Use of an Elevated Boot to Reduce Contralateral Support Limb Complications Secondary to Cast Application

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For a horse whose limb is placed in a cast that covers the entire foot, weight-bearing problems often occur. An elevated boot can be used on the support limb to raise the foot the same distance off the ground as the casted leg. Authors' address: Veterinary Teaching Hospital, College of Veterinary Medicine and Biomedical Sciences, Colorado State University, 300 West Drake Rd., Fort Collins, CO 80523. © 1997 AAEP.

1. Introduction
As casting materials improve, and the techniques for repairing fractures and other injuries of the distal leg are refined, more horses are placed in casts. Reasons for using casts in horses include fractures, tendon injuries, and soft-tissue injuries of the pastern area. In all of these cases, the limb is placed in a cast that includes the entire foot. Often this will include the use of poly(methyl methacrylate), or PMMA, at the bottom of the cast to reduce wear of the weight-bearing surface of the cast. Inherently, the combination of cast material and PMMA on the solar surface of the foot raises the casted leg further off the ground than the supporting leg. This poses some problems for the horse in that it can no longer bear weight evenly on the casted leg and the contralateral leg because of the difference in length. To compensate for a difference in length, the horse has to either place the casted leg in front of or behind the supporting leg, thus increasing weight bearing on the support leg, or bear the majority of weight on the casted limb. The consequences of increased weight bearing of the support leg include breakdown, weight-bearing laminitis, or, in young animals, angular limb deformities. Results of increased weight bearing in the casted leg may lead to breakdown of fracture repair, and, more commonly, severe cast sores. To prevent these secondary problems, we have begun using an elevated boot on the support limb to raise the foot to the same distance off the ground as the casted leg. The purpose of this paper is to describe how the elevated boot is made, and how it has worked in selected cases.

2. Methods
An appropriately sized Easy Boot or Davis Barrier Boot is selected to fit the foot of the support limb of the horse. A piece of wood (green treated pine) of similar thickness to the built-up solar portion of the cast is chosen, and the outside circumference of the selected boot is traced onto the wood. The wood is cut along the line, and four to six wood screws or drywall screws, long enough to go 1 in. (2.54 cm) into the wood, are used to attach the boot to the wood. The
screws should be directed from the inside of the boot into the wood block. The boot is then placed onto the support limb, after the foot has been cleaned, and Elasticon is placed on the top of the boot to keep the inside of the boot clean. The boot should be removed and the foot should be cleaned on a weekly basis to prevent thrush.

3. Results
The first horse that the elevated boot was used on was a 6 year old, male intact, Quarter Horse that was presented to the Veterinary Teaching Hospital for a pastern laceration of the palmar aspect of the right front leg of 2 days duration. The laceration was cleaned and debrided, the leg was bandaged, and the horse was placed in a Kimsey Splint for 2 days prior to surgery. The horse used the splint very well and moved around the stall comfortably. The third day after presentation, the horse was anesthetized, the wound further debrided, the pastern bone curetted, the skin and subcutaneous tissues closed, and the leg placed in a cast with the phalanges slightly flexed. The cast included the foot, and an approximately 1-cm-thick layer of PMMA was added to the bottom of the cast. The total thickness of the bottom of the cast was estimated at 3.5 cm (1.5 in.). The horse recovered from anesthesia and was taken back to its stall. The following morning the horse was noted to be somewhat depressed and did not use the casted leg very well. There was no heat, swelling, or discharge associated with the casted leg. Throughout the day it was noted that the horse did not move around the stall and was inappetent. While standing, the horse would position the casted leg either in front of or behind the contralateral support limb. The following morning, an elevated boot was applied to the support leg, and the horse immediately walked over to the feed bin and started eating. It was noted that the horse now moved freely about the stall.

4. Discussion
An elevated boot has been used on approximately 20 horses that had casts on either the forelimb or hindlimb. Reasons for applying casts have included fracture repair of the third metacarpus–metatarsus and second phalanx, arthrodesis of the metacarpal phalangeal joint and proximal interphalangeal joint, repair of lacerated tendons, and soft-tissue injury such as pastern lacerations. The elevated boot was originally only applied to horses that showed some problem with movement; however, we currently apply an elevated boot to any horse that has a cast, as soon as it is stable following recovery from anesthesia. The use of elevated boots has not completely alleviated complications associated with cast application, but it has dramatically reduced the frequency of such problems. The boots are not expensive to make and can easily be reused.

Footnotes
a Easy Care, Inc., 3600 E. Hanley Blvd. #136, Oro Valley, AZ 85737.
b Davis Manufacturing, Inc., 350 N. Center St., Brandon, WI 53919.
c Johnson and Johnson, 501 George St., New Brunswick, NJ 08903.
d Kimsey Co., 164 Kentucky, Woodland, CA 95695.