“The Top 5”
Shoulder Publications

James D. Kelly, II, MD
Disclosure

- Tornier, Inc
  - Consultant
  - Speaker
  - Designer
  - Royalties
Constant Score: 100 points

Subjective 35 points

<table>
<thead>
<tr>
<th>Function</th>
<th>Points</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ability to work</td>
<td>0.4</td>
</tr>
<tr>
<td>Ability to engage in recreational activities</td>
<td>0.4</td>
</tr>
<tr>
<td>Ability to sleep</td>
<td>0.2</td>
</tr>
<tr>
<td>Ability to work at specific level</td>
<td></td>
</tr>
<tr>
<td>Waist</td>
<td>2</td>
</tr>
<tr>
<td>Chest</td>
<td>4</td>
</tr>
<tr>
<td>Neck</td>
<td>6</td>
</tr>
<tr>
<td>Head</td>
<td>8</td>
</tr>
<tr>
<td>Above head</td>
<td>10</td>
</tr>
<tr>
<td>Pain</td>
<td>0.15</td>
</tr>
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</table>

Objective 65 points

<table>
<thead>
<tr>
<th>Activity</th>
<th>Points</th>
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<tbody>
<tr>
<td>Flexion and abduction (scored separately)</td>
<td></td>
</tr>
<tr>
<td>$&gt;150^\circ$</td>
<td>10</td>
</tr>
<tr>
<td>$121^\circ = 150^\circ$</td>
<td>8</td>
</tr>
<tr>
<td>$91^\circ = 120^\circ$</td>
<td>6</td>
</tr>
<tr>
<td>$61^\circ = 90^\circ$</td>
<td>4</td>
</tr>
<tr>
<td>$31^\circ = 60^\circ$</td>
<td>2</td>
</tr>
<tr>
<td>Combined active external rotation</td>
<td></td>
</tr>
<tr>
<td>Hand behind head, elbow forward</td>
<td>2</td>
</tr>
<tr>
<td>Hand behind head, elbow back</td>
<td>2</td>
</tr>
<tr>
<td>Hand on top of head, elbow forward</td>
<td>2</td>
</tr>
<tr>
<td>Hand on top of head, elbow back</td>
<td>2</td>
</tr>
<tr>
<td>Full elevation from top of head</td>
<td>2</td>
</tr>
<tr>
<td>Combined active internal rotation of hand</td>
<td></td>
</tr>
<tr>
<td>Interscapular region</td>
<td>10</td>
</tr>
<tr>
<td>Inferior tip of scapula</td>
<td>8</td>
</tr>
<tr>
<td>Twelfth rib</td>
<td>6</td>
</tr>
<tr>
<td>Lumbosacral junction</td>
<td>4</td>
</tr>
<tr>
<td>Buttock</td>
<td>2</td>
</tr>
<tr>
<td>Lateral thigh</td>
<td>0</td>
</tr>
<tr>
<td>Strength</td>
<td>1/lb</td>
</tr>
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</table>
Shoulder Rotator Cuff Repair Failure

- What is the rate of re-tear?
- When will the re-tear occur?
- Does a re-tear affect the outcome?
- When will I start therapy?
Time to Failure After Rotator Cuff Repair

A Prospective Imaging Study

Joseph P. Iannotti, MD, PhD, Allen Deutsch, MD, Andrew Green, MD, Sally Rudicel, MD, Jared Christensen, PhD, Shannon Marraffino, and Scott Rodeo, MD

Investigation performed at the Cleveland Clinic, Cleveland, Ohio; Kelsey Seabold Clinic, Houston, Texas; University Orthopedics, Providence, Rhode Island; Hospital for Special Surgery, New York, NY; Mount Sinai Medical Center, New York, NY; Massachusetts General Hospital, Boston, Massachusetts; CORE Institute, Phoenix, Arizona; Everett Clinic, Everett, Washington; University of Rochester Medical Center, Rochester, New York; Texas Orthopedic Specialists, Bedford, Texas; UCSF, San Francisco, California; and Yale University, New Haven, Connecticut

Prospective, Multicenter

113 patients (59yo)

Tears 1-4 cm

Arthroscopic suture bridge repair

Immobilizer 6 weeks

PROM 6 weeks

Avoid AROM 12 weeks

Progression thereafter

Sequential MRI’s
Recurrent tear 17%

- Re-tear 17% (19/113)
  - Mean time to re-tear 19.2 weeks
- Re-tear Correlated with
  - Reduced Abduction strength
- Re-tear NOT correlated with
  - Constant
  - PENN
  - VAS
When did Re-tears Occur?
ABDUCTION STRENGTH $p = .0026$

Reference lines are drawn for the 25th, 50th, and 75th percentiles of scapular abduction strength for the contralateral arm at the final visit.
EXTERNAL ROTATION STRENGTH  p=.108

Reference lines are drawn for the 25th, 50th, and 75th percentiles of external rotation strength for the contralateral arm at the final visit.
Conclusion

- Re-tears occur 6-26 weeks post op.
- Repair should be protected for at least 6 mos

Does delayed motion negatively affect outcome?


- Tears 3cm or less
- Compared Sling immobilization for 6 weeks to early PROM
- No difference at follow up 6 months and thereafter
- Retear rate of 8% no different among groups
  - 3/50 Immobilization group
  - 6/57 Early motion group
Frozen Shoulder

- What is the best option to treat Frozen Shoulder?
- Who should evaluate frozen shoulder?
  - Does it have to be me....
A blinded, randomized, controlled trial assessing conservative management strategies for frozen shoulder

Sarah Russell, MSc, MCSP\textsuperscript{a}, Arpit Jariwala, MChOrth, FRCS(Tr&Orth)\textsuperscript{b}, Robert Conlon, BSc, MCSP\textsuperscript{a}, James Selfe, PhD\textsuperscript{c}, Jim Richards, PhD\textsuperscript{c}, Michael Walton, MSc, FRCS(Tr&Orth)\textsuperscript{a,}\textsuperscript{*}

\textsuperscript{a}Wrightington Upper Limb Unit, Wigan, Lancashire, UK
\textsuperscript{b}Ninewells Hospital, Dundee, UK
\textsuperscript{c}University of Central Lancashire, Preston, Lancashire, UK

<table>
<thead>
<tr>
<th>Inclusion criteria</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age 40 to 70 years</td>
</tr>
<tr>
<td>Patients reported local shoulder pain, frequently present either over the anteromedial aspect of the shoulder extending distally into the biceps region or over the lateral aspect of the shoulder extending into the lateral deltoïd region. Symptoms were present for at least 3 months.</td>
</tr>
<tr>
<td>Spontaneous onset of a painful stiff shoulder</td>
</tr>
<tr>
<td>Marked loss of active and passive global shoulder motion, with at least 50% loss of external rotation</td>
</tr>
<tr>
<td>Normal findings on anteroposterior and axillary radiographs of the glenohumeral joint</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Exclusion criteria</th>
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</thead>
<tbody>
<tr>
<td>Pathologic findings or glenohumeral osteoarthritis on radiographic evaluation</td>
</tr>
<tr>
<td>Clinical evidence of significant cervical spine disease</td>
</tr>
<tr>
<td>History of significant trauma to the shoulder</td>
</tr>
<tr>
<td>Local corticosteroid injection or any physiotherapy intervention to the affected shoulder within the last 3 months</td>
</tr>
<tr>
<td>Cerebrovascular accident affecting the shoulder</td>
</tr>
<tr>
<td>Inflammatory joint disease affecting the shoulder</td>
</tr>
<tr>
<td>Bilateral frozen shoulder due to possible underlying systemic cause</td>
</tr>
<tr>
<td>Thyroid disease</td>
</tr>
<tr>
<td>Any coronary event, post-coronary artery bypass, or catheterization before the clinical appearance of frozen shoulder</td>
</tr>
<tr>
<td>Prior surgery, dislocation, or fractures on the affected shoulder</td>
</tr>
<tr>
<td>Active medicolegal involvement</td>
</tr>
</tbody>
</table>
Frozen Shoulder PCP Referrals to Physiotherapy

- 75 Patients out of 850 referred
- 6 weeks of Group Exercise
- 6 weeks of Individual PT
- Home PT
Mean Constant Score

Exercise Class Better than Multimodal and Home Exercise


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Hospital Anxiety Disability Score (HADS)

HADS worse in Home Exercise Group

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Conclusions

- **Group Exercise supervised by PT:**
  - Most rapid recovery rate, Superior Outcomes
  - Provides clinical setting in which patients’ have peer support, reduced anxiety
  - Most cost effective!

- **Individual PT better than Home PT**
Shoulder Instability: Scope vs. Open

- What is the outcome of arthroscopic vs. open instability surgery?
- Is Arthroscopic “as good as” Open surgery?
- What is the recurrence rate?
A Randomized Clinical Trial Comparing Open and Arthroscopic Stabilization for Recurrent Traumatic Anterior Shoulder Instability

Two-Year Follow-up with Disease-Specific Quality-of-Life Outcomes

Nicholas G.H. Mohtadi, MD, MSc, FRCSC, Denise S. Chan, MBT, MSc, Robert M. Hollinshead, MD, FRCSC, Richard S. Boorman, MD, MSc, FRCSC, Laurie A. Hiemstra, MD, PhD, FRCSC, Ian K.Y. Lo, MD, FRCSC, Heather N. Hannaford, BKin, Jocelyn Fredine, BKin, CAT(C), Treny M. Sasyniuk, MSc, and Elizabeth Oddone Paolucci, PhD

Investigation performed at the University of Calgary Sport Medicine Centre, Calgary, Alberta, Canada

Clinical Evaluation

- WOSI (Western Ontario Shoulder Instability Index)
  - Disease specific Quality of Life Outcome

- ASES (American Shoulder and Elbow Surgeons) Score
  - Shoulder (but *not* disease) specific score

- Dislocation Recurrence
Surgery

“Expertise Based”

“Arthroscopic” experts performed arthroscopic surgery (98)
  - Suture anchor
  - 38/47 SLAP lesions repaired

“Open” experts performed open surgery (97)
  - Suture anchor
  - Majority Subscapularis split
Clinical Outcome: WOSI

Range of Motion of the groups were equivalent

SLAP tears not addressed in open procedures
Recurrent Dislocation:
Scope 23%    Open 11%

\[ p = .05 \]

**TABLE IV** Frequency of Traumatic and Atraumatic Dislocations and Subluxations at the Two-Year Follow-up Evaluation*

<table>
<thead>
<tr>
<th>Group</th>
<th>No Recurrence</th>
<th>Traumatic</th>
<th>Atraumatic</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Subluxation</td>
<td>Dislocation</td>
</tr>
<tr>
<td>Open (n = 80)</td>
<td>71</td>
<td>2</td>
<td>4</td>
</tr>
<tr>
<td>Arthroscopic (n = 87)</td>
<td>67</td>
<td>1</td>
<td>14</td>
</tr>
</tbody>
</table>

*One patient in the open group and four patients in the arthroscopic group did not return for the two-year follow-up evaluation. However, these patients provided the necessary information regarding recurrent instability to be included in this table.
Regression Analysis: Profile of “at risk” patient

- Male
- 25 years old or younger
- Hill-Sachs
  - Sport
  - Glenoid Bone Loss (ineligible for this study)
Clavicle Fracture
Should we repair displaced clavicle fractures? Why?
Open Reduction and Plate Fixation Versus Nonoperative Treatment for Displaced Midshaft Clavicular Fractures

A Multicenter, Randomized, Controlled Trial

C.M. Robinson, FRCSEd(Tr&Orth), E.B. Goudie, BMedSci(Hons), MRCSEd, I.R. Murray, BMedSci(Hons), MRCSEd, Dip SEM, P.J. Jenkins, FRCSEd(Tr&Orth), M.A. Ahktar, MRCSEd, E.O. Read, BMedSci(Hons), C.J. Foster, MBChB, K. Clark, BSc, A.J. Brooksbank, FRCS(Tr&Orth), A. Arthur, FRCS(Tr&Orth), M.A. Crowther, FRCS(Tr&Orth), I. Packham, BMBS, BMedSci, FRCS(Tr&Orth), and T.J. Chesser, FRCS(Tr&Orth)

Investigation performed at The Edinburgh Shoulder Clinic, The New Royal Infirmary of Edinburgh, Little France, Edinburgh, Department of Trauma and Orthopaedics, Glasgow Royal Infirmary, Glasgow, and Department of Orthopaedic Surgery, Frenchay Hospital, Bristol, United Kingdom

The Journal of Bone and Joint Surgery (American), 95(17), 1576. 2013
<table>
<thead>
<tr>
<th></th>
<th>Non Operative Tx (105 patients)</th>
<th>ORIF (95 patients)</th>
<th>P Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Non-Union Rate (CT Eval)</td>
<td>16/105 (18%)</td>
<td>1/95 (1%)</td>
<td></td>
</tr>
<tr>
<td>Constant Score</td>
<td>87.8</td>
<td>92.0</td>
<td>.01</td>
</tr>
<tr>
<td>Dash Score</td>
<td>6.1</td>
<td>3.4</td>
<td>.04</td>
</tr>
<tr>
<td>Time Off Work in days</td>
<td>24.2</td>
<td>22.0</td>
<td>.7</td>
</tr>
<tr>
<td>Cost (Pounds)</td>
<td>1518</td>
<td>6813</td>
<td>&lt;.0001</td>
</tr>
</tbody>
</table>

8 patients (9%) non-operatively treated had delayed union
<table>
<thead>
<tr>
<th></th>
<th>Non Operative Tx (89)</th>
<th>ORIF (94)</th>
<th>P Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Constant Score</td>
<td>89.4</td>
<td>92.5</td>
<td>ns</td>
</tr>
<tr>
<td>Dash Score</td>
<td>4.8</td>
<td>3.2</td>
<td>ns</td>
</tr>
</tbody>
</table>

Non-Union was the only independent predictor of functional outcome.
Secondary Operation Rate 18% in both groups
Operative Group

- Patients *less dissatisfied* ($p < .0001$) with
  - Shoulder droop
  - Local bump
  - Shoulder asymmetry

- Patients *more dissatisfied* ($p = .006$) with
  - Local numbness
Conclusions

- ORIF is reliable
- Routine ORIF not mandatory
- You must operate on 6 fractures to prevent ONE non-union
- Result using DASH and Constant are equivalent when non-unions are removed
Longitudinal Observational Study of Total Shoulder Replacements with Cement

Fifteen to Twenty-Year Follow-up

Patric Raiss, MD, Thomas Bruckner, PhD, Markus Rickert, MD, and Gilles Walch, MD

Investigation performed at the Centre Orthopédique Santy, Lyon, France

63 TSA Single Surgeon

- 2 lost to follow up
- 16 Died
- 45 Patients
  - 3rd Generation Humeral Cemented Stem
  - Keeled Glenoid
  - Reamed subchondral bone, Curettage Glenoid

Post-op (1993)
Radiolucent lines and loosening do not correlate with inferior clinical outcome in patients without revision.
“Nothing ruins short term results as well as long term follow up”

- Significant and longitudinal improvement after TSA
- 30% Revision rate at 20 years
- Linear increase in radiolucent lines through 15 years
- Glenoid remains the weak link
Thank You!

James D. Kelly, II, MD
Criteria to Judge “Best Paper”

- Well Designed
  - Prospective, Randomized, Control Group
- Answer a specific question
- Follow-up
  - Long-term
  - Small drop out rate
- Clinically Relevant
- Learn one important Pearl