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Talipes Equinovarus

**TABLE OF CONTENTS**

**DEFINITION**

**TYPES**

**CAUSES**

**PATHOPHYSIOLOGY**

**CLINICAL MANIFESTATION**

**DIAGNOSTIC EVALUATION**

**MEDICAL MANAGEMENT**

**NURSING MANAGEMENT**

**COMPLICATIONS**

**Definition**

Talipes equinovarus, sometimes called clubfoot, is characterized by plantar flexion, inward tilting of the heel (from the midline of the leg), and adduction of the forefoot (medial deviation away from the leg’s vertical axis).

Clubfoot, also known as talipes equinovarus (TEV), is a common foot abnormality, in which the foot points downward and inward. The condition is present at birth, and involves the foot and lower leg.

**Causes of talipes equinovarus**

1. Intrinsic(genetic)

2. Extrinsic factors (intrauterine environment)

3. Pressure theories: Abnormal fetal positioning, constriction bands etc.

4. Drugs: Salicylate use in first trimester, Prenatal exposure to barbiturates, Maternal alcohol consumption etc.

5. Postural: Due to abnormal intrauterine position.

6. Temperature: Infective pathogens (enteroviruses)

7. Electromagnetic radiation

8. Vascular theory: Hypoplasia or absence of the anterior tibial artey,

9. Maternal disorders e.g Maternal anaemia, Maternal hyperemesis, Thyroid disorders etc

10. Generalized disorder of development of limb.

**Classification**

Not all Clubfeet are the same and it is important that all people treating clubfoot use the same terms to describe the different types. Each type of clubfoot has unique characteristics and may need specific treatment. Early recognition of the type of clubfoot one is dealing with can help guide appropriate treatment. Although there is no universal classification system for clubfoot, clubfoot can be classified according to the nature of the deformity:

**Positional Clubfoot**

Positional clubfoot refers to a flexible foot that was held over time in an abnormal position in utero. When the child is born, due to the prolonged positioning, they may present with one or both feet in an atypical resting position. Children with positional clubfoot typically exhibit unrestricted passive range of motion of forefoot and ankle. The foot at the time of birth has some deformity but bony alignment is not impacted and foot position is likely corrected through conservative treatment involving a program of stretching, range of motion, and weight bearing. In a small number of cases post conservative treatment the foot needs 1 or 2 Casts to ensure they are maintained in a corrected position although in the majority of cases these feet usually correct well and do not lead to any long lasting, significant impairment.

**Idiopathic Clubfoot**

Most commonly, clubfoot is classified as “Idiopathic Clubfoot” meaning there is no known cause for the deformity. In idiopathic clubfoot, there can also be a definite hereditary influence, in that if a person has a relative, parent, or sibling has clubfoot, then they are more likely to have clubfoot or have a child with it (3-10% chance). Within the group of idiopathic clubfeet there is a wide spectrum of impairment depending on severity, as well as whether the clubfoot has been untreated, partially treated, poorly treated, or successfully treated. These are outlined by the Arica Clubfoot Training as follows:

**Untreated Clubfoot :** all clubfeet from birth up to 2 years of age that have had very little or no treatment can be considered as untreated clubfeet.

Treated Clubfoot - untreated clubfeet that have been corrected with Ponseti treatment are termed “treated clubfeet”. Treated clubfeet are usually braced full-time for 3 months and at night up to age 4 or 5 years.

**Recurrent Clubfoot :**this is a clubfoot which has achieved a good result with Ponseti treatment, but the deformity has recurred. The commonest reason is due to abandoning the braces early.

**Neglected Clubfoot :** the neglected clubfoot is a clubfoot in a child older than 2 years, where little or no treatment has been performed. The neglected clubfoot may respond to Ponseti treatment, but also may have bony deformity that requires surgical correction.

Complex Clubfoot - any foot with deformity that has received any type of treatment other than the Ponseti method may have added complexity because of additional pathology or scarring from surgery.

**Resistant Clubfoot** : this is a clubfoot where Ponseti treatment has been correctly performed but there has been no significant improvement. It is often found that this type of clubfoot is not in fact idiopathic after all and is secondary or syndromic.

**“Atypical” Clubfoot :** It involves a foot that is often swollen, has a plantar flexed first metatarsal and an extended big toe. It can occur spontaneously but most often occurs after slippage of a cast.

Secondary Clubfoot

**Secondary clubfoot**, on the other hand, occurs when there is another disease or condition that is causing or linked to the development of clubfoot. Such conditions are usually Neurological such as Spina Bifida associated with concurrent sensory and or motor impairments or Syndromic Disorders such as Arthrogryposis associated with more global findings and involvement of other musculoskeletal issues.

Pathophysiology

Various theories of the pathogenesis of clubfeet have been advanced, including the following:

• Arrest of fetal development in the fibular stage

• Defective cartilaginous anlage of the talus

• Neurogenic factors

• Retracting fibrosis

• Anomalous tendon insertions

• Seasonal variations

With respect to neurogenic factors, histochemical abnormalities have been found in posteromedial and peroneal muscle groups of patients with clubfeet. This is postulated to be due to innervations changes in intrauterine life secondary to a neurologic event, such as a stroke leading to mild hemiparesis or paraparesis. This is further supported by a 35% incidence of varus and equinovarus deformity in [spina bifida](http://emedicine.medscape.com/article/311113-overview).

Retracting fibrosis (or myofibrosis) may occur secondary to increased fibrous tissue in muscles and ligaments. In fetal and cadaveric studies, Ponseti also found the collagen in all of the ligamentous and tendinous structures (except the Achilles [calcaneal] tendon), and it was very loosely crimped and could be stretched.The Achilles tendon, on the other hand, was made up of tightly crimped collagen and was resistant to stretching. Zimny et al found myoblasts in medial fascia on electron microscopy and postulated that they cause medial contracture.

Inclan proposed that anomalous tendon insertions result in clubfeet.However, other studies have not supported this proposal. It is more likely that the distorted clubfoot anatomy can make it appear that tendon insertions are anomalous.

Robertson noted seasonal variations to be a factor in his epidemiologic studies in developing countries.This coincided with a similar variation in the incidence of poliomyelitis in the children in the community. Clubfoot was therefore proposed to be a sequela of antenatal polio like condition. This theory was further supported by motor neuron changes in the anterior horn in the spinal cord of these babies.

**CLINICAL MANIFESTATIONS OF TALIPES EQUINOVARUS**

Most infants who have clubfoot have no identifiable genetic, syndromal, or extrinsic cause. Some of the clinical manifestations are;

• **Foot abnormality:**The ankle is in equinus, and the foot is supinated (varus) and adducted (a normal infant foot usually can be dorsiflexed and everted, so that the foot touches the anterior tibia).

• **Bone displacement:** The navicular is displaced medially, as is the cuboid.

• **Contractures:** Contractures of the medial plantar soft tissues are present; not only is the calcaneus in a position of equinus, but also the anterior aspect is rotated medially and the posterior aspect laterally.

• **Empty heel:** The heel is small and empty; the heel feels soft to the touch (akin to the feel of the cheeks); as the treatment progresses, it fills in and develops a firmer feel (akin to the feel of the nose or of the chin).

**Diagnostic evaluation of talipes equinovarus**

Clubfoot is diagnosed through physical examination. Typically, babies are examined from head-to-toe shortly after they are born. There are four components of the clubfoot deformity:

Factors used to assess severity include the stiffness of the deformity (how much it can be corrected by manually manipulating the foot), the presence of skin creases at the arch and heel, and poor muscle consistency.

Sometimes, it is possible to detect clubfoot before birth using ultrasound . Prenatal diagnosis by ultrasound can allow parents to learn more about this condition and plan ahead for treatment after their baby is born.

|  |  |  |
| --- | --- | --- |
| 1 | IMG_256 | [Cavus](https://en.wikipedia.org/wiki/Cavus_deformity): the foot has a high arch, or a caved appearance. |
| 2 | IMG_257 | [Adductus](https://en.wikipedia.org/wiki/Metatarsus_adductus): the forefoot curves inwards toward the big toe. |
| 3 | IMG_258 | [Varus](https://en.wikipedia.org/wiki/Varus_deformity): the heel is inverted, or turned in, forcing one to walk on the outside of the foot. This is a natural motion but in clubfoot the foot is fixed in this position. |
| 4 | IMG_259 | [Equinus](https://en.wikipedia.org/wiki/Equinus_deformity): the foot is pointed downward, forcing one to walk on tiptoe. This motion occurs naturally, but in clubfoot the foot is fixed in this position. This is because the [Achilles tendon](https://en.wikipedia.org/wiki/Achilles_tendon) is tight and pulls the foot downwards. |

More testing and imaging is typically not needed, unless there is concern for other associated conditions.

**Treatment of talipes**

Newborn's bones, joints and tendons are very flexible, treatment for clubfoot usually begins in the first week or two after birth. The goal of treatment is to improve the way your child's foot looks and works before he or she learns to walk, in hopes of preventing long-term disabilities.

Treatment options include:

• Stretching and casting (Ponseti method)

• Surgery

**Stretching and casting (Ponseti method)**

This is the most common treatment for clubfoot. Your doctor will:

• Move your baby's foot into a correct position and then place it in a cast to hold it there

• Reposition and recast your baby's foot once a week for several months

• Perform a minor surgical procedure to lengthen the Achilles tendon (percutaneous Achilles tenotomy) toward the end of this process

After the shape of your baby's foot is realigned, you'll need to maintain it with one or more of the following:

• Doing stretching exercises with your baby

• Putting your child in special shoes and braces

• Making sure your child wears the shoes and braces as long as needed usually full time for three months, and then at night and during naps for up to three years

For this method to be successful, you'll need to apply the braces according to your doctor's directions so that the foot doesn't return to its original position. The main reason this procedure sometimes doesn't work is because the braces are not used as directed.

**Surgery**

If your baby's clubfoot is severe or doesn't respond to nonsurgical treatments, more-invasive surgery may be needed. An orthopedic surgeon can lengthen or reposition tendons and ligaments to help ease the foot into a better position. After surgery, your child will be in a cast for up to two months, and then need to wear a brace for a year or so to prevent the clubfoot from coming back.

Even with treatment, clubfoot may not be totally correctable. But in most cases, babies who are treated early grow up to wear ordinary shoes and lead full, active live

The treatment included gentle manipulation of the foot and the serial application of above knee plaster casts at weekly interval without anesthesia, as described by Ponseti

Nursing Management for Talipes Equinovarus

Assessment of a child with clubfoot include:

\* History. Seek a detailed family history of clubfoot or neuromuscular disorders, and perform a general examination to identify any other abnormalities.

\* Physical exam. Examine the feet with the child prone, with the plantar aspect of the feet visualized, and supine to evaluate internal rotation and varus; if the child can stand, determine whether the foot is plantigrade, whether the heel is bearing weight, and whether it is in varus, valgus, or neutral.

**Nursing interventions for the child are:**

Protect skin integrity. Monitor site of impaired tissue integrity at least once daily for color changes, redness, swelling, warmth, pain, or other signs of infection; monitor patient’s skin care practices, noting type of soap or other cleansing agents used, temperature of water, and frequency of skin cleansing; and provide gloves or clip the nails if necessary to avoid damaging the skin with scratches ​•​Promote acceptance of body image. Acknowledge and accept an expression of feelings of frustration, dependency, anger, grief, and hostility; support verbalization of positive or negative feelings about the actual or perceived loss; and be realistic and positive during treatments, in health teaching, and in setting goals within limitations.

\* Provide health education. Include the parents in creating the teaching plan, beginning with establishing objectives and goals for learning at the beginning of the session; provide clear, thorough, and understandable explanations and demonstrations; and render positive, constructive reinforcement of learning.

**Complications**

Clubfoot typically doesn't cause any problems until your child starts to stand and walk. If the clubfoot is treated, your child will most likely walk fairly normally. He or she may have some difficulty with:

• **Movement.** The affected foot may be slightly less flexible.

• **Leg length.** The affected leg may be slightly shorter, but generally does not cause significant problems with mobility.

• **Shoe size.** The affected foot may be up to 1 1/2 shoe sizes smaller than the unaffected foot.

• **Calf size.** The muscles of the calf on the affected side may always be smaller than those on the other side.

However, if not treated, clubfoot causes more-serious problems. These can include:

• **Arthritis.** Your child is likely to develop arthritis.

• **Poor self-image.** The unusual appearance of the foot may make your child's body image a concern during the teen years.

• **Inability to walk normally.** The twist of the ankle may not allow your child to walk on the sole of the foot. To compensate, he or she may walk on the ball of the foot, the outside of the foot or even the top of the foot in severe cases.

• **Problems stemming from walking adjustments.** Walking adjustments may prevent natural growth of the calf muscles, cause large sores or calluses on the foot, and result in an awkward gait.

