

Is it Time to Rethink Our Understanding of Contralateral Femoral Version?

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INTRODUCTION: Femoral version is critical in lower extremity mechanics and reconstruction of the femur. Abnormal anteversion, which exceeds this range, can lead to gait abnormalities and increased risk of joint pain and instability. The contralateral femur is often used as a template to assess femoral version while fixing fractures, reconstruction and deformity correction. We hypothesized that a large proportion of individuals have version differences and that patients with version measurements outside the normal range are associated with larger differences between each side. This has implications in reconstruction and fracture care.

METHODS: Femoral version was measured in all patients who underwent CT of bilateral femurs over the last 5 years, and in patients who underwent CT angiography with lower extremity runoff over a 6-month period. Demographic information including sex, age, and race were recorded. Subjects who had a history of prior hip/knee arthroplasty or hardware anywhere in the femur, or above knee amputation were excluded. Additionally, patients with evidence of congenital and or acquired femoral deformity (eg, Ollier's, Perthes) were excluded. Variation in femoral version across all subjects and within/between demographic groups was calculated and analyzed.

RESULTS: A total of 816 hips were assessed in 408 patients. The mean femoral version was 12 degrees (95% CI [11.4 - 12.6]). The mean difference between left and right was 6 degrees (95% CI [5.5-6.5]). 62.5% of hips had version measurements outside of the historical 'normal' (10-20). 43% of patients had greater than a 5-degree difference from each side, 16% had a greater than 10-degree difference between each side. Patients with version measurements outside the normal range (10-20 degrees) had a greater chance of having at least a 5-degree difference between each side than patients within the normal range (21% vs 14%, $p < 0.001$).

DISCUSSION AND CONCLUSION: Almost 20% of patients have differences of greater than 10 degrees between measured femoral version. Patients with increased (or decreased) version of the femur have a higher likelihood of having differences between contralateral hips. This has implications in reconstruction and fracture care and suggests that utilizing the other limb as template may not be as accurate as we think.