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A case of ORIF with fibula graft of 2nd & 3rd metacarpal nonunion

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Abstract

Background: The management of nonunion and malunion in the metacarpals and phalanges is one of challenging task for surgeons. The Structure has a propensity for stiffness, the ability of adjacent digits to substitute functionally for compromised digits, the small size of the bones, and associated complications. Because of atrophic changes and stiffness and tendon adhesions amputation and arthrodesis are treatment options. In our case study we have successfully treated a case of non-union of metacarpals with excellent results.

Methods: A 26 years old Male presented with the chief complaint of weakness in right hand since 8 months following A/H/O crush injury. Diagnosed with 2nd, 3rd metacarpal fracture ex fix with hypogastric graft was done. Following a time period of 8 months patient presented with non-union metacarpals. Patient underwent ORIF with fibula bone grafting (Fig 4) and minifragment plate and screw fixation (Fig 5).

Results: Post-operative 4 weeks following the surgery the K-wires were removed and patient was called for regular follow up and rehabilitation in the form of grip strengthening exercises. 8 weeks post-op there was a significant improvement in the ROM and hand grip, patient was given a sling and early mobilisation was started.

Keywords: ORIF, nonunion, Graft, hypogastric flap surgery, pseudoclawing

Introduction

A 26 year old male, presented with the complaint of weakness in the right hand since 8 months following an A/H/O crush injury.

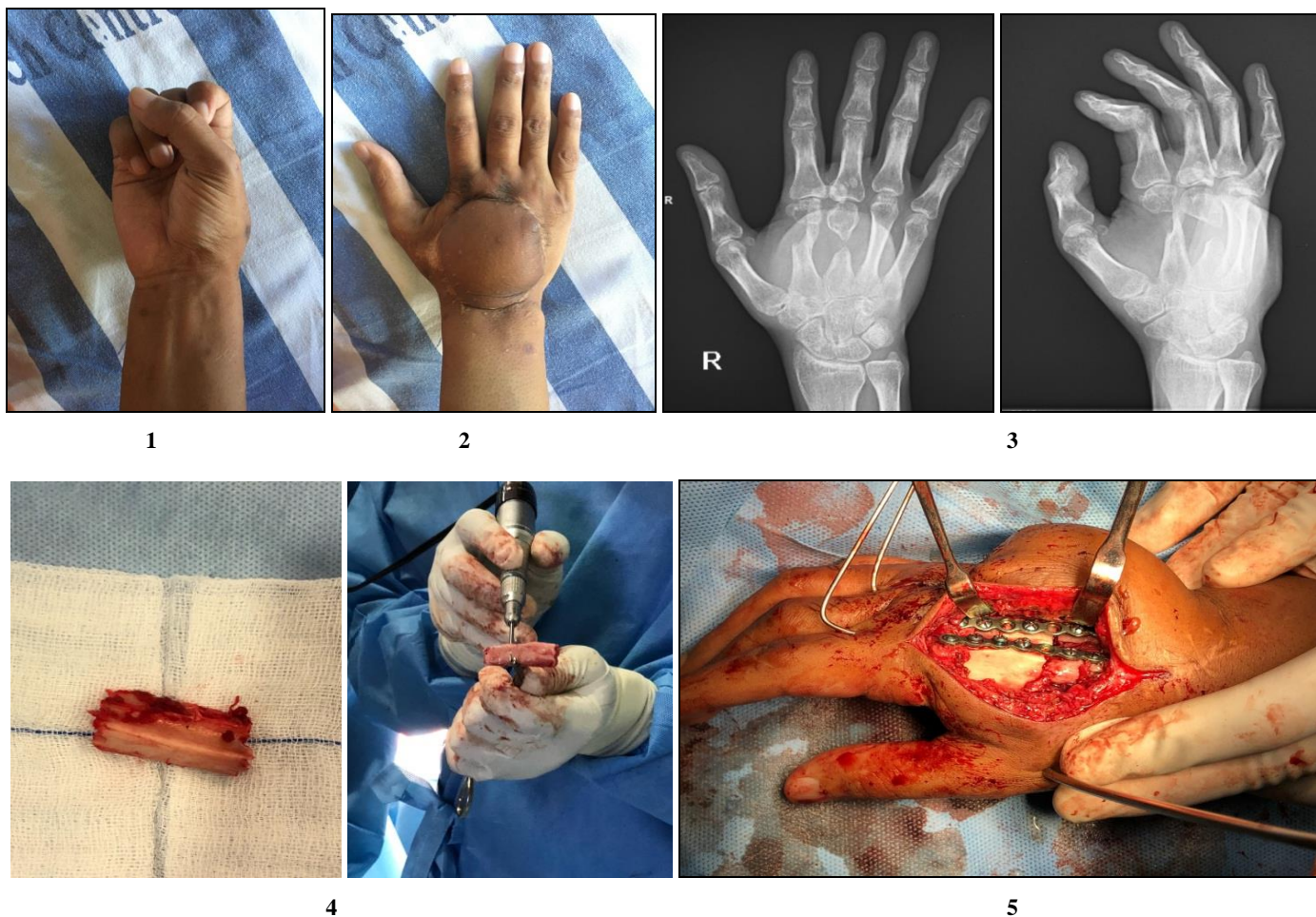
Patient was taken to a hospital in Wayanad where he was attended by a team of surgeons, diagnosed to have 2nd and 3rd metacarpal compound fracture. He underwent wound debridement, external fixation with hypogastric flap surgery. His hand was kept in the hypogastrium for 2 months. Later it was removed and mobilized. Patient noticed he had persistent weakness in the right hand even after 8 months. Patient came to our hospital for further management.

On examination, the hand grip was weak (Fig 1), 2nd and 3rd MCP joint ROM was restricted however IP joints and wrist movements were unaffected. A circular flap was noticed on the dorsal aspect of the hand (Fig 2). Radiographic X-Rays of right hand AP and Oblique views showed nonunion of the 2nd and 3rd metacarpals (Fig 3). Patient underwent ORIF with fibula bone grafting (Fig 4) and mini fragment plate and screw fixation (Fig 5). Post-operatively, patient was given a sling and early mobilisation was started.

4 weeks following the surgery the K-wires were removed and patient was called for regular follow up and rehabilitation in the form of grip strengthening exercises. 8 weeks post-op there was a significant improvement in the ROM and hand grip.

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PRE – OP & INTRA – OP



Discussion

The inter metacarpal ligaments stabilize the distal metacarpal and maintain alignment. Similar to metacarpal neck fractures, the amount of apex dorsal angulation is debated, but increases from radial to ulnar due to increasing mobility at the CMC joint from radial to ulnar.

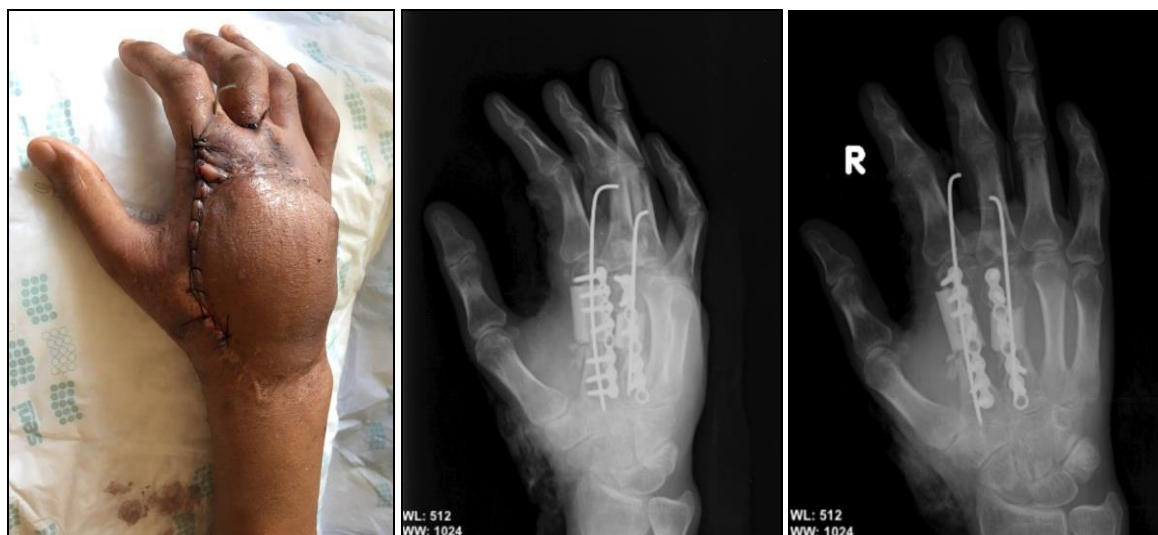
Suggested acceptable angulation of each metacarpal shaft:

- Index and long fingers $<10^{\circ}$
- Ring and small fingers $<30^{\circ}$
- Every 2 mm of metacarpal shortening leads to 7° of extensor lag.
- Up to 5 mm is acceptable without significant functional

deficit.

Nonoperative treatment includes immobilization for about 4 weeks, with the MCP joints flexed and the IP joints free in a Clam-digger cast. Operative indications include open fractures, malrotation and unacceptable angulation, malunion and nonunion. It is best judged clinically by asking the patient to flex all the fingers simultaneously. If scissoring or malrotation is present with composite digital flexion, open reduction should be considered.

Post-Op



Conclusion

Surgical fixation with autologous bone grafts and stable internal fixation has a high union rate with resultant restoration of alignment and stability, but achieves modest improvements in motion. Slightly larger implants and bone grafts are useful for obtaining adequate stability to initiate immediate exercises in order to limit the potential for stiffness

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