Plastic and Reconstructive Surgery
Orthopedics
Physical Medicine and Rehabilitation

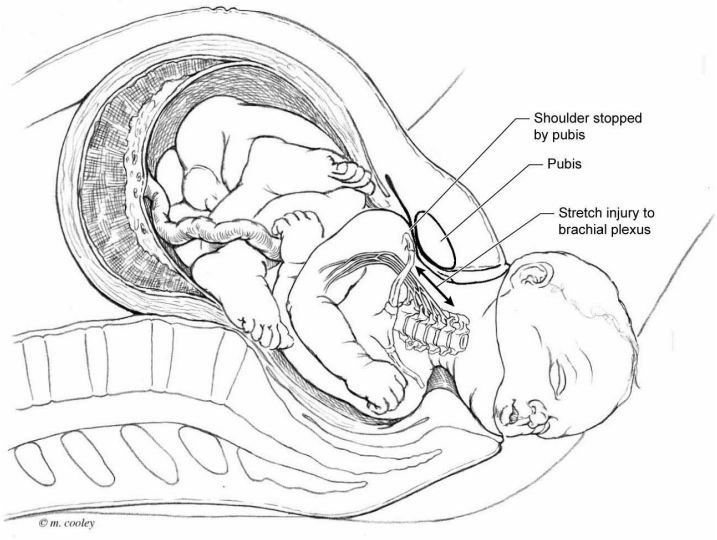
Identifying and Treating Brachial Plexus Injuries in Infants

NATIONWIDE CHILDREN'S

When your child needs a hospital, everything matters.[SM]

Defining Brachial Plexus Injuries

The brachial plexus is a network of nerves that sends signals from the spine to give feeling and movement to the shoulder, arm and hand. Injury to these nerves may occur around the time of birth or later through trauma, inflammation or tumor compression. Injuries to the brachial plexus occur in approximately 1-2 in 1000 births. These injuries affect the sensation and movement of the shoulder, arm and hand, and the extent of the injury depends upon how severely the nerves were damaged. If they were mildly stretched, a complete recovery of function may occur. However, if they were severely stretched or torn away from the spinal cord, surgery may be necessary to restore function to the arm.



Establishing a Diagnosis

Certain factors in the pregnancy and birth history may be associated with a brachial plexus birth injury:

- Shoulder dystocia
- Large birth weight
- Forcep delivery
- Prolonged labor
- Multiparity
- Gestational diabetes
- Clavicle fracture
- Humerus fractures (usually contralateral if present)

Common signs and symptoms of brachial plexus injury in infants may vary based upon the type and severity of injury:

- One arm affected
- Abnormal resting position of the arm (waiter's tip position or complete flail arm)
- Weakness or complete inability to move the shoulder, arm and/or hand
- Dislocated shoulder
- Asymmetric reflexes (moro, tonic neck) in young infant
- Diaphragm asymmetry
- Horner's syndrome (ptosis, miosis, anhydrosis of affected side of face)
- Respiratory distress, poor feeding or failure to thrive secondary to phrenic nerve injury and diaphragm impairment
- Lack of sensation in the arm or hand

When to Refer to a Specialist

Although up to 60 percent of infants with brachial plexus birth injury will demonstrate complete spontaneous recovery by 2 months of age, those who do not recover may require surgery as young as 3 months of age to give them the best chance for nerve recovery.

Accordingly, referring all infants with suspected brachial plexus birth injury as soon as possible to the Brachial Plexus Clinic for assessment is extremely valuable.

Our specialized brachial plexus occupational therapists frequently assess and begin working with a child prior to their first team clinic visit.

For the patient's first visit at the Brachial Plexus Clinic, it is helpful to bring any tests or imaging that may have been performed (such as x-rays, MRIs or EMGs).

Preparing Families for Their Initial Brachial Plexus Clinic Visit

At the initial visit, the multidisciplinary team will perform a detailed history, physical exam and review of any imaging or tests that have been performed. For young children, this may include observation of how they use their arm at play. If a brachial plexus injury is suspected, additional tests may be ordered.

In most cases, no additional tests will be ordered, and patients will be followed closely with repeat clinical exams to determine if their injury is improving.

Nonsurgical Treatment of Brachial Plexus Injuries

Occupational and Physical Therapy – Those infants who have full recovery of elbow flexion at 2 months generally have complete recovery of arm function in the first 2 years. However, some of these infants may require therapy for stretching and splinting to maintain their range of motion and prevent stiff joints while they recover.

Botox and Splinting – Some patients who have stiff joints and decreased range of motion that is not improving with therapy may benefit from Botox injections to relax the tight muscles temporarily. These injections may be done in combination with splinting and may be performed in the clinic or operating room setting depending on the overall treatment plan.

Surgical Treatment

If nerves have been severely stretched, torn or avulsed, they may benefit from surgical repair. This is generally performed within 6 months of the injury to give muscles the best chance at functional recovery.

Nerve Grafting – The brachial plexus injury is explored, scar or neuroma is excised and nerve grafts (typically sural nerves from the lower legs) are used to replace the damaged nerves. Full recovery may take up to three years.

Nerve Transfers – A portion of another working nerve is connected to the injured nerve close to its targeted muscle to help speed the process of recovery form the injury. Nerves regenerate at 1 mm/day (1 inch/month), so it may take time to see the full extent of recovery. It is very important to continue with splinting and stretching so joints remain supple until nerve recovery occurs.

Shoulder Surgery – Muscle imbalances from the brachial plexus injury can result in long term shoulder deformities such as dislocations and glenohumeral dysplasia. A variety of procedures including reduction, tendon transfers and osteotomies may be indicated.

Secondary Procedures – These may be indicated in childhood or long term to help improve function of the arm. These may include specific procedures on the shoulder, elbow, forearm, wrist or hand to help make it more functional.

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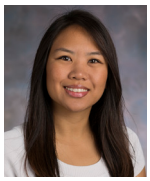
The Brachial Plexus Program at Nationwide Children's Hospital

Nationwide Children's offers a collaborative, multidisciplinary, evidence-based approach to caring for brachial plexus injuries. Our team of experts from plastic surgery, orthopedic surgery, physical medicine and rehabilitation, radiology, physical and occupational therapy, nursing and social work help provide the best comprehensive care for every patient and family.

Meet Our Team

Kim A Bjorklund, MD
Plastic and Reconstructive Surgery



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Physical Medicine and Rehabilitation

Kathryn S. Milks, MD
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Occupational Therapy

Referrals and Consultations

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Central Scheduling Phone: **(614) 722-6299** or **(877) 722-6220** | Fax: **(614) 722-5826**
Physician Direct Connect Line for 24-hour urgent physician consultations: **(614) 355-0221** or **(877) 355-0221**.

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