

–30° C.<sup>72</sup> Other alternatives include topical application of chemicals<sup>73</sup> and injection of neurotoxins such as cobra venom. Carbon dioxide laser treatment of the proximal nerve stump has reduced the development of neuromas.<sup>74</sup>

In certain countries, animal welfare legislation and equine sports associations (for instance, the International Equestrian Federation [FEI]) prohibit horses that have had a digital neurectomy from competing in official events. As a consequence, various methods of detecting a neurectomy have been developed.<sup>75,76</sup>

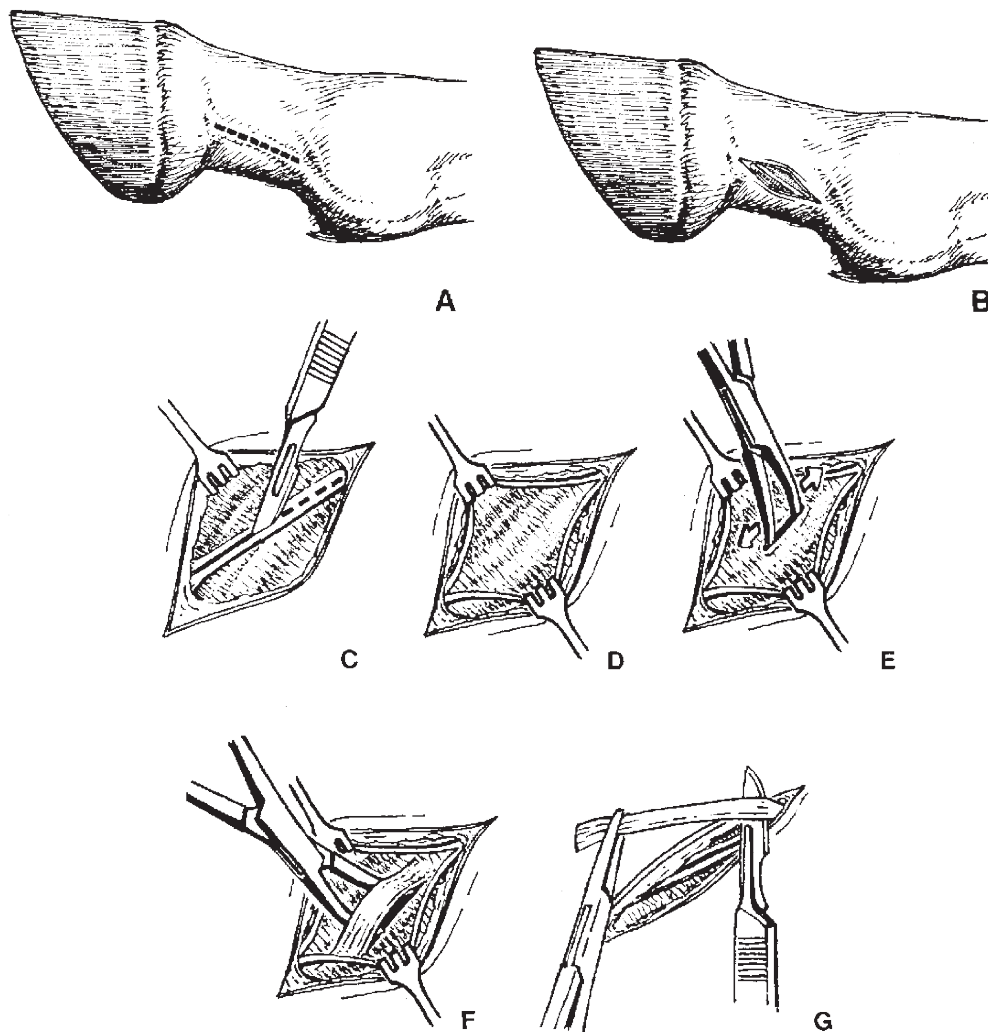
### Palmar Digital Neurectomy in the Pastern Region Using One Skin Incision

The horse is positioned in dorsal recumbency,<sup>68</sup> and the limbs are extended and tied to restraints attached to the ceiling. The surgical field is clipped, prepared for aseptic surgery, and draped. The nerve is palpated, and an approximately 6- to 8-cm incision is made in the pastern skin

directly over the nerve<sup>65</sup> (Fig. 93-48, A and B). Usually the skin incision is made along the dorsal edge of the DDF tendon, which directly exposes the nerve.

The ligament of the ergot is identified and split longitudinally (see Fig. 93-48, C and D), allowing access to the neurovascular bundle located beneath it. Splitting the ligament provides an extra layer to be closed over the severed nerve and potentially reduces postoperative irritation and subsequent neuroma formation. Additionally, mistakenly transecting the ligament instead of the nerve can be prevented with this technique. The nerve is isolated within the neurovascular bundle and well separated from the artery (see Fig. 93-48, E and F). The neurotomy is initially performed proximally and then distally, followed by removal of the loose piece of nerve (see Fig. 93-48, G).

The ligament of the ergot is closed in a continuous pattern, and the skin is closed with simple interrupted sutures. Aftercare is the same as that for the method using a small incision, described under "General Considerations."



**Figure 93-48.** Illustration of the neurectomy procedure for the phalangeal region through one incision. **A**, Location of the skin incision. **B**, The skin incision has been made. **C**, The ligament of the ergot is split longitudinally and separated (**D**), giving access to the underlying tissues and the neurovascular bundle. **E**, The structures of the neurovascular bundle are separated, and **F**, the nerve is isolated. **G**, A 2-cm piece of nerve is excised.

### Palmar Digital Neurectomy in the Pastern Region Using Two Small Incisions

The location of the nerve is palpated and two approximately 1.5-cm skin incisions are made directly over the nerve (Fig. 93-49, A and B). The distal skin incision is located at the distal end of the pastern region at the transition to the bulb of the heel. The proximal skin incision is selected at the proximal end of the pastern region at the transition to the metacarpophalangeal joint.

The tissue is bluntly dissected longitudinally with a mosquito forceps so that the dorsal and palmar aspects of the nerve are freed (see Fig. 93-49, C). It is important that the nerve and artery be well separated. Proximally the nerve might be obscured by the ligament of the ergot, which runs superficial to the nerve at a slightly different angle. The nerve is always covered by fascia, and it can be surprising how deep a dissection is required for its isolation.

Once the nerve has been freed proximally and distally, it is alternately pulled at either end to ensure that the correct structure has been exposed. The nerve is pulled up with a mosquito forceps, held with tissue forceps, and cut sharply as far distally and proximally as possible with a no. 15 scalpel blade (see Fig. 93-49, D and E). One clamp is applied to the proximal end and another one to the distal end of the severed nerve segment, and tension is applied to ensure that all attachments are eliminated and the nerve segment can be completely removed (see Fig. 93-49, F and G). The skin incisions are closed with 2-0 nonabsorbable suture material.

The advantages of this technique are the small size of the skin incisions, short time of surgery, and low incidence of neuroma formation.

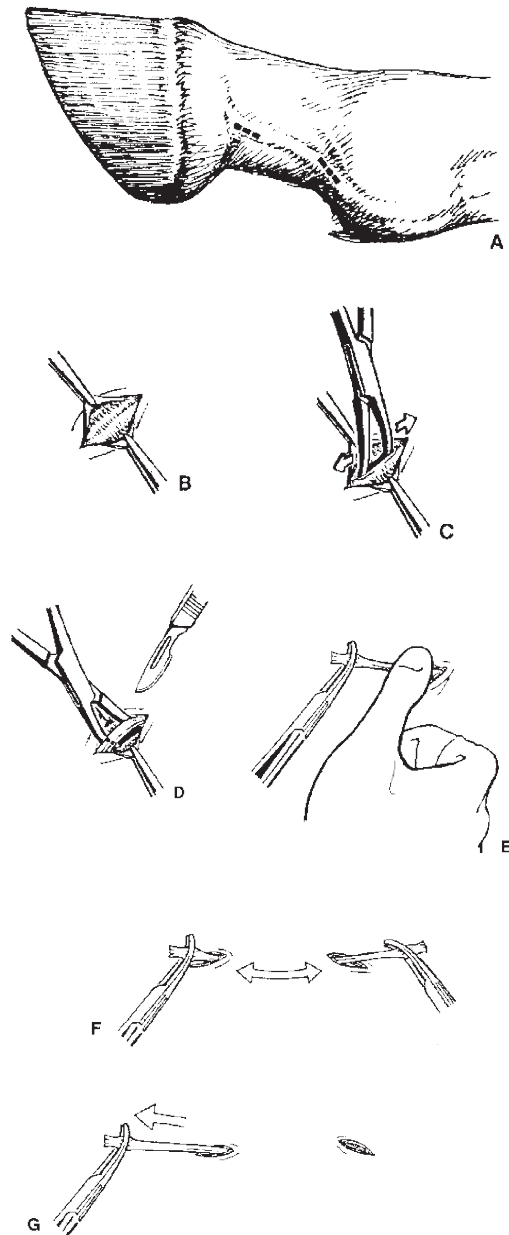
### Repeated Palmar Digital Neurectomy

A second neurectomy might be necessary when re-innervation occurs and the horse becomes lame again. For this procedure, a long incision is usually made so that the nerve can be adequately freed. This procedure is often more difficult than the initial operation because the nerve is generally very closely associated with the artery.

Small neuromas are always seen in the proximal aspect of the previous surgical field. These nodules can be easily palpated in horses that have had a neurectomy. Sometimes the regrown nerve is surrounded by a large amount of scar tissue, which makes the operation more difficult. Only the neuroma and part of the distal nerve should be removed. Skin closure and aftercare are the same as for the other neurectomy procedures.

### High Lateral and Medial Palmar Neurectomy

The goal of high lateral and medial palmar neurectomy is to disrupt afferent and efferent nerve tracts proximal to the division into palmar and dorsal branches to prevent pain sensation from chronic disease processes innervated by the dorsal branches of the lateral and medial palmar nerve. This is usually performed proximal to the flexor tendon sheath, because locating and removing the nerve is easy in this location (Fig. 93-50). Also, there is little relative movement in this area, so that the nerve endings are less traumatized. The operation is carried out with the horse in dorsal recumbency. The skin is incised immediately proximal to



**Figure 93-49.** Digital neurectomy performed through two small incisions. **A**, Location of the two incisions. **B**, The neurovascular bundle is visible through an incision. **C**, The nerve is isolated, and **D**, elevated above the incision. **E**, The proximal end is transected, followed by the distal end (**F**) and the piece of nerve pulled out of the distal incision (**G**). The incisions are subsequently sutured.

the flexor tendon sheath on the lateral and medial aspects of the metacarpus. The nerve is located, isolated, and removed. Aftercare is the same as for the other techniques.

### SURGICAL MANAGEMENT OF NAVICULAR SYNDROME

Navicular disease is a degenerative disorder that involves the DSB and its surrounding structures. The etiopathogenesis of the condition is multifactorial, and many theories have been