“Early Learning Experience with a Neck Stabilized THA Stem for Treating Osteoarthritis”

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**Purpose:**

Total hip arthroplasty is one of the most effective orthopaedic procedures with a very high success rate as measured by pain relief, improved function and patient satisfaction. However, since the introduction of total hip arthroplasty in the 1940s, a range of design philosophies for femoral components have demonstrated variable clinical results. Aseptic loosening, joint dislocation, thigh pain, bone resorption and femoral component failure have been some of the complications that plague this procedure.\(^1\) The past few years has seen an influx of so-called short stems with very little clarification as to design features, required surgical technique and long-term clinical outcomes. Most devices, meet with some level of learning curve and most systems do little in the way of warning new surgeons as to the perils - **Dislocation of the hip** and femoral component failure have been some of the complications that plague this procedure.\(^1,2\) The introduction of total hip arthroplasty in the 1940s, a range of design philosophies for femoral components have demonstrated variable clinical results. Aseptic loosening, joint dislocation, thigh pain, bone resorption and femoral component failure have been some of the complications that plague this procedure.\(^1\)

**Why the need for a new design concept?**

- **Concerns with survivorship of young active patients** (Kaplan-Meier 72% to 86% in patients <60 yrs. old)\(^3\)
  - Hips fall for a number of reasons:\(^2,3,9\)
    - Loosening of the hip replacement
    - Infection of the hip replacement
    - Dislocation of the hip
    - Breakage or wearing out of the implant
    - Damage to the surrounding bone (periprosthetic fracture)
- **Concerns with Hip Resurfacing**\(^10,11\) (Decreasing indications)
  - Broader indications
  - Broader selection of bearing material (MoM biological concerns: ALVAL, Aseptic, Lymphocytic Vasculitis and Associated Lesions)
  - More conservative approach (Tissue sparing both hard and soft tissue)
- **Concerns with Rising Health Care Cost**
  - Hip replacements are expected to increase 174% in the next 20 years\(^1\)
  - The number of patients waiting more than nine months for hip and knee replacements in North Wales has increased by 11700%.
  - Less inventory requirements
  - Less instruments
- **Concerns with Retrieveability and Conversion for Revisions**
  - More hard & soft tissue to work with for revision surgery

**Methods:**

One year follow up on 200 cases by three surgeons at different centers. A novel tissue sparing neck stabilized stem design (ARC™ Neck Sparing) was used in all cases.

Two surgeons used the anterior single incision and one surgeon used a small posterior surgical approach. All were implanted with cementless acetabular components of four different designs and three different bearing surfaces. Intraoperative x-rays were taken on all patients undergoing the posterior approach and half of all anterior approach patients had intraoperative fluoroscopy or plain x-rays taken.

FEA studies were evaluated to determine best stem orientation and instrumentation designed and developed for surgical preparation of femoral stem.

**Results:**

FEA Analysis of Neck Stabilized Stem vs. Conventional Cementless Taper Total Hip Stem\(^1,3\)

One stem has been revised due to sepsis and was eventually converted to a primary cementless stem. No stems have been revised due to aseptic loosening. Two modular necks were explanted for exposure to the acetabular component due to dislocations, providing better exposure to the socket while leaving the femoral stem in place.

Two stems were removed one for dislocation and one for pain due to heterotopic bone formation. Both revised to conventional cementless primary stems.

Surgical evaluation clearly demonstrates there is no difficulty for access to the socket or proximal femur when using a neck sparing stem design.

Intraoperative evaluation demonstrated the need for a smaller stem size in small female patients.

**Observations:**

The initial year (April 2010 to April 2011) results of a novel modular neck stabilized curved stem design clearly demonstrates that this approach can be used as a main stream treatment for the osteoarthritic patient.

The advantage of neck sparing stabilized stems saves tissue, both hard (bone) and soft tissue as compared to conventional cementless total hip stem designs. This new approach has the potential benefit of less blood loss, quicker rehabilitation and if necessary easier removal and conventional of revision surgery. We are encouraged with our initial clinical / surgical impression and believe the potential advantages warrant further evaluation of this new approach to THA.