

# The Fractures And Complications Following Treatment For Distal Third Humeral Fractures

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## Abstract

The authors report 135 cases of fractures of the distal humerus treated and followed to the general hospital (ex cto) The aim of this work is to study the fractures, their treatment Material and method The fracture of the distal humerus occurs in the young adult, the complex fractures are most frequent. The access transolecraniene has permitted a good reduction and a solid fixing facilitating functional rehabilitation Result From good and very good result were obtained from the start. The arthrolysis was carried out among 28 patients, the attacks of the nerve urinary and of the nerve medial regressed Conclusion The precast blade of Lecess posed by way tranolecraniene changed the forecast of these fractures amongst those with paravant being a bad forecasts

## INTRODUCTION

The humeral pallet fractures sit usually below the distal insertion of the brachial muscle. The lower limit of this insertion draws an angle opened at the bottom, half an inch wide (approximately) of the coronoid small cavities.

The fractures of the humeral pallet are thus, for the majority, joint fractures: supra fractures and intercondylar, unicondylar sagittal fractures, diacondylar fractures and fractures of the capitellum. The need for an anatomical reduction and an early rehabilitation explains the frequent therapeutic problems. We will associate inside some complex diaphysoepiphyseal forms which prognosis and surgical strategy are comparable.

The objective of this work is to study the epidemiology, the treatment and the result of those fractures.

## MATERIAL AND METHOD

The work is based on the study of 135 cases of the fractures of the humeral pallet followed and treated from 1990 to 2005.

## SEX

There is a predominance of males that is to say 101 over 34 in the females; the right side is the most affected.

## AGE AND CIRCUMSTANCE

The age varies from 20 to 60 years .Only 10 patients are

more than 50 years old.

The mechanism is sometimes difficult to specify. The supracondylar fractures of the adult are specially caused by a constraint in flexing: direct shock on the pallet, shock on the flexing elbow.

## MANAGEMENT OF THE PATIENT

The injured man presents a total impaired mobility of the elbow and holds his upper limb with the contralateral limb.

The inspection shows a significant and painful deformity, with an oedema and a haematoma. So, we need to search a cutaneous access, which is often posterior.

The palpation does not find the osseous reference marks, characteristic of the elbow. We must take the distal pulses, search a paralysis of the cubital, of the radial one and/or of the median nerve and to keep informed, if they are present, the patient and his family.

We need to search other lesions on the upper limb (wrist, shoulder, before arm).

The Radiography is systematic and is centred on both the full-face and profile elbow. It will include according to the clinical examination, radiographies of the supra and subjacent joints.

Ideally, radiography must be repeated at the surgical unit with accurate index on the limb in traction after having

placed the anaesthesia.

In the event of compound fracture, a prophylactic antibiotic therapy must be carried out and tetanus vaccination must be checked and possibly repeated.

### **CLASSIFICATION**

#### **COMMON FRENCH NOMENCLATURE**

The lesions are usually reported to the diagram of the SOFCOT round table in 1979 [ 1 ]: supra condylar, supra and inter condylar and fragmented joint fractures,.

#### **EXTRA-JOINT FRACTURES**

They have the best forecast.

- Supracondylar fractures account for 26 cases (19,25%).
- Extra-joint fragmented fractures are relatively rare in the adult. The characteristic feature, which is sagittal, separates the medial or side extensor condyle of the humerus from the rest of the metaphysis. The degree of displacement is much variable under the influence of the muscles which are inserted inside.
- Extra and intercondylar Fractures

They have the majority with 75 cases (55,5%).

Diaphyseopiphyseal fractures, which extra condylar and spiroid characteristic feature wind up in the middle of the diaphysis.

- Joint fragments are much moved and sometimes comminuted.
- Diacolumnar fractures: complex, they include three main characteristic features: A feature coarsely horizontal on a column, insulating more often a large fragment of the condylar extensor of humerus;
- An almost frontal feature separating joint surfaces;

And a sagittal feature splitting again the previous one on the level of the trochlea.

They are recognizable by the stump of column which has remained intact.

### **JOINT FRAGMENTED FRACTURES**

They include the unicondylar fractures in 12 cases (8,8%), with the sagittal feature, and purely joint fractures, whose feature, is primarily frontal.

- Unicondylar fractures are the least rare: side condyle in 10 cases (7,4%) or medial in 2 cases (1,4%). The fragment of side condyle separated from the metaphysis includes the condyle, side extensor condyle of humerus and the external cheek of the trochlea. Association is frequent with a radial head fracture in 2 cases (1,4%) and the olecranium in 2 (1,4%) cases.
- Pure joint fractures include 4 (2,9%) cases. The feature is practically frontal, discreetly oblique at the bottom and behind. It separates a variable fragment with joint surface, which moves ahead and in top, giving the full face an aspect of double contour. According to the size of the fragment, we distinguish three types among them:
- Capitellum fracture or Hahn-Steinthal type I in 1 case(0,7%) or eminentia capitata fracture is the smallest one;
- Hahn-Steinthal fracture or type II in 1 case( 0,7%), takes not only the condyle, but also the conoid area and the trochlea external cheek;

Kocher diacondylar fracture in 1 case( 0,7%)

Orthopedic treatment

#### **IMMOBILIZATION IN PLASTER**

It was made by brachio-antebrachial plaster to 90° of flexing of the elbow in neutral pronation, supported with elbows tucked in, during 6 weeks, it was about non moved supra condylar fractures.

#### **IMMEDIATE REHABILITATION/PHYSICAL THERAPY**

It was immediate; the elbow was rehabilitated in active flexing on the 3rd day with splints of postures in the complex fractures

#### **SURGICAL REDUCTION AND OSTEOSYNTHESIS**

They are indicated in the case of moved extra-joint fractures and joint fractures (in particular supra and intercondylar)

which are still moved.....The reduction of joint surfaces must be supported by a solid and stable osteosynthesis allowing an immediate rehabilitation and leaving free the joint small cavities. On this condition, and in spite of the differences of criteria for assessment, the surgical treatment shows its superiority in the whole recent studies.

### **THE ACCESS WAY**

Apart from the sagittal unicondylar fractures, that can undergo a synthesis by an elective medial or side way, the way initially median posterior is centred on the olecranium. It only allows a broad exposure of the pallet by respecting the muscular points of attachment on the two tuberosities. The patient can be sitting in ventral decubitus, the arm resting on a support, elbow bent and before arm in space. But the same position of the limb is obtained in side decubitus if the shoulder is bent to 90°, and with the preference of the anaesthetists.

In the V-shaped transtricipital access, the triceps is incised in inverted V-shaped with the musculoaponeurotic junction. The joint exposure is poor. The joining of the triceps is source of stiffness, because it limits the postoperative mobilization and sticks to the posterior side of the humerus. the transolecranal access [ 2 ] is for much the elective access of low fractures. After the osteotomy of the olecranium at its base, the opening of the capsule gives an excellent joint day indeed. In spite of the precautions of repair (screwing, staying), the osteotomy is source of real complications: secondary dislocation, pins migration, stitching rupture, pseudarthroses.

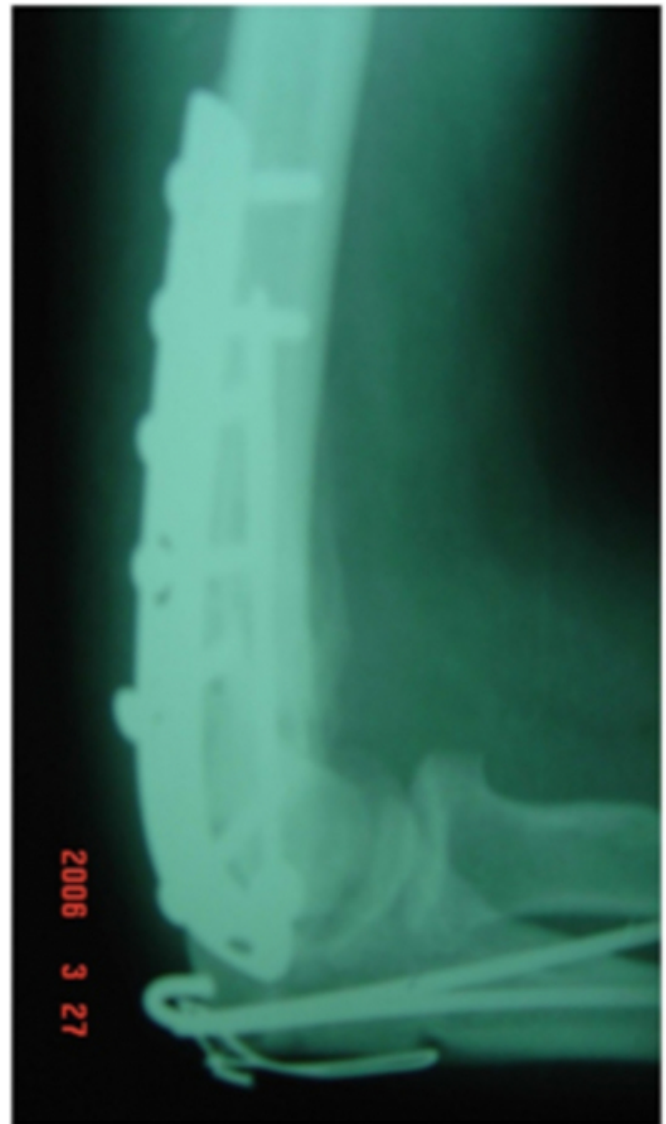
The paraolecranal- transtricipital access consists in incising longitudinally, in continuity, the tricipital tendon and the olecranal periost. When the elbow is bent to more than 90°, the joint sight is satisfactory. The disintegration of the inter muscle septum and the longitudinal separation of muscle fibres of the triceps allow the exposure of the upper part of the pallet. The joining of the two scraps at the end of the operation, reinforced by olecranal trans-osseous points, allows an early rehabilitation.

### **MATERIAL AND OSTEOSYNTHESIS PRINCIPLES**

In the fragmented fractures, screwing can be recommended in some cases, the ablation of a fragment can be made when this one cannot be screwed.

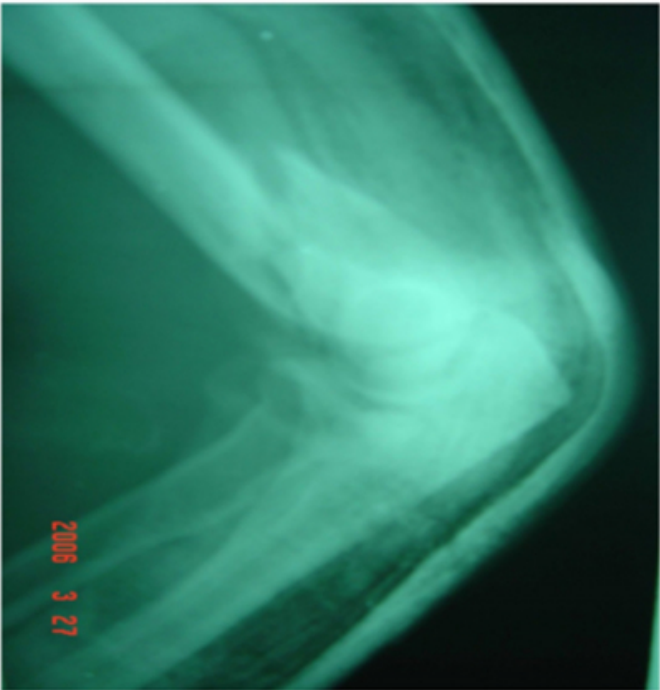
**Figure 1**

Photography 1 : fracture supra and intercondylar profile view of pallet associated to a fracture of the radius neck



**Figure 2**

Photography II : Osteosynthesis by Lecestre plate



**RESULTS**

The healing was made between 45 and 60 days with a 60 days average,

The functional assessment was made with Mayo Clinic performance index.

Pain None 45

Slight 30

Moderate 15

Severe 0

Mobility

Arc between 50 and 100 15

Arc lower than 50 5

**Figure 3**

Photography 3 & 4: Flexion and extension of this elbow



Stability

- Stable 10
- Moderately unstable 5
- Unstable 0

Daily activities

- To comb oneself 5
- Hand/mouth 5
- Toilets 5
- To put on a shirt 5
- To put one's shoes 5

Excellent 90-100 points in 50 cases (37%)

Good 75-89 points in 57 cases(42,2%)

Average 60-74 points in 2 cases (1,48%)

Bad < 60 points in 26 cases (19,2%)

### **STIFFNESS**

We counted 25 cases (18,5%) of stiffness which were taken again surgically by arthrolysis. The causes are related to the local conditions.

All joint or per joint elements can contribute to decrease mobility when they are impaired.

### **NERVOUS COMPLICATIONS**

2 nervous complications were noted, it was about regressive paralysis of the ulnar nerve and medial one.

### **VICIOUS CASE**

There were in 3 cases (2,2%) related to reduction defects or secondary moving.

### **Figure 4**

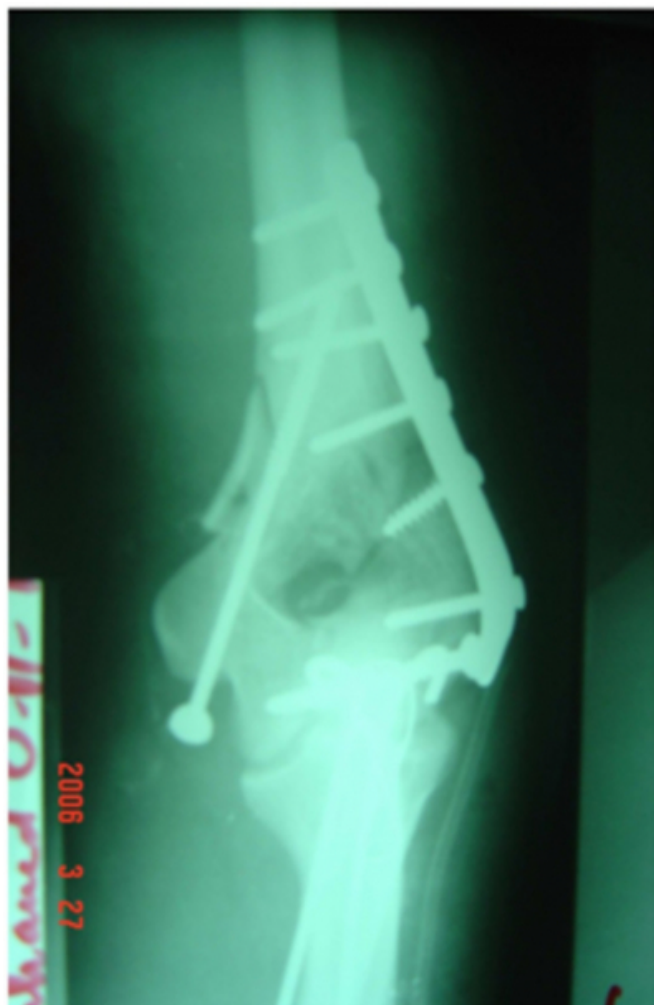
Photography 5 : Metaphysialdiaphysial epiphysial





**Figure 5**

Photography 6: Second moving with tendency of vicious case



## DISCUSSIONS

### THE FREQUENCY

The same series give a report on two peaks/pick of frequency. The one, including between 20 and 30 years, is made of a majority of men and corresponds to violent traumatism: public highway accidents (23 to 27 %) or falls from a high place, sometimes with major crash (traffic elbow). The associate lesions (cutaneous opening, poly-traumatism) are particularly frequent in this case. The other concerns the old subject between 60 and 80 years, with a female prevalence.

### ETIOLOGY

The generally found causal traumatism is the simple fall (Decoulx 44 % [3]), Lecestre 48 % [4], Folschveiller 58 % [5], Claisse 66 % [6], which can involve significant damage.

## FRACTURES

The type of fracture identical to that is described in literature 15 to 20 % of the distal fractures of the humerus in the adult. The feature is generally oblique:

- in the frontal plan, finishing on the level of a column (side);
- in the sagittal plan, below and behind.
- It can be transverse, spiroïd, with third fragment or comminuted.

The non moved forms are frequent [4]. The height of the feature is extremely variable, interesting the small cavities or placed largely above the small cavities. In the majority of the series (25 to 55 %). the lesion interests both columns, associating a feature supra condylar with adjustable height and an intercondylar feature which detach usually the trochlea external cheek. The first classifications were testing the number and the fragments moving, the feature type, in T-shaped, V-shaped or Y-shaped. But the complex fractures often are not subject to any description. The main prognosis factor is the degree of comminution supra condylar and above all articular. Lecestre and Dupont [4] individualized two rare forms but which are therapeutic sources of complications: the diaphyseoepiphyseal and diacolumnar fractures.

## OSSEOUS RESECTIONS

- the regulated ablation of the capitellum was recommended by many authors even in the event of broad fragment, because of the simplicity of the aftermath of surgery and the difficulties related to the osteosynthesis. This exeresis avoids the possible avascular necrosis of the fragment which is seldom observed. Sometimes good [7], the functional result is generally poor medium-term, especially in the event of delayed excision. The risk of after effects instability of the elbow in valgus is largely raised by the resection associated with the radial head, and especially the existence of a lesion of the LLI. The resection at first sight should thus be reserved for small size and/or comminuted fragments.

the open hearth reduction gives the best results, on condition that it is anatomical.

The osteosynthesis is less stable by pins than by a screwing in recall by the posterior face deprived of cartilage. A technique of per cutaneous reduction without synthesis was published [8].

### **COMPLICATIONS**

The frequency of the nervous complications after treatment is variously assessed according to the authors and surgical techniques': to 7 % according to Fontanesi [ 9 ], 12 % according to Burri [ 10 ], 15 % according to Kipfer [ 11 ] and Jupiter [ 12 ], 16 % at the time of SOFCOT round table [ 13 ], 27 % according to Lecestre and Lortat-Jacob [ 4 ], 33 % f according to Claisse [ 6 ], up to 54 % according to Langlais [ 13 ] after assembly in triangulation.

### **ULNAR NERVE**

It is generally injured by far (49 cases out of 60 at the time of the SOFCOT round table).

Two elements can support the appearance of an ulnar paralysis:

the too broad dissection of the nerve, must be protected and handled carefully to the maximum;

### **RADIAL NERVE**

Its attack is rarer in post operative. Lecestre [13] notes nevertheless 11 cases among them over 388 operated cases (2, 8 %). 10 was not re-operated and end in 9 healings, a case treated by neurolysis.

### **STIFFNESS**

Peri joint ossifications are also a frequent source of stiffness (21 % of the cases according to Fontanesi [ 9 ], 20 % according to Claisse [ 6 ]):

whether small, located in the thickness of the capsule or the small cavities, forming

a stop;

or more significant, dense and well limited, located ahead, in the muscle brachial. The indication of an arthrolysis of the elbow will be decided only after healing of the fracture, for significant stiffness and at the subjects whose behavior enables to hope for an effective participation in rehabilitation. A normal joint line space or close to the normal is essential, which finally limits this technique with the pallet traumatism which are not accompanied by too significant osseous rehandlings. The various authors preferred largely the use of a double side track. It gives a good result in 1 case out of 2, approximately, according to Lecestre [13].

### **CONCLUSION**

The fractures of the humeral pallet hold their bad reputation,

deserved, of the batch of nervous complications and especially of stiffness of the after effects elbow.

The quality of the reduction and the possibility of an immediate rehabilitation contribute largely to the progress the surgical treatment.

Good radiographic stereotypes in traction under anaesthesia, allows specifying the anatomical type and the joint degree of size reduction. This one conditions the operational difficulty and the functional prognosis.

The majority of supra and intercondylar fractures can enjoy a rigorous and univocal technique:

- an initially posterior trans olecranal access offers a joint sight sufficient while respecting the ulnar nerve and the continuity of the extensor apparatus;

- and a solid osteosynthesis, ensured by a moulded pre external plate or two perpendicular plates.

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