Nonstandard Radiographic Techniques for the Equine Practitioner

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The diagnostic capabilities of the equine practitioner can be greatly increased with the use of nonstandard radiographic projections that are designed to enhance specific locations within a designated anatomical region. These techniques can easily be performed by using standard portable radiographic equipment. Author’s address: New Jersey Equine Clinic, 384 Millstone Rd., Clarksburg, NJ 08510. © 1997 AAEP.

1. Introduction
The standard radiographic projections necessary for the evaluation of particular anatomical locations in the horse have been well documented. However, in some instances these standard views may not provide the clinician with the definitive information that is required to conclusively evaluate the region in question. The purpose of this paper is to provide the equine practitioner with additional radiographic diagnostic capabilities that are uncomplicated, do not require special equipment, and are readily applicable to field use.

2. Foot
The standard views are 65° dorsopalmar (plantar); lateromedial. The nonstandard views are 65° oblique projections; dorsopalmar (plantar). The lateral and medial oblique projections are used most commonly to evaluate the solar margins of the coffin bone, the palmar (plantar) processes, and the integrity of the articular surface. The projections are made with the beam elevated 65° and directed 30–45° medially or laterally to the midline.

The dorsopalmar (plantar) view is useful in evaluating the general conformation of the foot, and if used at an increased exposure, the extensor process of the distal phalanx. This view is taken with the foot elevated on a block with the machine placed squarely on the ground in front of the horse, and the beam directed at the coronary band.

3. Navicular Bone
The standard views are 45° and 65° dorsopalmar (plantar); lateromedial; tangential. The nonstandard views are 65° oblique projections. The lateral and medial oblique projections are useful to detect enthesiopathy of the wings of the navicular bone. The technique is similar to that used for oblique views of the coffin bone, with the only differences being an increase in exposure and appropriate collimation used to isolate the navicular region.

4. Fetlock
The standard views are dorsopalmar (plantar); lateromedial; flexed lateromedial; obliques. The nonstandard views are 125° dorsopalmar (plantar); flexed dorsopalmar (plantar); 45–60° elevated obliques; palmar (plantar) tangential (sesamoids); laterome-
dial tangential. The palmar region of the distal cannon bone can have serious pathology that is often undetectable by using standard radiographic techniques. The 125° dorsopalmar and flexed dorsopalmar projections are superior for visualization of degenerative lesions of this area. These views are also very helpful in delineating the presence of palmar comminution frequently associated with condylar fractures.

The 125° dorsopalmar view is obtained with the limb elevated onto a block so that the machine is distal to the fetlock joint (Fig. 1). Exposure must be increased in order to evaluate the palmar aspect of the distal cannon bone, as this view will result in the proximal sesamoid bones being evenly superimposed on the joint space. A more useful technique in the author’s opinion is the flexed dorsopalmar view (Fig. 2). This technique elevates the proximal sesamoid bones above the joint surface and allows for complete evaluation of the condylar surfaces. For this view to be obtained, the fetlock is flexed as the limb is brought forward and the beam is directed 125° in a dorsopalmar direction.

Basilar and abaxial fractures of the proximal sesamoid bones and osteochondral fragments of the palmar (plantar) processes of the proximal phalanx can be best evaluated by using the elevated (45–60°) oblique views. The cassette is positioned as if for the standard oblique view, and the beam is directed 20–40° off lateral and elevated appropriately.

In addition, there are two tangential (skyline) views that are useful for specifically evaluating the proximal sesamoid bones. The palmar proximal to palmarodistal projection is useful for the evaluation of the abaxial surface of each sesamoid and for detecting axial fractures in the intersesamoidean region (Fig. 3). The limb is placed on a cassette and as far back under the horse as possible, similar to the positioning used for a tangential view of the navicular bone. The beam is centered between the sesamoid bones and directed perpendicular to the ground. For evaluation of the abaxial surface only, such as to determine articular involvement of a fracture, the cassette is placed laterally or medially, the machine is elevated 65°, and the beam is directed distally (Fig. 4).

5. Carpus
The standard views are dorsopalmar; lateromedial; flexed lateromedial; tangential (distal row); obliques. The nonstandard views are tangential (distal radius); tangential (proximal row). The tangential views of both the distal radius and the proximal row of carpal bones can be helpful in instances in which osteochondral fragments may be present in an axial location that cannot be adequately visualized on the standard views.

For the skyline view of the distal radius to be obtained, the limb is flexed and pulled slightly caudal, leaving the radius and metacarpus perpendicular and parallel to the ground, respectively (Fig. 5). The beam is directed distally at a 65° angle from horizontal. For the skyline view of the proximal
row, the carpus is fully flexed and the metacarpus is parallel to the ground. The beam is directed slightly flatter, at 45° from horizontal (Fig. 6).

6. Tarsus
The standard views are dorsoplantar; lateromedial; obliques. The nonstandard views are flexed lateromedial; plantar tangential (calcaneus). The flexed lateromedial projection is very useful in evaluating lesions associated with the plantar aspect of the talus and dorsal surface of the calcaneus. The cassette is placed medially, and the free hand flexes the limb completely by grasping the hoof. The beam is kept perpendicular to the metatarsus, and care is taken to avoid abducting or adducting the limb.

The plantar tangential view allows full evaluation of the medial and lateral borders of the calcaneus, as well as the sustentaculum tali (Fig. 7). The limb is flexed fully with the metatarsus parallel to the ground and the cassette placed against the plantar aspect of the tarsus. The beam is directed vertically and slightly cranially. This view is particularly useful in situations in which there has been blunt trauma to the medial aspect of the tarsus, as there is very little soft-tissue coverage in this region.

7. Stifle
The standard views are caudocranial; lateromedial; lateromedial oblique. The nonstandard views are flexed lateromedial; tangential (patella). The flexed
The lateromedial projection is infrequently more informative than the standard lateromedial oblique, but it can be useful in cases of osteochondrosis that affect the medial femoral condyle. This projection gives an unobstructed view of the entire condyle. An additional assistant is required to flex the limb caudally. The cassette is placed medially and the beam is directed perpendicular to the femur.

For lesions specific to the patella, the tangential view is superior for evaluation of the articular surface of this bone as well as the trochlear ridges of the distal femur (Fig. 8). The limb is flexed fully by an assistant in a fashion similar to that used for the flexed lateromedial view. The cassette is placed against the tibia and extended cranially enough to include the patella, and the beam is directed vertically and slightly caudally.

**References**