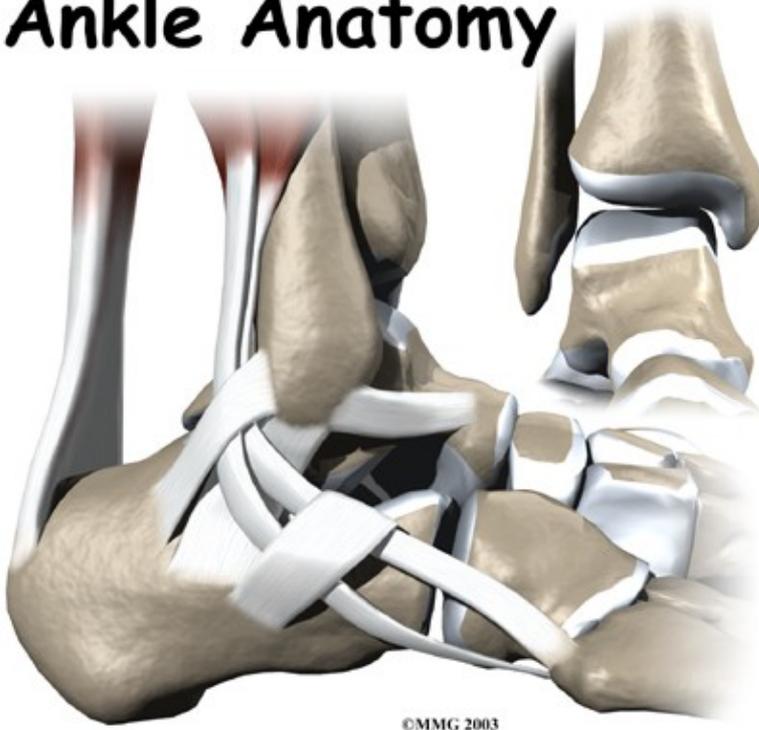


Ankle Anatomy

Introduction

Physical Therapy in Congress Park, Denver Downtown, Central Park, and Highlands Area for Ankle

Ankle Anatomy



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Welcome to Atlas Physical Therapy's patient resource about ankle problems.

The ankle joint acts like a hinge. But it's much more than a simple hinge joint. The ankle is actually made up of several important structures. The unique design of the ankle makes it a very stable joint. This joint has to be stable in order to withstand 1.5 times your body weight when you walk and up to eight times your body weight when you run.

Normal ankle function is needed to walk with a smooth and nearly effortless gait. The muscles, tendons, and ligaments that support the ankle joint work together to propel the body. Conditions that disturb the normal way the ankle works can make it difficult to do your activities without pain or problems.

This guide will help you understand:

- what parts make up the ankle
- how the ankle works

Important Structures

The important structures of the ankle can be divided into several categories. These include

- bones and joints
- ligaments and tendons
- muscles
- nerves
- blood vessels

The top of the foot is referred to as the *dorsal* surface. The sole of the foot is the *plantar* surface.

Hear from some of our **Foot Therapy** patients

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“ Atlas Physical Therapy is the best! I came in with a sprained ankle and the staff was super patient and helpful as we worked through the injury. Brett and Will were amazing and I would recommend them... ”

“ Atlas Physical Therapy is the best! I came in with a sprained ankle and the staff was super patient and helpful as we worked through the injury. Brett and Will were amazing and I would recommend them to anyone! The downtown location is super convenient for anyone who works down there too! ”

Leanne S

Denver, CO

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“ By far the best physical therapists I have ever gone to! Alex and Kate have fixed everything that has come up from foot issues, to knee problems to all the tiny little things that happen during... ”

“ By far the best physical therapists I have ever gone to! Alex and Kate have fixed everything that has come up from foot issues, to knee problems to all the tiny little things that happen during training or just life in general. Lexi and Emma are awesome at making sure im doing exercises correctly and making it fun at the same time. With the help of everyone at Atlas Physical Therapy I was able to complete my first ultramarathon and look forward to completing many other ridiculous goals. ”

Amanda H

Denver, CO

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“ I had been referred to Alex at Atlas by several different people, but it ended up being my daughter's plantar fasciitis that finally got us in there. He did absolutely great with her really does well... ”

“ I had been referred to Alex at Atlas by several different people, but it ended up being my daughter's plantar fasciitis that finally got us in there. He did absolutely great with her really does well with kids. I don't have any acute injuries at this point, but while I was in there with her, I asked about various ongoing issues/problem areas I have, and ended up beginning treatment with him as well. He takes a well rounded and very practical approach that for us has included tissue work (both), dry needling (me), ultrasound (her), adjustments (me), and obviously various exercises and stretches. The rest of the staff there is great as well.

Highly recommend. ”

Dan O

Denver, CO

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“ I am a runner and runners sometimes get hurt! Alex has magic hands. The man has helped me get through plantar fasciitis on both feet, hip and knee issues and a pulled hamstring! All while keeping it... ”

“ I am a runner and runners sometimes get hurt! Alex has magic hands. The man has helped me get through plantar fasciitis on both feet, hip and knee issues and a pulled hamstring! All while keeping it fun and just being an amazing coach. If something ails you- go see him! He has magic hands and will get you back on track in no time ”

Maili Aring Dilworth

Denver, CO

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“ Iâ€” ve been going to Atlas for a couple of months to work on some issues with my peroneal and Achilles, and Iâ€” ve been thoroughly impressed with every single person who works at Atlas. Iâ€” ve worked... ”

“ Iâ€” ve been going to Atlas for a couple of months to work on some issues with my peroneal and Achilles, and Iâ€” ve been thoroughly impressed with every single person who works at Atlas. Iâ€” ve worked with at least 5 people here, and they have all been knowledgeable, helpful, friendly, caring and cool. They remember who I am every time I come back, have been great at listening and helping with my recovery, and I quite honestly look forward to each visit. Iâ€” ve been getting dry needling done lately, and I was pretty afraid since I hate needles. Both Kate and Amanda have done an excellent job however with minimal discomfort and great results afterwards. Iâ€” m happy to have discovered Atlas, and Iâ€” ve been recommending it to friends and family. ”

Matt G

Denver, CO

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“ Heather is great! Â She took me from barely walking to being able to run again. Â I broke/dislocated my ankle last year and started seeing Heather once I was weight bearing again. Â I wouldnâ€” t have... ”

“ Heather is great! Â She took me from barely walking to being able to run again. Â I broke/dislocated my ankle last year and started seeing Heather once I was weight bearing again. Â I wouldnâ€” t have gotten to the point Iâ€” m at now without her! ”

Mark W

Denver, CO

[View all yelp reviews](#)

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“ This place is great. I worked with Alex for a little over a month. I visited several PT's prior to meeting with Alex all of whom suggested to remove screws post ankle surgery. With Alex's help, I was... ”

“ This place is great. I worked with Alex for a little over a month. I visited several PT's prior to meeting with Alex all of whom suggested to remove screws post ankle surgery. With Alex's help, I was able to avoid a second surgery, AND am now feeling like I did before the injury. Thanks Alex ”

Jeff W

Denver, CO

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“ Amazing place, awesome team! I broke my ankle in January and had surgery a day later. About 7 weeks after that, I started physical therapy at Atlas and I could not have been happier. I was... ”

“ Amazing place, awesome team! I broke my ankle in January and had surgery a day later. About 7 weeks after that, I started physical therapy at Atlas and I could not have been happier. I was assigned to work with Kate as my PT and she was fantastic. She worked closely with me on movement, strengthening, massaging and flexibility in order to getting me back to my normal self and activities. At times, I even felt bad for her, because I am very ticklish so working on my foot wasn't always the easiest thing for her, but she took it like a champ; she even did a great job of distracting me in order for her to work on my ankle issues. The exercises I was instructed to do were super helpful, and I was able to do them both at home and at the facility (along with many more when I was there). I loved how I was able to work with multiple staff members while working out my ankle and everyone pushed me to keep going and never made me feel bad if I wasn't able to complete something, but rather said it was okay and we would try again the next time I came in. No matter the time of day or how busy they were, everyone said hello to you, by name, when you walked in making you feel very welcomed. Although I have recently graduated, I will sporadically go back so I can have Kate continue to help me recover, get new exercises for strength, and to just say hello to the staff. I could not be more happy with my recovery and the awesome people at Atlas who helped make it happen. ”

Rachel M

Denver, CO

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“ Laura has been a godsend for me and has helped put me back together more than once! I came in when I was pregnant for a hip issues, then post pregnancy for a foot issue. Both situations I was treated... ”

“ Laura has been a godsend for me and has helped put me back together more than once! I came in when I was pregnant for a hip issues, then post pregnancy for a foot issue. Both situations I was treated wonderfully by the administrative staff and the physical therapist. The new location is key, parking is ample. The are communicative, timely and most importantly, work wonders on what ails you! ”

Heidi K

Denver, CO

[View all yelp reviews](#)

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“ Iâ€ve been impressed and very satisfied with Atlas Physical Therapy ever since I started seeing them after a foot surgery in 2021. When I returned a year or so later in 2022 I worked closely with... ”

“ Iâ€ve been impressed and very satisfied with Atlas Physical Therapy ever since I started seeing them after a foot surgery in 2021. When I returned a year or so later in 2022 I worked closely with Andrea and Nate. Not only were they fantastic to work with, they were excellent listeners and very effective at finding the best treatment to alleviate my issues. I highly recommend using them for your PT needs! ”

Kristi S

Denver, CO

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“ Am 77 years old and started seeing Lexi at the Stapleton location for strengthening of an achilles tendon injury, core strength training, and flexibility and balance training. Lexi was very sensitive... ”

“ Am 77 years old and started seeing Lexi at the Stapleton location for strengthening of an achilles tendon injury, core strength training, and flexibility and balance training. Lexi was very sensitive to all of my needs and concerns and included all of the areas that I wanted to improve upon in each workout. I have improved significantly in each of those areas and Lexi has given me a series of exercises and stretches to maintain and continue to build on my own. I highly recommend Lexi to anyone seeking to improve themselves in a serious yet fun environment. ”

Wayne B

Denver, CO

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“ I am really grateful to Alex and his crew, they helped me with an ankle injury and my back issues. He helped strengthen and rehabilitate my ankle, while leaving me feeling like he was really... ”

“ I am really grateful to Alex and his crew, they helped me with an ankle injury and my back issues. He helped strengthen and rehabilitate my ankle, while leaving me feeling like he was really invested in my recovery. When we had reached a point where I was still having some pain but he had done all that he could, he didnâ€™t just keep taking my money, he made a suggestion for a doctor that might be able to help me further. I recommend them regularly and will be back with any future injuries. ”

Susie B

Denver, CO

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“ Iâ€ve struggled for seven years with ankle pain since tearing a ligament, and also developed really bad runnerâ€™s knee while training for my first half marathon last year. The only other time... ”

“ Iâ€ve struggled for seven years with ankle pain since tearing a ligament, and also developed really bad runnerâ€™s knee while training for my first half marathon last year. The only other time Iâ€™d been to physical therapy for a previous injury, the results were temporary. Alex at Atlas PT explained the why behind my pain, gave me detailed exercises and therapy that were doable, I noticed results immediately... and four years later, I can still run, hike, and ski again without pain. ”

Rachel W
Denver, CO
[View all yelp reviews](#)

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“ Hey! Iâ€ve been working with Alex Lanton following two surgeries on my foot. Heâ€s so smart, fun, and effective. I would never go anywhere else for my PT needs. ”

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Jenna T
Denver, CO
[View all google reviews](#)

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“ My daughter saw Nikhil to address ankle pain due to hypermobility. He was great at quickly identifying the issue, explaining it, and prescribing easy and effective exercises that helped very quickly. Great experience. ”

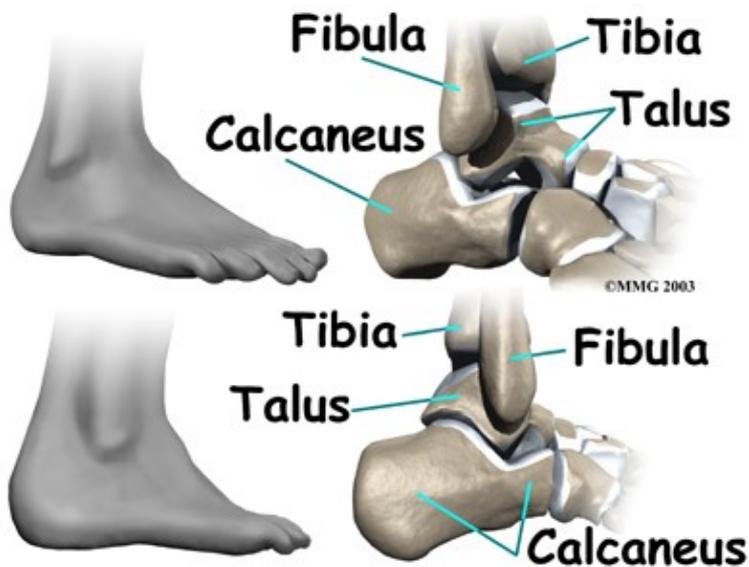
Sarah J
Denver, CO
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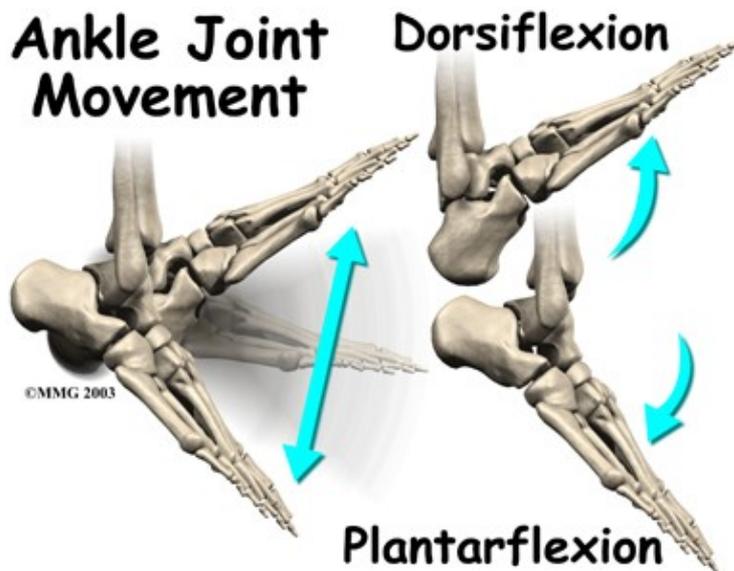
Bones and Joints

The ankle joint is formed by the connection of three bones. The ankle bone is called the *talus*. The top of the talus fits inside a socket that is formed by the lower end of the *tibia* (shinbone) and the *fibula* (the small bone of the lower leg). The bottom of the talus sits on the heelbone, called the *calcaneus*.



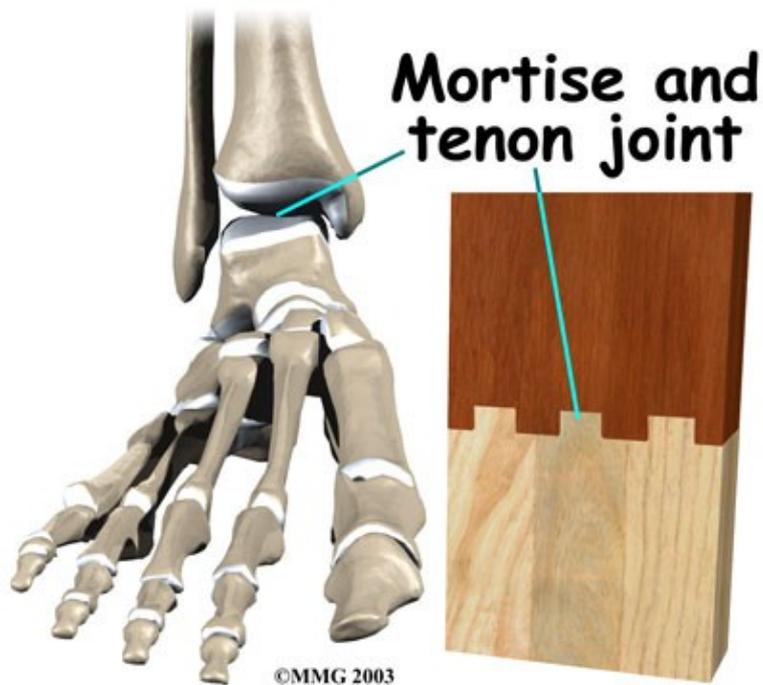
The talus works like a hinge inside the socket to allow your foot to move up (*dorsiflexion*) and down (*plantarflexion*).

Talus Works Like a Hinge



Woodworkers and craftsmen are familiar with the design of the ankle joint. They use a similar construction, called a mortise and tenon, to create stable structures. They routinely use it to make strong and sturdy items, such as furniture and buildings.

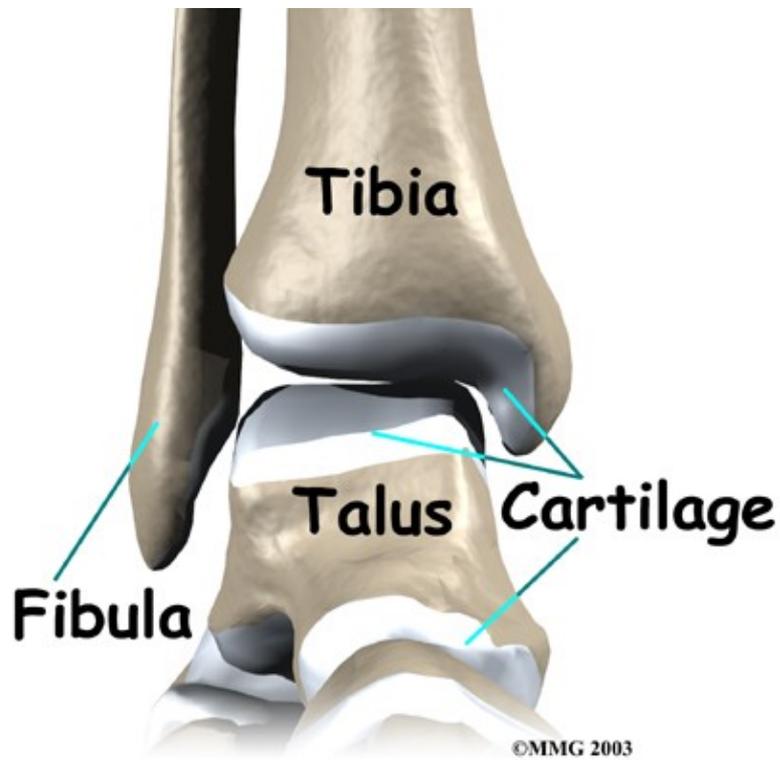
Mortise and Tenon



Inside the joint, the bones are covered with a slick material called *articular cartilage*. Articular cartilage is the material that allows the bones to move smoothly against one another in the joints of the body.

The cartilage lining is about one-quarter of an inch thick in most joints that carry body weight, such as the ankle, hip, or knee. It is soft enough to allow for shock absorption but tough enough to last a lifetime, as long as it is not injured.

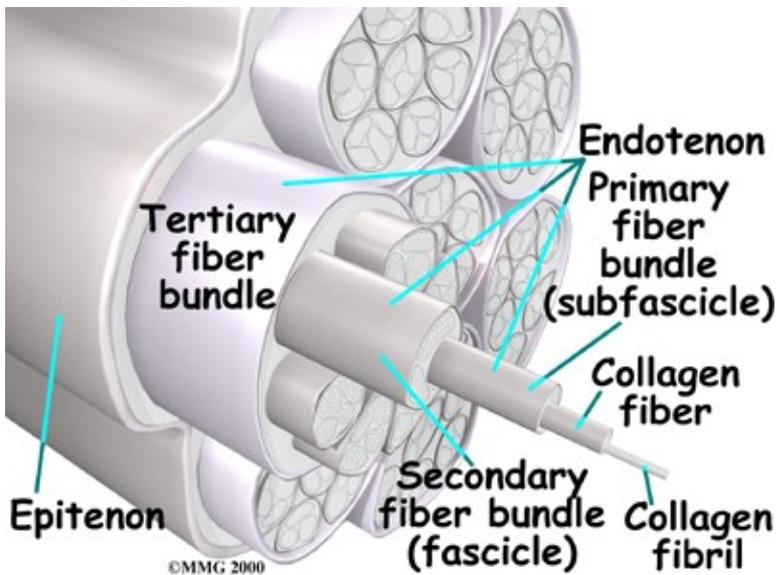
Cartilage



Ligaments and Tendons

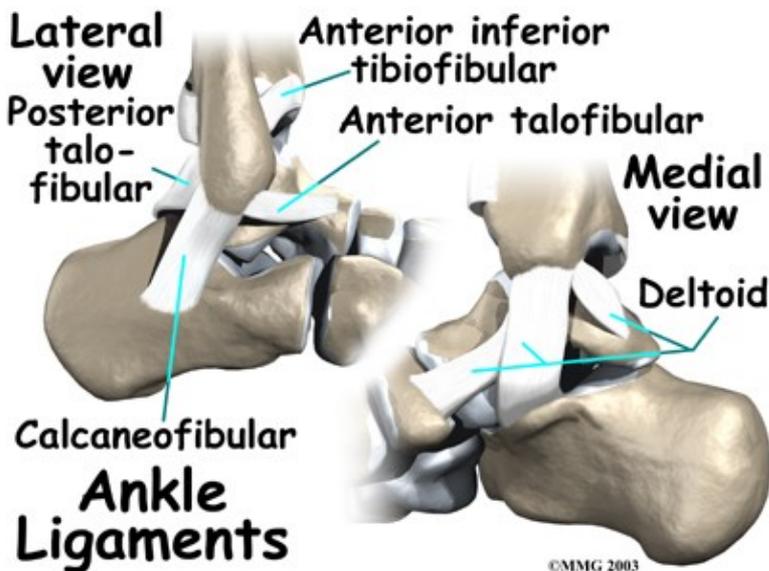
Ligaments are the soft tissues that attach bones to bones. Ligaments are very similar to *tendons*. The difference is that tendons attach muscles to bones. Both of these structures are made up of small fibers of a material called collagen. The collagen fibers are bundled together to form a rope-like structure. Ligaments and tendons come in many different sizes and like rope, are made up of many smaller fibers. Thickness of the ligament or tendon determines its strength.

Collagen



Ligaments on both sides of the ankle joint help hold the bones together. Three ligaments make up the *lateral ligament complex* on the side of the ankle farthest from the other ankle. (*Lateral* means further away from the center of the body.) These include the *anterior talofibular ligament (ATFL)*, the *calcaneofibular ligament (CFL)*, and the *posterior talofibular ligament (PTFL)*. A thick ligament, called the *deltoid ligament*, supports the *medial* ankle (the side closest to your other ankle).

Three Main Ligaments

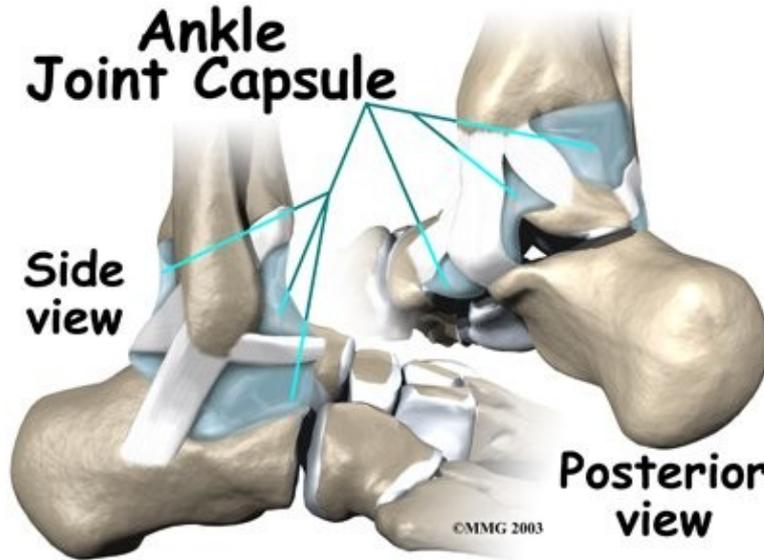


Ligaments also support the lower end of the leg where it forms a hinge for the ankle. This series of ligaments supports the ankle *syndesmosis*, the part of the ankle where the bottom end of the fibula meets the tibia. Three main ligaments support this area. The ligament crossing just above the front of the ankle and connecting the tibia to the fibula is called the *anterior inferior tibiofibular ligament (AITFL)*. The *posterior fibular ligaments* attach across the back of the tibia and fibula. These ligaments include the *posterior inferior tibiofibular ligament (PITFL)* and the *transverse ligament*. The *interosseous ligament* lies between the tibia and fibula. (*Interosseous* means between bones.) The interosseus ligament is a long sheet of

connective tissue that connects the entire length of the tibia and fibula, from the knee to the ankle.

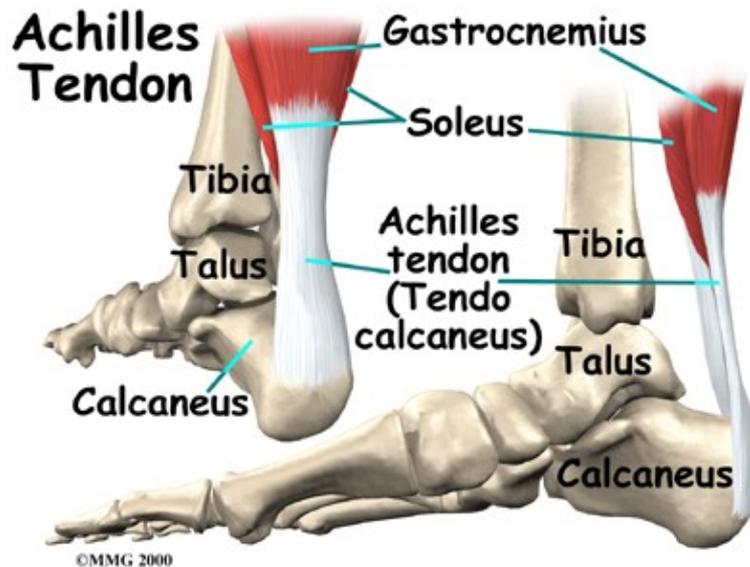
The ligaments that surround the ankle joint help form part of the joint capsule. A joint capsule is a watertight sac that forms around all joints. It is made up of the ligaments around the joint and the soft tissues between the ligaments that fill in the gaps and form the sac.

Joint Capsule

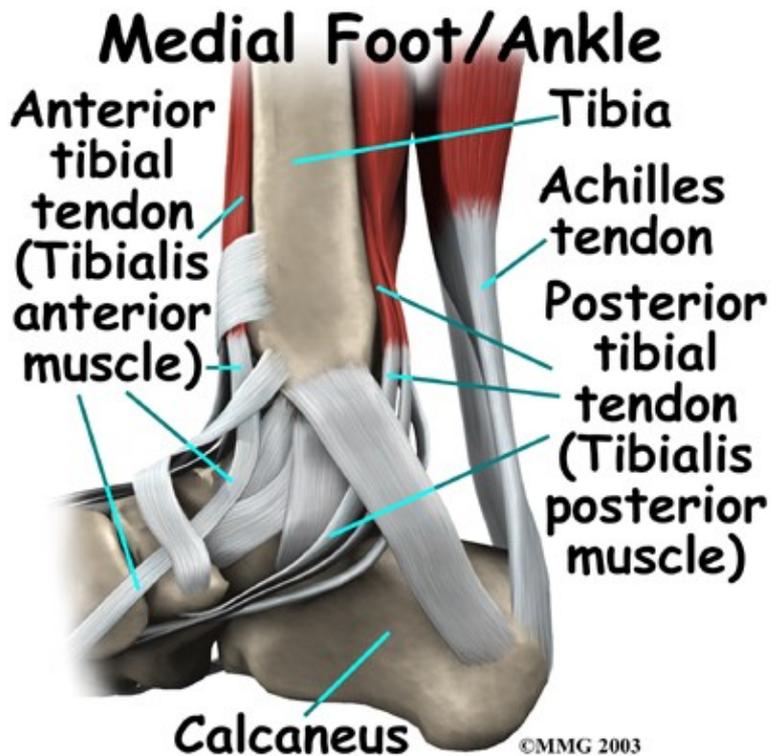


The ankle joint is also supported by nearby tendons. The large Achilles tendon is the most important tendon for walking, running, and jumping. It attaches the calf muscles to the calcaneus (heelbone) and allows us to raise up on our toes. The posterior tibial tendon attaches one of the smaller muscles of the calf to the underside of the foot. This tendon helps support the arch and allows us to turn the foot inward.

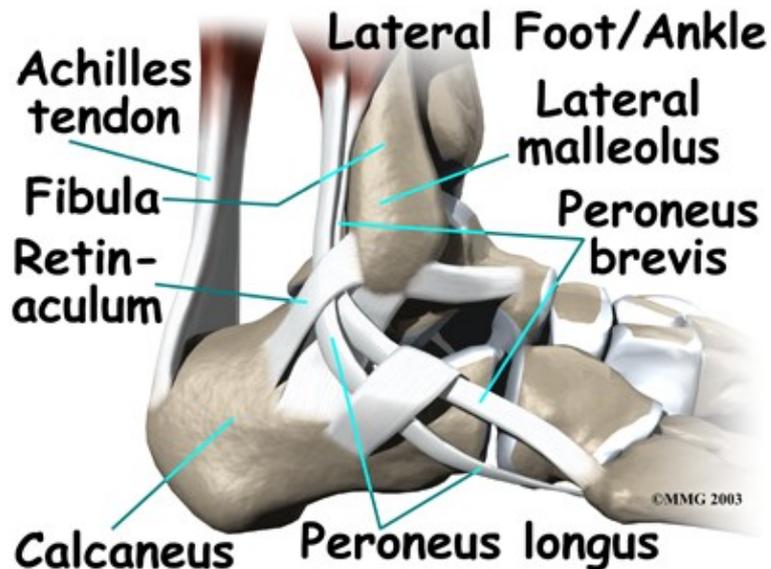
Achilles Tendon



Posterior Tibial Tendon



The anterior tibial tendon allows us to raise the foot. Two tendons run behind the outer bump of the ankle (the lateral malleolus). These two tendons, called the peroneals, help turn the foot down and out.



Muscles

Most of the motion of the ankle is caused by the stronger muscles in the lower leg whose tendons pass by

the ankle and connect in the foot. Contraction of the muscles in the leg is the main way that we move our ankle when we walk, run, and jump.

The key ankle muscles have been discussed earlier in the section on ligaments and tendons. These muscles and their actions are also listed here.

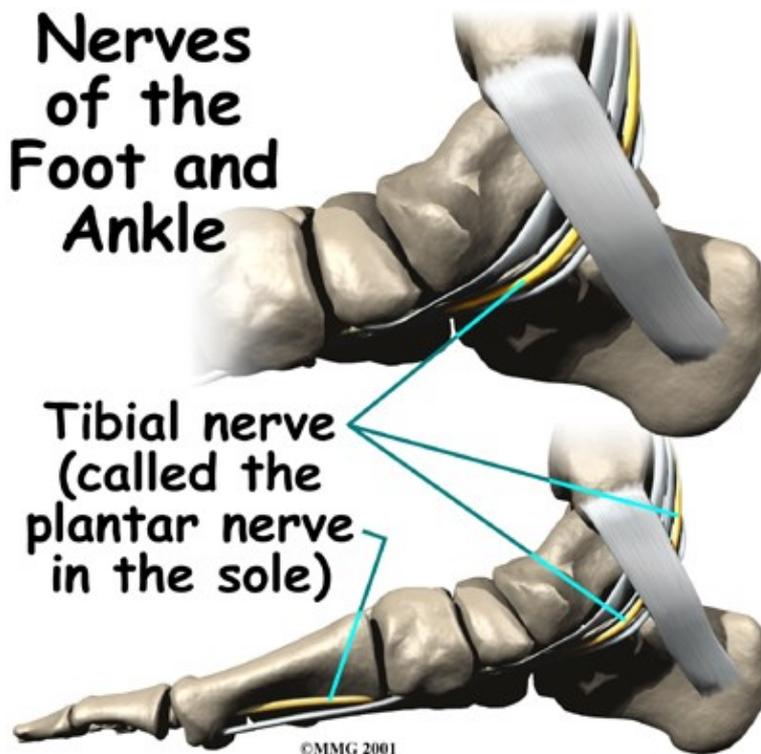
- The peroneals (*peroneus longus* and *peroneus brevis*) on the outside edge of the ankle and foot bend the ankle down and out.
- The calf muscles (*gastrocnemius* and *soleus*) connect to the calcaneus by the Achilles tendon. When the calf muscles tighten, they bend the ankle down.
- The posterior tibialis muscle supports the arch and helps turn the foot inward.
- The anterior tibialis pulls the ankle upward.

Nerves

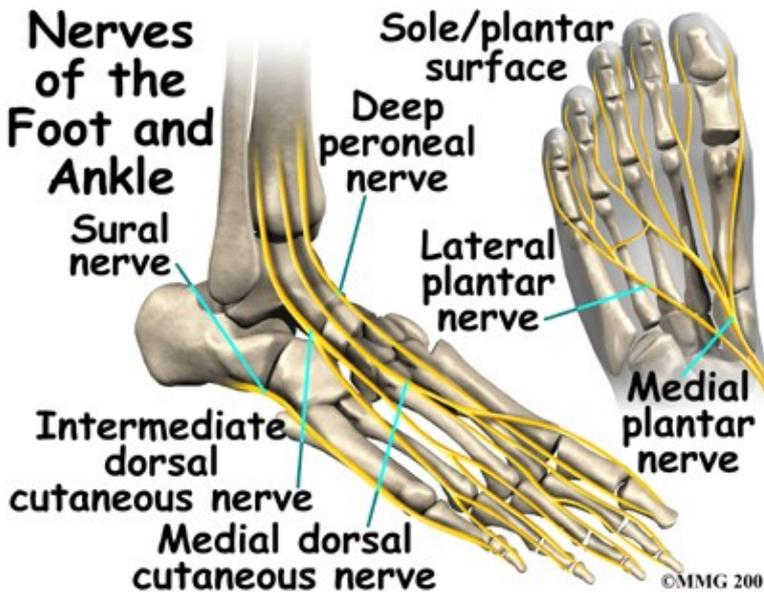
The nerve supply of the ankle is from nerves that pass by the ankle on their way into the foot. The tibial nerve runs behind the medial malleolus. Another nerve crosses in front of the ankle on its way to top of the foot. There is also a nerve that passes along the outer edge of the ankle. The nerves on the front and outer edge of the ankle control the muscles in this area, and they give sensation to the top and outside edge of the foot.

Tibial Nerve

Nerves of the Foot and Ankle



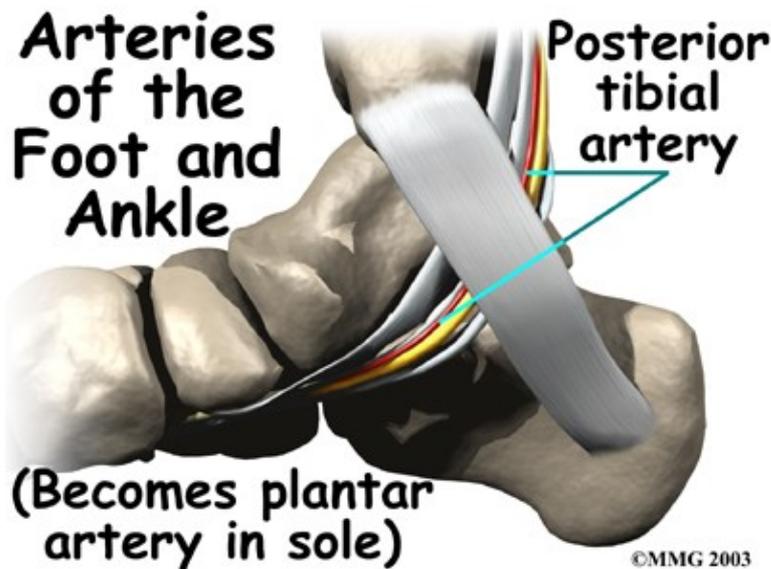
Nerves on Front and Outer Edge



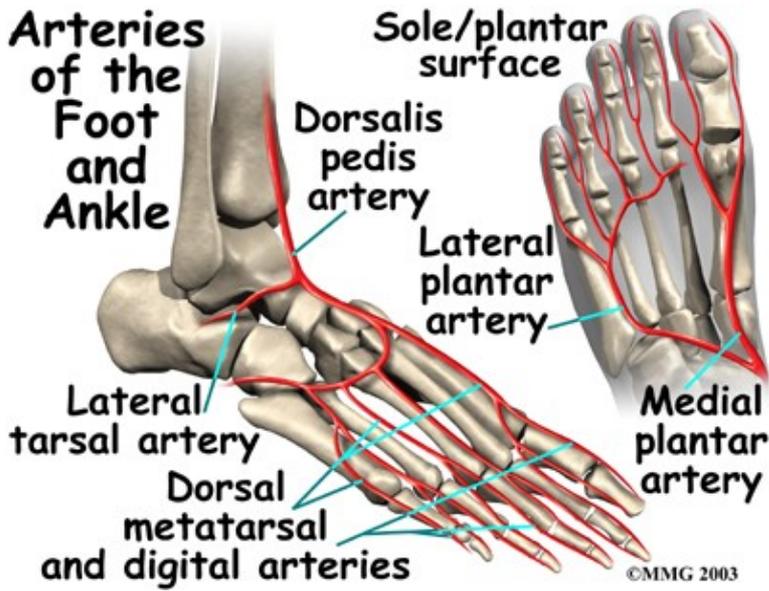
Blood Vessels

The ankle gets blood from nearby arteries that pass by the ankle on their way to the foot. The *dorsalis pedis* runs in front of the ankle to the top of the foot. (You can feel your pulse where this artery runs in the middle of the top of the foot.) Another large artery, called the posterior tibial artery, runs behind the medial malleolus. It sends smaller blood vessels to the inside edge of the ankle joint. Other less important arteries entering the foot from other directions also supply blood to the ankle.

Posterior Tibial Artery



Arteries Entering the Foot



Summary

As you can see, the anatomy of the ankle is very complex. When everything works together, the ankle functions correctly. When one part becomes damaged, it can affect every other part of the ankle and foot, leading to problems.

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