Your Natural Wellness Clinic

Laser Spine and Sport

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Understanding Foot Function & Orthotics

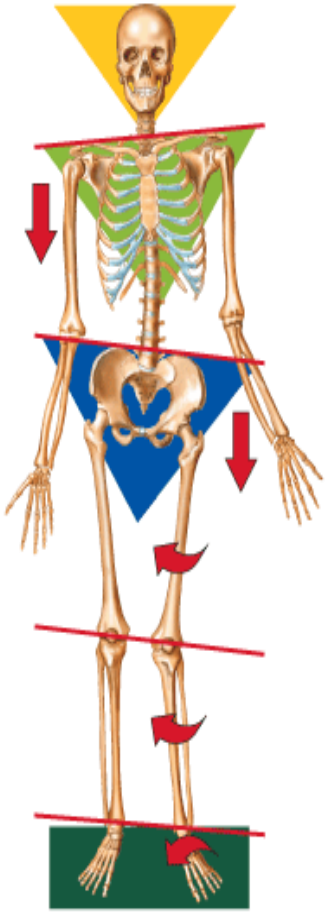
Your Feet Are Your Foundation

Non-Surgical Solutions for Foot Pain, Knee Pain, Back Pain

Your feet are the foundation of your body. Your feet support proper function of the knees, pelvis and spine. They support you when you stand, walk, or run. And they help protect your spine, bones, and soft tissues from damaging stress as you move around. Your feet perform better when all their muscles, arches, and bones are in their ideal stable positions. For the feet to function properly, they must be healthy, in balance and able to absorb a great deal of shock from daily contact with hard surfaces (concrete, wood, and tile floors) which try to compensate for the irregularities in the feet. Custom orthotics help to maintain the feet in proper balance, acting as a stable base or foundation for the body's musculoskeletal system.

Orthotics Can Help More Than You Think

Heel Spurs	**Knee Pain /Arthritis**	**Hip Pain**
Flat Feet	**Chronic Neck Pain**	**Short Leg**
Plantar Fascitis	**Chronic Shoulder Pain**	**Shin Splints**
Bunions	**Lower Back Pain**	**Kids' Posture**
Chronic Ankle Pain	**Sacroiliac Joint Pain**	**Sports Injuries**



Orthotics work on your feet much like glasses work on your eyes, by reducing stress and strain on your body by bringing the feet back into proper alignment. Custom molded orthotics are prescribed when the feet are not functioning properly. Custom orthotics look like insoles, but are biomechanical medical appliances made from precise imprints of your feet and custom molded to correct your specific foot imbalances. Orthotics are part of an overall prescribed therapy program. As a result of proper support, your body becomes healthier. This occurs through the improvement of your foot function and the removal of foot dysfunction. Orthotics are an important part of a program to heal injured or damaged tissues critical to foot, knee and spinal health. Your orthotics will allow your feet, lower leg, knees and pelvis to function in a more natural and efficient manner. This will result in decreased pain, muscle tightness and assist in elimination of symptoms, allowing you to enjoy your daily activities comfortably.

Preventative Care - Orthotics can prevent damage to the feet, knees hips and low back. The feet contain almost one-fourth of the body's bones plus a complex network of muscles, tendons and ligaments, all working together whenever you stand, walk, or run. With 26 bones, 38 joints and approximately 107 ligaments, it is not surprising that foot dysfunction has been found to affect up to 80% of the population by age 20. Support of the feet is very important, most painful conditions of the foot and knees originate with the strain of these foot tissues and joints. Therefore, control and support of the feet to prevent strain can be of significant benefit to everyone. The foot is constructed with three arches which, when properly maintained, give exceptional supportive strength. These three arches form a supporting vault that distributes the weight of the entire body. If there is compromise of one arch in the foot, the other arches must compensate and are subject to additional stresses, which usually leads to further compromise.

It's a chain reaction. Doctors of Chiropractic know alleviating pain in one part of your body often requires treating a different part. This concept is often overlooked by allopathic doctors. The pain you feel in your neck could be caused by a misalignment in your spine that is caused by unbalanced positioning in your pelvis, knees or feet. See? It's a chain reaction. By stabilizing and balancing your feet, custom molded orthotics enhance your body's performance and efficiency, reduce pain, and contribute to your total body wellness. Our orthotics complement your chiropractic treatment when you stand, walk, and live your active life.

Understanding Human Biomechanics: The joints and muscles of the body function most efficiently when they are in physical balance. Principles of physics and engineering have shown that with any physical entity, whether it is a bridge, a building, or the human body— Structure dictates function. The body is a biomechanical kinetic chain where abnormal movements at one line, or joint, can interfere with proper movements at other joints. During standing and walking, our bodies are subjected to natural forces and postures that can inflict mechanical stress and strain throughout the interrelated chain of joints and muscles. When foot imbalance is present, there is a negative impact on the knees, hips, pelvis, and spine. Some patients must have these abnormal forces reduced before they can achieve improved spinal function.

Understanding Pronation: Pronation describes the rotation of a body part downward or inward. It is actually a normal motion that occurs when walking; however, if it happens excessively, pronation can cause global postural problems. The major cause of over-pronation is a decrease in the arch height.

Postural Effects from Imbalances in the Feet: A loss of arch height will cause a flattening and rolling in of the foot— this is termed pronation. Because everything is connected, the bones of the leg also inwardly rotate. Excessive rotation of the bones of the leg (tibia and femur) will cause unnecessary stresses on the knee as well as twisting of the pelvis and spine. If the pronation is more prevalent on one side, there can be a resultant unleveling of the pelvis and a functional scoliosis. Tilting of the pelvis places tension on muscles and connective tissues, which can eventually lead to chronic back problems. High levels of heel-strike shock can result from breakdown of the body's natural "shock absorbers." The shock wave then transmits up the kinetic chain causing painful symptoms all the way up to the head, slowed recovery of leg and spine injuries, and aggravation of other conditions.

Benefits of Spinal Pelvic Stabilizing Orthotics: Properly fitted orthotics support the foot to control excessive and unwanted pronation and supination. This helps to reduce unwanted stress on the body. Improved shock absorption reduces repetitive stress on joints and muscles, permitting smoother function and decreasing arthritic symptoms. Use of orthotics represents a long-term, yet cost-effective intervention for many types of functional and structural problems.

How spinal pelvic stabilizing orthotics Work: Wearing orthotics inside your shoes is similar to placing a shim beneath the leg of a wobbly table: it adds support to eliminate unwanted motion in the entire structure. The foot is formed of three distinct arches, which create an architectural vault. The result of supporting these three arches is improved stability and postural integrity. Flexible spinal pelvic stabilizing orthotics encourage optimal muscle and nerve function by guiding the feet through a more normal pattern with each step taken.

About spinal pelvic stabilizing orthotics: Using weightbearing impression images of the feet in the position of function from a foam casting kit. Skilled laboratory technicians create unique orthotics designed to correct and support areas of weakness. The combination of flexible, yet supportive and durable construction materials ensure that the stabilizers will both guide the feet when walking and provide support during long periods of standing.

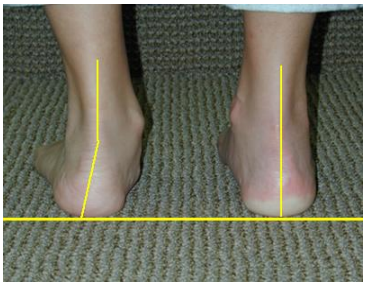
Unlike other stabilizing technologies, which use rigid materials to force the feet into a theoretical "ideal" position and may result in muscle atrophy and abnormal nerve proprioception, we use orthtotics which are flexible and allow controlled, supported movement for the dynamic human body and foot.


Normal Arch


Flat Arch

Your body is an interconnected system of specialized parts, and the support structure which holds everything together is made up of bones, muscles, tendons, and ligaments. Even if your feet don't hurt, they may be contributing to your overall postural balance. If you're having pain or discomfort in a specific area of your body—anywhere from your feet to your neck— click on the link(s) below nearest to your area of pain to learn how custom-made orthotics may help bring you long-term relief.

What Causes Foot Problems? From the time you learn to walk, your feet assume three crucial functions: they support your body whenever you stand, walk, or run; they assist you in achieving movement from one place to another; and they help protect your bones and soft tissues from damaging shock stress as you move. By the age of 20, nearly 80% of us have had some kind of foot problems, and by age forty almost all of us do. As we age, and with old injuries, increased weight, our feet become flatter and wider. This changes the biomechanical function of the foot, especially when walking. Normally, the big toe is the main force in the toe off phase of walking. However, after about 40 years of age and with the flattening of the feet, this toe off force is shifted from the big toe to the second and third toes. This results in a flatter, weaker foot which places a great amount of stress and strain on the muscle, tendons and ligaments of the feet, knees, and even up to the pelvis. **What are some of the most typical foot problems?** Pronation is considered the most common foot problem. In pronation, some of the bones of the foot drop to a less stable position because the foot arches are too weak to keep them in proper alignment. The arches themselves may be unnaturally stretched ("flat feet"), and stress on the entire foot increases. Another common problem — one that is often found along with pronation — is plantar fascitis, a stress irritation to the sheath of elastic tissues running nearly the entire length of the foot. If not treated, either condition can lead to progressive development of foot malfunction and discomfort. Feet can become "tired and achy" or experience a burning pain, and walking can begin to feel "clumsy" as you try to move your foot in a way that avoids further pain. Foot pain means that you should make an appointment for a foot exam.



Pronation: the most common and damaging medical problem that may occur as a result of flat arches. Pronation is a turning outward of the foot at the ankle, so that one has a tendency to walk on the inner border of the foot. You can test for pronation by looking at the leg and foot from the back. Normally you can see the Achilles Tendon run straight down the leg into the heel. If the foot is pronated, the tendon will run straight down the leg, but when it lies on the heel, it will twist outward. This makes the inner ankle bone much more prominent than the outer ankle bone. Because pronation is a twisting of the foot, all of the muscles and tendons which run from the leg and ankle into the foot will be twisted. If left untreated, pronation may be the cause of heel spurs, plantar fasciitis, frequent ankle sprains, shin splints, weak and painful arches, and eventually knee, hip, and lower back pain.

with Orthotic ***without Orthitic***

Structural Defects: foot problems that may occur because the bones and joints of the foot are not held together with the normal amount of tension. This allows the bones and joints to move into abnormal positions causing: bunions, hammertoes, neuromas, calluses, and corns. If these problems are left untreated, they become progressively more painful and debilitating.

How do I know if I have pronated feet? Your chiropractor or pediatrist is best qualified to make that determination; but basically speaking, pronated feet often "flare outward" during standing or movement; your Achilles tendons and kneecaps may be rotated inward from the midline of your legs; and shoes may have heel wear on the outside and look "run over".

Since my feet don't hurt, I don't have any real problem with them — right? Wrong. Even if your feet don't hurt, the fact that your foundation has been weakened can have a potentially serious impact to the rest of your body. If you are currently having knee, hip, low back or neck pain, the reason may be because your feet aren't supporting joints, bones, or soft tissues above the ankle properly, and this lack of support has contributed to stress/pain in some other part of your body. If you are having pain in any of the areas mentioned above, ask your healthcare professional if your feet could be a contributing factor.

Pain Relief Could Be Only Two Feet Away Even if your feet don't hurt, they may be a major factor contributing to your health problems. Spinal-pelvic misalignment may be the culprit. Pain in various parts of your body may be traced directly or indirectly to your feet. A foot problem may be the cause of discomfort or pain in your leg/hip, back, arm/shoulder or even your neck! Custom-made, flexible orthotics, or may be part of the solution to your health problems.

Take This Test

- ☐ Do you stand or walk on hard surfaces for more than 4 hours daily?
- ☐ Do you participate regularly in any physical sport (basketball, baseball, tennis, golf, bowling, etc.)?
- ☐ Are you age 40 or over?
- ☐ Have you had a prior knee injury, back injury, or neck injury?
- ☐ Do your shoes wear unevenly?
- ☐ Do you have joint pain while standing, walking, or running?
- ☐ Is one of your legs shorter than the other?
- ☐ Do you have knock knees or bow legs?
- ☐ Do you have obvious foot problems (bunions, corns, flat feet, etc.)?
- ☐ Do your feet "toe out" when you're walking?

If you said yes to any of the above, ask us about semi or custom-made foot **orthotics**.

Flat Feet Causes: The normal arch is made up of bones and joints which are held tightly together in a precise relationship. In order for the arch to flatten out, the ligaments and tendons which hold the bones and joints together must be more flexible than normal. This abnormal flexibility may be a result of: the genes we inherit from our parents, the weakening of muscles and ligaments caused by advancing age, neuromuscular diseases, or injury. Injuries may include one severe trauma, or years of standing for long periods of time in the wrong types of shoes (those with high heels or those with poor support). This flexibility of the bones, joints, and soft tissues is what causes the foot problems which are related to flat arches or feet. The following conditions are the most common foot problems seen in flat feet:

Treatment in the child and adolescent must be directed to supporting the individual bones and joints which make up the arch, and to aid the arch in its job as a shock absorber during the individual's growing years. This support of the individual components of the arch will prevent the arch from flattening out further as growth continues, allowing a normal arch to be formed. Aiding the development of a normal arch is accomplished through the use of **custom-made orthotics.**

Custom-made Orthotics: Custom-made orthotics are medical devices which gently support not only the arch, but each individual component of the arch and foot. Also, because of the state-of-the-art materials used in the construction of custom-made orthotics, they allow the arch to become a much more efficient shock absorber. Our custom-made orthotics for the treatment of flat feet have been developed over the past 30 years. What makes these orthotics unique is their ability to support the individual components of the arch, not just the "arch" as a whole, and to act as an efficient shock absorber.

Our custom-made orthotics are constructed of the latest space-age thermoplastic materials. These materials not only provide the support which is needed, but they also have a "memory." This memory allows the orthotic to compress slightly when pressure is applied to it, but when the pressure is released, the orthotic returns to its original height and shape. This ensures maximum comfort, while guaranteeing that the arch will always be supported at its most efficient height. In children this will help to promote the development of a normal arch, and act as a shock absorber during the growing years. In an adult, our custom-made orthotics help to prevent the further collapse of the arch; they act as shock absorbers and they will help to reduce pain in the arches, the entire foot, leg, knees, hips, and lower back. Over-the-counter arch supports may give temporary relief, but the material will break down quickly and they do not support the individual components of the arch long term. These custom-made orthotics are comfortable, will last for years, and will fit into all flat shoes, and shoes with heel heights of up to 1 1/2 inches. Unfortunately, most insurance plans do not pay for custom orthotics. And many Pediatrists charge $350 - $600. But the good news is that we have found a few orthotic manufacturers which are more reasonably priced. And we even have semi-custom sandals.

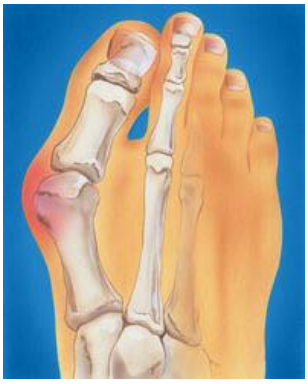
A Heel Spur is a piece of calcium or bone that sticks out from the bottom of the heel bone, and lies within the fibers of the plantar fascia. When walking, the spur digs into the plantar fascia and causes small micro-tears in the plantar fascia. This produces inflammation and pain in the heel, which at times may radiate into the arch.

Plantar fasciitis is an inflammation of the plantar fascia. The plantar fascia is a thick ligamentous/fibrous band on the bottom of the foot that is attached to the heel, and runs forward to insert into the ball of the foot. Plantar fasciitis is a painful inflammation of this band, which usually occurs at its attachment to the heel; however, the inflammation and pain of plantar fasciitis can occur anywhere on the plantar fascia. This is caused by overuse and improper foot function. The most common sign of these problems is pain in the bottom of the heel or arch when first standing, which gradually improves with walking. This pain may later return with continued walking. The pain usually temporarily subsides after a period of rest. The treatment involves correcting the underlying causative problems. Orthotics are and excellent correction, combined with stretching, ultrasound and foot manipulation.

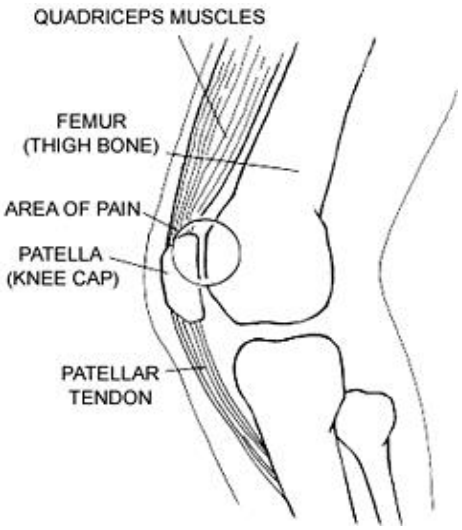
Achilles Tendonitis is an inflammation of the Achilles Tendon. This tendon allows the muscles in the calf of the leg to attach to the back of our heels. The Achilles Tendon is a long and thick tendon, which moves our foot down, so that the toes point to the ground (plantarflexion).

Bunions or ***Hallux Valgus*** and ***Hallux Abducto Valgus***. A bunion is a complex deformity that results in a bump that develops on the inner side of the foot, in the area where the big toe and the bone it connects to (called the first metatarsal) meet. The turning inward of the big toe, so that it presses against the second toe (the big toe is no longer straight). Bunions are a progressive deformity, and if left untreated the bump will become larger, and the big toe will eventually lie over or under the second toe.

Causes of Bunions: The normal foot is made up of bones and joints which are held tightly together, in a precise relationship. In order for a bunion to form, the ligaments and tendons which hold the bones and joints together must be more flexible than normal. This abnormal flexibility is usually the result of a biomechanical foot defect called pronation**,** which destroys the normal relationship between the big toe and the first metatarsal. Pronation is caused by either the genes we inherit, or the way our feet lie against the uterine wall prior to our birth. Pronation is a turning outward of the foot at the ankle, so that one has a tendency to walk on the inner border of the foot. When this occurs, we walk with an abnormal amount of our weight being forced on the big toe and first metatarsal. The result is a bump on the inner side of the foot, and a big toe which is pushed over toward the second toe. When flat feet occur along with pronation, the foot becomes even more flexible and susceptible to bunion formation.



Bunion progression may be hastened by: Wearing high heel and pointed toe shoes. These types of shoes apply abnormal pressure to the big toe and force it over toward the second toe; they also irritate the first metatarsal head causing a bump to form (when bone is irritated it enlarges). An injury to the inner side of the foot or big toe may damage the first metatarsalphalangeal joint, and speed up bunion formation. Arthritis of the first metatarsalphalangeal joint may cause the joint to become enlarged, and a bunion may then form.



Knee Pain There is no single cause for painful knee joints. Of course, the most obvious factor is a traumatic injury, such as falling hard on the knee joint, or being struck on or near the knee. Traumatic injuries usually happen suddenly and with great force. Chronic injuries develop over a longer period of time, and are often the result of repeated stress to the knee. This stress can cause the knee joints to move out of normal alignment; in some cases, your kneecaps may either be closer to each other ("knock kneed") or farther apart than they should be. Other possible reasons for chronic injuries may include obesity, ligament weakness, not having enough protection from heel-strike shock, foot/ankle problems, improper exercise or lifting techniques, etc. Organic conditions would include infections and tumors. Ask us to examine your knees and feet, we will be looking for possible alignment/tracking problems, and testing for signs of muscle or ligament weakness — to help determine the cause of your back, knee or foot pain.

Causes of knee alignment problems? The knee is actually two joints involving three bones: the larger weight-bearing ginglymus ("hinge") joint between the femur and tibia bones, and a smaller joint between the femur and patella ("kneecap"). As a hinge joint, the healthy knee bends in one plane of motion much more than it rotates, although some rotation is involved during the gait (walking) cycle. In a normal posture, the kneecaps point straight ahead over the feet. This is the knee posture which gives the most support to the hips and spine. Problems occur when a knee becomes misaligned, and one cause for this can originate in the foot/ankle. If one or both feet has a structural problem ("flat feet", high arch, weak ankles, for example), this condition can cause the leg to rotate improperly, which in turn produces stress on the knee. As knee muscles and ligaments weaken, the joint may begin to move out of its proper position. These imbalances have a potential "ripple effect" which can affect the hips, low back, and neck. That's why you'll often encounter someone whose back started hurting after he/she began having knee problems.

Runner's Knee - Patellofemoral Pain Syndrome One of the most common causes of knee pain in a runner.
The symptoms of this condition may include:
1. Pain near the knee cap (patella), and below it. The pain is located on the anterior surface (front) of the knee, not deep within the knee joint.
2. You may feel and hear a "grinding" when the knee is flexed and extended.
3. Pain after sitting with the knees bent for a time, and then standing up and walking.
4. Walking or running downhill, or walking down stairs may produce knee pain.
5. Direct pressure on the knee cap may produce pain.
6. The area around the patella may swell when pain is present.

What is Runner's Knee (Patellofemoral Pain Syndrome)? The *patella (knee cap)* lies in a groove on the front of the femur, just above the knee joint. This groove is called the *Trochlear Groove*. Normally, when walking or running the patella moves up and down this groove vertically, with no sideways motion (just like an elevator moves). Pain occurs when the patella is not tracking vertically in this groove, but is pulled sideways. This will cause the cartilage on the undersurface of the patella, and the cartilage in the Trochlear Groove to rub abnormally against each other, producing pain. If left untreated, the cartilage that is subjected to this excessive rubbing will become permanently damaged, and begin to deteriorate and break down. This condition is known as chondromalacia and can become permanent, since damaged cartilage cannot usually repair itself.

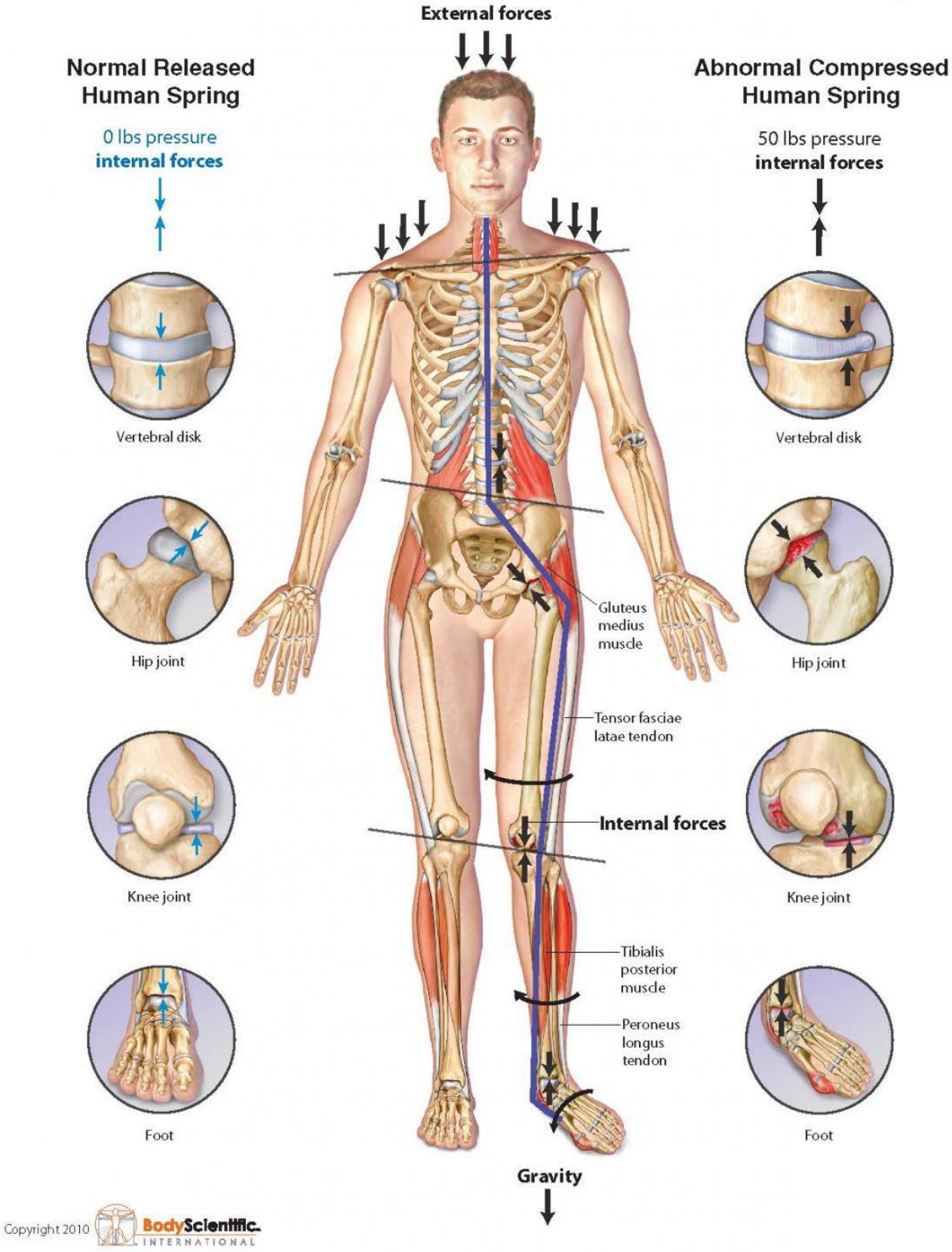
Causes of Runner's Knee: In order for the lower extremity to function properly and painfree, the feet, ankles, legs, and knees must be in a straight or neutral alignment. This allows the patella to move normally within the Trochlear Groove. The most common cause of misalignment begins in the feet and is due to a biomechanical defect known as pronation. Pronation is present when the feet roll in at the ankle. With each step, pronation causes the heel to strike the ground on the inner side of the heel, rather than the center of the heel. So as the foot rolls in, the lower leg must also roll in, causing the knee and patella to roll inwards, or medially. When this occurs, the patella cannot track vertically in the trochlear groove, but is forced to track vertically and medially, thereby producing friction pain. Other, less common causes of this condition include: knock knees, weak thigh muscles, and an abnormal "Q Angle" (the angle that measures the pull of the Quadriceps muscle on the patella).

Low Back Pain There are many possible reasons for low back pain, but spinal strain and postural fatigue account for about 70% of cases not caused by more serious disc or organic conditions. For example, lifting a heavy object improperly, or falling, may cause immediate back pain. Other reasons may not be so apparent and may take a long time to develop into a painful condition (such as poor sleeping, standing, or sitting posture). Health professionals are frequently confronted with a group of injuries known as "low back strain/sprain." These injuries involve spinal muscles, ligaments, joint capsules, discs, and fascia. Whatever the cause, low back pain affects 80% of adults at some time in their lives. And coming to see your health professional was a smart thing to do.

How would spinal/pelvic stabilizers help my back? My feet don't hurt! Your feet are the foundation of your body, and if your feet are not properly supported, you can have problems anywhere from your ankles on up through your neck. Orthotic therapy is essential in restoring structural and functional balance and developing the strength and flexibility to keep your body stable as you stand, walk, or run. Depending on a variety of factors (lifestyle, health, age, weight, sex), your healthcare professional will select the stabilizers best suited for you. Because it is very important to wear your stabilizers all day long, and because most people wear at least two styles of shoes each day, your healthcare professional may decide that a stabilizer Combo (two pairs) would be best for your low back condition.

Call to schedule an exam to see if you can benefit from orthotics.

Fig. 3


External forces
Normal Released Human Spring
0 lbs pressure
internal forces
Vertebral disk
Hip joint
Knee joint
Foot
Abnormal Compressed Human Spring
50 lbs pressure
internal forces
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Hip joint
Knee joint
Foot
Gluteus medius muscle
Tensor fasciae latae tendon
Internal forces
Tibialis posterior muscle
Peroneus longus tendon
Gravity
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