

Rotator Cuff Repair Rehabilitation Program
Large-Massive (>5cm)
Compromised Tissue Quality

The GLSM Rotator Cuff Repair Rehabilitation Program is an evidence-based and soft tissue healing dependent program which allows patients to progress to vocational and sports-related activities as quickly and safely as possible. This program is outlined for a double row suture bridge supraspinatus repair performed either **mini-open** (splitting of the deltoid muscle fibers) or **arthroscopically**. Individual variations will occur depending on surgical details and patient response to treatment. Double row fixation has been shown to better restore the normal rotator cuff footprint, maximize tendon-bone contact, and minimize gapping with early ROM (Kim et al, AJSM, 2006).

For a **partial rotator cuff repair with Regeneten augmentation** use a modified/accelerated program including: sling: 4 weeks. AROM: start at 4 weeks. Strengthening: start at 8 weeks

For a **subscapularis repair**: limit extension to neutral 6 wks, ER to neutral for 4 wks, at 4 wks ER >neutral to patient tolerance until 6 wks, gentle stretching for ER at wk 6, no isolated heavy resistance to IR for 12 wks..

For an **open repair**: limit extension and ER ROM to neutral for 6 wks, no active flexion for 6-8 wks, and no resistance to IR for 6-8 wks secondary to deltoid detachment and reattachment.

Contact us at 1-800-362-9567 ext. 58600 if you have questions.

<p>Pre-Op</p>	<p>Pre-op overall stiffness can be correlated to post-op stiffness. The best predictor of post-op stiffness at 6 wks is decreased pre-op IR vertebral level ROM (Trenerry et al, Clin Ortho Related Res, 2005).</p> <p>Pre-op exercises should be on increasing or maintaining overall ROM and muscle activation. Emphasis on improving behind the back horizontal adduction and IR.</p>
<p>Factors Influencing Post-op Rehabilitation</p>	<p>Type of repair: Open, mini-open, arthroscopic Size of tear: small(<1cm) medium (2-4cm) large to massive (5+cm) Location of tear and number of tendons involved Amount of tendon retraction Tissue degeneration/fatty infiltrate Pre-op stiffness Tissue quality: is affected by age, smoking, diabetes, chronicity of tear Surgeon preference Tissue healing: Soft tissue-to-bone healing is a slow and gradual process that requires at least 12 wks of healing to allow adequate pull-out strength of the repair (Ghodadra et al, JOSPT, 2009).</p>
<p>General Program Outline</p>	
	<p>ROM: Emphasis on PROM initially. Add AAROM supine ER at wk 4. Add AAROM elevation at wk 6. Add AROM elevation at wk 8 with emphasis on avoiding shoulder shrug. Goal of full ROM 12-16 wks.</p> <p>Muscle Activation: Important to prevent reflex disassociation, maintain muscle tone, and prevent muscle atrophy. Initiate with sub-max pain-free isometrics and AROM as outlined in the protocol.</p> <p>Strengthening: No aggressive strengthening for 12 wks. Goal of 75-80% strength by 5-6 months. Patients should continue with strength training at least 1 year post-op to maximize outcome.</p> <p style="text-align: right;">Updated: 4/2020</p>

Phase I: 0-6 weeks	(Immediate post-op maximum protected motion phase)																																														
Goals	<ul style="list-style-type: none"> • Protect anatomic repair • Prevent negative effects of immobilization • Gently begin PROM per tolerance except for IR • Adequate pain control 																																														
Sling	<ul style="list-style-type: none"> • 24 hours/day for 6-8 weeks. D/C based on MD approval • Remove sling for bathing/dressing and exercises as outlined by PT • Try to keep arm relaxed in sling and avoid protective posture to decrease muscle tension in cervical region 																																														
Precautions	<ul style="list-style-type: none"> • Keep arm supported when in and out of sling. • When laying supine, prop elbow on pillow to keep in line with the shoulder. • No behind the back movements (avoid combined ext/add/IR). Try to keep elbow in line with shoulder. • Avoid sudden movements or supporting body weight through the hand or elbow. • No lifting or carrying of objects on injured side. • Avoid pushing or pulling objects to minimize compression/shear to the shoulder 																																														
Recommendations See next page for specific treatments	<ul style="list-style-type: none"> • No shld AROM or resisted motion • Initial emphasis on PROM per tolerance except for IR and ext. Start all motion in scapular plane • Safe AAROM for shld elevation (see below). No pulleys 																																														
Modalities	<ul style="list-style-type: none"> • Ice 15 minutes 3-5x/day, more often as needed for pain control • IFC for pain management/inflammation control 																																														
PROM	<ul style="list-style-type: none"> • Gradually progress based on tolerance except no IR or extension for 6 weeks • Elevation: start in at least 30 deg of elevation for all motion. Start in scapular plane, progressing to abduction (limit of 90 deg) and flexion/scaption as tolerated. Strain on supraspinatus: scaption < abduction < flexion, so start in scaption (Hatakeyama et al, AJSM, 2001) • ER / IR: no IR until 4 weeks ER: start in scapular plane at least 30 deg (avoid 0 deg). wk 3: progress to 60 deg of abduction, wk 4: progress to 90 deg Strain on supraspinatus with ER: 30 deg scaption < 60 deg < 0-15 deg (Hatakeyama et al, AJSM, 2001) <table border="1" style="width: 100%; border-collapse: collapse; text-align: center;"> <thead> <tr> <th colspan="4">ROM Targets (in degrees)</th> </tr> <tr> <th></th> <th>0-2 wks</th> <th>2-4 wks</th> <th>4-6 wks</th> </tr> </thead> <tbody> <tr> <td>Flexion / scaption</td> <td>Per tolerance</td> <td>Per tolerance (at least 90)</td> <td>Per tolerance (0-110)</td> </tr> <tr> <td>Abduction</td> <td>45</td> <td>60</td> <td>90</td> </tr> <tr> <td>ER at 0 deg</td> <td>None</td> <td>None</td> <td>30</td> </tr> <tr> <td>ER in scapular plane</td> <td>20</td> <td>40</td> <td>60</td> </tr> <tr> <td>ER at 60 ABD</td> <td>none</td> <td>30</td> <td>45</td> </tr> <tr> <td>ER at 90 ABD</td> <td>none</td> <td>none</td> <td>30</td> </tr> <tr> <td>IR (GH) in scapular plane</td> <td>none</td> <td>none</td> <td>20</td> </tr> <tr> <td>IR at 90 ABD</td> <td>None</td> <td>None</td> <td>None</td> </tr> <tr> <td>Extension</td> <td>Neutral</td> <td>Neutral</td> <td>Neutral</td> </tr> </tbody> </table>			ROM Targets (in degrees)					0-2 wks	2-4 wks	4-6 wks	Flexion / scaption	Per tolerance	Per tolerance (at least 90)	Per tolerance (0-110)	Abduction	45	60	90	ER at 0 deg	None	None	30	ER in scapular plane	20	40	60	ER at 60 ABD	none	30	45	ER at 90 ABD	none	none	30	IR (GH) in scapular plane	none	none	20	IR at 90 ABD	None	None	None	Extension	Neutral	Neutral	Neutral
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AAROM	<ul style="list-style-type: none"> • See PROM progression listed above • No pulleys until 6 weeks secondary to increased EMG activity. (Dockery et al, Orthopedics, 1998) • Safe exercises to perform based on EMG < 20 MVC: <ul style="list-style-type: none"> Supine assisted ROM with opposite arm or wand flexion and ER Supine press-up/protraction hands close and hands wide with washcloth or wand Forward bow Towel slide and/or ball roll table Codmans small and large, progress passive to active (Dockery et al, Orthopedics, 1998, Uhl et al, Phy Med Rehab 2010, Long JOSPT 2010) 																																														
AROM	None																																														

Phase I: 0-6 weeks	(Immediate post-op maximum protected motion phase)
Treatment Interventions	<ul style="list-style-type: none"> • Warm up: Passive Pendulum or Hot pack • GH Mobilizations grade I/II for pain or muscle spasm • Thoracic spine P-A mobilizations as needed. • Emphasis on GH PROM/AAROM range of motion per guidelines. No IR or extension. Start shoulder elevation in at least 30 deg. <p>ER positioning: start in scapular plane, wk 3: progress to 60 deg scaption/abduction wk 4: progress to 80 deg scaption/abduction, wk 5: progress to arm by side</p> <ul style="list-style-type: none"> • No AROM • AAROM safe exercises: Supine assisted ROM with opposite arm or wand flexion, scaption, and ER Forward bow Towel slide and/or ball roll table Codman's small and large, progress passive to active Supine press-up/protraction hands close and hands wide with washcloth or wand <ul style="list-style-type: none"> • Active scapular retraction, scapular depression in neutral position • Postural education: Avoid forward head/rounded shld. • Scapular PROM in sidelying (if needed). Manual resisted scapular isometrics • AROM elbow, wrist, hand. Gripping activities without lifting • Cryotherapy. IFC if indicated

ROM Targets Reference Chart (in degrees)						
Overall goal is Functional ROM at 10-12 weeks						
	0-2 wks	2-4 wks	4-6 wks	6-8 wks	8-10 wks	10-12 wks
Flexion / scaption	Per tolerance	Per tolerance (at least 90)	Per tolerance (at least 120)	Unlimited (140)	Unlimited (160)	Unlimited (170/180)
Abduction	45	60	90	120	150	170/180
ER at 0 deg	None	None	30	50	65	65+
ER in scapular plane	20	40	60	70	70	70+
ER at 60 ABD	None	30	45	60	70	70+
ER at 90 ABD	None	None	30	50	70	80/90
IR in scapular plane	None	None	20	40	60	60+
IR at 90 ABD	None	None	None	30	40	50+
Extension	Neutral	Neutral	Neutral	45	60	60+

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Phase II: 6-8 weeks	(Intermediate moderate protection phase)																										
Goals	<ul style="list-style-type: none"> • Protect anatomic repair • Adequate pain control • Progress PROM/AAROM per guidelines • Progress to shoulder isometrics 																										
Sling	<ul style="list-style-type: none"> • D/C per MD approval 																										
Precautions	<ul style="list-style-type: none"> • No shoulder AROM for lifting. No lifting or carrying objects on injured side. • Avoid prolonged unsupported arm positioning. • Avoid sudden movement or supporting body weight through the hand or elbow. • Avoid pushing or pulling objects to minimize compression/shear to the shoulder • No resisted movement. 																										
Recommendations	<ul style="list-style-type: none"> • Patient can perform ADL's below shoulder height • Treatment emphasis on restoring PROM /AAROM based on guidelines provided • Gentle movement into extension, gentle movement into IR, but no combined ext/add/IR • Add low load long duration stretching if needed • Facilitate thoracic extension 																										
Modalities	<ul style="list-style-type: none"> • Ice 15 minutes 3-5x/day, more often as needed for pain control • IFC for pain management/inflammation control 																										
Aquatics if needed	<ul style="list-style-type: none"> • Emphasis on ROM with water at shld height 																										
PROM / AAROM	<ul style="list-style-type: none"> • Continue with PROM with goal of full PROM by wk 12. Progress to gentle PROM IR at 90/90 at wk 7. Add gentle PROM ext at wk 7. • Add AAROM for shld elevation with goal of full AAROM by wk12-14. <table border="1" style="margin-left: 40px;"> <thead> <tr> <th colspan="2">ROM Targets (in degrees)</th> </tr> <tr> <th></th> <th>6-8 wks</th> </tr> </thead> <tbody> <tr> <td>Flexion / scaption</td> <td>Per tolerance (140)</td> </tr> <tr> <td>Abduction</td> <td>120</td> </tr> <tr> <td>ER at 0 deg</td> <td>50</td> </tr> <tr> <td>ER in scapular plane</td> <td>60</td> </tr> <tr> <td></td> <td></td> </tr> <tr> <td>ER at 60 ABD</td> <td>60</td> </tr> <tr> <td>ER at 90 ABD</td> <td>50</td> </tr> <tr> <td></td> <td></td> </tr> <tr> <td>IR (GH) in scapular plane</td> <td>40</td> </tr> <tr> <td>IR at 90 ABD</td> <td>30</td> </tr> <tr> <td>Extension</td> <td>45</td> </tr> </tbody> </table>	ROM Targets (in degrees)			6-8 wks	Flexion / scaption	Per tolerance (140)	Abduction	120	ER at 0 deg	50	ER in scapular plane	60			ER at 60 ABD	60	ER at 90 ABD	50			IR (GH) in scapular plane	40	IR at 90 ABD	30	Extension	45
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AROM	<ul style="list-style-type: none"> • Contraindicated for flexion, scaption, abduction. • IR / ER with arm in scapular plane through pain-free ROM 																										
Treatment Interventions	<ul style="list-style-type: none"> • Warm up: Passive Pendulum or Hot pack or AAROM on Nustep • Low-load long duration end-range stretch at wk 7 (if necessary) using wand and hot pack in supine for ER (Davies, Ellenbecker. Biomechanics, 1999). • GH Mobilizations grade I/II for pain, III/IV to increase joint mobility • Thoracic spine P-A mobilizations • Facilitate Thoracic extension: stretch in sitting with/without overpressure (ball / towel roll/ foam roller behind back) • PROM with end range stretching as outlined above • AAROM as outlined above: Pulleys, wand exercises, ball rolling on table • Aquatics • Postural education: Avoid forward head/rounded shoulders • Active scapular protraction, retraction to neutral, scapular depression • Scapular manual RROM in sidelying • AROM elbow, wrist, hand • Cryotherapy. IFC if indicated 																										

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Phase III: 8-12 wks	(Minimal protection phase with emphasis on normalizing ROM)																														
Goals	<ul style="list-style-type: none"> • Preserve the integrity of the surgical repair • Implement AROM for shoulder elevation avoiding shoulder shrug • Restore normal ROM with normal movement patterns • Decrease pain and inflammation • Initiate sub-max and pain-free muscle activation exercises 																														
Precautions	<ul style="list-style-type: none"> • Patient can perform ADL's up to shoulder height. • Limit overhead activities. • Avoid making sudden movements and lifting heavy objects. • No aggressive strengthening activities. • Avoid pushing or pulling heavy objects. 																														
Recommendations	<ul style="list-style-type: none"> • Treatment emphasis on restoring PROM / AAROM / AROM • Add AROM exercises avoiding compensatory shoulder shrug. Encourage normal movement patterns • Add sub-max pain-free shoulder isometrics (GH, RTC) • Add sub-max rhythmic stabilizations to encourage co-contraction • Continue with thoracic extension exercises • Continue with aquatics up to wk 10-12 																														
Modalities	<ul style="list-style-type: none"> • Ice 15 minutes 1-3x/day, more often as needed for pain control • IFC for pain management/inflammation control 																														
Aquatics	<ul style="list-style-type: none"> • Continue until wk 10-12. Work on increasing ROM with emphasis on normal movement patterns. 																														
PROM / AAROM / AROM	<ul style="list-style-type: none"> • Goal is functional ROM in all planes with normal movement patterns by 12-16 wks • Add gentle AAROM ext wk 8. • Add in gentle IR stretch behind the back vertebral level at wk 10 <table border="1" data-bbox="430 1066 1409 1470"> <thead> <tr> <th colspan="3">ROM Targets (in degrees)</th> </tr> <tr> <th></th> <th>8-10 wks</th> <th>10-12 wks</th> </tr> </thead> <tbody> <tr> <td>Flexion / scaption</td> <td>Unlimited (160)</td> <td>Unlimited (0-170/180)</td> </tr> <tr> <td>Abduction</td> <td>150</td> <td>170/180</td> </tr> <tr> <td>ER in scapular plane</td> <td>70</td> <td>70+</td> </tr> <tr> <td>ER at 60 ABD</td> <td>70</td> <td>70+</td> </tr> <tr> <td>ER at 90 ABD</td> <td>70</td> <td>80/90</td> </tr> <tr> <td>IR (GH) in scapular plane</td> <td>60</td> <td>60+</td> </tr> <tr> <td>IR (GH) at 90 ABD</td> <td>40</td> <td>50 +</td> </tr> <tr> <td>Extension</td> <td>60</td> <td>60+</td> </tr> </tbody> </table>	ROM Targets (in degrees)				8-10 wks	10-12 wks	Flexion / scaption	Unlimited (160)	Unlimited (0-170/180)	Abduction	150	170/180	ER in scapular plane	70	70+	ER at 60 ABD	70	70+	ER at 90 ABD	70	80/90	IR (GH) in scapular plane	60	60+	IR (GH) at 90 ABD	40	50 +	Extension	60	60+
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Muscle Activation Strengthening	<ul style="list-style-type: none"> • No aggressive strengthening activities • Add in sub-max pain-free shld isometrics for muscle activation. Muscle activation is important to minimize rotator cuff inhibition, maintain muscle tone, and minimize muscle atrophy (Ghodadra et al, JOSPT, 2009). • Strengthening will be with the weight of the arm focusing on quality movement and endurance (ie: initially 2-3 sets of 10 progressing to 2-3 sets of 30 reps of full flexion, scaption, abduction, ER. 1x/day, 5 -7 days per week per tolerance). • When progressing to shld isotonic in the next phase, the patient must be able to elevate arm without shoulder or scapular hiking. If unable, will need to continue with dynamic rhythmic stabilization GH joint exercises. • Add in arm supported bicep / triceps isotonic strengthening wk 8, progress to unsupported at wk 10 																														

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Phase III: 8-12 wks	(Minimal protection phase with emphasis on normalizing ROM)
Treatment Interventions	<ul style="list-style-type: none"> • Active warm-up: Codman's, UBE with no resistance (add light resistance at wk 9) • Low load long duration end-range stretch (if necessary) using wand and hot pack in supine for ER. Utilize for other movements as necessary. • GH Mobilizations • PROM with end range stretch • Therapeutic exercises: AAROM: Pulleys, wand. Add in extension past neutral wk 7, Add in gentle IR behind the back stretch wk 10 <p>AROM: GH: All motions with emphasis on quality movement. Focus on endurance working up to 30 repetitions Scapula: (light resistance of <5 lbs with emphasis on endurance) protraction, retraction (seated progress to prone), rows to neutral, depression</p> <p>*** 4 keys exercises to maximize mid/lower trapezius and inhibit upper trapezius (Cools et al, AJSM, 2007) sidelye ER sidelye flexion prone horizontal abduction with ER prone extension</p> <p>Muscle activation: Sub-max pain-free GH isometrics Supported Biceps / Triceps isotonic, progress to unsupported wk 10</p> <p>Rhythmic stabilization sub-max (to facilitate muscle activation / co-contraction): Wk 8: supine arm supported ER/IR wk 10-12: supine flexion 90 deg, low load CKC (<BW) ie: ball on table with patient standing</p> <ul style="list-style-type: none"> • Encourage thoracic extension • Ice (in stretch if needed) 15 minutes • E Stim (IFC or NMES) if necessary

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Phase IV: 12+ wks	Regain Functional ROM / Strengthening and Conditioning Phase																		
Goals	<ul style="list-style-type: none"> Establish and maintain functional ROM, mobility, and stability Progress muscular strength, power, and endurance Initiate higher level activities depending on functional demands and MD approval 																		
Precautions	<ul style="list-style-type: none"> Patient must be able to elevate arm without shoulder or scapular hiking. If unable, need to continue with dynamic rhythmic stabilization GH exercises. Patients should continue to perform strengthening exercises for up to 1 year post-op to maximize outcome. 																		
Recommendations	<ul style="list-style-type: none"> Facilitate regaining functional ROM Emphasize regaining strength and endurance with proper movement patterns Continue with proprioceptive / kinesthetic exercises Progress to independent strengthening at wk 20-24 Assess posterior capsule for tightness 																		
Modalities	<ul style="list-style-type: none"> Ice 1x/ day and /or after strenuous activities 																		
ROM	<ul style="list-style-type: none"> No restrictions. Goal is functional ROM in all planes with normal movement patterns by 12-16 wks <table border="1" data-bbox="430 730 1179 1045"> <thead> <tr> <th colspan="2">Goals to achieve /not exceed</th> </tr> <tr> <th></th> <th>12-16 wks</th> </tr> </thead> <tbody> <tr> <td>Flexion / scaption</td> <td>Unlimited (0-170/180)</td> </tr> <tr> <td>Abduction</td> <td>0-170/180 deg</td> </tr> <tr> <td>ER in scapular plane</td> <td>0-80/90 deg</td> </tr> <tr> <td>IR (GH) in scapular plane</td> <td>0-70 deg</td> </tr> <tr> <td>ER at 90 ABD</td> <td>0-80/90 deg</td> </tr> <tr> <td>IR (GH) at 90 ABD</td> <td>0-70 deg</td> </tr> <tr> <td>Extension</td> <td>0-60 deg</td> </tr> </tbody> </table>	Goals to achieve /not exceed			12-16 wks	Flexion / scaption	Unlimited (0-170/180)	Abduction	0-170/180 deg	ER in scapular plane	0-80/90 deg	IR (GH) in scapular plane	0-70 deg	ER at 90 ABD	0-80/90 deg	IR (GH) at 90 ABD	0-70 deg	Extension	0-60 deg
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Strengthening	<ul style="list-style-type: none"> Target scapulothoracic, rotator cuff, glenohumeral, and total arm strengthening and endurance Progress to unilateral scapulothoracic strengthening Strengthening initially with uni-planar movements progressing to multi-planar movements Wk 20: Isokinetic ER/IR power test at 90, 180 deg/sec Wk 20: Progress to overhead strengthening (if needed) if adequate strength scores: MMT 4/5, Isokinetic ER/IR of 75% at 90 and 180 deg/sec; ER/IR ratio of 2/3 Isometric strength test (5 sec hold) for shld flexion and scaption of 75% compared to opp extremity. (Measure with hand-held dynamometer. Perform 3 reps and calculate the average) 																		

	Rotator Cuff Repair Large/Massive Compromised Tissue Quality
Phase IV: 12+ wks	Regain Functional ROM / Strengthening and Conditioning Phase
Treatment Interventions: (Examples of exercises but not an all-inclusive list)	<ul style="list-style-type: none"> • Active warm-up: UBE, rower • Continue with ROM activities as necessary • Scapulothoracic strengthening: <ul style="list-style-type: none"> chest press (+), rows in full ROM, press down, scaption (Moseley et al AJSM, 1992) prone horizontal abduction in neutral rotation, prone extension with ER, prone horizontal abduction with ER, prone full can, dynamic hug, serratus punch 120 deg, lat pull downs (wk 18) • Glenohumeral / rotator cuff strengthening: <ul style="list-style-type: none"> flexion, scaption, prone horizontal adduction with ER, press down (Townsend et al, AJSM, 1991) sidelying ER, isotonic IR/ER in scapular plane progress to 90/90 at wk 18 if needed, isokinetic IR/ER in scapular plane progress to 90/90 wk 20 if needed • Total arm strengthening: Triceps extensions, biceps curls • PNF patterns at wk 16 • Proprioceptive/Kinesthesia activities: <ul style="list-style-type: none"> rhythmic stabilization: supine flexion 120 deg standing flexion 90 deg bilateral progress to unilateral body blade • CKC exercises: sub-max BW: quadruped (euroglide / cuff link), wall push-ups Progress to full BW (wk 18): partial prone walk-outs, full prone walk-outs • Plyometrics: bilateral progress to unilateral • Cryotherapy, electrical stimulation, and biofeedback, and if necessary
Isokinetic IR/ER testing	<ul style="list-style-type: none"> • Wk 20 (5 months), wk 28 (7 months) and 12 months at 30/30/30 position or 90/90 (if appropriate)
Return to work/sport	<ul style="list-style-type: none"> • Based on MD approval, full ROM, minimal pain at rest or with activity, isokinetic power at 90%, isometric hand-held dynamometer testing 90% and/or MMT 5/5, and functional testing at 90 % compared to uninvolved side • 6-8 months: Return to interval throwing program per MD approval

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