

# Ilizarov Correction of Malrotated Femoral Shaft Fracture Initially Treated With an Intramedullary Nail: A Case Report

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## ABSTRACT

Ideally, acquired femoral malrotation as a complication of intramedullary nailing of a femoral shaft fracture should be identified and corrected early in the course of treatment. In this report, we present a previously undescribed precise surgical technique for acutely correcting an acquired femoral malrotation deformity 20 days after fixation of a femoral shaft fracture with a statically locked intramedullary nail. An Ilizarov external fixator was used intraoperatively to correct a 27° femoral malrotation deformity in a 19-year-old man.

**M**alrotation of the femur after intramedullary nailing is a challenging management problem.<sup>1-3</sup> Femoral rotation that differs more than 15° from the contralateral side has been described as a true malrotation deformity.<sup>2-5</sup> Hip or knee symptoms and functional disability have been reported when femoral rotational differences exceed 20°. <sup>1,6</sup> Femoral rotational differences less than 10°, however, seldom produce patient complaints or dis-

ability and are generally considered not clinically significant.<sup>3,4</sup> In this report, we describe the identification, quantification, and correction of a malrotation deformity that resulted from locked intramedullary nailing of a femoral shaft fracture.

## Case Report

A 19-year-old man sustained an isolated closed left femoral shaft fracture from a work-related injury. At a level I trauma center, he underwent intramedullary nail fixation of the fracture with locking screws placed proximal and distal to the fracture site. His hospital course was uneventful, and he was discharged home without any obvious complication.

On postoperative day 9, the patient presented complaining of left knee pain and limited knee range of motion. On physical examination, he had a 40° extension lag at the knee, and active knee flexion was limited to 95°. All incisions were healing well, and there was no evidence of infection in the knee. Passive internal and external rotation of bilateral lower extremities in the sitting and prone positions was suggestive of an internal rotation deformity of the distal fragment of the left femur (Figure 1A). Plain radiographs showed malaligned cortices of the fracture site but no significant angulation or translation deformity of the femur (Figure 1B).

Given that a rotational deformity was suspected, a computed tomography (CT) scan was performed on both the affected lower extremity and the unaffected lower extremity with the legs taped down to prevent movement of either lower extremity during the study. Rotation of the distal femoral condyles relative to the axis of the femoral neck was determined by measuring the inclination of the femoral neck with respect to the transcondylar axis.<sup>7,8</sup> This measurement was compared with that of the unaffected femur to determine the malrotation angle.

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