FACTORS AFFECTING THE CEMENT PENETRATION OF A HIP RESURFACING IMPLANT: AN IN-VITRO STUDY

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INTRODUCTION
Hip resurfacing is increasingly used in orthopedic arthroplasty. In order to plan and conduct the implantation properly, the operating surgeon needs to know how the cementing technique will influence the cement penetration. Breusch et al. [1] quantified the cement penetration in a conventional hip stem and Morberg et al. [2] investigated the cement-bone-interface histologically. However, no information could be found about cement penetration in hip resurfacing prostheses.

OBJECTIVES
Determine the influence of the following parameters on cement penetration: use of jet lavage, type of cement, and the standing period of the cement.

MATERIALS AND METHODS
The Durom™ Hip Resurfacing implant (Zimmer GmbH, Switzerland) and nine fresh frozen paired whole cadaver femora (mean 47 years, range 26 to 66 years) were used in this study. The standard case was the use of jet lavage for cleaning the prepared bone and Simplex® cement (Stryker Orthopaedics, USA) with a three minute standing time. The femora were divided into three paired groups: (A) compared the use of jet lavage to no jet lavage, (B) compared the two low viscosity cements SULCEM™-3 (Zimmer GmbH, Switzerland) and Simplex®, and (C) a 1.5 minute standing time was compared to a 3 minute standing time. All 18 implantations were conducted within a two day period by an experienced surgeon using the standard OR procedures.

RESULTS AND DISCUSSION
Leaving out jet lavage decreased the mean cement penetration ratio by 62% (p = 0.018), whereas the mean penetration depth decreased by 65% (p = 0.024). No significant differences were seen between SULCEM-3 and Surgical Simplex when comparing the cement penetration ratio (p = 0.71) and depth (p = 0.57). Applying the cement after a standing time of 1.5 minutes instead of 3 minutes resulted in a lower penetration ratio and depth in all cases. However, the results were not significant (p = 0.15, p = 0.16) (Fig. 2).

CONCLUSION
Using jet lavage or increasing the standing time of the cement to 3 min. has the tendency to increase the cement penetration, whereas no difference in cement penetration was found when different cement brands of comparable viscosity are used.

LITERATURE

ACKNOWLEDGEMENT:
The authors acknowledge the great support of the Biomechanics Group at the Technical University of Munich, Germany.