

Vergleichende Bildgebung der Zehe

Dr. Maren Hellige
Dip. ECVDI, FTÄ f. Pferde



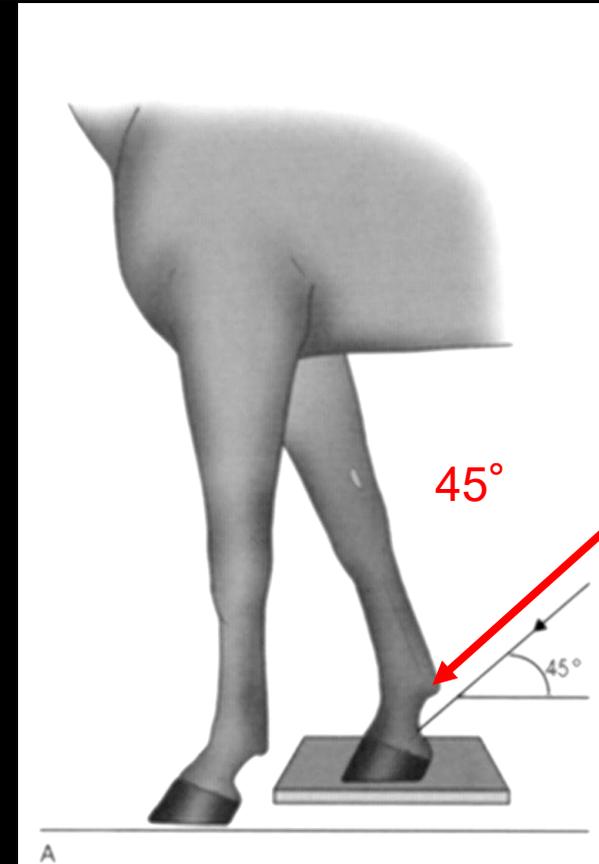
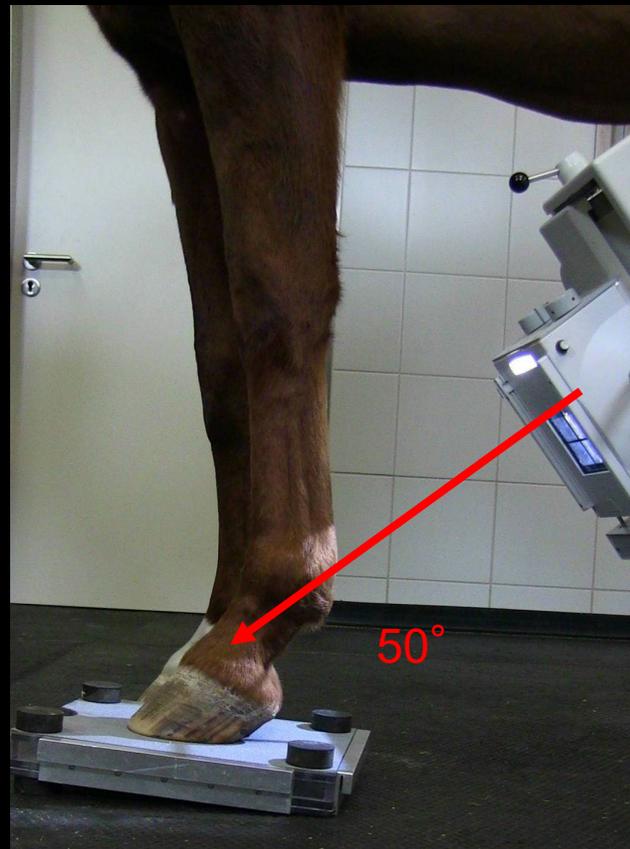
Einleitung

- Welche Bildgebenden Verfahren
 - Röntgen
 - Ultraschall
 - CT (cone beam vs. fan beam)
 - MRT (low field vs. high field)
- Untersuchung an der belasteten vs. unbelasteten Gliedmaße

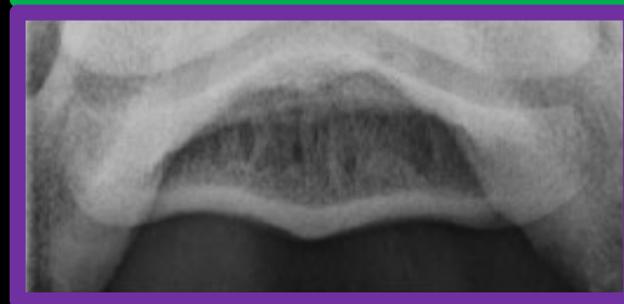
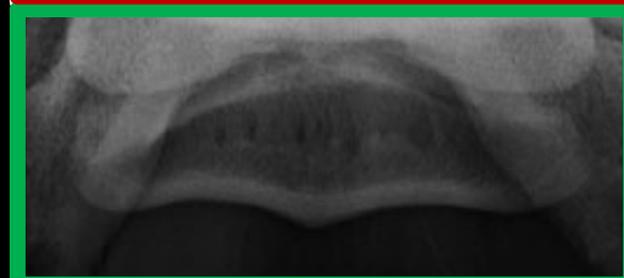
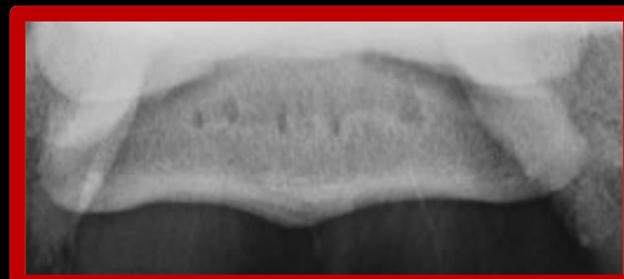
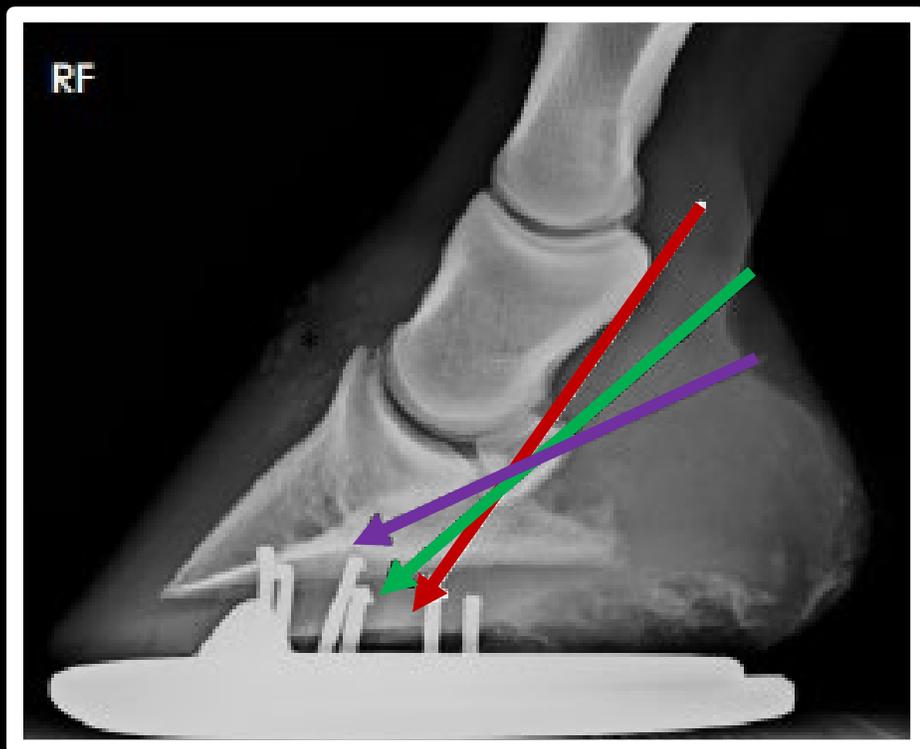
Digitales Röntgen



Tangentialaufnahme des Strahlbeins



Winkelung



Additional palmaroproximal–palmarodistal oblique radiographic projections improve accuracy of detection and characterization of equine flexor cortical lysis

Sherry A. Johnson¹  | Myra F. Barrett²  | David D. Frisbie¹

- Mehrere unterschiedliche Winkel erhöhten die Sensitivität
- Flacher Winkel wird empfohlen, wenn Läsionen der Gleitfläche vermutet werden

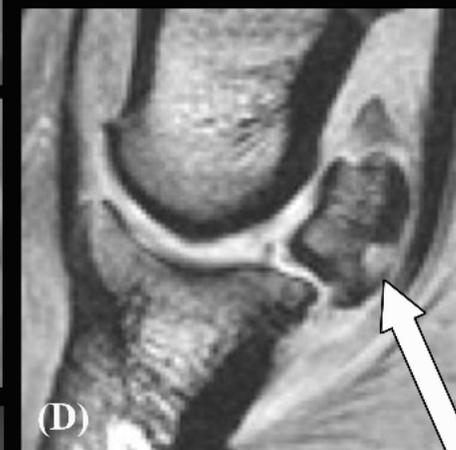
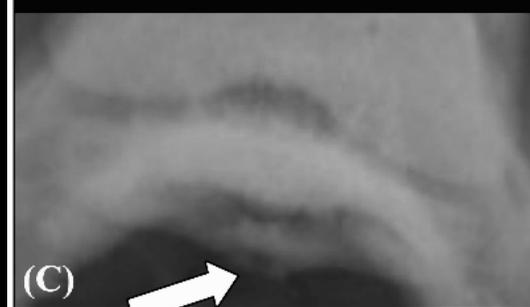
55°



45°



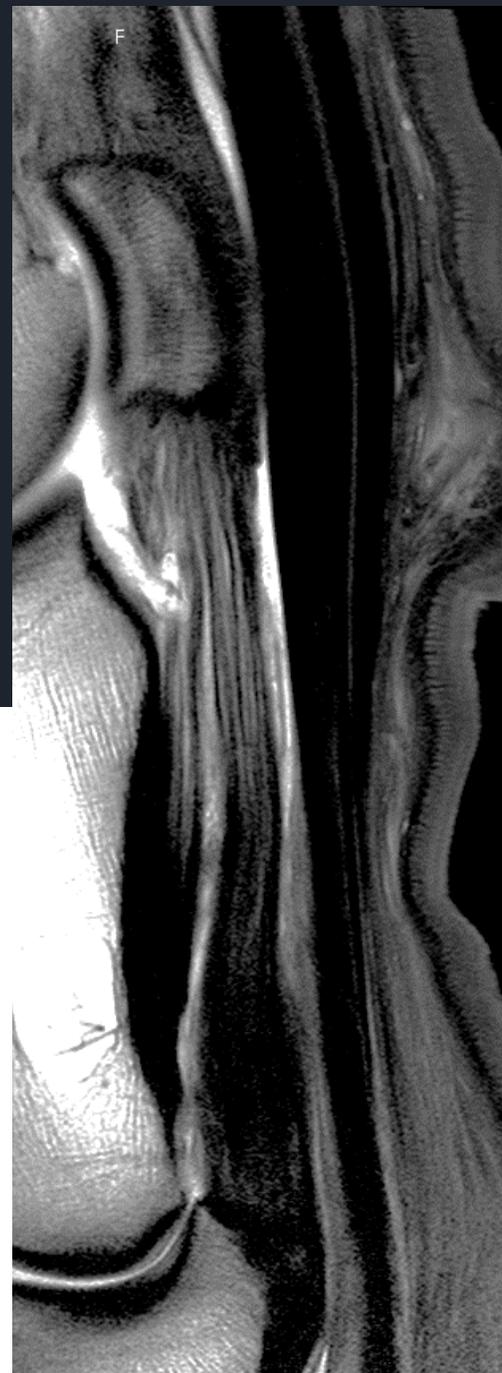
35°



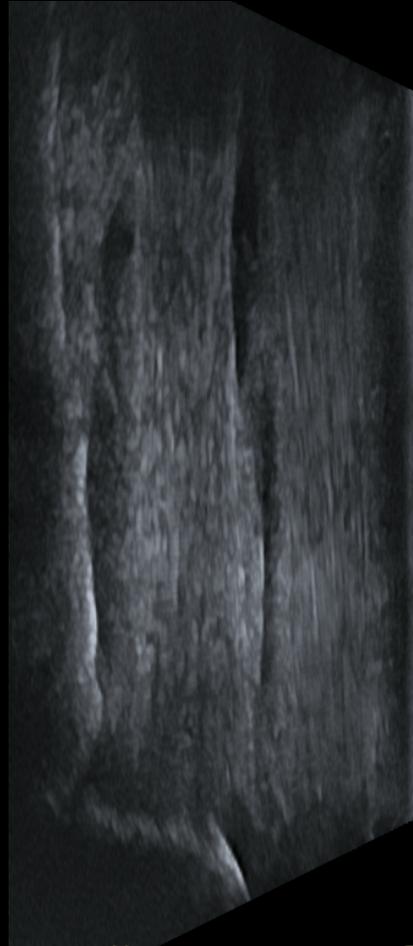
Winkelung d. Skyline Aufnahme



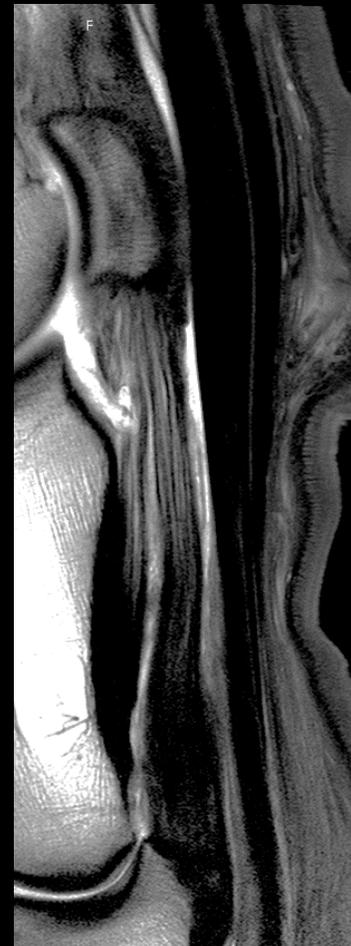
Fesselbeuge



Gleichbeinbänder

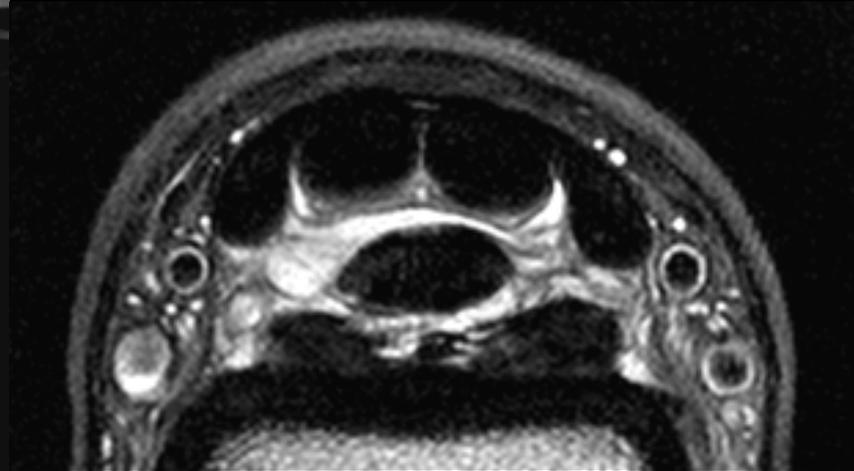
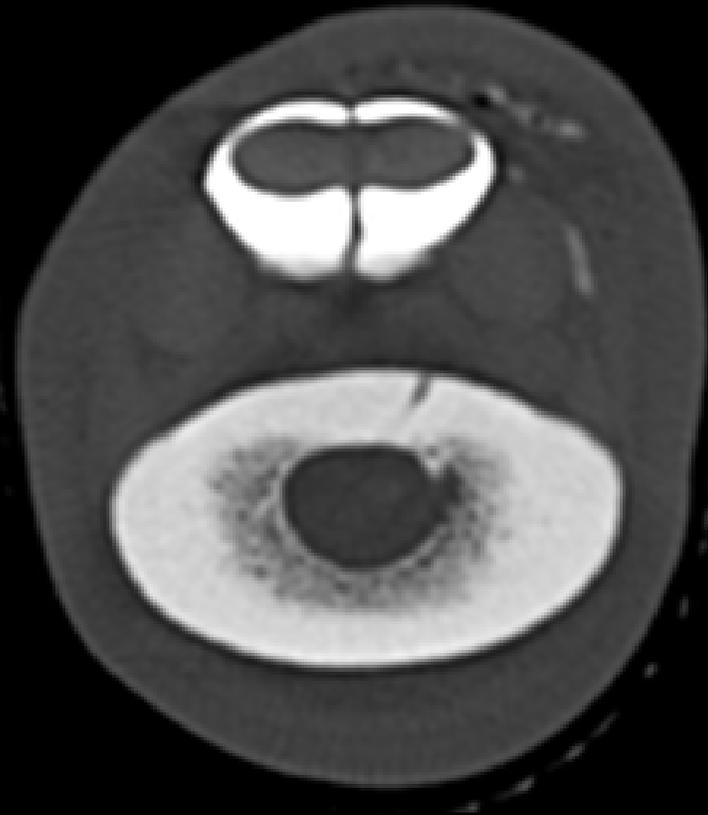


LOGIO
E9

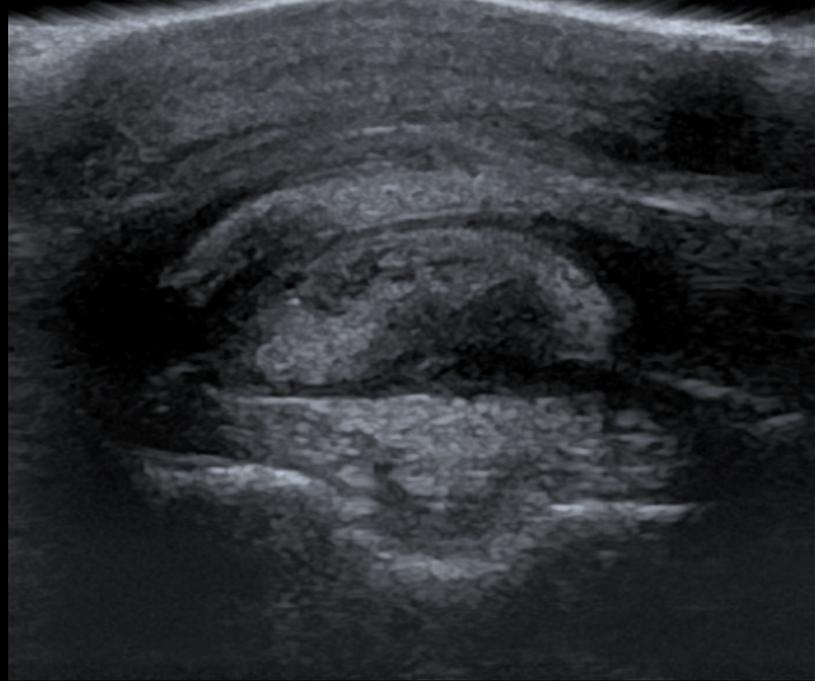
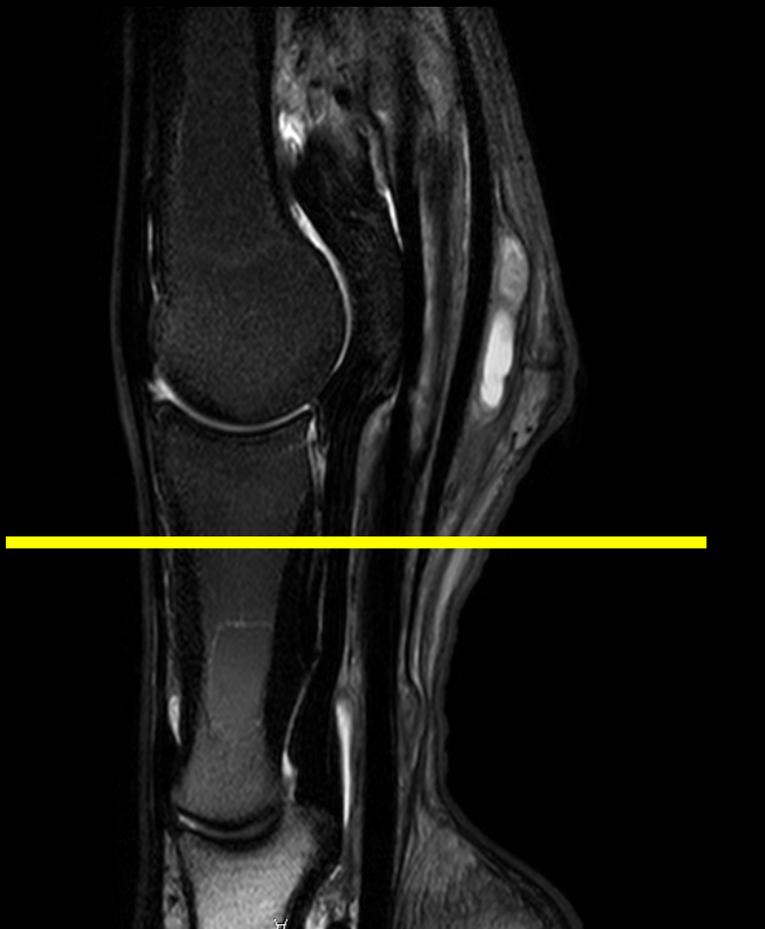
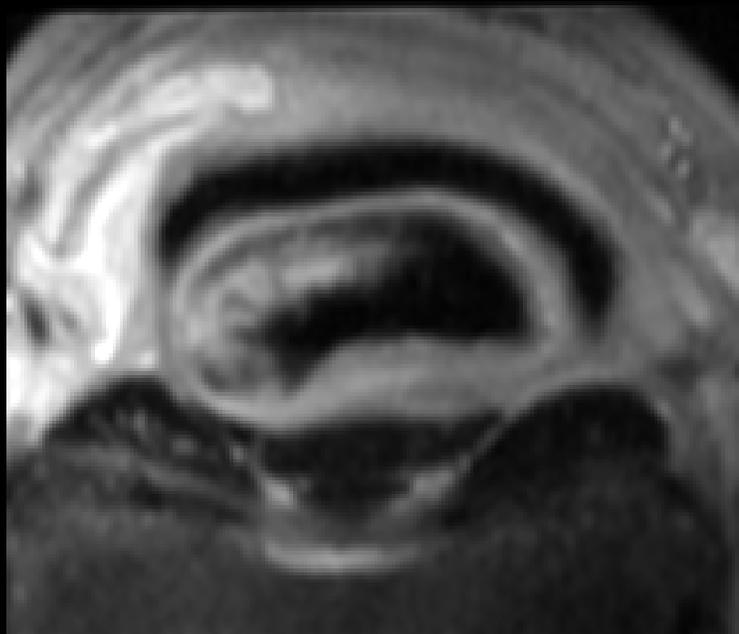




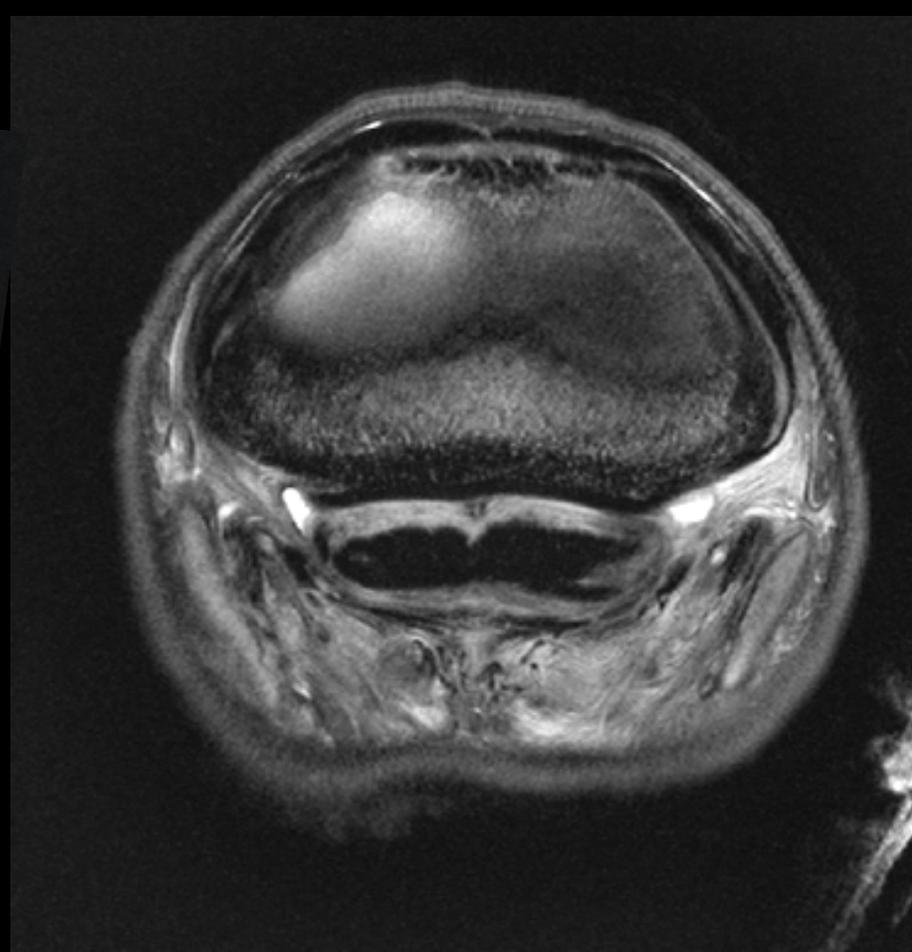
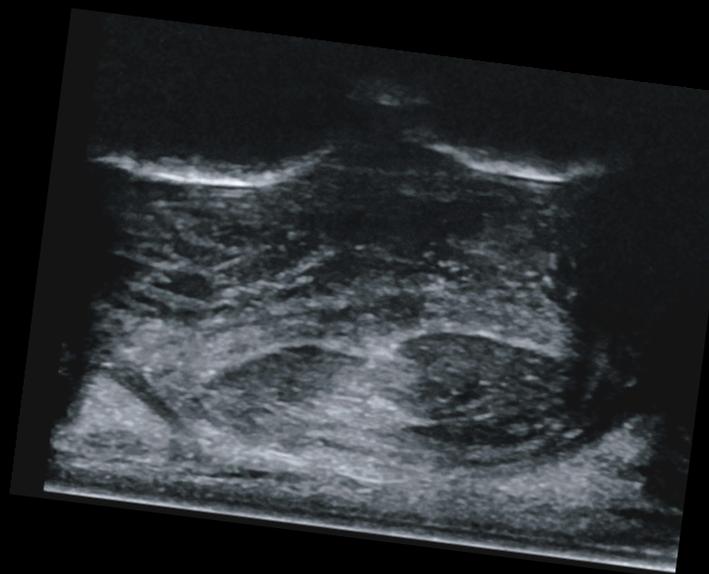
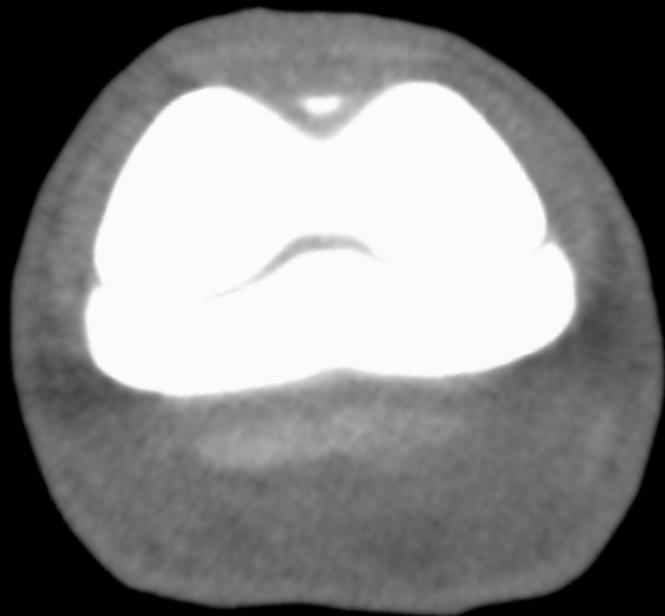
Fesselbeuge



Läsion TBS

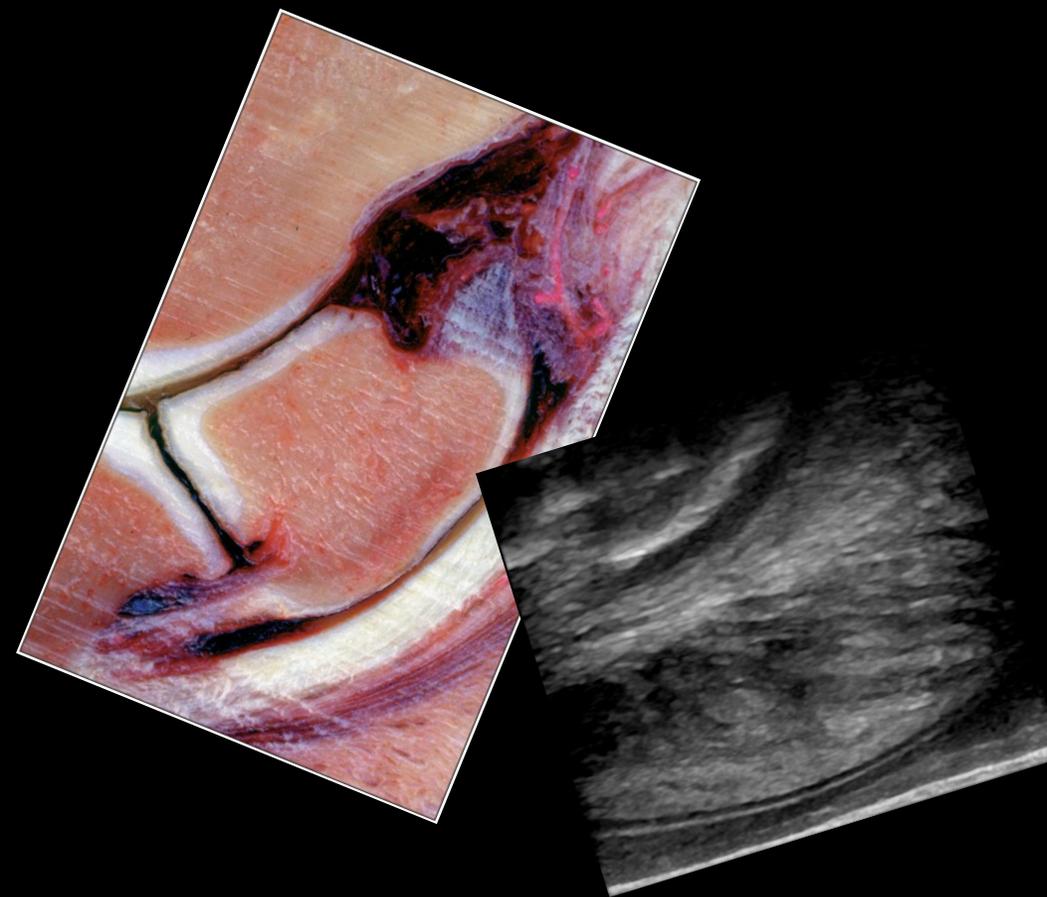


Läsion der TBS - CT / MRT



ULTRASONOGRAPHY OF THE PODOTROCHLEAR APPARATUS IN THE HORSE USING A TRANSCUNEAL APPROACH: TECHNIQUE AND REFERENCE IMAGES

VALERIA BUSONI, DVM, JEAN-MARIE DENOIX, DVM, PhD





Comparison Between Ultrasonographic and Standing Magnetic Resonance Imaging Findings in the Podotrochlear Apparatus of Horses With Foot Pain

Laurence Evrard^{1*}, Zoë Joostens², Maxime Vandersmissen¹, Fabrice Audigié³ and Valeria Busoni¹

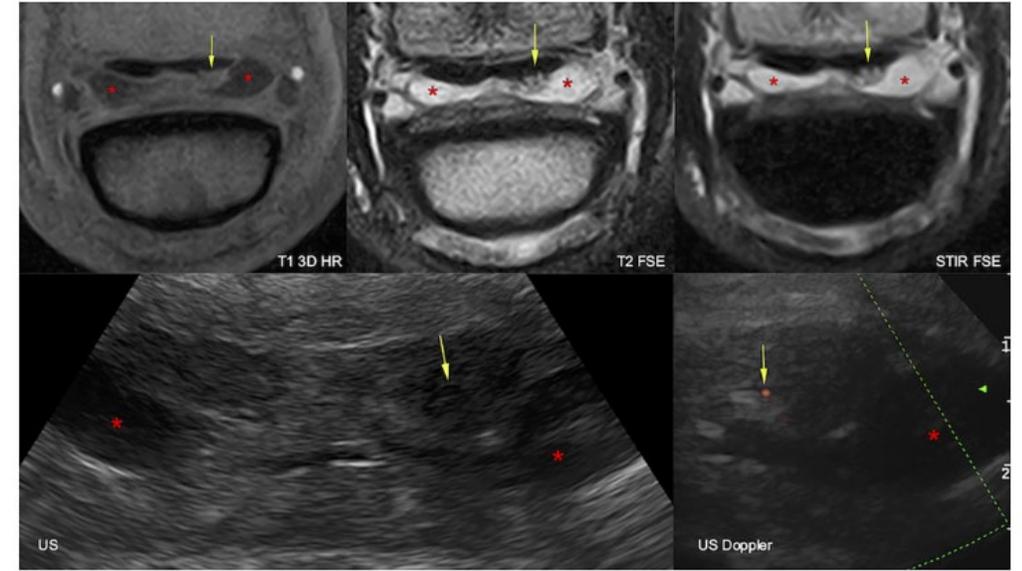


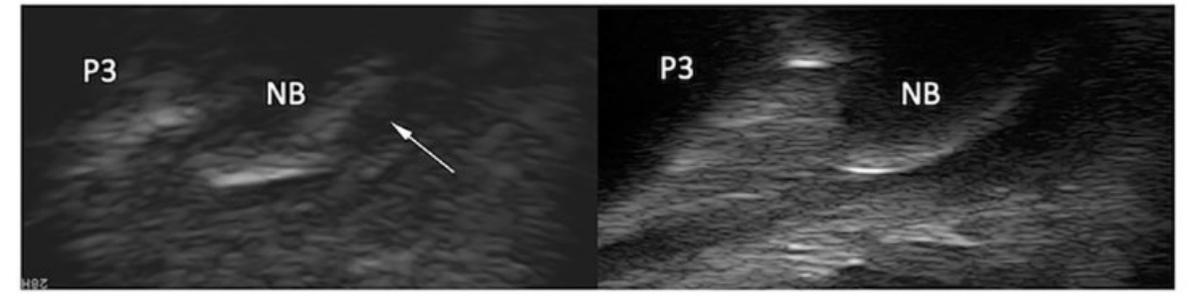
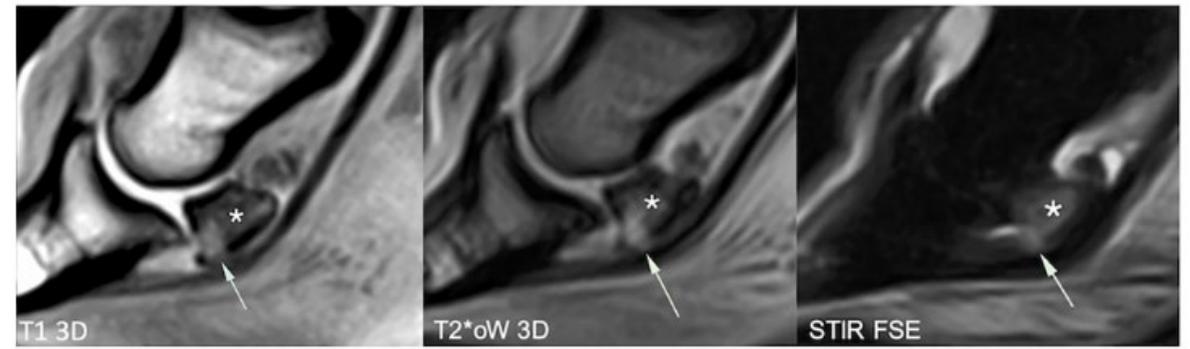
FIGURE 2 | Transverse magnetic resonance imaging (MRI, top) and ultrasonographic (bottom) images of the right front foot at the suprasamoidean level: lateral is to the right and dorsal to the bottom. The lateral lobe of the deep digital flexor tendon is increased in size and deformed by a dorsal lesion, hyperintense in all MRI sequences, hypoechoic, and vascularized at ultrasound (arrows). The navicular bursa is moderately effused (asterisks). T1 3D HR, high resolution tridimensional gradient echo T1 weighted sequence; T2 FSE, fast spin echo T2 weighted sequence; STIR FSE, fast spin echo short tau inversion recovery weighted sequence; US, ultrasonography; US Doppler, Doppler ultrasonography.

- Prospektive Studie
- TBS, Strahlbein, Bursa podotrochlearis, n=34 Zehen
- Mehr Läsionen im US im Vergleich zum MRT



Comparison Between Ultrasonographic and Standing Magnetic Resonance Imaging Findings in the Podotrochlear Apparatus of Horses With Foot Pain

Laurence Evrard^{1*}, Zoë Joostens², Maxime Vandersmissen¹, Fabrice Audigié³ and Valeria Busoni¹



- MRT war besser für die Diagnostik von Strahlbeinerkrankungen
- Transkunealer US erlaubte keine vollständige Beurteilung der TBS
- Läsionen der Gleitfläche des Strahlbeines wurden sowohl mittels US als auch mittels MRT dargestellt (bis auf einen Fall)

Comparison of Ultrasound and MRI for Detection of Soft Tissue Injuries in the Palmar Aspect of the Equine Foot

Georgette E. Shields, DVM, MS; Myra F. Barrett, DVM, MS, DACVR*;
and David D. Frisbie, DVM, MS, PhD, DACVS, DACVSMR

- TBS, Fesselbein-Strahlbein-Hufbeinband, Bursa podotrochlearis
- 70 Untersuchungen von 45 Pferden
- US- gute Sensitivität (85%), moderate Spezifität (60%) bei dorsalen Läsionen der TBS
- Geringe Genauigkeit für Füllungen d. Bursa (67%) und Veränderungen d. Fesselbein-Strahlbein-Hufbeinbandes (61%).

MRT



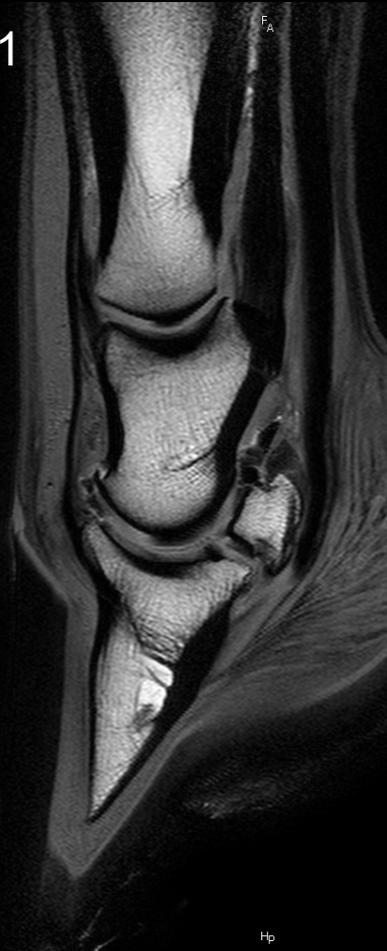
MRT

Low-field / High-field



MRT Sequenzen High Field

T1



T2



PD

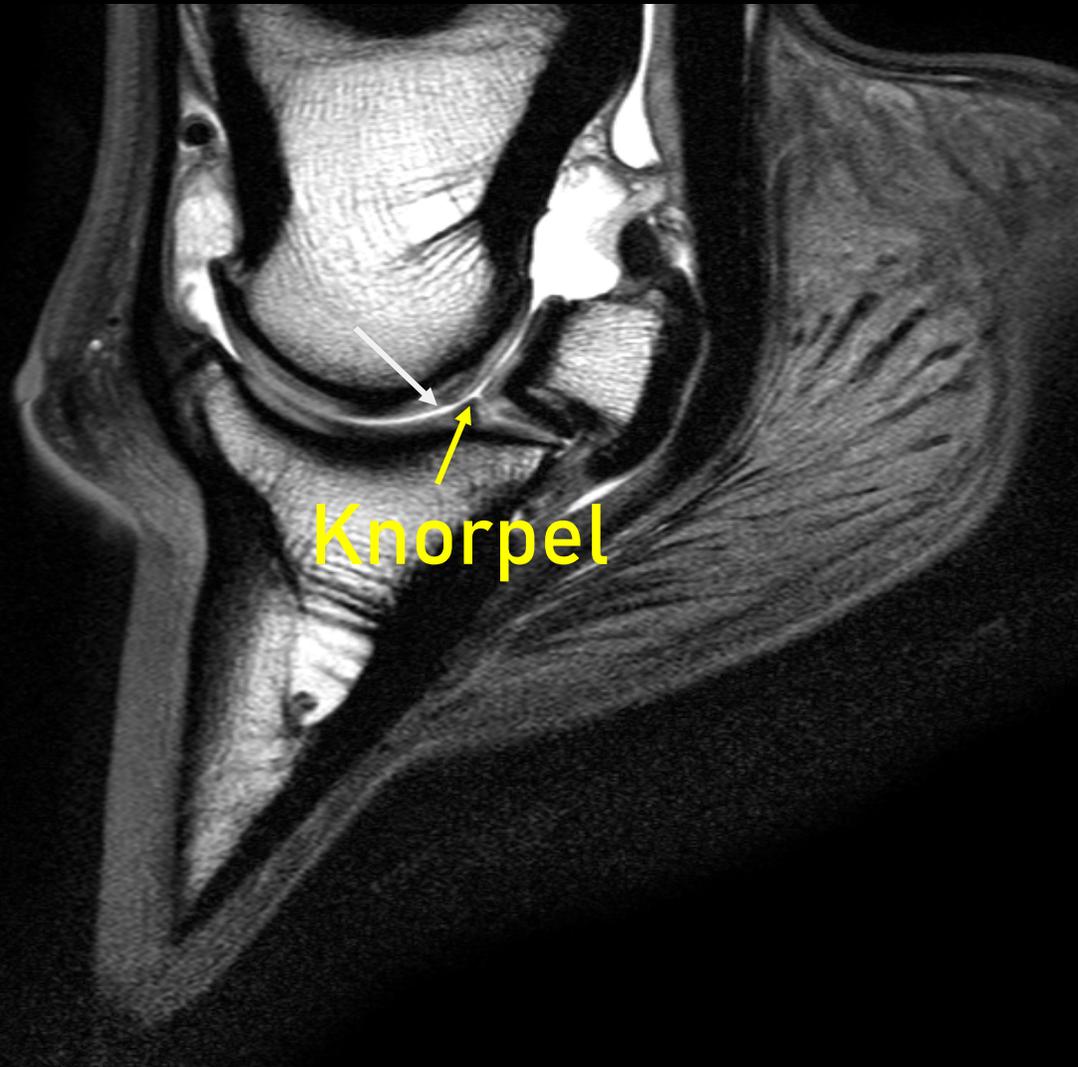


PD
SPAIR



Zehe MRT Anatomie

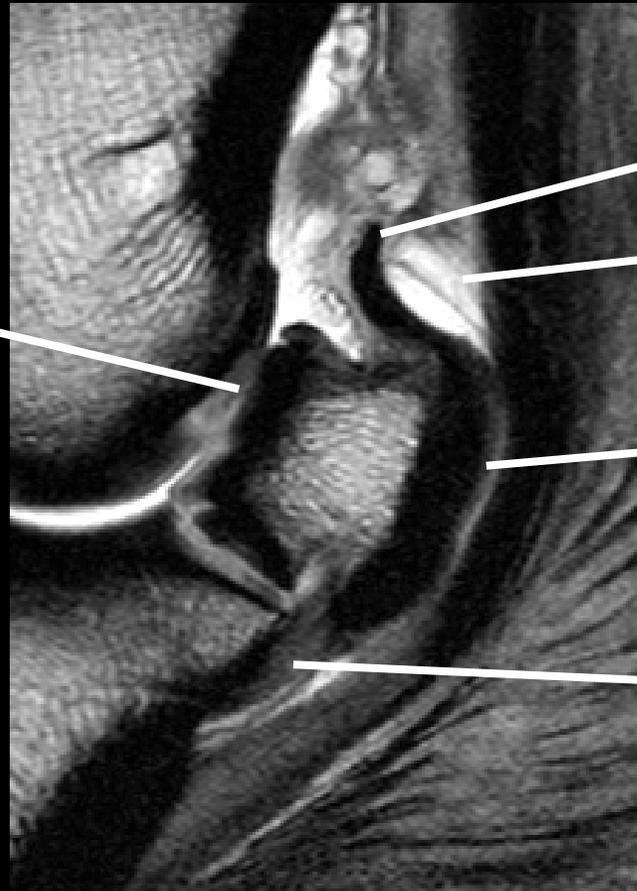
Synovia



Knorpel

MRT Anatomie Strahlbein

Dorsale Gelenkfläche
mit hyalinem Knorpel



Fesselbein-Strahlbein-
Hufbeinband

Bursa podotrochlearis

Gleitfläche

Strahlbein-Hufbeinband
Lig. sesamoideum distale impar

Histologie

a: hyaliner Knorpel

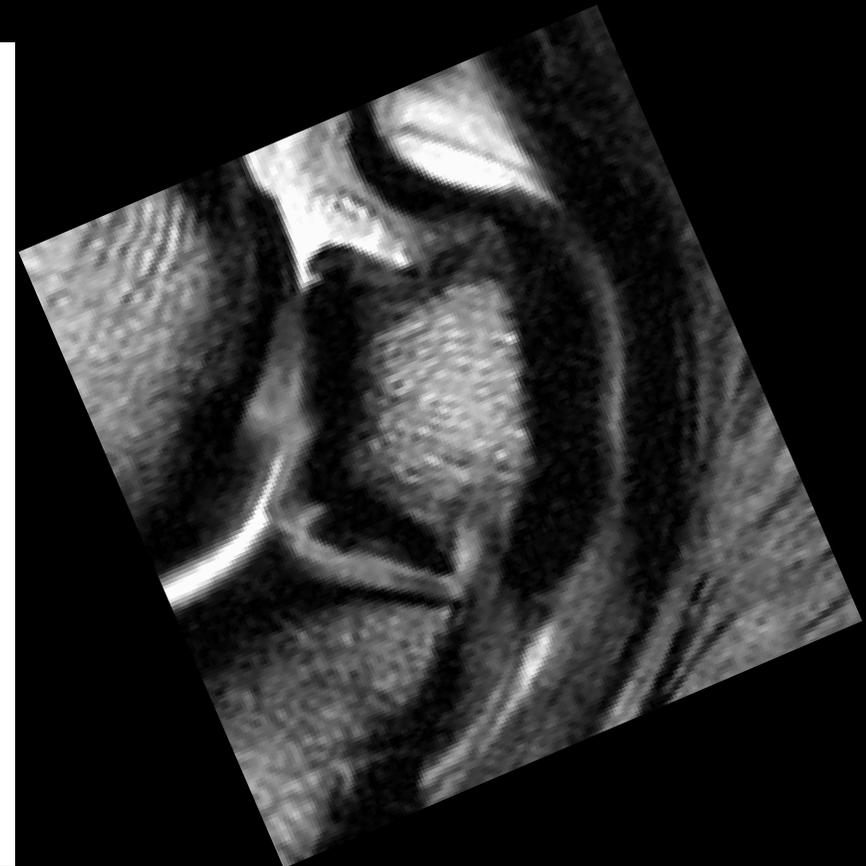
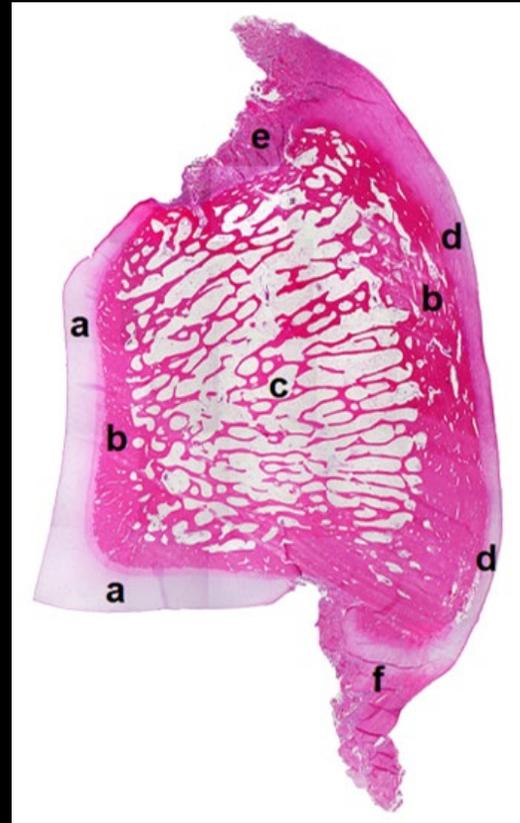
b: Kompakta

c: Spongiosa

d: Faserknorpel

e: Insertion des Fesselbein-Strahlbein-Hufbeinbandes

f: Ursprung des Strahlbein-Hufbeinbandes

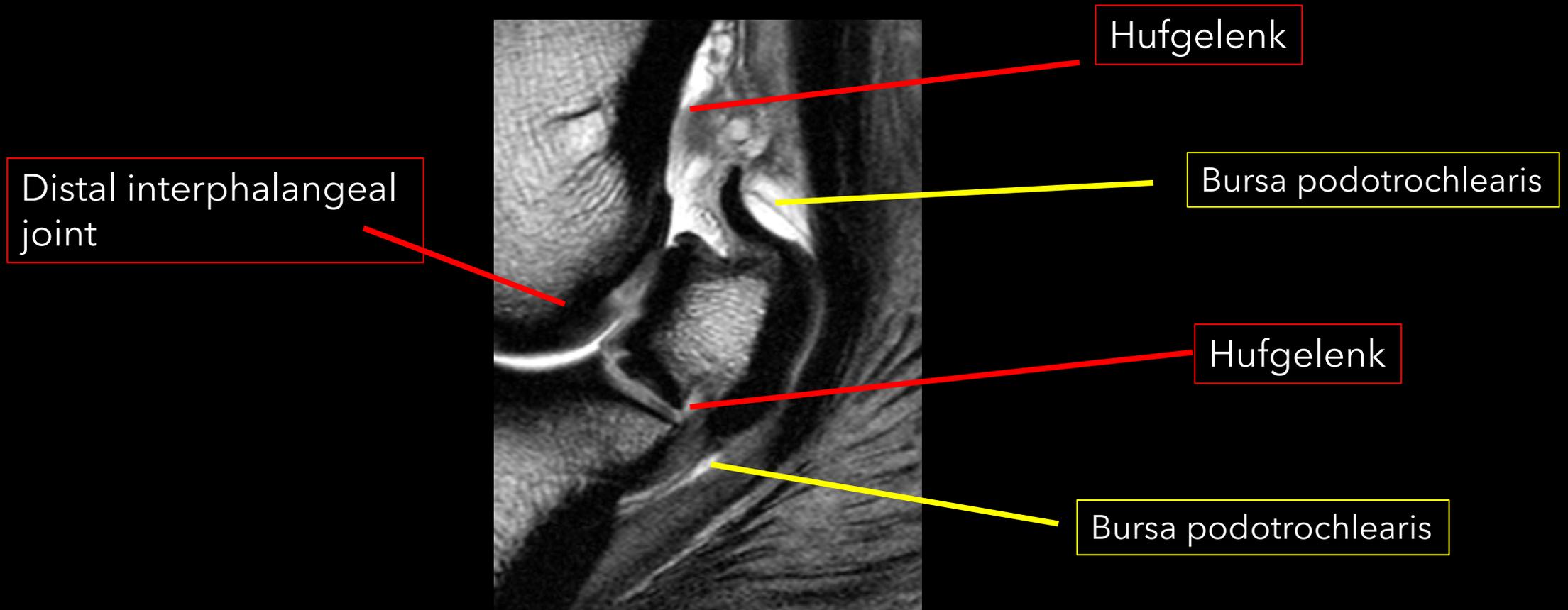


Anatomie / Strahlbeinbänder

- gekreuzte Kollagenfibrillen
- Bindegewebe
- Gefäße



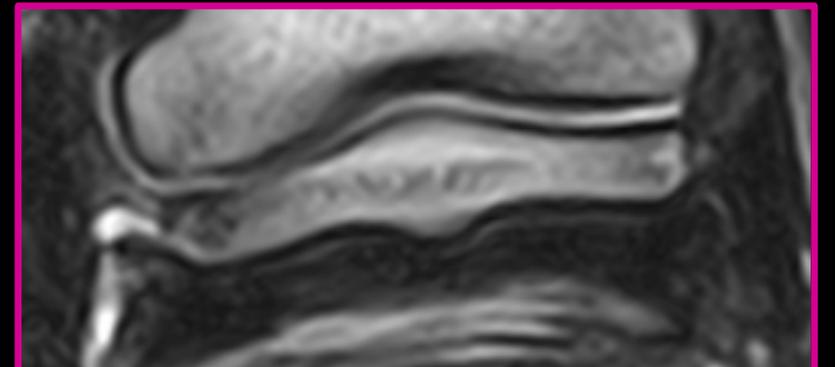
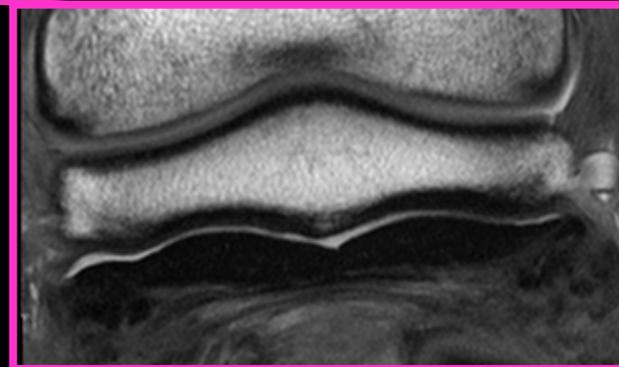
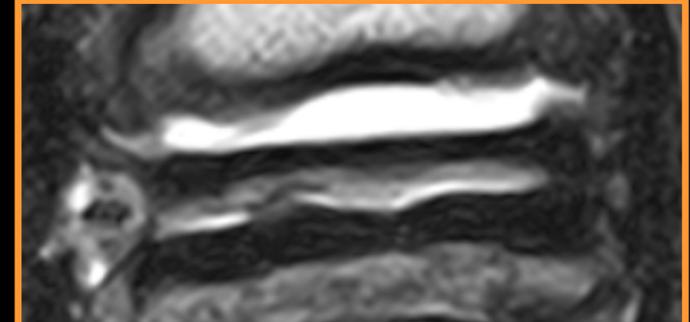
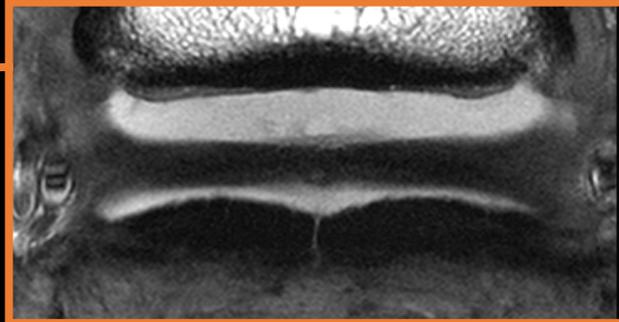
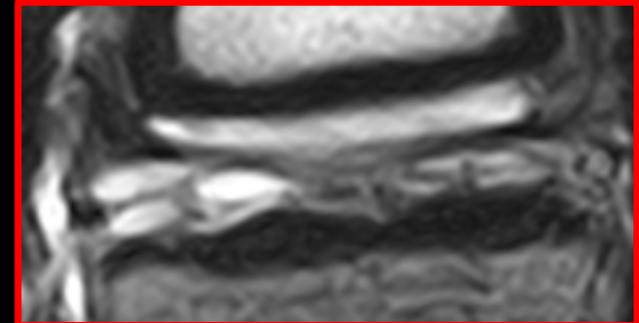
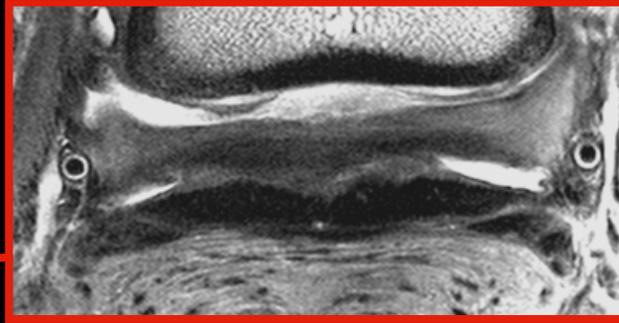
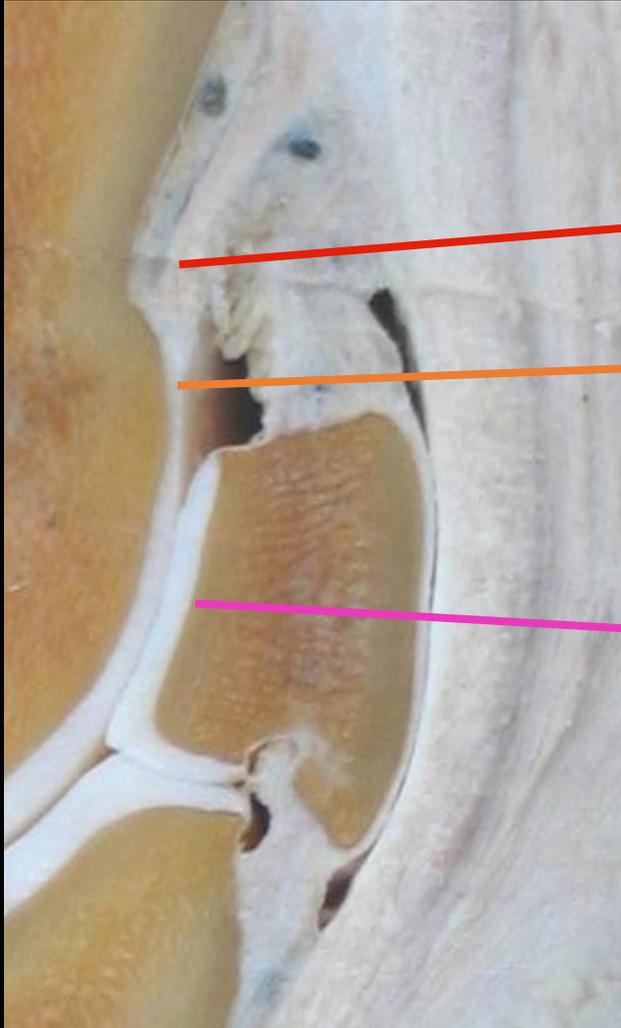
Anatomie Strahlbein



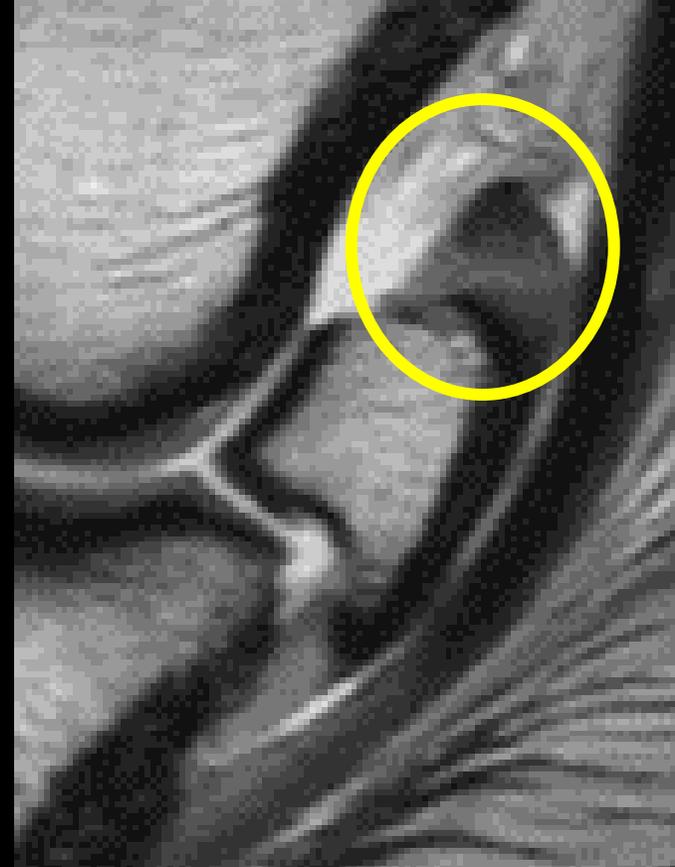
Anatomie

High-field PD

Low-field T2 FSE



Pathologie d. Fesselbein-Strahlbein- Hufbeinbandes

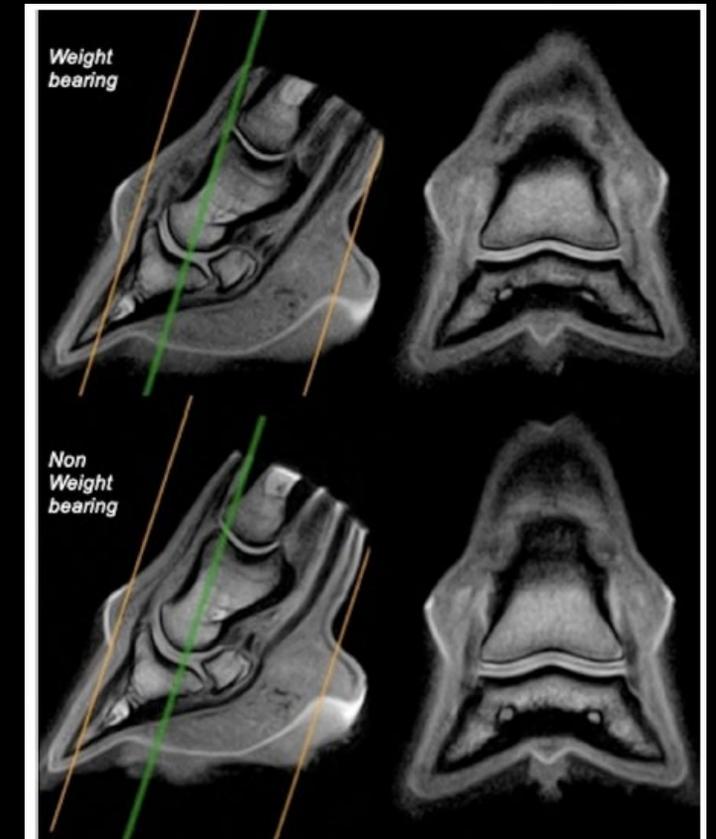
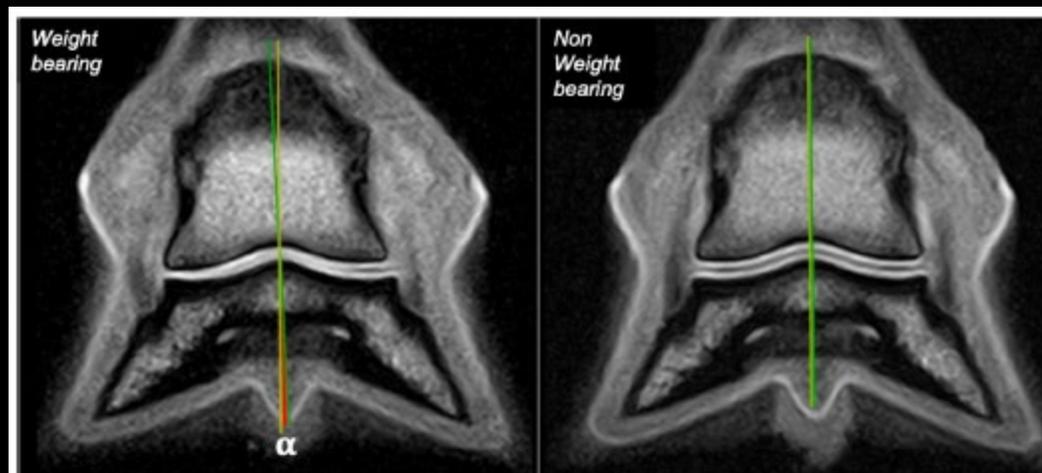


RESEARCH ARTICLE

Low field magnetic resonance imaging of the equine distal interphalangeal joint: Comparison between weight-bearing and non-weight-bearing conditions

Laurence Evrard^{1*}, Fabrice Audigié², Lélia Bertoni², Sandrine Jacquet², Jean-Marie Denoix², Valeria Busoni¹

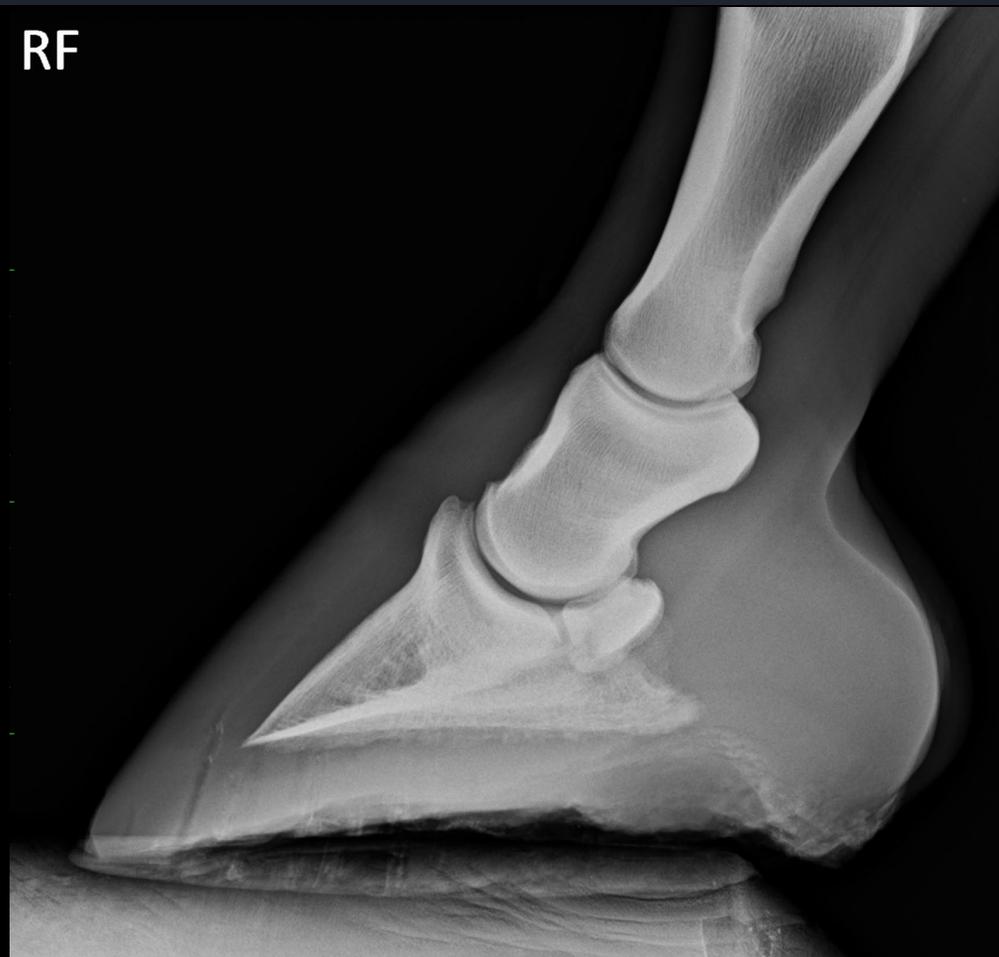
- Unterschiedliche Weite d. Hufgelenkes zwischen belastet und unbelastet
- Zehenweit - med. Gelenkspalt enger
- Knorpel dünner an belasteter Gliedmaße



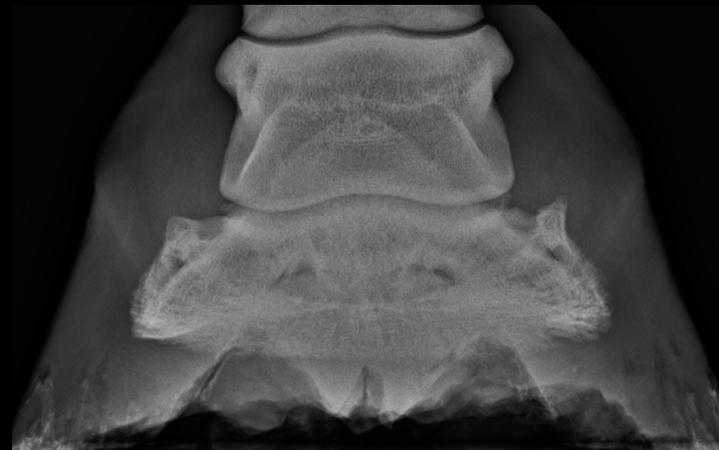
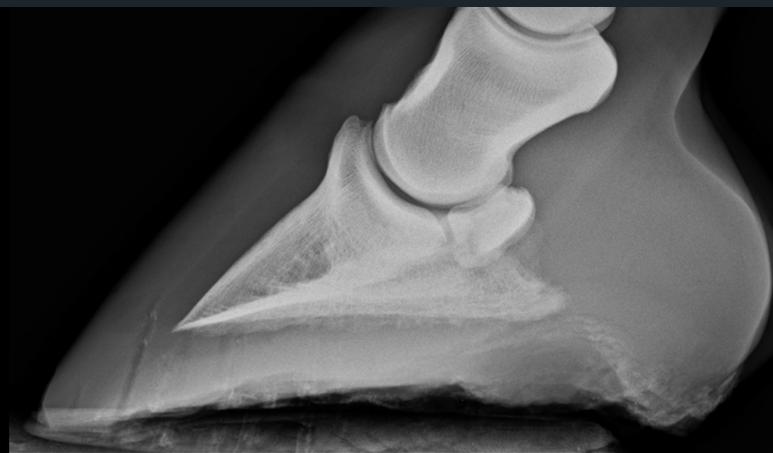
Fall Rö / MRT

- 10 Jahre alte KWPN Stute
- 2/10 VR
- Harter Zirkel:
 - 1/10 VR linke Hand
 - 4/10 VR rechte Hand

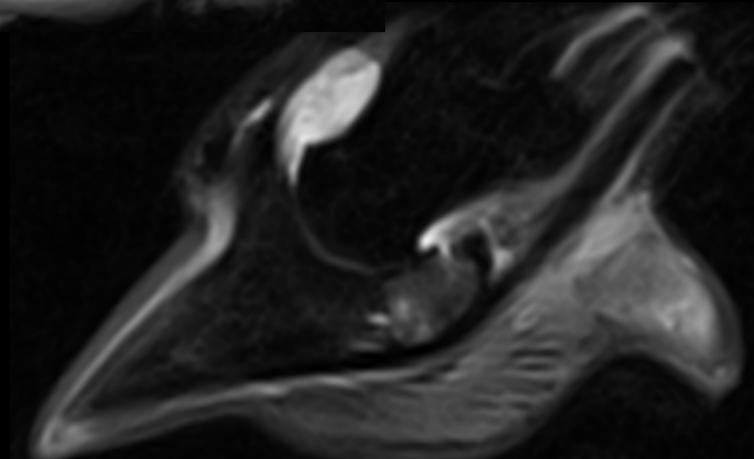
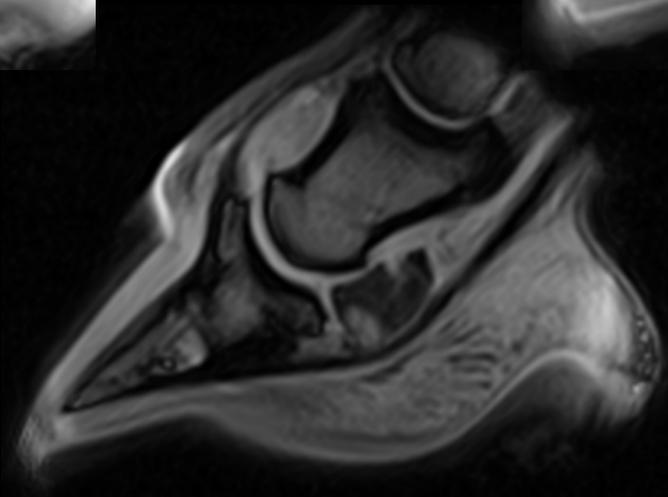
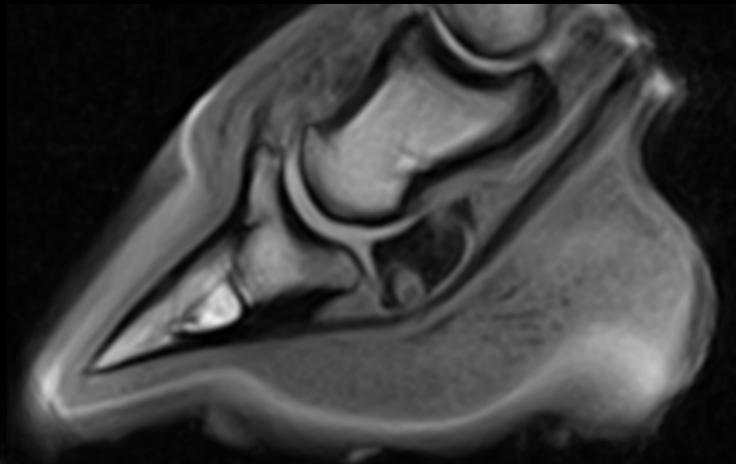
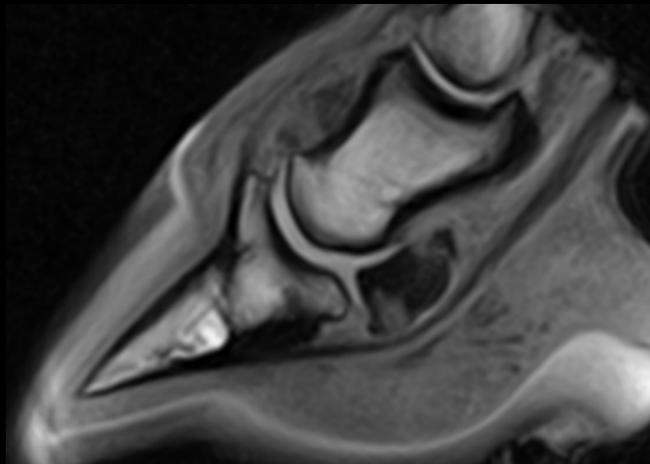
RF



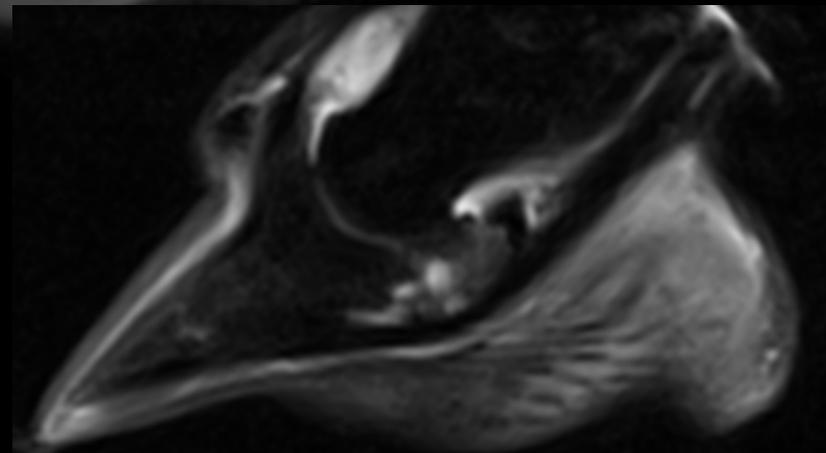
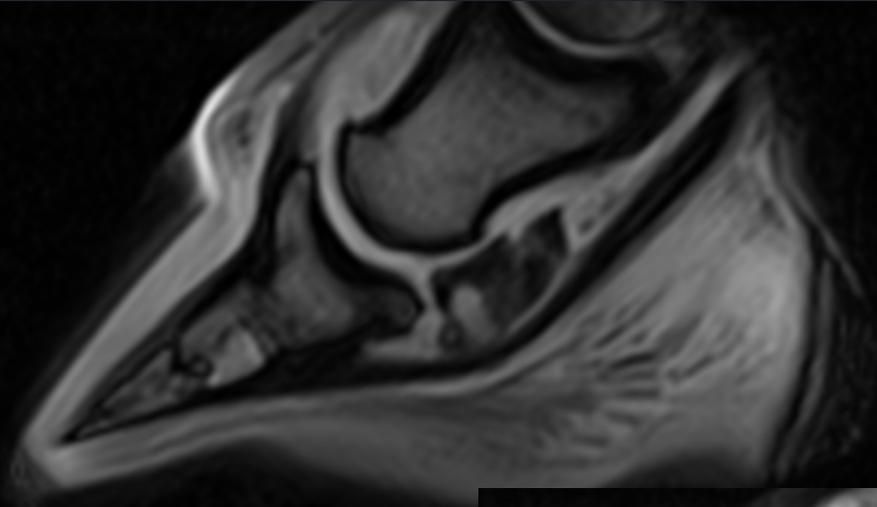
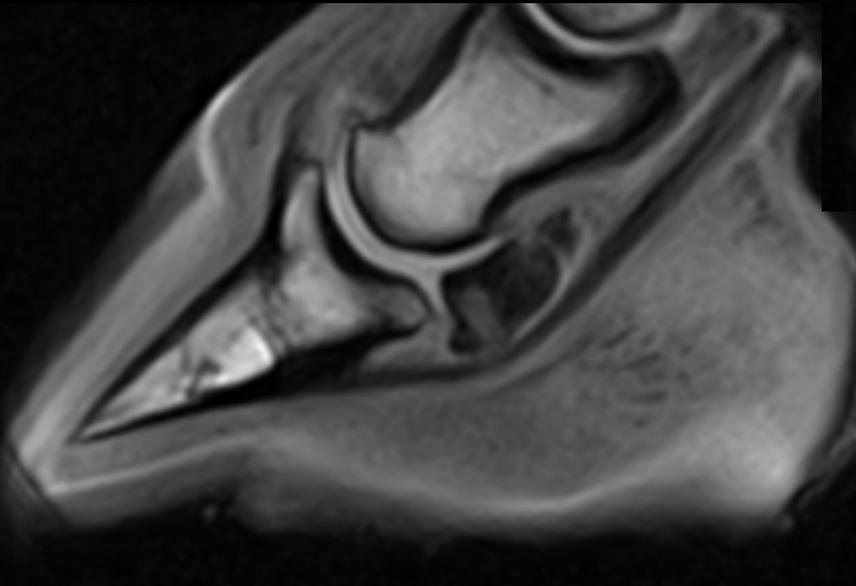
Fall Rö / MRT



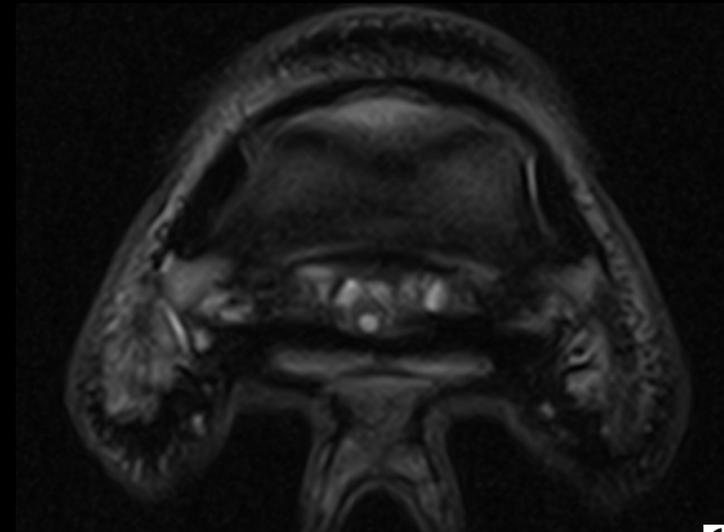
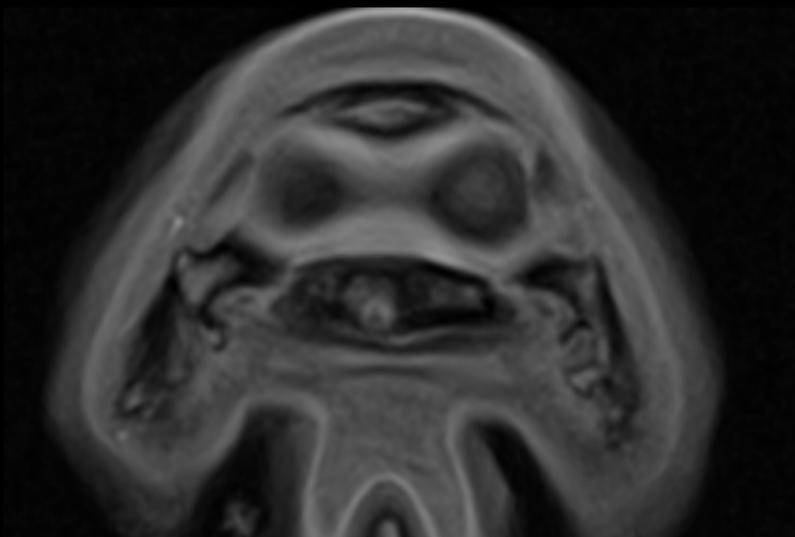
Fall Rö / MRT



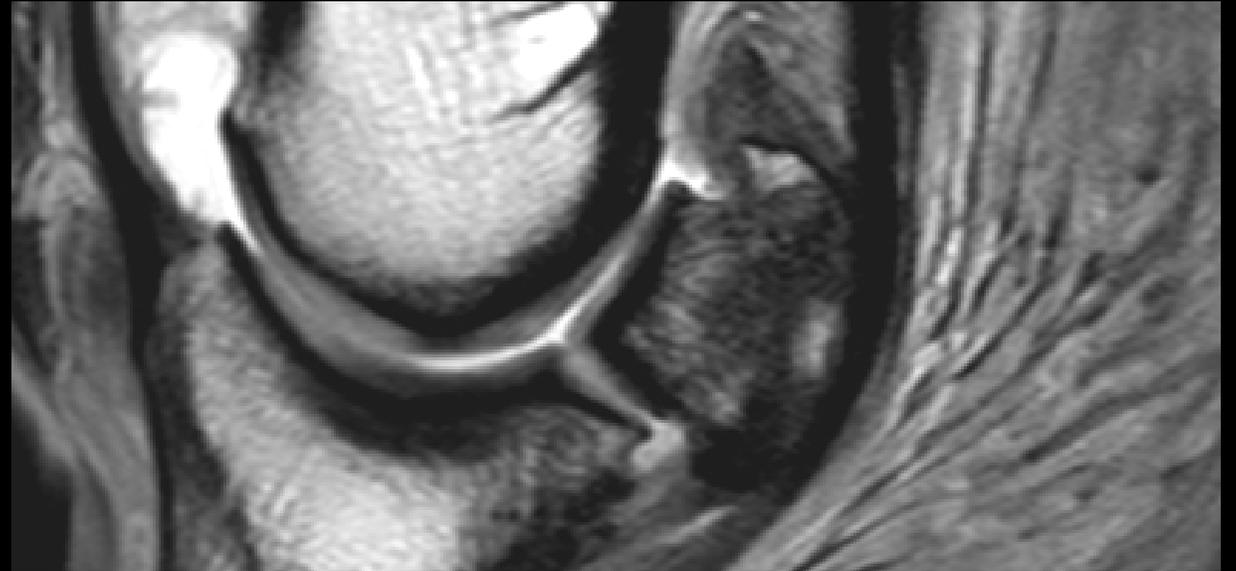
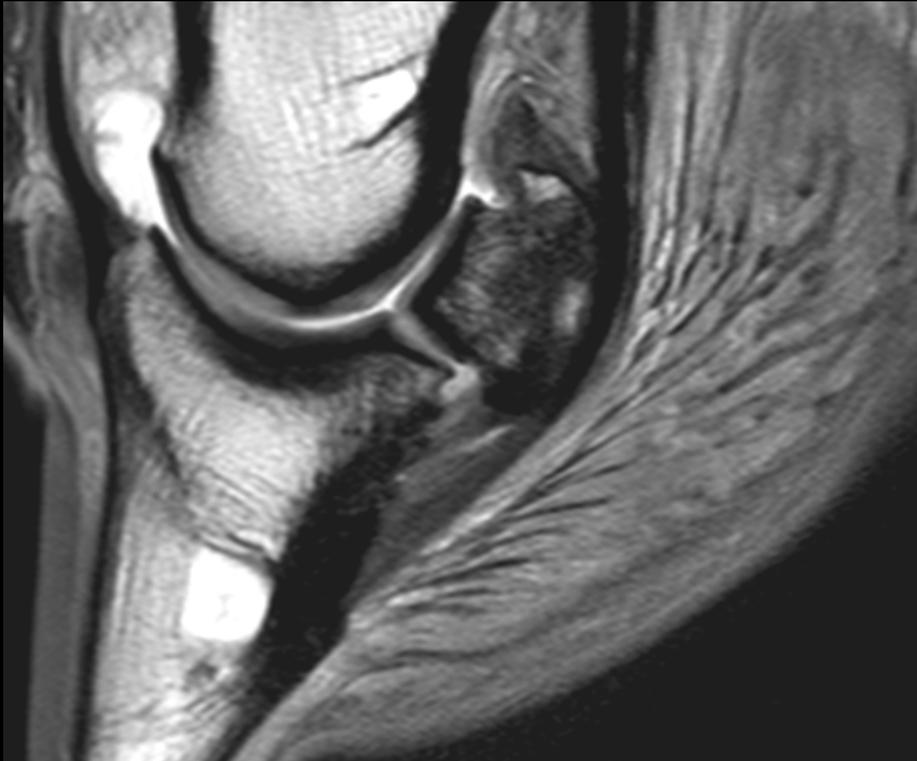
MRT Strahlbein



Läsion Gleitfläche Strahlbein



Einbruch d. Gleitfläche

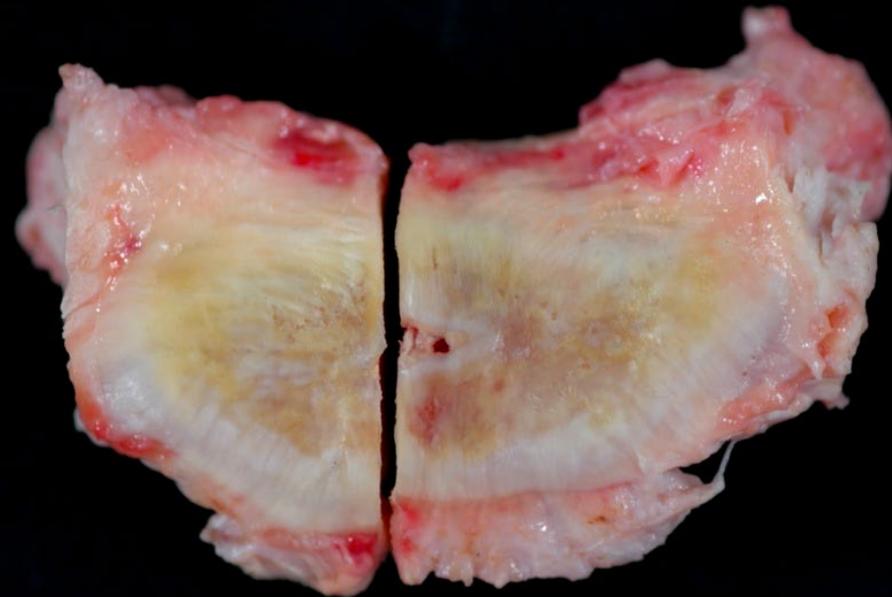


PD

Einbruch d. Gleitfläche



PD SPAIR



Einbruch d. Gleitfläche
Adhäsion mit TBS

Fall Rö / MRT

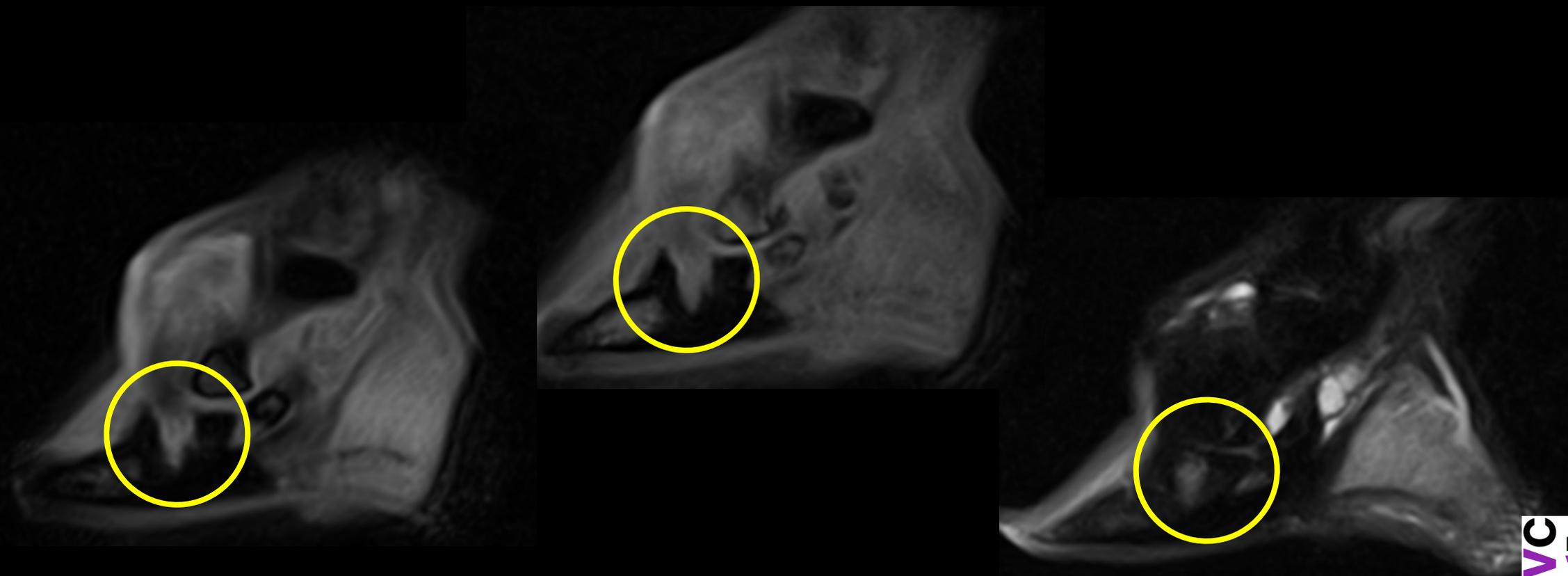
- 11 Jahre alte Irish Sportpferde Stute
- Lamheit: 2/10 VR
- Harter Zirkel:
 - 1/10 VR linke Hand
 - 4/10 VR rechte Hand



Zystenähnliche Läsion im Hufbein



Zystenähnliche Läsion im Hufbein



Zystenähnliche Läsion im Hufbein

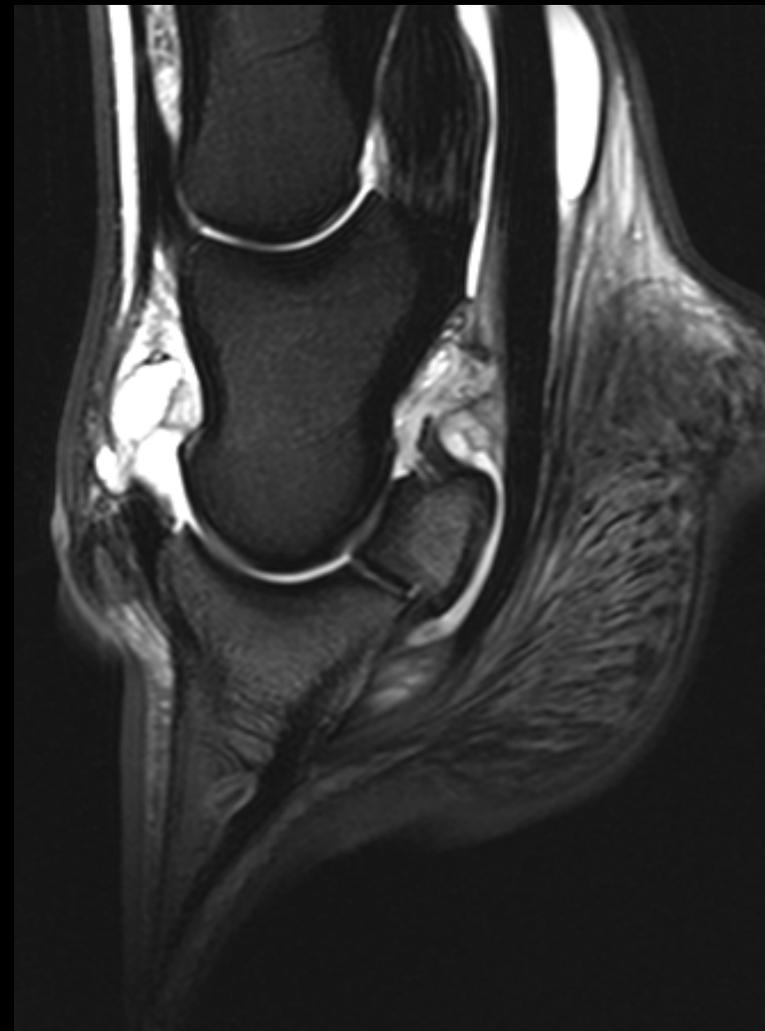
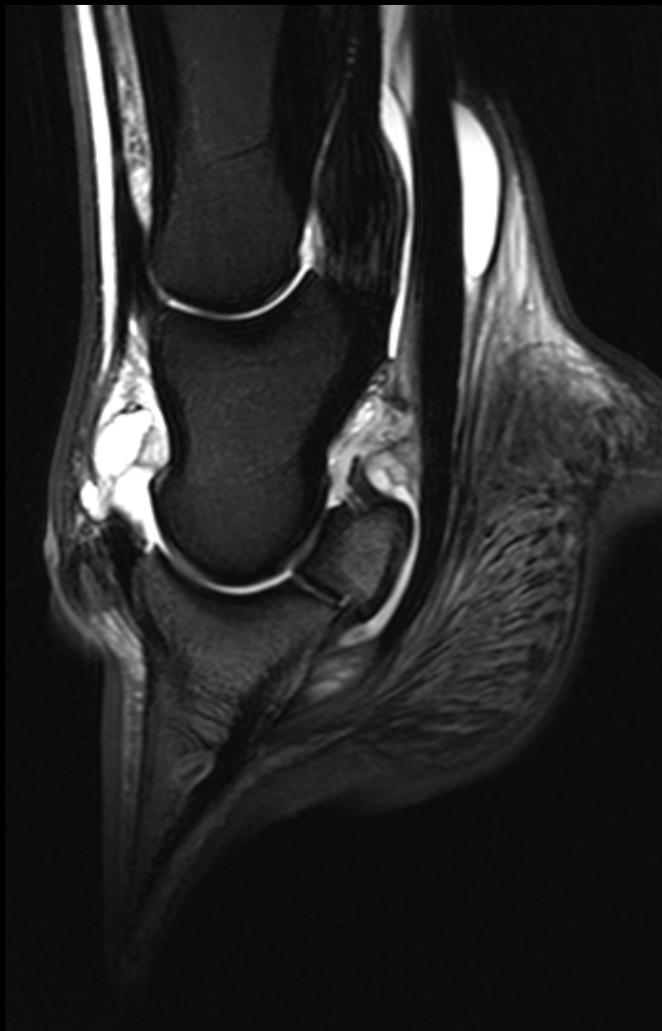
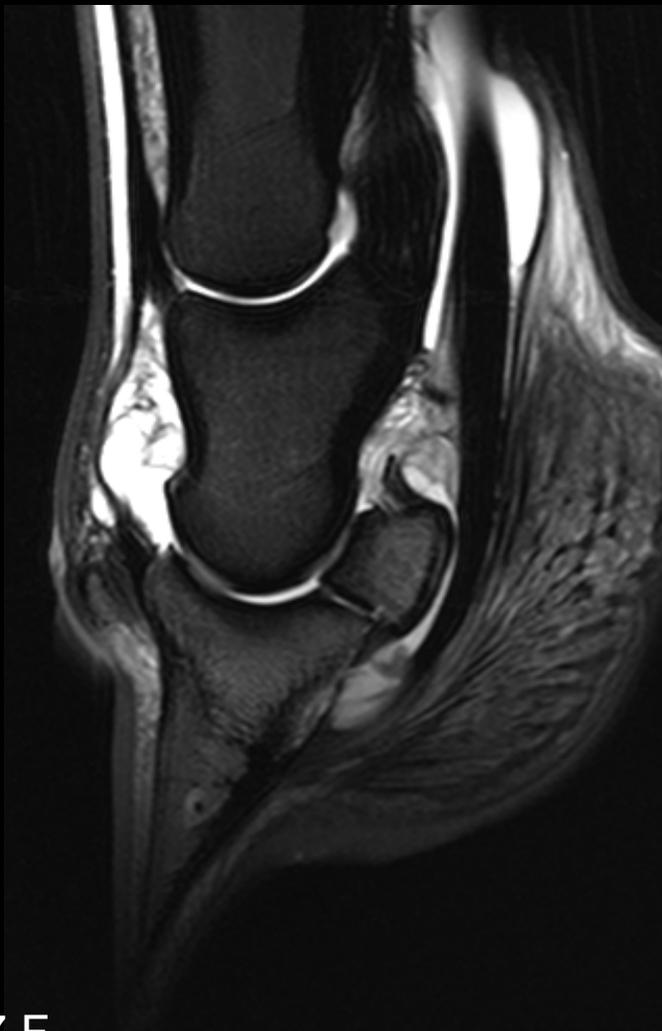


Zystenähnliche Läsion im Hufbein

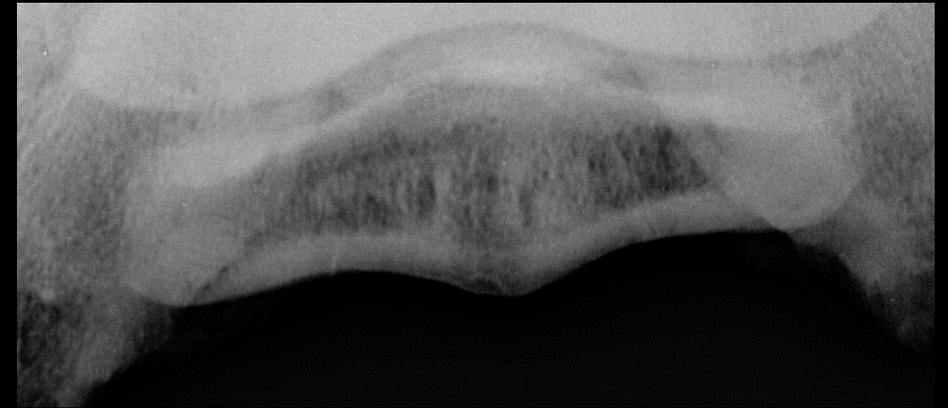


M. Anselmi, D. 18. 6. 19. 2019

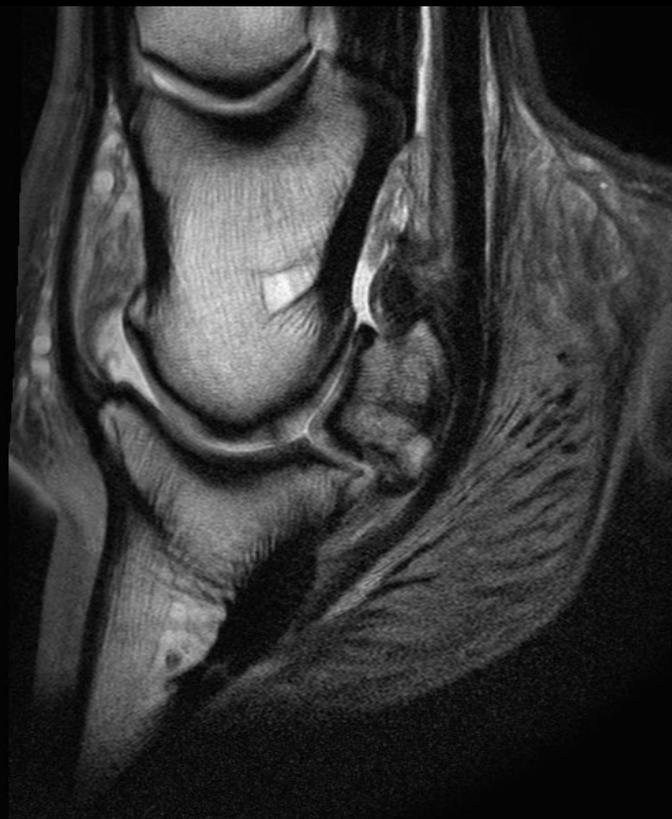
Läsion der TBS



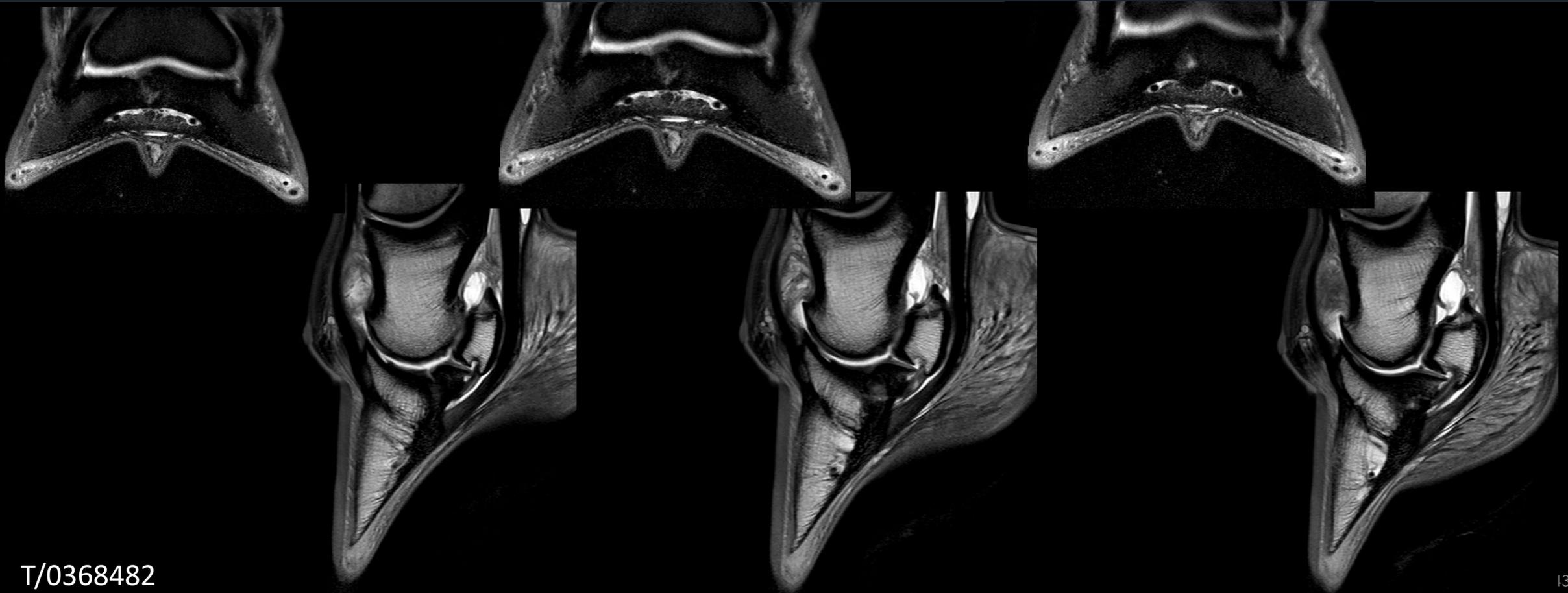
Röntgen Strahlbein



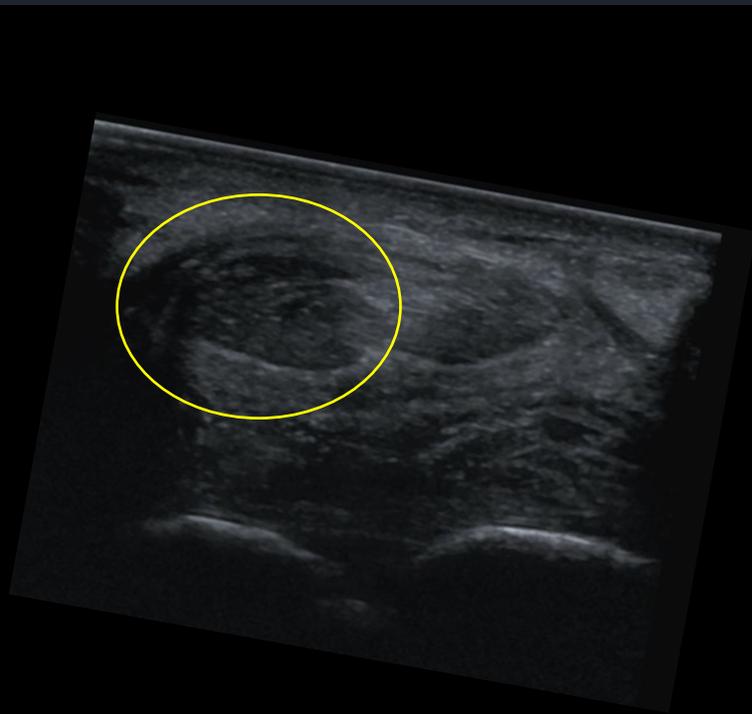
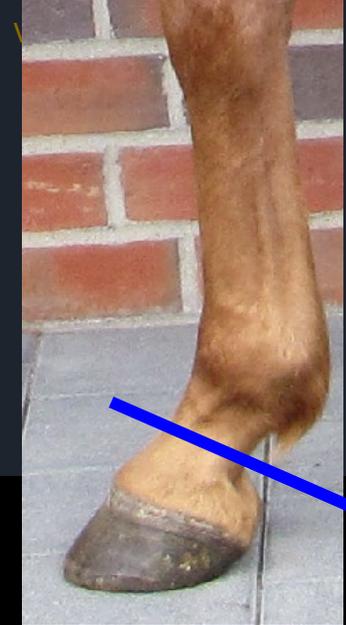
Röntgen / MRT



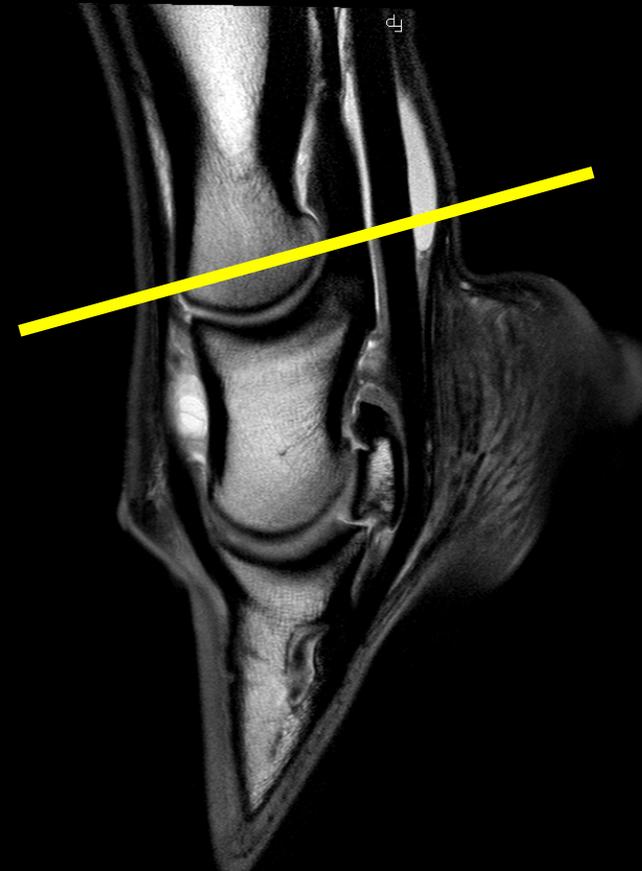
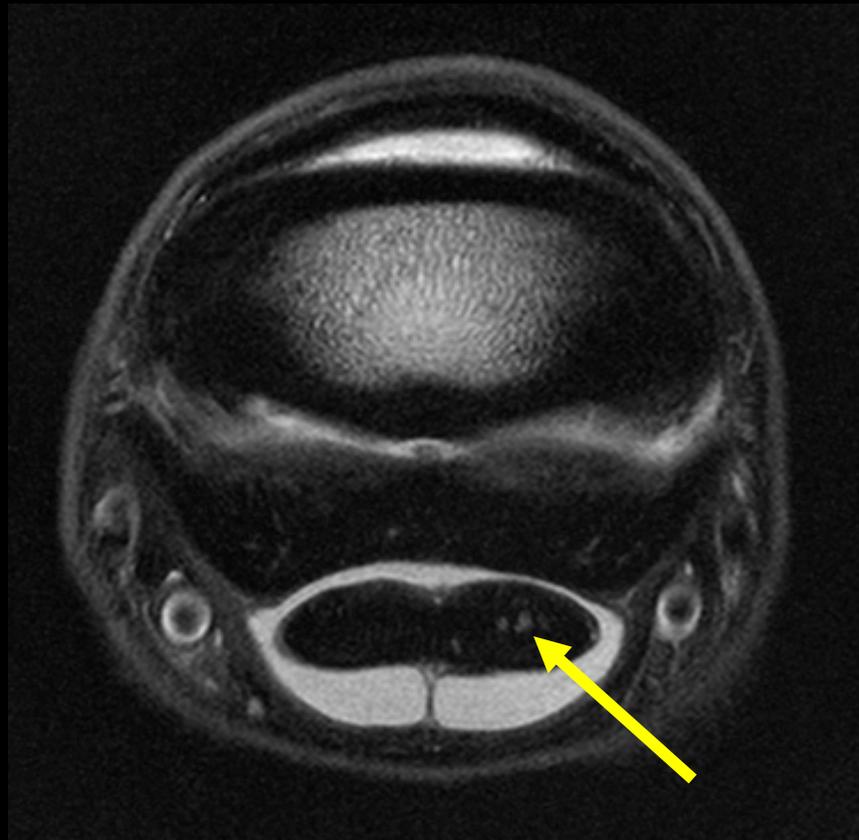
Insertion d. Strahlbein-Hufbeinbandes



Läsion d. TBS – MRT / US

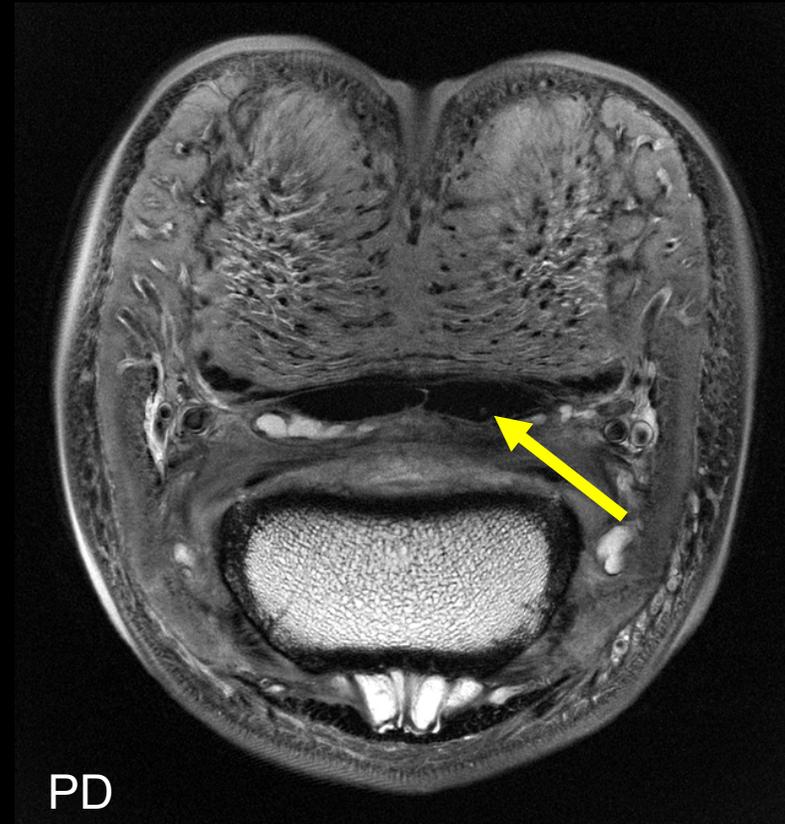
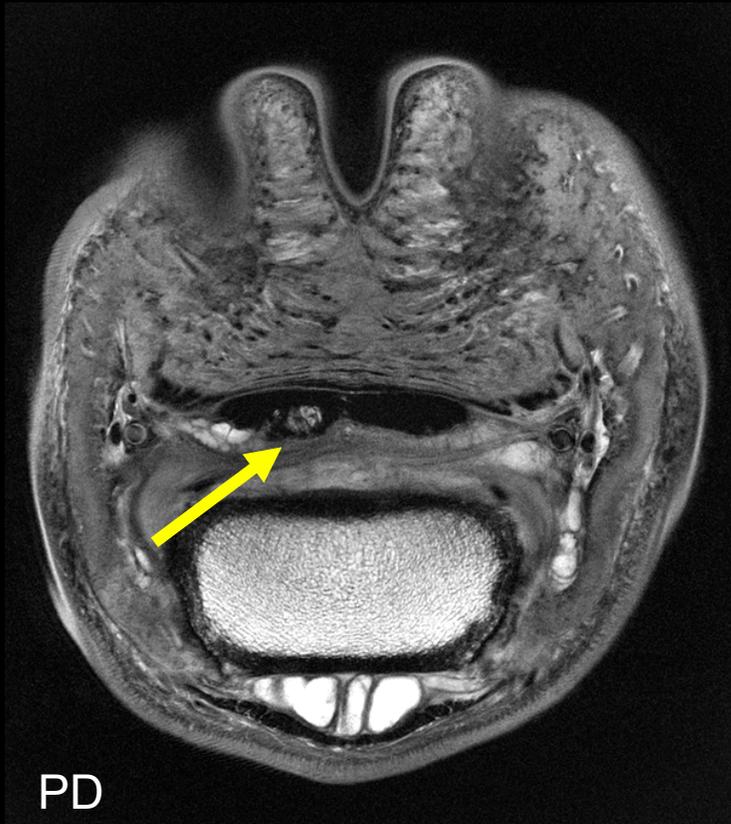


Läsion d. TBS – MRT

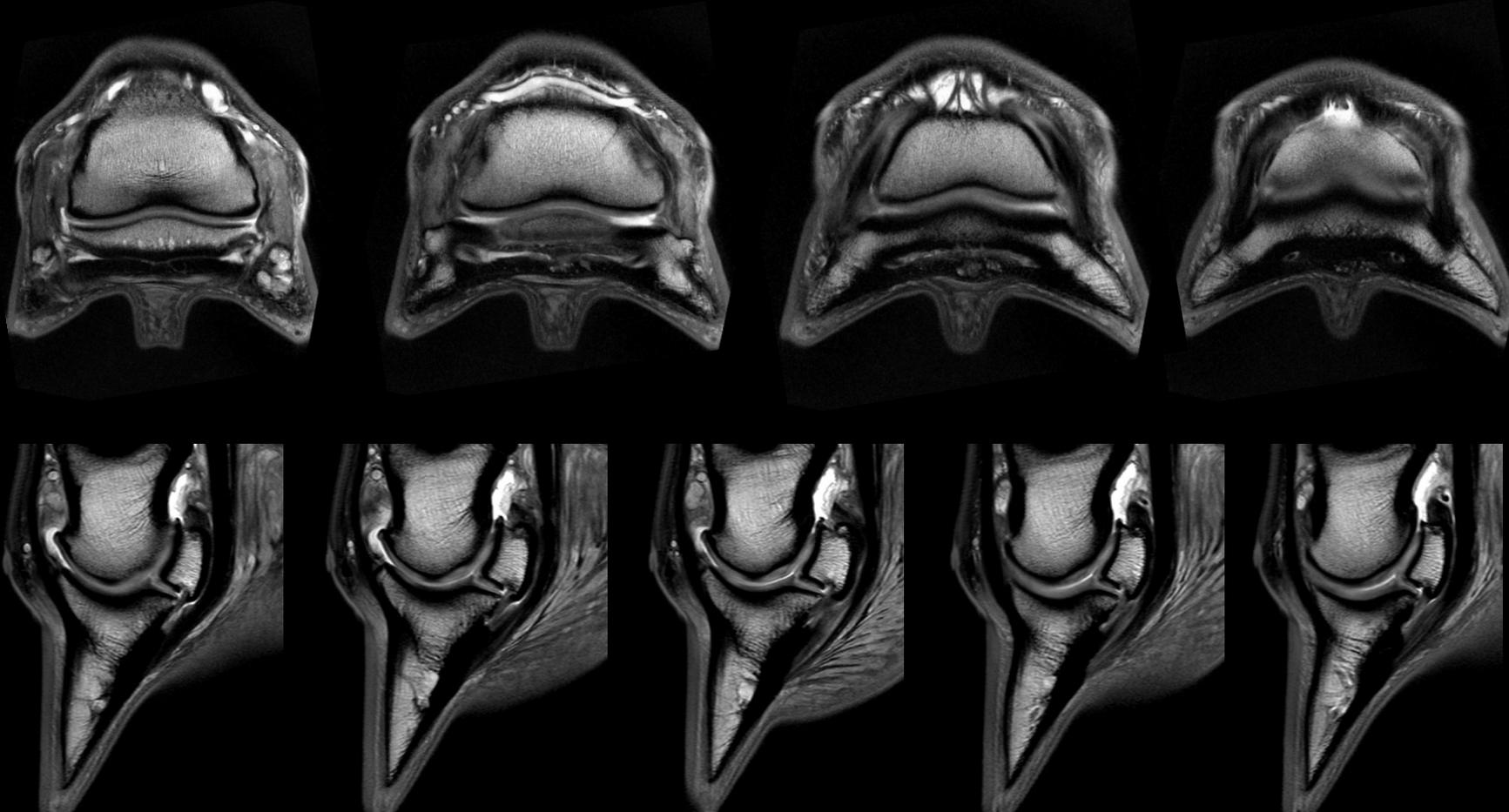




Läsion d. TBS – MRT



Läsion d. TBS distal



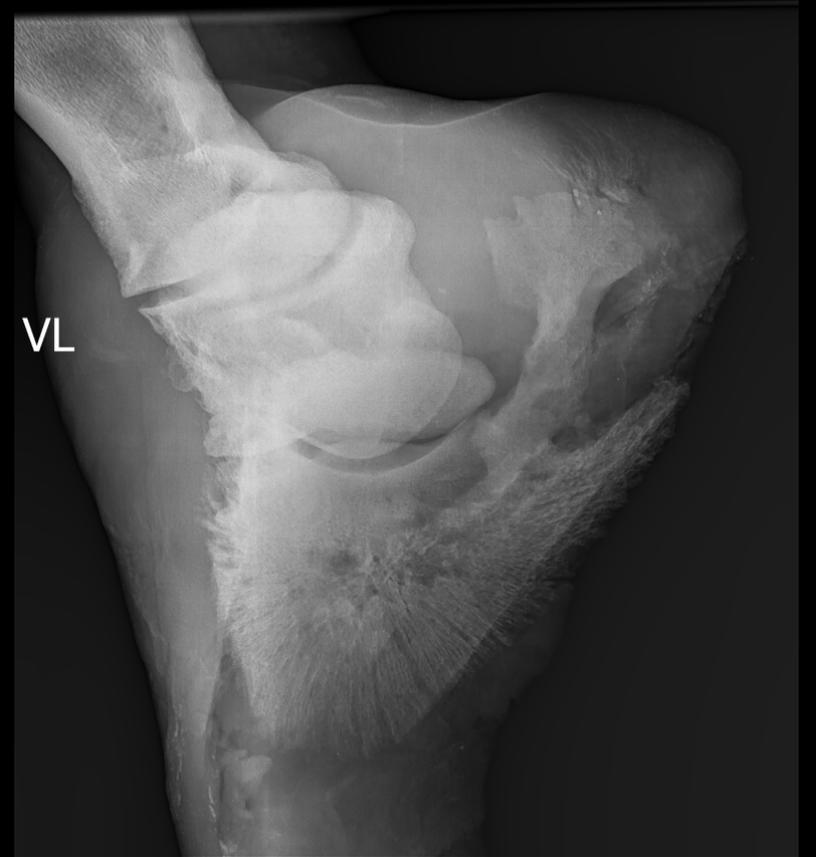
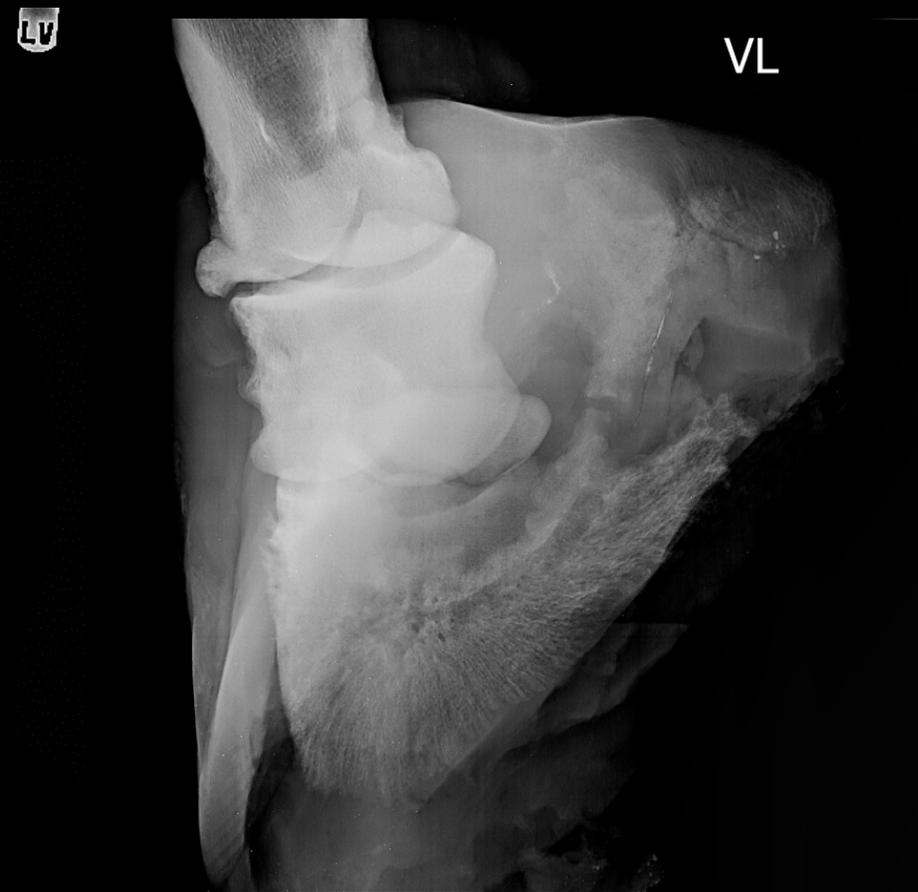
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Fall Rö / MRT

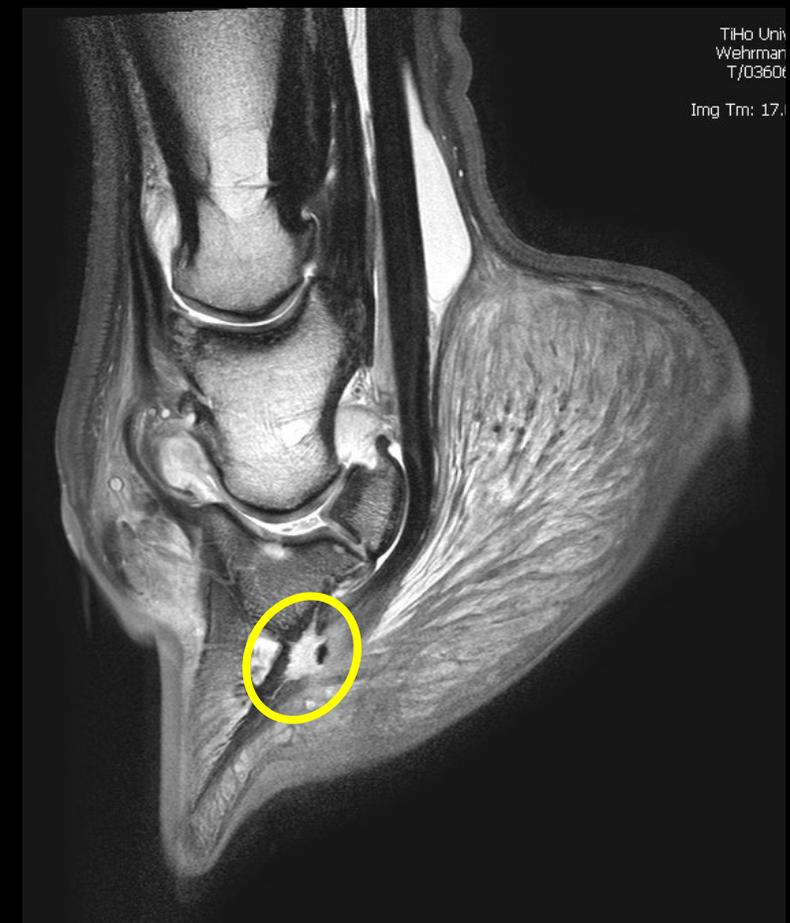
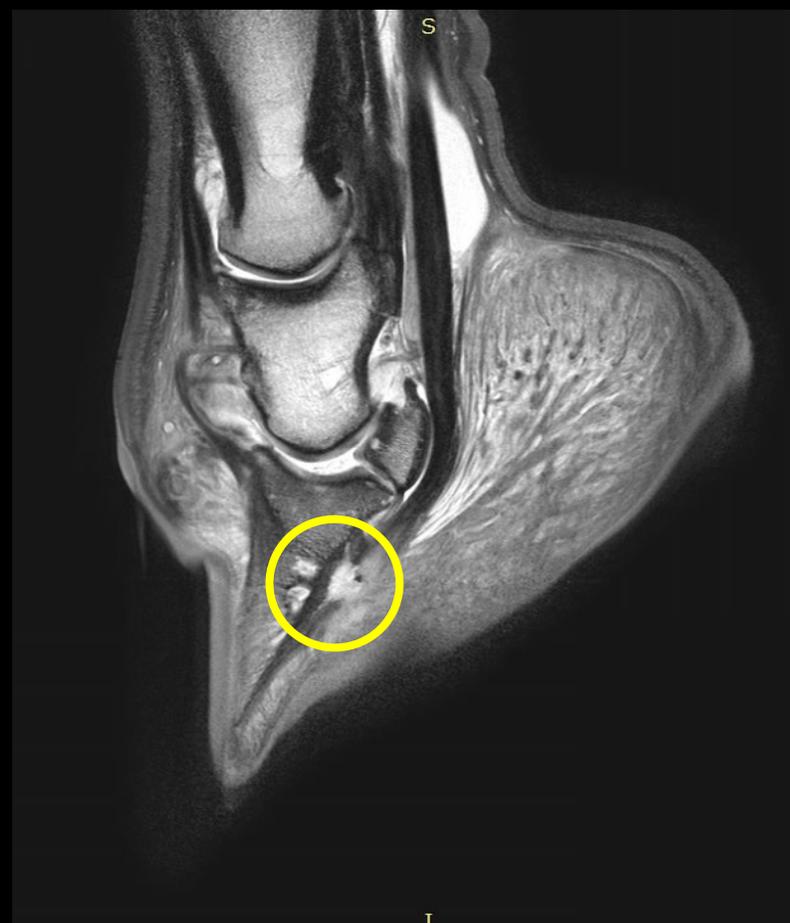
- 8 Jahre alter Clydesdale Wallach
- Lahmheit: 5/5 VL



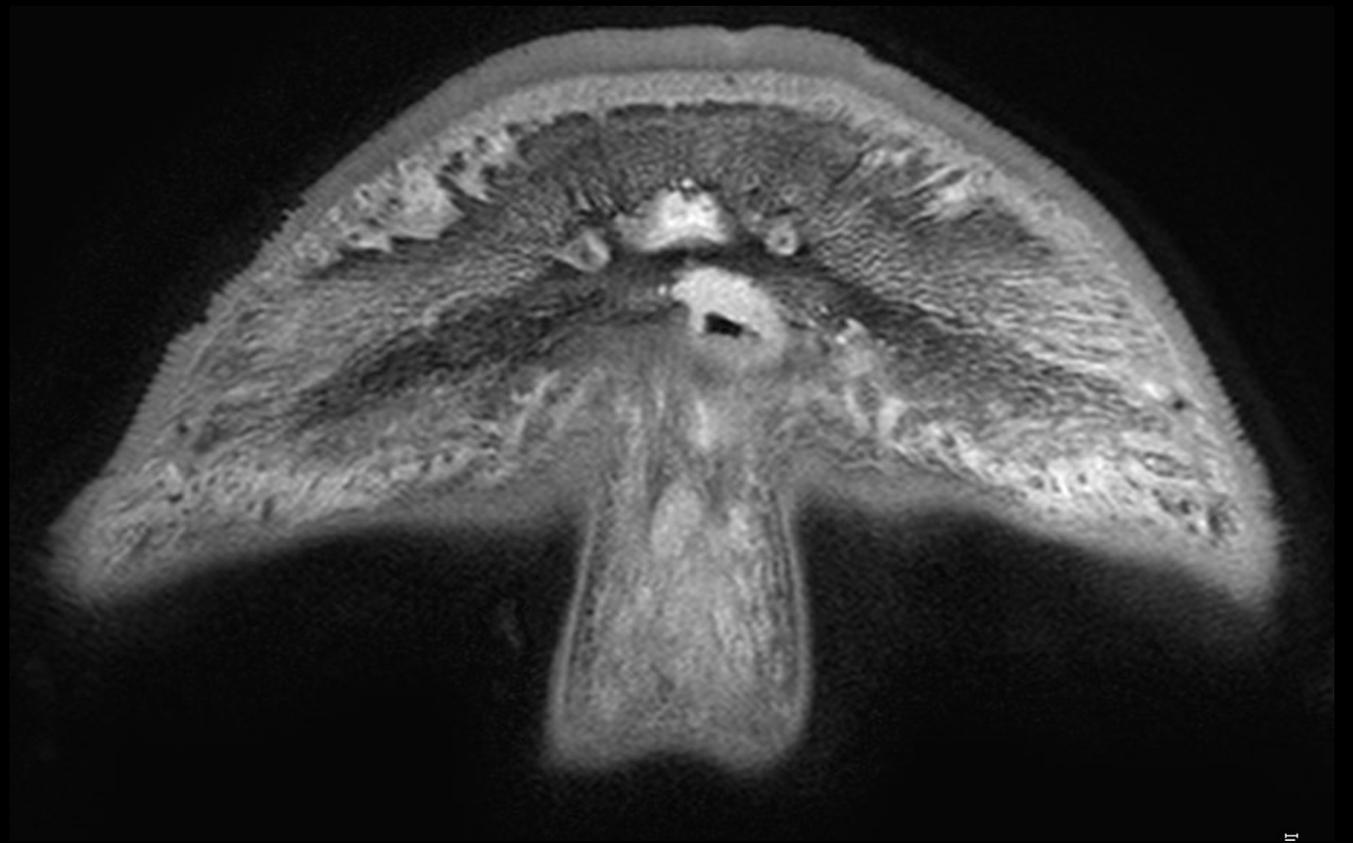
Fall Rö / MRT

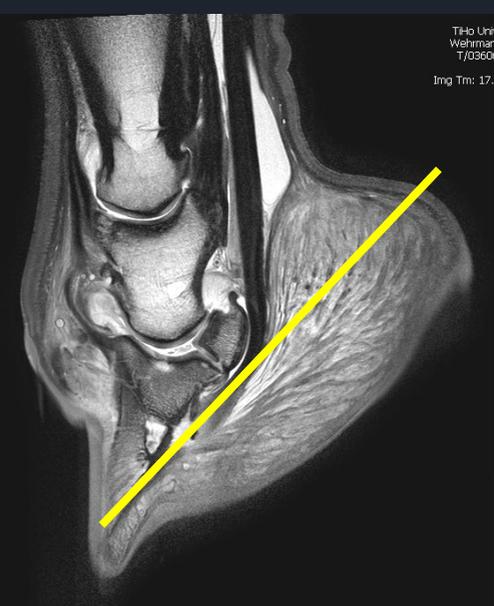


Fall Rö / MRT



Fall Rö / MRT

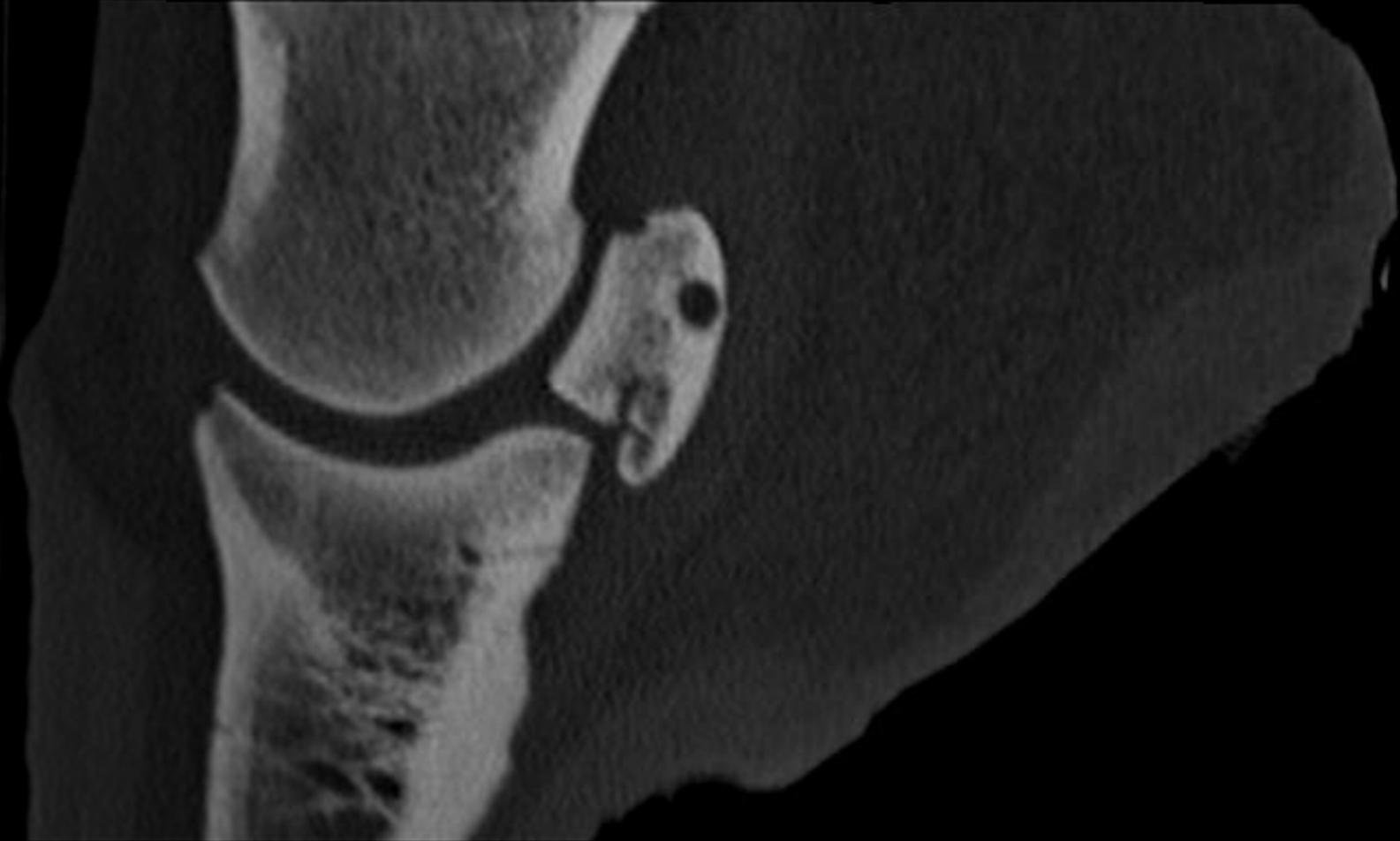




Fall Rö / MRT



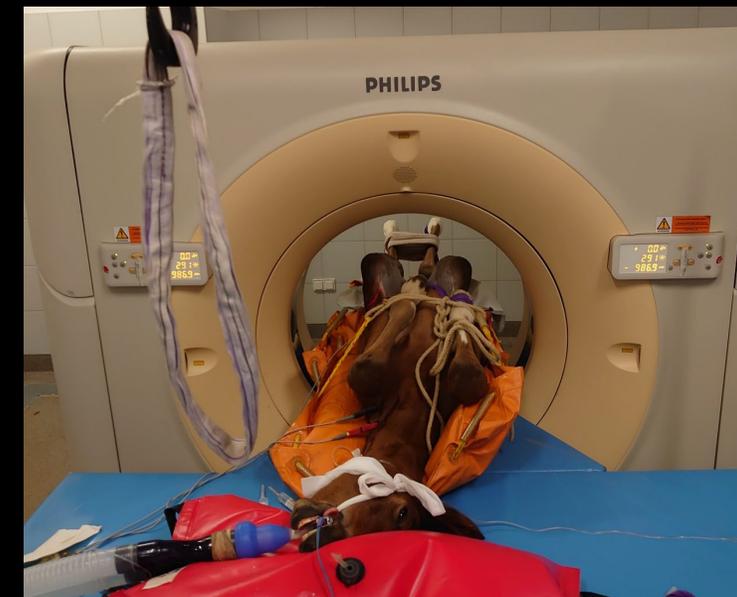
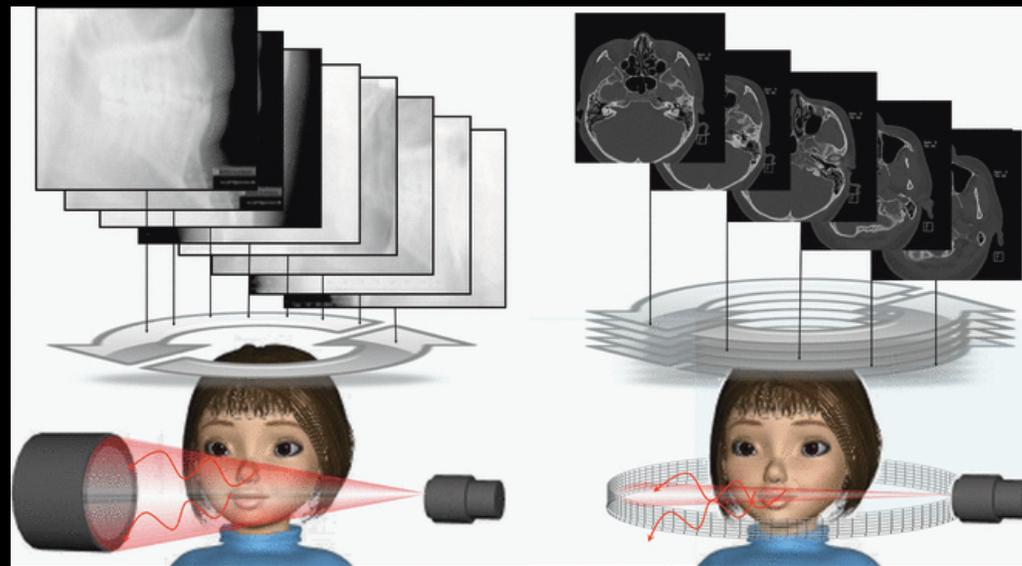
CT



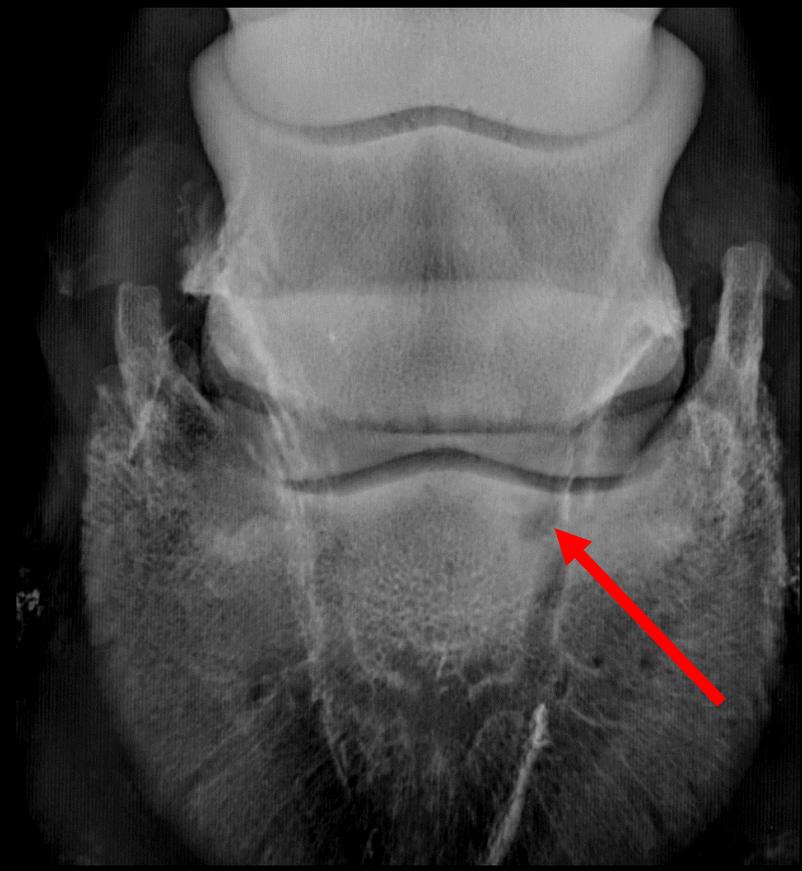
A

P

CT Systeme: cone beam / fan beam



Hufbeinzyste

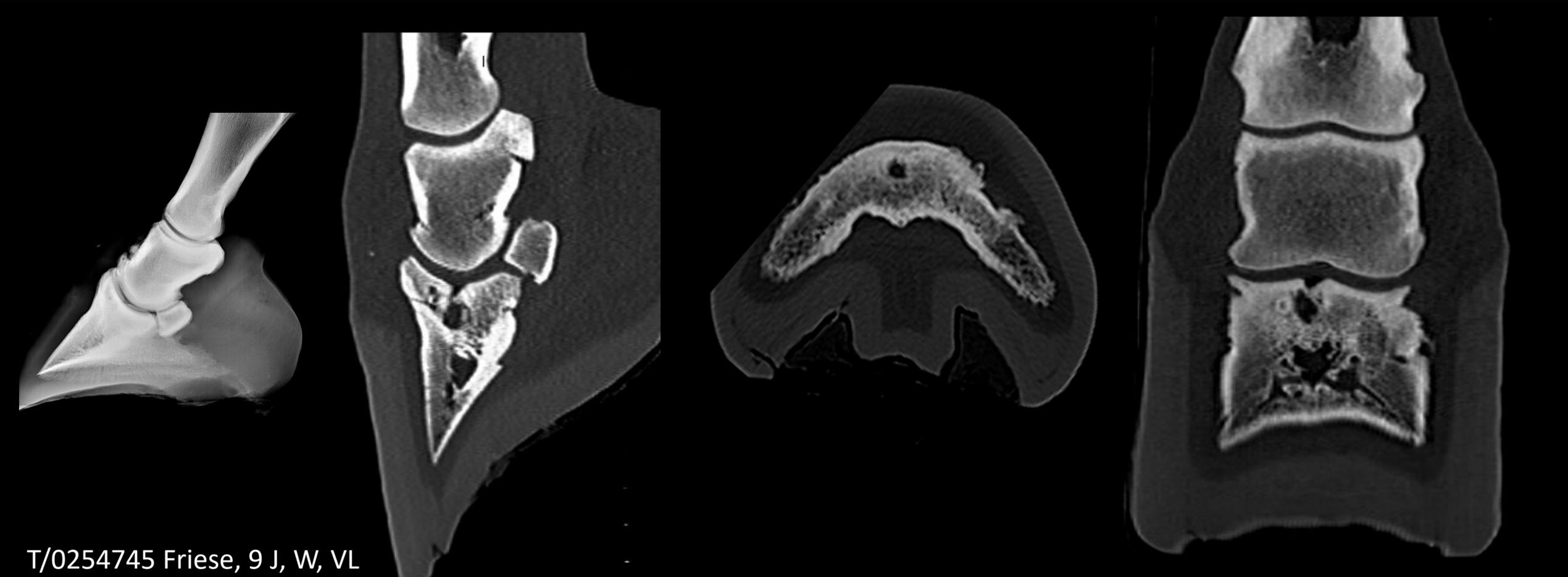


Hufbeinzyste



T/0254745 Friese, 9 J, W, VL LH seit 16 Monaten

Hufbeinzyste

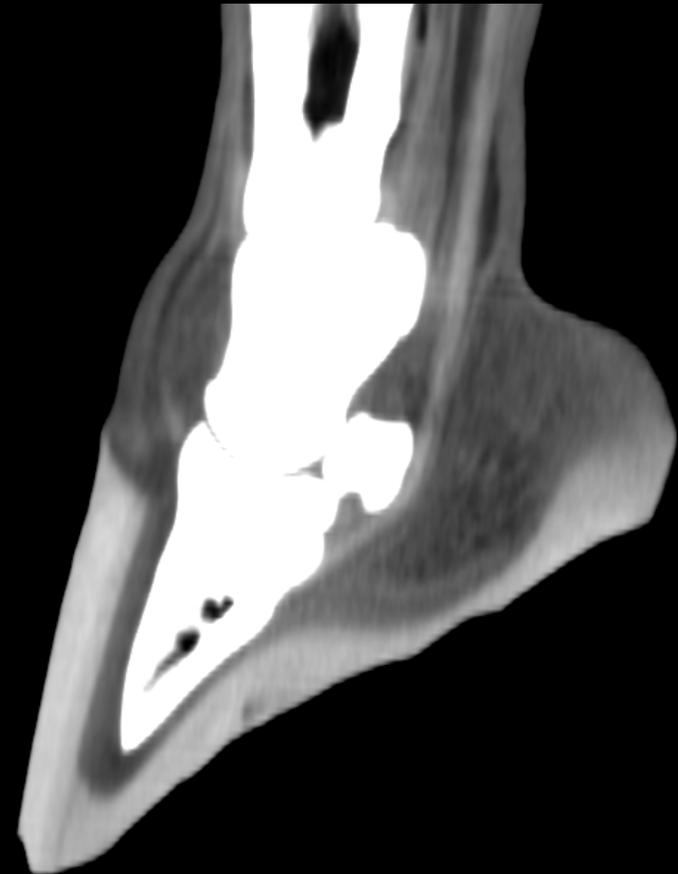


CT Arthrographie



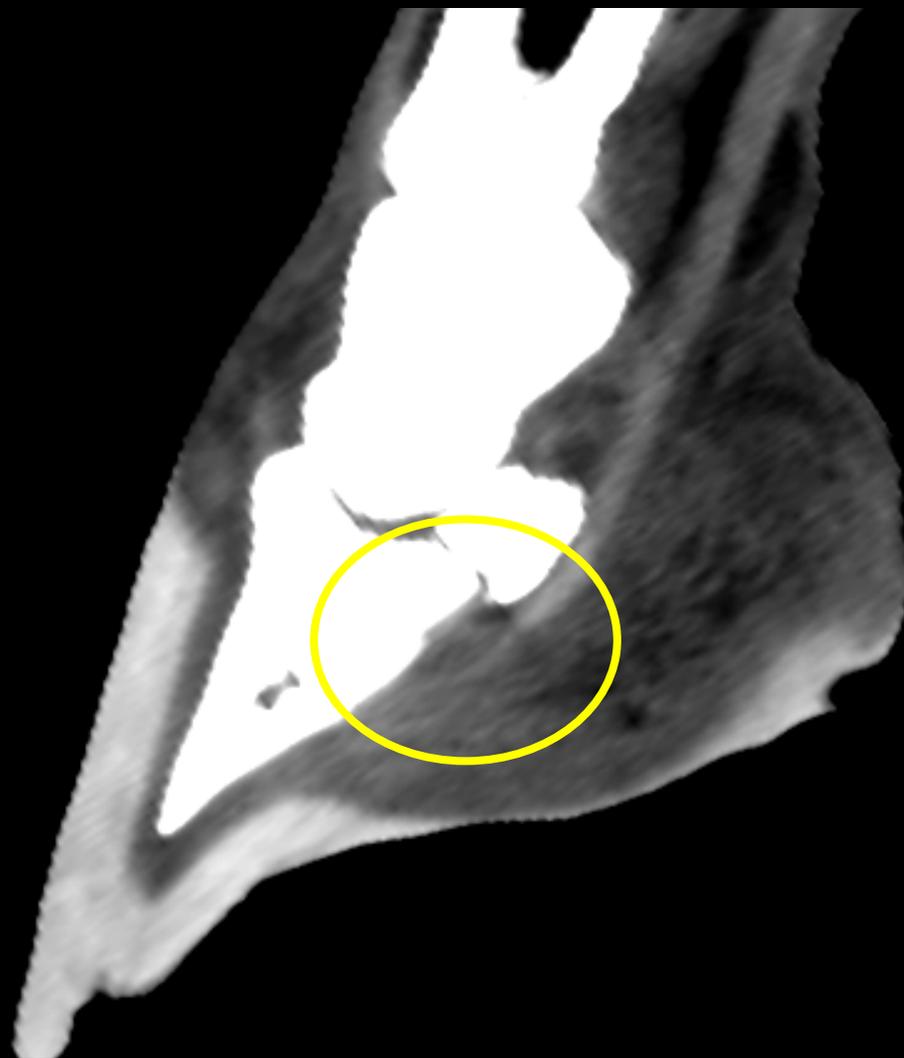
T/0263147 Friesen Mix, 2 J, W, VR LH seit 2 Monaten

Röntgen / CT



T- 0455215

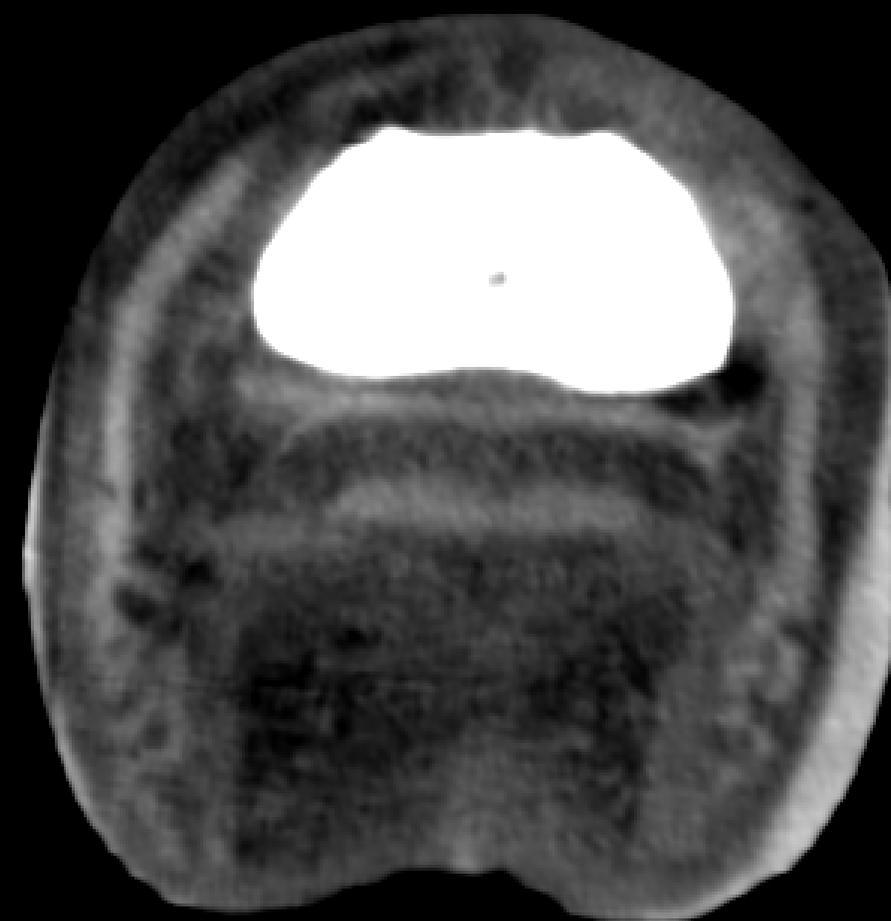
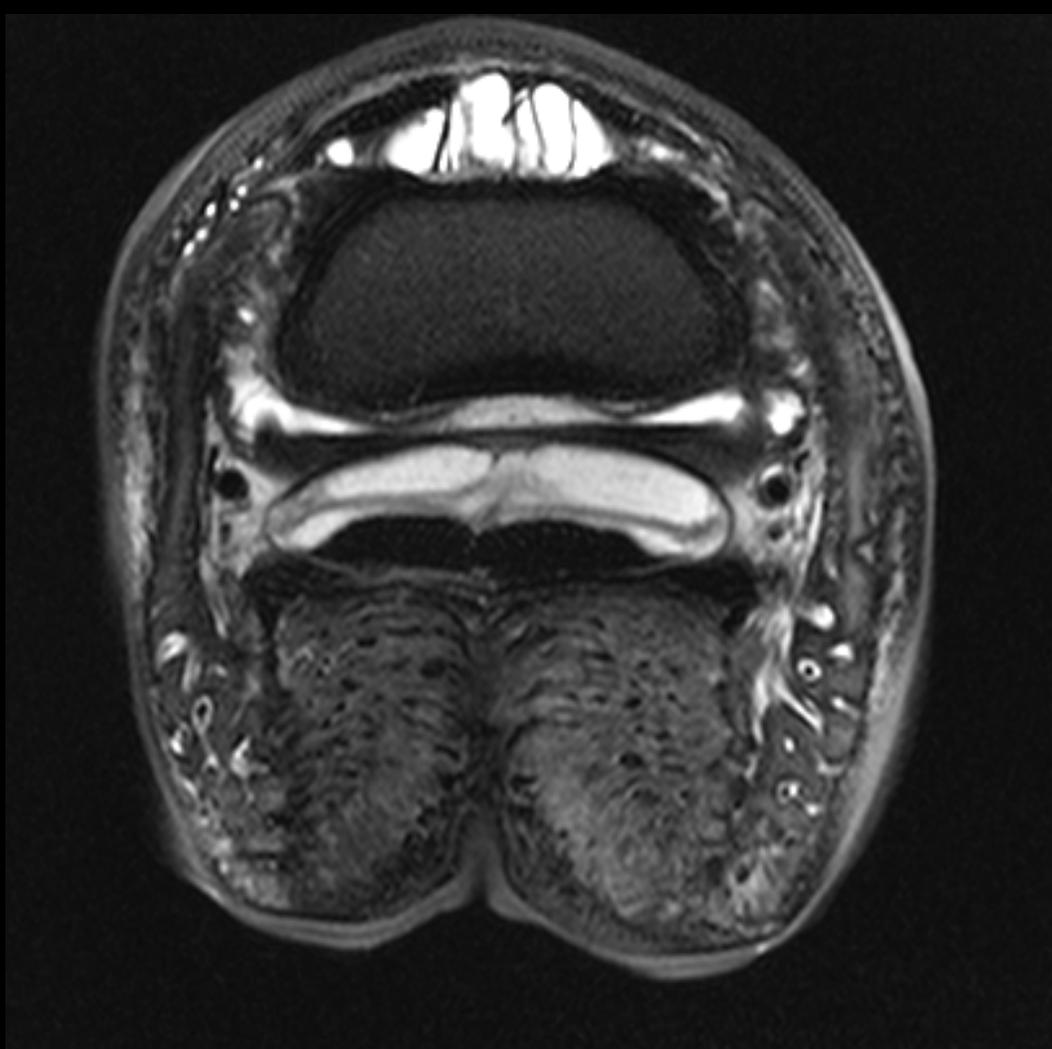
Läsion der TBS



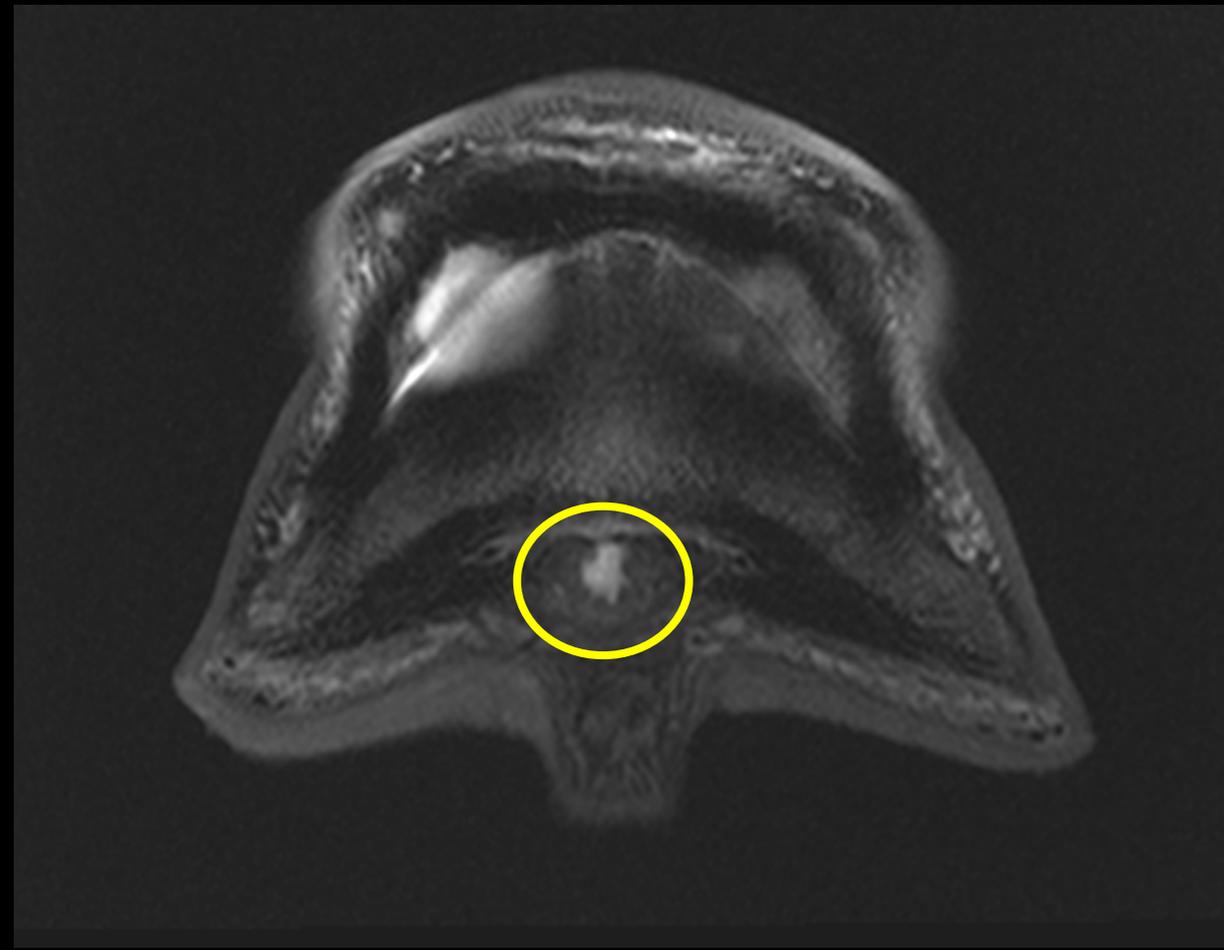
Bursa podotrochlearis



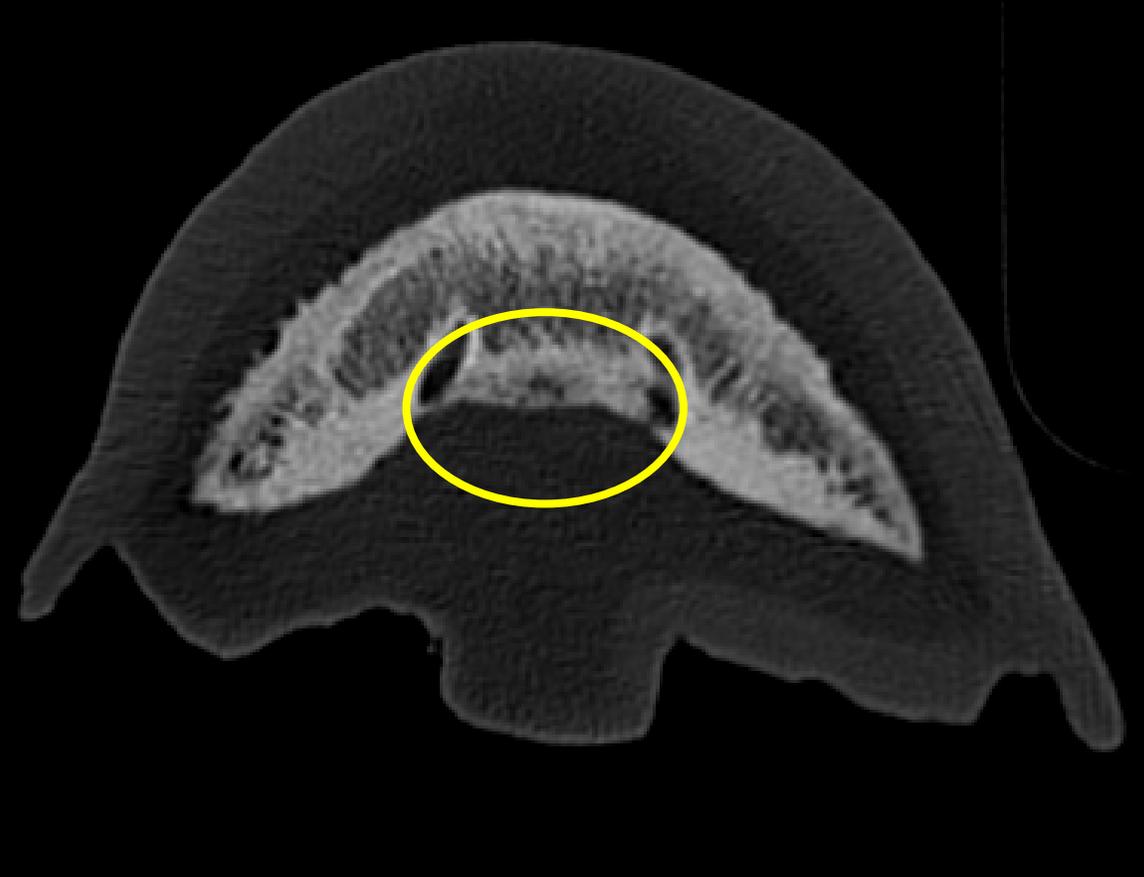
Bursa podotrochlearis



TBS Läsion



Sequester / Resorption



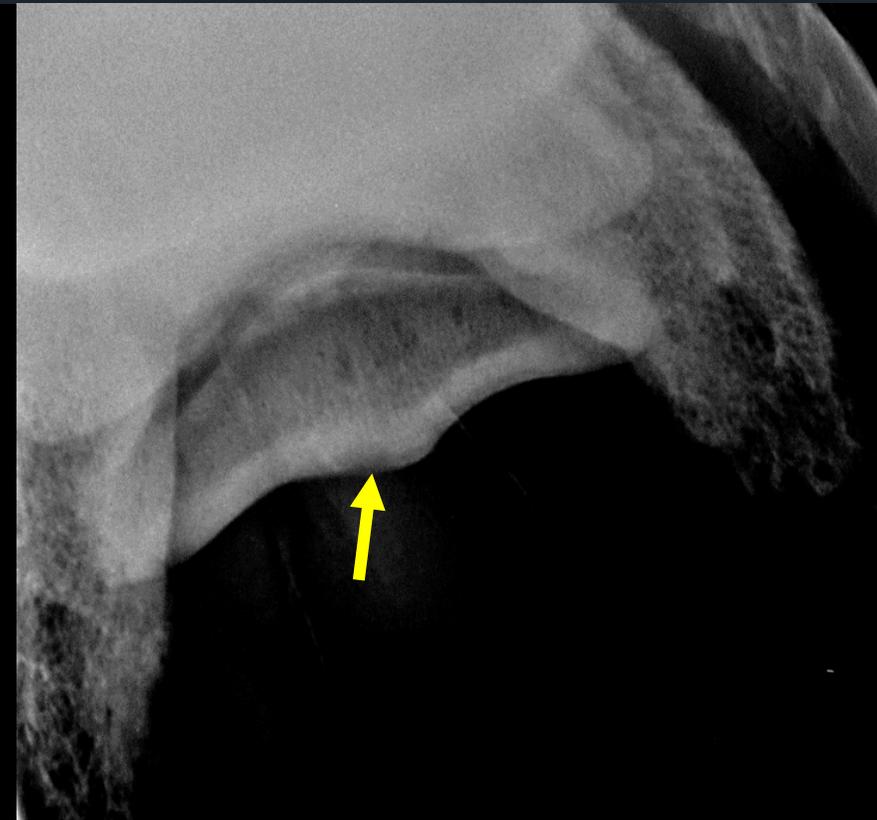
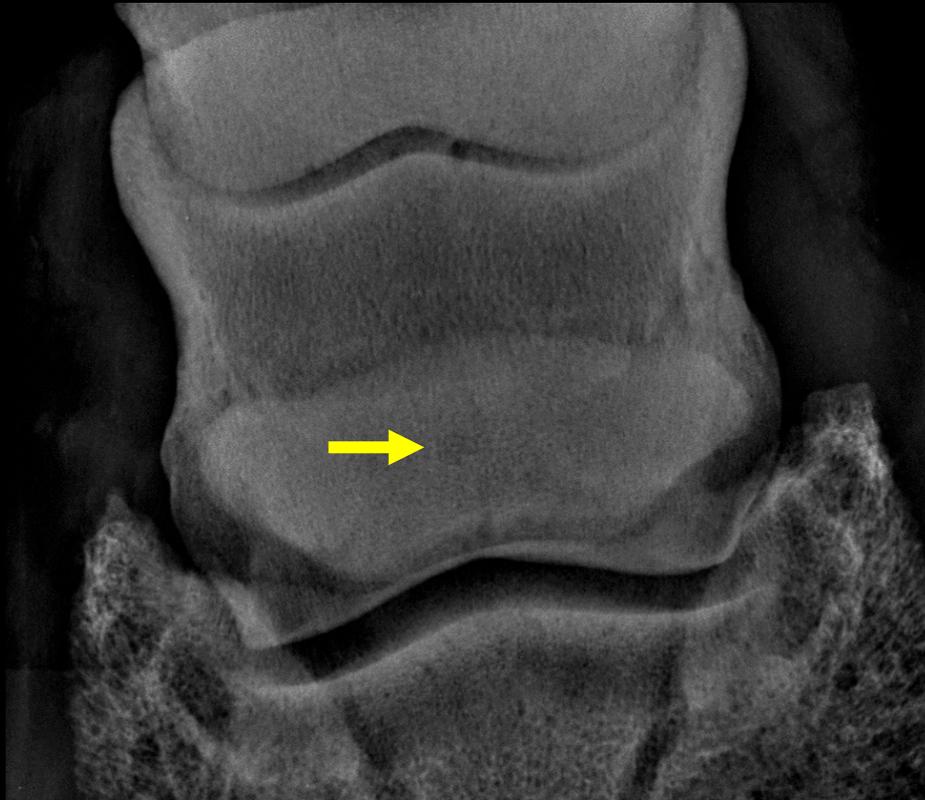
CT / MRT Strahlbeinläsion



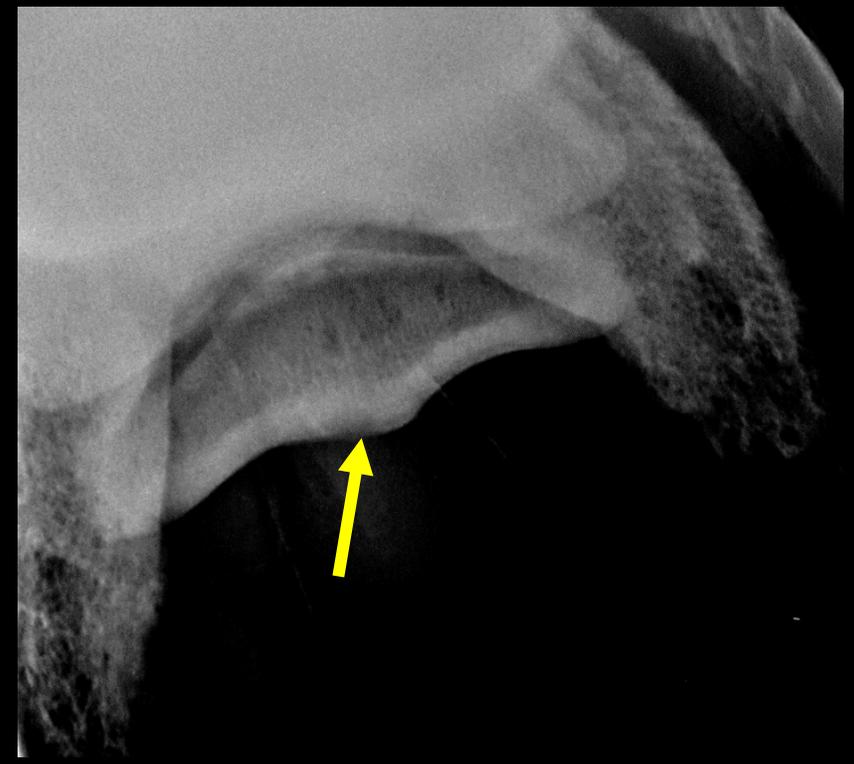
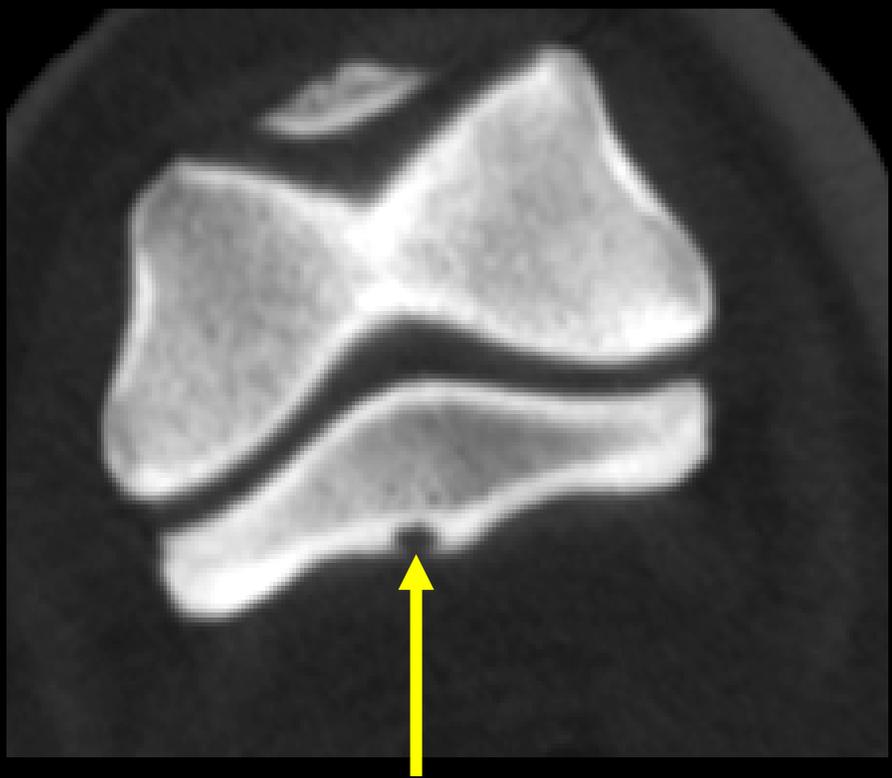
T-02657.



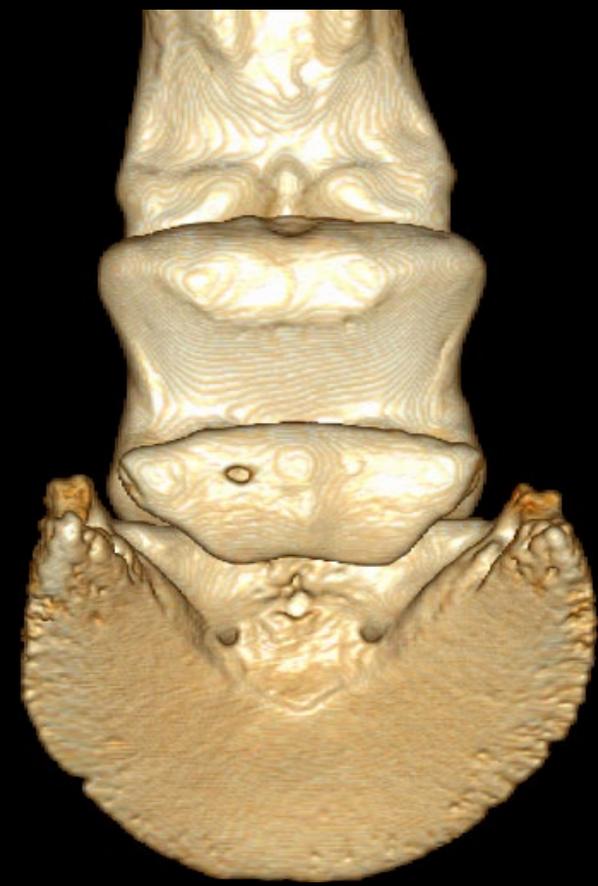
Röntgen Strahlbein



CT / Röntgen



CT 2D vs. 3D



MRT / CT

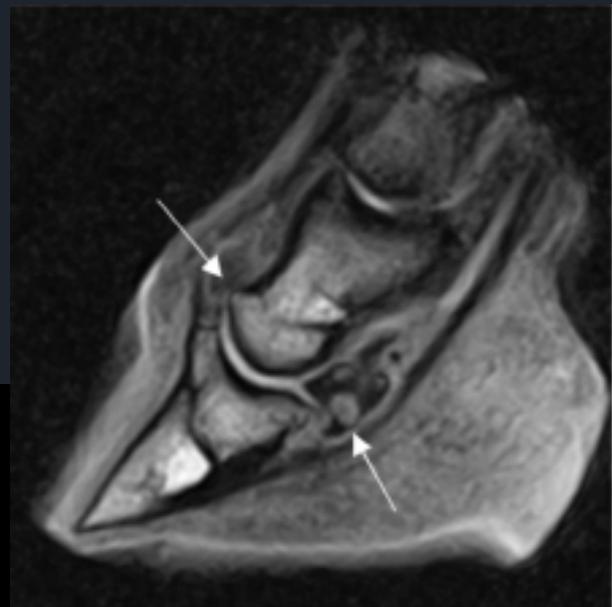


Figure 1.

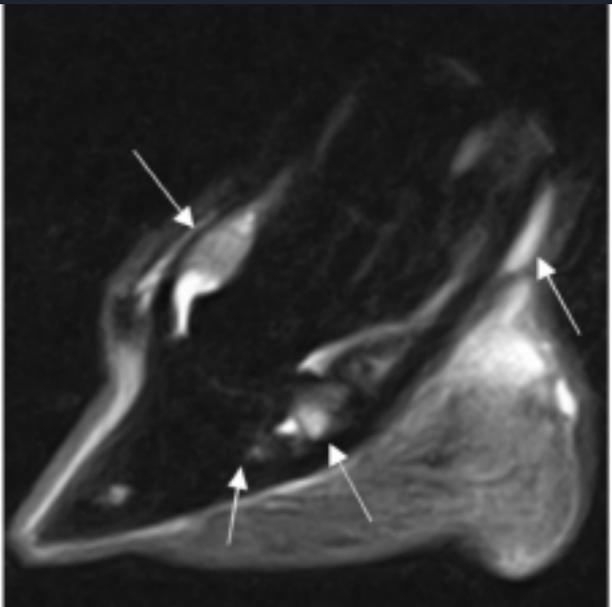


Figure 2.

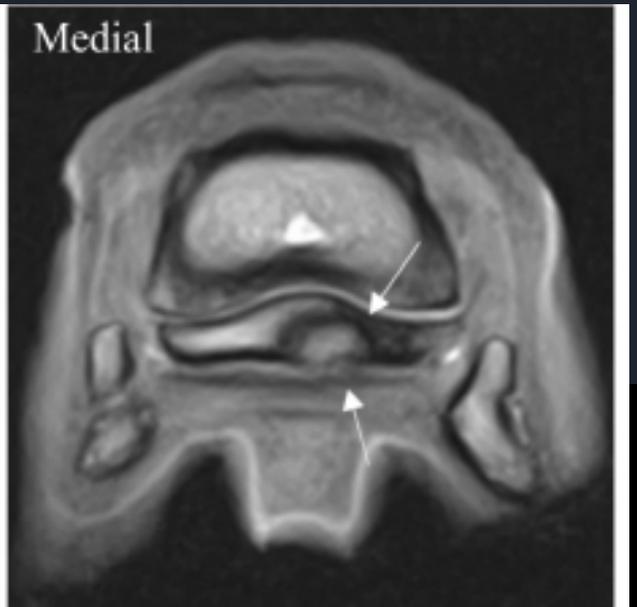
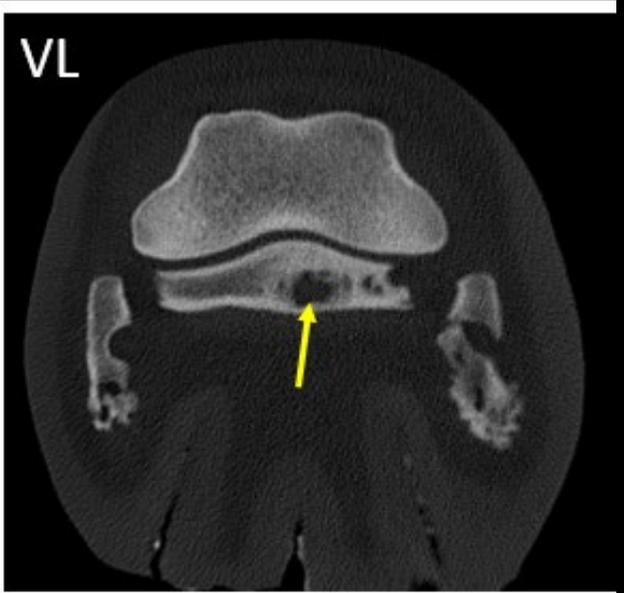
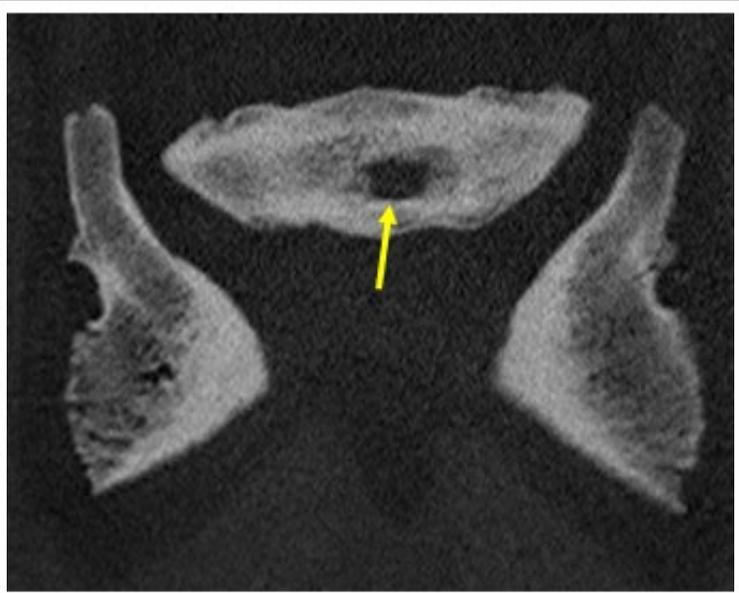
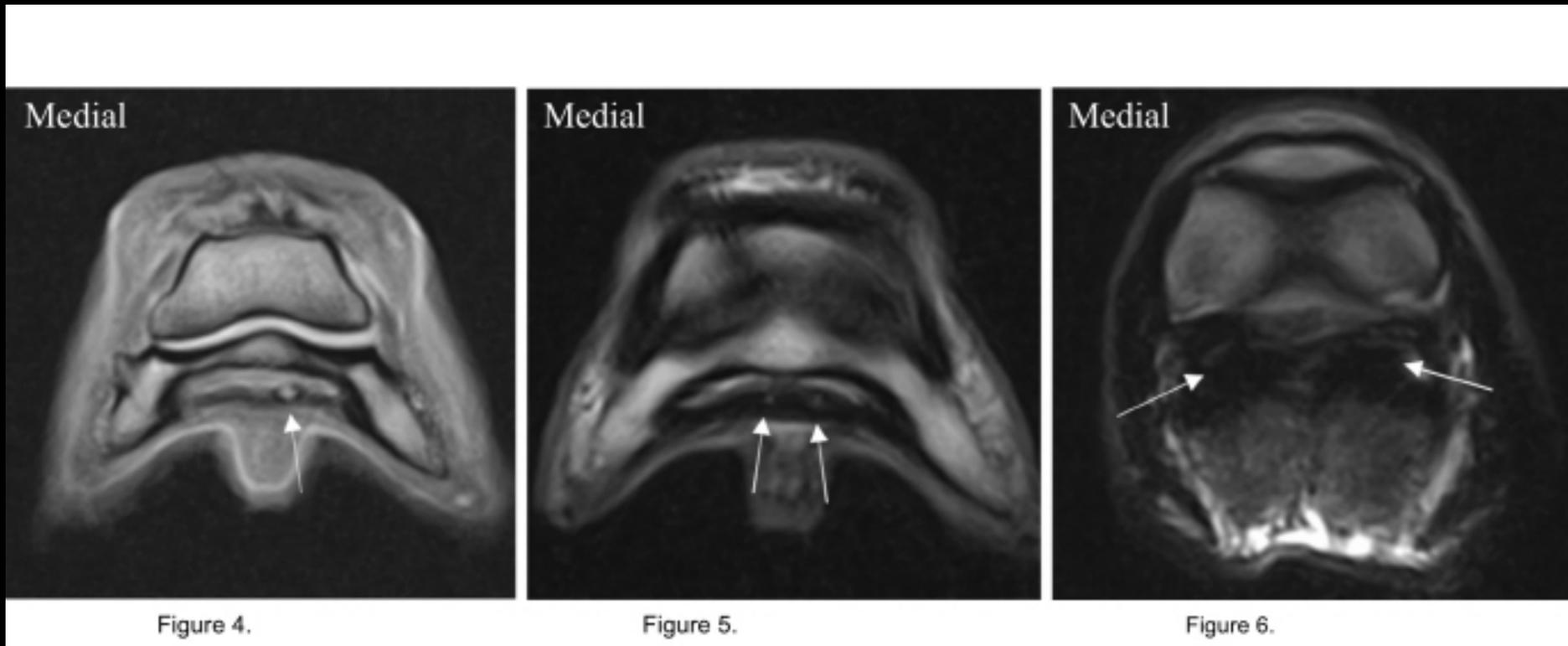


Figure 3.



MRT / CT



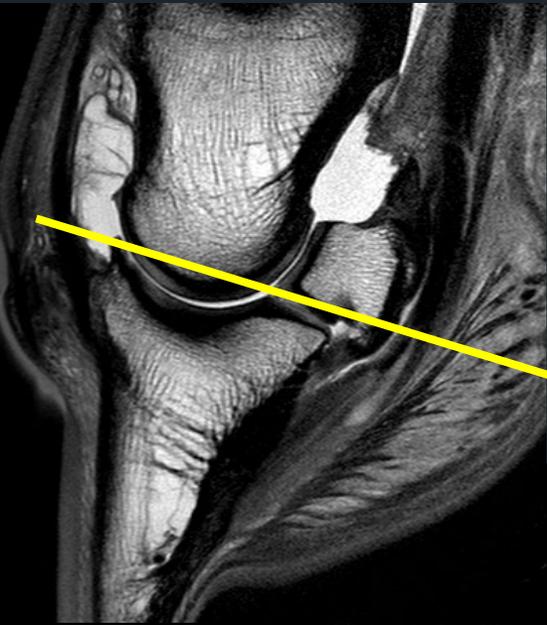
LH nach Nageltritt



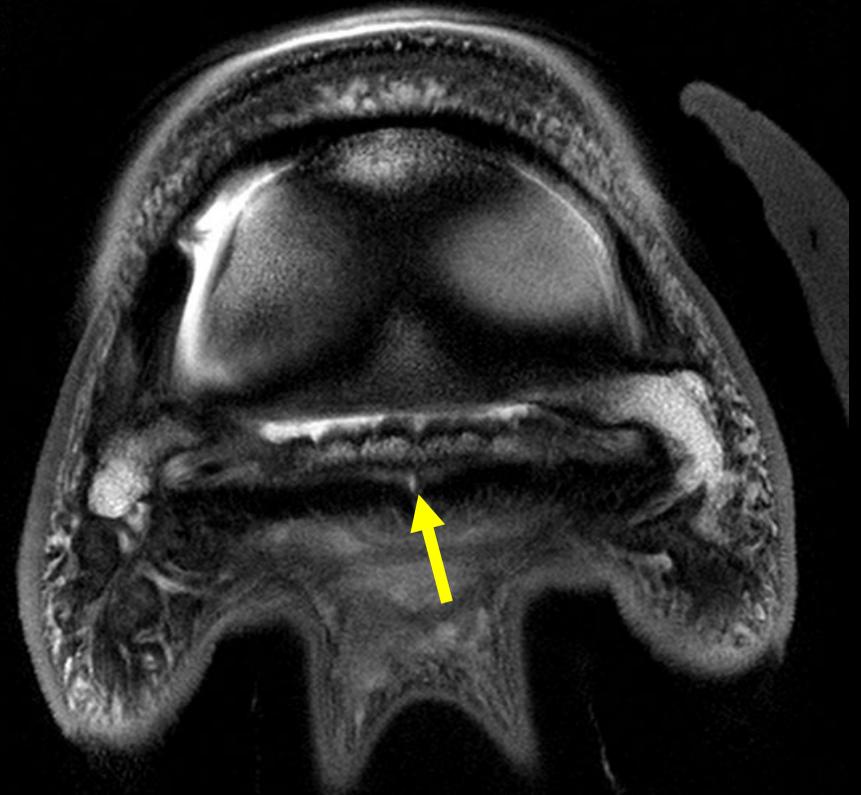
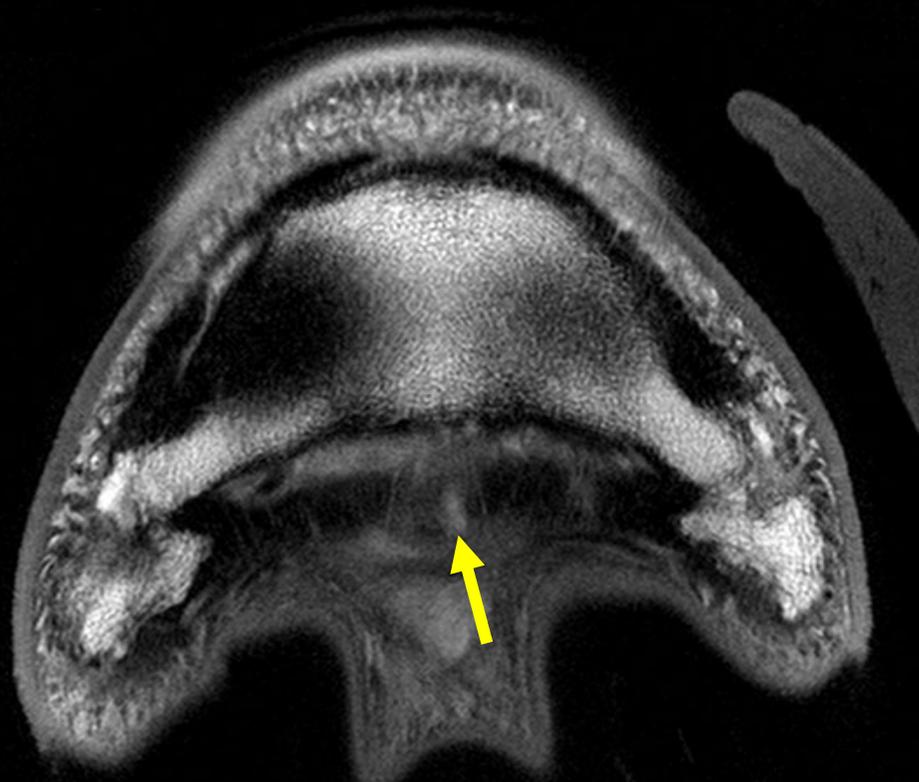
LH nach Nageltritt



PD sagittal



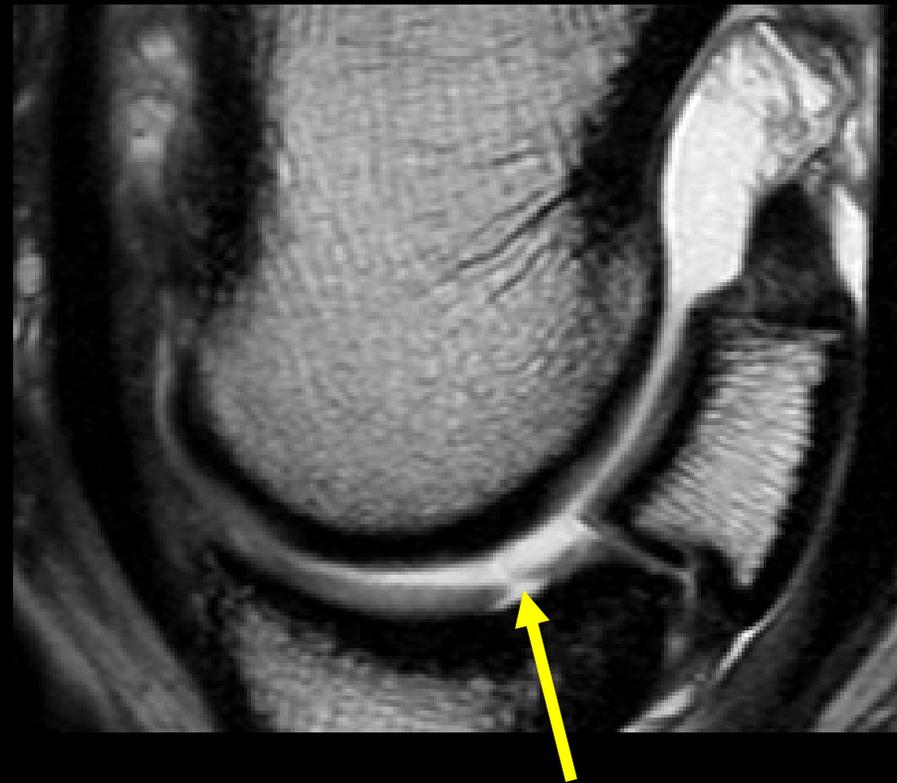
LH nach Nageltritt



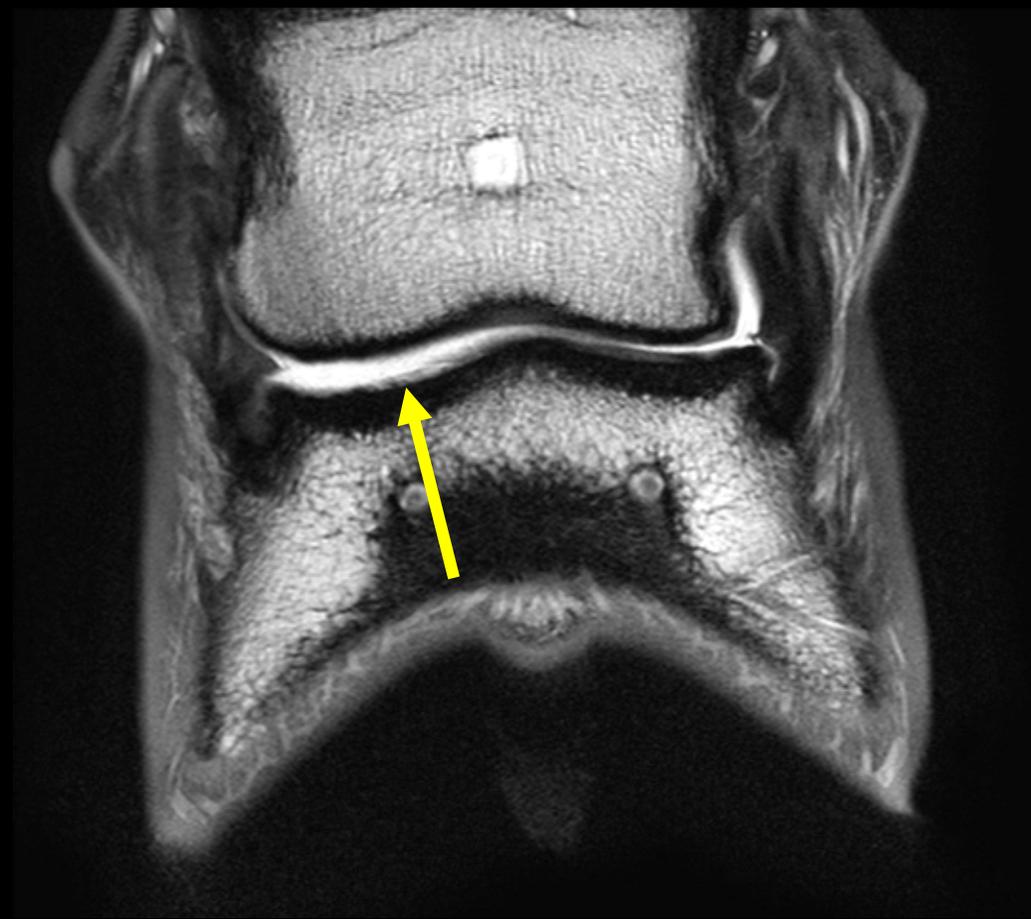
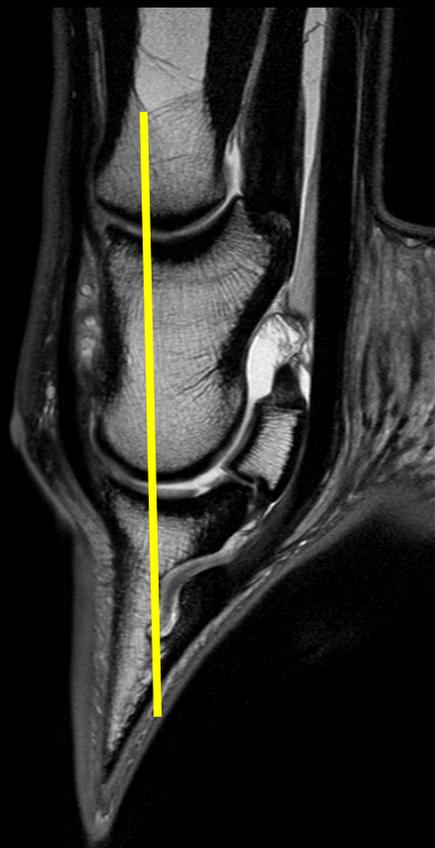
PD trans

T/0261908

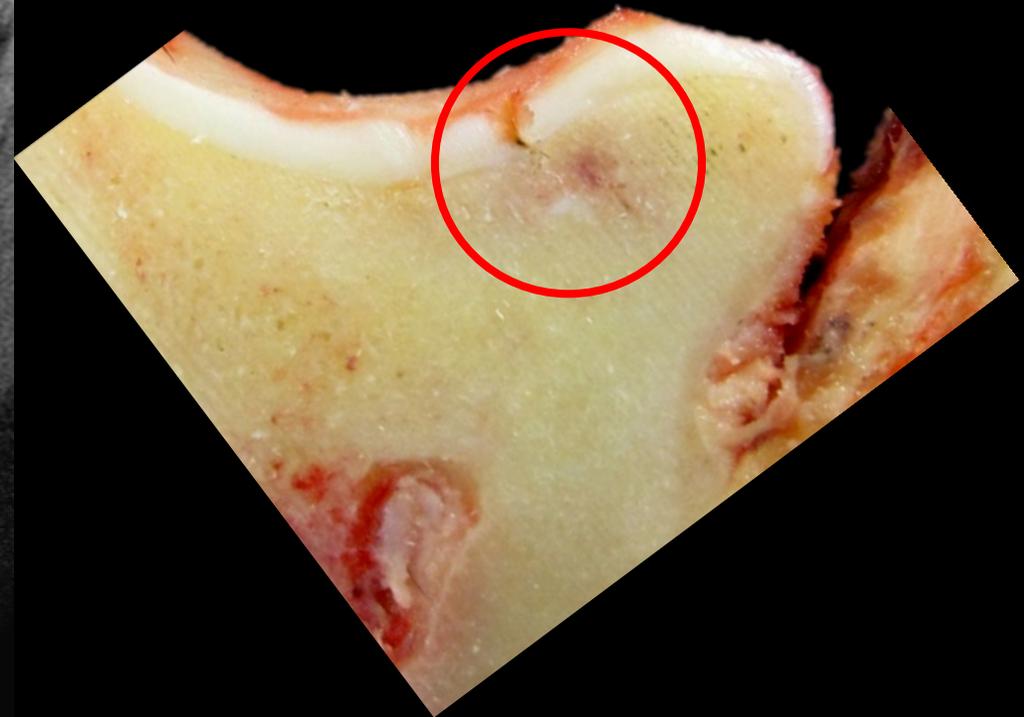
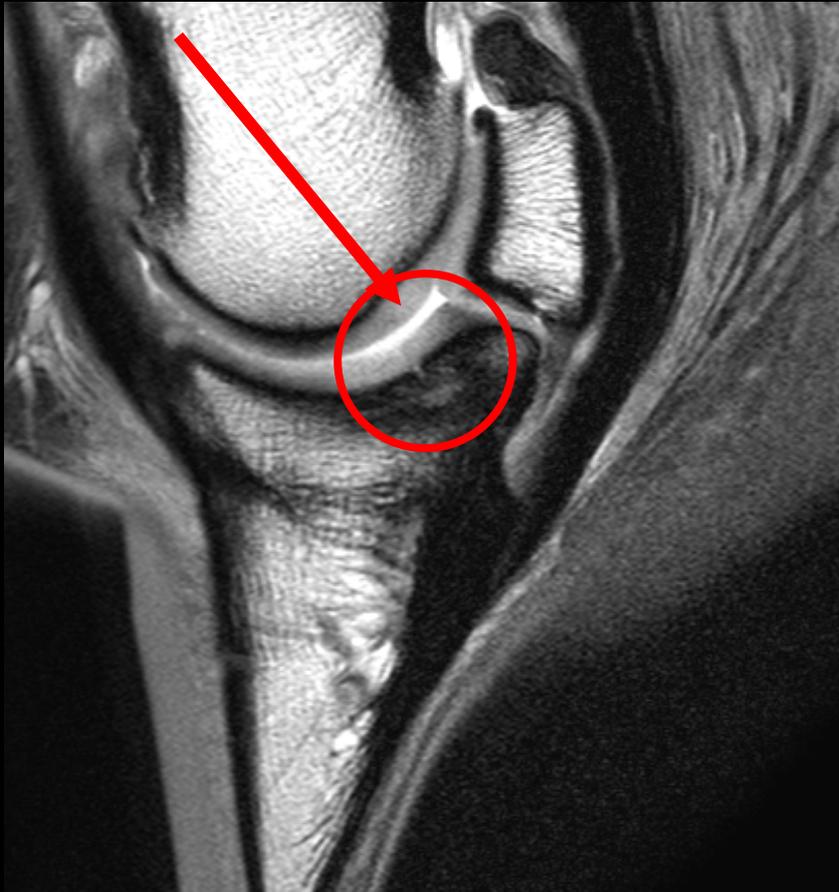
Knorpelläsion im Hufgelenk



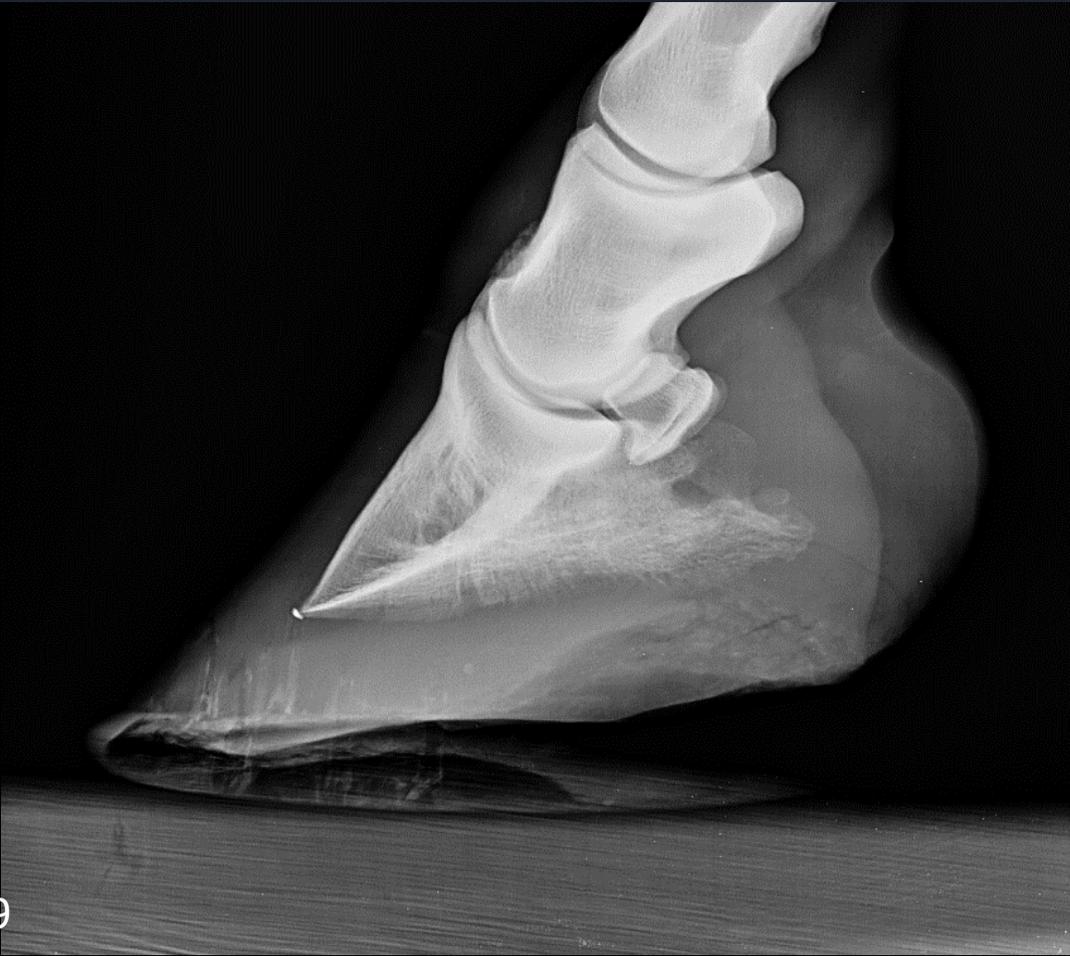
Knorpelläsion im Hufgelenk



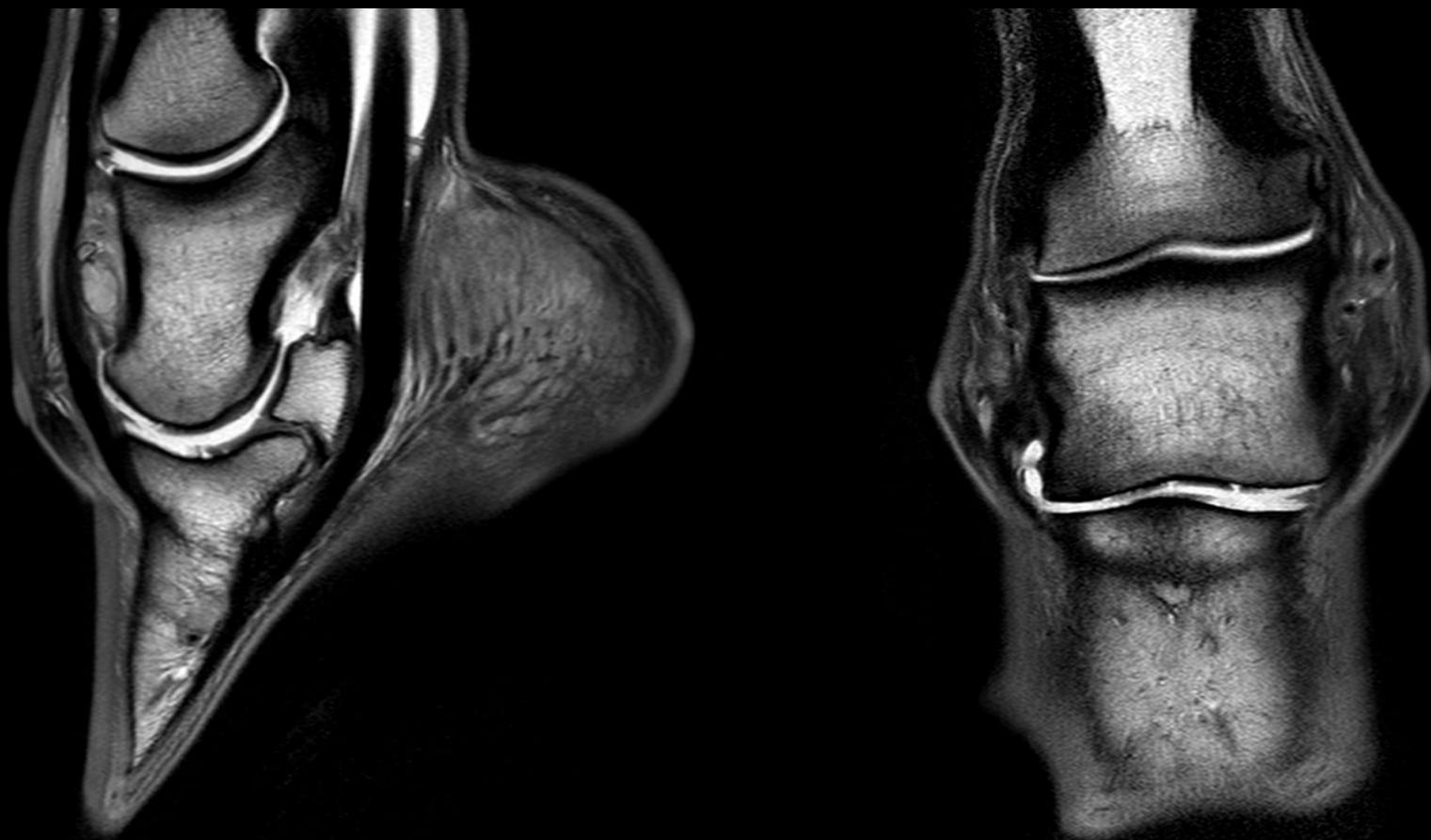
Knorpelläsion im Hufgelenk



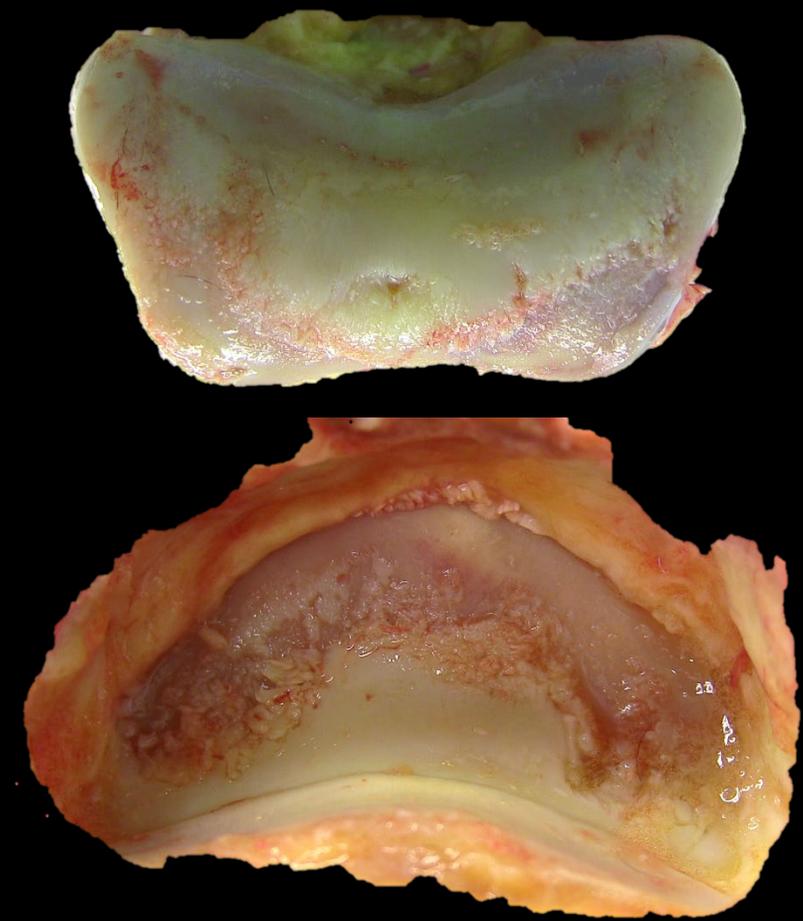
Röntgen



MRT



MRT / PM

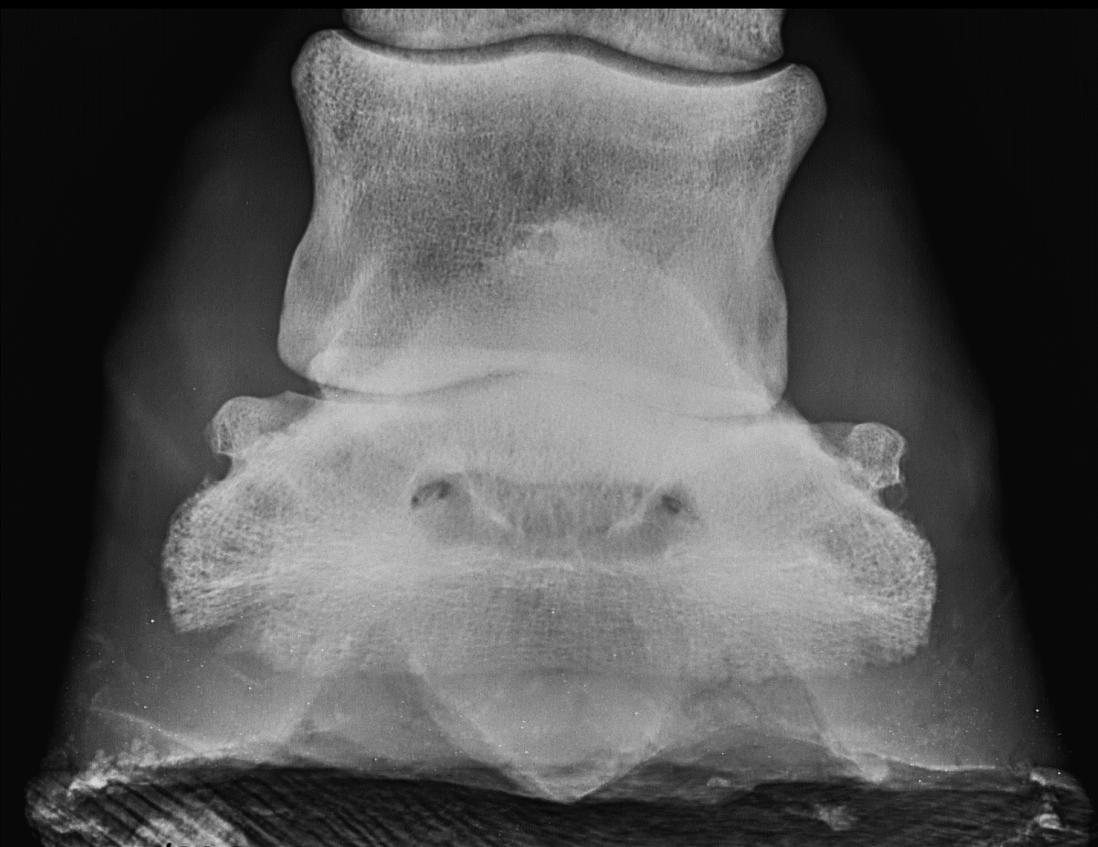


Röntgen



T/0364198

Röntgen / CT Arthrographie

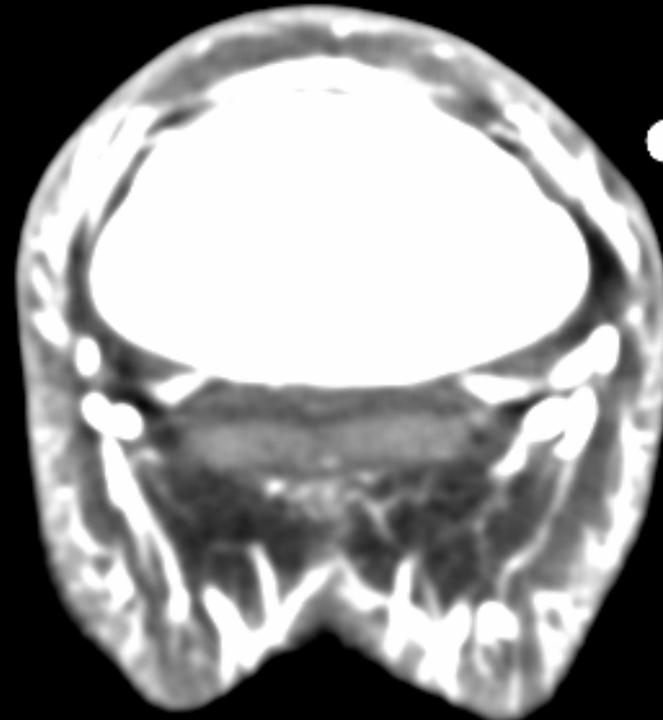
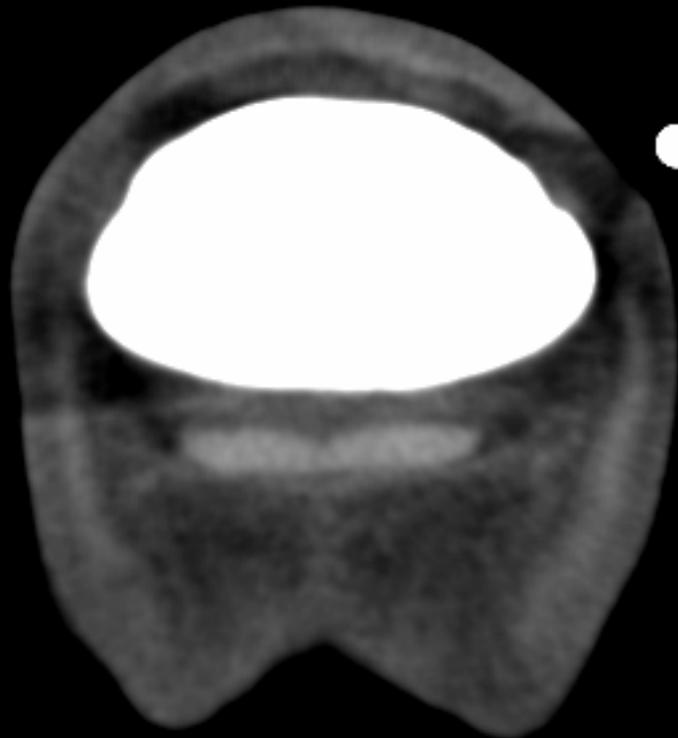


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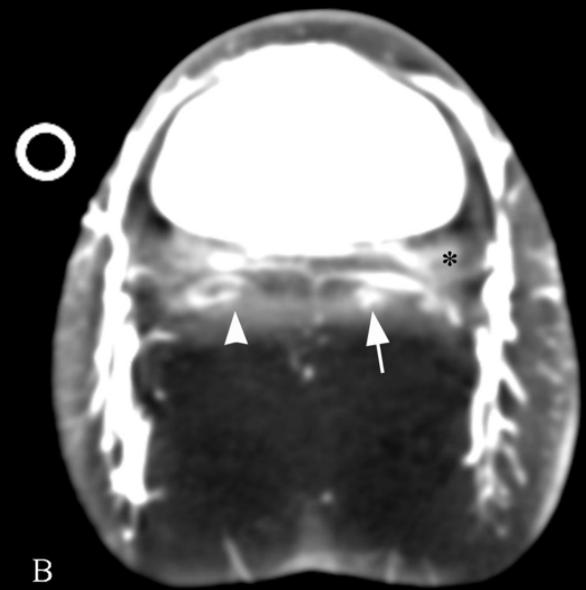
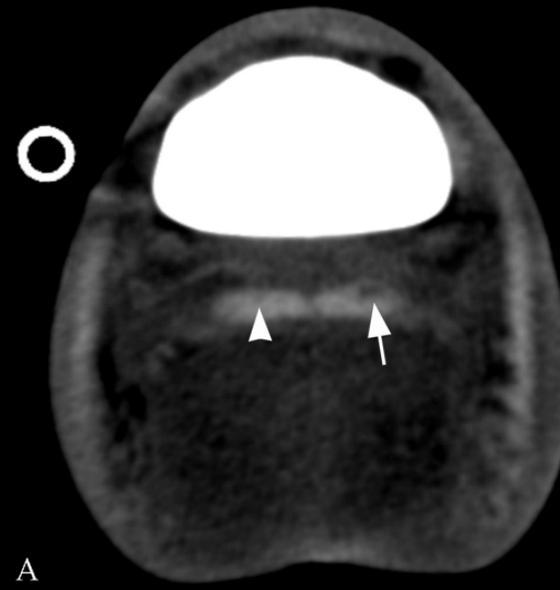
CT Arthrographie / PM



CT mit intraarteriellem Kontrast



CT mit intraarteriellem Kontrast

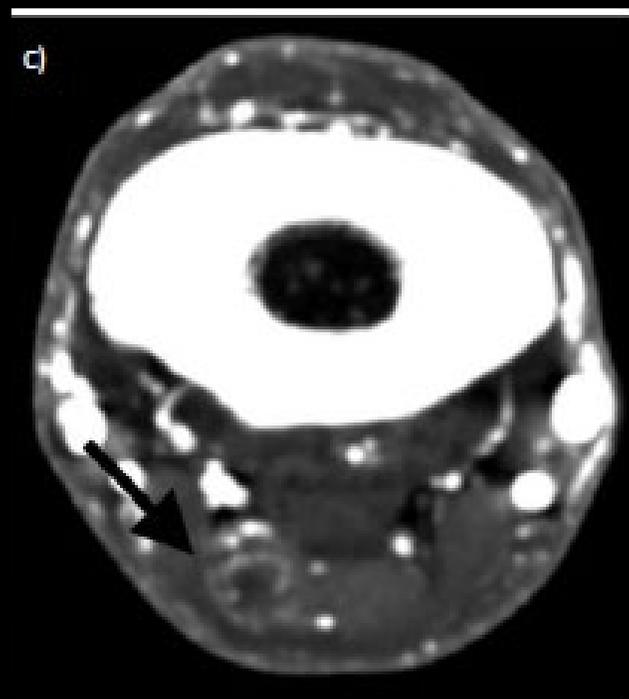
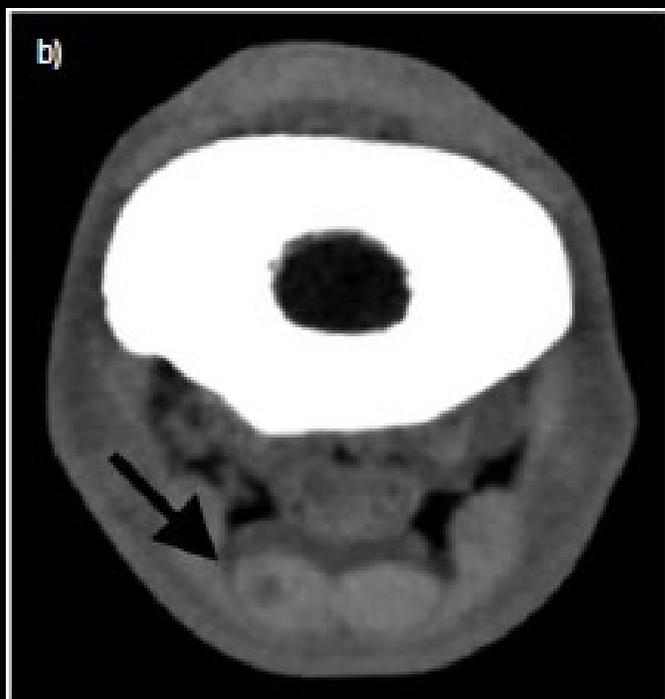


Contrast-enhanced computed tomographic evaluation of the deep digital flexor tendon in the equine foot compared to macroscopic and histological findings in 23 limbs

S. E. VAN HAMEL, H. J. BERGMAN[†], S. M. PUCHALSKI[‡], M. W. DE GROOT[§] and P. R. VAN WEEREN^{*}

Equine Veterinary Journal ISSN 0425-1644

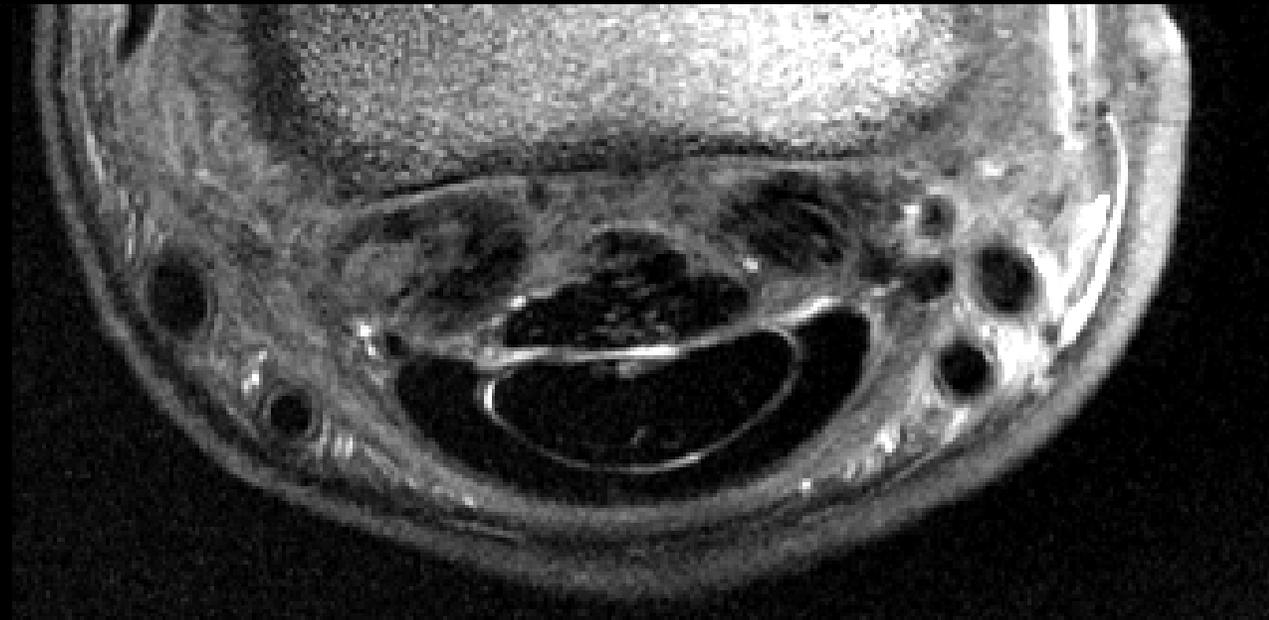
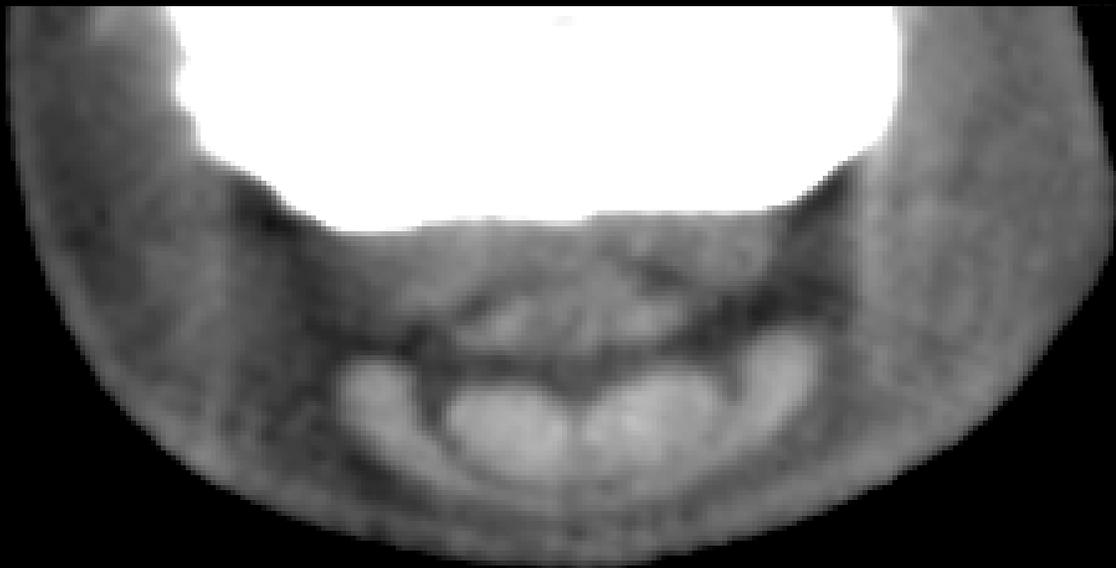
DOI: 10.1111/evj.12129



- Sensitivity of CECT for diagnostic lesions of the DDFT 93%

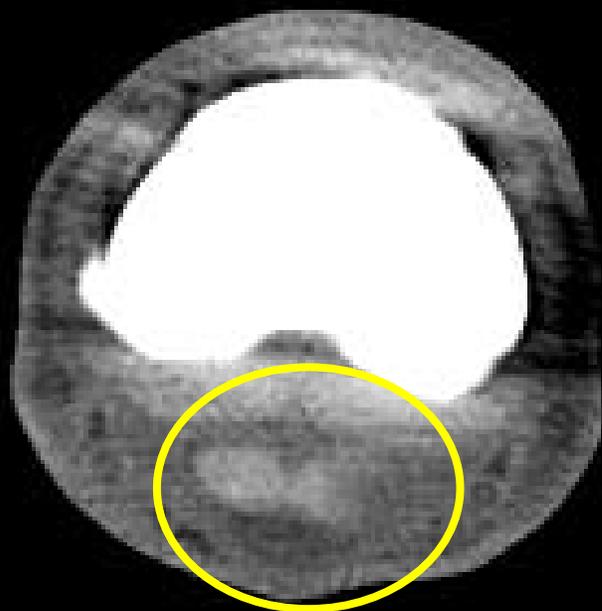


Schräge Gleichbeinbänder

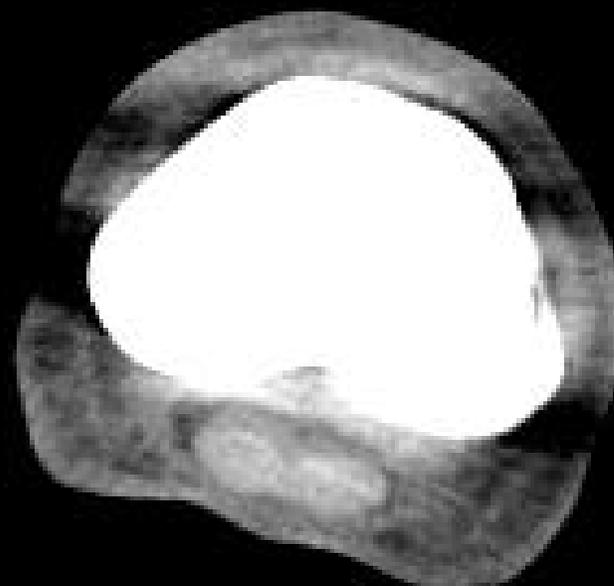


Läsion der TBS

LH



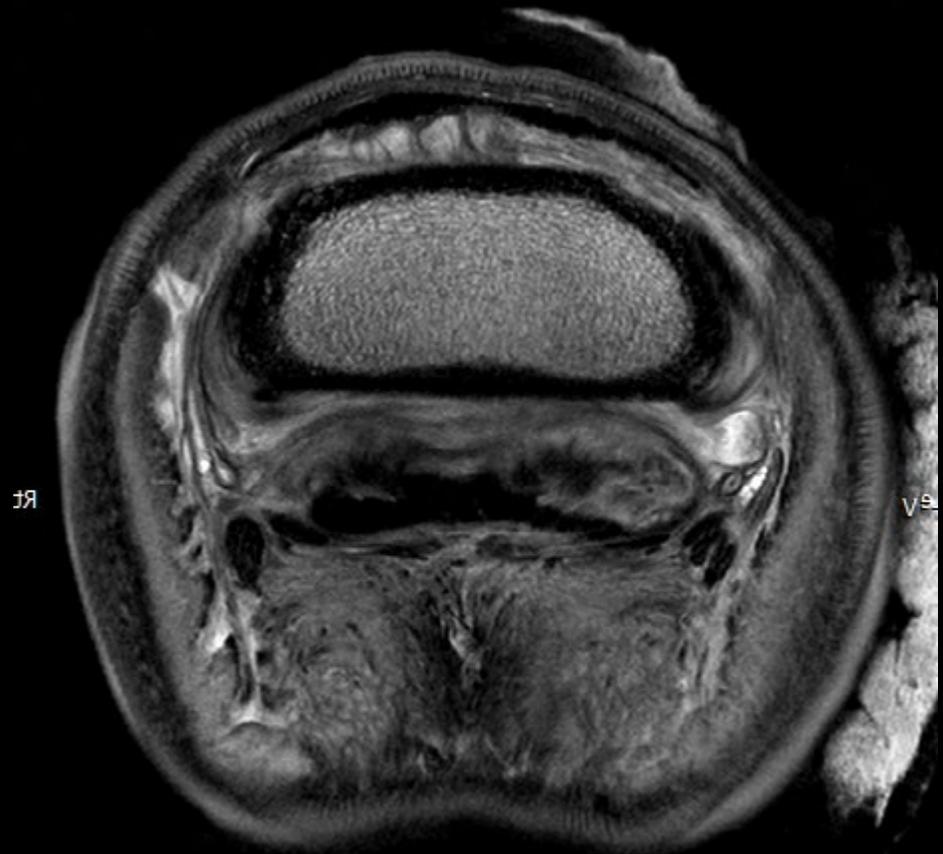
RH



Läsion der TBS - CT / MRT



T-0265746



Diskussion

- CT ermöglicht eine gute Darstellung von Sehnen
- MRT ist üblegen in der Darstellung der Bänder
- US ist limitiert im Bereich d. distalen Zehe
- High field vs. Low field MRT
- Belastete vs. Unbelastete Gliedmaße beim US
- Weitere vergleichende Studien sollten folgen



Vielen Dank !