ORTHOPEDICS & SPORTS MEDICINE
BAYCARE CLINIC

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Mid-Substance Achilles Tendon Repair (Arthrex Speedbridge System)

Phase 1- Early Protective Phase (Days 1-14)

Goals for Phase 1

- Protect surgical wound
- Gain patient comfort
- Protection of surgical repair
- Reinstate optimal gait pattern
- Achieve active ankle dorsiflexion to neutral/plantar grade
- Maintain quads and hamstrings strength
- Maintain hip/pelvis and trunk control and stability

Guidelines/Restrictions

- Wound protection and infection control are key in this phase – due to limited vascularity and the use of a boot excessive movement and loading should be avoided to prevent a hot/humid environment
- Rest and elevate foot/ankle when possible
- Keep walking duration short and only as required
- Come out of boot only in a controlled environment to perform gentle ROM exercises
- No passive ankle stretching
- No toe stance, running, jumping

Criteria for Progression to Phase 2

- Wound is clean and dry with no infection
- Able to walk without crutches in boot
- Pain is reducing

Typically, the Speedbridge allows for early mobilization into slight Achilles tendon stress however pain and wound protection are the key limiting factors in this phase.

Key Focus

- Facilitate wound healing and minimize infection risk

Brace

- Use of boot with ~1.5 cm heel raise inserted
- Can come out of boot to allow NWB gentle active ROM within patient comfort

Weight Bearing

- Partial weight bearing according to comfort
- Crutches if required for comfort and gait normalization
- Reduce crutches in stages depending on pain and gait pattern

PROM

- NO passive dorsiflexion stretching

AROM

- Active open chain ankle ROM in all directions within comfortable range
- Non-weight bearing active dorsiflexion can be commenced and limited by patient comfort, however, check if there is a 'safe zone' advised by the surgeon and this is normally not beyond neutral

Manual Therapy

- AP talus passive translation mobilization
- Subtalar passive mobilization
- 1st ray/MTP passive motion

Strengthening

- Isometric ankle plantarflexion (straight and bent knee), dorsiflexion, inversion, and eversion in neutral as tolerated (can be done within the boot)
- Foot intrinsic muscle strengthening (towel scrunches)
- Open chain quadriceps strengthening (with or without added resistance)
- Hamstring strengthening (resistance band, seated hamstring curl, can consider Nordics as long as the ankle can be sufficiently protected in the boot)
- Non-weight bearing hip and core control/strengthening

Cardiovascular

- Consider hand bike

Phase 2 – Early Post-Op (Not to begin before week 2)

Goals for Phase 2

- Minimal pain
- Commence isometric plantar flexion
- Maintain ankle ROM within phase limits
- Maintain lower limb, core, and cardiovascular conditioning

Guidelines/Restrictions

- Rest and elevate as much as possible
- Can walk without use of crutches as long as gait pattern is uncompensated
- Walking should be limited to a maximum of 15-20 minutes continuously and up to a maximum of twice per day according to symptoms.
- Come out of boot only in controlled environment to perform rehabilitation exercises
- No passive ankle dorsiflexion stretching
- No toe stance, running, jumping

Criteria for Progression to Phase 3

- Completing full rehabilitation exercises from Phase 2 competently and without pain

Key Focus

- Commence standing closed chain strength work in boot and early static standing without boot

Brace

- Removed only in a controlled environment to perform rehabilitation exercises

Weight Bearing

- Full weight bearing in boot

PROM

- No passive ankle dorsiflexion

AROM

- Full active, non-weight bearing plantarflexion, inversion and eversion
- Active dorsiflexion to patient limits

Manual Therapy

- Continue with passive mobilization and soft tissue release as indicated (avoiding surgical repair site)
- Maintain 1st ray/MTP ROM/mobility

Strengthening

- Maintain previous phase
- Maintain isometric ankle plantar flexion – can be done out of boot
- Begin band resisted ankle isotonic dorsiflexion, inversion, and eversion
- Begin wall slides with boot on
- Supine glute bridges if patient can comfortably complete without the boot
- Core/trunk conditioning can include lower limb loading as tolerated

Proprioception

- Consider narrow base static standing on two feet without boot but within training shoes with eyes open and closed (controlled environment)
- No arm movement
- Keep work ratio short and ensure patient has plenty of rest time, consider duration of standing time

Cardiovascular

- Hand bike
- Consider static bike with boot on
- Consider pool based aqua jogging assuming the sutures/clips are removed and wound has healed satisfactorily

Phase 3 - Early Functional (Not before week 4)

Goals for Phase 3

- Achieve active dorsiflexion to plantargrade
- Develop early isotonic plantar flexion strength
- Progress static balance/proprioception

Guidelines/Restrictions

- Ensure symmetrical patterning on wall squat
- Monitor pain and effusion levels in response to introduction of new activities
- Walking should be limited to a maximum of 15-20 minutes continuously and up to a maximum of three times per day according to symptoms
- Come out of boot for short duration gait practice only in a controlled environment
- Wear boot when outdoors or spending more time on feet
- Can begin driving as comfort allows
- No toe stance, running, jumping

Criteria for Progression to Phase 4

- Active ankle dorsiflexion to plantar grade
- Completing full rehabilitation exercises from Phase 3 competently and without pain

Key Focus

- Develop sufficient dorsiflexion range and plantar flexion strength to facilitate graduated removal of boot

Brace

- Full weight bearing in boot
- Wear boot when outside or spending more time on feet

Weight Bearing

- Full weight bearing in boot
- Consider short periods walking out of the boot as symptoms allow

ROM

- Limit active dorsiflexion by patient comfort
- Gentle passive dorsiflexion stretching may be applied if the patient is struggling to reach neutral actively

Manual Therapy

- Continue manual therapy from Phase 2 as needed

Strengthening

- Maintain previous phase
- Develop band resisted ankle isotonic dorsiflexion, inversion, and eversion
- Introduce band resisted ankle plantar flexion not going beyond neutral – straight and bent knee
- Introduce wall squats without boot
- Consider single leg glute bridges without boot
- Gait practice in controlled environment without boot

Proprioception

- Narrow base static standing on two feet without boot with eyes closed and arm movements
- Wide base static standing on two feet on unstable base (i.e. balance pad/cushion)
- Consider single leg static standing with eyes closed (no arm movements)

Cardiovascular

- Static bike with boot on
- Aqua jogging

Phase 4 – Mid Functional (Not before week 6)

Goals for Phase 4

- Min 10° dorsiflexion AROM
- Double leg calf raises from floor – achieves 20 full range plantarflexion
- FADI >75%
- Reciprocal and symmetrical stair pattern

Guidelines/Restrictions

- Ensure symmetrical pattern on calf raises and squat activities
- Patients may experience some discomfort at the posterior calcaneus at the site of surgical swivel lock fixation – monitor this and consider limiting calf raise volume
- Monitor walking duration and irritability as patient transitions out of the boot
- No jumping or running

Criteria for Progression to Phase 5

- Ankle dorsiflexion to 10°
- Complete full rehabilitation exercises from Phase 4 competently and without pain
- FADI >75%
- Achieves 20 full range double leg calf raises

Brace

- Mostly phasing out of boot – may use for comfort as required or if patient is spending longer amounts of time on feet

Weight Bearing

- Full weight bearing

AROM

- Aim for 0-20° active dorsiflexion
- Begin closed chair ankle dorsiflexion mobilization up to 20°

Manual Therapy

- Passive stretching can be used gently to assist if ROM is limited

Strengthening

- Continue with band-resisted isotonic ankle strengthening if indicated
- Begin double leg gastric and soleus biased calf raises from the floor
- Progress squat activities and consider split squat and single leg squat progressions as able
- Begin small step-up work under control with goal to develop a good reciprocal pattern

Proprioception

- Single leg stance with arm movements +/- eyes closed on unstable base (balance pad/cushion)

Cardiovascular

- Static bike
- Aqua jogging
- Consider rowing machine

Phase 5 – Late Functional (Not before week 10)

Goals for Phase 5

- FADI >85%
- Normal gait pattern without boot
- Normal reciprocal stair pattern
- Single leg calf raises – achieves 20 full range over edge of step

Guidelines/Restrictions

- Patient to use "soreness rules" to guide rehab intensity and frequency
- Patient may experience some discomfort at the posterior calcaneus at the site of the surgical swivel lock fixation – monitor this and considering limiting calf raises over edge of step (to limit end range loading)
- Monitor kinetic chain ROM and control (i.e. ankle dorsiflexion range, knee flexion during loading and pelvic/hip control)
- You may wish to contain the volume of walking in the context of overall load

Criteria for Progression to Phase 6

- FADI >85%
- Achieves 20 full range single leg calf raises over edge of step
- Completing full rehabilitation exercises from Phase 5 competently and without pain

Brace

- None

Weight Bearing

- Full weight bearing

AROM

- Full in all directions
- Work on closed chain dorsiflexion

Manual Therapy

- Manual therapy as needed to facilitate full ROM

Strengthening

- Begin single leg gastrocnemius and soleus biase calf raises from the floor and then progressing to over a step (into dorsiflexion)
- Maintain/progress single leg squats
- Larger step work (i.e. step-up with kick)
- Begin forward lunge-based activities
- Develop lower limb and core strength as appropriate

Proprioception

- Single leg stance with arm movements +/- eyes closed on unstable base (balance pad/cushion)
- Side stepping, carioca, and other entry level agility exercises

Agility

- Side stepping, carioca, and other entry level agility exercises – begin at walking pace

Cardiovascular

- Static bike
- Aqua jogging
- Rowing machine
- Consider cross trainer as ankle function permits

Phase 6 – Transitional (Not before week 12)

Goals for Phase 6

- FADI >95%
- Vertical hop testing – able to achieve 20 single leg hops on the spot with equal height to unaffected side without pain or irritation
- Y-balance test – composite score >85% contralateral side

Guidelines/Restrictions

- Patient to use "soreness rules" to guide rehab intensity and frequency
- Monitor kinetic chain ROM and control (i.e. ankle dorsiflexion range, knee flexion during loading and pelvic/hip control) to prevent anterior knee overload

Criteria for Progression to Phase 7

- FADI >95%
- Y-Balance test – composite score >85% contralateral side
- Vertical hop testing – able to achieve 20 single leg with equal height to contralateral side

Brace

- None

Weight Bearing

- Full weight bearing

AROM

- Full in all directions

Strengthening

- Continue/progress single leg squats
- Continue/progress single leg calf raises on step
- Continue/progress multi-directional lunge work
- Progress closed chain loading (i.e. back squat load and depth, Olympic lifts etc. depending on patient population)
- Begin landing control exercises as indicated
- Continue/progress hamstring, bridge and trunk work

Proprioception

- Single leg stance with arm movements +/- eyes closed on unstable base (balance pad/cushion)
- Side stepping, carioca, and other entry level agility exercises

Agility

- Begin entry level plyometrics program if indicated
- Consider vertical, horizontal, and pivoting components of the person's ultimate functional goals
- Monitor ground impacts (starting at 80 reps per session)
- Agility circuits with multi-components – advance to reflect patient goals or sport specificity

Phase 7 – Sport Specific (Not before week 16)

Goals for Phase 7

- FADI >95%
- Y-balance test – composite score >95% contralateral side
- Hop testing (single, triple, x-hop, timed lateral, time forward 6m) >95%

Guidelines/Restrictions

- Patient to use "soreness rules" to guide rehab intensity and frequency
- Monitor kinetic chain ROM and control (i.e. ankle dorsiflexion range, knee flexion during loading and pelvic/hip control) to prevent anterior knee overload
- Patient must adequately demonstrate sport specific training and sport specific testing may be indicated to determine return to play readiness
- Generally, patients will not return to competitive sport before 16 weeks and may take considerably longer depending on the multitude of factors involved with their recovery, including the sport or activity they wish to return to
- The most important factors in determining readiness to return to play are the objective functional measures outlined and the patient's confidence in their abilities

AROM

- Full in all directions

Strengthening

- Continue/progress single leg squats
- Continue/progress single leg calf raises on step
- Continue/progress multi-directional lunge work
- Progress closed chain loading (i.e. back squat load and depth, Olympic lifts etc. depending on patient population)
- Progress landing control exercises (add plyometric components)
- Continue/progress hamstring, bridge and trunk work

Agility

- Add more advanced cutting/twisting/turning movements with progressive exposure to training drills. Start with few variables and progress towards open play.
- Agility circuits with multi-components – advance to reflect patient goals or sport specificity

This protocol was reviewed and updated by Jeremy Saller, MD, Nicole Herzog, PT, and Brittany Vickman, PT on 8/26/2024