



## HIP REPLACEMENT SURGERY

### STABILITY

The Summer 2008 article reviewed the basic components of a hip replacement (THA). Last month's article reviewed the basic components of a hip replacement (THA). One of the stated goals of this procedure is hip joint stability. Stability refers to the ability of the spherical femoral head to remain in the acetabular component (the prosthetic hip socket). If the femoral head were to come fully out of the socket (hip instability), the hip replacement would be dislocated and would require a hospital visit to relocate the hip joint.

There are several factors which contribute to THA stability. First and foremost is the position of each of the components. The

Figure 1. Components of hip replacement



acetabular component (prosthetic hip socket) is placed into the pelvis with a specific 3-dimensional position and direction. The femoral component is placed into the proximal femoral canal with a specific height and forward twist (called anteversion). The way that these positions affect hip stability is beyond the scope of this article. Suffice it to say, stability is a primary goal for the hip surgeon.

With all else constant, the larger the femoral head, the more stable the hip replacement. The reason for this

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relationship is that the larger femoral heads have more surface area that can be moved in the hip socket. The limiting factor is that as the head size increases, the liner of the shell must become thinner. As discussed last month, the bearing surface of the original hip replacement used a stainless steel metal head and a plastic shell made from polyethylene. Experience with these plastic polyethylene liners has shown that if the liner is too thin (less than 6-8 mm), it will wear out much more quickly. There has been a limit on the thinness of these liners and, therefore the largeness of the femoral heads. A major factor in the long term survival of hip replacements is the ability of the bearing

surfaces (femoral head and socket liner) to resist wear. If the socket liner wears out, revision hip surgery is often necessary.

### MATERIALS

New materials and advances in the production of old materials have decreased the wear rates of bearing surfaces giving the hip surgeon and the patient many excellent choices for bearing surfaces. Today, choices for bearing surfaces include: newer wear resistant polyethylene plastic liners with metal (cobalt-chrome) or ceramic heads, ceramic heads and liners (there are several types of ceramics), and metal heads with metal liners. Significantly, the decreased wear rates of the shell liners allow for thinner liners and, therefore, larger femoral heads. The larger femoral heads, as stated above, increase the stability of the hip replacement.

### MINIMALLY INVASIVE HIP SURGERY

During the past several years there has been an interest in "minimally" invasive surgery of the hip, the goal of which is to minimize the length of the hip scar. Several recent studies in the Orthopedic journals indicate that there is a higher complication rate using the minimally invasive techniques. Many of these complications were related to inadequate positioning of the components which lead to increase instability (higher rates of dislocation) of these hip replacements.

A recent article from the *Journal of the American Academy of Orthopedic Surgeons*

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(Dec. 2007 p. 707 by Vail and Callaghan gives an overall perspective on minimal incision THA and writes, "Total hip replacement may be successfully achieved via smaller incisions, but functional improvement, discharge to home, patient satisfaction, and analgesic requirement may be similar regardless of the length of the incision."

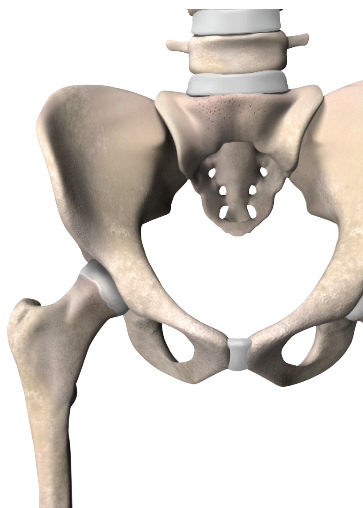
In the context of a hip replacement, the term "minimally invasive" only refers to the length of the incision. The actual bony work and placement of the components (the main portion of the procedure) remain the same. The length of the incision is commensurate with the patient's height and weight. Most arthroplasty surgeons will attempt to minimize a hip incision's length, but without compromising the results.

the potential pitfalls guides the surgeon and patient to take specific precautions. For example, a blood thinner can be given for 4 weeks after the surgery to prevent blood clots related complications.

With all this said, the overall satisfaction with this procedure is quite high. 90%-95% of operations have good or excellent results even after 10-15 years. Some studies have tracked hip replacements beyond 25 years.

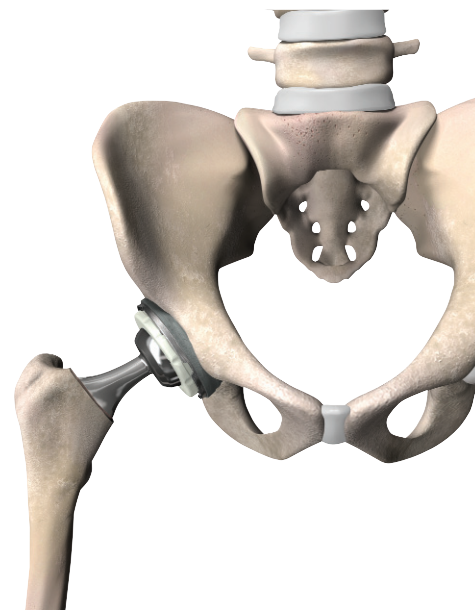
Future articles will explore knee replacement surgery, arthroscopic surgery of the knee, and rotator cuff surgery.

Figure 2. Normal pelvis



## COMPLICATIONS

Potential complications of THA include: Dislocation (discussed above). Infection (which may require further surgery). Fracture of the bone near the metal prosthesis (more common on the femoral side). Injury to a major artery (rare). Injury to a nerve (usually transient, but can leave residual weakness and /or numbness). Leg length discrepancy. Squeak (a sound produced during certain hip movements). This has been seen in some cases of ceramic on ceramic bearing surfaces. Blood clots and pulmonary embolism. Knowledge of



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