



Brachial Plexus Injury Awareness

ADULTS WITH BRACHIAL PLEXUS INJURIES

WHAT IS A BRACHIAL PLEXUS INJURY?

Brachial plexus injuries are nerve injuries in which the nerves and/or the nerve roots of the brachial plexus are damaged. This injury affects the motor and sometimes also sensory functions in the patient's arm and/or hand. Depending on the severity and extent of the injury the first symptoms may vary individually:

- Some patients have good or moderate use of their fingers, but little or no control over the muscles of shoulder and elbow.
- Some patients can use their arm, but have little or no control of the fingers.
- Some patients have a completely flaccid limb with no sensory or motor functions.
- The injury can be bilateral in which case both arms are affected.

There are many thousands of adults worldwide with varying degrees of disability caused by brachial plexus injuries. Some of those affected were injured at birth and some have been injured later in life, but information and resources for all of these adults are difficult to find. Many adults do not realize that there are others dealing with the same problems and issues, regardless of how and when their injury happened. Adults affected by brachial plexus injuries may not have had treatment for the injury, and in fact may not even be aware that treatment is available, even many years post injury. Because some of the problems associated with brachial plexus injuries over the longer term are similar for all sufferers, it can be extremely helpful to have contact with others who are having, or have had, the same challenges.

OBSTETRICAL BRACHIAL PLEXUS INJURIES

Brachial plexus injuries that happen during birth are known as obstetrical brachial plexus injuries (OBPI). Availability of brachial plexus statistics vary widely, but where figures are available the general consensus is that brachial plexus injuries occur in 2-5 out of 1000 births. The majority of these birth injuries occur as a result of a birthing emergency called *shoulder dystocia*. *Shoulder dystocia* is when the baby's shoulder becomes impacted on the mother's pelvic bone. During the birth, the brachial plexus nerves can be stretched, torn, or avulsed (pulled out of the spinal column). A high percentage of infants injured at birth regain a great deal of recovery to their affected arm, but many are left with some degree of disability, which can vary from musculoskeletal development problems or impaired sensory and motor function of the affected arm to complete paralysis of the hand, arm and/or shoulder.

Having coped well through their childhood and young adulthood with the injury, some adults as they age may start to experience long term problems in their affected arm and overuse symptoms in their unaffected arm. Family doctors in many cases do not realize that these problems may be specifically related to the brachial plexus injury. It may be extremely beneficial for these adults affected by brachial plexus injuries to seek help from a specialist even in later life. In addition, the many years of existing with the injury make these adults a valuable information resource in themselves, especially for parents of newly injured babies and also for adults who have suffered a traumatic brachial plexus injury. Finding a support group can therefore be extremely helpful. Just finding that there are many others facing similar challenges can be very comforting for those who have suffered alone for so long.

TRAUMATIC BRACHIAL PLEXUS INJURIES

Brachial plexus injuries caused by road accident or other physical trauma are known as traumatic brachial plexus injuries (TBPI). These are devastating injuries that sometimes do not recover spontaneously or respond well to treatment. For this reason, expert specialist help should be sought as soon as possible after diagnosis.

As the causes of such injuries are often violent, such as road accidents, gunshot or knife wounds, establishing and treating other, possibly life threatening injuries incurred at the same time is often the priority immediately post trauma. Sometimes there can be a delay in the detection and treatment of the brachial plexus injury because treatment of these other, more immediately serious injuries has to take priority.

Once any more dangerous conditions have been identified and stabilized, the assessment and possible treatment of the brachial plexus injury can begin. Major areas of concern to the patient are likely to be management of the pain, which can be chronic and extreme, and which does not generally respond well to many painkillers. Those painkillers which are found to be effective often have serious and debilitating side effects. The patient often has concerns about life after the accident, whether those concerns are related to employment, finances, relationships, self-image or just performing simple tasks with one hand, especially if the dominant arm is injured. Most injured people have concerns in all these areas. There is a period of adjustment to the psychological effects of the damaged limb, which can be very hard on the sufferer and their families. Finding knowledgeable support is a priority in all cases.

CAUSES OF TRAUMA INJURIES

Brachial plexus injuries can happen in many ways. They can be divided into two categories, open or closed injuries. One common cause of a closed injury is a motorcycle accident. It is surmised that following impact, the rider hits the ground, often continues to slide and a brachial plexus injury is caused when the helmeted head is forced away from the point of the shoulder, causing violent traction to the brachial plexus. Closed injuries are usually caused by traction or compression

of the brachial plexus, and can be caused by sports injuries, car accidents, falls or radiotherapy, to name a few. Open injuries such as knife wounds or cuts, including surgery, can also cause injury to the brachial plexus.

INJURY CLASSIFICATION AND PROGNOSIS

Brachial plexus injuries need referral to a specialist as soon as possible upon detection. The type and extent of injury is ascertained by clinical evaluation utilizing EMG, seeking out sensory and motor changes in the affected limb, MRI (magnetic resonance imaging) scan and possibly CT Myelogram where contrast dye is injected into the spine and scanned to see if there is leakage from the spine or other indicators of damage. Surgical exploration may be scheduled to physically examine the extent of injury. The types of injury range from mild lesion (stretch) to tears and neuromas (scar tissue that builds up around damaged area) rupture and avulsion (nerve root being pulled from the spine).

Some mild injuries recover quite quickly and spontaneously. Some may benefit from nerve graft surgery (typically at 3 to 6 months post trauma), the donor nerve being taken from the patient's leg or other possible site and grafted in place of the damaged brachial plexus nerve(s). After nerve surgery the recovery time frame is months to possibly years, although denervated paralyzed/ paralysed muscle tissue will atrophy and may not be receptive to nerve impulses after a period of time. It should be emphasized that just as the many possible complex variations of the injury occur, so does the rate and extent of recovery for each individual patient. As a general rule the smaller fine control muscles in the hand are in the most danger of being lost as the regeneration of damaged nerves is slow, approximately 1 inch or 3 centimeters a month. Therefore, by the time any nerve recovery reaches the patient's hand, atrophy may have resulted in lost function. Some injuries unfortunately do not respond to treatment and are so severe that they are permanent.

Besides the nerve grafting and scar tissue removal surgeries available as a possible option, there are other surgical techniques which can be utilized long after the initial period of injury. These include muscle and tendon release surgery.

PAIN

Pain can be the most limiting factor in rehabilitation of patients with a brachial plexus injury. It has been observed that pain following avulsions is particularly severe, and has been described, by those affected, variously as crushing, constant burning and even 'like putting your hand in a deep fat fryer' or into a vise. An almost unbearable feeling of pressure can build up in the affected limb. However, some people with less severe injuries also report serious pain. In these cases it has been described as being of a different nature to that experienced from avulsions, and is mainly felt when the injury is recovering. It has been reported that 90% of the patients who have avulsions to one or more nerve roots have severe pain.

TREATMENT OF THE PAIN

Management of the pain is difficult. One possibility is electrical stimulation (TNS or TENS) for pain relief. In one study, it was found that of 158 patients, 100 gained significant pain relief as a result of the stimulation. Some of those had experienced pain for a very long time before the stimulation. Some patients report no easing of pain with this method. The 'pain gate' theory (the idea that occupation of the patient in tasks etc will 'block' the pain impulses in the brain) is often advised, and can be effective. For this reason, if at all possible, it is often best for the patient to return to work or take up another occupation as soon as is practicable. Good results have been reported from use of a chiropractor, massage and other alternatives to drug based analgesia. For extreme cases, surgery of various kinds is sometimes advised. These surgeries include nerve block surgeries, insertion of a pump delivering painkillers direct to the area affected and ablative surgeries, which involve the burning of nerve endings. Surgeries of this kind would normally be undertaken after referral to a specialist pain clinic. Details of these and other methods of dealing with chronic pain may be found from the link to www.pain.com found below under ***Further Information***. It is advisable to discuss your options with a brachial plexus injury specialist and it may be helpful to discuss the surgery with others who have experienced it.

ANALGESIC DRUGS

Rather than to list effective drugs, especially since different brand names are used internationally, it is simpler to state that, in most cases, opiates are used immediately post trauma, and in some cases continue to be used for some time afterwards. Due to the undesirable side effects of both these and anti-inflammatory drugs, the patient needs to keep pursuing other methods of pain relief, especially if the pain becomes protracted or chronic. Anti-depressants and anti-convulsants have been used, though, again, if long-term use is contemplated, the side effects need to be considered. However, it is a fact that long term or chronic pain often leads to depression and tricyclic anti-depressants are front line treatments for chronic neuropathic pain. Talking with other people who are injured can often help, although all these injuries are different and what works for one might not work for another. Severe pain has been reported as reducing greatly over the years, though pain flare ups still occur many years post trauma, including reports from some patients who have had amputations (phantom limb pain). In most cases, the pain ceases to be a major issue within the recovery timeframe.

EXERCISE

All patients with brachial plexus injuries will need to undertake exercises to retain the range of motion in the affected limb. This is because unused muscles will atrophy and shrink, which can cause problems later, or prevent functional use of the limb as recovery starts. It is especially important to keep the hand and fingers loose in order that maximum functionality may be restored in the event of any recovery.

THERAPY

As well as traditional physical therapy there are other treatments known to work well for patients; Hydro or aqua-therapy in a heated pool is an excellent way to loosen and stretch muscles. The heat and hydrostatic pressure of the water offer many benefits. Massage therapy and chiropractic treatment bring relief to many patients. Any muscle motor recovery from previously paralyzed muscle will need strengthening work for a long time after re-innervation. It is important that the patient develops a long-term view of Brachial Plexus injury rehabilitation.

SENSATION/MOVEMENT IN THE AFFECTED ARM

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 careful that the affected limb is not inadvertently damaged. Tables similar to those below are commonly used by doctors to evaluate the level of function in patients.

TABLE ONE: MOTOR FUNCTION

M0	No muscular contraction
M1	Return of perceptible contraction in the proximal muscles
M2	Return of perceptible contraction in both proximal and distal muscles
M3	Return of function in both proximal and distal muscles of such a degree that all important muscles are able to act against resistance
M4	Return of function as in M3; in addition, all synergic and independent movements are possible
M5	Complete recovery

TABLE TWO: SENSORY FUNCTION

S0	Absence of sensibility in the autonomous area
S1	Recovery of deep cutaneous pain sensibility within the autonomous area of the nerve
S2	Return of some degree of superficial cutaneous pain and tactile sensibility within the autonomous area of the nerve
S3	Return of superficial cutaneous pain and tactile sensibility throughout the autonomous area, with disappearance of any previous over response
S3+	As S3; in addition some recovery of 2 point discrimination within the autonomous area
S4	Complete recovery

LONG TERM ISSUES FACING ADULTS WITH BRACHIAL PLEXUS INJURIES

Because the unaffected arm has done double duty for so many years, it ages more quickly and is prone to stress-related injuries, such as tendonitis, bursitis, carpal tunnel syndrome and muscle injury. Arthritis is reported in both the affected and unaffected arms and shoulders. It is imperative for an adult with such an injury to be aware of this and not to overuse either the affected or unaffected arm. They may need to learn to ask for help whenever possible in order to avoid such injuries.

PSYCHOLOGICAL ISSUES

It is important to understand that even in its mildest forms, a brachial plexus injury is truly life changing. Many people with these injuries have periods of depression and while this could be considered a normal reaction to any traumatic event, the ongoing nature of the injury may cause the depression to become serious or prolonged. In addition, worries about self-image, relationships and finances are likely to be causing extra anxiety. The patient will need to learn to share his or her problems with friends or family, and seek medical help where necessary. The depression can be more limiting than the injury, it is important to realize it will pass and seek help where necessary. As time passes and the patient gains acceptance and becomes accustomed to the life changes wrought by the injury, such periods of depression become fewer.

FURTHER INFORMATION

www.ubpn.org

Contains information, lively message boards and support from brachial plexus injured people and their carers worldwide.

www.nabd.org.uk

Directed at injured motorcyclists, with help and advice re: getting back on the road. Excellent personal profiles and stories, good general and specific information.

www.independentliving.org

A site dedicated to the support of all disabled people, with links to many helpful sites and resources to help with 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. Details of surgeries etc, including case studies. There is an extensive library of articles written.

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