ACROMIOPLASTY FOR IMPINGEMENT WITH AN INTACT ROTATOR CUFF

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This is a retrospective review of 108 patients who underwent decompressive anterior acromioplasty for chronic impingement in the absence of a full thickness rotator cuff tear. Before operation, all the patients had had shoulder pain for at least one year despite conservative treatment. At operation, the rotator cuff tendons were explored and were intact.

Anterior acromioplasty, followed by rehabilitation was successful in 87% of patients. The operation was less successful in women, in those who had diminished movement before operation, who were involved in worker’s compensation claims, and whose pain followed direct trauma. Appropriate selection of patients is considered the key to success.

Impingement syndrome is a common shoulder problem (Neer 1972; Neer and Welsh 1977; Kessel and Watson 1977; Hawkins and Kennedy 1980; Hawkins, Misamore and Hobeika 1985; Bigliani, Morrison and April 1986). Neer (1972) showed that the functional arc of elevation is forward and that impingement occurs predominantly against the anterior one-third of the inferior surface of the acromion and against the coraco-acromial ligament. Rathbun and Macnab (1970) demonstrated an avascular area of the supraspinatus tendon directly under this area.

There is little in the literature regarding anterior acromioplasty as a decompressive procedure in the presence of an intact rotator cuff, consequently there are few guidelines for its use (Neer 1972; Post and Cohen 1985; Raggio, Warren and Sculco 1985; Cofield and Azevedo 1987). The purpose of this present review is twofold: to determine the effectiveness of anterior acromioplasty in eliminating the symptoms of chronic impingement, and to analyse the factors which may contribute to success or failure.

PATIENTS AND METHODS

A retrospective analysis of 108 consecutive patients undergoing anterior acromioplasty is reported; all the operations were performed by the senior author (RJH) between 1976 and 1983. The length of follow-up ranged from 2 years 6 months to 8 years with an average of 5.2 years. Each patient answered a questionnaire, was interviewed, examined and the pre-operative radiographs inspected. There were 69 males and 39 females with an average age of 41.2 years (range eight to 70 years); in 83 patients (77%) the dominant extremity was involved. Thirty-five of the patients (32.4%) were claiming worker’s compensation.

The indication for surgery was pain due to chronic impingement and unresolved by non-operative means (modified activity, physical therapy and anti-inflammatory drugs for at least one year, average 17.9 months). Fifty-nine of the patients (55%) had had two or more corticosteroid injections with varying relief. Most patients had temporary relief of pain from an injection of 10 ml of 1% Xylocaine into the subacromial space (Neer and Welsh 1977). Before operation 51 patients (47%) required narcotics and pain disturbed sleep in 103 patients (95%). Identifiable trauma had occurred in 62 patients (57.4%): a direct blow in 18 patients, an indirect injury such as a fall on the elbow or the outstretched hand in 16, and overuse as in tennis, throwing or work-related activities, in 28.

On physical examination, all patients had tenderness over the greater tuberosity and anterior acromion; 36 (33%) had acromioclavicular joint tenderness and 55 (51%) bicipital groove tenderness. All patients had a positive impingement sign, namely pain on forced elevation of the shoulder (Neer and Welsh 1977; Hawkins et al. 1985). Relief of this pain by a subacromial injection of Xylocaine helped to confirm the diagnosis. Ninety-three patients had a classical “painful arc” of movement (Kessel and Watson 1977), but passive movements were full in all but 24 (22%) who had lost an average of 20° (10 to 30°) elevation and lateral rotation compared with the uninvolved shoulder.
Radiographic changes on plain radiographs were present in 70 (65%) of the shoulders. These changes included sclerosis and erosion of the anterior acromion and greater tuberosity with degenerative changes, especially on the under surface of the acromioclavicular joint. Arthrography was performed in 55 patients (51%) to rule out cuff tears in questionable cases; no full thickness tears were seen but in 11 patients there was some irregularity on the under surface of the rotator cuff.

At the time of surgery 10 patients had no discernible gross pathology, 28 had an oedematous subacromial bursa, 50 a thickened scarred bursa, and 20 patients had bursal scarring associated with superficial wear and degeneration of the supraspinatus tendon. Patients with symptomatic acromioclavicular pain who had resection of the outer clavicle in conjunction with the acromioplasty or those who had repair of a full thickness rotator cuff tear were not included in this study.

Surgical technique. The surgical procedure followed was that described by Neer (1972). It must be emphasised that only 2.5 cm of the deltid should be detached from the anterior acromion. The osteotomy commences at the anterosuperior edge of the acromion and is angled towards the apex of the under surface of the arch of the acromion as viewed from the side. Approximately 1.5 cm of acromion is resected (Fig. 1). Because of the attachment of the coraco-acromial ligament to the under surface of the acromion, a portion of the ligament also must be excised. The bursa is removed and any inferior osteophytes of the acromioclavicular joint excised. The deltid may be re-attached to the acromion through drill holes: this enables rehabilitation to begin early.

After-care. Passive elevation and lateral and medial rotation are performed in the first few days, followed at two weeks by active movements and stretching. The sling is discarded at between one and two weeks and the patient progresses to strengthening exercises.

RESULTS

The postoperative results of 108 patients are presented in Tables I and II. Results were divided into satisfactory and unsatisfactory groups. To be satisfactory a patient had to have minimal pain or none at all, normal use of the shoulder, within 20° of full movement, normal strength and a negative impingement sign. All patients who did not meet these criteria were considered unsatisfactory. At final review an average of 5.2 years (range 2.6 to 8.1 years) after operation, 94 patients (87%) were satisfactory and 14 (13%) were failures.

Several factors influenced the results. Women had a higher failure rate than men. Comparison of the patients claiming workers' compensation with those who did not, indicated there was no difference in the pre-operative profiles or operative findings; however, eight out of 35 (22.9%) compensation cases were unsatisfactory compared with six of the other 73 (8.2%). Seven of the 25 patients (28%) who had limited movement before operation were failures compared with seven of the 83 (8.4%) with a normal range. Of the 62 patients with a definite history of trauma (acute or repetitive) pre-operatively, 11 (17.7%) were unsatisfactory; only three of the 46 (6.5%) unsatisfactory results occurred in patients without trauma (Table II).

Pain relief. Ninety-four patients had no pain or only minimal pain at follow-up; 79 of these (73%) were pain-free at an average of four weeks (one to 10 weeks) from operation. Normal activities were resumed within 12 weeks in this group of patients. Fifteen additional patients also were in the satisfactory group but had a delayed response to pain relief averaging 30 weeks (range 12 to 45 weeks).

Failures. Fourteen patients (13%) were unsatisfactory or failures. In three patients the failure was related to complications which developed after the operation, in five it was due to an associated diagnosis and there was no known cause in six. Of the complications, two patients had persistent sympathetic reflex dystrophy unresponsive to conservative measures and one had a frozen shoulder. Of those with an associated diagnosis, two had acromioclavicular joint pain unrelieved by resection of the joint; both were patients claiming workers' compensation. Two patients had glenohumeral arthritis which became evident after the acromioplasty. One patient had a significant psychiatric history and this

![Diagram showing the osteotomy cut and the amount of bone resected.](https://example.com/diagram.png)
was thought to relate to his continuing complaints of pain. In six patients the cause of failure was not known; they had persistent pain, localised tenderness and painful movement which did not respond to subacromial injection and other conservative measures.

DISCUSSION

Neer's (1972) concept of impingement responsive to decompressive anterior acromioplasty forms the basis of this study, which considered only decompression in the presence of an intact rotator cuff. In our patients pain was usually of an aching nature, worse with repetitive shoulder activities, and night pain was common. Tenderness was over the anterior acromion and most patients had a full range of movement and a positive "impingement sign" (Neer and Welsh 1977; Hawkins and Kennedy 1980).

Ninety-four of our 108 patients (87%) had excellent pain relief; of these 79 were back to their normal activities including work by 12 weeks. A further 15 patients achieved pain-free status but took longer (average 30 weeks) to do so. In the patients with delayed success or who were failures, there was a higher incidence of females, of patients claiming compensation, of those with a pre-operative decrease in the range of movement and of those whose onset was related to trauma. Eight of the 14 outright failures were workers' compensation board cases; this was out of a total of 27 such patients. The cause for the higher rate of failure among these patients is unknown. Seven of 25 shoulders with a diminished range of movement pre-operatively were unsatisfactory; this suggests that the diagnosis of impingement may have been inaccurate since the diminished range of motion makes clinical diagnosis more difficult.

Thirty-six of our patients had pre-operative tenderness over the acromioclavicular joint; only two of these resulted in failure when nothing more was performed than anterior acromioplasty with excision of the osteophytes on the under surface of the acromioclavicular joint.

**Conclusion.** Anterior acromioplasty has been performed on 108 patients with impingement but intact rotator cuffs. At review after a minimum of 2.5 years from operation, the treatment had been successful in 87% of patients.

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**REFERENCES**


