d) Orthopedics presents the following educational references as a public service and for informational purposes only. The material is derived from the current medical knowledge on the topics listed. The content is not intended to be a substitute for professional medical advice, diagnosis, or treatment. Always seek the advice of your physician or other qualified health provider with any questions you may have regarding a medical condition.
How Your Ankle Works

The ankle joint is a hinge type joint that participates in movement and is involved in lower limb stability. There are 2 types of motions that take place at the ankle joint: dorsiflexion and plantar flexion. Dorsiflexion involves bringing the dorsum of the foot towards the anterior surface of the leg. Such movement is necessary in order to have the foot contact the ground heel first during heel strike and to allow the foot to clear the ground during the swing phase of gait. Plantar flexion occurs when the toes are in contact with the ground and the heel is raised off of the ground (toe raises). This movement provides the propulsive force necessary to lift the limb off the ground and start it swinging forward during the toe off portion of gait. During mid stance, when the lower limb supports the weight of the torso, the ankle is in its most stable configuration, which is the dorsiflexed position.

Gait Mount

<table>
<thead>
<tr>
<th>Heel Strike</th>
<th>Midstance</th>
<th>Toe Off</th>
<th>Swing Phase</th>
</tr>
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</table>

Dorsiflexion

Plantar Flexion
Ankle Pain?

At some time in your life you may experience foot, heel, or ankle pain. There are an estimated 25,000 people who sprain an ankle every day in the United States. Even with this high frequency, ankle sprains are not always minor injuries. About one quarter of these will result with the person developing long-term joint pain and weakness. This handbook will allow you to understand the basic anatomy of your foot and ankle so you can get on to healing your body.

Severity of an ankle sprain varies from the ligament being simply stretched, slightly torn, or completely ruptured. In more severe sprains, you are often unable to walk or even put weight on your foot, and your ankle may feel unstable. You usually have a lot of pain at first, but it can significantly decrease after the first hour. If your ankle sprain does not get treated and heal properly you may be more susceptible to re-injury.

Your physician may use the following grading system to determine your injury level:

**Grade I:** Injury involves only a mild stretch of the ligament. Patients are usually able to bear weight on the ankle immediately following injury.

**Grade II:** Injury involves some ligament tearing and patient generally experience more significant pain and swelling. They can usually bear some weight.

**Grade III:** Injury involves a complete tear of one or more ligaments. Significant pain, swelling, and bruising are usually present. The patient will demonstrate clinical, as well as functional instability. Weight bearing for this person is usually difficult.
Inversion Ankle Sprain

An ankle sprain occurs when the ligaments that connect the bones in the foot, ankle, or lower leg are stretched or torn. Inversion ankle sprains happen most frequently. During an inversion ankle sprain the anterior talofibular ligament (ATFL) is most commonly injured followed by the calcaneofibular ligament.
Eversion Ankle Sprain

Eversion ankle sprains occur less often and are usually more severe. Damage to the deltoid ligament occurs with this type of sprain, however due to the deltoid’s strength it can often result in an avulsion fracture of the medial malleolus rather than damage to the ligament.
High Ankle Sprain

A high ankle sprain injures the large ligament above the ankle that joins together the two bones of the lower leg. These two bones, the tibia (shin bone) and fibula, run from the knee down to the ankle. They are joined together by this ligament, called the "syndesmosis" or syndesmotic ligament.

Patients who sustain a high ankle sprain injure this syndesmotic ligament. The ligament can also be associated with more common low ankle sprains, and even ankle fractures.
Achilles Tendonitis

Achilles Tendonitis is an overuse injury usually characterized by a gradual onset of posterior ankle pain. Achilles Tendonitis may be associated with some increase in activity level. The pain is made worse by wearing lower-heeled shoes and by running, jumping, and climbing activities. It is improved by wearing higher heeled shoes which takes stress off of the achilles.
Achilles Bursitis (Retrocalcaneal Bursitis)

This is a common condition in athletes, particularly in runners. It can often be mistaken for Achilles tendonitis or can occur in conjunction with Achilles tendonitis.

A bursa is a small sack of fluid that goes between a tendon and a bone to help the tendon move smoothly over the bone.

The retrocalcaneal bursa lies between the Achilles tendon and the calcaneus (heel bone). With repeated trauma the bursa can become inflamed.

It is possible for the athlete to have both Achilles tendonitis and bursitis at the same time (Haglund's syndrome).
Plantar Fasciitis

Plantar fasciitis is an inflammation of the plantar fascia and the perifascial structures. If not treated properly chronic stress to the origin of this fascia on the calcaneus may cause calcium to deposit, forming a spur.
Ankle Sprain Treatment

After a medical professional has determined the severity of the ankle injury, initial treatment can follow the RICE principle:

Rest: Crutches and/or some type of ankle support should be used until walking is not painful.

Ice: After the compression bandage has been applied, use ice packs or an ice wrap to decrease the temperature of the injured area. Ice should be applied for 20 minutes every 1 to 2 hours for the first 24 to 72 hours, or until swelling goes down. Do not expose the area to prolonged cold.

Compression: An elastic pressure bandage or wrap can be applied around the ankle at the site of the sprain. This will help decrease swelling and should be worn for the first 24 to 36 hours. Compression wraps do not offer protection, and a protective brace should be used if you try to bear weight on your injured ankle. Don’t apply the wrap too tightly. Loosen the bandage if it gets too tight. Signs that the bandage is too tight: include numbness, tingling, increased pain, coolness, or swelling in the area below the bandage.

Elevation: Promptly elevate the injured limb. If possible, it should be raised above the level of the heart for at least 2-3 hours a day for the first 24 to 36 hours to help reduce swelling and bruising. The easiest way to achieve this is to lie on your back and prop the injured limb up on some pillows.
Rehabilitation and Exercises

Therapeutic exercise has been found to significantly reduce recovery time for mild and moderate ankle sprains. If ankle ligaments do not heal properly, they can become weak and unstable and give out with only minor trauma. Rehabilitation exercises can help repair and strengthen injured ligaments. The following are a few exercises that your doctor may suggest to help your recovery. None of these should be performed without the approval of your physician. Your doctor may also prescribe formal physical therapy.

Each exercise should be done slowly and without pain:

**ABC's:**

This exercise will help to increase your range of motion (ROM). Sit with your foot hanging off the edge of a table, or prop it up on some pillows so the ankle is in the air. Then trace the alphabet with your toes. This will encourage movement in all directions.
Dorsiflexion Stretch:
While seated in a chair with your foot on the ground, take a rolled up towel and place in the ball of your foot. Gently pull back on both ends of the towel bringing your toes towards you until you feel a light painless stretch. Hold this position for 10 seconds, then repeat 3 to 5 times.

Toe Curls:
While seated in a chair place a hand towel on the floor. The surface should be smooth, such as a tile or wooden floor (carpet is not recommended). While keeping your heel on the ground, curl your toes and grab the towel with your toes to scrunch the towel. Let go, and continue scrunching up the entire length of the towel. When you reach the end of the towel, reverse the action by grabbing the towel with your toes, scrunching it, and pushing it away from you. Repeat, until you have pushed the entire length of the towel away from you.

Toe Lift:
Sitting in a chair with your foot flat on the ground, lift your toes slowly, leaving your heel on the ground, then lower them and repeat 15 to 20 times.
Eversion:
Now take the same towel again. Seated in a chair with your heel on the ground, lift your foot, turn it inward, place it on the towel, then slide the towel outward. Repeat this until you have gone the entire length of the towel. Then stretch the towel out on the other side and repeat in the opposite direction.

Inversion:
With the same towel, stretch the towel out on the other side and repeat in the opposite direction.
Heel Raises:
If weight bearing is tolerated, stand on the edge of a stair, make sure you have some type of railing or handles to balance yourself. Push off your toes to raise your heels, then lower, returning to the start position. Repeat exercise 15 to 20 times.

Weight Shifting:
If weight bearing can be tolerated, stand upright with equal pressure on both legs. Slowly shift your weight to the side of your injured ankle then return to the center position. Repeat exercise 15 to 20 times.

One Leg Standing and Quarter Squats:
If weight bearing is tolerated, stand on your injured leg while lifting the non-involved leg off the ground. Putting your arms across your chest, balance on the one leg for 60 seconds. If this is tolerated without discomfort, in the same position, slowly bend the leg you are standing on at the knee 20 to 30 degrees, then immediately return to the upright position. Repeat 15 to 20 times.

Two Legged Quarter Squats:
If weight bearing can be tolerated, stand upright with equal pressure on both legs. Slightly bend your knees 20 to 30 degrees then stand back upright. Repeat exercise 15 to 20 times.
**ProCare**

Surround® Air Ankle  
Grade I, II, III

Universal Ankle Brace  
Grade I, II, III

Surround Gel Ankle  
Grade I, II, III

Double Strap Ankle  
Grade I

Surround FLOAM Ankle  
Grade I, II, III

DS Ankle Wrap  
Grade I

Stabilized Ankle Support  
Grade I, II

Elastic Ankle Support  
Grade I

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Why Universal is a Perfect Fit

Quick-Fit® Wrist II

The Quick-Fit Wrist II is a universal, functional wrist orthosis for the treatment of wrist and hand injuries and trauma. A simple single pull lace design and stockinet tongue ease application while the soft nylon/foam laminate offers maximum comfort. The QuickFit Wrist II has an adjustable, malleable dorsal stay pod that may be placed in the proper location for maximum immobilization or removed completely during rehabilitation. A unique contoured palmar stay provides proper anatomical fit allowing full finger dexterity and may be contoured as needed to address a variety of indications. Universal left and right sizes limit inventory to help improve efficiencies. Patent pending.

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For more information, please contact your Aircast/ProCare Territory Manager or Authorized Distributor.

In addition to the Quick-Fit® Wrist II, DJO offers a complete line of wrist, hand and thumb supports that include the Universal Thumb-O-Prene® and the ProCare® Thumb Splint. Please see back for product descriptions.
Why Universal is a Perfect Fit

Universal Thumb-O-Prene®
The enhanced universal wrap-around design provides a low-profile comfortable, custom fit that is both functional and simple. The unique design combines two stays, rigid and spiral plus a movable elastic strap to address various pathologies of the thumb including Tendonitis, Basal Joint Arthritis and instability of the CMC (Carpometacarpal) joint. The elastic strap may be wrapped between forefinger and thumb to help stabilize the CMC joint without restricting the use of the thumb or wrist. Bilateral fits right or left thumb.

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ProCare® Thumb Splint
The ProCare Thumb Splint offers a universal, wrap-around support with functional features to address a variety of pathologies including Gamekeeper’s/Skier’s Thumb, Basal Joint Arthritis and Thumb Tendonitis. Dorsal, Radial and Palmar stay pockets on thumb contain a malleable aluminum stay and spiral stay that may be removed or modified for desired support. Bilateral fits right or left thumb.

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For more information, please contact your Aircast/ProCare Territory Manager or Authorized Distributor.
In addition to the Universe Air-Stirrup Care Kit, DJO offers a complete line of foot and ankle products.
Complete functional management of ankle sprains in a universal kit. The kit includes:

- Air-Stirrup Universe ankle brace supports, protects and controls swelling; universal size eliminates excess inventory
- Ankle wrap provides circumferential compression
- Cold pack to help reduce pain
- Exercise band to help strengthen the ankle
- DVD and instruction booklet provides information for proper care of sprained ankles

**DVD and instruction booklet adhere to standards for patient education as identified by JCAHO.**

For more information on Aircast’s innovative treatment solutions, contact your territory manager.

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### PEER REVIEWED CLINICAL SUPPORT

#### Early Mobilization works better compared to immobilization

**Early Mobilization Versus Immobilization in the treatment of lateral Ankle Sprains**


- Percentage of patients returning to work after 10 days was **4 times greater** with the Air-Stirrup than the group treated with immobilization

#### The Stirrup works better than compression wrap alone

**Treatment of Acute Ankle Sprain: Comparison of a Semi-Rigid Ankle brace and Compression Bandage in 73 Patients**


- The group using the Aircast Air-Stirrup used **42% less sick leave** than the group using ankle wrap (5.3 days vs. 9.1 days)
- The group wearing the Aircast Air-Stirrup reported less pain and more mobility

#### Management of Ankle Sprains: a randomized controlled trial of the treatment of Inversion injuries using an elastic support or an Aircast Ankle brace


- Using the Karlson Scoring Method, the Air-Stirrup group had a **28% improvement** over compression bandage at 10 days and 29% better at 1 month

#### Importance of the Duplex aircell design in an ankle brace

**Conservative Therapy for Acute Lateral Ligament Lesions: Single Chamber vs. Two-Chamber Orthosis Systems**


- Reduction of edema was **clearly superior (50%)** with the dual aircell design compared to the single aircell design

#### Efficacy for fracture treatment

**Comparative Study of Functional Bracing and Plaster Cast Treatment of Stable lateral Malleolar Fractures**


- Comparing Air-Stirrup to below knee cast for Lauge-Hansen Stage II Ankle fracture, the Aircast Air-Stirrup resulted in **faster resolution of swelling**, increased comfort, ankle support without function loss, and fewer complications than casting

#### Combination of compression wrap and ankle brace is even better

**A Prospective, Randomized Clinical Investigation of the Treatment of First-Time Ankle Sprains**


- The use of the Air-Stirrup in conjunction with an elastic wrap **significantly reduces the time to recovery** and provides earlier time to pre-injury function

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### Ordering Information

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**Air-Stirrup Universe Care Kit**

DJO proudly sponsors: