

Management of Chronic Unreduced Anterior Dislocations of the Shoulder: Case Series of 53 Patients

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Abstract

Background: Chronic anterior dislocations of the shoulder have been reported on since White's comments in 1741. Anatomopathologically, such cases exhibit modifications of the injured tissues (fibrosis, neo-articulation, muscle contracture, capsular, ligamentous, bone and tendon lesions) because of the longstanding unreduced humeral head. We hypothesize that the clinical status of such cases and the different lesion patterns observed in them obviate the need for conservative treatment or the use of classic open procedures.

Methods: The study reports on 53 non-randomized cases showing duration of dislocation of at least 3 weeks in patients aged between 20 and 75 years. The 53 patients were placed in three management categories: conservative, closed reduction and open reduction groups.

Results: The results were evaluated following Rowe's evaluation of results for chronic unreduced dislocation of the shoulder. Among the 49% of patients with open management, the overall score averaged 74 points. In 4 cases, we performed a modified Boytchev procedure, and the overall rating units averaged 81 points.

Conclusion: These results show that the overall prognosis for surgical treatment is improved.

This study is a Level IV case series.

Introduction

A glenohumeral joint that has been dislocated for several days is a chronic dislocation. This condition has been known since 1741 [1] (White, cited by Schulz) and 1825 [2] (Cooper, cited by Rowe). Souchon [3] was the first author to offer a definition: "we will call recent all dislocations no older than a month."

In the medical literature, a number of authors [4-16] have discussed the handling of this condition, many of them adopting an optimistic view [5,6,8-12,16] and offering hope for patients. 1982 saw a landmark, when Rowe [13] presented his rating system for the evaluation of the treatment, and on the base of various different studies [4,10,13] identified three weeks as the criterion for considering a shoulder dislocation as chronic.

Logically, chronic anterior dislocation of the shoulder exhibits the same anatomopathological lesions as acute anterior dislocations: Bankart lesion, ligament lesions, tendon lesions, capsular rupture, glenoid fracture or erosion, Hill Sachs lesion; but these lesions have become longstanding and may have undergone change. Dubousset [17] and Langlais [7] reported cases treated by closed reduction in which Hill Sachs lesions had filled up spontaneously over time; other added modifications of injured tissues include fibrosis, neo-articulation, and muscle contracture. The condition thus becomes more complex and shows different lesion patterns, which obviously need different procedures of management.

Treatment of longstanding injured structures may be judged obsolete, so the principle of treatment is in theory to check for and tackle strategic lesions in order to stabilize the glenohumeral joint after open reduction requiring different complex techniques, each one adequate for a specific pattern of chronic shoulder dislocation. The procedures performed include Bankart, Latarjet, Dutoit, open repair with pinning, humeral head replacement, and resection of the humeral head. In 2002, we began to

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use the Boytchev procedure. Treatment decisions also depend on clinical symptoms; patients who do not have much disability are left unreduced. The aim of this study is to discuss different treatment options, to evaluate and compare our results using different methods of management, to emphasize the effectiveness of open repair and to shed light on the place of the Boytchev procedure as another possible surgical treatment.

Materials and Methods

For this study, the patients were selected using the following inclusion criteria: a clinical history of chronic anterior shoulder dislocation as a result of a traumatic event, a time interval between dislocation and treatment of at least three weeks, typical symptoms of anterior dislocation: persistent deformity of the shoulder, discomfort or disability, pain, and possible associated injuries. Pain, motion and function are evaluated using Rowe's evaluation of results for chronic unreduced dislocation of the shoulder. The condition is documented using plain and special radiographs and in some cases computed tomography [18] before and after treatment and follow-up. The patients were placed in the following management categories: conservative treatment, manipulation and closed reduction, and open repair.

The patients who underwent open repair were followed up for at least two years. Some patients with conservative treatment had a follow-up of less than two years because there was no change in their clinical evolution.

Between January 1987 and December 2015, we collected data on 53 non-randomized patients (Table 1) with chronic anterior unreduced dislocations of the shoulder. The age of the patients ranged between 20 and 75 years (average age 44 years). 34 of them were male and 19 were female. 44 patients were affected on the right side, 9 on the left. The causes of injury were in 49 cases a fall, while one case arose from a car accident, one from a sporting accident, one from an accident at work, and in one case the cause was undetermined. The delay before diagnosis ranged between 3 weeks and 156 weeks (Figure 1), with an average of 18 weeks. The reasons for the absence of treatment were, in 45 cases, a failure to consult, and in 2 cases an unsuccessful reduction; in 2 cases the problem went unrecognized, in one case the problem occurred after an epileptic fit, and in 3 cases the patients had sought treatment by a faith healer. 46 of the patients came from rural areas and 42 were from a low socio-economic category. 28 radiological lesions and anatomical operative findings revealed 17 head lesions (10 compression fractures and Hill Sachs lesions, 5 greater tuberosity fractures, 1 necrosis of the humeral head and a head fracture with avulsion of the supraspinatus), 6 glenoid lesions (5 glenoid rim erosions and 1 fractured rim), 2 diaphyseal fractures, and 3 long biceps lesions (2 dislocations and 1 rupture). No severe vascular or neural injuries were observed. There were 20 cases in which the patients were left untreated. 7 had manipulation and closed reduction under anaesthesia, 3 with pinning, 1 without pinning and 3 cases in which this treatment failed. 26 patients underwent open reduction with preservation of the humeral head. In one case of head necrosis, the patient refused any treatment and was lost in follow-up. 3 patients had complications, which included 2 superficial wound infections and 1 redislocation (1 month after reduction under anaesthesia). The length of follow up, for cases receiving no treatment, ranged between 10 and 120 months, with an average of 19 months; for



Figure 1: Patient with one unreduced dislocation of the shoulder after 156 weeks of disability.

cases of closed reduction, it ranged between 20 and 41 months, with an average of 28 months; and for open reduction, the follow up ranged between 25 and 130 months, with an average of 34 months. Length of follow up, across all the categories, averaged 27 months. 4 patients were lost in follow up: 3 who refused treatment and 1 whose shoulder was redislocated 4 weeks after manipulation reduction. The evaluation using Rowe's grading system for the shoulder before any management shows that initial ratings ranged between 40 and 75 points (75 points for the no treatment category, 40 points for those receiving closed reduction and 44 points for operative management). The patients evaluated by the same system after management were assessed as excellent, good, fair, or poor.

Non operative management

In some patients closed reduction was performed in supine position under general anaesthesia with total muscle relaxation. We began the maneuver with repetitive gentle rocking of the humerus from internal to external rotation, adding flexion-extension and abduction-adduction movements to liberate the imprisoned humeral head in the neo-articulation; then we made a steady traction along the axis of the arm while applying pressure on the proximal humerus in the axilla to effect reduction.

Surgical technique

Under general anaesthesia, the patient is placed in supine position. After antiseptic preparation, the skin incision is made over the classical delto-pectoral groove. The length of incision is generally about 10 cm, but it can be longer if necessary. The approach is made through the deltoid muscle, reclining cephalic vein inside, until the subscapularis appears, covering all the anterior side of the neo-articulation. The subscapularis muscle and capsule are incised near their insertion, preserving some attachment in the lower part. When the neo-articulation is opened, the humeral head is clearly visible below the

subscapularis muscle. Adhesions are generally very extensive, and liberation is done step by step without forcing, to avoid any devascularisation or crushing of the humeral head, which is often osteoporotic. Careful liberation with external rotation and lateral traction allows the head to be released from its imprisonment in the neo-articulation. Then with the finger we touch the glenoid fossa (which is strangulated by the contracted deltoid muscles), to see its position, and to have an idea about its new constitution. When the articular surface of the glenoid fossa is well exposed, we excise the soft fibrous tissue with a rongeur, gently, without

causing damage, in order to preserve the articular cartilage; this cartilage is then evaluated. We try to preserve soft fibrous tissue around the rim for a good positioning of the head (which must be centralized). Before reducing the humeral head, we maintain an external traction on the highly contracted deltoid muscle for a varying length of time in order to achieve the reduction without damaging the head [19]. All the anatomical structures are repaired and sutured using the usual technique, other accompanying lesions (bone, tendon lesions and other operative findings) are restored when necessary if possible, and the head is stabilized:

	case	age sex	cause of injury	dislocation side	cause of diagnosis delay and treatment	duration of disability	radiological and/or operative findings	treatment	follow up in months	result	rating units
no treatment	1	60M	fall	R	unsuccessful reduction	3 weeks		abstention	10	good	80
	2	49F	fall	R	consultation of a faith healer	3 weeks		refused treatment	lost to follow up		
	3	30M	auto acc	R	unrecognized shown in assessment	24 weeks	Hill Sachs lesion	abstention	120	good	85
	4	26M	fall	R	no consultation	14 weeks		abstention	17	excellent	95
	5	62F	fall	R	no consultation	3 weeks		abstention	14	fair	65
	6	31M	fall	R	consultation of a faith healer	11 weeks		abstention	10	good	75
	7	53F	fall	R	no consultation	6 weeks		abstention	14	good	85
	8	37M	fall	R	no consultation	48 weeks	deformation of the head and rim erosion	abstention	14	excellent	95
	9	50F	fall	R	no consultation	3 weeks		abstention	18	good	70
	10	36M	labour acc	R	unrecognized shown in assessment	12 weeks	shaft humeral fracture	abstention	28	good	85
	11	28M	fall	R	no consultation	19 weeks		abstention	18	good	80
	12	65F	fall	L	no consultation	36 weeks	great tuberosity fracture	abstention	12	fair	70
	13	33M	fall	L	no consultation	15 weeks		abstention	10	excellent	90
	14	38F	fall	R	no consultation	06 weeks	inferior dislocation	refused treatment	lost to follow up		
	15	70F	unknown	R	consultation of a faith healer	43 weeks	deformation of the head and glenoid fossa	abstention	12	poor	45
	16	35M	fall	R	no consultation	09 weeks		abstention	14	fair	55
	17	75F	fall	R	no consultation	33weeks	necrosis of humeral head and deformation of glenoid fossa	refused treatment	lost to follow up		
	18	66M	fall	R	no consultation	27weeks	Hill sachs lesion	abstention	18	good	70
	19	58F	fall	R	no consultation	156 weeks	defomation of the head and glenoid fossa	abstention	12	good	75
	20	25M	fall	L	no consultation	50 weeks	deformation of the head and glenoid fossa	abstention	14	good	75
closed reduction	21	55M	fall	R	no consultation	4weeks		manipulation reduction	10	fair	55
	22	59M	fall	R	no consultation	3 weeks		manipulation reduction	11	good	70
	23	63F	fall	R	no consultation	03 weeks		manipulation reduction	10	good	70
	24	44M	fall	R	after epileptic fit	05 weeks		manipulation reduction	lost to follow up		
	25	49F	fall	L	no consultation	03weeks		manipulation reduction	18	fair	60
	26	27M	fall	L	no consultation	04 weeks	Hill sachs lesion	manipulation reduction	20	good	80
	27	35F	fall	R	no consultation	03weeks		manipulation reduction and pinning	24	good	85

open reduction	28	57F	fall	R	no consultation	8 weeks		open reduction	34	good	80
	29	51F	fall	R	no consultation	5 weeks	great tuberosity fracture	open reduction	21	good	85
	30	61M	fall	R	no consultation	4 weeks	long biceps brachii dislocated	open reduction	26	good	80
	31	31F	fall	L	unsuccessful reduction	3 weeks		open reduction	32	good	80
	32	20M	fall	R	no consultation	11 weeks	great tuberosity fracture	open reduction	130	good	85
	33	35M	fall	R	no consultation	40 weeks	Hill Sachs lesion	open reduction	38	good	85
	34	53M	fall	R	no consultation	4 weeks		open reduction	42	good	80
	35	65F	fall	R	no consultation	9 weeks		open reduction	16	good	70
	36	54F	fall	L	no consultation	8 weeks		open reduction	36	good	70
	37	57M	fall	R	no consultation	4 weeks	rim fracture	open reduction	28	good	75
	38	65F	fall	L	no consultation	3 weeks		open reduction	15	good	70
	39	20M	sport acc	R	no consultation	3 weeks		open reduction	48	good	80
	40	33M	fall	R	no consultation	44 weeks	deformation of the head	open reduction	56	fair	75
	41	28F	fall	R	no consultation	12 weeks		open reduction	24	poor	45
	42	39M	fall	R	no consultation	28 weeks	Hill Sachs lesion	open reduction	11	fair	55
	43	59M	fall	R	no consultation	08 weeks	neck and shaft humeral fracture	open reduction	30	fair	55
	44	42M	fall	R	no consultation	05weeks	fracture of great tuberosity	open reduction	50	good	85
	45	43M	fall	R	no consultation	17weeks		Boytchev	28	good	70
	46	38M	fall	L	no consultation	38weeks	deformation of the head	Boytchev	50	excellent	90
	47	49M	fall	R	no consultation	20weeks		Boytchev	36	good	85
	48	40M	fall	R	no consultation	14weeks	long biceps brachii dislocated	open reduction	24	good	75
	49	32M	fall	R	no consultation	08weeks		Boytchev	32	good	80
	50	56M	fall	R	no consultation	06weeks		open reduction	14	good	75
	51	30M	fall	R	no consultation	36 weeks	rupture of long biceps brachii	open reduction	10	fair	60
	52	28F	fall	R	no consultation	32 weeks	deformation of the head	open reduction	34	good	85
	53	36M	fall	R	no consultation	24 weeks	neck fracture	open reduction	20	fair	55

Table 1: Characteristics of patients, options and results of treatment

- By temporary stabilization with percutaneous pinning, to avoid post-operative instability;
- By definitive stabilization:

Either through capsular and muscular repair carried out via tight sutures, or through a repair using a technique such as that of Bankart, or by using a bony procedure in which the coracoid process is first divided with an osteotome and screwed into the anterior glenoid rim, using the Latarjet technique or another procedure such as that of Dutoit. In some cases we performed the stabilization using a modified Boytchev's technique [20].

Here the incision begins from the level of the coracoid process, extending distally. We expose the horizontal part of the coracoid process with the tendinous origin of the short head of biceps and the coracobrachialis muscle. An anteroposterior drill hole is made from the anterior end of the horizontal part of the coracoid process along its axis. The anterior 2 cm of the coracoid process is divided with an osteotome and mobilized distally. We incise horizontally and liberate the superior border of the subscapularis muscle. On the top of this muscle, we perform the anterior arthrotomy and the opening of the neo-articulation and progressively and carefully liberate the humeral head in order to reduce it. Sometimes we encounter difficulties, so we extend the subscapularis incision into an inversed L incision, but not completely, preserving the muscle tendon's inferior attachment. On the lower border of the subscapularis, we create a tunnel

between shoulder capsule and muscle with a curved vascular forceps (taking care not to damage the anterior circumflex humeral vessels), or only under the subscapularis muscle in the room left by the neo-articulation, through which the isolated coracoid process with the conjoined tendons is now passed before being fixed to the predrilled proximal coracoid process with a 3.5 AO screw (Figure 2). The wound is closed in layers around a suction drain. A well padded dressing is applied. The arm is immobilized at the side of the chest with an elastic bandage.

Post-operative management:

Once the immobilization is removed, normally after three weeks, shoulder exercises are recommended: passive and active exercises to be increased progressively by the patient himself and with the kinesiologist for as long as necessary. When the shoulder joint is transfixed with a pin, the arm is maintained in a sling for 2 or 3 weeks. During immobilization, isometric muscular reinforcement is begun. After removal of the pin(s), we continue with manual passive mobilization aimed at amplifying articular mobility and restoring elementary sliding articular movements. After a few days or simultaneously, we begin active physical therapy, which aims at recuperation of strength and motion, and ensures the beneficial effect of early motion on the joint cartilage and muscular reinforcement.

Results

The rating scores for our management and the treatment

results are summarized in Table 1. In the non-treatment category, which consisted of 20 patients, 3 were untraced, 3 patients were rated excellent (Figures 3A and 3B), 11 good, 2 fair and 1 poor. The overall score averaged 76, with a pain score of 21 points, a motion score of 26 points, and a function score of 29 points. Out of 7 patients who were reduced by closed manipulation, 4 were rated good, 2 fair and 1 suffered a redislocation after 4 weeks and was lost track of. The overall score averaged 70 points, with an improved pain score of 24 points, motion score of 24 points, and function score of 22 points.

In the open reduction category, which included 26 patients, 1



Figure 2: Per-operative photograph showing the passage of the isolated coracoid process with the conjoint tendon deep under the subscapularis before being refixed in the original site with a screw.



Figure 3A: Young patient with a chronic anterior dislocation of the shoulder, clinically evident.

Figure 3B: The same patient with a complete range of motion, with no pain or discomfort; he had no treatment. The result is excellent.

was graded as excellent, 19 were graded as good, 5 as fair and 1 as poor. With open reduction and pinning (Figure 4), 5 shoulders showed good results, 4 showed fair results and 1 a poor result. With the Dutoit technique, the 2 results were assessed as good. With the Latarjet technique (Figures 5A, 5B and 5C), we obtained 5 good results and 1 fair result; with the Bankart technique, there were 4 good results. The 4 shoulders treated using the Boytchev technique (Figures 6A and 6B) showed 1 excellent result (Figure 7) and 3 good results. The overall score averaged 74 points, pain score was 24 points, motion score 26 points, and function score 24 points. The result with the Boytchev procedure was 25 to 30 points for pain, 30 points for motion and 15 to 30 points for function. The ratings averaged 81 points.

Comparison of our results: For the no treatment category, at diagnosis 3 were excellent, 9 were good and 5 were fair (3 were lost to follow up). If the patients receiving rehabilitation are included, the score improves from 68 points to 76 points (8 points higher). In the closed reduction category, all the shoulders



Figure 4: Patient with anterior chronic dislocation managed by open reduction and pinning.

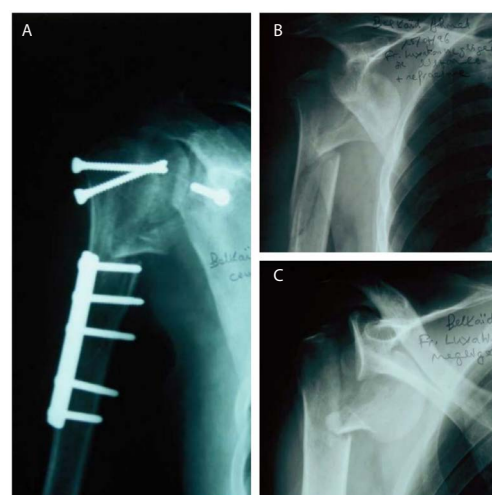


Figure 5A: Patient with 8 weeks of longstanding dislocation and a humeral head fracture. This patient refused any treatment at first.

Figure 5B: The same patient after a second fall; in addition to the damaged humeral head, he now presented a shaft fracture of the humerus.

Figure 5C: The same patient reduced operatively and stabilized by the Latarjet technique; the head has been screwed and plating performed for the fractured shaft of the humerus



Figure 6A: A thirty eight year old male patient who has suffered 3 years of disability.

Figure 6B: The same patient after treatment by the Boytchev procedure. Radiograph showing the refixation of the coracoid process with a screw in its original site.

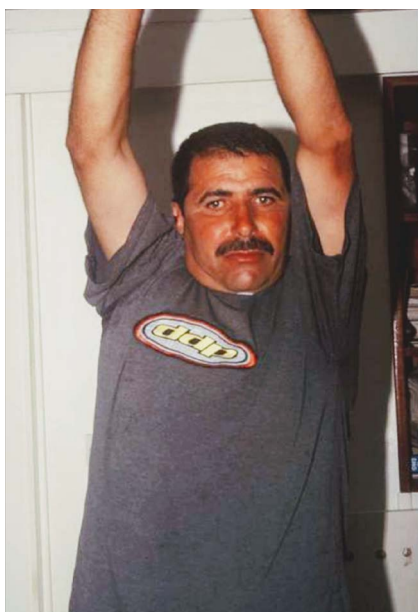


Figure 7: Six months later, the same patient underwent a Boytchev procedure after 38 weeks of disability. The rating score is 90 points. The result is excellent.

were initially assessed as poor or fair; the initial score was 58 points and it improved to 70 points (12 points higher). In the open reduction category with preservation of the head, the preoperative evaluation was poor, the initial score was 48 points and the final score was 74 points (26 points higher).

Discussion

In comparison with other studies [5,8,12,13] we notice significant differences: this is one large case series, the age of our patients is comparatively young, the delay before diagnosis is long. 42% of the anatomopathological lesions are revealed

radiologically and operatively. We must point out that, considering the long duration of disability in our case series, these operative findings are not fresh and have undergone modifications and so cannot be repaired like recent lesions, and this explains why our study contains a relatively low number of open repairs using the Bankart procedure. Also, the Hill Sachs lesion was observed in less than 30% of cases, perhaps because our patients are young, with solid bone constitution, or because the Hill Sachs defect filled up spontaneously, as reported by Dubousset [17] and Langlais [7]. Curiously, we notice 3 long biceps brachii lesions; no other author [5,8,12,13,16] has reported this lesion. With regard to conservative treatment, there are two subgroups. Apart from three patients lost at follow-up, three other patients had an excellent result at diagnosis; they did not receive any rehabilitation. In the second subgroup, 14 patients received rehabilitation. Their scores improved by an average of 8 points (from 68 points to 76 points). In this category some patients had a short follow-up, the cause obviously being the good function at diagnosis. In the category of those undergoing closed reduction, the result improved by an average of 12 points (from 58 points to 70 points). This result can be attributed to the relatively short duration of disability. In the category of those undergoing open reduction, the results improved by an average of 26 points (from 48 points to 74 points); this is clearly the best outcome in our case series.

In the medical literature, several authors [4-16] have discussed the handling of this condition. Among many reported articles, there is variability of study design (dealing with posterior and/or anterior dislocations, using one or multiple procedures of treatment, different evaluation methods, etc). To sum up, the majority of authors [5-8,12,13] reported improved results when performing open repair, whatever the procedure adopted. With regard to these data, we notice:

- that chronic glenohumeral dislocation is still a current topic;
- that its management is complex;
- that the operative indications are to tackle strategic lesions, but this is often difficult because the lesions are long-established and have undergone modifications due to the longstanding unreduced humeral head;
- that various operative techniques are used to stabilize the reduced head, depending on eventual lesion patterns;
- that the classic techniques like Bankart and Latarjet are effective, while the Boytchev procedure seems promising.

The distinguishing feature of our open management is the introduction of a modified Boytchev technique, which since 2002 has been performed on 4 patients. This is a technique which has several advantages. It allows easy access to the neo-articulation and good visualization because of the existence of sufficient room within the neo articulation for passing the coracoid process. With regard to the biomechanical modes of action, some studies have confirmed the biomechanical effectiveness of this procedure (Shibata [21], Lei Sheng Jiang [22]).

The number of cases where this Boytchev procedure [20] has been used remains limited, but the results are very encouraging, and it offers us another alternative for the stabilization of chronic shoulder dislocation.

Generally, with open management, the prognosis is favourable in a majority of patients (77% obtained excellent or good results). Longterm results are important; in most patients, the treatment was carried out between 2 and 20 years ago. For operative treatment, our follow-up averaged 34 months (27 months for all categories), whereas Mansat's follow-up averaged 25 months, and that of Rowe 67 months.

Are there clear indications enabling us to select one method rather than another? The answer is clear in the case of patients with mild discomfort or disability, where the best option is to give no treatment. Closed reduction is recommended in early cases. The answer is also clear when the humeral head is seriously damaged, in which case the indication is replacement or resection of the humeral head. But the interesting question is how to select one method versus another in surgery, to determine the effectiveness or superiority of one particular operative treatment. A comparison of our results for each surgical technique shows that open reduction with pinning receives a score of 71 points, the use of the Bankart procedure 73 points, the Latarjet procedure 74 points, the Dutoit procedure 77 points and the Boytchev procedure 81 points. In the literature, Rowe [13] evaluated the results obtained using various types of surgical management: 7 open reductions with preservation of the humeral head, 3 head replacements and 4 resections of the humeral head. The scores for the three procedures averaged 79 points, 75 points and 68 points respectively. Mansat [8] reported the results of 5 patients treated by the reinsertion of the capsulo-labral complex onto the glenoid rim; the scores averaged 75 points. Many other authors [6,8,11,16] report on smaller series and the performance of other open procedures. In fact, then, we see that for open reductions preserving the humeral head, the decisive criterion for choosing one technique over the others depends on the radiological and operative findings and the possibility or otherwise of anatomical repair, depending on their modifications over the long period when the head was unreduced, the ultimate goal being to definitively stabilize the reduced humeral head. Rowe [13] observed (and this is true for the other authors too [23]) that 'one should point out that the number of patients in each treatment category was small. Therefore, direct conclusions should not be drawn from comparison of these rating units'. In fact, then, there is as yet no statistically significant difference demonstrating that one surgical treatment is superior to another.

Conclusion

In this case series, 53 patients were reviewed and evaluated using the rating system of Rowe and Zarins. In reporting the results, we conclude that 38% of patients did not need any treatment because of their insignificant symptoms and level of discomfort. In 13% of the series, we recommended closed reduction for patients with no long standing dislocation. For open reduction (chosen for 49% of our patients), the prognosis is generally favourable. Special attention is paid to the Boytchev's technique, which obtained a score 7 points higher than our other operative techniques, but the number of patients undergoing this procedure remains small, so we cannot yet conclude that it yields a substantial improvement of the results in comparison with other surgical techniques.

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