Pulsatile lavage improves fixation strength of cemented tibial components

Schlegel UJ, Siewe J, Delank KS, et al. Pulsed lavage improves fixation strength of cemented tibial components. International Orthopaedics. 2011; 35: 1165–9.

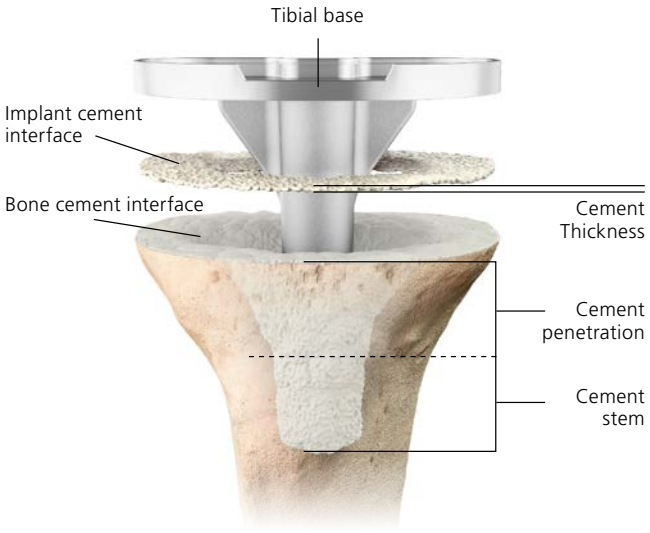
"The aim of this study was to investigate whether the amount of cement penetration into trabecular bone increases in pressure-irrigated specimens and whether the cement penetration depth influences fixation strength in cemented tibial components."

Highlights:

- "This study demonstrates that cement penetration and likewise fixation strength improved significantly when pulsed lavage was used."
- "The bone–cement interface seems to be especially critical in terms of implant survival."
- "Fixation strength of the tibial trays was determined by a pull-out test with a material testing machine. Median pull-out forces and cement penetration were significantly (p=0.031) improved in the pulsed lavage group as compared to the syringe lavage group. Enhanced fixation strength is suggested as being a key to improved survival of the implant."
- "Median pull-out forces were 1,275 N (range 864–1391) and 568 N (range 243–683) in the pulsed lavage group and the syringe lavage group, respectively."
- "In all pulsed lavage specimens failure was induced at the cement–implant interface, while in the syringe lavage group, five of the six failures occurred at the cement–bone interface."
- "A greater cement penetration allows increased contact area with trabeculae in the cancellous bone, improved strength at the interface, hence increased stability of the implant may be expected."
- "In syringe lavage specimens failure occurred at the cement-bone interface, which is a sign for a low interface strength. This is critical, as fixation in this area has been shown to be crucial for the outcome in TKA."

Key points:

- Cement penetration into bone is significantly improved using pulsatile lavage. An increased cement penetration into the bone correlates with greater pull-out strength.
- **When the bond between cement and bone was improved via pulsatile technique, it was more likely that the failure occurred between cement and implant. This was consistent with higher pull out strength.**
- **The lowest pull out strength was observed with failure at the bone-cement interface.**
- Schlegel protocol did NOT include simulated intra-operative motion combined with lipid infiltration as described in the EFORT poster.



Adaptated from Ulhenbrock et al[1]

1. Uhlenbrock A, Püschel V, Püschel K, Morlock MM, Bishop NE. Influence of time in-situ and implant type on fixation strength of cemented tibial trays - A post mortem retrieval analysis. Clinical Biomechanics. 2012; 27: 929–35.

DePuy Synthes
PART OF THE Johnson&Johnson FAMILY OF COMPANIES