Humeral Bone Loss in Reverse TSA

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Disclosure

• DJO
  - Speaker, Consultant
  - Uncemented Reverse TSA Design Team
  - Research Support
• Biomet
  - Speaker, Knee Consultant Oxford and XP Knee
  - Research Support
• Flower Orthopaedics
  - Speaker, Consultant
  - Design Team Upper Extremity Plate System
  - Royalties
• Trice Medical
  - Advisory Board
  - Strategic Planning Board
  - Consultant
  - Stock Options

Proximal Humerus Bone Loss

• Clinical Problem with Proximal Humeral Bone Loss
• Risks
• Surgical Technique
• Outcomes
Potential Clinical Problems with Proximal Humeral Bone Loss

- Humeral Component Loosening
- Instability
- Function
  - Loss of RC
  - Loss of Deltoid Insertion

RISKS

TIME

INFECTION

COST

Malunion/Graft Failure

DISEASE TRANSMISSION

THE ONLY THING YOU CAN’T BUY

You can even buy DEAD pieces of Human bone!
NONUNION / GRAFT FAILURE

- SQUIRE et al. Acta Orthop Belgium 2013
- Massive Allograft for Tumor
- Allograft Revision 75%
- 5 yr implant survival 44%
- 10 yr --- NO IMPLANTS SURVIVING

“we no longer perform”

ITS NOT NECESSARY!

- Wiater et al. JSES 2012
- 25 Patients with humeral bone loss
- 38.2 mm ave. (26-72 mm)
- Ave age 67
- 87% Patient satisfaction
- FF 38-103
- NO Humeral Component subsidence or Loosening

Use Monoblock Stems

Failed Hemi → Revised to RSP with Significant Bone Loss
Loosening Humerus Revised to Longer Stem with Allograft

Purpose

The purpose of this study was to determine the effect of proximal humeral bone loss on the fixation of reverse shoulder humeral implants.

Methods

• Reverse designs used:
  ➢ Modular
  ➢ Non-modular

• Cemented into 18 fourth generation Sawbones humeri simulating intact vs. bone loss conditions
Methods (Cont’d)

Torque cyclically applied in increments of 2.5 N·m (up to 25 N·m or failure) to the distal end of the humerus while the implant was rigidly attached proximally.

Results

- Failure occurred at the implant-bone/cement interface on the non-modular (monoblock) implants and at the humeral socket-stem interface in the modular models.

Revision Arthroplasty with Use of a Reverse Shoulder Prosthesis-Allograft Composite

Ardi Chandra, Narsingh Vyas, Robert Pron, Jonathan C. Larp, Dadele Poppello and Mark Franklin

Revisions of Failed Hemi Arthroplasty

- 371 Total
  - 91 using proximal humeral allograft
  - 280 with RSP alone
- 237 females, 134 males
- Average age: 68
- Average follow-up: 43 months

Complications

- 16% (60/371) overall
  - 15% (42/280) non-allograft patients
    - 9 dislocation, 9 loosening
    - 6 failed baseplate
    - 5 infection, 5 peri-prosth fx
    - 4 hematoma
    - 2 glen/hum dissociation, 2 chronic instability
  - 20% (18/91) allograft patients
    - 4 dislocation
    - 3 chronic instability, 3 glen/hum dissociation, 3 hematoma
    - 2 loosening
    - 1 infection, 1 failed baseplate, 1 peri-prosth fx

ASES Total

![ASES Total Chart]
“Wrap Around” Effect
• Morning Rounds Postop day 1
• Clinical Deformity

Limited Revision
• Plus 4 socket
• Semiconstrained Liner
2 weeks postop

• Smells like alcohol
• Severe Shoulder pain
• No injury recalled

Second Limited Revision
6 Months Postop

• Phone call from Jonathan Levy
• Hey – “I’ve got a patient of yours”

3rd Limited Revision

• 44+ 8 Glenoid head
• Plus 8 socket
• Semiconstrained Liner

Post op Day # 2

• Phone call – “My shoulder is killing me”
• Clinic visit
  - Clinically dislocated
  - Alcohol on breath
Massive Proximal Humeral Bone Loss

- Options
  - Resection Arthroplasty
  - Allograft-Prosthetic Composite
  - Tumor Prosthesis
Technique: Use of Proximal Humeral Allograft (PHA)

- Measure amount of bone to be restored with the allograft.

Technique: Use of PHA

- PHA is cabled to native humerus and humeral alignment rod is used to ensure proper orientation.
Technique: Use of PHA

- PHA is cabled to native humerus and humeral alignment rod is used to ensure proper orientation
- Construct is trialed

Benefits of Restoring Proximal Humeral Bone

- Increased compressive force between the humerus and deltoid
- Increased Stability

Benefits of Restoring Proximal Humeral Bone

- Support Humeral Component
  - Increased interface between humeral component and bone
  - Larger cement mantle
Benefits of Restoring Proximal Humeral Bone

PHA Facilitates Muscle Reattachment

Repair of Subscapularis

Indications for Proximal Humeral Allograft

Consider allograft when:
- Proximal humeral bone loss >5 cm
- Soft tissue envelope is patent
- Instability Case - Restore deltoid wrap effect

THANK YOU!