SKYLINE ORTHOPEDICS
Orthopedic Surgery, Sports Medicine & Arthroscopy Specialists

Jonathan Watson, MD

REHABILITATION PROTOCOL- ACL reconstruction & meniscus repair 1 (peripheral, vertical tears)

The rehabilitation guidelines are presented in a criterion based progression program. General time frames are given for reference to the average, but individual patients will progress at different rates depending on their age, associated injuries, pre-injury health status, rehab compliance, tissue quality and injury severity. Specific time frames, restrictions, and precautions may also be given to protect healing tissues and the surgical repair/reconstruction. It should not be a substitute for one's clinical decision making regarding the progression of a patient's post-operative course based on their physical exam findings, individual progress, and/or the presence of post-operative complications. The therapist should consult the referring physician with any questions or concerns.

Special attention must be given to impairments that caused the initial problem. For example, if the patient is s/p partial medial meniscectomy and they have a varus alignment, post-operative rehabilitation should include correcting muscle imbalances or postures that create medial compartment stress.

INDIVIDUAL CONSIDERATIONS: S/p

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PHASE 1- Surgery to 2 weeks

REHAB GOALS	1. Protection of the post-surgical repair 2. Full passive knee extension and flexion to 90 degrees (medial meniscus), 70 degrees (lateral meniscus) 3. Restore leg control – no lag with straight-leg-raise 4. Restore/maintain patellar mobility 5. Eliminate effusion/swelling
PRECAUTIONS	1. Crutches and weight bearing as tolerated with brace locked in extension. Brace flexion limited to 90 degrees (medial meniscus), 70 degrees (lateral meniscus) 2. Brace on for sleep for 2 weeks (locked in extension), afterwards can remove for sleep and bathing. 3. Cryocuff 3-5 times per day for 20 minutes and ice after every therapy session 4. No open chain exercises for quadriceps/hamstring
RANGE OF MOTION	○ Heel props, prone hangs for passive knee extension ○ Patellar mobilization- superior/inferior and medial/lateral ○ Passive, active assist, active knee flexion, active/active assist knee

EXERCISES	extension (limit 90-30 for anterior horn repairs) ○ Hamstring & calf stretches
SUGGESTED THERAPEUTIC EXERCISES	○ Quad sets ○ Side lying hip abduction, prone hip extension ○ Calf pumps, ankle strengthening exercises ○ BTB/quadriceps autograft-prone isometric hamstring exercises 30-45 flexion ○ NMES as tolerated ○ Standing weight shifts, gait training with crutches
CARDIOVASCULAR EXERCISE	Upper body circuit training or UBE.
PROGRESSION CRITERIA	○ Minimal pain & swelling ○ Full passive extension symmetrical ○ Good quad set, able to perform SLR without lag ○ Knee flexion to 90 degrees (70 degrees for lateral) and full extension ○ Good patellar mobility

PHASE 2- 3-6weeks

REHAB GOALS	1. Protection of the post-surgical repair 2. Restore knee range of motion – full knee extension and Knee flexion 3. Regain quadriceps control 4. Minimize pain and swelling 5. Restore normal gait
PRECAUTIONS	1. Crutches and weight bearing as tolerated with brace locked in extension until week 4. Can then unlock for ambulation. 2. Discontinue brace when: minimal pain & swelling, full & symmetric passive knee extension, 120 deg of knee flexion, able to perform straight leg raise without lag, normal gait pattern without crutches (about 6 weeks) 3. Cryocuff 3-5 times per day for 20 minutes and ice after every therapy session
RANGE OF MOTION EXERCISES	○ Continue phase 1 exercises ○ Manual passive knee extension as needed ○ Patellar mobilizations ○ Passive knee flexion- no ROM limitation
SUGGESTED THERAPEUTIC	○ Continue phase 1 exercises ○ SLRs in all planes if no extensor lag. Can add resistance at ankle if no extensor lag at 6 weeks

EXERCISES	○ Heel raises, start double leg, progress to single leg ○ Double leg balance knee flexed 30 deg. If minimal deviations, can progress further to unstable surface then eyes closed. ○ Open chain knee extension from **90 to 60 flexion only**. Light resistance up to 10lb ok ○ Week 6- BTB & quad grafts- resisted knee flexion (prone & standing) 0-90 when 100 active knee flexion achieved. Once performed with 10lb can transition to leg curl machine. ○ Week 6- Mini squats, leg press & wall slides 0-60 deg flexion ○ Gait training
CARDIOVASCULAR EXERCISE	Upper body circuit training (seated), core strengthening or UBE Stationary bike- high seat, low resistance Pool walking at 3 weeks
PROGRESSION CRITERIA	○ Minimal pain & swelling ○ Full passive knee extension, SLR without lag ○ At least 120 deg of flexion ○ Able to walk without assistive device

PHASE 3- 7-12 weeks postop

REHAB GOALS	○ Protection of graft during healing ○ Maintain/restore full ROM ○ Improve quad strength & endurance ○ Improve hip & core strength, balance, stability
PRECAUTIONS	○ Continue ice after PT ○ Avoid post activity swelling ○ No impact activities/plyometrics ○ Avoid posterior knee pain with deep flexion ○ Avoid single leg squats
RANGE OF MOTION EXERCISES	○ Continue exercises from phase 2. ○ Soft tissue/scar mobilizations as needed ○ Hip ROM as tolerated, avoid excessive ER/IR that would torque knee
SUGGESTED THERAPEUTIC EXERCISES	○ Continue phase 2 exercises ○ Hip & core strengthening- cont 4 way hip exercises, side steps, diagonal walking w/bands, planks, pelvic tilts, bridging, lateral side support ○ Balance- progress to throwing & catching objects on two legs, balance boards, perturbations ○ Open chain- continue limited arc extension (**90 to 60 deg flexion ONLY)** advance to machine when tolerating 10lb ○ Hamstring autografts- ok to start resisted knee flexion (prone & standing) 0-90 when 100 active knee flexion achieved. Once

	performed with 10lb can transition to leg curl machine. ○ Closed chain- continue exercises from phase 2, progress to 0-75 deg knee flexion for step ups/downs, leg press, squat, lunge. Minisquats 0-45, lateral step ups (5-10cm block)
CARDIOVASCULAR EXERCISE	Week 7- Elliptical, stairmaster Pool walking Nordic trak, swimming with straight leg kick at week 9
PROGRESSION CRITERIA	○ Minimal pain & swelling ○ Symmetrical passive & active extension and flexion ○ Adequate progression in neuromuscular & balance exercises ○ No issue with progression to treadmill elliptical

PHASE 4- 13-20 weeks postop

REHAB GOALS	○ Restore/maintain full ROM ○ Improve strength, at least 70% quad strength prior to running ○ Continue neuromuscular progression ○ Walk/run progression
PRECAUTIONS	Caution when progressing strengthening in this phase. The graft is at risk of failure and aggressive rehab could be detrimental Post-activity soreness should resolve within 24 hours Avoid post activity swelling Continue ice after PT Avoid posterior knee pain with deep flexion Avoid single leg squats
RANGE OF MOTION EXERCISES	Continue with flexibility exercises Hip, IT band stretching & sport specific stretches if precautions followed
SUGGESTED THERAPEUTIC EXERCISES	○ Progress phase 3 activities with resistance/weight ○ Balance/neuromuscular- continue progression to single leg stance then with unstable surface, perturbations, etc ○ Ok to increase closed chain strengthening exercises ROM to 0-90 ○ Progress Closed chain to single leg: leg press, higher level step up/downs
CARDIOVASCULAR EXERCISE	Continue previous phase exercises Week 20- Progress to walk/run progression when quadriceps index (dynamometer strength ratio of involved/uninvolved) is 70%. Can progress to running when tolerate fast treadmill walking for 15 minutes. Straight ahead, level surface only. Do not increase more than 10% per week.
PROGRESSION	○ At least 70% quad strength

CRITERIA	○ Able to walk 20 min without pain or swelling ○ Clearance by physician

PHASE 5- 21-32 weeks

REHAB GOALS	○ No pain/swelling/instability ○ Full ROM ○ 90% quad strength ○ Begin agility, jumping and hopping
PRECAUTIONS	Post-activity soreness should resolve within 24 hours Avoid post activity swelling
RANGE OF MOTION EXERCISES	Continue with flexibility exercises
SUGGESTED THERAPEUTIC EXERCISES	○ Progress strengthening from phase 4 ○ Open chain- ok to advance knee extension from 90-60 to 90-45 degrees ○ Closed chain- ok to increase ROM from 0-90 as tolerated. Advance resistance/difficulty as tolerated ○ Balance/neuromuscular- continue to progress and advance difficulty ○ Week 24- Agility training- 85% quadriceps strength prior to initiating: lateral shuffling, forward/backward shuttle runs, carioca, ladder drills. Start with 50% effort, progress slowly to 100%. ○ Week 24- Plyometrics- begin when 85% quad strength achieved. Make sure good form with landing. Begin with single forward jumps take off and landing both legs. Progress to side to side jumping, jumping w/rotation, box jumps. As patient improves progress from single to consecutive jumps. Single leg hops when 90% quad strength achieved, perform jumps on both legs with equal weight distribution, follow same progression as jumping above, emphasize correct form.
CARDIOVASCULAR EXERCISE	○ Continue from phase 4 ○ Progress to sprinting when quad index >90%. Transition from running to full sprint short distances. Progress from 40 to 100 meters.
PROGRESSION CRITERIA	○ No pain/swelling ○ Full ROM symmetrical ○ Quad index at least 90% ○ Hop test scores at least 80%: single leg hop for distance, single leg triple hop, single leg triple crossover hop, timed 10 meter hop. ○ Tolerating full effort agility, jumping/hopping, and sprinting without symptoms or movement abnormalities

PHASE 6- 8-12 months postop

REHAB GOALS	○ No pain/swelling/instability ○ Full ROM ○ Greater than 90% quad strength ○ Return to sport/work
PRECAUTIONS	Post-activity soreness should resolve within 24 hours Avoid post activity swelling Functional brace when thigh muscle girth <1cm side to side difference
RANGE OF MOTION EXERCISES	Continue with flexibility exercises
SUGGESTED THERAPEUTIC EXERCISES	○ Progress from phase 4 ○ Agility training- continue, incorporate sport specific activities ○ Plyometrics- jumping & hopping more challenging by changing height/distance, speed, directions, combination of tasks ○ Cutting drills: when 90% quad strength: begin with running S pattern, progress to 45 deg cuts then sharper cuts. Can begin pivoting & cut and spin drills when able to cut at sharp angles include anticipated and unanticipated movements, incorporate sport specific activities ○ Return to sport test: see below
CARDIOVASCULAR EXERCISE	○ Advance to baseline
PROGRESSION CRITERIA- RETURN TO SPORT	○ Full ROM equal to contralateral ○ No pain or swelling ○ Quadriceps index and hop test >90% of contralateral ○ Tolerating all drills without symptoms ○ Passing return to sport test

RETURN TO SPORT TEST

- 10 rep max single leg squat with external weight
- Single broad jump landing on one foot
- Triple broad jump landing on one foot
- Single leg forward hop
- Single leg crossover hop
- Single leg medial and lateral hop
- Single leg medial and lateral rotating hop
- Single leg vertical hop

- Single leg triple hop
- Timed 6 meter hop
- 10 yard lower extremity functional test
- 10 yard pro agility run