



HYBRIDMANUFACTURING™ - COST BENEFIT WITH SOPHISTICATED MATERIALS AND GEOMETRIES

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INTRODUCTION

JOSSI Orthopedics Ltd.

1. has been producing components and instruments commissioned by providers of implants for orthopaedics and trauma surgery for over 30 years;
2. skillfully uses a unique production method (HYBRIDMANUFACTURING™) which saves processing time as well as material costs;
3. processes all the metals and polymers conventionally used in medical engineering;
4. provides a complete range of development and finishing services from the initial ideas right through to the packaged sterile products.

METHOD

HYBRIDMANUFACTURING™ refers to an intelligent combination of deep drawing and machining processes, designed to ensure that flat material is formed as near to net-shape as possible, so that only minimal processing is required. Unlike casting and forging, which always have to be done at the start of the process chain, forming using HYBRIDMANUFACTURING™ is subject to no such restrictions. Examples of this can be seen in Fig. 1: firstly, the basic form is produced from a titanium sheet. The subsequent stages involve embossing the macrostructure or incorporating shaped structures, such as screw holes.



Fig. 1: Macro-structured shell for acetabular cup for cementless primary implantation (left) and an acetabular roof cup for revision surgery (right).

The two implant types shown in Fig. 1 are only economically feasible to manufacture using forming technology in this way, because the material costs and processing time required for machining from the solid are considerable.

Even structures with more distinctive shapes, such as polyhedrons or fins, can be produced cost-efficiently using forming technology (Fig. 2, 3).

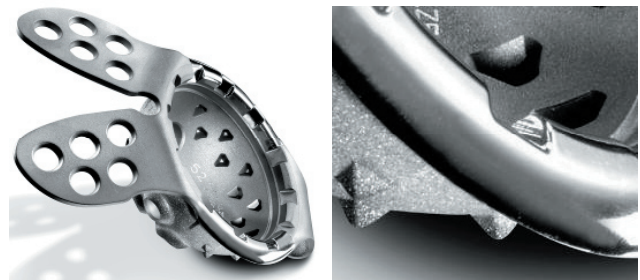


Fig. 2: Cement-free modular revision cup (left) with shaped macrostructures (right).



Fig. 3: Fracture plate, formed near net-shape in a multi-step forming process.

Pure titanium (all grades), titanium alloys, CoCr alloys and high-alloy medical steels are all suitable for forming.

CONCLUSIONS

HYBRIDMANUFACTURING™ means that customers of JOSSI Orthopedics Ltd. are offered the additional option of forming technology as well as conventional machining. Forming technology is always useful for producing large, complex structures which have thin walls or are made from expensive materials. The best current example of this is the thin-walled metal-backs for acetabular cups, the logical consequence of increasingly large ball-head diameters. The reduction in material expenses and processing time creates significant advantages in terms of cost savings, and therefore competitiveness, even when producing small batches.

*Presentation at Meet the Expert, Solothurn, 14th/15th Sept. 2010