

# Ten Year Migration and Inducible Displacement of Cemented and Uncemented Tibial Components in Total Knee Arthroplasty

Elise Laende<sup>1,2</sup>, Glen Richardson<sup>2</sup>, Michael Dunbar<sup>1,2</sup>

<sup>1</sup>School of Biomedical Engineering, Dalhousie University <sup>2</sup>Division of Orthopaedic Surgery, Department of Surgery, Dalhousie University and Nova Scotia Health Authority, Halifax, Nova Scotia, Canada

## Objectives:

- Compare implant **migration** (permanent displacement) and **inducible displacement** (reversible motion) at 10 years to the migration results in the first 2 post-operative years
- Compare long-term fixation of **cemented** versus **uncemented** tibial components

**Methods:** Subjects who had previously participated in RSA migration studies with two-year follow-up were recruited to return for a long-term follow-up exam, at least 10 years from surgery. The implants studied included two cemented designs (NexGen® Option Stemmed, Zimmer, Warsaw, IN and Advance® Knee System, Wright Medical Technology, Inc., Arlington, TN) and one uncemented (NexGen® LPS Trabecular Metal™ (TM) Monoblock, Zimmer, Warsaw, IN ) design.

At the 10 year visit, subjects had supine RSA exams (Figure 1a) to determine long-term migration as well as a loaded exam (single leg stance, Figure 1b) to determine inducible displacement. Overall migration was quantified as maximum total point motion (MTPM).

Correlation were calculated between early and late migration and cemented and uncemented groups compared with significance set at  $p < 0.5$ .

**Results:** Seventy-five subjects (Table 1) were available for long-term follow-up, with average time since surgery of 12 years (range: 10-14 years).

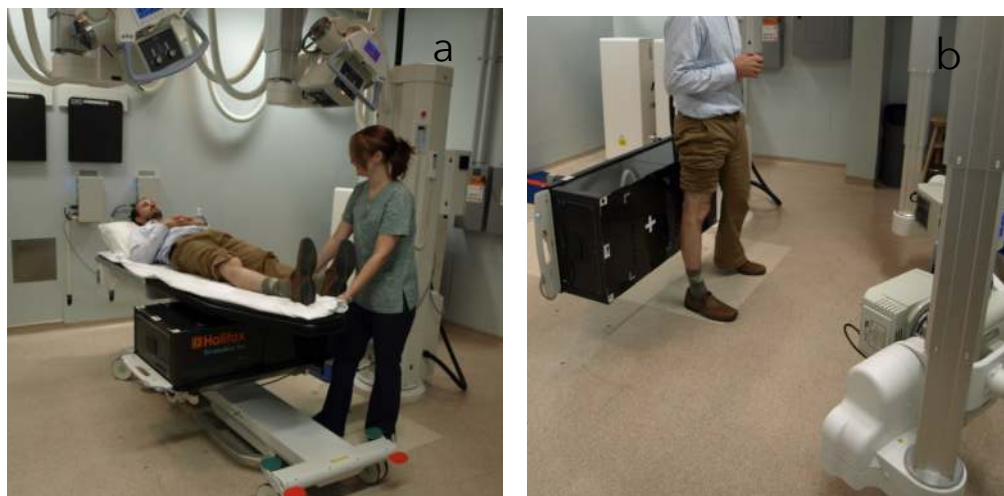
Median migration at the long-term follow-up was 0.6 mm (MTPM; range 0.2-2.8 mm) and was not different between the cemented and uncemented groups ( $p = 0.9$ , Mann Whitney U Test).

Migration at one year and two years was significantly correlated with long-term migration, with the strongest correlation at two years ( $p < 0.001$ , correlation coefficient = 0.74 for all tibial components, Figure 2). Migration at one, two, and 10 years did not correlate with inducible displacement at 10 years.

Inducible displacement at 10 years was significantly lower for the uncemented implants ( $p < 0.001$ , Mann Whitney U Test, Figure 3).

**Conclusion:** While cemented fixation is more common for tibial components in total knee arthroplasty, these findings indicated that uncemented fixation may offer equivalent or better fixation over the long-term, which is of growing importance as arthroplasty is offered increasingly to younger patients.

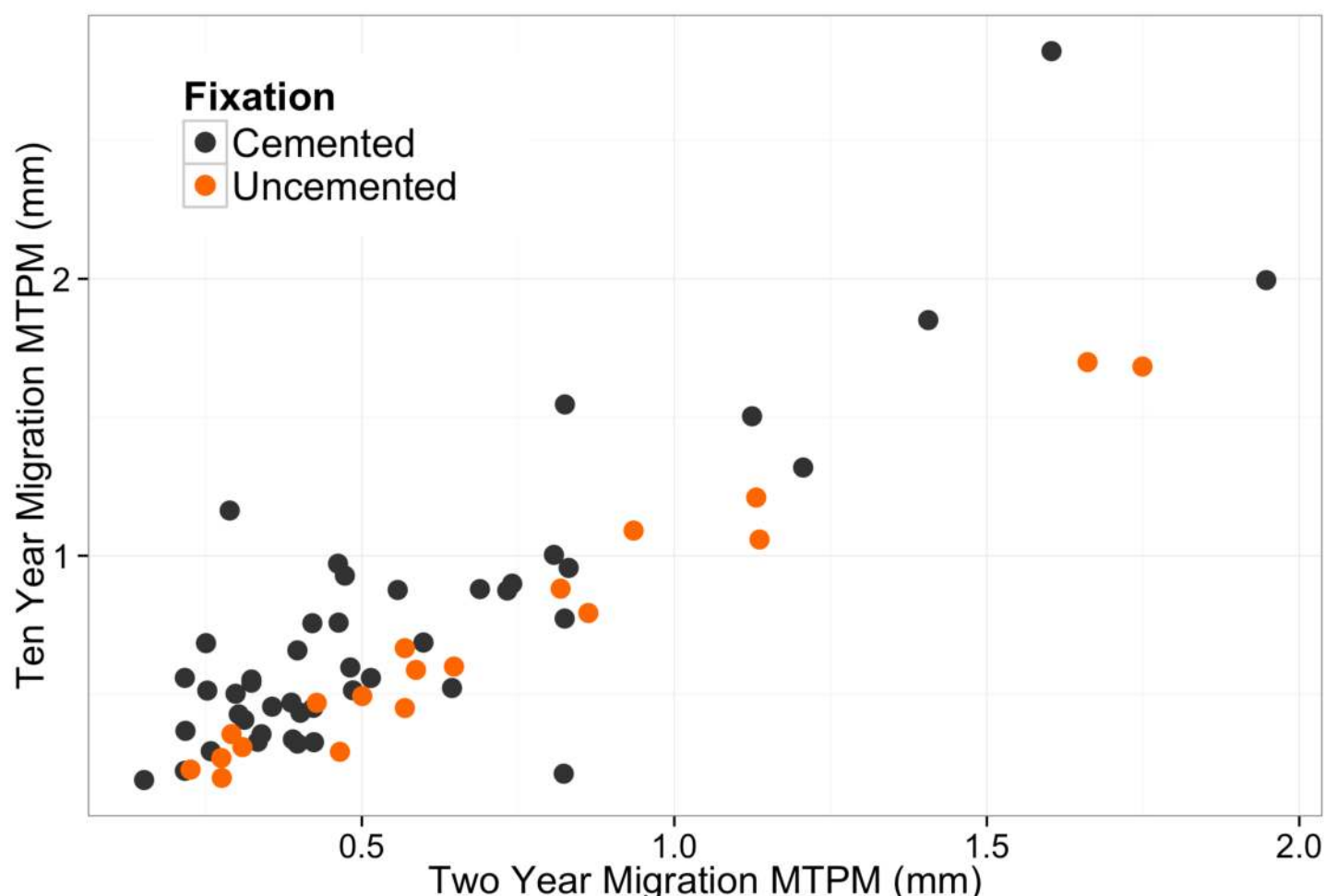
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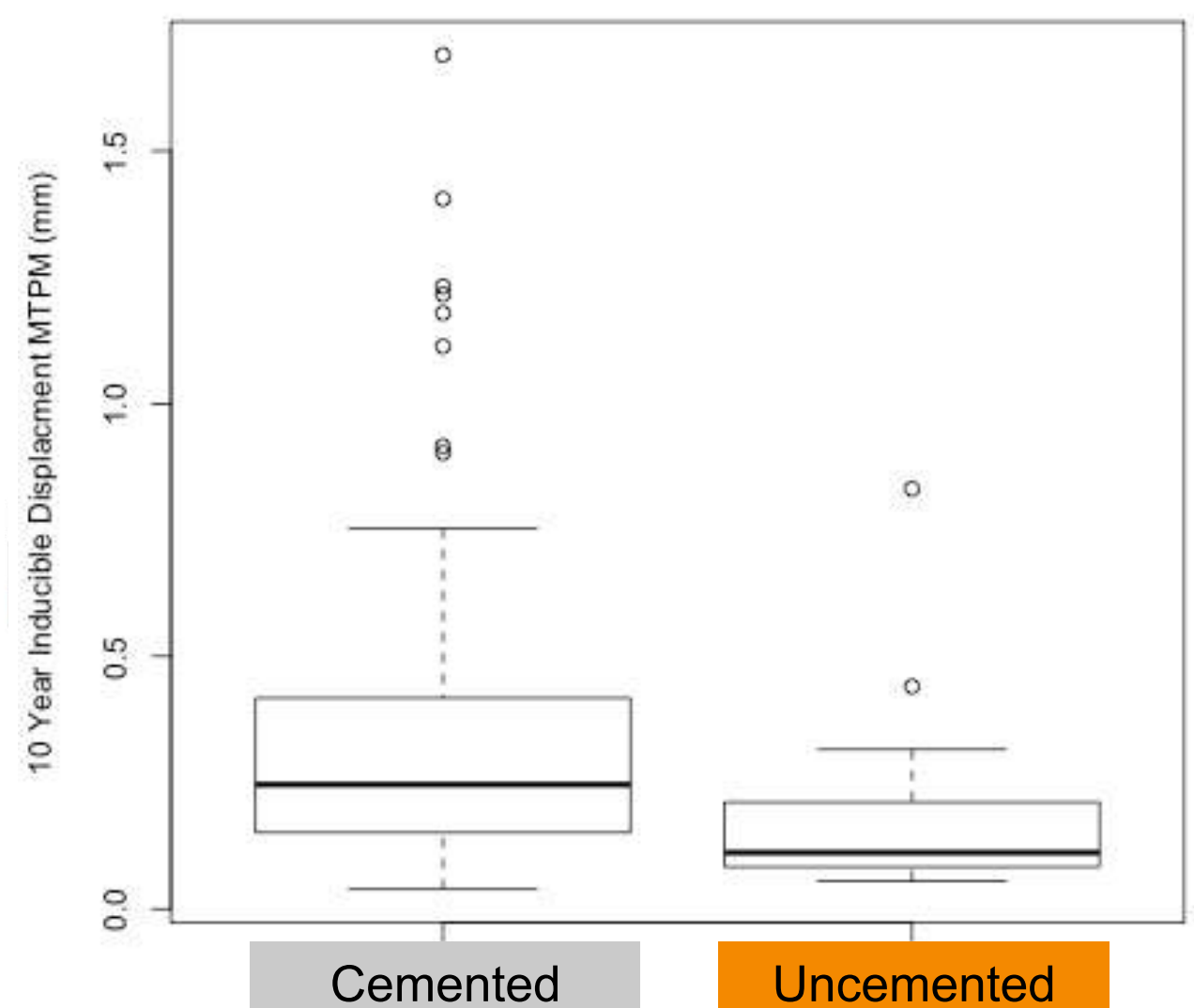
**Figure 1:** RSA exams (a) supine and (b) standing

**Table 1:** Demographic variables (mean (SD))

	Cemented	Uncemented	Combined
n	53	22	75
Age at surgery (years)	62 (7.6)	62 (7.2)	62 (7.5)
BMI at surgery (kg/m <sup>2</sup> )	33 (5.7)	32 (6.6)	33 (5.9)
%Female	71%	62%	68%



**Figure 2:** Two year vs. 10 year migration (MTPM). Spearman's rank correlation coefficients: All subjects:  $\rho = 0.74$  ( $p < 0.001$ ), cemented components:  $\rho = 0.67$  ( $p < 0.001$ ), uncemented components:  $\rho = 0.95$  ( $p < 0.001$ ).



**Figure 3:** Inducible Displacement for cemented (n=53) and uncemented (n=22) tibial components at a minimum of 10 years from surgery. Between group differences  $p < 0.001$  (Mann Whitney U Test).