General Information on Clubfoot

Before Treatment

Parents of an infant born with clubfoot can be reassured that their babies, if otherwise normal, when treated by expert hands, will have normal looking feet with normal function for all practical purposes. The well-treated clubfoot, like those of the 2-year-old girl shown here, has no handicap and is fully able to live a normal active life.

Overview of Management

The majority of clubfeet can be corrected in infancy in approximately 6 weeks with the proper gentle manipulations and plaster casts (below). The treatment is based on sound understanding of the functional anatomy of the foot and of the biological response of muscles, ligaments, tendons, and cartilage to the corrective positional changes obtained by manipulation and casting.

Severe Clubfoot

Fewer than 5% of infants born with clubfoot may have very severe, short, plump feet with stiff ligaments that are unyielding to stretching. These babies may need surgical correction. However, the results are better if bone and joint surgery can be avoided altogether. Clubfoot surgery invariably leads to scarring, stiffness, and muscle weakness, which becomes more severe and disabling after adolescence.

Starting Treatment

The treatment should begin during the first week or two of life to take advantage of the favorable elasticity of the tissues forming the ligaments, joint capsules, and tendons. These structures are stretched with weekly gentle manipulations. An above-knee plaster cast is applied after each weekly session to retain the degree of correction obtained and to soften the ligaments. Thereby, the displaced bones are gradually brought into correct alignment.

Duration of Active Treatment

Five to seven plaster casts extending from the toes to the upper thigh with the knees at a right angle should be sufficient to correct the clubfoot deformity. Even very stiff feet require no more than eight or nine plaster casts to obtain maximum correction. Before applying the last plaster cast, the Achilles tendon is often cut in an office procedure to complete the correction of the foot. By the time the cast is removed 3 to 4 weeks after the heel cord lengthening, the tendon has regenerated to a proper length. After the end of the treatment, the foot should appear overcorrected. However, it will return to normal in a few weeks. Because the surgeon can feel with his/her fingers the position of the bones and the degree of correction, radiographs of the feet are not necessary except in complex cases.

Abduction Brace

After correction, clubfoot deformity tends to relapse. To prevent relapses, after the last plaster cast is removed, a foot abduction brace must be worn full-time for 2 to 3 months and thereafter at night for 2 to 4 years. The brace consists of high-top open toed shoes attached to the ends of a bar, with the shoes rotated out approximately 70 degrees. The length of the bar equals the width of the baby's shoulders. A strip of plastizote must be glued inside the counter of the shoe, above the baby's heel to prevent the shoe from slipping off. The baby may feel uncomfortable at first when trying to alternately kick the legs. However, the baby soon learns to kick both legs simultaneously and feels comfortable. In children with only one clubfoot, the shoe for the normal foot is fixed on the bar in 40 degrees of external rotation. During the daytime, the child wears regular shoes.

Relapse

When the deformity relapses, further weekly manipulations are performed and plaster casts are applied. Occasionally, another percutaneous Achilles tenotomy may need to be performed. In some cases, despite proper bracing, a simple operation may be needed when the child is older than 2 years to prevent further relapses. The operation consists of transferring the anterior tibialis tendon to the third cuneiform.

Find Experience Doctors

Surgeons with limited experience in the treatment of clubfoot should not attempt to correct the deformity. They may succeed in correcting mild clubfoot, but severe cases require experienced hands. Referral to a center with expertise in the nonsurgical correction of clubfoot should be sought before considering surgery. Poorly conducted manipulations and casting will further compound the clubfoot deformity rather than correct it, making treatment difficult or impossible.

After Cast Application

Your child's foot has been placed in a cast to begin to correct the turning in of his/her foot and to prevent future deformity. Your baby may be restless, but he/she should be comfortable after a time. Please consider the following.

1. **Check the circulation** in the foot every hour for the first 12 hours after application and then four- times a day. This is done by pinching the toes and watching the return flow of blood. The toes will turn white and then quickly return to pink if the blood flow to the foot is good. This is called blanching. If the toes are dark and cold and do not blanch (white to pink) the cast may be too tight. If this occurs, call your local doctor, emergency department, or orthopaedic clinic staff and ask them to check the cast.

2. **The top of the toes should be exposed**. If you cannot see the toes, it may mean the cast has slipped and correct reduction is not being maintained. Call the orthopaedic clinic immediately, and tell the doctor that you cannot see your baby's toes.

3. **Keep the cast clean and dry.** The cast may be wiped with a slightly dampened cloth if it becomes soiled.

4. **The wet cast should be placed on a pillow** or soft pad (hard surfaces may dent wet plaster). Whenever your child is on his/her back, place a pillow under the cast to elevate the leg so that the heel extends just beyond the pillow. This prevents pressure on the heel, that could cause a sore.

5. **Use disposable diapers** and change the baby often to prevent cast soiling. Apply the diaper above the top of the cast to prevent urine/stool from getting inside the cast. Diapers with elasticized legs work well.

Notify your doctor or the clinic nurse if you notice any of the following.

- any drainage on the cast
- any foul smelling odors coming from inside the cast
- skin at the edges of the cast becoming very red, sore, or irritated
- child running a fever of 38.5°C/101.3°F or higher without an explainable reason, such as a cold or virus

A new cast will be applied every 5 to 7 days. The nurse will remove the cast with a special plaster knife; therefore, the cast must be softened the day you are coming to the clinic. To do this, put your child in a tub or sink, making sure that warm water is getting inside the cast (about 15—20 minutes). After the bath, wrap a soaking wet hand towel around the cast and cover with a plastic bag. A bread sack works well for this.

After removal of the last cast and to prevent relapse, the baby will be fitted with a night brace (foot abduction brace consisting of shoes attached to a metal bar). The brace will be worn 23 hours a day for 3 months and thereafter at night and during naps for an additional 2 to 4 years. The first and second nights of wearing the brace, the baby may be uncomfortable, but it is important that the brace not be removed. After the second night, the baby will adapt to the splint. Relapses will almost invariably occur if the splint is not worn as prescribed. Once the brace is removed, ordinary shoes can be worn. Yearly visits will be scheduled for 8 to 10 years to check for possible relapses.

Set Up Brace

The brace will be set up for you by your orthotist, but you may be responsible for changing the shoes and widening the bar as your child grows. Change the shoes only when the baby's toes completely curl over the edge of the shoe. The forefoot adduction (inward curving) usually does not recur, so waiting will not affect the correction but will save you money. If you do not know what size shoes were used on the bar, measure the length of the shoe and contact your orthotist. New shoes will be two sizes larger than the current shoes. You may contact your local orthotist to order new straight last shoes for the foot abduction brace. Screws are used on the bottoms of the shoes to attach the shoes to the foot- plate on the bar. Mark the joints on the bar before changing the shoes to ensure a return to the proper alignment. Attach the shoes with the buckles toward the inside. You should adjust the width of the bar at this time. Measure the distance between the outside of the shoulders, this will be equal to the distance between the center heel screws in the shoe; lengthen the bar to match your measurements. Mark a line for the location of the toes the first time the shoes are worn to indicate that the heel is down.

Helpful Hints

1. **Expect your child to fuss** in the brace for the first 2 days. This is not because the brace is painful but because it is something new and different.

2. **Play with your child** in the brace. This is key to getting over the irritability quickly. The child is unable to move his/her legs independently of each other. You must teach your child that he/she can kick and swing the legs simultaneously with the brace on. You can do this by gently flexing and extending the knees by pushing and pulling on the bar of the brace.

3. **Make it routine**. Children do better if you make this treatment a routine in your life. During the 3 to 4 years of night and nap time wear, put the brace on any time your child goes to the "sleeping spot." The child will know that when it is that time of day, the brace needs to be worn. Your child is less likely to fuss if you make the use of this brace a part of the daily routine.

4. **Pad the bar.** A bicycle handlebar pad works well for this. By padding the bar, you will pro tect your child, yourself, and your furniture from being hit by the bar when the child is wearing it.

5. **Never use lotion on any red spots** on the skin. Lotion makes the problem worse. Some redness is normal with use. Bright red spots or blisters, especially on the back of the heel, usually indicate that the shoe was not worn tightly enough. Make sure that the heel stays down in the shoe. If you notice any bright red spots or blistering, contact your physician.

6. **If your child continues to escape** from the brace, and the heel is not down in the shoe, try the following.

   a. Tighten the strap by one more hole.
   b. Tighten the laces.
   c. Remove the tongue of the shoe (use of the brace without the tongue will not harm your child).
   d. Try lacing the shoes from top to bottom, so that the bow is by the toes.

7. **Periodically tighten the screws on the bar.** Tools have been provided.

Instructions for Brace Use

The foot abduction brace is used only after the clubfoot has been completely corrected by manipulation and serial casting. Even when well corrected, the clubfoot has a tendency to relapse until the age of approximately 4 years. The foot abduction brace, which is the only successful method of preventing a relapse when used consistently as described herein, is effective in 90% of the patients. Use of the brace will not delay your child's sitting, crawling, or walking.

Foot Abduction Brace

The brace consists of an adjustable aluminum bar with adjustable footplates to which straight last shoes attach. The orientation of the footplates to the bar is set by the orthotist. The shoes are straight last, meaning they can go on either foot, but the shoes are set up with the buckles on the inside, so that you do not have to turn the baby over to tighten the straps and laces. The foot strap is the key to this device; it does not matter if the strap goes through the top or bottom holes on the sides of the shoe. On the inside of the shoe, above the heel, there is a pink pad that creates an area for a normal heel to develop and grow into; it also helps to prevent the heel from coming out of the shoe.

Wearing Schedule

Use the brace once the last set of casts is removed. The infant wears the brace for 23 hours a day for the first 3 months after cast removal. The brace is removed only for baths. For the next 3 to 4 years, the brace is used at night and nap time only. Your physician will decide on the duration of bracing depending upon the clubfoot severity. However, do not end treatment early. If you are unsure, ask your doctor.

Wearing Instructions

1. Always use cotton socks that cover the foot everywhere the shoe touches the baby's foot and leg. Your baby's skin may be sensitive after the last casting, so you may want to use two pairs of socks for the first 2 days only. After the second day, use only one pair of socks.
2. If your child does not fuss when you put the brace on, you may want to focus on getting the worst foot in first and the better one in second. However, if your baby tends to kick a lot when putting on the brace, focus on the better foot first, because the baby will tend to kick into the second shoe.
3. Hold the foot into the shoe and tighten the strap first. The strap helps keep the heel firmly down into the shoe. Do not mark the hole on the strap that you use, because with use, the leather strap will stretch and your mark will become meaningless.
4. Check that the child's heel is down in the shoe by pulling up and down on the lower leg. If the toes move backward and forward, the heel is not down, so you must retighten the strap. A line should be on the insole of the shoe, indicating the location of the child's toes; the toes will be at or beyond this line if the heel is down.
5. Lace the shoes tightly, but do not cut off circulation. Remember: the strap is the most important part. The laces are used to help hold the foot in the shoe.
6. Be sure all the baby's toes are out straight and that none of them are bent under. Until you are certain of this, you may want to cut the toe portion out of a pair of socks so you can clearly see all the toes.

Common Questions

What causes clubfoot?

Parents may be concerned that they have done something wrong and caused their child's clubfoot. Doctors agree that clubfoot is not caused by anything the family did or did not do.

The cause of clubfoot is not exactly known. Doctors know that clubfoot is more common in certain families. The usual incidence of clubfoot is about 1 in 1,000 births. The chances of having a second child with clubfoot is approximately 1 in 30. In summary, there is no reason for parents to feel guilty about having a child with clubfoot.

What is the future for children with clubfoot?

The child with a clubfoot corrected by Ponseti management can be expected to have a nearly normal foot. Some minor effects may be noticed.

Size difference

The treated clubfoot is often very slightly smaller than the normal foot. There may be a slight reduction in the size of the calf. How much reduction depends on the original severity of the clubfoot. No significant shortening of the leg occurs.

Subtle differences do not cause any problem and often go unnoticed by the child. During adolescence, when people become very concerned about body image, this slight difference may be noticed, but is usually forgotten in a year or two.

Sports

Outcome studies of patients treated by Ponseti management show that children and adults with corrected clubfoot may participate in athletics like anyone else. We know many excellent athletes who have corrected clubfoot.

Family Resources

Parent Groups

International: The main Ponseti managment parents' support group has 384 members:

http://groups.yahoo.com/group/nosurgery4clubfoot

United Kingdom: STEPS charity group:

http://www.steps-charity.org.uk/forum/home.html

France: Hospital Debrosse, Lynon; Ponseti-specific site:

http://ifrance.com/piedbot/

Germany: Iris and Stephan's Klumpfuss Info:

http://www.klumpfuss-info.de/

Finland: Kampurat:

http://groups.yahoo.com/group/kampurat/

Portugal: Pe Boto; Ponseti-specific:

http://www.peboto.grupos.com.pt/

Brazil: Pe Torto; Ponseti-specific:

http://www.petorto.com.br/

Additional Links

University of Iowa:

http://www.uihealthcare.com/news/pacemaker/2002/fall/ponseti.html

Dr. Ponseti's Web Site:

http://www.vh.org/pediatric/patient/orthopaedics/clubfoot/index.html

Parent Support Group:

http://groups.yahoo.com/group/clubfoot

Support Bulletin Board:

http://messageboards.ivillage.com/iv-ppclubfoot

Sites Showing Treatment

Graham's Treatment:

http://www.datahaus.net/family/Graham/CF/

Rose's Treatment:

http://community-2.webtv.net/joybelle15/ROSESCLUBFOOTPAGE

Cotton Family:

http://members.aol.com/vc11/

Other Links

John Mitchell: makes clubfoot models for teaching:

http://www.mdanatomical.com

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