

Variation in supine pelvic tilt in patients undergoing total hip arthroplasty

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Introduction: Studies have shown that ½ of all cups placed during conventional total hip arthroplasty are malpositioned¹⁻⁴. Surgical navigation affords the opportunity to place acetabular components with greater accuracy⁵⁻⁷. Yet, as accuracy improves, questions arise as to the optimal position of the acetabulum on an individual patient basis. One variable to consider is preoperative pelvic tilt. The current study reports on the variation in preoperative pelvic tilt.

Methods: CT studies in 473 patients undergoing CT-based computer assisted total hip arthroplasty were assessed. As part of the planning, the supine pelvic tilt was measured in all patients. Planning was performed either using the CT based BrainLAB planning system (BrainLAB AG, Feldkirchen, Germany) or the HipSextantTM Navigation system (Surgical Planning Associates Inc., Boston, MA).

Results: Measurement of pre-operative supine pelvic tilt using CT in 473 patients revealed a mean of $4.58^\circ \pm 6.43^\circ$ and a range of -16° to 22.9° . In 227 men, the mean supine pelvic tilt was $3.55^\circ \pm 6.48^\circ$ with a range of -16° to 22.9° . In 246 women, the mean pelvic tilt was $5.52^\circ \pm 6.24^\circ$ with a range of -12.2° to 22.8° .

Discussion: The current study demonstrates a very wide range of supine pelvic tilt in patients undergoing total hip arthroplasty. This parameter should certainly be considered by surgeons when determining optimal cup positioning in individual patients. While some authors have advocated using “adjusted anteversion” to fully incorporate supine pelvic tilt into the cup orientation goal⁸, we do not feel that there is sufficient evidence to support this recommendation. Rather, while it is clear that cup position should be changed to partially accommodate to the native supine preoperative pelvic tilt, we feel that a better understanding of spino-pelvic flexibility on an individual patient basis and of change in pelvic tilt following hip arthroplasty is needed to further refine treatment recommendations on an objective basis.

References

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