

# Brachial Plexus Injuries, Therapy, and Safe Positioning

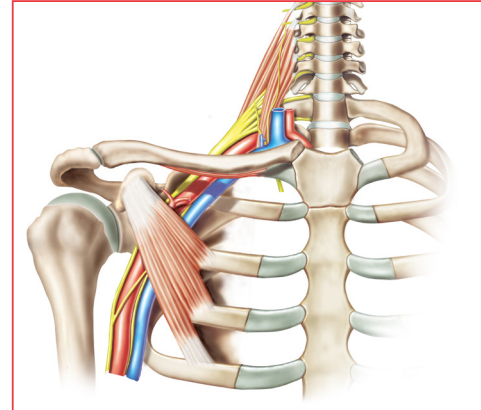
## What is the brachial plexus?

The brachial plexus is a group of nerves that come from the cervical part of the spine in the neck. The brachial plexus controls movement and feeling of the hands, wrists, elbows, and shoulders.

When the brachial plexus is injured, the nerve cannot communicate to the body. This injury can range from a bruise to a complete tear from spinal cord (avulsion). Injuries can happen in the womb, during birth, or from an accident.

## Types of injuries to the brachial plexus

- **Avulsion.** The nerve is torn away from its attachment at the spinal cord. This is the worst type of brachial plexus injury. An eyelid droop suggests an avulsion of the lower brachial plexus. This is called a Horner's Sign.
- **Rupture.** The nerve is torn, but not at the spinal cord attachment.
- **Neuroma.** Scar tissue has grown around the brachial plexus injury, putting pressure on the injured nerve and keeping the nerve from sending signals to the muscles.
- **Neurapraxia.** The nerve has been stretched and damaged, but not torn.



## Will the injury heal?

The injured nerves re-grow from the neck down the arm, but it is a slow process. You should start to notice more movement in the injured arm over time. A good sign of recovery is if your child is bending his or her elbow by 3 months of age. If this does not happen, there is a chance your child may need surgery to help the nerve get better. The timing of surgery is very important, because by 12 months of age the muscles that have not gotten any communication from the nerve are too weak to ever get better.

Avulsion and rupture injuries cannot reconnect on their own and will need surgery.

Neuroma and neuropraxia injuries may or may not need surgery. This depends on whether your child shows certain signs of improvement over time.

## Types of surgery

- **Neurolysis.** Removing scar tissue around the nerve.
- **Neuroma excision.** A large amount of scar tissue is removed and then nerve endings put together.
- **Nerve grafting.** If the gap is very large, a nerve from another part of the body may be used to reconnect nerve endings.

There are other procedures that may be done as well. Your child's health care provider will talk to you about these other options, if needed.

## Can therapy help?

While the nerve is healing, the muscles are not moving. This causes them to tighten and make the joint unable to move. It is important to move and stretch the muscle several times every day to keep the muscles from tightening. Therefore, occupational and physical therapy are very important for recovery of a brachial plexus injury.

Most of the therapy for brachial plexus injuries is done at home by the child's caregiver, with some more-intense therapy to work on specific range of motion or strength goals.

A therapist will teach you activities to do at home every day and will check your child's progress to see if he or she has motor skills appropriate to his or her age.


Beginning when your child is 2 weeks old, do the following **range of motion** activities 4 to 5 times every day. Do these movements very slowly and gently. They should not be painful for your child.

## Getting started with therapy



For all activities, be sure to support your baby's shoulder blade (scapula) with one hand, while gently doing the stretch with the other hand.



When doing the activities with a child younger than 3 months old, do not move the baby's arm farther up than a 90-degree angle from the body. A 90-degree angle looks like the letter L turned on its side, like this 

## Activity #1: Shoulder flexion

Starting with baby's arm at side, with thumb pointing toward ceiling, slowly lift the arm in front of the body.



## Activity #2: Shoulder abduction

Starting with baby's arm at side with palm facing ceiling, gently move arm away from body to the side and continue lifting toward baby's head as show in the pictures.



*Shoulder abduction for children younger than 3 months*



*Shoulder abduction for children 3 months old and older*

### Activity #3: Internal rotation

With baby's shoulder out at 90-degree angle, gently rotate palm of hand toward the floor.



### Activity #4: External rotation

With baby's arm at side and elbow at 90-degree angle, gently rotate hand away from body and toward the floor.



### Activity #5: External rotation

With baby's shoulder out at 90-degree angle, gently rotate back of hand toward the floor.



### Activity #6: Elbow flexion

Gently bend arm with thumb toward shoulder and then again with palm of hand facing shoulder.



### Activity #7: Elbow extension

Fully straighten the arm between each bend.



### Activity #8: Forearm supination

Gently rotate forearm with elbow bent at baby's side until palm is facing upward.



### Activity #9: Forearm pronation

Gently rotate forearm with elbow bent at baby's side until palm is facing downward.



### Activity #10: Wrist flexion

Gently bend the wrist down and hold for 3 to 5 seconds.



### Activity #11: Wrist extension

Gently bend the wrist back and hold for 3 to 5 seconds.



## Activity #12: Finger and thumb extension

Open palm by straightening fingers and thumb and hold for 3 to 5 seconds.



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## Safe positioning: Resting

Safely positioning your baby is another important part of recovery to keep your baby from more injury. You can pick up and carry your child, but following these positioning guidelines are important for your baby's safety and healing.



*When baby is resting, use pillows, towel rolls, or stuffed animals to keep arm from bending down (contracting).*

## Safe positioning: Tummy time

Placing your baby on his or her belly for “tummy time” is very important for growth and development. Your child should be placed on his or her tummy several times a day. However, do not put your baby in a position that puts weight on the arms or shoulders. Your child’s shoulder muscles are not strong enough to keep the shoulder in the joint and too much force on the shoulder joint may cause it to dislocate.

Never leave your baby alone during tummy time.



*Position your baby over a towel roll or your lap with his or her arms out to the side and not under the body.*

## Safe positioning: Picking up

Support arms and shoulders when picking up your child.



**Do not** scoop under the arms as this puts unnecessary force on the shoulder joint.





## Safe positioning: Carrying

Place your baby's arm on his or her chest or support the arm against your body.



**Do not** let your baby's arm fall behind the shoulder and dangle.



If you have questions about these activities, call Pediatric Rehabilitation at (615) 343-6445.