

Brachial Plexus Birth Palsy

Department of
Orthopedic Surgery



Children's Hospital Boston

The Children's Hospital Boston Brachial Plexus Program provides comprehensive care for children with acute and chronic brachial plexus palsies.

We follow standard protocols for each child, for each visit, in a comprehensive approach.

Care decisions are based on the infant/child's problem and recovery status.

Services are provided through the Brachial Plexus Program include:

- Microsurgical reconstruction
- Nerve grafts and transfers
- Tendon transfers
- Osteotomies
- Open reduction of shoulder and elbow dislocations
- Arthroscopic surgical care
- Physical therapy
- Occupational therapy
- Parental and child support program

What is brachial plexus?

The brachial plexus are a complex network of nerves between the neck and shoulders that control muscle function in the chest, shoulder, arms and hands, as well as sensibility in the upper limbs.

What causes brachial plexus injuries?

Brachial plexus injuries in newborns usually occur in the process of childbirth. The nerves of the brachial plexus are stretched, compressed or torn. This results in a loss of muscle function.

Once diagnosed with brachial plexus birth palsy, how soon should I bring my child in to see the specialist?

Once your child's primary care physician has made a diagnosis, it is safe to wait at least four weeks of life for a comprehensive evaluation.

How often should my child be seen after the first initial appointment?

This depends on your child's return of function, usually every 1-3 months until 6 months of age, then every 6 months through 24 months of age.

Are there different types of brachial plexus nerve injuries?

Depending on the severity, the injury can cause your child to have various degrees of muscle weakness. There are four different types of nerve injuries to the brachial plexus.

- **Avulsion** - The nerve roots are torn from the spinal cord. If a droopy eyelid is noted on the affected side, this may indicate a more severe injury. This type of injury is less common.
- **Rupture** - The nerve is torn but not where it attaches to the spine.
- **Neuroma** - The nerve has tried to heal, but scar tissue has formed and presses against the injured nerve or interferes with nerve function.
- **Stretch** - The nerve has been damaged but not torn, and usually heals itself within 3 months of life. This injury is most common. These stretch injuries are also known as “neurapraxia”.

Are there any treatments?

Some brachial plexus injuries may heal on their own (spontaneous recovery). Many children improve or recover by 3-12 months of age.

Initial treatment for brachial plexus injuries includes occupational and physical therapy.

Therapists will work with your child and you, the parent, to learn exercises. Most parents perform range of motion (ROM) exercises at home with their child many times a day for several years.

These exercises are important to keep the joints and muscles moving as normally as possible. Surgery is another treatment which may be indicated when there is inadequate recovery.

What are the different types of surgery and, how do I know if it is right for my child?

If there is no improvement over the first 3-6 months of life, microsurgery (which involves operating on small nerves using a surgical microscope) may be helpful. However, nerve surgery will not completely restore normal



function or help infants over the age of one years old. Some children, after nerve surgery, continue to have some weakness in the shoulder, arm or hand.

If your child has difficulty raising their hand over their head, turning their hand palm up, or to extend their wrist, further surgery may be indicated.

In some cases a surgical procedure called a **tendon transfer** (tendons are the connective tissue between the muscle and bone) may be performed. It involves separating the tendon from its normal attachment and reattaching it in a different place, often improving shoulder and wrist motion as well as elbow position and hand grip.

Tendon transfers are done between the age of one year and adulthood, as appropriate. This type of procedure utilizes extensive therapy, which can continue up to one year postoperatively. The patient is in a cast around 6 weeks and subsequently utilizes nighttime splints up to 6 months.

In some instances, shoulder weakness and/or joint deformity may cause limitations in motion that are not amenable to tendon transfers. An **osteotomy** is a surgical procedure in which bones are cut and reorientated, which may improve upper extremity function.

Capsulorrhaphy refers to the surgical tightening of loose tissue around the shoulder joint. This procedure may be performed through a surgical incision (open capsulorrhaphy) or with the use of arthroscopy, in which a pencil-sized camera and instruments are inserted into the shoulder via small incisions. Capsulorrhaphy may be performed in combination with tendon lengthenings, in which tight muscles and tendons are surgically stretched to a more normal length.

What is the prognosis?

The prognosis is dependant upon the extent of the injury. The majority of patients will achieve near normal arm function without surgery. Not all children recover fully. In the absence of a full recovery, a significant percentage of children may benefit from a surgical treatment to improve either strength of motion, or to optimize shoulder



One of the major problems with brachial plexus birth palsies is the mal-development of the shoulder joint, which may be progressive over time. In addition to periodic physical examinations, magnetic resonance image (MRI) and/or computed tomography (CT scans) may be performed.

Is there a support group for families of children with brachial plexus birth palsy?

Yes. Our program offers support if desired. We ask all families and children to participate in a parental/child support program.

We also encourage families to utilize all other support programs on a national and international level.

What research is being done?

The Brachial Plexus program as part of the Department of Orthopedic Surgery, and the Clinical Effectiveness Research Center is doing extensive research on brachial plexus birth palsy, including grant funded research through the American Society for Surgery of the Hand (ASSH) and the Pediatric Orthopaedic Society of North America (POSNA). This is an effort to establish a standard care at all hospitals and determine the natural history (spontaneous recovery), and microsurgery results for brachial plexus injuries. Our program is directing a multi-center study over the next five years to determine the timing of microsurgery, tendon transfers and osteotomies.

We present all of our research papers on a national basis and also publish these results in peer review journals. Numerous papers have already been published and presented in these areas and will continue to be published prospectively.

Need further information?

During your visit you will meet many staff members from the Orthopedic department including:

Orthopedic, Hand & Microvascular Surgeons

- Peter Waters, MD
- Donald Bae, MD

Orthopedic Nurse Practitioners

- Rachel Difazio, NP
- Elizabeth Shannon, NP

Orthopedic Nurse

- Paula Donahue, RN

Research Coordinators

- Laurie Travers

Occupational Therapy

- Annette Correrria, OTR
- Kerri Colantuno, OTR

Surgical Coordinator

- Nilda Coronel

All staff members involved in your care will help answer your questions. The brachial plexus research coordinator will greet you during your visit and ask if you would be willing to participate in our ongoing prospective study on brachial plexus birth palsy. Upon agreement the research coordinator will assist you in filling out our input forms and modern questionnaires.

Should surgery be needed, the surgical coordinator will schedule your pre and post operative appointments. If you have questions, you can reach a nurse, nurse practitioner or the surgical coordinator directly at 617-355-6021, M-F, 8:30a.m.- 5:00p.m. Dr. Waters is available via the Department of Orthopedic Surgery at 617-355-6648. Please note that HIPAA regulations limit our ability to correspond by email.