

## REHABILITATION GUIDELINES FOR ACL WITH QUAD TENDON AUTOGRAPH

### PHASE I (**0-2 WEEKS**) EARLY POSTOPERATIVE

DATES:

Appointments	<ul style="list-style-type: none"> <li>Physical therapy 2-3x/week, beginning 2-5 days post-op</li> </ul>
Rehabilitation Goals	<ul style="list-style-type: none"> <li>Decrease swelling/effusion</li> <li>Protect Incision</li> <li>Maintain/re-establish neuromuscular control (quads)</li> <li>Decrease Assistive Device</li> <li>0-90 Range of Motion</li> </ul>
Precautions	<ul style="list-style-type: none"> <li>WB: <ul style="list-style-type: none"> <li>WBAT with crutches</li> <li>May be weaned to 1 crutch with full extension if steady in gait.</li> <li>DC crutches when quad control returns, Full extension achieved, stable with low fall risk</li> </ul> </li> <li>Brace <ul style="list-style-type: none"> <li>Brace locked in extension until first PT visit, then unlocked at all times.</li> <li>May remove brace for sleep and exercises after 1 week</li> </ul> </li> <li>Ice 3-5x/day, 20 min each time, especially after exercises <ul style="list-style-type: none"> <li>Weaning from ice towards end of week 2</li> </ul> </li> <li>No resistive open chain exercises with leg in full extension</li> </ul>
Suggested Therapeutic Exercises	<ul style="list-style-type: none"> <li>Edema mgt <ul style="list-style-type: none"> <li>Ankle pumps, ball rolling</li> </ul> </li> <li>Restore full extension (including hyperextension)</li> </ul>

## REHABILITATION GUIDELINES FOR ACL RECONSTRUCTION

	<ul style="list-style-type: none"> <li>○ Prolonged extension- prone hang, supine with roll under ankle</li> <li>• Gentle knee flexion (to protect incision and reduce effusion) <ul style="list-style-type: none"> <li>○ Heel slides, wall slides, prone knee flexion</li> </ul> </li> <li>• Neuromuscular control <ul style="list-style-type: none"> <li>○ Quad sets (with NMR as needed), SLR (all planes), HS isometrics</li> </ul> </li> <li>• Gait Training and Proprioception/Balance exercises <ul style="list-style-type: none"> <li>○ weight shifts forward, retro, lateral and single leg stance</li> <li>○ Assistive Device Training</li> </ul> </li> </ul>
Cardiovascular Exercises	<ul style="list-style-type: none"> <li>• UBE</li> <li>• Stationary bike: as soon as motion (0-115 degrees) allows <ul style="list-style-type: none"> <li>○ No resistance</li> </ul> </li> </ul>
Progression Criteria	<ul style="list-style-type: none"> <li>• Incision wound progressing appropriately</li> <li>• A-SLR without extension lag</li> </ul>

### PHASE II (**2-8 WEEKS**) INTERMEDIATE POSTOPERATIVE STAGE

DATES:

Appointments	Continue physical therapy 2-3x/week
Rehabilitation Goals	<ul style="list-style-type: none"> <li>• Decrease Swelling/effusion</li> <li>• Scar tissue healing / remodeling</li> <li>• Continue to progress ROM</li> <li>• Restore efficient gait</li> <li>• Begin to restore muscle girth symmetry</li> <li>• Restore Proprioception</li> <li>• Limb speed and Coordination</li> </ul>
Precautions	<ul style="list-style-type: none"> <li>• Wear brace except for sleeping, exercises</li> <li>• No open chain resistive exercises with weights in full extension <ul style="list-style-type: none"> <li>○ Can use therabands for HS/Quad or manually resisted</li> </ul> </li> <li>• No Swimming (freestyle kick or breast-stroke)</li> </ul>

## REHABILITATION GUIDELINES FOR ACL RECONSTRUCTION

Suggested Therapeutic Exercises	<ul style="list-style-type: none"> <li>• Reduce Effusion <ul style="list-style-type: none"> <li>◦ Ankle Pumps, ball rolling</li> </ul> </li> <li>• Scar Tissue Healing/remodeling <ul style="list-style-type: none"> <li>◦ Scar mobilizations, patellar mobilizations</li> </ul> </li> <li>• Restore ROM (0-120) <ul style="list-style-type: none"> <li>◦ Prone Extension hangs, CREEP knee extension stretch, Prone QS, SLR, Standing TKE, Backwards Gait</li> <li>◦ Heel Slides, Wall Slides, Ball Rolling, Total Gym, Reformer</li> </ul> </li> <li>• Restore muscle girth symmetry &amp; double limb movement competencies <ul style="list-style-type: none"> <li>◦ Blood Flow Restrictive Training</li> <li>◦ <i>Quad &amp; Glutes:</i> Bridges, Squats, Wall Squats (isometric holds), Prone leg lifts</li> <li>◦ <i>Hamstring:</i> bridge with feet on FR or ball, Stool Scoots, Hip Hinge/Deadlift, Prone knee curls (with manual resistance and/or theraband)</li> <li>◦ <i>Calf:</i> double or single leg heel raises</li> <li>◦ <i>Hip stabilizers:</i> Standing hip extension, ABD, ADD with surgical limb in weight bearing <ul style="list-style-type: none"> <li>▪ Clamshells, Fire hydrants, Lateral Steps with TB around knees/feet</li> </ul> </li> </ul> </li> <li>• Proprioception and Coordination <ul style="list-style-type: none"> <li>◦ Double leg balance progressed to balance board/wobble board for early NM retraining <ul style="list-style-type: none"> <li>▪ Slight flexion in knee with balance activities</li> </ul> </li> <li>◦ Wall Drills (Double leg triple extension drive)</li> <li>◦ Marching Drills (A-march forwards, backwards, laterally)</li> </ul> </li> <li>• Gait Training – wean from Assistive Device</li> </ul>
Cardiovascular Exercises	<ul style="list-style-type: none"> <li>• Stationary bike: as soon as motion (0-115 degrees) allows</li> <li>• Elliptical</li> <li>• Stairmaster</li> <li>• Pool: walking, aqua-jogging,</li> </ul>
Progression Criteria	<ul style="list-style-type: none"> <li>• ROM (0-120)</li> <li>• Minimal Effusion (&lt;1+ on Stroke Effusion Test)</li> <li>• Normalize Gait <ul style="list-style-type: none"> <li>◦ DC brace: with adequate quad control for gait on level surfaces, inside. 6 weeks post-op.</li> </ul> </li> </ul>

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PHASE III (8 WEEKS – 3 MONTHS) *FOUNDATION BUILDING* DATES:

Appointments	Continue physical therapy 1x/week with emphasis on developing HEP
Rehabilitation Goals	<ul style="list-style-type: none"> <li>• Restore full ROM, flexibility</li> <li>• Restore muscle girth symmetry</li> <li>• Proficient with single limb bodyweight movement competencies</li> <li>• Restore proprioception</li> <li>• Limb speed and coordination (micro-plyos)</li> <li>• Begin USTART testing (movement competencies, balance, girth, strength testing)</li> </ul>
Precautions	<ul style="list-style-type: none"> <li>• No downhill walking/running, downhill skiing, downhill biking until 4.5 months</li> <li>• No unsupervised plyometrics</li> <li>• May start resistive open chain muscle strengthening</li> <li>• Use soreness rules to advance their therex program</li> </ul>
Suggested Therapeutic Exercises	<ul style="list-style-type: none"> <li>• Restore muscle girth symmetry <ul style="list-style-type: none"> <li>◦ Leg Press, Blood Flow Restrictive Training</li> </ul> </li> <li>• Restore flexibility <ul style="list-style-type: none"> <li>◦ HS, Quads, Adductors, ITB/TFL</li> </ul> </li> <li>• Single Leg bodyweight movement competencies <ul style="list-style-type: none"> <li>◦ SL squat to box, Lunges (sagittal and lateral), Step Ups/downs (anterior/lateral)</li> </ul> </li> <li>• Restore proprioception <ul style="list-style-type: none"> <li>◦ SL Balance progressing to unstable surface <ul style="list-style-type: none"> <li>▪ Knee must be in slight flexion (30deg)</li> </ul> </li> <li>◦ Perturbations with sports cord with DL movements (anterior, laterally with squats, lunges)</li> </ul> </li> <li>• Limb speed and coordination (micro-plyos) <ul style="list-style-type: none"> <li>◦ Single leg triple extension, SL triple ext drive and double tap</li> <li>◦ A-march with ankle flips (forwards/backwards/lateral)</li> </ul> </li> <li>• Pool: lateral movement, deep water jogging in place (no freestyle or frog/breaststroke kick)</li> </ul>
Cardiovascular Exercises	<ul style="list-style-type: none"> <li>• Road biking on flat roads only</li> <li>• Treadmill walking</li> <li>• Pool walking/jogging</li> </ul>
Progression Criteria	<ul style="list-style-type: none"> <li>• Y Balance assessment – establish baseline at 6-8 weeks</li> <li>• Girth Measurement (target &lt;2cm)</li> <li>• Pass USTART Movement Competencies,</li> <li>• Score USTART flexibility and countermovement (does not need to pass)</li> </ul>

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### PHASE IV (3 TO 5 MONTHS) ACCUMULATION

DATES:

Appointments	Home Exercise program with monthly check in or begin group exercises with ATC
Rehabilitation Goals	<ul style="list-style-type: none"> <li>• Restore muscle girth symmetry and strength</li> <li>• Flexibility</li> <li>• Proprioception</li> <li>• Plyometrics <ul style="list-style-type: none"> <li>○ Hop drills without difficulty</li> <li>○ Good landing mechanics with jumping</li> <li>○ Hopping/agility drills without knee pain or effusion</li> </ul> </li> <li>• Impact activities – <ul style="list-style-type: none"> <li>○ Running without knee effusion (begin jogging at 12 weeks)</li> <li>○ Progress to running patterns at 75% speed</li> </ul> </li> </ul>
Precautions	<ul style="list-style-type: none"> <li>• No downhill walking/running, downhill skiing, downhill biking until 4.5 months</li> <li>• May start freestyle swimming (No breast-stroke kick)</li> </ul>
Suggested Therapeutic Exercises	<ul style="list-style-type: none"> <li>• Strength Training (Barbell, Kettlebell, medicine balls, Free weights, weight machines) both open chain and closed chain</li> <li>• Jumping <ul style="list-style-type: none"> <li>○ Double Limb Drop Jumps and counter jumps</li> <li>○ Box jumps</li> </ul> </li> <li>• Agility drills: <ul style="list-style-type: none"> <li>○ Agility Ladder drills, jump rope drills,</li> </ul> </li> <li>• Sport Specific Training (may train with team) <ul style="list-style-type: none"> <li>○ Running/Cutting Drills</li> </ul> </li> </ul>
Cardiovascular Exercises	<ul style="list-style-type: none"> <li>• Increasing endurance (duration and frequency) with closed chain exercises 3-4x/week</li> <li>• Return to Running program (on Track or Treadmill)</li> <li>• Pool: may start freestyle swimming (no breaststroke kick)</li> </ul>
(Phase IV continued) Progression Criteria	<ul style="list-style-type: none"> <li>• Y Balance: assessing for progress</li> <li>• Girth Measurement (&lt;2cm)</li> <li>• Single leg hop for distance (15% symmetry)</li> <li>• Pass USTART (movement competencies, counter movements and flexibility)</li> <li>• IPRRS objective measure score</li> </ul>

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PHASE V (5 TO 8 MONTHS) TRANSITION

DATES:

Appointments	Transition to an IND HEP program or group/dry land training with ATC or Coach
Rehabilitation Goals	<ul style="list-style-type: none"><li>• No longer needs modifications to avoid pain, swelling, ROM with activity and exercise.</li><li>• Able to complete a running program (3 miles at varying speeds)</li><li>• Restore previous levels of training in volume and intensity</li></ul>
Precautions	<ul style="list-style-type: none"><li>• Return to sport testing at 9 months post-op, prior to MD visit</li><li>• may advance swimming (avoid frog/breaststroke kick)</li></ul>
Cardiovascular Exercises	<ul style="list-style-type: none"><li>• Running</li><li>• Swimming</li></ul>
Progression Criteria	<ul style="list-style-type: none"><li>• Pass Return to Sport testing</li><li>• Quadricep and hamstring strength at 90% of unaffected limb</li><li>• Single leg hop test and vertical jump at least 90% of opposite leg</li><li>• Jog, full speed run, shuttle run and figure of 8 running without a limp</li><li>• Full controlled acceleration and deceleration</li><li>• Squat and rise from a full squat</li><li>• Subjective Measurements of function (IKDC and IPRRS)</li></ul>

### References:

Mammoth Orthopedic Institute  
The Steadman Clinic  
USSA Return to Sport Protocol  
UD Delaware Physical Therapy Clinic

PT name and date: Melissa Buehler, PT, DPT 4/10/20

MD name and date: Dr. Brian Gilmer, 5/18/20

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