



JISRF – A Classification System for Short Stem Uncemented Total Hip Arthroplasty

by

Timothy McTighe*

S. David Stulberg**, John Keggi**, Louis Keppler**, Tony Aram**, Robert Kennon**, Edward McPherson**, Declan Brazil**



Introduction:

The use of short stems is growing. Initial short and mid-term follow up studies of a number of these stems suggest that stable, durable fixation and excellent clinical outcomes can be achieved. As a result, a very large number of short stem designs are available. However, there does not exist a classification system for uncemented short stem implants that would allow comparisons of clinical and radiographic results. The purpose of this presentation is to propose a classification system based upon the length of the stem and the method by which the stem seeks to achieve stability.



Methods:

25 femoral components described as having “short stems” were evaluated. The range of lengths for each stem type and the method of achieving initial implant stability was determined. The optimum radiographic position of each of these implants and the proposed type of bone remodeling associated with this placement in the proximal femur was evaluated.



Some of these devices are not available in the U. S. and some are new to their clinical experience. As a result this paper makes no assumption as to clinical performance or benefits to certain product feature. This is intended to point out certain trends for hip reconstruction and provide as base for development of the “JISRF Short Stem Classification System”.

Trends:

Conservative approaches to hip development (devices and surgical approaches) are the main focus in total hip arthroplasty at the moment.

The recent MoM concerns have reduced current alternate bearing development. The focus is high on improved polyethylene material matting with improved ceramic heads.

Recent reports with certain convention style stems have raised concerns over the use of modularity at this neck stem junction. Neck stem modular tapers are being used in six of the twenty-five devices we reviewed with success. It is important to remember not all modularity is created equal. Application of modularity in certain design styles like neck sparing have significantly reduced stresses at the modular neck stem junction compared to both conventional monoblock and modular designs.

The European experience with certain styles of conservative designs are years ahead of the U.S. experience. So it is reasonable to look towards Europe for both trends and early to mid-term clinical results.

Head Stabilization

Hip Resurfacing

The procedure is bone-conserving on the femoral side because most of the joint is retained.



Sub Class of Head Stabilization

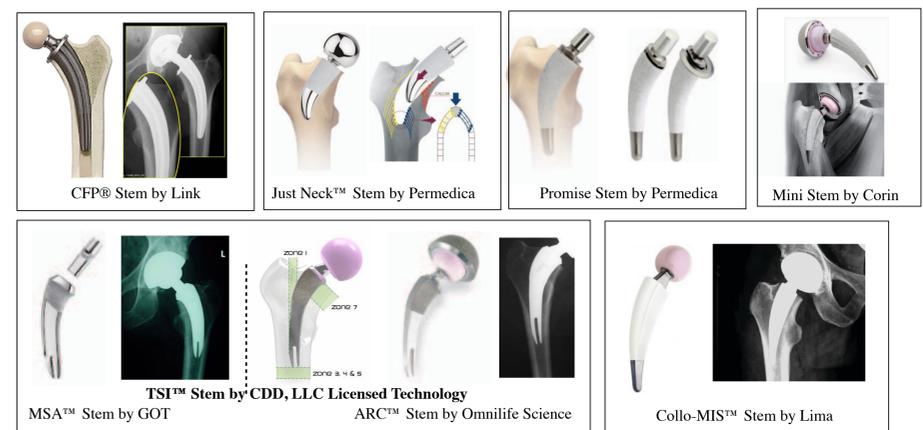
Mid Head Stabilization

The BMHR (Birmingham Mid Head Resection) is an alternative, bone-conserving hip device for young and active patients who are unsuitable for a BHR.



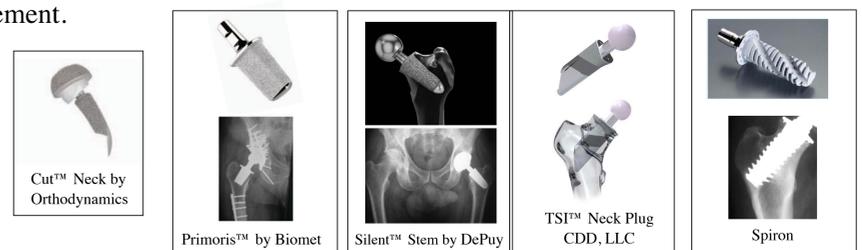
Neck Stabilization

This is one of the fastest growing market segments for short stems. Historically femoral neck retention was advocated by Freeman, Townley, Whiteside and Pipino. Only Pipino advocated a short curved neck sparing stem. Freeman, Townley and Whiteside all advocated saving the neck with the use of standard length stems that engaged the neck, metaphysis and diaphysis.



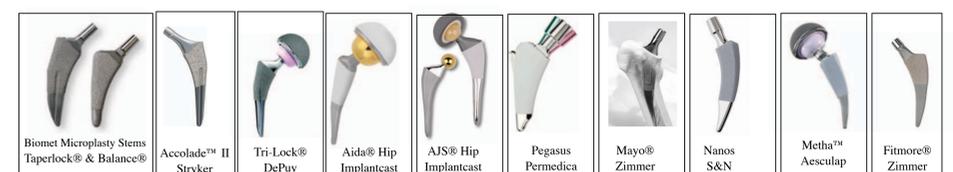
Part of the Neck Stabilized Family (Plugs)

Devices that are designed to sit in the femoral neck and have minimal metaphyseal engagement.



Metaphyseal Stabilization

There is a long history of using short metaphyseal stems that include anatomical, straight, and tapered style stems. Variable results have been seen often depended on surgical technique, bone quality and patient related activities.



Summary:

Not all short stems generate the same radiographic findings and or clinical results. It is also important to appreciate the specific design and appropriate surgical technique for a given design.

This classification will help differentiate and clarify when reporting on the design and clinical findings of short stem total hip arthroplasty.

JISRF Short Stem Classification System

1. Head Stabilized
2. Neck Stabilized
3. Metaphyseal Stabilized
4. Conventional - Metaphyseal/
Diaphyseal Stabilized



*Executive Director

Joint Implant Surgery and Research
Foundation
Chagrin Falls, OH
www.jisrf.org

** JISRF Tissue Sparing Implant Study
Group