Modular Hips to Restore Proper Mechanics



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Introduction:

THA continues to improve but complications still occur. Dislocation and osteolysis continues to be a significant problems. The causes for dislocation can be multi-factorial, and include: mal-positioned components, soft tissue laxity, and impingement of component-on-component or on fixed obstructions such as osteophytes. Weakness of the abductor muscles due to improper reconstruction can also be a contributing factor. In countering these factors, stability is often achieved at the expense of limb lengthening.

What are the Goals of THA?

Eliminate Pain

• New Hip

Restore Function

• Reproduce Hip Mechanics 1. Femoral Offset



Two Remaining Significant Problems in THA

Dislocation

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



2. Neck Length 3. Version Angle

F/Axis	Rotation	1	¥ /	
	F/Axis			
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Osteolysis • Eccentric Poly Wear





Discussion:

Current Dislocation Costs

Estimating a conservative 2% dislocation rate, there would be a corresponding 6,000 dislocated hips each year.

- Non-operatively treated 4,500 (75%) \$6,000 Cost: relocation, brace, x-rays, rehabilitation
- **Operatively treated** 1,500 (25%) **\$25,000** Cost: operation, brace, and rehabilitation

 $6,000 \times 4,500 = 27$ million $25,000 \times 1,500 = 37.5 \text{ million}$

Total cost of dislocations per year in the United States. \$64.5 million

"Wright Medical Web Site"

Dislocation Treatment Trends



Constrained Sockets



Navigation

Big heads are helpful for impingement problems, however do not aid in soft tissue laxity. Constrained sockets are indicated for soft tissue laxity but not indicated for mechanical instability. Surgical navigation is promising to reduce implant alignment problems and dual offset stems are helpful for restoring joint mechanics but increase in-



"Despite a number of improvements in femoral stem neck geometry and increasing femoral head sizes up to 36mm, dislocation continues to be a significant problem after THA" - Dr. Amstutz.

Increased Offset Stems

ventory costs.

Intrinisic Modular Indexable Neck (IMIN[™])



R-120[™] - Cemented



Alfa II[™] - Cementless



3 neck lengths 32, 35, 38 mm





8° & 12°





Surgical Technique:

Technique is the same as any standard fixed neck cement or cementless stem.



Option Stem First - Then Cup



Posterior Approach



Stem Designs





Anterior Mini-Dual Incision

Implant orientation is a significant part of surgical technique. The mini-incision places a higher demand on implant positions. Proximal modular stems provide adjustmens reducing the risk of implant discrepancey, and soft tissue laxity.



Variable 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



Fine Tuning Joint Mechanics



Trials in Place



Joint Stability Range of Motion

Insertion of Neck & Head

Head neck insertion can be done by assembling head onto neck and inserting as a single unit.



Another approach is to insert the modular neck first then assemble the head onto the neck then impacting both tapers.



The Advantage of Proximal Modular Necks: With the trials in place the surgeon can verify joint stability and range of motion without disrupting the implant/bone interface. If necessary, the surgeon can also *fine tune the joint mechanics* by adjusting the modular neck.

<image>

Ways to Reduce Dislocation

- Restore Hip Mechanics
- Modular Necks Aid in Restoration
- Anterior or Direct Lateral Approach
- 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 (Digital \$60,000 / Image 250,000)





Summary

- Modular neck designs aid 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
- Allows for replacement of ceramic heads by replacement of modular neck
- Reduces chances of mechanical impingement of implants especially with mini-incision surgical approaches

2004 Predictions and Concerns

Reynolds

Modularity is here to stay
Increased Pt. activity & BMI influences outcomes & Device Failures
1. High Impact Yield Failure
2. Long Term Fatigue Failure
Increased device malposition due to limited exposure
Increased medical/legal exposure
Early Clinical/Surgical Impressions
No long term data available at this point, however, we are extremely encouraged that this device will aid in reducing post-op dislocations and help restore joint mechanics.









Mammoth Mountain

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