Distal Triceps Repair
Clinical Practice Guideline

Background Information:
The included guideline is intended for post-operative rehabilitation following a distal triceps repair, which is indicated for those with a partial or complete triceps tendon rupture. Progression through this guideline is time dependent on soft tissue healing as well as criterion-based concerning patient demographics and clinical assessment. Rehabilitation for distal triceps repair should be slow following the first six post-operative weeks and should follow biological tissue healing principles for a tendon taking into account inflammatory, proliferative and remodeling phases of healing. Please refer to the surgical note for information regarding each procedure.

Precautions:

- No aggressive triceps stretching following early controlled range of motion guidelines
- All splint and brace use should be given by surgeon. Typical splint use should be for 2 weeks followed by a brace set at range of motion restrictions for elbow flexion (see remaining portion of guideline)
- Limit passive shoulder flexion range of motion to less than 90 degrees for 6 weeks
- No isolated triceps contraction with elbow extension or shoulder extension for 6 weeks
- No resisted or isotonic triceps contraction or shoulder extension/rows for 12 weeks
- No weight bearing or upper extremity closed kinetic chain exercise through the surgical extremity for 12 weeks
    - No pushing open a door or pushing up from a chair

Phase 1: Protection PROM (0-2 weeks)

GOALS:

- Protect the repair
- Minimal to no edema
- Minimize the effects of immobilization

PRECAUTIONS:

- No aggressive triceps stretching/elbow flexion for 6 weeks
- Once out of splint/cast follow brace restrictions for elbow flexion
- Limit passive shoulder flexion range of motion to less than 90 degrees for 6 weeks
- **NO Elbow AROM**
- No isolated triceps contraction with elbow extension or shoulder extension for 6 weeks
- No soft tissue mobilization/cross friction massage directly over scare for 6 weeks
- No resisted or isotonic triceps contraction or shoulder extension/rows for 12 weeks
- No weight bearing or upper extremity closed kinetic chain exercise through the surgical extremity for 12 weeks
    - No pushing open a door or pushing up from a chair

Post-Operative 0 to 2 weeks
ROM *PROM* ▪ Limit shoulder forward elevation to < 90 degrees ▪ Early controlled motion once in brace: -PROM elbow flex locked in 20 degrees -Elbow Flexion can progress 15 degrees every 5 days (3 sets of 30 minutes per day) ▪ NO Active Elbow Extension Scapular Control Exercises ▪ Sidelying scapular clocks -Avoid shoulder extension contraction Home Program: educate brace use, precautions, home program for wrist and hand (see below) *Active Range of motion of wrist/hand (gripping, wrist flex/ext, supination/pronation)* *(avoid triceps contraction)* *Modalities/cryotherapy PRN*

MILESTONES TO PROGRESS TO PHASE 2:

1. Appropriate healing of surgical repair by adhering to precautions & immobilization guidelines
2. Early controlled ROM in brace performed with emphasis on home program
3. Minimal to no pain (0-2/10) with ROM with NO forced PROM

Phase 2: Progression of Early Controlled Motion (2-6 weeks)

GOALS:

- Protect the repair
- Minimal to no edema
- Progression of early controlled motion within precautions

PRECAUTIONS:

- No aggressive triceps stretching/elbow flexion for 6 weeks
- Early controlled motion through therapist guidance and brace use
- Limit passive shoulder flexion range of motion to less than 90 degrees for 6 weeks
- No isolated triceps contraction with elbow extension or shoulder extension for 6 weeks
- No soft tissue mobilization/cross friction massage directly over scare for 6 weeks
- No resisted or isotonic triceps contraction or shoulder extension/rows for 12 weeks
- No weight bearing or upper extremity closed kinetic chain exercise through the surgical extremity for 12 weeks
    - No pushing open a door or pushing up from a chair

Weeks 2 to 4	***Weeks 4-6***
PROM ▪ Limit shoulder forward elevation/Flex to < 90 degrees ▪ Do NOT push elbow flexion *AAROM* ▪ Shoulder & Elbow- Therapist assisted and self-assisted techniques with uninvolved extremity -Do NOT push elbow flexion -Avoid elbow ext activation *Manual* ▪ Gentle STM; NOT on surgical scar -Effleurage to improve blood flow & reduce edema *Active Range of motion of wrist/hand (gripping, wrist flex/ext, supination/pronation)* *(avoid triceps contraction)* *Modalities* ▪ Edema control with vasopneumatic compression, cryotherapy, electrical stimulation PRN for pain control	*PROM* ▪ Continue with shoulder and elbow early controlled motion ▪ Do not push elbow flexion until 6 weeks AAROM/AROM ▪ Continue assisted techniques avoiding elbow extension activation ▪ Shoulder AAROM to AROM -Self passive/assisted motion with uninvolved extremity -Pulleys -Wand *Strengthening* ▪ NO triceps/elbow ext activation ▪ Submaximal shoulder ISOM -Initiate at 25-50% effort & pain-free -AVOID shoulder extension/row *Modalities* ▪ Edema control with vasopneumatic compression, cryotherapy, electrical stimulation PRN for pain control

MILESTONES TO PROGRESS TO PHASE 3:

1. Pain-free full shoulder AROM with good scapulohumeral rhythm
2. Pain-free full elbow flexion PROM (do NOT PUSH ROM)
3. Minimal to no edema

Phase 3: Initiation of Elbow Activation (6-12 weeks)

GOALS:

- Progressive controlled extension activation following tissue healing principles
- Improve shoulder and scapulothoracic strength

PRECAUTIONS:

- Progressive loading program should be incorporated, avoid unnecessary early activation
- No resisted or isotonic triceps contraction or shoulder extension/rows for 12 weeks
- No weight bearing or upper extremity closed kinetic chain exercise through the surgical extremity for 12 weeks
    - No pushing open a door or pushing up from a chair

Weeks 6 to 8	***Weeks 8-12***
Elbow Brace is Removed (per surgeon guidelines) *AROM* ▪ Continue shoulder AROM with emphasis on scapulohumeral rhythm ▪ Initiate elbow extension AROM -Concentric motion with NO resistance -NO eccentric triceps activity (use uninvolved extremity during eccentric motion) *Strengthening* ▪ Isotonic shoulder IR & ER with light resistance (scapular neutral plane) ▪ Supine scapular serratus punch/protraction -High repetition & low resistance *Manual* ▪ Gentle STM/light scar mobilization if hypomobile *Neuromuscular Reeducation:* ▪ Supine ABCs *Modalities* ▪ Edema control with vasopneumatic compression, cryotherapy, electrical stimulation PRN for pain control	PROM/AAROM/AROM ▪ End ROM mobility per deficits present *Strengthening* ▪ Resisted shoulder ER & IR -Continue up to 30 degrees abd -progress to 90 degrees abd ▪ <u>Week 8</u>: Prone scapular stabilization exercises -Initiate with gravity resisted motion ▪ <u>Week 9</u>: initiate light/submaximal triceps ISOM (25-50% effort & pain-free) ▪ Gradual Biceps Strengthening ▪ Resisted serratus anterior punch -NO weight bearing through extremity ▪ NO pressing activity for 12 weeks -No shoulder press, bench press, etc… *Neuromuscular Reeducation:* ▪ Supine rhythmic stabilization of shoulder *Functional Activity* ▪ <u>Week 10</u>: Stationary Bike and light jogging -Walk to jog progression programs

MILESTONES TO PROGRESS TO PHASE 4:

1. Full pain-free shoulder and elbow AROM
2. 5/5 MMT strength for shoulder and rotator cuff
3. 4+/5 or 5/5 MMT strength for scapulothoracic musculature
4. Pain-free elbow extension activation

Phase 4: Return to Sport/Recreational Activity (Weeks 12-16)

GOALS:

- Maintain non-painful and full shoulder and elbow AROM
- Progressive resistive isotonic loading of triceps
- Introduction of WB and pressing activity
- Return to sports-related activity

PRECAUTIONS:

- Progressive loading program should be incorporated, avoid unnecessary early activation
- If patient does not perform velocity dependent tasks during work/sport/ADLs do not perform plyometrics

CRITERIA FOR PLYOMETRIC TRAINING

1. Adequate strength of triceps and entire surgical extremity: MMT 4+/5
   (70-80% bilateral comparison with handheld dynamometer)
2. Involved extremity Elbow Ext to Flex ratio >76% (isokinetic or handheld dynamometry testing)
3. Pain-free ADLs and with previous strengthening
4. Minimum 3 weeks of multi-plane activity at increased speed of movement

Weeks 8-12

PROM/AAROM/AROM

- End ROM mobility per deficits present

Strengthening

- Progress triceps isotonic loading (including eccentrics)
- Strengthening in PNF Patterns of Motion
- Week 12: Initiate CKC UE Activity/WB through surgical extremity
  -Initiate in standing, 25% body weight, wide hand positioning, and with mild elbow flexion
- UBE stationary erogometry
  -Short-duration and pain-free (2-3 minutes)
- Week 14: Introduce push-up progression
  -Initially in modified position (on knees) and limiting elbow flex to 45 degree

Energy Storage and Power Development

- Week 16: Initiate Plyometric Activity
  -Start with double-arm activity at chest height
  (chest pass)
  -Progress to single-arm activity (free throw)

Functional Activity

- Return to Sport at 5-6 months
  -Interval progressive sport programs

MILESTONES TO RETURN TO SPORT:

1. Muscular strength >90% bilateral comparison for rotator cuff & scapular stabilizers
   (handheld dynamometer)
2. Involved extremity Elbow Ext to Flex Ratio > 76% (isokinetic or handheld dynamometry testing)
3. Completion of an interval sport progression program

References:

1. Blackmore SM, Jander RM, Culp RW. (2006). Management of distal biceps and triceps rupture. *Journal of Hand Therapy, 19*(2): 154-169.
2. Dunn JC, Kusnezov N, Fares A, et al. (2017). Triceps tendon ruptures: A systematic review. Hand, 12(5): 431-438.
3. Kocialkowski C, Carter R & Peach C. (2018). Triceps tendon rupture: Repair and rehabilitation. *Shoulder & Elbow; 10*(1): 62-65.
4. Bennett JB & Mehlhoff TL. (2015). Triceps tendon repair. *J Hand Surg Am; 40*: 1677-1683.
5. Giannicola G, Bullitta G, Rotini R, Murena L, et al. (2018). Results of primary repair of distal triceps tendon ruptures in a general population. The Bone & Joint Journal; 100-B(5): 610-616.

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