

**Intraoperative Radiographic Rotational Profile of the Tibia**

*Sean P. Wrenn, MD; Robert Brandon Ponce, MD; Andres Libos; VAMSHI GAJARI, MBBS; Andres F. Moreno, MD; Joseph Cave; Stephen Bigach, MD; Michael A. Quacinella, DO; Taylor M. Yong, MD; Manish K. Sethi, MD; Daniel J. Stinner, MD; Robert H. Boyce, MD; Amir Alex Jahangir, MD; Lauren Maccormick Tatman, MD; Phillip Mitchell, MD; William T. Obremskey, MD, MPH, FIOTA*

**Purpose:** Few techniques are described for routine intraoperative assessment of tibial torsion. Measuring the twist of the proximal versus distal axis of the tibia in comminuted fractures or fractures with segmental bone loss is necessary, and no technique or routine need is generally accepted in practice today. Recreating this rotation is an important part of restoring patient anatomy for patients undergoing operative repair of bicondylar tibial plateau (Type 41), tibial shaft (Type 42), and distal tibial pilon fractures (Type 43). Considering the demands for availability, simplicity, applicability, and precision, we describe a method employing a mobile C-arm fluoroscope to assess the tibial rotation of the contralateral uninjured leg intraoperatively that can be used to assess rotation of the injured tibia.

**Methods:** Assessment and comparison of the injured leg following fracture reduction and fixation can ensure restoration of tibial rotation under sterile conditions before the patient leaves the operating room. Prior to sterile preparation of the injured leg, a rotational profile of the contralateral uninjured tibia is assessed by attaining a perfect lateral of the femoral condyles and then, with the leg held in that position, moving the C-arm to the ankle and attaining a mortise view. The mortise view angle of external or internal rotation is assessed by the amount the C-arm needs to arc to attain the mortise view.

**Results:** This method was applied clinically to establish a rotational profile of the uninjured tibias in 64 adults with a contralateral tibia injury. 61 patients exhibited external rotation and 3 exhibited internal rotation. The torsion of tibias evaluated ranged from 15° of internal rotation to 45° of external rotation. On average, the tibias assessed had 19.6° of external rotation with a standard deviation of 11.5°.

**Conclusion:** Given the variability of rotational profiles of the tibia, the proposed method of assessing tibial torsion intraoperatively can be useful in recreating patient anatomy during operative fixation of tibial fractures. Implementation of this technique may diminish the need for further reoperation to address problems with malrotation.