Information for SV-Veterinarians

LUMBAR-SACRAL TRANSITIONAL VERTEBRAE / LTV

Transitional Vertebrae develop at the transition of the vertebral spine segments (e.g. lumbar spine / sacral bone). If this occurs the deformed vertebra shows characteristics of the front segment and of the past segment as well.

The lumbar spine of dogs normally consists of seven vertebrae (L). Three vertebrae (S), which are totally fused at an age of 18 month at latest are forming the sacral bone (Figure 1). Between L7 and S1 exists a normal disc and there is no contact between the transverse processes an no contact to the alia of the ilium (Figure 3). Lumbar-sacral transitional vertebrae (LTV) develop in the region of L7 and S1. They are characterized by an abnormal form most frequently at the spinal and transvers processes. In an advanced stage the vertebral body can also be involved.

A correlation between LTV and the prevalence of Cauda Equina Syndrome (CES) is discussed.

Proposed by the Swiss Dysplasia Commission for the screening on hip radiographs LTV are divided in four types. The differentiation is based on two criteria:

1. Degree of the fusion of the spinal processes of the sacrum
2. Symmetric or asymmetric formation of the transverse processes and configuration of the contact area of transverse processes with the alia of the ilium.

Figure 3 demonstrates a normal lumbar-sacral conjunction (Type 0) on a pelvic radiograph.

Type 1 shows a normal anatomical form of L7 and sacrum bone but with an separated spinal process of S 1 (Figure 4). Type 2 includes all the different forms of LTV with more obvious abnormal anatomical findings if the development is symmetrically (Figure 5).

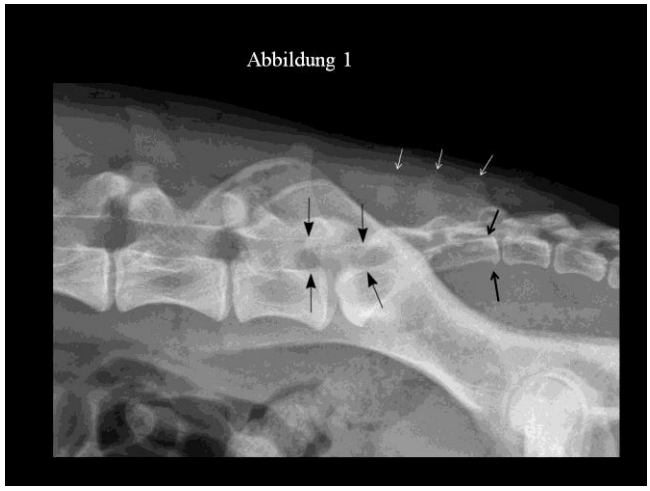
All asymmetrical forms of LTV are included in Type 3 (Figure 6).

A very high risk for the dog to get a cauda equina syndrome (CES) is the development of an OCD (Osteochondrosis dissecans) at S1 (Figure 2). In such cases the disc between L7 and S1 is always damaged.

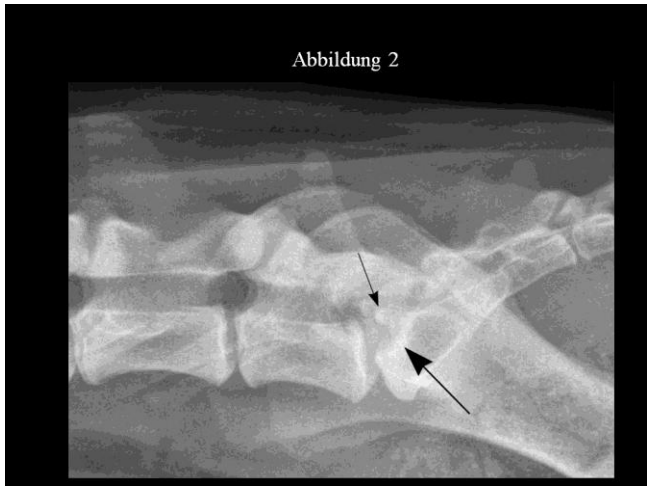
Actually the Verein für Deutsche Schäferhunde (SV) e.V. has decided to include the anatomical changes at the lumbar sacral conjunction, especially LTV and OCD in the screening, but on a voluntary base. To examine LTV the standard pelvis radiograph for CHD is adequate. Except for the identification of a dog on different radiographs also for this examination it is very important that the total pelvis including L7 is displayed on the image (Figure 3). All CHD radiographs, which don`t meet this requirement, are not evaluable and have to be refused in any case.

If a dog owner wants to have an examination concerning OCD an additional radiograph has to be made. The image has to demonstrate the region from L 4/5 to the first coccygeal vertebra on a latero-lateral view. The lumbar sacral conjunction has to be in the central beam, no axial rotation of vertebral column and pelvis and the technical quality (detail, contrast) must allow a detailed analysis of the bone structure (Figure 1).

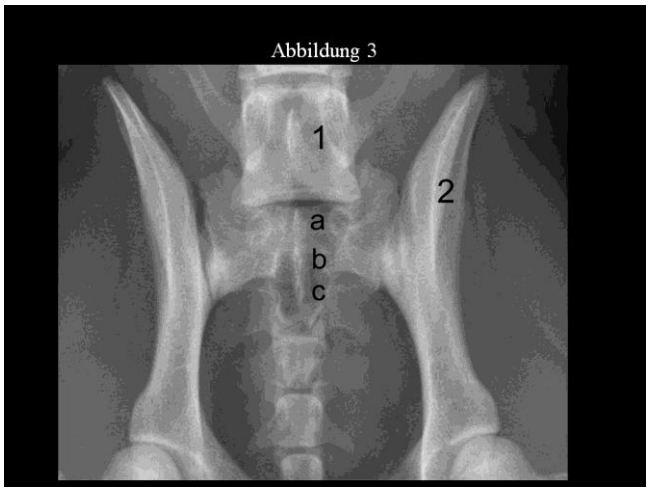
Dr. Bernd Tellhelm



Latero-lateral radiograph of a normal lumbar-sacral conjunction. The bony structures are well defined, the vertebral canal is wide (large black arrows). The three sacral vertebrae (caudal large black arrows to small black arrows) are totally fused and also the spinal processes (white arrows).

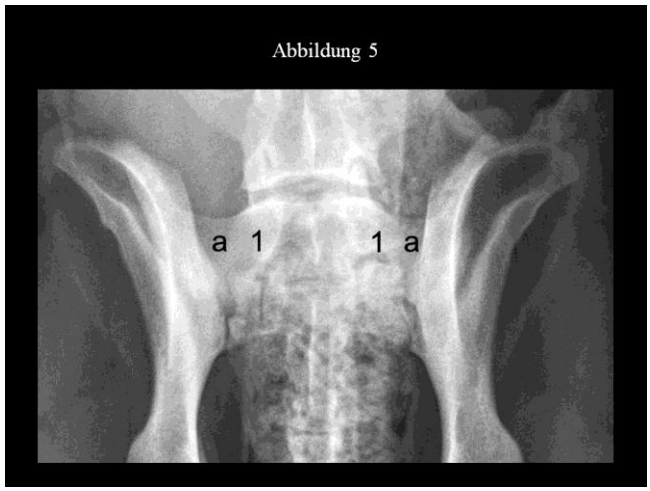


Latero-lateral radiograph of the lumbar-sacral conjunction of a dog 12 month of age with an OCD of the first sacral vertebra. The ossification of the front part of the sacral bone is incomplete (large arrow),a separate piece of bone (small arrow) is situated within the vertebral canal.



Hip-radiograph including the lumbar-sacral region. It shows a normal lumbar-sacral conjunction (Type 0). The transverse processes of the last lumbar vertebra / L7 (1) are symmetric with a normal orientation (cranio-lateral). There is no contact with the alia of the ilium (2). Sacral bone and L 7 are totally separated. The spinal processes of the sacral bone are fused (a, b, c).

Hip-radiograph including the lumbar-sacral region.
The spinal process (a) of the first sacral vertebra is separated. Symmetric LTV type 1 (1).



Hip-radiograph including the lumbar sacral region. Demonstrated is a symmetric LTV (1) developing a broad contact area with the alia of the ilium by its transverse processes (a / Type 2).

Hip-radiograph including the lumbar sacral region. Demonstrated is an obviously asymmetric developed LTV (Type 3). The left transverse process (1) of the vertebra has a broad contact area with the left alia of the ilium. The right transverse process (2) shows a normal configuration.