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Rehabilitation Protocol for Distal Biceps Tendon Repair

This protocol is intended to guide clinicians through the post-operative course for distal biceps tendon repair. This protocol is time based (dependent on tissue healing) as well as criterion based. Specific intervention should be based on the needs of the individual and should consider exam findings and clinical decision making. The timeframes for expected outcomes contained within this guideline may vary based on surgeon's preference, additional procedures performed, and/or complications. If a clinician requires assistance in the progression of a post-operative patient, they should consult with the referring surgeon.

The interventions included within this protocol are not intended to be an inclusive list of exercises. Therapeutic interventions should be included and modified based on the progress of the patient and under the discretion of the clinician.

Considerations for the Post-operative Distal Biceps Tendon Repair
Many different factors influence the post-operative distal biceps tendon repair rehabilitation outcomes, including post-operative pain and edema as well as specific suture material chose by surgeon. It is recommended that clinicians collaborate closely with the referring physician regarding type of repair and precautions with range of motion and lifting restrictions.

If you develop a fever, unresolving numbness/tingling, excessive drainage from the incision, uncontrolled pain or any other symptoms you have concerns with, please contact referring physician.

PHASE I: IMMEDIATE POST-OP (Day 0-1 WEEK AFTER SURGERY)

Rehabilitation Goals	• Reduce post-operative pain • Reduce post-operative edema • Protect surgical repair • Patient education of surgical precautions and expectations of progression • Optimize tissue healing environment
Precautions	• Non-weight bearing on repaired upper extremity. • **AVOID** active elbow flexion and forearm supination until Week 4 • **NO LIFTING** with repaired upper extremity until Week 8
Brace	• Initial immobilization: posterior elbow orthosis with elbow in 90 degrees flexion with forearm in 0 degrees of pronation/supination for 5-7 days (unless otherwise indicated by surgeon) • Hinged elbow brace: with brace set locked from 90 degrees of flexion to full flexion, initiate elbow flexion and forearm pronation/supination passive range of motion (PROM) at 5-7 days post-operative
Interventions	• Modalities to reduce post-operative edema and pain control • Grip strengthening with forearm/wrist in neutral position • Scar massage
Criteria to Progress	• Adequate maintenance of post-operative pain and edema control • Progression of elbow passive range of PROM in elbow flexion and forearm pronation/supination within confines of hinged elbow orthosis is based upon referring surgeon's assessment of surgical repair.

PHASE II: INTERMEDIATE POST-OP (2-6 WEEKS AFTER SURGERY)

Rehabilitation Goals	• Reduce post-operative pain • Reduce post-operative edema • Protect surgical repair • Patient education of surgical precautions and expectations of progression • Optimize tissue healing environment (avoid nicotine and caffeine) • Improve elbow flexion and forearm pronation/supination PRROM in hinged brace • Initiate elbow flexion and forearm pronation/supination active-assisted range of motion (AAROM) and active range of motion (AROM) in hinged brace
Precautions	• Non-weight bearing on repaired upper extremity • No lifting with repaired upper extremity
Brace	*Hinged Elbow Brace* (set locked to allow restricted extension ROM): • 2nd week: 90 degrees to full flexion • 3rd week: 45 degrees to full flexion • 4th week: 30 degrees to full flexion • 5th week: 20 degrees to full flexion • 6th week: discharge hinged elbow brace
Additional Interventions **Continue with Phase I interventions as indicated*	*Swelling Management* • Ice, compression, elevation (check with MD re: cold therapy) • Retrograde massage *Range of Motion* Week 2 • Elbow flexion/extension PROM within confines of hinged elbow brace • Forearm pronation/supination PROM with elbow at 90 degrees, in hinged elbow brace • Shoulder AROM as needed, avoiding hyper-extension • Wrist and hand AROM Week 3 • Elbow flexion/extension PROM within confines of hinged brace • Forearm pronation/supination PROM with elbow at 90 degrees flexion in hinged elbow brace Week 4 • Elbow flexion/extension AROM in gravity-eliminated plane in hinged elbow brace • Forearm pronation/supination AROM with elbow at 90 degrees flexion and forearm supported Week 5 • Elbow flexion AROM in gravity-eliminated plane in hinged elbow brace, progressing to against gravity in hinged elbow brace, with removal of brace for AROM if full and painless against gravity • Forearm pronation/supination AROM with elbow at 90 degrees flexion without support
Criteria to Progress	• Adequate maintenance of post-operative pain and edema control • Full elbow flexion AROM and forearm pronation/supination AROM against gravity, without brace, and without increased pain or swelling

PHASE III: LATE POST-OP (7-10 WEEKS AFTER SURGERY)

Rehabilitation Goals	• Protect surgical repair • Prevent muscle inhibition • Improve cardiovascular endurance • Maintain scapulothoracic endurance
Precautions	• Non-weight bearing to repaired upper extremity until Week 8

	• Begin gradual weight bearing with elbow flexed at Week 8, progress to extended elbow by Week 10 • No lifting with repaired upper extremity until Week 8
Additional Interventions **Continue with Phase I-II Interventions as indicated*	*Range of Motion:* • Begin combined/composite motions (i.e. extension with pronation). If significant ROM deficits present at week 8, discuss progression to more aggressive PROM with referring orthopedic surgeon *Weight-Bearing Progression:* • Wall push ups • Push ups on elevated table • Modified forearm plank (elbows bent) • Quadruped progression with elbows extended: *Scapulothoracic Strength/Endurance:* • Prone scapular slides with shoulder extension to neutral • Serratus wall slides • Seated scapular retraction • Wall scapular protraction/retraction with elbows extended at Week 10 *Conditioning*: • Treadmill walking and running • Stationary bike (gradually progress weight bearing on involved upper extremity over Weeks 7-10 beginning with elbow flexed and progressing to elbow extended
Criteria to Progress	• Full, pain-free ROM of shoulder, elbow, wrist, and hand • Proper scapulothoracic mechanics • Full A/PROM to repaired elbow and forearm with normal grip strength

PHASE IV: TRANSITIONAL (11-15 WEEKS AFTER SURGERY)

Rehabilitation Goals	• Increase functional strength of operated upper extremity • Initiate strengthening at Week 10

Additional Interventions **Continue with Phase II-III interventions*	*Range of Motion:*
	• Continue with combined/composite range of motion, focusing on proper mechanics of shoulder, elbow, wrist, and hand
	
	Strengthening:
	• At Week 10, initiate submaximal isometrics of elbow flexors, extensors, supinators, and pronators at Week 10.
	• Over Weeks 10-12, progress from submaximal isometrics to submaximal isotonics:
	  ○ Resisted bicep curl (pronated, neutral, and supinated grip)
	  ○ Resisted pronation and supination
	  ○ Resisted tricep extension
	• Progress shoulder strengthening program with light upper extremity weight training:
	  ○ Standing resisted shoulder elevation
	  ○ Standing shoulder PNF diagonals
	  ○ Resisted Prone I, Prone Y, Prone T
	  ○ Rows
	  ○ Resisted shoulder ER, Resisted shoulder IR
	  ○ Supine shoulder protraction
	  ○ Wall push ups
	  ○ Quadruped stability progression

Criteria to Progress	• Full, pain-free ROM of shoulder, elbow, wrist, and hand • Proper scapulothoracic mechanics

PHASE V: EARLY RETURN TO SPORT (4-6 MONTHS AFTER SURGERY)

Rehabilitation Goals	• Increase strength and endurance of repaired upper extremity
Additional Interventions **Continue with Phase II-IV interventions as indicated*	*Advanced Strengthening:* • Continue Phase IV exercises • Rhythmic stabilizations • High plank stability progression • Bilateral upper extremity plyometrics after Week 16 (based on control and response) • Single arm plyometrics after Week 20-22 (based on control and response)
Criteria to Progress	• Full, pain-free A/ROM of shoulder, elbow, wrist, and hand • Proper scapulothoracic mechanics • Pain-free performance of HEP

PHASE VI: UNRESTRICTED RETURN TO SPORT (6+ MONTHS AFTER SURGERY)

Rehabilitation Goals	• Increase strength of operated upper extremity • Return to sport
Additional Interventions **Continue with Phase II-V interventions as indicated*	• Focus on progression of sport-specific movements • Graded participation in practice, with full, pain-free practice prior to participation in competition

Criteria to Discharge	• Full, painless elbow/wrist ROM
	• Shoulder total ROM within 5° of non-throwing shoulder
	• > 40° horizontal adduction of throwing shoulder
	• < 15° Glenohumeral IR deficit.
	• Elbow, shoulder and wrist strength with MMT, HHD or isokinetic:
	  ○ ER/IR ratio: 72-76%
	  ○ ER/ABD ratio: 68-73%
	  ○ Throwing shoulder IR: ≥ 115% of non-throwing shoulder
	  ○ Throwing shoulder ER: ≥ 95% of non-throwing shoulder
	  ○ Elbow flexion/extension: 100-115% of non-throwing shoulder
	  ○ Wrist flexion/extension: 100-115% of non-throwing shoulder
	• Functional test Scores:
	  ○ Prone Drop ball test – 110% of non-throwing side
	  ○ 1-arm balls against wall @ 90/90:
	  • 2lb ball
	  • 30 seconds with no pain
	  • 115% of throwing side
	  ○ Single arm step down test:
	  • 8-inch
	  • 30 seconds
	• Satisfactory score on Kerlan-Jobe Orthopedic Clinic shoulder and elbow score (KJOC) throwers assessment
	• Physician Clearance
	• Independent with HEP

Return-to-Sport	• For the recreational or competitive athlete, return-to-sport decision making should be individualized and based upon factors including but not limited to previous injury history, the level of demand on the upper extremity, contact vs non-contact, and frequency of participation.

	Close discussion with the referring surgeon is strongly recommended prior to advancing to a return-to-sport rehabilitation program.

Contact	

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