

# Treatment of Metacarpal Fractures using High Strength, Bioactive, Bioresorbable F-u-HA/PLLA Pins



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## Objectives

We used high-strength, bioactive, bioresorbable pins made of forged composites of unsintered hydroxyapatite particles/poly-L-lactide (F-u-HA/PLLA) for treating metacarpal fractures. This device has several advantages over existing bioresorbable polyglycolide (PGA) or PLLA devices: the radio-opacity of the device allows it to be observed in radiographic images, it exhibits good biocompatibility throughout the bioresorption process, and it binds directly to the surrounding bone without intervention of fibrous tissue. The purpose of this report is to present our surgical technique using F-u-HA/PLLA pins for metacarpal fractures, and to verify the advantages of this device using postoperative radiographs.

## Methods

Under brachial plexus anesthesia, manual reduction of the fracture was performed under fluoroscopic control. A 1-cm longitudinal skin incision was made to expose the proximal part of the fractured metacarpal bone and an entry hole for the F-u-HA/PLLA pins was made by using a 2.4-mm k-wire. Two k-wires (diameters, 2 mm and 1.5 mm) were inserted into the medullary canal through the hole to fix the fracture temporarily. The 2.0-mm k-wire was removed and a 2.0-mm F-u-HA/PLLA pin was inserted into the intramedullary canal in which the 2.0-mm k-wire had been placed. The same procedure was used for the 1.5-mm F-u-HA/PLLA pin insertion. Five patients were treated using this method. Radiographs were evaluated for fracture healing, radio-opacity of the pins, and radiolucent zones around the pins. The range of motion of the fingers and the postoperative complications were assessed.

## Results

All fractures were united. Shadows of all the pins were observed and there were no radiolucent zones around the pins at the final radiographic follow-up. Ranges of motion of all fingers were normal and postoperative complications were not observed in any of the patients.

## Conclusions

The radio-opacity of F-u-HA/PLLA devices is a major advantage of this device. No radiolucent zones were present around the pins, no osteolysis was observed on postoperative radiographs, and there were no postoperative complications. Re-operation for removal was unnecessary. Open reduction and internal fixation using F-u-HA/PLLA pins offers several advantages in treating metacarpal fractures.



Case1. 17-year-old female



Case2. 60-year-old male

## Literatures

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