Management of the B2 Glenoid

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Topics

Types of glenoid defects

Management options for the B2 glenoid
Types of Glenoid Defects

OSTEOARTHRITIC GLENOID WEAR

Common wear pattern is posterior
Associated with posterior glenohumeral subluxation
  - With arm in forward elevation
5 degrees of posterior wear correlates with 2.5 degree change in retroversion

Bryant CD, JSES 2010

Walch

A – central
  - 1 – mild
  - 2 – severe
B = posterior
  - 1 – mild
  - 2 – severe
C = glenoid dysplasia
  - Retroversion > 25 degrees

Moderate inter-observer and substantial intra-observer reliability

Nowak DD, JSES 2010
Walch G, J Arthroplasty 1999

GLENOID DYSPLASIA

Seen in 0.5% of cases
Due to incomplete ossification of inferior glenoid growth center
Tolerated well early in life but is associated with advanced arthritic change at a young age

Sperling JW, JBJS - A, 2002
Smith SP, JBJS - B 2001
Edwards TB, JSES 2004
Types of Glenoid Defects

OSTEOARTHRITIC GLENOID WEAR

Mayo
- None
- Mild – erosion into subchondral bone
- Moderate – medialization
- Severe – wear to the coracoid base

Sperling JW, JSES 2007

Consequences in Anatomic TSA

B2 GLENOID

Biomechanics
- Increased contact pressure
- Decreased contact area
- Eccentric loading

Higher complication rate for anatomic TSA in B2 glenoids
- Radiolucent lines
- Clinical loosening
- Posterior instability

Shapiro, JSES, 2007
Walch, JSES, 2012
Gallusser, Orthop Traumatol Surg Res, 2014

Options for Glenoid Defects

Anatomic TSA with high side reaming
- +/- accepting stem anteverision

Anatomic TSA with glenoid bone grafting
- Structural
- Impaction

Anatomic TSA with augmented glenoid component
- Cuff intact RTSA for glenoid bone loss

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High Side Reaming

Be judicious
- Penetration of subchondral bone risks glenoid component subsidence in anatomic TSA
- With cemented keeled components

Alter humeral component version

[References: Walch, JBJS, 2012; Spencer EE, JBJS, 2005]

Indications for Glenoid Bone Grafting

NO HARD CRITERIA

Most studies identify 15-20 degrees of posterior wear as the point where components will perforate the glenoid vault

But mostly based on surgeon judgment

Graft if bone stock is deficient enough where glenoid fixation or component placement is in question

[References: Nowak DD, JSES 2009; Gillespie R, Orthopaedics 2009; Hoenecke HR, JSES 2008; Ting FSH, JSES, 2013]

Technique

Pre-op CT to understand glenoid morphology and bone stock

Deltoidectomy approach

Patient specific instrumentation or targeting guides optional to obtain anatomic glenoid version

[References: Campbell Clinic Orthopaedics]
Technique

STRUCTURAL GLENOID BONE GRAFT FOR TSA

- Central starting point
- Ream
- Step cut/burr glenoid to receive graft
- Measure area of glenoid deficiency
- Cut and shape graft
- Lay into defect
- Fix with countersunk screws
- Prepare glenoid
- Implant

Outcomes

TSA BONE GRAFTING

- Satisfactory outcomes in 52%-82% of cases
- Failure rate ~18%
- Incomplete radiolucent lines in 14%
- Reliably restores glenoid bone stock and version

Augmented Glenoid Components

- Angled and step-cut designs
- Custom and off-the-shelf options
Augmented Glenoid Components

Conceptually attractive
- Allows correction of glenoid version
- Some biomechanical evidence shows no increase in glenoid strain with augment
  - Step cut design
- Other biomechanical evidence favors eccentric reaming over augment
  - Less edge displacement on loading
  - Angled design

Kirane, JSES, 2012
Wang, CORR, 2015
Sabesan, JSES, 2014

Short term clinical outcomes promising
- Mix of anterior and posterior wear patterns
- Similar clinical scores as non-augmented glenoids
- Higher incidence of radiolucencies in augmented glenoids

Lenart, JSES, 2015
Wright, Bull Hosp Jt Dis, 2015

Cuff intact RTSA

Also conceptually attractive
- Fewer intra-operative decisions/changes
- Less concern about subscapularis failure and/or posterior instability
- Clinically successful

Mizuno, JBJS, 2013
Cuff intact RTSA

Algorithm?

- Physiologically old
  - Physiologically young
    - Correctable with reaming
    - Not correctable with reaming

- B2 glenoid
  - RTSA with or without bone graft/augment
  - TSA with high side reaming
  - TSA with bone graft or augment

Thank you