

RESECTION OF THE ACROMION IN THE TREATMENT OF PERSISTENT ROTATOR CUFF SYNDROME OF THE SHOULDER

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Partial or complete excision of the acromion was performed in 25 patients (29 shoulders) with long-standing pain in the shoulder typical of rotator cuff syndrome. There was no verified history of trauma in nine cases (13 shoulders), while injury was the cause of pain in 16 patients (16 shoulders). In nine shoulders there was a small and in two a large rupture of the rotator cuff. Twelve of the 13 non-traumatic shoulders became painless postoperatively and the pain was relieved in one. In the 16 traumatic shoulders the relief of pain was complete in six, partial in nine, and one remained unchanged. The condition was not aggravated in any of the cases. Mobility increased postoperatively in four cases and was in no case decreased by the operation. In this series the results were as favourable after partial as after complete excision of the acromion. Excision of the acromion alone or excision in combination with other procedures appears to be a promising method of treatment of patients with long-standing rotator cuff syndrome.

Key words: acromion resection; supraspinatus syndrome; rotator cuff syndrome; painful arch syndrome; shoulder pain

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The majority of patients with rotator cuff (supraspinatus, painful arch, impingement) syndrome of the shoulder recover either spontaneously or after conservative treatment. Patients with persistent pain have been operated upon applying various methods, e.g., partial (Smith-Petersen et al. 1943, Darrach 1945, Neviaser 1961, Neer 1972) or complete excision of the acromion (Watson-Jones 1943, Armstrong 1949, Rössler 1959, Rose 1961, Hammond 1962, Sik 1964).

The aim of this study was to investigate the importance of the extent of excision of the acromion because the literature is somewhat controversial on this subject.

We also wanted to find out how the rotator cuff syndrome of different aetiologies and the mobility of the shoulder affected the results of the operation.

MATERIAL

The series consists of 25 patients with 29 shoulders with rotator cuff syndrome, operated upon at the Orthopaedic Hospital of the Invalid Foundation, Helsinki, during the period 1958-1970. The patients' ages at the time of operation ranged from 30 to 64 years, the average being 50 years. Of the non-traumatic cases five were female and four male; of the traumatic cases four were female and 12 male. The right shoulder only was affected in 14 cases, the left shoulder in seven and both shoulders in four (Table 1), and only one patient was left handed.

Table 1. Side of operated shoulder in relation to aetiology (no. of patients).

Side	Aetiology		Total
	Non-traumatic	Traumatic	
Left	1	6	7
Right	4	10	14
Bilateral	4	—	4
Total	9	16	25

Table 2. Duration of pain before operation in relation to aetiology.

	Aetiology	
	Non-traumatic	Traumatic
Duration in years	$\frac{1}{2}$ –6	$\frac{1}{2}$ –17
Average	2.7	3.6

Pain in the shoulder had been experienced for a period of from half a year to 17 years, the average being 3.3 years (Table 2). The majority of the patients had been conservatively treated

(physiotherapy, cortisone injections, local anaesthetics, X-ray treatment) without success. The pain in the shoulder was in all cases accentuated on flexion and abduction of the humerus. A follow-up examination was performed 3.5–15 years (average 6.5 years) after operation. There was no history of injury in nine cases (13 shoulders), while it was obvious that the pain had been caused by trauma in 16 cases (16 shoulders). In the latter group there were three cases of dislocation of the shoulder joint and one case of acromioclavicular dislocation. One patient had a history of slight shell splinter injury (Table 5).

Of the non-traumatic patients six had light, two moderate and one heavy physical work; of the patients with trauma, three had light, six moderate and seven heavy physical work.

Preoperative clinical findings. In the non-traumatic group the range of passive and active movement was normal before operation in 11 shoulders and somewhat reduced in two (Table 6). In the traumatic group the range of movement was normal in seven shoulders, slightly reduced in two and markedly reduced in seven (Table 7). In the majority of patients with limitation of shoulder movement, active abduction and flexion were the most affected.

Preoperative X-rays revealed calcified depos-

Table 3. Results in relation to pain and extent of excision of the acromion in non-traumatic cases (no. of shoulders).

Extent of excision of acromion	Results				Total
	Painless	Improved	Unchanged	Impaired	
Partial	11	1	—	—	12
Subtotal	1	—	—	—	1
Complete	—	—	—	—	—
Total	12	1	—	—	13

Table 4. Results in relation to pain and extent of excision of the acromion in traumatic cases (no. of shoulders).

Extent of excision of acromion	Results				Total
	Painless	Improved	Unchanged	Impaired	
Partial	3	6	—	—	9
Subtotal	1	—	—	—	1
Complete	2	3	1	—	6
Total	6	9	1	—	16

Table 5. Results after excision of the acromion in relation to pain in the various categories of injury in the traumatic group.

Trauma and peroperative findings	Results				
	Painless	Improved	Unchanged	Impaired	Total
Partial rupture of supraspinatus only	2	3	1	—	6
Partial rupture of supraspinatus + rupture of the long head of m. biceps	—	1	—	—	1
Dislocation of humerus + total supraspinatus rupture	1	1	—	—	2
Dislocation of humerus without visible rupture of tendons	—	1	—	—	1
Dislocation of acromioclavicular joint	1	—	—	—	1
War injury, shell splinters	—	1	—	—	1
Miscellaneous cases without injury to tendons	2	2	—	—	4
Total	6	9	1	—	16

its in the musculotendinous cuff in eight non-traumatic and two traumatic shoulders. Acromioclavicular arthrosis was clearly present in three shoulders, one non-traumatic and two traumatic. Dislocation of the acromioclavicular joint was observed in one shoulder.

Rotator cuff rupture. During the operation a small rupture of the rotator cuff was observed in nine shoulders, two non-traumatic and seven traumatic. A large rupture was found in two out of three shoulders that had become painful after dislocation of the humerus.

Operative procedure. The excision of the acromion was performed in sagittal projection, and complete excision (including the acromioclavicular joint) was performed in six shoulders, subtotal excision in two and partial excision in 21 (Tables 3 and 4). In nine out of the 11 shoulders with a rotator cuff tear, this was repaired during operation: in three the tendon was fixed by sutures to the tuberculum majus humeri and in the remainder the tendon defect was merely sutured as well as possible to diminish the defect. The detached part of the deltoid muscle was refixed by sutures to the clavicle and the rest of the acromion.

Postoperative care. After the operation, three extremities only were fixed in an abduction splint for about 2 weeks; the others were sup-

ported in a collar sling. Passive movements were usually begun during the first week postoperatively and the active exercises thereafter.

RESULTS

Pain. Twelve of the 13 non-traumatic shoulders became painless postoperatively and the pain was considerably relieved in one (Table 3). In the 16 traumatic shoulders the relief of pain was complete in six and marked in nine, while one remained unchanged (Tables 4 and 5). No aggravation was recorded in this series. Of the two patients with no tendon suture in connection with the acromion excision one was painless and the other was improved and of the nine patients with tendon sutures four were painless, four others improved and one unchanged.

Mobility. Postoperatively the range of movement was normal in 12 non-traumatic shoulders and slightly reduced in one (i.e., one improved, 12 unchanged)

Table 6. Results in relation to mobility of the shoulder before and after excision of the acromion in the non-traumatic group (no. of shoulders).

	Mobility			Total
	Normal	Slightly reduced	Markedly reduced	
Before operation	11	2	—	13
After operation	12	1	—	13

Table 7. Results in relation to mobility of the shoulder before and after excision of the acromion in the traumatic group (no. of shoulders).

	Mobility			Total
	Normal	Slightly reduced	Markedly reduced	
Before operation	7	2	7	16
After operation	9	3	4	16

(Table 6). In the traumatic group the range of movement was normal post-operatively in nine shoulders, slightly reduced in three and markedly reduced in four (i.e., three improved, 13 unchanged) (Table 7). Thus the operation resulted in increased mobility in four shoulders and in no case was the range of movement further decreased by the operation.

In this series the extent of the excision of the acromion did not influence the occurrence of pain nor the mobility of the shoulder (Tables 3 and 4).

There was no definite correlation between the age of the patient and the duration of the symptoms before operation and the results.

There was no dislocation or subluxation of the glenohumeral joint postoperatively in our series.

DISCUSSION

The aetiology and the mechanism of pain in the shoulder are not fully understood. A number of investigations (Codman

1934, Watson-Jones 1943, Wilson 1943, McLaughlin 1944, 1946, 1954, Armstrong 1949, Hammond 1962, Moseley 1969, Macnab 1971) have shown that a lesion of the tendon of the supraspinatus muscle or some other muscle belonging to the rotator cuff system may lead to the typical condition, the painful arch (supraspinatus) syndrome, which is characterized by pain, tenderness on palpation, muscle spasm and limitation of shoulder movement. The pain is usually elicited by activity or compression of the rotator cuff. Abduction and flexion of the humerus, in particular, often lead to painful compression of the rotator cuff between the head of humerus, the acromion and the acromioclavicular ligament. Excision of the acromion eliminates the compression of the rotator cuff caused by movements of the shoulder joint. Many authors consider complete excision of the acromion necessary to ensure successful results and to eliminate the risk of recurrence. The importance of excision of the anterior edge and undersurface of the anterior part of the

acromion which may cause impingement on the tendinous portion of the rotator cuff has been emphasized (Neer 1972). In the present series the results were as favourable after partial as after complete excision of the acromion. As regards the relief of pain, the results were generally good, and the condition was not aggravated postoperatively in any of the cases. Mobility was also improved after operation in some of the cases and there was no instance of postoperative impairment of mobility. In our series there was no dislocation and subluxation of the shoulder after the operation. Subsequently we have seen two other cases with a tendency to subluxation of the humeral head during normal activities after complete excision of the acromion. In these cases there was a large rupture of the capsule and of the rotator cuff both of which were not adequately reconstructed. It is probably important to reconstruct these structures and if they are still insufficient the acromion should not be excised completely.

Most patients with pain in the shoulder, particularly those with the supraspinatus syndrome, recover spontaneously or after physiotherapy. In the treatment of persistent symptoms of the supraspinatus group, excision of the acromion appears to be a promising alternative.

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