

DISEASES & CONDITIONS

Erb's Palsy (Brachial Plexus Birth Palsy)

Erb's palsy is a form of brachial plexus palsy. It is named for one of the doctors who first described this condition, Wilhelm Erb.

The brachial plexus (BRAY-key-el PLEK-sis) is a network of nerves near the neck that give rise to all the nerves of the arm. These nerves provide movement and feeling to the shoulder, arm, hand, and fingers. Palsy means weakness, and brachial plexus birth palsy causes arm weakness and loss of motion.

One or two of every 1,000 babies have this condition. It is often caused when an infant's neck is stretched to the side during a difficult delivery.

Most infants with brachial plexus birth palsy will recover both movement and feeling in the affected arm, often with daily physical therapy exercises. Parents play an active role in helping their child recover maximum function in the affected arm.

This infant has brachial plexus birth palsy. The arm is rotated in toward the body and the infant cannot move the arm effectively.

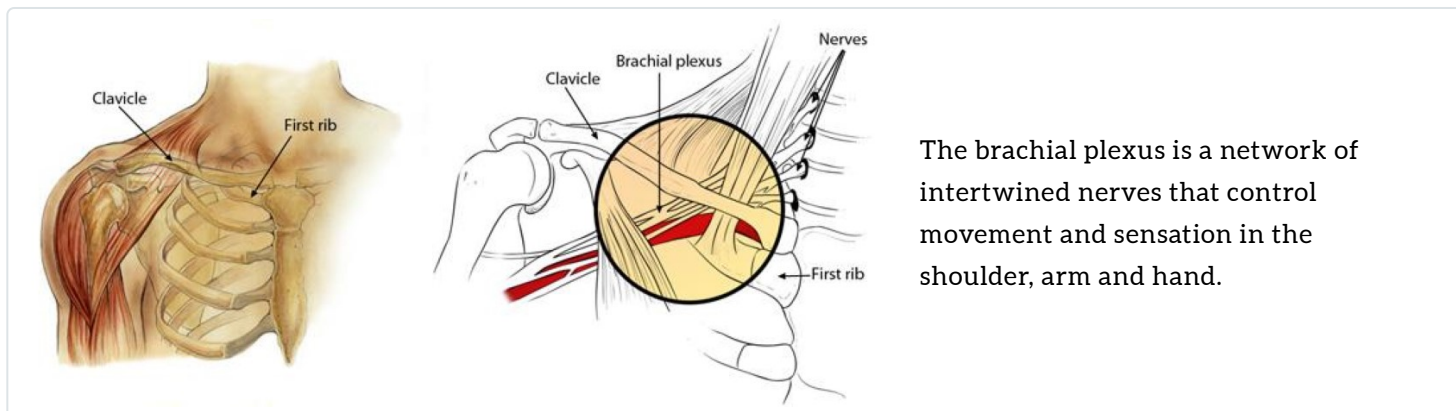
Courtesy of Texas Scottish Rite Hospital for Children



Anatomy

The brachial plexus is formed as the nerves to the arm, hand, and fingers pass from the spinal cord, between the bones of the neck (vertebrae) and go into the arm. Along the side of neck, near the shoulder, these nerves merge together. From there, they branch out to form a "highway system," or "plexus," of nerves.

This system of nerves then travels behind the collarbone (clavicle) and spreads out into the arm. The nerves that go to the shoulder lie higher in the neck than those that travel to the hand and fingers. Nerves that provide feeling to the hand and fingers lie lower in the neck and deep in the armpit.



Description

In most cases of brachial plexus birth palsy, it is the upper nerves in the brachial plexus that are affected. This is known as Erb's palsy. The infant may not be able to move the shoulder, but may be able to move the fingers. If both the upper and lower nerves are stretched, the condition is usually more severe than just Erb's palsy. This is called a "global," or total, brachial plexus birth palsy.



This toddler has brachial plexus birth palsy. It has caused a weakness of the right arm. The child is unable to raise the right arm overhead when reaching for an object.

Courtesy of Texas Scottish Rite Hospital for Children

In general, there are four types of nerve injuries. All can occur at the same time in the same infant. The symptoms of a nerve injury are the same (loss of feeling and partial or complete paralysis), regardless of the type of injury. It is the severity of the injury that affects both treatment decisions and the extent of recovery possible.

Neurapraxia

A stretch injury that "shocks," but does not tear the nerve is the most common type. This is called a "neurapraxia" (new-rah-PRAK-see-ah). Normally, these injuries heal on their own, usually within 3 months.

Neurapraxia can happen in adults, as well as infants. For example, when it happens to football players who are injured during play, it is called a "burner" or "stinger."

Neuroma

A stretch injury that damages some of the nerve fibers may result in scar tissue. The scar tissue may press on the remaining healthy nerve. This condition is called a "neuroma." Some, but not total, recovery usually occurs.

Rupture

A stretch injury that causes the nerve to be torn apart (ruptured) will not heal on its own. A rupture happens when the nerve itself is torn.

Avulsion

An avulsion happens when the nerve is torn from the spinal cord. Nerve ruptures and avulsions are the most serious types of nerve injury. It may be possible to repair a rupture by "splicing" a donor nerve graft from another nerve of the child. It is not possible to repair an avulsion from the spinal cord. In some cases, it may be possible to restore some function in the arm by using a nerve from another muscle as a donor.

Cause

Brachial plexus stretch injuries in newborns usually occur during a difficult delivery, such as with a large baby, a breech presentation, or a prolonged labor. They may also happen when a birth becomes complicated and the person assisting the delivery must deliver the baby quickly and exert some force to pull the baby from the birth canal. If one side of the baby's neck is stretched, the nerves may also be stretched, and injury may result.

Symptoms

Symptoms of brachial plexus birth palsy may include:

- Weakness in one arm
- Loss of feeling in the arm
- Partial or total paralysis of the arm

Doctor Examination

A pediatrician is usually the one to make the diagnosis of a brachial plexus palsy injury, based on weakness of the arm and physical examination.

Your doctor may order an x-ray, ultrasound, or other imaging study, such as an MRI, to learn whether there is any damage to the bones and joints of the neck and shoulder. The nerve injury can affect the growth and development of the shoulder. He or she may also do some tests to learn whether any nerve signals are present in the muscle of the upper arm. These tests may include an electromyogram (EMG) or a nerve conduction study (NCS).

Treatment

Because most newborns with brachial plexus birth palsy recover on their own, your doctor will re-examine your child frequently to see if the nerves are recovering. Nerves grow and recover very slowly; it may take up to 2 years for a complete recovery.

Nonsurgical Treatment

Daily physical therapy is the main treatment method for Erb's palsy.

Because a baby cannot move the affected arm all alone, parents must take an active role in keeping the joints limber and the functioning muscles fit. Your doctor or a physical therapist will teach you how to do exercises with your baby to keep your baby's arm in good condition.

Daily physical therapy and range-of-motion exercises, done as often as possible during the day, begin when a baby is about 3 weeks old. The exercises will maintain the range of motion in the shoulder, elbow, wrist, and hand. This will prevent the joint from becoming permanently stiff, a condition called "joint contracture."

Surgical Treatment

If there is no change over the first 3 to 6 months, your doctor may suggest surgery on the nerves to improve the potential outcome.

Microsurgery

In microsurgery, surgeons often use high-powered microscopes and small, specialized instruments. Nerve surgery does not typically restore full, normal function, and is usually not helpful for older infants.

- **Nerve graft.** Depending upon the nerve injury, it may be possible to repair a rupture by "splicing" a donor nerve graft from another nerve of the child.
- **Nerve transfer.** In some cases, it may be possible to restore some function in the arm by using a nerve from another muscle as a donor.

Because nerves recover very slowly, it may take several months, or even years, for nerves repaired at the neck to reach the muscles of the lower arm and hand. After surgery, your doctor or physical therapist will provide rehabilitation exercises to perform at home to improve your baby's strength and range of motion.

Other Procedures

Other surgical options for treating brachial plexus birth palsy may include:

- **Release of joint contractures.** Thickened soft tissues around the shoulder and elbow joints can be released to allow more motion.
- **Tendon transfer.** To improve the ability to raise the arm, a functioning tendon is moved from its normal attachment in the body and reattached in the shoulder area.

Outcomes

Many children with brachial plexus injuries will continue to have some weakness in the shoulder, arm, or hand. There may be other surgical procedures that can be performed at a later date that might improve function. As your child grows, your doctor will discuss the various treatment options and make a specific recommendation based on your child's individual situation.

Weakness of the left shoulder, arm, and hand persist in this young child with brachial plexus birth palsy.

Courtesy of Texas Scottish Rite Hospital for Children



Living with Erb's Palsy

In some children, the affected arm is noticeably smaller than the unaffected arm. This occurs because nerves do have an effect on growth. Although the affected arm will continue to grow as the child grows, it grows at a slower pace, and the size difference will become more noticeable as the child gets older.

Children are very adaptable. Be supportive and encouraging, and focus on all the things your child can do. This will help your child develop a healthy sense of self-esteem and compensate for any limitations in function.



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Learn more about this topic at POSNA's OrthoKids website:

[Brachial Plexus Palsy \(http://orthokids.org/Condition/Neonatal-Brachial-Plexus-Palsy\)](http://orthokids.org/Condition/Neonatal-Brachial-Plexus-Palsy)

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