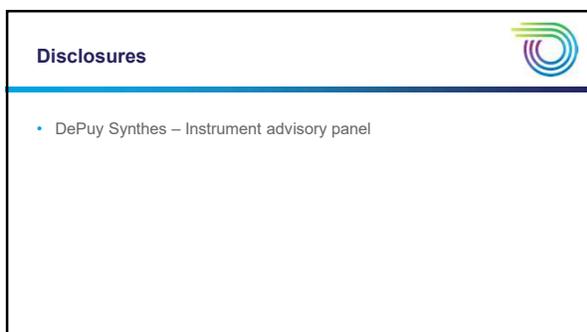
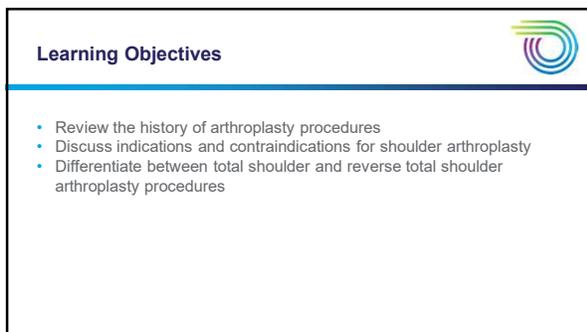


1



2



3

Total Shoulder Arthroplasty



1873. On the Pain of Arthritis. The illustration shows a man with several swords and spears stuck into his shoulder, representing the pain of arthritis.

4

TSA vs RTSA

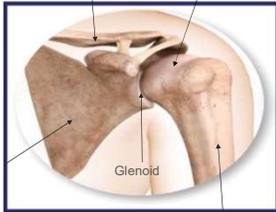
- Anatomy
- History
- Types of Arthritis
- Physical Findings
- Non-Operative Treatment
- Surgical Options
- Rehabilitation

5

Shoulder

Anatomy of the Shoulder

- Ball-and-socket joint
- Humeral head at the end of the humerus
- Glenoid holds the humeral head
- Most complex joint in the body, with 360° rotation

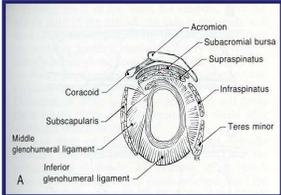


Clavicle Humeral head
Scapula Glenoid Humerus

6

Shoulder Anatomy

- Rotator Cuff
 - Subscapularis
 - Infraspinatus
 - Supraspinatus
 - Teres minor

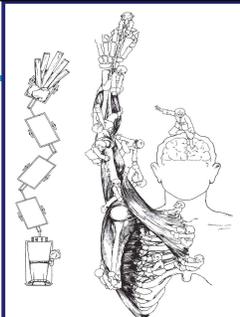


7

Rotator Cuff



8



9

History of TSA

- 1893 first prosthesis inserted by French Surgeon Pean for TB Arthritis
- Platinum and rubber
- Removed two years later



10

History of TSA

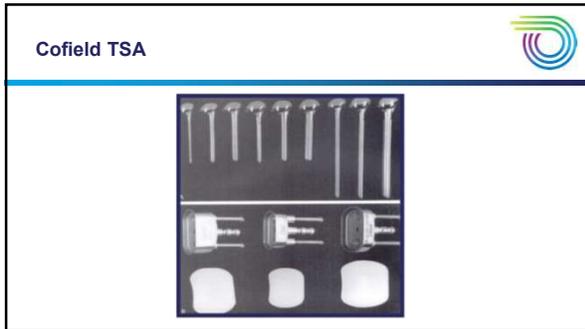
- 1953 Neer Vitallium Prosthesis for Proximal Humerus Fracture
- 1971 and 1974 Neer reported results in RA and OA
 - First Glenoid Component
- Several Component Types

11

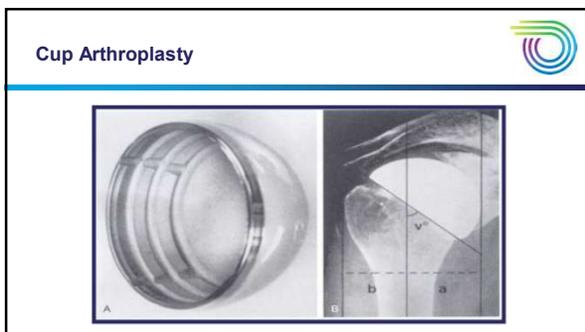
History of TSA

- Boileau and Walch late 80's Anatomic study of Proximal Humerus
- Diameter of Humeral Head, Inclination, and Retroversion all Variable
- Third Generation Prosthesis—Anatomic adaptable

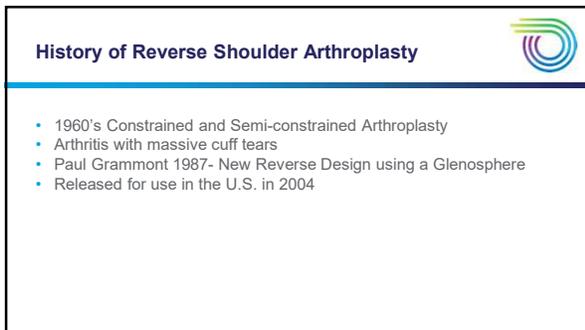
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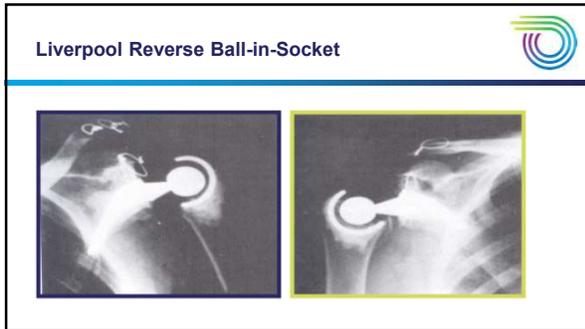
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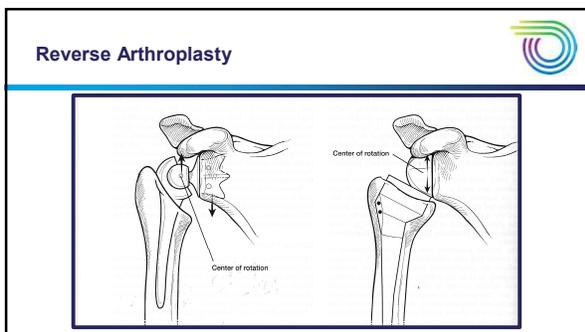
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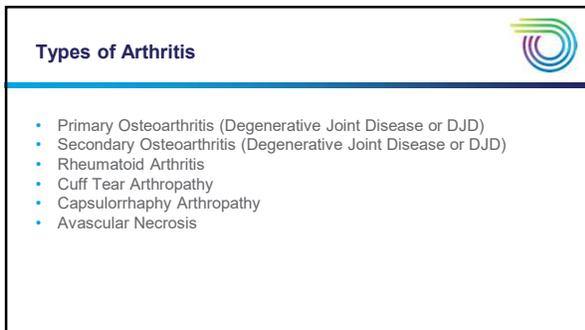
15



16



17



18

Symptoms 

- Pain at night
- Pain away from body
- Loss of motion
- Popping and grating
- Loss of strength

19

Physical Findings 

- Mild to moderate muscle wasting
- Crepitus on joint ROM
- Limited ROM
- Muscle weakness due to pain

20

Treatment Options 

- Medications
- Physical therapy
- Activity modification
- Surgery

21

Non-operative Treatment 

- Gentle Range of Motion (ROM)
- RC isometrics
- Scapular strength
- NSAIDs/Analgesics
- Limit over-head activity

22

When to Proceed with Surgery? 

- Pain unresponsive to non operative treatment
- Severe limitation of motion
- Progressive glenoid bone loss

23

Surgical Options 

- Synovectomy
- Resection Arthroplasty
- Interposition Arthroplasty
- Arthrodesis
- Hemiarthroplasty
- Total Shoulder Arthroplasty
- Reverse TSA

24

Indications for TSA

- ✓ Osteoarthritis --- Cuff intact, Good Glenoid Bone stock
- ✓ Inflammatory Arthritis---- Variable Cuff and Bone quality
- ✓ Post Traumatic Arthritis----- Tuberosity and Cuff OK
- ✓ Post Instability Surgery Arthritis----- ? Subscapularis
- ✓ Avascular Necrosis---- ? Hemi in Young Patient

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Primary DJD

- Glenoid worn posteriorly
 - Posterior subluxation
- Humerus worn centrally
- Subchondral cysts
- Osteophytes and loose bodies
- Anterior capsule tightness
- RC Tears uncommon

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Osteoarthritis



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Walch Classification

- A1 Mild Central Erosion
- A2 Major Central Erosion
- B1 Narrow Posterior Joint Space/Subluxation
- B2 Biconcave
- B3 Advanced Posterior Erosion, Subluxation, No Paleoglenoid
- C Hypoplastic with Retroversion >25 degrees
- D Eccentric Anterior Glenoid Erosion

Berth, M.J. Koole, K.E. Yarem, M. Gaudi, M.O. Chami, J. Wain, G. A modification to the Walch classification of the glenoid in primary glenohumeral subacromioclavicular using three-dimensional imaging. J Shoulder Elbow Surg. 2018;26(12):1601-1606.

28

Glenoid Version

Angle: 66.268 7.273 732
Version = -3.7°

29

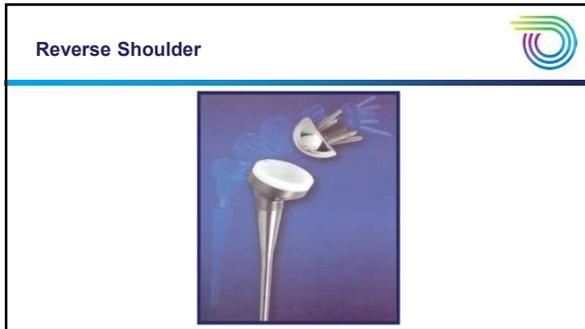
Computerized Planning

Viewer PROFILE LOG USERS CASES LOG OUT

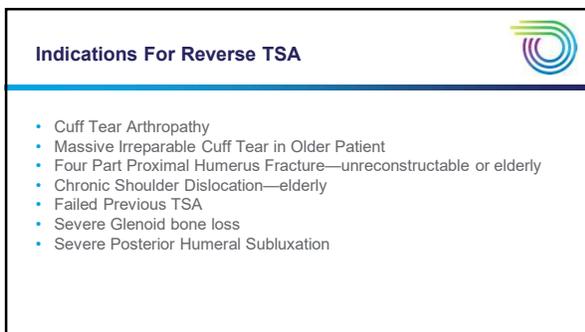
Native Version: 4.3
Native Inclination: 8.0

Ver: -4° +
Inc: 5° +
Roll: 12° +
SR: 22
AP: 22
L/M: 22

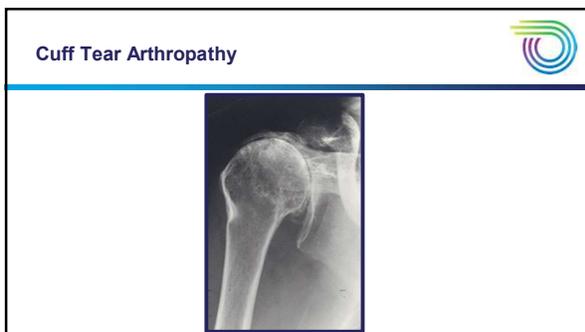
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32



33

Cuff Tear Arthropathy

- Milwaukee shoulder
 - Basic calcium phosphate crystals cause chemical induced tissue damage
- Massive rotator cuff tear
- Glenohumeral instability
- Loss of articular cartilage
- Humeral head collapse and bone loss

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Cuff Tear Arthropathy

Table III Hamada classification

Grade	Description
1	Acromiohumeral interval >6 mm
2	Acromiohumeral interval ≤5 mm
3	Grade 2 plus acetabularization
4	Grade 3 plus glenohumeral joint space narrowing
5	Humeral head collapse

A Radiographic Classification of Massive Rotator Cuff Tear Arthritis
Kobayashi H, Hamada K, Kato Y, Yamashita Y, Yoshizawa K, Ichiyama T, Takahiro M, Mitsuoka M, Ohtsuka T, Kawai H, et al. J Bone Joint Surg Am. 2011;93(10):942-949.

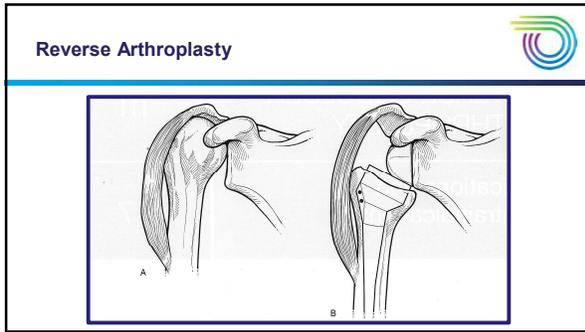
35

Rotator Cuff

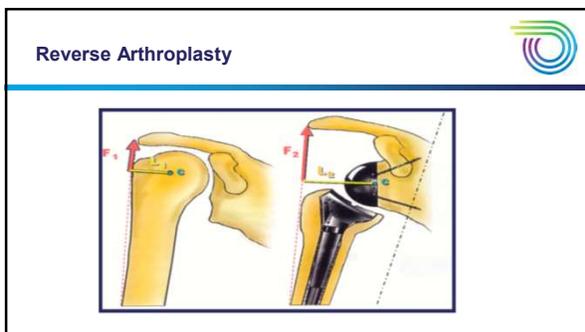
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Slide 36

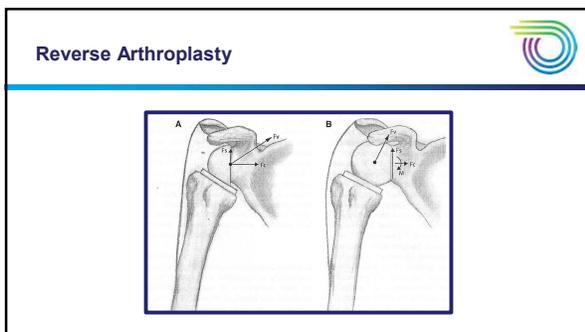
A1 Same as slide #7. Do we want to keep this slide?
Author, 3/29/2021



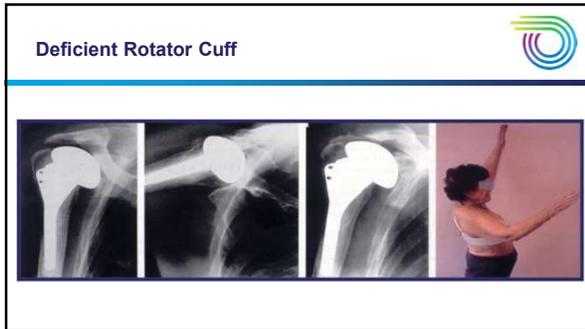
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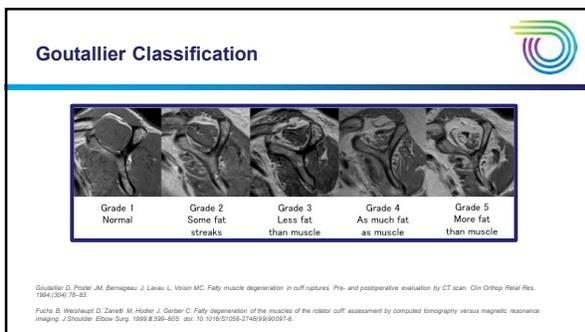
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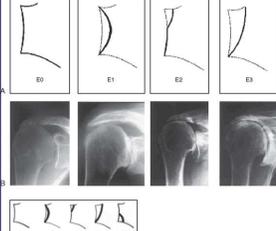


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Favard Classification



The Favard Classification is a system for grading glenoid bone loss. It is divided into two main categories: A and B. Category A includes grades E0, E1, E2, and E3, which represent increasing degrees of bone loss on the anterior and posterior surfaces of the glenoid. Category B includes grades E0, E1, E2, E3, and E4, representing more severe bone loss. The diagrams show the glenoid surface with lines indicating the extent of bone loss. X-ray images illustrate the appearance of the glenoid in different grades.

Favard L, Luchmann S, Clement P. Glenoidfraktur mit massiver anterior-posteriorer Defizienz. In: Wirth G, Bohner P (eds) Schulterarthroskopie. Berlin: Springer-Verlag; 1999. pp 281-286.

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Cuff Tear Arthropathy

- Glenoid bone loss



This slide illustrates Cuff Tear Arthropathy. It features a grid of images: three X-rays showing glenoid bone loss and three 3D anatomical models of the shoulder joint. The 3D models clearly show the erosion of the glenoid surface due to the chronic tear of the rotator cuff muscles.

Klein et al. J Bone Joint Surg Am. 2010;92: 1144-1154

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Contraindications for Reverse Arthroplasty

- Primary DJD
- Marked deltoid deficiency
- Previous infection
- ? Patients < 65 years old

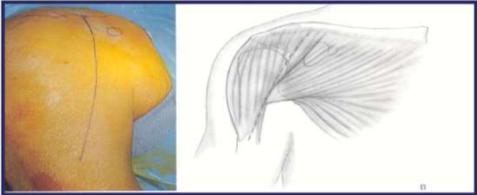
45

Complications

- Glenoid loosening-lucent lines
- Humeral loosening (2-5%)
- Glenohumeral instability (0-35%)
- Rotator cuff tears (-2%)
- Periprosthetic fracture
- Infection (-1%)
- Nerve injuries

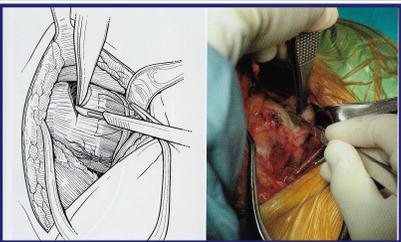
46

Surgical Technique

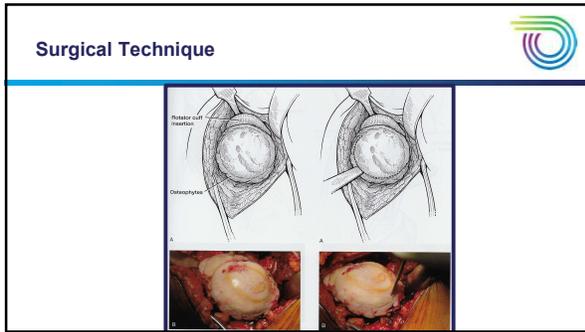


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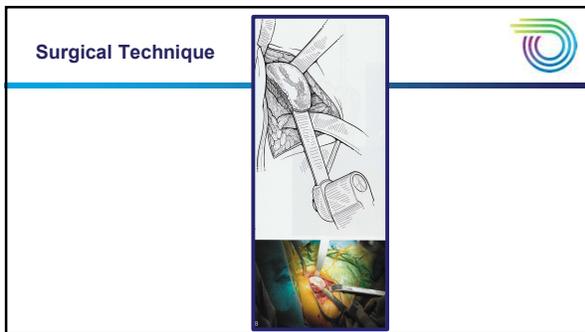
Surgical Technique



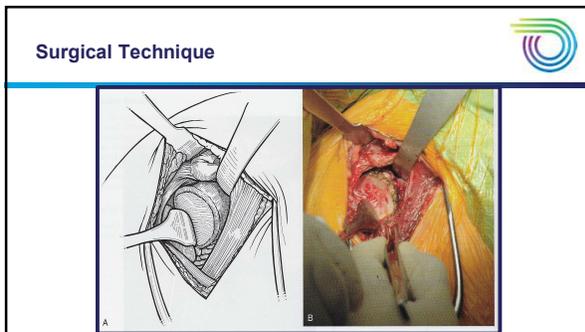
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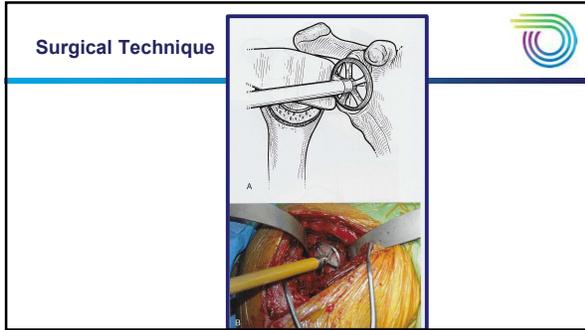
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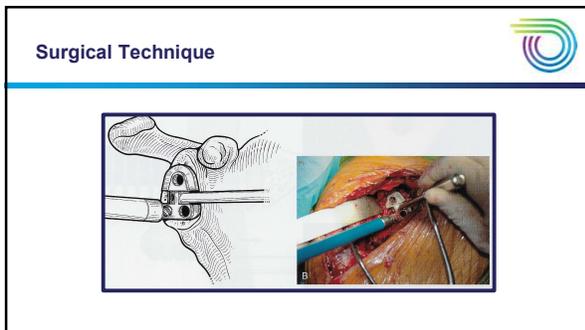
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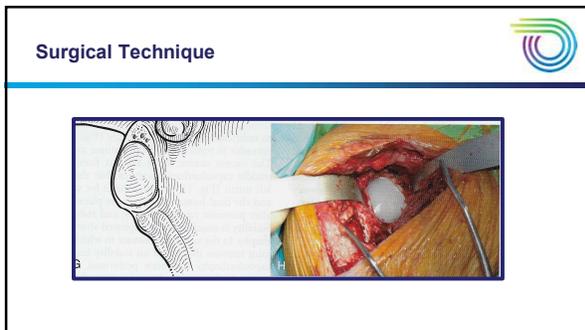
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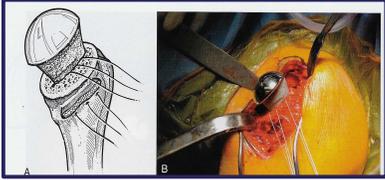


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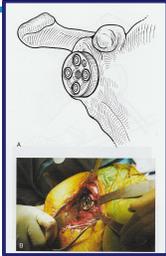
Surgical Technique



The slide contains two images: a line drawing on the left labeled 'A' showing a knee joint with a femoral component and ligaments, and a photograph on the right labeled 'B' showing an intraoperative view of a knee joint with surgical instruments.

55

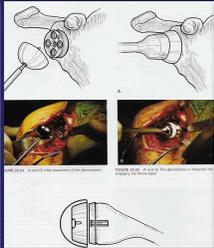
Surgical Technique-Reverse



The slide contains two images: a line drawing on top labeled 'A' showing a hand with a device on the palm, and a photograph on the bottom labeled 'B' showing an intraoperative view of a hand with surgical instruments.

56

Surgical Technique-Reverse



The slide contains four images: two line drawings at the top showing hand devices, two photographs in the middle labeled 'A' and 'B' showing intraoperative views of hands, and a line drawing at the bottom showing a hand device.

57

Surgical Technique-Reverse



The image contains three diagrams illustrating the reverse total shoulder arthroplasty technique. The top-left diagram shows a humeral head with a black arrow pointing to the location of the humeral head component. The top-right diagram shows a humeral head component. The bottom diagram is an intraoperative photograph showing the surgical site with the components in place.

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Rehabilitation

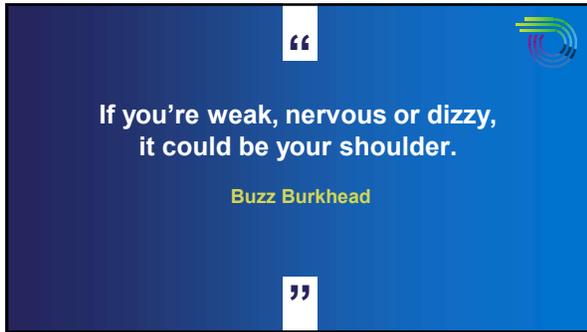
- Sling for 4 weeks- PROM
- AROM for 4 weeks
- Strength exercises at 8 weeks
- Driving?? Safety and liability
- Resume most activities by 12 weeks
- RTSA lower rates of achieving SCB and PASS at 6 months and 2 years—(Dragger et al JSES in press)

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Summary

- **Total Shoulder Arthroplasty**
 - Glenohumeral Arthritis
 - Good Bone Stock
 - Intact Rotator Cuff
- **Reverse Total Shoulder Arthroplasty**
 - Massive Irreparable Rotator Cuff
 - Cuff Tear Arthropathy
 - Glenoid Bone Loss
 - Severe Posterior Subluxation
 - Revision of Failed TSA

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