

ANKLE LIGAMENT RECONSTRUCTION POST-OPERATIVE GUIDELINES

The following Ankle Ligament Reconstruction Guidelines were developed by the HSS Rehabilitation. These types of surgeries are intended to correct ankle instability. The primary intention is to return to full functional and recreational activities. Returning to impact activities is based on pre-surgical activity and surgeon clearance.

Progression is both criteria-based and patient specific. Phases and time frames are designed to give the clinician a general sense of progression. Progression will be dependent on adequate soft tissue healing time for the involved structures. The program should balance the aspects of tissue healing and appropriate interventions to maximize function.

The following considerations should be kept in mind:

- Partial weight bearing (PWB) progression increases by approximately 25% of body weight per week
- For patients with comorbidities such as diabetes, osteoporosis or high body mass index (BMI), healing times and weight bearing (WB) progression may be delayed
- Be mindful that concomitant surgeries such as tendinous repairs or reconstructions may affect treatment choices and rate of progression
- Monitor for plantar fasciitis and metatarsal head pain
- Consider removable external shoe lift for the non-operative limb
- Be aware of graft materials

Follow physician modifications as prescribed.

ANKLE LIGAMENT RECONSTRUCTION POST-OPERATIVE GUIDELINES

Post-Operative Phase 1: Weeks 4-8

PRECAUTIONS

- Excessive tensile forces into inversion or eversion based on location of repair – avoid passive motion
- Avoid standing or walking for extensive periods of time

CONSIDERATIONS

- History of previous ankle sprains
- Psychosocial involvement/pain sensitization
- Pre-injury condition

ASSESSMENT

- Foot Ankle Disability Index (FADI)
- Numeric Pain Rating Scale (NPRS)
- Wound status
- Edema
- Screen for deep vein thrombosis
- Sensory screen
- AROM/PROM of non-involved lower extremity (LE) joints
- Ankle joint mobility
 - Talocrural
- Foot joint mobility
 - Metatarsophalangeal joints (MTPJ's)
 - Lesser digits
 - Midfoot joints
 - First ray plantarflexion
- Soft tissue extensibility
 - Gastroc-Soleus complex
 - Flexor Hallucis Longus (FHL) and Flexor Digitorum Longus (FDL) tendons
 - Long toe extensors
 - Hip extension
- Palpation focusing on hypertonicity of surrounding muscles
- Strength- Manual muscle testing (MMT) focusing on ankles/hips
- Gait and stair training according to weight bearing status with crutches and Controlled Ankle Motion Boot (CAM) per MD recommendations

TREATMENT RECOMMENDATIONS

- Scar mobilization, silicone strips, moisturizing when wound is healed
- Joint mobilizations with focus on talocrural joint
- Progressive gait and stair training
 - Ankle and toe AROM
- Focus on seated and closed chain motion in plantarflexion/dorsiflexion
- Progress to standing flexibility exercises respecting WB status
 - Runner's gastrocnemius stretch with rear LE within WB restrictions when 25% WB
 - Progress to toe articulation (push off motion with rear foot)
 - Progress to soleus stretch when 50% WB
 - Long toe flexor stretch against wall
 - Bilateral mini-squats when 50% WB
- Progress hip flexibility with emphasis on extension
- Initiate balance/proprioception exercise training respecting WB status
 - Rocker board in seated with PF/DF
 - Weight shifting (use scale to assess load)
- Strengthening
 - Isometric exercises in neutral inversion/eversion
 - Isotonic plantarflexion/dorsiflexion
 - Proximal LE
 - Bilateral heel raise progression: seated, seated with load, leg press, standing with upper body support, standing unsupported
 - Intrinsic
 - Arch doming progressing from seated to standing
 - Marble pick ups
 - Short foot strengthening
 - Bilateral stance with assessment of foot tripod (calcaneus, 1st and 5th metatarsal heads)
- Stationary bicycle when 50% WB
- Aquatic exercise if accessible when incision healed and cleared by MD
- Upper body conditioning as tolerated
- Desensitization
 - Progressive touch/stroking of the foot
 - Ball massage on sole of foot
- When incisions are fully healed, consider:
 - Contrast baths
 - Compression garments

CRITERIA FOR ADVANCEMENT

- Stable/controlled swelling
- Wound closure
- Bilateral standing heel raises
- Full weight bearing (FWB) in CAM boot with or without assistive device

EMPHASIZE

- Gait training with gradual progression of WB
- LE ROM and flexibility exercises emphasizing ankle and hip while respecting WB and wound status
- Progression to closed chain exercises
- Monitor maintenance of tripod during WB activities
- Continuous monitoring of swelling

MODIFICATIONS TO PHASE 1

- Deltoid: Avoid passive eversion and aggressive subtalar joint mobilizations; avoid maximal isometric inversion with posterior tibial tendon reconstructions if present.
- Lateral Ankle Reconstruction: Avoid passive inversion, aggressive subtalar and distal tib-fib joint mobilizations and forceful plantarflexion stretching; avoid maximal isometric eversion with peroneal tendon reconstructions if present.
- Autograft: Be mindful of donor site healing.
 - Limit motions which stress healing tissues
 - Anterior Talofibular Ligament (ATFL): limit inversion and plantarflexion
 - Calcaneofibular Ligament (CFL) and Posterior Talofibular Ligament (PTFL): limit inversion
 - Deltoid Ligament: limit eversion
 - High Ankle Sprain: limit WB inversion/eversion

ANKLE LIGAMENT RECONSTRUCTION POST-OPERATIVE GUIDELINES

Post-Operative Phase 2: Weeks 9-12

PRECAUTIONS

- Avoid weaning off assistive device and CAM boot when excessive pain or compensatory movements persist
- Avoid forceful plantarflexion stretching

ASSESSMENT

- FADI
- NPRS
- Wound/scar status
- Edema
- Open and closed chain ankle/hallux AROM/PROM
- Palpation to identify pain generators/hypertonicity
- Ankle, mid-foot and MTP joint mobility
 - Distal tibiofibular (tib-fib), talocrural
 - Repair integrity
- Soft tissue extensibility
 - Hip flexors
 - Iliotibial band
 - Gastroc-Soleus complex
- Strength of LE
 - Peroneal muscles
 - Posterior tibialis
 - Proximal hip and thigh
 - Single leg stance (SLS) with assessment of foot tripod (calcaneus, 1st and 5th metatarsal heads) and short foot posture
- Functional activities
- Squats and stairs
- Gait quality FWB without assistive device
 - With and without CAM as indicated

TREATMENT RECOMMENDATIONS

- Scar mobilization, silicone strips, moisturizing when wound is healed
- Patient education on appropriate footwear
 - Consider supportive sneakers, foam padding, taping, ankle support orthosis
- Gait training weaning from CAM boot and assistive device
 - Encourage step through pattern
- Edema management
 - Compression garments
 - Patient education on edema management
- AAROM/AROM/PROM progressions
 - Half-kneel, step stretching, flat footed squat with knees over toes and UE support, squat on toes
 - Mobilization of 1st MTP, distal tib-fib, talocrural and subtalar joints
 - Progress lower extremity flexibility with emphasis on hip extension
 - Lunging with elastic band or strap for talocrural self-mobilization
 - Foam roller to proximal musculature
 - Maintain tensile integrity of repair i.e. keep it a little tight compared to opposite side
- Progress unilateral static and dynamic standing balance/proprioceptive exercises
- Strengthening
 - Proximal hip control
 - Progress from bilateral to unilateral standing exercises, e.g. heel raises with proper eccentric control
 - Progress to dynamic, closed chain proximal LE strengthening
 - Squats bilateral progressing to unilateral
 - Resisted lateral band walks
 - Lunges
 - Forward step up/down progression
 - Posterior chain
 - Medial/lateral ankle strengthening
 - Active against gravity
 - Isotonic
 - Manual/PRE resistance
 - Aquatic therapy
 - WB intrinsic training
- Dynamic stability and eccentric loading
 - Heel raises with theraband perturbation
 - Balance trainers

- Progress cardiovascular conditioning and gait
 - Elliptical (forward and backward)
 - Encourage gym program
 - Retro treadmill
 - Core progressions
 - Front planks
 - Side planks

CRITERIA FOR ADVANCEMENT

- Functional ankle/toe ROM to allow for symmetrical gait
- Community ambulation FWB without CAM boot and assistive device as appropriate
- Ascend/descend 6-inch steps reciprocally
- Manual muscle test grade of 5/5 for dorsiflexion, inversion, eversion, plantarflexion

EMPHASIZE

- Wean from crutches to cane/no assistive device and CAM boot to supportive shoe
- Functional single LE articulation in WB
- Stability with movement

MODIFICATIONS TO PHASE 2

- Lateral Reconstructions: Avoid forceful plantarflexion/inversion combined motions
- Deltoid Reconstructions: Avoid forceful eversion/excessive pronation

ANKLE LIGAMENT RECONSTRUCTION POST-OPERATIVE GUIDELINES

Post-Operative Phase 3: Weeks 13-18

PRECAUTIONS

- Avoid premature progression to impact activities e.g. running, jumping
- Avoid too much too soon with high intensity activities and drills

ASSESSMENT

- FADI
- NPRS
- Swelling
- Monitor joint mobility throughout the kinetic chain screening for potential distal effects on foot/ankle alignment i.e. hip version
 - Premorbid compensatory patterning
- Functional strength of LE
- Squats and stairs
- Dynamic SLS on various surfaces
- Single leg squat
- Star Excursion Test (see reference #2)

TREATMENT RECOMMENDATIONS

- Patient education on best activity specific footwear options
- Edema control with a bimalleolar compression device or other compression garments
- Progress gait efficiency and speed e.g. stride length, cadence, push off, trunk rotation
- AROM/PROM and mobilization focusing on persistent deficits
- Progress to loaded single leg closed chain activities
- Progress dynamic balance/proprioceptive exercises
 - E.g., cariocas, tandem walking, heel walking, toe walking, single leg balance with multidirectional and multisurface challenges
 - Challenge with reactive exercises
- Continue to progress functional strengthening
 - Maximize symmetrical movement patterns and encourage healthy compensatory patterns in adjacent joints as necessary
- Consider starting pre-impact training (e.g. aquatic/anti-gravity treadmill)
 - Eccentric strengthening and end range control
 - Functional lower extremity chain strengthening
 - Hiking, yoga, Pilates, light aerobic classes

CRITERIA FOR DISCHARGE OR ADVANCEMENT TO PHASE 4 RETURN TO SPORT/DYNAMIC ACTIVITIES (IF APPLICABLE)

- Full ankle and hallux ROM (ankle fracture may not achieve full sagittal plane ROM with syndesmotic screw; bunionectomy may not regain full hallux extension ROM)
- At least 90% heel rise strength compared to non-operative side
- SLS \geq 90% of contralateral side with minimal foot, hip or core strategies
- Ability to appropriately progress to loaded activities
- Independent management of residual symptoms
- Independent home exercise program

EMPHASIZE

- Symmetry and efficiency in gait cycle without assistive device
- Dynamic stability
- Maximizing ankle and hallux dorsiflexion and plantarflexion ROM
- Monitor for apprehension during activities

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Post-Operative Phase 4: Return to Sport/Dynamic Activities (Weeks 19+)

PRECAUTIONS

- Too much, too soon: monitor volume and load
- Avoid compensatory movement strategies
- Monitor movement strategies during fatigue situations
- Avoid inadequate rest and recovery
- Avoid inadequate strength to meet demands of activity level
- Ensure that underlying pathology is conducive to long term loading and will optimize joint preservation

ASSESSMENT

- FADI
- NPRS
- Effusion
- Dynamic single leg alignment and control
- Gait in various conditions
- Movement strategy (squat, forward step up 6-8"/step down 6-8", single leg squat)
- Effects of fatigue on movement patterns, quality and/or pain
- Functional strength: as above
- MMT
- PROM/Flexibility assessment
- Address ongoing efficacy of external supports (compression stockings, brace, rocker sneakers)

TREATMENT RECOMMENDATIONS

- Increase volume and plantarflexion load to mimic load necessary for return to activity
- Introduce movement patterns specific to patient's desired sport or activity
- Introduction of light agility work
 - Hopping patterns
- Increase cardiovascular load to match that of desired activity
 - Return to run progressions

- Consider collaboration with ATC, performance coach/strength and conditioning coach, skills coach and or personal trainer for complex sports specific movements if available
- Begin gentle passive dorsiflexion stretching at 6 months if less than 90% dorsiflexion of non-operative side

CRITERIA FOR DISCHARGE

- Ensure that there is a plan in place for a graded return to full or modified activity based on patient's maximal therapeutic activity (e.g., ATC, skills coach, CSCS)

EMPHASIZE

- Progression of pain free loading
- Eccentric gastrocnemius/soleus control
- Quality with functional activities

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References

- Byrne, C., Keene, D.J., Lamb, S.E. & Willett, K. (2017). Intrarater Reliability and Agreement of Linear Encoder Endurance Test Outcome Measures in Healthy Adults. *Journal of Electromyography and Kinesiology*, 36, 34-39.
- Gribble, P.A., Hertel, J. & Plisky, P. (2012). Using the Star Excursion Test to Assess Dynamic Postural-Control Deficits and Outcomes in Lower Extremity Injury: A Literature and Systematic Review. *Journal of Athletic Training*, 47(3), 339-357.
- Hebert-Losier, K., Wessman, C., Alricsson, M. & Svantesson, U. (2017). Updated Reliability and Normative Values for the Standing Heel-Rise Test in Healthy Adults. *Physiotherapy*, 103, 446-452.
- Hillegass, E., Puthoff, M. & Frese, E.M. (2016). Role of Physical therapists in the Management of Individuals at Risk for or Diagnosed With Venous Thromboembolism: Evidence-Based Clinical Practice Guidelines. *Journal of Physical Therapy*, 96(2), 143-166.
- Saxena, A., Granot, A. (2011). Use of an Anti-Gravity Treadmill in the Rehabilitation of the Operated Achilles Tendon: A Pilot Study. *The Journal of Foot & Ankle Surgery*, 50, 558-561.
- White, D.K., Tudor-Locke, C., Zhang, Y., Fielding, R., LaValley, M., Felson, D.T., Douglass Gross, K., Nevitt, M.C., Lewis, C.E., Torner, J. & Neogi, T. (2014). Daily Walking and the Risk of Incident Functional Limitation in Knee OA: An Observational Study. *Arthritis Care and Research*, 66(9), 1328-1336.

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