High Ankle Sprain (Syndesmosis Sprain)

Anatomy and Biomechanics
The ankle is a complex joint made up three bones: the tibia, the fibula and the talus. These three bones are connected by several ligaments that help stabilize the joint. When these ligaments are overstretched, it is referred to as an ankle sprain. A “high” ankle sprain involves the ligaments connecting the tibia and fibula just above the ankle joint, also known as the ankle mortise. The three major syndesmotic ligaments are the anterior inferior tibiofibular ligament (AITFL), the posterior inferior tibiofibular ligament (PITFL) and the interosseous ligament.

Mechanism of Injury
High ankle sprains are less common and account for approximately 15% of all ankle sprains. Injuries to the syndesmotic ligaments commonly occurs when the ankle is planted and rotated resulting in a shearing force between the tibia and fibula bones. Athletes who participate in sports that involve cutting and planting of the foot have the greatest risk for ankle syndesmotic sprains. Swelling is not always present with syndesmosis injuries but walking, flexing the foot upward and rotating the foot can be very painful.

Treatment Options
After your injury, your physician will work with you to determine a personalized course of treatment. Recovery is different in each case, but “high” ankle sprains generally take longer to resolve than lateral ankle sprains. Typically, high ankle sprains can be treated conservatively with physical therapy. Immediately after injury, you may be non-weight bearing for up to 1-2 weeks to prevent further injury and protect the ligaments. Your physician may decide to use a splint, brace or heel lift to help stabilize and facilitate healing. Rest, ice, compression and elevation will help reduce the pain and swelling of the ankle. Once the pain and swelling resolves, your physical therapist will advise you to begin bearing weight on your ankle and progress your rehabilitation program according to your individual goals.
**Surgery**

If the syndesmotic injury is severe or a fracture is also present with the injury, conservative measures are not the primary course of treatment and surgery is often indicated. Surgery can involve the use of syndesmotic fixation screws or suture fixation to stabilize the ankle mortise. Regardless of which procedure you undergo, weight bearing can be restricted for 6 to 8 weeks following surgery and patients gradually progress to a walking boot. A successive course of physical therapy is important to restore range of motion, strength and function. Full recovery can take up to one year.

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**Rehabilitation**

**The following is an outlined progression for rehab. Advancement from phase to phase as well as specific exercises performed should be based on each individual patient’s case and sound clinical judgment by the rehab professional.**

**Phase 1**

**Acute Phase**

**Goals**
- Control pain and swelling
- Restore pain free ROM
- Protect healing structures (splint, brace or heel lift)

**Precautions**
- Often Non-Weight Bearing with Crutches with progression to CAM boot.
- Avoid Painful Dorsiflexion and Eversion

**Recommended Exercises**

**Range of Motion**
- Ankle pumps
- Ankle circles
- Toe curls

**Strength**
- Ankle isometrics (neutral PF, DF, INV and EV)
- Hip Abd/Ext/ER isotonics

**Guidelines**

ROM deficits should be mostly resolved and minimal swelling present before progressing to next phase. Avoid painful DF and eversion/ER of foot to limit shearing of ankle mortise and protect healing structures. Perform ROM exercises 2-3 sets of 20 repetitions, 3-5 times a day. Perform strengthening
exercises 2-3 sets of 10 repetitions, once a day. Ice for 15-20 minutes with ankle elevated 3-5 times a day.

**Phase 2**

**Sub-Acute Phase**

**Goals**
Maintain ROM and improve flexibility
Progressing WB’ing and normalize gait mechanics
Improve strength and initiate double-limb balance activities

**Precautions**
May continue to need CAM boot and or crutches for weight bearing.

**Recommended Exercises**

**Range of Motion/Stretching**
- Gastroc/soleus towel stretch
- Seated tilt board/wobble board ROM

**Cardio**
- Bicycle without resistance 10-15 minutes

**Strength**
- Seated heel raises
- Seated toe raises (pain free ROM)
- Ankle isotonics with Theraband (PF, DF, INV and EV)
- Body weight squat
- Standing hip isotonics

**Proprioception**
- Double-limb standing activities (advance to foam, tilt board, etc.)

**Guidelines**
Achieve full pain free ROM but continue to be cautious with DF and eversion/ER. Perform ROM/stretching exercises 2-3 repetitions holding for 30 seconds, 2-3 times a day. Perform strengthening exercises 2-3 sets of 20 repetitions, once a day. Perform proprioception exercises 3 sets of 30-60 seconds, once a day. Continue to ice for 15-20 minutes with ankle elevated once a day.

**Phase 3**
**Strengthening Phase**

**Goals**
Maximize strength and initiate CKC exercises  
Maximize neuromuscular control and initiate single-limb exercises  
Initiate treadmill walking

**Precautions**
Full Weight Bearing: but may continue to use a heel lift or ankle brace for protection

**Recommended Exercises**

**Range of Motion/Stretching**
- Gastroc/soleus wall stretch  
- Standing tilt board/wobble board ROM

**Cardio**
- Bicycle/elliptical/treadmill 10-15 minutes

**Strength**
- Advance ankle isotonics with Theraband (PF, DF, INV and EV)  
- Heel raises (progress double-limb to single-limb)  
- Forward lunges (monitor ankle DF ROM)  
- Lateral lunges  
- Hip Abduction side stepping  
- Plank and side plank  
- Single-limb bridge

**Proprioception**
- Single-limb standing activities (advance to foam, tilt board, etc.)  
- Balance step ups (forward, lateral, crossover, etc.)

**Guidelines**
Achieve normal ankle strength and end range DF and eversion/ER without pain. Patient should be able to perform single-limb heel lift with good control. Perform ROM exercises once a day. Perform strengthening exercises 2-3 sets of 15-20 repetitions, every other day. Perform proprioception exercises every other day. Continue to ice for 15-20 minutes as needed.

**Phase 4**

**Return to Activity/Sport Phase**

**Goals**
Continue dynamic strengthening and proprioceptive exercises  
Initiate jog-to-run progression  
Initiate cutting, pivoting and sport specific drills
**Precautions**
Cleared to return to sport per physician

**Recommended Exercises**

**Range of Motion**
- Gastroc/soleus wall stretch
- Standing tilt board/wobble board ROM

**Cardio**
Continue cycle and elliptical progressions. Jogging at progressive speeds without heel lift 10-15 minutes

**Strength**
Continue progressing Phase 3 exercises
- Single-limb squat
- Single-limb dead lift

**Proprioception**
- Single-limb balance with perturbations (progress eyes open to eyes closed, foam, BOSU, *sport specific if applicable)
  - Balance step ups on uneven surface (forward, lateral, crossover, *sports specific if applicable)

**Plyometrics** *emphasize eccentric control, avoiding increased trunk flexion, dynamic genu valgum, and femoral internal rotation *
- Wall jumps- athlete stands by wall with arms up, hops vertically and lands softly on the balls of the feet. Emphasize soft landings, maintaining a slight bend in the knee.
- Double-leg vertical jumps- athlete stands with hands at side, knees slightly bent and jumps straight up for maximum height. Emphasize soft landings, maintaining a slight bend in the knee. Hold each landing for 3-5 seconds.
- Heiden/speed skater hop- athlete stands on one leg with knee slightly bent then jumps for maximum vertical height and lands on the opposite leg. Emphasize soft landings, controlled transitions and maintaining a slight bend in the knee.

**Sport Specific Drills**
- Initiate sports specific drills
- Begin speed/agility program

**Guidelines**
Perform stretching program daily. Cardio exercise is recommended 3-5 times a week for 15-20 minutes. Perform strengthening/proprioception exercises 3 times a week. Perform plyometric/jumping exercises 2 times a week. Monitor increased swelling with plyometrics. Decrease intensity if swelling persists. Clear to return to sport per physician.
<table>
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<th>Time</th>
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| Phase 1 Acute Phase | *NWB with crutches | *Control pain and swelling  
*Restore pain free ROM  
*Protect healing structures (splint, brace or heel lift) | **Modalities**  
Ice, compression, ESTIM  
**ROM**  
Ankle pumps, ankle circles, toe curls  
**Strengthening**  
Ankle isometrics, hip AB/Ext/ER isotonics | *Minimize joint effusion and edema  
*Avoid forceful DF and rotation to protect healing structures |
| Phase 2 Sub-Acute Phase | *WBAT with crutches or CAM Boot | *Maintain ROM and flexibility  
*Progress WB and normalize gait mechanics  
*Improve strength and initiate double-limb balance exercises | **ROM**  
Gastroc/soleus towel stretch, tilt board/wobble board ROM  
**Cardio**  
Bicycle without resistance  
**Strengthening**  
Ankle isotonics with Theraband, seated heel raises, seated toe raises (pain free ROM), body weight squat  
**Proprioception**  
Double-limb standing activities on foam, standing hip isotonics | *Avoid forceful DF and rotation to protect healing structures |
| Phase 3 Strengthening Phase | *FWB but may continue to use heel lift or ankle brace for protection | *Maximize strength, initiate CKC exercises  
*Maximize neuromuscular control, initiate single-limb exercises  
*Initiate treadmill walking | **ROM/Stretching**  
Gastroc/soleus wall stretch, standing tilt board/wobble board ROM  
**Cardio**  
Bicycle/elliptical/treadmill  
**Strengthening**  
Advance ankle isotonics with Theraband (PF, DF, INV and EV), heel raises (progress double-limb to single-limb), forward lunges, lateral lunges, resisted hip AB walks, plank and side plank, single-limb bridge  
**Proprioception**  
Single-limb standing activities (advance to foam, tilt board, etc.), balance step ups (forward, lateral, crossover, etc.) | *Avoid forceful DF and rotation to protect healing structures  
*Caution pivoting or lateral movements  
*Not cleared to return sports |
| Phase 4 Return to Activity/Sport | *Sport specific program per physician clearance | *Continue dynamic strengthening and proprioceptive exercises  
*Initiate jog-to-run progression  
*Initiate cutting, pivoting and sport specific drills | **ROM/Stretching**  
Gastroc/soleus wall stretch, standing tilt board/wobble board ROM  
**Cardio**  
Jogging at progressive speeds without heel lift 10-15 minutes  
**Strengthening**  
Continue progressing Phase 3 exercises, single-limb squat, single-limb dead lift  
**Proprioception**  
Single-limb balance with perturbations, balance step ups on uneven surface  
**Plyometrics**  
Wall jump, double-leg vertical jumps, heiden/speed skater hop  
**Sport Specific Drills**  
Initiate sports specific drills, begin speed/agility program | *Cleared for return to sport per physician |

*Reviewed by Michael Geary, MD