

CORRECTION OF COMPLEX THREE-DIMENSIONAL DEFORMITIES AT THE PROXIMAL FEMUR USING INDIRECT REDUCTION WITH ANGLE BLADE PLATE AND PATIENT-SPECIFIC INSTRUMENTS

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Introduction: Corrective osteotomies for complex proximal femoral deformities can be challenging. The use of three-dimensional (3D) preoperative planning and patient-specific instruments (PSI) have already been established for different orthopedic procedures. Improved accuracy and decreased procedure times were demonstrated compared to conventional methods¹. A new technique to correct complex deformities of the proximal femur is presented and illustrated in a 38-year old patient with malunion of the proximal femur after a gunshot injury. This gives an overview of an indirect reduction technique with the aid of PSI and a conventional angle blade plate.

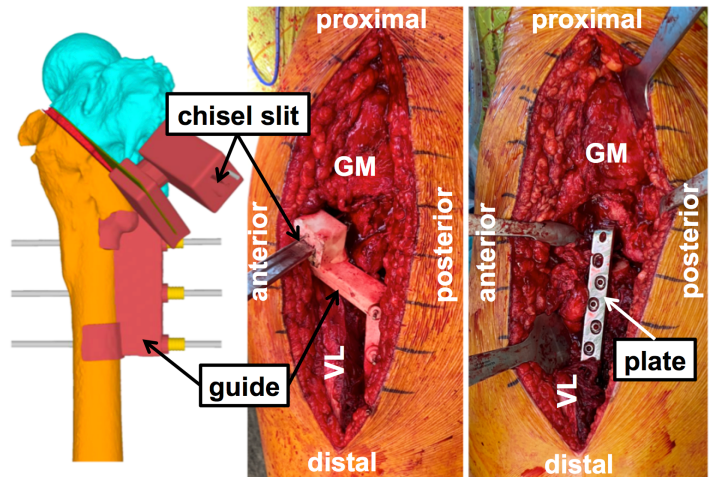
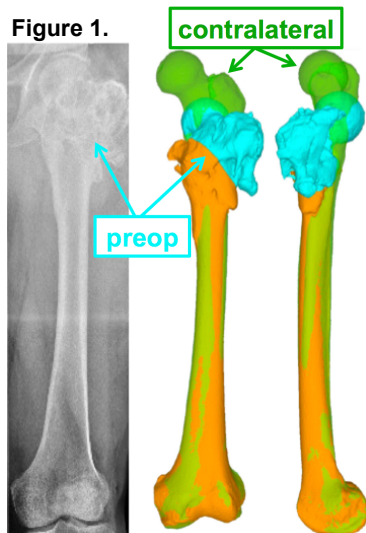


Figure 2. VL: vastus lateralis, GM: gluteus medius

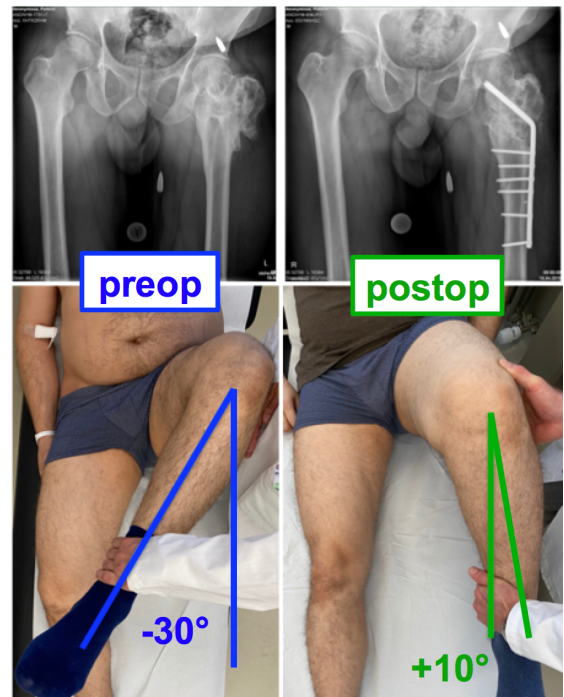


Figure 3. Pre- and postoperative situation.

Methods:

1. Using CT-data, 3D models were generated for 3D planning (in collaboration with the Computer Assisted Research and Development Group (Balgrist CARD AG, Zurich, Switzerland)).
2. A subvastus approach to the femur exposes the trochanteric ridge (Fig. 2). This landmark and the femoral circumference serve as the specific record of the basic guide.
3. An "osteotomy & implant positioning guide" is placed over the previously inserted reference pins (Fig. 2). Pinning is planned in a way that pin positions correspond to screw holes for later implant fixation (Fig. 2).
4. The chisel slit determines the direction and depth of the chisel.
5. The cutting slit predefines the accurate osteotomy.
6. Once the osteotomy is completed, the angle blade plate is inserted into the preordained chisel hole and over the reference pins, resulting in the desired deformity reduction (Fig. 2).

Results: Indirect deformity reduction (lengthening, flexion and rotation) over an angle blade plate was successfully performed with the above-mentioned technique. Thanks to PSI the detachment of the muscle was limited to the lateral subvastus approach.

Literature

¹ Baraza N et al, 3D Print Med, 2020

Conclusions: Understanding complex deformities of the proximal femur is enhanced by using preoperative 3D planning and additional PSI allowing accurate intraoperative implementation. Further advancements in this technique, such as indirect deformity reduction over an angle plate permit complex corrections with fewer surgical steps and less damage to the surrounding soft tissues.