

Variations in the 7th Lumbar (L7) Vertebra Length Associated with Sacrocaudal Fusion in Greyhounds

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Abstract : The lumbosacral junction (where the 7th lumbar vertebra (L7) articulates with the sacrum) is a clinically important area in the dog. The 7th lumbar vertebra (L7) is normally shorter than other lumbar vertebrae, and it has been reported that variations in the L7 length may be associated with other abnormal anatomical findings. These variations included the reduction or absence of the portion of the median sacral crest. In this study, 53 greyhound cadavers were placed in right lateral recumbency, and two lateral radiographs were taken of the lumbosacral region for each greyhound. The length of the 6th lumbar (L6) vertebra and L7 were measured using radiographic measurement software and was defined to be the mean of three lines drawn from the caudal to the cranial edge of the L6 and L7 vertebrae (a dorsal, middle, and ventral line) between specific landmarks. Sacrocaudal fusion was found in 41.5% of the greyhounds. The mean values of the length of L6, L7, and the ratio of the L6/L7 length of the greyhounds with sacrocaudal fusion were all greater than those with standard sacra (three sacral vertebrae). There was a significant difference ($P < 0.05$) in the mean values of the length of L7 between the greyhounds without sacrocaudal fusion (mean = 29.64, SD \pm 2.07) and those with sacrocaudal fusion (mean = 30.86, SD \pm 1.80), but, there was no significant difference in the mean value of the length of the L6 measurement. Among different types of sacrocaudal fusion, the longest L7 was found in greyhounds with sacrum type D, intermediate length in those with sacrum type B, and the shortest was found in those with sacra type C, and the mean values of the ratio of the L6/L7 were 1.11 (SD \pm 0.043), 1.15, (SD \pm 0.025), and 1.15 (SD \pm 0.011) for the types B, C, and D respectively. No significant differences in the mean values of the length of L6 or L7 were found among the different types of sacrocaudal fusion. The occurrence of sacrocaudal fusion might affect directly anatomically connected structures such as the L7. The variation in the length of L7 between greyhounds with sacrocaudal fusion and those without may reflect the possible sequences of the process of fusion. Variations in the length of the L7 vertebra in greyhounds may be associated with the occurrence of sacrocaudal fusion. The variation in the vertebral length may affect the alignment and biomechanical properties of the sacrum and may alter the loading. We concluded that any variations in the sacrum anatomical features might change the function of the sacrum or the surrounding anatomical structures.

Keywords : biomechanics, Greyhound, sacrocaudal fusion, locomotion, 6th Lumbar (L6) Vertebra, 7th Lumbar (L7) Vertebra, ratio of the L6/L7 length

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