

Technological Development Challenges and Evaluation in Total Hip Replacement

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Commentary

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DESCRIPTION

Total Hip Replacement (THR) has been superseded surgically with hip resurfacing. The procedure entails resurfacing the articulating surfaces of the patient's hip joint with substantial bone eviction when compared to a THR by screwing a cap (typically made of cobalt-chrome metal), which is hollow and shaped like a mushroom, over the head of the femur and a matching metal cup (similar to what is used with a THR) in the acetabulum (pelvis socket) and the parts are assembled correctly, and the hip is moved, the movement of the joint causes synovial fluid to flow between the hard metal bearing surfaces, lubricating them.

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When compared to THR, hip resurfacing has the potential advantages of comprising less bone removal (Bone Preservation), a reduced risk of hip dislocation due to a relatively larger femoral head size (defined the patient has an anatomically correct femoral head size), and more intuitive revision surgery for any subsequently performed revision to a THR device because the surgeon will have access to more original bone stock. When compared to THR, hip resurfacing offers the potential to be a permanent cure, allowing for normal ROM (Range of Motion), and reduces the amount of "Stress shielding". Two additional benefits result from keeping the femoral neck and not opening the marrow-filled femoral cavity, including a reduced risk of blood clots caused by fatty marrow that can enter the bloodstream. A few potential drawbacks of hip resurfacing include aseptic loosening, metal wear, and femoral neck fractures (rate of 0%-4%).

The surgeon and the patient's anatomy determine whether or not a person is a good candidate for hip resurfacing. Younger patients who are not morbidly obese, meet the criteria for a hip replacement clinically (as determined by the doctor), have non-inflammatory degenerative joint disease, are free of infection, and are not allergic to the metals used in the implant are typically better candidates for hip resurfacing.

Contraindications

Severe femoral head bone loss, big femoral neck cysts (usually discovered during surgery), and Osteoporosis, Osteonecrosis, Rheumatoid Arthritis, and Femoral head cysts larger than 1 cm on an x-ray taken prior to surgery. Due to the uncertain consequences of metal ion release on the fetus, metal-on-metal resurfacing systems are often not advisable for women of childbearing age.

Approaches in the so-called large ball THR devices share this characteristic with hip resurfacing devices, which are metal-on-metal articulating devices that differ from total hip replacement systems in that they are more bone preserving and maintain the natural geometry. To accommodate the stem component of a THR device, the upper portion of the femur bone must be removed. The top of the femoral head is designed to closely fit the underside of the femur cap in hip resurfacing devices, negating the need to cut the femur bone. The fundamental benefit of hip resurfacing surgery is that there is still an undamaged femur bone available for a THR stem in the event that a revision is necessary. When a THR stem needs to be revised, the metal stem in the femur must be removed; during removal and replacement with a bigger diameter stem, frequently most of the bone is damaged. A revision may be simpler to carry out if a hip resurfacing is done when a patient is younger.

Recent research has demonstrated that the success of a hip resurfacing depends on the surgeon's training and experience and that exact alignment of the hip resurfacing parts is essential. Therefore, care should be given when choosing a surgeon with experience and a strong track record, in addition ensuring that a reliable method is employed.