

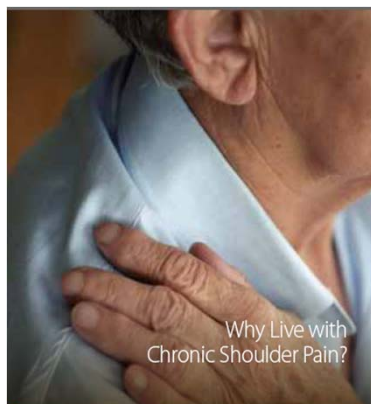
SHOULDER ARTHROPLASTY

Marty Isbell M.D.
Raleigh Orthopedic Clinic

Solutions for Chronic Shoulder Pain

Shoulder Arthroplasty vs. Hips and Knees

- Shoulder is third most common joint replacement after hips and knees
- Just as safe and effective in relieving pain and restoring mobility as hip or knee replacement when performed by an experienced surgeon
- Shoulder arthroplasty shown to be comparatively safer than any other joint replacement
- In a study of patients with shoulder pain, more than 95% reported having less pain after shoulder replacement



Farmer KW, Hammond JW, Queale WS, Keyurapan E, McFarland EG. Shoulder arthroplasty versus hip and knee arthroplasties: a comparison of outcomes. ClinOrthopRel Res 2007;455:183-9.

Shoulder Arthroplasty:

Sources of Chronic Shoulder Pain in Patients

Degenerative diseases (60%)

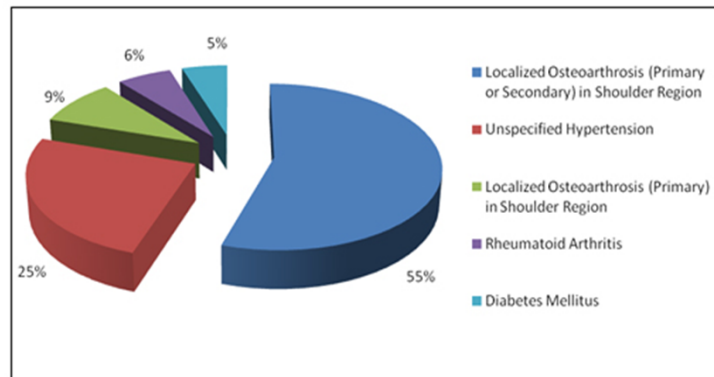
- Osteoarthritis
- Rheumatoid arthritis
- Rotator cuff tear
- Necrosis
- Post-traumatic arthritis

Trauma (40%)

- Fracture

Shoulder Joint Replacement Prevalence

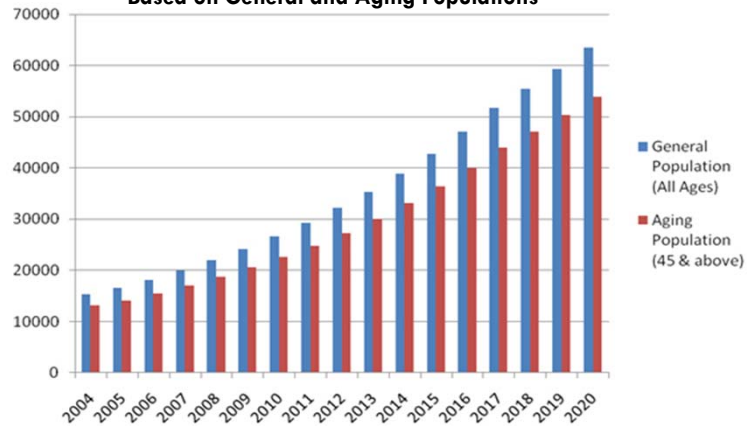
Top 5 Associated Diagnoses for Shoulder Arthroplasty



Source: PearlDiver Patient Records Database, 2004-2006

Shoulder Joint Replacement Forecast

**Forecast of Shoulder Replacement Hospitalizations
Based on General and Aging Populations**



Source: PearlDiver Analyst, public sources and PearlDiver Patient Records Database, 2004-2006

Treatment Options

- **Non-surgical**
 - Lifestyle changes
 - Physical therapy
 - Medications
 - Injections – steroid, viscosupplements?
 - **None of these are permanent solutions**
- **Surgical**
 - **Arthroscopy?**
 - Three primary procedures
 1. Primary total shoulder replacement
 2. Reverse total shoulder replacement
 3. Humeral head resurfacing

Surgical Options

Shoulder Arthroscopy

- Sometimes viable option in mild cases
- Capsular release to regain motion
- Debridement of inferior spur
- Subacromial decompression
- Limited benefit
- Worse? Less time to total



Total Shoulder Arthroplasty



Total Shoulder Arthroplasty

("Primary" shoulder arthroplasty)

- Gold standard in shoulder replacement
- Alleviates pain and improves function
- Replacement consists of humeral stem, humeral head (ball), and glenoid (socket)
- Usually performed after conservative treatments have failed (physical therapy, medications)
- Option for patients with rotator cuff function



Shoulder Joint



Anterior view: scapula, humerus and glenoid



Lateral view of glenoid (socket)

Total Shoulder Arthroplasty

- Stem Material
 - Titanium(Ti6Al4v)
 - Proximal portion: Grit blasted
 - Distal portion: Polished Ti
- Humeral Head
 - Cobalt chrome
- Glenoid Material
 - Polyethylene



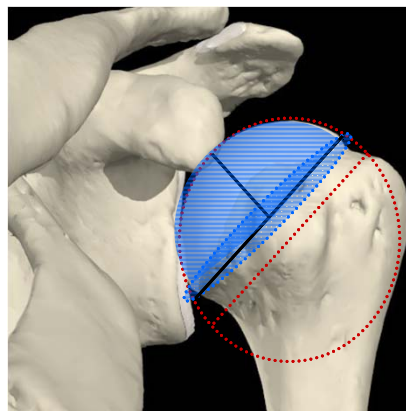
Press Fit Humeral Stem and Humeral Head



Glenoid implant

Total Shoulder Arthroplasty

- Primary shoulder implant design based on anatomic principles:
 - Because the humeral head is spherical, there is a mathematical relationship between diameter and thickness
- As diameter increases, so does thickness
- Replicates anatomy for optimal patient outcomes



Total Shoulder Arthroplasty Outcomes

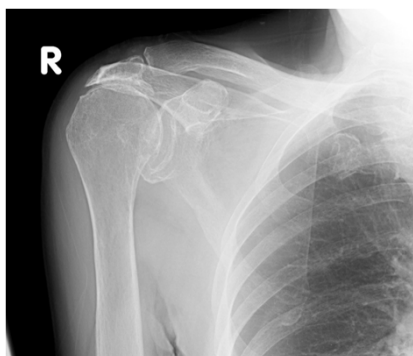
- Study results demonstrated:¹
 - 93% survivorship of prosthesis at 10 years, and 87% at 15 years
 - 83% of patients reported relief from moderate or severe pain at 12 years
 - Active abduction (raising arm to the side) improved by an average of 40-117 degrees
- 73% of patients at 10-20 years reported “excellent results,” and 20% reported “satisfactory results”²



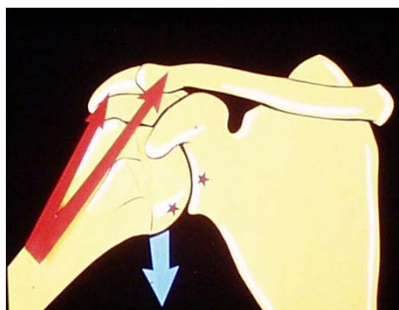
¹Fardet L, Messow M, Maillefert JF, and Dougados M. Primary glenohumeral degenerative joint disease: factors predisposing to arthroplasty. *Clin Exp Rheumatol* 21: 13-18, 2003.

²Rizquero R, Marshall K, Voloshin I, Blaine TA, Levine WN, and Bigliani LU. Total Shoulder Arthroplasty Offers Long-Term Solution For Osteoarthritis Sufferers. Presented at the 71st Annual Meeting of the American Academy of Orthopaedic Surgeons, San Francisco, March 10-14, 2004.

Rotator Cuff Arthropathy



Normal Shoulder



Balance between :

- Ascending forces of the deltoid, and
- Descending forces of the rotator cuff muscles

Reversed Shoulder Arthroplasty



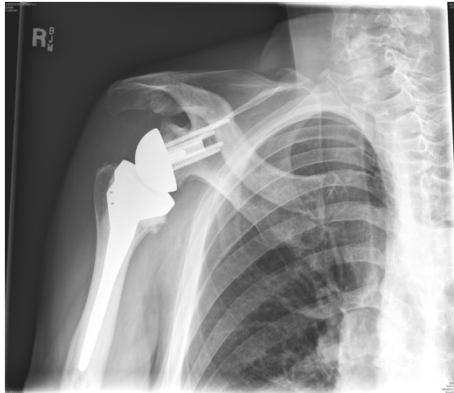
- Developed in Europe, approved by the FDA in 2004
- Used for patients with arthritis and/or irreparable rotator cuff tear
 - Normal mechanics of the shoulder are disrupted with cuff tears
 - May be impossible for patients to lift arm
- Also used for patients with complex shoulder issues and previously failed surgical treatments

Reversed Shoulder Arthroplasty



- Reversed prosthesis designed to function only with the deltoid
- Designed to be 'self-stable'
- Optimized to eliminate potential for glenoid loosening, a historic complication with RSA

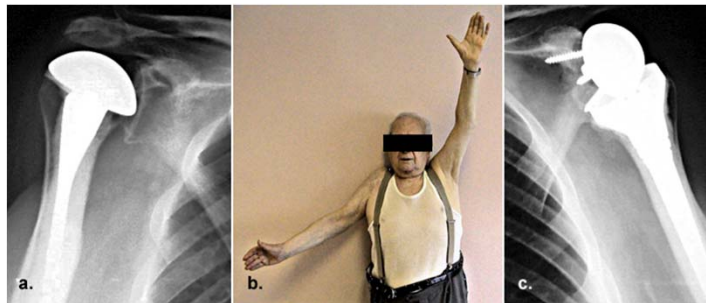
Reversed Shoulder Arthroplasty



- Reverse prosthesis offers a “fixed fulcrum” for the shoulder joint, allowing arm to be raised even when rotator cuff muscles are absent
- Offers many patients an excellent option that was not previously available
- Studies indicate high success rate*
 - Patient satisfaction is as high as 80% with Reversed
 - 67% of patients in study reported no pain

*Izquierdo R, Marshall K, Voloshin I, Blaine TA, Levine WN, and Bigliani LU. Total Shoulder Arthroplasty Offers Long-Term Solution For Osteoarthritis Sufferers. Presented at the 71st Annual Meeting of the American Academy of Orthopaedic Surgeons, San Francisco, March 10-14, 2004.

Functional Results: Standard Prosthesis vs. Reversed



One Patient, Two Procedures – Different Results

Fig a: Xray of right shoulder (standard hemiarthroplasty)

Fig b: Function of right and left shoulders

Fig c: Left shoulder treated with reversed prosthesis

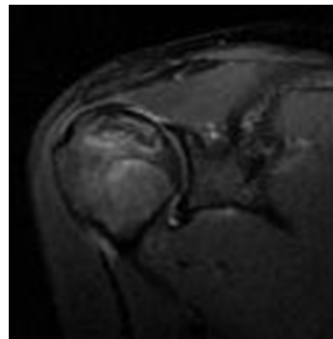
New Reversed Shoulder Technology

- Newer technology in U.S., many general orthopaedic surgeons do not perform the procedure
- Procedure can be complex
- Functional results for fracture rely on tuberosity healing
- Novel technologies such as **Reversed for Fracture** are performed by only a few surgeons in the U.S., expanding patient indications



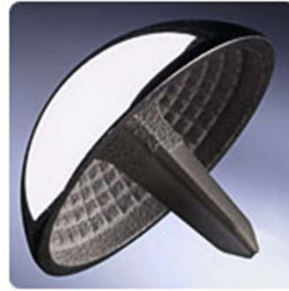
Reversed for Fracture

Special Cases – Young, AVN...



Humeral Resurfacing Head

- Conservative option to restore normal joint mechanics with minimal bone resection
- Replaces diseased humeral head surface for patients with early stage avascular necrosis or gleno-humeral joint disease
- Younger population +/- biologic glenoid resurfacing



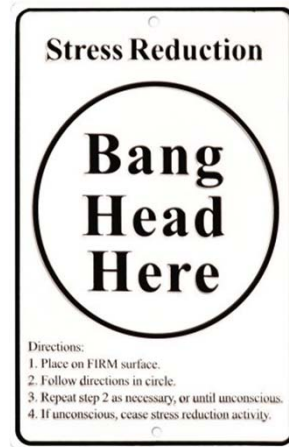
Humeral Resurfacing Head



- Reproduces the articulating surface of the humeral head and restores the center of rotation
- Cementless fixation allows for future revision to primary or reversed shoulder arthroplasty

Complications

- Although rare, some of the most severe complications associated with shoulder joint replacement are:
 - Infection
 - Dislocation
 - Postoperative fractures
 - Glenoid component failure
 - Low risk of PE/DVT vs hip and knee, but they happen



Key Success Factors for all Shoulder Arthroplasty Procedures

- Condition and quality of the bone
- Type and severity of arthritis
- Condition of the rotator cuff
- Age, activity level and overall patient health
- Commitment to rehabilitation after surgery

The Value of Shoulder Specialists

- 75% of shoulder replacements are performed by general orthopedic surgeons, doing only 1-2 cases per year*
- Complexity with glenoid replacement
 - ▣ Many surgeons are not proficient in glenoid access
 - ▣ May fall back on doing a “hemi” prosthesis, avoiding glenoid replacement, which is not optimal for best patient results

*HasanSS, Leith JM, Smith KL, and Matsen FA, 3rd. The distribution of shoulder replacement among surgeons and hospitals is significantly different than that of hip or knee replacement. *J Shoulder Elbow Surg* 12: 164-169, 2003.

The Value of Shoulder Specialists

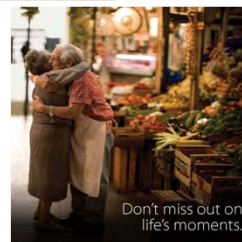
- Study showed direct correlation between surgeon volume patient outcomes
 - ▣ 1.68%: Post-Op complication rate for surgeons performing 2 or less procedures per year
 - ▣ 0.97%: Post-Op complication rate for surgeons performing 5 or more per year



*Nitin J et. Al. The relationship between surgeon volume and hospital volume and outcomes for shoulder arthroplasty. *J Bone Joint Surg Am*. 2004;86:496-505.

Overall Patient Satisfaction

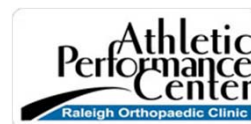
- Goal: relieve pain and restoring function for your patients
- "Ninety-nine percent of the people who have a shoulder replacement for arthritis get pain relief and say that they wish they had done it sooner."^{1*}



Farmer KW, Hammond JW, Queale WS, Keyurapan E, McFarland EG. Shoulder arthroplasty versus hip and knee arthroplasties: a comparison of outcomes. ClinOrthopRel Res 2007;455:183-9.

Our Practice

- 4 surgeons performing multiple shoulder replacements a year
- 4 surgeons fellowship trained in shoulder surgery
- Very low complication/infection rates
- Referral practice for complicated arthroplasties throughout the region



Thank You

