A Comparison of Five Techniques for Injection of the Navicular Bursa in the Horse

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Injection of the navicular bursa is most reliably achieved by inserting a needle through the skin 1 cm proximal to the coronary band, midway between the heel bulbs and advancing it in the sagittal plane of the foot towards the “navicular position.” Authors’ Address: The Equine Referral Hospital, Royal Veterinary College, Hawkshead Lane, North Mymms, Hatfield, Hertfordshire AL9 7TA. UK © 1999 AAEP.

1. Introduction
Numerous different techniques for injection of the navicular bursa have been described, but there is little conformity among these descriptions. The aim of this study was to evaluate five different techniques for injection of the navicular bursa and to assess which technique was most consistently successful.

2. Materials and Methods
The literature was reviewed and techniques for injection of the navicular bursa were categorized into five different approaches.

A. Distal Palmar Approach Parallel with the Coronary Band (DPPCB)¹ (Fig. 1)
The needle was inserted midway between the heel bulbs, immediately proximal to the coronary band and advanced dorsally in the sagittal plane, parallel with the coronary band.

B. Distal Palmar Approach Parallel with the Sole (DPPS)² (Fig. 2)
The needle was inserted midway between the heel bulbs, immediately proximal to the coronary band and advanced dorsally in the sagittal plane, parallel with the solar surface of the foot.

C. Proximal Palmar Approach (PP30)³ (Fig. 3)
The needle was inserted into the hollow of the heel and advanced dorsally in the sagittal plane, at an angle of 30° to the horizontal.

D. Lateral Approach (L45)⁴ (Fig. 4)
The needle was inserted proximal to the lateral cartilage of the third phalanx, between the second phalanx and deep digital flexor tendon and advanced distally at an angle of 45° in the frontal plane.
E. Distal Palmar Approach to the Navicular Position (DPNP) (Fig. 5)

The “navicular position” was defined as a point on the lateral or medial aspect of the hoof wall, 1 cm distal to the coronary band and midway between the most dorsal and most palmar aspect of the coronary band as viewed from lateral or medial. A radiopaque marker was attached to the lateral hoof wall to mark this point.

The needle was inserted midway between the heel bulbs, proximal to the coronary band and advanced along the sagittal plane of the foot towards the bisecting point between the sagittal plane and the long axis of the navicular bone. The long axis of the navicular bone was assumed to be the connecting line between the “navicular position” points on the lateral and medial hoof walls.

Five inexperienced practitioners performed each approach on five cadaver forelimbs. In order to ascertain conformity with the description of the techniques, radiopaque markers were applied to the dorsal hoof wall and coronary band, and radiographs were taken after needle placement. Once the needle was inserted in accordance with the relevant description, 3 ml meglumine diatrizoate* was injected and another radiograph was taken. The presence of contrast medium in the navicular bursa only was interpreted as a successful injection.

The navicular position was marked with a radiopaque marker on the hoof wall of a forefoot in 10 standing horses to assess whether the landmarks for the “navicular position” as defined in the cadaver...
limbs could be applied to the live horse. Radiographs were taken to assess the position of the marker.

The data were analyzed using Cochran-Q, Fisher’s Exact post hoc and Kruskal-Wallis tests, \( p \) values < 0.05 were considered significant.

3. Results

The results for successful injection of the navicular bursa in the hands of inexperienced practitioners were 4/25 (16%) for the DPPCB technique, 8/25 (32%) for the DPPS technique, 8/25 (32%) for the PP30 technique, 10/25 (40%) for the L45 technique, and 23/25 (92%) for the DPNP technique. Radiographs demonstrated that the radiopaque marker used in the DPNP technique was superimposed, at least partly, on the navicular bone in all limbs, in both the cadaver specimens and in the live horses (Fig. 6).

Analysis of these results suggested a highly significant difference between these techniques \( (p < 1 \times 10^{-6}) \) and that the results obtained with the DPNP technique differed significantly from those of the other 4 techniques \( (p < 0.0002) \). The DPNP technique was between 2.3 and 5.75 times more likely than the other techniques to result in successful injection of the navicular bursa in the hands of an inexperienced practitioner.

A Kruskal-Wallis test showed there was no significant difference between the five techniques in the number of times that the needle had to be inserted to conform with the relevant description of the approach \( (p = 0.08) \).

4. Discussion

The position of the navicular bone was highly predictable as a point 1 cm below the coronary band, halfway between the most dorsal and most palmar aspect of the coronary band. The use of this point as a landmark for injection of the navicular bursa allowed a high degree of accuracy and reliability of needle placement, irrespective of the foot conformation. The DPNP technique was superior to the other injection techniques evaluated. These findings have been supported by the authors’ experiences in clinical cases. In the other techniques, strict adherence to published guidelines may result in erroneous needle placement.

References and Footnotes


*Urografin 370, Schering Health Care Limited, Burgess Hill, West Sussex, England.*