

LITTLE FEET

A GUIDE TO YOUR CHILD'S FOOT HEALTH

A  BOOK FROM 1FOOT 2FOOT



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A Better Feet for a Better Life™ Book

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Table of Contents

Introduction	1
What Can a Podiatrist Do For Your Child’s Foot?.....	2
Normal Development	3
The Development of Walking	4
Shoe Shopping.....	5
Common Pediatric Foot Conditions.....	7
Pediatric Flatfoot.....	7
Intoeing	9
Toe Walking	11
Tarsal Coalition.....	12
Juvenile Bunion.....	13
Clubfoot.....	14
Brachymetatarsia.....	14
Curly Toe	15
Webbed Toes.....	15
Ingrown Nails.....	16
Plantar Warts.....	17
Hyperhidrosis and Bromhidrosis (Sweaty Smelly Feet).....	18
Athletic Injuries in Kids.....	19
Sever’s Disease/Pediatric Heel Pain.....	20
Orthotics / Arch Supports.....	21
A Word to Expectant Mothers and Pregnant Feet	22
Final Thoughts.....	23

Introduction

If it were possible to walk the circumference of the globe, would you? Well, according to the American Podiatric Medical Association, your feet travel upwards of 115,000 miles in a lifetime – the equivalent of walking around the globe four times. Providing some thought and care at an early age can greatly enhance the quality of those walked miles. Ask yourself: Did you or your spouse ever walk pigeon-toed, bow-legged, or have flat feet? Did you “outgrow” the problem or do you still suffer with the same condition? The answers are important since structural problems tend to be inherited.

By downloading *Little Feet: A Guide to Your Child’s Foot Health*, you have taken the first step in recognizing the importance of your child’s feet in a healthier life. My name is Matthew Dairman and I am the founder of 1Foot 2Foot Centre for Foot and Ankle Care. I’m a podiatrist, which simply means that I am a specialist in the care and treatment of feet and ankles. I’m an active member of the Hampton Roads community, and by treating the community like family – with respect, honesty and kindness – the community becomes family.

I wrote this book to help you understand what could be happening with your child’s feet and what help is available from a podiatrist. My purpose here is to offer parents insight into what is “normal” and “abnormal” in regards to a child’s foot health, and to help answer one of the most common questions heard among the pediatric medical community, “Is my child walking correctly?”

If after reading this book you think you and your child might be helped by seeing a podiatrist, I hope you consider 1Foot 2Foot. Whether it’s an ingrown nail or a fractured ankle, we will do everything we can to treat the condition, eliminate the pain and treat your family as if they were our family. We love kids, and we devote ourselves to the mechanics of their feet and ankles because we want them to have the most positive results over the long term.

Dedicated to your *toetal* health,

Matthew C. Dairman, DPM MS

What Can a Podiatrist Do About Your Foot Complaints?

Let's first answer the question, "What is Podiatry?" Podiatry is a branch of medicine that deals with the examination, diagnosis, and treatment of conditions and functions of the human foot and ankle by medical and surgical methods.

Next, let's answer the question, "How does a Podiatrist (DPM) differ from an Orthopedist (MD or DO)?" A podiatrist has a doctorate degree in podiatric medicine (DPM) as opposed to allopathic medicine (MD) and osteopathic medicine (DO). DPM, MD and DO physicians all have the same undergraduate prerequisites and attend a 4 year medical school. The major difference is that DPM's actually take more classes in regard to lower extremity anatomy, surgery, biomechanics, and bracing. DPM's choose their specialty from day one, thus giving focus toward the specialty 5 years earlier than other doctors.

From medical school through residency training, DPM's, MD's and DO's rotate through all specialties and have the same requirements, guidelines, and demands. All three types of physicians have the same hospital surgical-medical privileges. The primary difference is the consideration of a patient's biomechanics in regard to conservative and surgical treatment. DPM's not only prescribe orthotics and braces, but are directly involved in their design, construction, and follow-up to assure they are effective. Moreover, an orthopedist's training in the foot and ankle focuses mostly on surgery even though conservative care could alleviate symptoms.

When medically necessary, podiatrists perform surgery to correct or remedy problems. Surgery may be as simple as removing a small skin lesion or as complex as reconstructing a severe flatfoot deformity or broken ankle. Before we recommend surgery, we explore the many conservative therapies that are available and then recommend the very best course of treatment.

Rest assured, the DPM's at 1Foot 2Foot are highly trained specialists capable of handling all of your family's foot and ankle needs. We have experience and knowledge specific to the pediatric foot and ankle. We exceed all state and national

requirements for continuing medical education to bring the most up-to-date treatment and techniques to our community.

Normal Development

From birth, every parent is concerned about their child's feet. I remember specifically counting my daughter's toes within seconds of her delivery. We watch in both awe and wonder as our children grow and develop, especially during the first few years of life. As a parent, we do everything in our power to ensure that our children remain healthy and develop normally. However, "normalcy" is difficult to define when it comes to the child's ability to walk, especially in light of all of the changes that occur during development. This is complicated by the fact that parents are often confused when it comes to "normal" foot development due to conflicting advice from grandparents, family, well-meaning neighbors, general pediatricians, orthopedic doctors, chiropractors, and podiatrists.

Normal Growth

Infants, those under the age of 16-18 months, grow more than half a foot size every two months. Toddlers from the ages of 16 to 24 months grow an average of half a foot size every three months. When children are 24 to 36 months old they grow approximately half a foot size every four months. Over the age of 3 years of age, children increase half a foot size every four to six months.

It will take approximately 18 years for a child's foot to fully develop. At birth, the foot contains 22 partially developed bones. Over the next 13 to 14 years many of these will fuse together to form the 26 bones that make up the mature adult foot. During the first year, each foot will reach almost half its adult size. This is why podiatrists consider the first year as most important in the development of the feet.

The American Podiatric Medical Association offers the following tips for normal infant foot development:

- Inspect your baby's feet often. If something doesn't look normal to you, ask your podiatrist or pediatrician.
- Provide opportunity for exercise. Lying uncovered enables kicking and other related motions which prepare the feet for weightbearing.

- Change the baby's position several times a day. Too long in one spot can put excessive strain on the feet and legs.
- Cover the baby's feet loosely. Tight covers restrict movement and can retard development.

The Development of Walking

Seeing a child take their first step is described as one of the most memorable moments in a parent's life. During the first year, your child has been developing muscle strength and coordination, mastering one physical feat after another, from sitting to rolling over to crawling. At about eight months your child will probably start pulling up onto furniture and walls. Shortly thereafter, the child will begin to move around while holding onto the furniture, known as 'cruising'. Children will begin to walk unassisted only when they are ready – typically occurring between the ages of 9-18 months. It is extremely important not to rush your child into walking since speeding up the “internal walking clock” may actually prove detrimental to their normal development. Around 14 months the child has abandoned crawling as the only means of getting around and can toddle a few steps. Naturally, the child's mobility is uncontrolled at this early stage of walking. Braking and steering systems haven't developed sufficiently to stop or swerve to avoid objects.

By their second birthday the majority of children are sure-footed although spills can and do occur. From about 2 years old the child becomes confident in all aspects of walking, running and jumping. In fact, a child of three will have developed nearly all the walking skills he or she will have as an adult of thirty.

As a child grows, parents will notice a change in the knee position. From the first steps until about the age of 2, a child will appear to be bowlegged (a condition known as genu-varum) which means there will be a gap between the knees when the child is standing with both feet next to each other. This is normal. The child will then go through a stage of being knock-kneed (genu-valgum), where the knees angle inwards when the child attempts to place the feet together. This stage is also normal from approximately 2-6 years of age. After 6, the condition typically corrects itself. If either of these stages persist or become excessive, it is a good idea to follow-up with your

pediatrician and/or podiatrist as soon as possible, since both of these conditions can be associated with other problems.

Shoe Shopping

While most parents recognize the need for correctly fitting shoes during a child's early years of walking life, few realize that children's feet remain vulnerable to ill-fitting shoes right through their school days, up to the age of 18 years or so. It is a concerning fact that many children suffer foot problems by their early teens, often associated with ill-fitting shoes. Yet if parents sustain vigilance throughout the foot's 18 formative years, the vast majority of foot problems will quite simply never occur.

The function of a child's shoe is to prevent injury from sharp objects, insulate feet from excessive temperatures, and protect during the stomping or kicking that can occur when agitated. These environmental threats are an unfortunate side effect of modern day living. For adults, the shoe industry has become increasingly centered on shoe fashion and the marketing of shoes as a status symbol. However, in children, shoes have maintained their original role of protection from the hazards of the outside world.

According to most experts, shoes are not recommended for pre-walking infants since the bones and ligaments in their feet are still flexible, rapidly developing and prone to deforming forces. In fact, a stiff shoe can decrease a child's ability to balance and cause frequent falling. A soft warm bootie is the preferred shoe of choice until the child is able to walk unassisted. Once walking, a flexible shoe is preferred to allow for normal foot function.

While there seems to be a large array of opinions regarding shoes, most experts agree that the proper shoe should be flexible, light, and made of breathable materials. If the shoe is too heavy or rigid, the foot will not develop normally. The heel counter should really be the only rigid part of the shoe. This is the part of the shoe that surrounds the heel and provides the greatest amount of support. The shoe should flex at the forefoot and midfoot, but not at the heel counter. Some suggest a high top sneaker to add stability, but there is controversy with this

since they can act as a 'brace' and disrupt the normal development of the muscles that support the foot and ankle.

Children's feet grow at a rapid and unpredictable pace due to the fact that they tend to grow in spurts. This is often very frustrating to parents since the cost of quality children's shoes is about one-half that of the adult's version. Parents should be advised that saving money by "passing down" shoes from older children can be problematic since every child wears their shoes differently. While the size may be just right, the old wear pattern of the shoe may throw off the normal gait in the new owner. Since the support of the shoe is most likely compromised, an older pair of shoes should be carefully inspected prior to being passed down.

Perhaps the most acceptable way of increasing the life of a shoe is to buy the shoe slightly bigger than the child's measured length. It is better to be too big than too small in terms of shoe fit. There should be about three-quarters of an inch from the longest toe (not always the first) to the tip of the shoe. Also, check to see that the child's foot is not lifting out of the heel or that the child doesn't trip over the shoe.

Shoe size should be checked as follows:

Age: 1-6 years	Check Shoe Fit: Every 2 months
6-10 years	Every 3 months
10-12 years	Every 4 months
12-15 years	Every 5 months
15-20 years	Every 6 months
>20 years	Every new shoe purchase

The Footwear Council offers the following fitting tips:

- If your child is repeatedly removing their shoes, the shoes may be too small.
- Any sign of a limp could mean trouble and shoes must be checked.
- If the shoe lining shows excessive wear in the area of the fifth toe, the shoes are too short. You can feel the inside lining of the shoe for dents for improper toe pressure.

- Watch for any red marks across the top of the foot, over the tops of the toe, or on the sides of the foot. When present, the shoe is likely too narrow or too small.
- If the soles are unevenly worn with excessive wear on the inside or outside edges this could be an indication of improper foot/ankle function. The child should be taken to see a specialist who can determine the best type of treatment to correct this.

Finally, remember that choosing a shoe for a child is a short-lived activity since they will soon insist on choosing shoes for themselves.

Common Pediatric Foot Conditions

We describe below the most common foot problems seen in 1Foot2Foot's pediatric patient population. Additional information may be found on our website at www.1Foot2Foot.com.

Pediatric Flatfoot

To treat or not to treat a pediatric flatfoot has been debated over the past many decades. Some feel that children will outgrow the condition, while others contend that treating the deformity early can prevent the long-term complications we see all too often in adults.

Parents often express concern regarding their child's apparent flattened foot (i.e., no clear visible arch when standing). The fact is nearly all children have flat feet (or pes planus) at some point in their development. Between 9 and 18 months, when a child begins to walk, the foot appears chubby and therefore flat. A normal fat pad consumes what will someday be the arch as the child develops. So at this age, a flatfoot is considered normal.

At 2 to 4 years of age, the foot takes on a more bony appearance as the fat pad disappears allowing a flatfoot to become more noticeable. The foot remains quite pliable at this stage as the bones are not fully developed. The abnormal forces caused by a flatfoot may cause permanent structural damage to the foot. The inside of the arch becomes flattened, the ankles appear to be rolling inward, and the front part of the foot appears to point outward causing some instability during walking. The child tends to complain of pain in the arch, heel or ankle, as well as

cramping in the legs. They may even trip or stumble over their own feet. These symptoms worsen with excessive standing, walking or running, and may lead to the child compensating in other ways to avoid the discomfort. For example, your child may refuse to participate in sports or claim he is too tired (even though he seems to have boundless energy at home).

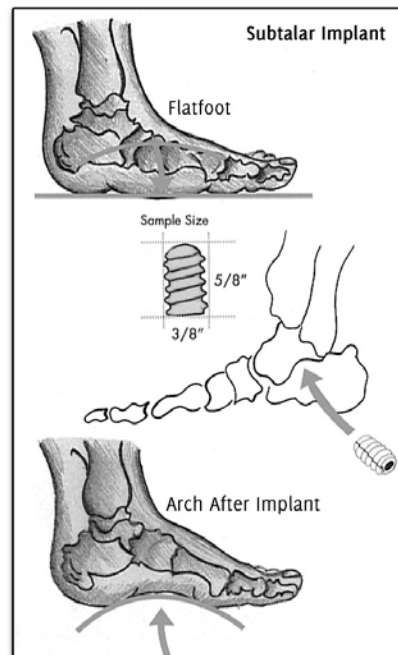
There are generally two types of pediatric flatfoot. A *Flexible* flatfoot is more common and often associated with overuse injuries in child athletes. There is an appreciable arch non-weightbearing that fully collapses on stance. A *Rigid* flatfoot is less common and is usually due to abnormal bone structure or growth during development (see Tarsal Coalition). A rigid flatfoot is always stiff and flat no matter the weightbearing status.

Regardless of flatfoot type, children with collapsing arches should be evaluated by a podiatrist at least annually to prevent problems. X-rays can be obtained to determine how the bones are developing, gait analysis can determine if the problem is isolated to the foot or stemming from a more proximal location, and shoe wear evaluation can guide you to more appropriate shoes and activities as necessary.

The simple presence of a flatfoot deformity does not require treatment. If the foot causes no pain or limitation in activity, there is simply no good reason to correct it. BUT, if another family member has had difficulties with such a deformity in their past, then treating the child is good preventative medicine.

In asymptomatic flatfoot, no treatment is needed except sturdy appropriate well-fitting shoes to relieve stress. Secondary symptoms of "Charlie horses" or leg cramps, tired feet, and knee and hip pain may require special shoe inserts (Orthotics/Arch Supports) to promote a healthy gait.

In painful flatfoot, treatment is necessary. Activity modification, new shoe gear, stretching exercises,



anti-inflammatories and arch supports are the mainstay of therapy. Many times, significant deformities require custom functional orthotics and physical therapy for more aggressive symptomatic relief. There is a high incidence of painful flatfoot in an obese child as the weight overloads the developing feet. Weight loss is always recommended prior to surgery in these cases.

Surgery should only be an option if the child is having consistent difficulty in weightbearing activities, has undergone at least 6 months of aggressive conservative therapy and has a significant deformity without improvement. Surgical procedures used to treat severe flatfoot include tendon transfer or lengthening, realignment of one or more bones, joint fusion, and/or placement of a subtalar implant. Surgical procedures are patient dependant and can be a combination of the aforementioned.

A subtalar implant is a small device that is inserted into the sinus tarsi, a canal that is positioned above the calcaneus (heel bone) and below the talus (the bottom bone of the ankle). The implant acts as an "internal orthotic" and restores the arch of the foot. The procedure used to place the implant is minimally invasive and requires little downtime. This is often our preferred procedure when possible for the following reasons: (1) small incision with minimal change in cosmesis, (2) reversible - implant can be removed with minimal to no residual effects, (3) allows for immediate weightbearing, and (4) typically performed in under 30 minutes thereby limiting anesthesia exposure.

Intoeing

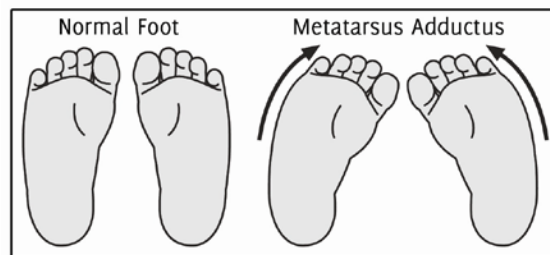
If your child walks with their toes pointed inward, they are intoeing or considered to be *pigeon-toed*. Intoeing is a part of normal development in children and will not affect their ability to walk, run or play. Some sports experts have even suggested that sprinters may have an advantage by being in-toed. Intoeing is usually seen in both feet, but may affect one side more than the other. Occasionally the deformity is severe enough to cause pain, shoe irritation and tripping, and it can predispose a foot to have other problems. Social concerns are also valid due to the "bully" attitude on the playground.

At first glance, it might seem like intoeing is a deformity of the foot, however it can be the result of any rotational over-growth or under-growth at any bone or joint from the foot up to the hip. For example, a common cause of intoeing in children under 2 years of age is not enough *tibial torsion*. The main bone in the lower leg (tibia/shin bone) has a normal growth development that includes a twisting of the leg in an outward direction. If this does not undergo its full rotation, a child can have a foot that appears in-toed. If the leg rotates too much, then the reverse effect will result in an out-toed position of the foot.

The most common cause of intoeing among children between the ages of 2-10 years is excessive inward twisting of the bone in the upper leg (femur/thigh bone). This is referred to as *femoral anteversion*. The hip joint undergoes rotational changes in an inward direction through adolescence. If the femur is twisted inward too much, the knees and toes will follow. Children with a twisted femur often sit with their legs crossed. Fortunately, most children will slowly grow out of this deformity.

Another reason a child may have an in-toed gait is due to a deformity in the foot itself. If your child's foot appears to be curved inward exhibiting a "C-shape," metatarsus adductus or hallux varus may be the reason. Either the metatarsal (long bones to the toes) or the hallux (big toe) can be pointing inward.

Metatarsus adductus is one of the most common pedal deformities occurring in 1-2/1,000 births. These deformities will usually be seen at birth, but can appear to worsen with time.



It is good to evaluate metatarsus adductus prior to a child's walking because conservative treatment options decrease with age. If it is very mild, the parents may be shown how to rub the outside of the foot to help the foot to go straight. Some children may need to wear special shoes. If the foot is rigid and cannot be straightened, it may be necessary to put casts on the feet and lower legs. The casts are usually put on before 8 months of age. If the foot has not straightened by the time a child is walking, the child may walk with his toes pointing in. In older children, if these treatments are not satisfactory, surgery may be indicated.

Intoeing is not a diagnosis, but a complaint and an objective finding on physical examination. Because the development of the child's leg and foot is a gradual process, it is not uncommon for a doctor to tell a parent: "Your child will grow out of it". While most of the time this is true, typically by the age of 8, there are occasions when the deformity does not correct itself. Early detection and close monitoring will increase the treatment options and outcomes.

Toe Walking

It is not uncommon for early walkers to walk on their toes as their muscles learn the correct way to balance the body. Most children between 1-2 years of age will experiment by walking on their toes, but this is generally short-lived. By age 3 children should begin walking with a more normal heel-to-toe walking pattern. If your child continues to toe walk, you should ask your podiatrist for a more detailed physical exam.

Equinus is the medical term for toe-walking and is defined as a foot that does not have enough dorsiflexion (i.e., flexion at the ankle joint bringing the foot toward the front of the leg). Occasional toe-walking is not a concern, especially if the child can voluntarily bring the heel to the ground. However, the child should be evaluated to rule out any neurological causes of the condition, especially if it becomes persistent.

There are three main reasons why a child may toe-walk. First, and most importantly, it may be caused by a spasticity of the calf muscles (gastrocnemius and soleus muscles). This is due to a neurological problem such as cerebral palsy, the most serious concern for toe-walking. The second most common reason for toe-walking is due to a tight heel cord (Achilles tendon). This can be treated with stretching, bracing, casting and sometimes surgery if indicated. The third reason is habitual toe-walking. For some reason children may just prefer to walk on their toes. They can walk on their heels when asked, but prefer to toe-walk. This is best treated with clever parenting and encouragement of heel walking.

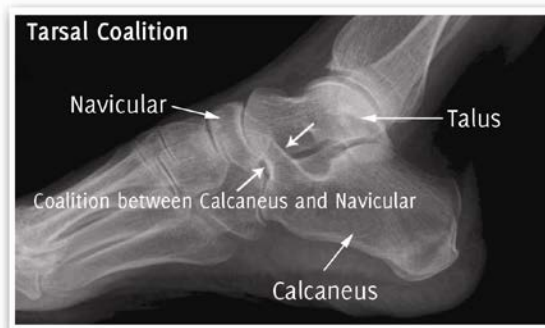
Left untreated, toe walking can cause the bones to grow incorrectly and/or overstretch ligaments – putting your child at risk for injuries and joint pain as they grow older. Toe walking

takes more energy than regular walking thereby leaving a child tired, unable to keep up with friends and unable to fully participate in sports. Moreover, shoes can be difficult to fit or may cause irritation with walking.

Depending on the underlying cause of your child's toe walking, physical therapy and/or serial casting may be beneficial. Serial casting is a gradual stretching of the tight calf muscles using toe-to-knee casts changed weekly, typically lasting 3-6 weeks. From there, a brace may be necessary for an additional 6-12 months to maintain the length achieved through casting.

Tarsal Coalition

Tarsal coalition is not a problem you as a parent will recognize as there is no specific deformity to the naked eye. Children with tarsal coalition develop an abnormal connection between the bones in the midsection and back part of the foot. It is usually diagnosed in late childhood or early adolescence when the coalition begins to limit foot movement, causing pain and stiffness. Symptoms may be particularly noticeable when walking on uneven surfaces, such as sand or gravel, an action that requires constant adjustment and adaptation of the foot. Frequent ankle sprains may also signal the presence of a coalition.



Most tarsal coalitions may be classified as one of two types: a calcaneonavicular coalition, in which the tissue develops between the calcaneus (heel bone) and the navicular (one of the foot bones), or a talocalcaneal or subtalar coalition, in which the coalition develops between the calcaneus and the talus (the ankle bone). The coalition may be composed exclusively of bone, a combination of bone and cartilage, or even fibrous tissue. Tarsal coalitions occur in both feet in about half of all cases.

Initial treatment for tarsal coalition is conservative starting with rest or immobilization. Although pain relief can be achieved in

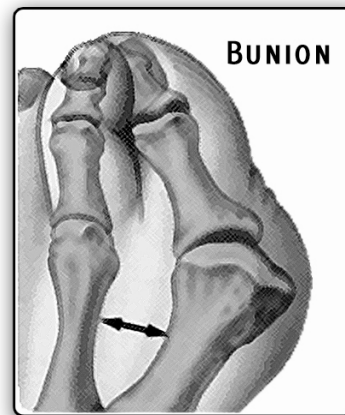
this way, in many cases the result is only temporary. Non-operative treatment can be appropriate for patients with tarsal coalitions that are symptom-free, and whose condition only becomes apparent on x-ray taken incidentally for another condition, such as an acute ankle sprain.

For children with ongoing pain, who do not respond to conservative non-operative measures, a podiatrist may remove the coalition. In most cases another type of tissue – usually fat – is placed between the bones to prevent the coalition from growing back. Tarsal coalitions may also be associated with other foot deformities, most commonly a flatfoot deformity, which may require treatment as well.

Juvenile Bunion

As with bunions in adults, in juvenile bunion, the joint at the base of the big toe (the metatarsophalangeal joint) moves out of alignment in such a way that the big toe angles inward toward the second toe. Unlike adult bunions, which usually result from ill-fitting footwear, injury to the joint, or have a hereditary component, juvenile bunion occurs most often in children who are ligamentously lax or loose-jointed. The problem is more common in girls than in boys.

Surgical treatment for juvenile bunion is generally restricted until the end (or close to the end) of growth, both because of concern for damage to the growth plate and because the condition tends to recur if treated too early. Non-operative treatment includes the use of wide shoes and avoidance of narrow dress shoes and high heels. Usually this sufficiently alleviates symptoms and defers the need for surgery.



In younger patients who do not respond to non-operative treatment and who have pain that interferes with their daily activities, surgery to realign the bone and straighten the toe can be performed. A number of different approaches are used, depending on the type of bunion, the extent of the deformity, the age of the child, and how much growth remains.

Clubfoot

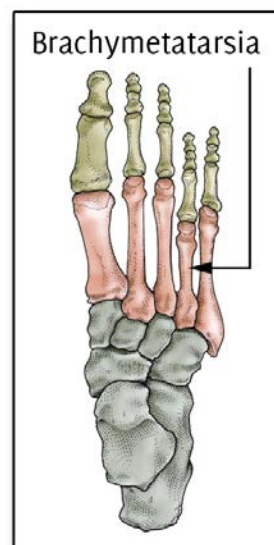
If you could hear your child talk before he is born, he might be saying “I need more womb!” Clubfoot describes a condition in which the foot – or sometimes both feet – are turned inward and pointing down. Immediately apparent at birth, clubfoot is known to develop in the womb, between 9 and 14 weeks gestation. In fact, in many cases, the deformity is detected on routine ultrasound. Occurring in about 1 in 1000 births; clubfoot is more common in boys than in girls. And although family history may play a part, many infants with clubfoot have no known relative with the condition.

In the majority of cases, clubfoot can be successfully treated without surgery, using the Ponsetti technique, which employs gentle manipulation and casting of the feet at weekly intervals. Treatment begins shortly after birth when the newborn's foot, including tendons, ligaments, joint capsules and bones are most responsive. Following this first phase of treatment, a brace is used for an extended period to maintain proper alignment. When applied correctly, the Ponsetti technique yields excellent results.

In some instances, clubfoot does require surgery – the approach that was used historically before widespread acceptance of the Ponsetti technique. While this approach can yield good correction of the deformity, the procedure may result in a stiff arthritic foot later in life. If this occurs, additional surgeries may be necessary to alleviate the pain.

Brachymetatarsia

Brachymetatarsia (pronounced ‘brake-ee meta-tar-see-a’) is a congenital (present at birth) shortening of a metatarsal bone in the foot. In most cases, brachymetatarsia results when the metatarsal growth plate closes too early. Once the growth plate closes, the bone can no longer grow. It can be caused by a genetic factor or by trauma to the foot that results in a metatarsal growth plate fracture. The fourth metatarsal is the most common, but any metatarsal can



be affected. The condition typically occurs in both feet. The classic presentation of brachymetatarsia is a shortened and elevated fourth toe as compared to the adjacent toes. Often considered a cosmetic problem, the abnormal length of bone places additional force on the normal bones thereby increasing risk of stress fractures, development of hammertoes, and painful skin lesions due to the increased pressure. Though conservative treatments are available to alleviate and redistribute the abnormal pressure (see Orthotics/Arch Supports), surgery is often necessary to correct the underlying deformity.

The goal of brachymetatarsia surgery is to achieve a normal length pattern of the metatarsals. This can be done by shortening the normal bones or by lengthening the abnormal one. The procedure of choice at 1Foot 2Foot is called callus distraction. In callus distraction we are actually able to lengthen bone over time with the use of an external fixator device that gradually stretches and stabilizes the bone as it grows. This procedure minimizes the stress placed on the nerves and arteries allowing the soft tissues time to respond to the correction. Results of correction can be dramatic! For additional information, please visit our website at www.1Foot2Foot.com – actual photographs of the condition and correction by 1Foot 2Foot are available.

Curly Toe

Curly toe involves malrotation of one or more toes. The malrotation usually involves the 4th and 5th toes and are flexed downward and twisted underneath the adjacent toe. Curly toe is a common disorder in infants and children. Often the deformity is congenital and bilateral (both feet are affected). If there are no symptoms, no treatment is needed. If the condition is severe and causes irritation with shoe wearing, surgery may be necessary.

Webbed Toes

Webbed toes, or syndactyly, is the term used for when the skin between the toes does not disappear as it is supposed to during fetal development. This usually happens very early in pregnancy - about 6 weeks. The fingers and toes are normally webbed until 6 weeks of fetal development when the skin between the fingers and toes starts to disappear.

This is a very common birth defect. The second and third toes are most often affected. Webbing may extend partially up between the digits, frequently just to the first joint, or may extend the entire length of the digits. You should look to see if you or your spouse have webbing or webbing in your families. This birth defect runs in families and is inherited in an autosomal dominant fashion. That is, anyone with the gene has a 50-50 chance of passing it on. Syndactyly can also occur as part of a pattern of other congenital (present from birth) defects involving the skull, face, and bones.

When occurring in the fingers, surgery to separate the digits is often performed before 2 years of age. Treatment for syndactyly of the toes is only necessary if the condition is painful physically or emotionally and typically occurs later in adolescence or beyond. A skilled podiatrist can separate the toes surgically using skin flaps or grafts with excellent results in function and appearance.

Ingrown Nails

Ingrown toenails are usually caused by abnormal pressure on the side of the nail causing the nail to deform. This abnormal pressure is often caused by an abnormal walking pattern that causes the foot to collapse outward resulting in walking off the side of the toes rather than the tips of the toes as was designed. The deformed nail can literally grow into and puncture the skin – hence the name Ingrown Nail. If the nail punctures the skin, bacteria around the nail can get into the body and cause an infection (*Paronychia*). The body will try to wall off any infection in an attempt to keep it from spreading throughout the body. This localized infection is called an *Abscess*. The infection will usually not clear completely until the foreign object – the ingrown nail – is removed.

Often an ingrown nail is present for quite some time before becoming painful. Kids in particular like to let the problem fester for weeks, if not months, in fear they will have to see a doctor. Parents will often try to correct the condition at home. This ‘bathroom surgery’ can actually make the condition worse. We’ve seen some very impressive (and some not so impressive) attempts at self treatment whether it’s “cutting out” the painful corner of the nail multiple times or cutting a ‘V’ in the nail. This ‘V’ technique, for the record, does not work and is not

recommended. The problem is that the skin by the side of the nail quickly re-grows next to the nail and the corner becomes ingrown further back until it is just too painful to “cut out”.

Ingrown toenails can be very painful and if not treated early, an infection can develop. At 1Foot 2Foot we make sure that patients with ingrown toenails are seen right away. Let our receptionist know that your child may have an ingrown toenail and we will get you in on the same day or, if you cannot make it, the next business day. Ingrown toenails usually resolve very quickly after the ingrown portion of the nail is removed either by trimming the nail corner, or in some cases, removing the edge of the nail back to the cuticle. Usually, a local anesthetic is used to lessen the discomfort.

We treat hundreds of kids with ingrown toenails every year and we take great pride in our ability to make the care of an ingrown toenail a nearly painless procedure for our patients—especially kids. If your child’s toe is tender we ensure that the toe is completely numb before taking care of the nail problem. We even ‘numb up’ the skin with a cold spray before giving a local anesthetic. The most common statement we hear after taking care of an ingrown toenail is “That was easy - I wish I hadn’t waited so long!” Some kids will record the procedure and show it on YouTube. In addition, we usually only have to remove a very small portion of the nail resulting in a normal appearance after it has healed.

Tips for Preventing Ingrown Toenails:

- Cut toenails straight across
- Don't cut toenails too short
- Don't pick your toenails or tear them at the corners
- Wear shoes with plenty of toe room
- Avoid wearing tight socks or pantyhose

Plantar Warts

Warts (*verrucae*) are caused by a virus that generally enters the body through small nicks, blisters or abrasions in the skin. Warts can appear on all aspects of the foot from top to bottom and heel to toe. When they occur on the soles of the feet they are known as plantar warts – ‘plantar’ being the bottom of the foot. Due to the amount of pressure that is put on the feet in the course of a day, plantar warts can become quite painful.

Teenagers between the ages of 12—16 are most commonly infected by warts, but they can occur at any age. Warts are also often contracted by walking barefoot on dirty surfaces. The virus thrives in warm, moist environments like showers and swimming pools. Be sure to look at all the feet in your family as warts can be contagious and it is not uncommon to see siblings requiring treatment.

If you suspect that you or a family member has a plantar wart, see a podiatrist to get a correct diagnosis and treatment plan. Over-the-counter wart preparations rarely work on plantar warts due to skin thickness and depth of the lesion. Treatments may include the use of a high concentration acid formula or cautery performed under local anesthesia to safely remove the wart. Prescription topical and oral medications may also be used to stimulate an immune response to the virus. Clinical studies have shown oral medications such as Cimetidine, when dosed appropriately, to be quite effective in children under the age of 18. Rarely is surgery necessary to remove a wart. 1Foot 2Foot does not advocate the use of lasers in the treatment of warts as some studies have shown spreading of the virus with this technique.

Hyperhidrosis and Bromhidrosis (Sweaty Smelly Feet)

We all know that kid who clears a room when he removes his shoes. He is likely suffering from hyperhidrosis and bromhidrosis. The real question is who is truly suffering when those shoes are off? There are more sweat glands per inch of our feet than anywhere else in the body and their function is to keep the skin moist and therefore supple. The glands secrete all the time, not just in response to heat or exercise, as elsewhere in the body. Hyperhidrosis, or excessive sweating, is caused by over-active sweat glands on the bottom of the foot. Hyperhidrosis is especially common in adolescence when hormonal changes and emotional/physical stresses are prevalent.

Left untreated, hyperhidrosis can lead to athlete's foot, blistering, skin maceration and painful calluses on the soles of the feet. Of greater concern to most, a big side effect of this condition is unpleasant foot odor – known as *Bromhidrosis*. This is caused by bacteria on the skin, breaking the sweat down which releases an offensive smell.

Using a daily over-the-counter antiperspirant on your feet can reduce the moisture and odor. Both spray and roll-on products are effective. Prescription drying agents are available when necessary. It is also very important to change socks regularly and air out shoes by removing the shoe liners at night. Train your child early about the importance of socks in protecting feet. At 1Foot 2Foot we offer several products that can significantly reduce, if not eliminate, the associated odor. Your child will no longer worry about clearing a room when they remove their shoes.

Athletic Injuries in Kids

All parents know that children take to sports like ducks to water. Almost as soon as they start to walk, they're chasing balls, swinging sticks, and running races against their real or imaginary friends. Children's sports used to mean baseball, basketball, or football. Times have changed. Soccer has leapt onto the youth sports scene, as have wrestling, tennis, and lacrosse with older children. The starting age for training in individual sports such as swimming, skating, track, and gymnastics grows younger every year – the image of Tiger Woods hitting golf balls at age 4 comes to mind.

Injuries may involve the bones, ligaments, tendons, or other soft tissue structures in the foot and ankle. Many injuries are unique to certain sports, whereas others are seen in all types of activity. Injuries can occur suddenly (acute) such as fractures and sprains or develop over time (chronic) like stress fractures and tendonitis. Each type of injury has a specific treatment. At 1Foot 2Foot a child athlete must pass the “5-Step Test” before safely returning to active play.

5-Step Test to Safely Return to Sport

1. Walk/run with full range of motion.
2. Walk on tiptoes without pain.
3. Jump on both feet without pain.
4. Hop on the affected foot without pain.
5. Demonstrate balance by performing single-leg stance on the affected side.

Sever's Disease/Pediatric Heel Pain

Don't be alarmed by its name. Sever's disease is not contagious and not terminal. It occurs in children when the growth plate (which is the growing part of the heel) is injured. The foot is one of the first body parts to grow to full size. This usually occurs in early puberty and is common among child athletes. During development, bones often grow faster than muscles and tendons. As a result, muscles and tendons become tight. The heel area becomes less flexible. During weight-bearing activity, the tight heel tendons may put too much pressure at the back of the heel where the Achilles tendon attaches. This can injure the heel and cause an inflammation of the growth plate known as calcaneal apophysitis – or Sever's disease.



Your child is most at risk for Sever's when he is in the early part of his growth spurt in early puberty. Sever's disease is most common in physically active girls and boys 8-10 years old and 10-12 years old, respectively. Soccer and baseball players (those wearing cleats) and gymnasts often get Sever's disease, but children who

do any running or jumping activities are also at risk. Sever's disease rarely occurs in older teenagers because the back of the heel has typically finished growing by the age of 15.

In Sever's disease, heel pain can be in one or both heels. It usually starts after a child begins a new sports season or a new sport. Your child may walk with a limp. The pain may increase when he or she runs or jumps. He or she may have a tendency to tiptoe. Your child's heel may hurt if you squeeze both sides toward the very back. This is called the 'squeeze test'. Your podiatrist may also find that your child's Achilles tendons have become tight.

Treatment of Sever's can be quite simple. First, your child should cut down or stop any activity that causes heel pain. Apply ice to the injured heel for 20 minutes 3 times a day. If your child has a high arch, flat feet or bowed legs, your podiatrist may recommend orthotics, arch supports or heel cups. Your child should never go barefoot with this condition.

If your child has severe heel pain, anti-inflammatory medications may help. It is important that your child perform exercises to stretch the hamstring and calf muscles, and the tendons on the back of the leg. Both legs should be stretched, even if the pain is only in one heel. For specific stretching instructions, consult your podiatrist or visit www.1Foot2Foot.com.

With proper care, your child should feel better within 2-8 weeks. In rare cases, your child might have to wear a below-knee cast for 2-6 weeks to allow the growth plate to heal. No long-term problems have been linked with Sever's disease. Sever's disease may be prevented by maintaining good flexibility while your child is growing. Good-quality shoes with firm support and a shock-absorbent sole will help. Your child should avoid excessive running on hard surfaces. If your child has already recovered from Sever's disease, stretching and putting ice on the heel immediately after activity will help keep your child from developing this condition again.

Sever's disease is the most common, but not the only cause of pediatric heel pain. We recommend you schedule an appointment with a podiatrist for a thorough evaluation of your child's condition.

Orthotics / Arch Supports

Custom-made foot supports that are worn under your heel and the arch of your foot are referred to as orthotics. These devices are molded to be anatomically matched to your foot and do more than just provide support. Custom foot orthotics when properly prescribed by a qualified podiatrist allow the muscles, tendons and bones of the feet and lower legs to function at their highest potential. This is most important in children when the musculoskeletal system hasn't fully developed. Orthotics can also help to stabilize unstable joints, prevent deformities, reduce pressure on painful aspects of the foot and, improve overall quality of life. Children's orthotics tend to be more aggressive in an effort to obtain maximum control and guide future growth.

How do you know if the use of orthotics is right for your child? If there is an obvious imbalance that causes such symptoms as flat feet or high arches, or there are external misalignments such as "knock knees", "bow knees", in-toeing, or out-toeing, then your

child is probably a good candidate for orthotics. If your child participates in an activity that places stress on their feet, orthotics could be beneficial. The best way to find out if orthotics can help is to make an appointment with a podiatrist for an exam.

It seems that lately many people are getting into the 'foot care business' and want to sell you orthotics. They offer you comfort and relief of your symptoms. Though this sounds promising, proceed with caution. The knowledge and training of the individual treating you is usually directly related to the success of your treatment. A true custom orthotic should be prescribed by a podiatrist who has thoroughly examined your feet, posture and gait. If you do not need orthotics, a podiatrist will tell you so. If you do need orthotics, 1Foot 2Foot will use the best possible technique to correct your foot problem and also use state-of-the-art orthotics that should last for several years. We can adjust and repair your orthotics in the office to ensure that your orthotics are working perfectly and feeling comfortable for years to come.

A Word to Expectant Mothers and Pregnant Feet

The feet of pregnant women need professional care. Within the first three weeks of conception, hormones are released that cause blood vessels to dilate and ligaments to stretch. The final four to five months of a pregnancy produce marked changes in shape, posture and body weight of the mother-to-be, all of which affect the feet and can result in fatigue. Common foot-related problems found in pregnancy include overpronation or flattening of the arches due to the extra weight and altered posture, edema (swelling) resulting from the extra blood pooling in the lower extremities from slower circulation (the dreaded *kankles*...when your ankles get as big as your knees), and skin changes such as calluses, ingrown nails and plantar warts that can not be self managed while the baby bump is in the way.

The 1Foot 2Foot Centre specializes in a range of treatments that can be beneficial for pregnancy-related symptoms. Healthy feet allow you to enjoy regular exercise and a happy healthy pregnancy. As this book is not intended for *adult* conditions, we invite you visit our website at www.1Foot2Foot.com for detailed information regarding pregnancy and your feet.

Final Thoughts

I hope the information in this publication has been helpful. Studies have shown over and over again that the feet often get ignored when it comes to the overall care of the body. My purpose for sharing this book with you is to give you the information needed to take the appropriate actions to care for your child's feet and ankles. I hope it helps you understand the pain your little ones may be experiencing. I also wrote it to help you see that podiatric medicine has benefited greatly from the advances medical science is making in the treatment of foot and ankle conditions.

Children and adolescents experience a variety of foot and ankle problems – from congenital disorders such as severe flatfoot, to sports injuries, to ingrown nails. It's essential that your child get highly capable, results-oriented attention.

We know that making an appointment to see a doctor isn't always the easiest thing to do, but with knowledge and understanding you can see that podiatrists offer many treatments that can greatly improve your quality of life. Don't let your child live with foot, ankle or leg pain. Most problems can be treated with conservative and pain-free treatment.

Dedicated to Your *Toetal* Health,

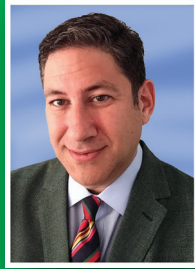
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About the Author



DR. MATTHEW C. DAIRMAN, DPM MS

Dr. Dairman was born and raised in New Jersey. He graduated from Skidmore College with Honors in Biology, and then earned a Masters in Epidemiology from the University at Albany School of Public Health. He received his Doctorate of Podiatric Medicine with Honors from Dr. William M. Scholl College of Podiatric Medicine in Chicago where he was recognized as a Swanson Foundation Independent Scholar, inducted into the Durlacher Honor Society, and earned a place in the Who's Who in American Colleges and Universities. Dr. Dairman completed his residency training at the North Colorado Medical Center Podiatric Surgical Residency where he served as Chief Resident from 2001-2002.

Dr. Dairman is Board Certified by the American Board of Podiatric Surgery. He is a Fellow of the American College of Foot and Ankle Surgeons, American Society of Podiatric Surgery, Association of Extremity Nerve Surgeons, and American Professional Wound Care Association. He is an active member of the American, Virginia and Hampton Roads Podiatric Medical Associations, and an Assistant Professor in the Department of Family and Community Medicine at Eastern Virginia Medical School. He has been named one of America's Top Podiatrists. Named a Media Spokesperson for the American College of Foot and Ankle Surgeons, Dr. Dairman enjoys lecturing and educating the community on all foot health issues.



*Overall Gold Winner in the
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