# Part 1- Achilles Tendonitis Prevention

## Learn the causes behind Achilles Tendonitis, plus crucial prevention strategies.

Every week I get asked for information on Achilles Tendonitis. So instead of constantly referring people to other sites, I thought it was time to write an article on Achilles Tendonitis myself.

Achilles injuries are commonly associated with sports that require a lot of running, jumping and change of direction. Excessive twisting or turning of the ankle and foot can result in a rupture or strain. The sports that are most susceptible to Achilles injury include running, walking, cycling, football, basketball and tennis.

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| Achilles picture used from "Principles of Anatomy and Physiology" - Sixth Edition. By G.J. Tortora and N.P. Anagnostakos. Published by Harper & Row - 1990 |
| Achilles tendon image from [Principles of Anatomy andPhysiology](http://www.amazon.com/exec/obidos/ASIN/0470084715/stretching-20) by G.J. Tortora and N.P. Anagnostakos. |

**What is an Achilles Tendon Injury?**

Firstly, let's take a look at where the Achilles tendon is located and what it does.

As you can see from the diagram to the right, the Achilles tendon is located at the rear (posterior) of the bottom half of the lower leg. In the diagram it is represented by the thick band of connective fibre that runs from bottom of the Gastrocnemius muscle to the heel bone.

The Achilles tendon is used to plantar flex the foot, or point the foot downward. This allows a person the run, jump and stand on one's toes.

The Achilles tendon is the strongest tendon of the body, and able to withstand a 1000 pound force without tearing. Despite this, the Achilles ruptures more frequently than any other tendon because of the tremendous pressures placed on it during competitive sports.

There are two main types of injuries that affect the Achilles tendon; Achillis Tendonitis and Achilles Tendon Rupture.

**Achilles Tendonitis** is simply an inflammation of the tendon, and in most cases is caused by excessive training over an extended period of time.

**Achilles Tendon Rupture**, on the other hand, is a tear (or complete snapping) of the tendon, and usually occurs as the result of a sudden or unexpected force. In the case of a complete rupture, the only treatment available is to place the lower leg in a plaster cast for 6 to 8 weeks, or surgery. As both of these treatments are beyond the scope of this newsletter, we'll be focusing the rest of this article on Achilles Tendonitis.

**Causes and Risk Factors**

There are a number of causes and risk factors associated with Achilles Tendonitis. One of the most common causes is simply a **lack of conditioning**. If the tendon, and muscles that connect to the tendon, have not been trained or conditioned, this can lead to a weakness that may result in an Achilles injury.

**Overtraining** is also associated with Achilles Tendonitis. Doing too much, too soon places excessive strain on the Achilles tendon and doesn't allow the tendon enough time to recovery properly. Over time small tears and general degeneration result in a weakening of the tendon, which leads to inflammation and pain.

Other causes of Achilles injury include a lack of warming up and stretching. Wearing inadequate footwear, running or training on uneven ground, and simply standing on, or in something you're not meant to. Biomechanical problems such as high arched feet or flat feet can also lead to Achilles injuries.

So what are some of the things you can do to help prevent Achilles Tendonitis?

1. **Warm Up properly**
A good warm up is essential in getting the body ready for any activity. A [well structured warm up](http://www.thestretchinghandbook.com/archives/warm-up.php) will prepare your heart, lungs, muscles, joints and your mind for strenuous activity.
2. **Plyometric Training**
Plyometric drills include jumping, skipping, bounding, and hopping type activities. These explosive types of exercises help to condition and prepare the muscles, tendons and ligaments in the lower leg and ankle joint.
3. **Balancing Exercises**
Any activity that challenges your ability to balance, and keep your balance, will help what's called proprioception: - your body's ability to know where it's limbs are at any given time.
4. **Stretch and Strengthen**
I'll cover these in a lot more detail a little later on when I discuss rehabilitation and conditioning exercises.
5. **Footwear**
Be aware of the importance of good footwear. A good pair of shoes will help to keep your ankles stable, provide adequate cushioning, and support your foot and lower leg during the running or walking motion.

# Part 2- Initial Treatment for Achilles Tendonitis

## Learn the Immediate Treatment Procedures for Achilles Tendonitis.

In part 1, we took a look at [what Achilles Tendonitis is](http://www.thestretchinghandbook.com/archives/achilles-tendonitis-pt1.php). We had a look at the muscles and tendons that make up the Achilles; what happens when Achilles Tendonitis occurs; and the major causes and risk factors that contribute to Achilles Tendonitis.

In part 2, we're going to outline a detailed strategy for the initial treatment of Achilles tendonitis. Firstly, we'll look at the importance of the immediate treatment (the first 48 to 72 hours), and then we'll outline the ongoing treatment necessary for a full recovery.

**Immediate Treatment**

The immediate treatment of any soft tissue injury is vital. Proper care and treatment now will go a long way towards a full recovery later.

Without a doubt, the most effective, initial treatment for Achilles Tendonitis is the R.I.C.E.R. regime. This involves the application of **(R)** rest, **(I)** ice, **(C)** compression, **(E)** elevation and obtaining a **(R)** referral for appropriate medical treatment.

Where the R.I.C.E.R. regime has been used immediately after the occurrence of an injury, it has been shown to significantly reduce recovery time. R.I.C.E.R. forms the first, and perhaps most important stage of injury rehabilitation, providing the early base for the complete recovery of injury.

When an Achilles injury occurs and the tendon has been damaged there is a large amount of uncontrolled bleeding around the injury site. This excessive bleeding causes swelling, which puts pressure on nerve endings and results in increased pain. It is exactly this process of bleeding, swelling and pain that the R.I.C.E.R. regime will help to alleviate.

**R.I.C.E.R.**

**R:** (rest) It is important that the Achilles and lower leg be kept as still as possible. This will help to slow down blood flow to the tendon and prevent any further damage.

**I:** (ice) By far the most important part. The application of ice will have the greatest effect on reducing bleeding, swelling and pain. Apply ice as soon as possible after the injury has occurred.

How do you apply ice? Crushed ice in a plastic bag is usually best. Although blocks of ice, commercial cold packs and bags of frozen peas will all do fine. Even cold water from a tap is better than nothing at all.

When using ice, be careful not to apply it directly to the skin. This can cause "ice burns" and skin damage. Wrapping the ice in a damp towel generally provides the best protection for the skin.

How long? How often? This is the point where few people agree. Let me give you some figures to use as a rough guide, and then I'll give you some advice from personal experience. The most common recommendation is to apply ice for 20 minutes every 2 hours for the first 48 to 72 hours.

These figures are a good starting point, but remember, they're only a guide. You must take into account that some people are more sensitive to cold than others. Also be aware that children and elderly people have a lower tolerance to ice and cold. Finally, people with circulatory problems are also more sensitive to ice. Remember to keep these things in mind when treating yourself or someone else with ice.

Personally, I recommend that people use their own judgement when applying ice to themselves. For some people, 20 minutes is way too much. For others, especially well conditioned athletes, they can leave ice on for much longer. The individual should make the decision as to how long the ice should stay on.

My personal recommendation is that people should apply ice for as long as it is comfortable. Obviously, there will be a slight discomfort from the cold, but as soon as pain or excessive discomfort is experienced, it's time to remove the ice. It's much better to apply ice for 3 to 5 minutes a couple of time an hour, than not at all.

**C:** (compression) Compression actually achieves two things. Firstly, it helps to reduce both the bleeding and swelling around the Achilles, and secondly, it provides support for the ankle and lower leg. Use a wide, firm, elastic, compression bandage to cover the entire ankle and lower leg.

**E:** (elevation) Simply raise the injured leg above the level of the heart at all possible times. This will further help to reduce the bleeding and swelling.

**R:** (referral) If the injury is severe enough, it is important that you consult a professional physical therapist or a qualified sports doctor for an accurate diagnosis. They will be able to tell you the full extent of the injury.

Before we finish with the initial treatment and move onto the next phase of the rehabilitation process, there are a few things that you must avoid during the first 72 hours.

Be sure to avoid any form of heat at the injury site. This includes heat lamps, heat creams, spas, Jacuzzi's and saunas. Avoid all movement and massage of the injured area. Also avoid excessive alcohol. All these things will increase the bleeding, swelling and pain of your injury. Avoid them at all costs.

**After the first 48 to 72 hours**

So what happens after the first 48 to 72 hours? Let's first take a quick look at how damaged tendons repair themselves.

When any damage occurs to the soft tissue (muscles, tendons, ligaments), the body immediately goes into a process of repair. Where the individual fibres have been ruptures, or torn, the body begins to bind the damaged fibres together using a fibrous protein called collagen. Or, as it's more commonly known, scar tissue!

When a tendon is torn or strained, you would expect that the body would repair that damage with new tendon. In reality, this doesn't happen. The tear or rupture, is repaired with scar tissue.

Now this might not sound like a big deal, but if you have ever suffered an Achilles injury, (or any soft tissue injury) you'll know how annoying it is to keep re-injuring that same old injury, over and over again.

Scar tissue is made from a very tough, inflexible fibrous material. This fibrous material binds itself to the damaged tendon in an effort to draw the damaged fibres back together. What results is a bulky mass of fibrous scar tissue completely surrounding the injury site. In some cases it's even possible to see and feel this bulky mass under the skin.

When scar tissue forms around an injury site, it is never as strong as the tissue it replaces. It also has a tendency to contract and deform the surrounding tissues, so not only is the strength of the tissue diminished, but flexibility of the tissue is also compromised.

**So, how do we get rid of that annoying formation of scar tissue?**

Firstly, you must keep active! Don't listen to anyone who tells you to do nothing. Now is the time to start active rehabilitation. Most of the swelling will have subsided after the first 48 to 72 hours and you are now ready to start light activity.

Light activity will not only promote blood circulation, but it will also activate the lymphatic system. The lymphatic system is vital in clearing the body of toxins and waste products, which can accumulate in the body following a sports injury. Activity is the only way to activate the lymphatic system.

Before we move on, a quick word of warning. Never, Never, Never do any activity that hurts the injured area. Of course you may feel some discomfort, but NEVER, NEVER push yourself to the point where you're feeling pain. Listen to your body. Don't over do it at this stage of the recovery, you've come too far to blow it now.

To remove most of the unwanted scar tissue, you now need to start two vital treatments. The first is commonly used by physical therapists (or physiotherapists), and primarily involves increasing the blood supply to the injured area. The aim is to increase the amount of oxygen and nutrients to the damaged tissues.

You see, the Achilles tendon receive very little blood supply, as compared to a muscle for example. So it's vitally important to increase the blood flow to the injured area. This will help supply the tendon with the oxygen and nutrients they need for a speedy recovery.

Physical Therapists accomplish this aim by using a number of activities to stimulate the injured area. The most common methods used are ultrasound and heat.

Ultrasound, or TENS (Transcutaneous Electrical Nerve Stimulation) simply uses a light electrical pulse to stimulate the affected area. While heat, in the form of a ray lamp or hot water bottle, is very effective in stimulating blood flow to the damaged tissues.

Secondly, to remove the unwanted scar tissue it is vital that you start to massage the injured tendon and connecting muscles. While ultrasound and heat will help the injured area, they will not remove the scar tissue. Only massage will be able to do that.

To start with, the Achilles tendon may be quite tender. So start with a light stroke and gradually increase the pressure until you're able to use firm strokes.

Concentrate your effort at the direct point of injury, and use your thumbs to get in as deep as possible to break down the scar tissue.

Be sure to drink plenty of fluid during your injury rehabilitation. The extra fluid will help to flush a lot of the waste products from your body.

# Part 3- Rehabilitation Exercises to Prevent Achilles Tendonitis Re-Injury

## Learn the crucial 4 steps to properly rehabilitate Achilles tendonitis and make your Achilles stronger than it's ever been.

In this part we're going to cover 4 crucial steps for completely rehabilitating the Achilles tendon and entire lower leg complex. We'll look at the rehabilitation and conditioning exercises needed to get your Achilles back to 100% and better.

If you've followed the advice from the previous two parts, you've come over 80% of the way. You may even feel that your Achilles is fully recovered. Your treatment so far may have stopped the swelling and bleeding, and it may have reduced the amount of scar tissue in the Achilles and calf muscles.

However, fixing your Achilles tendonitis is as much about treating the condition as it is about preventing it from re-occurring. If you've ever suffered from any sporting injury in the past, you'll know how annoying it is to think you're recovered, and then out-of-the-blue, you're injured again and back to where you started. It can be one of the most frustrating and heart-breaking cycles an athlete, or anyone else for that matter, can go through.

**Active Rehabilitation**

Most people will refer to this phase of your recovery as the active rehabilitation phase, because during this phase you will be responsible for the rehabilitation process. You will be doing the exercises and activities required to speed up your full recovery.

The aim of this phase of your rehabilitation is to regain all the fitness components that were lost because of the injury. Regaining your flexibility, strength, power, muscular endurance, balance, and co-ordination will be the primary focus. Without this phase of your rehabilitation there is no hope of completely and permanently making a full recovery.

The first point to make clear is how important it is to keep active. Often, the advice from doctors and similar medical personnel will simply be; rest. This can be one of the worst things you can do. Without some form of activity the injured area will not receive the blood flow it requires for recovery. An active circulation will provide both the oxygen and nutrients needed for the injury to heal.

**Warning!**

Never, never, never do any activity that hurts your Achilles. Of course you may feel some discomfort, but never push yourself to the point where you're feeling pain. Be very careful with any activity you do. Pain is the warning sign; don't ignore it. One of the worst things you can do is start this phase of your rehabilitation too early. If you have any doubts about performing the exercises in this article, please refer to part 1 or part 2 of this article below.

In part 1, we looked at [what Achilles Tendonitis is](http://www.thestretchinghandbook.com/archives/achilles-tendonitis-pt1.php). We had a look at the muscles and tendons that make up the Achilles; what happens when Achilles Tendonitis occurs; and the major causes and risk factors that contribute to Achilles Tendonitis.

In part 2, we outlined a detailed strategy for the [initial treatment of Achilles tendonitis](http://www.thestretchinghandbook.com/archives/achilles-tendonitis-pt2.php). Firstly, we reviewed the importance of the immediate treatment (the first 48 to 72 hours), and then we outline the ongoing treatment necessary for a full recovery.

Please note: The order of the exercises listed below is very important. The exercises start with gentle easy movements and progress to intense dynamic exercises. Please start with the range of motion exercises listed below and only move onto the next set of exercises when these can be performed pain free.

1. **Range of Motion Exercises**

Regaining a full range of motion of your Achilles, ankle joint and lower leg is the first priority. A full range of motion is extremely important, as it lays the foundation for more intense and challenging exercises later in the active rehabilitation process.

As you work through the initial stages of recovery and your Achilles begins to heal, start to introduce some very gentle movements. First bending and straightening your ankle, then as you get more comfortable with this simple movement, start to incorporate some rotation exercises. Turn your ankle from side to side, and rotate clockwise and anti-clockwise.

When you feel comfortable with these range of motion exercises and can perform them relatively pain free, it's time to move onto the next phase of the active rehabilitation process.

1. **Stretch and Strengthen Exercises**

Now it's time to add some intensity to the range of motion exercises. The aim here is to gradually re-introduce some strength back into the injured muscles, ligaments and tendons.

When attempting to increase the strength of your Achilles, be sure to approach this in a gradual, systematic way of lightly over-loading the muscles and tendons. Be careful not to over-do this type of training. Patience is required.

An effective and relatively safe way to start is to begin with **isometric** exercises. These are exercise where the ankle joint itself does not move, yet force is applied and the calf muscles and Achilles are contracted.

For example: imagine sitting in a chair while facing a wall and then placing the ball of your foot against the wall. In this position you can push against the wall with your foot and at the same time keep your ankle joint from moving. The muscles contract but the ankle joint does not move. This is an isometric exercise.

The above example can be used to strengthen the Achilles and ankle joint in all directions. Pushing your foot to the left or right against something immoveable, and pushing down (as above) and pulling up.

It's also important at this stage to introduce some gentle stretching exercise. These will help to further increase your range of motion and prepare your Achilles for more strenuous activity to come. While working on increasing the flexibility of your Achilles, it's also important to increase the flexibility of the muscle groups around the injured area. These include the calf muscles, and the anterior muscles of your shin.

1. **Balance and Proprioception Exercises**

This phase of the rehabilitation process is often overlooked and is one of the main reasons why old injuries keep re-occurring. Once you feel some strength returning to your Achilles it's time to incorporate some balancing drills and exercises.

When muscles and tendons are torn, nerves are also damaged. These nerves send vital information to the brain about the specific position and location of the Achilles tendon and ankle joint in relation to the rest of your body.

Without this information the muscles, tendons and ligaments are constantly second-guessing the position of the Achilles and ankle joint. This lack of awareness about the position of the lower leg can lead to a re-occurrence of the same injury long after you thought it had completely healed.

Balancing exercises are important to help re-train the damaged nerves around your lower leg and ankle joint. Start with simple balancing exercises like walking along a straight line, or balancing on a beam. Progress to one-leg exercises like balancing on one foot, and then try the same exercises with your eyes closed.

When you're comfortable with the above activities, try some of the more advanced exercises like wobble or rocker boards, swiss balls, stability cushions and foam rollers.

1. **Plyometrics and Sports Specific Exercises**

This last part of the rehabilitation process will aim to return your Achilles to a pre-injury state. By the end of this process your Achilles should be as strong, if not stronger, than it was before you injured it.

This is the time to incorporate some dynamic or explosive exercises to really strengthen up your Achilles tendon and improve your proprioception. Start by working through all the exercises you did above, but with more intensity.

For example, if you were using light isometric exercises to help strengthen your Achilles and calf muscles, start to apply more force, or start to use some weighted exercises.

From here, gradually incorporate some more intense exercises. Exercises that relate specifically to your chosen sport are a good place to start. Things like skill drills and training exercises are a great way to gauge your fitness level and the strength of your Achilles and lower leg.

To put the finishing touches on your Achilles recovery, I always like to do a few plyometric drills. Plyometric exercises are explosive exercises that both lengthen and contract a muscle at the same time. These are called eccentric muscle contractions and involve activities like jumping, hoping, skipping and bounding.

These activities are quite intense, so remember to always start off easy and gradually apply more and more force. Don't get too excited and over-do-it, you've come too far to do something silly and re-injure your Achilles.

Article by Brad Walker and Injury Fix™
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