

Congenital Malformations of the Lumbosacral Vertebral Column

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In the Literature

Bertram S, Ter Haar G, De Decker S. Congenital malformations of the lumbosacral vertebral column are common in neurologically normal French bulldogs, English bulldogs, and pugs, with breed-specific differences. *Vet Radiol Ultrasound*. 2019;60(4):400-408.

FROM THE PAGE ...

French bulldogs, English bulldogs, and pugs can be grouped together based on brachycephalic anatomy. They are known to have respiratory difficulty due to shortened noses and share a propensity for congenital vertebral malformations. These breeds are also known to have block vertebrae, hemivertebrae, transitional vertebrae, and neural tube defects.¹ A study revealed that the degree of screw-tail in French bulldogs correlates with the severity of hemivertebrae in the thoracic region.²

The current study examined 149 CT scans of vertebrae L6 to S3 and coccygeal vertebrae in neurologically normal pugs, French bulldogs, and English bulldogs over a 6-year period. The goal of the study was to determine whether vertebral lumbosacral (LS) malformations were present in neurologically normal dogs and whether the severity of tail deformity was linked to the presence of vertebral malformations in the LS region. Fifty-one percent of dogs had evidence of at least one type of congenital vertebral malformation, 60.5% had LS intervertebral disk herniations, and 67.1% had abnormal tails; normal tail morphology was only identified in 32.9% of dogs. These results support an association between LS hemivertebrae at L7 and S1 and the degree of tail malformation and intervertebral disk herniation in English and French bulldogs. Tails were more consistently normal in pugs, and this breed exhibited more transitional LS vertebral malformations than hemivertebral malformations. All breeds had an increased incidence of intervertebral disk disease as age increased.

This study concluded that the severity of screw-tail in English and French bulldogs is correlated with the presence of hemivertebrae; pugs do not have true screw-tails and are more likely to have transitional vertebrae. In addition, apparently clinically normal pugs and English and French bulldogs can have vertebral abnormalities. Because these results were found in clinically normal dogs, the study authors caution against overinterpreting results of CT scans and emphasize the importance of lesion localization during neurologic examination to avoid intervening in a clinically normal patient. In addition, there were some limitations due to the study's retrospective nature and the fact that most dogs did not undergo neurologic examination; it is possible that patients with intermittent or mild neurologic deficits were considered normal.

... TO YOUR PATIENTS

Key pearls to put into practice:

- 1** A genetic defect of the *DVL2* gene that is linked to vertebral malformations of the thoracic and coccygeal vertebrae has been identified in English and French bulldogs.³ Pugs do not share this defect and therefore should not be considered to have true screw-tails. The tail defect in pugs is more likely vertebra curva, the result of bone bending from soft tissue tension during development.
- 2** The study findings further support minimizing severe screw-tails due to their correlation with vertebral malformations. Although patients may be clinically and neurologically normal, selective breeding to minimize the screw tail phenotype may improve the gene pool.
- 3** Although advanced imaging can be helpful for visualizing anatomic neurologic lesions, the physical examination, including a thorough neurologic examination, is the most important factor in determining the relevance of imaging findings. In some cases, findings could be consistent with normal aging and not be clinically problematic.

References

1. Westworth DR, Sturges BK. Congenital spinal malformations in small animals. *Vet Clin North Am Small Anim Pract.* 2010;40(5):951-981.
2. Schlensker E, Distl O. Heritability of hemivertebrae in the French bulldog using an animal threshold model. *Vet J.* 2016;207:188-189.
3. Mansour TA, Lucot K, Konopelski SE, et al. Whole genome variant association across 100 dogs identifies a frame shift mutation in *DISHEVELLED 2* which contributes to Robinow-like syndrome in Bulldogs and related screw tail dog breeds. *PLoS Genet.* 2018;14(12): e1007850.

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