

**THE INTEREST OF THE SHORT TELEGRAPH NAIL IN THE TREATMENT OF FRACTURES OF THE UPPER EXTREMITY OF THE HUMERUS: ABOUT 27 CASES**

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**SUMMARY**

Fractures of the upper end of the humerus occupy the third fracture site in people over 65 years of age after the wrist and the upper end of the femur, preferentially affecting the osteoporotic elderly subject after a low energy trauma or more rarely the young subject after a high energy trauma. the Telegraph nail covers a wide range of applications for the treatment of simple and complex fractures of the upper extremity of the humerus allowing a rehabilitation protocol in the immediate intervention. It is a straight intramedullary nail made of stainless steel, 15 cm long, locked proximally and distally, the proximal locking is ensured by 4 cancellous screws, of long thread, the distal locking is ensured by one or two transverse screws at the level of the deltoid V. we report 27 observations of fracture of the upper extremity of the treated humerus Tee by short Telegraph nail collected between 2014 and 2017. The aim of our work is to analyze the radio-clinical results and assess the impact of this technique on the function of the shoulder. Osteosynthesis by Telegraph nail allows very effectively treat fractures of type 2 and 3 but also fractures impacted in valgus with 4 fragments, it is an effective and reproducible solution valid even for complex fractures of the proximal humerus and allows rapid recovery of mobility of the shoulder

**KEYWORDS:** Nail, humerus, fracture.

**INTRODUCTION**

Fractures of the upper extremity of the humerus account for about 5 of all fractures. it is the third site of fracture in people over 65 years of age after the wrist and the upper end of the femur, their incidence is constantly increasing with the aging of the population. 80% of fractures of the upper end of the humerus is little or not displaced and can benefit from orthopedic treatment with good results.<sup>[1-4]</sup> around 20% of these unstable or large displacement fractures require surgical management.<sup>[5]</sup> classifications have been proposed, the most used nowadays in particular in Anglo-Saxon countries, demur the classification of Neer.

Fractures of the proximal humerus are characterized by the absence of a reference technique and certain controversies on surgical indications and operative techniques. The results are good for impacted articular fractures and extra articular fractures whereas complex articular fractures (strongly displaced type 4 of Neer) are accompanied by disappointing results and are subject to prosthetic treatment except in young subjects.<sup>[6-8]</sup>

**METHODS**

We carried out a prospective study of 27 patients treated by Telegraph nail collected over a period of 4 years between 2014 and 2017, the patients are divided into 17 women (63%) for 10 men (37%) with an average follow-up of 9 months. The average age was 62 years.

All patients are approached antero-externally in a semi-seated position, the fracture was evaluated according to the Neer classification. We studied the results in patients reviewed at least 6 months postoperatively by clinical and radiographic examination. to evaluate the function of the shoulder, to judge the consolidation and to look for a possible complication. many classifications have been proposed the most used nowadays, in particular in the Anglo-Saxon countries, remains the classification of Neer this classification takes into account the number (2 to 4) and of the displacement of the fragments. in our series 13 patients presented a fracture of the surgical neck with two fragments figure (1) according to the classification of Neer. 9 patients with a three-fragment fracture in figure (2), 3 cases with a four-fragment fracture in figure (3) and 2 cases with a fracture-dislocation. 23 cases of our patients were victims of a simple mechanical fall, the others following accidents on

the public highway. The main judgment criterion which directs towards a surgery a fracture with an inter fragmentary diastasis of more than a centimeter and a tilt of more than 45 ° of the humeral articular surface compared to the reference 130 °. all our patients were operated by an anterolateral approach in percutaneous and we always opted for a dynamic distal locking. all our patients benefited from immobilization for 3 weeks and the pendulum post-operative mobilization was from 2 weeks. the functional results are evaluated by the constant score, comprising four objective and subjective criteria which are defined for a total of 100 points: mobility, pain, daily function and strength.

## RESULTS

### Patient

- The average age was 62 years old
- No difference in age by gender
- The average delay between the trauma and the surgical treatment was 4 days (1 to 15 days)

### Consolidation

- All fractures consolidated with an average delay ranging from 8 to 12 weeks
- No patient present with non-union

### Mobility

- The antepulsion: average was 140° with extremes of 85 ° -165 °
- Abduction: average was 120°

### By comparing the constant scores

- -12 results: excellent
- -9 results: good
- -6 results: means

### Complications

- No patient has immediate complications such as vascular or infectious in our series
- Two patients have algodystrophy
- Two cases of partial necrosis of the humeral head after 8 months of evolution
- A case of acromial conflict

### Radiological results

According to the reduction criteria, the results are divided into 12 anatomical, 5 subatomic, 6 intermediate and 4 bad reductions, we have no secondary displacement notes.



Figure 1: Fracture of the surgical neck with two fragments according to Neer's classification.

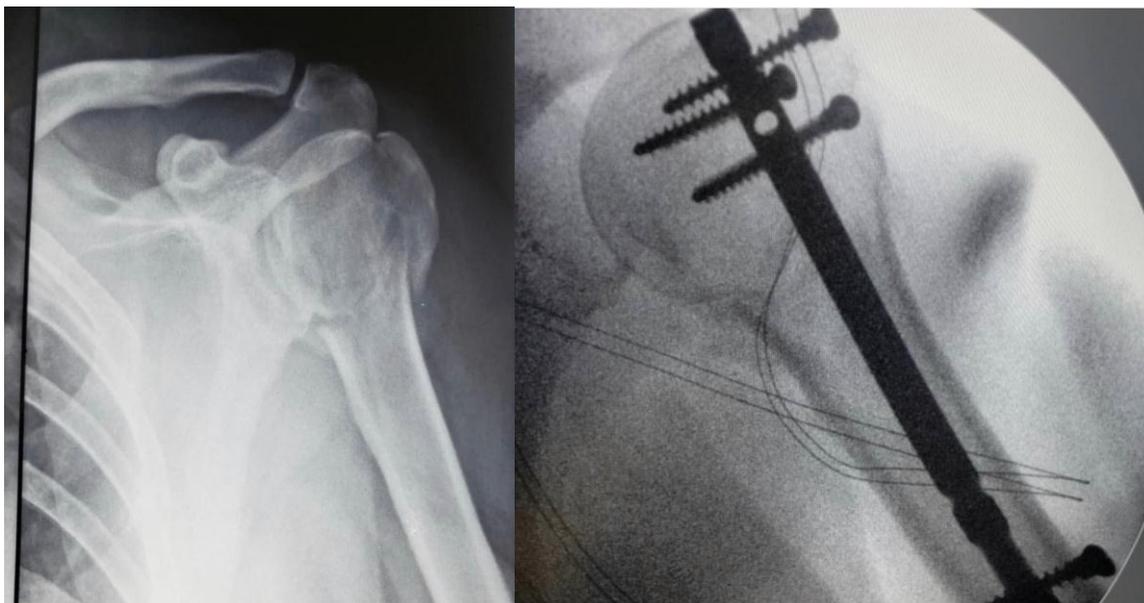


Figure 2: Fracture of the surgical neck with 3 fragments according to the classification of Neer.

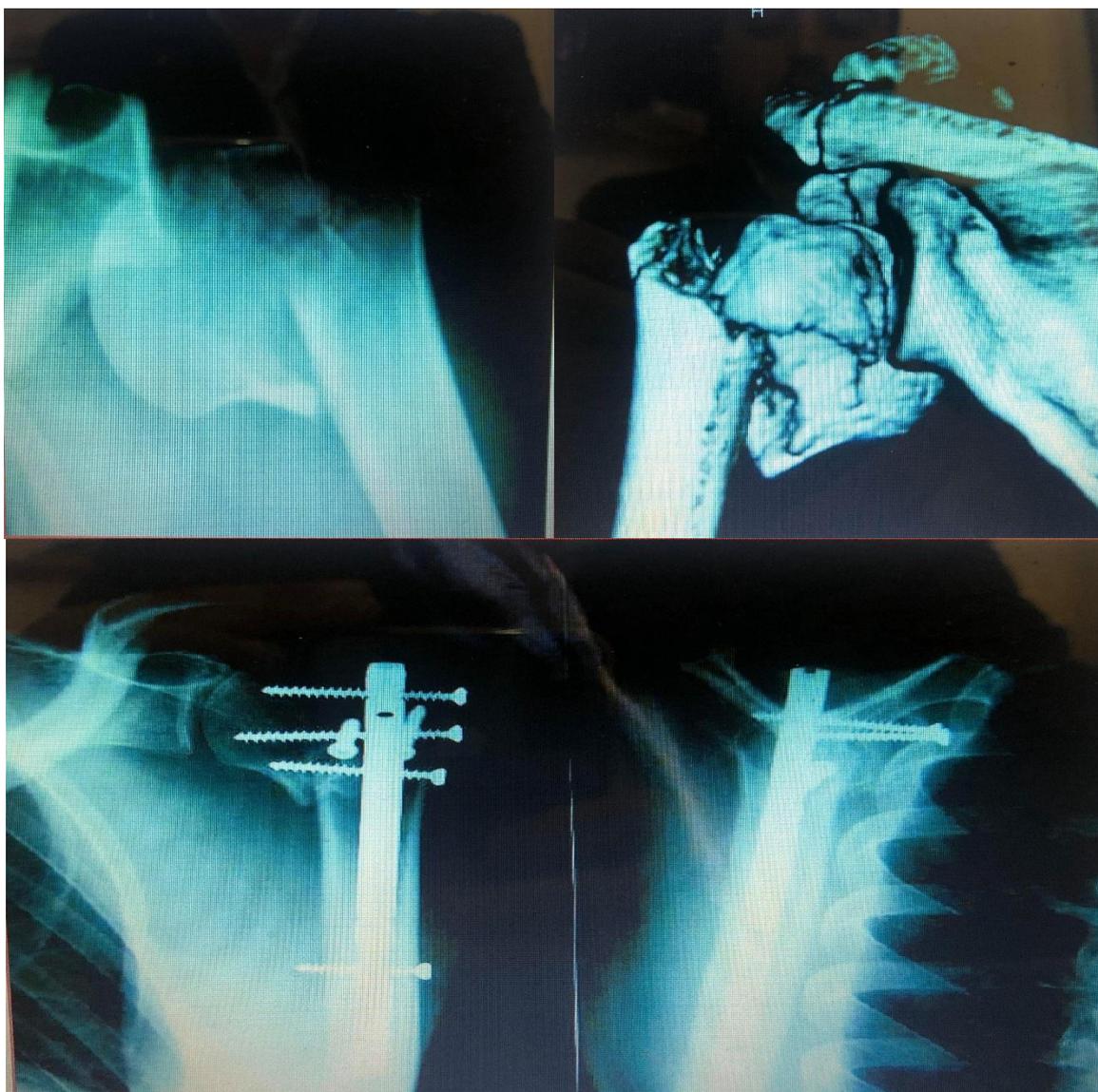


Figure 3: Fracture of the surgical neck with 4 fragments according to Neer's classification.

## DISCUSSION

Fractures of the upper extremity of the humerus are in terms of frequency the third most common fracture in subjects over 65 years of age,<sup>[9]</sup> after fractures of the wrist and the upper extremity of the femur with a clear predominance of females and represent approximately 5.7% of fractures treated in trauma surgery,<sup>[10-11]</sup> they affect both osteoporotic elderly subjects following low energy falls and young subjects following high kinetic trauma.<sup>[12]</sup> the management of these fractures can vary from simple orthopedic immobilization of the shoulder to humeral arthroplasty, including many osteosynthesis techniques. these post-traumatic injuries pose three problems for the surgeon:

- Diagnostic
- Therapeutic
- Prognosis

The Telegraph nail seems to be the best solution and has no equivalent. It makes it possible to treat very effectively.<sup>[13]</sup> simple fractures, that is to say fractures with two and three fragments of Neer, but also the fractures impacted in valgus has 4 fragments. It presents an overall mechanical resistance similar and satisfactory with respect to an axial pressure and seemed to be more adapted mechanically and allows an early mobilization of the shoulder. is more rigid compared to the screwed plates and therefore provides greater primary stability both in the diaphyseal and metaphyseal region. it also seems to have superior biomechanical qualities for torsion and bending type constraints allowing the possibility of starting the reeducation protocol as quickly as possible. Generally Neer type 2 fractures do not cause reduction problems once the scale or translation of the humeral head is corrected, on the other hand, fractures type 3 or 4 of Neer can cause problems of reduction of the head and tuberosities and this is where the interest of the nail comes from with these 4 poly axial proximal screws (frontal, sagittal, oblique) allowing better fixation of the trochiter and the trochin. reduction of the trochanteric fragment is essential and known for a long time.<sup>[14-16]</sup> the displacement of the trochiter is always posterior and proximal by the action of the supra muscles and infraspinatus. Consolidation in the ascended position leads to a sub acromial conflict,<sup>[17]</sup> and in the posterior position a conflict with the glenoid.<sup>[18]</sup> Lesions of the rotator cuff secondary to the protrusion of the nail, as well as that which are generated during the initial osteosynthesis then at the ablation of the material is one of the major arguments of the detractors of the antegrade grafting.

In 2007 a prospective study published by Boughebr,<sup>[19]</sup> which concludes that the quality of the reduction of the fracture was an important parameter influencing the final clinical result, with an average constant score of 88.7% for the fractures whose reduction was considered correct, against 75.6% when it was bad. the complications found in our series join that of the literature. the series produced by Cuny published in 2002<sup>[20]</sup> presents 15

secondary conflicts has a salient nail we have a mobilization of a locking screw (26%) whereas in our series no case, osteonecrosis (1.75%) was found for 64 fractures and for we found two cases of osteonecrosis for 27 patients or one rate (7, 4%), we find no deep septic complication. Osteonecrosis of the head is a complication frequently found after fractures of the proximal humerus. Statistics vary between 15% and 5 Gerber,<sup>[21]</sup> pointed out that these necroses were often well supported by patients, for the author the fractures of poor results leading to osteonecrosis are imperfect osteosynthesis or concomitant lesions of the rotator cuff tendons

## CONCLUSION

Osteosynthesis with a short Telegraph nail seems to be an effective, rapid and reproducible solution in the surgical treatment of stage 2 and 3 fractures with good radio-clinical results, in case of complexity of the fracture the anatomical reduction of the tuberosities and of the cephalic tilt and the only guarantor of a good evolution

### Consent

The patient has given their informed consent for the case to be published.

### Competing Interests

The authors declare no competing interest.

### Authors' Contributions

All authors have read and agreed to the final version of this manuscript and have equally contributed to its content and to the management of the manuscript.

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