

LONG-TERM MEASURES OF IMPLANT FIXATION IN CEMENTED AND UNCEMENTED TOTAL KNEE ARTHROPLASTY

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BACKGROUND: Predictive models of long-term implant fixation of total knee arthroplasty (TKA) based on radiostereometric analysis (RSA) have to date focused on short-term measures of implant migration. The presence of “continuous migration” (migration that has not stabilized) in the second post-operative year is currently the best indicator of risk for later mechanical loosening. The objective of this study was to determine the value of inducible displacements as an alternative measure of implant fixation, specifically comparing cemented and uncemented TKA.

METHODS: Inducible displacements of tibial base plates in TKA were measured from supine to single-leg stance standing exams with RSA (n = 274; 193 cemented components, 81 uncemented components) from 6 months to 10 years from surgery. Implant migration was measured from post-operative reference exams to follow-up exams at the same times as inducible displacement assessments.

RESULTS: Uncemented components demonstrated higher early inducible displacement (within the first 3 post-operative years, $p < 0.001$), but lower late inducible displacement at 10 years compared to cemented implants ($p < 0.001$). The correlation between migration and inducible displacement was greatest for uncemented components in the first year (Pearson correlation coefficient = 0.58, $p < 0.001$). Inducible displacements were significantly higher for continuous migrators, especially for uncemented components (0.27 ± 0.20 mm for stable fixation versus 0.45 ± 0.27 for continuous migrators, $p = 0.001$).

CONCLUSION: These findings suggest successful long-term fixation is achievable without cement and that long-term cemented fixation may not be completely stable, possibly susceptible to mechanisms such as cement delamination. A potential application of inducible displacement is screening uncemented implants in the first post-operative year to identify failure to achieve adequate osseointegration.