



Dynamic trial fitting of the cup, is the simulated press-fit reliable?

D. Hoornenborg, S. de Waard, I. Sierevelt, D. Haverkamp

Introduction

Trial fitting of the acetabular component in total hip arthroplasty is traditionally done by trial cups, which do not resemble the real press-fit obtained by the definitive cup. The X-pander[®] was developed to mimic the real press-fit obtained by the definitive cup, to ensure that the definitive cup will have a satisfactory press-fit for initial stabilization. The goal of this study was to judge whether the suggested press-fit felt by the surgeon relates the definitive press fit of the cup or X-pander by a biomechanical study on bovine calf acetabulae.

Results

The experienced press-fit as felt by the surgeon had a correlation with the measured lever out force of the X-pander ($r=0,5$ $p<0,001$).

When correlating the assumed press fit with the traditional trial cup with the lever out force of the placed cup, no significant correlation was found in 19 test ($p=0,09$).

Correlation of the cup lever out with X-pander lever-out ($n=9$ diameter 56), $r=0,8$ ($p=0,01$).



Methods

A biomechanical study was performed with bovine calf acetabula, one serie ($n=66$) was done in which the feel of the surgeon regarding press-fit was correlated to lever out of the X-pander. One serie ($n=19$) was done with feel regarding press-fit with traditional trial cup (Stryker Trident) correlated to the lever out of the implanted cup and one serie ($n=9$) in which lever out of X-pander is correlated to lever out of the implanted cup (size 56 Stryker Trident).

Lever out force was measured with a Mecmesmin[®] AFG 2500 N, a digital force gauge and Mecmesmin[®] MultiTest 2,5-dV, a Force Measurement Testing Device For Compression Tests and Traction Testing with VectorPro[™] MT Materials Testing Software.



Conclusion

This biomechanical study shows that dynamic trial fitting can give a good indication of achieved press-fit by the definitive cup.

Drs D. Hoornenborg
Orthopedic surgeon
MC Slotervaart
Amsterdam, the Netherlands
Daniel.hoornenborg@slz.nl