

# The Bony Apprehension Test for Instability of the Shoulder: A Prospective Pilot Analysis

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**Purpose:** We performed a prospective pilot study of the “bony apprehension test,” in which apprehension is experienced at or below 45° of abduction and 45° of external rotation, as a means of screening for a significant bony lesion causing instability of the shoulder. **Methods:** Over a 1-year period, 29 consecutive cases of symptomatic shoulder instability were examined with the bony apprehension test and treated with surgery. Findings at arthroscopy were used as the definitive diagnostic data point. This information was compared with the results of the test and with the results of the preoperative plain radiographs. **Results:** There were 8 cases involving significant bony lesions and 21 cases involving only soft-tissue lesions. The bony apprehension test was positive in all 8 patients in the bony lesion group and in 3 of 21 patients in the soft-tissue lesion group, representing a sensitivity of 100%, specificity of 86%, positive predictive value of 73%, and negative predictive value of 100%. Preoperative radiographs were positive in 4 patients in the bony lesion group only, representing a sensitivity of 50%, specificity of 100%, positive predictive value of 100%, and negative predictive value of 84%. **Conclusions:** The bony apprehension test can reliably screen for significant osseous lesions. In this study it was more sensitive than plain radiographs, as shown by a higher sensitivity for the test (100%) than for preoperative plain radiographs (50%). **Level of Evidence:** Level II, development of diagnostic criteria based on consecutive patients with universally applied gold standard. **Key Words:** Apprehension test—Shoulder instability—Bony instability—Bankart lesion—Hill-Sachs lesion—Glenoid insufficiency.

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The standard apprehension test (Fig 1) comprises one of the cornerstones of the physical examination of a patient with shoulder instability.<sup>1-6</sup> To perform the test, the examiner places the patient supine on the examination table with the shoulder just off the edge of the table. Alternatively, the patient may be examined in a seated or standing position with the examiner behind the patient. The arm is gradually

brought into combined abduction and external rotation. Once the full “position of athletic function”<sup>7</sup> of 90° of abduction and 90° of external rotation is reached, the examiner applies gentle anteriorly directed force to the posterior humerus to re-create the anterior dislocation/subluxation moment. During the test, the examiner questions the patient about the presence of a sensation of apprehension that the shoulder is going to dislocate. A positive subjective response from the patient indicates a positive test.

Although a positive anterior apprehension test does not constitute an absolute indication for surgical intervention, it definitely helps the surgeon establish anterior instability as a diagnosis and thereby formulate an appropriate treatment plan.<sup>1,2,7,8</sup> Surgical results for open and arthroscopic anterior shoulder reconstruction have been excellent, as long as the appropriate procedure is performed.<sup>3-6,9-12</sup> Pathologies such as a bony Bankart lesion (Fig 2) or an engaging Hill-Sachs lesion (Fig 3), however, are difficult to

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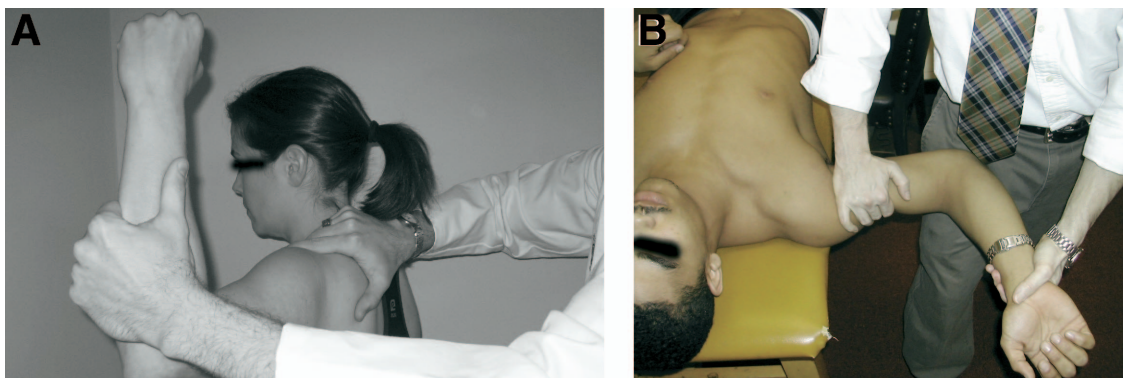
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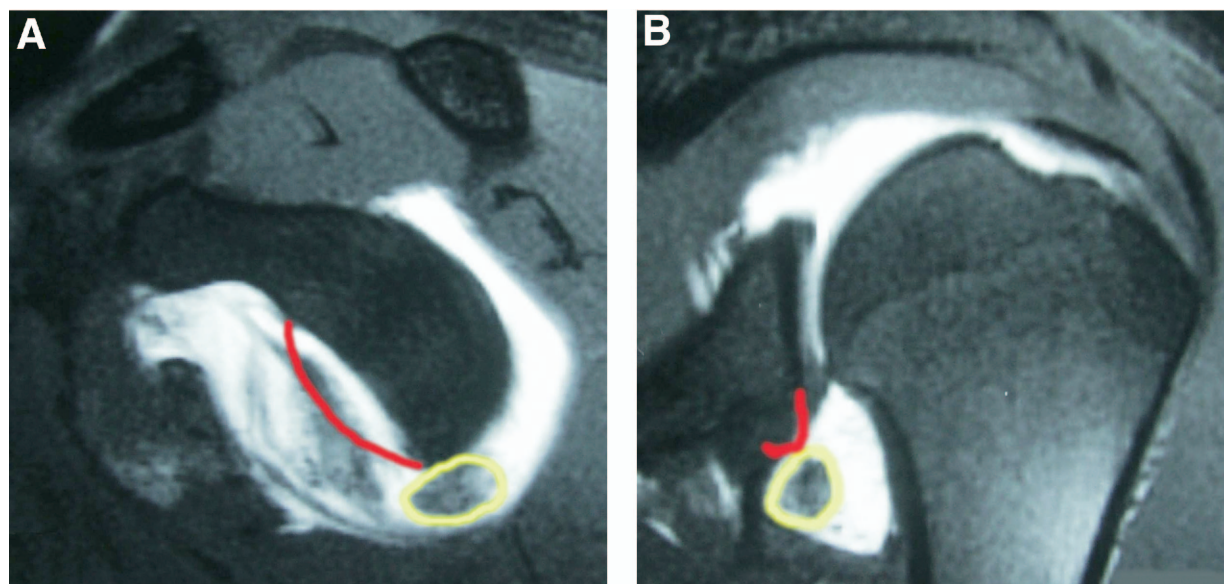


**FIGURE 1.** Standard apprehension test. (A) The examiner attempts to elicit a sensation from the patient that the shoulder “feels like it is about to come out of joint” by stabilizing the scapula and placing the arm slowly into a position of 90° of abduction and 90° of external rotation. (B) Anteriorly directed pressure on the posterior humerus is then applied as needed in a further attempt to elicit this sensation, illustrated here as the examiner pulls the proximal humerus forward. Pain alone is generally not considered a positive result.<sup>2</sup>

diagnose without advanced imaging modalities such as computed tomography (CT) or magnetic resonance imaging (MRI).<sup>9,13-20</sup> Instability due to such bony defects—“bony instability”—constitutes an important cause of failure of primary reconstruction because of failure to properly address the bony lesion.<sup>9,13-23</sup> A simple, inexpensive, reliable tool for screening for bony instability would thus prove quite valuable in the workup of a patient with shoulder stability complaints.

In 2004 Miniaci and Gish<sup>8</sup> called attention to the fact that significant apprehension could be present well below the standard position of 90° of abduction/

90° of external rotation in cases of anterior glenohumeral instability associated with large Hill-Sachs defects. To our knowledge, no previously published study has involved a clinical series to validate this observation. At our institution, we have treated several cases of anterior instability related to osseous lesions, and we have witnessed similar findings on physical examination. A retrospective analysis of our cases found a correlation of the “bony apprehension test,” performed at the position of 45° of abduction/45° of external rotation, with significant bony lesions of the shoulder (Fig 4).<sup>24</sup> The purpose of this pilot study was



**FIGURE 2.** Bony Bankart lesion. Oblique sagittal (A) and coronal (B) MRI cuts of a large bony Bankart lesion. The red line indicates the approximate missing area of the glenoid. The yellow line highlights the bony fragment found in the inferior recess.

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