

KNEE

ACL Reconstruction

Surgery Date: _____

Progressions are time and criterion-based, dependent on soft tissue healing, patient demographics and clinician evaluation. A review of the operative note and communication of any concerns with the referring physician is encouraged. Use of allowed visits should consider overall insurance limitations. When limitations are present, spread visits out over time to ensure that the patient can optimally complete rehab program with return to appropriate activities.

Summary of Recommendations

Precautions

- No testing of repaired or reconstructed/injured ligaments (Lachman, Anterior/Posterior Drawer, Varus/Valgus Stress) prior to 12 WEEKS
- KT 1000 at 12–14 weeks
- No isotonic resisted hamstring exercises for 8 weeks with hamstring autograft
- Beginning at postoperative week 4, loaded open-chain knee extension may be performed from 90° to 45° of knee flexion. Avoid loaded terminal knee extension from 45° to 0° for the first 8 weeks. After 8 weeks, progressively introduce the terminal arc as quadriceps control allows and provided there is no increase in pain or effusion.

Meniscus Repair Precautions (if applicable)

- No weight-bearing (WB) therapeutic exercise >90° x 8 WEEKS
- PWB or WBAT x 4 WEEKS (depending on location of repair: check with physician office)
- No forced flexion beyond 90° x 4 WEEKS
- Communication with physician critical regarding meniscal repair restrictions

Outcome Tools

- IKDC
- KOOS
- ACL-RSI

Strength Testing

- Isokinetic testing no earlier than 16 weeks, training at 14 weeks when clinically appropriate

Criteria to Discharge Assistive Device

- ROM: Full active knee extension; no pain on passive overpressure
- Strength: Able to perform strong quad isometric and superior patellar glide and able to perform 2x20 SLR with load, without quad lag
- Effusion: 1+ or less (preference: trace or less)
- Weight Bearing: Demonstrates pain-free ambulation without visible gait deviation

Criteria to Initiate Running and Jumping

- ROM: Full, pain-free knee ROM, symmetrical with the uninvolved limb
- Strength: 70% Isokinetic testing for hamstring and quad at 60°/sec, 180°/sec, and 300°/sec for straight plane running
- Strength: 80% Isokinetic testing for hamstring and quad at 60°/sec, 180°/sec, and 300°/sec for COD/COS/plyometrics
- No Effusion
- Weight Bearing: Normalized gait and jogging mechanics
- Neuromuscular Control: Symmetry and absence of pathomechanics bilaterally

Criteria for Return to Sport

- ROM: Symmetrical in flexion and extension to 0 degrees

- Strength: 90% Isokinetic testing for hamstring and quad at 60°/sec, 180°/sec, and 300°/sec for contact and high level RTS activities
- Quad to Hamstring ratio 3:2
- Effusion: No reactive effusion $\geq$ 1+ with sport-specific activity
- Normalized gait and jogging mechanics
- Neuromuscular control: Appropriate mechanics and reactions with high level agility, plyometrics, and high impact movements
- Functional Hop Testing: LSI 90% or greater for all tests
- ACL-RSI Score $\geq$ 75%
- Physician Clearance: MD formal visit and/or PT release to sport with MD approval
- Athlete, Parent and Coach conference

Early Post-Operative Phase (Post ACLR – 4 Weeks)

Appointments

- Post-operative evaluation should be performed 2–5 days following surgery. Follow-up appointments 1–2x per week; however this needs to increase if ROM deficits exist

Precautions

- No testing of repaired or reconstructed ligaments (Lachman, Anterior/Posterior Drawer, Varus/Valgus Stress) prior to 12 WEEKS
- Loaded open-chain knee extension is limited to the 90°–45° arc; avoid loaded terminal knee extension from 45° to 0° for the first 8 weeks.

Meniscus Repair Precautions

- No weight-bearing (WB) therapeutic exercise $>90^\circ$ x 8 WEEKS
- PWB x 4 WEEKS
- No forced flexion beyond 90° x 4 WEEKS

Pain and Effusion

- Assess and control effusion
- NMES and active quad control crucial for effusion control
- Cryotherapy and compression

Range of Motion

- Extension: Emphasis on achieving full knee extension immediately following surgery. If full extension is not achieved by 4 weeks, contact surgeon regarding ROM concerns
- Flexion: No forced flexion past 90° for meniscus repairs. ACLR and meniscectomy are able to push for symmetrical flexion as appropriate

Therapeutic Exercise

- Emphasis on quad activation without gluteal co-contraction
- Restore patellar mobility
- Work toward symmetrical ROM
- Decrease effusion
- Ambulation with appropriate joint loading and without obvious gait deviation

NMES Parameters

- Russian and Direct Current interventions are indicated

Criteria to Discharge Assistive Device

- ROM: Full active knee extension; no pain on passive overpressure
- Strength: Able to perform strong quad isometric and superior patellar glide and able to perform 2x20 SLR without quad lag

- Effusion: 1+ or less (goal is trace to zero)
- Weight Bearing: Demonstrates pain-free ambulation without visible gait deviation

Criteria to Progress to Middle Phase

- ROM: ≥ 0 –120 degrees
- Strength: Quadriceps set with normal superior patellar translation, SLR x 10 seconds without extensor lag Goals (do not limit progression): Effusion 1+ or less; able to tolerate CKC therex program without increased pain

Middle Phase of Rehabilitation (4–16 Weeks)

Appointments

- 2 times a week, unless insurance restrictions exist. HEP should be performed daily

Precautions

- Loaded open-chain knee extension: continue within the 90°–45° arc; after 8 weeks, progressively introduce the terminal 45°–0° arc as quadriceps control allows and provided there is no increase in pain or effusion.
- No isolated resisted hamstrings strengthening until 8 weeks (for hamstring autografts)

Pain and Effusion

- Cryotherapy/compression as needed for reactive effusion and post therapy session
- Any effusion at this time needs to be addressed in coordination with referring physician

Range of Motion

- If full AROM knee extension is not achieved by 4 weeks, contact surgeon regarding ROM concerns

Criteria to Initiate Running and Jumping

- ROM: Full, pain-free knee ROM, symmetrical with the uninvolved limb
- Strength: 70% Isokinetic testing for hamstring and quad at 60°/sec, 180°/sec, and 300°/sec for straight plane running
- Strength: 80% Isokinetic testing for hamstring and quad at 60°/sec, 180°/sec, and 300°/sec for COD/COS/plyometrics
- NO EFFUSION
- Weight Bearing: Normalized gait and jogging mechanics
- Neuromuscular Control: Demonstrated bilateral control with all tasks, even when fatigued

Criteria to Progress to Late Phase

- Symmetrical ROM, with exception of hyperextension
- NO EFFUSION
- Strength: Isokinetic quadriceps and hamstrings strength $\geq 80\%$
- Neuromuscular Control: Demonstrates proper lower extremity mechanics with all therapeutic exercises (bilaterally)

Late Phase of Rehabilitation (Weeks 16 – Return to Sport)

Appointments

- Frequency of visits remain 2x a week with insurance limitations being the only variable to consider Transition to the Return to Sport phase is based on presentation of the patient, with timeframe from surgery being secondary. Tolerance of increased load and intensity needs to be addressed by continuing to evaluate the patient at each appointment.

Precautions

- Psychosocial issues and factors need to be considered and addressed when appropriate
- Return to Sport sooner than 9 months requires physician approval, with goal of RTS 9–12 months from surgery

Pain and Effusion

- No Effusion (presence of an effusion is a red flag for progression)
- Pain with functional progression needs to be addressed in regards to volume and load

Range of Motion

- Full flexion symmetrical to contralateral limb (as defined as 5 degree difference)
- ACTIVE Extension to 0 degrees and pain free with overpressure

Interventions/Activities

- Progress neuromuscular re-education activities
- Progress sport- and position-specific activities
- Begin agility exercises between 50–75% effort (utilize visual feedback to improve mechanics as needed, progress to full speed with integration of sport elements)
- Advance plyometrics: Bilateral to single leg, progress by altering surfaces, adding ball toss, 3D rotations, etc.
- Progress HEP to mirror in-clinic activities and general fitness goals

Criteria for Return to Sport

- ROM: Full, pain-free knee ROM, symmetrical with the uninvolved limb
- Strength: Isokinetic testing 90% or greater for hamstring and quad at 60°/sec, 180°/sec, and 300°/sec, 3:2 Quad to Hamstring ratio
- Effusion: No reactive effusion
- Normalized gait and jogging mechanics
- Neuromuscular control: Appropriate mechanics with high level agility, plyometrics, and high impact movements, even when fatigued
- Functional Hop Testing: LSI 90% or greater for all tests
- ACL-RSI Score $\geq$ 75%
- Physician Clearance
- Athlete, Parent and Coach conference