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Review article

Diagnosing shoulder instability

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ABSTRACT

Shoulder instability can be challenging in diagnosis with a number of pathologies and causations at work. The four pillars of a structured consultation include history, examination, special tests and appropriate investigations. When findings in each of these domains are aligned then one can be confident in the diagnosis. This article focuses on the relevant points in each of these pillars to aid the practicing clinician in their diagnostic expertise.

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1. Diagnosing shoulder instability

The shoulder is an inherently unstable joint, which is a natural consequence of the large degree of motion it achieves. A complex arrangement of both static and dynamic structures works in harmony to maintain its equilibrium of stability. Any disruption, malfunction or disharmony in the way these tissues act can result in shoulder instability, that can then present in clinic through a variety of manifestations- pain, weakness as well as the feeling of an unstable joint itself.

Shoulder instability can be classified through direction; anterior, posterior, multi-directional, as well as Cause. The Stanmore Classification has provided a comprehensive description of causation by taking into account both structural and non-structural causes. It gives a clear diagrammatic representation of the complex continuum and coexistence of these pathologies[1] (see Fig. 1).

Diagnosing shoulder instability is best made on a history of the problem, clinical examination, accurately performing pertinent special tests, and usually with the help of radiological investigations. The reliability of a diagnosis is high when these four key pillars are aligned, however, equally when they are not overlapping or are even divergent then confidence in the diagnosis will be lower.[2] This four pillar model of patient assessment is strongly advocated and practised in our department and as such this article will be broken down into these subcomponents.

The management of glenohumeral instability closely follows the description and definition of the type of instability (see Table 1). One needs to clearly categorise each patient into the relevant subtype prior to instigating treatment.

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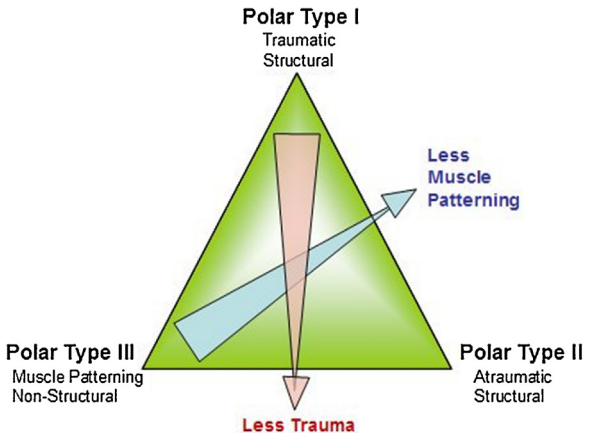

Fig. 1. The Stanmore triangle classification of instability.

Table 1
Types of Shoulder Instability.

Etiology	Traumatic	Single event
	Atraumatic	Repetitive Capsular Muscular Neurological
Direction	Anterior Posterior Global	
Pathology	Labral disruption Bony lesion Capsular pathology	
Duration	Acute Recurrent	

2. History

This should cover the direction of instability, duration and chronicity of symptoms. 96% of shoulder dislocations are associated with a traumatic episode[3] and therefore enquiry into a sentinel event, along with the nature and degree of energy involved are an important starting point. The position of the arm and direction of the force should be recorded, along with whether there was a subjective clunk or a frank dislocation that required medical reduction following confirmation by radiographs.

High-energy trauma is more commonly associated with structural changes to the joint. This is in comparison with an insidious onset 'slipping out of joint', which is more associated with non-structural changes. Symptom frequency during work, sport or even daily activities can inform on the severity of instability, it is also important to distinguish between subluxations experienced versus frank dislocations.

Almost half of patients do not experience instability at all and may only complain of pain or a 'dead arm' sensation. Associated pain with instability is important as it may indicate other injuries such as tuberosity fracture or rotator cuff tear, whilst progressive pain and stiffness following a long history of shoulder instability could herald the development of post-traumatic arthritic symptoms. It should also be noted that some young athletes can complain of pain alone, termed the "Unstable Painful Shoulder". These patients may deny feeling unstable and complain of pain rather than apprehension in the relevant special tests.[4]

Age, occupation and any relevant leisure activities are important to document. In particular age of onset is a significant prognostic guide with an 80% risk of recurrence in patients younger than 20 years of age,[5] this can increase to 90% with a return to sport[6] or in patients involved in contact sports.[7] Conversely increasing age is protective of future dislocations with just a 16% risk of recurrence in those over 40 years of age.[8] Posterior instability can develop from the repetitive micro trauma associated with throwing, swimming or overhead racket sports. Patients may complain of a persistent ache towards the latter stages of their sport as muscles fatigue and dynamic stability is lost.[9]

Finally it is essential to enquire about other joints being dislocated, voluntary dislocation or generalised laxity. There may be systemic underlying conditions such as connective tissue disorders or other non-structural conditions that have resulted in instability.

3. Examination

The pattern of examination follows the mantra of "Look, Feel, Move" with several pertinent findings for instability patients. The initial observation of the patient may well be normal; particularly if it is a young and fit patient presenting once acute pathology has settled. However one can enquire about bruising around the shoulder at time of injury and occasionally in the modern day photographic evidence on a smart phone may be provided.

Look for wasting around the girdle, disuse, limb neglect or trophic changes secondary to CRPS. Shoulder girdle positioning and subsequent posture can also be observed, with painful or subluxed shoulders hanging downwardly rotated and depressed. This position can lead to traction on the lower portion of the brachial plexus and paraesthesia in C8 dermatomal distribution. Also patients with excessive capsular laxity tend to hang their shoulder at the limit of their hypermobile range, which can cause secondary compensatory thoracic kyphosis that can be observed. Astute observations may also show evidence of more systemic conditions such as Marfans Syndrome or evidence of Brachial Plexus injury.

Before touching the patient it is important to identify altered pain perception such as hyperalgesia, allodynia or CRPS, especially if suspecting atraumatic instability as a cause. Shoulder joint congruence, muscle contour and tone, asymmetry as well as tenderness of specific structures can all be identified by palpation.

Regarding movement, full active and passive range should be explored, with any excess or poor coordination in motion noted. Dynamic shoulder instability will often only be revealed when muscles are fatigued, therefore multiple repetitions of tasks may be required. The presence of scapula dyskinesia is a sensitive marker for muscle patterning behavious and this should be carefully noted.

Assessing Beightons score should also be routinely performed when patients present with instability.[10] This is helpful to gauge as well as give a clear record of global hyperlaxity.

4. Special tests

By this stage of a consultation the health care professional will often be testing their theory as to the type of instability the patient is experiencing. A wide variety of special tests have been described for each form of shoulder instability and here we describe those commonly used.

4.1. Anterior instability

An anterior apprehension test is performed whilst standing behind the patient. With the shoulder abducted to 90 degrees, the joint is then passively moved into maximal external rotation with an anteriorly directed force also applied to the posterior humeral head. A mirror is useful in this test to both observe apprehension in the patients face, as well as feeling reluctance in the muscles, particularly

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