# ANKLE ACHILLES REPAIR POST-OPERATIVE GUIDELINES

The following Post-Operative Achilles Repair Guidelines were developed by HSS Rehabilitation. Progression is both criteria-based and patient specific. Phases and time frames are designed to give the clinician a general sense of progression and will be dependent on adequate soft tissue healing time. The program should balance the aspects of tissue healing and appropriate interventions to maximize function.

Patients are typically discharged from the hospital on the day of surgery. The ankle is placed in a splint in full plantarflexion for the first 2 weeks. At 2 weeks (Post-Operative Phase 2), the splint is removed, and patients are placed into a Controlled Ankle Movement (CAM) boot with heel wedges. Patients are encouraged to have one physical therapy session at 2 weeks for patient education and proximal hip and core strengthening. Patients are kept non-weight bearing (NWB) for 4 weeks. During this period, they are encouraged to elevate the leg and control swelling. Patients will begin a weight bearing progression with crutches and physical therapy at 4 weeks (see Appendix).

- If surgeon uses plantarflexion wedges, remove as per their recommendations.
- For patients with re-rupture repairs, comorbidities such as diabetes, osteoporosis or high body mass index (BMI), healing times and weight bearing (WB) progressions may be delayed.
- Monitor for repair tension, plantar fasciitis and metatarsal head pain.
- Consider removable external shoe lift for the non-operative limb.

**FOLLOW SURGEON MODIFICATIONS AS PRESCRIBED**

# ANKLE ACHILLES REPAIR POST-OPERATIVE GUIDELINES

## Post-Operative Phase 1: Weeks 0-2

### PRECAUTIONS

- Avoid placing the lower extremity (LE) in prolonged dependent position
- Non-removable splint must be kept dry at all times
- Contact surgeon if splint is feeling tight or toes are cold/numb

### ASSESSMENT

- Mental status (alert and oriented x 3)
- Numeric Pain Rating Scale (NPRS)
- Activity Measure for Post-Acute Care (AM-PAC)
- Dressing check
- Edema
- Post-anesthesia upper extremity (UE) and LE sensory motor screening
- Functional status: bed mobility, transfers, ambulation, stair mobility, if required

### TREATMENT RECOMMENDATIONS

- Patient education
    - Pain control
    - Maintain NWB status
    - LE must be elevated on at least two pillows 80%-90% of the time (follow surgeon instructions)
    - Walking is for functional home mobility and short distances only – wheelchair or knee scooter should be used for longer distances
- Transfer training: in and out of bed and sit to stand (e.g. chair, toilet)
- Gait training with appropriate assistive device on level surfaces while maintaining NWB status
- Stair training if required NWB with crutch and rail or seated bump-up method
- Activities of daily living (ADL) training and home modifications
- Promotion of knee extension while elevated
- Therapeutic exercise with focus on maintaining non-operative LE and bilateral UE motion, flexibility, and strength

**CRITERIA FOR ADVANCEMENT**

- Understanding of elevation protocol and other precautions
- Pain controlled
- Safe ambulation/stair negotiation with NWB and appropriate device on level surfaces independently or with assistance of family member/friend if consistently present at home
- Independent with transfers
- Discharge home within 1-2 days when goals have been achieved and with surgeon clearance
- Note that acute care phase 1 protocol is maintained until follow-up with surgeon

**EMPHASIZE**

- Edema control
- Elevation protocol
- Independent transfers
- Gait training NWB
- Safe stair mobility, if required

# ANKLE ACHILLES REPAIR POST-OPERATIVE GUIDELINES

## Post-Operative Phase 2: Single Visit Home Exercise Program (HEP) (Weeks 3-4)

### PRECAUTIONS

- Maintain NWB status
- Avoid placing the LE in prolonged dependent position
- No active or passive dorsiflexion (DF) stretching

### ASSESSMENT

- Foot Ankle Disability Index (FADI)
- NPRS
- Weight bearing status
- Wound status
- Edema
- Screen for deep vein thrombosis
- Sensory screening
- Achilles tendon resting angle[7]
- UE and LE sensory motor screening
- Functional status: bed mobility, transfers, ambulation, stair mobility, if required

### TREATMENT RECOMMENDATIONS

- Patient education
    - One-time physical therapy home exercise program (HEP) visit
    - Skin care education: wound care and infection prevention
    - Edema management: maintain 80% elevation schedule
- Active range of motion (AROM): full plantarflexion (PF) and DF to neutral
- Initiate weight bearing progression as tolerated (see Appendix)
- No stretching of the Achilles tendon
- Proximal hip and core strength
    - Abdominal exercises
        - Supine and quadruped
    - 3-way straight leg raise emphasizing gluteal strengthening
    - Clamshells at 45 degrees and 0 degrees hip flexion with abdominal control
    - Emphasize hip extension strengthening
    - Consider blood flow restriction (BFR) training with surgeon clearance
- Upper body conditioning program

**CRITERIA FOR ADVANCEMENT**

- Patient understands repair protection recommendations (no weight-bearing, no stretching)
- Edema well controlled
- Independent with core and hip stability program

**EMPHASIZE**

- Proximal hip strengthening
- Edema control
- Elevation protocol
- Independent transfers
- Gait training NWB
- Safe stair mobility, if required
- Avoid stress on the tendon during any exercises

# ANKLE ACHILLES REPAIR POST-OPERATIVE GUIDELINES

## Post-Operative Phase 3: Weeks 5-8, Tendon transfer typically delayed until week 6

**PRECAUTIONS**

- Avoid passive overpressure or stretching into ankle DF
- No maximal plantarflexion strength testing

**ASSESSMENT**

- FADI
- NPRS
- Weight bearing status
- Wound/scar status
- Edema
- Screen for deep vein thrombosis
- Sensory screen
- Achilles tendon resting angle[7]
- Palpation of repair and scars
    - Scar adhesions
- LE AROM/passive range of motion (PROM)
    - Ankle inversion/eversion
    - Ankle plantarflexion
    - Ankle dorsiflexion: AROM only
    - Hallux mobility
    - Hip extension/rotation
- Ankle joint mobility
    - Talocrural in open packed position
    - Distal tibiofibular joint
    - Subtalar joint
- Foot joint mobility
    - 1st metatarsal phalangeal (MTP) joint mobility
    - Lesser digits
- Soft tissue extensibility
    - Hamstrings
    - Hip Flexor/Quadriceps
    - Soleus
    - Flexor hallucis longus (FHL) and Achilles tendon
    - Long toe extensors
    - Plantar fascia

- Manual muscle testing (MMT) focusing on ankles and hips
- Gait and stair training partial WB with crutches

**TREATMENT RECOMMENDATIONS**

- Progress weight bearing as tolerated (see Appendix)
- Reduce/remove heel wedges according to surgeon preference
    - If active DF past opposite limb, consider slowing progressing and retaining wedges and boot longer than recommended (contact surgeon)
- Adjust crutch height if necessary, to accommodate CAM boot height with external shoe lift
- Edema control
    - Compression stocking 20-30 mmHg, closed toe, knee length when wound is closed
- Desensitization
    - Progressive touch/stroking of the foot and ankle
    - Ball massage on sole of foot
    - When incisions are fully healed, consider contrast baths
- Scar mobilization, silicone strips, moisturizing when wound is healed
- Bend the repair to limit peri and intra-tendinous hardening/scarring
- Seated and closed chain motion
    - Ankle and toe AROM/PROM
    - Seated ankle inversion/eversion
    - Toe articulation
        - Seated heel raises – emphasize rolling through hallux
    - Intrinsics
        - Marble toe pick ups
        - Short-foot strengthening/Arching doming (seated to standing)
- Joint mobilizations
    - Talocrural and tibiofibular joints
    - 1st MTP dorsiflexion
    - Subtalar joint inversion/eversion
- Stretch and release FHL
- Progressive gait and stair training
- Progress to standing flexibility exercises respecting WB status
    - Progress toe articulation through hallux (push off motion)
    - Bilateral mini squats when 50% WB
- Progress hip flexibility with emphasis on extension
- Initiate balance/proprioception exercise training respecting WB status
    - Multidirectional wobble board
        - Bilateral stance on a cushion shod/unshod
    - Weight shifting (use scale to assess load)
    - Tandem stance when 75% WB

- Strengthening
    - Proximal LE
    - Bilateral heel raise progression: seated, seated with load, leg press, standing with upper body support
    - Band-resisted inversion, eversion
        - Begin in knee flexion, progress towards knee extension
    - Hip extension in standing
    - Consider BFR training with surgeon clearance
- Stationary bicycle when 50% WB
- Aquatic exercise if accessible when incision healed and cleared by surgeon

**CRITERIA FOR ADVANCEMENT**

- Stable/controlled edema
- Wound closure
- Symmetrical bilateral heel raises either full weight bearing (FWB) or PWB
- FWB in CAM boot, no wedges, with or without assistive device
- DF to neutral

**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
- Continuous monitoring of edema

# ANKLE ACHILLES REPAIR POST-OPERATIVE GUIDELINES

## Post-Operative Phase 4: Weeks 9-12

### PRECAUTIONS

- Avoid weaning off assistive device and CAM boot too early
- No passive DF 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
- Achilles tendon resting angle[7]
- Functional strength of LE
- Squats and stairs
- Single leg stance (SLS) with assessment of foot tripod (calcaneus, 1st and 5th metatarsal heads)
- Gait quality FWB without assistive device
    - With and without CAM boot, as indicated

### TREATMENT RECOMMENDATIONS

- Patient education:
    - Appropriate footwear
        - If difficulty with rollover/push off phase of gait consider supportive sneakers, foam padding, heel lift, taping, rocker bottom shoe
    - Edema management
    - Compression garments
- Gait training weaning from CAM boot and assistive device
    - Encourage step through pattern
    - Emphasize push-off at terminal stance
- Edema management
- Scar mobilization, silicone strips, moisturizing when wound is healed

- AROM/PROM and mobilizations of ankle and toes
    - Flat footed squat with knees over toes and UE support
    - Mobilization of 1st MTP, distal tibiofibular, talocrural and subtalar joints
    - Lunging with resistance band or strap for talocrural self-mobilization
    - Foam roller to anterior tibialis, calves and distal tibiofibular joint
- Strengthening
    - Progress plantar flexor strengthening
        - Bilateral plantarflexion
            - Leg press; standing leaning on elbows, fully upright
        - Heel raises with proper eccentric control
            - Two up/one down
        - Unilateral exercises
            - Leg press, standing leaning on elbows, fully upright as tolerated
    - Core strengthening
        - Front and side planks
    - Progress to dynamic, closed chain proximal LE strengthening
        - Squats, gluteus medius band exercises, leg press, hip extension
- Forward step up/down and lateral step-up progressions
- Balance/proprioceptive exercises: progress unilateral static and dynamic standing
    - Unstable surfaces (e.g., foam, rocker board)
    - Single leg activities with attention to equal weight bearing on 3 points of foot tripod
        - Windmills, lawnmowers
- Progress cardiovascular conditioning
    - Encourage gym program
    - Retro treadmill
    - Swimming: avoid pushing off the wall during turns
- If pain or gait deviations are persistent, consider aquatic exercises or antigravity treadmill (if available)

**CRITERIA FOR ADVANCEMENT**

- Functional ankle/toe ROM to allow for symmetrical gait
    - DF to 75% of non-operative side
    - Full MTP joint mobility
- Community ambulation FWB without CAM boot and assistive device, as appropriate
- Ascend 6-inch steps reciprocally
- SLS without Trendelenburg
- Ability to perform symmetrical bilateral heel raises
    - Ability to perform eccentric heel raise 10x

**EMPHASIZE**

- Wean from crutches to cane/no assistive device and CAM boot to supportive shoe
- Functional single LE articulation in weight bearing
- Plantarflexion strength through full ROM prior to progressing load
- Talocrural joint mobility
- Hip abductor/extensor strengthening

# ANKLE ACHILLES REPAIR POST-OPERATIVE GUIDELINES

## Post-Operative Phase 5: Weeks 13-23

### PRECAUTIONS

- Avoid premature progression to impact activities (e.g., running, jumping)

### ASSESSMENT

- FADI
- NPRS
- Edema
- Open and closed chain ankle/hallux AROM/PROM
- Ankle, mid-foot, and MTP joint mobility
- Kinetic chain and potential distal effects on foot/ankle alignment (i.e., hip version)
    - Premorbid compensatory patterning
- Functional strength of LE
- Manual muscle test (MMT)/Dynamometry of LE
- Single heel raise work (height x reps) within 80% of unaffected limb
- Squats and stair descent
- SLS with assessment of foot tripod
- Gait quality FWB without assistive device
- Star Excursion Test[2]

### TREATMENT RECOMMENDATIONS

- Patient education on alternative footwear options
- Edema control with ankle compression garment, as needed
- Maximize gait symmetry, efficiency, and speed (e.g., stride length, cadence, push off, trunk rotation)
- AROM/PROM and mobilization focusing on persistent deficits
    - Sitting on dorsum of feet for plantarflexion ROM
    - Progress lower extremity flexibility with emphasis on hip extension
- Forward step-down progression
- Progress single leg closed chain activities (e.g., single leg squat, loaded forward lunge)
- Balance/proprioception: progress dynamic, loaded exercises
    - E.g., cariocas, tandem walking, heel walking, toe walking, single leg balance with multidirectional challenges
    - Progress to unstable surfaces and perturbations

- Functional strengthening: continue to progress
    - Maximize symmetrical movement patterns and encourage healthy compensatory patterns in adjacent joints as necessary
- Consider starting pre-impact training (i.e., aquatic, elliptical, anti-gravity treadmill)
    - Eccentric strengthening and control
        - End range control
        - 3-point heel lowering exercise
    - Functional LE chain strengthening
    - Hiking, yoga, Pilates, light aerobic classes

**CRITERIA FOR DISCHARGE OR ADVANCEMENT TO RETURN TO DYNAMIC ACTIVITIES/SPORT**

- Ankle DF ROM within 10% of uninvolved side
- SLS ≥ 90% of uninvolved side with minimal foot, hip or core strategies
- Descend 8-inch steps reciprocally
- MMT 5/5 of all muscle groups
    - At least 80% closed chain, heel raise work (height x reps) compared to contralateral side for advancement to higher impact activities
- Ability to appropriately progress to loaded activities
- Independent management of residual symptoms
- Independent gym program
- Progress to sport specific training as indicated

**EMPHASIZE**

- Symmetry and efficiency in gait cycle without assistive device
- Dynamic stability
- Maximizing ankle and hallux dorsiflexion and plantarflexion ROM

# ANKLE ACHILLES REPAIR POST-OPERATIVE GUIDELINES

## Post-Operative Phase 6: Return to Dynamic Activities/Sport (Week 24+)

### PRECAUTIONS

- Avoid 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
    - Heel Raise Work (height x reps) compared to contralateral side
- MMT/Dynamometry of LE
- PROM/Flexibility assessment
- Address ongoing efficacy of external supports (e.g., compression stockings, brace, rocker sneakers)

### TREATMENT RECOMMENDATIONS

- Begin gentle passive DF stretching if less than 90% DF of non-operative side
- Increase volume and PF load to mimic load necessary for return to activity
    - At least 80% closed chain, heel raise work (height x reps) compared to contralateral side to return to running
    - Consider strengthening from more lengthened positions with varying speeds
- Increase cardiovascular load to match that of desired activity
    - Return to run progressions

- Introduce movement patterns specific to patient's desired sport or activity
    - At least 90% closed chain, heel raise work (height x reps) compared to contralateral side and initiation of running progression to return to agilities
    - Agility progressions
    - Jumping patterns
    - Hopping patterns
- Consider collaboration with certified athletic trainer (ATC), performance coach/strength and conditioning coach (CSCS), skills coach and or personal trainer for complex sports specific movements, if available

**CRITERIA FOR DISCHARGE OR ADVANCEMENT TO RETURN TO SPORT**

- 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 and soleus control
- Quality with functional activities

# ANKLE ACHILLES REPAIR EARLY WEIGHT BEARING POST-OPERATIVE GUIDELINES

## Appendix 1:

**Weight bearing**:
Use the following weight bearing progression unless otherwise directed by surgeon with walker/crutches and CAM boot.

Post-op Week 4: 25% body weight with walker/crutches and CAM boot
Post-op Week 5: 50% body weight with walker/crutches and CAM boot
Post-op Week 6: 75% body weight with walker/crutches and CAM boot
Post-op Week 7: 100% body weight, wean off assistive device as indicated with CAM boot
Post-op Week 8: Transition out of CAM boot utilizing appropriate assistive device as necessary to avoid limp

**Wedges:**
Reduce/remove heel wedges according to surgeon preference

- If active DF past opposite limb, consider slowing progressing and retaining wedges and boot longer than recommended (contact surgeon)

## Appendix 2:

Single leg heel raise normative values by age and sex[3]

| Age | Male | Female |
|---|---|---|
| 20-29 | 37 | 30 |
| 30-39 | 32 | 27 |
| 40-49 | 28 | 24 |
| 50-59 | 23 | 21 |
| 60-69 | 19 | 19 |
| 70-79 | 14 | 16 |
| 80-89 | 10 | 13 |

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