‘Look Mom, No Hands!’

Mastering The Art of Radiographic Positioning & Technique

(Part II)

Orthopedic Imaging
Spring 2018
Julie White, RVT, RT(R)

Reminders...

Verify:

- -Right patient
  - -Correct patient info, too!
- -Right part
- -Right views/positions
- -Right technique

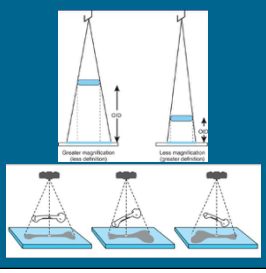
Beam Geometry

-Size distortion

- -Magnification

-Shape distortion

- -Elongation
- -Foreshortening



Before Every Exposure

-Verify:

- -Patient
- -Part
- -Views/Positions
- -Technique

-Select appropriate technique

- -Measure at thickest part

-Positioning key points:

- -Part parallel to plate, beam perpendicular to part/plate

After Every Exposure

-Image QC

- -Technique
- -Anatomy
- -Positioning

-Anything wrong = repeat exposure

-Hang your films correctly!

- -'All dogs walk to the left'
- -Head, Right side, and cranial & lateral aspect of limbs = on the left!

Carpus + Manus

-Lateral, Dorsopalmar

-low kVp, high mAs

-Landmarks:

- -Carpus: proximal ⅓ of metacarpals to distal ⅓ radius/ulna
- -Manus: toe nails to proximal to carpal joint

Carpus + Manus Lateral

-Patient position

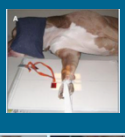
- -R or L lateral w/affected limb down
- -Affected limb extended cranially
- -Unaffected limb taped + pulled caudally

-Measure at level of carpus

-Place marker on dorsal aspect of limb

-Collimate to include:

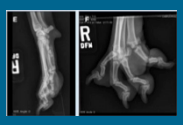
- -Carpus - proximal ⅓ metacarpals to distal ⅓ of radius ulna
- -Manus - digits to distal radius/ulna



Carpus + Manus Lateral

-Image QC

- -Technique
- -Anatomy included
- -Positioning
  - *carpal + metacarpal bones superimposed
  - *joint spaces distinct



Carups + Manus Dorsopalmar

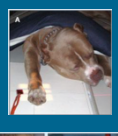
-Patient Positioning

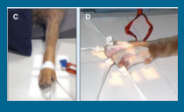
- -Patient sternal on table
- -Affected limb extended
- -Head placed over unaffected limb

-Measure at level of carpus

-Place marker on lateral aspect of limb

--Collimation: same as lateral





Carpus + Manus Dorospalmar

-Image QC

-Technique

-Anatomy Included

-Positioning

*No superimposition of carpal bones

**except accessory + ulnar

*No superimposition of phalanges

Carpus + Manus Additional Views

-Flexed/Extended lateral

-Medial/Lateral Stressed dorsopalmar

-Medial stress view - pressure applied to lateral aspect pushing medial

-Lateral stress view - pressure applied to medial aspect pushing lateral

-Obliques - rotate 35*

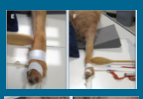
-Dorsolateral to palmeromedial - supinate (rotate dorsal aspect towards midline)

-Dorsomedial to palmerolateral - pronate (rotate dorsal aspect away from midline)

Carpus + Manus Additional Views

-Flexed/Extended

-Stressed



-Oblique

Tarsus + Pes

-Similar to carpus/manus

-Lateral + dorsopalmar

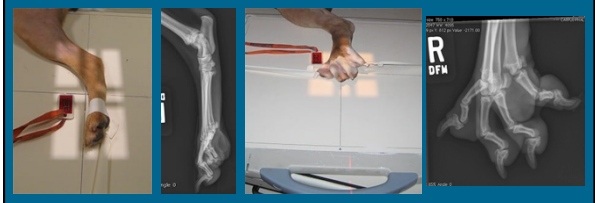
-DP = patient in dorsal recumbency

-Elevate patient in V trough so tarsus/pes flat on table

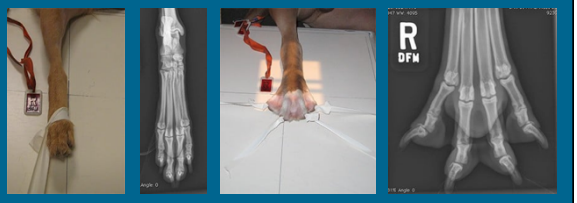
-May need to do table top if able

-Additional views include flexed/extended, stress views, obliques

Tarsus + Pes - Lateral



Tarsus + Pes - Dorsoplantar (CrCd)



Stifle

-Lateral + Caudocranial

-low kVp, high mAs

-Landmarks:

- ⅓ distal femur + ⅓ proximal tib/fib for stifle only

-TPLO/TTA include tarsus

Stifle - Lateral

-Patient Position

-Lateral, with affected limb down

-Opposite (up) limb abducted and taped

-May need sponge under dorsal pelvis +/- tarsus

-Measure widest part of stifle

-Center light on femoral epicondyles, include distal ⅓ of femur, proximal ⅓ tibia

-TPLO and TTA: include tarsus; stifle & tarsus flexed to 90°

-Mark cranial aspect of limb with marker and include ortho ball for magnification factor

Stifle - Lateral

-Image QC

-Technique

-Anatomy included

-Distal ⅓ femur, proximal ⅓ tibia (tarsus if TPLO/TTA)

-Patella + fabella

-Cranial + caudal skin margins

-Positioning

-femoral condyles superimposed

Stifle - Caudocranial

-Patient Position

-Sternal recumbency

-Limb internally rotated & extended caudally

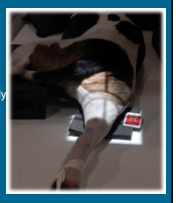
-Opposite limb can be placed on wedge or also extended caudally

-Measure thickest portion of stifle joint

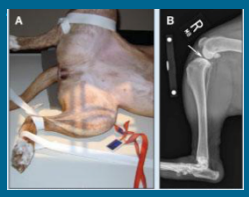
-Center beam on stifle, include ⅓ distal femur, ⅓ proximal tibia

-TPLO/TTA include tarsus

-Mark lateral aspect of limb



Stifle - Additional Lateral Views



TPLO

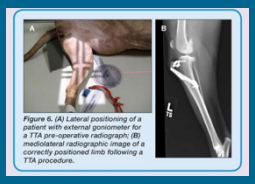


Figure 6. (A) Lateral positioning of a patient with external goniometer for a TTA pre-operative radiograph; (B) mediolateral radiographic image of a correctly positioned limb following a TTA procedure.

TTA

Stifle - Caudocranial

-Image QA

-Technique

-Anatomy included

-distal ⅓ femur, proximal ⅓ tibia

-femoral condyles, patella, fabellae

-Positioning

-femoral condyles symmetrical in size/shape

-patella centered on femur (if normal)

-femur + tibia aligned

Elbow + Antebrachium

-Lateral + Craniocaudal

-low kVp, high mAs

-Landmarks:

-Elbow: ⅓ distal humerus + ⅓ proximal radius/ulna

-Antebrachium: elbow joint through carpus

*some facilities include manus/digits

*Elbow and carpus will be distorted due to beam geometry.

Elbow + Antebrachium - Lateral

-Patient in lateral recumbency with affected limb down

-Limb can be neutral or extended cranially with elbow at roughly 100° angle

-Unaffected limb taped caudally and dorsally

-Elbow: center on medial humeral condyle

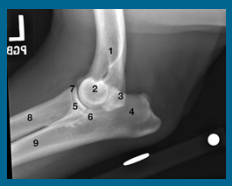
-Antebrachium: center between carpus + elbow

-Marker on cranial aspect of limb

Elbow + Antebrachium - Lateral

-Humeral condyles superimposed

-Joint space open and even between radius/humerus and ulna/humerus



Elbow + Antebrachium - Craniocaudal

-Patient sternal with affected limb pulled cranially

-Head placed over unaffected limb

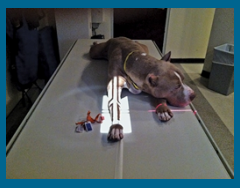
-Elbow rotated internally & carpus/manus flat on table

-Thin sponge under elbow helps maintain position & pt. comfort

-Place marker on lateral aspect of limb

-Elbow center between humeral condyles

-Antebrachium center between carpus + elbow



Elbow + Antebrachium - CrCd

-Olecranon centered on humeral condyle

-Joint spaces should be open and even
*beam geometry may distort joint spaces for antebrachium.

Spine - Lateral

-Patient in R or L lateral recumbency

-Should take each section separately

-Collimated views over each junction may be needed

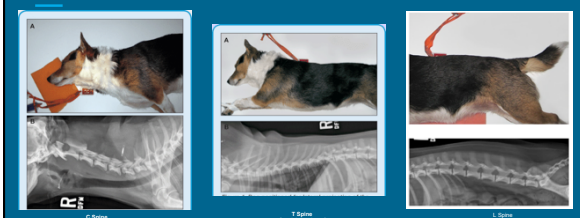
-Beam geometry will distort disc spaces!

-Ensure patient is in true lateral

-May need sponge between elbows, under sternum, between femurs

-May need thin foam under neck for C-spine

Spine - Lateral



Spine - VD

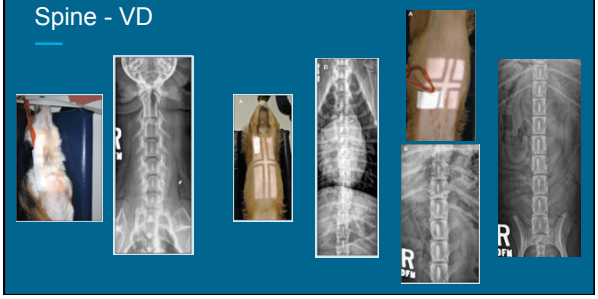
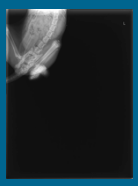


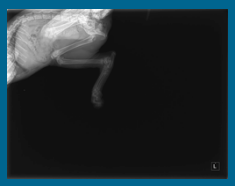
Image Review

Stifle Study

R Forelimb Lameness

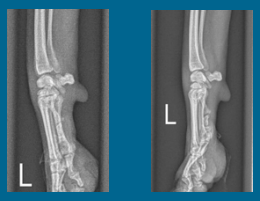
Hindlimb Study



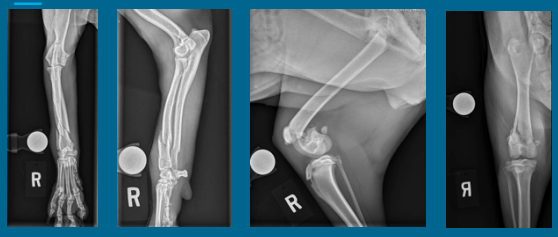


Carpus Study

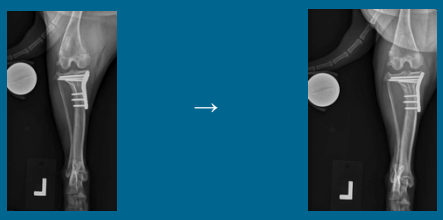
Myth:
Technique doesn't matter in digital imaging.



What if it's Broken?

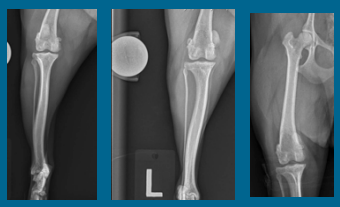


How do I Fix This?



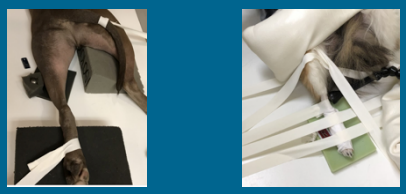
Patellas Are Tricky...

Don't be fooled by a luxating patella!

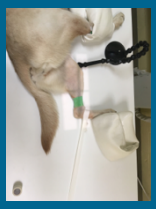


Creative Positioning

And More...



A few more...



References

-Berry C (ed): Small Animal Radiography: Essential Positioning Guide. NAVC

-Berry C, Mauragis D. Today's Veterinary Practice: Imaging Essentials Series. 2011. http://todaysveterinarypractice.navc.com/small-animal-thoracic-radiography/

-GOOGLE images

-Many thanks: University of Florida CVM Diagnostic Imaging Dept. for training & images

-Thanks to all VSH radiologists for helping, editing, and providing additional images

Questions??