Management of the B2 Glenoid

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Topics

Types of glenoid defects

Management options for the B2 glenoid

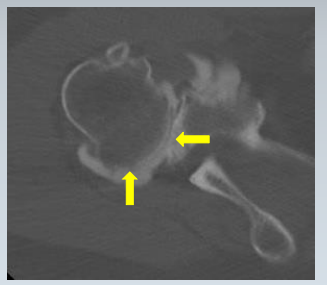
Types of Glenoid Defects

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



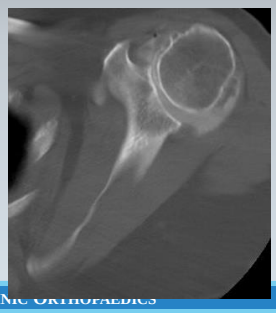
Bryce CD, JSES 2010

Types of Glenoid Defects

OSTEOARTHRITIC GLENOID WEAR

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

Moderate inter-observer and substantial intra-observer reliability



Nowak DD, JSES 2010
Walch G, Acta Orthop Belg 1998
Walch G, J Arthroplasty 1999

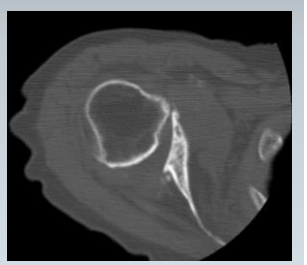
Types of Glenoid Defects

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 anteversion

Anatomic TSA with glenoid bone grafting
- Structural
- Impaction

Anatomic TSA with augmented glenoid component

Cuff intact RTSA for glenoid bone loss

High Side Reaming

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

Altering humeral component version

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

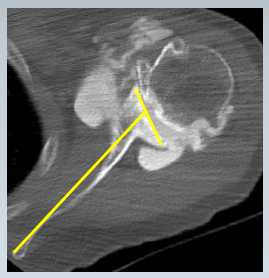
Nowak DD, JSES 2009
Gillespie R, Orthopaedics 2009
Hoenecke HR, JSES 2008
Ting FSH, JSES, 2013

Technique

Pre-op CT to understand glenoid morphology and bone stock

Deltopectoral approach

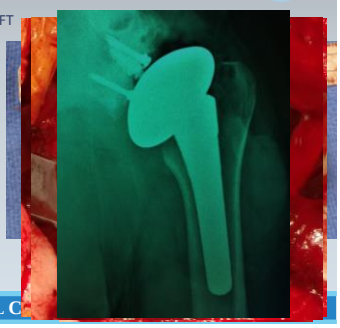
Patient specific instrumentation or targeting guides optional to obtain anatomic glenoid version



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

Hill JM, JBJS-A 2001
Steinmann, JSES 2000
Sabesan, JBJS, 2013

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

Augmented Glenoid Components

Short term clinical outcomes promising
- Mix of anterior and posterior wear patterns

Similar clinical scores as non-augmented glenoids

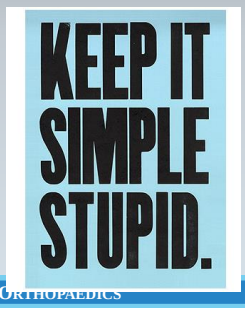
Higher incidence of radiolucencies in augmented glenoids

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

Cuff intact RTSA

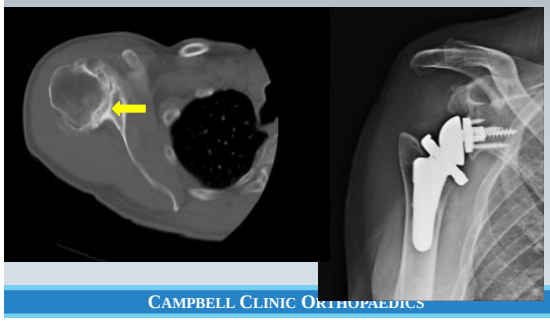
Also conceptually attractive
- Fewer intra-operative decisions/changes
- Less concern about subscapularis failure and/or posterior instability

Clinically successful

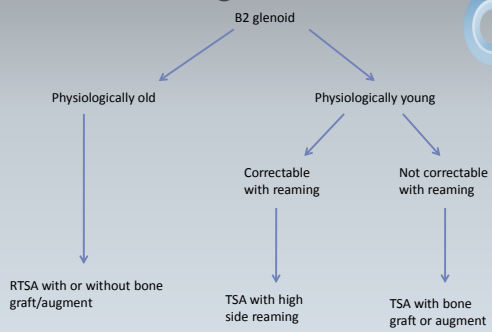


Mizuno, JBJS, 2013

Cuff intact RTSA



Algorithm?



Thank you