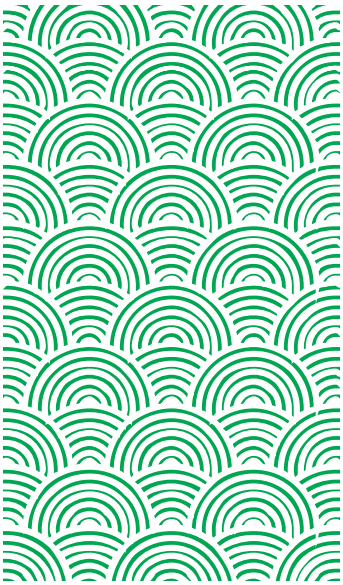

Massage Therapy Continuing Education PROLONGED STANDING

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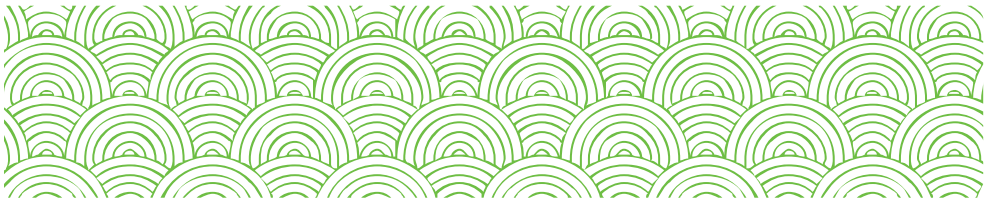

PROLONGED STANDING

5 CEUs

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Chapter One

Overview

Prolonged standing can have a number of negative effects on your health and well-being. Massage therapists should be aware of these effects and how to prevent them- your clients aren't the only ones whose health you should be concerned about!

What is prolonged standing? Studies generally define it as "spending over 50% of total working hours during a full work shift in the standing position."[i] Prolonged standing isn't just generally uncomfortable- it can lead to long-term health problems.

Since the industrial revolution, health issues surrounding prolonged standing in the work environment skyrocketed. Factory workers and retail workers especially experienced various issues. In fact, in the 1880's, the medical communities in major cities across the world began advocating for reform in the dress shop industry because they were seeing so many foot and leg issues in the young women employed there.[ii]

Most prolonged standing injuries are for jobs in the service, retail, and industrial sectors.[iii]

Consider the following statistics concerning prolonged standing injuries in the United States and the United Kingdom today:

- In 2008, the U.S. Bureau of Labor Statistics reported 3.7 million cases of non-fatal work injuries. There were several risk factors that contributed to the number, with prolonged standing being one of them.[iv]
- Over 11 million workers in the UK (which is over half the workforce) is at risk for injury due to prolonged standing.[v]
- There are over 200,000 people in the UK who currently suffer from lower

limb issues that are caused by or worsened by prolonged standing on the job.[vi]

- "Prolonged time in an upright posture at work may cause hypertension comparable to 20 years of aging."[vii]
- Prolonged standing injuries results in over 2 million sick days per year being taken in the UK[viii]
- American Podiatric Medical Association (APMA) reported that 83% of industrial workers in the United States experienced foot or lower leg pain and discomfort associated with prolonged standing.[ix]

Here are a few issues that can be caused or worsened by prolonged standing on the job:

"• painful feet and legs

• swelling in feet and legs

• bunions/corns

• heel problems, including plantar fasciitis/heel spurs

• Achilles tendonitis

• varicose veins

• orthopedic changes to the feet, including flat feet

• low back pain

• restricted blood flow

- immobilization/locking of joints
- arthritis in knees and hips
- stiffness in neck and shoulders
- problems in pregnancy and birth defects
- high blood pressure
- heart and circulatory problems "[x]

And a few more:

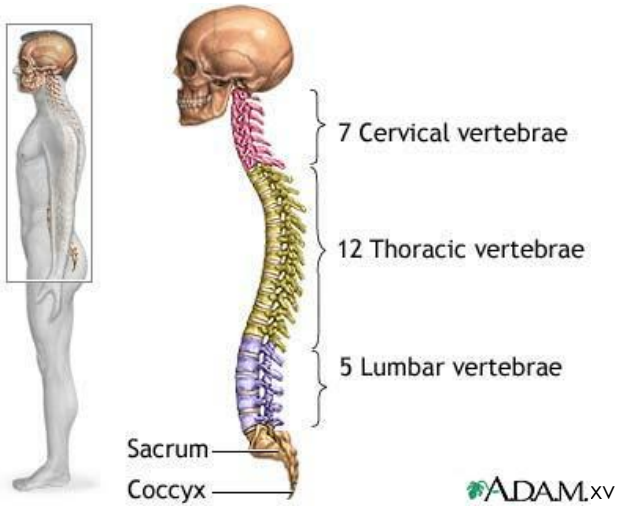
- Chronic Venous Insufficiency: "chronic venous insufficiency (CVI) describes a condition that affects the venous system of the lower extremities and causing venous hypertension including pain, swelling, edema, skin changes, and ulcerations in the legs."[xi]

- Work-related musculoskeletal disorders (WMSD)[xii]

Chapter Two

Lower Back Pain

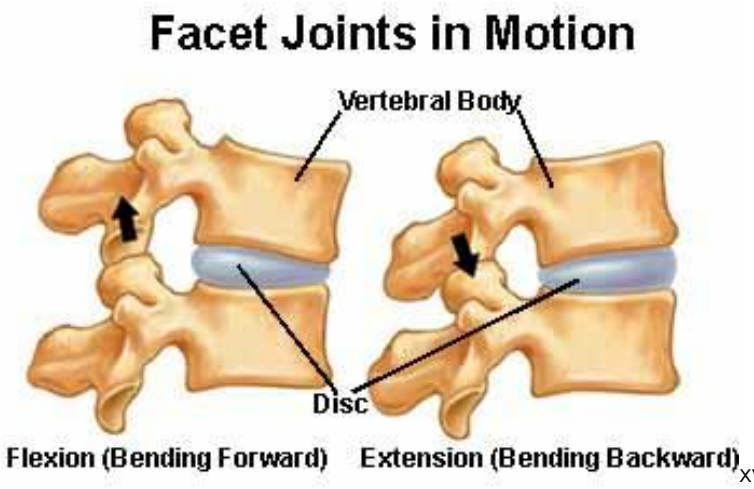
Studies have shown that people start to experience lower back pain after just two hours of prolonged standing. [xiii] Lower back pain (lumbar pain) is one of the leading causes of disability and sick leave, and can also be one of the most common complaints you'll hear as a massage therapist. Lower back pain is also one of the most common complaints in emergency rooms, with over 6 million annual cases presenting each year. Only cancer and heart disease cost Americans more in health care costs.[xiv]



The lower back contains five lumbar vertebrae, which are the largest of the spinal bones. The lumbar area of the spine bears the most weight of any portion of the spine; therefore, it carries the most stress and is the most prone to injury.[xvi]

During periods of prolonged standing, a condition known as joint compression begins to affect the entire body, but since your lumbar spine carries so much of your body weight, the effects can be felt quickly.

Joint compression occurs when "Each body part is compressed by all of the sections of the body above it. For example, the head, arms and torso compress the hips, but the feet are compressed by the weight of the entire body. Compressing a joint is like squeezing a sponge -- body fluids are squeezed out of the space in the joint. Without body fluids and circulation, joints become malnourished, and cannot continue to support the weight of the body. Wear and tear of body parts occurs."[xvii]



[xviii]

The facet joints of the lumbar spine are especially vulnerable to compression caused by prolonged standing. These are the joints on the knobby portion of each vertebrae. They move closer together or farther apart when you bend forward or backwards. Spinal compression from prolonged standing causes the facet joints to push closer together, which can lead to pain that radiates

down the legs or into the groin.[xix] The compression of the spine can also lead to nerve compression.

Prolonged standing is a form of "static posture," which is a posture that we hold for long periods of time without really moving out of it. They are "physical exertions wherein the same physical posture is maintained throughout the exertion."[xx] Studies have shown that people with a history of lower back pain shift their body weight less when they're in a static posture, which puts even further pressure on the lower back and causes more pain. People without a history of lower back issues are more likely to move frequently while they're standing, spreading the weight and stress over more joints and connective tissues.[xxi]

Massage therapy clients (or massage therapists themselves) who also have restrictions in their leg muscles will find that they might have more back issues when they are in a static posture like prolonged standing. For example, tight hamstrings will pull on the pelvis, which in turn moves the spine out of balance and causes more stress on the lumbar vertebrae. So, when you're confronted with a client with lower back pain caused by prolonged standing, be sure to address any tightness in the legs.[xxii]

One of the most severe possible effects on the back due to prolonged standing is reduced height. One 2006 study in the *European Spine Journal* showed a direct correlation between the number of discs that showed

reduced height (causing loss of spine length and lower back pain) and the number of hours spent in prolonged standing postures at work.[xxiii]

Loss of disc height can lead to a number of back problems.[xxiv]

Of course, lower back pain can have any number of causes. Prolonged standing may be the primary cause, or it might just be irritating a preexisting condition in your client. In any case, if your client presents with the following symptoms (or you have them yourself), send him or her to a spinal specialist or their family doctor before performing massage because they could be indicative of a serious problem that needs immediate attention:

- Low back pain extending down one or both legs (indicates nerve compression)
- Back pain with leg pain that increases when the leg is lifted to the chest or when you bend at the waist
- Back pain started after a recent fall
- Back pain that has lasted longer than three weeks and is severe enough to interfere with your usual routine
- Pain that gets worse when you lie down or that wakes you up at night
- Back pain with a fever

- Bladder or bowel issues
- Pain in the lower back accompanied by leg numbness/weakness, especially when you walk (can be caused by a condition called spinal stenosis[xxv]
- "unexplained weight loss
- swelling of the back
- constant back pain that does not ease after lying down
- pain in your chest or high up in your back
- pain down your legs and below the knees
- loss of bladder control
- inability to pass urine
- loss of bowel control
- numbness around your genitals, buttocks or back passage
- pain that is worse at night"[xxvi]

Treatment of Lower Back Pain

Most of the time, low back pain can be treated and managed with conservative treatments. Treatment methods include:

- **Ice and Heat Packs:** "patients should apply a cold pack or a cold compress (such as a bag of ice or bag of frozen vegetables wrapped in a towel) to the tender spot several times a day for up to 20 minutes. After 2 to 3 days of cold treatment, they should then apply heat (such as a heating lamp or hot pad) for brief periods to relax muscles and

increase blood flow. Warm baths may also help relax muscles. Patients should avoid sleeping on a heating pad, which can cause burns and lead to additional tissue damage."[xxvii]

- **1-2 Days of Bed Rest**
- **Exercise to strengthen back muscles: "**Maintaining and building muscle strength is particularly important for persons with skeletal irregularities. Doctors and physical therapists can provide a list of gentle exercises that help keep muscles moving and speed the recovery process. A routine of back-healthy activities may include stretching exercises, swimming, walking, and movement therapy to improve coordination and develop proper posture and muscle balance. Yoga is another way to gently stretch muscles and ease pain. Any mild discomfort felt at the start of these exercises should disappear as muscles become stronger."[xxviii] (more exercises below)
- **Medications**: Non-steroidal anti-inflammatory drugs available over-the-counter can be used to treat back pain. A doctor may also prescribe other drugs depending on the cause of the back pain.
- **Chiropractic care**
- **Acupuncture**
- **"Traction** involves the use of weights to apply constant or intermittent force to gradually "pull" the skeletal structure into better alignment. Traction is not recommended for treating acute low back symptoms.
- **Trans-cutaneous electrical nerve stimulation (TENS)** is administered by a battery-powered device that sends mild electric pulses along nerve fibers to block pain signals to the brain. Small electrodes placed on the

skin at or near the site of pain generate nerve impulses that block incoming pain signals from the peripheral nerves. TENS may also help stimulate the brain's production of endorphins (chemicals that have pain-relieving properties).

- **Ultrasound** is a noninvasive therapy used to warm the body's internal tissues, which causes muscles to relax. Sound waves pass through the skin and into the injured muscles and other soft tissues."[xxix]

Exercises for Low Back Pain From Prolonged Standing

- Hamstring exercises (hamstrings place additional stress on low back): lie on your back with one leg out straight in front of you. Raise the other leg straight up, pushing your heel toward the ceiling. Support the leg with your hands. Rest and repeat, then perform on each side.[xxx]
- Partial Crunches: strengthening your core will help the muscles support your lower back when you stand.
- Wall Sits: Press your back up against the wall and lower yourself into a seated position so your thighs are parallel to the floor. Hold for ten seconds, then repeat 8 to 12 times.
- Press-up Back Extensions: "Lie on your stomach with your hands under your shoulders. Push with your hands so your shoulders begin to lift off the floor. If it's comfortable for you, put your elbows on the floor directly under your shoulders and hold this position for several seconds."

- Bird Dog: "Start on your hands and knees, and tighten your stomach muscles. Lift and extend one leg behind you. Keep hips level. Hold for 5 seconds, and then switch to the other leg. Repeat 8 to 12 times for each leg, and try to lengthen the time you hold each lift. Try lifting and extending your opposite arm for each repetition. This exercise is a great way to learn how to stabilize the low back during movement of the arms and legs. While doing this exercise don't let the lower back muscles sag. Only raise the limbs to heights where the low back position can be maintained."

- Knee to Chest: "Lie on your back with knees bent and feet flat on the floor. Bring one knee to your chest, keeping the other foot flat on the floor. Keep your lower back pressed to the floor, and hold for 15 to 30 seconds. Then lower your knee and repeat with the other leg. Do this 2 to 4 times for each leg."
- Pelvic Tilts
- Bridges


[xxxi]

Chapter Three
Flat Feet

Adult Acquired Flatfoot Deformity is "a condition that results in a fallen arch with the foot pointed outward," and is one of the risks of prolonged standing.[xxxii] While one-fourth of Americans have flat feet (with only 10

percent being born that way and the rest having acquired it through injury)[xxxiii] and live with it without issues, others can develop further complications, such as "knee pain, shin splints, Achilles tendinitis, and plantar fasciitis."[xxxiv] These other conditions occur because without the arch, the foot loses its shock-absorption abilities. It also shifts the knee and hip positions, which can lead to further injury.[xxxv]

Normal Arch

Flat Arch [xxxvi]

Some people who have developed flat arches might not be able to tell (how often do you really look at the bottom of your feet?), but there are a few tests you can perform to quickly find out:

- "Footprint Test: When you get out of a swimming pool, look at your footprint on the concrete. The front of the foot will be joined to the heel by a strip. If your foot is flat, then the strip is the same width as the front of the foot, creating a footprint that looks like a stretched out pancake. With a normal arch, the strip is about half the width of the

front of the foot. If you have a high arch, only a thin strip connects the front of the foot with the heel.

- Shoe evaluation: Put your shoes on a flat table and view them at eye level from behind. See if the sole is worn evenly. A flat foot will cause more wear on the inside of the sole, especially in the heel area. The shoe will easily rock side to side. A flat foot will also cause the upper part of the shoe to lean inward over the sole. Both shoes should wear about the same way.

- Tiptoes Test: Place your fingertips on a wall that you are directly facing and stand on your tiptoes on one foot. If you can't do it, a fallen arch may be the culprit.

Too Many Toes Sign[xxxvii]

- Too Many Toes Sign: Stand with your feet parallel. Have someone stand in back of you and look at your feet from behind. You can also

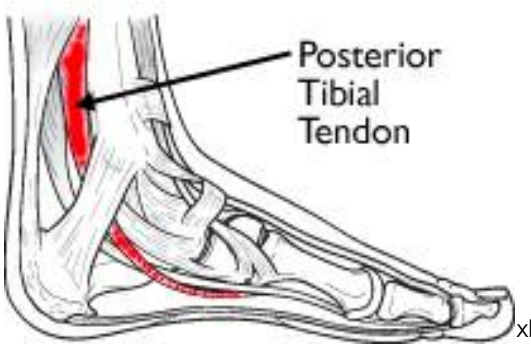
do it yourself if you stand with your back to a mirror. Normally only the pinky toe is visible from behind. If one foot is flatter than the other, the 4th and sometimes the 3rd toe on that foot can also be seen."[xxxviii]

Other symptoms of a collapsed arch or one that is about to collapse include:

- "Pain along the course of the posterior tibial tendon which lies on the inside of the foot and ankle. This can be associated with swelling on the inside of the ankle.
- Pain that is worse with activity. High intensity or impact activities, such as running, can be very difficult. Some patients can have difficulty walking or even standing for long periods of time.
- When the foot collapses, the heel bone may shift position and put pressure on the outside ankle bone (fibula). This can cause pain on the outside of the ankle. Arthritis in the heel also causes this same type of pain.
- Patients with an old injury or arthritis in the middle of the foot can have painful, bony bumps on the top and inside of the foot. These make shoe wear very difficult. Occasionally, the bony spurs are so large that they pinch the nerves which can result in numbness and tingling on the top of the foot and into the toes.
- Diabetics may only notice swelling or a large bump on the bottom of the foot. Because their sensation is affected, people with diabetes may not have any pain. The large bump can cause skin problems and an ulcer (a sore that does not heal) may develop if proper

diabetic shoe wear is not used."[xxxix]

The most common cause of AAFD is *Posterior Tibial Tendon Dysfunction (PTTD)*. The Posterior tibial tendon runs from the calf down the leg and into the foot. It holds up the arch when you walk. Prolonged standing can aggravate this tendon, causing inflammation or even tearing. Injury to this tendon will result in slow arch collapse.



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There are two different forms of flat feet: flexible and rigid. Flexible flat feet are common in toddlers, are asymptomatic (have no pain or other issues), and will probably disappear by the time the child is between the ages of three to five. Rigid flatfeet are caused by some sort of anatomical abnormality, are often painful, and require medical treatment.[xli]

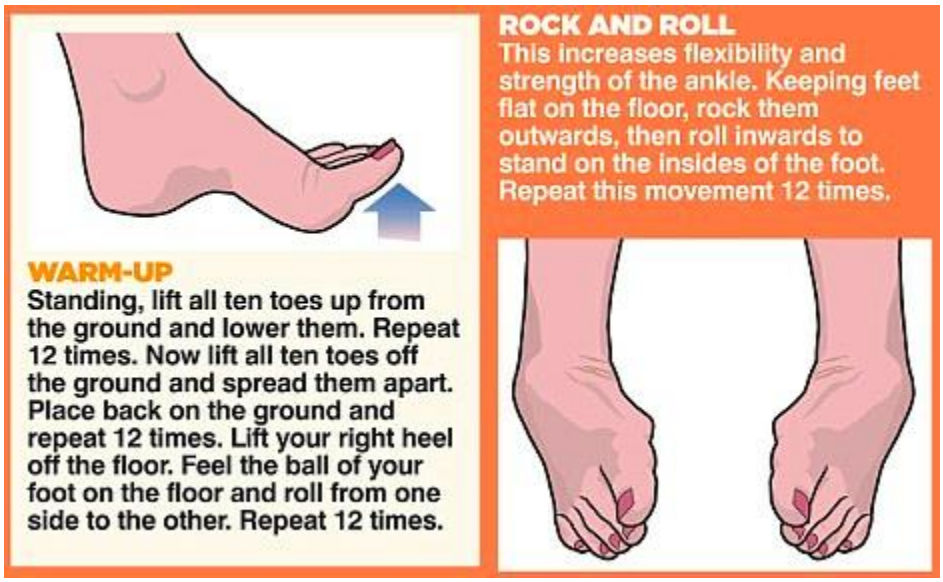
Treatment for Flat Feet

There are a number of treatments available for people who have acquired flat feet, though they depend on the cause of the injury. Treatments include:

- **"Arch supports (orthotic devices).** Over-the-counter arch supports may help relieve the pain caused by flatfeet. Or your doctor might suggest

custom-designed arch supports, which are molded to the contours of your feet. Arch supports won't cure flatfeet, but they often reduce symptoms.[xlii]

- **Proper shoe wear.** A structurally supportive shoe may be better tolerated than sandals or shoes with minimal support.[xliii]
- **Get Barefoot.** It seems counter-intuitive, but going barefoot for ten minutes a day can help counteract the effects of standing in bad footwear. Doing aerobics while barefoot is especially effective. If you consistently go barefoot while walking or running for ten minutes every day, you should see arch improvement in two months.[xliv]
- **Do the following foot exercises to strengthen the arch and surrounding muscles in the feet and lower leg:**



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Try a variety of these alternative exercises to strengthen the arch and the surrounding muscles/connective tissues:

- **"Correct heel and toe walking:**

  The patient is taught to walk with the feet along parallel lines. Any tendency towards slaying must be immediately corrected. The heels should first be placed on the ground, the outer border next, the toes finally.. The weight should not at any time in this procedure be taken

on the inner border. The heel is then cleanly raised from the ground, the five metatarsals used as the fulcrum, and the big toe for a concluding propulsion to a straight leverage. The heel and toe walk brings all the muscles into equal action, and ensures normal balance.

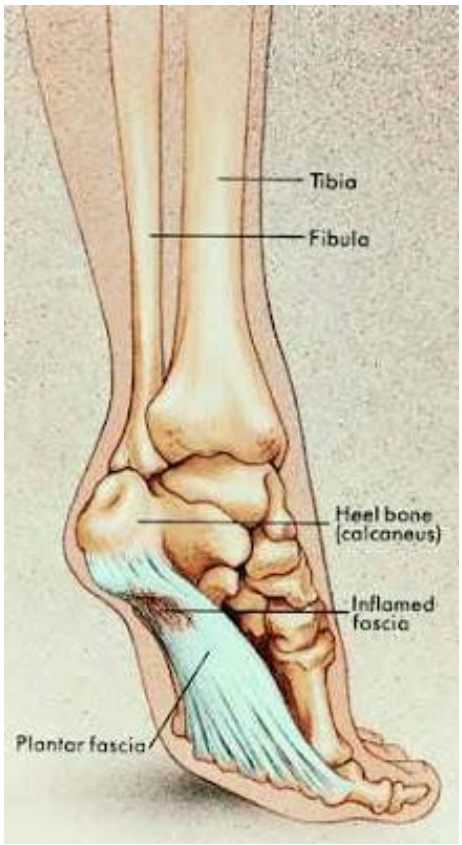
- **Walking** on the outer borders of the foot. Each foot should be lifted over the other one at each step.
- **Standing:** heel raising and lowering to the outer borders. The patient starts with the feet inverted, raises the heels, and lowers the outer borders.
- **Standing** with the feet inverted. Holding this position.
- **Standing** on a book: the edge of which is placed immediately under the metatarso-phalangeal joints. The toes are then flexed and extended.[xlvi]

Surgery is a last resort in cases of flat feet, and is usually on pursued if there is severe pain that isn't relieved with other methods. This is usually when there is a tear or rupture of the tendon that supports the arch, or if the joints in the foot need to be fused into a correct position.[xlvii]

Chapter Four

Plantar Fasciitis

Plantar fasciitis is one of the most common causes of foot pain among both athletes and workers who are on their feet all day. Approximately 2 million people undergo treatment for the condition every year in the U.S. Plantar fasciitis is a "syndrome of inflammation of the band of tissue that runs from the heel along the arch of the foot."[xlviii] People who suffer from plantar fasciitis generally have pain first thing in the morning that subsides, but returns with prolonged standing. It is a common ailment among those who already have flat feet.[xlix]



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What Are Planter Fascia?

Plantar fascia is a "thick, fibrous, relatively inelastic sheet of connective tissue originating from the medial heel, where it then passes over the superficial musculature of the foot and inserts onto the base of each toe."[li]

What do the Plantar Fascia Do?

The fascia on the bottom of the feet "provides support when the foot rises up on the toes during walking, running, or climbing. It supports the long arch of the foot," which makes both flat-footed people and those with high arches vulnerable to plantar fasciitis.[lii] To put it more technically: "The function of the plantar fascia is twofold: statically, it stabilizes the medial longitudinal arch; dynamically, it restores the arch and aids in reconfiguring the foot for efficient toe-off."[liii]

What Causes Plantar Fasciitis?

There are a number of factors that can cause plantar fasciitis. There are also a number of risk factors that, if you have them, make you more likely to develop the condition. The risk factors include:

- Structural abnormalities of the foot (flat feet, high arches, etc.)
- Being overweight
- Having age-related degeneration of the fascia
- Having a job that requires prolonged standing, especially on concrete
- Athletic training errors
- Tight muscles in the calves or shortened Achilles tendon

- Over pronation of the feet (feet that roll inward when you stand or walk)[liv]

Those who are training for long-distance running events and workers who experience prolonged standing are most likely to develop the condition. Stress on the plantar fascia can lead to "micro-tears [and]…repetitive trauma to the plantar fascia exceeding the fascia's ability to recover may lead to degenerative changes and an increased risk of injury."[lv]

Symptoms of Plantar Fasciitis

The main symptom of plantar fasciitis is pain on the heel and along the sole of the foot, with about 30 percent of patients experiencing the pain in both feet.[lvi] Again, most patients experience pain when they take their first few steps in the morning, then again after prolonged standing or exercise. If you have pain at night, you probably have another condition (like arthritis or issues with the nerves in the feet).[lvii]

Your doctor will diagnose plantar fasciitis by going over your medical history and giving you a physical exam. During the physical exam, "The toes are grasped and dorsiflexed with one hand, while the other hand palpates the plantar aspect of the foot. The point of maximum tenderness is usually located just forward of the heel bone."[lviii]


[lix]

The doctor may also apply pressure to the arch of the foot to test for tenderness, or have you stand barefoot on the floor so he or she can see how your feet bear your weight. He may order x-rays to rule out stress fractures in the feet. [lx]

Treatment for Plantar Fasciitis

Treatment will vary based on your case, but there are a few self-care things you can do to help restore the strength of the tissues and relieve pain:

- "Give your feet a rest. Cut back on activities that make your foot hurt. Try not to walk or run on hard surfaces.
- To reduce pain and swelling, try putting ice on your heel. Or take an over-the-counter pain reliever like ibuprofen (such as Advil or Motrin), naproxen (such as Aleve), or aspirin.
- Your doctor may give you splints that you wear at night, shots of steroid medicine in your heel, or other treatments. You probably will not need surgery. Doctors only suggest it for people who still have pain after trying other treatments for 6 to 12

months." [lxi]

- "Weight loss should be emphasized when obesity is present. Consultation with a dietitian, or referral to a community program should be considered.
- Symptomatic flat feet should be treated with proper shoes and arch supporting shoe inserts. Wearing slippers or going in bare feet may aggravate the condition, even when the floor is carpeted. Having a slip-on at the bedside with a one-inch heel that provides some support for the arch is helpful when arising from bed.
- Protective footwear — Athletic shoes, arch supporting shoes (particularly those with an extra-long counter, which is the firm part of the shoe that surrounds the heel), or shoes with rigid shanks (usually a metal insert into the sole of the shoe) are helpful. Cushion-soled shoes with silicone gel pad inserts or heel cups can provide temporary pain relief. Appropriate shoes and accessories can be found in stores featuring work shoes or "orthopedic shoes."
- People who work or reside in buildings with concrete floors should use cushion-soled or crepe-soled shoes."[lxii]
- Replace running shoes every 300 to 500 miles
- Consult your doctor about your training limits- consider switching to biking or swimming
- Wear a walking cast for six weeks to limit ground reactive forces and allow the fascia to heal[lxiii]

There are also some exercises you can do to help treat plantar fasciitis.

- Downward facing dog is a yoga pose that helps stretch tight hamstrings and calves, which can relieve strain on the plantar fascia.

Downward Facing Dog[lxiv]

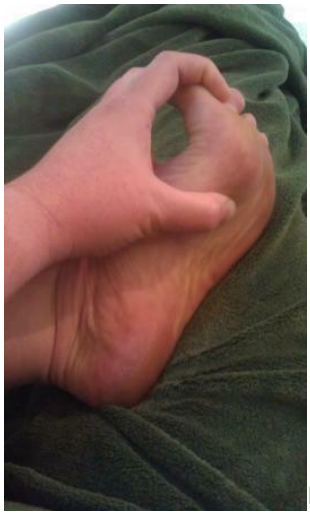
- Towel Curl: Place a towel under the foot while you're in the seated position. Use the toes to curl the towel back toward the heel. This will strengthen the longitudinal arch.

[lxv]

- Practice picking up objects with the toes and dropping them into a cup in order to strengthen the fascia and surrounding muscles.
- Ankle circles: do 50 to 100 reps of ankle circles on each side, with the foot flexed and then pointed. This strengthens the ankle muscles, reducing stress on the fascia.
- Wall Sit: Place your back up against the wall and sink down until your thighs are parallel with the ground, as if you were sitting in a chair. Hold the position for one minute and repeat as much as you can.

There are self-massage methods you can use to help relax and lengthen the plantar fascia. Begin by crossing one foot over the other knee so you can reach the sole of the foot. Pull the toes back with one hand and use the knuckles on the other hand to vigorously apply pressure from the toes to the heel. Repeat on the other foot.[lxvi]

Pull back the big toe on the first foot and use the thumb of your other hand to apply steady, deep pressure to the fascia under the base of the big toe knuckle. Hold for 15 seconds, release, and move down the foot. Repeat with the other toes, and then with the other foot. You can also use one hand on each foot, if desired.

 [lxvii]

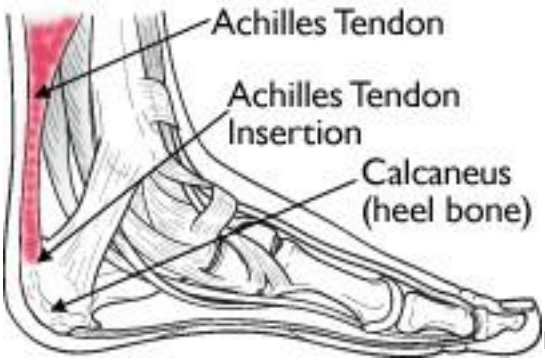
You can also roll a golf ball or tennis ball under the foot to massage the tissues.[lxviii] Some physical therapists or chiropractors might recommend the Gaston technique of myofascial release for treating plantar fasciitis. This technique involves the use of a very precise and small tool that is used to break up scar tissue and other adhesions that are shortening the fascia. There is data that shows that myofascial release promotes healing by "replacing degenerative tissue with a stronger and more functional tissue."[lxix]

Chapter Five

Achilles Tendonitis

Achilles tendonitis is "a condition of irritation and inflammation of the large tendon in the back of the ankle."[lxx] It is a common injury in those who experience prolonged standing, as well as long-distance runners.[lxxi]

The Achilles tendon is the largest in your body. It "connects your calf muscle to your heel bone and is used when you walk, run, and jump…and is prone to tendinitis, a condition associated with overuse and degeneration."[lxxii]



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There are two types of Achilles tendinitis:

- "Noninsertional Achilles Tendinitis…fibers in the middle portion of the tendon have begun to break down with tiny tears (degenerate), swell, and thicken. Tendinitis of the middle portion of the tendon more commonly affects younger, active people.
- Insertional Achilles Tendinitis…involves the lower portion of the heel, where the tendon attaches (inserts) to the heel bone. In both

noninsertional and insertional Achilles tendinitis, damaged tendon fibers may also calcify (harden). Bone spurs (extra bone growth) often form with insertional Achilles tendinitis. Tendinitis that affects the insertion of the tendon can occur at any time, even in patients who are not active."[lxxiv]

There are also a number of factors that can contribute to the development of Achilles tendinitis:

- A sudden increase in the stress you put on the tendon, like standing all day all of a sudden, or increasing your running routine by several miles
- Tightened calf muscles
- Bone spur in the heel, which can rub against the tendon
- Having flat feet
- Over pronation[lxxv]
- Wearing shoes with bad arch support or "rigid heels"[lxxvi]

Symptoms of Achilles Tendinitis

- "Pain and stiffness along the Achilles tendon in the morning
- Pain along the tendon or back of the heel that worsens with activity
- Severe pain the day after exercising
- Thickening of the tendon
- Bone spur (insertional tendinitis)
- Swelling that is present all the time and gets worse throughout the day with activity"[lxxvii]

Treatment of Achilles Tendinitis

There are a number of treatment options, most of which depend on the causes behind the problem. Most doctors will start with conservative treatments, including rest, icing for 20 minutes whenever the tendon acts up, and temporary use of anti-inflammatory medication.[lxxviii]

You can also do a number of at-home exercises and stretches:

- "Calf stretch -Lean forward against a wall with one knee straight and the heel on the ground. Place the other leg in front, with the knee bent. To stretch the calf muscles and the heel cord, push your hips toward the wall in a controlled fashion. Hold the position for 10 seconds and relax. Repeat this exercise 20 times for each foot. A strong pull in the calf should be felt during the stretch."

lxxix

- "Bilateral heel drop:

Stand at the edge of a stair, or a raised platform that is stable, with just the front half of your foot on the stair. This position will allow your heel to move up and down without hitting the stair. Care must be taken to ensure that you are balanced correctly to prevent falling and injury. Be sure to hold onto a railing to help you balance. Lift your heels off the ground then slowly lower your heels to the lowest point possible. Repeat this step 20 times. This exercise should be done in a slow, controlled fashion. Rapid movement can create the risk of damage to the tendon. As the pain improves, you can increase the difficulty level of the exercise by holding a small weight in each hand.

- Single leg heel drop. This exercise is performed similarly to the bilateral heel drop, except that all your weight is focused on one leg. This should be done only after the bilateral heel drop has been mastered."

lxxx

Other treatments include:

- "Orthotic devices protect or change the position of the foot and ankle in order to promote healing. A shoe insert or wedge that slightly

elevates your heel can relieve strain on the tendon and provide a cushion that lessens the amount of force exerted on the tendon.

- Corticosteroid injections may be used with caution to reduce inflammation around a tendon that has been chronically inflamed. An increased risk of tendon rupture has been observed with this treatment. To lower that risk, your doctor may use ultrasound imaging to ensure that he or she injects the corticosteroid near the target site while avoiding a direct injection into the tendon.
- Platelet rich plasma (PRP) injection is a relatively new treatment under investigation for treating chronic, non-healing degeneration of the Achilles tendon (Achilles tendinosis) and other chronic tendon problems. This treatment involves injecting your own blood plasma, which contains factors that promote healing, at the site of the inflamed tendon.
- Surgery to repair damaged tissue and improve function of the tendon is considered only when several months of more conservative treatments don't work or if ongoing inflammation results in partial or complete rupture of the tendon."[lxxxi]

Massage for Achilles tendonitis

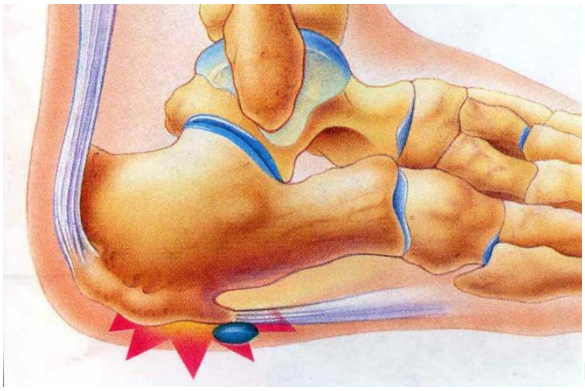
Transverse friction can be used on Achilles tendonitis. This technique will reduce discomfort and increase blood flow to the tendon. Counter-strain to the calf can also relieve stress on the tendon.[lxxxii] Effleurage to the calf, starting at the heel and working toward the knee, is a good stroke to start with before moving to deeper work.[lxxxiii]

Chapter Six
Other Foot Issues
Associated With Prolonged Standing

Achilles tendonitis and plantar fasciitis are common foot issues among those who experience prolonged standing. There are also a number of other issues that can affect the feet and heels amongst this population of workers.

Heel Spurs

Heels spurs are commonly associated with plantar fasciitis patients (about 70 percent of patients with plantar fasciitis have them), but it is actually its own condition. A heel spur is a hook of bone on the back of the heel or a bony growth on the bottom of the heel that usually develops along with plantar fasciitis.[lxxxiv] Heel spurs can press on nerves or bursa in the foot, causing pain when you stand.



[lxxxv]

Bunion

A bunion is described as a "bony deformity of the foot affecting the joint between the foot and big toe (hallux); it appears as a "bump" on the bone at the base of the big toe. Anatomically it is described as a bony enlargement of the medial eminence at the base of the first metatarsal." Wearing bad shoes that put pressure on the big toe will cause the big toe to turn in further, and will irritate the existing bunion (which makes it bigger). People who experience prolonged standing are at greater risk for bunion development, as are those with flat feet or existing foot injuries.

lxxxvi

Hammer Toe

A hammer toe is when the toe bends downward and looks like a claw. It can be genetic. You can also develop hammer toes by wearing shoes that are too narrow or short for your foot. The most commonly affected toe is the second toe. As the toe is shortened in the shoe and shoved into the front of the shoe from prolonged standing, the muscles and tendons will eventually shorten, as well. Eventually, you will not be able to move the toe. Corns and calluses also commonly develop on the same toes.

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Chapter Seven
Varicose Veins

What Are Varicose Veins?

According to the U.S. National Library of Medicine, varicose veins are "Varicose veins are swollen, twisted, and sometimes painful veins that have filled with an abnormal collection of blood."[lxxxviii] Any veins in your body can become twisted in this way, but the most common are in the feet and the legs. In cases of prolonged standing, the pressure that the body puts on the veins in the lower body increase the chances of the varicose veins developing.[lxxxix]

Veins become varicose when the valves in the veins malfunction, so blood stops moving toward the heart. The veins retain the blood and become swollen.[xc] Instead of flowing from one valve to the next, the blood continues to pool in the vein, increasing venous pressure and the likelihood of congestion while causing the vein to bulge and twist.[xci]

[xcii]

Superficial varicose veins are visible on the surface of the leg, and can be surrounded by spider veins (flooded capillaries). Interior varicose veins are not usually visible, but they can be painful and might lead to blood clots.[xciii] Superficial varicose veins are also more likely to form because they have less muscle support than interior veins.[xciv]

Along with prolonged standing, other factors that contribute to varicose vein formation include obesity, a sedentary lifestyle, pregnancy, constipation, genetics, and other leg injuries. Sitting with your legs crossed can worsen existing varicose veins.[xcv]

Varicose veins can also lead to more serious complications, including:

- "Sores or skin ulcers due to chronic (long-term) backing up of

blood. These sores or ulcers are painful and hard to heal. Sometimes they cannot heal until the backward blood flow in the vein is repaired.

- Bleeding. The skin over the veins becomes thin and easily injured. When an injury occurs, there can be significant blood loss.
- Superficial thrombophlebitis (throm-bo-fli-BYT-uhs), which is a blood clot that forms in a vein just below the skin. Symptoms include skin redness; a firm, tender, warm vein; and sometimes pain and swelling.
- Deep vein thrombosis, which is a blood clot in a deeper vein. It can cause a "pulling" feeling in the calf, pain, warmth, redness, and swelling. However, sometimes it causes no significant symptoms. If the blood clot travels to the lungs, it can be fatal."[xcvi]

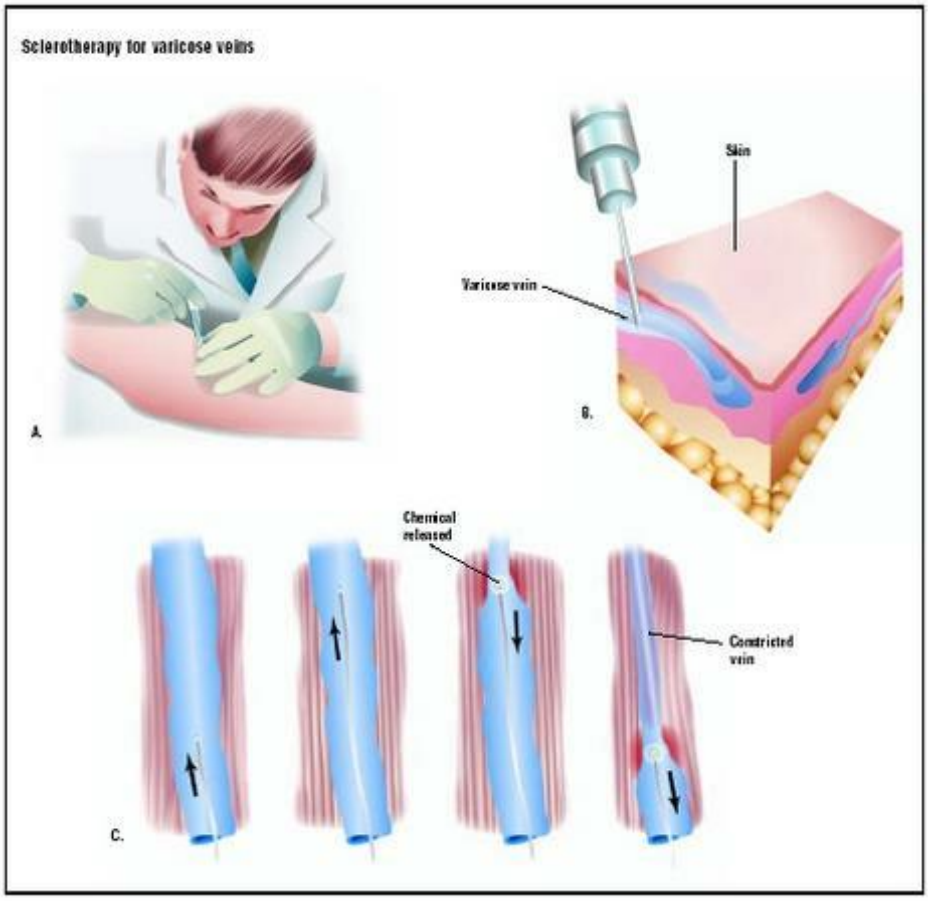
You should go see a doctor about the varicose veins if any of the following apply:

- The vein has become swollen, red, or very tender or warm to the touch
- There are sores or a rash on the leg or near the ankle
- The skin on the ankle and calf becomes thick and changes color
- One of the varicose veins begins to bleed
- Your leg symptoms are interfering with daily activities
- The appearance of the veins is causing you distress[xcvii]

How Are Varicose Veins Treated?

There are a number of treatments available for varicose veins, depending on the severity of the case.

1. Compression stockings- these put pressure on the veins to help blood move along. There are also a variety of compression stockings. The first type, support pantyhose, put pressure all over the leg. The second type are over-the-counter "gradient compression hose," which provide stronger pressure. Prescription gradient compression hose offer the most pressure, and you need to be fitted for them.
2. Sclerotherapy involves the injection of medicine into the vein by the doctor. The medication causes the veins to swell shut and turn into scar tissue.



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The veins eventually fade, but the treatment may need to be repeated. It is often done with compression stocking treatment. Sometimes the doctor will use an ultrasound to guide the needle. There are some potential side effects:

- "Stinging, red and raised patches of skin, or bruises where the injection was made. These usually go away shortly after treatment.
- Spots, brown lines, or groups of fine red blood vessels around the treated vein. These also usually go away shortly after treatment.
- Lumps of blood that get trapped in vein and cause inflammation.

> This is not dangerous. You can relieve swelling by applying heat and taking aspirin. Your doctor can drain the trapped blood with a small pinprick at a follow-up visit."[xcix]

Varicose veins can be prevented, even if you do have to stand for long periods of time. There are a few steps you can take (especially in the wardrobe department) to make sure the veins in your legs stay healthy. Start with exercise- low-impact exercises like swimming/biking/the elliptical machine will keep your leg muscles fit, which supports the veins, without straining the legs. It will also keep your weight down, which further reduces strain on the legs.

Wear flat, supportive shoes, along with supportive hose (especially if varicose veins run in your family). When the day is over, prop your feet up so they are higher than you heart and stay that way for 15 minutes. This will prevent blood from pooling in your veins.[c]

Massaging Varicose Veins

Massaging varicose veins can be very beneficial for the person who suffers from them; however, there are certain precautions that should be taken (even if you are massaging your own legs). If there is any broken skin, ulcers, or phlebitis present, do not massage on the varicose veins. You will also want to limit friction over the area by using proper lubricating oils. [ci]

Massage that encourages circulation and helps with lymphatic drainage is most useful in treating varicose veins. Effleurage strokes that are about three inches long will help move blood through the vein from valve to valve.

Longer strokes afterward will help with overall blood flow. Strokes used on varicose veins should always move toward the heart, and should "use full-palm pressure or flat fingertip pressure when massaging over varicose veins and avoid digital pressure, cross-fiber friction, stripping, wringing, and percussion movements." Elevating the legs 45 degrees during the session will also help with venous movement. [cii]

What Are Spider Veins?

Spider veins are different from varicose veins, though the are often confused. They are "very tiny superficial blood vessels that increase in size over time and commonly occur on the legs."[ciii] This is opposed to varicose veins, which are larger, raised, and ropy. And while weight gain can lead to varicose vein formation, spider veins are not affected by weight gain. In fact, losing weight can lead to spider veins because the collapse of the skin reveals previously hidden spider veins.[civ]

What Are Hemorrhoids?

Hemorrhoids are varicose veins in the anus. They can be caused by prolonged standing, as well as prolonged sitting, pregnancy, constipation, and rectal surgery. Symptoms include:

- Bleeding
- Itching
- A lump that makes it painful to sit down

- Skin irritation
- Pain[cv]

To prevent hemorrhoids, avoid prolonged standing. Avoid straining on the toilet. Drink plenty of water and eat a high-fiber diet. Treatments for hemorrhoids include:

- "Wash the anal area gently but thoroughly after each bowel movement, using a soft tissue and warm water. To dry, dab the area with a soft cloth.
- For external hemorrhoids, apply an ice compress.
- Frequent warm baths or sitz baths can relieve mild symptoms of pain and itching.
- Anesthetic ointment and topical corticosteroids (such as hydrocortisone) may ease pain and swelling.
- An injection of a solution that turns the hemorrhoid to scar tissue may be used (sclerotherapy).
- Some hemorrhoids may be tied off using a rubber band (rubber band ligation).
- In severe cases surgical removal (hemorrhoidectomy) may be necessary."[cvi]

Chapter Eight

Other Issues With Prolonged Standing

Prolonged Standing and Pregnancy

Studies show that prolonged standing when pregnant can result in a number of complications, including "premature birth, birth defects, low birth weight, and stillbirth."[cvii] An *Occupational and Environmental Medicine* study followed 4,680 pregnant women through their pregnancy. The study showed that women who experienced prolonged standing had babies "whose heads were on average 1cm smaller than average at birth, suggesting that they grow at a slower rate." [cviii]

Prolonged standing during pregnancy can also lead to blood pooling in the legs, causing pain, and to lower back pain. [cix] To help prevent these complications, pregnant women should take the following precautions at work:

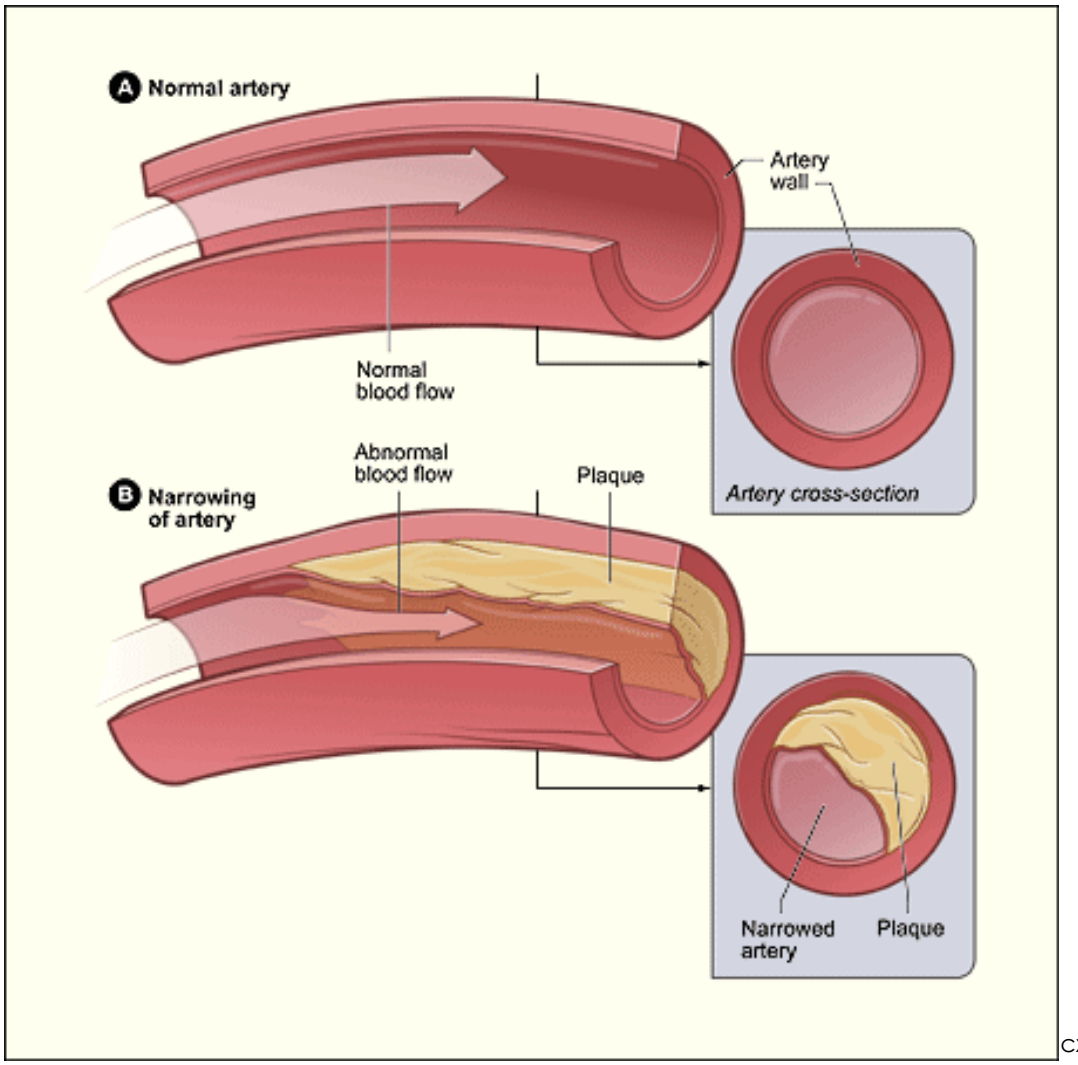
- "Limit standing to less than two hours in a row. Even with this limit, floor matting should be provided.
- Prolonged sitting (more than two hours in a row) is also not good for the fetus, so pregnant workers should be able to switch frequently between sitting and standing.
- Workstation arrangement may have to be altered to accommodate the pregnant worker's new dimensions.
- Frequent breaks with the legs raised would be helpful."[cx]

Heart Issues

There is evidence that prolonged standing can lead to heart problems and stroke, resulting from increased risk of carotid atherosclerosis. It also "constitutes a risk factor for the development of hypertension comparable to 20 years of aging, which in turn is one of the accepted major risk factors for the development of cardiovascular disease."[cxi]

Hypertension is another term for high blood pressure, which is the "measurement of the force against the walls of your arteries as your heart pumps blood through your body."[cxii] Up to 1/3 of people who have hypertension don't know it, but there are symptoms of severe high blood pressure:

- "Severe headache
- Fatigue or confusion
- Vision problems
- Chest pain
- Difficulty breathing
- Irregular heartbeat
- Blood in the urine
- Pounding in your chest, neck, or ears"[cxiii]



[cxiv]

Carotid atherosclerosis is "hardening of the [carotid] arteries…It occurs when fat, cholesterol, and other substances build up in the walls of arteries and form hard structures called plaques. Over time, these plaques can block the arteries and cause problems throughout the body."[cxv] When plaque forms, it will act in one of three ways:

- "They can stay within the artery wall. There, the plaque grows to a certain size and stops. "Because they don't block blood flow, these plaques may never cause any symptoms," says Stein.

- They can grow in a slow, controlled way into the path of blood flow. Eventually, they cause significant blockages. Pain on exertion (in the chest or legs) is the usual symptom.
- The worst-case scenario: plaques can suddenly rupture, allowing blood to clot inside an artery. In the brain, this causes a stroke; in the heart, a heart attack."[cxvi]

Chapter Nine

Posture

Your posture during prolonged standing can go along way toward preventing the development of health complications. When you stand with good posture, your spine is strong and there is no strain on the muscles and connective tissues.

Having proper posture while standing also does the following:

- "Keeps bones and joints in the correct alignment so that muscles are being used properly.
- Helps decrease the abnormal wearing of joint surfaces that could result in arthritis.
- Decreases the stress on the ligaments holding the joints of the spine together.
- Prevents the spine from becoming fixed in abnormal positions.
- Prevents fatigue because muscles are being used more efficiently, allowing the body to use less energy.
- Prevents strain or overuse problems.
- Prevents backache and muscular pain.
- Contributes to a good appearance."[cxvii]

When you're standing up, your spine has three natural curves: the cervical curve at the top of the spine, the thoracic curve in the upper back, and the

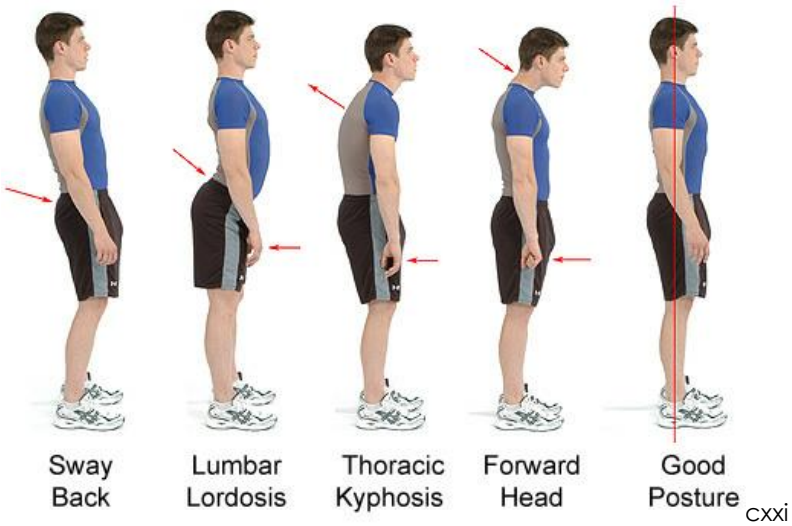
inward lumbar curve. Keeping your posture correct will maintain these natural curves in the spine, reducing strain on your lower back.

[cxviii]

To maintain good posture while standing, follow these tips:

- "Hold your chest high.
- Keep your shoulders back and relaxed.
- Pull in your abdomen and buttocks.
- Keep your feet parallel.
- Balance your weight evenly on both feet.
- Try not to tilt your head forward, backward or sideways, and make sure your knees are relaxed — not locked."[cxix]
- "Hold your head up straight with your chin in. Do not tilt your head forward, backward or sideways.
- Make sure your earlobes are in line with the middle of your shoulders.

- Avoid standing in the same position for a long time."[cxx]



[cxxi]

If you are unsure if your posture is good while you're standing, you can test it by standing against a wall. Keep your butt, shoulders, and head against the wall. Your heels should be about two to four inches away from the wall. Reach your hand behind you and slide it between your lower back and the wall. You should be able to comfortably slide your hand in that space. If there is more than a hand's width of space, tighten your abs. If there is less, arch your lower back. When you walk away from the wall, maintain that posture.[cxxii]

If you're not used to standing properly, it may tire you out or feel stiff at first. Your muscles will soon adjust to the new work they're doing. Of course, people who are experiencing prolonged standing will probably get tired no matter how good their posture is. You can lift one foot up onto a footrest if

you can't sit down. Maintain your good posture, even with one foot on the rest.[cxxiii]

There are a number of factors that contribute to poor posture, along with prolonged standing. These include pregnancy, obesity, weak muscles, improper footwear, and tight muscles (inflexible).[cxxiv]

If your poor posture is due to or exacerbated by muscle tightness or weakness, here are some exercises and stretches that target postural muscles. These steps should make standing properly easier over time, which in turn will help prevent or correct discomfort and other health issues:

- "Neck flexes. Hold shoulders in a relaxed position and lower your head by tucking your chin in towards your chest. Hold for five seconds and gently raise head back up. Now tilt head back as far as you can and hold for five seconds. Repeat the process five times. Next, swivel head around to the right and hold for five seconds. Bring head back to the center and then look around to the left. Repeat this process five times.

- Shoulder flexes. Loosen and relax shoulders, then raise them up to your ears holding them tight for five seconds. Let shoulders drop into a relaxed position. Repeat five times.

- Side stretches. Sit upright in a chair with your feet planted firmly on

the ground. With your right hand firmly holding the seat of the chair, gently lean toward the left. Hold for five seconds. Repeat five times. Change to the left hand and do five stretches.

- Back stretches. Get on your hands and knees on the floor. Keep your hands flat on the ground, about shoulder width apart and your knees hip-width apart. Arch your back up as far as you can (like a cat arching its back). Hold the position for a few seconds. Now walk your hands forward to stretch out your back as far as is comfortable. Hold the position for a few seconds. Repeat five times."[cxxv]

Regular massage can also help correct your posture. Massage "relaxes the overworked and sore muscles that result from poor posture and allows the body to properly position itself back into its natural alignment… With ongoing massage the muscles are loosened and relaxed-joints have greater freedom and pressure points are relieved. This allows the body to position itself in a healthy and natural posture, therefore avoiding the movements and positions developed over time as a reaction to the pain."[cxxvi]

Chapter Ten

Footwear

Wearing proper footwear is one of the most important things you can do if your work requires prolonged standing. Here are some important do's and don'ts for footwear when standing, from the Canadian Centre for Occupational Health and Safety:

> "DO wear shoes that do not change the shape of your foot.
>
> DO choose shoes that provide a firm grip for the heel. If the back of the shoe is too wide or too soft, the shoe will slip, causing instability and soreness.
>
> DO wear shoes that allow freedom to move your toes. Pain and fatigue result if shoes are too narrow or too shallow.
>
> DO ensure that shoes have arch supports. Lack of arch support causes flattening of the foot.
>
> DO wear shoes with lace-up fastenings.
>
> DO tighten the lace instep of your footwear firmly. The foot is prevented from slipping inside the footwear.

DO use padding under the tongue if you suffer from tenderness over the bones at the top of the foot.

DO use a shock-absorbing cushioned insole when working on metal or cement floors.

DO choose footwear according to the hazard at your workplace.

DO select footwear taking into account individual fit and comfort. Try them on and walk around for a few moments before buying.

DO NOT wear flat shoes.

DO NOT wear shoes with heels higher than 5 cm (2 inches)."[cxxvii]

When you're buying new shoes, always measure each foot individually. Not everyone's two feet are the same size. Have your feet measured regularly because they can widen as we age.[cxxviii] It's a good idea to shop for new shoes AFTER you've worked a full shift- your feet will be slightly swollen and you need your shoes to fit that state.[cxxix]

Chapter Eleven
Other Things You Can Do

Along with correcting your posture and using proper footwear, there are other steps you can take to prevent injury from prolonged standing.

Workplace Design

While this is really more the responsibility of the employer, if you own your own practice or your client who stands a lot owns their own space, you can take these steps to make the workplace more friendly to your legs and back.

- Use adjustable work benches and tables
- Provide portable footrests or built-in foot rest bars on workstations
- Position computer stations or tools within easy reach so the employee doesn't have to bend or stretch to reach them
- Provide a seat that has an adjustable height so the employee can continue working while taking a seated break
- Don't require employees to stand for long periods of time on concrete or metal floors. Install wood, cork, or rubber floors
- Make sure the floors aren't slippery
- If you have to have concrete/metal floors, cover them with non-foam anti-fatigue mats

Workers themselves can practice a few steps in this category that will lessen the strain of prolonged standing:

- Always face the work

- Keep your body near the work station
- Adjust the work station so that you have enough room to shift positions regularly
- Use provided footrests or foot rails
- Don't reach behind your shoulder line[cxxx]
- Don't work with your neck flexed at more than 30 degrees, or with your head rotated for more than one minute
- Take breaks to stretch and walk regularly.

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