

# Madigan Army Medical Center

## Musculoskeletal Treatment Guidelines

### Ankle Sprain

#### Diagnosis/Definition

- Traumatic ankle injury with negative radiological findings. Graded I-III with Grade I being ligamentous trauma without laxity, mild pain and swelling, Grade II being ligamentous trauma, considerable signs of swelling, pain, loss of motion and Grade III being ligamentous laxity and joint instability.

#### Initial Diagnosis and Management

- History
  - Mechanism of injury
  - Location of pain and swelling
  - Ability to walk or bear weight
  - History of prior inversion sprains and prior treatment
  - When did the injury occur
  - Age of the patient
  - Complicating illness
  - Medications
  - Presence of pain elsewhere in the legs
- Physical Examination
  - Observe for obvious deformity
  - Determine location of swelling and ecchymosis
  - Palpate for local tenderness
  - Squeeze and rotatory tests
    - A squeeze test is performed by squeezing the tibia and fibula together at the mid calf. Pain distally at ankle joint indicates syndesmotic sprain.
    - The external rotation test is performed by having the patient sit with the knee flexed 90 degrees. The foot is externally rotated while the examiner holds the tibia in a fixed position. Pain at the ankle joint indicates injury to the syndesmotic ligaments.
  - Evaluation of peroneal tendons
  - Observation of patient walking
  - Neurovascular status
  - Test range of motion
- Plain films if indicated.
  - X rays are required if bone tenderness is present as well as the patient inability to bear weight at the time of evaluation.
- NSAIDs.
  - Adults - 200 to 400 milligrams (mg) every four to six hours as needed for up to 2 weeks. Example: Ibuprofen
  - Take tablet or capsule forms of these medicines with a full glass (8 ounces) of water.

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- Do not lie down for about 15 to 30 minutes after taking the medicine. This helps to prevent irritation that may lead to trouble in swallowing.
- To lessen stomach upset, these medicines should be taken with food or an antacid.
- Elastic wrap or gel cast for compression.
- "Weight bearing as tolerated" and crutch walking if limp present.
- Do not prescribe posterior splint or recommend non-weight bearing as these result in increased swelling, pain and risk of Reflex Sympathetic Dystrophy.
- Ice and elevation for 20 min every 2 hours for 72 hours.
- Encourage active range of motion.
  - See attached example
  - Move the foot up and down as tolerated as though pressing on a gas pedal.
  - Make circles with the foot, both clockwise and counterclockwise.
  - As tolerated, begin bearing weight on the foot. In either a sitting or a standing position, shift weight from front to back and from the inside to the outside of the foot.
  - Begin non weight-bearing Achilles stretch.
- Appropriate restrictions of activity.
  - See attached profile example
  - No running until walking is pain free
  - Use crutch if weight bearing on injured ankle is too painful

### **Ongoing Management and Objectives**

- Same day visits should be scheduled for patients experiencing sudden, intense pain with rapid onset of swelling, cold or numbness in the foot, presence of gross deformity, complicating conditions (ex. Diabetes), the fact that it is a work related injury and/or the inability to bear any weight.
- Return to full activities is expected for Grade I sprains in 3-4 weeks and for Grade II sprains in 6-8 weeks. The time to return to full activities for Grade III varies and is dependent on orthopedic management choice.
- Flexibility and strength testing
  - See attached example
  - Move the foot up and down as tolerated as though pressing on a gas pedal.
  - Make circles with the foot, both clockwise and counterclockwise.
  - As tolerated, begin bearing weight on the foot. In either a sitting or a standing position, shift weight from front to back and from the inside to the outside of the foot.
  - Begin non weight-bearing Achilles stretch.
  - The patient should also begin balancing exercises as tolerated. Instruct the patient: when he/she can do this comfortably for 30 seconds, he/she should challenge the affected leg. Try 5-10 repetitions for 30 seconds each, two or three times a day. Alternatively a balance board may be used.

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- Patient will require period of functional rehabilitation between the return of normal strength and motion and return to normal activity. This is normally determined by Physical Therapy.
- Follow up visits should be scheduled for two weeks after injury. However, patient should be informed if inability to bear weight and pain persists after 3 days he/she should contact provider for same day appointment.

### **Indication a Profile is needed**

- Any limitations that affect strength range of movement, and efficiency of legs and feet.
- Limitations that produce slightly limited mobility of joints, muscular weakness, or other musculo-skeletal defects.
- Defects or impairments that require significant restriction of use.

### **Specifications for the Profile**

Please see attached for example.

- Week 1
  - No running, jumping, marching, ruck
- Weeks 2-3
  - Running, jumping, marching and ruck at own pace and distance
  - If sprain is moderate (grade II), no running, jumping, marching or ruck for 2-3 weeks.
  - If sprain is severe (grade III), no running, jumping, marching or ruck for 3-8 weeks, plus crutches for up to 2 weeks

### **Patient/Soldier Education or Self care Information**

- See attached sheet
- Demonstrate deficits that exist
  - Describe/show soldier his/her limitations (unable to walk without a crutch, unable to run, etc.)
- Explain injury and treatment methods
  - Use diagram attached to describe injury, location and treatment.
- Instruct and demonstrate rehab techniques
  - Demonstrate rehab exercises as shown in attached guide
  - Warm up before any sports activity
  - Participate in a conditioning program to build muscle strength
  - Do stretching exercises daily
  - Listen to your body: never run if you experience pain in the foot or ankle
  - Replace athletic shoes as soon as the tread or heel wears out
- Ask the patient to demonstrate newly learned techniques and repeat any other instructions.

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- Fine tune patient technique
  - Correct any incorrect ROM/stretching demonstrations or instructions by repeating and demonstrating information or exercise correctly.
- Encourage questions
  - Ask soldier if he or she has any questions
- Give supplements such as handouts
- Schedule follow up visit
  - If pain persists with weight bearing
  - The sprain does not improve as expected
  - Patient is having difficulty ambulating after three days of injury
  - Increased pain or swelling after the first three days
  - Patient has any questions regarding care

### **Indications for Referral to Specialty Care**

- To Physical Therapy: Routine referral for rehabilitation of recurrent Grade I and all Grade II sprains, and/or if the ankle is tender to palpation.
- Orthopedic Surgery referral for all Grade III sprains and any grade if plain radiographs are suggestive of any pathology.

### **Referral criteria for Return to Primary Care**

- Completed specialty care.

### **Input was provided by:**

- Occupational Therapy Clinic
- Physical Therapy Clinic
- Orthopedic Clinic
- Family Practice Clinic
- Okubo Clinic
- 555 Engineers
- 1<sup>st</sup> Brigade
- 3<sup>rd</sup> Brigade
- 62<sup>nd</sup> Medical Brigade

### **POC:**

- Outcome Management

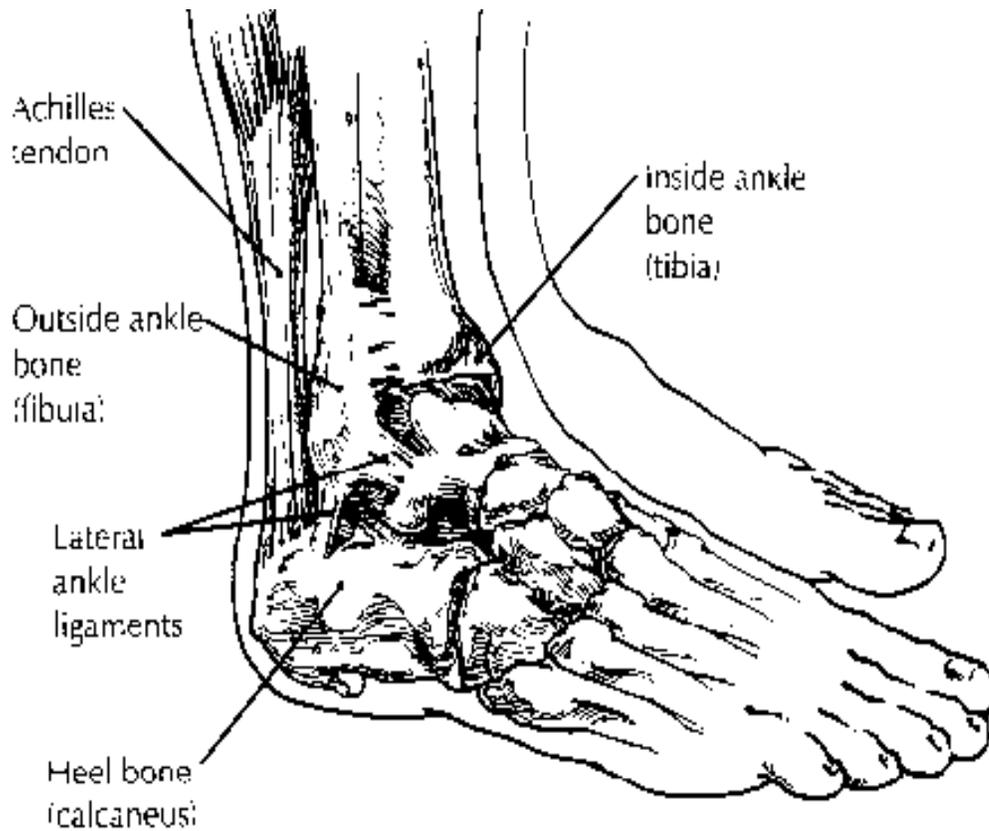
### **References:**

- Mellion, I., Morris B. (2002). Team Physician's Handbook, 3<sup>rd</sup> Edition. Hanley & Belfus, Inc: Philadelphia, PA.

## **Madigan Army Medical Center Musculoskeletal Treatment Guidelines**

- Lillegard, Rucker. (1999). The Handbook of Sports Medicine. A symptom-oriented approach, 2<sup>nd</sup> Edition. Butterworth-Heinemann Medical: Burlington, MA.
- Baechle, Thomas, Earle, Roger. (2000) Essentials of Strength Training and Conditioning, 2<sup>nd</sup> Edition. Human Kinetics Pub: Champaign, IL
- Schenck, Robert, Jr. et al. (1999). Athletic Training and Sports Medicine, 3<sup>rd</sup> Edition. American Academy of Orthopedics: Tucson, AZ.
- [http://www.mamc.amedd.army.mil/referral/Documents/Physical\\_Therapy/Ankle\\_Sprain.pdf](http://www.mamc.amedd.army.mil/referral/Documents/Physical_Therapy/Ankle_Sprain.pdf)
- [http://www.nismat.org/ptcor/ankle\\_sprain/](http://www.nismat.org/ptcor/ankle_sprain/)
- Ankle Exercises for patients was downloaded with permission from: Center of Excellence for Medical Multimedia (CEMM). <http://www.cemm.org/>. Downloadable PDFs. Lt Col (Dr.) Randy Mauffray, Director, CEMM. 2011

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### Range of Motion and Strengthening Guide

#### ➤ Activity

Soon after your injury, you can gradually begin to walk short distances and perform everyday activities. This early activity aids your recovery and helps you regain mobility.

- **Range of Motion** – Move the foot up and down as tolerated as though pressing on a gas pedal, make circles with the foot – both clockwise and counterclockwise, as tolerated begin weight bearing on the foot- shift weight from front to back and from side to side.
- **Flexibility** – Continue flexibility exercises throughout the day to improve circulation and to regain normal range of motion.
- **Strengthening** – Once you can walk without pain, have rise up on your toes, then try walking on your heels and toes 10-20 feet two or three times a day. For additional strengthening, continue range of motion exercises with a cuff weight around the forefoot.
- **Balance** – Begin balancing on the injured leg, as tolerated. When you can do this comfortable for 30 seconds, try 5-10 repetitions for 30 seconds each, two or three times a day.
- **Walking** - Once you are able to wear athletic shoes comfortably, you may begin walking for exercise.
- **Running** - Once you can walk pain-free you may begin running.
- **Other Activity** - Once you can run pain-free, most patients may return to normal activity. This includes team sports, aerobics, marching, step climbing, etc.
- **Pain or Swelling After Exercise or Activity** - You may experience mild foot pain or swelling after exercise or activity. Elevate your foot and apply ice wrapped in a towel. Exercise and activity should consistently improve your strength and mobility. If you have any questions, contact your physical therapist or primary care provider.

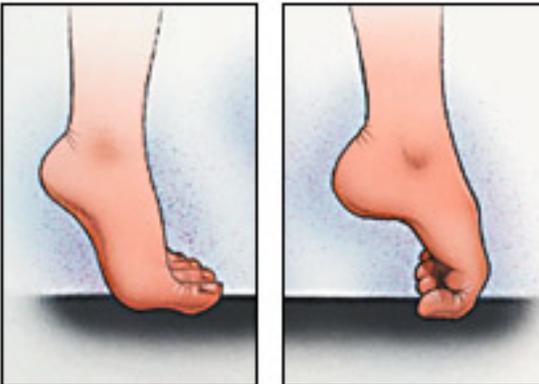
## Madigan Army Medical Center Musculoskeletal Treatment Guidelines



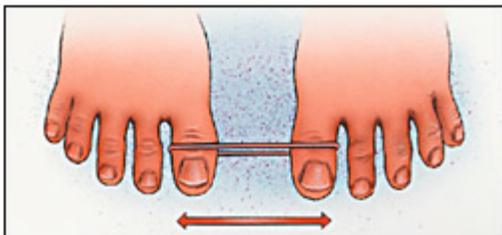
**Ankle Pumps** - Move your foot up and down rhythmically by contracting the calf and shin muscles. Perform this exercise periodically for two to three minutes, two or three times an hour in the recovery room.



**Towel Curls** - Place a small towel on the floor and curl it toward you, using only your toes. You can increase the resistance by putting a weight on the end of the towel. Relax and repeat this exercise 5 times.

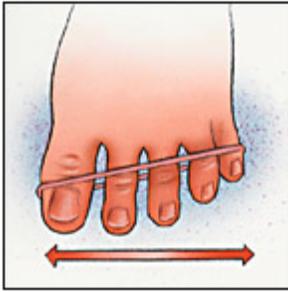


**Toe Raises, Toe Curls** - Hold each position for 5 seconds and repeat 10 times.

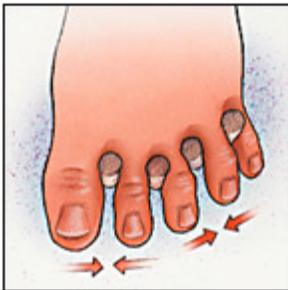


**Big Toe Pulls** - Place a thick rubber band around both big toes and pull the big toes away from each other. Hold for 5 seconds and repeat 10 times.

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Toe Pulls - Put a thick rubber band around all of your toes and spread them. Hold this position for 5 seconds and repeat 10 times.



Toe Squeezes - Place small corks between your toes and squeeze for 5 seconds. Repeat 10 times.



Marble Pick Up - Place 20 marbles on the floor. Pick up one marble at a time and put it in a small bowl. Repeat with all 20 marbles.

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<b>PHYSICAL PROFILE</b>																																
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DA FORM 3349, MAY 86

REPLACES DA FORM 5302-R (TEST) DATED FEB 84 AND DA FORM 3349 DATED 1 JUN 80, WHICH ARE OBSOLETE  
USAPPC V1.00

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## Musculoskeletal Treatment Guidelines

### PATIENT INFORMATION

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The most common type of ankle injury is a sprain. A sprain is stretching and tearing of ligaments (fibrous bands connecting adjacent bones in a joint.) There are many ligaments around the ankle and these can become damaged when the ankle is forced into a position not normally encountered.

The most frequently seen sprain occurs when weight is applied to a foot, which is on an uneven surface, and the foot "rolls in" (inversion). Because the sole of the foot is pointing inward as force is applied, the ligaments stabilizing the lateral - or outside - part of the ankle are stressed. Many patients report hearing a "snap" or "pop" at the time of the injury. This is usually followed by pain and swelling on the lateral aspect of the ankle.

**THE MOST IMPORTANT INITIAL MANAGEMENT OF A SPRAIN IS,**

- **R** - rest
- **I** - ice
- **C** - compression
- **E** - elevation

Many of the problems resulting from sprains are due to blood and edema in and around the ankle. Minimizing swelling helps the ankle heal faster. The **RICE** regimen facilitates this.

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- **Rest** - no weight bearing for the first 24 hours after the injury (Possibly longer, depending upon severity)
  - **Ice** - apply ice packs using a towel over a plastic bag to the area that is painful. Be careful to avoid frostbite. Ice should be intermittently applied for the first 24 hours.
  - **Compression** - an ACE bandage or other soft elastic material should be applied to the ankle to help prevent the accumulation of edema.
  - **Elevation** - elevating the ankle helps in removing edema. By having the foot higher than the hip (or heart), gravity is used to pull edema out of the ankle.
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**In the initial 24 hours, it is very important to avoid things, which might increase swelling.**

#### **Avoid**

1. Hot showers
2. Heat rubs (methyl salicylate counterirritants such as "Ben Gay", etc.
3. Hot packs

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4. Drinking alcohol
5. Aspirin - prolongs the clotting time of blood and may cause more bleeding into the ankle. (Tylenol or Ibuprofen may be taken to help with pain, but will not speed up the healing process)

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### WHEN TO SEEK MEDICAL ATTENTION

If the ankle is obviously fractured or dislocated, then medical attention should be sought immediately. If you are fairly certain that it is sprained then use the **RICE** regimen and get a professional opinion regarding diagnosis and treatment. Rice University students are encouraged to make an appointment with one of the physicians at the student health service to assess the severity of the injury, determine if X-rays are necessary, and to receive instruction on proper rehabilitation of the injury.

In some instances a fracture of one of the bones in the leg or ankle may occur along with a sprain. Pain alone is not necessarily a reliable guide of the presence or absence of a fracture. Fractures can usually be diagnosed with an X-ray examination.

A student who sprains his or her ankle on a Friday night can usually follow the **RICE** regimen, and see a physician on Monday or Tuesday.

**Because it is not possible to predict or discuss every possible situation that might arise, it is recommended that the student use common sense in dealing with his or her injury.**

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### DEGREE OF SEVERITY OF ANKLE SPAINS

- Grade I - stretch and/or minor tear of the ligament without laxity (loosening)
- Grade II - tear of ligament plus some laxity
- Grade III - complete tear of the affected ligament (very loose)

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### TREATMENT

After the initial 24 hours the patient can begin partial weight bearing using crutches. Gradually progressing to full weight bearing over several days as tolerated. The patient should try to use a normal heel-toe gait. An ankle brace may

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be necessary to protect the joint from re-injury. As soon as pain allows, rehabilitation exercises should be done.

### **THE REHABILITATION EXERCISES ARE THE MOST IMPORTANT ASPECT OF RECOVERING FULL FUNCTION OF THE ANKLE.**

A full list of exercises is available at the student health service. One simple exercise that can be begun early in the course of treatment is the "alphabet" exercise. This is non-weight bearing and involves trying to draw the letters of the alphabet with your toes.

Most sprains heal completely within a few weeks. The more severe the injury, the longer the time to heal. Often it is necessary to continue rehab exercises for a month or two following the injury. Grade III injuries are usually managed conservatively - rehabilitation exercises, etc. - but a small percentage may require surgery.

### **Ankle Exercises for Patients from the CEMM Library**

# Ankle Exercises - Isometric Exercises

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Isometric exercises, which involve pushing against a fixed object with your ankle, are a good way to get started. Examples of isometric exercises include:

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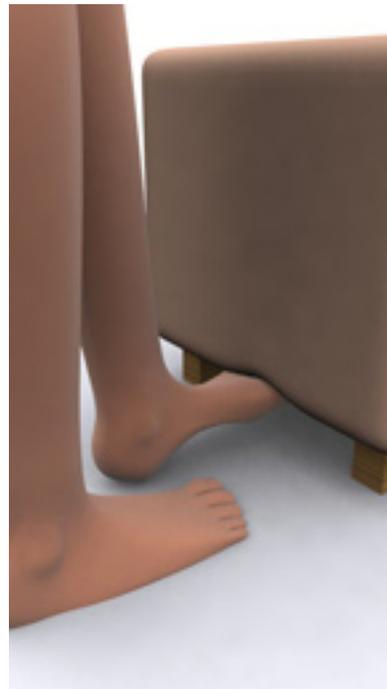
Placing your ankle in the "down and in" position against a fixed object such as a couch. Hold this position for a count of 10. Repeat 10 times.



Placing your ankle in the "up and out" position against the same object. Hold this position for a count of 10. Repeat 10 times.



Pushing your ankle down against a fixed object and hold for a count of 10. Repeat 10 times.



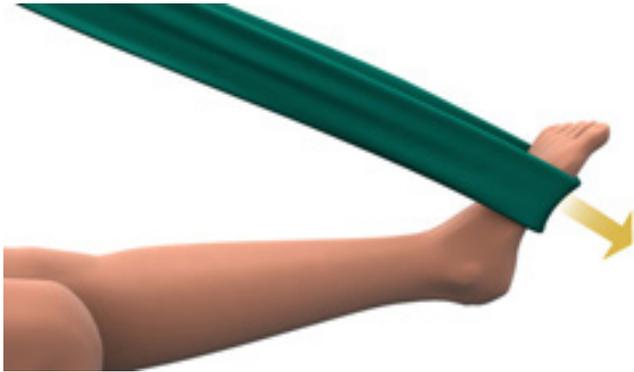
Pushing your ankle up against a fixed object and hold for a count of 10. Repeat 10 times.

# Ankle Exercises - Isotonic Exercises

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Once isometric exercises have been mastered, you can move on to **isotonic exercises**, which involve improving the range of motion of the ankle against resistance. Isotonic exercises can be performed using a resistance band, which you can get through a physical therapist or at any sporting goods store. Examples include:

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Using a resistance band around your foot, hold the ends of the band with your hand and gently push your ankle down as far as you can and then back to the starting position. Repeat 10 times.



Tie the resistance bands around a fixed object and wrap the ends around your foot. Start with your foot pointing down and pull your ankle up as far as you can. Return to the starting position. Repeat 10 times.



Tie the resistance bands around a fixed object located to the outer side of your ankle and wrap the ends around your foot. Start with the foot relaxed and then move your ankle down and in. Return to the relaxed position and repeat 10 times.



Tie the resistance bands around a fixed object located to the inside of your ankle and hold your foot in a relaxed position and wrap the ends around your foot. Bring your foot up and out and then back to the resting position. Repeat 10 times.

# Ankle Exercises - Proprioceptive Exercises

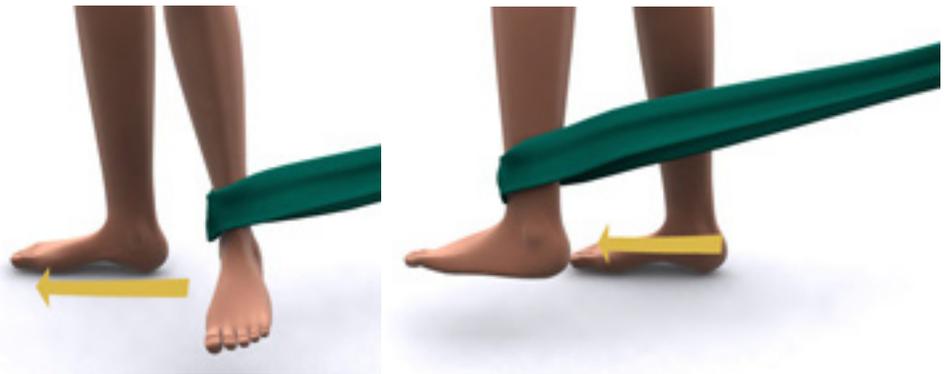
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Once you have regained the motion and strength in your ankle, be sure to check with your provider or physical therapist before increasing your activity level. **Proprioceptive exercises** are designed to improve your awareness of the position, location, orientation and movement of your ankle. This is important to help avoid future ankle injuries. Examples of proprioceptive exercises include:

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Standing on a pillow on your affected leg. Hold this position for a count of 10. Repeat 10 times.



Standing on your affected leg with the resistance band applied to your unaffected leg. Bring your unaffected leg forward and then back to the starting position. Repeat 10 times. Start slowly and progress to a faster speed for a more difficult workout.



Swinging your unaffected leg behind you and then back.

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