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**Posterior dislocation of the shoulder: recommendations for a classification**

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**Abstract** Posterior dislocation of the shoulder is rare, constituting only 2.1% of all shoulder dislocations. The mechanisms of injury may be due to direct or indirect forces, and constitutional predisposing factors also play a role. Anatomically, 97.5% of dislocations are subacromial. Three hundred articles published in the international literature concerning posterior shoulder dislocation and subluxation were reviewed and a classification determined by the underlying aetiology was developed. On this basis dislocations and subluxations may be traumatic or atraumatic, primary and recurrent; recurrent cases of voluntary dislocation are considered separately. In addition, a follow-up assessment score weighted towards stability of the shoulder after treatment is detailed.

**Introduction**

Posterior subluxation and dislocation of the shoulder is rare, and this is reflected by the small numbers of cases in publications in the international literature. At present no established, valid classification for this condition exists.

There may be one of several underlying causes for the dislocation and a wide variety of surgical procedures have been recommended, not necessarily related to the underlying pathogenesis. By analysing 300 publications in the international literature dealing with this subject, we have developed an aetiologically orientated classification of posterior subluxation and dislocation of the shoulder. Using this, the most appropriate management may be determined for each subgroup and an algorithm for therapy established.

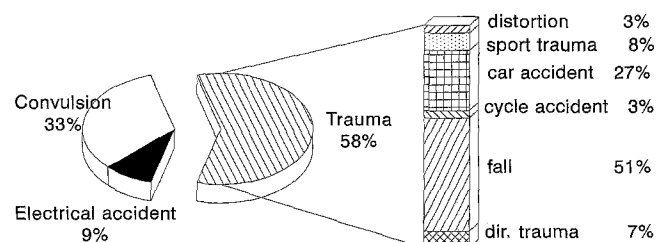
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**Pathogenesis**

The pathogenesis of posterior shoulder dislocation can be divided into three main groups:

1. Direct forces on the humeral head or proximal shaft of humerus [11] (Fig. 1).
2. Indirect forces. There are two possible mechanisms of injury:
  - (a) Forces acting on the glenohumeral joint via a lever arm through the humeral shaft. This accounts for the most frequent cause of posterior dislocation due to falling with the arm adducted, flexed and internally rotated and elbow extended [2, 12].
  - (b) Disturbances of muscle balance. A significant proportion of posterior dislocations are due to convulsions from epileptic fits [17, 19]. In these cases there is generalised muscle contraction, but as the adductors and internal rotators (latissimus dorsi, pectoralis major, subscapularis, and teres major) are stronger than the external rotators (infraspinatus and teres minor) adduction, flexion and internal rotation predominate. This contraction leads in addition to dorsocranial movement of the humeral head. This is limited superiorly by the acromion and medially by the glenoid fossa, but since there is no bony restraint posteriorly, dislocation in that direction may occur. A distinct



**Fig. 1** Distribution of dislocations due to direct and indirect forces

**Table 1** Constitutional factors predisposing to posterior dislocation of the shoulder

Bone	Capsule and ligaments	Musculature
Retrotorsion of humeral head	Laxity of posterior capsule	Discoordination
Glenoid tilt	Ligamentous laxity (e.g. Ehlers-Danlos)	Isolated muscular action
Glenoid dysplasia	Dysplasia of aplasia of the labrum	

Hill-Sachs lesion frequently occurs even if the glenohumeral joint relocates immediately. A similar mechanism of injury is likely with posterior dislocations after electrocution [1] and in psychiatric patients undergoing electroconvulsive therapy [18].

3. Constitutional predisposing factors. Changes in the area of the glenohumeral joint may also predispose to subluxation or dislocation [9, 20] (Table 1). The first dislocation is often triggered by a certain movement or minor trauma, and this may lead to an atraumatic recurrent shoulder dislocation. This kind of dislocation often progresses to increasing instability [20], and the position of the arm which triggers dislocation occurs frequently with every day activities.

### Classification of posterior subluxation and dislocation of the shoulder

#### Anatomical classification

Anatomically the type of dislocation is classified according to the position of the humeral head [13] (Tables 2, 3). Posterior subluxation is said to occur if 50% of the

**Table 2** Anatomical classification and incidence of posterior dislocation and subluxation of the shoulder

Variant of dislocation	Number of cases	%
Subluxation	176	100
Luxation	400	100
Subacromial	390	97.5
Subglenoidal	1	0.25
Subspinous	9	2.25

**Table 3** Characterization of variants of posterior shoulder dislocation

Subacromial	Subglenoidal	Supspinous
Main component internal rotation	Posteroinferior dislocation of the humeral head	Greatest dislocation of all variants
Humeral head is directed posteriorly	Anterosuperior humeral head touches posteroinferior glenoid	Humeral head lying medially and inferior to the scapular spine
Minor tubercle in glenoid	–	Severe soft tissue defect
Major tubercle no longer seen lateral to humeral head	–	–

humeral head is posterior to the glenoid. Compared with dislocation, subluxation of this type is unstable [5, 6].

#### Definitions

Before proceeding to a recommended classification, it is necessary to define certain terms:

*Acute and persistent.* A posterior subluxation or dislocation is acute if it has occurred within the previous 6 weeks and persistent if it remains unreduced for longer than 6 weeks [4, 7, 16, 20].

*Traumatic and atraumatic.* It is not possible to further subdivide dislocations due to trauma. Minimal trauma may cause subluxation or dislocation, though it may only be apparent at a later date that instability is present. Taking an accurate history from the patient is clearly important in distinguishing traumatic from atraumatic causes of dislocation, especially when the injury may have apparently been insubstantial – so-called “micro-trauma” – and happened a long time in the past.

*Post-traumatic recurrent and atraumatic recurrent.* In these cases dislocation occurs unintentionally, often in connection with pathological joint changes due to an injury or to underlying constitutional factors. Recurrent traumatic dislocations can be caused by an injury to the joint that occurred at the time of the first dislocation which was not treated.

*Voluntary.* Voluntary subluxation or dislocation is always intentionally triggered by the patient, does not occur as a result of trauma and should be classified in the post- or atraumatic voluntary group [9, 15].

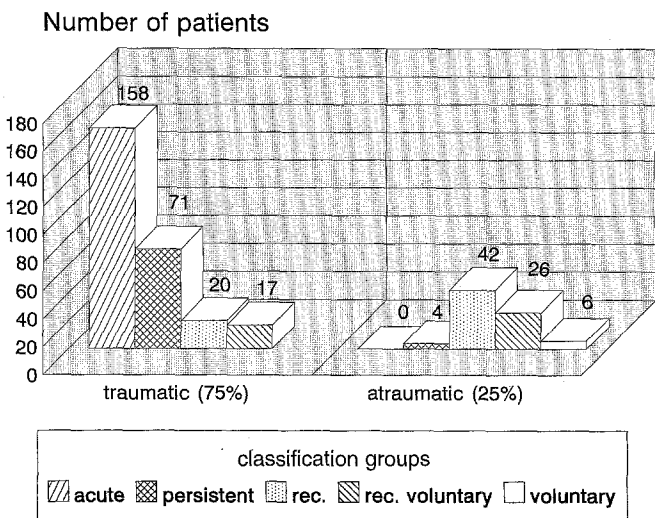
*Post-traumatic voluntary and atraumatic voluntary.* This sub-group is not described in the literature and occurs in patients in whom voluntary dislocation has a tendency to become involuntary. It is a combination of the two sub-groups mentioned before.

#### Aetiologically based classification

The currently used classifications of the shoulder are confusing and do not consider the underlying aetiology. They are therefore of limited use in determining a plan of man-

**Table 4** Aetiologically based classification of posterior dislocation and posterior subluxation

Type	Abbreviation
I Traumatic dislocation/subluxation (Dislocation: trauma, convulsion, electrocution Subluxation: major and minor trauma)	
A Primary dislocation/primary subluxation	
1 Acute	I/A/1
2 Persistent	I/A/2
B Recurrent dislocation/subluxation	
1 Post-traumatic	I/B/1
2 Post-traumatic voluntary	I/B/2
II Atraumatic dislocation/subluxation	
A Primary dislocation/primary subluxation	
1 Acute	II/A/1
2 Persistent	II/A/2
B Recurrent dislocation/subluxation	
1 Atraumatic	II/B/1
2 Atraumatic voluntary	II/B/2
3 Voluntary	II/B/3



**Fig. 2** Assignment of dislocations to the aetiologically based classification groups (n = 344)

agement in individual cases. In order to clarify the situation, 300 publications (750 cases) of the international literature were reviewed and a new classification derived, shown in Table 4. Cases with combined post- or atraumatic recurrent and voluntary components have, until now, been difficult to classify. Post- and atraumatic voluntary dislocations constitute 36.5% of all recurrent dislocations, whereas just 5% are voluntary (Fig. 2). Until now this latter group has been considered substantial by many authors [9, 14]; however, this can no longer be maintained after critical analysis of the published literature. It is important to distinguish post- and atraumatic voluntary dislocations from entirely voluntary dislocations as optimal treatment differs between these two groups [8].

**Method of assessment of posterior subluxation and dislocation of the shoulder**

A method of assessment should allow the results of different forms of treatment to be evaluated and compared and thus enable the most appropriate form of management to be selected. Two follow-up schemes which are commonly used in posterior dislocation of the shoulder have been described. That published by Neer [10] refers to follow-up after treatment of fracture dislocations of the proximal humerus. Another by Rowe [15] is used in patients with persistent posterior dislocation. Eber and Buch [3] recommend Neer's scheme to analyse treatment of posterior dislocation, but this does not take into account criteria which are important in posterior instability. Mobility, function and stability are the most important factors by which to judge the success of recovery. In the scoring system that we have developed, stability and function account for 50% of the total number of points, and are weighted more highly than in Neer's assessment. One shortcoming common to both the Neer and Rowe schemes is that a patient with recurrence of dislocation or subluxation after surgery may still be assessed as having a good outcome, whereas in the scheme presented here the result would be rated as poor irrespective of the parameters of pain and range of movement.

The present authors believe that a standard method of assessment which allows comparison of the degree of instability of all types of posterior subluxation and dislocation is required. An assessment method based on evaluation of pain, function, range of movement and recurrence is presented in Tables 5-7. The total number of points that can be scored is 100. The scores for pain, stability and

**Table 5** Follow-up assessment: scoring for pain

Grade	Points
None	25
Slight, no limitation of daily activity	20
Moderate	10
Severe, tolerated, occasional analgesics	5
Extreme, complete inability to work	0
Total	25

**Table 6** Follow-up assessment: scoring for stability and function

Grade	Characteristics	Points
Normal	No instability during work or sports	50
Slight limitation	Drawer tests negative, limitation due to slight adjustment during extreme effort	35
Moderate limitation	Drawer tests positive, feeling of instability	15
Marked limitation	Recurrent dislocation or subluxation, marked limitation of activity	0
Total		50

**Table 7** Follow-up assessment: scoring for range of movement

Flexion (°)	Extension (°)	Abduction (°)	External rotation (°)	Internal rotation (°)	Points
–	–	–	60	90	6
180	–	180	30	70	5
120	40	120	20	60	3
100	30	100	10	50	2
80	15	80	10	30	1
< 80	< 15	< 80	< 10	< 30	0
Total					25

**Table 8** Interpretation of point scores according to type of dislocation

Outcome	Type of dislocation		
	Dislocation		Subluxation, acute and recurrent
	Acute and recurrent	Persistent	
Excellent	> 89 points	> 89 points	> 89 points
Good	80–89 points	80–89 points	80–89 points
Fair	60–79 points	50–79 points	70–79 points
Poor	< 60 points	< 50 points	< 70 points

function and range of movement are added together and interpreted according to Table 8, resulting in an outcome evaluation ranging from “excellent” to “poor”. The scores required for “excellent” or “good” are the same with all types of dislocations. The more serious injuries to a joint, implying worse initial values, such as a large Hill-Sachs lesion in cases of persistent posterior dislocation, are taken into account by changing the boundary between “fair” and “poor”. In so doing, this takes into account the preoperative state of the shoulder.

Because of the rarity of posterior shoulder dislocation and subluxation it is difficult for any single clinic to gain a large amount of experience in treating this condition. To determine a management plan for each subgroup of posterior dislocation or subluxation, a multicenter study would have to be undertaken. To allow a comparison of the outcome of treated cases one system of classification and evaluation should be used. The authors recommend that when the patient is reviewed at follow-up, the subgroup of

dislocation should be recorded, as well as the evaluation period, the functional score and the specific parameters of pain, range of movement, function and stability.

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