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## Calculation of pediatric femoral fracture rotation from direct roentgenograms

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**Background:** Radiologic determination of pediatric femoral fracture rotation has been debated. Measuring the ante-torsion angle of the fractured femur by computed tomography and comparing it with the opposite side has been the method of choice for this purpose. However, no simple method for direct measurement of femoral fracture rotation exists in the literature. In this study, our aim was to test a mathematical method of measuring the axial plane mal-rotation from direct roentgenograms.

**Materials & Methods:** A pediatric femoral shaft fracture model was produced. The bone was secured to a wooden frame that allowed the distal part of the fracture to rotate around an axis. Radiographs were taken at known intervals of rotation ranging from the neutral position to 60° external rotation and to 60° internal rotation in 5° increments of rotation. Five independent, blinded observers measured the radiographs and calculated the fracture rotation according to a standard formula. Calculated rotation values were compared with known rotation values.

**Results:** Calculated rotation values were close to actual rotation values through-out the arc of rotation. The mean absolute error of five observers for all measurements of external and internal rotation was 3.97° ( $\pm 0.83$ ). The correlation coefficient between calculated and actual rotation values was 0.9927. The inter observer intra class correlation coefficient for calculated rotation was 0.997.

**Conclusions:** Absolute error and correlation coefficient values indicate that this method is accurate and reliable in determining the fracture rotation.

### Biography

Ketenci I E was born in Rize, Turkey in 1979. He completed primary school in Rize and middle school education in Istanbul. He graduated from Marmara University School of Medicine in 2004. He completed his orthopaedic surgery residency in Marmara University in 2010. After one year of military duty he is working as an orthopaedic surgeon in Haydarpasa Numune Training and Research Hospital, Istanbul since 2011.

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