of internal impingement may be characterized by the following findings: a different distance between the head of the humerus

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and the profile that can be attributed to the glenoid labrum, with a conflict between these two structures; elevation of the humerus in its dynamic phase; altered echogenicity of the area corresponding to the glenoid labrum; and a normal aspect of the long head of the biceps. We aim to verify this hypothesis by conducting further imaging studies and comparing them with surgical evidence.

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Conflict of Interest

No potential conflict of interest relevant to this article was reported.

Supplementary Material

Supplementary Fig. 1. Representation of how the probe was positioned in the coronal view at the level of the glenohumeral joint, indicated with the dotted line.

Supplementary Fig. 2. Bilateral comparison of the shoulders under dynamic stress (abduction and full rotation). On the right, the head of the humerus was elevated and was not coherent with the cavity in comparison with the corresponding contralateral image (right). It is possible to notice a hypoechogenic area at a level attributable to the glenoid labrum.

Supplementary Fig. 3. Detailed image of the glenohumeral joint in its static phase. It is possible to notice the diastasis between the

head of the humerus and the cavity, as well as the area of altered echogenicity at the level of the portion attributable to the cavity.

Supplementary Fig. 4. Image of the long head of the biceps brachii, which seemed normal and perfectly in place at the level of the bicipital sulcus.

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