# Medialization of the Cup During Total Hip Arthroplasty

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## INTRODUCTION:

Placement of the acetabular cup, particularly with regards to medialization of the cup, remains debated today. While classic teaching indicates medialization of the cup to the true floor of the acetabulum, some surgeons may prefer a more anatomic cup position to allow for greater range of motion and preservation of bone stock. Prior studies have correlated lack of medialization to implant failure and longevity, however, these studies, now greater than 20 years old, featured historic and mostly cemented implants, which may not be as relevant with today's modern bearing surfaces and coatings. The purpose of this study was to evaluate whether medialization of the acetabular cup during THA using modern day implants affects the outcome of aseptic loosening.

## METHODS:

This was a retrospective analysis of patients who underwent THA who had a minimum of 10 years follow-up or required revision surgery for aseptic loosening. Patient demographics and details of surgery were recorded. Radiographic parameters were measured on pre- and post-operative radiographs. When preoperative radiographs were unavailable, the contralateral hip was used as a template. Radiographic measurements included acetabular offset (AO), vertical offset, femoral offset and acetabular floor width (AFW). Change in each measurement was defined as the postoperative minus the preoperative measurement. The association between revision surgery and mean offset change was analyzed using univariable linear regression; Student's t-test was used to calculate the difference in means between revision and non-revision groups.

## RESULTS:

149 total patients were included, consisting of 117 patients with long-term follow-up after primary THA who did not require revision surgery, and 31 patients after primary THA who required revision due to aseptic loosening of the cup an average of 7.7 years after primary THA. Mean age at time of primary THA was 60.8 years in the non-revision THA group and 54.3 years in the revision THA group. Patients with no change or increase in AO (corresponding to no change or lateralization of hip center) had 2.9 times (95% CI: 1.3 - 6.6, p=0.0097) increased odds of aseptic loosening compared to those with a decrease in AO (corresponding to medialization of hip center). When evaluating individual measurements, patients who underwent revision THA for aseptic loosening had significantly greater change in AO compared to patients without revision surgery by 2.6mm (increase of 0.7mm in revision group versus decrease of 1.9mm in non-revision group; p=0.013). Similarly, multivariate regression controlling for diabetes and BMI demonstrated a difference of 2.6mm in mean AO change (p=0.018). Revision THA patients also had significant increase in vertical offset by 4.7mm (p=0.00002) and significant decrease in femoral offset by 3.8mm (p=0.029) compared to the non-revision patients. Change in combined offset and AFW were not significantly different between the two groups.

#### DISCUSSION AND CONCLUSION:

In the studied cohort, aseptic loosening was significantly associated with increased acetabular offset after primary THA, with nearly 3 times increased odds of aseptic loosening compared to those with decreased acetabular offset after primary THA. Medialization of the cup and hip center of rotation (with corresponding decrease in acetabular offset) during primary THA may remain an important factor for longevity of modern day cementless hip arthroplasty implants.