



Rehabilitation Protocol:

Flatfoot Reconstruction

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◀ Overview

The breakdown of the arch of the foot is commonly referred to as “flatfoot.” The flatfoot deformity occurs slowly over several years and results in weakening of the foot intrinsic musculature and ligaments as well as contractures and imbalance of the calf musculature. Flatfoot reconstructive surgery is comprised of several surgical procedures that are designed to correct the misaligned foot. A preoperative assessment including clinical exam and radiographs is used to determine the combination of procedures required to correct the flatfoot deformity.

Surgical Procedures:

a. Flexor Tendon Transfer

In the flatfoot deformity the posterior tibial tendon (PTT) may have significant tendinopathy, an interstitial tear or be completely ruptured at the time of surgery. The Flexor Digitorum Longus tendon is used to either augment or replace the injured PTT. Approximately 10 to 12 weeks are required for the tendon to heal. Thus, passive range of motion (PROM) and strengthening exercises should be held until the third postoperative month.

b. Gastrocnemius Recession

An integral part of flatfoot reconstruction is releasing the contracture of the gastrocnemius, or calf, muscle. During the rehabilitation process, it is important to maintain gastrocnemius flexibility. Emphasis should be placed on maintaining the foot in a dorsiflexed position while immobilized and daily stretching of the Gastrocnemius/soleus complex once out of casting.

c. Posterior Calcaneal Osteotomy (medial slide)

The flatfoot deformity includes hindfoot valgus; a condition in which the calcaneus, or heel, is not centered under the foot, and must be repositioned. Bone healing occurs rapidly in this osteotomy but occasionally pain may be experienced from the screw heads during the initial transition to full weight bearing.

d. Anterior Calcaneal Osteotomy (lateral column lengthening)

A lateral column lengthening is performed typically to correct the forefoot abduction aspect of the deformity. By extending the length of the calcaneus at the location of the talonavicular joint, the talonavicular joint can be rotated from an abducted to neutral alignment. This procedure is utilized to address the plantar medial subluxation of the talus.

e. First Tarsometatarsal fusion and Navicular-Cuneiform fusion

The abduction deformity of the flatfoot contributes to shear strain on the medial column. This presents as a hallux valgus deformity as well as plantar gapping of the first tarsometatarsal and/or navicular-cuneiform joints. In this situation, fusion of the involved joints is required to stabilize the medial column to restore the medial longitudinal arch.

Complications:

Perioperative complications are primarily related to the incisions in the form of delayed wound closure, infection and bleeding. Swelling also limits range of motion (ROM) in the postoperative period and needs to be aggressively managed with frequent, daily elevation. Stiffness in the forefoot, midfoot and transverse tarsal joints is also common and ROM must be practiced frequently. Other possible complications include nonunion, hardware failure, nerve damage, deep vein thrombosis, pulmonary embolism, persistent pain, and recurrent flat foot deformity.

◀ Phase I Immobilization 0–4 Weeks

Goals

- Edema management
- Pain Control
- Ensure healing process
- Maintain safe NWB practices
- Maintain Hip and Knee ROM
- Maintain forefoot ROM
- Minimize atrophy
- Strengthen proximal and distal muscle groups

Precautions

- NWB in splint in dorsiflexion
- Self-monitor for skin breakdown and signs of infection (sensation, color, temperature changes)
- Affected extremity should not be in dependent position for >10 minutes

Weeks 0–2

Therapeutic Exercise

- Gait training for NWB with appropriate AD
- Strict elevation “toes to nose” 50 minutes of every hour
- Deep breathing
- Frequent weight shifts to prevent skin breakdown
- Hip and knee AROM
- Hip and knee stretching

Weeks 2-4

Therapeutic Exercise

- 4 way straight leg raises
- Long arc quads
- Lower extremity stretches (hamstring, hip flexors, quads, glutes, hip rotators)
- Pelvic and core stabilizing exercises
- Hip and knee strengthening
- Toe AROM
- 4 way ankle isometrics in cast
- Elevation

◀ Phase II – Progressive Weight bearing Phase Weeks 4 – 12

Goals

- Progression to FWB in boot
 - Allow 3-6 weeks
- Progression to FWB in supportive shoe and no AD
 - Allow additional 2 weeks
- Normal gait
- Increase ROM at ankle and foot
- Edema management
- Strengthen proximal and distal muscle groups

Precautions

- Progressive weight bearing in CAM boot
 - Begin weight bearing at 20 pounds and advance 20 pounds every 4 days
- NO PROM until Month 3
- Progress AROM eversion carefully to ensure healing

Weeks 4-12

Therapeutic Exercise

- Progressive weight shifting onto affected extremity
- Gait training in CAM with LRAD to no AD with proper pronation and supination
- Progress to supportive shoe
- Towel scrunches
- AROM to ankle and hindfoot all planes 3x/day for 10 minutes, holding end range for 10 seconds and performed bilaterally to mimic noninvolved ankle
- Forefoot towel scrunches
- Gentle Gastrocnemius stretching
- Gentle Soleus stretching
- Closed chain exercises
- Double limb proprioceptive exercises: on foam, ½ foam roller, BAPS board, rocker board, partial tandem/tandem stance, EO/EC
- Strengthen medial ankle and arch with foot doming exercises
- Scar mobilization
- Stationary bike in boot/shoe
- Core, upper and lower extremity strengthening
- Elevation
- Education on appropriate footwear and/or orthotic use to prevent hyperpronation

◀ Phase III : Functional Rehabilitation

Weeks 12 – 24+

Goals

- Increase balance and proprioception
- Normal ankle and foot mobility
- Full ankle strength
- Normal reciprocal stair negotiation
- Single limb heel raise with good mechanics achieved by 24th week
- Independent long term HEP
- Return to recreational activities
- Edema management

Precautions

- Use caution with combined resisted plantar flexion and inversion
- 10 minutes 2-3x/day is sufficient for single limb heel descents and raises
- Treadmill walking may begin once stair negotiation is normalized
- Full recovery may continue for up to 1 year postoperatively

Weeks 12-24+

Therapeutic Exercise

- Single limb stance activities
- AAROM and PROM to ankle and foot
- Resisted exercises using theraband
- Manual Therapy to increase ROM, decrease soft tissue restrictions
- Double limb heel raises
- Eccentric Gastrocnemius strengthening
- Single limb heel raises
- Biking with resistance
- Rowing
- Treadmill walking
- Plyometrics and agility drills if appropriate

ROM=range of motion , PROM=passive range of motion, AROM=active range of motion, NWB=non weight bearing, FWB=full weight bearing, AD=assistive device, CAM=controlled ankle motion, HEP=home exercise program, LRAD=least restrictive assistive device, EO=eyes open, EC=eyes closed, AAROM = active assisted range of motion

Rehabilitation Protocol for Flatfoot Reconstructive Surgery

Rehabilitation Guidelines: Summary Table

Post –op Phase/Goals		Therapeutic Exercise	Precautions
<p>Phase I: Immobilization 0 - 4 weeks after surgery</p> <p>Goals: Edema management Pain Control Ensure healing process Maintain safe NWB practices Maintain Hip and Knee ROM Maintain forefoot ROM Minimize atrophy Strengthen proximal and distal muscle groups</p>	<p>Weeks 0-2</p>	<ul style="list-style-type: none"> -NWB gait training -Strict Elevation “toes to nose” 50 minutes of every hour -Deep breathing -Frequent weight shifting in sitting or supine -Hip and knee AROM -Hip and knee stretching 	<ul style="list-style-type: none"> -NWB in splint in dorsiflexion -Self-monitor for skin breakdown and signs of infection -Affected extremity should not be in dependent position for >10 minutes
	<p>Weeks 2-4</p>	<ul style="list-style-type: none"> -4 way straight leg raises -Long arc quads -Lower extremity stretches (hamstring, hip flexors, quads, glutes, hip rotators) -Pelvic and core stabilizing exercises -Toe AROM -4 way ankle isometrics in cast -Elevation 	

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<p>Phase II: Progressive Weightbearing</p> <p>Goals: FWB in boot FWB in supportive shoe and no AD Normal gait Increase ROM at ankle and foot Edema management Strengthen proximal and distal muscle groups</p>	<p>Weeks 4 – 12</p>	<ul style="list-style-type: none"> -Progressive weight shifting onto affected extremity -Gait training in CAM with LRAD to no AD with proper pronation and supination -Progress to supportive shoe -Forefoot towel scrunches -AROM to ankle and hindfoot 3x/day for 10 minutes, holding endrange for 10 seconds and performed bilaterally to mimic noninvolved ankle -Gentle Gastrocnemius stretching -Gentle Soleus stretching -Closed chain exercises -Double limb proprioceptive exercises: on foam, ½ foam roller, -BAPS board, rocker board, partial tandem/tandem stance, EC -Foot doming to strengthen arch -Scar mobilization -Stationary bike in boot/shoe -Core, upper and lower extremity strengthening -Elevation -Education on appropriate footwear and/or orthotic use 	<ul style="list-style-type: none"> -Begin weight bearing at 20 pounds and advance 20 pounds every 4 days until FWB in a CAM boot -NO PROM until Month 3 -Progress AROM eversion carefully to ensure healing

Post –op Phase/Goals		Therapeutic Exercise	Precautions
<p>Phase III: Functional Rehabilitation</p> <p>Goals: Increase balance and proprioception Normal ankle and foot mobility Full ankle strength Normal reciprocal stair negotiation Single limb heel raise with good mechanics Independent long term HEP Return to recreational activities Edema management</p>	<p>Weeks 12– 24+</p>	<ul style="list-style-type: none"> -Single limb stance activities -AAROM and PROM to ankle and foot -Resisted exercises using theraband -Manual Therapy to increase ROM, decrease soft tissue restrictions -Double limb heel raises -Eccentric Gastrocnemius strengthening -Single limb heel raises -Biking with resistance -Rowing -Treadmill walking -Plyometrics and agility drills if appropriate 	<ul style="list-style-type: none"> -Use caution with combined resisted plantar flexion and inversion -10 minutes 2-3x/day is sufficient for single limb heel descents and raises -Treadmill walking may begin once stair negotiation is normalized
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