ATRAUMATIC RECURRENT POSTERIOR SHOULDER SUBLUXATION : REVIEW OF THE LITERATURE AND RECOMMENDATIONS FOR TREATMENT

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Isolated atraumatic recurrent posterior subluxation of the shoulder (ARPS) constitutes 1% of all shoulder subluxations ; it is therefore difficult for any single clinic to gain a large experience in treating this condition. Based on a review of the literature 83 cases of ARPS out of 237 reported cases with all types of posterior subluxation of the shoulder (185 patients) were analyzed. Most cases of ARPS occur between 11 and 20 years of age ; they are frequently associated with changes such as dysplasia of the glenoid labrum or an alteration in the spinoglenoid angle. More than half of all ARPS occur bilaterally. The diagnosis is based on history, physical examination including tests of instability, or on techniques of dynamic examination (ultrasonography, arthroscopy). A plan of management related to the underlying etiology has been developed. At the first occurrence, cases of subluxation should be treated conservatively by kinesitherapy and physical therapy. Operative treatment is indicated when conservative management for at least 6 months has been unsuccessful and subluxation continues to occur during everyday activities, but it should never be instituted in patients with emotional disorders. The underlying pathologic lesion should determine the technique for shoulder reconstruction in atraumatic posterior shoulder subluxation. In cases in the atraumatic voluntary subgroup, surgery is indicated if conservative treatment fails and the voluntary component has been eliminated. In this subgroup, isolated soft tissue procedures have not been shown to produce good long-term results, and supplementary bony procedures are considered necessary. Conservative treatment exclusively is recommended in voluntary cases.

Keywords : posterior subluxation ; shoulder ; classification ; conservative treatment ; operative treatment.
Mots-clés : subluxation postérieure ; épaule ; classification ; traitement conservateur.

INTRODUCTION

Isolated atraumatic posterior subluxations of the shoulder occur rarely compared with anterior subluxations (1, 7, 8, 17, 26). This is reflected in the literature which is constituted mainly of case reports and the results of surgery in small series of patients (8, 11, 13, 15, 20, 28, 33). The clinician is therefore faced with the fact that there are numerous causes of posterior subluxation and many methods of treatment but no rationale as to which is the most appropriate, given the underlying etiology.

The purpose of this paper is to analyze the problem of atraumatic posterior subluxation of the shoulder in over 50 published papers and to recommend a plan of management related to the underlying etiology.

MATERIALS AND METHODS

Because of the rarity of atraumatic posterior shoulder subluxation (1% of all shoulder subluxations) (1, 7, 8, 20, 26, 28) it is difficult for any single team to gain a large experience in treating this condition. Eighty-three atraumatic posterior shoulder subluxations out of 237 shoulders with all types of posterior subluxation (185 patients) were analyzed from the literature. The

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papers concerning recurrent posterior shoulder dislocation or subluxation had to be reviewed to select for this study cases with pure atraumatic subluxations. The cases used for this study were described as atraumatic by the authors and had detailed case histories so that they could be graded according to a special rating scale created for this type of dislocation (17). In this follow-up scheme 50 points are given for stability and function, 25 points for range of motion and 25 points for pain. The results are graded as excellent (90-100 points), good (80-89 points), fair (70-79 points) and poor (69 points or less). In case of a recurrence of subluxation the result is rated as poor regardless of the other parameters (12). Cases of multidirectional instability with a posterior component were excluded from the study.

Incidence

Posterior subluxation of the shoulder (i.e. the incomplete loss of contact between the joint surfaces) occurred in men and women in a ratio of 3.3 :1. Primary atraumatic posterior subluxation occurred mainly between the ages of 11 and 20 years (fig. 1), and in 75% of cases there was an underlying abnormality of the glenohumeral joint or soft tissue structures (table I). Seventy-eight percent of unilateral subluxations had an underlying traumatic origin, whereas 88% of bilateral cases were atraumatic (fig. 2).

Table I. — Compilation of constitutional factors and additional injuries in posterior shoulder subluxation (N = 57)

Pathology	N
Bone	
Dysplasia of the glenoid	18
Hypoplasia of the posterior glenoid rim	14
Abnormal spinoglenoidal angle	10
Retrotorsion of the humeral head	2
Reverse Hill-Sachs lesion	1
Capsule and ligaments	
General ligament laxity	17
Capsular enlargement	16
Bankart lesion	10
Posterior labral tear	1

Classification

Trauma accounted for posterior subluxation of the shoulder in 49% of patients. There was no reported history of injury in 51% of patients ; it is on these that we are reporting. Atraumatic primary subluxation is not specifically reported in the literature. The term

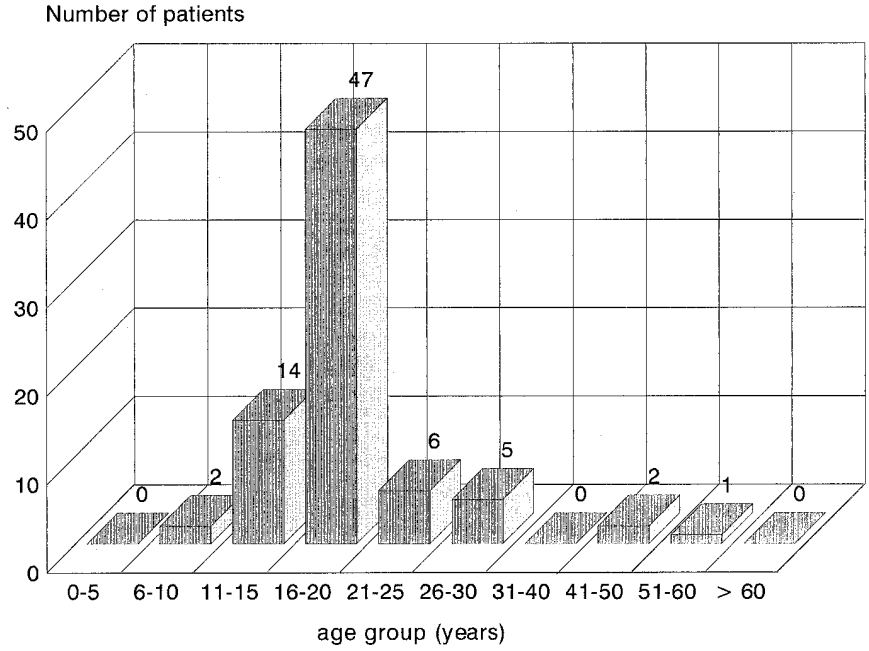

Fig. 1. — Age distribution of atraumatic posterior shoulder subluxation (age of onset) (N = 77).

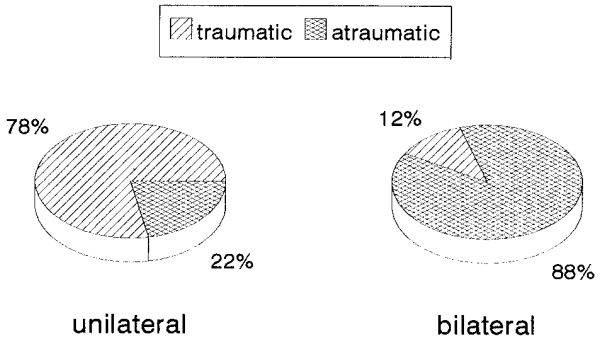

Fig. 2. — Relationship between unilateral and bilateral posterior shoulder subluxation and pathogenesis (N = 185).

persistent subluxation has been created by McLaughlin (21) but has never been reported elsewhere. Atraumatic recurrent subluxation may be classified into 3 groups, defined as :

1. Atraumatic : subluxation occurring unintentionally, frequently in association with developmental anomalies in the glenohumeral joint (bone and soft tissue).
2. Voluntary : subluxation occurring intentionally, usually painless.
3. Atraumatic voluntary : atraumatic subluxation which may progress to occur intentionally ; the patient is able to provoke subluxation in the typical position (adduction, forward flexion of 60°, maximal internal rotation) by selective muscle activation.

The classification for this special type of dislocation is listed in table II.

Table II. — Recommended classification of posterior shoulder subluxation based upon etiology (see ref. 17)

Classification of atraumatic posterior subluxation based upon etiology	
Subgroup	Abbreviation
II. Atraumatic subluxation	
A. Primary subluxation	
1. acute	II/A/1
2. persistent	II/A/2
B. Recurrent subluxation	
1. atraumatic	II/B/1
2. atraumatic-voluntary	II/B/2
3. voluntary	II/B/3

Diagnosis

The diagnosis of posterior subluxation is made mainly by typical case history and clinical examination. Several tests for instability have been described, such as the posterior drawer test of Norwood and Terry (26) and that of Gerber and Ganz (9). According to Cofield and Irving (4) the posterior drawer test rarely produces apprehension in these patients and therefore the diagnosis must be made on the basis of subluxation. Techniques of visualization of the subluxation by clinical examination, radiology, arthroscopy are less reliable than in the case of dislocation (11, 12, 17, 22, 33).

Subluxation may be detected by dynamic radiographs or sonographically by a function study (13), and arthroscopy may ascertain the mechanism of dislocation and the presence of intraarticular joint pathology (17). Once the underlying pathology has been determined the appropriate management may be instituted.

Treatment

Conservative treatment consists of intensive physiotherapy to strengthen the muscles of the rotator cuff, especially the external rotator muscles, as well as behavior training to avoid movements leading to subluxation (8, 13, 14, 25, 36).

Eight methods of operative treatment with a variety of modifications have been described for posterior shoulder dislocation (1, 2, 3, 5, 6, 8, 10, 13, 14, 15, 17, 18, 19, 23, 24, 28, 29, 31, 33, 34, 36). These are detailed in table III.

RESULTS

Atraumatic recurrent subluxation

This represents 12.5% (23 cases) of all posterior subluxations (traumatic and atraumatic) in the papers reviewed. Sixteen atraumatic cases were treated surgically (table IV). Two of the 9 cases treated by horizontal capsular reefing as described by Tibone *et al.* (34) were assessed as fair results ; the patients had persistent pain and extreme restriction of movement ; in a third case with a fair result subluxation recurred after surgery.

Atraumatic-voluntary recurrent subluxation

This subgroup represents 34% (63 cases) of all posterior subluxations (traumatic and atraumatic),

Table III. — Methods of operative treatment

Method of operative treatment	Purpose
Posterior bone block (intra- and extra-articular) (5, 8, 9, 13)	Reinforcement of posterior aspect of the joint
Osteotomy of the scapular neck (1, 16, 19)	Change of the glenoid tilt to anterior
Rotational osteotomy (21)	External rotation of the humeral head by means of an osteotomy through the humeral neck
Posterior Putti-Platt procedure (4, 10)	Posterior capsular reefing with folding of the infraspinatus and/or the teres minor
Boyd and Sisk procedure (2)	Posterior transposition of the long head of the biceps to form a dynamic loop with a force directed anteriorly in combination with posterior capsular reefing
Posterior Bankart procedure (17)	Refixation of torn labrum or capsule to the posterior glenoid rim in combination with capsular reefing
Capsular shift procedure (5, 14)	Stabilization of the joint by shifting and overlapping of the capsule with the aim to reduce the capsular pouch
Wettmann procedure (23)	Transposition of the coracobrachial muscular system and the subscapularis with the aim of creating a force pulling anteriorly

Table IV. — Results of treatment for atraumatic recurrent subluxation.
Success rate is defined as the proportion of cases considered as good or excellent (80-100 points) in a special follow up scheme (see ref. 17)

Treatment	No. of cases	Success rate [%]
Boyd and Sisk procedure	1	[100]
horizontal posterior capsular reefing	9	66
bone block combined with posterior capsular reefing	4	50
osteotomy of the scapular neck	2	50 (50% recurrence)

and 47 treated cases of atraumatic origin have been reported in the literature. Seven cases without any secondary injuries or changes were treated conservatively with no recurrence. Those cases treated surgically, including revisions, are given in table V.

Voluntary recurrent subluxation

Conservative treatment (physiotherapy, biofeedback) exclusively is recommended in this group which constitutes 7% of posterior subluxations (traumatic and atraumatic). Surgery in all 13 cases, consisting of 7 osteotomies of the scapular neck, 3 posterior operations as described by Putti-Platt and 3 posterior capsular reefings, failed to prevent recurrence of subluxation.

DISCUSSION

Management of posterior subluxation of the shoulder depends on the frequency of occurrence of subluxation, and on the precipitating mechanism, for example the underlying pathology (8, 11, 15, 27, 28, 33). A conservative approach is indicated if the patient subluxes the shoulder with sports or strenuous activities but has few problems in everyday tasks (8, 13). Such patients may be treated with long-term physical therapy and should be advised to avoid or modify the actions that trigger subluxation (14, 30).

Conservative treatment consists of isometric muscle strengthening exercises with specific attention being paid to the abductors (deltoid and supraspinatus), external rotators (infraspinatus and

Table V. — Results of treatment for atraumatic-voluntary recurrent subluxation. Success rate is defined as the proportion of cases considered as good or excellent (80-100 points) in a special follow up scheme (see ref. 17)

Treatment	No. of cases	Success rate [%]
I. Good results		
Boyd and Sisk procedure	3	100
Posterior Bankart procedure	2	100
Fronek capsular shift procedure	1	100
Rotational osteotomy	11	82
Bone blocks (extra-articular) incl. Posterior soft tissue reefing	8	75
II. Poor results		
Posterior Putti-Platt procedure	5	60 (40% recurrence)
Wettmann procedure	2	50
Osteotomy of the scapular neck	10	50 (50% recurrence)

teres minor), subscapularis which internally rotates the shoulder and the musculature that stabilizes the scapula (8, 15, 17). The exercises should be continued for at least 6 months (8, 10, 17).

Surgery is indicated if conservative treatment fails and subluxation recurs with everyday activities (7, 14, 33). There is no indication for surgical treatment in atraumatic voluntary subluxations (so called emotionally unstable cases) (14, 30, 33).

Cases of recurrent voluntary subluxation and those with a distinct voluntary component should be considered to make up a separate subgroup (14, 15). These patients usually have no underlying predisposing cause of subluxation, and investigations often do not reveal any pathological findings. Rowe *et al.* (29) recommend a full psychiatric assessment before embarking upon surgery in this group of patients, as many have a conversion neurosis.

It is important to assess the degree of the voluntary component of subluxation by case history and clinical examination. In case of atraumatic-voluntary subluxation patients should be treated conservatively initially. Surgery should be considered in those patients without psychological problems, in whom a voluntary component of the subluxation has been eliminated, conservative treatment has failed but there is still a tendency for involuntary subluxation, perhaps due to a capsular-ligamentous lesion (14, 15, 30, 33).

Preoperative investigations to determine the specific structural skeletal anomalies responsible for subluxation using CT-Scan or MRI are important. On this basis the appropriate combined procedure on soft tissue and bone may be undertaken in this subgroup of patients.

Implantation of a posterior bone block (1, 6, 7, 8, 13, 14, 20, 36), posterior transposition of the long head of biceps according to Boyd and Sisk (3), or rotational osteotomy (29) all appear to give good results. Good long-term results have been achieved by rotational osteotomy (33). Contrary to the procedures which may affect the intra-articular structures, such as bone blocks or osteotomies of the scapular neck, rotational osteotomy does not entail severe complications such as osteoarthritis (19, 33). Hawkins and Bell (15) state that scapular osteotomy is a potentially complicated procedure that requires special attention to technique. In cases belonging to the atraumatic-voluntary subgroup isolated soft tissue procedures do not show good long-term results and should only been used supplementarily. The capsular shift procedure (8, 24) should be used if a supplemen-

tary capsular reefing procedure is chosen. The optimal procedure is dependent upon the underlying structural pathology.

CONCLUSION

Isolated atraumatic posterior subluxations of the shoulder occur rarely compared with anterior subluxations. Most cases reported occurred between 11 and 20 years of age and nearly 70% of the atraumatic cases were bilateral. In 75% there was an underlying abnormality of the glenohumeral joint or soft tissues. The atraumatic recurrent cases are classified in into 3 subgroups : atraumatic, atraumatic voluntary and voluntary. The management is related to the etiology and the underlying pathologic lesion. On the first occurrence atraumatic recurrent posterior subluxations should be treated conservatively by physical therapy. Operative treatment is indicated when conservative treatment is unsuccessful, subluxation continues to occur in everyday activities and *if there is no voluntary component*. Eight methods of operative treatment with a variety of modifications have been described for this condition ; the underlying pathologic lesion should determine the technique for shoulder reconstruction. Good long-term results have been achieved by posterior bone blocks, transposition of the long head of the biceps tendon and by rotational osteotomy. Osteotomy of the scapular neck is a potentially complicated procedure which is only indicated in case of an abnormal spinoglenoid angle. Soft tissue procedures do not show good long-term results. Conservative treatment exclusively is recommended in voluntary cases. In cases in the atraumatic voluntary subgroup, surgery is indicated if conservative treatment fails and the voluntary component has been eliminated, perhaps after psychiatric treatment.

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SAMENVATTING

K.-D. HELLER, J. FORST, B. COHEN, R. FORST. Geisoleerde atraumatische achterste schoudersubluxatie. Overzicht van de literatuur en therapeutische conclusies.

De geïsoleerde atraumatische achterste schoudersubluxatie (ARPS) heeft een aandeel van 1% van alle schoudersubluxaties. Zodoende heeft de arts op grond van talrijke behandelingsmethodes onvoldoende ervaring op dit gebied verzameld. Gebaseerd op de resultaten van de internationale literatur konden 83 gevallen met ARPS van uit het gehele kollektieve van 237 schouders met alle vormen van achterste schoudersubluxatie vastgesteld worden. De meeste gevallen beginnen tussen het 11de en 20ste levensjaar en men ziet vaak pathologische veranderingen in de omgeving van de schouder b.v. een dysplasie van het labrum glenoidale of een verandering van de spinoglenoidale hoek. Meer dan 50% van deze subluxaties zijn aan beide schouders te zien. Deze diagnose wordt op grond van de anamnese, het klinisch onderzoek en de instabiliteitstests of door technieken met dynamische onderzoeken b.v. sonographie of kijkoperatie gesteld. Er werd en behandelingsschema op grond van de betreffende etiologie ontwikkeld. In ieder geval zou deze vorm van schouderluxatie eerst konservatief behandeld moeten worden, b.v. met physische therapie. De operatieve therapie is nodig, als de konservatieve behandeling gedurende een periode van 6 maanden geen verbetering brengt en de subluxatie reeds door alledaagse bewegingen ontstaat. De operatieve therapie mag nooit bij psychische patiënten doorgevoerd worden. De operatie moet volgens de pathologische veranderingen van de schouder gebeuren. Toevallige gevallen zullen ook niet geopereerd worden, als deze op een andere manier geholpen kunnen worden. In dit geval hebben alleen ingrepen op de weke delen geen goed resultaat getoond. Deze zullen dan met een geste op het skelet moeten gecombineerd worden. Bij voluntaire subluxaties, geven geïsoleerde ingrepen op de weke delen geen goede resultaten. Conservatieve therapie is bij deze gevallen geïndiceerd.

RÉSUMÉ

K.-D. HELLER, J. FORST, B. COHEN, R. FORST. Subluxation postérieure atraumatique récidivante de l'épaule. Revue de la littérature et propositions thérapeutiques.

La subluxation postérieure atraumatique recidivante isolée (ARPS) represente 1% de toutes les subluxations de l'épaule ; de ce fait, il est difficile pour une équipe d'acquérir une grande expérience du traitement de cette pathologie. Sur la base de la littérature internationale, 83 cas d'ARPS relevés parmi 237 cas de subluxation postérieure (185 patients) ont été analysés. La plupart des cas d'ARPS surviennent entre les âges de onze et vingt ans ; ils sont fréquemment associés à des ano-

malies telle qu'une dysplasie du bourrelet glénoïdien ou une altération de l'angle spino-glenoïdien. Plus de la moitié des cas sont bilatéraux. Ce diagnostic est basé sur l'examen clinique, en particulier sur les tests d'instabilité ou sur des technique d'examen dynamique (ultrasonographie, arthrographie). Un plan de traitement a été developpé. Un premier épisode de subluxation devrait être traité de façon conservatrice par kinésithérapie et physiothérapie. Un traitement opératoire est indiqué lorsqu'un traitement conservateur est resté inefficace après six mois et que la subluxation continue à se manifester dans les gestes quotidiens, mais ce traitement ne convient pas à des patients émotionnellement perturbés. Les cas avec une composante de subluxation volontaire ont un pronostic défavorable à long terme et nécessitent un geste complémentaire. Pour ce groupe, le traitement conservateur est à recommander.