

## Brachial Plexus Injuries

Brachial plexus injuries are injuries affecting the network of nerves that control the muscles of the shoulder, arm, elbow, wrist, hand and fingers. Brachial plexus injuries can result in full to partial paralysis of one or both (bilateral) arms. Stretching, tearing or other trauma can cause injury to the nerves of the brachial plexus. Brachial plexus injuries often occur during the birthing process, and can also occur as a result of automobile, motorcycle, or boating accidents; sports injuries (“burners” and “stingers”); animal bites, gunshot or puncture wound; as a result of specific medical treatments/procedures/ surgeries; or due to viral causes.

Brachial plexus injuries sustained during the birthing process are known as Obstetrical Brachial Plexus Injuries (OBPI), and those caused by other types of trauma are known as Traumatic Brachial Plexus Injuries (TBPI). Both types are also sometimes referred to as Erb’s Palsy, Klumpke’s Palsy or Brachial Plexus Palsy.

Traumatic brachial plexus injuries can be divided into two categories: open and closed. Closed injuries are those that occur due to excessive traction (motorcycle accidents and sports injuries); and open injuries are those that occur without excessive traction (gunshot wounds and animal bites).

The mildest form of brachial plexus injury occurs when the nerves have been stretched. When the nerves have been torn (ruptured) or pulled out of their spinal “socket” (avulsed), surgical intervention may be the only hope for regaining functional use of the arm.

## Steps to Recovery

A person who is newly injured should visit a brachial plexus specialist as soon as possible. The extent of the injury is sometimes ascertained by clinical

evaluation and/or through the use of tests that may include: EMG, MRI & CT scans, and CT Myelogram. Surgical exploration may be scheduled to physically examine the extent and nature of the injury.

The neurosurgical techniques most often used to repair a severe injury are: exploration of the brachial plexus nerves, testing the nerves to see if the brain is receiving messages from them (EMG), removal of the scar tissue that has formed around the nerve (neuroma), and if necessary, nerve grafting. This first surgery, or “primary surgery,” is usually done 3 to 6 months post-trauma. Donor nerves are usually taken from the legs (sural nerves).

## Time is of the Essence

The timeframe for surgical repair is one of the most important factors impacting recovery. When a nerve is injured, it regresses back to its origin in the spinal column in the neck. Regeneration occurs at a slow rate of one inch or 3 centimeters per month and the nerves have to grow down the entire length of the arm. The problem experienced is that within 12 months of the injury, the muscles that have not already been innervated (connected to nerves) will have atrophied to the point where innervation is no longer possible. The smaller fine control muscles in the hand are in the most danger of being lost—because they are the furthest away from the origin of the nerves.

## Loss of Sensation

Most brachial plexus injuries result in a completely “flail” arm immediately after the injury happens, with little or no movement detectable. As recovery occurs, the sensation and motor functions of the affected limb may gradually return. Some injuries are less severe and virtually complete recovery may occur in these cases. If sensory function is at all impaired, the patient will need to be extremely care-

ful that the affected limb is not inadvertently damaged.

## Treatment of Pain

Pain can be one of the most limiting factors in rehabilitation for those with brachial plexus injuries. The pain has been described as being very severe: “like a crushing feeling,” “like putting your hand in a deep fat fryer,” “a constant burning,” or “like lightening bolts.” Also reported is a feeling of constant pressure.

Treatment of pain can include the use of analgesics, anti-depressants, anti-convulsives, electrical stimulation (TENS) and specific pain-reducing surgical treatments which include nerve blocks, insertion of a pump to deliver pain medication directly to the area involved, and ablation techniques that literally burn the nerve endings.

Alternative medicine including acupuncture, chiropractic and massage therapy have been reported to be helpful.

The “pain gate theory” – the theory that occupation of the patient in tasks will “block” the pain impulses in the brain – is often advised and can be effective.

## Therapy and Exercise

People with brachial plexus injuries must develop a long-term view of brachial plexus injury rehabilitation. Establishing a relationship with a physical and/or occupational therapist will be necessary and helpful.

Splinting of the affected side can offer support and be valuable for rehabilitation. The therapist will be able to define what splint will be most effective for the different problems encountered. Range of motion exercises (ROM) will help keep the joints loose so that maximum functionality may be restored in the event of recovery. Aquatic therapy in a heated pool is an excellent way to loosen and

stretch muscles. The heat of the water and the hydrostatic pressure of the water provides many benefits. Once the muscles are innervated they will need to be strengthened—this will take a lot of time and effort.

### **Research is Ongoing**

The truth of the matter is that adults with ruptured or avulsed nerves face a serious and debilitating situation with many challenges. There are surgical techniques that may or may not offer return of function. There are many medical and personal factors that can be involved in decision-making regarding treatment of this type of injury.

Great hope lies in the fact that promising research related to peripheral nerve injuries is ongoing in many medical facilities worldwide.

### **Emotional Support**

Even the mildest form of a brachial plexus injury can be truly life altering. Many people with these injuries have periods of depression which can be serious or prolonged. Anger, sadness and grief are normal and important processes. Peer group and/or professional counseling can help the process of acceptance tremendously.

A local support group can be very valuable for the person affected by a brachial plexus injury, their family and their caregivers. There are picnics, gatherings, camps and conferences that happen on an ongoing basis worldwide. Internet websites can also provide a valuable on-line support network.

Those who are injured need to know that they are not alone. Sharing this knowledge is in itself the most important goal of this brochure.

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### **Internet Resources**

#### **www.ubpn.org**

The website of the United Brachial Plexus Network, Inc. contains resource information, listings of specialists and brachial plexus centers, and lively message boards with support from people who have brachial plexus injuries of all ages, in all walks of life and from all over the world. Learn about the annual International Brachial Plexus Injury Awareness Week.

#### **www.nabd.org.uk**

Directed at injured motorcyclists, the site of the United Kingdom's National Association for Bikers with a Disability offers help and advice. Excellent personal profiles and stories, good general and specific information.

#### **www.independentliving.org**

A site dedicated to the support of all persons with disabilities, with links to many other helpful sites and resources related to all aspects of disability, from the psychological to human rights.

#### **www.pain.com**

As its name suggests, this site is of interest to those suffering from chronic pain. Includes details of surgeries, etc. including case studies and an extensive articles library.

### **Recommended Reading**

#### **One-Handed In A Two-Handed World**

by Tommye-Karen Mayer  
Published by Prince-Gallison Press, 1997

#### **The Complete Book of Shoulders and Arms**

by Kurt, Mike & Brett Brungardt  
Published by Harper Perennial, 1997

#### **When Bad Things Happen to Good People**

by Harold S. Kushner  
Published by Avon, 1994



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The United Brachial Plexus Network strives to inform, support and unite families and those concerned with brachial plexus injuries worldwide

## **Information for Adults with Brachial Plexus Injuries**

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