

Rehabilitation Guidelines for Lateral Ankle Reconstruction

The ankle is a very complex joint. There are actually three joints that make up the ankle complex: the tibiotalar joint, the subtalar joint and the distal tibiofibular joint. Stability of a joint is maintained by connective tissue structures and the dynamic support of the surrounding muscles. The primary stabilizing connective tissues are ligaments. A ligament connects bone to bone to limit excessive movement. The outside (lateral) ankle complex is stabilized at each of the three joints by three major ligaments. The tibiotalar joint is stabilized by the anterior talofibular (ATFL) ligament. The subtalar joint is stabilized by the calcaneofibular (CF) ligament and the tibiofibular joint is stabilized by the anterior and posterior tibiofibular (ATFL and PTFL) ligaments (Figure 1).

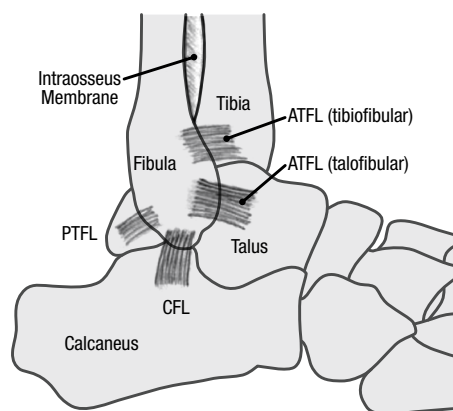


Figure 1

The muscles of the lower leg, ankle and foot also help to stabilize the ankle joint dynamically. When the ankle complex starts to move excessively in one direction, reactive corrective firing of the opposite muscle groups can help stabilize the joint. The muscles that are primarily responsible for preventing lateral ankle sprains are the peroneus longus and brevis (Figure 2). The ability for these muscles to react quickly is not only related to their strength but more importantly by proprioception, which is the body's ability to sense the position of the joint and subsequently correct it as necessary by sending nerve impulses to the appropriate muscles. Proprioception can be enhanced or trained with the use of balance exercises so these are commonly used in ankle sprain prevention and rehabilitation programs.

Lateral ankle sprains are very common, especially in sports such as basketball and volleyball. Generally athletes recover well from this type of injury with physical therapy and rehabilitation. However, up to 20% of lateral ankle sprains can lead to chronic pain and instability. This instability may occur via repetitive

ankle sprains or even progress to the ankle giving way with routine daily activities. Aggressive rehabilitation, bracing, taping and orthotics are all non-surgical options that may be appropriate to prevent instability.

If these measures fail to control the instability it may be necessary to restore the anatomy of the lateral ankle with surgical reconstruction. The preferred surgical method is to perform an anatomic repair of the anterior talofibular and calcaneofibular ligaments via a technique called the Brostrom repair, which involves shortening the attenuated ligaments and a direct repair with suture fixation. When the anatomical repair is reinforced with the advancement of the inferior extensor retinaculum, it is called the modified Brostrom repair. When the repair is further augmented with a slip of the peroneus brevis tendon through a drill hole in the fibula it is referred to as a modified Brostrom-Evans technique. The peroneus brevis tendon then acts as a check to inversion stresses and provides reinforcement to the anatomical repair without limiting long-term inversion/eversion motion or strength. For revision surgeries or in the

(continued)

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case of excessive instability, an allograft (cadaver tissue, usually a tendon) may be needed to reconstruct both the anterior talofibular and calcaneofibular ligaments.

After surgery, rehabilitation with a physical therapist or athletic trainer is needed to restore range of motion,

strength, proprioception, movement control and guide the athlete's return to sport. The rehabilitation guidelines are presented in a criterion based progression. Specific time frames, restrictions and precautions are given to protect healing tissues and the surgical repair/reconstruction. General time frames are also given for

reference to the average individual, but individual patients will progress at different rates depending on their age, associated injuries, pre-injury health status, rehabilitation compliance and injury severity. The technique used for reconstruction may alter the rehabilitation as well.

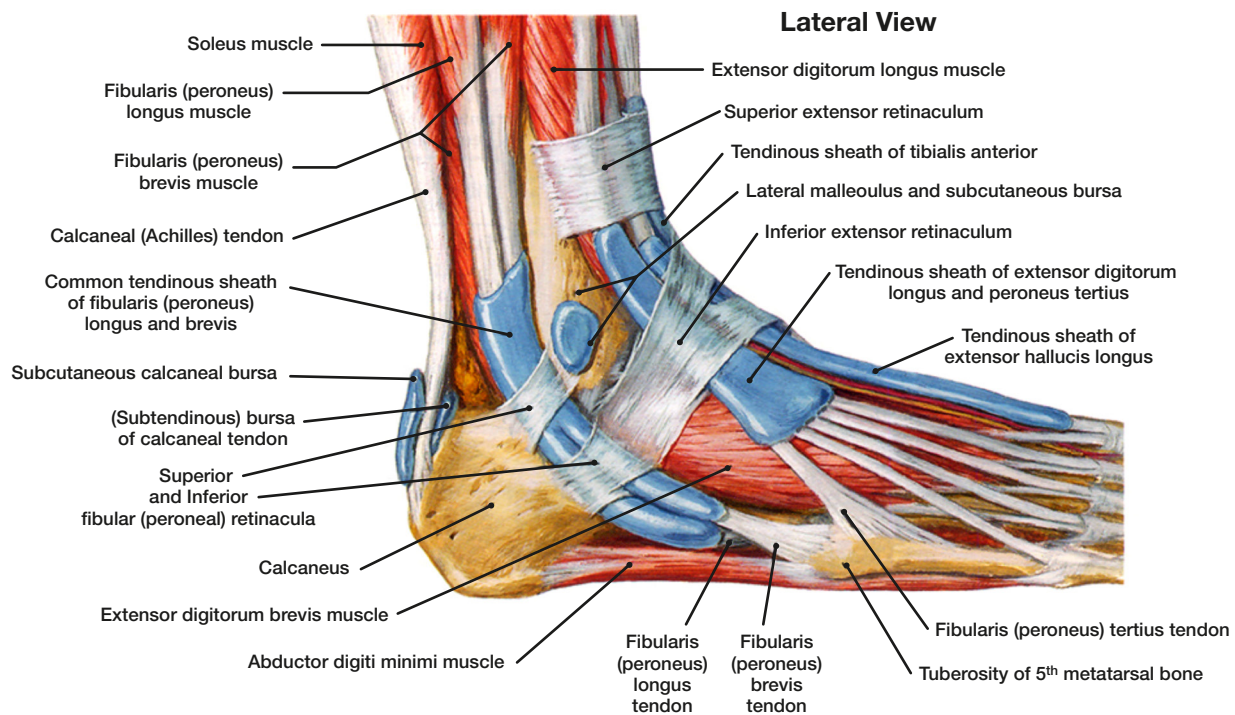


Figure 2

Rehabilitation Guidelines for Lateral Ankle Reconstruction

PHASE I (Surgery to 6 weeks after surgery)

Appointments	<ul style="list-style-type: none"> • 2 weeks after surgery, the patient is seen by the surgeon; within 2-5 days of this first visit with the surgeon following surgery, the patient should have the first rehabilitation appointment
Rehabilitation Goals	<ul style="list-style-type: none"> • Protection of the post-surgical ankle
Precautions	<ul style="list-style-type: none"> • Non-weight bearing until the first visit following surgery with the surgeon, then touchdown weight bearing (TDWB) in a boot or cast
Range of Motion (ROM) Exercises (Please do not exceed the ROM specified for each exercise and time period)	<ul style="list-style-type: none"> • No range of motion at this time, unless specified by surgeon, depending on technique
Suggested Therapeutic Exercise	<ul style="list-style-type: none"> • 4-way straight leg raises • Full arc quad sets • Abdominal isometrics • Planks from knees
Cardiovascular Fitness	<ul style="list-style-type: none"> • Upper Body Ergometer per patient

PHASE II (begin 6 weeks after surgery)

Appointments	<ul style="list-style-type: none"> • Rehabilitation appointments are one time a week for ~4 weeks
Rehabilitation Goals	<ul style="list-style-type: none"> • Continued protection of the repair • 75% of full active range of motion • Total leg strength to permit transition to weight bearing • Wean out of boot to an ankle stabilizing orthoses (ASO)
Precautions	<ul style="list-style-type: none"> • No inversion or eversion range of motion to protect the repair • Progressive and graduated return to weight bearing
Range of Motion (ROM) Exercises (Please do not exceed the ROM specified for each exercise and time period)	<ul style="list-style-type: none"> • Active and Active Assistive range of motion for ankle plantarflexion and dorsiflexion • Active and Active Assistive range of motion for forefoot and toe mobility

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Suggested Therapeutic Exercise	<ul style="list-style-type: none"> • Ankle isometric strengthening in neutral • Double leg balance exercises - starting in neutral with very short range of motion excursions • Standing 4-way straight leg raises • Planks from feet—forward and lateral
Cardiovascular Fitness	<ul style="list-style-type: none"> • Upper Body Ergometer, gentle stationary biking

PHASE III (begin after meeting Phase II criteria, usually 10 to 12 weeks after surgery)

Appointments	<ul style="list-style-type: none"> • Rehabilitation appointments are one to two times per week
Rehabilitation Goals	<ul style="list-style-type: none"> • Full active range of motion in weight bearing and non-weightbearing positions • 5/5 (full strength) peroneal strength in neutral and plantarflexed positions • 5/5 hip strength • Normal gait mechanics
Precautions	<ul style="list-style-type: none"> • No jumping, hopping or sports • ASO to protect repair outside of therapy appointments
Suggested Therapeutic Exercise	<ul style="list-style-type: none"> • Ankle strengthening exercise progression: progressing from short arc isotonic to full arc isotonic to eccentric strengthening • Balance progression: Double leg unstable surface to single leg stable surface • Gait Drills: forward march, backward march, side stepping, backward stepping, hip circle walk • Gentle stretching as needed to regain full range of motion
Cardiovascular Fitness	<ul style="list-style-type: none"> • Walking, biking, Stairmaster and elliptical (if Phase II criteria is met) • No swimming
Progression Criteria	<ul style="list-style-type: none"> • Full ankle strength on manual muscle testing and single leg balance equal to the other side

PHASE IV (begin after meeting Phase III criteria, usually 14-16 weeks after surgery)

Appointments	<ul style="list-style-type: none"> • Rehabilitation appointments are once every 2 to 3 weeks
Rehabilitation Goals	<ul style="list-style-type: none"> • Patient to demonstrate stability with higher velocity movements and change of direction movements that replicate sport specific patterns • No apprehension or instability with high velocity change of direction movements • Improve core and hip strength as well as mobility to eliminate any compensatory stresses to the ankle • Cardiovascular endurance for specific sport or work demands
Precautions	<ul style="list-style-type: none"> • Progress gradually into provocative exercises by increasing velocity and progressing from known to unanticipated movement patterns
Suggested Therapeutic Exercise	<ul style="list-style-type: none"> • Impact control exercises beginning 2 feet to 2 feet, progressing from 1 foot to the other and then 1 foot to the same foot • Movement control exercises beginning with low velocity, single plane activities and progressing to higher velocity, multi-plane activities • Return to running drills focusing of proper gait mechanics without compensations or significant post exercise soreness • Balance progression: Single leg stable surface to single leg unstable surface • Strength and control drills related to sport specific movements, including dynamic balance and strength in plantarflexed positions • Sport/work specific balance and proprioceptive drills • Hip and core strengthening • Stretching for patient specific muscle imbalances
Cardiovascular Fitness	<ul style="list-style-type: none"> • Design to use sport specific energy systems
Progression Criteria	<ul style="list-style-type: none"> • Patient may return to sport after receiving clearance from the orthopedic surgeon and the physical therapist/athletic trainer

These rehabilitation guidelines were developed collaboratively by Marc Sherry, PT, DPT, LAT, CSCS, PES (msherry@uwhealth.org) and the UW Health Sports Medicine physician group.

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