Case “G” – fetlock.

Briefly, the results of the discussion RAD images, tomosynthesis (DTS) scans and MRI images of horse named G (RH Fetlock) were as follows:

1. Both RAD images and DTS scans acquired perfectly. We have some minor comments on the DP DTS scan. With the natural position of the horse's hind leg and the DP DTS scan (central position in Fig. 1), the X-rays inclination angle differs from the inclination angle that traditionally used in radiography (in Fig.1 at bottom right and your image in Fig.2). As a result, sesamoid bones are superimposed on third metacarpal bone (cannon bone) on DTS scans. The next time we offer to perform a DTS scan using a stand (in Fig.1 at top right). In this case, the angles of X-rays for radiography and DTS will be similar. In addition, for the DTS scan the distance between the joint and the DR will be decreased. The images of the joint will be more detailed.

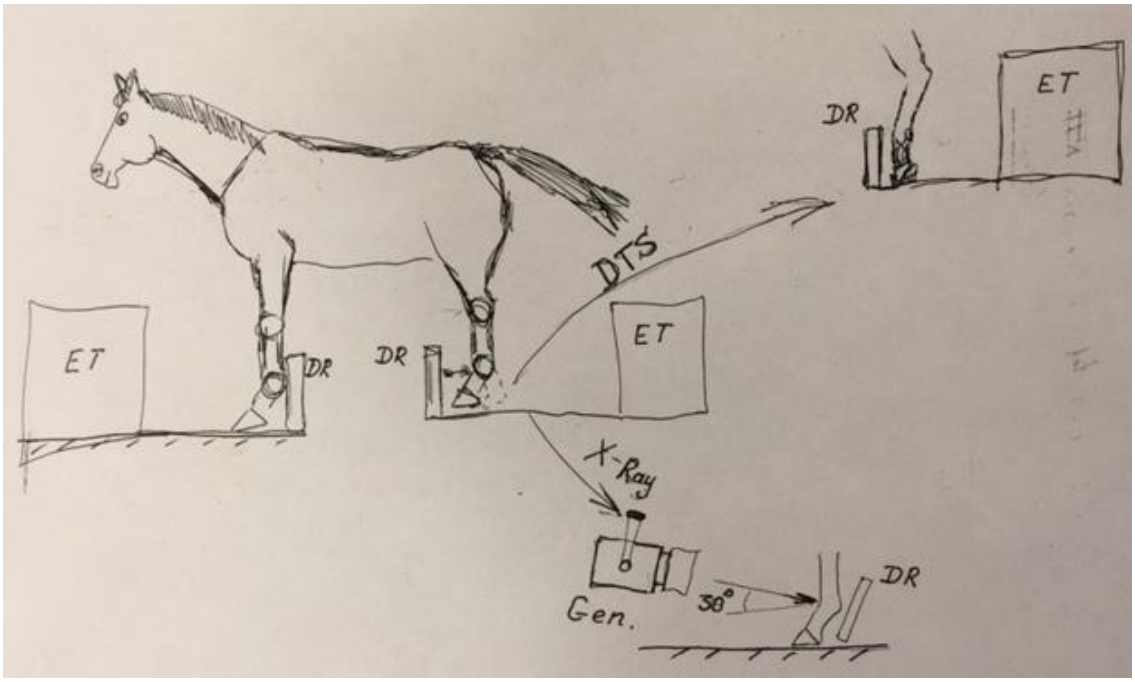

Fig. 1

2. In the RAD image of Fig.2 FETLOCK AP RH “G”, with a green arrow you showed a dark spot with a contrast K=0.12.

Fig. 2

The possibility of DTS layers separation in depth allows you to observe separately sesamoid bones and other bones of the joint that are located closer to the DR.

On the DTS DP scan on layers -68...-85 (distance 10mm in depth), the corresponding two spots with the contrast K=0.15...0.17 are visible (Fig. 3). Proximal phalanx bone on layers -68...-85 is visible out of focus (in focus on layer -24). Maybe these two spots belong to the sesamoid bone. The MRI confirmation is required.

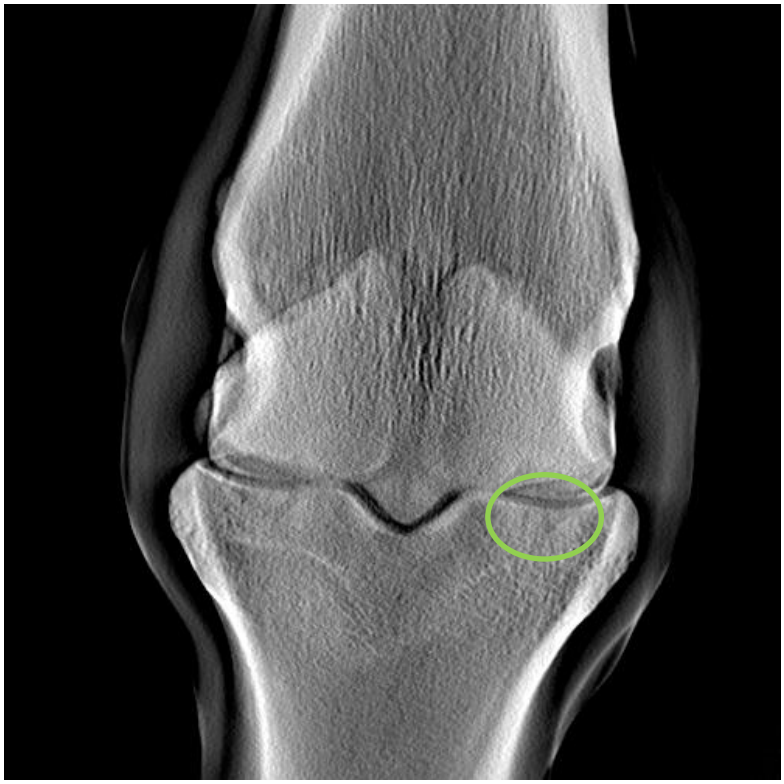

Fig. 3.

The sesamoid bones themselves have degenerative changes. Lateral seasamoid bone has more significant changes. This is clearly seen (circled in blue) on the LM slice -60 (Fig.4). Changes are visible on the slices -45...-75, which corresponds to 18mm depth. Proximal phalanx bone changes (circled in green) are additionally visible on the -60 slice (Fig.4).

Proximal phalanx bone changes – possible, two osteophyte fragments – are additionally visible on the slice -60 (Fig.4).

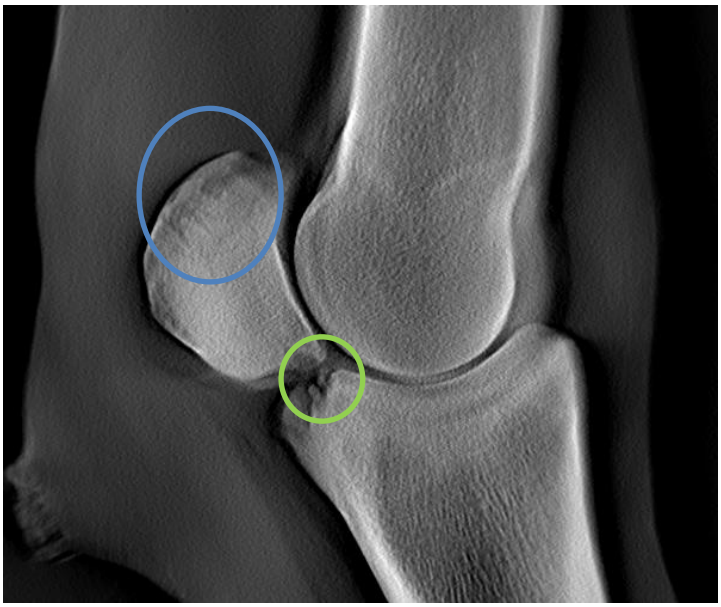

Fig.4

3. On the RAD image Fig. 2 FETLOCK AP RH “G” with red arrow you indicated a dark spot with contrast K=0.1. This formation is clearly visible on the MRI image Fig. 5, taken from your letter.

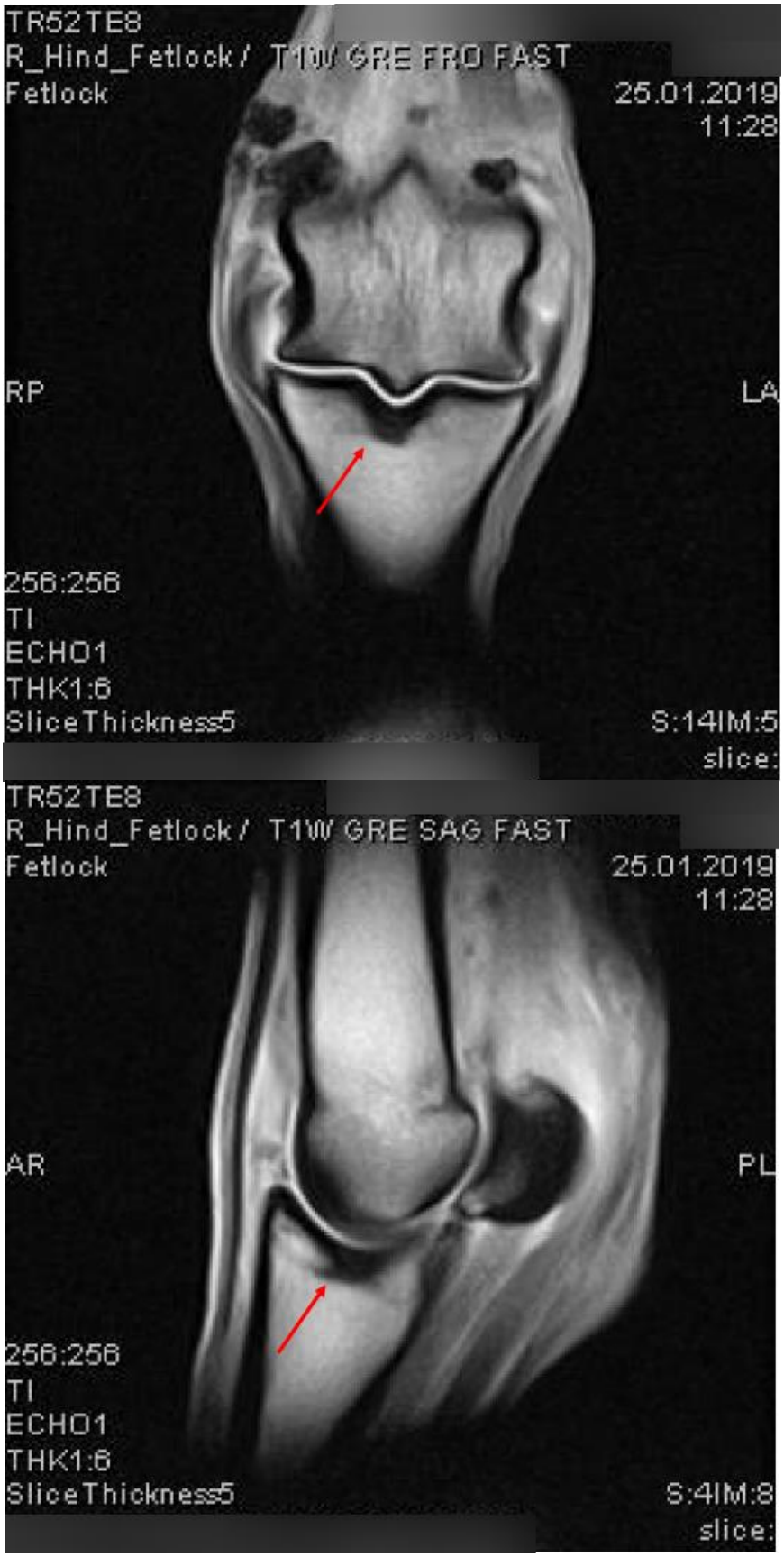

Fig. 5

A similarly shaped zone with a degenerative structure is visible on the DTS LM slice -90 (Fig.6).

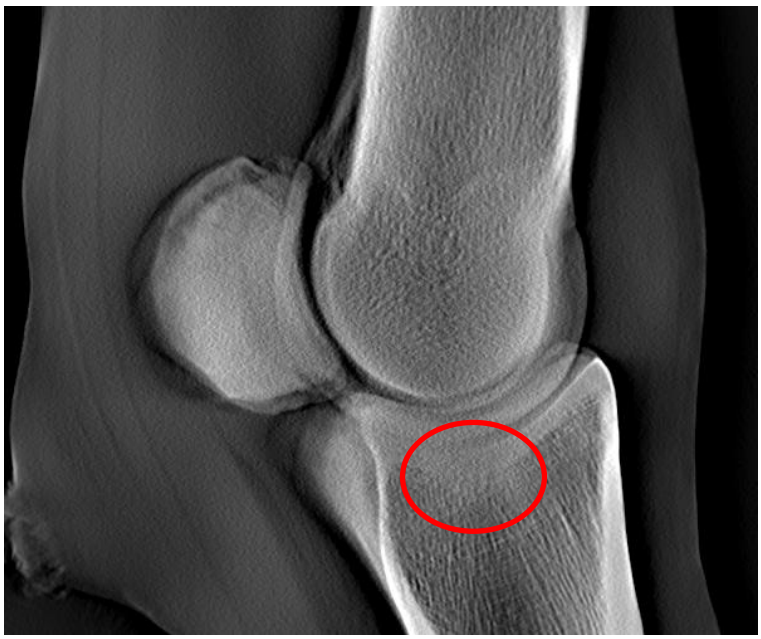

Fig. 6

On RAD images we do not see degenerative formation of this form shape.

4. In this case, areas with a loss of bone density have a different shape. The contrast of the formation on the RAD image depends on both the shape and the direction of the X-rays. In the case when the shape is an elongated cylinder, it is better observed in the direction of X-rays along the axis of the cylinder. If the X-ray direction at an angle of more than 30° or the shape of the area of reduced bone density is a ball, then on the X-ray image the image contrast decreases and at K<0.05 the pathology ceases to be visible. On DTS slices, in contrast to X-ray images, the contrast of the zone with reduced bone density is mainly determined by the value of the decrease in density and depends little on the shape of the pathology zone.
   Verification with MRI is undoubtedly useful for both radiography and DTS examinations.

5. In the Kiev equine clinic we performed examination of horse named “AB”. RAD DP image of LF Foot shown on Fig.7.

Fig. 7.

On Fig.8 DTS slice 22 is shown.

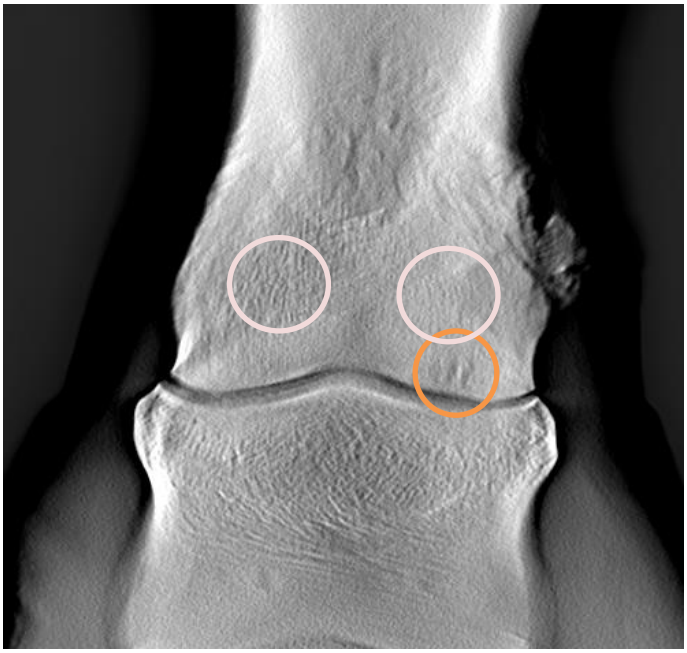

Fig. 8.

Slice on Fig. 8 shows the proximal phalanx bone structure. The deviation contrast measurements on slice 22 (circled in rose color) give the values on the left K_D = 0.13 and on the right K_D = 0.06. Thus, you can register a 50% reduction in X-ray density of the bone beam structures.
On the RAD image on Fig. 7 such measurements are incorrect, as it is not obvious which bone area in depth they are related to.

Full DTS scan LF Foot DP you can find following the link:
https://ncloud.it24.com.ua/s/8FSMeW2jKaxkCjB