CLINICAL ASSESSMENT OF INSTABILITY OF THE SHOULDER

WITH SPECIAL REFERENCE TO ANTERIOR AND POSTERIOR DRAWER TESTS

CHRISTIAN GERBER, REINHOLD GANZ

From University of Berne

Anterior and posterior drawer tests of the shoulder are described. Their purpose is to detect anterior and posterior shoulder instability and thereby to eliminate some of the failures of operative treatment. Their value in assessing unidirectional and multidirectional instability both before and after operation is discussed.

The treatment of chronic instability of the shoulder has received far more attention in the medical literature than its clinical diagnosis. Most accounts tend to focus on operative procedures without presenting clinical methods of detecting glenohumeral instability accurately, let alone grading it (Moseley 1969; Trillat and LeClerc-Chalvet 1973; Rockwood 1975; Bateman 1978; Post 1978; Saha 1981; Kessel 1982).

The diagnosis of the direction of instability of the shoulder is often based on radiographic findings, and may be difficult if no dislocation is present when the patient is seen (Patte et al. 1980; Rowe 1980). It is therefore not surprising that the surgeon is often faced with posterior subluxations which have erroneously been interpreted as anterior instabilities, or with so-called "loose shoulders" in which anterior or posterior reconstructions have failed because multidirectional instability was not recognised before operation (Du Toit and Roux 1956; Trillat, Dejour and Roulet 1965; Rowe, Patel and Southmayd 1978; Neer and Foster 1980).

For the unstable knee, clinical testing of the capsule and ligaments is universally accepted; it provides the basic information for determining treatment as well as for grading the results after operation. In this paper we describe a set of comparable, relatively simple, clinical tests which we have used successfully to determine the direction or directions of shoulder instability; the tests have proved helpful in deciding the appropriate treatment and in evaluating the results.

ANTERIOR INSTABILITY

The diagnosis of anterior dislocation is obvious if the patient has been seen with the joint dislocated, or if it has been demonstrated radiographically. Anterior subluxations are often suspected from their characteristic history which has been well described in many publications (Blazina and Satzman 1969; Rockwood 1975; Patte et al. 1980; Hastings and Coughlin 1981; Rowe and Zarins 1981; DePalma 1983). However, about half the patients with anterior subluxation never experience...
subjective instability; they complain exclusively of pain in the affected shoulder or of a "dead arm". These patients need meticulous clinical examination, both to detect the anterior instability and also to rule out multidirectional instability.

The apprehension test. Symptomatic anterior subluxation is diagnosed by means of the "apprehension test". Lateral rotation of the humerus at 45°, 90° and 135° of abduction, combined with forward and downward pressure on the humeral head, provokes the anterior subluxation. The patient suddenly becomes apprehensive when he realises that his shoulder is about to "slip out" and he involuntarily counteracts the test manoeuvre (Figs 1 and 2). The test stresses the subscapularis and the middle glenohumeral ligament when performed at 45° of abduction, and the inferior glenohumeral ligament when performed at 90° or more. Often it is positive only in this latter position, in which the subscapularis no longer exerts any control on forward and downward movement of the humeral head (Turkel et al. 1981). A positive apprehension test is usually correlated with a bony lesion (Protzman 1980; Hastings and Coughlin 1981; Rowe and Zarins 1981; DePalma 1983) or with a labral lesion at the antero-inferior rim of the glenoid (Bernageau et al. 1976; Blazina and Satzman 1969; McGlynn, El-Khoury and Albright 1982; Rowe and Zarins 1981).

The anterior drawer test of the shoulder. In order to detect and grade laxity or insufficiency of the anterior capsular mechanism, we have been using a test analogous to the anterior drawer test of the knee, which we call the "anterior shoulder drawer test". This test can be used to demonstrate instability of the shoulder, both clinically and radiographically. It can also be performed on painful shoulders where the apprehension test is difficult to interpret, and it has enabled us to diagnose anterior subluxations unequivocally even in patients with a negative apprehension test.

The test is performed with the patient supine. It should not be performed with the patient standing or sitting; in these positions we have not been able to reproduce it reliably. The examiner stands facing the affected shoulder. Assuming the left shoulder is being tested, he fixes the patient's left hand in his own right axilla by adducting his own humerus (Fig. 3). The patient should not grasp the surgeon's axilla but should be completely relaxed. To be sure that relaxation is complete,
The lateral the hand, abduction, (Fig. 4).

The affected shoulder is held in 80° to 120° of abduction, 0° to 20° of forward flexion, and 0° to 30° of lateral rotation; this position should be quite comfortable. The examiner holds the patient's scapula with his left hand, pressing the scapular spine forward with his index and middle fingers; his thumb exerts counter-pressure on the coracoid process. The scapula is now held firmly in the examiner's left hand (Figs 5 and 7). With his right hand, he grasps the patient's relaxed upper arm in its resting position and draws it anteriorly (Figs 6 and 8) with a force comparable to that used at the knee in Lachman's test.

The relative movement between the fixed scapula and the movable humerus can easily be appreciated and can be graded as with knee instability. If necessary it can be demonstrated by radiography (Figs 9 and 10), and by cineradiography using an ordinary axillary projection (Gerber, Ganz and Rüfenacht 1983). An occasional audible click on forward movement of the humeral head—probably due to labral pathology—is usually associated with apprehension. Its presence should be noted in addition to recording the degree of anterior displacement of the humeral head.

POSTERIOR INSTABILITY

Posterior dislocations of the shoulder are often overlooked, both clinically and radiographically (McLaughlin 1952; Rowe 1956; Rockwood 1975).

Recurrent posterior subluxations occur either spontaneously or after significant trauma. They are often combined with anterior instability or with inferior instability, or with both (Rockwood 1975; Tibone et al. 1981; Neer and Foster 1980; DePalma 1983) and they account for a large proportion of voluntary shoulder subluxations (Boyd and Sisk 1972; Rowe, Pierce and Clark 1973; Rockwood 1975; DePalma 1983).

The history of unidirectional posterior instability is often revealing: the patient either voluntarily subluxates his shoulder in forward flexion and medial rotation, or he complains of weakness and instability on combined flexion and medial rotation (for example, when doing press-ups). Some patients, however, cannot tell in which position the shoulder feels unstable or, if they have multidirectional instability, they are apprehensive in several different positions.

We could find no reliable test for posterior instability in the literature. The apprehension test mentioned by Kessel (1982) was not consistent in detecting posterior subluxation in our patients. We feel it is this absence of
any reliable clinical test to identify posterior shoulder subluxation with certainty which may have contributed to its low rate of detection.

The posterior drawer test. The patient must be supine. The examiner stands level with the affected shoulder. Assuming the left shoulder is being tested, he grasps the patient’s proximal forearm with his left hand, flexes the elbow to about 120°, and positions the shoulder into 80° to 120° of abduction and 20° to 30° of forward flexion. The examiner holds the scapula with his right hand, with his index and middle fingers on the scapular spine; his thumb lies immediately lateral to the coracoid process, so that its ulnar aspect remains in contact with the coracoid while performing the test (Figs 11, 13 and 15). With his left hand, the examiner slightly rotates the upper arm medially and flexes it to about 60° or 80°; during this manoeuvre, the thumb of the examiner’s right hand subluxates the humeral head posteriorly (Figs 12, 14 and 16). This posterior displacement can be appreciated as the thumb slides along the lateral aspect of the
coracoid process towards the glenoid, and the humeral head abuts against the ring finger of the examiner's right hand. This manoeuvre is painfree but often associated with a slight to moderate degree of apprehension, enabling the patient to identify the position of instability with certainty.

**INFERIOR INSTABILITY**

Inferior instability (Figs 17 and 18) is almost always a component of multidirectional instability. The clinical diagnosis is made by gentle traction on the relaxed upper arm (Neer and Foster 1980). This test is done with the patient upright and the shoulder in the neutral position. It is important that the shoulder muscles are relaxed and that the stress is applied to the upper arm and not to the forearm; this eliminates the effect of the biceps and triceps brachii. Subluxating the humeral head inferiorly is the simplest of the tests described. Although well established, it warrants restating, since a positive result invariably points to complex (multidirectional) instability.

![Fig. 17](image1)

Inferior instability which can be demonstrated by applying downward traction on the upper arm.

![Fig. 18](image2)

**DISCUSSION**

Many authorities agree that the exact clinical diagnosis of multidirectional instability (as distinct from unidirectional subluxation or dislocation) is critical, since the different conditions require different therapies (Boyd and Hunt 1965; Rowe et al. 1973; Bateman 1978; Neer and Foster 1980; DePalma 1983). Many reference texts, however, do not provide guidelines for such clinical assessment. Although each surgeon undoubtedly has his own test, only DePalma (1983) gives a reasonably detailed account of a method of assessing shoulder instability. Neer and Foster (1980) test for inferior instability, but consider that testing and grading of anteroposterior instability is misleading if not performed under anaesthesia. After two years' experience with the tests described in this paper, we feel that this view needs to be reconsidered.

The anterior drawer test helps to grade anterior instability and gives information about the anterior capsular mechanism. The test was positive in all our patients with recurrent dislocation. In post-traumatic cases it was occasionally necessary to abduct the humerus to more than 120° and to exert considerably more forward pressure to elicit an anterior drawer sign; this was more abduction than was needed in non-traumatic cases. Anterior subluxation was easily detected in the presence of slight to moderate joint laxity, whereas the apprehension test appeared more sensitive in tight shoulders with truly post-traumatic antero-inferior subluxations.

We have seen only two patients with post-traumatic subluxation who had a negative anterior drawer sign when tested up to about 135° of abduction; both these patients had a bony lesion at the antero-inferior glenoid rim which was detected radiographically using a modified axillary view (Rokous, Feagin and Abbott 1972). Rowe and Zarins (1981) and DePalma (1983) stated that anterior subluxation of the shoulder is always associated with a positive apprehension test. The anterior drawer test has enabled us to detect and demonstrate radiographically anterior shoulder subluxation in five patients in whom the apprehension test was negative. Four of these had moderate joint laxity and multidirectional instability; the other had slight to moderate joint laxity without detectable posterior or inferior subluxation.

The anterior drawer test has to be performed exactly as we have described it if reproducible results are to be obtained. When interpreting the results, it should be remembered that there is a significant range of laxity in normal individuals, just as there is in the knee.
The posterior drawer test is easier to perform than the anterior. Its results are obviously normal or abnormal and therefore less prone to misinterpretation. The test is very often associated with apprehension; the shoulder does not move backwards gradually, but either subluxates posteriorly or remains contained in the glenoid fossa.

In the past two years we have diagnosed 24 recurrent posterior subluxations of the shoulder: 17 subluxated posteriorly, inferiorly and anteriorly; 4 posteriorly and inferiorly; and 3 shoulders posteriorly only. In a series of 56 anterior shoulder reconstructions, we could unequivocally explain five objectively unsatisfactory results; these five had posterior instability, either alone or combined with multidirectional instability. Four of these posterior subluxations were never symptomatically unstable; the patients said their shoulders were easily fatigued and chronically painful, especially after exertion. It thus appears that a chronically painful shoulder can result, not only from anterior instability, but also from posterior or multidirectional instability. Clinical examination of patients with moderate to severe joint hypermobility has shown that posterior subluxations can also be elicited in some patients without subjective shoulder problems.

The correlation of clinical evaluation with arthroscopic and operative findings both before and after treatment suggests that the tests presented have greatly improved our assessment and care of patients with unstable shoulders. In our clinic the incidence of diagnosed posterior instability of the shoulder has increased remarkably with the use of the posterior drawer test, and we suspect that the number of missed posterior instabilities is even higher than has so far been suggested (Rockwood 1975).

Using the tests described, we are also able to detect multidirectional instability of the shoulder; unless this is diagnosed, standard anterior or posterior reconstructive procedures are liable to fail (Du Toit and Roux 1956; Trillat et al. 1965; Rowe et al. 1978; Neer and Foster 1980).

The authors are grateful to Mr R. Sulzer for the photographic work and to Mr D. Rüfenacht, MD, for his invaluable graphic artwork.

REFERENCES


