Effects of Industrial Styrofoam on Forefoot Center of Pressure and Load Distribution in Normal Horses

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The use of industrial styrofoam sole supports may provide an effective treatment for acute laminitis. Authors' addresses: Departments of Veterinary Clinical Sciences (Schleining, McClure), Kinesiology (Derrick), and Statistics and Veterinary Diagnostic and Production Animal Medicine (Wang), Iowa State University, Ames, Iowa 50011; e-mail: jschlein@iastate.edu. © 2010 AAEP.

1. Introduction
Laminitis is a significant contributor to equine morbidity. The exact etiology remains elusive, and controversy exists regarding the best treatment modality. The goal of this study was to evaluate the effect of industrial foam insulation sheeting (“blue foam”) to the sole of the foot on load distribution and the center of pressure in normal horses.

2. Materials and Methods
Center of pressure data and solar load distribution patterns were recorded using the forefeet of 25 horses using a high-resolution pressure measurement system before placement of sole support. These measurements were repeated at various intervals for 48 h after placement. Data were compared using a linear mixed model with repeated measurements.

3. Results
Total contact surface area was increased significantly at all time points, whereas contact pressure and peak contact pressure were significantly decreased at all time points after application of styrofoam. Palmar movement of the center of pressure was seen 24–48 h after styrofoam application.

4. Discussion
This study indicates a styrofoam sole support provides the foot with an increased weight-bearing surface area while decreasing total contact pressure. This removes the hoof wall and presumably the laminae from a primary weight-bearing role. The benefit of a palmar shift in the center of pressure is a decrease in the moment arm acting at the distal interphalangeal joint, which decreases the pull of the deep digital flexor tendon on the third phalanx.