

## O 668 SOFT BEARINGS FOR HIP AND KNEE APPLICATIONS

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**Purpose of the study:** Previous studies have shown the possibility to fabricate both acetabular cups and tibial inserts from soft materials such as polyurethanes, which work in the short term, but durability is an issue. This study addresses the suitability of a new family of polyurethanes based on polycarbonate technology, which offer enhanced resistance to degradation mechanisms and therefore improved durability.

**Materials and methods:** A series of acetabular cups of various internal and external diameters were manufactured by injection moulding from two grades of the material. The harder grade (75D) formed the outer shell, whilst a softer (80A) formed the inner, compliant layer. The products were characterised for biocompatibility, ageing, surface profile, friction, simulated wear, with one series also being implanted into sheep for two years.

**Results:** The moulding process yielded components that were biologically inert according to ISO 10993. The surface profile was smooth (1 micron) with good control over the clearance (0.2mm) and sphericity (<0.1mm). Friction properties showed the system was working with full fluid film lubrication. When tested to 5 million cycles in the hip simulator no wear was apparent, but certain design limitations were noted. *In the sheep study no apparent wear on any of the 24 cups was noted and also no adverse reaction in the surrounding tissue after 2 years implantation.*

**Conclusions:** The outcome of this study shows that a new family of polyurethanes is capable of producing a low wear bearing which is both tolerable and durable. With an optimised bearing design, a limited clinical study is envisioned.