Navicular Syndrome

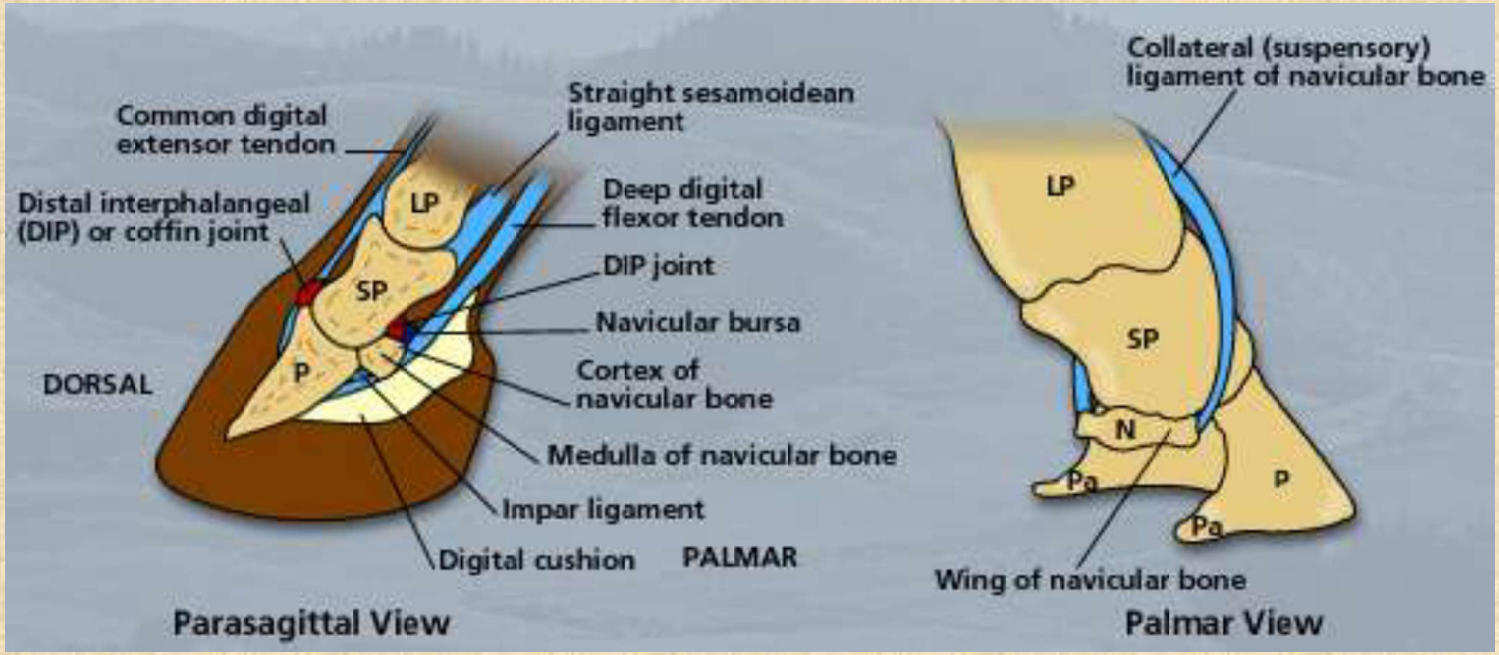
INTRODUCTION

- Recognized as an important cause of lameness in the horse since the middle of the nineteenth century.
- Despite considerable research it remains a **poorly understood condition**, which may be attributable to the following:
  - ❑ Traditionally viewed as a single condition, it is now recognized to be a complex, multi-factorial disease
  - ❑ In the past, diagnosis was often imprecise and not based upon thorough veterinary examination
  - ❑ It involves other structures within the foot in addition to the navicular bone
  - ❑ It is a dynamic and not a static disease (anatomical structures of the foot all move in relation to one another as the horse exercises)
  - ❑ It is a progressive disease with clinical signs changing according to the stage at which the horse is examined

Navicular Syndrome

INTRODUCTION

- Navicular syndrome is most commonly diagnosed as a cause of chronic **forelimb** lameness in **middle aged** (6 - 12 years old) **performance horses** but, with detailed investigation, is probably a much less common condition.
- Hunters and show horses are more commonly affected.
- A thorough knowledge of the normal anatomy of the horse foot is essential in understanding navicular syndrome.



Navicular Syndrome

CAUSES

- The causes of navicular syndrome are poorly understood, however current **theories** include:
  - **Abnormal foot conformation** and **foot imbalance** predisposes the horse to navicular syndrome
  - **Repeated trauma** to and **wear and tear** of the deep digital flexor tendon, navicular bone and navicular bursa causes pain
  - **Poor blood supply** to the navicular bone, associated with **thrombosis** and pressure from the deep digital flexor tendon on the damaged bone, causes pain (this theory is less favored)

Navicular Syndrome

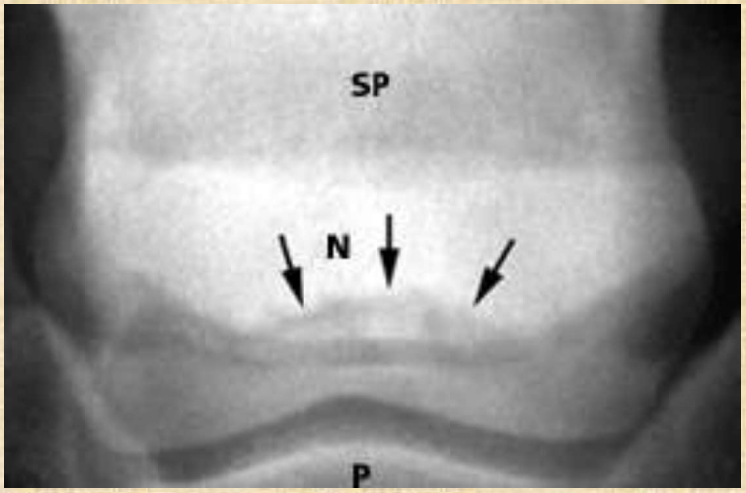
CAUSES

- Once navicular syndrome has been initiated the resultant pathology includes
  - **bone changes,**
  - **cartilage changes,**
  - **tendon changes and**
  - **ligament changes.**

Navicular Syndrome

CAUSES

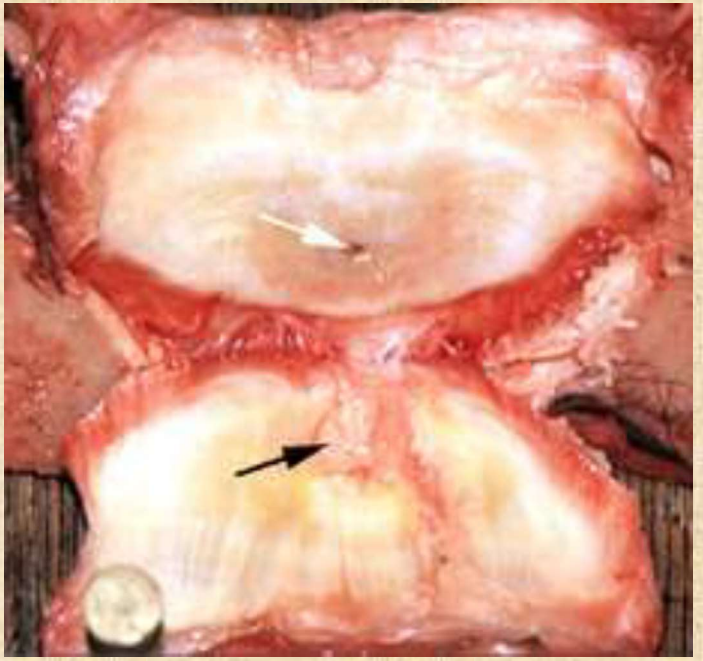
- Once navicular syndrome has been initiated the resultant pathology includes
  - **bone changes,**
    - Micro fractures and thickening of the palmar cortex of the navicular bone occur
    - Lysis of the navicular bone occurs (destruction or decomposition of bone cells)
    - Lysis results in holes developing in the bone (these holes are sometimes called synovial fossae)



Navicular Syndrome

CAUSES

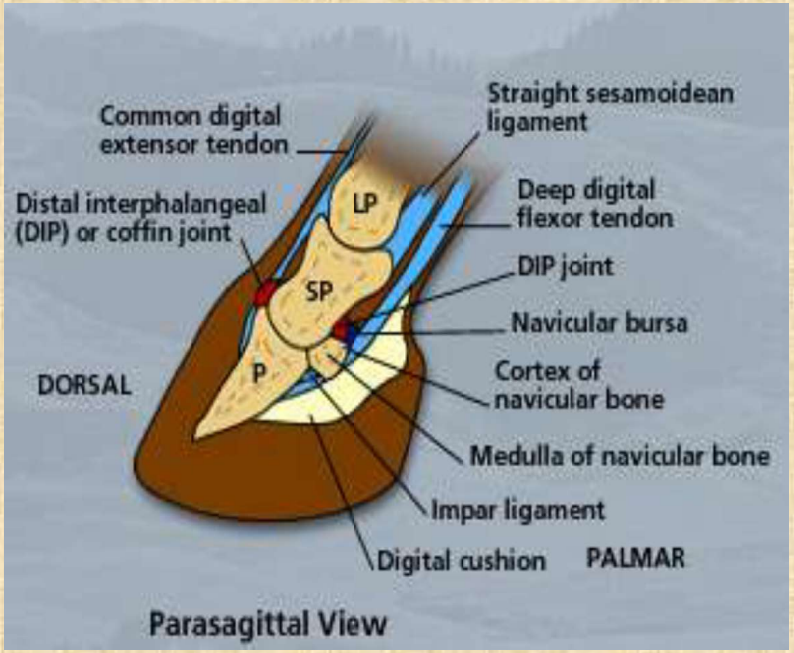
- Once navicular syndrome has been initiated the resultant pathology includes
  - **bone changes,**
  - **cartilage changes,**
    - Partial and full thickness erosions of cartilage on the palmar surface of the bone
    - These erosions result in ulceration and exposure of the sensitive bone on the surface where the deep digital flexor tendon moves over it



Navicular Syndrome

CAUSES

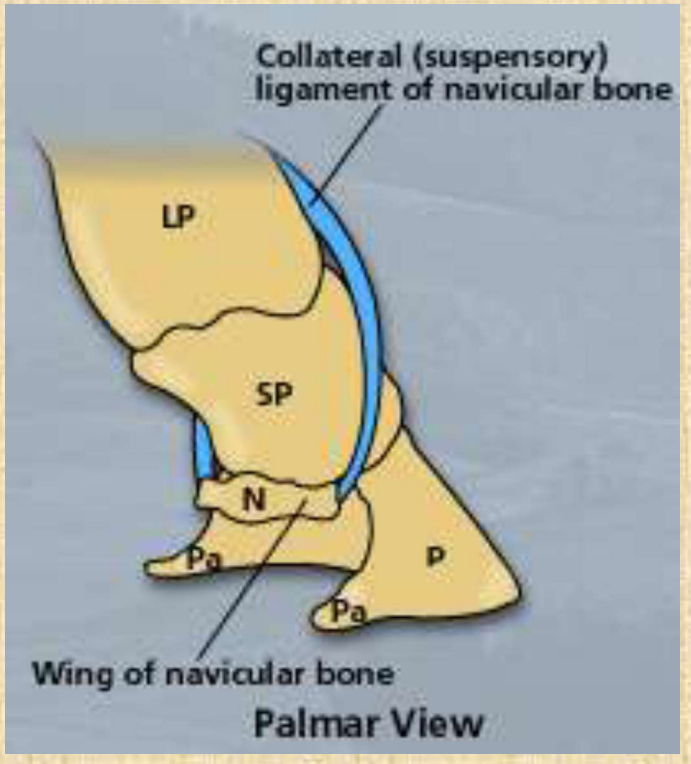
- Once navicular syndrome has been initiated the resultant pathology includes
  - **bone changes,**
  - **cartilage changes,**
  - **tendon changes and**
    - Damage to the deep digital flexor tendon may occur, leading to fibrous adhesions (scar tissue) forming between the tendon and the ulcerated navicular bone



Navicular Syndrome

CAUSES

- Once navicular syndrome has been initiated the resultant pathology includes
  - **bone changes,**
  - **cartilage changes,**
  - **tendon changes and**
  - **ligament changes.**
    - Small areas of new bone, sometimes called entheseophytes, may form at the insertion point of the collateral (suspensory) ligaments of the navicular bone



Navicular Syndrome

CAUSES

- It is important to note that navicular syndrome is a dynamic problem:
  - During each stride the horse lifts up the leg, moves it and then lowers the leg to bear weight
  - All of the structures of the foot are loaded and unloaded, stretched and relaxed, time after time

Navicular Syndrome

DIAGNOSIS: CLINICAL EXAMINATIONS

- History of intermittent forelimb lameness of variable degree, which may shift from one leg to another or involve both legs simultaneously
- Lameness develops insidiously over a period of weeks or months
- Horse may have a tendency to point one foot forward and then the other while at rest
- Horse has a short forelimb gait with a tendency to stumble (worsens on hard ground)

Navicular Syndrome

DIAGNOSIS: CLINICAL EXAMINATIONS

- Toes of shoes show excessive damage and at the toe the sole may be bruised (caused by stubbing)
- In some chronic cases, abnormal gait causes the feet to become small, narrow and high at the heels (**one foot will often have poorer shape and be more painful than the other)**
- In rare cases, pressure with hoof testers across the heels or diagonally across the frog to the opposite heel causes pain (not a reliable guide in the diagnosis of navicular syndrome)

Navicular Syndrome

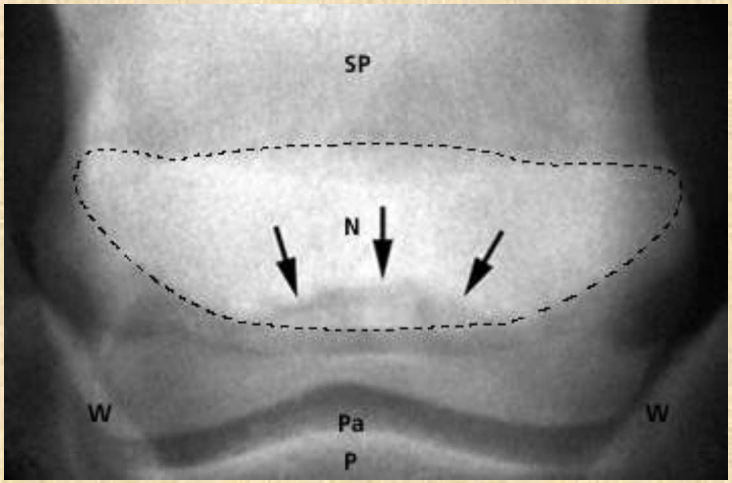
DIAGNOSIS: NERVE BLOCKS

- A local anaesthetic nerve block of the palmar digital nerves, the distal interphalangeal (coffin) joint and/or the navicular bursa results in an improvement or abolition of lameness.

Navicular Syndrome

DIAGNOSIS: RADIOGRAPHY

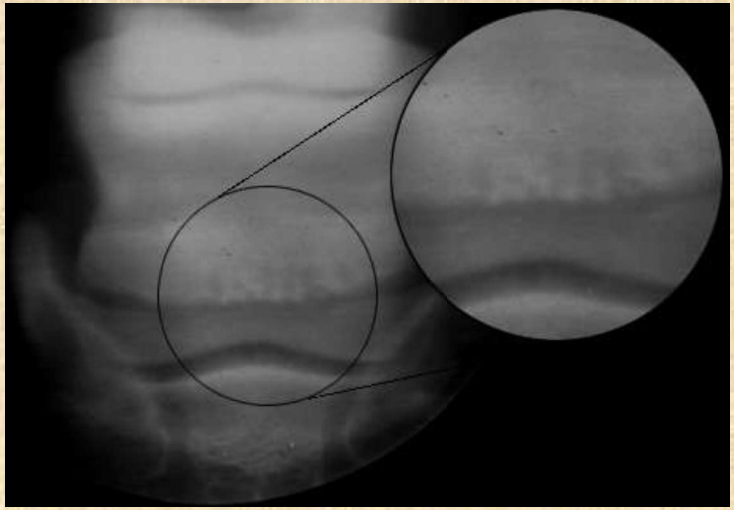
- **Specific radiographic views may reveal:**
  - Micro fractures or thickening of the palmar cortex of the navicular bone
  - Chip fractures of the distal (bottom) edge of the navicular bone
  - An increase in the number of holes normally seen at the bottom edge of the navicular bone (synovial fossae) or a change in their shape (mushroom-shaped or rounded)

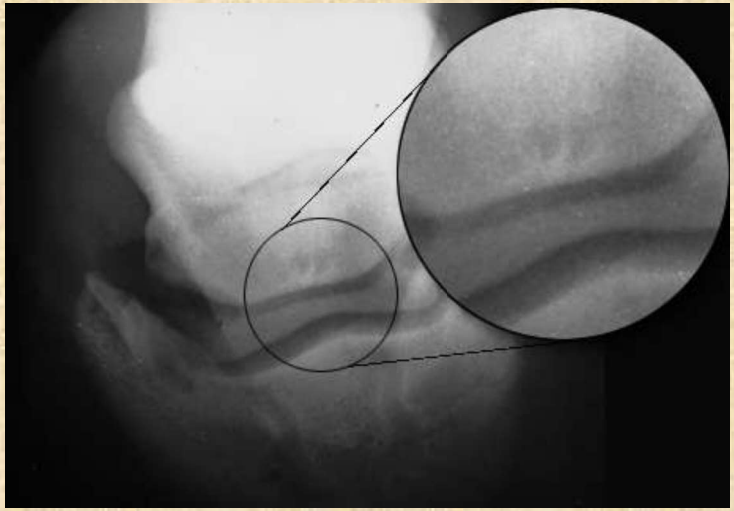


Navicular Syndrome

DIAGNOSIS: RADIOGRAPHY

- **Specific radiographic views may reveal:**
  - Holes in the wings or proximal (upper) edge of the navicular bone (cyst)
  - Areas of abnormal density or pattern in the navicular bone (lollipopos)
  - Formation of new bone (entheseophytes) at the proximal border or wings of the navicular bone





Navicular Syndrome

DIAGNOSIS: RADIOGRAPHY

- Many of these radiographic abnormalities may be found during a routine or pre-purchase examination of normal horses:
  - May be argued that some of these horses are in the early stages of developing the condition, however, **navicular syndrome should not be diagnosed on the basis of radiographic findings alone**
  - **Confirmatory clinical examination** and **nerve block** results help ascribe significance to radiographic examination

Navicular Syndrome

TREATMENT

- Navicular syndrome is a **progressive** and **irreversible** syndrome which cannot be truly cured.
- Treatment of the condition is designed to slow its inevitable progression and to relieve pain through
  - **corrective trimming and shoeing,**
  - **drug therapy and**
  - **corrective surgery.**

Navicular Syndrome

TREATMENT: CORRECTIVE TRIMMING & SHOEING

- Aim of trimming and shoeing is to correct foot abnormalities or imbalances.
- For a broken backwards hoof pastern axis which leads to a long toe/low heel conformation or in cases where the heels have collapsed badly:
  - ❑ Toe is trimmed back as much as possible from the ground surface
  - ❑ Heels are trimmed only if they are overgrown
  - ❑ Horse is shod every 4 - 6 weeks with a rolled toe, egg bar shoe, fitted full at the quarters and extending well back at the heels to provide support

Navicular Syndrome

TREATMENT: CORRECTIVE TRIMMING & SHOEING

- Aim of trimming and shoeing is to correct foot abnormalities or imbalances.
- For chronic cases where the feet are small and upright:
  - Horse is shod with a wide webbed, rolled toe bar shoe, fitted well back at the heels to provide support

Navicular Syndrome

TREATMENT: DRUG THERAPY

- Vasodilator drugs
  - Drugs (i.e. isoxuprine, papaverine) which cause blood vessels to dilate
  - May improve the blood supply to the navicular bone
- Thrombolytic drugs
  - Drugs (i.e. warfarin, streptokinase, alteplase, reteplase, and tenecteplase) which dissolve blood clots
  - May help remove blood clots and improve blood circulation to the navicular bone
  - Dosage must be carefully monitored through regular blood clotting tests to prevent life-threatening internal haemorrhage
  - Warfarin must not be used in combination with other drugs, especially phenylbutazone, where there is the risk of a potentially fatal drug interaction

Navicular Syndrome

TREATMENT: DRUG THERAPY

- Non-steroidal anti-inflammatory and anti-endotoxic drugs
  - Drugs (i.e. flunixin, phenylbutazone) which counteract inflammation or bacterial toxins
  - Will help relieve pain but will not treat the cause
  - Must not be used with warfarin because of the risk of a potentially fatal drug interaction

- Long-acting anti-inflammatory or lubricating drugs
  - Injections of long-acting anti-inflammatory (i.e. corticosteroids) or lubricating (i.e. sodium hyaluronate) drugs may help alleviate pain in some cases but response is variable.

Navicular Syndrome

TREATMENT: CORRECTIVE SURGERY

- Desmotomy
  - Surgical section of the medial and lateral collateral (suspensory) ligaments of the navicular bone under general anaesthesia
  - May relieve pressure on the damaged navicular bone and relieve the lameness

- Surgical section of heel nerves
  - Will prevent the horse from feeling pain in the heel area
  - Should only be used as a last resort for horses which are not used for demanding athletic work
  - Horse will no longer have sensation in the heel, therefore the foot requires careful supervision to avoid heel injuries and infections

Navicular Syndrome

AFTER-CARE

- Good foot shape and foot balance should be maintained through regular trimming and shoeing by an experienced farrier
- A controlled exercise programme, whilst the horse is receiving non-steroidal anti-inflammatory medication, is often helpful
- Feeding the horse supplements which include glucosamine and polysulphated glycosaminoglycans may help cartilage repair

Navicular Syndrome

PREVENTION

- Maintaining good foot shape and foot balance through regular trimming and shoeing by an experienced farrier
- As not all the inciting causes of navicular syndrome are known the condition is not always specifically preventable

Navicular Syndrome

CAUTION

- Navicular syndrome is a complex problem which may end the working life of a performance horse
- An accurate diagnosis as well as the elimination of other causes of heel pain is a pre-requisite for successful management
- The most common factors predisposing a horse to navicular syndrome are an abnormal foot shape and hoof imbalance caused by inadequate or improper hoof trimming and shoeing, therefore use a properly qualified farrier regularly
- Corrective trimming and shoeing should be performed by a specifically-experienced farrier
- If a horse shows signs of lameness a veterinarian should be contacted to accurately diagnose the cause of the lameness