

Total hip arthroplasty: Choice of the implant

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Since the early 1960s, total hip arthroplasty (THA) has been an excellent solution for painful hip osteoarthritis. However, even after 50 years of experience, we are still struggling optimizing the materials for the bearings. Bone-implant fixation has two good solutions. Third-generation cementing is an excellent and long-lasting method, especially for the femoral component. The other reliable approach is the use of uncemented porous-coated titanium.

The bearing remains problematic. Wear particles from the gliding surfaces can start cell reactions through foreign-body, allergic, or toxic mechanisms. These can lead to large osteolytic changes in the bone around the components, component loosening, or even massive tissue necrosis and pseudo-tumour formation around the hip joint.

The original Charnley's metal-on-UHMW-polyethylene (MoPE) solution had the benefit of minor volumetric wear because of small head size. Therefore, even in long-term followup, the tissue reactions remained at an acceptable level. On the other hand, the small head lead to a high luxation risk. Metal-on-metal (MoM) bearings were used alongside with MoPE during the 1960s, but MoPE remained the mainstream solution.

The use of modern MoM bearings has increased quickly in this millennium. It took nearly ten years before it was recognised that this method causes severe pseudo-tumour formation in the soft tissues around the hip joint in 1 – 15% of patients during 5 – 10 years (1)

The development of polyethylenes has given rise to a multitude of different hardened cross-linked poly-

ethylene (XLPE) materials. However, oxidation of the polyethylenes over decades in human body weakens the material and causes accelerated breakage of the cup. Because of this, antioxidant E-vitamin has been added to XLPE and thus, hopefully, the long-term outcomes with MoXLPE bearings improve.

Ceramic-on-ceramic (CoC) bearings have been used since the 1970s. Ceramics are the hardest materials used in hip surgery; they are brittle and sometimes the head or the acetabular liner breaks, which leads to a new surgery. However, in the newest generations of ceramics this has been very uncommon. In addition, CoC bearing can cause harmful squeaking for 1-3% of the THA patients (2).

Considering all of the above factors, it can be expected that we will be returning more to the use of MoXLPE bearings with uncemented titanium bone implants (3).

References

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