Use of the Woodpecker Pneumatic Broach with the CLP

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Cementless Stem Designs

- Cylindrical (AML, Echelon)
- Anatomic (PCA, Image)
- Tapered
Tapered Stem Designs

- Canal filling (Mallory-Head, Synergy)
- Flat, Oval (Taperloc, Accolade)
- Flat, Rectangular (Zweymüller, CLP)

Primary Rotational Stability

Good fit without fill gets stability from macro-interlock and interfacial friction between prosthesis & cortical bone
Corner-Cortical Interlock

- Tapered AP and ML
- Rectangular
- Non-canal filling
- Grit-blast finish only
- Lateral metaphyseal flare to increase primary torsional stability

Zweymüller Philosophy
Other Similar Designs Followed

- CLP
- Platform
- Others

CLP vs Cylindrical
Primary Stability
Fit and Fill

Advantages of Flat, Rectangular, Tapered Stem

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The Tapered Press Fit Total Hip Arthroplasty
A European Alternative

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My Experience

- 1000 Consecutive Primary THA’s
  - 905 Zweymüller stems
  - 93% osteoarthritics
  - Dorr bone types
    - A: 442
    - B: 474
    - C: 84
  - Mean age – 63.3 yrs (23-93)
  - Most inserted with pneumatic broach (Woodpecker) preparation

“Woodpecker” Pneumatic Broach

- Manufactured by IMT (Switzerland)
- Distributed by Minnestota Bramstedt Surgical Inc., St. Paul, MN
- Adapters available to most broaches
Theory of Operation

- 10mm linear excursion
- Frequency 70Hz (70 strokes/min)
- Forward stroke cuts, backward stroke clears bone chips
- Axial force <1.0 Newton/stroke (0.22 pounds)

Advantages

- Ease of use (no swinging mallet)
- Multiple short, quick strokes rather than large heavy strokes reduce risk of fracture
- Facilitates accurate broaching to minimize gaps between prosthesis and bone
Settings

- Operates at 87-120 PSI
- Low impact setting useful for osteoporotic bone

Technique

- Begin with small broach
- Increase broach size incrementally until resistance encountered
- Broach in straight line
- Exert only moderate pressure (let Woodpecker do the work)
- With CLP, can seat implant 5-10mm lower after initial resistance if necessary to avoid leg length inequality
Provides Precise Cancellous Bone Compaction
Cancellous Bone Compaction

- Delays stress shielding
- Increases primary stability
- Maintains endosteal blood supply

Preservation of blood supply

Live bone heals (osseo-integrates) better than dead bone
Simplicity of removal

- Non-canal-filling stem allows for introduction of thin osteotomes
- Occasional extended trochanteric osteotomy needed due to excellent secondary fixation
  - Easily performed
  - Easily repaired

Minimize Gaps
**Reduction of Hoop Stresses**

- **Bolland, JBJS-B, 2007**
  - In vitro study of bone impaction using Woodpecker device compared to hand broaching
  - Hoop strains significantly reduced using Woodpecker device (13.2% vs 4.2%)
  - Bone impaction equal or better with Woodpecker device

**Revision THA**

- **(Hourlier, Polyclinique de la Thierache, Wignehies, France-unpublished data)**
  - 62 revision THA’s using long, Zweymuller stem
  - Mean f/u 4.8 years
  - All femora prepared using Woodpecker
  - No fractures
  - Mean subsidence 1mm
My 1,000 Cases

- 43% Type A bone
- 48% Type B bone
- 9% Type C bone

8.6% Type C Bone
Fracture Rate

- 4 femoral shaft fractures/1000 cases (0.4%)
  - 2 hand broaching
  - 2 pneumatic broaching
- All in extremely osteoporotic bone

Leg Lengths

- Within 7mm in 912 hips (91.2%)
  - Error likely related to method of leg length determination
- Stem subsidence <2mm in all
Intra-op Adjustability

- Sharp, cutting broaches allow intra-op changes
  - In prosthesis height
    - Leg length
    - Soft tissue tension
  - In prosthesis anteversion
Summary

- Woodpecker pneumatic broach for preparation for CLP stem
  - Safe
  - Simple
  - Reliable
  - Reproducible

Thank-You!

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