



# Neck Sparing Total Hip Arthroplasty -Lessons Learned-

by

Timothy McTighe, Dr. H.S. (h.c.)

Executive Director, JISRF, Chagrin Falls, Ohio

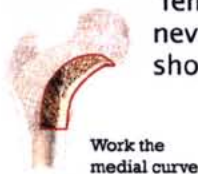
J. Keggi, K. Keggi, L. Keppler, R. Kennon, F. Schmidt, C. Bryant, L. Rubin,  
S.D. Stulberg, T. Aram, B. Vaughn, E. McPherson, B. Walter,  
D. Brazil, A. Turnbull, A. van der Rijt, I. Woodgate,

**Introduction:** Architectural changes occur in the proximal femur after THA and can lead to implant loosening and or breakage. Previous surgeon designers (Freeman, Townley, Whiteside and Pipino) have advocated the idea of neck sparing stems. However, to-date most neck sparing stems have had disappointing results regarding maintaining proximal bone mineral density. Our aim was to identify design features that would improve proximal load transfer, simplify surgical technique, and be economical by inventory size and cost.

**Materials and Methods:** Review of previous published work was evaluated along with new FEA modeling providing for a new approach to a neck sparing short curved stem design. Hundreds of radiographs were evaluated for sizing. A number of cadaver workshops along with twenty intra-operative trial implantations were performed to aid the development of a simple and reproducible surgical technique. All surgical approaches have been used. The review process provided for a novel new design that was validate by the fabrication and implantation of five custom stems with post operative follow-up between **twenty-four and thirty months. This has lead to two stem designs (ARC™ and MSA™ Stems)**

**Results:** Over 200 stems have been implanted to date (between Australia-MSA & U.S.- ARC) with no revisions. Direct anterior, anterior-lateral and posterior small incisions have been used with no difficulty for access to the socket or proximal femur. Radiographic review clearly demonstrates the need for 20° of internal rotation for proper measurement of femoral offset and medial neck curve. Surgical intraoperative evaluations demonstrated any standard conventional or small incisions works with this stem. The anterior single incision is especially attractive since the curvature of the stem reduces the need as compared to standard length straight stems for femoral mobilization. FEA modeling demonstrated improved proximal strain patterns to the retained femoral neck. Fatigue FEA modeling showed reduced implant strains in the modular neck as a result of a shorter bending moment by retention of neck sparing feature.

**Clinical / Surgical Impressions:** There are three distinct technique related features; the level of the neck resection, the angle of resection and rasping the medial curvature of the femoral canal. The learning curve is about three cases and never do you risk being able to convert to a standard or short conventional style stem if need be.



Although very early in stating any clinical results, impressions are encouraging regarding surgical blood loss, tissue sparing approaches, early rehab, expectance and expectations of our patients. This has been used instead of HR and indications are expanding in some practices as a main stream THA vs. conventional cementless stems. We remain cautiously optimistic and only long term data can validate this new design.

