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What safe-zone? The Majority of 224 Dislocated THA were within the Lewinnek Zone

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Introduction: One long held tenet is that cup inclination and anteversion should be 40±10° and 15±10°, respectively, to minimize dislocations after primary total hip arthroplasty (THA). Recent interest in navigation, robotics and advanced 3-D imaging has focused on those classic targets defined by Lewinnek in 1978. In contemporary THA practice (characterized by multiple femoral heads size options, multiple liner options, and the predominance of uncemented femoral fixation) whether those target values accurately predict dislocation remains poorly understood.

Methods: From a consecutive cohort of 11,246 primary THAs done at our institution between 2003 and 2012, we retrospectively identified 224 THAs (1.9%) which subsequently dislocated. Clinical demographics including age, gender, and BMI, as well as radiographic parameters including inclination, anteversion, center of rotation, and limb length discrepancy were analyzed. The mean age was 64 years, mean was BMI 29 kg/m2, and mean time to first dislocation was 18 months. Minimum follow-up was 2 years.

Results: The majority (58%) of these dislocated THAs had an acetabular socket position that was within the Lewinnek safe-zone. Mean cup inclination was 44±8° (95% CI = 42-45°), with 84% within the safe zone. The mean anteversion was 15±9° (95% CI = 13-16°), with 69% within the safe zone. The mean lateralization of the center of rotation was 6 ±4mm from the native center of rotation, and the mean limb length difference was 4±7 mm longer.

Conclusion: The historical target values for cup inclination and anteversion defined by Lewinnek may be useful, but should not be considered a safe-zone given that the majority of these contemporary THAs which dislocated were in fact within those target values. It is likely that the ideal cup position for some patients lies outside the Lewinnek zone and that more advanced analysis is required to identify the right target in that subgroup.