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"The team at Hambleton Equine Clinic cannot praise the team of exceptional radiologists and support staff enough. The reports have always been sent through super quick and the reports themselves are highly informative and annotated, providing vital information for developing treatment and rehabilitation plans for our patients, as well as helping clients to see and understand the pathologies present. In this case, Prime Design had a guarded and uncertain prognosis for soundness, let alone competitive event work. Collaborating with the VetCT team has enabled us to have a happy outcome for this horse and owner combination, ready for their first Young Event Horse season".

- Hambleton Equine Clinic
$O T$


# REPORTING SERVICE: CT 

Species: Equine

## Clinical History:

Lateral and medial malleolus fractures confirmed on rads, rule out any other
abnormalities. Skin staples used as markers to determine screw fixation sites

## Questions to be answered:

Number of series / images: 7 / 669
Series: [CORONAL 2.0 CORONAL CE, SAGITTAL 2.0 SAGITTAL CE, AXIAL 1.0, VR VR.1 CE, 2.0, AXIAL 1.0 CE]

Study dated: mm/dd/yyyy
Study received: mm/dd/yyyy
Anatomic regions: Tarsus/foot
Details of study and technical comments: Computed tomographic examination of a tarsus is provided. There are no post-contrast images, and the examination is of excellent diagnostic quality.

## Diagnostic interpretation:

- There is diffuse soft tissue swelling associated with the peritarsal region, concentrated on the distal tibia and tarsocrural joint regions.
- There are a minimum of three hypoattenuating linear intersecting fracture planes within the distal physis and the epiphysis of the tibia, which results in the epiphysis being fragmented into predominantly four large bony fragments. This comprises a closed, articular, slightly displaced and comminuted Salter Harris fracture, with the following specifics:
- There is a Salter Harris type III fracture through the medial physis (medial malleolus), which then extends in a dorsolateral-plantaromedial orientation distally to connect to the tibiotarsal joint space (articular). The physis is widened medially and there is periosteal bone formation on the surface of the tibia. There is sclerosis of the tibial epiphysis around the margins of the fragments, and remodelling along the fracture plane plantarly. (Fig 1)
- There is a rectangular shaped bone shaped fragment, $3.0 \mathrm{~cm} \times 1.3 \mathrm{~cm} \times 0.7 \mathrm{~cm}$ located dorsally within the epiphysis, which comprises the dorsal portion of the distal intermediate ridge of the tibia and spans between the trochlear ridges of the talus. This is intersected medially by the medial malleolus fracture and laterally by the lateral malleolus fracture, and bordered proximally by the physis. This fragment is nondisplaced but articular with the tibiotarsal joint. (Fig 2)
- There is a Salter Harris type III fracture through the lateral malleolus of the tibia, orientated in a dorsolateral-plantaromedial orientation, which extends laterally along the physis to exit the lateral cortex of the tibia. This is also a complete, slightly displaced articular fracture. There is remodelling of the fracture plane, and at least three bone fragments approximately $2 \mathrm{~mm} \times 3 \mathrm{~mm}$ located lateral to the physis.
- This results in a fourth portion of the plantar aspect of the tibial epiphysis remaining present, which has not fractured and is non-displaced.
- There is overall maintained joint congruity, however there are small defects in the articular surfaces at the fracture sites of the tibiotarsal joint.
- There is slight raised periosteal bone formation around the dorsal and lateral margins of the distal tibial diaphysis.
- There are two very small bone attenuating fragments, less than 1 mm in size located at the distal level of the talus; one is dorsal to the central tarsal bone, and one is located within the interosseous space between talus and central tarsal bone. The articular surface of the talus identified is smooth, however the articular cartilage integrity cannot be assessed without a contrast arthrogram.
- There is smoothly outlined periosteal bone formation on the medial aspect of the body of the talus.
- Multiple skin staples are present which identify surface landmarks of the medial and dorsal margins of the medial malleolus fragment, but not the plantarolateral and dorsolateral landmarks of the other planes identified.


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Figure 1: MPR images of the medial malleolus fracture configuration.


Figure 2: MPR images of the dorsal intermediate ridge of the tibia fracture fragment.


Figure 3: MPR images of the lateral malleolus fracture configuration.


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Figure 4: MIP thicker slice reconstruction images of the combined fragments present

## Conclusions:

1. Comminuted Salter Harris fractures of the distal tibial epiphysis. There are suspected to be three fracture planes resulting in the epiphysis being fragmented into four large pieces of bone. There are multiple small bony fragments located within and surrounding the tarsocrural or proximal intertarsal joint. There is a combination of callus / periosteal bone formation, and remodelling of the physes consistent with a sub-acute nature to the injuries.
2. Associated soft tissue swelling with the fractures.

## Additional comments:

The overall appearance is that of a complex, closed, articular, slightly displaced combination of type III Salter Harris fractures. There is remodelling of the physes, which is consistent with sub-acute aetiology, however if this is not consistent with the duration of lameness (unknown) then a much less likely alternative is that of physeal infection and subsequent pathological fracture. Based on the appearance, I suspect that this however relates to a slightly more chronic timeline.

It is recommended to consider ultrasound examination of the tarsocrural joint collateral ligaments in this horse.

## Reporting Radiologist:

xxxxx
RCVS \& European Specialist in Veterinary Diagnostic Imaging

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[^0] only be interpreted by a currently licensed and registered veterinary surgeon responsible for the care of this patient.

## REPORTING SERVICE: CT

Species: Equine Breed:Thoroughbred Sex:Gelding Age: 4 years

## Clinical History:

Acute onset right hindlimb lameness following a paddock accident. Radiographs identified a medial malleolus fracture but there is suspicion of multiple fracture lines within the talus as well.
Questions to be answered:
Detail regarding location and extent of fracture propagation for surgical planning
Number of series / images: 6 / 4300
Series: 2CM SEC, 2CM SEC - SOFT TISSUE FILTER, 2CM SEC - UNFILTERED
Study dated: dd/mm/yyyy
Study received: dd/mm/yyyy
Anatomic regions: Tarsus - Right, Tarsus - Left
Details of study and technical comments: a CT study of the hind limbs, from the feet to the tarsi are provided for review. Images are of good technical quality.

## Diagnostic interpretation:

## Left tarsus and digital extremity

There are shallow and well defined defects in the central aspect of the talus trochlea and tibial cochlea. This is likely incidental. There is a minimal, shallow defect in the medial ridge of the talus trochlea, likely incidental. There is no sign of osteoarthritis. An incidental enthesophyte is visible on the dorsoproximal border of the third metatarsal bone.

There is a very small mineralized fragment issued from the most proximal, plantar, central aspect of the proximal phalanx, at the joint margin. The digital extremity looks otherwise normal.

## Right tarsus and digital extremity

There is a complex fracture of the medial malleolus of the tibia. There is one main, well-defined, elongated 20 mm fragment originating from the articular margin. Further dorsally, there are several other smaller fragments, including 2 measuring about 10 mm each.

There is thickening of the tarsocrural soft tissues, with moderate effusion. The medial collateral ligament may be markedly thickened and ill-defined, compared with the left side.

Besides, there is a complex fracture pattern of the talus. A first fracture plane isolates an overall cuboid fragment at the most distal medial aspect of the talus. The fragment sides measure about 27 mm . A second smaller fragment located medially, immediately dorsal to the cuboid fragment. The fragment is only minimally displaced medially. The fragment has a broad articular component (with the proximal intertarsal joint) and contains one the distal entheses of the medial collateral ligament.

Then, a second major fracture plane is coursing along an almost dorsal plane through the talus, from the medial cortex to the lateral cortex. Proximally, the fracture plane is relatively plantar. Medially and centrally, it reaches the plantar recess of the tarsocrural joint just plantar to the medial ridge. Laterally, it reaches the talocalcaneal joint. The fracture plane runs distally, slightly obliquely, remaining plantar to the ridges. Medially, it joins the described cuboid fragment. Laterally, a smaller ( 9 mm ) fragment is seen at the fracture margin, in the osseous notch plantar to the lateral ridge. Most distally, in addition to the cuboid fragment described above, the fracture plane reaches the proximal intertarsal joint in a complex pattern made of the continuity of the predominantly dorsal plane fracture plane and a complementary line running plantarly (and reaching the plantar aspect of the cuboid fragment. Few small fragments are displaced in the joint space dorsally. There is no identified fracture of the central tarsal bone.

Incidentally, there are similar shallow defects of the central aspect of the talus trochlea and tibial cochlea. There is a moderate shallow defect in the medial ridge of the talus trochlea, likely incidental.

There is a small mineralized fragment issued from the most proximal, plantar, central aspect of the proximal phalanx, at the joint margin.


Fig 1: Medial malleolus of the right tibia fracture.
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This report is based on the available history and radiographic interpretation only and not on a physical examination of the patient. It has been prepared specifically for interpretation by the currently licensed and registered veterinary surgeon responsible for the care of this patient.


Fig 2: Large distomedial cuboid fragment of the right talus.


Fig 3: Transverse images from proximal to distal through the talus. Note the essentially dorsal fracture plane, reaching to medial and lateral fragments and producing a complex pattern most distally at the proximal intertarsal subchondral plate.
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Fig 4: Parasagittal medial and lateral images of the main dorsal plane fracture.


Fig 5: Thickening and poor margination of the soft tissues including the medial collateral ligament of the tarsus.
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Fig 6: Small fragments at the plantar aspect of the proximal phalanges, bilaterally.

## Conclusions:

Complex, biarticular fracture of the right talus.
Additional complex fracture of the right medial malleolus, at the articular margin.
Likely concurrent marked medial collateral desmopathy of the right tarsus and synovitis of the right tarsocrural joint.

Incidental plantar fragmentation of both proximal phalanges, possibly representing minor avulsion of some short sesamoidean ligaments, or atypical OCD.

## Reporting Radiologist:

American specialist in Veterinary Diagnostic Imaging American specialist in Equine Diagnostic Imaging

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## REPORTING SERVICE: CT

Species: Equine Breed: Connemara Sex: Gelding Age: 10 years

## Clinical History:

Draining tract from left mandible for approximately 6 months. On radiographs a fistula can be seen in the region of the 306 tooth and a small osseous fragment associated with the mandible at this level.

## Questions to be answered:

Is there periapical infection of the 306 or 307 ?

Number of series / images: 6 / 2682
Anatomic regions: Head
Details of study and technical comments: Computed tomographic (CT) examination of the skull is included, the images are reconstructed in a bone and soft tissue algorithm and using a transverse, dorsal and sagittal plane. The examination is of good diagnostic quality.

## Diagnostic interpretation:

There is marked thickening of the left mandible at the level of the interdental space between canine and premolar teeth, extending caudally to the level of the mesial margin of the 308. This is most profound at the level of the 306 tooth, with the majority of the osseous swelling being lingually located, and being represented by a thick plane of smooth periosteal reaction. There is moderate surrounding soft tissue swelling ventrally and slight laterally to the left mandible. There is marked widening of the periodontal space surrounding the lingual aspect of the reserve crown and roots of the 306 , with a wide soft tissue attenuating tract extending from the periodontal space along the lingual aspect of the tooth to the oral cavity. There is a 15 mm diameter hypodense tract completely through the lingual aspect of the left mandible, surrounded by regional cortical osteolysis. Within the lingual mandibular cortical defect, and within the widened periodontal space, there are three large (up to 15 mm diameter, and separately up to 3 cm length) hyperdense mineral attenuating fragments, at least in part representing cortical fragments, one of which projects dorsally along the lingual tooth margin extending to the clinical crown at the oral cavity level. The remaining cortical bone of the left mandible at the level of 306 is thickened. The roots of the 306 are moderately blunted and irregular in contour; subjectively the pulp horns are widened, and there is faint pulp gas within the distal pulp chamber. Periodontal space gas is not an overt feature.

The most linear of the above described lingually located mineral attenuating fragments projects into the interdental space between 306 and 307 at the level of the reserve crowns.

At the level of the 307 tooth, there is moderate widening of the periodontal space surrounding the mesial tooth root, with a linear soft tissue attenuating tract ( 10 mm diameter) of periodontal space widening along the mesial - lingual aspect of the reserve crown connecting both to the oral cavity and the above described widened 306 periodontal space. There is linear gas attenuation within the mesial pulp chamber. There is both thickening of the surrounding mandibular cortex (lingually) and a thin zone of osseous resorption of the overlying mandible. At the level of the gingiva, lingual to the 307 clinical crown, there is focal accumulation of mixed soft tissue and gas attenuating material, most consistent with impacted feed material.

There is a small lingually located chip fracture of the 408 mesially.
There is a very small oval shaped mineral attenuating fragment along the buccal margin of the clinical crown / gingiva of the 208. There is mild multifocal gas filling of the left and right maxillary cheek teeth infundibula; however these are not overtly dilated nor remodelled.

There is enlargement of the left mandibular lymph nodes.
The paranasal sinuses are bilaterally air-filled. The nasolacrimal ducts and infraorbital canals are structurally within normal limits.

The temporomandibular joints are normal. The tympanic bullae are air-filled and normal. The hyoid apparatus, including the tympanohyoid articulations are within normal limits.

There is minor, smooth entheseous bone on the caudal aspect of the occiput.


Figure 1: Transverse images at the level of the '06 cheek teeth. Note marked thickening of the left mandible (red arrows) with surrounding periosteal reaction, mineral attenuating fragments (yellow arrows) and periodontal space widening (green arrows) lingually.

[^1]

Figure 2: Transverse images at the level of the '06-'07 cheek teeth. Note marked thickening of the left mandible (red arrows) with surrounding periosteal reaction, mineral attenuating fragments (yellow arrows) and periodontal space widening (green arrows) lingually. The right image indicates linear soft tissue attenuating tract lingual to the 307.


Figure 3: Parasagittal reconstructed images. Red arrows indicate osseous remodelling and resorption of the left mandible with ventral periosteal reaction (blue arrows), with associated mineral attenuating fragments (yellow arrows). There is blunting / remodelling of the 306-307 apices (green arrows) with widened periodontal space.
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Figure 4: Dorsal plane reconstructed images. There is prominent left mandible thickening (red arrows) with associated lingually located mineral attenuating fragments (yellow arrows) including extending into the periodontal space. There are medially located cortical defects (pink arrows), and periodontal space widening / oro-alveolar tracts (green arrows)


Figure 5: Medial view of the left mandible (with the right side removed), with the visible cortical osteolysis and fragment presence.

## Conclusions:

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1. Chronic left mandible thickening, lingually located cortical fragmentation and osteolysis at the level of 306; consistent with likely sequestration and osteomyelitis, with concurrent periapical infection of the 306 tooth.
2. Tracts connecting the oral cavity to periodontal space are present involving both 306 and 307.
3. Pulpitis of the 307 with periodontal space widening and root remodelling, consistent with mild periapical infection.
4. Left mandibular lymphadenopathy, likely reactive.
5. Small chip fragment of 408, without periapical infection.

## Additional comments:

There is chronic osseous remodelling with periosteal reaction and multifocal cortical defects of the left hemimandible at the level of the $306>307$ cheek teeth. Fragment presence is consistent with cortical sequestration and associated draining tracts; however these also involve the periodontal spaces around both 306 and 307 with low-grade evidence of periapical infections and pulpitis of both of these teeth, the 306 being more markedly abnormal. Some feed material is suspected to be packing into a gingival defect lingual to 307 .

## Reporting Radiologist:

European Specialist in Veterinary Diagnostic Imaging
RCVS Specialist in Large Animal Diagnostic Imaging

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## REPORTING SERVICE: CT

Species: Equine Breed: Friesian Sex: Mare Age: 12 years

## Clinical History:

Head CT for evaluation of a draining tract extending to hyoid apparatus. On presentation the horse had a discharging tract from the ventral aspect of the mandible (just to the left of midline) (see additional study)

## Questions to be answered:

Clinical question to be answered: identification of extent of tract and involvement of additional structures / identification of any concurrent pathologies

Number of series / images: 4 / 3011

## Series:

Study dated:

## Study received:

Anatomic regions: Head
Details of study and technical comments: Computed tomographic (CT) examination of the skull, from the level of the mid-C2 vertebral body to the muzzle is included, the images are reconstructed in a transverse plane with a high frequency (bone) and low-frequency (soft tissue) algorithm. Image metadata is used to determine laterality of findings. A large field of view utilised limits spatial resolution.

## Diagnostic interpretation:

There is regional soft tissue swelling in the intermandibular space, centred at the level of the hyoid apparatus, though extending rostral and caudal to this, with an irregular ventral skin surface contour, occupying a region up to 4.3 cm thickness ventral to the basihyoid bone. There is a focal skin surface defect to the left of midline at the level immediately ventral to the hyoid apparatus. There is no clear gas tract or hyperdense foreign material identified. There is thickening in the region of the left > right mandibular lymph nodes, however overall soft tissue swelling precludes specific identification. The lateral retropharyngeal lymph nodes are thickened.

There is marked multifocal osseous deformity, thickening and fragmentation of the ventral segments of the hyoid apparatus as follows:

- The left ceratohyoid bone is moderately thickened along the length, and the distal third is heterogeneous with a central hypodense focus extending from the ceratohyoid involving the junction to the basihyoid and thyrohyoid bones. The left thyrohyoid bone is thickened along the length and heterogeneous rostrally.
- The ventral 1 cm of the right stylohyoid bone is thickened, extending to the junction to the ceratohyoid bone. The right ceratohyoid is both lingually misaligned, markedly thickened and prominently heterogeneous. The articulation between stylohyoid and ceratohyoid is heterogeneous and widened. There is prominent heterogeneity at the articulation between right ceratohyoid and both basihyoid and thyrohyoid bones, and the right thyrohyoid bone is moderately thickened along the length. There is a completely indistinct junction between right ceratohyoid and basihyoid bones, with widened interosseous space and surrounding soft tissue swelling.
- There is marked thickening and heterogeneity of the body of the basihyoid bone, including prominent central osseous fragmentation, with central hyperdense (mineral) cores surrounded by osteolysis with soft tissue attenuation and a further thin rim of mineral attenuation superficial to this. One large, and several small osseous fragments are present, within otherwise swollen soft tissues. The right lateral margin of the basihyoid body is subjectively more heterogeneous than the left.
- There is soft tissue swelling between basihyoid and the outline of the larynx ventrally; rostral to the epiglottis.
- There is minimal evidence of a clear lingual process of the basihyoid bone, and the rostral margin of the basihyoid on midline is irregular in contour and heterogeneous.
- The bodies of the stylohyoid bones are otherwise normal bilaterally.
- The tympanohyoid cartilages are bilaterally normal, as is the remainder of the tympanohyoid articulation bilaterally. The tympanic bullae are air-filled and within normal limits.

There is prominent maxillary incisive prognathism, with a maxillary 'overbite' of around 2.5 cm compared to the mandibular incisors.

There is otherwise appropriate juvenile dentition present within all dental arcades, including unerupted dental elements and dental buds. Maxillary '05 ('wolf') teeth are present bilaterally.

The paranasal sinuses are bilaterally within normal limits.
The temporomandibular joints are bilaterally structurally within normal limits.


Figure 1: Thick slice multiplanar (MPR) reconstruction, with sagittal (left image), transverse (middle) and dorsal plane (right image) images, the horses left is to the image right where applicable. Red arrows indicate bulbous thickening and fragmentation of the basihyoid bone, the yellow arrows thickened ceratohyoid bones, green arrows thyrohyoid bones and blue arrows stylohyoid bones. Note surrounding soft tissue swelling.


Figure 2: Three-dimensional reconstruction of the hyoid apparatus viewed from left rostral. Note deformity of the ventral segment of the hyoid apparatus, with multifocal hypodense regions of osteolysis and fragmentation.


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Figure 3: Three-dimensional reconstructions of the hyoid apparatus viewed from rostral (left image) and dorsal (right image); the horses left is to the image right. Note deformed hyoid bones, which are thickened and fragmented, with irregular articulations.


Figure 4: Thick slice multiplanar (MPR) reconstruction, with sagittal (left image), transverse (middle) and dorsal plane (right image) images, the horses left is to the image right where applicable. Red arrows indicate thickened and fragmented basihyoid bone, the yellow arrows thickened ceratohyoid bones, green arrow right thyrohyoid bone, and blue arrows stylohyoid bones. The purple arrows indicate ventrally located left-sided soft tissue swelling.
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Figure 5: Thick-slice transverse reconstructions (from MPR) with the horses left to the image right. There is ventral intermandibular soft tissue swelling (purple arrows) and a skin surface defect (orange arrow). The basihyoid is thickened and heterogeneous (red arrows), the ceratohyoid bones are thickened and offset (yellow arrows) compared to the stylohyoid bones (blue arrows).

## Conclusions:

1. Marked ventral-left intermandibular soft tissue swelling and skin surface tract, with underlying fragmentation, chronic remodelling and osteitis (septic versus aseptic) of the ventral third of the hyoid apparatus, affecting both ceratohyoid bones, the basihyoid and both thyrohyoid bones. The ventral margin of the right stylohyoid is also thickened. Chronic fractures and sequestration is possible, and a dysplastic / congenitally malformation aetiology cannot be ruled out given the juvenile age, however as extremely rare in horses, is considered slightly less likely.
2. Likely reactive regional lymphadenopathy.
3. Maxillary prognathism.

## Additional comments:

The appearance of this hyoid apparatus is unusual. Ultrasound of this region would be recommended, as this may facilitate a soft tissue tract not identified on CT examination and may characterise further the soft tissue swelling between skin and hyoid apparatus. A definitive aetiology of the osseous fragmentation is not clear, with speculative options ranging from previous penetrating wound and septic osteitis / fragmentation of the hyoid to traumatic fracture and sequestration. These are favoured over a dysplastic process, however if the presenting complaint were to be extremely long standing, then this may be revised accordingly, and it may also be further refined on the basis of nature of wound discharge. Endoscopic examination of the pharynx and larynx would be recommended to further assess laryngeal function.

## Reporting Radiologist:

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MR2

## REPORTING SERVICE:MRI

## Clinical History:

He is lame on the right front on a straight line
Blocked the coffin joint, much improved but still lame.
Rads of foot: NSF
Negative to RF PD block
An abaxial block on the right front was positive.
Ultrasound of tendons : NSF

## Questions to be answered:

Query tendon / soft tissue injury
Number of series / images: 13 / 340
Series: R_FORE_FOOT / PILOT,R_FORE_FOOT / PILOT OF A PILOT, R_FORE_FOOT / STIR FSE FRO, R_FORE_FOOT / STIR FSE SAG, R_FORE_FOOT / STIR FSE TRA, R_FORE_FOOT / STIR TEST, R_FORE_FOOT / T1W 3D SAG HR, R_FORE_FOOT / T1W 3D TRA HR, R_FORE_FOOT / T2*W 3D FRO HR, R_FORE_FOOT / T2*W 3D PTRA HR, R_FORE_FOOT / T2W FSE FTRA, R_FORE_FOOT / T2W FSE PTRA, R_FORE_FOOT / T2W FSE VFRO

Study dated: dd/mm/yyyy

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Study received: dd/mm/yyyy
Anatomic regions: Front foot/ pastern - Right
Details of study and technical comments: Standing MRI study of the right fore foot. There are no transverse images perpendicular to the flexor cortex of the navicular bone, which limits interpretation of the deep digital flexor tendon. The images presented are of diagnostic quality.

## Diagnostic interpretation:

Within the medial lobe of the deep digital flexor tendon, extending from the level of the mid-diaphysis of the middle phalanx, to the proximal horizontal border of the navicular bone, there is a linear lesion. This is of hyperintense signal throughout its length on T1W images. The dorsal border of the tendon is irregular on T2FSE images within the proximal recess of the navicular bursa, with moderate increased signal intensity on T2FSE sequences within the tendon at this level. The proximal recess of the navicular bursa is moderately effused, with moderate soft tissue material present at the dorsal aspect of the tendon.

Within the distal horizontal border of the navicular bone there are several mildly enlarged and irregularly sized and shaped synovial invaginations. These are largely confined to the distal horizontal border. There is mild diffuse increased signal intensity within the spongiosa of the navicular bone on STIR sequences. The branches of the collateral sesamoidean ligament are midlly thickened with mildly irregular margins. This is best seen in T2FSE images. The distal sesamoidean impar ligament is moderately thickened, most markedly axially, with loss of definition of the dorsal and palmar borders of the ligament at this level.

At the flexor surface of the distal phalanx, there is mild diffuse increased signal on STIR sequences. This extends a short distance into the body of the distal phalanx. At the flexor surface itself there is a focal region of osseous resorption axially at the site of attachment of the distal sesamoidean impar ligament.

The distal interphalangeal joint is moderately effused with moderate synovial proliferation within the dorsal recess of the joint. There is moderate periarticular new bone formation at the dorsomedial and dorsolateral aspects of the joint. The collateral ligaments of the distal interphalangeal joint are normal in appearance.

There is moderate periarticular new bone associated with the proximal interphalangeal joint.
Subjectively the angle of the solar margin of the distal phalanx is flatter than normal. There is marked thickening of the solar tissues.

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Frontal and transverse images showing the proximodistal extent of the deep digital flexor tendon lesion within the medial lobe of the tendon.


T2FSE transverse images showing the interruption of the dorsal border of the deep digital flexor tendon within the proximal recess of the bursa (red arrows) and moderate effusion of the bursa (blue arrows).

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Frontal T1W and sagittal STIR image showing the region of signal alteration within the distal phalanx associated with the insertion of the distal sesamoidean impar ligament (red arrows) with focal osseous resorption of the flexor surface of the bone (blue arrows).


Frontal and sagittal T1W images showing the moderate periarticular osteophyte formation (blue arrows) and moderate effusion of the distal interphalangeal joint (green arrows). The enthesopathy associated with the distal sesamoidean impar ligament is indicated by the red arrows.

## Conclusions:

- Deep digital flexor tendon tendinopathy, with a lesion within the medial lobe of the tendon. The lesion has an acute on chronic appearance, with regions which appear relatively quiescent and regions that have fluid signal within them, which may indicate active injury.
- Moderate navicular bursitis, likely secondary to the presence of a deep digital flexor tendon lesion.


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& \text { ABN } 24601862220 \quad \text { Registered Office in Australia Suite 11, 185-187 High Street, Fremantle, WA 6160, Australia }
\end{aligned}
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- Moderate distal interphalangeal joint osteoarthropathy with moderate periarticular osteophyte formation.
- Mild navicular pathology, with evidence of distal sesamoidean impar ligament desmopathy and enthesopathy of the insertion of the ligament.


## Additional comments:

The most significant abnormalities detected in this MRI examination are those associated with the deep digital flexor tendon and navicular bursa. The distal interphalangeal joint osteoarthropathy and enthesopathy associated with the insertion of the distal sesamoidean impar ligament are considered chronic and low grade. These may reflect chronic foot imbalance.

## Reporting Radiologist:

RCVS and European Veterinary Specialist in Diagnostic Imaging (Large Animal)

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## REPORTING SERVICE:MRI

Species: Equine Breed: Thoroughbred Sex: Gelding Age: 3 years

## Clinical History:

Raced last week. Lame right fore
Questions to be answered:
Number of series / images: 10 / 85
Series: R_FORE FETLOCK / PILOT, R_FORE_FETLOCK / STR FSE SAG MI/+, R_FORE_FETLOCK / STIR FSE TRA MI/+, R_FORE_FETLOCK / STIR TEST, R_FORE_FETLOCK / T1W GRE FRO MI, R_FORE_FETLOCK / T1W GRE SAG MI, R_FORE_FETLOCK / T1W GRE TRA MI, R_FORE_FETLOCK / T2*W GRE FRO MI, R_FORE_FETLOCK / T2*W GRE TRA MI, R_FORE_FETLOCK / T2W FSE TRA MI

Study dated: dd/mm/yyyy. Study received: dd/mm/yyyy
Anatomic regions: Metacarpophalangeal joint - Right
Details of study and technical comments: A low field MRI study of the right metacarpophalangeal joint is available for review. The images are of diagnostic quality though the number of sequences is limited.

## Diagnostic interpretation:

Palmar condylar sclerosis of the metacarpal condyles is mild in the lateral condyle and moderate in the medial condyle. There is moderate sclerosis of the dorsal epiphyseal region of the medial metacarpal condyle with focal T2 hyperintensity in the dorsal subchondral bone plate. The medial dorsal eminence of the proximal phalanx is moderately sclerotic and flattened. A small osseous fragment is suspected from the apex of the medial dorsal eminence but is poorly resolved. There is moderate fluid and soft tissue distension of the metacarpophalangeal joint. The dorsal synovial plica is mildly thickened. A focal concavity in the compact bone at the dorso proximal margin of the sagittal ridge of the third metacarpal bone is likely a prominent vascular channel. A subchondral/compact bone defect cannot be entirely excluded but is considered unlikely.

There are no detectable articular defects or interosseous fluid signal in the metacarpal condyles, proximal sesamoid bones or proximal phalanx.


T1 frontal and T2FSE transverse images showing the pattern of condylar sclerosis in the metacarpal condyles (red arrowheads).


T2 FSE and T2* transverse images showing the sclerosis in the dorsal medial condyle (red arrows) and hyperintensity in the subchondral bone (white arrowheads).

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T1 sagittal and T2* transverse images showing the synovial distension (red arrow), subchondral bone sclerosis (red arrowheads), suspected osseous fragment (black arrowhead) and concavity in the compact bone at the proximal margin of the sagittal ridge (blue arrow).

## Conclusions:

- 'Dorsal impact injury' of the fetlock joint as evidenced by subchondral bone injury in the dorsal aspect of the medial metacarpal condyle, sclerosis, and possible fragmentation of the medial dorsal eminence of the proximal phalanx and synovial distension / synovial hypertrophy in the dorsal aspect of the joint. This is a chronic mechanism of injury secondary to cyclic fetlock hyperextension.
- No evidence of radiographically occult fracture pathology or palmar osteochondral defects have been identified on the images provided.


## Additional comments:

The MRI findings may be a cause of low-grade lameness in some individuals, however, are also seen in horses free from lameness. A positive response to intra articular fetlock block would be necessary to confirm the relevance of the findings. Radiography is more sensitive than MRI to detect small fragments from the dorsal eminence of the proximal phalanx. Fragments at this location are usually irrelevant, though in this instance may support the mechanism of traumatic bone injury at the front of the joint.

## Reporting Radiologist:

Large Animal Associate of the European College of Veterinary Diagnostic Imaging

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# REPORTING SERVICE: MRI 

Species: Equine Breed: Draft horse Sex: Gelding Age 12 years

## Clinical History:

Acutely RF lame when hunting. NAD on foot exam. Improved with rest but marked increase in lameness when exercising again. Positive ASNB block.

## Questions to be answered:

Number of series / images: 13 / 292
Anatomic regions: Front foot - Right
Details of study and technical comments: A low field MRI study of the right fore foot acquired under standing sedation is available for review. The images are overall of diagnostic quality though signal:noise is reduced compared to the average, which is not uncommon in this breed. The distal phalanx and laminar tissues are only partially evaluated. The pastern region is largely outside the field of view.

## Diagnostic interpretation:

The collateral cartilages of the foot are bilaterally ossified. The lateral ossified lateral collateral cartilage has a largely benign appearance with good definition between the compact and spongiform parts. The medial ossified collateral cartilage is abnormal. There is diffuse T1/T2 hypointensity and STIR hyperintensity throughout the ossified medial cartilage and extending into the medial palmar process and medial body of the distal phalanx. There is local thickening and loss of demarcation of the laminar layers and disruption of the corticolaminar attachments on the medial aspect of the foot. There is an irregular linear hyperintensity on all imaging sequences within the base of the ossified medial collateral cartilage running obliquely through the base of the cartilage which appears contiguous with a hyperintense linearity extending in a palmaroproximal-palmarodistal direction through the medial palmar process of the distal phalanx to exit the solar surface of the bone. This is consistent with a chronic ('wing') fracture of the distal phalanx with concurrent fracture of the base of the medial ossified collateral cartilage.

The ossified medial collateral cartilage extends to the abaxial margin of the distal part of the medial collateral ligament of the distal interphalangeal joint. The collateral ligaments of the distal interphalangeal joint and the chondrocoronal ligaments are mildly, diffusely heterogeneous on FSE images, which is not uncommon in heavier boned breeds.

There is moderate distension of the distal interphalangeal joint with fluid and soft tissue intensity material. The degree of periarticular remodelling / osteophytosis is considered mild. Subchondral bone sclerosis is mild and there are no overt articular defects within the distal interphalangeal joint.

The podotrochlear apparatus is largely unremarkable, with the exception of moderate remodelling of the distal border of the navicular bone, of questionable clinical relevance.


T1 MPR image showing the signal hypointensity within the medial palmar process and ossified collateral cartilage (red arrow) and linear hyperintensities at the base of the ossified cartilage (red arrowheads) and through the medial palmar process of the distal phalanx (white arrowheads).


T1 and STIR transverse images showing the signal hyperintensity on both sequences at the base of the ossified collateral cartilage (white arrow) and diffuse STIR hyperintensity in the ossified collateral cartilage (white arrowheads). Medial is to the right.


T1 and STIR transverse images showing the linear signal hyperintensity on both images in the medial palmar process of the distal phalanx (white arrowheads).

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T1 frontal images showing the fracture lines through the medial palmar process (red arrowheads) and at the base of the medial ossified collateral cartilage (white arrowheads).


T1 weighted transverse and frontal images showing the extension of the ossified collateral cartilage to the abaxial margin of the medial collateral ligament of the distal interphalangeal joint (white arrows).

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$T 1$ and STIR transverse images showing the irregular corticolaminar attachments and laminar thickening (white arrowheads) and interosseous fluid signal (white arrows) at the junction of the medial palmar process and body of the distal phalanx.

## Conclusions:

- Type 1 ('wing') fracture of the medial palmar process of the distal phalanx. The fracture appears chronic though the presence of interosseous fluid signal on STIR images suggests an ongoing healing/remodelling response.
- Ossification of the collateral cartilages of the foot, benign on the lateral side and pathologic / degenerative on the medial side. A fracture at the base of the medial ossified collateral cartilage has been detected.
- Laminar disruption / disorganisation / thickening and irregular corticolaminar attachments on the medial aspect of the foot.
- Mild osteoarthrosis of the distal interphalangeal joint. The relevance of this finding is questionable.


## Additional comments:

On balance the chronic distal phalangeal fracture, associated laminar changes and concurrent fracture at the base of the medial ossified collateral cartilage are the most likely cause of lameness reported. There is no strong evidence of active collateral ligament desmopathy or enthesiopathy, though chronic low-grade disease is difficult to detect on low field images and may be a feature.

## Reporting Radiologist:

Dr ...
Large Animal Associate of the European College of Veterinary Diagnostic Imaging

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# REPORTING SERVICE: MRI 

Species: Equine Breed: ISH Sex: Gelding Age 6 years

## Clinical History:

Marked distension of the right carpal sheath. Not currently lame. MRI to determine if tenoscopy required.

## Questions to be answered:

Is tenoscopy indicated?
Number of series / images: 14 / 542
Series: R_CARPUS / PILOT, R_CARPUS / PILOT OF A PILOT, R_CARPUS / STIR FSE FRO FAST/+, R_CARPUS / STIR FSE SAG FAST/+, R_CARPUS / STIR FSE TRA FAST/+, R_CARPUS / STIR TEST, R_CARPUS / T1W 3D FRO FAST, R_CARPUS / T1W 3D SAG FAST, R_CARPUS / T1W 3D TRA FAST, R_CARPUS / T1W GRE TRA FAST, R_CARPUS / T2*W 3D TRA HR, R_CARPUS / T2*W GRE FRO FAST, R_CARPUS / T2*W GRE TRA FAST, R_CARPUS / T2W FSE TRA FAST

## Study dated:

## Study received:

Anatomic regions: Carpus - Left
Details of study and technical comments: a standing low-field MR study of the carpal sheath is provided for review. Images are of adequate technical quality, despite some movement artefacts as expected in upper limb scanning.

## Diagnostic interpretation:

There is mild effusion in the middle carpal joint and the radiocarpal joint, without prominent thickening of the synovium. There is no identified subchondral injury.

There is moderate effusion of the carpal sheath. Heterogeneity, including several spots of high signal in the musculotendinous segment of the DDFT in the most distal radial segment is normal. At the level of the radiocarpal joint, the dorsal and medial border of the SDFT looks mildly irregular. There is accompanying rather prominent synovial tissue and mesotenon swelling. The palmar carpal ligament looks normal.

The mentioned spur is suspected at the caudal lateral aspect of the radius. It seems to reach the dorsal border of the DDFT, but without obvious associated lesion. On the slice immediately distal, the entire caudal aspect of the physeal scar looks irregular multifocally. At the level of the most central physealrelated prominence, the mesotenon and the synovial tissue is thickened, in continuity with the medial border of the DDFT looking thickened and somewhat hyperintense on T2 images. Anatomy of the tendons is grossly modified and there is poor margination of the tendon structures dorsomedially in the radial segment, suggesting adhesions are possible in that area.

The proximal enthesis of the suspensory ligament is minimally thickened medially. There is no suspected resorption or bone marrow lesion. A prominent vascular structure runs dorsal to the medial lobe of the DDFT, but there is no suspected desmopathy. The AL-DDFT and the flexor tendons look normal in the scanned proximal metacarpal segment.


Fig 1: Most distal radial segment, thickening of the mesotenon and irregularities of the SDFT.
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Fig 2: Thickening and hyperintensity of the medial border of the DDFT and anatomic deformity and swelling of the tendons and mesotenon dorsomedially further proximally, with poor margination of the various structures.

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Fig 3: Several spurs at the caudal distal aspect of the radius. Note the mesotenon looks prominently thickened just palmar / caudal to the large central spur on the right image.

## Conclusions:

Tenosynovitis of the right carpal sheath, with suspected lesions of;

- the deep digital flexor tendon (medial border, proximally in the radial segment, concurrent with prominent mesotenon swelling and possible underlying role of one physeal spur, and
- the superficial digital flexor tendon (milder, superficial, further distally at the radiocarpal joint level).

Nonspecific mild synovitis of the right middle carpal and radiocarpal joints, without identified subchondral injury.

## Additional comments:

The anatomy seems more prominently altered in the proximal aspect of the carpal sheath, involving most obviously the medial border of the DDFT in continuity with the mesotenon. The latter is extensively thickened, consistent with a chronic condition. Further distally, the SDFT looks irregular superficially, which could suggest fibrillation.

In my opinion, there is indication for tenoscopy. There is a tendency of MRI to underestimate the extent of tendon damage in tendon sheaths, whatever the location. I would focus on the most proximal and medial aspect of the sheath.

## Reporting Radiologist:

American specialist in Equine Diagnostic Imaging
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# REPORTING SERVICE: PPE 

Species: Equine Breed: Warmblood Sex: Mare Age: 5 years

## Clinical History:

Pre-purchase exam for jumping up to $3^{\prime} 6$ ". Sound during lameness exam. Mild positive to hind upper limb flexion.

## Questions to be answered:

Number of series / images: 27 / 32
Series: CERVICAL SPINE CAUDAL, CERVICAL SPINE CRANIAL, CERVICAL SPINE MIDDLE, LEFT FORE FOOT DP, LEFT FORE FOOT LATERAL, LEFT FORE FOOT P3 SOLAR MARGINS, LEFT FORE NAVICULAR DP, LEFT FORE NAVICULAR SKYLINE, LEFT STIFLE CACR, LEFT STIFLE LATERAL, LEFT STIFLE OBLIQUE, LEFT TARSUS DLPMO, LEFT TARSUS DMPLO, LEFT TARSUS DP, LEFT TARSUS LATERAL, RIGHT FORE FOOT DP, RIGHT FORE FOOT LATERAL, RIGHT FORE FOOT NAVICULAR DP, RIGHT FORE FOOT NAVICULAR SKYLINE, RIGHT FORE FOOT P3 SOLAR MARGINS, RIGHT STIFLE CACR, RIGHT STIFLE LATERAL, RIGHT STIFLE OBLIQUE, RIGHT TARSUS DLPMO, RIGHT TARSUS DMPLO, RIGHT TARSUS DP, RIGHT TARSUS LATERAL

Anatomic regions: Cervical spine, Stifle - Left, Stifle - Right, Tarsus - Right, Tarsus - Left, Front foot/ pastern - Left, Front foot/ pastern - Right

Details of study and technical comments: Laterolateral images of the cervical spine; $\mathrm{LM}, \mathrm{CdCr}$ and CdLCrMO views of the stifles; LM, DP, DLPIMO, DMPILO of the tarsi; LM, DP, DPrPaDiO and PaPrPaDiO of the front feet. In the left foot a digital and physical marker are present on opposite sides of the limb. The digital marker is considered correctly placed on the lateral side of the limb. Images are of good diagnostic quality.

## Diagnostic interpretation:

## Cervical spine:

The intervertebral foramina are subjectively narrowed at all visible sites. This is likely secondary to conformation and short vertebral pedicles. The intra and intervertebral ratio are within normal limits.

The articular process joints of C5-6 and C6-7 are mildly and moderately enlarged respectively. This is symmetrical between left and right.


LL view of the caudal cervical spine showing the enlarged C5-6 and C6-7.

## Stifles:

Left - There is mild new bone formation on the medial aspect of the tibial plateau. The medial eminence of the tibia is pointed.

Right - a medium size osteophyte is present on the medial aspect of the tibial plateau; the distal articular margin of the medial condyle of the femur is also remodelled. A concavity is present in the distal aspect of the medial condyle. There is thickening of the adjacent subchondral bone but an overt osseous cyst-like lesion cannot be seen in these images.
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CdCr views of the left (left side) and right (right side) stifles showing the periarticular remodelling (arrowheads) and the lucency in the RIGHT medial femoral condyle.

## Tarsi:

Left - There is narrowing of the distal intertarsal joint. The subchondral bone of both the third and central tarsal bone is thickened. Subchondral bone lucencies are present in both bones dorsomedially. The interosseous space of the distal intertarsal joint is not visible and is markedly increased in opacity. Moderate periarticular remodelling is present associated with the distal intertarsal joint dorsolaterally.

Right - There is a similar appearance of the distal intertarsal joint to that of the left limb but the degree of subchondral bone lysis is less severe in this limb.
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DP and DLPMO views of the LEFT tarsus showing the subchondral bone lucencies (arrowheads) and the sclerosis of the interosseous space of the distal intertarsal joint (arrows).

## Front feet:

Left - the palmar compact bone of the navicular bone is subjectively thickened in the LM view but normal in the skyline view. This may reflect slight obliquity in the LM view. A possible small distal border fragment is present at the junction between the distal horizontal and lateral sloping borders. Only a small defect is seen in the adjacent navicular bone.

The toe is long. The medial hoof wall is upright while the lateral is flared.
Right - two triangular shaped synovial invaginations are seen along the distal horizontal border of the navicular bone.

There is similar foot conformation to that of the left limb.

## Conclusions:

- Moderate bilateral osteoarthritis of the distal intertarsal joint
- Osteoarthritis of the medial femorotibial joint; mild in the left limb and moderate in the right.
- Subchondral bone lucency in the RIGHT medial femoral condyle.
- Possible small distal border fragment in the LEFT navicular bone.
- Symmetrical enlargement of the caudal articular process joints.

[^3]The most concerning finding for future soundness and re-sale value of this horse are found in the stifles and tarsi. The degree of osteoarthritis seen in all these regions could progress to overt lameness although successful management of these conditions may be achieved.

The degree of osteoarthritis in the cervical spine is relatively mild and likely reflects adaptive remodelling at this stage.

The distal border fragment in the navicular bone is very small and its clinical significance per se is difficult to determine.

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## Reporting Radiologist:

European Specialist in Veterinary Diagnostic Imaging RCVS Specialist in Large Animal Diagnostic Imaging
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## REPORTING SERVICE: XR

## Clinical History:

Wound to medial aspect of hock 3.5 weeks ago. Grade $4 / 5$ lameness. Effusion of tarsocrural joint/sheath

## Questions to be answered:

Number of series / images: 4 / 6
Series: R_TARSUS_DLPMO, R_TARSUS_DMPLO, R_TARSUS_DP, R_TARSUS_LM
Study dated: Study received:
Anatomic regions: Tarsus - Right
Details of study and technical comments: Six right tarsal radiographs (including 2 flexed calcaneal skyline projections) are included of good diagnostic quality.

## Diagnostic interpretation:

There is marked regional soft tissue swelling around the plantar and plantaromedial aspect of the tarsus, most focally at the level of the body of the talus and calcaneus. There is a complete fracture through the proximal-plantaromedial aspect of the sustentaculum tali, involving the medial and the plantar (flexor) surfaces, and extending to include approximately $50 \%$ of the articular (flexor) surface at the level of the tarsal sheath (fragment size up to 25 mm diameter). The resulting large osseous fragment is slightly plantaromedially displaced, and this is surrounded by several less well defined small osseous fragments within the overlying soft tissues. There is regional decreased bone opacity within the parent portion of the sustentaculum tali axial to the fragment with some heterogeneity, and the fragment bed is irregular with some osseous resorption. There is a focal step in the plantar (flexor) surface of the sustentaculum.

There is no definitive gas present within the visible confines of the tarsal sheath, nor the tarsocrural joint. There is mild soft tissue swelling associated with the recesses of the tarsocrural joint.

The skin contour overlying the medial aspect of the tarsus is irregular with several small foci of increased soft tissue opacity.

Small periarticular osteophytes are present at the dorsomedial margins of the distal intertarsal joint; an unrelated finding to the main lesions.


Figure: DMPLO, PIPrPIDiO and DPL right tarsus radiographs. Red arrows indicate the fracture of the sustentaculum tali, with small step in the flexor surface (blue arrow), and adjacent mineral opacity foci (orange arrows). There is marked regional soft tissue swelling (green arrows) and a suspect skin wound (purple arrow).

## Conclusions:

1. Displaced fracture of the right sustentaculum tali, with involvement and marked soft tissue swelling of the tarsal sheath. Several additional bone fragments are plantaromedially displaced.
2. Focal osteitis of the fragment bed of the sustentaculum tali, DDx septic versus aseptic osteitis.

This report is based on the available history and radiographic interpretation only and not on a physical examination of the patient. It has been prepared specifically for interpretation by the currently licensed and registered veterinary surgeon responsible for the care of this patient.
3. Tarsal sheath swelling and regional skin disruption, DDx tenosynovitis versus septic process; a definitive aetiology is not determined, however a septic process is considered likely due to the inciting process (wound). Associated / regional cellulitis is considered likely.
4. Mild tarsocrural joint effusion, DDx sympathetic response, previous trauma, local cellulitis.
5. Minimal distal tarsal joint osteoarthritis (juvenile).

## Additional comments:

Synoviocentesis and appropriate fluid analysis / culture of the tarsal sheath would be recommended to assess for a concurrent septic process.

Ultrasonography of the deep digital flexor tendon within the tarsal sheath would be indicated as this fracture has disrupted the flexor surface and likely regional retinaculum, thus concurrent soft tissue injury is considered likely (either primary to the injury, or secondary to excoriation).

Repeat radiographic monitoring post treatment would be recommended (i.e. DMPLO and PIPrPLDiO).

## Reporting Radiologist:

European Specialist in Veterinary Diagnostic Imaging
RCVS Specialist in Large Animal Diagnostic Imaging
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# REPORTING SERVICE: XR 

Species: Equine Breed:Icelandic Sex: Mare Age: 4 years

## Clinical History:

Icelandic horse unable to trot, prefers pacing/tölt, since being a foal. RH lameness detected at trot. Bilaterally weak behind. No response to flexion. Diagnostic analgesia to the level of the stifle did not significantly improve the lameness.

## Questions to be answered:

Lytic area at the femoral head of the right femur seems more marked than on the left, is this a normal finding or possible pathological finding?

Number of series / images: 1 / 3
Series: HÃ?FTLED
Study dated: Study received:
Anatomic regions: Coxofemoral - Left, Coxofemoral - Right
Details of study and technical comments: A single ventrodorsal radiograph of the left and two ventrodorsal radiographs of the right coxofemoral joint region are included, the radiographs are of diagnostic quality.

## Diagnostic interpretation:

Bilaterally, the femoral heads are located within the acetabular rims in this limb position. There is asymmetry of the contour of the femoral heads, with the right being irregular in the middle third of the articular contour. There is reduced definition between the right femoral neck and femoral head along the caudal margin. There is a prominent, and subjectively deepened radiolucent concavity within the subchondral bone, likely at the attachment of the ligament of the femoral head (teres ligament) on the right, with a surrounding sclerotic rim, present to a lesser extent on the left. The contour of the right acetabulum is irregular, and small multifocal osteophytes are present around the cranial, caudal and central articular margins. The cranial and caudal margins of the left acetabulum are slightly irregular.

Faeces in the rectum is superimposed on the included portions of the pelvis.

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Figure: VD coxofemoral joint radiographs as labelled. Note osteophyte formation and irregular contour to the right > left acetabulum. There are prominent radiolucent depressions in the head of the femur bilaterally (yellow arrows), but more evident on the right.

## Conclusions:

Right coxofemoral joint osteoarthritis, and suspected ligament of the head of the femur entheseopathy, with only mild changes in the left limb.

## Additional comments:

Ultrasound examination in the standing horse may facilitate further assessment of the coxofemoral joints, and this can be performed using a dynamic technique (Brenner \& Whitcomb, 2009), to aid in the assessment of subluxation which may not be identified on weightbearing VD radiographs in particular, and joint effusion. The relatively young age of the horse suggests that either a chronic or prior traumatic event, or manifestation of dysplasia or developmental orthopaedic disease (osteochondrosis) may be possible underlying contributors. Additional investigations could include standing dorsolateralventrolateral oblique radiographs, or coxofemoral joint diagnostic anaesthesia (aseptic) or trial medication.

## Reference:

Ultrasonographic diagnosis of coxofemoral subluxation in horses. Brenner., S, Whitcomb, M.B. (2009). Veterinary Radiology \& Ultrasound. 50 (4), 423-428.

## Reporting Radiologist:

European Specialist in Veterinary Diagnostic Imaging
RCVS Specialist in Large Animal Diagnostic Imaging
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## REPORTING SERVICE: XR

Species: Equine Breed: Arabian/QH Sex: Filly Age: 2 years

## Clinical History:

Knuckling on the RF fetlock several months ago (flexural deformity centered at fetlock). Initially improved but now ntermittently getting worse.

She is asymmetric at the walk with an elevated heel on the LF (flexural deformity at the coffin and pastern joint/possible subluxation on visual exam and palpation). RF has a mild flexural deformity at the fetlock and carpus with occasional fetlock and carpal buckling.

Lameness examination: 3/5 lame on the LF and 2/5 lame on the RF.

## Questions to be answered:

Number of series / images: 7 / 8
Series: LEFT FORE FOOT DP, LEFT FORE FOOT LATERAL, RIGHT FORE FETLOCK DLPMO, RIGHT FORE FETLOCK DMPLO, RIGHT FORE FETLOCK DP, RIGHT FORE FETLOCK LATERAL, RIGHT FORE FOOT LATERAL

Study dated: Study received:
Anatomic regions: Front fetlock - Right, Front foot/ pastern - Left, Front foot/ pastern - Right
Details of study and technical comments: DP and LM views of the left front and LM view of the right fore foot, a DP view of the left fore fetlock region and LM, DP, DLPMO and DMPLO views of the right fore fetlock region are available for review. The images are of diagnostic quality.

## Diagnostic interpretation:

## Left fore foot:

The digit has an overall upright foot conformation. There is mild malalignment of the proximal and middle phalanges with dorsal deviation of the distal aspect of the proximal phalanx relative to the proximal articular surface of the middle phalanx causing mild subluxation of the proximal interphalangeal joint. The subluxation causes a focal prominence on the dorsal aspect of the distal pastern region, no overt soft tissue swelling, or synovial distension is identified in the pastern region. A focal millimetric radiolucency is identified in the dorsodistal articular margin of the proximal phalanx (laterality is not determined) and very subtle periarticular remodelling.

The angle of the distal interphalangeal joint is acceptable with mild extension of the joint in the weightbearing position. The solar margin angle is above normal at 11 degrees (ref: 3-8). The dorsal hoof wall angle is elevated to 57 degrees (ref: 48-54). There is focal dorsal irregularity of distal phalanx on the LM view. The dorsopalmar and mediolateral balance of the foot is acceptable.

The collateral cartilages of the foot are ossified, which is biaxially symmetric and has a benign appearance.


LM and DP views of the left fore foot showing the measurements for solar margin angle and dorsal hoof wall angle (blue and yellow angle lines respectively), the prominence on the dorsal pastern region (red arrow) caused by the dorsal subluxation of the proximal interphalangeal joint (green arrowhead), the focal radiolucency in the dorsodistal articular margin of the proximal phalanx (red arrowhead) and subtle periarticular remodelling (white arrowhead). The large red arrow shows the dorsopalmar balance of the foot and the yellow arrowheads the ossified collateral cartilages. The green arrow the focal reaction on the dorsal surface of the distal phalanx.

## Left fore fetlock:

A 2-degree fetlock valgus is noted. No further abnormalities are identified on the single projection provided.

## Right fore foot:

The right fore foot is less upright than the left. The proximal and middle phalanges are normally aligned. There is very slightly dorsal periarticular remodelling of the middle phalanx. The dorsal hoof wall angle is within normal limits at 52 degrees. The solar margin angle is just below normal range at 2.5 degrees (ref 3-8). The dorsopalmar balance of the foot is displaced palmarly. The collateral cartilages of the foot are ossified, which is biaxially symmetric and has a benign appearance.

No further abnormalities are identified.

This report is based on the available history and radiographic interpretation only and not on a physical examination of the patient. It has been prepared specifically for interpretation by the currently licensed and registered veterinary surgeon responsible for the care of this patient.


LM view of the right fore foot showing the dorsal hoof wall angle (yellow angle lines), flat solar margin angle (blue angle lines), dorsopalmar imbalance (red arrow), mild periarticular remodelling of the proximal interphalangeal joint (white arrow).

## Right fore fetlock:

A very subtle 1.5-degree varus of the fetlock emanating from the distal metacarpal physis is identified. No further abnormalities are identified.

## Conclusions:

- Mild subluxation of the left fore proximal interphalangeal consistent with the flexural deformity reported. The flexural deformity is most likely congenital/developmental rather than acquired. No underlying primary cause for the flexural deformity has been identified on the images provided. A millimetric radiolucency in the dorsal aspect of the left fore proximal interphalangeal joint may indicate focal traumatic injury due to altered joint loading. The prominence on the dorsum of the pastern region is mostly related to the subluxation, there is minimal soft tissue swelling or synovial distension identified.
- Asymmetric conformation of the front feet. The left fore being upright, the right fore foot has flatter conformation and dorsopalmar imbalance.
- A mild fetlock valgus is noted in the left fore limb and a very subtle fetlock varus in the right fore limb.


## Reporting Radiologist:

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NM

## REPORTING SERVICE: NM

Species: Equine

## Clinical History:

History:

3 week history of behavioral changes
Tech comment: obvious swelling on medial, proximal left hind cannon bone

## Questions to be answered:

looking for cause of pain/ behavioral changes per owner

Number of series / images: 66 / 66
Series: ANGLED PELVIS, BL CARPI, BL CARPI*, BL DP ELBOWS, BL DP SHOULDERS, BL FRONT FEET, BL FRONT FEET*, DORSAL PELVIS, DP LSPINE, DP LSPINE2, DP STIFLES, DP TSPINE, DP TSPINE2, DP TSPINE2*, L LAT CSPINE, L LAT CSPINE1, L LAT CSPINE1*, L LAT CSPINE2, L LAT CSPI NE3, L LAT LSPINE, L LAT MID LSPIN, L LAT PELVIS, L LAT SKULL, L LAT TSPINE, LF LAT CARPUS, LF LAT FOOT, LF LAT FOOT*, LF LAT SCAPULA, LF LAT SHOULDE2, LF LAT SHOULDER, LH LAT FOOT, LH LAT FOOT*, LH LAT HOCK, LH LAT STIFLE, LH LAT STIFLE*, LH

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PD FOOT, LH PD FOOT*, LH PD HOCK, OBLIQUE PELVIS, OBLIQUE PELVIS2, R LAT CSPINE, R LAT CSPINE*, R LAT CSPINE1, R LAT LSPINE, R LAT LSPINE1, R LAT PELVIS, R LAT SKULL, R LAT TSPINE, RF LAT CARPUS, RF LAT FOOT, RF LAT FOOT*, RF LAT SCAPULA, RF LAT SCAPULA*, RF LAT SCAPULA2, RF LAT SHOULDER, RH LAT FOOT, RH LAT FOOT2, RH LAT FOOT2*, RH LAT HOCK, RH LAT HOCK2, RH LAT STIFLE, RH PD FOOT, RH PD FOOT*, RH PD HOCK, RH PD HOCK2, RLAT TSPINE*

Study dated: dd/mm/yyyy
Study received: dd/mm/yyyy
Anatomic regions: Full body
Details of study and technical comments: Full body bone phase nuclear scintigraphic examination. The images are of diagnostic quality.

## Diagnostic interpretation:

## Head and neck

- In the region of the conchofrontal and caudal maxillary sinuses there is diffuse mild increased radiopharmaceutical uptake, more markedly on the left lateral image than the right lateral image. There is a focal region of moderately increased increased radiopharmaceutical uptake within the caudal aspect of the sinus, directly dorsal to the alveolus of the maxillary 11 tooth.
- There is marked count capture at the cranial extent of the jugular vein, suggesting extravasation of the radiopharmaceutical at the point of injection. This hampers interpretation of the cranial cervical images, even after masking of this region.
- Within the dorsal aspect of the cranial cervical region there is moderate linear increased radiopharmaceutical uptake, consistent with uptake within the nuchal ligament. This extends from the level of approximately C2 caudally to the level of C4. This is best seen in the mid cervical images, due to the above described count capture and is more prominent in the left sided images than the right.


Lateral images of the head showing the mild diffuse increased radiopharmaceutical uptake in the region of the conchofrontal and caudal maxillary sinuses, most marked on the left side (green arrows). The focal region
of increased radiopharmaceutical uptake within the caudal aspect of the conchofrontal sinus can be appreciated (red arrows).

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Left lateral image of the caudal cervical region showing the linear regions of increased radiopharmaceutical uptake at the dorsal aspect of the neck.

## Forelimbs

- There is mildly overall reduced increased radiopharmaceutical uptake throughout the distal limbs, likely consistent with cold distal limb syndrome.
- No significant abnormalities of radiopharmaceutical uptake are noted in the


## forelimbs. Back and pelvis

- At the dorsal extent of the articular process of approximately T4, there is a focal region of intense increased radiopharmaceutical uptake. This is causing count capture in the right lateral images (pre masking) and to a lesser extent in the left lateral images. The dorsal images show that this is located axial to the right scapula and is lateral to the spinous processes.
- The contour of the cranial thoracic spinous processes is irregular and not uniform. There is ventral displacement of the tips of the spinous processes of the cranial portion of the withers relative to the caudal portion. In the dorsal images there are several linear regions of increased radiopharmaceutical uptake just lateral to the spinous processes, which may represent displaced tips of the spinous processes.
- There is mild diffuse increased radiopharmaceutical uptake within the dorsal aspect of the mid thoracic spinous processes, estimated T12-14.
- There is mild diffuse increased radiopharmaceutical uptake within the sacroiliac joint region. This is bilaterally symmetrical.


Dorsal and lateral images of the cranial thoracic vertebral column and scapulae. The focal region of increased radiopharmaceutical uptake (red arrows) is dorsal and axial to the right scapula. The linear regions of increased radiopharmaceutical uptake are consistent with fractured tips of the spinous processes (green arrows).


Left and right lateral images of the cranial thoracic vertebral column. The ventral displacement of the tips of the cranial portion of the withers can be appreciated (red arrows), estimated T4-8 with a dorsal step caudally (green arrow)


Dorsal and right lateral images of the thoracic vertebral column showing the mild increased radiopharmaceutical uptake associated with the spinous processes of T12-14 (estimated) (green arrows).

## Hindlimbs

- Within the distal tarsal joints there is moderate linear increased radiopharmaceutical uptake. This is more marked and focal in the left hindlimb and more diffuse within the right hind.
- At the proximomedial extent of the left proximal metatarsal region there is a linear region of increased radiopharmaceutical uptake consistent with a bony exostosis between the second and third metatarsal bones.


Lateral and plantar images of the tarsi showing the increased radiopharmaceutical uptake associated with the distal tarsal joints (green arrows). The proximomedial metatarsal uptake is indicated by the red arrows.

## Conclusions:

- Fracture and ventral displacement of the tips of the spinous processes of the cranial aspect of the withers (estimated T4-T8)
- Focal region of increased radiopharmaceutical uptake within the soft tissues of the right dorsal scapula/cranial thorax region. This is considered likely too far lateral to be associated with the fractured spinous processes. This may represent focal soft tissue injury, dystrophic mineralisation, soft tissue trauma or skin contamination considered less likely. Ultrasonography of this region may be considered.
- Mild increased radiopharmaceutical uptake associated with the distal tarsal joints, which may represent distal tarsal osteoarthritis.
- Bony exostosis (splint) at the medial aspect of the left proximal metatarsal region, consistent with reported swelling.
- Mild uptake associated with the mid thoracic spinous processes. This may be normal variation or may indicate impingement of the spinous processes. Radiography of this region may be considered.
- Mild diffuse increased radiopharmaceutical uptake within the region of the caudal maxillary and conchofrontal sinuses. This may represent low grade sinus disease or may be normal variation
- Moderate linear increased radiopharmaceutical uptake left side of neck. Given the presence of extravasated contrast material further ventrally, it is considered likely that this is skin surface contamination, however should this not be considered likely, investigation of the cranial aspect of the nuchal ligament may be indicated.


## Additional comments:

The fracture and ventral displacement of the tips of the spinous processes may be associated with the reported temperament change. Low grade lameness may also be associated with changes of temperament. The presence of increased radiopharmaceutical uptake in the distal tarsal joint region may merit further investigation if the suspected withers fractures are not considered consistent with the clinical signs.

## Reporting Radiologist:

RCVS and European Veterinary Specialist in Diagnostic Imaging (Large Animal)

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## REPORTING SERVICE: NM

Species: Equine Breed: Thoroughbred Sex: Colt Age: 3 years

## Clinical History:

LH lame. ? upper limb lameness.

## Questions to be answered:

Number of series / images: 15 / 41
Anatomic regions: Half body
Details of study and technical comments: Delayed (bone) phase scintigraphic images of the hindlimbs, back and pelvis are available for review. The images are of diagnostic quality.

## Diagnostic interpretation:

There is abnormal increased uptake of the radionuclide in the following areas:

- Mild linear IRU in the left iliac wing of the pelvis.
- Mild diffuse IRU in the lower tarsal joints of both limbs, slightly more so in the left hind.
- Mild IRU in the left distolateral tibia compared to the right.


Dorsal oblique views of the left (left image) and right (right image) iliac wings showing the IRU associated with the stress injury in the left (red arrowheads).


DV views of the pelvis showing the IRU associated with the stress injury of the left iliac wing (red arrowheads). The right image has been masked to show the counts from the lesion more clearly.


Lateral views of the left (left image) and right (centre image) tarsi and plantar views of both tarsi (right image) showing the distal tibial IRU (red arrowheads) and IRU in the distal tarsal region (red arrows).

## Conclusions \& additional comments:

- Stress fracture of the left iliac wing. Though the IRU is mild, the soft tissue attenuation is greatest at this location. This is the most salient finding and the likely cause of the left hind lameness reported in the clinical history. The colt is considered at increased risk of sustaining a more serious injury should high intensity exercise continue.
- Distal tarsal joint osteoarthrosis. Of questionable / secondary relevance to the current clinical picture. May need some attention in the future when the pelvic stress injury has resolved.
- Mild diffuse IRU in the lateral aspect of the left distal tibia. This is most likely artefactual and relates to technical and positional factors. Mild tibial stress reaction cannot be entirely excluded but is considered unlikely.


## Reporting Radiologist:

Large Animal Associate of the European College of Veterinary Diagnostic Imaging

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[^4]
# REPORTING SERVICE: PPE 

Species: Equine Breed: Thoroughbred Sex: Gelding Age: 3 years

## Clinical History:

3/5 Lame RH.

## Questions to be answered:

Number of series / images: 37 / 38
Series: DORS PELVIS_MOTCORR, DORSAL LUMBAR \& OBLIQUES, DORSAL LUMBAR_MOTCORR, DORSAL PELVIS \& OBLIQUES, DORSAL PELVIS-1_MOTCORR, DORSAL PELVIS_MOTCORR, HIND LATERAL FETLOCKS, HIND LATERAL FETLOCKS COL, L H LAT FETLOCK_MOTCORR, L LAT FEMUR, L LAT HOCK_MOTCORR, L LAT LUMBAR_MOTCORR, L LAT PELVIS_MOTCORR, L LAT STIFLE_MOTCORR, L LAT TIBIA_MOTCORR, L OBL LUMBAR_MOTCORR, L OBL PELVIS_MOTCORR, L POST FETLOCKS, L POST HOCKS, LATERAL FEMORA, LATERAL HOCKS, LATERAL LUMBAR \& PELVIS, LATERAL STIFLE, LATERAL TIBIAE, LPO_MOTCORR, PLANTAR FETLOCKS \& HOCKS, POST FETLOCK_MOTCORR, POST HOCK_MOTCORR, R H LAT FETLOCK_MOTCORR, R LAT FEMUR, R LAT HOCK_MOTCORR, R LAT LUMBAR-1, R LAT PELVIS_MOTCORR, R LAT STIFLE_MOTCORR, R LAT TIBIA_MOTCORR, R OBL LUMBAR_MOTCORR, RPO_MOTCORR

Anatomic regions: Half body
Details of study and technical comments: Bone phase scintigraphic study of the lumbar spine, pelvis and hindlimbs.

## Diagnostic interpretation:

## Lumbar spine and pelvis:

There is higher uptake in the right tuber sacrale compared to the left. The shape of the tuber sacrale is normal.

A line of mild increased radiopharmaceutical uptake is seen in the caudal aspect of the right iliac wing, extending in a cranioproximal to caudal distal direction at the junction between the wing and the iliac shaft.


Dorsal and right oblique view showing the uptake in the right iliac wing (arrowheads) and the higher uptake in the right tuber sacrali (arrows).

## Hindlimbs:

There is normal uptake in the stifles and tibias.
Mild to moderate increased radiopharmaceutical uptake is seen in the right proximal metatarsal region. This uptake is poorly visualized in the lateral view but this may be related to mild obliquity.

There is moderate uptake in the distal diaphysis of the LEFT third metatarsal bone. The uptake is located along the plantar cortex, lateral to the midline and does not appear to extend distal to the level of the subchondral bone of the condyle. The proximal sesamoid bones are normal.
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Plantar image showing the uptake in the right proximal metatarsal region.


Lateral and plantar images of the left hind fetlock showing the uptake in the distal lateral aspect of the third metatarsal bone.

## Conclusions:

- increased radiopharmaceutical uptake in the RIGHT iliac wing consistent with stress fracture.
- increased radiopharmaceutical uptake in the RIGHT proximal metacarpal region. This may relate to suspensory ligament enthesopathy.
- increased radiopharmaceutical uptake in the LEFT distal third metatarsal bone. This likely represents stress related bone remodelling, consider transverse fracture or less likely lateral condylar stress fracture.


## Additional comments:

Based on the clinical signs and pain on palpation of the gluteal region the iliac wing stress fracture is considered the most significant finding. The degree of uptake is relatively mild but this may consistent with an early stage fracture. Ultrasound is recommended for further diagnosis.
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The uptake in the proximal metatarsal region is of unclear clinical significance and needs to be correlated with the clinical signs. Suspensory ligament desmopathy/enthesopathy might be present.

The uptake in the left distal metatarsal bone is also unusual in distribution, not completely fitting with either a transverse or a condylar type of stress fracture. In absence of lameness in this limb this may be currently incidental although imaging of the fetlock is recommended to determine the exact nature of the pathology.

## Reporting Radiologist:

European Specialist in Veterinary Diagnostic Imaging
RCVS Specialist in Large Animal Diagnostic Imaging

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## REPORTING SERVICE: NM

Species: Equine Breed: Standardbred horse Sex: Mare Age: 4 years

## Clinical History:

History of 3rd carpal bone disease, previously medicated. RF metacarpal swelling noted.
Lameness examination - grade $3 / 5$ lame LH. Positive to flexion. Low 4 point nerve block negative. Mare fractious and difficult to block, therefore nuclear scintigraphy recommended.

Number of series / images: 31 / 32
Series: CAUDAL STIFLES, DORSAL PELVIS \& OBLIQUES, DORSAL PELVIS \& OBLIQUES 2, DORSAL PELVIS \& OBLIOUES COL, DORSAL PELVIS-1_MOTCORR_NEW_NEW, DORSAL PELVIS_MOTCORR_NEW_NEW, DORSAL SPINE, FORE LATERAL FETLOCKS, HIND LATERAL FETLOCKS, L OBL PELVIS_MOTCORR_NEW_NEW, LATERAL CARPI, LATERAL CARPI COLO1, LATERAL ELBOWS, LATERAL FEMORA, LATERAL HOCKS, LATERAL HOCKS COL, LATERAL HUMERI, LATERAL SHOULDER, LATERAL STIFLES, LATERAL TIBIAE, LEFT LATERAL SPINE, LPO_MOTCORR_NEW_NEW, PLANTAR FETLOCKS \& HOCKS, PROFILE, R OBL PELVIS-1_MOTCORR_NEW_NEW, RIGHT LATERAL SPINE, RPO_MOTCORR_NEW_NEW, TOMO, TRANSAXIAL, TRI SPECT, VOLUMETRIX MI RESULTS

Anatomic regions: Front fetlock - Left, Front fetlock - Right, Thorax, Hind fetlock - Left, Hind fetlock Right, Front foot/ pastern - Left, Front foot/ pastern - Right, Abdomen, Hind foot/ pastern - Left, Shoulder, Hind foot/ pastern - Right, Elbow, Stifle, Pelvis/tail, Stifle - Left, Stifle - Right, Coxofemoral Left, Coxofemoral - Right, Shoulder - Left, Shoulder - Right, Elbow - Left, Elbow - Right, Cervical spine, Thoracolumbar spine, Carpus - Right, Carpus - Left, Tarsus - Right, Tarsus - Left, Metacarpus - Right, Metacarpus - Left, Metatarsus - Right, Metatarsus - Left

Details of study and technical comments: Bone phase scintigraphic images of the cervical and thoracolumbar spine, forelimbs, pelvis and hindlimbs including SPECT images of the pelvis.

## Diagnostic interpretation:

## Cervical spine:

There is normal distribution of the radiopharmaceutical in the cervical spine.

## Forelimbs:

No specific abnormalities are identified in the carpus.
There is also normal distribution of the uptake in the remaining regions of the forelimbs.

## Thoracolumbar spine and pelvis:

There is normal distribution of the radiopharmaceutical in the thoracolumbar spine.
There is higher uptake in the left tuber sacrale compared to the right.


Dorsal image of the pelvis showing the higher uptake in the left tuber sacrale.

## Hindlimbs:

A focal area of moderate increased radiopharmaceutical uptake is seen in the caudal lateral diaphysis of the left tibia, at the junction between the mid and distal thirds.

There is normal distribution of the radiopharmaceutical in the remaining regions of the hindlimbs. No alteration of the uptake is seen in the palmar process of the left proximal phalanx at the location of the reported fragment confirming the chronic nature of this finding.
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Caudal and lateral images of the tibia showing the focal area of increased radiopharmaceutical uptake.

## Conclusions:

- Increased radiopharmaceutical uptake in the caudal lateral cortex of the tibial diaphysis. Stress fracture is considered the most likely differential.
- Higher uptake in the left tuber sacrale when compared to the right. This likely reflects asymmetrical musculature coverage rather than pathology in the region.


## Additional comments:

The lesion in the tibia is the most likely cause for the left hindlimb lameness observed. Radiographic examination may be considered to confirm the lesion.

## Reporting Radiologist:

European Specialist in Veterinary Diagnostic Imaging
RCVS Specialist in Large Animal Diagnostic Imaging

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