

CASE REPORT



Treatment of a comminuted intraarticular head fracture of the fifth metacarpal with a MC Head/Neck plate

The Surgeon

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Dr. Baas is Head of Hand and Forearm Surgery at one of the largest trauma centers in southern Germany. The department is certified as a hand trauma and replantation center by the Federation of European Societies for Surgery of the Hand (FESSH), and is also approved to treat the most severe injuries under the German *Schwerstverletzungsartenverfahren* (SAV) of the employers' liability insurance association. Although the department covers the entire field of hand surgery, it focuses on the management of complex hand injuries.

Introduction

Many metacarpal fractures can be managed conservatively, in a closed procedure with Kirschner wires, or openly with standard osteosynthesis materials. However, more distal fractures, especially intraarticular fractures of the metacarpal head or neck, remain challenging, since they require – if possible step-free-reconstruction. But this cannot be achieved satisfactorily with standard materials. Standard materials are bulky, do not take sufficient account of the specific anatomical conditions, and are therefore difficult to adapt to them. Below we present a newly developed plate design illustrated by a case study. This plate facilitates the management of fractures of the metacarpal head and neck and significantly reduces many of the associated problems.

The Case



Patient History / Profile

A man of about 50 years of age presented to the hospital after having punched a door in anger with a clenched fist the day before.



Preoperative Clinical Findings

The patient complained of tenderness and pain on movement over the metacarpophalangeal joint of the right little finger. The conventional X-ray of the metacarpus in two planes revealed a comminuted intraarticular fracture of the head of the fifth metacarpal with a distinct joint step. Due to high manual demands, the patient wanted the best possible reconstruction



Figure 1: Preoperative conventional X-ray of the metacarpus in two planes showing a comminuted intraarticular fracture



Surgical Treatment

The surgical procedure on the fifth day after the trauma involved open reduction and internal fixation with a Medartis angular stable 1.2–2.3 TriLock MC Head/Neck plate inserted on the extensor side. To this end, a straight approach on the extensor side was followed by a short split of the extensor hood (approx. 0.5 cm), which was later reclosed with a PDS 5.0 suture. Although one of the 1.5 mm angular stable screws could already be placed in the very small fragment supporting the joint surface, while inserting the plate additional stabilization with a 1.2 mm interfragmentary screw was provided, not least because of the patient's temperament. Since the fracture extended far distally, it was crucial to place the plate intraarticularly, but still proximal to the joint surface, and also to adapt it optimally to the anatomical situation in order to minimize bulk and not impede tendon gliding. Since the plate holes in the second row were further apart than the most distal screws, the separately avulsed fragment incorporating the origin of the ulnar collateral ligament could also be securely included in the osteosynthesis.



Figure 2: A-B Fixation without single screw, and C-D definitive restoration with single screw



Postoperative Treatment

The follow-up management was functionally load-free for a period of 6 weeks. After this time, the X-ray showed bone consolidation and the patient was able to make a complete fist. The patient does not wish to have the implant materials removed. Experience has shown that plates at this site do not interfere with the extensor hood when optimally contoured thanks to their flat profile.

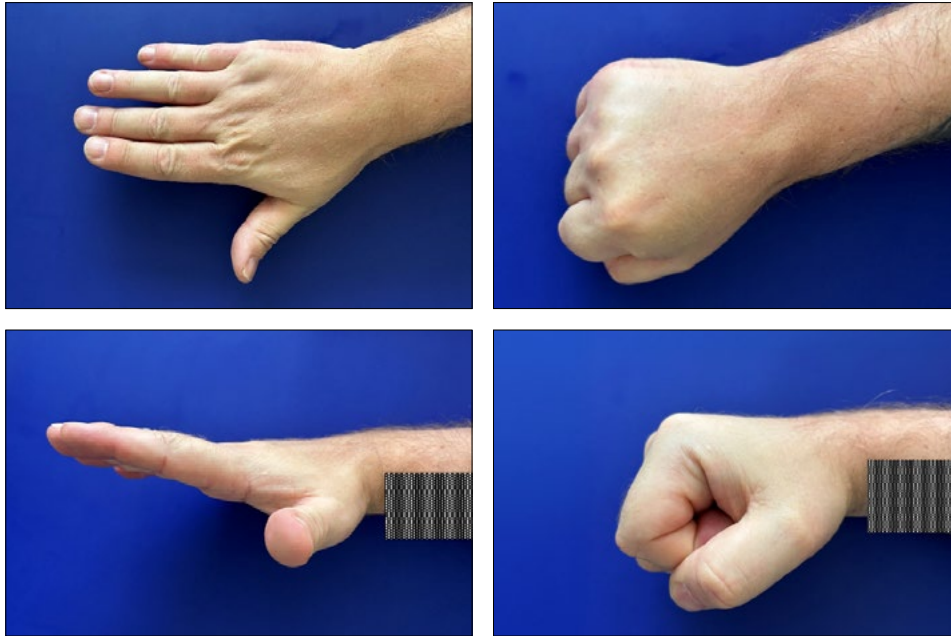


Figure 3: Complete fist closure 6 weeks postoperatively



Conclusion

The new plate design of the 1.2–2.3 TriLock MC Head/Neck plate is tailored to the specific anatomical conditions of the distal metacarpus and enables optimal adaptation with the lowest possible profile and thus minimal impairment of tendon gliding.

Angular stable 1.5 mm or 1.2 mm screws are used in the metacarpal head since these are easier and more flexible to place and are best suited for small fracture fragments. All plate holes in the distal section of the plate are located in “wings” that can be adjusted independently of each other and are not connected by bars.

The most distal plate holes are also positioned closer together to facilitate their placement beyond the taper of the head.

The collateral ligament attachments, which are often separately avulsed in complex, comminuted fractures, can be reliably addressed thanks to the wider spacing of the plate holes at the level of the collateral ligament attachments (second row of plate holes from the distal end), thereby allowing functional rehabilitation even for more complex fracture configurations.

At the level of the diaphysis, the 2.0/2.3 mm angular stable screws were retained and supplemented by a 2.0 or 2.3 cortical screw for compression. The screws are arranged linearly in a single row for better contouring to the narrow bone that is present particularly at the fourth metacarpal and the torqued shape of the shaft. The simplified adaptation to the contour of the shaft should help prevent the unwanted rotational deviations that can occur with grid plates in this area.

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