How to Take Radiographs of the Metacarpophalangeal/Metatarsophalangeal Joint (Fetlock Joint)

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1. Introduction
The fetlock joint is one of the most common radiographed areas of the horse. It is a relatively simple joint made up of the third metacarpal/metatarsal bone (cannon bone), the proximal phalanx (P1), and the paired proximal sesamoid bones. To accurately assess pathology within the joint, quality radiographic images must be obtained.

2. Materials and Methods
Currently in the author’s practice, digital radiography is used exclusively. The techniques will vary, depending on which system being used (digital, computed, or plain radiography). It is possible to obtain excellent radiographs with any form of image acquisition as long as proper technique is used. In the author’s experience for fetlock radiography, the patient is usually not sedated; however, if the patient is difficult, the author will use anywhere from 2.5 mg to 5 mg of detomidine IV. A good handler is very important because they will properly position the horse so that image acquisition is easier. Radiation safety is always practiced by everyone involved wearing lead gowns and thyroid protectors and the plate holder wearing lead gloves.

3. Results
Standard views of the fetlock include five views (Figs. 1–4). The standard views taken follow: dorsal to palmar elevated 10° to 15° (DP), standing lateral to medial view (SLM), flexed lateral to medial view (FLM), dorsomedial (30°) to palmarolateral oblique view, elevated 10° to 15° (DMPLO), and a dorsolateral (30°) to palmaromedial oblique view, elevated 10° to 15° (DLPMO).

Special Views
As mentioned earlier, there are some additional views of the fetlock that are taken to highlight specific anatomic areas of concern. Tangential fetlock DP views are used to highlight portions of the articular surface of the distal metacarpus/metatarsus not seen on the standard DP projection. The most common is a flexed DP elevated at 10° to 15° (FDP) of the fetlock (Fig. 5). More extreme tangents are sometimes necessary, such as the dorsodistal-palmaroproximal DP view, which is taken in the weight-bearing position 15° below horizontal (Fig. 6). Another specialty view is the palmar 45° proximolateral-palmarodistal medial oblique view (Pal 45° PrL-DiMO, Fig. 7). This view can also be taken from the contra-axial side of the limb.
Fig. 1. Dorsal to palmar view of fetlock, elevated 15° to project joint space.

Fig. 2. Poor-quality DP caused by lack of 15° elevation, which leads to lack of projection of joint space.

Fig. 3. Standing lateral to medial view with excellent overlap of sesamoids and visualization of mid-sagittal ridge.

Fig. 4. Poor-quality SLM caused by improper angle in the medial to lateral and proximal to distal direction.
4. Discussion

Factors Affecting Radiograph Quality

Some factors that result in poor-quality radiographs are poor positioning, dirt/mud/water on the horse, motion on the radiograph, and poor exposure. These examples can lead to a misrepresentation of the horse and an incorrect diagnosis. Motion makes the radiograph difficult to interpret accurately (Fig. 8). Poor positioning can result in hidden pathology because the proper area is not highlighted (Fig. 9). Dirt, mud,
Fig. 9. The flexed DP highlights the distal palmar/plantar condyles of the cannon bone. This view is used to detect condyle fractures on the palmar aspect that are not seen easily on the standard DP view. Image was taken in the non-weight-bearing position.

Fig. 10. Dorsodistal-palmaroproximal DP of the fetlock. Despite superimposition of the sesamoids over the fetlock joint, a short, incomplete (dorsal to plantar) condylar fracture can be seen that was not apparent on the standard DP view.

Fig. 11. Palmar 45° PrL-DMiO. This view is used to highlight the abaxial surface of medial sesamoid bone. This projection can be used for either sesamoid.

Fig. 12. Motion. Flexed lateral to medial view with motion. The image becomes “blurry,” and subtle detail and lesions may be missed.
and water on the horse cause artifacts on the radiographs and can make it difficult to differentiate true lesions from artifact (Figs. 10 and 11). Poor exposure can be the result of underexposure (light image) or overexposure (dark image). Digital images can compensate for some exposure problems by altering the brightness and contrast (windowing) (also see Figs. 12–15). However, gross inaccuracies in exposure cannot be corrected, especially overexposure.1–3

References