

Neonatal Brachial Plexus Injury

Condition: The *brachial plexus* is a bundle of nerves that go from the neck to the armpit. During labor or delivery, these nerves can be damaged, which is called *neonatal brachial plexus injury (NBPI)*. This may result in paralysis of either all or portions of the upper extremity.

Background: NBPI occurs in one to two of every 1,000 live births. It is considered the most common birth injury and the most common cause of paralysis of the arm in children.

Risk Factors: Risk factors include:

- A condition called shoulder dystocia increases the risk (100 times more likely). This condition occurs after the baby's head is delivered during birth, but the shoulders do not follow. This then requires significant manipulation to get them to pass through. This manipulation can increase the risk of damage to the nerves.
- High birth weight (especially greater than 4.5 kilograms). This increases the risk of shoulder dystocia (as mentioned above)
- Maternal Diabetes (this increases the risk of a larger size of the infant, increasing risk as above)
- Having a previous baby with NBPI.

History and Symptoms: Immediately after delivery, the arm in which the nerves are damaged will be weak and extremely loose. The infant may not respond to a stimulus on that affected arm. There may be a report of shoulder dystocia during delivery.

In addition to loss of function & weakness, the baby may also have abnormal muscle contractions (such as spasms). You may also see abnormal positioning of the bones of the neck, arms, and hands, and different size of the arms. Although most newborns will recover in a few months, 20-30% have a permanent disability.

Physical Exam: The physical medicine & rehabilitation (PM&R) physician (known as a physiatrist) is a doctor who focuses on function. There are pediatric PM&R physicians as well. Physiatrists specialize in assessing patients with musculoskeletal, brain, spine, and nerve injury. They can come up with a plan to help maximize function. In infants with NBPI, they will do an examination that assess the location of the injury, which muscles are weak, tight, and which nerves are affected. The PM&R physician will check the movement of the shoulder, elbow, wrist, hand, and fingers including the strength and tightness. He/she will check the senses, such as with pin prick. He/she can check the eyes to make sure other nerves have not been damaged. He/she can check the breathing to make sure nerves controlling the diaphragm (one of the breathing muscles) has not been affected.

Diagnostic Process: The PM&R physician will take an X-ray, to make sure there are not additional injuries besides the NBPI, such as bone fractures. Very rarely, a nerve study may be done if surgery is needed or to check long term effects.

Rehab Management: The PM&R physician can oversee the treatment plan and check for changes in strength, sensation, tightness, and recovery. He/she will also work with an occupational therapist to help improve function.

For the first week after birth, the affected arm or hand should be supported and protected. Parents should not hold infants under the arms because this can increase damage to the nerves and the shoulder. After seven days, gentle range-of-motion exercises can begin.

Over the next couple of months, the infant should continue with occupational therapy, and parents will assist in stretching, movement, and strengthening, and using the arm or hand with daily activity. The goal is to maximize movement and try to obtain function.

At three-four months, the PM&R physician will refer to a special kind of hand surgeon or neurosurgeon if there is no noted recovery. A nerve transfer (taking a working nerve and replacing the damaged nerves) may be needed. A muscle surgery may also be needed to realign the muscles in the arm. The child should continue occupational therapy and may also need equipment or new strategies to help use the arm well.

Other Resources for Patients and Families: The [United Brachial Plexus Injury Network](#) has resources and information that may be helpful.

Frequently Asked Questions

What is PM&R?

Physical medicine and rehabilitation (PM&R), also known as physiatry, is a primary medical specialty that aims to enhance and restore functional ability and improve quality of life to those with injuries, physical impairments or disabilities affecting the brain, spinal cord, nerves, bones, joints, ligaments, muscles and tendons. PM&R physicians, known as physiatrists, evaluate and treat the whole body, maximize patients' independence in their daily life and are experts in designing comprehensive, patient-centered treatment plans to empower patients to achieve their goals. By taking the whole body into account, they can accurately pin-point problems, decrease pain, assist in recovery from devastating injuries and maximize overall outcomes and performance with non-surgical and peri-surgical options. To learn more, visit www.aapmr.org/aboutpmr.

What makes PM&R physicians unique?

PM&R physicians' training focuses not just on treating medical conditions, but on enhancing the patient's performance and quality of life in the context of those medical conditions. They focus not only on one part of the body, but instead on the development of a comprehensive program for putting the pieces of a person's life back together – medically, socially, emotionally and vocationally – after injury or disease. PM&R physicians make and manage medical diagnoses, design a treatment plan and prescribe the therapies that physical therapists or other allied therapists perform or that are carried out by the patients themselves. By providing an appropriate treatment plan, PM&R physicians help patients stay as active as possible at any age. Their broad medical expertise allows them to treat disabling conditions throughout a person's lifetime.

Why see a PM&R physician?

A PM&R physician will thoroughly assess your condition, needs, and expectations and rule out any serious medical illnesses to develop a treatment plan. By understanding your condition and goals, you and your PM&R physician can develop a treatment plan suited to your unique needs.

How do I find a PM&R physician near me?

Visit www.aapmr.org/findapmrphysician or contact your primary care physician for a referral.

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