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Original Article

Intra-focal reduction and percutaneous fixation of neck fractures of the fifth metacarpal: description of surgical technique☆,☆☆

Gustavo Pacheco Martins Ferreira[a,*], *Paulo Randal Pires*[a], *André Lopes Portugal*[b], *Henrique de Gouvêa Schneiter*[c]

[a] *Hospital Maria Amélia Lins, Belo Horizonte, MG, Brazil*
[b] *Hospital Risoleta Tolentino Neves, Belo Horizonte, MG, Brazil*
[c] *Hospital Eládio Lasserre, Cajazeiras, Salvador, BA, Brazil*

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ABSTRACT

Objective: to demonstrate a surgical technique for treating neck fractures of the fifth metacarpal, by means of reduction through intra-focal manipulation and percutaneous fixation using Kirschner wires, with the aims of making it easier to achieve and maintain the reduction during the operation and enabling reduction of these fractures even if a fibrous callus has formed.
Methods: a series of ten patients with neck fractures of the fifth metacarpal presenting palmar angles greater than 30° underwent the surgical technique described, as examples, and their results were evaluated through postoperative radiographs and clinical examinations.
Results: all the patients achieved reductions that were close to anatomical and evolved to consolidation of the fracture in the position obtained.
Conclusion: the surgical technique described is effective, easy to carry out, minimally invasive and low-cost, thereby enabling adequate clinical and radiographic reduction, even in subacute fractures already presenting a fibrous callus.

Redução intrafocal e fixação percutânea das fraturas do colo do quinto metacarpo – descrição de técnica cirúrgica

Palavras-chave:
Metacarpo
Fraturas ósseas
Membro superior
Fios ortopédicos

RESUMO

Objetivo: demonstrar uma técnica cirúrgica para o tratamento das fraturas do colo do quinto metacarpo por meio de redução por manipulação intrafocal e fixação percutânea com fios de Kirschner, visando a facilitar a obtenção e manutenção da redução no intraoperatório e possibilitar a redução dessas fraturas, ainda que com calo fibroso formado.

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☆☆ Work performed at Hospital Maria Amélia Lins, Belo Horizonte, MG, Brazil.
* *Corresponding author.*
E-mail: gustavopmf@yahoo.com.br (G.P.M. Ferreira).
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Métodos: dez pacientes portadores de fratura do colo do quinto metacarpo com angulação palmar superior a 30° foram submetidos, como exemplos, à técnica cirúrgica descrita. Os resultados foram avaliados por meio de radiografias e exame clínico pós-operatório.
Resultados: todos os pacientes obtiveram redução próxima da anatômica e evoluíram para consolidação da fratura na posição obtida.
Conclusão: a técnica cirúrgica descrita é eficaz, de simples execução, minimamente invasiva, de baixo custo e permite redução clínica e radiográfica adequadas, mesmo em fraturas subagudas com calo fibroso formado.

Introduction

Fractures of the neck of the fifth metacarpal generally result from an axial impact mechanism on the head of the metacarpal with the fist closed. For this reason, they are known as boxer's fractures, even though they only rarely occur among professional pugilists.[1–4] These fractures generally present palmar angulation because of the deforming force of the interosseous muscles and comminution of the volar cortex, with consequent instability.[4] A sagittal angle greater than 30° or shortening of more than 5 mm is associated with alteration of the biomechanics of the flexor system and may lead to dysfunction. Presence of rotational deviation greater than 5° may lead to superimposition of the affected ray, with obstruction of the adjacent fingers.[1,2,4,5]

In 1938, Jahss[6] described a maneuver for reducing fractures of the metacarpals with palmar displacement that became established both for conservative treatment and for maintaining the reduction during surgical fixation. However, this maneuver requires an assistant to maintain the reduction during the operation, which also adds difficulty to percutaneous insertion of the Kirschner wires under radioscopy because the assistant's and the patient's hands overlap and also because the reduction often becomes lost if there is any movement of the hand. Furthermore, the maneuver is incapable of reducing subacute fractures with a fibrous callus already formed, which typically occurs after 7–10 days.

In 1987, Kapandji[7] described a new technique for reduction and intrafocal fixation of fractures of the distal radius. Because of the success of this technique, it became established and was extrapolated for treating several types of fracture. This served as motivation for application to fractures of the neck of the fifth metacarpal.

In the present study, a technique for intrafocal reduction and percutaneous fixation with Kirschner wires for treating fractures of the neck of the fifth metacarpal is described, the radiographic results obtained are presented and the advantages of this technique are discussed.

Materials and methods

Between September and October 2012, ten patients with neck fractures of the fifth metacarpal were treated surgically using the technique described, and the radiographic results were recorded to demonstrate the efficacy of the technique. The other characteristics of the patients are described in Table 1.

Fig. 1 – Measurement of fracture displacement angle.

All the patients were operated by a single professional hand surgeon. The inclusion criteria were as follows: fracture with volar displacement in the sagittal plane greater than 30° and/or rotational displacement greater than 5° on clinical examination; and length of evolution after the trauma of between 1 and 21 days. The exclusion criteria were skeletal immaturity, exposed fracture, previous fracturing of the fifth metacarpal and fracturing extending to the joint. The preoperative and postoperative displacements of the fracture were measured on radiographs in posteroanterior and oblique (semipronated at 30°) views of the affected hand, by means of a standard method for determination of the anatomical axis. The angles were measured using the Adobe Photoshop CS3 Extended 10.0 software (Fig. 1).

Description of the technique

The patient was positioned in dorsal decubitus with the fractured limb on a radiotransparent table, and under adequate anesthesia by means of brachial plexus block. Under fluoroscopy, the intrafocal wire was inserted manually in the dorsopalmar direction until reaching the subchondral region of the distal fragment of the fifth metatarsal. Its position was proven by means of radioscopy (Fig. 2). The wire was positioned in parallel to and juxtaposed with the diaphysis of the metatarsal, with consequent reduction of the fracture in the sagittal and coronal planes, given that the diaphyses of the