# FRACTURES OF THE SCAPULA

M. SCAVENIUS, C. SLOTH

**This paper presents a review of all patients admitted to the orthopedic department of Frederiksberg University Hospital during a period of 10 years with a diagnosis of fracture of the scapula — a total of 18. All medical records and roentgenograms were reviewed retrospectively. We found, in agreement with the literature reviewed, an extremely high frequency — 88% in our study — of high-energy trauma as a cause of scapular fractures. In 88% of the cases the scapular fracture was associated with other lesions ; fractures of the ipsilateral humerus or ribs were seen with the highest incidences (44%). All patients were treated conservatively, resulting in satisfactory conditions of their scapula and shoulder girdles.**

**Keywords** : scapula ; fractures.
**Mots-clés** : omoplate ; fractures.

## INTRODUCTION

Scapular fractures are considered a very unusual injury, among studies in adults they account for 1%-3% of all fractures. Fracture of the scapula was first described by Desault in 1805 ; — since then very few detailed reports have been published (3, 4, 7, 9, 11). Recently McGahan *et al.* (8), Armstrong and Van der Spuy (1) and Thompson *et al.* (10) reviewed 121, 62 and 68 patients, respectively, with scapular fractures.

In this report, all patients admitted to our institution during a period of 10 years with fracture of the scapula are reviewed.

## MATERIAL AND METHODS

All medical records and all roentgenograms were reviewed retrospectively for all 18 patients admitted to Frederiksberg University Hospital with a scapular fracture during a 10-year period. The hospital has a background population of 88,000 inhabitants.

## RESULTS

Throughout the observation period, 18 patients with a diagnosis of scapular fracture were admitted and treated in our department. Patients' ages ranged from 19 to 85 years, with an average age of 59 years, 14 patients were older than 40 years. There was an even sex distribution : 9 females and 9 males.

Regarding the mechanism of injury, 44% of the patients had been involved in traffic accidents ; of these 71% were injured in accidents with more than one individual involved. Likewise, 44% of the patients had histories of falls from a height, and the remaining 12% suffered falls from the same level.

Among the 9 patients whose fractures were due to falls, 5 (56%) had underlying medical conditions as explanations for their trauma : 2 patients suffered from uncontrolled diabetes (1 hypoglycemia and 1 hyperglycemia), 2 patients had pernicious anemia and 1 patient had sequelae from a bilateral subdural hematoma 11 years earlier with neurological disorders of the lower limbs.

The anatomical distribution of the fractures was 8 (44%) fractures of the glenoid cavity and scapular neck, and 56% of the scapular body. One patient had two fractures on the same scapula, another one had bilateral fractures.

During the study, the diagnosis in two cases had to be revised, since careful scrutiny of the radiographs did not disclose any fractures. No

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fractures of the acromion, coracoid or scapular spine were found.

The severity of the force required to produce scapular fractures implies a high frequency of associated injuries. In this series there were only two cases of isolated scapular fracture.

The distribution and type of concomitant lesions is presented in table II. Five patients had associated dislocations, mostly of the glenohumeral joint. Furthermore it is remarkable that 13 patients presented a total number of 20 concomitant fractures, the most frequent of which were ipsilateral humeral and rib fractures, occurring in 38%

Table I. — Causes of scapular fractures

| | | |
|---|---|---|
| 1 : | Falls from heights | 44% |
| 2 : | Traffic accidents | 44% |
| | A : Two-vehicle accidents | 71% |
| | B : Single vehicle accidents | 29% |
| 3 : | Falls from same level | 12% |

Table II. — Associated lesions in 18 patients

| | | |
|---|---|---|
| A : | Associated fractures | |
| | Humerus | 6 |
| | Ribs | 6 |
| | Clavicule | 2 |
| | Pelvis | 2 |
| | Wrist | 1 |
| | Femur | 3 |
| B : | Associated joint dislocatio ·s | |
| | Glenohumeral | 3 |
| | Acromioclavicular | 1 |
| | Other | 1 |
| C : | Other associated lesions | |
| | Cerebral contusions | 3 |
| | Pneumothorax | 2 |
| | Renal contusion | 1 |

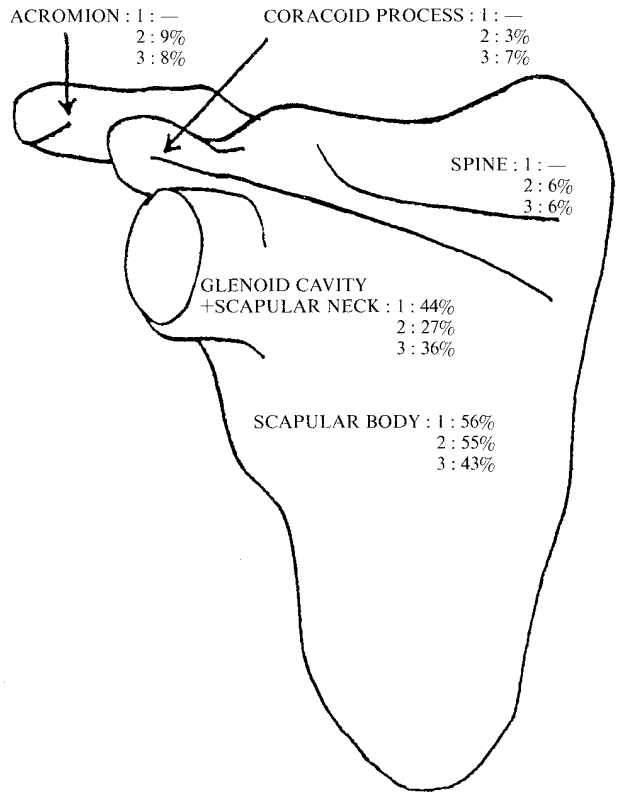


***Fig. 1.***

1 : Scavenius & Sloth 1996
2 : Armstrong & Van der Spuy 1984
3 : McGahan *et al.* 1980
Anatomic location of scapular fractures in percentages, according to three selected authors.

of all patients. Six patients suffered from associated injuries outside the musculoskeletal system, 3 with cerebral concussions, 2 with pneumothorax and 1 with renal contusion.

All patients received conservative treatment with sling immobilization for 12-14 days and early active exercise ; furthermore 10 patients received

Table III. — Fractures most often associated with scapular fractures

| 1 : McGahan (1980) | | 2 : Armstrong (1984) | | 3 : Scavenius (1996) | |
|---|---|---|---|---|---|
| Ribs | 44% | Ribs | 43% | Ribs | 38% |
| Clavicle | 26% | Clavicle | 39% | Humerus | 38% |
| Cranium | 24% | Tibia/Fibula | 27% | Clavicle | 13% |
| Humerus | 12% | Humerus | 11% | Pelvis | 13% |
| Tibia/Fib. | 11% | Cranium | 10% | Tibia/Fib. | 13% |

out-patient rehabilitation in the department of physiotherapy.

The average period of hospitalization was 16.3 days (1-58 days), and 14 patients stayed in hospital for longer than 2 weeks, in all cases because of associated lesions. We had a mortality rate of zero.

## DISCUSSION

Scapular fractures are extremely rare, accounting for only 1% to 3% of all fractures (5, 6, 10), because the anatomic location and the soft tissues protect the scapula. Consequently, scapular fractures only occur after severe trauma. In the present study 88% occurred during "high-energy trauma", usually traffic accidents or falls from a height. According to McGahan *et al.* (8), 93% of all scapular fractures were caused by high-energy trauma, while the corresponding percentages in the reports of Thompson *et al.* (10) and Armstrong and Van der Spuy (1) were respectively 89 and 85%.

As well as these above-mentioned authors (1, 8, 10), we also noted in this study a very high frequency of associated injuries, inasmuch as only 2 scapular fractures were isolated. In accordance with these papers (1, 8, 10), the most frequent associated lesions were fractures of the ipsilateral humerus and/or ribs, both occurring in 38% of the patients.

Thirty-eight percent had lesions outside the musculoskeletal system : cerebral contusions, pneumothorax and renal contusions. No cases of peripheral neurological or vascular lesions were seen.

Other papers also report high frequencies of associated lesions, varying from 75% to 98% (1, 8, 9, 10, 11). The distribution is shown in table III.

These papers also report variable incidences of peripheral vascular and neurological complications (1, 8, 10). Among the latter, the most common are ipsilateral brachial plexus lesions (1, 8, 10). When a scapular fracture is associated with a lesion of the brachial plexus, the fractured part of the scapula is usually the acromion ; 67% of acromial fractures are associated with this neurological disorder (1, 8). The frequency of acromial fractures is very low however, since they account for only 8%-9% of all scapular fractures (1, 8). The prognosis of this neurological complication is very unfavorable (1, 8). Vascular complications rarely occur, inasmuch as they are only described in two papers ; frequencies vary from 1.6% (10) to 10.7% (1).

The scapular body and the glenoid fossa/scapular neck are the two most frequent fracture locations. The distribution is shown in fig. 1.

As for the treatment of scapular fractures, most authors report satisfactory clinical and radiological results after conservative treatment consisting of immobilization followed by early limited exercises of the shoulder, and likewise all our patients had a satisfactory outcome according to their medical outpatient records and radiograms.

In rare selected cases surgical intervention is found appropriate, typically in cases with severely displaced glenoid and/or scapular neck fractures. These fractures have the least favorable prognosis after conservative treatment (5).

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## SAMENVATTING

*M. SCAVENIUS, C. SLOTH. Scapula fracturen.*

De auteurs rapporteren een overzicht van de in het Frederiksberg Universitair Ziekenhuis opgenomen patiënten met een scapula fractuur tijdens een 10-jaren periode, 18 in totaal.
De Rö-opnamen en dossiers werden retrospectief geëvalueerd.
Zoals vermeld in de literatuur werd een vrij hoge frequentie — 88% in deze studie — van trauma's met vrij belangrijke energie als oorzaak van de fractuur teruggevonden. Bij 88% van de gevallen was de scapula fractuur geassocieerd met andere letsels. Fracturen van de homolaterale humerus of ribben waren bij 44% genoteerd. De patiënten werden conservatief behandeld met een gunstig resultaat voor scapula en schoudergordel.



## RÉSUMÉ

*M. SCAVENIUS, C. SLOTH. Fractures de l'omoplate.*

Les auteurs présentent une étude des patients admis au service d'orthopédie de l'hôpital universitaire Frederiksberg pendant une période de dix ans avec le diagnostic de fracture de l'omoplate, soit un total de 18 blessés. Les dossiers et les radiographies furent étudiés rétrospectivement. Les constatations confirment les données de la littérature notamment la très grande fréquence (88% dans cette étude) de traumatismes à très forte énergie comme cause des fractures de l'omoplate. Dans 88% des cas la fracture de l'omoplate était associée à d'autres lésions, les fractures de l'humérus et des côtes, du même côté étaient les plus fréquentes (44% des cas). Tous les malades furent traités non-chirurgicalement avec un résultat satisfaisant pour l'omoplate et la ceinture scapulaire.