# "Tissue Sparing Conservative Approach To the Hip-Posterior Approach"

By
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**"It is important to know where we came from less we forget the mistakes of the past." It is also important not to lose sight of our goals and not be unduly influenced by current trends. Successful surgery is simple, reproducible and predictable.**

THA has been and continues to be an excellent surgical treatment for diseases of the hip joint. Current clinical results demonstrate 97% good to excellent results at 15-17 years as compared to 95% at eight years for hip resurfacing (HR). At first glance, one would think these results were comparable. However, we must remember that indications for HR are at most 10% of THA.

So what is the driving factor for HR?

We believe that this is patient driven. Patients are under the impression that this is a conservative surgical approach as compared to traditional cementless THA because of less femoral bone resection.

Hip resurfacing however requires a more extensive soft tissue exposure which has consequences.

Most hip surgery in the Unites States is done via the posterior approach which has been shown to significantly affect blood flow to the femoral head in HR.

The direct lateral and modified lateral approaches have been associated with an incidence of postoperative abductor weakness and slower recovery.

The anterior approach provides good exposure of the acetabulum but can be challenging in mobilizing the femur for proper exposure. Some advocate the use of traction tables and or special retractors in combinations with a second incision to provide adequate exposure.

Current HR employ a MOM bearing. Containdications for HR and MOM bearings include:

- Women of childbearing age
- Osteopenia
- Patients with metal sensitivity
- Patients with renal disease
- AVN

Additional concerns with HR are:

- Steep learning curve
- Extensive soft tissue exposure
- Acetabular fixation
- Very sensitive to implant malposition (femoral and acetabular)
- Long-term exposure to metal ions

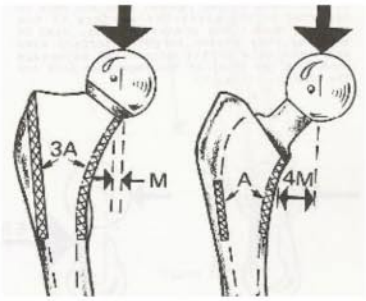
Recent developments and past-experience in neck sparing designs may offer a truly tissue sparing (both bone and soft tissue) approach to total hip arthroplasy.

Dorr has clearly demonstrated that the MIS posterior approach has better early pain relief and function as compared to conventional posterior surgical incisions. However bone conservation in-the-form of neck sparing designs goes back to the 1980s and is credited to Michael Freeman.

Freeman's design concept was a neck-sparing stem that would have the following objectives:
• minimize the incidence of asceptic loosening
• conservative femoral bone resection
• Reduce tensile and sheer stresses at the implant-interface and transfer hoop tension into compressive forces at the implant-interface.

Freeman in describing the biomechanical forces in the reconstructed hip went as far as to say "the design of all conventional arthroplasty is made worse since the femoral neck is routinely resected." He also stated: "This is done for reasons that are purely historical". Drs. Moore and Thompson designed stems for the treatment of femoral neck fractures, and for this reason, the femoral neck had to be discarded. In the typical arthritic hip, the neck is intact and therefore it can be retained. There is significant mechanical advantage in retaining the femoral neck, which results in a reduction of torsional forces placed on the implant-bone interface.

As you can see by this illustration, since bone now extends upwards to reach the inferior surface of the femoral head, the area of bone available to resist downward migration of the component is increased (by a

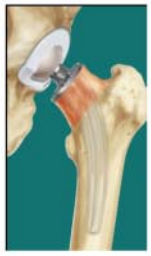



factor of about three), while the length of the moment arm, is reduced by a factor of about four.

Two additional papers by Freeman back up his concept of neck retention: Freeman, M.A.R., Rasmussen, G.L., Camargo, J.N. and Burton, K.C. "Cementless Fixation of Prosthetic Components in Total Hip Arthroplasty" In "The Young Patient with Degenerative Hip Disease", ED. I Goldie. Pub. Almqvist & Wiksell International Ltd. 1985 Freeman, M.A.R., "Why Resect the Neck? JBJS 1986

Dr. Charles Townley, of Port Huron, Michigan entered the market with a neck-sparing device called the Horizontal Platform Stem marketed by DePuy in the 1980's. This lead to his current device the PSL which is basically the same stem however manufactured and distributed by a company he Founded "BioPro"
" The prosthesis must load the supporting bone over the largest possible surface area of the remolded cortical arc, and in the normal direction ordained by the trabecular pattern" ( Townley,Orthopedics Today, October 1990).

Professor Pipino from the Department of Orthopaedics and Traumatology, Policlinico of Moza, Milan, Italy has been working with neck sparing stems for the past 25 years. His original design series spanned from 1979 to 1996. His original stem was a cobalt chromium alloy, straight stem, 4 sizes, with a single CCD angle of 135° He has strongly advocated a tissue-sparing approach for both soft tissue and hard tissue (bone). "This is achieved, in THA, by conservation of the femoral neck through-the-use of a mini-stem." (J. Orthopaed Traumatol (2006) 7:36-41)

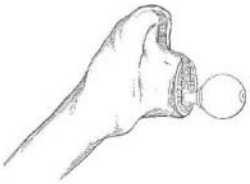


**CFP Stem**

His updated design the CFP stem maintains many of the original design concepts. However, he has changed material to titanium alloy to reduce stiffness of the stem and has added additional sizes and surface texturing to improved torsional resistance. In his March 2006 paper he reported on 943 stems demonstrating a high percentage of excellent clinical results and good radiographic appearance.

Leo Whiteside, M.D., from the Biomechanical Research Laboratory St. Louis, Missouri has been another strong advocate of neck sparing stems. Dr. Whiteside started his research in the early 1990's and he remains enthusiastic about the advantages of this concept. Some of his biomechanical studies clearly demonstrate the initial advantage in torsional resistance and stability of the stem. Although some proximal remodeling is observed with this design he continues to use the Quatroloc stem.

" Changes in direction of principal strain in the substance of the medial femoral bone show how bone must adapt to the bone-implant-interface."( Whiteside, 63rd Annual Meeting of the AAOS Feb. 22-26, 1996)



The NSA™ (Neck Sparing Approach), MSA™ (Muscle Sparing Approach™) stems are curved,short,neck sparing designs. Their design incorporates both head and neck modularity, a sagital distal slot, and a proximal design based on finite element analysis to load the medial calcar.

**Posterior Surgical approach**

MIS has been defined as an incision length 10-12 cm or less. The senior author has evolved slowly into this small incision approach as a natural progress of experience. At no time, has he promoted the use of MIS or small incisions over conventional surgical exposure, and still feels that adequate exposure is of vital importance. The posterior approach is familiar to most surgeons, requires no special instruments and has not added any additional time for the procedure.

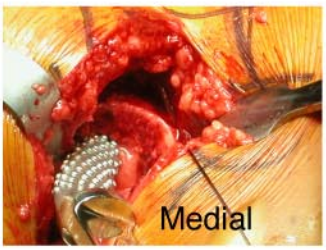
It should be noted that intraoperative x-rays are our standard routine and we feel this is a vital aspect to the success of our past, current and future outcomes for THA. Certainly there is evidence that malpostioning of implants has increased since the increased use of smaller surgical incisions. Future developments in surgical navigation could also prove to be of benefit.

As with Dorr's technique, the patient is positioned in the lateral decubitis position. The skin incision is a short oblique incision centered over the posterior aspect of the greater trochanter.. The fascia is divided in line with the fibers of the gluteus maximus. The gluteus maximus muscle is split for about 10 cm. At this point a Charnley self-retaining retractor may then be placed. The abductor musculature is protected and the piriformis tendon is released. The remaining short external rotators and gluteus maximus tendon insertion are not disturbed. The posterior capsule is incised at the base of the neck superiorly, posteriorly and inferiorly and "T" posteriorly. The acetabular insertion of the capsule is preserved. Incising the anterior capsule superiorly is often performed to release contractures.

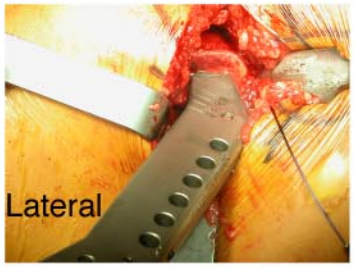
The subcapital high neck resection in no way restricts acetabular exposure.

Femoral exposure is simplified without the need to dissect the soft tissue of the pirifromis fossa, resect the lateral femoral neck or disturb the medial greater trochanter and abductor insertion.

The femoral canal is entered with a small curved Mueller rasp. The curvature mimics that of the natural medial curvature of the femur and preserves the proximal lateral cortex of the neck.




**Note:**
**The higher the neck resection the smaller the size of the stem.**




**abductor musculature is protected ⇒**

Surgical approach with prototype instruments that clearly demonstrate the ability to convert a high neck resection into a conventional cementless THA without difficulty.

A standard box chisel is used to open a direct line into the femoral canal, followed by a short tapered hand reamer then impaction broaches used in incremental sizes. A standard proximal modular tapered cementless stem is inserted, intraoperative x-ray taken to confirm targeted restoration and case closed.