

Derotation Osteotomy with Z-translated Calculation for Malrotation of Femoral Shaft - A Novel Technique

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INTRODUCTION: Malrotation of the femoral shaft is a common sequela following inadequate reduction of femoral shaft fractures. While various corrective methodologies have been previously delineated, these approaches often entail reliance upon the subjective assessment of the surgical practitioner. Herein, we introduce a novel osteotomy technique that affords facile and precise execution.

METHODS: A 43-year-old male sustained a closed left proximal femur fracture due to a traffic accident 14 years ago. The fracture was managed with a dynamic hip screw (DHS), but subsequent post-operative follow-up revealed heterotopic ossification around the hip and malrotation, resulting in walking difficulties. The patient presented with an excessive out-toeing gait on the left and a tendency to fall. The preoperative images indicated a difference of 30 degrees in external rotation of the feet bilaterally, with measurements of 28 degrees on the right side and 58 degrees on the left side. A Z-translated calculation osteotomy was performed at the distal third of the left femur using a Gigli saw and bonescalpel, with the dimensions of the Z-translated square bone segment calculated as $30/360 * \pi d = 1/12 * 2.84 * 3.14 = 0.74$ (d representing the femoral shaft diameter, cm).

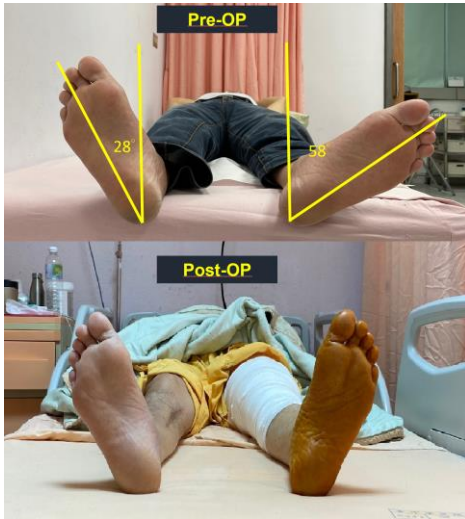
RESULTS SECTION: The patient demonstrated favorable postoperative recovery, with a noticeable immediate amelioration in the out-toeing gait. Subsequent to surgery, the osteotomy site exhibited robust union both radiographically and clinically at the one-year follow-up.

DISCUSSION: Historically, the correction procedure was executed utilizing Steinmann pins and a goniometer set; however, this approach rested predominantly on subjective visual assessment. Within this context, we elucidate a novel methodology for rotational osteotomy, which entails meticulous calculation of the osteotomy volume. This calculated approach has demonstrated commendable and consistent correction outcomes, thereby enhancing the reliability of the procedure.

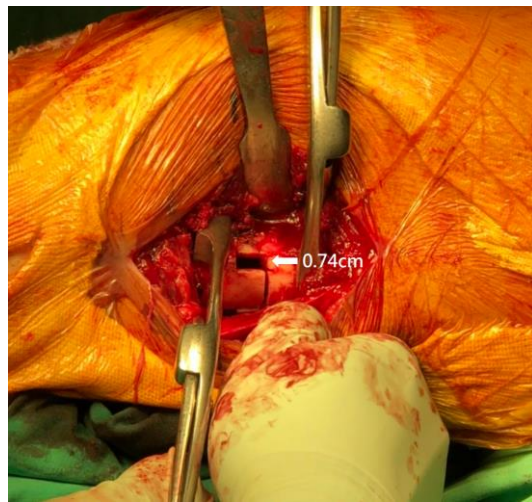
SIGNIFICANCE/CLINICAL RELEVANCE: This study introduces a new technique to address femoral shaft malrotation, enhancing surgical precision and patient outcomes by replacing subjective assessment with calculated methods.

IMAGES AND TABLES:

(a)



(c)



(b)

