
Reduction and Fixation of
Metatarsal Neck Fracture by
Metaizeau's Technique

NCT05640466

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Type of study

This study was a prospective interventional study.

Study setting

The study was conducted at orthopedics department at Sohag General Hospital.

Study period

This study was performed in the period between May 2022 and April 2023.

Patients

20 patients with displaced metatarsal head fractures were included.

Criteria of patient selection:

Inclusion criteria:

- Patients with displaced fracture neck metatarsals 2nd, 3rd, and 4th metatarsals.

Exclusion criteria:

- Poly-traumatized patient.
- Patient with fracture first and fifth metatarsal bone.
- Fracture shaft metatarsal bone.
- Open fractures of the foot.
- Intraarticular fracture of metatarsals.
- Lisfranc fracture.
- Segmental fracture of the metatarsal

Methods:

All patients were subjected to the followings:

Metaizeau's technique

Metaizeau's technique was applied to reduce the displaced metatarsal head distally from the fracture in an easier way and to keep the fracture site closed.



Figure (1): Second, third, and fourth metatarsals displaced head fractures.

After preparing the metatarsal fracture site for an open reduction. The procedure was performed by the senior surgeon who was qualified in the technique. The patients were placed in the supine position on a radio-transparent operating table. A Kirschner wire with its distal end is placed showing a small bend into the medullar cavity through the lateral margin of the proximal metaphysis of the affected metatarsal using a 5mm skin incision at that level. It were able to ease the pin in by drilling a hole on the side of the metatarsal bone. The skin incision was made over the interosseus space, to use one incision for the two neighboring metatarsal bones. **Figure (23)**

The diameter of the Kirschner wires to be used should be related to the size of the fractured metatarsal medullar cavity. It drove the Kirschner wire antegrade, with the help of an X-ray image intensifier. The Kirschner wire was driven through the endomedullar cavity from the proximal metaphysis, progressing anterogradely towards the displaced distal epiphysis. Once it reached the fracture site, It tried to thread the metatarsal head with the bent distal end of the Kirschner wire.

Subsequently, It rotated the wire 180 to direct its end to the dorsum of the foot so as to provoke a translation effect on the metatarsal head in order to obtain the head reduction, and maintained this reduction with the Kirschner wire. Open reduction was unnecessary all fractures, leaving the fracture site untouched, and preserving the soft tissues, which will collaborate in the healing process of the fracture.



Figure (2): Postoperative radiograph showing intramedullary fixation with Metaizeau's technique

Postoperative treatment

Postoperatively, no weight bearing in a splint during the first 2 week was allowed. progressive weight bearing cast for the next 2 weeks was permitted after clinical signs consolidation, pain and tenderness subsidence, and after 4 weeks we removed the cast and set the patient walking without cast but with crutches if needed, and the Kirschner wires were removed 6 weeks following the operation. **Figure (3)**



Figure (4): Radiographic consolidation of the metatarsal displaced head fractures after 8 weeks, showing a correct alignment, no angular deviations, and no shortening of the metatarsal bones.

Postoperative follow up

Outpatient follow-up was conducted immediately post-operative until achieving the union. It was done 4, 8, 24 weeks and 12 months post-operatively. **Figure (5)**

Postoperative evaluation

- **Clinically:** neurological and vascular assessment, deformity and stiffness evaluation were done.
- **Radiological:** x-ray imaging was performed in the 4th, 8th and 24th postoperative weeks to evaluate the alignment and anteroposterior and oblique views of the foot.

Ethical considerations:

The study was approved by the Ethics Committee of Faculty of Medicine, Sohag University. There are adequate provisions to maintain privacy of participants and confidentiality of the data are as follows:

- The patients were given the option of not participating in the study if they did not want to.
- We put code number to each participate with the name and address kept in a special file.
- We hide the patients name when we use the research.
- We used the results of the study only in a scientific manner and not to use it in any other aims.

Statistical Analysis

Statistical analysis was done by SPSS v26 (IBM Inc., Chicago, IL, USA). Quantitative parametric data were presented as mean and standard deviation (SD). Qualitative variables were presented as frequency and percentage (%).