	Open	Closed	Wired	Nailed
Clavicle	6	0	6	0
Humerus	1	0	1	0
Forearm	24	5	21	8
Metacarpals	4	0	4	0
Femur	9	4	0	13
Tibia	3	10	0	13
Total	47	19	32	34

tures and fractures with muscle interposition, all of them amenable to opening up the site with any type of osteosynthesis but for which this procedure offers many advantages.

Of the cases treated we have chosen a few radiographs of the procedures performed and of some of the difficulties that we experienced, taking into account that we want to keep this article short.

CONCLUSIONS

1. Our experience, base don 66 cases, confirms the usefulness of this method for selected cases.

2. We consider most cases in which for some reason it is necessary to open the fracture side to be amenable to a nailing procedure.

3. It is not always easy to achieve immobilization, not so much because of the method used but rather because of the delayed healing and the exuberant callus.

4. We had no other significant complications attributable to the method used than delayed consolidations and exuberant calluses.

5. Fixation with K-wires is an easy innocuous procedure.

6. The fixation technique described in this paper is not easy and should be performed by specialized personnel.

Comment

This article was first published in our Journal in 1947, seven years after Küntscher's classic paper. In those early years of intramedullary osteosynthesis the author mentions that «although there is an increasing number of publications on he subject, this method is still the subject of continuing investigation». He could not have been more right since today, six decades later, this procedure still awakens great interest since it constitutes, *per se,* one of the fundamental lines of treatment offered by internal osteosynthesis for the management of long bone fractures.

After the development of his first method, Küntscher's completed his work with the development of closed techniques, a method for intramedullary reaming, the locking nail and the possibility to compress the fracture site among others. Subsequently, many other methods of intramedullary osteosynthesis have emerged. The development of the AO osteosynthesis techniques with a screw-in plate, its emphasis on anatomical reduction and the theory of *ad primam* healing almost condemned intramedullary nailing to oblivion although nowadays both approaches are self-standing fields of research that offer different kinas of solutions. Both of them are supported not only by large series of clinical studies but also by biological studies such as the work on vascularization done by Rhinelander and Kessler. So this is far from an exhausted field on study as Dr. López de la Garma prophetized.

The article is based on a heterogeneous series of 66 cases of intramedullary osteosynthesis performed on patients that had not been previously selected; this is indeed a study carried out from the vantage point of the experience accumulated with those new and «imaginative» surgical methods. Techniques had to be discovered on a case-by-case basis and patient by patient since as the author says «perfection is not easily achieved.»

The series presented includes all kinds of long bone fractures and pseudoarthroses; the method not only includes Küntscher's well-known intramedullary nailing procedure but it also includes cases of K-wire fixation used to address dIaphyseal ulnar, radial and even clavicular fractures. The decision to open the fracture site or not is a function of the degree of difficulty of each case and in most cases the procedure is followed by plaster cast immobilization.

In a sort of discusión of the method presented, Dr. López de la Garma compares it with other procedures such as immobilization with transfixating pins and a plaster cast, continuous extension and other osteosynthesis systems like screw-in vitallium plates (an expensive and

rarely used method in those days). Finally, he offers us a biological interpretation of the results by pointing out a higher production of periosteal callus, which he considers a result of phenomena related to either intramedullary pressure or mechanical or chemical irritation. He states that his patients did not show alterations in their leukocyte count or pulmonary embolisms (we suppose that by this he means embolisms with a clear clinical expression). Lastly, it would seem that it is his recommendation to remove the instrumentation once x-rays show that the fracture has healed since he mentions a case in which the nail had to be kept in place for a long time (up to 174 days).

We were impressed by the far-sightedness and the accuracy with which the author lays down the basic – though comprehensive – guidelines that had o be followed when applying the method he describes. Another remarkable aspect of the paper is the description – albeit rather succinct – of the different biological and biomechanical pitfalls that have later given rise to myriad studies and papers amongst them the one quoted on pulmonary embolism in nailing procedures (a problem related to pressures exerted during reaming).

This paper was not written in accordance with the methodological requirements of the present day, but all the cases presented show great resolutive capacity, a long experience and a great deal of surgical expertise on the part of the author. It also shows significant scientific intuition for expounding the theories and biological problems that the method has raised.

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