



Joint Implant Surgery  
& Research Foundation



Keggi Orthopaedic  
Foundation

NOVEMBER 8, 2002

**Yale Grand Rounds**

Sponsored by an educational grant from JISRF  
and Keggi Orthopaedic Foundation

# Why Use a Modular Neck Design for Cemented THA?

by

**Hugh U. Cameron, M.B., Ch.B.**

Timothy McTighe, Dr. H.S. (hc)

Bernard Stulberg, M.D.

Kristaps J. Keggi, M.D.

## What are the immediate goals of THA?

### Eliminate Pain

- New Hip

### Restore Function

- Reproducing Hip Mechanics

1. Femoral Offset
2. Neck Length
3. Version Angle



## What are the immediate goals of THA? (cont.)

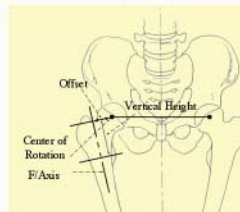
### Eliminate Pain

- New Hip

### Restore Function

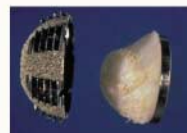
- Reproduce Hip Mechanics

1. Femoral Offset
2. Neck Length
3. Version Angle



## Two Remaining Significant Problems in THA

- Dislocation



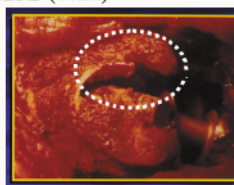
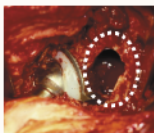
## Dislocation

- Reports from 2-8%
- Higher in Posterior Approach
- Higher in Sm. Dia. Heads
- Higher in Revisions >20%



## Two Remaining Significant Problems in THA (cont.)

- Dislocation
- Osteolysis



Proximal femoral cavity from polyethylene granuloma 4 yrs postop

## Keys to Success in THA

- Technique, Technique, Technique
- Limb Alignment
- Implant Position
- Soft Tissue Balance

- Patient Selection
- Implant Design
- Implant Materials

## Current Trends

- Surgical Navigation Systems
- Mini-Incisions
- Hard on Hard Bearings
- Large Femoral Heads
- Increased use of Lateral Femoral Offsets
- Increased use of Constrained Sockets

## Current Trends Surgical Navigational Systems

- **Challenges in THA**
  - Optimum cup alignment
  - Desired leg length
  - Optimum femoral offset



## Challenges in THA

Cup Alignment  
>30% Malpositing

### Optimum

45° Abduction

20° Anteversion



## Single biggest medical / legal problem in THA

- **Desired Leg Length**



## Modular Neck

### Benefits

- Adjustment of Hip Mechanics
- Less chances of implant impingement
- Option of Stem Insertion Prior to Cup
- Reduced Operative Bleeding
- Modular Site Outside of Bone Interface
- Accessibility to Cup in case of Revision
- Replacement of Ceramic Head if Necessary (new neck taper)

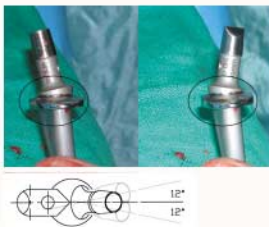
## R-120™ Cemented Stem Collared Design

- Intrinsic Modular Indexable Neck
- C.C. Conventional Styled Stem
- Full Collar
- A/P Teardrop Cement Groove
- Proximal Mate Finish
- Distal tip Polished
- Currently 6 sizes



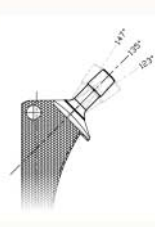
## IMIN™ Features

- **Version Adjustment**  
(8°, 12°, 15°)
- Neck Shaft Angle Adjustment
- Stem Insertion /  
Acetabular Exposure



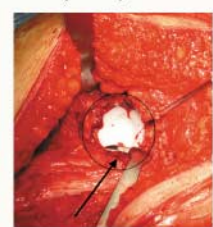
## IMIN™ Features (cont.)

- Version Adjustment
- **Neck Shaft Angle Adjustment**
- Stem Insertion /  
Acetabular Exposure



## R-120™ Modular Neck Features (cont.)

- Version Adjustment
- Neck Shaft Angle Adjustment
- **Stem Insertion /  
Acetabular Exposure**



## Surgical Approaches

- **Anterior**  
Mini-Dual  
Mini-Tri
- **Direct Lateral**
- **Posterior**  
Mini-Dual

## Surgical Approaches

- **Anterior/Lateral (Modified Watson-Jones)**  
Dr. Hugh Cameron, Toronto, Canada



## Stem Driver



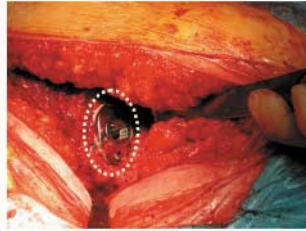
### Trials at position #3

(Cameron)



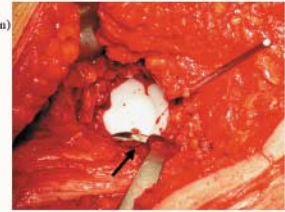
### Stem w/o Neck

(Cameron)



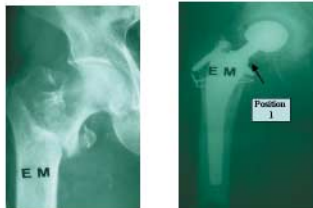
### Cup & Stem w/o Neck in Place

(Cameron)



### Pre & Post-Opt X-ray

(Cameron)



### Posterior Approach

Dr. Bernard Stulberg, Cleveland, Ohio



### Posterior Approach

- R-120™ stem w/o neck in place (B. Stulberg)



### Posterior Approach

- R-120™ post-op x-ray

(B. Stulberg)



### Surgical Approaches cont.

- Anterior mini-dual approach

Dr. Kristaps J. Keggi, Waterbury, CT



### Surgical Approach

- Anterior (Keggi)

Small Single



Dual Mini-Incision



### Surgical Approach

- Anterior (Keggi)

Tri Mini-Incision used for obese pts. (450lbs.)

Closed Tri Mini  
Inferior stab would  
used for drain



### Incision needs to be large enough to insert cup

(Keggi)



### Cup In Place Screw Insertion

Keggi





## Canal Reaming



## Long Straight Femoral Broach



## Femoral Trial Insertion



## Optimum Femoral Offset

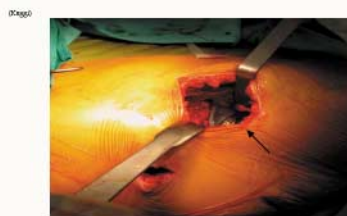
Valgus Neck Shaft Angle  
147° (position 6)

Varus Neck Shaft Angle  
123° (position 0)

(Same pt., same implants,  
different neck positions)



## Femoral Stem & Cup in Place w/o Neck



## Post-op X-Ray



## Ways to Reduce Dislocation

- Anterior or Direct Lateral Approach
- **Restore Hip Mechanics**
- **Modular Neck to Aid in Restoration**
- 32 mm Dia. Head or Larger
- Do not use skirted necks or modular truion necks
- Constrained sockets (not indicated for impingement problems)
- Reduce Use of Angled Poly Inserts
- Navigation System (\$50,000-250,000)

## Summary

- **Modular neck design aids in fine tuning joint mechanics**
- Works with all surgical approaches
- Allows for femoral stem insertion first (aids in reducing blood loss)
- Allows for ease and access in case of revisions
- Reduces chances of mechanical impingement of implants with mini-incision surgical approaches



### Clinical Summary to Date

50 implanted since 1/02 by authors

250 implanted in last 12 months by study group members\*

0 dislocations

0 intra-op fractures

No significant leg length inequalities

70% indexed to positions other than 0

## IMIN™ Study Group Members\*

### Design: R-120™

Hugh U. Cameron, M.B., Ch.B.  
Timothy McTighe, Dr. H.S. (hc)  
Ian Murray, M.E.

### Clinical/Surgical

Milt Smit, M.D.  
Bernard Stulber, M.D.  
John Froehlich, M.D.  
Peter Buchert, M.D.  
Kristaps Keggi, M.D.  
John Keggi, M.D.  
Dave Halley, M.D.



**Joint Implant Surgery  
& Research Foundation**

17321 Buckthorne Drive • Chagrin Falls, OH 44023

Phone: (440) 543-0347 • FAX: (440) 543-5325

info@jisrf.org • www.jisrf.org