

Brachial Plexus Injury

What is the brachial plexus?

The brachial plexus is a network of nerves that originate near the neck and shoulder. These nerves begin at the spinal cord in the neck and control the hand, wrist, elbow, and shoulder (**see Figure 1**). Nerves are the electrical wiring system in all people that carry messages from the brain to the rest of the body. A nerve is like an electrical cable wrapped in insulation.

Motor nerves carry messages from the brain to muscles to make the body move. Sensory nerves carry messages to the brain from different parts of the body to signal pain, pressure, and temperature. The brachial plexus has nerves that are both motor and sensory.

What happens when the brachial plexus is injured?

The network of nerves is fragile and can be damaged by pressure, stretching, or cutting. Stretching can occur when the head and neck are forced away from the shoulder, such as might happen in a fall off a motorcycle. If severe enough, the nerves can actually avulse, or tear out of, their roots in the neck. Pressure could occur from crushing of the brachial plexus between the collarbone and first rib, or swelling in this area from injured muscles or other structures.

Injury to a nerve can stop signals to and from the brain, preventing the muscles of the arm and hand from working properly, and causing loss of feeling in the area supplied by the injured nerve. When a nerve is cut, both the nerve and the insulation are broken. Pressure or stretching injuries can cause the fibers that carry the information to break and stop the nerve from working, without damaging the cover.

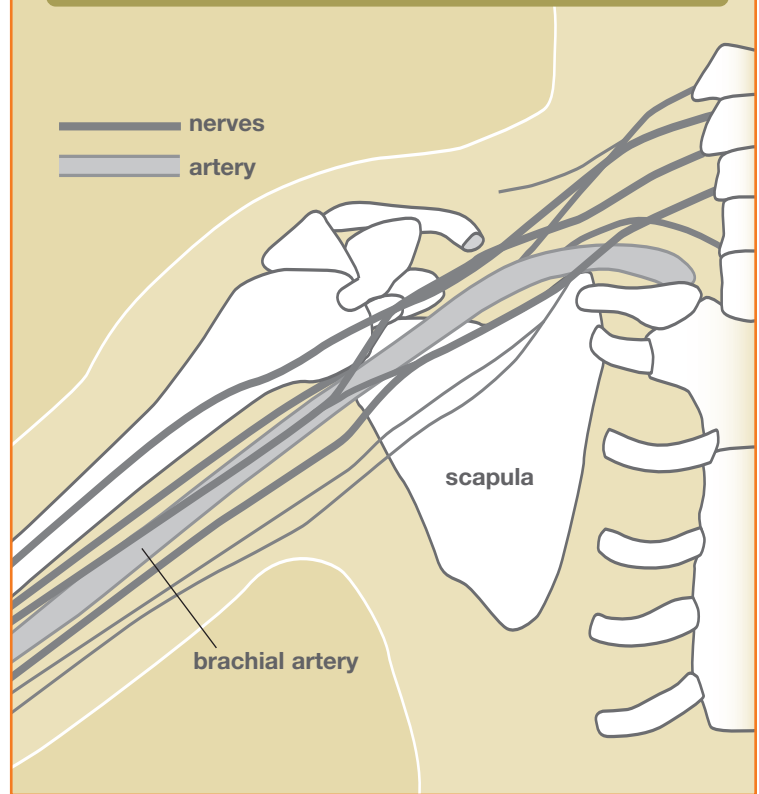
When nerve fibers are cut, the end of the fiber farthest from the brain dies, while the insulation stays healthy. The end that is closest to the brain does not die, and after some time may begin to heal. If the insulation was not cut, new fibers may grow down the empty cover of the tissue until reaching a muscle or sensory receptor.

Some brachial plexus injuries are minor and will completely recover in several weeks. Other injuries are severe enough that some permanent disability involving the arm can be expected.

How is it treated?

Many brachial plexus injuries can recover with time and therapy. The time for recovery can be weeks or months. When an injury is unlikely to improve, several surgical techniques can be used to improve the recovery. To help decide which injuries are likely to recover, your physician will rely upon multiple examinations of the arm and hand to check the strength of muscles and sensation. Additional testing, such as an MRI scan, or CT scan/myelography, may be used to visually evaluate the brachial plexus. A Nerve Conduction Study/Electromyogram

Figure 1: The brachial plexus is a network of nerves that originate near the neck and shoulder, whose branches form the nerves that go into the arm, forearm, and hand.



(NCS/EMG), a test that measures the electrical activity transmitted by nerves and muscles, may also be performed. In some cases, repair of the nerves or transfer of undamaged nerves from other areas of the body can be performed. In other cases, transfer of functioning muscles (tendon transfer) to take over areas of lost function can be performed.

What is my role in recovery and what kind of results can I expect?

The patient must do several things to keep up muscle activity and prevent the joints from getting stiff. Your doctor may recommend therapy to keep joints flexible. If the joints become stiff, they will not work even after muscles begin to work again. When a sensory nerve has been injured, the patient must be extra careful not to burn or cut fingers since there is no feeling in the affected area. After the nerve has recovered, the brain gets lazy and a procedure called sensory re-education may be needed to improve feeling in the hand or finger. Your doctor will recommend the appropriate therapy based on the nature of your injury.

Factors that may affect results after brachial plexus injury include age and the type, severity, and location of the injury. Though brachial plexus injuries may result in lasting problems for the patient, care by a physician and proper therapy can maximize function.