Evaluation and Management of Atraumatic Shoulder Pain

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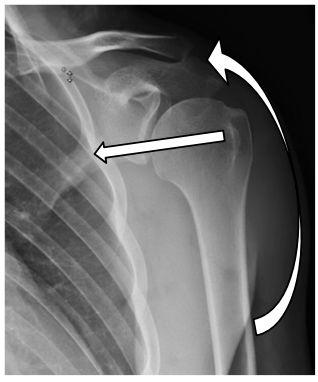
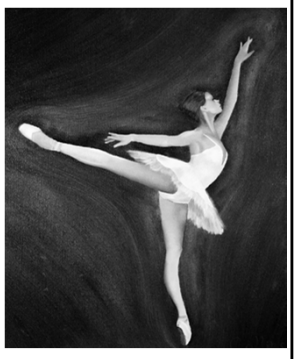
Outline

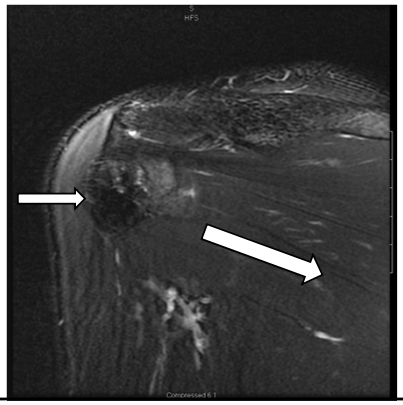
- Anatomy
- Biomechanics
- Differential Diagnosis
- Pathology
- Evaluation (X rays!!)
- Treatment vs. Referral

Force Couples

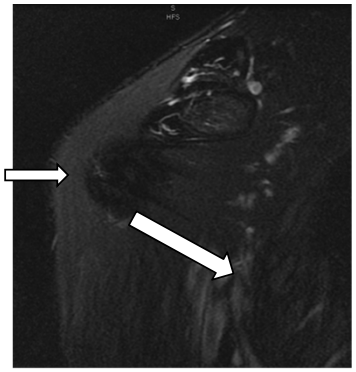




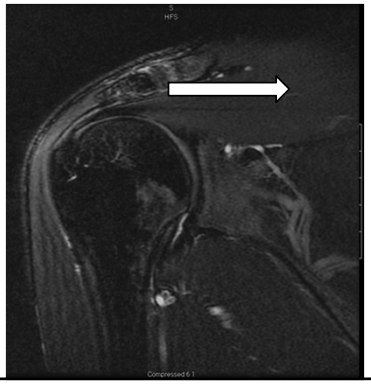
Infraspinatus



Subscapularis



Supraspinatus



Differential Diagnosis

- Rotator Cuff Disease
- Adhesive Capsulitis
- Glenohumeral Osteoarthritis
- Calcific Tendinitis

Evaluation

- History and Physical Exam
- Traumatic is different
- Always get X-rays
- MRI for pre surgical planning

Rotator Cuff Disease

- Shoulder Impingement
- Rotator Cuff Tendinosis
- Rotator Cuff Tendinitis
- Shoulder Bursitis
- Long Head of Biceps Tendinosis

All are essentially the same process

Rotator Cuff Disease

- Degenerative process
- Increasing with Aging Population
- Not clearly an overuse problem

Rotator Cuff Tears Prevalence

- 5-39% Cadaveric studies
- 9% Postmortem (DePalma et al. ICS '50)
- 18% by Arthrogram (Pettersson Act Scand '42)
- 28% in age > 60 yrs. (Sher et al. JBJS '95)
- Over age 80 >50% (Tashijian 2015)

- MRI and Cadaveric studies support 10-40% of population >60 yo has cuff tear

Why?

- Intrinsic
  - Vascularity
  - Internal strain
  - Morphology
  - Stiffness
  - Genetics
- Extrinsic
  - Subacromial Impingement
  - Internal Impingement
  - Acromial shape
  - Spurring
  - Mechanics

Genetic influences in the aetiology of tears of the rotator cuff

SIBLING RISK OF A FULL-THICKNESS TEAR

P. Harvie,
S. J. Ostlere,
J. Teh,
E. G. McNally,
K. Clipsham,
B. J. Burston,
T. C. B. Pollard,
A. J. Carr

- **205 pts**
- **129 Siblings, 150 spouses**
- **Relative risk of symptomatic full-thickness tears in siblings versus controls was 4.65 (95% CI 2.42 to 8.63)**

Prevalence Data

- **MRI and Cadaveric studies support 10-40% of population >60 yo has Cuff tear**
- **US Population 2010=308.4 million**
  - **Over Age 60 = 57 million**
- **Conservative Estimate (10%):**
  - **5.7 million cuff tears in USA**
- **BUT – only 270,000 rotator cuff surgeries are done each year….**
- **4.7% of People with Cuff Tears have Surgery…**

If 95% of People with Rotator Cuff Tears are not having Surgery….

Rotator Cuff Tears
Physical Exam

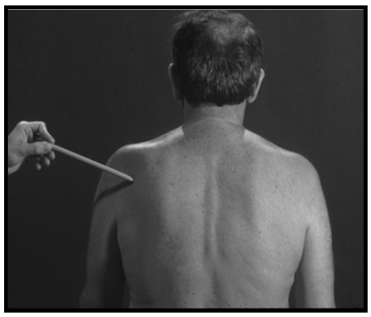
Early

- **Usually full passive ROM**
- **Stiffness RARE! (9%)**
- **Pain with Elevation**
- **Loss of IR**
- **Night Pain**
- **Weakness is uncommon**

Later

- **Spinati atrophy**
- **Weakness of Elevation**
- **Weakness of ER (at side)**
- **Drop sign**
- **Lag sign**
- **Biceps rupture**

Rotator Cuff
Inspection for atrophy



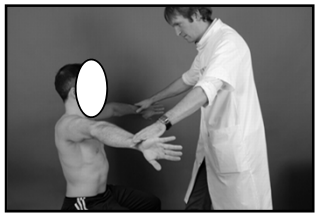
Physical Exam

Cervical Spine AC Joint

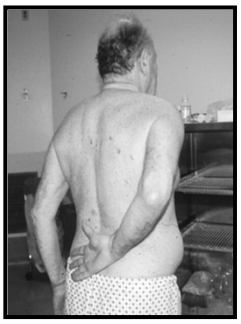
Range of Motion

Range of Motion

Strength Testing



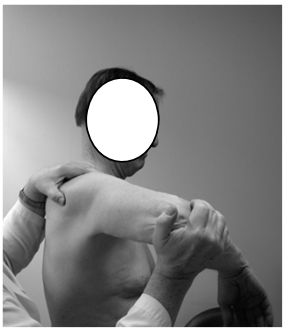
Subscapularis Tests



Lift-off

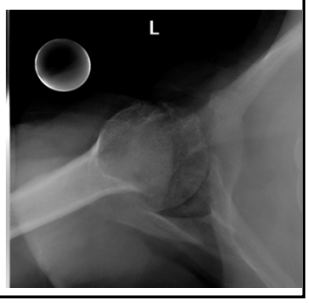
Belly Press

Impingement Signs



Physical Exam – Rotator Cuff Tears

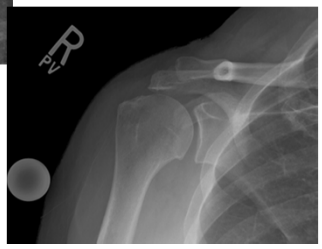
Test	Authors	LOE	N	Sens	Spec	PPV	NPV	+LR	-LR	Accuracy
Drop Arm Test	Park 2005		**913**	.349	.875	.650	.668	**2.79**	**.744**	.665
Jobe-Pain	Itoi 1999		**143**	.63	0.55	.31	.82	**1.4**	**0.7**	.57
Jobe-Pain	Kim2006		**200**	.939	..939	.462	..939	**15.39**	**.065**	.62
Jobe-Weakness	Itoi 1999		**143**	.77	0.68	.44	.90	**2.4**	**0.3**	.70
Jobe-Weakness	Kim 2006		**200**	..757	.709	.562	.855	**2.60**	**.343**	.725
Full Can-Pain	Itoi 1999		**143**	0.66	0.64	.37	.85	**1.8**	**0.5**	.64
Full Can-Pain	Kim 2006		**200**	.712	.679	.552	.827	**2.218**	**.424**	.69
Full Can-Weakness	Itoi 1999		**143**	0.77	0.74	.49	.91	**3.0**	**0.3**	.75
Full Can – Weakness	Kim 2006		**200**	.773	.679	.543	.858	**2.408**	**.334**	.71
Supraspinatus Test	Holtby 2004		**50**	.411	.697	.411	.697	**1.37**	**0.84**	.60
Neer	MacDonald 2000		**85**	0.833	0.508	.400	.886	**1.693**	**0.329**	.588
Neer	Park 2005		**913**	.593	.472	.413	.649	**1.12**	**.862**	.518
Hawkins	MacDonald 2000		**85**	0.875	0.426	.375	.897	**1.524**	**0.293**	.659
Hawkins	Park 2005		**913**	.687	.483	.452	.712	**1.33**	**.648**	.500
Painful Arc	Park 2005		**913**	.758	.618	.610	.764	**1.98**	**0.391**	.680
Rent test (palpation)	Wolf 2001		**109**	.957	.968	.957	.968	**30.1**	**0.0**	.963



70 y/o Female 3 yrs of treatment for RCD
4 injections, 1 full yr PT, 2 MRI's

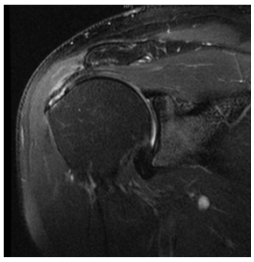
48 y/o M. Marine, weeping

Rotator Cuff Disease

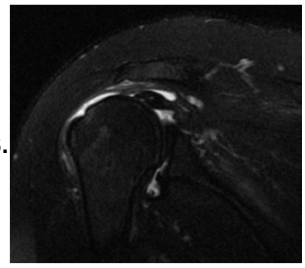


53 y/o with 2 months of pain

MRI



VS.



"My rotator cuff is torn"

"My rotator cuff is torn"

A Prospective Evaluation of Survivorship of Asymptomatic Degenerative Rotator Cuff Tears

Jay D. Keener, MD, Leesa M. Galatz, MD, Sharlene A. Teefey, MD, William D. Middleton, MD, Karen Steger-May, BA, Georgia Stobbs-Cucchi, RN, Rebecca Patton, MA, and Ken Yamaguchi, MD

Investigation performed at the Shoulder and Elbow Service, Department of Orthopaedic Surgery, Washington University, St. Louis, Missouri

- **228 pt f/u 5 yrs,**
- **49% Enlarged, Mean time 2.8 yrs**
- **46% Increased pain**
- **61% Full thickness, 44% PTT enlarged**

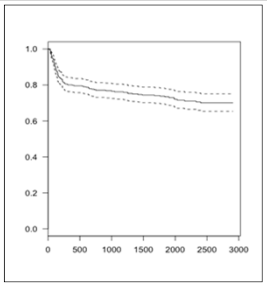
Patients with symptomatic rotator cuffs may be at risk for size progression over time

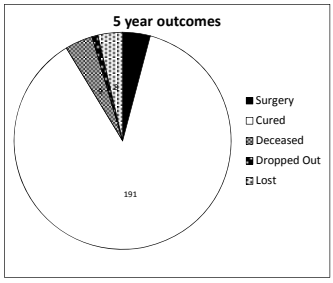
Effectiveness of physical therapy in treating atraumatic full-thickness rotator cuff tears: a multicenter prospective cohort study

the MOON Shoulder Group

- **452 pts with full thickness tears**
- **Standardized PT program**
- **Followed 2 yrs**
- **Less than 25% opted for surgery, most did so early 3-12wks**

Effectiveness of Therapy *5 Year Outcomes*





85% Follow up at 5 years
3% died, 16% lost to follow up
24% had Surgery
Those that had Surgery Decided Early

Features NOT Predictors of Surgery

Patient Factors

- **Age, sex, BMI**
- **Handedness**
- **Education, occupation**
- **Work-compensation status**
- **Comorbidities**
- ***Pain level***
- ***Duration of symptoms***
- **SANE score**

Structural Factors:

- ***Number of tendons torn***
- ***Amount of retraction***
- ***Forward elevation* strength**

What are the Predictors of Failure of Non-operative Treatment?

- *Anatomic Severity of Tear- NO ASSOCIATION*
- *Symptoms (pain, strength)– NO ASSOCIATION*

- **Associations**
  - **Higher Activity Level (p=0.011)**
  - **Not Smoking (p=0.023)**
  - **Younger Age (p=0.042)**

Predictors of Failure of Non-operative Treatment?
Strongest Association

- ***Low Patient Expectations* Regarding Success with Therapy (p<0.0001)**
- **If a patient thought PT would not be effective- it generally wasn't**
- **If a patient thought PT would be effective-It was**

Operative versus Non-Operative Treatment for the Management of Full Thickness Rotator Cuff Tears: A Systematic Review & Meta-analysis

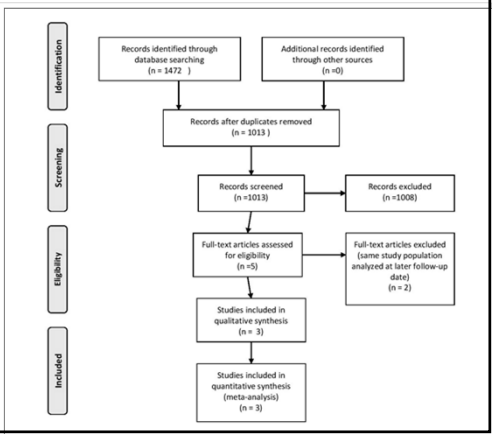
Christine Piper MD, Alice Hughes MD, Yan Ma PhD, Haijun Wang PhD, Andrew Neviaser MD

Purpose

- **There has been recent trend toward surgery for atraumatic rotator cuff tears, however, no consensus exists on whether surgery is the optimal treatment.**
- **The aim of this study is to analyze the Level I and II research comparing operative versus non-operative management for atraumatic rotator cuff tears.**

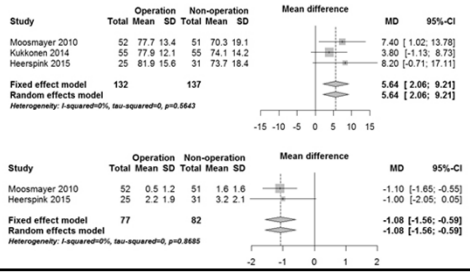
Methods

- 258 patients w/ 1 yr follow-up
- Mean age: 59-64 years
- Clinical outcomes measures: Constant-Murley score and the Visual Analog Pain Scale



Results

- Statistically significant differences in both Constant & VAS scores, favoring surgery after 1 year of follow up with a mean difference of 5.64 and 1.08 respectively.



Conclusions

- There was a statistically significant improvement in outcomes for patients managed operatively compared to non-operatively.
- The difference in both Constant Score and VAS were small and do not meet the minimal difference considered clinically significant.

Study Overview

ARC
ARTHROSCOPIC ROTATOR CUFF TRIAL

ShoulderStudy.com

Study Overview

STUDY TITLE	Operative versus Non-Operative Treatment for Atraumatic Rotator Cuff Tears: A Multicenter Randomized Controlled Pragmatic Trial
SHORT TITLE	Arthroscopic Rotator Cuff (ARC) Clinical Trial
PRINCIPAL INVESTIGATOR	Nitin Jain, MD, MSPH
FUNDED BY	Patient-Centered Outcomes Research Institute (PCORI)
LENGTH	5 years total (3 ½ years recruitment)
RECRUITMENT TARGET	700
PARTICIPATING SITES	12 (including Vanderbilt)

Participating Sites

COORDINATING CENTER & RECRUITING SITE:

Vanderbilt University Medical Center

RECRUITING SITES:

Washington University in St. Louis

The Ohio State University Wexner Medical Center

UI Sports Medicine, University of Iowa Hospitals and Clinics

University of Kentucky

Sports Medicine, University of Colorado

Orthopedic Institute

UT Southwestern Medical Center

Penn Medicine

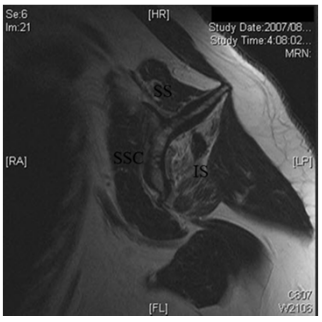
UCSF Medical Center Orthopaedic Institute

Michigan Medicine

KOC Knoxville Orthopaedic Clinic

Reasons to Operate

- **Trauma**
- **Pain**
- **Function**
- **Progression**
- **Fatty Degeneration**



Rotator Cuff Summary

- **Multifactorial in Origin**
  - **History, PE, X-Ray**
    - **Surgery for**

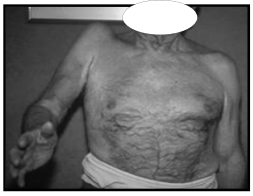
1.Traumatic tears

2.Younger patients

3.Larger tears

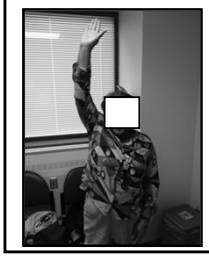
4. Failure of Non Op

Rotator Cuff Arthropathy



Indications for Reverse

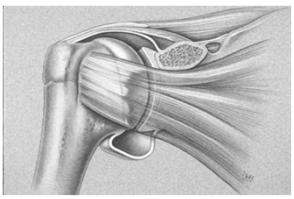
- RCA
- Massive Tears in Elderly
- Fractures
- Revision Arthroplasty
- Severe OA

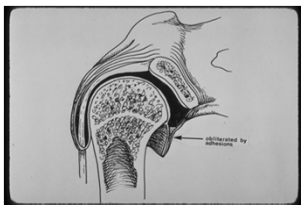


Adhesive Capsulitis

Adhesive Capsulitis

- A painful, gradual loss of both active and passive glenohumeral motion resulting from progressive fibrosis and ultimate contracture of the glenohumeral joint capsule.
- Terminology is an issue





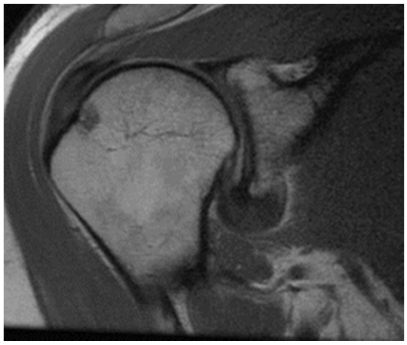
Demographics

- 2-5% of population
- Females >males
- Between ages 40 and 60
- Non-dominant shoulder
- More common in diabetics (and more resistant to treatment)

Keys to Diagnosis

- Early → Pain in all planes of motion
- Later→ Mechanical restriction of passive ROM
- Easiest to feel as tethering of ER at the side
- X-Rays- Normal! (or osteopenia)

Keys to Diagnosis



Stages

- Stage I Pre-adhesive
- Stage II Acute adhesive synovitis
- Stage III Maturation
- Stage IV Chronic

Physical Therapy - High-grade vs Low-grade

- 100 patients
  - Sx >3mos, >50% loss PROM
- Randomized to:
  - HGPT-intensive mobilization at end-range positions
  - LGPT-passive mobilization within pain free zone
- Outcomes
  - ROM
  - Shoulder Rating Questionnaire
  - Shoulder Disability Questionnaire
- F/U 3,6,12 months
- Results
  - Both groups improved
  - HGMT significantly better for passive abduction (3, 12 months); external rotation (12 months)

Vermeulen HM Comparison of high-grade and low-grade mobilization techniques in the management of adhesive capsultitis of the shoulder: randomized controlled trial. Phys Ther 86(3):355-68, 2006.

Long-term Outcomes

- Shaffer et al 1992,
- Retrospective review, brought patients back for examination
  - Average 7 years from diagnosis
  - 92 patients met criteria, 62 participated (67%)
  - 31 (50%) with mild pain and/or stiffness
  - 60% with evidence of restriction in at least 1 plane
  - 7 (11%) reported interference with function
  - No correlation between ROM and complaints

Shaffer B. Frozen shoulder. A long term follow up. JBJS 74A(5):738-46, 1992

Arthroscopy

- Prospective study of 73 patients (LOE 4) Arthroscopic Capsulotomy
  - Mean symptom duration- 19.7 months!!
  - Mean age 52, 57% females
  - 70% of patients had aggravation of pain at 4.5 weeks, 37% required corticosteroid injection
  - 12 month - changes in pain, function, and ROM maintained
  - 11% had recurrence of pain or stiffness

Watson L. Frozen shoulder: a 12-month clinical outcome trial. J Shoulder Elbow Surg 9(1):16-22, 2000

Adhesive Capsulitis

- When to refer?
  - Failure to improve after treatment of 4 months
  - Unsatisfied with function or level of pain after 8-12 months of physical therapy.

Summary

1. Rotator Cuff Disease
2. Adhesive Capsulitis
3. Glenohumeral Osteoarthritis
4. Calcific Tendinitis

- History and Physical Exam
  - Traumatic is different
    - Always get X-rays