REHABILITATION FOLLOWING SCR: GUIDELINES & OUTCOMES

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• Immobilization alone was only used in 1 RCT
• "protected" ROM most common comparison
• No apparent effect is < 3cm with NO IMMOBILIZATION (Sheps et al 2015)
SCR Implications for Rehab

- **Allograft**
  - Best tissue @ day 1 post-op
- “**soft tissue rTSA**” (Thay Lee, PhD)
- **Rotational stress**
  - Tenodesis effect of subscapularis & infraspinatus
- **Long axis stress**
  - Gravity
  - "distraction"

(Mihata et al AJSM ’16)

#1 Timing and Expectations?
What Happens if this Fails?

- Arthroscopic/ Open Repair
- Debridement/ tenotomy
- Reverse Total Ms Transfer

#2 Education Sets Expectations

[Images of an elderly woman in physical therapy exercises]
Key Early Education

- ADL’s
  - Common mistakes:
    - Door management
    - Bed mobility & rising from chair
  - Toileting & dressing
- Joint protection
- Deltoid function
  - Additional cuff repair
- Est appropriate functional goals
  - ROM for desired tasks
  - Loading - how much after 12 weeks

“this is your box” for the next 3 months

#3 Protected ROM

Rehabilitation plan to match the surgery and the patient

<table>
<thead>
<tr>
<th>Phase</th>
<th>Time</th>
<th>Exercises</th>
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</table>
| **Phase 0** (QUIET) | **Week 0 – 4** | Quiet in sling with elbow/wrist/hand 
Supported pendulums with elbow bent 
Begin active scapular retraction/protraction exercises with therapist cueing |
| **Phase 1** (Passive) | **Week 5 – 8** | Pendulums to warm-up beginning week 5 
Supine External Rotation –0°-30° beginning at week 5 
Supine Forward Elevation –0°-90° beginning at week 5 |

Ultra sling for weeks 0-4 
Regular sling for weeks 4-8
“Successful” clinical outcomes widely reported for rotator cuff repair

(Wilson ’02; Galatz ’04; Burkhart ’01; Tauro et al ’98; Gartsman ’98)

- 25%-95% anatomic failure of cuff repair reported
  (Oh et al ’09; Nho et al JSES ’09; Huijsmans et al ’07; Galatz et al ’04; Harryman et al ’91)

- When- 98% in 1st 6 months
  - Repairs of tears > 4cm fail < 12 wks
  (Miller et al AJSM ’11)

PROM

(Uhl et al ’10; Gaunt & Uhl JOSPT ’11)
ER then FE- ROM 1st

Hold vs. cycles….

Mobilizations
Does Early Versus Delayed Active Range of Motion Affect Rotator Cuff Healing After Surgical Repair?

A Systematic Review and Meta-analysis

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Background: The timing of passive range of motion (ROM) after surgical repair of the rotator cuff (RC) has been shown to affect healing. However, it is unknown if early or delayed active ROM affects healing.

Purpose: To determine whether early versus delayed active ROM affects structural results of RC repair surgery.

Study Design: Systematic review and meta-analysis.

Methods: A systematic review of articles published between January 2004 and April 2014 was conducted. Structural results were compared for early (<6 weeks after surgery) versus delayed (>6 weeks after surgery) active ROM using chi-square and Fisher exact tests, as well as relative risks (RRs) and 95% CIs. The analyses were stratified by tear size and repair method.

Results: A total of 37 studies (2251 repairs) were included in the analysis, with 10 (649 repairs) in the early group and 27 (1602 repairs) in the delayed group. For tears <3 cm, the risk of a structural tendon defect was higher in the early versus delayed group for transosseous plus single-row suture anchor repairs (39.7% vs 24.3%; RR, 1.63 [95% CI, 1.28-2.08]). For tears >3 cm, the risk of a structural tendon defect was higher in the early versus delayed group for suture bridge repairs (48% vs 17.5%; RR, 2.74 [95% CI, 1.59-4.73]) and all repair methods combined (40.5% vs 26.7%; RR, 1.52 [95% CI, 1.17-1.97]). For tears >5 cm, the risk of structural tendon defect was higher in the early versus delayed group for suture bridge repairs (100% vs 16.7%; RR, 6.00 [95% CI, 1.69-21.26]). There were no statistically significant associations for tears measuring <1, 1-3, or 3-5 cm.

Conclusion: Early active ROM was associated with increased risk of a structural defect for small and large RC tears, and thus might not be advisable after RC repair.

Keywords: rotator cuff; rehabilitation; active range of motion; healing

In the United States, over 270,000 rotator cuff (RC) repair surgeries are performed each year, but structural tendon defects after repair are still quite common. Large tears (>5 cm) are associated with defect rates as high as 70% and small tears (<3 cm) up to 20%. Healing after repair is affected by patient age, comorbidities, quality of RC tissue, repair technique, tear size, activity level, rehabilitation, and other factors. Previous studies have found an association between postoperative healing and improvement in objective measures of function (strength and range of motion [ROM]), but no studies have found an association between postoperative healing and subjective outcome scores (eg, pain scores). The structural integrity of the tendon after RC repair (ie, intact vs recurrent defect) is likely affected by postoperative immobilization and rehabilitation, but standard protocols are lacking. Instead, the timing of commencement of passive and active ROM exercises varies depending on the experience of the surgeon and rehabilitation team. The primary goals of rehabilitation are to minimize stress on the repair and improve tissue healing while preventing stiffness and muscle atrophy. There is some evidence to support the hypothesis that early (within 1 week after surgery) initiation of PROM is associated with increased risk of “re-tear/non healing” with early AROM. Increased risk of “re-tear/non healing” with early AROM:

- <3 cm early 1.63x
- >3 cm early 2.5x
- >5 cm 6x

~ 25% of strength & stiffness @ 12 weeks

Schlegel et al ’99; Arnoczky et al ’88, Rodeo et al ’93, St Pierre et al ’95, Hsu et al ’16

#5 Controlled Loading & Return to Function

<table>
<thead>
<tr>
<th>Phase</th>
<th>Exercise goals</th>
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<tbody>
<tr>
<td>Phase 1</td>
<td>PROM, Pendulum, Forward bow, Therapist-assisted FE, CPM in FE, Self-assisted supine FE, ER/IR self-assisted with stack</td>
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<tr>
<td>Phase 2</td>
<td>AAROM or AROM, AAROM supine washcloth press-up, AAROM supine press-up, Side-lying supported active elevation, AAROM reclined wedge press-up</td>
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<tr>
<td>Phase 3</td>
<td>Pulling, Incline sitting, Ball in Up, Upright FE, AABR, Lowering</td>
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<tr>
<td>Phase 4</td>
<td>Upright active FE with no weight, Upright active FE 1 lb, Aquatic FE fast speed, Side-lying dumbbell ER at 90°, resistance of 25% and IR at 90°, resistance of 25% and ER at 90°, Standing dumbbell ER at 90°, a/bd, 10-s rep max</td>
</tr>
</tbody>
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- All suggested exercises <40% rotator cuff EMG

25-50%

40-60%

>50%
Great < 90 then Fight Gravity

- Lower trapezius
- Middle trapezius
- Serratus anterior
- Posterior rotator cuff

AAROM-AROM Progression

(Uhl et al ’10; Gaunt & Uhl JOSPT ‘11)
“Posterior Chain”

#5 Controlled Loading & Return to Function

➔ No heavy lifting 4-6 months
➔ Sport progressions
  o Golf > 20 weeks
  o Tennis >26 weeks
  o Swimming >26 weeks

Fealy S et al. ‘02; McKee MD et al. 00; Ellman et al ‘86; Charousset et al ‘08)
Bjorkenheim, J. M. et al.