Shin Splint Solutions

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Introduction

If you have been suffering with the pain of Shin Splints and have found yourself frustrated by your search for relief, then you have made a wise purchase in Shin Splint Solutions. In the following pages, you will both empower yourself with new knowledge about this annoying problem as well as find the pain relief you have been looking for.

My name is Dr. Peggy Malone and I have been helping athletes with Shin Splints to find relief and go back to their sport not only pain free but...stronger and faster than before for close to ten years...and....I can help you too!

**My Story:** Believe me, I can relate to where you are right now and how you feel because it was only a few short years ago that I was super frustrated with the problem of Shin Splints both as a health care professional...and as an athlete!

I was training for my first marathon and I had constant shin pain that got worse with every long run. I was EXTREMELY frustrated that I couldn’t solve the problem because my education and tools as a health care practitioner should have given me the answers to relieve my pain. I tried ALL the traditional solutions...rest, ice, pain medication, stretching. I got only temporary relief from the agony that returned
every time I went back to my running. It took the enjoyment out of my training and it was the catalyst for my professional curiosity.

In my practice, I had many patients with the same Shin Splint pain and the same frustration that I was dealing with. Using the knowledge that I had back then, I could only help them to achieve the same temporary relief that I found for myself but couldn’t find the long term solution to this very annoying problem...

I wish that during my early professional years, and through my own initial struggles with Shin Splints, I had known what I know now. I have spent thousands of dollars and an equal number of hours going to seminars, reading books, talking to various experts and learning about sports injuries including repetitive strain injuries like Shin Splints.

Since then, I have overcome my own shin pain and have completed many races of varying distances including half and full marathons as well as 2 half Ironman triathlons and 2 Ironman triathlons. My own athletic endeavours along with my education and experience have given me valuable insight into working with athletes for both the care of injuries as well as for the improvement of athletic performance.

In the following pages, it is my sincere hope that you find the solution to your Shin Splint puzzle. Let’s get started...
Chapter 1: What are Shin Splints and What Causes Them?

What are Shin Splints?
The name ‘Shin Splints’ is used by both patients and health care professionals to describe a variety of lower leg problems. It refers to a generalized group of overuse injuries and pathologies of the lower leg. The term does not include the more sinister diagnoses of stress fracture and compartment syndrome. (We will cover these in a later chapter)

Shin Splints are essentially an exercise-induced form of lower leg pain common among athletes. The pain is usually around the tibia (the shin bone).

One specific type of Shin Splint limited to the medial (inside) portion of the tibia is the most common cause of leg pain encountered in sports medicine practices. The term used to describe it is Medial Tibial Stress Syndrome (MTSS) and it is a specific overuse injury producing pain along the posteromedial (inside and behind the tibia) aspect of the lower 2/3s of the tibia.
Anatomy
To better understand Shin Splints, or MTSS, lets have a look at the muscles, tendons and bones involved.

The lower leg is made up of two bones. The larger bone, the one typically known as the shin bone, is called the tibia. The smaller, thinner bone on the outside of the lower leg is called the fibula.

The two muscles that are most commonly involved in Shin Splints are the tibialis anterior muscle which is located on the front of the shin and the posterior tibialis muscle which is located inside and behind the tibia. The tibialis anterior muscle dorsiflexes the ankle bringing the toes closer to the knee. The posterior tibialis muscle stabilizes the medial arch of the foot and plantar flexes the ankle bringing the toes into a pointed down position. Both muscles...
invert the foot during gait countering pronation. (Don’t worry...this will make more sense when we talk about biomechanics of the feet)

The pain and soreness of Shin Splints can either be located anteriorly on the front of the leg or medially on the inside of the leg.

If the pain is on the front of the leg and is especially intense when lifting your toes off the floor while your heel is still firmly planted then you are probably suffering from Anterior Shin Splints. If the pain is more medial on the inside edge of the shin bone, then the problem is most likely the more common Posterior Shin Splints. (MTSS)

Shin Splints have been thought to be an inflammation of the periosteum (membrane covering the bone) due to excessive traction causing a tearing away of muscle fibres at the muscle-bone interface. Recent studies say that it is not an inflammatory process but instead a stress reaction of bone that has become painful.

Despite the controversy over the exact etiology, the overuse injury compromises the dense and tough fascial attachments of the tibialis muscles at the tibia which affects both the muscles and their
attachment at the bone and causes the agonizing pain that keeps you from your activities.

**What Causes Shin Splints?**

There are 5 major factors to consider when discussing the causes for Shin Splints:

1) **Training Methods**: Shin Splints are most likely to appear when you change the type of training, when you increase the intensity or frequency of training and when you increase the duration of training. This is especially true if the changes are abrupt.

2) **Training Surfaces**: Training on hard or uneven surfaces (again especially if you have never done this type of training before or if you have abruptly changed to this kind of workout) can lead to the onset of Shin Splint pain. The pain can appear after a workout on a very hard surface like concrete, or conversely after a workout where the terrain is uneven and unpredictable such as a run in sand or heavy snow.

3) **Muscle Dysfunction and Inflexibility**: Biomechanical abnormalities in the body such as misalignments, muscle imbalances, inflexibility, weakness and instability are all factors that can lead to the onset of stubborn Shin Splints. Over-pronation of the foot and inflexibility of the calf musculature are especially
troublesome factors that increase the likelihood of Shin Splints. We will cover these topics in detail in Chapters 2 and 4.

4) **Shoe Selection/Proper Equipment:** Making sure that you are wearing the correct shoe for your specific biomechanical pattern plays a huge role in preventing Shin Splints especially if your foot over-pronates. Chapters 2 and 3 discuss this in detail.

5) **Biomechanics of Running:** Injuries of the lower leg are very often related to improper technique or form while running. All of us learned to run when we were kids and back then....we were good at it. Since then, we have taken on postural or other repetitive habits that have tightened up certain muscles and have weakened others. As a result of these bad habits of life, many of us have ‘forgotten’ how to run in the way that we were designed to which makes us susceptible to injury. In Chapter 4, we will discuss the biomechanics of running and what you can do to change your form so that you will be less likely to be injured and hopefully you will perform better too!
Chapter 2: Foot Biomechanics and How Your Biomechanical Pattern Contributes to Shin Splints

“The human foot is a masterpiece of engineering and a work of art”
Leonardo Da Vinci (1452-1519)
**Biomechanics of the Foot**

Your feet are the foundation of the rest of your body and therefore they play an enormously important role in everything that happens above them...including Shin Splints.

The foot is designed to do two things every time you take a step. First it has to absorb the shock of your body weight and second it has to form itself into a rigid lever to push your body forward to the next step. These two functions are essentially opposite of one another which is why the design of the foot is so fabulous...in the split second of a running step your foot does its job as a shock absorber and then quickly changes into a rigid lever so that you can keep moving. Let’s explore how this happens...

**Pronation (Rolling In):** Pronation is normal and necessary for each step. It is the action of the foot rolling in such that it can absorb the weight of your body with each step.

**Supination (Rolling Out):** Supination is also normal and necessary for each step. It is the action of the foot rolling back out to line up the bones of the arch of the foot which form the rigid lever that helps you to move forward.

So simply put, for a normal functioning foot each step begins with the outside of the heel hitting the ground. Then the foot rolls in or
pronates to absorb the weight of the body. Then as the foot naturally progresses from heel to toe during foot strike, the foot rolls out or supinates in order to form the arch of the foot which is the rigid lever that pushes the body forward. Even though this is ‘Normal’ alignment, only about 20-30% of people have feet that follow this pattern.

**Neutral (Normal) Alignment of the Foot (Right foot)**

Biomechanical problems begin when a foot rolls in too much or it rolls out too much. A foot that is over-pronating or rolling in too much provides ample shock absorption for the body above it but it doesn’t allow the foot to supinate normally back to the place where the foot forms the rigid lever necessary for push off. As a result, the body compensates by pushing off with soft tissues like muscles, tendons and ligaments. If this happens enough times, overuse injuries such as Shin Splints may become a problem. Over-pronators make up the majority of the population and the majority of athletes struggling with Shin Splints. 70-80% of people have this biomechanical pattern.
Over-pronated Alignment of the Foot

Mild Over-pronation (Right Foot)  More Severe Over-pronation (Right Foot)

Conversely, a foot that rolls out too much or over-supinates (under-pronates) has a very effective rigid lever to push the body forward but it doesn’t allow the body above it the proper amount of shock absorption during the gait cycle. This lack of cushioning can lead to injuries such as stress fractures. This biomechanical pattern only makes up about 3% of the population so you are in the minority of athletes and Shin Splint sufferers if your feet follow this pattern.

Over-supinated (Under-pronated) Alignment of the Foot (Right Foot)
**How To Figure Out Your Biomechanical Pattern**

A health professional can help you to determine which of the biomechanical patterns your feet fall into, but you can get a pretty good idea by simply looking at the outline your wet foot makes on the floor. ‘The Wet Test’

When you get out of the shower what does your footprint look like?

A) You have a normal arch (neutral pronation) if: There's a distinct curve along the inside of your foot with a band a little less than half the width of your foot connecting the heel and toe.

B) You have a low arch (flat feet/ possible over-pronation) if: There's not much of a curve along the inside of your foot and your imprint shows almost the entire foot.

C) You have a high arch (supination or under-pronation) if: There's a very sharp curve along the inside of your foot and your imprint shows a very thin band between your heel and toe or no connection at all.
More Biomechanical Factors
The biomechanical pattern where the foot exhibits abnormal pronation is the most relevant to Shin Splint sufferers so we will explore it in a little more detail.

Abnormal pronation= Excessive pronation or pronation occurring when the foot should be supinating. As stated above, pronation of the subtalar (lower ankle/foot) joint is an important component of absorbing the forces of the body meeting the ground during the gait cycle.

When the amount of pronation is increased or when there is a change in the timing or the speed of pronation, the muscles of the lower leg that resist pronation (the tibialis muscles) have to work much harder. As a result, muscle fatigue occurs earlier which then increases the amount of force absorbed at the interface where the muscle meets the bone. This then leads to the painful symptoms of Shin Splints that you feel at your shin bone where those muscles attach.

This increased load on the tibialis muscles is even more pronounced when exercising on hard, non-compliant surfaces like concrete. So, if you have an over-pronating foot and you are training on hard surfaces, you are much more likely to develop painful stubborn Shin Splints.
Decrease in range of motion of ankle dorsiflexion is also an important factor to consider with respect to an increased prevalence of Shin Splints. This decrease indicates tightness of the superficial posterior group of muscles which includes the gastrocnemius muscle and the soleus muscle.

Tightness in these muscles can cause improper function of the joints of the entire leg. It also leads to excessive over-pronation by requiring the mid-foot and the forefoot to dorsiflex more (ie. lifting up the toes each step).

You can test to see if you have tight calf muscles (Gastrocnemius and Soleus) by sitting on a chair and straightening your leg out in front of you and bringing your toes back toward your knees (ie. dorsiflexing your ankle). You should be able to dorsiflex 10-15 degrees past 90 degrees. If your ankle seems stuck at 90 degrees or even less than 90 degrees then you most likely...
have a lot of tightness in your calves. You can test this flexibility another way by standing and doing a squat. If you can keep your heels on the ground as you squat down and bring your butt toward your feet, then you have good flexibility. If your heels want to come up off the floor or if your upper body comes way forward over your feet to keep you balanced, tight calf musculature is most likely part of your biomechanical picture.

Another risk factor for Shin Splints is decreased endurance or weakness in this muscle group. (Gastrocnemius and Soleus muscles). So a huge part of any program to reduce Shin Splints will involve the stretching and strengthening of this muscle group.
Chapter 3: Proper Shoe Selection for Your Biomechanical Pattern

For many beginner athletes the choice of footwear is all too often based on factors such as how much they cost, how pretty they are or even which celebrity has endorsed them. Many novice runners will go straight to the bargain table and look for the least expensive shoe that fits them and off they go. Conversely, some beginners assume that the most expensive shoe in the store is the best shoe.
In determining how to choose a running shoe, your choice of running shoes can make the difference between having a good or bad experience, running in comfort or pain, and, most importantly, whether you stay healthy or get injured. There really is no single 'best shoe' – as everyone has slightly different needs.

Choosing the right pair of running shoes can be overwhelming given all the high-tech shoes available, the in-your-face marketing strategies employed by big shoe companies and all the bells and whistles that are described with every different shoe that you look at.

Most shoe companies divide their shoes into three main categories: cushioned, stability and motion control. These options are essentially categorized by your biomechanical needs.

**Factors to Consider When Picking a Running Shoe:**

- Biomechanics-Foot Type and Gait Type
- Weight
- History of Running
- How Fast Do You Run?
- How Far Do You Run?
- Are you Injured or Have you Been Injured in the Past Year?
- What is Your Goal?
- The Fit of the Shoe
Biomechanics
One method of determining pronation and, ultimately, foot and gait type is by checking your arch height. The easiest way to figure out your arch height is by using the ‘Wet Test’, which we learned about in Chapter 2. Your arch height should give you a good head start on knowing which gait type you are. Your gait type will be determined by the amount of pronation that occurs during your gait cycle. If you still aren’t sure after doing the Wet Test you may have to consult a health care professional. Once you know your foot type and your gait type, you should have a fairly good indicator of which type of running shoe to choose.

1) If you have a low arch (flat feet/over-pronator) you should choose Motion Control Running Shoes. People with low arches are more likely to over-pronate (roll too far inward), which can lead to overuse injuries. Motion control shoes typically have lots of ‘stuff’ or support on the medial (inside) portion which helps to stop the
foot from over-pronating too much (ie. rolling in too far). They have a straight shape that gives maximum support to your foot and are the most rigid, control-oriented running shoes.

2) If you have a normal arch (neutral pronation) you should choose Stability Running Shoes. Stability shoes offer a good blend of cushioning, medial support and durability. They often have a semi-curved shape and don't control foot motion as strictly as motion-control shoes.

3) If you have a high arch (under-pronator) you should choose Cushioned Running Shoes. People with high arches typically don’t pronate enough and as a result miss out on the shock absorption benefit of the pronation motion. Cushioned shoes will allow your feet to roll inward in order to offer the needed shock absorption for this arch type. They have a curved shape to encourage foot motion and have the softest midsole with the least medial support.

Once you have determined your foot type and degree of pronation, one other important characteristic you'll need to look for is shoe shape. You can see the shape most clearly by looking at the bottom of the shoe.
Typically, running shoes come in three shapes (straight, semi-curved and curved) which correspond to the three types of prints revealed by the wet test. Most experts believe that:

Over-pronators should choose a running shoe with a Straight shape. Under-pronators should choose a running shoe with a Curved shape. Normal/Neutral pronators should choose a running shoe with a Semi-Curved shape.

**Weight**

In addition to your biomechanics, your weight impacts the arch of your foot and how it reacts in each running step. The more you weigh, the more force you will generate each time you put your body weight over your foot, and consequently heavier runners need a shoe that offers both cushioning for shock absorption and stability for added durability.

This factor is something that is often neglected or overlooked in specialty running stores. They will often look at your foot shape and biomechanics only and forget that extra weight may need more support.

It is relevant to mention here as well that all of the studies that are done on most athletic shoes are done using athletes that have a very low weight. So if you’ve read something about a shoe (especially a
shoe that is not very stable or supportive) and you think it might be for you, remember that shoe is designed for and performs best on an elite athlete with very little weight to support.

**History of Running**
What is your experience as a runner?, ie., how many years have you been putting one foot in front of the other? With more experience, you will have gained more strength in all of the muscles from your feet to your core that are important in supporting your feet and your body as you run. As a result, the longer you have been running, the less support you will need in your shoes.

If you have been running less than 3 years, I would still consider you to be a beginner from the perspective of your muscles and you will need a little more stability at your feet until you gain the necessary strength to prevent injury.

This 3 year rule is especially relevant if you are over 35 years old...Mother Nature is particularly mean to those of us in this category and so we have to be a little more cautious to prevent injury. (We have less flexibility, less pliability of soft tissues, less strength in all of our muscles, and a more difficult time coming back from injury)
How Fast Do You Run?

This is the number one thing that I have found that people will neglect to consider when they are searching for running shoes. You may be wondering why this is relevant. Well, let’s explore:

As you increase your pace, your foot biomechanics will shift in two important ways that will result in less support being required at your subtalar joint.

When we discussed biomechanics of the foot, you’ll remember that pronation and supination of the subtalar joint are both important parts of the gait cycle. When running slowly, the heel is the first part of the foot to strike the ground and the foot moves from pronation to supination as your foot moves along the ground toward the toes until you toe off.

So the first important biomechanical shift with increased speed is that moving faster will naturally take you out of pronation and into supination sooner as your foot will strike the ground closer to your toes rather than at your heel. A good example of this is a sprinter who is moving extremely fast. They will be on their toes for the whole sprint. You can also test this by watching what happens to your foot when stand flat foot on the ground in bare feet and then rise up onto your tiptoes. You should see that your arch rolls out in a supination motion.
The second important biomechanical factor that is relevant with increased pace is that, the faster you go, the less time your foot is on the ground. The less time your foot is in stance phase on the ground, the less subtalar stability or support it needs.

So you may be saying to yourself; ‘This is all very interesting Dr. Peggy, but how does it help me when I choose my shoe?’ Well let me tell you:

Here is a rough guide to speed and shoe selection. Remember that the general rule is: the faster you go, the less support you’ll need in your shoe. These speeds are for your long run pace. If you are faster or slower than indicated in this table, you’ll need less or more support accordingly.

<table>
<thead>
<tr>
<th>Less Support</th>
<th>Lots of Support</th>
</tr>
</thead>
<tbody>
<tr>
<td>6 min /mile</td>
<td>8 min / mile</td>
</tr>
<tr>
<td>3:40 min / km</td>
<td>5 min / km</td>
</tr>
</tbody>
</table>

**How Far Do You Run?**

How far you run is also relevant in shoe selection. If you are running 5km or a couple of miles a few times per week, you will have less repetition and less stress on your legs and feet than if you are
running hundreds of kilometres or miles per week. More distance will generally require more support especially if it is your first time training for a particular distance. It is important to keep in mind here that even elite and professional runners will have more support in their training shoes and then will use their racing flats (which have very little support) only on race day.

**Are you Injured or Have you Been Injured in the Past Year?**
If you are currently injured (which probably you are if you are reading this book) or if you have struggled with injury in the past year (and especially the last 3-6 months) then you will need more support at your subtalar joint until you can get past your injury and get healthy and strong again. Consider trying a more stable shoe than what you would normally wear for at least one year post injury to allow your body to keep moving and running but with a little more support.

**What is Your Goal?**
This is an interesting question that I bring up to the athletes that come into my practice that have struggled with Shin Splints or other running injuries and this is a question that you should definitely consider when you choose your shoes.

Many of the athletes I work with have talked to other athletes and they have been told to get ‘the newest, coolest’ shoe with less support...
that is lighter and which will ‘help to increase the strength of their muscles when they wear it so they can go faster’. Many athletes often decide to give it a try and then end up in my office with an injury.

Now it certainly is true that a lighter shoe can offer an advantage and it certainly is true that shoes with less subtalar stability can, in some cases, make your muscles work harder such that they will get stronger and help you to move faster. All of this is great....unless that isn’t your goal.

If your goal is to be active and get fit or to try something new or to have social time with friends or to get to the finish line upright and smiling with no injuries and you don’t care how fast you are going or how long it takes you to get there...then a shoe that will be supportive and help to prevent injury is a better option than the ‘newest, coolest’ shoe.

Just some food for thought to counter all of the marketing and peer pressure that you’ll get in your world as an athlete.

**Shoe Fit**

By now you probably have a pretty good idea of what type of running shoe you should be looking for and how to choose running shoes. However, it is still a good idea to go to a specialty running store to purchase your new shoes. The people who work in these stores are
knowledgeable and will guide you in making the best choice for your foot. If you have a particularly ‘special’ foot or if you have struggled finding the right shoe even with the advice of a specialty store, then consider seeing a health professional that has some expertise in this area.

Here are some tips for a successful running shoe shopping trip:

● Shop for shoes late in the day as your feet will tend to swell slightly throughout the day. Your feet will be at their largest in the late afternoon or evening.
● Try on the shoes with the socks that you will wear to run in them.
● If you wear orthotics, bring them with you. It will be good to get a feel for how they feel inside the shoe.
● It is often helpful to bring your old pair of shoes with you to the store (especially if they worked well)
● Make sure you measure both of your feet. Often, one foot is slightly larger than the other. You should be fitted for the larger foot.
● There should be a thumb width between your longest toe and the end of shoe. (if in between sizes go with the larger size).
● Your heel should fit snugly with no slipping. The mid-foot should be snug but not tight, and there should be enough room in the toe box to wiggle your toes.
Once you’ve found running shoes that feel right, walk/jog/run in them as much as you can. Some stores have a treadmill, others allow a run around the store or the parking lot or up and down the street. You need to feel the shoes in action.

**Motion Control/Stability Tests for Footwear**

Since most of the population (70-80%) and the majority of Shin Splint sufferers share an over-pronated biomechanical pattern, it is worthwhile going through a few tests that you can do on any shoe (running or casual) in any store to test for stability/motion control.

**Torsional Rigidity (Dish Rag Test)**

Take any shoe and try to twist it or wring it out like a dish rag. If the shoe moves or twists a lot, then it isn’t very stable.
Flexion Stability (Fold Test)
If you can fold a shoe in half and put it in your pocket, it is not very stable. There should be some fold at the toes to allow for forefoot flexion during gait.

Heel Counter Rigidity (Pinch Test)
The heel counter is the rigid piece at the back of the shoe that surrounds your heel. It helps to keeps the foot stabilized if it is firm. Test by pinching the back of the shoe.

When is it Time to Get New shoes?
Running shoes should be changed every 500 miles or 800 km. For a frequent runner, this equates to about a couple of times a year (every 6 months). Those who are heavier or who run on challenging surfaces
such as snow during the winter might need to change their shoes even more often (every 3 or 4 months).

When a patient presents to my office with a new symptom such as painful Shin Splints, one of the first things I ask about is the age and mileage of their shoes. Since shoes can appear to be in good condition but fail to provide adequate support, this is often a reason for a new injury.

If your shoes look like these shoes....it’s definitely time to go shopping for a new pair :) One more stability/motion control test is called the Upper Stability or Shelf Test. If you see your shoes drifting inward to the medial side as shown in this photo, they definitely don’t have any stability. Some casual or dress shoes come new like this so it’s worth checking them before you buy them to see if the upper part of the shoe leans in like this.
For those with biomechanical challenges such as excessive pronation, severe bunions or a leg length discrepancy; a good shoe may not be enough and a custom orthotic insert may be recommended. Orthotics can help correct the biomechanics of muscles in the lower leg and foot to help stabilize the foot and restore normal function. Talk to your health care provider about the best options for your feet.
Chapter 4: What Does Your Butt Have to Do With It?

What Does Your Butt Have to Do With Shin Splints?: When patients come into my office with shin or foot pain and I start talking to them about the function of their pelvic musculature, it often leads to confusion. This chapter will help to explain the vital connection between your core musculature including your gluteal muscles (your butt) and the annoying pain of Shin Splints.
Before we clear up the confusion, let me start by confusing you a little bit more with this statement: **Running is a one-legged sport.**

Huh? That’s the response I often get when I utter these words to a patient who is suffering with Shin Splints. Let me explain....the biomechanics of walking and running are quite different.

During walking, there is double support (i.e., two-feet support or both feet on the ground) between 25 to 30 percent of the gait cycle time.

During running, there is no double support, meaning that when you are in contact with the ground you are only ever on one foot at a time, hence: Running is a one-legged sport.

Ok, well that’s great but I am still confused about what all this has to do with Shin Splints. The gluteal muscles play an important role in stabilizing your pelvis when you are on one leg. If there is any biomechanical dysfunction involving the gluteal musculature, the entire leg (including your painful shins) can be affected.

**The Gluteal Musculature (Your Butt Muscles)**
The gluteals are a group of muscles that make up the posterior pelvis or the butt area. The major gluteal muscles are the gluteus maximus, medius and minimus.
The gluteus maximus muscle is a hip extensor muscle which pulls the leg back and propels the body forward during the gait cycle. It is the biggest strongest propulsion muscle in the body.

Gluteus Maximus Muscle

The gluteus medius and gluteus minimus muscles are hip abductor muscles which pull the leg up to the side. They are also extremely important stabilization muscles that keep the pelvis and the trunk stable during the gait cycle when you are on one leg.

Gluteus Medius Muscle   Gluteus Minimus Muscle
Mobilizer muscles act to move a limb or the trunk. They tend to act at specific times during the gait cycle and the muscle activity tends to be at a high level. For example, during running the gluteus maximus and the hamstrings are the main mobilizer muscles which contract to extend the hip joint to produce a push off so the body can move forward.

Stabilizer muscles act to control the motion of a limb or the trunk. They tend to act more continuously and the muscle activity tends to be at a low level. For example, the gluteus medius and gluteus minimus work to maintain a level pelvis when weight-bearing on one leg, preventing the unsupported side from dropping down. These muscles activate providing continuous endurance to maintain the optimal stable pelvic position while on one leg.

**Biomechanical Dysfunction of the Gluteal Region**

Human beings are designed to stand and walk and run and jump and hunt and gather. We are kinetic machines who should always be on the move. In modern day culture, instead of moving our bodies the way in which they were designed, all of us sit sit sit. We sit to go to school, to watch TV, to drive, to eat, to work at a computer and many of us sit all day at a desk for work.

Standing, walking and running all engage the gluteal and abdominal musculature and lengthen the hip flexor muscles. Sitting however,
tightens and shortens the hip flexors and inhibits, or turns off, the gluteal and abdominal musculature.

The best way to understand this is to imagine that your gluteal muscles have gone on holidays....they are no longer doing their job.

**Sherrington’s Law of Reciprocal Inhibition**

This law of muscular contraction states that when a muscle on one side of a joint is contracted, the muscle on the opposite side of the joint is sent a neurological signal to relax or release.

For example, in the upper arm, when the biceps muscle contracts, the triceps muscle relaxes and vice versa.

So when you are seated for long periods of time (as all of us are), the hip flexor muscle on the front of the hip (iliopsoas muscle) is tightened and shortened or contracted and the hip extensor muscle (gluteus maximus muscle) is relaxed or turned off.

This is a problem I see in almost every single patient regardless of their complaint.

So that’s the bad news, is there good news? Of course...you can wake up your gluteal region by stretching through the muscles that are tight and contracted as well as strengthening all of the weakened...
muscles that have been ‘turned off’. I usually describe this process as ‘re-introducing your brain to your butt’.

By making this ‘re-introduction, you will alleviate the pain associated with Shin Splints and you will also gain speed, strength and stability in your run as the gluteal muscles wake up to the job that they are meant to do.

**Reactivating your Gluteal Musculature**

The first exercises that patients usually focus on when they are making attempts to reactivate and strengthen their gluteal musculature are squats or lunges. **This is a mistake.**

If you are struggling with Shin Splints, a huge biomechanical contributor (as described above) is a lack of stability at the pelvis or at the feet which translates to the tibialis muscles, making them work harder which ultimately leads to your painful stubborn shins.

Doing a squat or a lunge with an unstable pelvis or feet will only aggravate the problem further. Instead, gluteal strength needs to be achieved in positions that won’t compromise the leg and lead to further stress at the shins. Only once you have achieved strength and stability gains with the more supported exercises is it appropriate to move on to squats and lunges.
Exercises To Strengthen and Stabilize your Gluteal Musculature
The first exercise I give to my patients is to make an isometric contraction (an increase in muscular tension without a change in muscle length) of their glutes in various positions as they go about their day. Hold the squeeze for 5-10 seconds for a set of 10 while sitting at a red light or standing in a line. If you can make this voluntary connection in a static position, then the contraction will be more likely to be there during functional movements like running.

You can start this isometric squeeze exercise right away, along with some of the techniques you will learn in Chapter 5, even if you are in a Shin Splint crisis. You may then want to ease into the other exercises for your glutes as the pain in your shins begins to subside.

The Clam Shell
This exercise will help you to isolate the gluteus medius muscle from a very supported position side-lying on the floor or bed.
Start by lying on your side with knees bent to 90 degrees and your feet parallel to your torso. Make sure that your hips stay stacked on top of one another throughout the exercise. Place your fingers on your gluteus medius muscle so that you can be sure that it activates during the movement. Slowly lift your knee while keeping the hips stacked. Repeat 20 times each side.

**The Bridge**

This exercise engages the gluteus maximus muscle that must work to support the back. The position on the floor allows strengthening of the glutes without putting stress on the knees or the lower legs.

Lie on your back with knees bent. Draw in the lower abdominals and curl the butt off the floor, lifting the hips until the knees, hips and chest are in line. Hold this position, purposefully squeezing the glutes to support the bridge position. Start with 10 x 10 seconds, building up to 2 x 60 seconds. Keep the pelvis level and the lower abdominals
drawn in. If you feel a strong contraction in the hamstrings or the lower back is straining, then you are not using your glutes strongly enough. Focus on squeezing your butt cheeks together to ensure they do the work.

**The Hip Hiker**

This exercise involves recruiting the gluteals to maintain a level pelvic tilt.

Stand on one leg on box or a step. Stand up with good posture, head looking forward into a mirror. Tilt the pelvis so the free side drops down. Your stance-leg knee should not have moved nor should your head or back. Focus on your gluteals on the stance leg (place your fingers on the gluteus medius muscle to ensure that it engages during the exercise). Pull the pelvis up from the tilted position until the free
side is level or even slightly higher. Slowly continue this hiking motion up and down. Complete 3 sets of 10 building up to 20 reps each side.

**One-Leg Squats**

This exercise is normally for the legs, but if performed with perfect technique it also works the gluteus medius and gluteus minimus of the stance leg in order to maintain pelvic stability. This exercise should be added to the others once you have made substantial gains in the strength of your glutes with the previous exercises and the pain of the Shin Splints is gone or mostly gone.

Stand on one leg in front of the mirror. Ensure your head is up and your shoulders are back, with the lower abdominals drawn in for
support. Place a hand on the wall for support until you have gained more strength. Arch your foot slightly to ensure your knee is not pointing inwards. Squat down with your butt going back and your knee staying over your laces. Keep the free-leg knee next to the stance knee to ensure you stay aligned. Keep your pelvis level and square as you squat down. Stand back up, ensuring everything remains aligned. Build up to completing 3 sets of 10 each leg.

**So, What does your Butt have to do with it?**

The kinetic chain (anatomy train) that goes from the ground at your feet, up through your ankle, knee and hip and into your core is vital in terms of stability for every person, especially during running gait.

In Chapter 3, we talked about stabilizing the foundation of this chain by choosing proper footwear. Now we know that there should be equal importance placed on the stability and function of the pelvis and the core....and in particular, the gluteal musculature. If the feet and the pelvis are both strong and stable, all of the musculature in between will be less likely to be injured as it won’t have to work as hard to try and make up for a lack of stability.

Remember that your Gluteus Maximus is your biggest strongest propulsion muscle. The Gluteus Medius is one of your most important muscles for maintaining stability while on one leg. If these muscles function as they should, you will move your body further and
faster with more ease and most importantly with less injuries including repetitive strain injuries like Shin Splints.

My patients that have had the most stubborn, resistant cases of Shin Splints who had tried every treatment that they could find only got the relief they needed when they added their core/gluteal strength into the equation and focused on getting stronger and more stable.

So begin right this minute by re-introducing your brain to your butt and start squeezing those glutes!!
Chapter 5: Stretching, Self Massage and Other Techniques to Treat Shin Splints

Here’s what you’ve been waiting for: Solutions

In this chapter, we will explore what to do when painful stubborn Shin Splints first appear and what to do if they have been an annoyance for weeks, months or years.
Stop the activity that is causing the pain:
This may seem like a no brainer but every athlete (myself included) will resist this advice. This doesn’t mean stop all together and this doesn’t mean stop your activity forever.

What it means is that it is important to allow the affected musculature and connective tissues some rest to let the healing process begin. If the pain started today or in the last couple of weeks, a few days of rest away from your activity (usually running) may be all you need. However, if you have chronically suffered with Shin Splints for months or years, you may have to take several weeks away from your activity to allow for some healing and to do some biomechanical retraining before you go back to the previous intensity of your sport.

Now don’t panic! There are lots of options to maintain your cardiovascular fitness and strength in the meantime. The best cross-training options for those suffering with Shin Splints are getting on a bike or getting in the water. Cycling, swimming or water running are all great ways to not only maintain your fitness but to keep your legs moving without the added stress of repetitive walking or running.

Movement is important for healing so even if the pain is quite intense, doing these activities gently is better than stopping all together.
R.I.C.E
This technique is especially relevant to Shin Splint sufferers who have newly acquired shin pain (within the last few days). It can be helpful for athletes who have been struggling for longer as well.

If applied correctly and in time the R.I.C.E technique can greatly reduce the recovery time of the athlete. It stands for Rest, Ice, Compression and Elevation. When an injury is acute (under 72 hours old) there is a significant amount of inflammation associated with it. Rest, Ice, Compression and Elevation all help to counter this inflammation which will help to prevent further injury as well as limit swelling and decrease the pain of the injury.

Rest is the first priority for any sporting injury. It refers not only to a period of time following the injury (as we discussed above) but also relates to resting immediately as soon as you feel pain. An athlete must know when to stop training even if it is in the middle of a workout. Seemingly minor problems can evolve into more serious injuries that could have been prevented by adequate rest and treatment.

Ice therapy and treatment is one of the simplest, safest, and most effective self-care techniques for injury, pain, or discomfort in muscles and joints. Icing an injury can significantly help with
decreasing pain and inflammation, and speed up recovery time. Ice therapy is very safe and effective but there are some precautions that must be followed. Ice should never be applied directly over the skin for a prolonged period of time as this can damage skin tissue. A wet towel can be used as a barrier between the ice and skin and acts as an excellent conductor of cold. Ice should not be applied before exercise or activity as this impairs your body’s ability to detect proper joint and muscle function, making you potentially more susceptible to further injury. Ice therapy should also not exceed the treatment time recommended. I usually recommend 10-15 minutes every hour.

Applying compression to an injury by wrapping the area with a tensor bandage functions to provide support to the area of injury as well as to increase the pressure within the tissue thus narrowing the blood vessels. This slows down the inflammatory process and prevents excessive edema or swelling.

Elevation of the injured area allows gravity to draw edema away from the area of injury. This aids in decreasing the swelling and associated pain.

**Ice vs. Heat?**
This is a question that is age old and never ending. Everyone is confused about the answer to this question depending on the type of injury, how long ago it happened, and the alignment of the planets :)

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Here is the way I see it based on extensive reading as well as personal and clinical experience:

As we discussed above, ice is generally recommended for acute injuries (under 72 hours old) but ice may also be used for chronic conditions, such as overuse injuries in athletes (Shin Splints). In these cases, ice the injured area after activity (10-15 minutes) to help control inflammation that is stirred up during your run. It is always relevant to continue to use ice post activity if you are having pain or discomfort even if it is weeks or months or years since you first had the injury. Never ice a chronic injury before activity.

Heat treatments can be used for chronic conditions to help relax and loosen tissues, and to stimulate blood flow to the area. Use heat treatments for chronic conditions, such as overuse injuries like Shin Splints before participating in activities or before stretching or massage or other bodywork treatments.

Do not use heat after activity, and do not use heat when you have an acute injury. Heating tissues can be accomplished using a hot shower or bath (which I recommend) a heating pad, or a hot, wet towel. When using heat treatments, be very careful to use a moderate heat for a limited time to avoid burns. Never leave heating pads or towels on for extended periods of time, or while sleeping.
So....simply....warm up the tissues to bring blood flow to the area, do your activity or treatment, then cool down the tissues to reduce swelling and inflammation.

**Stretching and Strengthening Techniques**

Here are some stretching and strengthening techniques that you can start right now to relieve your stubborn Shin Splint pain.

**Equipment:** A Foam Roller and an Elastic Stretching Band are tools that are helpful to stretch and strengthen the muscles of the lower leg and ankle. However, you can get creative...use a towel or a belt instead of a band. For a homemade version of a foam roller, wrap an apple juice can in a towel.

For all of the exercises, go slow and stay in your comfort zone. In some cases, you may find the stretches uncomfortable but if you find the exercise painful, then back up and approach it gently.
Calf Stretch on the Stairs
Place your toes on the edge of a stair and drop your heel toward the floor. You’ll feel a stretch in your calf and the bottom of your foot. Hold for 10-15 seconds.

Lower Calf Stretch
As you drop your heel, bend your knee and push your knee down toward your toes. You’ll feel this stretch lower on the calf and on the inside of the lower leg. Hold for 10-15 seconds.

Foam Roller Shin Stretch
Balance your hands on the floor and roll back and forth slowly to your tolerance as you stretch the front of the shins. If the intensity is high, try one leg at a time slowly adding more weight into the stretch.

Seated Shin Stretch
Kneeling on the floor slowly sit back on your heels until you feel a stretch in the front of the shins. Hold for 10-15 seconds. Move on to the next stretch if this position bothers your knees.
**Standing Shin Stretch**

Do this stretch with bare or sock feet. Cross one foot over the other and place your toes down toward the floor. Use the back leg to push into the calf of the crossed leg. Hold for 10-15 seconds.

**Toe Ups**

In order to start to stabilize and strengthen the musculature of the lower leg, stand with your back to the wall and pull your toes up toward the ceiling. Hold for 5-10 seconds and repeat 10 times.

**Gas Pedal**

Using an elastic exercise band, loop the band around the foot and pull back on either side of the band. Plant your heel on the floor then stretch the Achilles tendon by pulling the foot toward you.

Then press the foot to the floor activating the calf muscles against the resistance of the band. Repeat 10 times.
Straight Leg Gas Pedal
Add more stretch to the Achilles tendon by repeating the Gas Pedal exercise with the knee straight. The resistance will be greater as you activate the calf muscle by pushing your foot toward the floor. Repeat 10 times.

Eversion and Inversion
Stretch and strengthen the lateral muscles of the lower leg by starting with the ankle in a neutral position. Turn the foot in and out as far as it will go 10 times.
Active Release Techniques (ART)

Since the majority of my patients are athletes and many of them are runners, much of the work I do is on the musculature and soft tissue of the pelvis and legs. Along with traditional chiropractic adjustments, I employ a soft tissue myofascial release technique called Active Release Techniques™. (ART)

ART is a patented, state of the art soft tissue system/movement based massage technique that treats problems with muscles, tendons, ligaments, fascia and nerves.

Overuse injuries like Shin Splints respond extremely well to ART. Every ART session is actually a combination of examination and

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**Toe Backs**

This exercise will help to further strengthen the tibialis anterior muscle. Attach the band to a railing or the leg of a heavy piece of furniture. Wrap the band around the forefoot and sit back until the band is tight with the ankle in a plantar flexed position. Pull back against the resistance of the band. Repeat 10 times.
treatment. The ART provider uses his or her hands to evaluate the texture, tightness and movement of muscles, fascia, tendons, ligaments and nerves. Abnormal tissues are treated by combining precisely directed tension with very specific patient movements.

Over 500 specific treatment protocols are unique to ART. They allow providers to identify and correct the specific problems that are affecting each individual patient.

In combination with the solutions that you have learned about in this book, you may want to consult an ART practitioner to have a more thorough assessment for both biomechanics and symptomatic relief.

If you would like to learn more about ART, visit www.activerelease.com

**Self Massage Techniques**

Although much more basic than the approach an ART practitioner would take, there are several self massage moves that I can pass on to you to try on your own painful shins that will give you some relief.

With each of these movements, remember to stay within your comfort zone. If anything feels too intense, then give yourself a break or go a little more gently. You may want to warm up the area you are working on before you start.
**Tibialis Anterior**

Start with your ankle dorsi-flexed and grab the muscle with your fingers as shown and place tension toward your knee. Hold the upward tension as you slowly plantar-flex your ankle. The key is to hold...don’t slide your fingers along the muscle. This will be quite uncomfortable especially if your shins are acute. Try to find areas that are tight and tender and repeat the process.

**Tibialis Posterior**

Start with your ankle plantar-flexed and place your thumbs just behind your tibia on the tibialis posterior. Direct your tension toward your knee. Remember to hold and don’t slide your thumbs. As you hold the upward tension slowly dorsi-flex your ankle up as far as you can. Follow the muscle along the tibia repeating this process as you go.
Gastrocnemius and Soleus
This group is a little harder to get at for self massage but it can be done. Start with your ankle plantar flexed and grab your calf with a tension that is aimed up toward your knee.

Hold the upward tension as you slowly dorsiflex your ankle. Repeat this process looking for tight and tender spots throughout the calf and achilles tendon.

Plantar Fascia
There are fascial connections from the tibialis muscles as well as the calf muscles into the bottom of the foot so working the bottom of the foot as well as the leg will offer more relief. Make a fist with your toes and take a tension aimed toward your toes. Hold this tension as you slowly open your foot by extending your toes. Repeat the process looking for tender and tight spots in the bottom of the foot.
You are on your way to pain-free shins!
This chapter has given you the tools you need to take control of the pain of Shin Splints and get back on track so you will be back to your sport before you know it.

Remember to go at your own pace, stay within your zone of comfort both physically and emotionally. If you feel as though you need the help of a professional, seek out an Active Release Techniques provider or a body worker experienced in a myofascial release technique who has worked with athletes.

Now that you are on the way to feeling better, the next chapter will help you to stay pain free and prevent Shin Splints from coming back.
Chapter 6: Steps You Can Take to Prevent Shin Splints From Coming Back

Once you get rid of them, do the right stuff so they stay gone.
This chapter will give you the tools you need to prevent a reoccurrence of painful Shin Splints and keep you running stronger and faster than before.
The previous chapters have outlined, what Shin Splints are, what causes them and ways that you can get some relief. Taking action and employing the use of all the information in those chapters on an ongoing basis will be vital in terms of preventing the return of Shin Splints.

Let’s review what we have learned so far that can help you get rid of Shin Splints today and prevent their return in the future:

● Find out your biomechanical pattern and choose the correct shoes to offer your feet the best stability.
● If you have a particularly difficult case of Shin Splints or if you have a particularly difficult foot type, then seek out the help of a professional and add a custom made orthotic in order to gain even more stability.
● Re-introduce your brain to your butt. Reactivating and strengthening your core musculature and most importantly your gluteal musculature will be key in terms of preventing a reoccurrence of painful Shin Splints.
● Use the stretching and strengthening exercises outlined in Chapter 5 to increase and then maintain the flexibility and strength of your lower leg musculature. Stretch after exercise or after a hot bath or shower when your muscles are warm.
● If you feel the edges of the pain returning, go back to the self massage techniques outlined in Chapter 5.
The one thing that every injured athlete is motivated to do is get back to their sport or activity. If you have followed the advice outlined in the previous chapters and have gotten sufficient relief from the pain of stubborn Shin Splints then you are probably eager to get moving.

Here is where you need to be careful. When your pain is receding and your confidence is growing is the time when you are most susceptible to re-injury. Just because you are starting to feel better does not mean that the tissues that were affected by Shin Splints are completely healed. It can take 6-8 weeks or longer in ideal circumstances for complete regeneration and healing of soft tissue injuries.

So...the advice I give my patients as they are starting an exercise program or are beginning to feel better is this:

**Avoid the Terrible Toos:** If you are a parent, then this statement may resonate with you (and if you have been suffering with Shin Splints for long, you may feel like this little guy) but I’m talking about a different sort of Terrible Toos.

- Too Much
- Too Fast
- Too Soon
These “Terribles” are the number one cause of running injuries and those who have had a previous injury are especially susceptible to an exacerbation if they push too much.

**Start Low and Go Slow**
To avoid a recurrence, “Start Low and Go Slow” and see what your body is able to tolerate. Stick to the 10-Percent Rule which states that you should never increase your weekly mileage or any one run by more than 10 percent over the previous week.

**Warm Up**
Always warm up your body by first moving the big muscles of your body which will help to avoid injury during your workout. This is different than stretching before you start. Ankle, knee and hip circles as well as arm circles all done in a comfortable range will start to get blood flowing into muscles and get you ready for your activity. Then start slowly by walking for about 5 minutes before you up the intensity.

**First Workouts**
Especially if you are just in the beginning stages of recovery, start with your warm up and then run for only 1-2 minutes. Slow back to a walk for 5 minutes and check in with your body to see how everything feels. Then speed up to a run again for the same 1-2
minutes. Repeat this cycle only 3 times on your first outing even if you have no pain and are feeling fabulous. It will be a total workout of about 20 minutes. With each subsequent workout, slowly trade timing of the intervals by decreasing the walk breaks by 1-2 minutes and by adding 1-2 minutes in each of the running intervals until you can comfortably run 20 minutes straight with no pain.

If at any time during this process you start to feel pain, stop your workout, take a few days rest and begin again at the beginning. When you can comfortably run the entire 20 minutes, you can start to add time and distance each week following the 10 percent rule.

**Workout Surface**
Walk or run on a soft even surface in order to minimize the risk of injury. Packed dirt or grass are ideal especially if you are just returning from injury. The asphalt road is softer than the concrete sidewalk and the shoulders of roads are usually soft but they are often slanted. I often see patients in my office with new leg complaints when they have started upping the distance of their long runs on country roads with a beveled shoulder. If you’re running consistently on a slanted surface, injury risk increases. Look for running routes over the flattest roads available.
Cross-Training
Cross training is a great way to avoid running injuries. In my own athletic experience, when I changed my training to include a lot more swimming and biking to get ready for a triathlon, the injuries that I struggled with as a runner virtually disappeared. Cross-training will reduce the repetitive pounding that your body takes when your running mileage is high and will help to even out muscle imbalances by developing parts of your body that running neglects. It will also burn additional calories, and increase aerobic capacity. Some examples of cross-training include cycling, swimming, cross-country skiing, stair machines and hiking. These options should definitely be included more often in the workout schedules of those who are just recovering from an acute injury.

Recovery Between Workouts
Expect mild stiffness and soreness 1-2 days after walking or running. This delayed onset muscle soreness (DOMS) is quite normal and is the result of tissue breakdown and healing. You should be relatively pain free before you do the activity again so you should include recovery periods of 24 to 48 hours between workouts in order to let your body rest and get ready for the next workout. If you have pain that lasts longer than 48 hours or gets worse with activity, it may be time to seek out the help of a professional.
During your recovery time between workouts take time to take care of yourself which will help you to avoid an injury or a recurrence of an injury like Shin Splints. Get a massage, do some restorative yoga, take lots of naps (sleep is often forgotten about in many training programs), go for a slow walk or an easy bike ride.

So get out there and start putting one foot in front of the other. Start slow to avoid the recurrence of Shin Splints, but if they happen to sneak up on you, use the tools that you have gained in this book to take care of it right away so you can get back on the road as soon as possible.

Here’s to staying Shin Splint free!
Bonus Chapter: When to Seek Out Professional Help for Shin Pain.

A Health Professional Can Help
There are often more questions than answers when it comes to the annoying problem of stubborn Shin Splints. Consulting a health care professional may help to get some questions answered so that you can find the relief you need.
When to See a Professional

The majority of Shin Splint sufferers should find relief in the pages of Shin Splint Solutions. It is my heartfelt hope that you are among them. However, there are situations that present with a complexity that may not respond to the solutions that I have outlined in the previous chapters. In those cases, seeking out the expertise of a health care professional may be in your best interest.

If you have tried the self massage techniques that I have outlined in Chapter 5 and have had some success but would feel more comfortable with a professional doing the work, look for a body worker (Chiropractor, Massage Therapist, Physiotherapist) that is experienced in sports myofascial release soft tissue therapies like ART.

If you are looking for a more thorough biomechanical assessment, a qualified health care professional or exercise therapist can be a great help. Look for someone who has experience with athletes and with your sport specifically. Increasing your biomechanical awareness is key to getting through the pain of Shin Splints.

The biomechanical assessment may lead the health care professional to recommend orthotics, which are custom made biomechanical insoles that you wear in your shoes. They can correct or reduce improper foot motions that lead to chronic injuries including Shin
Splints. Again, look for a professional who has experience making orthotics for athletes. In my practice, I cast and dispense orthotics for athletes and I find that patients will say that my approach is different than the professional who made their previous pair of orthotics.

Shin Pain that isn’t Shin Splints

Keep in mind, there are different reasons your shins could hurt. The term Shin Splints gets thrown around a lot to describe just about any pain in the shins, but there are several other potential diagnoses. So if you have shin pain and it isn’t Shin Splints as outlined in Chapter 1, then what is it?

Stress Fracture

Most people have at least heard the term ‘Stress Fracture’ but are not really sure what that means. So, what is a stress fracture and how does it differ from Shin Splints?

A Stress fractures is a small breakdown in bony tissue or an area within a bone which has been damaged by repetitive impact forces over time. The tibia is the site of about 50 per cent of all stress fractures in athletes.

All of the risk factors for Shin Splints that we learned about in Chapter 1 apply as contributors to stress fracture as well. In addition
to the training and biomechanical causes that we have discussed, stress fractures may also appear as a result of an underlying nutritional problem (inadequate intake or absorption of calcium) or hormonal problem (levels of sex hormones are too low). The female athlete triad includes low bone density along with disordered eating and amenorrhea (interruption in menstruation). Overtraining may lead to decreased testosterone levels in men resulting in osteopenia (weakened bone).

With Shin Splints, pain usually disappears once the activity that causes the pain is reduced or stopped. With a stress fracture, however, the patient usually experiences pain that does not go away with rest. The pain often persists with walking and increases when walking up steps or during similar moderate activity. The patient often complains of pain at night or while sitting quietly. A ‘one-leg hop test’ is a functional test often used to distinguish between Shin Splints and a stress fracture. A patient with Shin Splints can hop at least 10 times on the affected leg; however, a patient with a stress fracture cannot hop without severe pain.

Stress fractures usually cause more localized pain and tenderness (a small area the size of a dime that feels like a toothache). The pain is often transverse (across the leg), whereas Shin Splints often produce more longitudinal pain and tenderness, (up and down the leg). Shin
Splints are more often bilateral (both legs), while bilateral stress fractures are rare.

X-rays are often taken to rule out a stress fracture, however x-rays may not show a fracture line or a healing stress fracture until several weeks after injury, so a bone scan, computed tomography (CT) scan or magnetic resonance imaging (MRI) scan may be used instead for a quicker and more accurate diagnosis.

During recovery, appropriate cross training activities like swimming, bicycling, as well as maintenance of upper body strength can be included in a training program. Running and aggressive walking should be stopped for the entire healing time to reduce the risk of delayed healing or further injury. Stress fractures usually take two to three months to heal but as much as six months may be required to restore the bone to normal and remove most traces of pain on the way to a full recovery.

**Compartment Syndrome**

Also known as Chronic Exertional Compartment Syndrome (CECS), this is often incorrectly diagnosed as ‘Shin Splints’ and is another form of shin pain that usually requires the intervention of a health care professional.
The muscles in the lower leg are split into sections or ‘compartments’ surrounded by strong membranes of fibrous tissue (fascia), which wrap up the different muscle groups. CECS most commonly affects the anterior compartment containing the tibialis anterior muscle, which is why it is often misdiagnosed as anterior Shin Splints.

The pain of CECS comes on with exercise, usually after 8-12 minutes, although the timing is variable. The pain grows worse as exercise continues until it is severe enough to force the athlete to stop exercising. The pain may be accompanied by numbness or tingling in the leg and top of the foot. The affected area feels ‘tight’ or tense and is often tender to the touch during exercise. The dorsi-flexion muscles may be weak. A key feature of CECS is that the pain resolves with rest when the athlete stops activity, usually after about 30 minutes.

The pain of CECS develops as a result of pressure imbalances between blood flowing into the muscles and the pressure of the fascia that surrounds the muscles. With exertion, blood flow to the muscle increases and the muscle swells. Even though fascia doesn't stretch much, in most people it is large enough to accommodate the swelling. Athletes, and especially endurance athletes, may develop enough swelling so that muscle arteries are squeezed enough to limit or interrupt the blood flow. The increased pressure inside the fascia may also compress nerves, resulting in numbness.
The diagnosis for CECS is made by measuring the pressure within the affected compartment, first at rest, then at several points while exercising, and finally 5, 10 and 20 minutes after exercise. This test is done by inserting a pressure probe into the affected compartment.

Once the diagnosis is established, the treatment for CECS that is likely to most rapidly return an athlete to pain free running is surgery. Surgical treatment involves splitting the fascia to allow the muscle more room to expand (a Fasciotomy). After surgery 70-85% of patients are able to return to pre-treatment levels of activity, symptom-free.

Common non-surgical approaches to CECS including physical therapy, stretching exercises, and anti-inflammatory medicines which are usually not helpful. In recreational athletes, a prolonged period of rest followed by very gradual return to running is sometimes successful. Unfortunately, non-surgical treatment for CECS is seldom effective in competitive athletes.

**It's ok to ask for Help**
If you suspect that your shin pain is more sinister than Shin Splints or even if you want another opinion, find a health care professional that can give you some treatment or guide you through your questions and your pain on the way to relief.
Conclusion

Shin Splint Pain Does NOT have to Rule Your Life

Whether you are a walker, a runner, a recreational athlete, someone who participates in organized team sports or an elite athlete, if you have suffered with the pain of Shin Splints, then you share in the frustration caused by this condition.

If you're serious about getting back to the activities that make you happy and banishing the agony of Shin Splints for good, I hope that you start using the information that you have learned in Shin Splint Solutions. You should now have the awareness and the tools that you need to conquer Shin Splints and get back to your regular activities.

It is my sincere hope that Shin Splint Solutions is the missing piece that will help you put together the Shin Splint puzzle and solve it once and for all.

Here’s to happy pain-free running!

Dr. Peggy Malone, B.Sc., D.C.
http://www.ShinSplintSolutions.com