REVISION TO REVERSE WITH GLENOID BONE LOSS

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DISCLOSURES

- Consultant for DJO
- Consultant for Conventus
- Consultant and receive royalties from Tornier/Wright

THESE ARE VERY DIFFICULT CASES

- Levy et al reported on the use RSA for the treatment of failed hemiarthroplasty with IC deficiency and found a 48% complication rate
  - 30 vs 60
- Frankels group reported on bone grafting in RSA's
  - 57 primary RSA's with graft and 66 revisions
  - 61 allografts and 56 autografts
  - Autograft used 91% of primaries and allograft in 85% of revisions
  - Primaries had a 7% complication rate and revisions had a 25% complication rate with 1 glenoid loosening
FAILED TSA

CONTAINED DEFECT

- This is the easiest of defects to treat
- Autograft heals more predictably with less resorption than allograft
- Can use iliac crest structural autograft for larger defects
- Distal clavicle autograft has been reported as well as cancellous impaction grafting
- The key is getting host bone support of the peg or screw so that the majority of the load is born by host bone

ILIAC CREST STRUCTURAL AUTOGRRAFT

In this case the iliac crest is prepared with the glenoid instrumentation

It is then removed with a small sagittal saw and milled to fit the defect and impacted in place
ILIAC CREST STRUCTURAL AUTOGRRAFT

The hole for the peg is drilled in the deepest portion of the vault at the apex for good cortical fixation. The graft can be placed on the peg (long peg required) and impacted in place.

ILIAC CREST STRUCTURAL AUTOGRRAFT

- Neyton et al revised 37 failed TSA's for glenoid loosening.
- Glenoid grafting was performed in 29 cases and 21 were structural iliac crest grafts.
- 22/29 grafts healed.
- 21% reoperation rate of which 3 were for glenoid loosening and 3 for instability.

CONTAINED DEFECTS WITH STRUCTURAL AUTOGRRAFT

- In cases of contained defects, one can often use structural autografts with very secure baseplate fixation.
- This allows for lateralization of the glenosphere (if an option in the prosthetic design).
- This allows for better soft tissue tensioning and mitigates instability.
UNCONTAINED DEFECTS

Can use iliac crest structural graft or the humeral head if available.

Graft is secured in place with screws.

Secured graft

Reaming completed of the graft and host bone.
UNCONTAINED DEFECTS

As long as the fixation is secure (50% of the post in host bone), then can lateralize if needed.

UNCONTAINED DEFECT

Failed bipolar 10mm of glenoid bone stock

UNCONTAINED DEFECT

Can perform the reverse on a scapular allograft

Can then cut and mill to fit the defect
UNCONTAINED DEFECT

Baseplate and graft impacted into hole for post with 50% of post in host bone

Graft integration after 1 year

UNCONTAINED SUPERIOR DEFECT

Superior bone loss can be difficult as the baseplate should not be placed with superior tilt

Frequently this requires grafting as there is not enough bone stock to ream eccentrically and lower the high inferior side

UNCONTAINED SUPERIOR DEFECT

- A novel augmented baseplate was compared to eccentric reaming in and a standard baseplate
- Composite specimens were used and testing before and after cyclic loading on a servohydraulic machine
- Found that both baseplates were equally stable, however there was less bone removed for the augmented component
- The benefit of less bone removal is less medialization and better soft tissue tensioning
  - Roche et al JSES 2013
Integration of the graft after 1 year
Conversion back to a reverse TSA
CENTERLINE ALTERNATIVES
• Normal glenoid centerline is perpendicular to the glenoid face
• Exists anterior to the scapular body

CENTERLINE ALTERNATIVES
• Alternate spine centerline
  • Parallels the scapular spine
  • Goes through the junction of the scapular spine and body
  • It is anteverted with respect to the true centerline

ALTERNATE SPINE CENTERLINE
• Place the center screw where you can find good host bone
• Accepting the anteversion
• Bone Loss
  • Posterior Bone Loss
  • Anterior Bone Loss
ALTERNATE GLENOID CENTERLINE

Ream the glenoid and determine how much host bone support there is.

ALTERNATE GLENOID CENTERLINE

HOW MUCH HOST BONE SUPPORT IS NECESSARY?

Formini et al evaluated how much bone support was necessary with various amounts of contact.

They found that at 25% of host bone support, there was enough micromotion (greater than 150 microns) to inhibit bone growth.

This would suggest that if there is 25% or less host bone support, then structural graft is needed.

Formini et al JSES 2015

WHAT KIND OF GLENSPHERE TO USE?

- In cases where large structural grafts are used for uncontained defects, consider protecting the graft with a larger glensphere.
- Would minimize interposition to mitigate load on the graft.
- This alternate position of the glensphere can limit impingement free ROM but the goal here is just to get on base... not a home run.
GLENOID BONE LOSS

- Revision cases with glenoid bone loss are very challenging
- CT scans are imperative to understanding the bone loss
- PSI could help placing guide pins however the metal artifact from the previous surgery often limits its use
- When trying to find the home run shot for the central post or screw; use a small diameter drill bit and a depth gauge to ensure placement before you buy it
- Have all kinds of graft options available

THANK YOU