

A Parents' Guide *to* Clubfoot

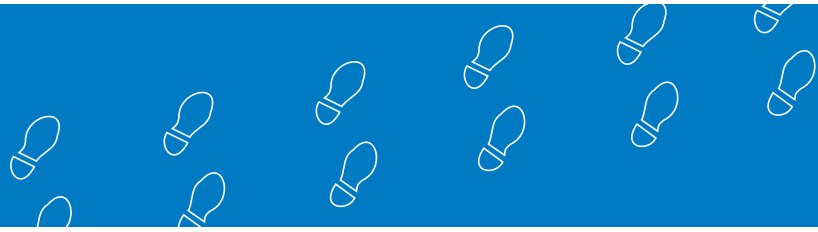


and its treatment using the Ponseti Method



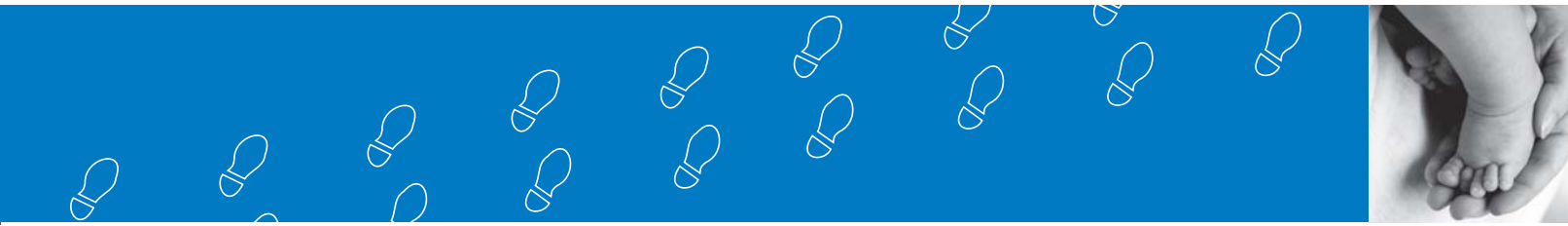
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Dedication by the Parent Authors:



To all the parents of children with clubfoot;
To all the previous, current and future kids with clubfoot;
To their personal journeys and the success of their treatment;

Walk tall!

Introduction

This booklet is intended for parents of children born with clubfoot to be treated using the Ponseti Method of correction. Whether your child is already born, or on the way and an ultrasound suggests a high likelihood of clubfoot or feet, this booklet will help you learn:

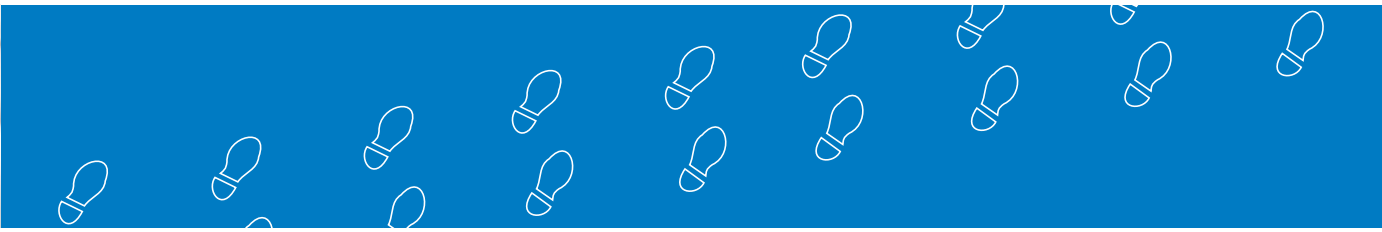
- About clubfeet,
- About the Ponseti Method of correction of clubfeet,
- About the important role of the parents in the correction process,
- What to expect from and how to prepare for treatment, and
- What to plan, prepare, and know that will help you and your child throughout the years of your child's treatment.

There are many different treatments for clubfeet. With the Ponseti Method, fewer surgeries are performed and your child's feet will look and function better than ever before. In almost all cases, the Ponseti Method gives supple, strong, painless feet well into middle age.

The idea for this booklet came from mothers Jillian Chateauneuf and Heather Cohen who each have children, Claire and Hayden respectively, born with clubfeet. Hayden and Claire are growing up normally after their clubfeet were treated without surgery by the Ponseti Method. Jillian and Heather felt a strong need for more parent-friendly material about the Ponseti treatment for clubfeet, which prompted them to spearhead an effort to ensure that parents in the future would benefit from their journey. This booklet was written by parents and for parents, with technical advice from the Clubfoot Team at the Royal Columbian Hospital and the Medical & Scientific Review Committee of the Canadian Orthopaedic Foundation.

The Canadian Orthopaedic Foundation encourages you to learn all you can about clubfeet. This booklet will answer many of your questions, but it is equally important to discuss your expectations and concerns with your doctor and other health professionals involved in your child's care. An experienced and highly trained team of health care professionals is focused on correcting your child's foot or feet, and making the journey as smooth as possible for you and your child. Be an active participant in your child's care.

About Dr. Ponseti and his Method



Dr. Ignacio Ponseti – 1914-2009

Dr. Ignacio Ponseti, Professor of Orthopaedics at the University of Iowa, pioneered his method in the 1940's after extensive research into the long-term after-effects of surgery for clubfeet. He found that those who had surgery for clubfeet often experienced stiffness, pain, and limited function in their feet as adults. In many cases, further surgery was required. By studying the anatomy and function of the human foot, he discovered why earlier methods had been unsuccessful and started manipulating newborn clubfeet differently. In his career, he treated over 3,000 children with clubfeet and received testimonials and follow-ups from patients well into middle age with functional, pain-free feet.

*Photo courtesy of University of Iowa,
Department of Orthopaedics and Rehabilitation*

“ *Parents of infants born with clubfeet may be reassured that their baby, if otherwise normal, when treated by expert hands will have normal looking feet with normal function for all practical purposes. The well-treated clubfoot is no handicap and is fully compatible with a normal, active life. – Dr. Ignacio Ponseti* ”

Initially Iowa City was the only place the Ponseti Method was available. In 1996 Dr. Ponseti published a book on his non-operative method, which helped doctors to better understand the techniques. This helped doctors around the world to learn, and then use, the method. Prior to his death in October 2009, Dr. Ponseti favourably reviewed this booklet.

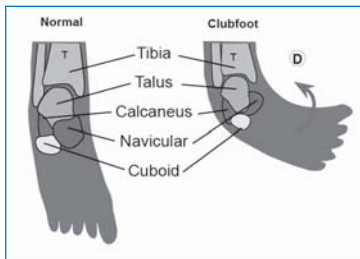
Dr. Shafique Pirani, an orthopaedic surgeon specially trained in the bone and joint problems of children and who was consulted extensively in the development of this booklet, runs the Clubfoot Clinic at the Royal Columbian Hospital.

“ *I read Dr. Ponseti's book on his non-operative method for correcting clubfeet in disbelief, but when I tried his manipulative technique I was amazed at the corrections achieved. Dr. Ponseti developed his method after much careful observation and critical thinking based on an accurate knowledge of foot anatomy and biology of growing bones. I adopted the technique in 1998 and am delighted with the results. In almost every case, the deformity corrects with about five casts. Feet corrected without surgery are more supple and stronger than feet corrected with surgery. – Dr. Shafique Pirani* ”

Understanding Clubfoot



What is clubfoot?



Congenital clubfoot, or talipes equinovarus, is a complex deformity that is readily apparent at birth and affects the muscles, ligaments, bones and joints of the developing foot and ankle. The ankle is rotated downward and the toes point inward towards the opposite leg. All foot bones are usually present, but are out of normal alignment. All of the foot and leg muscles are also present, but some are smaller and weaker than normal. *Tendons* and ligaments are contracted, especially behind the ankle and along the instep.

Why my baby?

Many parents ask this question. It helps to understand that clubfoot is among the most common of birth defects. Worldwide, more than one baby in a thousand is born with this foot deformity. That may not sound like a lot, but it is: every year more than 100,000 babies worldwide are born with a clubfoot or clubfeet. Fifty percent of cases affect one foot, and fifty percent affect both feet. Boys are more commonly affected than girls. Sometimes clubfoot runs in families. It also helps to understand that clubfoot responds well to treatment. When treated by medical experts, children born with clubfeet and no other significant medical problems will have feet that are capable of a normal, active life.

What causes clubfoot?

There are many theories, however the actual cause is not known. There is no need for parents to feel at fault.

Does this mean my baby has other problems?

Your doctor will check your baby thoroughly directly after birth. Most often, clubfoot is an isolated condition from an unknown cause (*idiopathic* clubfoot). Rarely, there are other conditions that are also noted such as spina bifida (*syndromic* clubfoot).

Occasionally the foot may have been held in a curved position in a crowded uterus (*positional* clubfoot); for example, if there are twins. Positional clubfoot is much quicker to correct than idiopathic or syndromic clubfoot. Your doctor will tell you what type of clubfoot your baby has.

When should treatment begin?

Babies suspected of having clubfoot at the newborn exam are usually referred right away to the orthopaedic team or clubfoot clinic. Infants are seen within a few weeks and treatment begins.

How severe is my baby's clubfoot?

All clubfeet are not of the same severity, although all have the same general appearance. Some doctors measure or score the amount of deformity present (see chart page 29). Scoring can assist the doctor to determine the severity of the clubfoot and to measure the progress of correction.

Understanding Clubfoot



How is clubfoot treated with the Ponseti Method?

Clubfoot treatment using the Ponseti Method can be considered in three phases (see Treatment Timeline – page 8):

1. **Correction.** The Ponseti method uses very specific and gentle manipulations to align the foot in a more normal position, and casting to allow the soft bones to “set”. Usually, about five weekly casts and a minor procedure to the *Achilles* tendon (tenotomy) are all that is needed to achieve full correction. Difficult clubfeet sometimes need more casts.
2. **Prevention of Relapse.** After correction, a brace is then necessary to prevent relapse. The brace is worn full time for two to three months, and then during nighttime and naps until the child reaches at least four years of age.
3. **Surveillance.** Your child will have regular visits until fully grown to monitor how the legs and feet are growing. Keep in mind that all children are different and length of treatment may vary.



What is relapse and how is it treated?

Clubfeet have a stubborn tendency to relapse, or come back, after casting correction. Relapses are treated the same way, through manipulation and casts, although casts are applied less frequently and typically correct within fewer castings. Rarely a clubfoot may be resistant. In such a case, your orthopaedic surgeon may recommend surgery, such as a tendon transfer, which would be explained by your surgeon at that time. This booklet addresses non-surgical correction.

What happens if clubfoot is not treated?

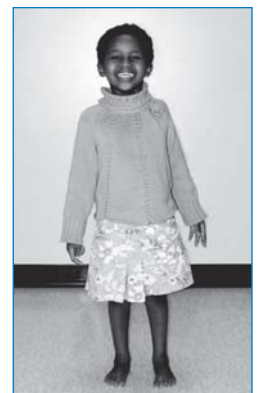
Left untreated, the deformity persists and results in severe physical – and emotional – handicap.

Will this process be painful for my baby?

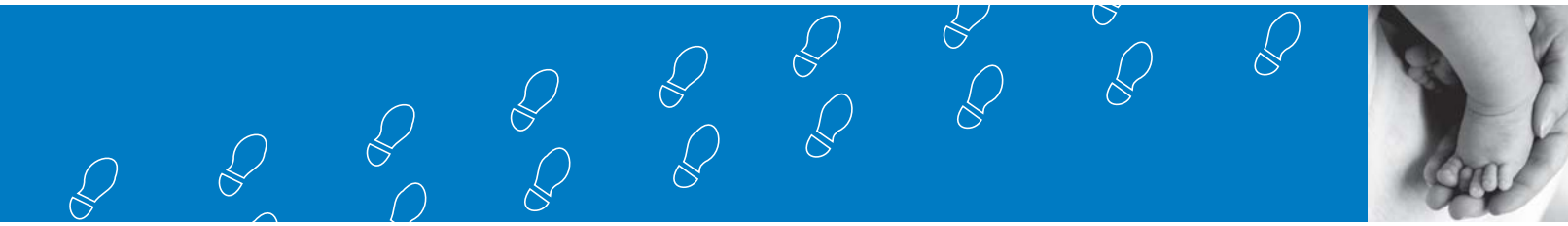
There may be some discomfort for your baby as he or she adjusts to the treatment, but the process is likely to be more painful for you as a caring parent than it is for your baby. This booklet explains the process and your important role in it to make correction easiest on both of you.

How will my child do as a grown-up?

Children with clubfeet corrected by the Ponseti Method grow up to have feet that are almost normal in shape and function. For children with one clubfoot, the corrected foot and calf may be slightly smaller. Children with corrected clubfeet grow normally and are able to participate in most sports or leisure activities. Studies in adults show that patients treated using the Ponseti Method continue to have as strong and as healthy feet as adults born with normal feet.



Clubfoot Treatment Overview

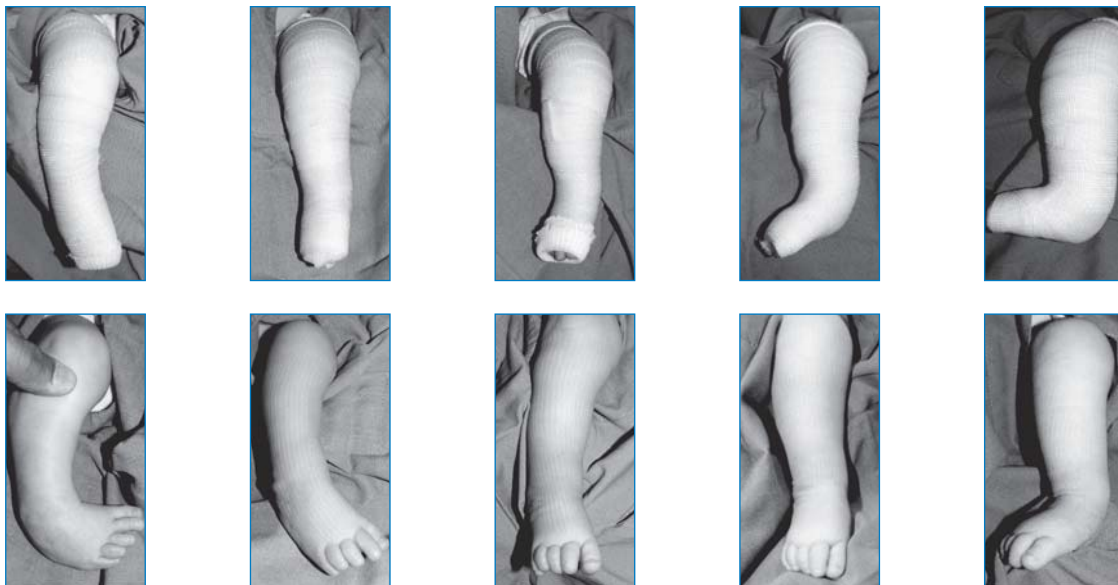


The early stages of treatment are part of an intensive process that involves commitment by both the family and the health care team to achieve and maintain optimal results. This section provides an overview of the correction process, with more detail and specifics about care and your role, beginning on page 10.

Straightening the Foot

Ideally, treatment begins during the first few weeks of life to take advantage of the favorable elasticity, or suppleness, of the tissues at that age. At each weekly visit, your baby's foot will be gently manipulated to stretch the short, tight ligaments and tendons of the ankle and foot. The foot is then held in progressively corrected positions by a cast that extends from toes to groin. The cast holds the correction obtained by the manipulation. The time in the cast relaxes the tissues for the next weekly manipulation. Gradually, the displaced bones and joints are brought into correct alignment.

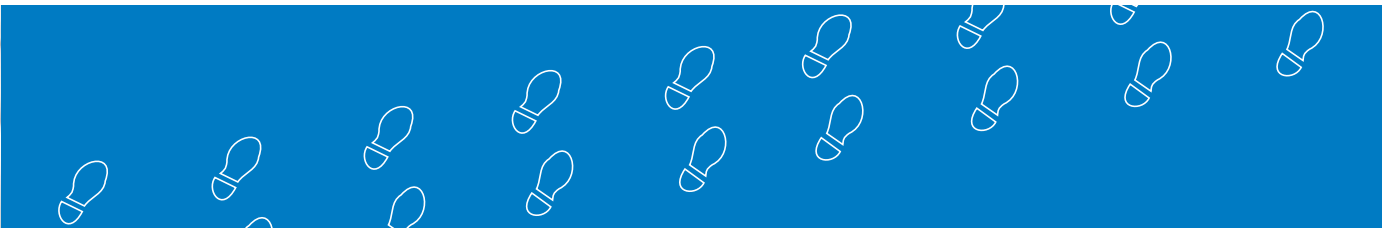
Weekly casts showing change in foot shape as correction progresses:



Casting corrects all the parts of the clubfoot except *equinus*, the downward pointing of the ankle. Equinus is corrected with the release of the Achilles tendon (called an Achilles tenotomy), and application of the last cast.



Clubfoot Treatment Overview



Achilles Tenotomy

In a clubfoot, the Achilles tendon is particularly thick and stiff making it resistant to stretching. To achieve good ankle motion, a minor procedure called an Achilles tenotomy is usually necessary to release the Achilles tendon and complete the correction. The tenotomy is a safe, short procedure for your baby, and is usually performed in the outpatient clinic under a local anaesthetic. The tenotomy creates a gap in the tendon, which then heals, resulting in a longer tendon with greater flexibility. The skin incision is very small and no stitches are needed. The ankle and foot are then casted for about three weeks in the fully corrected position.



Bracing

Clubfeet have a stubborn tendency to relapse, or come back, after casting correction. To prevent relapse, your doctor will prescribe a brace to hold the foot or feet in the corrected position after removal of the last cast. The brace is worn 23 hours per day for two to three months, allowing an hour for brace-free bathing and cuddling, and then during nighttime and naps until the child is approximately four years old. Sometimes the duration of brace wear will vary (up to six years of age) depending on the severity of the clubfoot and its tendency to relapse. This will be determined by your doctor as your child grows.

The brace, called a foot *abduction* brace because it “abducts” or rotates the foot or feet outward, looks like two shoes connected by a bar. This simple design is effective in holding the feet in the corrected position. Normal shoes are fine for the child to wear when not wearing the brace.

The foot abduction brace is the only brace that prevents relapse and is over 90% effective, if used as prescribed. Wearing the brace will not significantly delay your child’s development with regard to sitting, crawling, or walking. However, NOT wearing the brace will significantly compromise the correction of the clubfoot or feet.

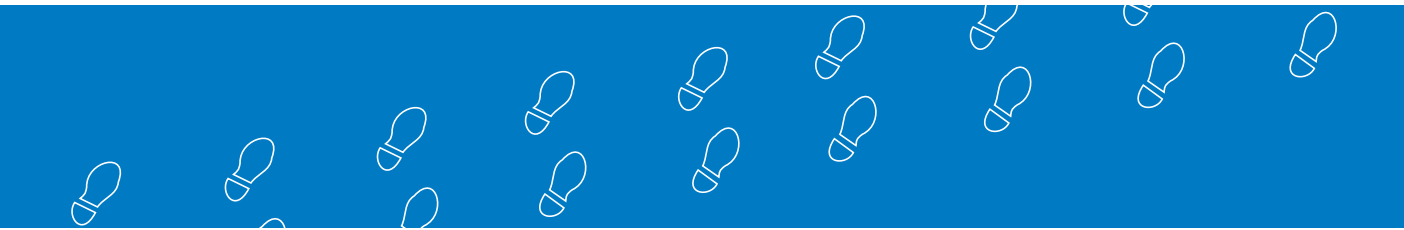
Follow Up and Supplemental Treatment

As your child grows, you may notice and be concerned about a slight difference in leg length and foot size. Have your child’s foot or feet checked regularly by your health care team to watch for relapse, and to detect and manage slight differences. Follow up is rarely needed after the bones stop growing – at around age fourteen for girls and age sixteen for boys. Your doctor will advise you about the follow up schedule. Sometimes surgery is recommended if leg-length differences become bothersome or painful.

Some doctors supplement treatment with physiotherapy. Appropriate exercises may be useful additions in preventing relapse, particularly if muscle imbalance within the foot is a problem. If you need help with an exercise program, a physiotherapist with paediatric experience can help gear exercises towards the age and interests of the child.

Once correction is complete, foot orthotics, supporting devices or insoles to control joint motion, may be useful to help balance the forces that go through a corrected clubfoot and to make up for slight differences in foot size or leg length that may appear as the child grows. Orthotics and braces need to fit correctly, like shoes, and will need changing at regular intervals depending on how fast the feet are growing. The cost of orthotics and braces are covered by most extended health care benefit plans.

Clubfoot Treatment Timeline

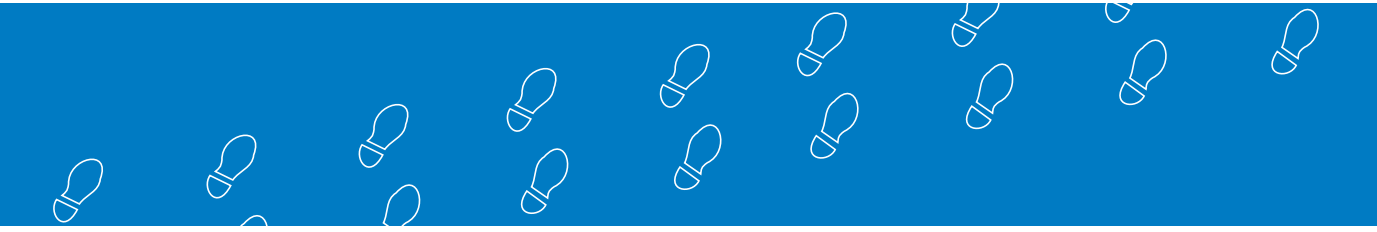


Straightening the Foot: About 2 months	Prevention of Relapse:		Surveillance: Until fully grown
	Full-Time Bracing: About 3 months	Part-Time Bracing: About 4 years	
<p>Casts applied at weekly intervals are all that is needed to correct clubfeet. Difficult clubfeet may need more casts.</p> <p>Usually a tenotomy is performed before the last cast is applied.</p> <p>The last cast stays on for 3 weeks.</p>	<p>The brace is fitted the day the last cast is taken off. It is worn 23 hours a day for 2 to 3 months.</p>	<p>After 2 to 3 months, bracing time is reduced to nighttime and naps only, usually until about 4 years of age.</p> <p>Clinic visits are every 3 to 6 months until approximately 4 to 5 years of age, to watch for relapse and change braces as your child outgrows them.</p>	<p>Clinic visits every 6 to 12 months to check how the feet and legs are growing.</p> <p>Visits continue until the child is fully grown, about age 14 for girls and age 16 for boys</p>

REMEMBER: Each child's progress is unique. These are guidelines only. Treatment length may vary.



Your Health Care Team



There are many health care professionals that play a role in your child's bone and joint health. The members of the team may vary, depending on your child's situation and needs. You have an important role to play, too. Be involved in the process – ask questions, voice concerns, and ask for information about your baby's diagnosis, treatment alternatives and the course of care.

Here are some of the health care professionals that you will likely meet during your child's treatment:

Orthopaedic Surgeon

An orthopaedic surgeon is trained to diagnose and treat a wide variety of musculoskeletal conditions and injuries. Paediatric orthopaedists are specially trained on the unique problems and needs of children.

Orthopaedic Surgery Fellow or Resident

Fellows are fully trained orthopaedic surgeons who are continuing training so that they can specialize in a specific area of orthopaedic care; for example paediatric *orthopaedics*. A resident is a licensed physician receiving training in a specialty, such as orthopaedics.

Physiotherapist

Physiotherapists are health care professionals trained to assess, treat and prevent disease, injury or conditions that affect the structure and/or movement of the human body through treatment, exercise and education.

Orthopaedic Technologist or Cast Technician

Orthopaedic technologists assist orthopaedic surgeons with the treatment of orthopaedic injuries and diseases by applying, adjusting, and removing a variety of casts, splints, bandages, and ambulatory aids. They may provide you with information and instructions regarding treatment.

Clinic Nurse

A clinic nurse is a registered nurse with a high degree of knowledge, skill and competence in a specialized area of nursing.

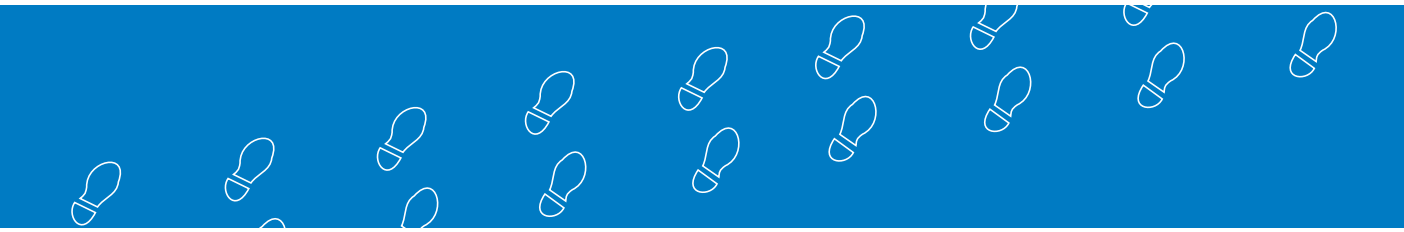
Certified Orthotist

Certified orthotists are health care professionals who assess, design, fabricate, and fit "braces" known as *orthoses*. The orthotist will help you to 'troubleshoot' if your baby's feet are coming out of the brace or if your baby is experiencing any discomfort with the brace. The orthotist can make adjustments to the brace and educate you on how to apply it properly.

Medical Students

Medical students are doctors-in-training and participate under supervision in most hospital clinics.

Your First Appointment



Babies with clubfoot will be referred to an orthopaedic surgeon or clinic by their family doctor, delivering doctor, obstetrician, or the hospital paediatrician. At some hospitals, you will be contacted by the orthopaedic clinic to arrange your first visit.

At your first visit, you will meet the orthopaedic surgeon and other professionals who will be part of your child's health care team. Your baby will be examined. Your orthopaedic surgeon will then discuss the findings with you and recommend a treatment plan. Often, the first casting treatment begins at this visit, so be sure to bathe your baby before the appointment. Your baby's cast will fit easily into car seats and strollers, so there is no special equipment to purchase.

Your first appointment can be a stressful time for parents. Your baby is very young, so you are likely to be anxious, tired or emotional. This is all natural. To minimize stress and make the most of your appointment:

- Allow plenty of time to get to your appointment.
- Bring diapers and any other needs for your baby in case a change is needed.
- Bring a full bottle for feeding (if your baby is not breast-fed).
- Dress your baby in a loose-fitting sleeper or pants that snap all the way open to fit easily over a cast.
- Write down your questions so you don't forget them.
- Bring a pen and something to write instructions on – this booklet or a notepad.
- Be patient – the office or clinic may be busy.
- You may find it helpful to pay for additional parking time, if pre-payment is required at the clinic or hospital, so you don't feel rushed.
- Try not to have plans for later that day.

Most importantly, take the time to discuss your concerns and expectations with your health care team. They are there to help you!

Questions for the first appointment:



Straightening the Foot: Casting



Casting

You and your baby will visit your health care team initially to have the first cast applied, and then weekly to have the old cast removed and a new one applied. The success of Ponseti correction lies in the gentleness of manipulation and casting. It should not be uncomfortable for the baby, stressful for the parents, or rushed for the tending health care professionals. For these weekly visits, it can help to keep your baby a little hungry with bottles ready. Feeding babies are relaxed babies, and many surgeons are quite happy to have mothers feed by bottle or breast while the casts are being put on.

Applying casts often requires two team members, one to manipulate and hold the limb in position and one to apply the cast. Although infants may fuss during the casting process, rest assured that the cast applications are not painful.

Types of Casts

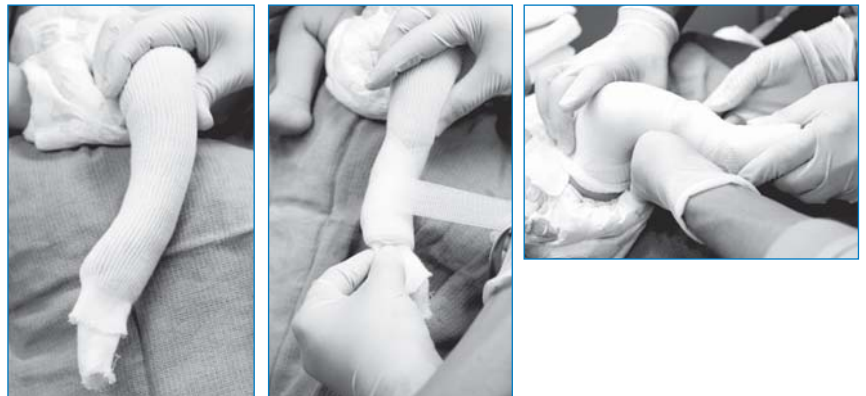
There are many types of casting materials available: plaster of Paris, rigid fibreglass, semi-rigid fibreglass. Your doctor will determine what material will work best for your child.

Cast Application

Once the baby is made comfortable, the leg and foot are gently manipulated into position. A sock or soft padding to line the cast will be applied before or after manipulation. Some clinics apply the full cast at once.

In others, the cast is applied in two stages: first the portion below the knee is applied and molded, and then the cast is extended to the upper thigh, with the knee in a relaxed flexed position. This long leg cast is essential for maintaining the foot in position. Casts usually dry in a few minutes.

Once casting is complete, you are asked to wait 5 to 10 minutes to make sure your child is comfortable and their toes are pink, indicating good circulation. Your health care team will make sure that there are no problems prior to your baby going home.

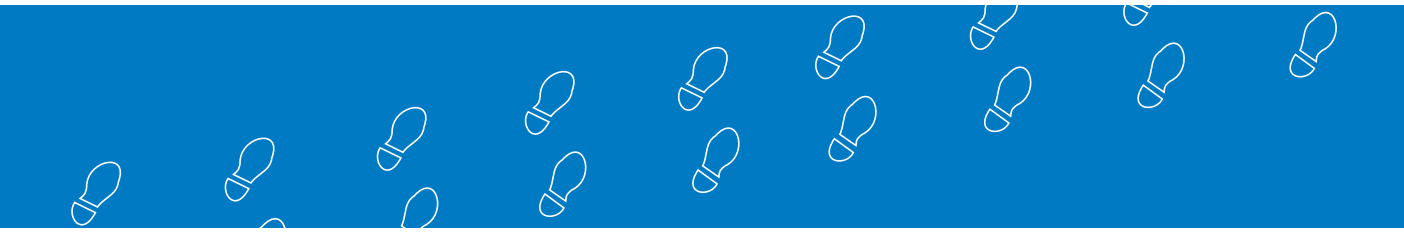


Tenotomy

Before the last cast is applied, a small cut just above the heel releases a tight Achilles tendon. Your surgeon will decide if this is needed. This procedure, called a tenotomy, completes the correction of the clubfoot.

Most surgeons prefer to perform the tenotomy in the clinic treatment room using a local anaesthetic. No stitches are needed as the skin incision is only a few millimeters long. A bandage or small dressing is all that is needed to cover the incision, then the last cast is applied. Once the cast is dry, you may take your baby home after a team member has checked that all is well. A cast after a tenotomy stays on for about three weeks.

Straightening the Foot: Casting



Some infants may be upset by the procedure, but will settle easily once the cast has set. Your doctor may suggest mild infant pain medicine for the first day. After the first day there usually is no discomfort. If your baby continues to cry, develops a fever, or you have concerns about the cast, contact your doctor immediately (see “When to Seek Medical Attention”).

Cast Care

You will be guided in cast and skin care at each appointment. It is most important to remember that the cast is not waterproof and to keep it clean and dry at all times for your baby's comfort and to prevent skin irritations. The following reminders are general cast care instructions; your health care professional may have others – be sure to take careful note of them:

- Keep cast clean and dry. Moisture under a cast can cause minor to severe skin conditions such as a rash or skin breakdown.
- Be extra careful with diapers. Changing them frequently helps prevent awkward leaks! The most difficult area is around the thigh-diaper region. Use disposable diapers with extra “leak guards”, or plastic covers that are snug around the leg for cloth diapering, to keep casts clean and dry.
- Never insert anything under the cast as skin may be damaged. Items such as knitting needles and rulers that are inserted into the cast can cause sores or scratches, which can lead to infection.
- Monitor your baby so that you become accustomed to watching for changes that may indicate a problem with the cast: these include skin colour and condition, an odour coming from the cast, or if your baby is fussier than normal.
- If you suspect that the inner lining of the cast is wet, it may need to be removed and replaced immediately. If this happens, immediately pat the cast as dry as you can without inserting anything underneath it. Leave your baby unclothed from the waist down except for the diaper, and call your doctor.



When Everything Is Well

A comfortable baby, adjusting well to the cast:

- Will move his or her legs without discomfort
- Will have normally-coloured, rash-free skin around and near the cast
- Will have normally-coloured toes that are not swollen
- May fuss a bit, but will be consolable

See next page for “When to Seek Medical Attention”.



Straightening the Foot: Casting



When to Seek Medical Attention

Seek medical attention if:

- Your baby's toes are swollen or not normal in colour (are blue, black, white or red)
- The cast is wet with urine or other fluid
- Your baby's skin shows a red rash on the legs, or abnormal colour or condition
- You notice an odour coming from the cast
- Your baby is crying inconsolably

During regular office hours:

- Contact the Cast Clinic where the cast was applied, or your doctor's office
- Expect a response within an hour or two
- If no response is forthcoming, take your baby to the emergency room

Outside of regular office hours:

- Take your baby to the emergency room

Emergency Contact Numbers:

- Cast Clinic Phone Number: _____
- Doctor's Office Phone Number: _____

Straightening the Foot: Casting



At Home with the First Cast

At first, your baby may be restless, but will settle after the first night. If you feel your baby is in pain, you may give him or her an infant pain reliever if approved by your doctor. If your baby does not settle, or the medicine does not calm your child, call your doctor.

Dressing Baby

Your baby's cast will fit under most baby pants and sleepers, so long as they are not tight fitting. Those with snap buttons that open right up, rather than having to be pulled off over the legs, are most easy to deal with. Stretchy pants with loose fitting legs and an elastic waistband also work well. Sleepers with toes will sometimes fit over the cast, or you can cut off part of the sleeper leg(s) and put a sock or soft bootie on your child to keep the foot or feet warm.

Bathing Baby

While your baby is wearing a cast, he or she will need to be sponge-bathed, as the cast is not waterproof and cannot become wet. You can place your baby in the tub or sink and have a bowl of warm water close by. Dip your cloth/sponge in the warm water, wring out excess water, and wash your baby.

You may also find a sponge bath at the edge of the tub works well. Wearing shorts yourself, sit on the edge of the tub with your feet inside and your baby in your lap with a towel over the cast(s). This allows you to run the water at a trickle, while you wash your baby's hair, face and upper body. You can then clean the lower body with a washcloth later on. Parents have found that bathing this way is much faster and less stressful to one's back than bending over your baby or the sink, particularly as babies get heavier!

Cast Removal



At your next appointment, and at every subsequent casting appointment, the old cast will be removed. Usually casts are removed in the clinic.

If **semi-rigid fibreglass** is used, no equipment is needed. The cast will simply be unwrapped similar to a roll of duct tape.

Straightening the Foot: Casting



If **plaster of Paris** is used, it usually needs to be soaked prior to unraveling the material. Some clinics may have you soak your baby's cast at home, and will provide you with specific instructions. Others soak the cast at the clinic. Usually a bath or sink will be filled with warm water and the cast completely submersed under water. Then a wet towel is wrapped around the cast and leg to soak for 20-30 minutes. The technician will likely have left a small bump of material on the cast. When this bump can be easily separated from the cast, the plaster is soft enough to unwrap.



Rigid fibreglass casts are usually used for older children to treat a relapsed clubfoot. They are strong and must be cut on both sides with a cast saw for removal. Though the cast saw is loud and seems frightening, it is actually a very clever and safe machine. The cast saw uses round blades that do not spin or cut like a conventional saw; instead, the blades vibrate at high speed and therefore do not harm skin. A vacuum system minimizes any cast dust on or near your child. Ear protectors may be available if your child wishes to wear them. When the

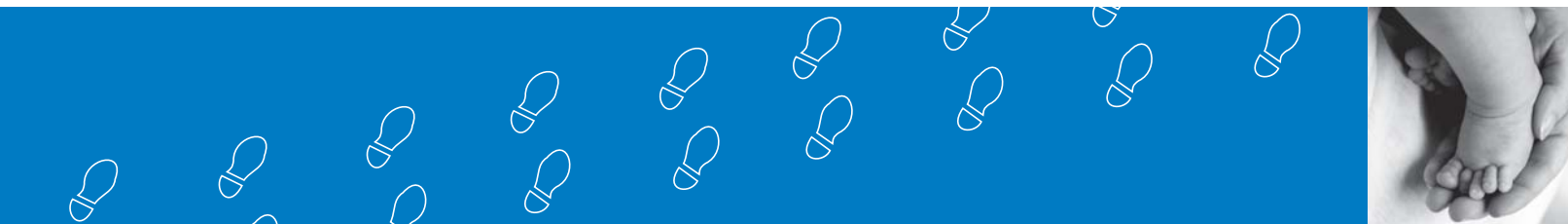
saw is in use, your child will feel a vibration, which most say feels like a tickle. Once the sides are split a spreader device is used to open the cast. Scissors are used to cut the cotton sock and padding completely, and the cast is then removed.

At each weekly visit, the old cast will be removed, and a new one applied until this stage of correction is complete. You and your baby will get used to the cast and the appointments, becoming more comfortable with the procedures each time. Remember to check the tips in "Your First Appointment" to keep your weekly appointments as stress-free as you can.

A special note for older children: An older child who has been immobilized in a cast for several weeks (to treat relapse) may experience some stiffness in the joints after the cast is removed. It's a good idea to prepare your child by mentioning this to him or her, and provide reassurance that it is normal.

Additional instructions:

Preventing Relapse: Bracing and Surveillance



After the last cast is removed, your baby graduates to wearing a brace. This is a new step for you and your baby, so use the checklist under “Your First Appointment”, and:

- Dress your baby in a sleeper or pants *that open all the way on both sides* – so you don’t have to remove the brace to change a diaper.
- Review the section “The First Night In the Brace” on page 19 for what you might expect or wish to prepare as your baby adjusts to the brace.

About bracing

Even after full correction, clubfeet have a stubborn tendency to recur or relapse. The tendency is much less after about age four. The best way to prevent recurrence is to use a special “foot abduction brace” consistently for 23 hours a day for two to three months, and then during nighttime and naps until four years of age. The duration of brace wear will vary depending on the severity of clubfoot and will be determined by your physician. You will follow up with your orthotist regularly as your child grows out of his or her boots or as they need adjustment.

The foot abduction brace is the only successful method of preventing a relapse and is effective in 90 percent of patients when used consistently as described above. Use of the brace will not significantly delay your child’s development with regard to sitting, crawling, or walking.

What is a foot abduction brace?

A foot abduction brace (FAB) is a brace specifically designed to “abduct” the foot and dorsiflex the ankle (toes pointing upward) to maintain treated clubfeet in a fully corrected position. It consists of two boots connected by a bar that holds the feet in the same corrected position as the last cast. There are different types available. Commonly used braces include the Markell, the Ponseti® AFO, (also known as the Mitchell Brace), the ALFA-Flex, and the Horton Click (a bar to which a variety of shoes can be attached). Each type has unique characteristics. Your doctor will prescribe the brace best suited for your child.

When is the brace applied for the first time?

The best time to apply the brace is the day the last cast comes off, because the foot is used to being in the fully corrected position. Applying the brace immediately after the cast comes off lessens the risk of relapse.

How is the brace set up?

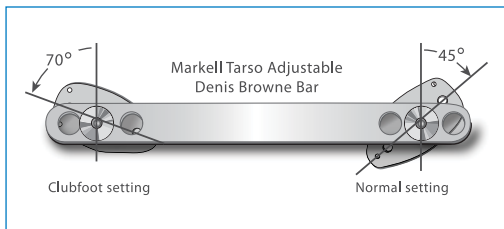
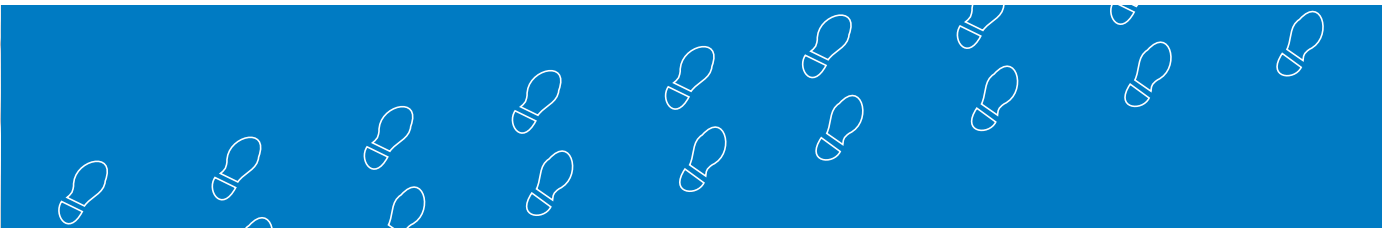
The FAB will be set up by your orthotist. As your child grows, larger shoes and longer bars will be supplied by the orthotist. It helps to be knowledgeable about some of the adjustments.



Bar length: Your child’s shoulders should fit in the distance between the inside heels of the boots.



Preventing Relapse: Bracing and Surveillance



Foot abduction: Each brace has a slightly different recommended angle (ALFA-Flex: 70 degrees for the clubfoot and 40 degrees for the unaffected foot, Ponseti AFO: 60 degrees for the clubfoot and 40 degrees for the unaffected foot, Markell: 70 degrees for the clubfoot and 45 degrees for the unaffected foot). Your orthotist or surgeon will guide you on what is best for your child.



Dorsiflexion: Usually 10 degrees of dorsiflexion is sufficient. The Ponseti AFO has this built in. The ALFA-Flex has an adjustable ball joint, and the Markell bar can either be bent or substituted for a Horton Click bar, which has foot plates with built in dorsiflexion of 10 degrees.

How do I put the brace on my child?

Tips in this section will help you learn how to use the brace. Your hospital, clinic, surgeon, and orthotist may have other tips – be sure to make note of them.

It is best to put the boots on when your child is relaxed and calm. You will find out through trial and error what works best for you and your child, but always ensure that the child's heels are all the way down to the bottom of the heel cup in the boots.

Initially, you may find it easier to put the shoes on your child separate from the bar, and then reattach the shoes to the bar. You may want to mark the shoes and bar with "right" and "left" to ensure the marks on the bar correspond to the correct footplate.

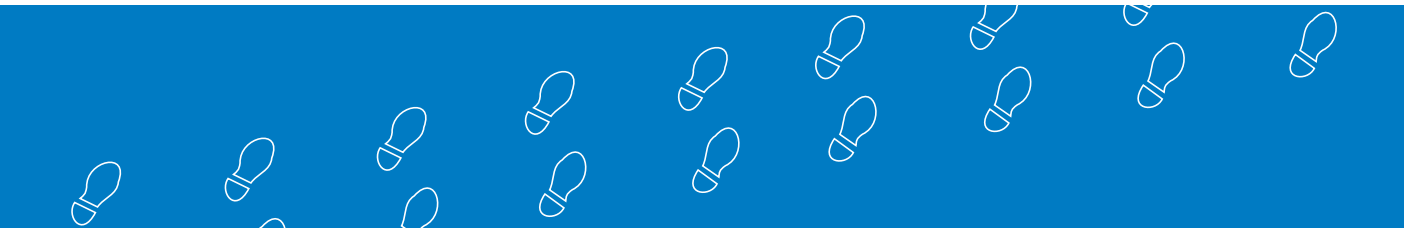
The pictures show the Markell shoe as an example. Other shoes work in a similar fashion.



- Open the shoe up as much as possible by loosening the strap(s) and/or removing the laces.
- Insert the foot into the shoe with the knee bent to 90 degrees and the ankle flexed so that the toes point upwards. Make sure the heel is completely down and back in the shoe. There should be a hole in the heel of the shoe to allow you to check foot position.
- With the knees still bent and the toes pointing up, use your thumb to apply pressure to the tongue and strap while tightening the buckle, and if applicable, the laces. Follow the same procedure, one foot at a time, starting with the clubfoot, or weaker of the two.
- Try to pull the shoe off. If the heel rises, it is not tight enough. Re-tighten the shoe using the above technique until the foot is secure in the shoe. It must be snug, probably tighter than you think it should be, yet without cutting off circulation. You will be surprised at what your child can tolerate.
- Make sure your baby's toes are not curled under, and that wrinkles are smoothed out of the socks. To smooth wrinkles, pull the socks from the top and toe when the boot is on.



Preventing Relapse: Bracing and Surveillance



- To check circulation, cut the toe area out of a pair of socks. Press on the child's toe nail – the nail will whiten – then remove pressure to confirm that colour returns quickly to the toe.
- Once the shoes are snug on both feet and laced or strapped up, the bar is attached, making sure the shoes are set at the right degree of abduction (outward turn), and well-fastened.

- **About the Ponseti® AFO:** The patented system features a soft rubber lining and soft leather straps for the comfort of the child. The location of the heel can easily be seen through two holes in the back of the AFO and the footwear attaches to the Ponseti® Bar by means of a Quick Clip system which allows for easy changing and application of the shoes and brace. The bar can be clipped onto the shoes after they are applied. This is also useful when placing the child in a high chair or shopping cart. These unique features were designed with the child's comfort in mind and may increase compliance to the prescribed bracing schedule.



- A Pressure Saddle (“pringle”) can be ordered to improve the pressure distribution over the middle strap.
- The Ponseti® AFO can be ordered with a Plantar Flexion Stop, which is useful for atypical clubfoot with neutral or negative dorsiflexion.
- The Ponseti® AFO is also available in the Toe Stilt style which adds a wedge to the toe of the AFO to help the patient maintain good dorsiflexion by stretching the Achilles tendon and increasing flexibility.
- If your child is “escaping” from the Ponseti® AFO, try tightening the middle strap by one buckle hole, then check to see that the baby's heel is down.
- The Ponseti® AFO Brace and additional products can be ordered by visiting www.opsb.com or calling 1-877-PONSETI (1-877-766-7384)

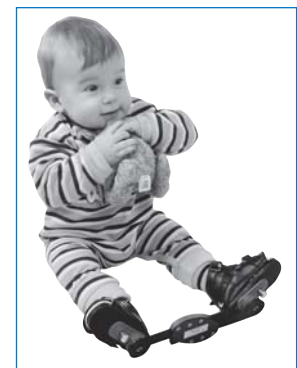


- **About Markell boots and bars:** The boots are “straight-last boots”. The tongue can be adjusted to ensure the strap is keeping the foot well seated in the shoe. When the child's heel is well-positioned in the shoe, the foot is not able to slip up and blisters will not form. If your child is “escaping” from the boots:

- Tighten the strap by one buckle hole and check that baby's heel is down.
- Tighten the laces and check that baby's heel is down.
- Remove the tongue of the shoe, or make the tongue-keeper slit longer by cutting it higher up to the top of the tongue, but do not cut the stitching.
- Lace the shoe from top to bottom so the bow is by the toes.



- **About the ALFA-Flex brace:** This brace has soft leather sandals lined with memory foam and practical Velcro or buckle fasteners in colourful designs:
 - Ball joints are moveable in two directions within therapeutic range.
 - A secure click-system fastens braces and shoes together.
 - Brace-length is adjustable allowing a single brace to be used for the duration of treatment.



- **About the Horton Click and 10 degree Kicker:** This is an adjustable length bar that attaches to Markell boots by a quick release mechanism that incorporates 10 degrees of dorsiflexion.



Preventing Relapse: Bracing and Surveillance

The First Night in the Brace

It's hard. Babies cry, and parents worry (Are the feet being damaged by the brace?)

Some helpful tips:

- Providing the brace is fitted well, crying only indicates frustration at not being able to move their legs independently because of the brace. Once babies get used to wearing the brace, they become much more comfortable.
- Babies get used to the brace, usually after the first night or two, and a normal routine is established.
- If your baby is crying and you are worried that the brace may be damaging the feet, remove the brace. Rarely, the brace irritates the skin, particularly if it is improperly applied. Babies will then cry inconsolably. Check for signs of skin irritation, such as unusual redness, swelling, bruises, blisters, and sores. If you see these, do not reapply the brace and seek your doctor's advice. Brace adjustments may be needed. If the skin looks okay, reapply the brace right away. This will prevent your baby from 'learning' that crying will result in parents removing the brace.

Red Marks on Baby's Foot or Feet

Correctly worn, the brace must be quite tight on your child, especially across the middle of the foot. You may notice red marks in this area, which is common. During the hour out of full-time wear you will notice these marks fade. Do not put lotion on these marks as the skin can break down (become macerated).

Blistering on the heels can be a sign that the shoe was not worn tightly enough. The heel must stay down in the shoe. If you notice blistering, or signs of an infection, your doctor and/or orthotist should be notified so that this can be corrected as soon as possible. These issues need to be addressed right away to ensure your child's comfort.

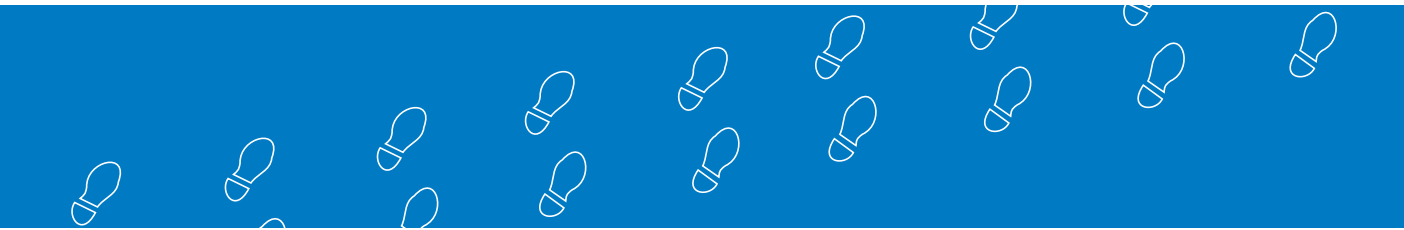
Baby's Comfort and Movement at Night

Your baby may occasionally whine or cry when he or she wishes to turn over. Amazingly, they do figure out how to do it, so you won't lose sleep forever! Blankets may slip off during the night; if this is a concern, you might try a sleeping bag or sleep sack. These work well in the winter months, allowing babies to turn with their covers, or you can try dressing them in a warm, thick sleeper. These also muffle the sound of them hitting the brace against the sides of the crib as they turn over.

The First Few Days

- Your child may fuss in the brace the first few days. This is not because the brace is painful, but because it is new and different.
- If your baby keeps crying, remove and reapply the brace. This will allow you to check for beginnings of blisters, indicating slipping in the shoes, and is good practice for putting the brace on.
- If your child seems uncomfortable at night, check the length of the bar by measuring it across your child's shoulders. A bar that is too short can be a cause of discomfort.

Preventing Relapse: Bracing and Surveillance



- Play with your child in the brace to help him or her get used to it. The child cannot move his or her legs independently, so teach your child that kicking and swinging the legs together is possible. Gently push and pull on the bar to flex and extend your child's knees. Kicking the bar "straight" will help to stretch the tight tendons of a clubfoot.
- Make it routine. Children will do better if you make this treatment a regular part of daily life.
- The bar of the brace can be padded with a bicycle handle pad to protect you, your child, and your furniture.
- Check your child's heels for bright red spots, which usually indicate that the shoe was not worn tightly enough. If you are having difficulty with this, your orthotist may add a pad above the heel. If red heel marks persist or are severe, contact your doctor.
- Occasionally check the bolts which attach the shoe to the bar and ensure that they are tight.
- Make sure your baby's socks fit well; poorly fitting socks can bunch up and cause friction or blisters.
- When your child graduates to nap and nighttime only wear, make putting on the brace a part of the ritual. Your child is less likely to fuss if the brace is a consistent part of their normal nap and bedtime routine.

Dressing Your Baby in the Brace

Your baby will need to be dressed in pants and sleepers that open all the way on both sides, so you don't have to remove the brace to change a diaper. Because the brace holds the feet at shoulder-width apart, stretchy pull-down pants will only come down as far as the knee and can be uncomfortable for the baby (and messy for you both!). As you become comfortable and confident at putting on the brace, you might wish to remove it briefly for diaper changes. However, this can be aggravating for your baby who thinks he or she is free, so it is best to avoid this in the beginning.



To keep little toes warm, you can put socks over the boots. You might also try buying slightly larger-toed sleepers and just cut a slit from the last snap so you can "hook" it over the boot toe.

Other Types of Orthoses

Other types of orthoses are sometimes recommended for children with clubfoot after correction using the Ponseti Method. These are listed below. Though not part of the Ponseti treatment, they are used in certain circumstances.



Ankle Foot Orthoses (AFOs) are custom-molded plastic boots secured with Velcro straps, meant to hold the foot in a neutral position. Since these cannot hold the foot in abduction, they are not used in place of a foot abduction brace for a Ponseti-corrected clubfoot. However, they may be used to maintain a surgically corrected foot. Some health care professionals will modify the AFOs to provide external rotation.

Foot Orthotics are custom-made shoe inserts which may be used to support a child's foot to optimize alignment, accommodate a leg-length difference, or support collapsing arches.



Exercise and Physiotherapy



Every child's life is about play! Make exercises fun so that it is a time of pure magic for both of you! Many clinics have physiotherapists to advise about exercise. Physiotherapists are health care professionals trained to assess and treat conditions that affect the structure and movement of the body through manual, hands-on exercise and education.

During the correction phase, normal baby stimulation and play is all that is necessary. Although babies should sleep on their backs, the Canadian Paediatric Society recommends it is also important that they experience 'tummy time' when they are settled and awake to learn how to hold up their head and put weight through their arms. Babies in casts can still be placed on their tummy or on their sides with support. Your doctor or a physiotherapist can show you various ways of positioning and holding your baby while in casts. Infants in casts can do most things considered normal for their age, except of course, take baths.

After casting is finished and your baby is in braces, a physiotherapist may suggest some basic exercises to do during the one hour of "off time" from the brace, such as:

- Heel cord stretches, to maintain the elasticity of the Achilles tendon, and
- Moving the foot in every direction to maintain a full range of motion.

Should my child do exercises to make their foot and ankle stronger?

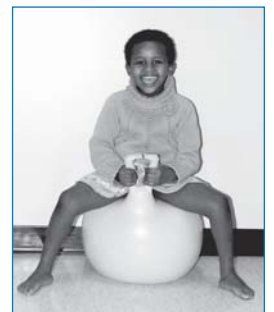
Most children treated in the Ponseti Method will build strength and flexibility through normal movement and activity. If the child has residual tightness or weakness in some muscle groups, the physiotherapist may recommend exercises specific to the concern. For younger children, this may include play activities that incorporate climbing, squatting, or walking on different angles or grades to naturally stimulate balanced use of the muscle groups.

What do the exercises do?

They improve the strength of your child's weaker leg and foot muscles, and stretch out the muscles that are too tight. Exercises also help your child keep up with age-appropriate motor skill development, improve balance, coordination and walking pattern.

When and how often should exercises be done?

Your physiotherapist will help you answer this question specifically for your child. Generally speaking, it is best to set aside a short period of time each day so that your child's exercises become a regular and expected part of the family's daily routine. It can be combined with the nightly ritual of putting on your child's brace, if that works for you. The important thing is to be consistent.



Parent Story: Jillian and Claire



Claire at 1 year old

On the rainy evening when I went into labour with my second child, it all happened so quickly that I thought she would be born in the Burnaby Hospital parking lot. Fortunately we made it to the delivery room in time. My doctor, however, did not. (That's another story.)

Although I didn't see our daughter, Claire, when she was first born, my husband did, and he knew right away that something didn't look right about her left foot. When the doctor finally arrived, she told us Claire had a clubfoot and that it could be fixed with a cast. Oh, "a" cast, I thought. Well, that's fine; like a broken leg the cast will be on for six weeks and then we will be done. Little did I know where our journey would take us.

That was years ago. Today, Claire runs, swims, skates and loves gymnastics. She is "normal". But it took more than just "a" cast to get her this far.

On our first visit to the Royal Columbian Hospital Cast Clinic, Claire was only six days old and I was nervous, exhausted and full of questions. She received a new cast every week and her foot started correcting. Meanwhile, we had to answer strangers' questions about the cast and tell our family all we knew about why this had happened. You will face the same kinds of things.

I was scared when Claire had her tenotomy. At that time it was done during day surgery under a local anesthetic and I was more worried about the anesthetic than the procedure. I know you will be nervous when it's your baby's turn, but you are fortunate that research has changed this procedure so that it's now most often done during your visit to the clinic. After the casts, you move on to boots and bars. When that happens, you will face even more questions from strangers and family. But by now you will be used to them, you'll have more answers and will feel more confident.

The first night with the boots and bars Claire cried every time she tried to turn over and the toe of the boot got caught in the crib railings. I'm not sure how she figured it out but by the second night she slept with only a few interruptions, and was fine after that. Babies are amazing at adapting, and if I could go back and do it again, I would worry less about her ability to handle it all.

Finally, at five years old, she was out of the brace and I thought we were "done," except for occasional visits to the clinic. Unfortunately I was wrong. When Claire was six-and-a-half her foot started turning in again, and I could tell things weren't looking right. Her next visit to the clinic confirmed it, and she went back into a cast. Now she was a big girl with a full leg cast, and I was worried about how she would cope with that. Once again she adapted, and within a week was running in the cast; she even figured out how to do somersaults in it!

Kids are so adaptable. I, however, was wracked with guilt – the relapse must have happened because I didn't force her to exercise every day, or I didn't do the stretches regularly. Eventually I realized that parents are not perfect and that parents of clubfoot babies have a little extra on their plates. For awhile Claire was back in her boots and bars. Although she was old enough to complain, she understood that it was important and wore them without complaint most of the time. Her biggest concern seems to be a desire to wear "pretty girl" shoes; she wants to wear flip flops but forgets that she has two different sized feet and needs her orthotics.

Although having a child with a clubfoot has its challenges, we are grateful that we live in a modern country where this condition can be corrected. My doctor says we are always shocked when things go wrong, but that we should really be shocked when babies are perfect. In the end, we have a wonderful, intelligent and healthy daughter. And she is "normal"!



Claire at 5 years old



Cast at 6 years old



Claire today



Parent Story: Heather and Hayden



My involvement with this booklet comes from a deep passion to help other parents understand the processes, the trials and the triumphs of having a child with clubfoot.

My son was born in June 2005 with bilateral clubfoot. Since there had been no diagnosis of clubfoot prior to his birth, it came as a big surprise! Before we discovered the Ponseti Method of treatment, we were frustrated with how much we didn't know about the whole process. I really needed a booklet such as this!

Royal Columbian Hospital does a huge service for the community and the parents of children with clubfoot by offering this method of treatment via Dr. Pirani, and we are fortunate to have this fabulous team of people available. With the combined efforts of your child's orthopaedic surgeon and the rest of the health care team, you will come away from this experience knowing you have had the best treatment possible for your child. Nothing is more rewarding than the first time you see your child stand up on those two perfect little feet.

During Hayden's early days, we dealt with issues around clothing, equipment and skin problems. Certain clothing did not fit well and some baby equipment was hard to negotiate with either the casts or the brace. Hayden developed some skin rashes under his first casts. On the day of Hayden's tenotomy, I was anxious and nervous. I wondered how much he would cry and if he would experience much pain. I chose to remain in the room to assist in comforting him. The procedure was so fast! Hayden cried, but mostly because he was being held down (at this point he was about six months old – older than most babies are when they have this procedure done) and he was annoyed. He settled down right away once it was over and fell asleep.

Once Hayden was finished with his casting phase, things got much easier with his transition into the boots and bar. I won't lie to you; the first night was rough. He woke up about every 20 minutes and cried, but by the next morning, he was totally fine and he never cried again about the brace. Yes, it was hard to always have him in it for the first little while. I had lots of bruises from accidental whacks. I had to make sure his pants and pajamas snapped all the way open, otherwise the brace would have to be removed for diaper changes and I didn't want to do that every time he needed changing. But before we knew it, his full-time brace wear (23 hours per day) was reduced to 12 to 14 hours a day in the brace. He continued wearing the brace until four years of age and now goes for regular follow up visits with Dr. Pirani.

His development has not been affected at all. He has done pretty much everything on time. He had already figured out how to roll over in casts and clued in straight away with the brace. He crawled as well as stood up in the brace. In fact, one bonus I observed was that as soon as I put the brace on him at night, he begins to rub his eyes and yawn!

If there is some advice I'd like to pass on, it's this: Always trust your instincts as a parent. If you think there is something wrong, there probably is. You know your baby best. Therefore, if you feel there is a problem with a cast, call your doctor right away and remove it if that is advised. An extra week of correction is better than causing your baby distress. Also, parents are the ones responsible for the bracing. If we don't put it on, our child's feet will not stay corrected. All the best in your baby's journey!



Heather and Hayden with Dr. Pirani



Hayden in his brace



Frequently Asked Questions



What causes clubfoot? Is it my fault?

No, it is not your fault. It may be hereditary, it may just happen; there is no proven cause. Feeling guilty is normal and those feelings can persist throughout this journey. Be careful not to let anyone else make you feel guilty. It is hard enough to raise a child even when everything is fine. Remember also that surgery is okay, it helps in all areas of life, and if this is the recommended treatment for your child, that is fine too.

Will my child be normal, look normal, and participate in normal activities?

Yes, your child will look normal. He or she may have one foot smaller than the other, or smaller feet or calf muscles than his or her peers, but these are things that people do not notice. Your baby may start walking a few months later than others, but he or she will be able to participate in all normal activities: swimming, running, jumping, and so much more.



Foot at birth



3 years



5 years



7 years

Photos are of Claire, whose mother helped create this booklet.

What happens when they are older? When are we finished treatment?

Clubfoot children lead normal lives once their feet are corrected. To stop clubfoot from coming back, braces should be worn at night until approximately the fourth birthday (sometimes longer if the doctor indicates). If there is no relapse within the first year or two of not bracing, then you are probably fine. However, follow-up visits may be necessary if one leg is longer than the other, as sometimes doctors recommend surgery to correct leg-length differences. Follow-up is rarely needed after the bones stop growing – usually at age 14 for girls and age 16 for boys.

Will my child have to wear different types of shoes?

If your child only has one clubfoot his or her feet will likely be different sizes. An orthotic can be made to fit the shoe on the clubfoot; this will help hold the foot in a good position and fill the “small” foot area. If your orthotist recommends two different sized shoes, you can save money by buying three sizes of identical runners and then use these to make two mix-matched pairs for your child. Children with bilateral clubfoot can generally wear regular shoes once they're ready for them, although initially, barefoot at home is best for early walkers and perhaps a soft leather slipper-type shoe in colder months.

What will my child's perspective on clubfoot be?

If you treat the clubfoot as a normal part of life, your child will too. Some children need glasses, some need hearing aids, and your child will need a brace for a while. As they get older show them the babies starting out at the clinic so they see they are not alone. If they want to tell their friends about their clubfoot, that is fine. Children are much more accepting, and have fewer worries than adults. Older children requiring a cast may enjoy choosing their own colour, if available, or decorating their cast or brace.



Famous People With Clubfeet



Sandra Schmirler, Olympic Curler

Sandra was born June 11, 1963, with a clubfoot and had to wear a cast for two months. She began curling at the age of 12 and became known as “Schmirler the Curler,” an appropriate nickname as she escalated to greatness, highlighted by skipping her team to a gold medal in the 1998 Olympics in Nagano, Japan. (Sandra passed away in 2000 at the young age of 36, after a six-month battle with cancer.)

Greg Barton, Sprint Kayaker and four-time Olympic Medalist

Greg was born Dec. 2, 1959, with a clubfoot and walked with more difficulty after a surgery that fused some bones. He won two gold medals in the 1988 Seoul Olympics. A member of four consecutive Olympic teams, Greg won the bronze in K-1 (1,000 meters) in 1984 and 1992. It was at the 1988 Games, however, that he stole the show, winning the gold in K-1 (1,000 meters) and then coming back 90 minutes later to team with Norm Bellingham to win the gold in K-2 (1,000 meters).

LeRoy Butler, Green Bay Packers Safety, played in four Pro Bowls

Born July 19, 1968, LeRoy was diagnosed with bilateral clubfoot, when he was unable to crawl at six months of age. Within six months, he had corrective surgery and wore a body cast. When Butler first began to walk, he used corrective shoes, and by the time he reached kindergarten, he used canes with wrist attachments so he could keep his balance. “If I wasn’t in a wheelchair, I had a cast or I used a brace,” LeRoy remembered. It wasn’t until after his 8th birthday that he improved significantly and went on to play professional football.

Jeff Gove, Pro Golfer

Jeff overcame physical ailments that might have made others step lightly around golf. He was born on May 28, 1971, with a clubfoot, and required several surgeries and special orthotics. Today he wears a size 9 shoe on one foot, a size 7 on the other, and a slight limp can be detected in his march down the fairways. It hasn’t affected his golf game!

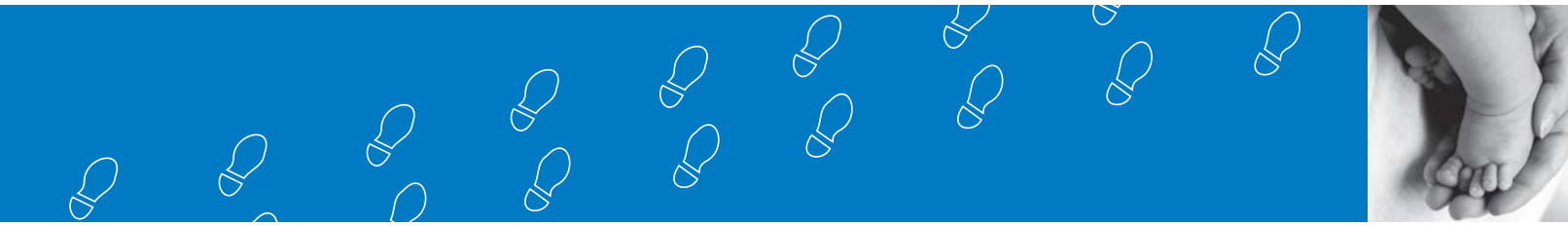
Mia Hamm, Women’s Soccer Player

Born March 17, 1972, with a partial clubfoot, Mia wore casts on her feet when she was a baby to help correct them. When the casts came off, her feet were ready to take on the world. Mia is considered the best all-around and most recognized woman soccer player in the world. She was a member of the gold medal-winning U.S. Women’s National Team at the 1996 Olympic Games, and was named U.S. soccer’s Female Athlete of the Year for three consecutive years from 1994 to 1996, becoming the first player to be honoured three times.

Kristi Yamaguchi, Olympic Figure Skating Gold Medalist

Born July 12, 1971, Kristi is considered a veteran professional. Her professional career is marked by numerous major championship titles and critically acclaimed performances earning her accolades from major sportswriters as the ‘best female skater in the world.’ Born with clubfeet, Kristi now leads a very active life.

Resources



The Canadian Orthopaedic Foundation is Canada's only health charity dedicated solely to helping people maintain and restore their bone and joint, or orthopaedic health.

Below are selected resources that may be of interest, encouragement or comfort to parents. These are just some of the links and resources the Canadian Orthopaedic Foundation lists on its website at www.movepainfree.org. The Foundation has no control over the resources listed, other than its own.

Information and Educational Websites

www.ponseti.info – Through its website the US-based Ponseti International Association promotes the Ponseti Method for the treatment of clubfoot, and provides information for patients.

www.clubfootclub.org – The Clubfoot Club website, maintained by a Canadian mom, provides insight, resources, and stories from the parents' perspective. The Clubfoot Club has a "stories" section with shared experiences from infancy through adulthood.

www.clubfoot.ca – Canadian Clubfoot Support Society

Clubfoot Supplies

www.opsb.com (Ponseti AFO/Mitchell brace)

www.markellshoe.com (Markell boots)

<https://www.semeda.de/english-1/> (ALFA-Flex brace)

Books

"Congenital Clubfoot: Fundamentals of Treatment", Ignacio V. Ponseti

"Homage to Iowa: The Inside Story of Ignacio V. Ponseti", Helena Percas-Ponseti



Glossary of Terms



Abduction

In medicine, the movement of a limb away from the midline of the body. *Abduction* of both legs spreads the legs. The opposite of abduction is adduction. *Adduction* of the legs brings them together.

Achilles Tendon

A tough sinew that attaches the calf muscle to the back of the heel bone. The Achilles tendon is one of the longest tendons in the body. It is also called the *tendo Achilles* or the *tendo calcaneus*, the calcaneus being the heel bone.

Bilateral

Having, or relating to, two sides. Bilateral clubfoot means both feet are affected.

Congenital

Present at birth. A condition that is congenital is one that is present at the time of birth.

Deformity

A change from the normal size or shape of an anatomic structure due to mechanical forces that distort an otherwise normal structure.

Dorsiflexion

The turning of the foot or the toes upward, as when the foot is flexed.

Equinus

Deformity of the foot in which the heel is pulled up and the forefoot is pulled down.

Equinovarus

Similar to equinus, with additional inward turning of the forefoot.

Gastrosoleus Muscles

The calf or *gastrosoleus* is a pair of muscles – the *gastrocnemius* and *soleus* – at the back of the lower human leg. The gastrosoleus complex is connected to the foot through the Achilles tendon.

Idiopathic

Of unknown cause. Any disease that is of uncertain or unknown origin may be termed idiopathic.

In Utero

While you are still pregnant, or the baby is still in the womb.

Ligament

A tough band of connective tissue that connects various structures such as two bones; it comes from the Latin *ligare*, meaning to bind or tie.

Maceration

The word macerate comes from the Latin *macero*, meaning to soften by soaking (in a liquid). If your child's skin becomes wet underneath the casts, maceration can occur and the skin will break down. It is painful and can leave scarring.

Orthopaedics

The branch of surgery broadly concerned with the skeletal system (bones). The term is rooted in the word *ortho*, meaning straight, and the Greek word *paes*, meaning child, and refers to the practice, literally, of straightening the child.

Orthosis (Orthoses, plural)

An external orthopaedic appliance that prevents or assists the movement of the spine or limbs.

Positional

Relating to the position of a baby, or babies, in utero.

Straight-last boots

The boots are made on a straight-last, a shoemaker's model for shaping footwear. A straight-last shoe is symmetrical, relative to a line drawn on the bottom of the shoe from the middle of the heel to the middle of the toe.

Syndromic

Part of a syndrome, a group of symptoms leading to a diagnosis.

Talipes

Clubfoot. The Latin word *talipes* was compounded from *talus* (ankle) and *pes* (foot) since, with the common or classic type of clubfoot (*talipes equinovarus*), the foot is turned in sharply and the person seems to be walking on his or her ankle. *Talipes equinovagus* refers to the malformation of the foot evident at birth in which the heel is elevated like a horse's hoof (*equino-*) and the heel is turned outward (*valgus*).

Tendon

The tissue by which a muscle attaches to bone. A tendon is somewhat flexible, but also fibrous and tough.

Tenotomy

A short procedure that releases the heel cord, or Achilles tendon. A small cut is made into the tendon (near the heel of the foot) with a tiny scalpel. This procedure is done to lengthen the tendon and enable it to function properly when the foot is flexing.

Unilateral

Having, or relating to, one side. In the case of clubfoot, this can be either the left foot or the right foot.

Varus

Angled inward, bent or twisted inward.

Contributors

The Canadian Orthopaedic Foundation gratefully acknowledges the many people who generously contributed their time and knowledge to help create this booklet. A special thank you goes to:



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Ron and Audrey Plaster – Grandparents of Clubfoot Patient, Claire Chateauneuf made a special contribution to this booklet through Audrey's establishing of a memorial fund with proceeds to the Royal Columbian Clubfoot Clinic following Ron's passing in 2004.



Jillian Chateauneuf – Parent of a Child with Clubfoot spearheaded this project, and as a photographer, contributed the photos. "I have learned so much in the journey to correct my daughter's clubfoot and hope that every parent will benefit from the information provided in this booklet."



Heather Cohen – Parent of a Child with Clubfoot Heather also spearheaded the development of the content for this booklet. "As a mother of three, my qualifications include mother's intuition, fierce protection of my children and a "because I'm the Mom" attitude. I am happy to report my son's feet look perfect thanks to Dr. Pirani and the Ponseti Method!"



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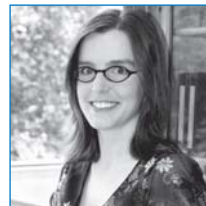
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Your Baby's Milestones



Baby's Name: _____

Significant Dates	
Due date:	_____
Birth date:	_____
Date of first clinic visit:	_____
First cast:	_____
Tenotomy:	_____
Bracing started:	_____
Night-time bracing only:	_____
Bracing discontinued:	_____
Other:	_____

Many doctors assess progress during treatment by measuring a number of 'scores' that indicate the amount of deformity that remains in the foot. Use the table below if you wish to record the Pirani Total Clubfoot Score during treatment.

PIRANI TOTAL CLUBFOOT SCORE (6 = severe deformity, 0 = normal)

	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7
Date							
Left foot							
Right foot							



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