

# Brachial Plexus Avulsion

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## BASIC INFORMATION

### Description

The brachial plexus is a group of nerves located in the armpit area, where the front leg joins the shoulder blade and the chest. The brachial plexus on each side includes the nerves that activate muscle movement and allow for sensation (feeling) in the leg. A brachial plexus avulsion occurs when these nerves are completely torn. Sometimes the nerves are only damaged or stretched.

### Causes

Trauma is the most common cause of brachial plexus injuries, and automobile accidents are the most common cause of trauma. Damage to the brachial plexus can also occur from falls, gunshot wounds, and other injuries that stretch the front legs.

### Clinical Signs

Clinical signs occur suddenly after the injury. Signs can vary depending on which nerves in the brachial plexus are damaged and the severity of the nerve damage.

- Damage to the nerves in one portion of the brachial plexus leads to inability to move the shoulder or bend the elbow. In these cases, the animal may be able to straighten the elbow and, therefore, support weight and walk.
- Damage to the nerves in another portion of the brachial plexus results in inability to support weight on the leg. The animal walks with the paw knuckled under and cannot bend the shoulder or elbow. Severe neurologic damage can result in loss of feeling in the leg.

A condition called *Horner's syndrome* can also occur following brachial plexus avulsion. Horner's syndrome affects the eye on the same side as the brachial plexus injury, resulting in a small pupil, a droopy upper eyelid, a raised third eyelid, and a sunken appearance to the eye. Vision is not affected.

### Diagnostic Tests

The diagnosis of brachial plexus avulsion is usually made from the history and neurologic examination. Other body systems are also evaluated for damage from the trauma. Orthopedic injuries and damage to the heart and lungs may be present and require immediate attention. X-rays of the front legs, abdomen, and chest may be recommended to evaluate for other injuries.

Specialized tests such as electromyography (EMG) and nerve conduction studies can be performed to evaluate muscle and nerve function; however, changes in these tests may not develop for 7-10 days after the injury. These tests usually require referral to a veterinary neurologist, are performed with the use of general anesthesia, and rarely provide information about the potential return of limb function.

## TREATMENT AND FOLLOW-UP

### Treatment Options

There is no specific treatment for brachial plexus avulsion. If the nerves are only damaged and not torn, then recovery of function may be possible. Recovery can take weeks to months. During this time, it is important to prevent injuries to the affected leg caused by dragging of the toes. A foot protector or "bootie" may be recommended. Some severely affected animals may mutilate the affected leg, especially if they have lost sensation (feeling) in their toes. A drug called *gabapentin* may be tried to alleviate the "pins and needles" sensations that are associated with self-mutilation and foot chewing.

Physical therapy exercises may be recommended, such as massaging the muscles and moving the leg in a walking motion for a few minutes, several times a day. These exercises are essential to maintain muscle tone and prevent shrinkage of the muscles from disuse.

If the animal does not regain nerve function in the affected leg, amputation is usually recommended to prevent continued injury and self-mutilation.

### Follow-up Care

Initially, frequent follow-up examinations are often needed to monitor for improvement and further damage to the leg. Once nerve function returns, or if the leg is amputated, long-term follow-up is not typically necessary.

### Prognosis

Prognosis depends on the severity of nerve damage. Mildly damaged nerves can sometimes regenerate over time, but the process is very slow. Brachial plexus injuries that cause paralysis and loss of feeling have a poor prognosis for recovery. Injuries that result in complete brachial plexus avulsions are irreversible. In general, if there is no improvement in 2-4 weeks, amputation of the affected leg may be necessary. The maximum time in which recovery is still possible is approximately 3-4 months after the injury.