Hip Radiographs

Radiographs are obtained under sedation or anesthesia for several reasons:

- To minimize stress to the patient;
- To permit precise positioning of the pelvis and hips;
- To remove the need for the animal to be held, as x-rays are potentially hazardous for anyone doing so.

The radiographic view required by the BVA/KC scoring scheme, as for most other hip dysplasia schemes, is the extended ventrodorsal (VD) view. The dog is positioned on its back with its hindlegs extended caudally, resulting in a position similar to that of a standing human. The femora must be positioned parallel to each other and for this, the stifles are rotated slightly medially and held in position with a tie or tape so that they lie in the sagittal plane with the patella superimposed over the centre of the distal femur. This position allows the femoral neck to be seen clearly, without superimposition by the greater trochanter and facilitates the detection of new bone on the femoral neck.

The extended VD position has several advantages:

- It is easy and safe to achieve;
- It is very repeatable;
- It requires no special positioning aids;
- It gives an excellent view of the hip joint in which all relevant anatomical areas can be seen.

Centring of the x-ray beam must be at the level of the hip joints, which can be achieved by palpation of bony landmarks such as the pubic symphysis and greater trochanters. Centring further cranially or further caudally will distort the appearance of the hip joints. Collimation must be sufficient to include the pelvis but it is not necessary to include the stifles; to do so requires either incorrect centring or an unacceptably large area to be irradiated.

It is important to avoid tilting the dog to the side (lateral rotation) as this will alter the appearance of the hips and may worsen the score, since the hip that is closer to the table may appear artefactually subluxated. It is also important that the technical quality of the image is of a high standard with optimum contrast and definition and all the necessary labelling. Radiographs that are poorly positioned or which are technically substandard may be rejected if the scrutineers feel that an accurate score cannot be given. Further details on radiography and submission are given in the BVA's Guidance Notes for the hip dysplasia scheme.

Reference

DENNIS R. Interpretation and use of BVA/KC hip scores in dogs. In Practice. BMJ Publishing Group Limited; 2012 Apr 16;34:178–194.

Elbow Radiographs

The hyperflexed medial to lateral view of each elbow is mandatory. Inclusion of a neutral medial to lateral view is highly recommended, while the inclusion of a cranial caudal or preferably the cranial caudal 10-15 degree lateral to medial oblique is encouraged.

Hyperflexed medial to lateral view (mandatory)

- Place the patient in lateral recumbency with the affected limb next to the tabletop.
- Forcefully pull the limb downward and cranially
- **Position the limb so that the elbow joint is a hyperflexed position. Make sure the carpus stays in a true lateral position, move the carpus toward the neck to hyperflex the elbow joint. This will help keep the elbow joint in a true lateral position.**
- Use sandbags to hold the limb in position.
- Arch the head and neck dorsally using sandbags to hold the position.
- Pull the unaffected leg caudally and hold it with sandbags or tie to the tabletop.
- Sandbags can be used to hold the pelvic limbs.
- X-ray beam direction: The vertically directed x-ray beam is centered on the elbow joint.

Lateral view (highly recommended)

- Position the patient in a lateral recumbent position with the elbow to be imaged down.
- Position the target limb cranially and ventrally and pull the opposite leg caudally
- Flex the elbow to a 90 degree angle
- Place the patient in lateral recumbency with the affected limb next to the tabletop.
- Forcefully pull the limb downward and cranially
- **Flex the elbow to a 90 degree angle.**
- Use sandbags to hold the limb in position.
- Arch the head and neck dorsally using sandbags to hold the position.
- Pull the unaffected leg caudally and hold it with sandbags or tie to the tabletop.
- Sandbags can be used to hold the pelvic limbs.
- X-ray beam direction: The vertically directed x-ray beam is centered on the elbow joint.

Craniocaudal view (encouraged)

- The patient is placed in sternal recumbency with the forelimb to be studied pulled as far cranially as possible and held by sandbags or tied to the table.
- The opposite forelimb can be left in a neutral position.
- Hyperextend the dog's neck and pull the head laterally toward the unaffected limb so that it is not within the primary beam.
- This positioning places the radius and ulna parallel to the tabletop but the humerus remains at an angle to the tabletop.
- X-ray beam direction: The vertically directed beam is angled distoproximally around 10 to 20 degrees in an effort to display the joint surfaces better.

Cranial 25-degree lateral-caudomedial oblique projection(encouraged)

- The patient is placed in sternal recumbency with the forelimb to be studied pulled as far cranially as possible and held by sandbags or tied to the table.
- Rotate the patient approximately 25° medially. The dog's head can be positioned laterally toward the unaffected limb so that it is not within the primary beam for both oblique views.
- The opposite forelimb can be left in a neutral position.
- X-ray beam direction: The vertically directed beam is perpendicular to the tabletop for the oblique views.

Spine Radiographs

Thoracic, thoracolumbar and lumbar spine, lateral view

- Place the dog in either lateral recumbency using sponges to make the spine parallel to the tabletop.
- Use a sponge beneath the sternum to achieve lateral positioning.
- Attempt to achieve this lateral positioning of the entire body
- Sandbags can be placed on the neck to help position the dog.
- The forelimbs are extended and can be held with sandbags or tied to the table.
- The pelvic limbs are in neutral position or extended being placed one over the other and tied to the tabletop or held with sandbags.
- **The vertically directed beam is perpendicular to the tabletop and centered on T6-7 for the thoracic spine, on T13-L1 for the thoracolumbar spine and on L3-4. (3 lateral views)**

Thoracic, thoracolumbar and lumbar spine, ventrodorsal view

- Place the sedated dog in dorsal recumbency.
- Sandbags may be positioned lateral to the thorax and abdomen.
- The body may be positioned so the abdomen or thorax is in a trough or held by a compression band.
- The forelimbs are pulled cranially and held by sandbags or ropes.
- The pelvic limbs can be in neutral position either held or tied to the table
- **The vertically directed beam is centered on T6-7 for the thoracic spine, on T13-L1 for the thoracolumbar spine and on L3-4. (3 ventrodorsal views)**