

# ***Solving Top Five-Foot Problems***

***This White Paper helps in good understanding of foot problems  
and how these challenges can be overcome***

## **A White Paper**

by



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## Abstract

People of all ages, from babies to old age get into foot conditions, which are causing disruption in their day-to-day life and working.

These conditions sometimes may become critical and time sensitive to get urgent medical attention unless proper care is taken, at the right time.

There is critical need for people with foot problems to understand these problems which are impacting their health and life.

Fortunately, newer, exciting enabling scanning technologies are emerging to address these foot issues. Most important among those is complete 3D foot scan.

American Gully is offering foot care solutions by fully utilizing world's leading and emerging technologies to secure, enhance and protect your feet through customized orthotic insoles and sandals to all age groups of men and women.

## Foot Problems Impacting Everyday Life

From babies to old age, people suffer with various foot problems. Some factors are genetic and some may evolve at a certain time in life, due to lifestyle and / or natural health issues. Leading medical researchers cited the following factors for foot problems.

- Congenital foot problems present at birth (inherited) grow with age and are the primary source of foot problems like flat foot, high arch and low arch
- One in four older people of age 45 or more are affected by foot pain
- Increased Body Mass Index (BMI) turn people obese and with growing age, the chances of getting foot pain increases due to mechanical load put on foot
- Fat under feet which absorbs shock, gets thinner with age especially under heels and ball of foot lead to severe foot pain
- Poor blood circulation due to Diabetes, smoking, blood clots in soft tissues will not be perfused with enough blood in feet causes foot pain and / or tingling sensation initially and may lose total sensation over a period of time, if neglected
- Arthritic foot problems caused by acute or chronic inflammation in foot joints
- Sports and athletic related stress may lead to high pressure on feet, which sometimes may result in collapse of arch under the feet



## The Top Five-Foot Problems

Ultimately, underlying these issues are five major challenges to the people with foot problems:

1. **Genetic Foot Problems:** How do I ensure that I do not have any hereditary foot problem at each phase of my life?
2. **Identification of Foot Problem and Where to Go:** How can I get an initial assessment or foot scan to identify where my foot pain started (root cause) and where to go, as there are not many Podiatrists in my city / town for treatment?
3. **Where Can I Get My Orthotics or Accessories:** How I can get quality orthotics / custom insoles of right (comfort) fit to footwear as recommended by my Doctor?
4. **Wide and Tall Footwear:** How do I make sure that I get exact fit footwear for my feet which are either Wide and / or tall / tall and wide?
5. **Foot Physiotherapy:** How can I get my Foot Physiotherapy done by a specialist as there are not many physiotherapists who specialize in only foot physiotherapy?

All these challenges are elaborated in brief to educate, enlighten and empower people to lead healthy life.

## Life Journey – Babies to Toddlers to Children

The feet of babies and toddlers will be very soft, and their bones will take time to grow to their full capacity. Newborn babies will have flat feet till they grow. They develop arches in their feet as they grow. However, issues start with some of the children, who may never develop their full arch.



This condition of flat feet poses problem later as the child may end up with weak ankles due to inward turn of the ankles, as shown below. Although it seems like it must be addressed as soon as possible, it may not cause significant problems. Often, it corrects itself by the time a kid turns six years of age. If the kid experiences any pain, then only Doctors may opt to start treatment.

In-toeing is a condition, popularly known as pigeon toes, wherein children walk with their feet turned inward. Those children with this problem may trip and fall way more often compared to normal children, especially if they are also suffering from internal tibial torsion, an inward rotation of lower part of the leg.

Children may trip a little when they first start to walk with in-toeing but will become less frequent with passing time. Parents should be concerned if there is asymmetry of feet and if the problem is not improving with time. Consultation with appropriate specialist is recommended.

Femoral anteversion is another related condition. It means that your child's upper part of the leg is bent more than usual and has inward rotation. In some cases, like cerebral palsy, in-toeing may occur due to an already existing medical condition. These problems are often not treated by doctors, as children usually develop better control of their muscles and improve their coordination during teen age.

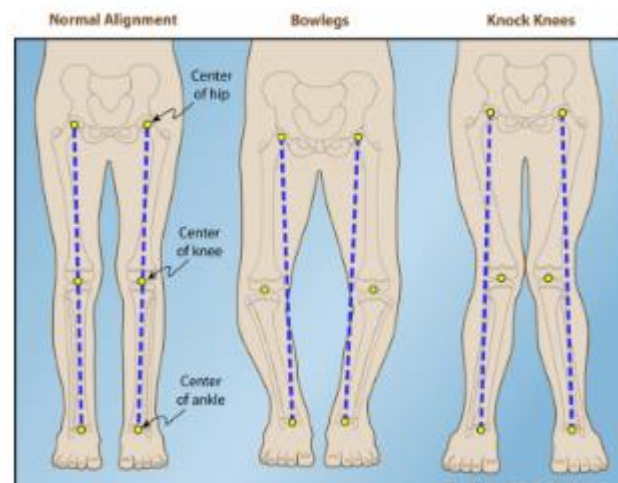




Many toddlers suffer from toe walking. Many toddlers walk on their tiptoes, which normally improves by the time they start schooling. If your child can stand on their feet flat, then the habit of toe-walking may probably disappear on its own. However, some kids are going to experience this problem for longer time. Like the other foot problem, toe walking could be tied to an existing medical condition, including, but not limited to autism, cerebral palsy, and muscle weakness related disorders.

However, your child may need help, if they s/he has stiff ankles or feet, thus making it difficult for you to move the feet up or to put shoes on or rarely stand with the feet flat or the habit of toe-walking still persists. One suggestion given by Doctors is to have your child undergo stretching exercises. They could also recommend putting a casting around the foot and ankle for about six weeks to stretch calf muscles. This is usually done, during the age of first four or five years.

Genu Valgum, also known as Knock Knees, is a symptom or indicator, if you notice your child's knees meet when they stand and have a gap between their two ankles. Appearance of Knock Knees is usually apparent or visible between two to three years age of the child and may increase in severity, till about age four. This condition almost corrects automatically by itself between ages of five to seven and normally, there is no need for any treatment. However, when one side is a lot more pronounced and / or painful, those children may need surgery.



Babies less than 18 months of age normally have a gap between their knees and ankles when they stand. If you are concerned, it is recommended to take photos every few months in standing position. That will help track the changes during growth of your child. Improvement is usually visible, after an age of 3 or 4 years.

If this condition worsens or does not correct by itself, you may have to consult a doctor for getting necessary medical advice. If only one leg is severely affected than the other, it may be a sign of either Rickets disease (problem in bone growth, due to lack of Calcium or vitamin D) or Blount disease (abnormal growth on the top of tibia bone).

Children experience pain in their heel, which may be due to plantar fasciitis, an inflammation in the thick band of tissue in heel bone. It may also be due to Sever's disease. This condition can cause pain associated with growth plate, at the back of heel. The pain may also be due to tightness of calf muscles and Achilles Tendon during growth spurt.

**In sports, your child is recommended to wear arch supports for reduction or avoiding this type of foot pain.**



If there is any concern about the way your child walks, getting a physiotherapy assessment is highly recommended. American Gully will be able to provide guidance, assistance, exercises, or onward referral to a medical specialist, for assurance.

Physiotherapists at American Gully or ones referred by it are experienced in musculoskeletal assessment and can help find reasons behind types of Gait problem, like muscle imbalance, tightness or weakness and joint stiffness for corrective treatment.

If your child has any issues identified during assessment, necessary treatment may include:

- advice on changes to sitting position
- necessary stretches for any muscle imbalance
- muscle strengthening exercises
- advice on motor skill acquisition due to delays
- inclusion in a specific Gym class on recommended equipment
- advice on proper footwear
- refer to a Podiatrist, if necessary or referral to a medical specialist, if it warrants

If it is advised to alter your child's sitting position for this type of problem. You must constantly remind them and is recommended to praise them when they adopt to their new position. You can manually assist them with physical stretches and in any strengthening exercises at home. It is recommended to provide opportunities for them to play with friends and neighbors or let them perform physical activities as part of daily routine.

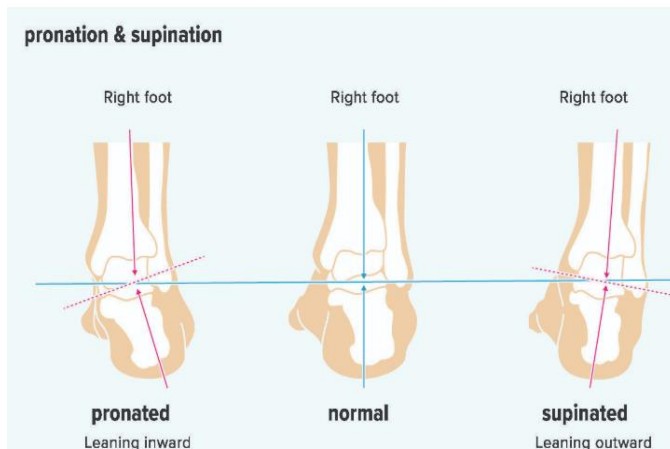
Tips for ensuring healthy feet of your child:

- Let toddlers go barefoot or wear only socks when toddlers are still learning to walk. Shoes will inhibit their feet and toes growth
- Always ensure that your kid is wearing an appropriate shoe size. Their feet grow incredibly fast, so please check their feet size on regular basis
- Select shoes that are a little bit bigger than their feet, to allow room for growth
- If your child is into sports, make sure they warm up before any physical activity and cool down afterwards, before resuming normal activities
- Encourage them to stretch and do exercises for strengthening their calf muscles

## Knowing Your Feet

Your foot is composed of 26 bones that form two crossing arches of the foot with 30 joints and more than 100 muscles, tendons and ligaments. The ankles of your foot are formed by the interaction of the foot and your lower leg. The bones of your foot are held together with ligaments. The foot muscles along with a tissue known as plantar fascia provide secondary support. There are also fat pads in the foot, to help with the qualities of weight-bearing and absorbing impact.

Supination and pronation are the medical terms used to describe the up or down orientation of your hand, arm, or foot. When your palm or forearm faces up, it is supinated. When your palm or forearm faces down, it is pronated.



When supination and pronation refer to your feet, it is little more complicated. Both terms involve your gait (manner of walking) and how your weight is distributed on each foot, as you walk or run.

- Supination means your weight tends to be more on the outside of your foot, when you walk
- Pronation means your weight tends to be more on the inside of your foot, when you walk

When you experience discomfort or pain, it is an indication that something is wrong in your foot. How and when that occurs (continuously or during certain times of the day), can often help in determining the cause, severity of the condition and proper diagnosis can be done by a healthcare professional.

## Causes of Foot Pain

Each day a normal person takes about 6,000 to 10,000 steps. When the normal movement pattern of a foot is disrupted due to an imbalance, results in a variety of foot problems as shown below. The most common ones are:

### Arch Pain



The term arch pain (also referred as arch strain) refers to an inflammation and/or burning sensation at the arch of the foot.

There are various factors that can cause arch pain. A structural imbalance or an injury to the foot can often be one of the direct causes. However, most frequently the common cause is a condition called plantar fasciitis.

Plantar Fascia is a broad band of fibrous tissue located along the bottom surface of the foot, that runs from heel to the forefoot. A foot with an unusually high arch, a sudden increase in physical activity, excessive weight on the foot which is usually attributed to obesity or pregnancy, improper fit of footwear, and over-pronation (flat feet) are the leading causes of plantar fasciitis. Over-pronation occurs during walking process. When a person's arch collapses upon weight bearing, it causes plantar fascia to stretch away from heel bone. With Plantar Fasciitis, bottom of your foot usually hurts inside the foot where heel and arch meet. The pain is often acute either in the morning or after a long rest, because while resting, plantar fascia contracts back to its original shape. As the day progresses, plantar fascia continues to be stretched and pain can slightly be reduced.

If this condition is left untreated and strain on the longitudinal arch continues, a bony protrusion may develop below the heel, known as a heel spur. It is important to treat this condition promptly before it worsens with age.

This is a common foot condition which can be easily treated. The real key for proper treatment of plantar fasciitis is determining the cause of excessive stretching of plantar fascia. If the cause is over-pronation (flat feet), an orthotic / Insole with rearfoot posting and longitudinal arch support is an effective device to reduce the over-pronation allowing the condition to heal through normal process. If you have high arch/es, that can also lead to plantar fasciitis. This type of orthotic will control over-pronation, support your arch and provide necessary relief. Other common treatments include stretching exercises, night splints for plantar fasciitis, wearing shoes that have cushioned heel to absorb shock and elevating heel with the use of a heel cradle or heel cup. Heel cradles and heel cups provide extra comfort in cushioning the heel to reduce the amount of shock and shear forces during everyday activities. Wearing proper footwear, comforting the foot with proper heel cushioning and shock absorption will help through a natural healing process. Every time your foot strikes the ground, plantar fascia is stretched. You can reduce the strain and stress on plantar fascia by following simple instructions like avoiding running on hard or uneven ground, losing any excess weight, wearing shoes and orthotics that support your arch to prevent over-stretching of plantar fascia. If the problem persists, consult a Podiatrist or foot specialist.

## Heel Pain



Heel pain is another common problem, in which weight bearing on the heel causes extreme discomfort.

There are two different categories of heel pain. The first one is caused by over-use (repetitive stress) or soreness resulting from too much impact on a specific area of the foot. This condition, often referred to as "heel pain syndrome," can be caused by shoes with heels that are too low, a thinned-out fat pad in the heel area, or from a sudden increase in activity. The other one is Plantar fasciitis, a very common diagnosis of heel pain, usually

caused from a biomechanical problem, such as over-pronation (flat feet) as described earlier.

To properly treat heel pain, you must absorb shock, provide cushioning and elevate the heel to transfer pressure. This can be accomplished with an orthotic / custom insole designed with materials that will absorb shock and shear forces. Footwear selection is an important factor in treating heel pain. Shoes with a firm heel counter, good arch support and appropriate heel height are the ideal choice. In addition, breaking pain cycle with the use of oral anti-inflammatory medications, cortisone injections, stretching and icing are recommended treatments. If the problem persists, consult your foot doctor.

## Metatarsalgia



Metatarsalgia is a medical term used to denote a painful foot condition in the metatarsal region of foot (the area just before toes, more commonly referred to as ball-of-the-foot). This is a common foot disorder that can affect bones and joints at the ball-of-the-foot. Metatarsalgia (ball-of-foot-pain) is often located under the 2nd, 3rd, and 4th metatarsal heads, or more isolated at the first metatarsal head (near the big toe).

With this common foot problem, one or more of the metatarsal heads become painful and/or inflamed, usually due to excessive pressure over a long period of time. It is common to experience acute, recurrent, or chronic pain with metatarsalgia. Ball-of-foot pain is often caused from improper fitting footwear, most frequently by dress / formal shoes and other types of restrictive footwear. Footwear of all kinds with a narrow toe box (toe area) forces the ball-of-foot area to be forced into minimal amount of space. This can inhibit your walking process and leads to extreme discomfort in your forefoot. Other factors that can cause excessive pressure in the ball-of-foot area can also result in metatarsalgia. These include shoes with heels that are too high or participating in high impact activities without proper footwear and/or orthotics. Also, as you get older, the fat pad in your foot tends to thin out, making you much more susceptible to pain in the ball-of-the-foot.

The very first step in treating metatarsalgia is to determine the cause of pain. If improper fitting footwear is the cause of pain, then footwear must be changed. Footwear designed with high, wide toe box (toe area) and a rocker sole is ideal for treating metatarsalgia. The high, wide toe box allows your foot to spread out, while rocker sole reduces stress on ball-of-the-foot. Unloading pressure on the ball-of-the-foot can be accomplished by using a variety of foot care products. Orthotics / Custom Insoles designed to relieve ball-of-foot pain usually feature a metatarsal pad. The orthotic / custom Insole is constructed with a pad (or a bump in Insole) placed behind the ball-of-the-foot to relieve pressure and redistribute weight from the painful area to more tolerant areas. Other products often recommended are gel metatarsal cushions and metatarsal bandages. When these products are used with proper footwear, you should experience significant relief. If problem persists, consult your foot specialist.



## Feet During Pregnancy

Pregnancy triggers many different changes in a woman's body. Many women have common complaints throughout their pregnancy. One of these complaints, often overlooked, is foot pain. Due to natural weight gain during pregnancy, a woman's center of gravity is going to be completely altered. This causes a new weight-bearing posture with added pressure to knees and feet.

Two significant and most common foot problems experienced by pregnant woman are over-pronation and edema. These problems can lead to pain in the heel, arch, or the ball-of-foot. Many women may also experience leg cramps and varicose veins, due to weight gain. Due to these factors, it is important for all pregnant women to learn more on foot health during pregnancy and help make their nine-month period, more comfortable.

Over-Pronation, also referred as flat feet is caused when a person's arch flattens out due to excess weight bearing condition and their feet roll inward, when walking. This can create extreme stress or inflammation in the plantar fascia, the fibrous band of tissue that runs from heel to forefoot. Over-pronation can make walking very painful and can increase strain on the feet, calves and/or back. The reason many pregnant women suffer from over-pronation is the added pressure on the body due to weight gain. Over-pronation is very prominent in people who have flat feet and / or obese.

Edema, also referred to as swelling in the feet, normally occurs during latter part of pregnancy. Edema results from extra blood accumulated, during pregnancy. The enlarging uterus puts pressure on blood vessels in pelvis and legs causing circulation to slow down and blood to pool in the lower extremities. The total water fluid in the body remains the same as before pregnancy, however it becomes displaced. When feet are swollen, they can become purplish in color. Sometimes extra water is retained during pregnancy, adding to swelling. If there is swelling in the face or hands, immediate consultation with a doctor is highly recommended.

There are effective ways to treat both over-pronation and edema during pregnancy. Over-Pronation can be treated conservatively with orthotics / custom insoles. These orthotics / custom insoles are the one designed with appropriate arch support and medial rearfoot posting to correct over-pronation. Proper fitting footwear is also very important in treating over-pronation. Choose comfortable footwear that provides extra support and shock absorption. It is important to treat over-pronation for pain relief but also to prevent other foot conditions from developing such as Plantar Fasciitis, Heel Spurs, Metatarsalgia, Post-Tib Tendonitis and/or Bunions.

Edema (water retention) in the feet can be minimized by the following methods: Elevate your feet as often as possible. If you have to sit for long periods of time, place a small stool below your feet to elevate them. Footwear that is too narrow or short will constrict circulation. Have your feet measured several times throughout the pregnancy. Pregnant women will probably change foot sizes.

Wear seamless socks that do not constrict circulation. If you are driving for a long period of time, take regular breaks to stretch your legs and promote blood circulation. Exercise regularly to promote overall health. Walking is recommended as best exercise. Drink plenty of water to keep the body hydrated. This helps your body retain less fluid. Eating well-balanced diet and avoiding foods high in salt can reduce water retention. Swelling is normally similar in both feet. If swelling is not symmetrical in both feet, that may be a sign of vascular problem and a doctor should be contacted immediately.



## Diabetic Foot and Diabetic Neuropathy

Diabetes is a serious disease that can develop from lack of insulin production in the body or due to inability of the body's insulin to perform its normal everyday functions. Insulin is a substance produced by pancreas gland which helps process the food we eat and turns it into energy. Diabetes is classified into two types, Type 1 and Type 2. Type 1 is usually associated with juvenile diabetes and is often linked to heredity.

Type 2, commonly referred to as adult onset diabetes and is characterized by elevated blood sugars, most often in people who are overweight or have not taken proper diet. Type 2 Diabetes symptoms can often be so mild that cannot be noticed. Some of the common symptoms are becoming cranky, feeling very thirsty, peeing a lot, blurred vision, tiredness or feeling worn out, feeling hungry, unhealing wounds, frequently attacked by infections and weight loss without extra effort or diet changes.

Diabetes often leads to peripheral vascular disease that inhibits a person's blood circulation. With this condition, there is a narrowing of the arteries that frequently leads to significantly decreased circulation in the lower part of the legs and the feet. Poor circulation contributes to diabetic foot problems by reducing the amount of oxygen and nutrition supplied to the skin and other tissue, causing injuries to heal poorly. Poor circulation can also lead to swelling and dryness of the foot.

More than 25% of diabetes patients develop foot problems due to this disease. Diabetic foot problems can develop due to poor circulation and neuropathy. Diabetic Neuropathy can cause insensitivity or loss of ability to feel the pain in foot, heat and cold. Diabetics suffering from neuropathy can develop minor cuts, scrapes, blisters, or pressure sores which they are not even aware of due to insensitivity of feet. If these minor blisters or pressure sores are left untreated, complications may result and lead to ulceration and may even be amputation. Neuropathy can also cause deformities such as Bunions, Hammer Toes, and Charcot Feet, a foot condition causing weakening of bones in the foot that can occur in people who have significant nerve damage and bones in feet are weakened enough to fracture with continued walking and the foot eventually changes its shape. It is very important for diabetics to take all necessary precautions to prevent all foot related injuries. Due to consequences of diabetic neuropathy, daily observation of full feet, including bottom of feet is very critical. When a diabetic patient takes necessary preventive foot care measures, s/he can reduce risks related to serious foot conditions.

Footwear and orthotics play an important role in diabetic footcare. By customizing fit of footwear to your feet, orthotics / customized insoles provide the necessary comfort and protection needed in diabetic footcare. Diabetic footwear should also provide the following features:

- High, wide toe box (high and wide space in the toe area)
- Removable insoles for fitting flexibility and an option to insert orthotics or customized insoles, if necessary
- Rocker Soles designed to reduce pressure under the foot most susceptible to pain, most notably at the ball of foot
- Firm heel counters, for support and stability



## Athlete's Foot

Athlete's foot is fungal infection of skin, usually found in between the toes. However, this infection can spread and cause significant discomfort, itching and even pain. People are mostly exposed to this type of fungus which causes athlete's foot in a gym, shower, swimming pool, where people walk around with barefoot. Fungus tends to survive particularly in warm and damp areas.

Wearing shoes that are damp can also cause this fungus to grow and spread in feet. This condition is highly contagious and can spread to other areas of skin, including hands, groin and scalp.

Athlete's foot causes itching, cracking, blistering and peeling of skin on feet. The condition usually starts between the fourth and fifth toes and then spreads over a period of time. A person with Athlete's Foot can also develop cracks in heels or on skin of the toes.

A person with Athlete's Foot should always keep their feet clean and dry with a "separate towel". Antifungal sprays, powders or lotions for feet are available in medical stores, over the counter.

If fungus is spreading or worsening after self-treatment, then you should see a doctor who can prescribe oral antifungal medicines. If you have diabetes and are experiencing a foot problem, immediately consult your foot doctor.

## Other Foot problems

Various other foot problems than the most common ones are as below, which need an analysis to get an appropriate treatment.

- **Achilles Tendonitis:** Achilles Tendon is the large tendon located in the back of your leg which inserts into heel. Achilles Tendonitis can be identified through shooting pain, burning pain or even extremely piercing pain in Achilles Tendon
- **Hammer Toe:** Hammer Toe is the toe that is at PIP joint (middle joint in the toe), potentially leading to severe pressure and pain. Hammer Toes can occur in any toe, other than the big toe
- **Mallet Toe:** Mallet Toe occurs when the joint at the end of the toe cannot straighten. Excessive rubbing of the mallet toe against top of the shoe / sandal can lead to pain and development of corn
- **Claw Toe:** Claw Toe is toe that is at the middle and end joints in a toe and can lead to severe pressure and pain. Ligaments and tendons that have tightened can cause the toe's joints to curl downwards
- **Bunions:** Bunion referred as Hallux Valgus is a common foot problem, is a prominent bump inside the foot around the big toe joint
- **Morton's Neuroma:** Morton's Neuroma is a common foot problem associated with pain, swelling and /or an inflammation of a nerve usually at the ball of foot, between third and fourth toes
- **Morton's Toe:** Morton's Toe is a common foot disorder where second toe is larger than the big toe. Morton's Toe leads to excessive pressure on second metatarsal head



- **Post-Tib Tendonitis:** Post-Tib Tendonitis is strain placed on posterior tibial tendon, which runs along, inside ankle and foot
- **Heel Spurs:** Heel bone is the largest bone in the foot which absorbs most amount of shock and pressure. A heel spur develops as abnormal growth of the heel bone like a cone below it
- **Calluses:** Formation of calluses is caused by accumulation of dead skin cells, which harden and thicken over an area of foot over time. This callus formation is body's defense mechanism to protect feet against excessive pressure and friction. Calluses are normally found on ball of foot, heel and/or inside the big toe. Some calluses have deep-seated core, known as a nucleation. This particular type of callus, can especially be painful due to pressure. This problem is often referred to as Intractable Plantar Keratosis
- **Gout:** Gout is a common and complex form of arthritis that can affect anyone. It is characterized by sudden and severe attacks of pain, swelling, redness and tenderness in joints, often at the joint at the base of big toe. An attack of gout can occur suddenly, often waking you up in the middle of the night with a sensation, as if, your big toe is on fire. The affected joint is hot, swollen and so tender, that even weight of bed sheet on it may seem intolerable
- **Corns:** Toe corns are small bumps on your toes that seem impossible to remove. Foot and toe corns are irritating bumps that usually appear on the sides or top of your toes because of footwear friction. Like calluses, toe corns develop from an accumulation of dead skin cells on the foot, forming thick and hardened areas. They contain a cone-shaped core whose point can press a nerve below, causing pain. Toe corns are very common and usually form on the top, sides and tip of the toes. Corns can become inflamed, due to constant friction and pressure from footwear. Corns that form between the toes are referred as soft corns

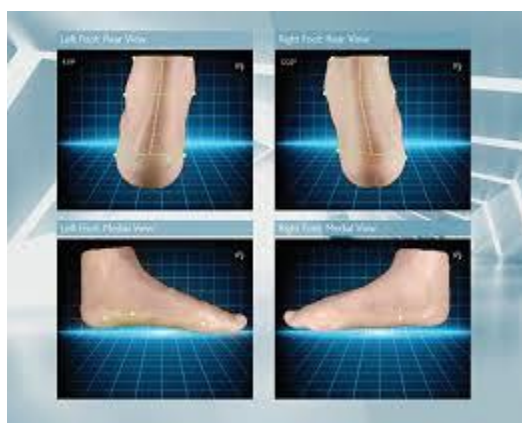


## American Gully



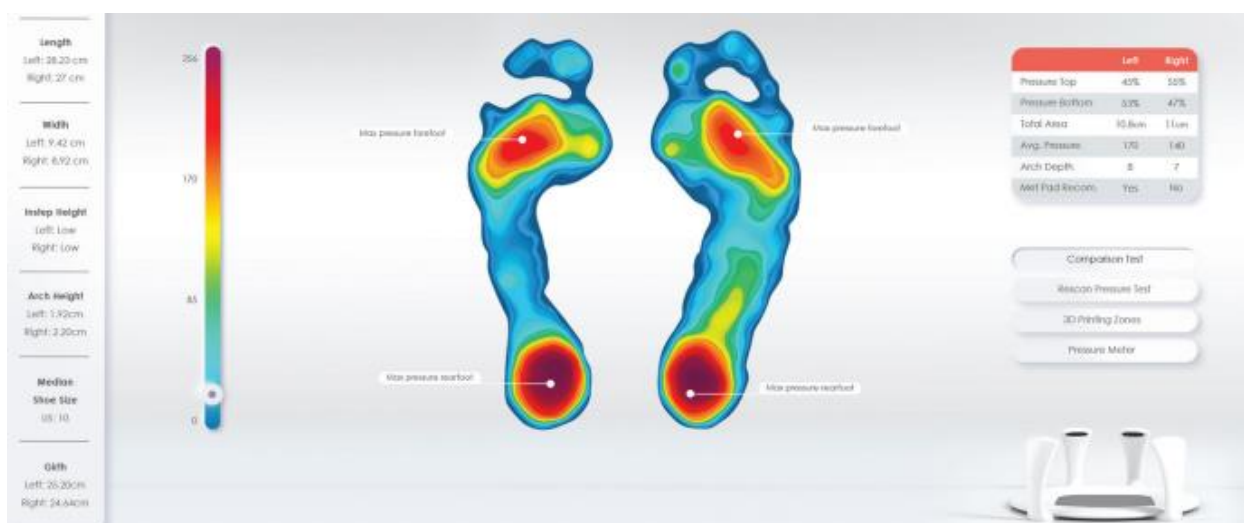
American Gully is a total footcare solutions company, first of its kind in the world, equipped with world's latest technology for 3D foot scanning, including Gait analysis. The complete 3D Scan Report can be sent through email to the patient / customer and his/her Doctor, for keeping track of progress, after wearing custom orthotics and / or treatment.





**American Gully** measures length, width, girth, arch height, in-step height, pronation/supination angles and foot pressure with reliable American technology through trained professionals.

American Gully analyzes each foot, to identify foot problems in a scientific way and provide **custom orthotics**, thus helping Podiatrists, Orthopedists, Diabetes Specialists and Physiotherapists.



**American Gully** multi brand outlets offer world's leading brands of footwear for normal, tall, wide feet of men and women.

**Other custom orthotics in the market are of no match in quality and comfort of ours. Our orthotics are available at a fraction of cost of others, in addition to pain relief sandals.**

Our range of footwear offering includes walking, running, athletic, sports, party, casualwear, diabetic shoes, sandals and accessories for customized fit, good health, and comfort.