Abolition of Lameness Caused by Experimentally Induced Solar Pain in Horses after Analgesia of the Distal Interphalangeal Joint

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A local anesthetic injected into the distal interphalangeal joint is commonly regarded to cause analgesia of that joint and also of the navicular bone and its ligaments. We found that analgesia of this joint also resolved lameness caused by pain induced in the toe region of the sole. Authors’ addresses: Dept. of Large Animal Surgery and Medicine, College of Veterinary Medicine, Auburn University, AL 36849-5522 (John Schumacher, DeGraves, Steiger, Coker); Dept. of Farm Animal and Equine Medicine and Surgery, The Royal Veterinary College, University of London, Hawkshead Lane, North Mymms, Hatfield, Hertfordshire AL9 7TA, UK (Schramme, Jim Schumacher, Smith). © 1999 AAEP.

1. Introduction
Temporary resolution of lameness caused by analgesia of the distal interphalangeal (DIP) joint was once thought to localize the cause of lameness to that joint. Lameness caused by navicular syndrome was found to resolve temporarily following injection of the DIP joint with local anesthetic. We have observed that horses we believed to be lame because of solar pain also had resolution of lameness after injection of the DIP joint with a local anesthetic. To test the theory that solar pain can be temporarily abolished or attenuated by a local anesthetic injected into the DIP joint, we created a method of inducing lameness caused by solar pain and then injected the DIP joint of the lame limb with mepivacaine hydrochloride.

2. Materials and Methods
Six horses with no signs of forelimb lameness were shod with shoes to which a 3⁄8"-16 nut had been welded to the inside of each branch just dorsal to the apex of the frog. Lameness caused by solar pain was created by forcing set-screws with pointed tips through the nuts into the sole of the toe. Horses were videotaped when walked or trotted on a hard surface before and after application of set-screws. The DIP joint of the lame limb was then injected with 10 ml of either saline or 2% mepivacaine hydrochloride, and 10 minutes later, gaits were again videotaped. Two investigators, who had no knowledge of the limb selected for set-screw application or whether the DIP joint had been injected with saline or mepivacaine hydrochloride, evaluated gaits.
recorded on videotape and assigned a lameness score for each gait of each horse. The principal investigator also scored gaits as recorded on videotape. Effects of treatment on lameness scores were evaluated using the sign test. Values of $p \leq 0.05$ were considered significant.5

3. Results
Application of set-screws caused a significant increase in lameness scores of the affected limb, compared with the contralateral limb and compared with the same limb before application of set-screws. Set-screw-induced lameness was significantly reduced by injection of mepivacaine hydrochloride but was not reduced by saline injection. Lameness scores of horses before application of set-screws and after injection of mepivacaine hydrochloride were not significantly different.

4. Discussion
Set-screws forced into the soles of horses created solar pain that could be controlled and quickly reversed. Injection of a local anesthetic into the DIP joint caused at least partial, and often total, analgesia of the sole at a region adjacent to the apex of the frog.

When lameness has been localized to the heel by analgesia of the palmar digital nerves, injection of the DIP joint with a local anesthetic has been recommended to distinguish lameness caused by navicular syndrome from lameness caused by pain originating from other structures in the heel.3 Based on results of this investigation, we question the value of anesthesia of the DIP joint to localize pain to this joint or the navicular bursa bone and ligaments. Erroneous perceptions as to what structures are desensitized by analgesia of the DIP joint may lead to misinterpretation of the results of diagnostic analgesia during clinical examination of a lame horse. Pain arising from the sole should be considered as a cause of lameness when lameness is abolished by diagnostic analgesia of the DIP joint.

References