REVIEW OF PODOTROCHLEAR SYNDROME IN EQUINES

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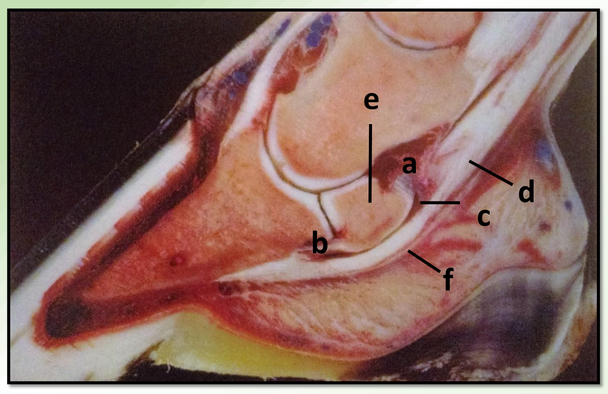
INTRODUCTION

Podotrochlear syndrome comprehends a variety of conditions that may cause heel pain in horses and it is clasically associated to chronic lameness which usually affects both front limbs. Its clinical manifestations are variable, both insidious and acute onsets have been described and signs may occur initially in one forelimb and progress to bilateral limb affectation.

AIMS

1. Review anatomical and biomechanical information about the syndrome.
2. Identify the possible limitations that it can cause.
3. Show recent diagnostic tools.
4. Provide relevant information about its treatment.

BIOMECHANICS



The podotrochlear apparatus is composed of the navicular bone, the CSLs (collateral sesamoidean ligaments), the DSIL (distal sesamoidean impar ligament), the navicular bursa, the DDFT (deep digital flexor tendon) and the ADDL (distal digital annular ligament). The navicular bone articulates with the second and third phalanges and it provides an advantage to the mechanical maintenance of the DDFT.

With regards to pathogenesis, the most accepted hypothesis is that of the continuous, repetitive and cyclic pressure between the DDFT and the navicular flexor cortex which causes degenerative changes in both structures and foot pain.

Figure 1. Parasagittal section of the equine foot. **a,** CSL. **b,** DSIL. **c,** navicular bursa. **d,** DDFT. **e,** navicular bone. **f,** ADDL. From Denoix J.M. (2001). *Distal part of horse limbs.*

DIAGNOSIS

Nowadays, even if **clinical signs**, **response to local anaesthesia** and **x-ray techniques** are common tools which help diagnosing this syndrome, **magnetic resonance imaging** is the most efficient technique in order to achieve an accurate and definitive diagnosis.

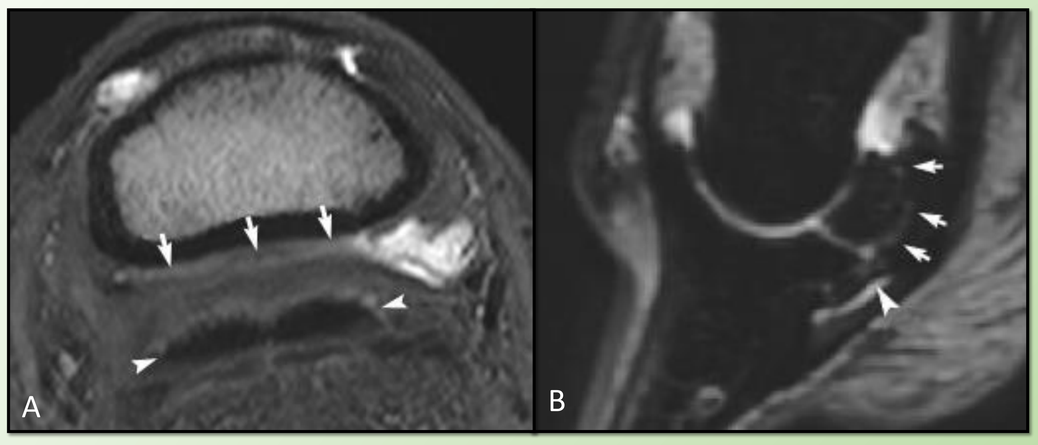


Figure 2. A, Sagittal STIR MRI with a linear increased signal intensity extending through the navicular bone between the insertion of the CSL and the origin of the DSIL (white arrows). **B,** Transverse T2 MRI of the left front foot. The CLs (arrows) is thickened and is in close apposition to the DDFT (arrowheads). Fluid can only be seen in the navicular bursa to the right of the image. From: Dyson S. (2011). Chapter 30 - Navicular Disease. *Diagnosis and Management of Lameness in the Horse*.

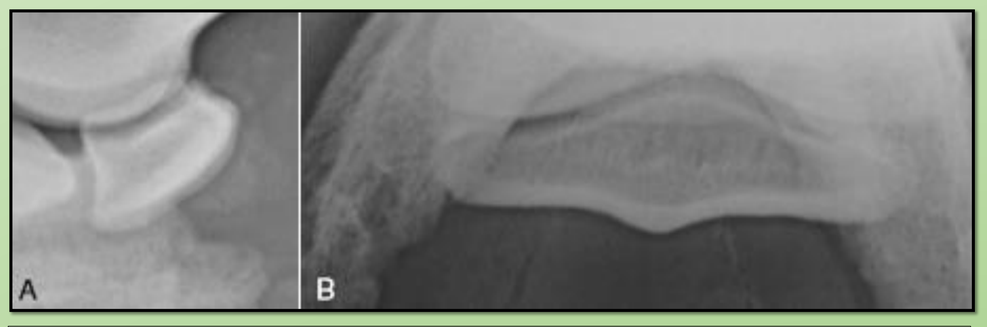


Figure 3. A, Lateromedial radioraphic image of a normal navicular bone. **B,** PPPDO radiographic image of a normal navicular bone. From: Dyson S. (2011). *Radiological interpretation of the navicular bone.*

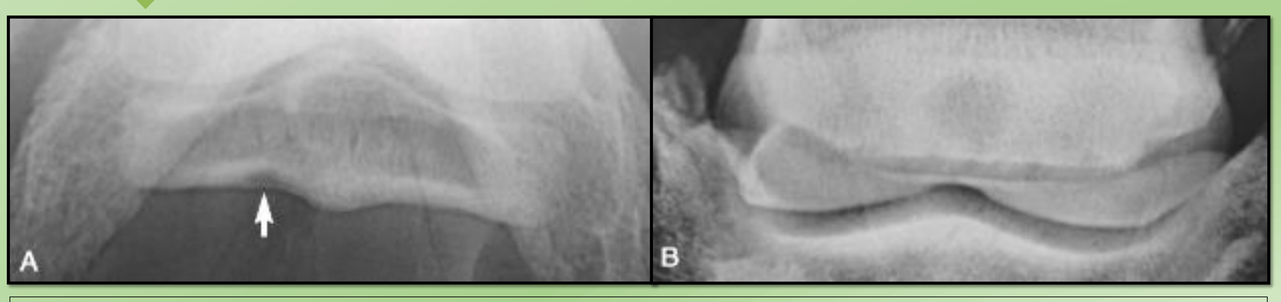


Figure 4. A, DPPDO radiographic image of a navicular bone with a radiolucent defect in the medial flexor cortex (arrow). **B,** DPPDO radiographic image of a navicular bone with a large cystlike lesion within the spongiosa of the bone. From: Dyson S. (2011). *Radiological interpretation of the navicular bone.*

TREATMENT

- FARRIERY: a correct dorsopalmar and mediolateral balance is necessary in order to guarantee good hoof biomechanics. Egg-bar shoes are the most commonly used to increase the ground contact area and to provide extra support to the heel.

- **AINEs:** such as Firocoxib and Phenylbutazone.
- **CHEMICAL NEURECTOMY** and **DPN (DIGITAL PALMAR NEURECTOMY)**: recent changes in DPN decreased the incidence of re-innervation post-surgery.
- **INTRA-ARTICULAR/INTRA-BURSAL ADMINISTRATION OF CORTOCOSTEROIDS.**

NEW THERAPIES

- **INTRA-ARTICULAR/INTRA-BURSAL ADMINISTRATION:** Stanozolol (to decrease the inflammation) and Polyacryl amid hydrogel.
- **GABAPENTIN**
- **OSPHOS**
- **INTRA-LESION THERAPIES WITH BIOLOGICAL AGENTS:** such as PRP and stem-cells.

- BAREFOOT: the aim is to exercise the digital cushion and the frog without compromising normal physiologic hoof mechanisms for energy dissipation on foot landing. Trimming the hoof so that the bone and joint balance is optimal and keeping toe short decreases lever arm on caudal soft tissue structures. Note the rounded off distal wall border in figure 6.

Figure 5. Bar shoe. From: Stephen E. (2009). *Proper Physiological Horseshoeing: What is it? How Do We Apply It?.* **Figure 6.** Barefoot trim. From: Casteljins H. (2012). *The basics of farriery as a prelude to therapeutic farriery*

CONCLUSIONS

Podotrochlear syndrome is one of the most important causes of lameness in horses, and is responsible for great loss of athletic ability in equine athletes.

Nowadays, diagnostic techniques such as palmar digital anaesthesia and x-rays are being replaced by more efficient techniques like MRI, which allows observation and study of the caudal foot structures in a more detailed and specific fashion.

It is known that rest is not the best therapeutic strategy in the long run and has been replaced by active rest followed by controlled exercise protocols and in terms of farriery, egg-bar shoes are the most commonly used. On the contrary, barefoot is a valid alternative approach that is gaining importance every day, such as the use of orthobiotic and regenerative therapeutic strategies.

Even though there has been a certain progression in the unveiling of the different pathologies involved in the treatment of this syndrome, large unknowns remain still as far as prevention and long term management.