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COMMINUTED AND SEVERELY DISPLACED FRACTURES OF THE SCAPULA

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Fractures of the scapula may be divided anatomically, as shown in Figure 1, into three types according to DeCoulx et al. (1956): I. Fractures of the body. II. Fractures of the apophysis. III. Fractures through the superior lateral angle.

Type III is generally considered most difficult to deal with.

Owing to the anatomical position and muscular protection of the scapula (Harmon & Bauer 1943, Heatly et al. 1946, McCally & Kelly 1940, Rowe 1963) considerable force (Findlay 1937, Rose 1963) and as a rule direct trauma are required to give rise to a fracture. Consequently, patients with scapular fractures often have multiple, competitive injuries which take priority over the scapular fracture. In planning the primary treatment, the scapular fracture has to be assessed with a view to possible reduction and fixation. On the basis of the literature it is difficult to arrive at any therapeutic conclusion. We therefore felt it was of interest to conduct a follow-up on patients

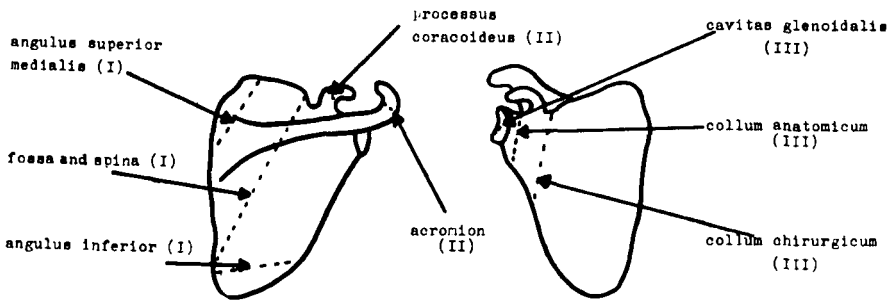

Figure 1. Types of fracture on the two aspects of the scapula.
(I: fractures of the body, II: fractures of the apophysis, III: fractures through the superior lateral angle).

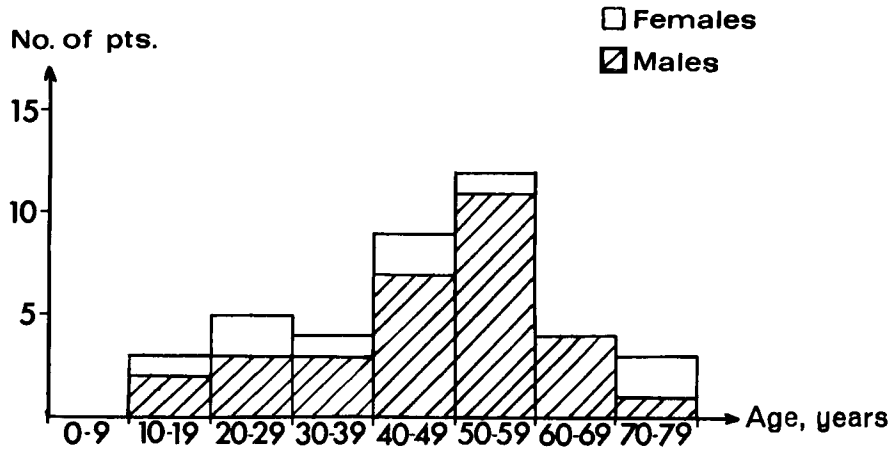

Figure 2. Age distribution and sex ratio of 40 patients with Type III scapular fracture.

treated conservatively for scapular fractures of Type III, either comminuted or severely displaced.

MATERIAL

The material is from the Odense Hospital where 660 patients with scapular fracture were treated during the 15-year period 1956–1970. A review of all the X-ray films disclosed that 40 patients had had comminuted as well as displaced Type III fractures. These patients were invited to attend a clinical and radiographic follow-up examination. The age distribution and sex ratio are shown in Figure 2. Nine were females and 31 males.

Table 1. Nature of accident causing scapular fracture in 40 patients.

Nature of accident	No. of patients	
Road:		34
pedestrian	9	
car	10	
motor-cycle	4	
moped	6	
bicycle	3	
unknown	2	
Fall		4
Blow		1
Unknown		1

Thirty-one patients had other fractures, 4 had injury to the brachial plexus, necessitating amputation of the forearm in 2, and one had injury to the axillary

artery and underwent amputation at the shoulder. The nature of the trauma is apparent from Table 1. The great majority were road accidents.

The fracture was due in 23 cases to a direct blow, in one case to indirect trauma, whereas in 16 cases the mechanism of the trauma was not stated.

Table 2. Site of fracture.

Site	No. of patients
anatomical neck	2
surgical neck	31
surgical neck + glenoid cavity	7

Table 3. Degree of displacement measured in mm on the X-ray films.

Displacement in mm	No. of patients
<5	2
5 – 9	8
10 – 19	10
>20	20

Table 2 gives the site of the fracture. There was no difference between sides, 22 being right-sided and 18 left-sided. No patient had a fracture exclusively of the glenoid cavity. Table 3 gives the degree of displacement. Four patients were treated as outpatients and 36 were admitted. Six patients were treated in extension with a hanging plaster cast, whereas 18 had no immobilizing treatment.

All were instructed in static contractions and, as soon as the immobilization was discontinued, in active movements. Local anaesthetics were not administered in any case, and brisement forcé was not used.

RESULTS

Of the 40 patients, 4 died after the accident, 2 had died of other causes before the time of follow-up, 1 was living abroad, 2 refused to be examined, and 2 could not be traced through the national registry. One patient had had an amputation at the shoulder and was not examined. Of the patients seen at follow-up 5 were females and 23 males. The youngest patient had been 13 and the oldest 72, mean age 43.7 years, at the time of the accident. The longest follow-up period was 8 years, the shortest 2 months, mean 8 years 11 months. Only one patient had a follow-up period of less than 2 years.

Table 4 gives the X-ray findings with respect to deformity and osteoarthritic changes. Patients with radiological evidence of osteoarthritis were divided into two groups by severity: mild, with slight sclerosing of the joint surfaces and formation of osteophytes, and severe: with marked sclerosing and subchondral cysts. Only one patient had severe

osteoarthritis. All the fractures had united, clinically and radiologically.

Nineteen patients were symptom free, 9 had pain, 4 of them also at rest. Four patients had been obliged to change their occupation, 2 because of the scapular fracture and 2 because of injury to the brachial plexus.

Table 4. Radiographic findings in the 28 patients examined at follow-up.

Deformity	No. of patients
mild	5
moderate	11
severe	12
Osteoarthritis	
none	10
mild	17
severe	1

Half the patients had visible deformity, but this deformity was severe in only one case. In 10 patients grating was elicited on movements in the shoulder on the affected side.

The circumference of the upper arm was reduced by more than 2 cm in 2 patients and that of the forearm in one patient, but reduced strength in the shoulder or upper-arm muscles could not be demonstrated clinically in any case. One patient had a loss of sensibility after injury to the brachial plexus. All the others had normal sensibility on the arm. All the patients were able to carry their hand to the nape of the neck and to the loin. Elevation forward-upward with free scapula was restricted in only 2 patients (20°–45°). Elevation outward-upward with free scapula was restricted by 10°–45° in 6 patients, average 30°. The remaining patients had normal mobility of the shoulder with free scapula. Table 5 presents the restriction of movement in the affected shoulder.

Table 5. Restricted mobility in the shoulder joint with fixed scapula in 28 patients.

Restriction of mobility	No. of patients
elevation	
forward-upward (10°–45°)	10
outward-upward (10°–40°)	13
rotation	
internal	0
external (10°–20°)	2

DISCUSSION

Fracture of the scapula is relatively uncommon (Harmon & Bauer 1943, Heatly et al. 1946, McCally & Kelly 1940, Rowe 1963), and displaced scapular fractures quite particularly rare. Among 2374 fractures, Newell (1927) found about one per cent to have affected the scapula, and thereof about 10 per cent were displaced or comminuted. The explanation is presumably the favourable position and mobility of the scapula. Of our 660 patients with scapular fracture, only 40, or 6 per cent, had displaced or comminuted fractures of Type III. The displacement may be considerable. Thirty of our 40 patients had displacement exceeding 1 cm. The trauma which they had sustained was often very severe, especially in the road accidents. The majority of patients have associated injuries. This applied to 36 of our 40 patients. Most patients belong to the occupationally most active age group (Rowe 1963), and this was confirmed by our series.

The literature on scapular fractures is rather meagre, but several authors feel that operative treatment should be considered in severely displaced fractures of the glenoid cavity (Fischer 1939, Harmon & Bauer 1943, Rowe 1963). All the patients of our material had been treated conservatively. Most interest is attached to fractures through the glenoid cavity, as these fractures are intraarticular. Eight of our patients had fractures through the glenoid cavity, but in all these cases there was also a fracture of the surgical neck. Of these patients 5 had died at the time of follow-up, and the remaining 3 were free of pain and had continued in their former occupation. However, only one had full mobility, 2 having an outward-upward elevation restricted by 20°–30° with fixed scapula.

Reduction of strength could not be demonstrated in any case, and none had restriction of mobility to the extent of inhibiting function, especially not with a free scapula, the mobility of the scapula compensating to some extent for restricted mobility in the humero-scapular joint.

According to our findings, conservative treatment, even of severely displaced as well as comminuted scapular fractures, appears to afford fully satisfactory results, functionally and occupationally.

SUMMARY

At the Odense Hospital 660 patients with scapular fractures were treated during the 15-year period 1956–1970. Of this number 40 had

severely displaced as well as comminuted fractures of Type III according to the classification of Pierre DeCoulx.

Most of the patients had sustained violent trauma causing multiple injuries, as a rule in road accidents. Thirty-one patients had associated fractures, 4 had injury to the brachial plexus, and one had injury to the axillary artery.

All the scapular fractures were treated conservatively. Of the 40 patients 28, 5 females and 23 males, were examined at follow-up after an average period of 8 years 11 months; 19 patients were symptom free, and only 2 had had to change their occupation because of the scapular fracture.

There was no instance of reduced strength, and a slight restriction of mobility was found in only 6 patients.

Our investigations show that conservative treatment, even of severely displaced as well as comminuted scapular fractures, affords fully satisfactory results.

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