Healthy Driven
Edward-Elmhurst
MEDICAL GROUPS

Orthopedics

ACHILLES REPAIR GUIDELINES

The following Post-Operative Achilles Repair Guidelines were developed by Hospital for Special Surgery's 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.

- Partial weight bearing (PWB) progression increases approximately 25% per week unless there are specific MD requests.
- If surgeon uses plantarflexion wedges, remove as per their recommendations.
- For patients with comorbidities such as diabetes, osteoporosis or high Body Mass Index (BMI), healing times and weight bearing (WB) progressions may be delayed.
- Monitor for plantar fasciitis and metatarsal head pain.
- Consider removable external shoe lift for the non-operative limb.

Typically, patients are discharged from the hospital on the day of surgery. The ankle is placed in a splint in full plantar flexion for the first 2 weeks. At 2 weeks (Post-Operative Phase 2), the splint is removed and they 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 toe touch weight bearing (TTWB) for 4 weeks. During this period, they are encouraged to elevate the leg and control swelling. Patients will begin weight bearing as tolerated (WBAT) with crutches and physical therapy at 4 weeks.

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ACHILLES REPAIR GUIDELINES

Post-Operative Phase 1: Weeks 0-2

PRECAUTIONS	▪ Maintain NWB status ▪ Avoid having lower extremity (LE) in prolonged dependent position ▪ LE must be elevated on at least two pillows for 80%-90% of the time (follow MD instructions) ▪ Keep knee extended when resting- pillows should be placed from calf down ▪ Walking is for functional home mobility and short distances only- wheelchair or knee scooter should be used for longer distances ▪ Non-removable splint must be kept dry at all times
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 lower extremity sensory motor screening ▪ Functional status: bed mobility, transfers, ambulation, stair mobility if required
TREATMENT RECOMMENDATIONS	▪ Pain control education ▪ Transfer training: in and out of bed and sit to stand- chair, toilet ▪ Gait training with appropriate device on level surfaces while maintaining NWB status ▪ Stair training if required NWB with crutch and rail or seated bump up method ▪ ADL training and home modifications ▪ Cryotherapy for pain control over soft portion of splint and/or proximally ▪ Elevation of LE to prevent swelling (educate patient in “toes above nose”) ▪ Promotion of knee extension while elevated ▪ Therapeutic exercise with focus on maintaining non-operative LE and bilateral UE motion, flexibility and strength ▪ Active range of motion, self-mobilization (with MD approval)
CRITERIA FOR ADVANCEMENT	▪ Understanding of elevation protocol and other precautions ▪ Good pain control ▪ 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 MD clearance ▪ Note that acute care phase 1 protocol is maintained until follow up with MD
EMPHASIZE	▪ Control swelling ▪ Elevation protocol ▪ Independent transfers ▪ Gait training NWB ▪ Safe stair mobility if required

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Post-Operative Phase 2: (Weeks 2-4)

PRECAUTIONS	▪ Maintain TTWB status, 30 degree heel wedge ▪ Avoid having LE in prolonged dependent position ▪ No active or passive dorsiflexion (DF) stretching
ASSESSMENT	▪ Foot Ankle Disability Index (FADI) ▪ NPRS ▪ Wound status ▪ Edema ▪ Screen for deep vein thrombosis ▪ Sensory screening ▪ Resting Achilles tension ▪ TTWB gait and stair ambulation patterns

TREATMENT RECOMMENDATIONS	▪ One-time physical therapy home exercise program (HEP) visit
	  ○ Patient education
	▪ Active range of motion, self-mobilization (with MD approval)
	▪ Maintain weight bearing precautions
	▪ Swelling management: maintain 80% elevation schedule
	▪ No stretching of the Achilles tendon
	▪ Skin care education: wound care and infection prevention
	▪ Adjust crutch height if necessary to accommodate CAM height
	▪ Proximal hip and core strength
	  ○ Abdominal exercises
	    ▪ Supine and quadruped
	  ○ 3 way straight leg raise (no forward flexion)
	  ○ Clamshells x 2 with abdominal control
	  ○ Emphasize hip extension strengthening
	▪ Upper body conditioning program
	
	Begin Blood Flow Restriction (BFR) Therapy

CRITERIA FOR ADVANCEMENT	▪ Patient understands repair protection recommendations (Toe Touch weight-bearing, no stretching) ▪ Edema well controlled ▪ Independent with core and hip stability program
EMPHASIZE	▪ Proximal hip strengthening ▪ Control swelling ▪ Elevation protocol ▪ Independent transfers ▪ Gait training TTWB ▪ Safe stair mobility if required ▪ No stress on the tendon during any exercises

ACHILLES REPAIR GUIDELINES

Post-Operative Phase 3: Weeks 5-8

PRECAUTIONS	▪ Avoid passive overpressure or stretching into ankle dorsiflexion (DF) ▪ No maximal plantarflexion strength testing ▪ WBAT with 15 degree heel wedge
ASSESSMENT	▪ FADI ▪ NPRS ▪ Wound/scar status ▪ Edema ▪ Screen for deep vein thrombosis ▪ Sensory screen ▪ Resting Achilles tension ▪ LE AROM/PROM o Inversion/eversion o Plantarflexion o Dorsiflexion: active only o Hallux mobility o Hip extension/rotation o Hamstrings ▪ Ankle joint mobility o Talocrural o Distal tibiofibular joint o Subtalar joint ▪ Foot joint mobility o 1st metatarsal phalangeal (MTP) joint mobility o Lesser digits ▪ Soft tissue extensibility o Flexor hallucis longus (FHL) and Achilles tendon o Long toe extensors o Soleus o Plantar fascia ▪ Strength- manual muscle testing (MMT) focusing on ankles and hips ▪ Palpation of repair and scars o Scar adhesions ▪ Gait and stair training PWB with crutches
TREATMENT RECOMMENDATIONS	▪ Reduce wedges according to schedule o If active DF past opposite limb, consider slowing progressing and retaining wedges and boot longer than recommended (contact MD) ▪ Edema control o Compression stocking 20-30 mmHg, closed toe, knee length when wound is closed

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ACHILLES REPAIR GUIDELINES

Post-Operative Phase 3: Weeks 5-8 (continued)

TREATMENT RECOMMENDATIONS (continued)

- Desensitization
  - Progressive touch/stroking of the foot
  - 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
- Focus on seated and closed chain motion
  - Ankle and toe AROM/PROM
  - Seated inversion/eversion
  - Toe articulation
    - Seated heel raise- emphasize rolling through hallux
  - Intrinsics
    - Marble pick ups
- Arching/doming progressing from 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
  - Hip extension in standing
- Bike when 50% WB
- Aquatic exercise if accessible when incision healed and cleared by MD

CRITERIA FOR ADVANCEMENT

- Stable/controlled swelling
- Wound closure
- Bilateral standing heel raises
- Full weight bearing (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 swelling

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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 ▪ Resting Achilles tension ▪ Functional strength of LE ▪ Squats and stairs ▪ Single leg stance (SLS) with assessment of foot tripod (calcaneus, 1st and 5th metatarsal heads) ▪ Gait quality full weight bearing (FWB) without assistive device o With and without CAM as indicated
TREATMENT RECOMMENDATIONS	▪ Gait training weaning from CAM boot and assistive device o Encourage step through pattern o Emphasize push-off at terminal stance ▪ Patient education on appropriate footwear o Consider supportive sneakers, foam padding, heel lift, taping, rocker bottom shoe if difficulty with rollover/push off phase of gait ▪ Edema management o Compression garments o Patient education on edema management ▪ Scar mobilization, silicone strips, moisturizing when wound is healed ▪ Forward step up/down and lateral step up progressions ▪ AROM/PROM and mobilizations of ankle and toes o Flat footed squat with knees over toes and UE support o Mobilization of 1st MTP, distal tibiofibular, talocrural and subtalar joints o Lunging with elastic band or strap for talocrural self-mobilization o Foam roller to anterior tibialis, calves and distal tibiofibular joint ▪ Progress unilateral static and dynamic standing balance/proprioceptive exercises o Unstable surfaces e.g. foam, rocker board o Single leg activities with attention to equal weight bearing on 3 points of foot tripod ▪ Windmills, lawnmowers

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ACHILLES REPAIR GUIDELINES

Post-Operative Phase 4: Weeks 9-12 (continued)

TREATMENT RECOMMENDATIONS (continued)	▪ Strengthening
	  ○ Progress plantar flexor strengthening
	    ▪ Bilateral plantarflexion
	      ▪ Leg press or 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
	▪ 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)
	
	Continue Blood Flow Restriction (BFR) Therapy

CRITERIA FOR ADVANCEMENT	▪ Functional ankle/toe ROM to allow for symmetrical gait
	  ○ Dorsiflexion 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
	▪ Single leg stance without Trendelenburg
	▪ Ability to perform symmetrical bilateral heel raises

EMPHASIZE	▪ Wean from crutches to cane/no assistive device and CAM boot to supportive shoe ▪ Functional single LE articulation in weight bearing ▪ Plantar flexion strength through full range of motion prior to progressing load ▪ Talocrural joint mobility ▪ Hip abductor/extensor strengthening

ACHILLES REPAIR GUIDELINES

Post-Operative Phase 5: Weeks 13-20

<table>
<tr><td>PRECAUTIONS</td><td>
▪ Avoid premature progression to impact activities, e.g., running, jumping
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<tr><td>ASSESSMENT</td><td>
▪ 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
▪ Squats and stairs
▪ Single leg stance (SLS) with assessment of foot tripod
▪ Gait quality FWB without assistive device
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<tr><td>TREATMENT RECOMMENDATIONS</td><td>
▪ 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
▪ Forward step down progression
▪ AROM/PROM and mobilization focusing on persistent deficits
  ○ Sitting on dorsum of feet for PF ROM
  ○ Progress lower extremity flexibility with emphasis on hip extension
▪ Progress single leg closed chain activities, e.g. single leg squat, loaded forward lunge
▪ Progress dynamic balance/proprioceptive and loading exercises
  ○ E.g. cariocas, tandem walking, heel walking, toe walking, single leg balance with multidirectional challenges
  ○ Progress to unstable surfaces and perturbations
▪ Continue to progress functional strengthening
  ○ Maximize symmetrical movement patterns and encourage healthy compensatory patterns in adjacent joints as necessary
▪ Consider starting pre-impact training (i.e. aquatic/anti-gravity treadmill)
  ○ Eccentric strengthening and control
    ▪ End range control
    ▪ 3-point heel lowering exercise
  ○ Functional lower extremity chain strengthening
  ○ Hiking, yoga, Pilates, light aerobic classes
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<tr><td>CRITERIA FOR DISCHARGE OR ADVANCEMENT TO RETURN TO SPORT</td><td>
▪ Ankle DF within 10% of uninvolved side
▪ SLS ≥ 90% of uninvolved side with minimal foot, hip or core strategies
▪ 5/5 strength of all muscle groups
  ○ At least 90% closed chain, heel raise strength compared to contralateral side
▪ Ability to appropriately progress to loaded activities
▪ Independent management of residual symptoms
▪ Independent gym program
▪ Progress to sport specific training as indicated
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<tr><td>EMPHASIZE</td><td>
▪ Symmetry and efficiency in gait cycle without assistive device
▪ Dynamic stability
▪ Maximizing ankle and hallux dorsiflexion and plantarflexion ROM
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Post-Operative Phase 6: Return to Sport/Dynamic Activities (Week 21+)

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 PF 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 　o Hopping patterns ▪ Increase cardiovascular load to match that of desired activity 　o 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% DF of non- op 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 gastroc/soleus control ▪ Quality with functional activities