

Title

Achieving Cup Target as per Spinopelvic Assessment is associated with improved THA outcome

- A prospective, multi-center study

Authors

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Background:

Different methods can help to optimize sagittal cup orientation in total hip arthroplasty (THA) based on individual spinopelvic characteristics. This study aimed to (1) assess how often Combined Sagittal Index (CSI)- and hip-spine-classification targets were achieved post-THA, (2) compare anteversion/inclination between cups in-/outside optimal CSI-zone, and (3) determine association with outcome.

Methods:

This is a multicenter, prospective, case-cohort study of 435 primary THA for osteoarthritis (53% females; age:65±12years-old) (58% lateral-, 29% anterior-, 13% posterior-approach). No robotics or dual-mobility were used. Patients underwent spinopelvic radiographs to measure parameters including. Unbalanced spine was defined as $PI-LL \geq 10^\circ$ (PI: Pelvic Incidence; LL: Lumbar Lordosis), stiffness as $\Delta LL < 20^\circ$. Optimal cup orientation was based on CSI-targets: 205-245° for balanced spine (n=327), or 215-235° for unbalanced spine (n=108), hip-spine-classification targets

($\pm 5^\circ$), and conventional inclination/anteversion of $40/20^\circ \pm 10^\circ$. Patient-reported outcome was measured using Oxford Hip Score (OHS).

Results:

CSI-targets were achieved in 60% (n=261/435), whilst 44% had cup position within hip-spine-classification targets (n=125/284). Anteversion was higher among cups within CSI-targets ($26^\circ \pm 8^\circ$ vs. $22^\circ \pm 10^\circ$; $p < 0.001$). Dislocation-rate was lower (0.4% vs. 1.7%; $p = 0.178$), and post-operative OHS was better among those within CSI-targets (42 ± 8 vs. 40 ± 9 ; $p = 0.003$) or within hip-spine-classification targets ($p = 0.028$), but not according to conventional orientation ($p = 0.384$).

Conclusion:

Awareness of adverse spinopelvic characteristics and using sagittal characteristics (especially CSI) can help surgeons to achieve optimal cup orientation, improving outcome and reducing dislocation-risk post-THA, without the need of dual-mobility.

Key words: Spinopelvic assessment, Total Hip Arthroplasty, Dislocation, Outcome, Acetabular cup orientation

Level of evidence: II (Prospective case-cohort study)

