

How to Perform Palmar Digital Neurectomy in the Standing Horse

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Neurectomy of the palmar digital nerves is a commonly employed surgical technique to treat chronic heel pain in horses that have frequently failed to respond to other therapeutic modalities. Although it is generally advocated that the procedure be performed with the horse anesthetized, it is possible to perform the procedure in the standing patient. Authors' address: Department of Large Animal Medicine and Surgery, Texas A&M University, College Station, TX 77843-4475. © 2001 AAEP.

1. Introduction

Neurectomy of the palmar digital nerves is occasionally required to allow horses with chronic heel pain the opportunity to remain athletically sound. A variety of diseases or syndromes can contribute to chronic heel pain, the most common of which is pain associated with structures in the region of the navicular bone. Despite aggressive treatment with intra-articular or intrabursal injections, therapeutic shoeing, and systemic anti-inflammatory agents, a significant number of horses either fail to respond to treatment or respond temporarily, necessitating consideration of palmar digital neurectomy as a final treatment option. Horses for which this treatment option is considered need to have the lameness improve more than 90% following perineural anesthesia of the palmar digital nerves. Although the neurectomy is technically easier to perform with the patient anesthetized and positioned in dorsal recumbency, it is possible to perform the procedure with the horse standing. In our practice, owner economic constraints are the most frequent reason for performing palmar digital neurectomy in the

standing horse; however, risks associated with general anesthesia occasionally necessitate consideration of standing neurectomy. It should be kept in mind, however, that there are certain situations where standing surgery is not in the best interest of the horse, the handler, or the clinician, and general anesthesia should be employed.

2. Materials and Methods

Optimally, the standing neurectomy should be performed on a concrete slab in a dust-free environment. Surgery can be performed with the horse restrained in a stocks or held by an assistant. We prefer to do surgery with the horse outside the stocks and held by an assistant so we are not encumbered by the horizontal bar of the stocks. The horse is groomed to remove loose hair and dander and the feet are picked and cleaned with a wire brush. Regional anesthesia of the foot is provided by blocking the palmar digital nerves at the abaxial level of the proximal sesamoid bones. Blocking the foot prior to clipping the hair facilitates clipping as the horse is not as sensitive to the vibration generated by the clippers. The feet to be denervated are

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clipped circumferentially from the coronary band to the level of the fetlock joint with a #40 clipper blade. The entire circumferential distal limb extending from the hoof wall to fetlock joint is prepared for aseptic surgery using standard techniques.

Depending on the temperament of the horse, mild sedation may be necessary. We typically give most horses 3 mg detomidine intravenously immediately prior to surgery. It is important to not over-sedate the patient as it will be difficult to pick up the leg to be operated. A second assistant is required to lift the limb to be operated off the ground. The limb is held by the assistant around the cannon bone, with the cannon bone parallel to the ground surface, and the foot is allowed to fall forward to its normal extended position. The surgeon operates on the lateral nerve of the left forelimb and the medial nerve of the right forelimb from the left side of the horse, and the lateral nerve of the right forelimb and medial nerve of the left forelimb from the right side of the horse. The assistant elevates the appropriate limb as required.

The palmar digital neurectomy stripping technique described by Black¹ is utilized. A 1.5- to 2.0-cm incision through the skin and subcutaneous tissue is made with a #10 scalpel blade immediately proximal to the collateral cartilage over the palmar aspect of the palpable neurovascular bundle containing the digital vein, artery, and nerve. The nerve is isolated by carefully separating the perineural tissues with a small curved mosquito hemostat and elevated out of the incision. Gentle traction is applied to the exposed nerve to facilitate identification of the nerve in the proximal pastern region. A proximal 2-cm incision is made over the palpable nerve just distal to the base of the proximal sesamoid bone and the nerve is isolated from the surrounding connective tissue and elevated out of the incision. In contrast to the original technique described by Black,¹ we prefer to transect the nerve in the distal incision first, followed by applying traction to the nerve isolated through the proximal incision with the mosquito hemostat to strip it from the palmar aspect of the pastern region. This will expose 8 to 10 cm of the palmar digital nerve. Once the nerve has been stripped free, firm traction is applied to tense the proximal nerve segment and it is transected sharply at the proximal extent of the proximal incision. Tensing the nerve prior to transection allows the proximal stump to withdraw into tissues that have not sustained surgical trauma. The skin is closed with stainless steel staples. We make a specific point of not burying any suture material in the subcutaneous area in an attempt to

minimize any inflammatory response near the transected nerve ends.

Intraoperative hemorrhage is usually minimal and is addressed by applying gauze sponges as needed to enhance visualization. If hemorrhage obscures visualization at the surgery site, the horse is allowed to stand on the leg and one of the other digital nerves approached during which time the bleeding site usually clots. Surgery can then resume at the appropriate time.

Following surgery, a padded pressure bandage is applied extending from distal to the coronary band to the proximal cannon bone region. The bandage is changed every 4 to 5 days for 2 weeks at which time the skin staples are removed. The horse is stall-confined for 30 days after which time light exercise can resume. Return to full training occurs 60 days postoperatively.

3. Discussion

Numerous techniques have been employed with regard to the actual transection technique when performing a palmar digital neurectomy. In a study that evaluated the long-term outcome of 4 surgical techniques for palmar digital neurectomy (guillotine transection, perineural capping, CO₂ laser coagulation, and CO₂ laser transection), it was determined that the guillotine method produced less painful neuromas because the nerve was stretched during transection, allowing the proximal nerve stump to withdraw into tissue less affected by surgical trauma.² Therefore, we use the guillotine technique to decrease the incidence of painful neuroma formation in conjunction with the stripping technique describe by Black to lengthen the time required for nerve regrowth to optimize the time operated horses remain pain free. Although not necessarily optimal from the standpoint of surgeon comfort, standing neurectomy can nevertheless be performed effectively and without compromise to the patient. In situations where the added cost of general anesthesia prevents palmar digital neurectomy from being considered as a treatment option, or if anesthetic risks preclude general anesthesia as an option, it may be prudent to consider performing the neurectomy in the standing patient.

References

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