This presentation provides information to educate consumers on various health topics. It is NOT intended to provide instruction on medical diagnosis or treatment.
The information contained in this presentation is compiled from a variety of sources. It may not be complete or timely. It does not cover all diseases, physical conditions, ailments or treatments. You should NOT rely on this information to determine a diagnosis or course of treatment. The information should NOT be used in place of an individual consultation, examination, visit or call with your physician or other qualified health care provider. You should never disregard the advice of your physician or other qualified health care provider because of any information you read in this handout or on any websites you visit as a result of this presentation.
If you have any health care questions, please consult your physician or other qualified health care provider promptly. Always consult your physician or other qualified health care provider before you begin any new treatment, diet or fitness program.
My Background

- Manchester Orthopedic Surgery and Sports Medicine since 1991
- Board Certified
- Hartford Hospital
- Manchester Memorial Hospital
- Shoulder and Elbow Surgery
- Sports Medicine
- Occupational Orthopedics
A Physicians Role

• A significant part of our role as physicians is to educate our patients about why they hurt and how we can help them get better.

• I hope this presentation helps someone get the relief they need from a painful shoulder problem.

• More information can be obtained on the internet from my website www.OrthoOnTheWeb.com or www.orthodoc.aaos.org/jtmazzara
Nonoperative Treatment of Rotator Cuff Tears

• Helpful in ~50% (33-92%)

• Acute rupture
  – 75% may have reduced pain with therapy
  – But the tendon tear will never heal without surgery.

• Chronic pain (>6 months)
  – poor response with therapy
My Approach

- Chronic pain, no or minimal weakness
  - PT for 3-6 weeks
  - MRI if not improving in 4-6 weeks
  - MRI after 6 weeks if improving but @ plateau
  - MRI if still in pain but patient does not want surgery
My Approach

- Acute pain, weakness
  - Office evaluation
  - X-rays
  - Injection
  - MRI
    - May be age dependent
Analyzing the Data

• If the weakness and pain are inconsistent with MRI findings
  – Look for other causes
    • C spine, nerve injuries
  – Consider multiple causes
    • Older patients with dislocations
    • Concurrent cuff tears, brachial plexus injuries, or axillary nerve injuries
Surgical Indications

• Patient dependent
• Impingement syndrome & Partial tears
  – Pain with functional impairments
  – Failure to respond to nonoperative treatment
• Chronic tears
  – Consider 3-4 months of nonsurgical treatment
• Acute tears
  – Best results if repaired within 3 weeks
Arthroscopic Acromioplasty

• Relieves impingement between the CA arch & the cuff

• Performed with arthroscopic or mini-open cuff repair
Technique of Arthroscopic Acromioplasty

• Bone spurs can be removed through small arthroscopic incisions by using a motorized burr.
Technique of Arthroscopic Acromioplasty
Arthroscopic v. Open Acromioplasty

- Arthroscopic group do better in first 3 months
- After 3 months, both methods give equal results
- Long-term: no difference
- 90% excellent results
Post-op Arthroscopic Acromioplasty

- Sling for 1-2 days
- Begin active motion immediately
- Advance as tolerated
Post-op Arthroscopic Acromioplasty

• Anticipated post-op goals
  – 1 month: Full motion (range 1-4 weeks)
  – 12 weeks: 75% functional recovery
  – 6 months: Full recovery
Surgery for Partial Thickness Tears

- Debridement alone
- Debridement and acromioplasty
- Acromioplasty, excision of damaged tendon with primary repair
Partial RCT: Debridement Alone

- Young athletes and workers
- Failed nonoperative therapy
- Tears related to overuse not impingement
- 80-85% success
Partial Tendon: Debridement & Acromioplasty

- Older patients
- Partial tear is debrided if <50% tendon thickness
  - Remove free flaps of torn tendon edge
- Remove the bone spurs
  - Performed arthroscopically
Partial Tendon Tears: Acromioplasty, Excise and 1° Repair

• For tears >50% tendon thickness
• Post-op treat same as a full thickness RC repair
Full Thickness Cuff Tears

- Arthroscopic repairs
- Mini-open repairs
- Open repairs
The Outcome and Repair Integrity of Completely Arthroscopically Repaired Large and Massive Rotator Cuff Tears

- **Massive defined as > 2 cm**
- 17 of 18 retears @ 12 months post op (94%)
- 2/3 improved after surgery
- Not doing as well @ 24 mo.

- “An arthroscopic repair arguably may not be the most appropriate procedure for a younger person with a massive tear in whom long-term strength is more important…”

Yamaguchi, et.al., JBJS February, 2004
Cuff Integrity Following Arthroscopic v. Open Rotator Cuff Repair

- American Shoulder and Elbow Surgeons Meeting
- Intact Cuffs are associated with better strength and outcome scores

<table>
<thead>
<tr>
<th>Intact by MRI after 1 year</th>
<th>Open Repair</th>
<th>Arthroscopic Repair</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tears &lt; 3cm</td>
<td>74%</td>
<td>84%* → 82%</td>
</tr>
<tr>
<td>Tears &gt; 3cm</td>
<td>62%</td>
<td>24%* → 21%</td>
</tr>
</tbody>
</table>

*Bishop, Flatow, et.al., ASES Meeting, March 2004
• Bishop, Flatow, et.al., ASES Meeting, October 2004
Arthroscopic Repair of Full-Thickness Tears of the Supraspinatus: Does the Tendon Really Heal?

BY PASCAL BOILEAU, MD, NICOLAS BRASSART, MD, DUNCAN J. WATKINSON, FRCS, MICHEL CARLES, MD, ARMODIOS M. HATZIDAKIS, MD, AND SUMANT G. KRISHNAN, MD

Investigation performed at the Department of Orthopaedic Surgery and Sports Traumatology, Hôpital de L’Arche, University of Nice, Nice, France

- 65 patients, 2 1/2 year follow up
- All arthroscopic repair
- CT-arthrogram evaluation post-op
- 71% healed, 95% patient satisfaction
- Healed tendons were stronger w/ better function
- Factors negatively impacting healing rate
  - Age over 65y
  - Larger tears (Delamination of subscap and infraspinatus tendons)

JBJS June 2005
• Studied 84 patients with tears smaller than 5 cm (=massive tears)
• Found equivalent results regarding patient satisfaction between mini-open and arthroscopic repair at 2 years
• Results determined by subjective scoring system
• Issues with this study
  – Healing time was the same in the 2 groups
  – MRI s were not performed to evaluate cuff integrity which impacts long term success
  – 2 years may no be a long enough follow up on young active patients or those who perform physical labor
Outcome and Patient Satisfaction of Arthroscopic Rotator Cuff Repair v. Mini-open Cuff Repair

Compared 2 groups of patients with tears of various sizes

- 24-70 month follow up: equivalent functional and patient satisfaction scores (UCLA and ASES scores)
- Despite less post-operative morbidity in ARCR, mid-term results are equivalent

Youm, Rokito, et.al., ASES Meeting, March, 2004
Cuff Integrity and Outcome in Open Repairs

- Prospective study, 47 patients
- MRI at 1 year post op
- Overall 69% intact
  - Tears < 3cm: 74% intact
  - Tears > 3cm: 62% intact
- Intact cuffs yielded a better functional outcome
- Patients with retears still had improved clinical outcomes including strength

Klepps, Flatow, et.al., AJSM, 32, 7, 2004
Other Literature

• **Harryman**, JBJS, 1991
  – 80% 1 tendon tears intact at follow up
  – 57% 2 tendon tears
  – 32% 3 tendon tears
  – Better results with an intact repair

• **Liu & Baker**, Arthroscopy, 1994
  – 66% intact with mini-open repair
  – Tear size correlated with cuff integrity at follow up
  – Functional outcome did not correlate with cuff integrity
Other Literature

- **Thomazeau**, *Clinics in Orthopedics*, 1997
  - 73% intact
  - Better outcome correlate with intact repair

- **Gerber**, *JBJS*, 2000
  - 66% intact, massive 2 tendon tears
  - Better results with intact repairs
Arthroscopic Cuff Repair

- Arthroscopy allows for a more complete evaluation of the joint and tendon
- Removal of bone spurs
- Rotator cuff repair using anchors
Arthroscopic Cuff Repair

• Advantages
  – Improved joint assessment, incl. biceps
  – Improved tendon mobilization
  – Decreased surgical trauma to deltoid
  – Faster rehabilitation (in first 3 months)
Arthroscopic Cuff Repair

• Advantages
  – Earlier return to function
    • 6 weeks to heal, 6 months for overhead work
  – Less Pain
    • No evidence of this
  – Shorter hospitalization
    • Every cuff repair goes home the day of surgery
  – Cosmetic
    • Multiple smaller incisions vs. one incision
Arthroscopic Cuff Repair

• Disadvantages
  – Longer operative time
  – Cannot place tendon gripping sutures
  – Anchors less secure in weak bone
  – Anchors are costly
  – No studies have proven the long term results to be superior to open or mini-open repairs
Arthroscopic Cuff Repair
Arthroscopic Cuff Repair
Arthroscopic Cuff Repair
Arthroscopic Cuff Repair
Arthroscopic Cuff Repair
Mini-open Cuff Repair

- Arthroscopic joint and tendon evaluation
- Arthroscopic bone spur removal
- Cuff repaired through 3 cm skin incision
- Deltoid fibers are split, not detached
- Cuff repaired with “tendon gripping” sutures
- *Double row repair* of tendon to bone using anchors and bone tunnels
Mini-open Cuff Repair

- Gold standard
- Allows double row repair
- Suture anchors *with* bone tunnels provide strongest repair with best restoration of RC footprint (Andrews AJSM, 2003)
Suture Fixation Techniques

• Holding strength with open suture placement techniques was superior
  – JBJS, 2002

Mechanical Strength of Arthroscopic Rotator Cuff Repair Techniques
An In Vitro Study

By Alberto G. Schneeburger, MD, Andreas von Roll, MD, Fabian Kalberer, MD, Fillaire A.C. Jacob, PhD, and Christian Gerber, MD
Suture Anchor Fixation

- Dependent on the quality of bone
- Anchors have a limited pull-out strength from bone
Suture Anchor Fixation

This osteoporosis is common in older patients, larger chronic tears and may not provide strong tendon repairs.
Double Row Cuff Repair

This type of repair through a small incision remains the “gold standard” for rotator cuff repair surgery.
Open Cuff Repair

Open cuff repairs may be appropriate for larger tears and complete rotator cuff avulsions.
Open Cuff Repair

12 weeks post massive cuff repair
Open Cuff Repair

- 5cm incision
- Deltoid is taken down from acromion
  - Must be securely repaired
- For larger tears
Post-op RC Repair

- Usually 6 weeks of limited arm use regardless of repair method
- Often require 2-4 months of formal physical therapy followed by home exercises
- Can take 12-18 months to reach maximum improvement
Post-op RC Repair

• Same restriction regardless of repair method
• At 1-6 weeks Passive motion
  – Passive forward elevation, ER with stick supine, pendulums
  – Avoid internal rotation and AROM until healed
• AROM of elbow/wrist and hand
Post-op RC Repair

• At 6 weeks begin AROM and advanced stretching
• At 8-12 weeks begin Theraband PREs depending on tear size
• At 4-6 months begin progressive resistance and dynamic strengthening
Rotator Cuff Repair Results

- Good to excellent
  - 85% - 95%
- Good-excellent pain relief
  - 78%
- Risk of rerupture
  - Large (2+ tendon tears)
    - 40%
  - Smaller tears
    - 10-20%
  - Severely retracted tears
    - 66%

This man is 7 weeks following and arthroscopic cuff repair.
Partial Repairs

• Massive retracted cuff tears
• Insufficient tendon to repair to bone
• Repair as much as possible
• Margin convergence restores some function
• Provides good pain relief
• Unpredictable functional recovery
Unsatisfactory Results

- Associated with retears
- Loss of function
- Often have good pain relief
  - This patient has return her repair but is happy since she no longer has pain. Her motion before and after surgery are the same.
Factors Affecting Outcomes

• Tear size (most important)
  – Affects recovery of strength (85-90% recovery)
• Age (>65)
• Pre-op function (inability to abduct > 100°)
• Larger tears and chronic retracted tears are more likely to rerupture
Recurrent Tears

- **Number of tendons**
  - 1 tendon 33%
  - 2 tendons 30-56%
  - 3 tendons 50%

- **Muscle Atrophy**
  - Increasing degrees of atrophy lead to increasing rates of rerupture

- **Cuffs with no noticeable atrophy**
  - 20% rerupture

![Figure 3 Percentage of cuffs with tear recurrence according to preoperative GFDI.](image)
Complications of Cuff Repair

- Rerupture
- Stiffness
- Infection
- Deltoid detachment
- Nerve injury
  - Weakness, numbness

"I think you should be more explicit here in step two."
Arthroscopy Without Repair

- Arthroscopic cuff debridement & limited acromioplasty
- Smaller tears get better pain relief
- No improvement with overhead activity and strength
- Beneficial in older low demand patients
Open Surgery Without Repair

• Open cuff debridement
• Better results with intact biceps, deltoid and no prior surgery
• 50-80% Improved comfort and function
• Preserve the CA arch
  – Avoids humeral head escape
Why Preserve the CA Arch?

If the CA arch is disrupted, the head of the humerus escapes up through the defect and pain and limited motion result.
Biceps Tenotomy

- Indicated in older low demand patients with irreparable cuff tears
- Unconcerned about biceps bulge
- Relieves pain from the impinged or dislocated biceps
- Minimally invasive, palliative, minimal rehab
Complications of Surgery

- Always part of pre-op discussion
- Nerve damage
  - Weakness, numbness
- Bleeding
- Infection
- Tendon rupture
- Stiffness
- Continued pain and impairment
- Stretched repair and recurrent instability
End of Part 3

- Part 4 reviews the diagnosis and management of shoulder stiffness, arthritis and instability.

Thanks

James T. Mazzara, MD
Thank You

Be careful out there.