Prevalence of Limb Length Inequality in an Asymptomatic Population

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INTRODUCTION: Leg length discrepancy (LLD) has long been considered a key factor in patient satisfaction following total hip arthroplasty (THA). Outcomes following THA have generally been excellent, although limb length inequality has been shown to be a leading cause of litigation as a result of this procedure. A residual difference in limb length following THA can prompt patients to complain of limping, back pain, neurological injury, and revision surgery in severe cases. While the subject has been discussed extensively in the orthopaedic literature, there is limited research into limb length discrepancy in the asymptomatic population. The purpose of this study is to examine the prevalence of LLD in patients who are not actively experiencing arthritic hip pain. By evaluating a baseline of the magnitude and prevalence of limb length discrepancy in the general populace, we may be better suited to treat and improve patient outcomes following total hip arthroplasty.

METHODS:

Data was collected on asymptomatic patients from 2003 to 2014 at a single institution. In total, 498 patients were identified according to our inclusion criteria. AP pelvis x-rays were obtained for a variety of reasons, including trauma, non-arthritic hip pain, and general screening. This allowed the investigators to use previously validated measures to evaluate limb length discrepancy. These include the teardrop distance (TD) and the ischial distance (ID). We also elected to include acetabular dysplasia in data collection, including acetabular index (AI) and center edge angle (CEA). All measurements were made by orthopaedic residents using the PACS system available at our institution.

RESULTS:

After including all qualifying patients, limb length and acetabular dysplasia measurements were compared to other patient demographics including age, gender, height, weight, BMI, and the laterality of the involved hip. We were able to identify increased TD >4mm in 29.52% of our patients, and >10mm in 3.01%. LLD based on ID showed a difference >4mm in 38.22%, and >10mm in 5.99% of patients. Hip dysplasia was identified in 32.02% of our patients as well. Increased age was noted to be statistically significant in patients with LLD based off of the TD. The mean age of patients with LLD <4mm was 51.76, compared to 72.12 in patients with LLD >10mm ($p=0.041$). Utilizing the ID for measurement of LLD showed a trend toward increased discrepancy based on age as well, but this was not statistically significant ($p=0.3114$). There were no significant differences in LLD or acetabular dysplasia based on gender, height, weight, or BMI.

DISCUSSION AND CONCLUSION: Patients identified in this study were not experiencing any hip pathology at the time of imaging. Therefore, we believe this provides an accurate representation of the asymptomatic population. Utilizing the ischial distance (ID) estimated limb length inequality >4mm in 44.21% of patients. The teardrop distance (TD) was slightly more conservative, with 32.53% of patients demonstrating LLD >4mm. This discrepancy was noted to be more severe in older patients. There is significant variability in limb lengths in the general populace, and we postulate that a moderate LLD (4-10mm) is generally well tolerated.