

Fractures of the Proximal Humerus: A Functional Assessment

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ABSTRACT: 42 patients with proximal humeral fractures were treated and their functional recovery assessed. These fractures showed excellent results in juveniles. In adults the results were less satisfactory. There were several factors which appeared to affect the results in the adults. Prolonged immobilisation, delay in physiotherapy and a large number of fracture fragments had a deleterious effect. Joint stiffness was the major problem.

INTRODUCTION

Fractures around the proximal humerus are difficult to treat. The results of different treatment modalities tend to vary considerably. The same treatment in different hands also gives varying results. Often, the results are not comparable because of the lack of a standard method of assessment.

The availability of the criteria formulated at the New York Orthopaedic Hospital¹ for these fractures is one means of assessment which can be used to compare the results in different centres. For long, these fractures have been treated with the varying success. It is therefore, useful to look at the different aspects of these fractures and their treatment. Using the quantifiable assessment allows us to assess various factors and better understand these fractures and improve the treatment.

MATERIALS & METHODS

The records and radiographs of 42 patients were looked there. These patients were treated at the General Hospital, Kuala Lumpur, Malaysia. 42 fractures in 42 patients were seen. There were 9 males and 33 females. Sixteen patients were juveniles below 20 years of age. The adults ranged from 34 years to 76 years of age.

All the patients were treated conservatively. Some of the patients had manipulative reduction

of their fractures followed by immobilization. The majority of the adults (17 patients) did not have manipulation.

There was a minimum follow-up period of 6 months. The functional result was then assessed, using the criteria originally used in the New York Orthopaedic Hospital.¹ In this scoring system, subjective, objective, functional and radiographic evaluation were used. The results were then graded as excellent (above 90), good (80-90), fair (70-79) or poor (less or equal to 70), out of the maximum of 100 units. Various factors were then evaluated to analyse their influence on the final functional result.

RESULTS

For the series as a whole the average score was 82 units. Only 45 per cent of the patients had an excellent result (Table 1). However, in juveniles, the results were good with 88 per cent having excellent results (Table 2). In adults, only 19 per cent had excellent results (Table 3). Since young patients had very good functional results, the functional results in the various types of fractures were analysed only in adults. The number of fracture fragments definitely influence the results. In-

TABLE 1
Overall Functional Results in Patients with
Proximal Humeral Fractures

	No. of Patients	Per cent	Per cent
Excellent	19	45	
Satisfactory	5	12	57
Unsatisfactory	7	17	
Failure	11	26	43

Scoring System: Excellent = over 89 units
Satisfactory = 80-89 Units
Unsatisfactory = 70-79 Units
Failure = below 70 Units

creasing the number of fragments from 2 to 4 resulted in a poorer score. The best average score were obtained in patients with 2 fragments (Table 4). The one patient who had a 4 fragment fracture had the poorest score.

Prolonged immobilisation seemed to have a deleterious effect on the functional results. The longer the immobilisation, the poorer the results (Table 5). Patients had these fractures immobilised for periods varying from 1 to over 7 weeks. Patients who had a duration of immobilisation of between 1 to 3 weeks showed a slightly better average score than those who were immobilised for period above 4 weeks.

Prolonging the period of physiotherapy apparently has a similar effect as prolonging the period of immobilisation. The best results were obtained in patients who had physiotherapy for one month or less (Table 6). The poorest results being those

TABLE 2
Functional Results in Juveniles

	No. of Patients	Per cent	Per cent
Excellent	14	88	100
Satisfactory	2	12	
Unsatisfactory	0		
Failure	0		

TABLE 3
Functional Results in Adults

	No. of Patients	Per cent	Per cent
Excellent	5	19	31
Satisfactory	3	12	
Unsatisfactory	7	27	69
Failure	11	42	

TABLE 4
Number of Fracture Fragments and Their Average Score

No. of fragments	No. of patients	Average score	Lowest score	Highest score
2	17	70	27	92
3	8	51	18	84
4	1	26		

TABLE 5
Duration of Immobilisation and the Functional Results in Adults

Duration of immobilisation (Weeks)	No. of patients	Average score
1 - 3	12	64
4 - 6	10	56
7 +	4	55

TABLE 6
Duration of Physiotherapy and the Functional Result In Adults

Duration of physiotherapy (Months)	No. of patients	Average score
0 - 1	8	85
2 - 3	7	57
4 - 6	9	48
7 +	2	39

TABLE 7
Type of Immobilisation and the Functional Result

Type	No. of patients	Average score
Collar and Cuff	17	59
Body Strapping	7	58
Shoulder Spica	2	70

who had physiotherapy for greater than 7 months.

The effect of the various types of immobilisation was the evaluated. Three different forms of immobilisation were used. These were collar & cuff, body strapping and shoulder spica. Collar & cuff and body strapping did not show any difference in the functional results (Table 7). Only 2 patients had a shoulder spica applied and therefore the results cannot truly be compared.

DISCUSSION

The functional assessment of the patient in this series showed an overall excellent or satisfactory result in only 57 per cent. In juveniles, there was an excellent or satisfactory result in all the patients. Treatment of these fractures in juveniles is

simple. The excellent ability of the proximal humerus in young patients to remodel² and the good functional results³ enable these fractures to be treated with only partial end on contact. All these patients only had closed reduction of the fractures. The results achieved confirmed that Aitken⁴ and DePalma and Cautilli³ were right to suggest that excessive manipulation and open reduction could result in more harm than good by damaging the epiphysis.

Adults, however, had only 31 per cent with excellent or satisfactory results. The remaining 69 per cent had unsatisfactory or poor results. This indicates the importance of these fractures, when they occur in the elderly. Osteoporosis is an important factor in the aetiology.⁵ The patients also had other associated chronic illnesses. Healing of these fractures is often good, but the function at the shoulder joint is severely restricted. Joint stiffness is the major problem. The lax capsule at the joint shrinks and shoulder mobility is impaired permanently. Prolonged physiotherapy did not improve the end results. In fact prolonged physiotherapy is probably an indication of the poor re-

sult.

It is probable that early physiotherapy rather than prolonged physiotherapy is the answer. Lucas Championnaire⁶ and Colin⁷ both insisted that mobilisation should be started early, as soon as pain began to subside. Prolonged immobilisation does not give an improved functional result. Certainly in adults waiting for 4 weeks or longer to allow rigid union before initiating physiotherapy gave poor results.

Collar and cuff or sling for periods of 4 weeks is the usual method of treatment. The abduction spica appears to have lost favour. Abduction of the arm has been noted to cause angulation to the fracture.⁸

The severity of the fractures is undoubtedly important in determining the functional result. The greater the number of fragments produced, the poorer the end result. Neer¹ found that open reduction was the preferred method of treatment for 3 part fractures and hemiarthroplasty for 4 part fractures. Others, however disagree⁹ and prefer open reduction and reconstruction for severe 3 part and 4 part fractures.

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