What Safe Zone? The Vast Majority of Dislocated THAs Are Within the Lewinnek Safe Zone for Acetabular Component Position.

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Abstract

BACKGROUND: Numerous factors influence total hip arthroplasty (THA) stability including surgical approach and soft tissue tension, patient compliance, and component position. One long-held tenet regarding component position is that cup inclination and anteversion of 40° ± 10° and 15° ± 10°, respectively, represent a "safe zone" as defined by Lewinnek that minimizes dislocation after primary THA; however, it is clear that components positioned in this zone can and do dislocate.

QUESTIONS/PURPOSES: We sought to determine if these classic radiographic targets for cup inclination and anteversion accurately predicted a safe zone limiting dislocation in a contemporary THA practice.

METHODS: From a cohort of 9784 primary THAs performed between 2003 and 2012 at one institution, we retrospectively identified 206 THAs (2%) that subsequently dislocated. Radiographic parameters including inclination, anteversion, center of rotation, and limb length discrepancy were analyzed. Mean followup was 27 months (range, 0-133 months).

RESULTS: The majority (58% [120 of 206]) of dislocated THAs had a socket within the Lewinnek safe zone. Mean cup inclination was 44° ± 8° with 84% within the safe zone for inclination. Mean anteversion was 15° ± 9° with 69% within the safe zone for anteversion. Sixty-five percent of dislocated THAs that were performed through a posterior approach had an acetabular component within the combined acetabular safe zones, whereas this was true for only 33% performed through an anterolateral approach. An acetabular component performed through a posterior approach was three times as likely to be within the combined acetabular safe zones (odds ratio [OR], 1.3; 95% confidence interval [CI], 1.1-1.6) than after an anterolateral approach (OR, 0.4; 95% CI, 0.2-0.7; p < 0.0001). In contrast, acetabular components performed through a posterior approach (OR, 1.6; 95% CI, 1.2-1.9) had an increased risk of dislocation compared with those performed through an anterolateral approach (OR, 0.8; 95% CI, 0.7-0.9; p < 0.0001).

CONCLUSIONS: The historical target values for cup inclination and anteversion may be...
useful but should not be considered a safe zone given that the majority of these contemporary THAs that dislocated were within those target values. Stability is likely multifactorial; the ideal cup position for some patients may lie outside the Lewinnek safe zone and more advanced analysis is required to identify the right target in that subgroup.

**LEVEL OF EVIDENCE:** Level III, therapeutic study.

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