Thank You

- Thanks to 2018 CHICAGO SPORTS MEDICINE SYMPOSIUM for the kind invitation to present and share this information

- It is indeed an honor and privilege to be invited to participate and thank you for your time.

George J. Davies, DPT,ATC,CSCS
Professor-Georgia Southern University-Armstrong Campus
Sports Physical Therapist:
Coastal Therapy, Savannah, GA.,
Gundersen Health System, LaCrosse, WI.

GEORGIA SOUTHERN

ARMSTRONG CAMPUS

Health Sciences Center

Disclosures

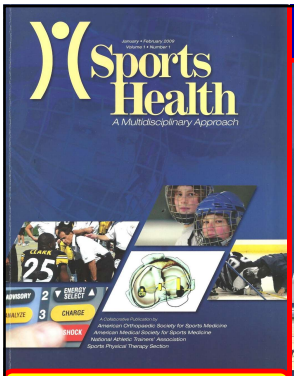
Index Medicus 2015
Impact Factor: 2.694
20th out of 81 in Sports Sciences 6/25/2018

Disclosures:

Associate Editor, Sports Health

Elsevier-Book Royalties
Human Kinetics-Book Royalties
Williams & Wilkins-Book Royalties
North American Seminars-DVD Royalties

No Conflicts



2009-2018

Index Medicus-2015
Impact Factor-2018

Disclosures:

The following companies have provided research equipment support to Biodynamics & Human Performance Center-GSU:
Arthrometrics, Atlanta, GA.
Biodex, Shirley, N.Y.
Boston Biomotion, NY
CDM Sport/Monitored Rehab Systems, Fort Worth, TX.
DS2 Rehab Systems, Missouri City TX
ERMI, Atlanta, GA.
ExerTools, Petaluma, CA.
Innovative Sports Inc, Chicago, IL.
TheraBand, Hygenic Corporation, Akron, OH.

No Conflicts

Disclosures

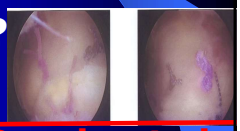
Disclosures

NO MORE FAKE NEWS

Rehabilitation Following Rotator Cuff Surgery

Changing Dynamics with Rotator Cuff Treatments:

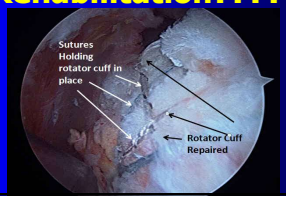
When to do Surgery, When to do Rehabilitation and How?



Accelerated vs Decelerated Rehabilitation?

Controversies in Sports Medicine

Rotator Cuff Repair: Early vs Delayed Motion-Rehabilitation?????



Wow, talk about a controversial area:

Rotator Cuff Repair: Early vs Delayed Motion?????

Every Orthopaedic Surgeon has their opinions and protocols and

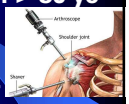
Every physical therapist has their opinions and protocols

And of course,

We all get our patients better…

ASES-Rehabilitation-RTC

- RTC tears affect ~ 30% of population > 60 yo
- RTC tears affect ~ 60% of population > 80 yo
- ~450,000 operations per year



- Direct medical costs - $7 billion/year
- Arthroscopic RTCR has increased 600% over past 10 years
- Arthroscopic repairs comprise greater than 95% of all RTCR in USA

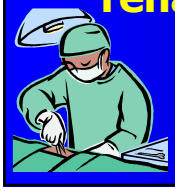
Thigpen, CA, et.al. The American Society of Shoulder and Elbow Therapists' consensus statement on rehabilitation following Arthroscopic rotator cuff repair. JSES. 25:521-535, 2016

ASES-Rehabilitation-RTC

- Despite positive clinical results, reports of structural failure after arthroscopic RTCR ranges from 16%-94%
- Patients whose repair fails to heal, greater than 98% have *failure to heal in within the first 6 months*
- For larger tears (>4 cm), failure occurs even sooner, with as many as 78% of failures occur with the first 3 months after repair

Thigpen, CA, et.al. The American Society of Shoulder and Elbow Therapists' consensus statement on rehabilitation following Arthroscopic rotator cuff repair. JSES. 25:521-535, 2016

Epidemiological factors influencing surgery and rehab of RTC repairs



Rotator Cuff Rehabilitation

- Many factors influence RTC healing:
- Tear size
- Quality of RTC tissue
- Age
- Fatty infiltration of muscle
- Comorbidities
- Repair techniques
- Activity level
- Osteoporotic bone
- Rehabilitation program

Rotator Cuff Rehabilitation

- Rehabilitation after RTC repair is important for successful outcome, but there is no consensus on the timing of immobilization and rehabilitation

Rotator Cuff Rehabilitation

- Rehabilitation after RTC repair is important for successful outcome, but there is no consensus on the timing of immobilization and rehabilitation
- Currently, rehabilitation protocols are frequently based on surgeon experience and expert opinion rather than scientific evidence.

Ross, D, et.al. Rehabilitation following arthroscopic RTC repair: a review of current literature. J Am Acad Orthop Surg. 22:1-9, 2014

Rotator Cuff Rehabilitation

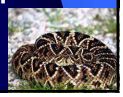
- Several studies have noted that increasing age is a significant factor for diminished rotator cuff healing, Larger tears and fatty infiltration or atrophy also negatively affect rotator cuff healing.
- There is conflicting evidence to support postoperative rehabilitation protocols using early motion over immobilization following rotator cuff repair.

Mall NA, et.al. Factors affecting rotator cuff healing. J Bone Joint Surg Am. May 7;96(9):778-88, 2014

Applications

- Immediate motion is relatively indicated for selected patients:
- Younger patients
- Athletic patients

- Smaller/medium size tears
- Surgical technique & expertise
- Double row fixation
- Suture bridge/Diamond Back techniques
- If you pick your patients wisely, you can always be successful !!!



Applications

- Immediate motion is relatively contraindicated for selected patients:
- Older patients
- Inactive patients

- Large/massive size tears
- Poor quality tissue
- Surgical technique & expertise

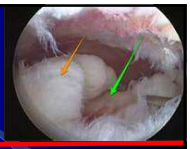
- Single row fixation
- Surgical procedure

RTC

- "It is evident that a successful outcome after surgical RTC repair is as much dependent on surgical technique as it is on rehabilitation"

Van der Meijden, OA, et.al. Rehabilitation after arthroscopic rotator cuff repair: current concepts review and evidence-based guidelines.
Int J Sports Phys Ther. 7:197-218, 2012

RTC Rehab



- Post-operative rehab program is critical to the successful outcome following repairs of the RTC surgical repair
- However,
- What does the research really say?

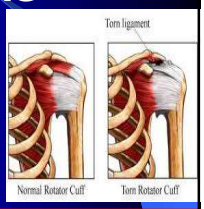
Rehabilitation-RTC

- CONCLUSION:
- Not all ROM parameters recover in the same way based on the size of tear: ***postoperative rehabilitative protocol is an integral contributor*** to favorable outcomes in patients with rotator cuff tears.
- CLINICAL REHABILITATION IMPACT:
- The knowledge about ROM recovering after arthroscopic rotator cuff repair is a strategic information for the patient, orthopaedic surgeon and physical therapist

Gumina, S, et.al. Mobility recovery after arthroscopic rotator cuff repai
Eur J Phys Rehabil Med. Jun 22. [Epub ahead of print], 2016

RTC

- "There is little consensus as to the most effective treatment of full thickness tears of the RTC."



Ainsworth, R, et.al. Exercise therapy for the conservative management of full thickness tears of the rotator cuff: a systematic review.
Br J Sports Med. 41:200-210, 2007

Rotator Cuff Rehabilitation

- Purpose was to compare the benefits and harms of nonoperative and operative interventions on clinically important outcomes in adults with rotator cuff tears
- GRADE (Grading of Recommendations Assessment, Development, and Evaluation) approach
- 137 studies met eligibility criteria. All trials had high risk for bias.

Seida JC[1], et.al. Systematic review: nonoperative and operative treatments for rotator cuff tears. Ann Intern Med. Aug 17;153(4):246-55, 2010

Rotator Cuff Rehabilitation

- CONCLUSION:
- Evidence on the comparative effectiveness and harms of various operative and nonoperative treatments for rotator cuff tears is limited and inconclusive.

Seida JC[1], et.al. Systematic review: nonoperative and operative treatments for rotator cuff tears. Ann Intern Med. Aug 17;153(4):246-55, 2010

Rehabilitation-RTC

- Eleven studies met the inclusion criteria.
- All the studies were of fair to good methodological quality.
- The findings of this review suggested that following RC repair, patients should expect improvement in pain, ROM and function.
- CONCLUSION:
- This review concludes that no single rehabilitation protocol is superior to another following RC repair.

Thomson S; et.al. Rehabilitation following surgical repair of the rotator cuff: a systematic review. Physiotherapy. Mar;102(1):20-8, 2016

RTC Rehab

Rehabilitation-RTC

- Pub Med Search
- Rotator cuff surgery AND rehabilitation
- 1297 articles
- 38 in 2018

ASSET-Rehabilitation-RTC

- Document represents the FIRST consensus rehabilitation statement developed by a multidisciplinary society of international rehabilitation professionals specifically for the postoperative care of patients with arthroscopic RTCR. (117 references)

Thigpen, CA, et.al. The American Society of Shoulder and Elbow Therapists' consensus statement on rehabilitation following Arthroscopic rotator cuff repair. JSES. 25:521-535, 2016

ASSET-Rehabilitation-RTC

- Purpose: Aid clinical decision making during the rehabilitation of patients after arthroscopic RTC repair

Thigpen, CA, et.al. The American Society of Shoulder and Elbow Therapists' consensus statement on rehabilitation following Arthroscopic rotator cuff repair. JSES. 25:521-535, 2016

ASSET-Rehabilitation-RTC

- **Overarching Philosophy of Rehabilitation:** Centered on the principle of the ***gradual application of controlled stresses to the healing RTC repair*** with consideration of RTC tear size, tissue quality, and patient variables

Thigpen, CA, et.al. The American Society of Shoulder and Elbow Therapists' consensus statement on rehabilitation following Arthroscopic rotator cuff repair. JSES. 25:521-535, 2016

ASSET-Rehabilitation-RTC

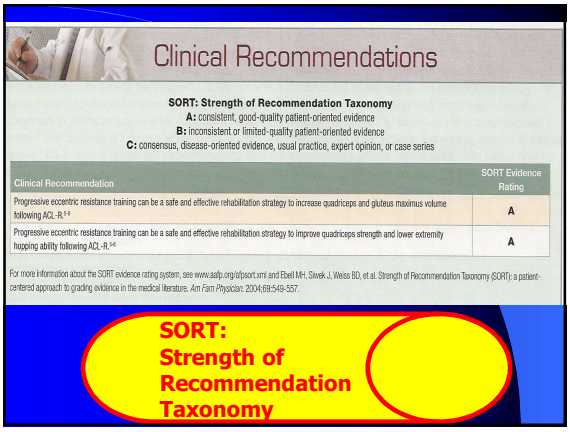
- **Phase-to-phase progression is based on:**
- 1) Achievement of milestones
- 2) Criterion-Based
- 3) Impairment-based

Thigpen, CA, et.al. The American Society of Shoulder and Elbow Therapists' consensus statement on rehabilitation following Arthroscopic rotator cuff repair. JSES. 25:521-535, 2016

ASSET-Rehabilitation-RTC

- **Rehabilitation Framework:**
  - 2-week period of strict immobilization
  - Staged introduction of protected PROM during weeks 2-6 post-op
  - Restoration of AROM
  - Progressive strengthening beginning at post-op week 12
  - When appropriate, rehabilitation continues with a functional progression for return to athletic or demanding work activities

Thigpen, CA, et.al. The American Society of Shoulder and Elbow Therapists' consensus statement on rehabilitation following Arthroscopic rotator cuff repair. JSES. 25:521-535, 2016



ASSET-Rehabilitation-RTC

- Key Recommendations:
- Protected PROM during first 6 weeks after arthroscopic RTC repair of small to medium tears (<4 cm) to promote the best opportunity for early restoration of ROM without jeopardizing healing or long-term outcomes
- SORT-A (10 references)

Thigpen, CA, et.al. The American Society of Shoulder and Elbow Therapists' consensus statement on rehabilitation following Arthroscopic rotator cuff repair. JSES. 25:521-535, 2016

RTC

- "A large number of factors must be taken into account before implementing a rehabilitation protocol after RTC surgery"
- One of the most important factors a rehabilitation protocol should take into account is the timing of biological healing of bone to tendon or tendon to tendon interface, depending on the type of rupture and repair.

Conti, M, et.al. Post-operative rehabilitation after surgical repair of the rotator cuff.
Chir Organi Mov. 93:S55-S63, 2009

ASSET-Rehabilitation-RTC

- RTC healing is protracted and protecting the repair from excessive loading, particularly early in the rehab process, is vital

Thigpen, CA, et.al. The American Society of Shoulder and Elbow Therapists' consensus statement on rehabilitation following Arthroscopic rotator cuff repair. JSES. 25:521-535, 2016

Rehabilitation-RTC

- The tendon-healing process incorporates biochemical and biomechanical responses to mechanical loading.
- Healing can be optimized with controlled loading.

Hsu JE, et.al. Immobilization After Rotator Cuff Repair: What Evidence Do We Have Now? Orthop Clin North Am. Jan;47(1):169-77, 2016

Rehabilitation-RTC

- Complete load removal and chronic overload can be deleterious to the process.
- Several randomized clinical studies have also characterized the role of postoperative mobilization after rotator cuff repair.

Hsu JE, et.al. Immobilization After Rotator Cuff Repair: What Evidence Do We Have Now? Orthop Clin North Am. Jan;47(1):169-77, 2016

ASSET-Rehabilitation-RTC

- Some surgeons and scientists believe that a 6-week period of strict immobilization is preferred
- However, there is no clear human evidence to support strict immobilization vs early protected ROM with limits of <90° of FE and <30° of ER within the first 6 weeks

Thigpen, CA, et.al. The American Society of Shoulder and Elbow Therapists' consensus statement on rehabilitation following Arthroscopic rotator cuff repair. JSES. 25:521-535, 2016

What we don't know?

- Timeline for Healing & Strength of RTC Repairs ???

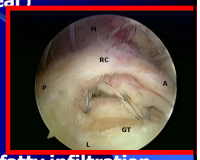
Timeline for Healing & Strength of RTC Repairs

Phases	I	II	III	IV	V	VI
	4 months	8 months	12 months	16 months		
	Protection Phase	Restore ROM	Early Strength	Functional Recovery	Recovery of skill sport	RTS
100 %						
80 %			X			
70 %			X			
60 %		X				
40 %		X				
20 %	X					
0 %	X					

ASSET-Rehabilitation-RTC

Key Recommendations:

Anatomic failure (non-healing or re-tear) after arthroscopic RCR repair is not uncommon (25-60%) but is not associated with poorer functional outcomes



Risk factors: age, poor tissue quality, fatty infiltration, atrophy, smoking, hypercholesterolemia, diabetes

SORT: B (10 references)

Thigpen, CA, et.al. The American Society of Shoulder and Elbow Therapists' consensus statement on rehabilitation following Arthroscopic rotator cuff repair. JSES. 25:521-535, 2016

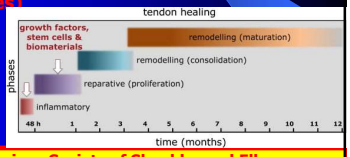
ASSET-Rehabilitation-RTC

Key Recommendations:

Occurrence: first 3-6 months after surgery

Clinician decision making: weigh stresses each intervention places on the RTC relative to its potential values balanced against the implications for healing

SORT: B (10 references)



Thigpen, CA, et.al. The American Society of Shoulder and Elbow Therapists' consensus statement on rehabilitation following Arthroscopic rotator cuff repair. JSES. 25:521-535, 2016

ASSET-Rehabilitation-RTC

Key Recommendations:

Supervised rehabilitation should monitor ER in neutral abduction and FE ROM as indicators of progress

SORT: A (6 references)

Thigpen, CA, et.al. The American Society of Shoulder and Elbow Therapists' consensus statement on rehabilitation following Arthroscopic rotator cuff repair. JSES. 25:521-535, 2016

ASSET-Rehabilitation-RTC

Key Recommendations:

Stiffness after arthroscopic RTCR at 1 year is not common (3-10%)

Risk factors: diabetes, thyroid disorders, acute RTC tears, partial thickness tears, adhesive capsulitis

Clinical reasoning: Patients with these conditions or co-morbidities may benefit from additional focus on their PROM during the first 6 weeks

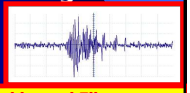
SORT: B (4 references)

Thigpen, CA, et.al. The American Society of Shoulder and Elbow Therapists' consensus statement on rehabilitation following Arthroscopic rotator cuff repair. JSES. 25:521-535, 2016

ASSET-Rehabilitation-RTC

Key Recommendations:

Muscle performance strategies should begin with AROM exercises with the upper extremity in a short-lever or gravity-minimized position with a <15% supraspinatus EMG activity level, followed by progressive stresses with a longer lever or higher loads



SORT: C (6 references)

Thigpen, CA, et.al. The American Society of Shoulder and Elbow Therapists' consensus statement on rehabilitation following Arthroscopic rotator cuff repair. JSES. 25:521-535, 2016

ASSET-Rehabilitation-RTC

Key Recommendations:

Patient education is important to success after arthroscopic RTCR and should include:

1) short term activity modifications

2) *Compliance* with home exercises

3) Resolution of shoulder stiffness balanced with long-term healing of the RTC

SORT: B (References 1)

Thigpen, CA, et.al. The American Society of Shoulder and Elbow Therapists' consensus statement on rehabilitation following Arthroscopic rotator cuff repair. JSES. 25:521-535, 2016

ASSET-Rehabilitation-RTC

- Phase I: 0-6 weeks
- Patient education
- Modalities
- PROM

Thigpen, CA, et.al. The American Society of Shoulder and Elbow Therapists' consensus statement on rehabilitation following Arthroscopic rotator cuff repair. JSES. 25:521-535, 2016

ASSET-Rehabilitation-RTC

- Phase I: 0-6 weeks
- Patient education-one of most important components of postoperative management
- 1) Communication
- 2) Thorough and timely patient education empowers patients so they share responsibility for rehabilitation decisions
- 3) Patient should understand pathology and procedure
- 4) Time frame for recovery
- 5) Associated precautions during each phase

Thigpen, CA, et.al. The American Society of Shoulder and Elbow Therapists' consensus statement on rehabilitation following Arthroscopic rotator cuff repair. JSES. 25:521-535, 2016

ASSET-Rehabilitation-RTC

- Phase I: 0-6 weeks
- Patient education & communication:
- 1) expectations for ***patient compliance*** with restrictions
- 2) identification of patient goals
- 3) importance of HEP
- 4) short term prognosis for the patient based on his or her pathology and situation
- 5) long term prognosis for the patient based on his or her pathology and situation

Thigpen, CA, et.al. The American Society of Shoulder and Elbow Therapists' consensus statement on rehabilitation following Arthroscopic rotator cuff repair. JSES. 25:521-535, 2016

ASSET-Rehabilitation-RTC

- Patients who exhibit ***poor compliance*** with post-operative restrictions in the first 6 weeks show a relative risk of re-tear or non-healing that is 152 times higher than that of compliant patients

Ahmed, S, et.al. The influence of intraoperative factors and post-operative rehabilitation compliance on the integrity of the RTC after arthroscopic repair. JSES. 24:229-35, 2015

ASSET-Rehabilitation-RTC

- Phase I: 0-6 weeks
- Modalities
- Passive modalities have not been shown to alter the long-term outcome after shoulder surgery
- Purpose: Control post-op pain and decrease opioid use in the first 72 hours:

Thigpen, CA, et.al. The American Society of Shoulder and Elbow Therapists' consensus statement on rehabilitation following Arthroscopic rotator cuff repair. JSES. 25:521-535, 2016

ASSET-Rehabilitation-RTC

- Phase I: 0-6 weeks
- Modalities-Cryotherapy:
- 1) decrease pain over first 24 hours postoperatively
- 2) better potential for sleep
- 3) reduced need for pain medication
- 4) Cryotherapy in first 10 days postoperatively reported diminishe shoulder pain and swelling
- 5) less pain during therapy
- 6) more tolerable rehabilitation

Thigpen, CA, et.al. The American Society of Shoulder and Elbow Therapists' consensus statement on rehabilitation following Arthroscopic rotator cuff repair. JSES. 25:521-535, 2016

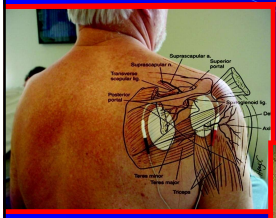
ASSET-Rehabilitation-RTC

- Phase I: 0-6 weeks
- Modalities
- Neuromuscular electrical stimulation has been shown to improve posterior cuff function after RTCR.

- TENS: In first 72 hours
- 1) helps control post-op pain
- 2) decrease opioid use

Thigpen, CA, et.al. The American Society of Shoulder and Elbow Therapists' consensus statement on rehabilitation following Arthroscopic rotator cuff repair. JSES. 25:521-535, 2016

ASSET-Rehabilitation-RTC



Electrical Stimulation To Posterior RTC

Thigpen, CA, et.al. The American Society of Shoulder and Elbow Therapists' consensus statement on rehabilitation following Arthroscopic rotator cuff repair. JSES. 25:521-535, 2016

ASSET-Rehabilitation-RTC

- Phase I: 0-6 weeks
- Passive Range of Motion (PROM)
- PROM has been suggested to be beneficial after RTCR and is included as an early component in rehabilitation program
- PROM exercises can be used to minimize any chance for post-op ROM loss while simultaneously protecting the repair
- Staged goals

Thigpen, CA, et.al. The American Society of Shoulder and Elbow Therapists' consensus statement on rehabilitation following Arthroscopic rotator cuff repair. JSES. 25:521-535, 2016

ASSET-Rehabilitation-RTC

- Judicious use of ROM exercises concluded patients with tears > 2 cm, early ROM produced a 1.4-1.9 times greater risk of failure

Chang, KV, et.al. Early vs delayed PROM exercise for arthroscopic rotator cuff repair: a meta-analysis of RTCs. AJSM. 43:1265-73, 2015

ASSET-Rehabilitation-RTC

- Phase I: 0-6 weeks
- Passive Range of Motion (PROM)
- Staged goals
- Elevation of the arm in the scapular plane and ER with the arm in 20-30 degrees of abduction are the only planes of GH motion recommended in this time frame
- Even within the ranges and planes we consider "safe" for the repair, repeated cyclic loads can have potentially detrimental effects on the suture-tendon interface due to the micro-motion

Thigpen, CA, et.al. The American Society of Shoulder and Elbow Therapists' consensus statement on rehabilitation following Arthroscopic rotator cuff repair. JSES. 25:521-535, 2016

ASSET-Rehabilitation-RTC

- Phase I: 0-6 weeks
- Passive Range of Motion (PROM)
- Staged goals
- Therefore, we recommend ***performing all exercises with only as many reps as necessary*** to achieve the staged ROM goals
- In this first phase of rehab, the exercises chosen for PROM should have levels of EMG muscle activity <15% MVC
- PROM exercises should be performed only in a gentle, comfortable manner as detailed exercises that meet but do not exceed the staged ROM goals

Thigpen, CA, et.al. The American Society of Shoulder and Elbow Therapists' consensus statement on rehabilitation following Arthroscopic rotator cuff repair. JSES. 25:521-535, 2016

ASSET-Rehabilitation-RTC

- Phase I: 0-6 weeks
- Passive Range of Motion (PROM) Staged goals

Post-Op Week	Passive Forward Elevation	Passive ER at 20° of Abduction	Passive ER at 90° of Abduction	Active Forward Elevation	Comments
POW-2	60-90°	0-20°	NA	NA	
POW-6	90-120°	20-30°	NA	NA	
POW-9	130-155°	30-45°	45-60°	80-120°	
POW-12	140°-WNL	30°-WNL	75°-WNL	120°-WNL	

Thigpen, CA, et.al. The American Society of Shoulder and Elbow Therapists' consensus statement on rehabilitation following Arthroscopic rotator cuff repair. JSES. 25:521-535, 2016

Suggested Shoulder Exercises categorized by Time of Initiation and Phase of Postoperative Rotator Cuff rehabilitation

	Post-Op Weeks 1-6	
Initiation Phase	Phase 1	
EMG Activity Level	< 15% MVC	
Exercise Goal	PROM	
Exercises	Pendulum	
	Forward bow (Table slides)	
	PT-assisted FE	
	CPM in FE	
	Self-assisted supine FE	
	ER/IR self-assisted with stick	

ASSET-Rehabilitation-RTC

Thigpen, CA, et.al. The American Society of Shoulder and Elbow Therapists' consensus statement on rehabilitation following Arthroscopic rotator cuff repair. JSES. 25:521-535, 2016

ASSET-Rehabilitation-RTC

Thigpen, CA, et.al. The American Society of Shoulder and Elbow Therapists' consensus statement on rehabilitation following Arthroscopic rotator cuff repair. JSES. 25:521-535, 2016

ASSET-Rehabilitation-RTC

- Phase II: 6-12 weeks

Thigpen, CA, et.al. The American Society of Shoulder and Elbow Therapists' consensus statement on rehabilitation following Arthroscopic rotator cuff repair. JSES. 25:521-535, 2016

ASSET-Rehabilitation-RTC

- Phase I: 6-12 weeks
- Passive Range of Motion (PROM) Staged goals

Post-Op Week	Passive Forward Elevation	Passive ER at 20° of Abduction	Passive ER at 90° of Abduction	Active Forward Elevation	Comments
POW-2	60-90°	0-20°	NA	NA	
POW-6	90-120°	20-30°	NA	NA	
POW-9	130-155°	30-45°	45-60°	80-120°	
POW-12	140°-WNL	30°-WNL	75°-WNL	120°-WNL	

Thigpen, CA, et.al. The American Society of Shoulder and Elbow Therapists' consensus statement on rehabilitation following Arthroscopic rotator cuff repair. JSES. 25:521-535, 2016

Suggested Shoulder Exercises categorized by Time of Initiation and Phase of Postoperative Rotator Cuff rehabilitation

	Post-OP Weeks 6-12	
Initiation Phase	Phase II	
EMG Activity Level	<15% MVC	
Exercise Goal	AAROM, AROM	
Exercises	Towel slide or horizontal dusting	
	AAROM supine washcloth press-up	
	AROM supine press up	
	Side-lying supported active elevation	
	AROM reclined wedge press-up	
	Supine elastic band FE	
	~~Aquatic FE slow speed~~	

ASSET-Rehabilitation-RTC

Thigpen, CA, et.al. The American Society of Shoulder and Elbow Therapists' consensus statement on rehabilitation following Arthroscopic rotator cuff repair. JSES. 25:521-535, 2016

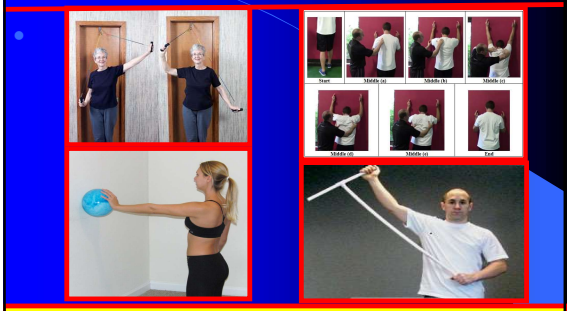
ASSET-Rehabilitation-RTC

Thigpen, CA, et.al. The American Society of Shoulder and Elbow Therapists' consensus statement on rehabilitation following Arthroscopic rotator cuff repair. JSES. 25:521-535, 2016

Suggested Shoulder Exercises categorized by Time of Initiation and Phase of Postoperative Rotator Cuff rehabilitation

	Post-Op 8-16	
Initiation Phase	Phase 2-3	
EMG Activity Level	16-29% MVC	
Exercise Goal	AROM or RROM	
Exercises	Pulley FE	
	Incline dusting	
	Ball roll on wall	
	Upright wall slide	
	FE with upright T-bar	
	AAROM elevation	
	Upright T-bar AAROM FE, active lowering	
	Upright active FE with no weight	

ASSET-Rehabilitation-RTC



Thigpen, CA, et.al. The American Society of Shoulder and Elbow Therapists' consensus statement on rehabilitation following Arthroscopic rotator cuff repair. JSES. 25:521-535, 2016

Rehabilitation-RTC

- A RTCR rehabilitation program that uses pulleys does not result in inferior outcomes, as determined by patient-determined outcome scores, measurements of scapular substitution, range of motion, and scaption strength.

Baumgarten KM, et.al. Are Pulley Exercises Initiated 6 Weeks After RTCR a Safe and Effective Rehabilitative Treatment? A Randomized Controlled Trial. Am J Sports Med. Apr 26, 2016

ASSET-Rehabilitation-RTC

Thigpen, CA, et.al. The American Society of Shoulder and Elbow Therapists' consensus statement on rehabilitation following Arthroscopic rotator cuff repair. JSES. 25:521-535, 2016

Suggested Shoulder Exercises categorized by Time of Initiation and Phase of Postoperative Rotator Cuff rehabilitation

	Post-Op 8-16	
Initiation Phase	Phase 2-3	
EMG Activity Level	16-29% MVC	
Exercise Goal	AROM or RROM	
Exercises – Continued	Aquatic FE fast speed	
	Side-lying DB ER at 0°; Resistance of 25% MVIC	
	Prone DB ER at 0°; Resistance of 25% MVIC	
	Elastic resistance ER, IR, & forward punch	

ASSET-Rehabilitation-RTC

Thigpen, CA, et.al. The American Society of Shoulder and Elbow Therapists' consensus statement on rehabilitation following Arthroscopic rotator cuff repair. JSES. 25:521-535, 2016

ASSET-Rehabilitation-RTC

- Phase III: 12-20 weeks

Thigpen, CA, et.al. The American Society of Shoulder and Elbow Therapists' consensus statement on rehabilitation following Arthroscopic rotator cuff repair. JSES. 25:521-535, 2016

ASSET-Rehabilitation-RTC

- Phase I: 12-20 weeks
- Passive Range of Motion (PROM) Staged goals

Post-Op Week	Passive Forward Elevation	Passive ER at 20° of Abduction	Passive ER at 90° of Abduction	Active Forward Elevation	Comments
POW-2	60-90°	0-20°	NA	NA	
POW-6	90-120°	20-30°	NA	NA	
POW-9	130-155°	30-45°	45-60°	80-120°	
POW-12	140°-WNL	30°-WNL	75°-WNL	120°-WNL	

Thigpen, CA, et.al. The American Society of Shoulder and Elbow Therapists' consensus statement on rehabilitation following Arthroscopic rotator cuff repair. JSES. 25:521-535, 2016

Suggested Shoulder Exercises categorized by Time of Initiation and Phase of Postoperative Rotator Cuff rehabilitation

	Post-Op Weeks 12-20	
Initiation Phase	Phase III-IV	
EMG Activity Level	30-49% MVC	
Exercise Goal	Endurance	
Exercises	High, middle & low scapular rows	
	Standing DB ER at 0° abd; 10 rep-max	
	Standing DB ER in scapular plane; 10 rep max	
	Elastic resistance shoulder flexion	
	Elastic resistance throwing acceleration	
	[illegible]	

ASSET-Rehabilitation-RTC

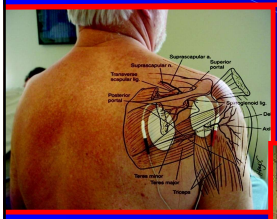
Thigpen, CA, et.al. The American Society of Shoulder and Elbow Therapists' consensus statement on rehabilitation following Arthroscopic rotator cuff repair. JSES. 25:521-535, 2016

ASSET-Rehabilitation-RTC

Concentric Throwing Acceleration Motions

Thigpen, CA, et.al. The American Society of Shoulder and Elbow Therapists' consensus statement on rehabilitation following Arthroscopic rotator cuff repair. JSES. 25:521-535, 2016

ASSET-Rehabilitation-RTC



Electrical Stimulation To Posterior RTC

Thigpen, CA, et.al. The American Society of Shoulder and Elbow Therapists' consensus statement on rehabilitation following Arthroscopic rotator cuff repair. JSES. 25:521-535, 2016

ASSET-Rehabilitation-RTC

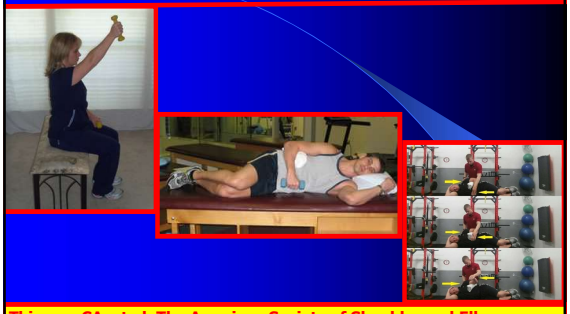
- Phase IV: 20-26 weeks

Thigpen, CA, et.al. The American Society of Shoulder and Elbow Therapists' consensus statement on rehabilitation following Arthroscopic rotator cuff repair. JSES. 25:521-535, 2016

Suggested Shoulder Exercises categorized by Time of Initiation and Phase of Postoperative Rotator Cuff rehabilitation

	Post-Op week 20 & >	
Initiation Phase	Phase IV	
EMG Activity Level	> 50% MVC	
Exercise Goal	Strengthening	
Exercises	Upright FE 3-4 lb.; 10 rep max	
	Sidelying DB ER at 0°; 10 rep max	
	Prone horizontal Abd; 10 rep max	
	Prone ER at 90° Abd; 10 rep max	
	Seated military press	
	Elastic resistance ER at 90°	
	Elastic resistance	

ASSET-Rehabilitation-RTC

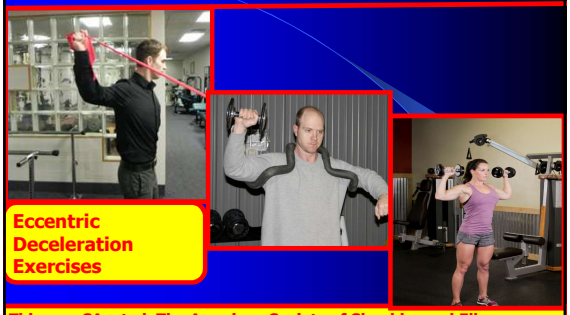


Thigpen, CA, et.al. The American Society of Shoulder and Elbow Therapists' consensus statement on rehabilitation following Arthroscopic rotator cuff repair. JSES. 25:521-535, 2016

ASSET-Rehabilitation-RTC

Thigpen, CA, et.al. The American Society of Shoulder and Elbow Therapists' consensus statement on rehabilitation following Arthroscopic rotator cuff repair. JSES. 25:521-535, 2016

ASSET-Rehabilitation-RTC



Eccentric Deceleration Exercises

Thigpen, CA, et.al. The American Society of Shoulder and Elbow Therapists' consensus statement on rehabilitation following Arthroscopic rotator cuff repair. JSES. 25:521-535, 2016

ASSET-Rehabilitation-RTC

- Frequency and format of supervised rehabilitation:
- As a method to combat the lack of ***compliance*** in patients after RTCR, they suggested:
- 1) constant reinforcement
- 2) advice
- 3) monitoring during the rehabilitation period

Ahmed, S, et.al. The influence of intraoperative factors and post-operative rehabilitation compliance on the integrity of the RTC after arthroscopic repair. JSES. 24:229-35, 2015

ASSET-Rehabilitation-RTC

- Frequency and format of supervised rehabilitation:
- ***All the recent RCTs examining RTCR outcomes***, included regular, supervised rehabilitation as part of standard practice

Thigpen, CA, et.al. The American Society of Shoulder and Elbow Therapists' consensus statement on rehabilitation following Arthroscopic rotator cuff repair. JSES. 25:521-535, 2016

ASSET-Rehabilitation-RTC

- Frequency and format of supervised rehabilitation:
- Frequency of PT FU visits will vary based on many factors
- Published studies suggest PT visit totals range from 12-28 visits after RTCR
- Phase I: ~ 1 time/week
- Phase II: 2 visits/week
- Phase III: 2 visits/week (as needed)
- Phase IV: 2 visits/week (as needed)

Thigpen, CA, et.al. The American Society of Shoulder and Elbow Therapists' consensus statement on rehabilitation following Arthroscopic rotator cuff repair. JSES. 25:521-535, 2016

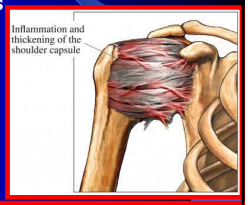
ASSET-Rehabilitation-RTC

- Management of complications:
- If patient does not meet the established milestones, then the patient is not progresses to the next stage
- Signs and Symptoms suggesting the patient is not ready to advance to the next phase include:
- 1) Excessive complaints pain (>3/10 in phase I; >2/10 in phases 2-4)
- 2) Lack of achievement of the lower range of the staged ROM goals
- 3) Noncompliance with HEP
- 4) Failure to adhere to healing precautions

Thigpen, CA, et.al. The American Society of Shoulder and Elbow Therapists' consensus statement on rehabilitation following Arthroscopic rotator cuff repair. JSES. 25:521-535, 2016

ASSET-Rehabilitation-RTC

- Management of complications:
- Complications related to postoperative pain and stiffness are not unexpected after arthroscopic RTCR, especially in the first 3 months
- Assessments begin during the first post-op visits and is continually re-evaluated throughout the rehabilitation process



Thigpen, CA, et.al. The American Society of Shoulder and Elbow Therapists' consensus statement on rehabilitation following Arthroscopic rotator cuff repair. JSES. 25:521-535, 2016

Rehabilitation-RTC

- In selected patients at a high risk of shoulder stiffness and therefore necessitating accelerated postoperative rehabilitation, DR
- repair of the RC could lower retear rates.
- (Emphasis on proper patient selection)

Franceschi F, et.al. Double-Row Repair Lowers the Retear Risk After Accelerated Rehabilitation. Am J Sports Med. Apr;44(4):948-56, 2016

Rehabilitation-RTC

- 164 Patients
- Isometric strength in FF, IR, ER @ 6,12,18,24 months FU
- To reach the strength of the uninjured contralateral shoulder in all 3 planes of motion, recovery took:
- 1) 6 months in patients with small tears
- 2) 18 months in patients with medium tears
- 3) Patients with large-to-massive tears showed continuous improvement in strength up to 18 months; however, they did not reach the strength of the contralateral shoulder at final follow-up

Shin S J, et.al. Recovery of Muscle Strength After Intact Arthroscopic RTCR According to Preoperative Rotator Cuff Tear Size. Am J Sports Med. Apr;44(4):972-80, 2016

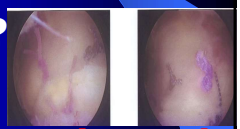
Rehabilitation-RTC

- 164 Patients
- Isometric strength in FF, IR, ER @ 6,12,18,24 months FU
- CONCLUSION:
- The recovery of muscle strength after arthroscopic repair was poorly correlated with patient satisfaction.
- This study recommends that regardless of pain relief and improved shoulder function, patients with larger than medium tears should be encouraged to continue with rehabilitation for the maximal restoration of muscle strength beyond 1 year postoperatively.

Shin S J; et.al. Recovery of Muscle Strength After Intact Arthroscopic RTCR According to Preoperative Rotator Cuff Tear Size. Am J Sports Med. Apr;44(4):972-80, 2016

Summary And Conclusions

Changing Dynamics with Rotator Cuff Treatments: When to do Surgery, When to do Rehabilitation and How?



Accelerated vs Decelerated Rehabilitation?


Patient Selection
&
Structured Rehabilitation


Thanks
CLINICAL
EXCELLENCE


THANK YOU