Mid-America Orthopedics

Dr. John Babb

12112 W. Kellogg, Wichita, KS 67235 – (316) 630-9300

QUAD TENDON REPAIR PROTOCOL

PHASE I: IMMEDIATE POST-OP (0-14 DAYS AFTER SURGERY)

- PT removes bandages on POD #3, keep steri-strips intact until Dr Babb can remove them.
- **NO ice bags** on any oozing or open wounds without being covered first with a bandage.
- If any wounds are oozing delay range of motion until wounds are closed and healed.
- **NO water on wounds** for 2 weeks (including showers) even if covered, no submersion of wounds in water (baths) until wounds are scars.
- No ointments, betadine etc should be used on the incisions or portals.
- If any drainage/oozing is present recover with 4x4's and notify Dr Babb (may need antibiotics).
- ***Precautions:***
  - ROM-controlled knee brace should be locked in extension and worn at all times (ambulating, sleeping, standing, etc.)
  - No active knee extension
  - No passive knee flexion beyond 60 degrees- Do not push motion at this point
- ***Weight Bearing:***
  - Weight Bearing as tolerated with brace locked in extension
- ***ROM:***
  - PROM
  - Heel slides with towel
  - Low intensity, long duration extension stretches: prone hang, heel prop
  - Seated hamstring/calf stretch
  - Gentle patellofemoral joint mobilization
- ***Strengthening:***
  - Calf raises
  - Quad sets
  - Glute sets

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

- ***Weight Bearing:***
  - Weight Bearing as tolerated with ROM-controlled knee brace locked in extension, should be full weight bearing by 6 weeks

- ***ROM/Mobility:***
  - Knee flexion PROM starts at 50 degrees week 2
    - Light overpressure only for PROM

  - Progress 10 degrees/week until 90 degrees achieved
    - 60-degree maximum end of week 2
    - 70-degree maximum end of week 3
    - 80-degree maximum end of week 4
    - 90-degree maximum end of week 5
  - Patellofemoral Joint Mobilization
  - Gradual flexion PROM with light overpressure per above
  - Extension PROM with overpressure as needed
  - Heel Slide
  - Sitting knee flexion to above ROM
  - Heel prop
- ***Bracing:***
  - Hinged brace locked in extension for standing/walking/sleeping
  - Brace worn at night until week 6 unless otherwise specified by surgeon
  - Can unlock for sitting/laying (brace angle can be unlocked to available PROM, but not to exceed PROM progression noted above)
- ***Cardio:***
  - Upper body ergometer
- ***Strengthening:***
  - Straight leg raise *without lag
  - Side lying hip abduction and adduction, prone leg extension
  - Standing hip abduction, adduction and extension
  - Glute bridge with legs straight elevated on a chair
  - Calf raise
  - Core strengthening: Plank as able without discomfort in knee
- ***Balance/proprioception:***
  - Standing weight shifts
- ***Criteria to Progress:***
  - Full passive knee extension PROM • Passive knee flexion to 90 degrees • FWB in brace with no pain • Active knee extension to 0 degrees with quad set

PHASE III: LATE POST-OP (6-16 WEEKS AFTER SURGERY)

- ***Rehab Goals:***
  - Wean assistive devices if any are still used • Restore full A/PROM of knee flexion • Begin stationary bike when able • Initiate progressive quadriceps loading/resistance exercises • Restore static single leg balance • Continue to progress proximal/distal strengthening
- ***Weight Bearing:***
  - Hinged brace unlocked for ambulation (0-60 degrees) provided patient demonstrates sufficient quad control during stance to prevent buckling
    - Use brace until week 8 unless otherwise specified by surgeon
    - Patient should demonstrate sufficient quad control, weight bearing tolerance and single limb stability prior to discharge of brace.
- ***Precautions:***
  - No weight bearing with flexion >90 deg until after 8 weeks
  - A/PROM should be cautioned not to progress faster than 10 degrees per week before 12 weeks post-op
  - Avoid aggressive quad stretching
  - No maximal voluntary contraction of the quadriceps until week 16 (No manual muscle test or handheld dynamometer testing)

- ***ROM/Mobility:***
  - Patellofemoral Joint Mobilization
  - Flexion PROM with overpressure
  - Heel Slide
  - Sitting knee flexion
- ***Cardio:***
  - Upper body ergometer
  - Stationary bicycle- Begin with partial rotations minimal resistance and gradually progress time and resistance once full motion is achieved.
  - Elliptical- may begin once active knee flexion motion reaches at least 120 degrees, able to perform 10 straight leg raises without lag, and gait is normalized without assistive device
- ***Strengthening:***
  Progress strength gradually as appropriate avoiding anterior knee pain, many of the below exercises will not begin until 8-10 weeks or later
  - Gym equipment:
    - leg press machine • seated hamstring curl machine and hamstring curl machine • hip abductor and adductor machine • hip extension machine • roman chair • seated calf machine *(Progress intensity (strength) and duration (endurance) of exercises as appropriate)*
    - Knee Extension machine at 16 weeks: If quad strength continues to be significantly limited limiting further progression may begin using knee extension machine if there is no anterior knee discomfort or pain
  - *The following exercises to focus on proper control with emphasis on good proximal stability:
    - Squat to chair • Lateral lunges • Romanian deadlift (single and double leg) • Resisted triple extension in standing
    - Single leg progression: partial weight bearing single leg press • step ups and step ups with march • slide board lunges (retro and lateral) • lateral step-ups • single leg squats • single leg wall slides • lateral step down
    - Proximal Strengthening: Double leg bridge • bridge with feet on physioball • single leg bridge • lateral band walk • standing clamshell/fire hydrant • hamstring walkout
- ***Balance/proprioception:***
  - Progress single limb balance including perturbation training
- **Criteria to Progress:**
  - Good recovery of quadriceps strength
    - Ability to perform 10 single leg squats to 60 degrees
    - Quad strength of at least 70% on handheld dynamometer: If following standard timeline, and timeline not delayed due to integrity of repair, can test quad strength at week 16
    - Or 100% quad set compared to contralateral side (measured by sphygmomanometer in mmHg)
  - Knee flexion PROM to at least 120 degrees
  - Single leg stance to 30 seconds on involved side with no significant compensatory pattern
  - Symmetrical gait pattern without use of assistive device
  - Symmetrical stair negotiation without reliance on UE

PHASE IV: TRANSITIONAL (4-6 MONTHS AFTER SURGERY)

- ***Rehabilitation Goals:***
  - Restore full ROM and muscle length of quadriceps • Restore quadriceps strength (quad index preferred) • Restore single leg dynamic balance/eccentric control (Y balance preferred) • Initiate return to jog/run protocol as tolerated • Restore proximal/distal strength to symmetry with contralateral side
- ***Precautions:***
  - Avoid pain more than delayed onset muscle soreness (DOMS) during or following exercise especially in the anterior knee/extensor mechanism
- ***Strengthening:***
  - Begin sub-max sport specific training in the sagittal plane
  - Bilateral PWB plyometrics progressed to FWB plyometrics
    - Progress to plyometric and agility program
  - Interval running program: Return to Running Program
    - Must have full ROM, resolved swelling, no pain with walking, at least 80% limb symmetry on handheld dynamometer, and ability to perform SL hop with good form prior to initiating jogging progression
- ***Criteria to Progress:***
  - Quad index of at least 90% (handheld dynamometry preferred, if not sphygmomanometer is acceptable)
  - Isokinetic dynamometry should be held until 6 months and reserved for cases where advanced return to sport/activity is needed
  - Symmetrical strength measures in hamstrings and hip (dynamometry preferred)
  - Y balance test within 90% of contralateral side
  - Symmetry in gait while jogging

PHASE V: PROGRESISVE RETURN TO SPORT (6-8 MONTHS AFTER SURGERY)

- ***Rehabilitation Goals:***
  - Progress running/sprinting program • Improve multidirectional dynamic movements and control of acceleration/deceleration • Improve power in plyometrics and landing mechanics • Restore full quadriceps strength • Return to sport/competition with minimal risk of re-injury

- ***Strengthening:***
  - Add sport specific exercises based on patient's desired sport goals
  - If participating in a cutting/sprinting sport, increased focus on rapid acceleration/deceleration activities and change of direction drills gradually increasing demand and predictability of drill
- ***Criteria for return to sport:***
  - Isometric quad/hamstring testing on surgery leg >/= 95% of non-surgery leg
  - Functional hop testing (broad jump, single leg hop, single leg triple hop with control, single leg triple hop with crossover) on surgery leg >/= 95% of non-surgery leg

Patient progression during the time frames along with general modality and exercise choice is left up to the discretion of the treating therapist. If you have any questions regarding this protocol, please contact (316) 630-9300.