CHU Sainte-Justine
Mother and Child
University Hospital Centre

Université de Montréal

Clubfoot

Information for parents and caregivers

Any expecting parents want their baby to be "normal" and healthy. The announcement, before or after birth, that your child has a clubfoot deformity always comes as a big and unpleasant surprise. However, once the diagnosis is announced, try not to let the news, or feelings of guilt, get you down: focus on the joy of your child-to-be or your newborn baby.

Take time to look for information about clubfoot and about the treatments to come. In most cases, your child will walk normally, will not limp or need to wear orthopedic shoes. He/she will participate in sports and will not be made fun of at school.

For the first few months, your child will be treated with castings changed weekly. A minor procedure called an Achilles tenotomy might be necessary to release the Achilles tendon and complete the correction. Then a foot-abduction brace, consisting of boots attached to a bar, will be prescribed. Initially worn full time, it will eventually need to be worn only at night once your child starts walking, and then until he/she reaches 4 to 5 years of age.

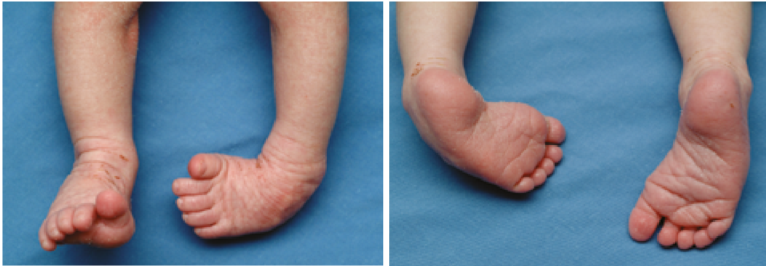
This brace is a very important part of the treatment, being the best way to prevent any recurrence of the deformity!

The treatment of clubfoot is demanding. Throughout this period, you will no doubt face scrutiny from others; these people may stare or ask questions but you will find that they are most often just curious and are rarely unkind. Soon enough, the challenges of the first few months will be nothing more than a distant memory!

In this leaflet, you will find information on clubfoot and how it is treated using the Ponseti Method. You will also find some tips from parents to ease your journey through the treatment.

What is clubfoot?

Clubfoot is a complex deformity readily apparent at birth, affecting the entire foot (rotated inward), the ankle (pointing downward), and the calf (underdeveloped); these can be either unilateral (1 foot) or bilateral (both feet).



The medical term is **congenital idiopathic talipes equinovarus or clubfoot.**

Club means forming a clublike mass

Varus means turned in

Equino means pointed downwards

Congenital means present before birth (but not necessarily hereditary)

Idiopathic means the actual cause is not known

More precisely, it means:

- incorrect positions of the bones of the foot and ankle in relation to one another
- bone deformations
- distorsion and incorrect direction of joint surfaces
- joint stiffness due to muscle, tendon, and ligament retraction

It is impossible to document the severity of your baby's clubfoot and predict its outcome during a prenatal ultrasound as the foot needs to be examined to quantify the extent of the stiffness and deformity.

What causes clubfoot?

Although there are many theories, the actual cause is not known. Clubfoot is among the most common of birth defects. Worldwide, 1 to 2 babies in a thousand are born with this foot deformity. Boys are more commonly affected than girls (ratio 2:1). Both feet are affected in half of the cases.

Every year, more than 70 new cases of clubfoot are treated at the CHU Sainte-Justine.

Is clubfoot hereditary?

Yes, the defect can sometimes be:

- more frequent in some families (father and/or mother and/or a sibling affected with a clubfoot)
- more frequent in certain ethnic groups
- associated with disease of the nervous system (spina bifida)
- associated with certain genetic disorders

What are the long-term consequences?

Clubfoot responds well to treatment! In most cases, children born with clubfeet will be capable of achieving a normal active life and will be able to participate in most sports or leisure activities.

When corrected, the foot remains slightly different in size and shape from a normal foot but can be fit in standard shoes.

For children with only one foot affected, the leg involved is often smaller in size below the knee, and slightly shorter. The foot will usually be up to one size smaller.

The calf could be a little weaker. Although your child might not grow up to be a champion in running or in any sport requiring strong propulsion, you will be surprised by his/her achievements!

Clubfeet have a stubborn tendency to relapse and your child will be monitored regularly until fully grown. Long term bracing is the best way to minimize such relapses.

The main cause for recurrence is linked to non-compliance with regards to the bracing protocol!

Certain additional treatments will sometimes be suggested if the deformity comes back, most of the time through non-surgical procedures.

How is clubfoot treated at our center?

Your baby will be seen at the CHU Sainte-Justine, in the clubfoot clinic by the team of specialists from the Orthopedic Department. The initial assessment and subsequent treatments will be provided alternately by the specialized pediatric orthopedic surgeons assigned to the clinic. The clubfoot treatment protocol used at the CHU Sainte-Justine follows the Ponseti Method.

Our clubfoot clinics are scheduled in the afternoon, 2 or 3 times a week.

Clubfoot treatment is done in 3 phases and ideally begins within a few weeks of your baby's life. At the initial visit, we will question you about your pregnancy

and the birth of the child. You will be asked to refer to the baby's health record: please bring it with you. Your baby will then be examined thoroughly from head to toe.

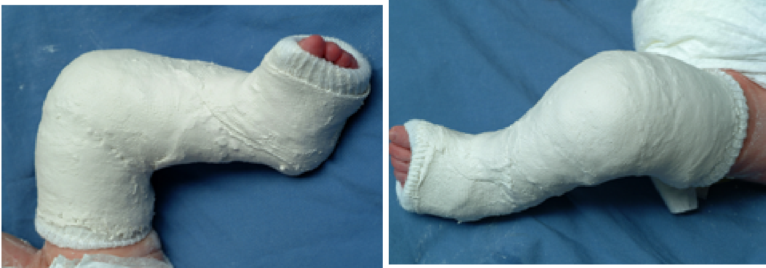
During the foot assessment, the rigidity of the deformity will be tested and scored by gradually manipulating the foot into a more normal position. This part of the examination may cause your child some discomfort but is necessary. The first cast is usually put at the end of this initial visit, if the foot is large enough to allow it. Otherwise treatment may be postponed 2 to 4 weeks.

Your child will then be seen in one of the Clubfoot clinics for serial castings, on a weekly basis for the first 2 to 3 months, or until full correction is achieved. You will notice slight variations in the treatment, depending on the technical preference of the orthopedic surgeon and the outcome of the correction week to week.

Long-term treatment with a foot abduction brace (boots and derotation bar) follows, to prevent relapses, until the child reaches at least four years of age. Visits will be spread out every 3 to 6 months at first, then on a yearly basis, until treatment is over.

Surveillance to monitor the outcome at the end of the active treatment, and to address relapses, will be necessary until your child's foot is fully grown.

1st phase: Correction by casting



Specific gentle manipulations to align the foot in a more normal position and to stretch the retracted tissues are used before the cast is applied. These manipulations are not a surgical procedure and are not intended to "break" the foot.

Following the manipulations, a long leg cast is applied to allow the soft bones to "set" in the position obtained by the manipulations. The shape of the cast, therefore, will be different from one week to the other. It's a two-step procedure, firstly done up to the knee, then up to the thigh, with the knee bent to prevent the cast from slipping. This long leg cast also enables control of the foot and leg rotation.

To ensure good maintenance of the correction, the casts are tightly fitted to the leg and foot. Some localized redness or little superficial pressure points are therefore expected at cast changes. They usually resolve spontaneously and most of the time do not compromise the outcome.

Serial manipulations and casting are done on a weekly basis until full correction is achieved or until a plateau has been reached. A minor procedure, done in the clinic to lengthen the Achilles tendon (tenotomy), will be necessary in most cases, to get full correction. A cast after the tenotomy stays on for a total of 4 weeks (2 x 2 weeks).

This first phase usually last 8 to 12 weeks. Difficult clubfeet sometimes need more casts.

A foot ultrasound might be requested at the beginning of the treatment to document the deformity. An occasional X-ray check might be necessary for older children. These additional tests are useful but not essential to the care of your child. Your orthopedic surgeon will judge the need for such modalities and their frequency.

What to check after cast application

Colour of the toes

As the cast dries, it gets warm for a few minutes. Toes sometimes become purple during this period. Once the plaster cools down, toes revert to their normal colour; they should become the same colour as the rest of the body.

Swelling of the toes

The foot being kept in a new position, vessels are stretched, and the blood flow will take some time to adapt to this new position. It is therefore always important to keep the casts up, to allow proper blood circulation. This prevents the toes from swelling and becoming purple or white. If, despite maintaining the legs up, the toes remain white or blueish, you should immediately contact the cast technicians, your orthopedic surgeon or the on-call orthopedic resident. They will advise you on what to do.

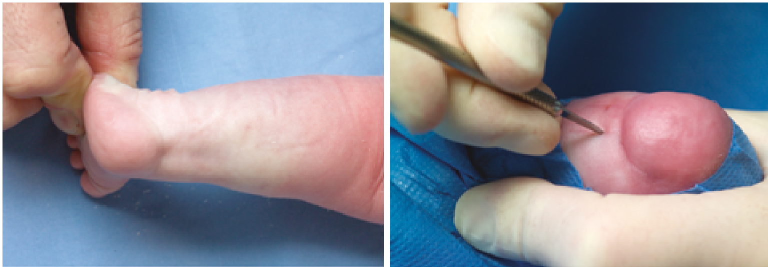
Position of the toes

Once the cast is applied, all toes should be easily seen. If you feel that the toes have “disappeared”, this means the foot has slipped into the cast and is no longer in the correct position. There is a risk of losing the correction achieved up to that point and the cast could hurt your baby. You should promptly make an appointment in the clinic, as the cast needs to be changed.

Tips for parents

- The initial visit with the orthopedics team is often perceived as more frightening than it really is. This is due to the fatigue following childbirth and postpartum emotional fragility. It is best if you do not come to the hospital alone for the first few weeks. Your spouse, a relative, or a friend will offer tremendous support.
- Manipulation and casting of the foot may be unpleasant for your baby; ensuring he/she is not hungry will make him/her more comfortable throughout the procedure. As it might be more difficult to feed your baby during the treatment, plan to arrive a little earlier and feed your child in the waiting room or the nursing room adjacent to the cast room. A well-fed baby is a relaxed baby! You can give Acetaminophen in dosages recommended for your child's body weight, 15 to 30 minutes before treatment. It will improve comfort during manipulation. Sucrose orally is offered during the procedure and is a safe and effective tool to improve your baby's well being during the first few weeks of treatment.
- The treatment day is always a very tiring event for your baby! It is normal for him/her to sleep more in the next 24 hours. The new position of the foot may also be uncomfortable, and your child may be miserable in the hours following the appointment. Acetaminophen in dosages and frequency recommended for your child's body weight can help relieve this discomfort. However, your baby should not be inconsolable! If this occurs contact us.
- Some babies will ask to feed more often in the hours following a cast application: this is quite normal! Do not hesitate to feed your child as often as necessary: he/she is probably hungry after all this effort!
- Your baby should lie on his/her back with a small pillow or flannel blanket folded under his/her feet (around 5 cm thick) to ensure his/her feet are raised up. Bottle or breastfeeding should be done in that position. Never put your child standing upright on his/her cast or hold him/her vertically with his/her legs hanging downwards, as the cast might slip!
- At each visit, you will be offered to give your child a bath and weigh him/her. Do not forget to bring in diapers, spare clothes, moisturizing cream, and soap as necessary.
- Most baby clothes adapt to casts. However, make sure they are large enough and the foot seen easily, to monitor the colour of the toes.
- **Keep cast clean and dry!** As the casts are not waterproof, you will need to wash your baby with a washcloth, never in the bathtub!
- If your baby needs to be weighed during a visit to the pediatrician, weigh him/her with the cast. At the next follow-up visit in the clubfoot clinic, ask for the weight of the cast, once it has been removed. You can then calculate the child's actual weight. A long cast applied on a 7 to 9-month old baby weighs around 150 g (around 5 ounces).

2nd phase: The tenotomy



In a clubfoot, the Achilles tendon (the tendon connecting the calf to the heel bone) is often resistant to stretching. To achieve full correction of the foot, a minor procedure called a tenotomy is necessary. This is a safe, short surgical procedure usually performed in the outpatient clinic between the 5th and 8th week, to sever the Achilles tendon. As the heel goes down, the tendon regrows in its new length. During the procedure, you will have to stay in the waiting room as the tenotomy requires a sterile technique. In an older child, the tenotomy will be done in the operating room under general anesthesia. Following the tenotomy, long leg casts will be required, generally for a period of 4 weeks (2 X 2 weeks). These casts help to maintain or even gain more correction while the tendon heels. Your baby will then be ready for the next phase!

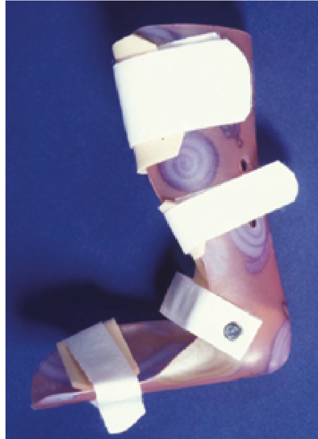
A minority of babies with clubfeet will not require a tenotomy and after the fully corrected feet have been maintained in long leg casts for a total of 4 more weeks (2 x 2 weeks), they will go straight to the foot abduction brace (boots and derotation bar).

3nd phase: the foot-abduction brace (boots and derotation bar)

Clubfeet tend to relapse after casting is over. A brace holding the feet in the corrected position will be necessary after the last cast is removed. The brace consists of two straight or flared ankle boots, connected to a metal bar called a derotation bar. It maintains the foot corrected by exerting an upward and outward pressure.

With careful respect to the daily recommended wear, this simple device is over 90% effective in maintaining the correction and preventing relapses.

The ankle boots and bar brace need to be worn initially 23 hours a day until your child starts crawling. Time in brace is then reduced to 18hrs a day until walking age. Afterwards the brace is worn during nighttime and naps until your child is approximately four years old. There might be some variation in the timeline during bracing depending on the severity of the clubfoot and its tendency to relapse: the decision is made by the orthopedic team in charge of you child.



In some specific circumstances, a plastic brace is used to maintain correction: it is a plastic splint shaped like a half-cast extending to the knee. It is molded into the corrected position of the foot and serves to maintain this correction. It generally needs to be changed every 3 months. This brace may be attached to a derotation bar.

As your child grows the deformity may recur and will usually be addressed by returning to serial castings for some time. Occasionally, a more extensive surgical procedure might be necessary.

The orthotist is a trained professional in charge of providing the foot abduction brace and will explain to you how to fit the feet in the boots and bar brace. Blisters due to pressure points and lost of correction can both occur rapidly when a foot is incorrectly positioned in the boot not thightened enough or if the boots are getting too small. Do not hesitate to contact our team if you have cause for concern.

The foot abduction brace is the most important way to prevent relapses. It will not delay your child's development significantly. However, not wearing the brace might significantly compromise the correction of the clubfoot and your child's capability to play and function normally!

Tips for parents

- **Socks**

  Your child should wear thin long socks under the brace, preferably made of cotton. This prevents skin irritation. Make sure there is no wrinkles and that the toes are not curled under.

- **Pyjamas**

  Open-toe sleepers are more convenient with the foot abduction brace, but slightly larger toed-sleepers can be used over the boots when a slit is cut from the last snap to allow access to the bar attachment.

  A regular toed sleeper can be use over plastic braces if not attached to the bar.

- **Shoes**

  Normal shoes are fine for the child to wear when not wearing the brace.

4th phase: Surgery

It is sometime not possible to achieve full correction of the foot by cast only. As well, a deformity may occasionally recur that cannot be corrected anymore with further casts. A surgical procedure may be suggested, either another tenotomy or a more extensive operation called a posterior release or postero-medial release. In older children, it is sometimes necessary to undertake a tendon transfer procedure to improve the position of the foot when walking.

Summary

Treatment of clubfoot is a “multi disciplinary affair” and requires close collaboration between you, the cast technicians, the orthotist and the orthopedic surgeon’s team. It is a very demanding process for you and your child, but the results are well worth it! Once your child’s foot is corrected, your child should catch up any delay in development that he/she might have suffered, and much faster than you would have hoped!

There is obviously no single, absolute recipe for obtaining a proper clubfoot correction but the goal remains the same for every child: to reach a correction good enough for your child to walk, run, and jump like any other children. And this is achievable!

What is the cost of treatment?

In the province of Quebec, treatment with serial castings, surgical procedures (when necessary), the plastic braces (orthotics) as well as the derotation bar are covered by the Quebec health insurance plan (RAMQ). Recently the cost of the boots for clubfoot treatment has been approved for government coverage.

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For more information:

For any questions during opening hours, call the cast room at
514 345-4931, extension 5998
The cast technician assigned to the clubfoot clinic will take your call.

You can also e-mail us at:
orthopedie.hsj@ssss.gouv.qc.ca

The opening hours are as follows:
Monday to Friday, from 8 am to 6 pm

For emergencies outside these hours:
contact the Sainte-Justine Switchboard Operator at
514 345-4931
and ask to speak with the
Network Activity Center (CCAR)'s nurse.

Website resources:

www.orthoconnect.org
www.whenithurtstomove.org
www.ponseti.info
www.piedbot.net
http://piedbot.ifrance.com/ponseti.htm
http://www.uihealthcare.com

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