Introduction

Joint replacement may provide a dramatic improvement in the quality of life of patients with end-stage arthritis of the hip. However, those who are young and active still pose a formidable problem, as conventional hip arthroplasty does not provide a lasting solution to their needs **(Daniel, et al., 2004).**

Although total hip arthroplasty is quite predictable and durable in older patients, young and active patients have higher rates of revision and these rates are increased when the etiology is osteonecrosis. Because, in the author's view, there was no satisfactory biological or prosthetic solution for the treatment of advanced arthritis in young and active patients, the authors began to investigate metal-on-metal surface arthroplasty in the early 1990s **(Amstutz, et al., 2004).**

Surface replacement arthroplasty (SRA) of the hip is a conservative procedure designed to retain a valuable femoral neck bone stock in the younger and more active patient. The procedure is introduced in the late 1940s and early 1950s **(Amstutz 1991, and McMinn 1996).**

Sir **John Charnley** performed the first hip resurfacing in the early 1950s using thin cups of Teflon. Rapid wear of the Teflon occurred and the wear debris caused an intense tissue reaction and subsequent clinical failure.

Resurfacing hip arthroplasty using a polyethylene cup and a metal head shell had gained popularity in the 1970s and by **1978** several systems were in clinical use. By 1982, however, reports of high failure rates resulted in the procedure being abandoned by many surgeons **(McMinn et al.,1996).**

High volumetric wear of polyethylene plays a central role in peri-prosthetic bone resorption and the failure of metal on polyethylene total hip resurfacing prostheses (**Schmalzried, et al.,1996).**

With the reintroduction of metal on metal bearing surfaces for total hip replacement with improved manufacturing and material properties in1988**,** a new metal on metal designs for surface arthroplasty were also reintroduced. The Wagner type was first implanted starting in 1991, and it consisted of forged CoCrMo alloy articulating surfaces, which were mounted into a Ti coarse blasted contoured shell for osseointegration. The McMinn type was manufactured from cast CoCr alloy **(Anastasia, et al., 2002).**

A cementless acetabular component used for resurfacing with a wall thickness of fewer than 5 mm is comparable in size to acetabular components used for total hip replacement. The fixation of a porous-in growth acetabular component used for resurfacing has been shown to be reliable and durable.

There are few clinical reports of total hip resurfacing that stratify results by diagnosis. However, available evidence indicates that the pain relief, function, and activity after total hip resurfacing for osteonecrosis are superior to the results reported for hemiresurfacing and similar to the results of total hip replacement.

Hemiresurfacing uses a cemented hemispherical femoral head prosthesis that is matched roughly in diameter to the patient’s native acetabulum. As with a conventional (stemmed) hip hemiarthroplasty, there is no acetabular component. Hemiresurfacing is a reasonable option in young patients without evidence of acetabular disease **(Schmalzried, 2004).**

The measured wear of first-generation retrievals of metal-on-metal implants has been reported to be only a few micrometers per year. Unlike the adverse effects of increased volumetric wear of polyethylene as a function of increased head size, the effect on wear by increasing the head size in metal-on-metal components is minimal. For these reasons, **Amstutz,** began to implant metal-on-metal surface replacements. Initially he used the fully cemented McMinn and fully cementless Wagner designs **(Amstutz , et al., 2004).**

Development of resurfacing arthroplasty began in 1989 and the following features were considered essential :

1. Thin component to avoid undue resection of femoral head or acetabular bone stock .
2. The articulation of a large diameter head femoral component against socket without production of excessive wear debris.
3. Use of materials and design criteria with a known clinical record .
4. Technique and instrumentation to avoid femoral neck notching and varus placement of the femoral component **(Mc Minn et al.,1996).**

The success of hip resurfacing is, at least to some degree, dependent on the quality of the starting material, the anatomy (size and shape), bone density and viability (vascularity) of the femoral head and neck **(Silva et al 2004)**.