

Anteroposterior or Lateral Images of Fluoroscopy to Determine the Rotation Alignment in the Fixation of Femoral Fractures: Which One Is More Accurate?

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Purpose: Since femoral fractures have been mostly fixed in a closed manner, fluoroscopic control is an important tool to determine anatomic axial and rotational alignment. Although it is commonly used to match the lesser trochanter profile on the coronal images of the fluoroscopy, rotational malalignment is highly reported. We compared the techniques of anteroposterior versus lateral images of the femur during the femoral fixation to know the accuracy of rotational alignment.

Methods: Consecutive patients who underwent the rotational control using anteroposterior (AP) vs lateral (LAT) fluoroscopic images during the fixation of femoral fractures between 2015 and 2023 were studied. Before the finalization of fixation, the rotational alignment was evaluated. In the group determined from AP images (AP group), the lesser trochanter profile of the fixed side was compared with that of the intact side while the leg was held with the patella facing anteriorly. In the group using LAT images (LAT group), the sagittal view of the proximal femur between the fixed and the non-injured sides was compared, which was achieved after obtaining the true neutral rotation image of the distal femur. Age and fixed implant were matched similarly between the 2 groups. The difference in femoral rotation between the operated side and the non-injured side was measured from the 3D CT scan postoperatively. The values from the AP and LAT groups were compared and statistically analyzed.

Results: In each group, 28 patients were collected, including the same number of selected implants of femoral fixation (reconstruction nail: 14, standard nail: 7, distal femur plate: 7). All patients had unilateral femoral fractures. The demographics of patients including age and gender were similar between the 2 groups. The mean difference of rotational alignment was 8.0° in the AP group and 4.3° in the LAT group respectively ($P = 0.046$). While the AP group showed 11 cases (39.3%) of rotational malalignment over 10°, the LAT group had only 2 cases.

Conclusion: This study demonstrates that lateral images of fluoroscopy offer improved accuracy and reproducibility to achieve the rotational alignment during the fixation of femoral fractures, compared with the traditional way of lesser trochanter profile using AP images.