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COMPUTED TOMOGRAPHY PREVALENCE OF THORACOLUMBAR ALTERATIONS IN FRENCH BULLDOGS AND DACHSHUNDS FROM DIFFERENT REGIONS OF BRAZIL

PREVALÊNCIA DE ALTERAÇÕES TORACOLOMBARES NA TOMOGRAFIA COMPUTADORIZADA DE BULDOGUES FRANCESES E DACHSHUNDS DE DIFERENTES REGIÕES DO BRASIL

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ABSTRACT

Intervertebral disc disease and vertebral anomalies are common in chondrodystrophic breeds. This retrospective study analyzed 108 computed tomography exams (62 Dachshunds and 46 French Bulldogs) from multiple imaging centers in Brazil, evaluating thoracolumbar alterations from T3 to L4. Imaging findings were reviewed to assess disc protrusion, extrusion, hemivertebrae, transitional vertebrae, and epidural hemorrhage. Dachshunds exhibited a significantly higher prevalence and severity of thoracic extrusions and larger protrusions in this region, while French Bulldogs were more frequently affected at the lumbar level, especially at L3-L4. Extensive epidural hemorrhage was observed predominantly in French Bulldogs, suggesting breed-specific vascular or anatomical predispositions. Hemivertebrae were observed only in French Bulldogs, while transitional vertebrae exhibited distinct patterns between breeds, with T13 more commonly affected in Dachshunds and L1 in French Bulldogs. These findings highlight the importance of breed-specific anatomical and pathological characteristics, which may influence clinical signs, imaging interpretation, and surgical planning. The use of multislice CT allowed detailed characterization of spinal disorders, contributing to a better understanding of spinal disease patterns in predisposed breeds and providing a foundation for individualized veterinary management.

Keywords: Computed tomography. Thoracolumbar spine. Intervertebral disc disease. Dachshund. French Bulldog.

RESUMO

Doença do disco intervertebral e anomalias vertebrais são comuns em raças condrodistróficas. Este estudo retrospectivo analisou 108 exames de tomografia computadorizada (62 Dachshunds e 46

Buldogues Franceses) provenientes de múltiplos centros de diagnóstico por imagem no Brasil, avaliando alterações toracolombares de T3 a L4. Os achados de imagem foram revisados para a avaliação de protrusão e extrusão discais, hemivértebras, vértebras transicionais e hemorragia epidural. Os Dachshunds apresentaram prevalência e gravidade significativamente maiores de extrusões torácicas e protrusões maiores nessa região, enquanto os Buldogues Franceses foram mais frequentemente afetados em nível lombar, especialmente em L3-L4. Hemorragia epidural extensa foi observada predominantemente em Buldogues Franceses, sugerindo predisposições vasculares ou anatômicas específicas da raça. Hemivértebras foram observadas exclusivamente em Buldogues Franceses, enquanto as vértebras transicionais exibiram padrões distintos entre as raças, afetando mais comumente T13 nos Dachshunds e L1 nos Buldogues Franceses. Esses achados destacam a importância das características anatômicas e patológicas específicas de cada raça, as quais podem influenciar os sinais clínicos, a interpretação dos exames de imagem e o planejamento cirúrgico. O uso da tomografia computadorizada multislice permitiu a caracterização detalhada das alterações da coluna vertebral, contribuindo para uma melhor compreensão dos padrões de doenças espinhal em raças predispostas e fornecendo base para um manejo veterinário individualizado.

Palavras-chave: Tomografia computadorizada. Coluna toracolombar. Doença do disco intervertebral. Dachshund. Buldogue Francês.

1. INTRODUCTION

Thoracolumbar alterations are frequently observed in chondrodystrophic dog breeds, such as Dachshunds and French

Bulldogs, due to their unique anatomical conformation and genetic predisposition. These alterations include congenital vertebral malformations, such as hemivertebrae and transitional vertebrae, as well as degenerative intervertebral disc diseases, including protrusions and extrusions (ABOUZEID, 2025; DE DECKER, ROHDIN, GUTIERREZ-QUINTANA, 2024; DICKINSON & BANNASCH, 2020).

Hemivertebrae are vertebrae with abnormal structural conformation resulting from defects in the embryonic development of portions of the vertebral body. These anomalies may present in various morphologies, such as butterfly vertebrae, which involve defects in the ventral and central regions of the vertebral body, and classic hemivertebrae, which are associated with incomplete formation of one side of the vertebra, possibly due to the absence of vascularization during embryonic development (RYAN *et al.,* 2017; SAUNDERS, 2017).

The intervertebral disc is a fibrocartilaginous structure responsible for providing mobility and absorbing impact between adjacent vertebral bodies. It is composed of two main components: the annulus fibrosus and the nucleus pulposus. The annulus fibrosus consists of concentric lamellae of collagenous tissue, which provide strength and maintain the ovoid shape of the disc, enclosing and containing the central nucleus. The nucleus pulposus, on the other hand, has a gelatinous consistency and a high-water content, features that are essential for dissipating compressive forces. This anatomical arrangement allows the intervertebral disc to function as an efficient biomechanical shock absorber, crucial for protecting the spinal cord and nerve roots during physiological spinal movements (EVANS & DE LAHUNTA, 2013; RAJ, 2008).

Intervertebral disc disease (IVDD) occurs when structural or functional changes affect the nucleus pulposus and/or the annulus fibrosus, potentially resulting in displacement of disc material toward the vertebral canal. This displacement mainly occurs in two forms: protrusion or extrusion. Protrusion, corresponding to Hansen type II, is characterized by chronic thickening and bulging of the annulus fibrosus without complete rupture. This deformation produces a disc prominence that may cause extrinsic compression of the spinal cord or nerve roots, generally associated with milder clinical signs. Extrusion, on the other hand, associated with Hansen type I, occurs when the annulus ruptures and the nucleus pulposus abruptly extrudes, often accompanied by more acute and severe clinical manifestations (DA COSTA *et al.*, 2020; FENN & OLBY, 2020).

An important factor associated with thoracolumbar disc extrusions is the presence of extensive epidural hemorrhage (DEEH), possibly resulting from rupture of the ventral internal vertebral venous plexus, which is located on the floor of the vertebral canal and covered by epidural fat (POLI *et al.*, 2022).

Computed tomography (CT) has become a highly accurate diagnostic tool for evaluating vertebral and disc alterations in dogs. Unlike conventional radiography, CT enables multiplanar visualization of bony structures and the vertebral canal, providing improved anatomical delineation, more precise detection of the affected level, and assessment of the extent of spinal cord compression. Despite its higher cost, CT has been increasingly incorporated into the routine of veterinary centers in Brazil and worldwide, being widely adopted by clinicians, neurologists, and orthopedic surgeons, particularly in cases of suspected IVDD (DA COSTA *et al.*, 2020; RICCIARDI *et al.,* 2018).

In this context, the present study aimed to characterize and compare congenital and degenerative thoracolumbar alterations between Dachshunds and French Bulldogs through computed tomographic evaluation, considering factors such as lesion location, type of lesion (protrusion or extrusion), presence of associated hemorrhage, and distribution pattern of lesions along the thoracolumbar spine.

2. THEORETICAL BACKGROUND

Thoracolumbar spinal alterations represent a significant clinical concern in veterinary medicine, particularly in chondrodystrophic dog breeds such as Dachshunds and French Bulldogs. These breeds exhibit a well-documented genetic predisposition to both congenital and degenerative spinal disorders, largely due to their unique anatomical conformation and cartilage development patterns. This predisposition contributes to an increased incidence of IVDD and vertebral malformations (ABOUZEID *et al.,* 2025; DICKINSON & BANNASCH, 2020). The chondrodystrophic phenotype is associated with early disc degeneration, which significantly increases the risk of spinal cord compression and neurological dysfunction (FENN & OLBY, 2020).

Congenital vertebral malformations are commonly reported in small brachycephalic breeds, particularly French Bulldogs. Among these, hemivertebrae are the most frequently described anomalies and result from failures in vertebral body formation during embryonic development. These malformations may lead to spinal deformities such as kyphosis, scoliosis, or lordosis, depending on their location and severity (DE DECKER; ROHDIN; GUTIERREZ-QUINTANA, 2024). Hemivertebrae can present in different morphological forms,

including butterfly vertebrae, characterized by a sagittal cleft in the vertebral body, and wedge-shaped vertebrae, caused by incomplete development of one side of the vertebra (RYAN *et al.,* 2017; SAUNDERS, 2017). Although some animals remain asymptomatic, these structural abnormalities may predispose them to spinal instability and secondary spinal cord compression.

From an anatomical and biomechanical perspective, the intervertebral disc plays a crucial role in maintaining spinal flexibility and absorbing mechanical loads. It is composed of two main structures: the annulus fibrosus and the nucleus pulposus. The annulus fibrosus consists of concentric layers of collagen fibers that provide tensile strength and structural integrity, while the nucleus pulposus is a gelatinous core rich in water and proteoglycans and is responsible for dissipating compressive forces (EVANS & DE LAHUNTA, 2013; RAJ, 2008). Degenerative changes affecting these components compromise disc function and predispose to disc displacement.

IVDD is one of the most common neurological disorders in dogs and is traditionally classified according to Hansen as type I or type II. Hansen type I is characterized by chondroid degeneration of the nucleus pulposus, leading to acute extrusion of disc material following rupture of the annulus fibrosus, often resulting in severe spinal cord compression. In contrast, Hansen type II involves fibroid degeneration, with chronic protrusion of the annulus fibrosus into the vertebral canal, causing gradual and progressive compression (DA COSTA *et al.,* 2020; FENN; OLBY, 2020). In chondrodystrophic breeds, Hansen type I is more prevalent and typically occurs in younger or middle-aged dogs (BRISSON, 2010).

In addition to disc degeneration, secondary factors may influence the severity of spinal cord injury. DEEH has been increasingly recognized as an important finding in cases of disc extrusion, particularly in French Bulldogs. This condition is believed to result from rupture of the internal vertebral venous plexus, contributing to increased spinal cord compression and worsening neurological outcomes (POLI *et al.,* 2022). Breed-related differences in the prevalence, localization, and severity of disc lesions have also been reported, suggesting that anatomical and genetic factors play a significant role in disease expression (AIKAWA *et al*., 2014; LA ROSA *et al*., 2023).

The distribution of disc lesions along the thoracolumbar spine is another clinically relevant aspect. In Dachshunds, disc extrusions are most commonly observed in the mid-thoracolumbar region, whereas French Bulldogs tend to present a more variable distribution, including frequent involvement of the lumbosacral region (ABOUZEID *et al.,* 2025; LA ROSA *et al*., 2023). Additional factors such as body conformation, body weight and level of physical activity may further influence the occurrence and severity of IVDD (LEVINE *et al*., 2006).

Diagnostic imaging plays a fundamental role in the evaluation of vertebral and disc abnormalities. CT has become a highly valuable tool because of its ability to provide detailed visualization of osseous structures and detect mineralized disc material within the vertebral canal. Compared with conventional radiography, CT offers greater sensitivity and accuracy in identifying disc extrusions and vertebral malformations (DA COSTA *et al*., 2020). Furthermore, advanced techniques such as CT myelography may enhance the assessment of spinal cord compression in complex cases (RICCIARDI *et al.,* 2018).

In this context, a comprehensive understanding of the anatomical, genetic, and clinical aspects of thoracolumbar spinal alterations is essential for accurate diagnosis and effective clinical management. Comparative studies involving breeds such as Dachshunds and French Bulldogs are particularly important for elucidating breed-specific patterns, improving diagnostic approaches and supporting evidence-based veterinary practice.

3. METHODOLOGY

This retrospective study included dogs evaluated at diagnostic imaging services in different regions of Brazil, with clinical suspicion of thoracolumbar IVDD between September 2024 and April 2025, including cases from Amazonas (AM), Rio Grande do Sul (RS), Minas Gerais (MG), São Paulo (SP), Rio de Janeiro (RJ), and the Federal District (DF).

CT reports were retrieved from an institutional database of examinations performed at different diagnostic centers using multislice computed tomography, and the analyses were based on the interpretation of the descriptions contained in the reports, supported by specialized evaluation of the DICOM-format images.

For this study, the thoracolumbar interval from T3 to L4 was standardized due to variability in acquisition protocols among imaging centers. This anatomical range, consistently present in most examinations, allowed for uniform and appropriate comparison between the evaluated cases.

As inclusion criteria, all Dachshunds and French Bulldogs that underwent thoracolumbar spine CT examinations within the study period, with or without alterations between vertebral segments T3

and L4, were selected. Patient data (age, breed, sex) and imaging findings used in this study were obtained exclusively from CT reports prepared by veterinary radiologists.

The investigated alterations included the presence and location of disc extrusion/protrusion, hemivertebrae, transitional vertebrae, and vertebral neoplasms. The frequencies of disc protrusions and extrusions were evaluated according to vertebral level, lesion laterality (central, right, or left), and presence of associated epidural hemorrhage. For each intervertebral interval, the number and proportion of affected patients were calculated by breed. The presence of hemivertebrae was assessed individually and proportions were calculated by vertebral level and breed, including 'butterfly' vertebrae, which were grouped under hemivertebrae for analysis purposes.

Transitional changes at T13 and L1 were evaluated bilaterally in terms of the morphology of the transverse processes. A vertebra was classified as transitional when, on at least one side (left or right), a developed transverse process was observed in L1 or a hypoplastic or absent transverse process was observed in T13 or L1.

Statistical analysis was performed using R software (v.4.4.1). The significance level was set at 5% ($p < 0.05$). Proportion tests, Fisher's exact test, and the chi-square test were applied to assess associations between categorical variables. For continuous variables, the Kruskal–Wallis test with Dunn's post hoc test for multiple comparisons was used. Multivariate logistic regression models were employed to identify factors associated with the presence of DEEH.

4. RESULTS

A total of 108 dogs were included, comprising 62 Dachshunds and 46 French Bulldogs. The p-values for comparisons between groups were: age (p = 0.033), females (p = 0.579), and neutered animals (p = 1) (as shown in Table 1). Age was the only significant difference between groups.

Table 1: Main demographic and clinical characteristics of the Dachshund and French Bulldog groups, including mean age ± standard deviation, sex, neuter status, and the corresponding p-value for the comparison between breeds.

	Dachshund	French Bulldog	P-value
n	62	46	-
Age (mean ± SD)	6.2 ± 2.7	5.1 ± 2.7	p = 0.033
Females	26	16	p = 0.579
Neutered	40	30	p = 1

Among the included animals, two Dachshunds showed no thoracolumbar alterations, while one Dachshund and three French Bulldogs presented findings consistent with vertebral neoplasms.

A total of 38 dogs had thoracic disc protrusion, and 36 had lumbar disc protrusion.

4.1. Thoracic Protrusions

Among the thoracic cases, 22 were Dachshunds and 16 were French Bulldogs. Dachshunds showed a higher mean proportion of vertebral canal occupancy by thoracic disc protrusions (16.8%), with greater variability among individuals (SD = 8.73; range 10–40%)

compared to French Bulldogs (12.4%; SD = 4.45; range 10–25%), as confirmed by both the t-test for mean comparison (95% CI 0.95–7.85%, p = 0.01) and the Kruskal–Wallis test (p = 0.02) (Table 2).

Table 2: Proportion of the spine affected by thoracic disc protrusions (TP). The table reports the total number of thoracic protrusions (TP), the mean percentage of disc protrusion extent (Mean %), median, standard deviation (SD), and range.

Breed	n (TP)	Mean %	Median	SD	Rang
Dachshund	33	16.8	15	8.73	10-4
French Bulldog	31	12.4	10	4.45	10-2

⚠ Esta tabela possui muitas colunas e foi cortada para impressão. Para visualizá-la completa, acesse o artigo original em: https://revistatopicos.com.br/artigos/computed-tomography-prevalence-of-thoracolumbar-alterations-in-french-bulldogs-and-dachshunds-from-different-regions-of-brazil?noblockage

When comparing the thoracic distribution of protrusions between breeds, the absolute number of protrusions per patient did not differ significantly (median [IQR]: 1 [1-2] in Dachshunds and 2 [1-3] in French Bulldogs; p = 0.157). Additionally, the number of affected thoracic segments, the specific vertebral locations involved, and the pattern of protrusion lateralization were evaluated. The prevalence, thoracic proportion, and distribution of these findings are summarized in Figure 1.

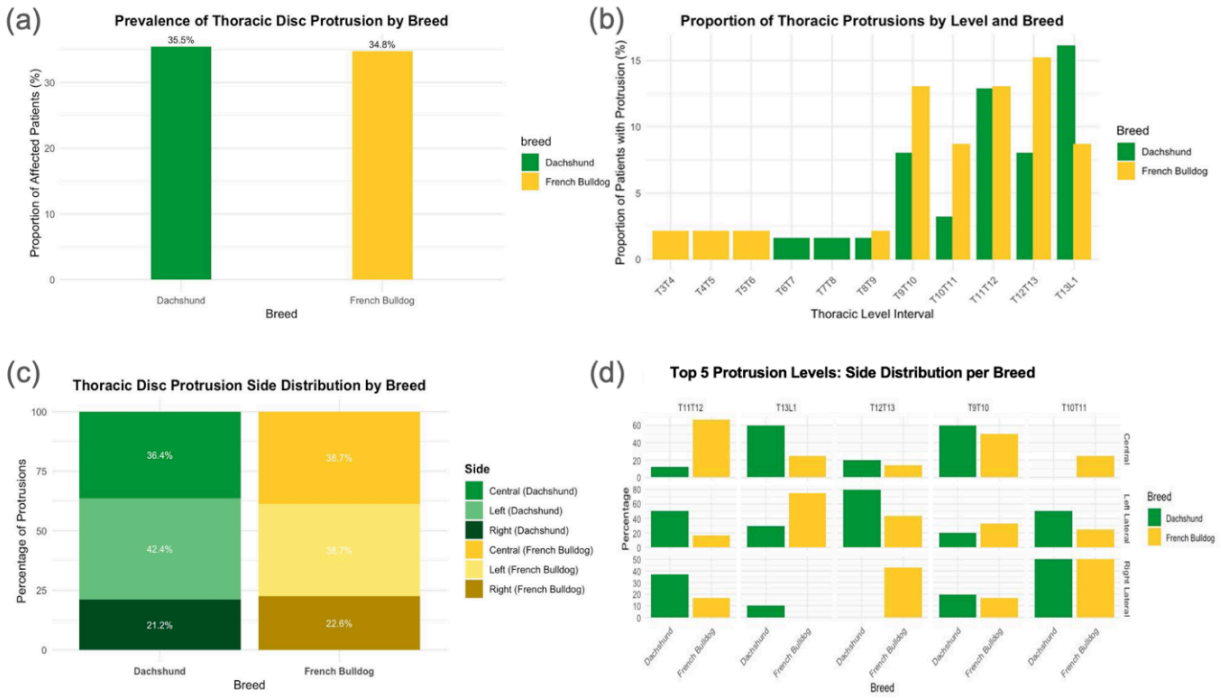

Figure 1: Thoracic intervertebral disc protrusions in Dachshunds and French Bulldogs. (A) Prevalence (%). (B) Distribution by vertebral interval (T3–L1). (C) Percentage distribution by lateralization (central, left, or right). (D) Lateral distribution at the five most affected levels (T9–T10 to T13–L1).

No significant differences were observed between breeds regarding the number of affected thoracic segments (1 vs. ≥ 2 levels; $p = 0.3245$), nor in relation to specific vertebral location or the pattern of protrusion lateralization ($p > 0.05$ for all thoracic levels).

4.2. Lumbar Protrusions

Among the lumbar cases, 16 were Dachshunds and 20 were French Bulldogs.

Analysis of lumbar disc protrusions revealed that, although French Bulldogs presented a slightly higher median number of affected levels per patient compared to Dachshunds (2 [1-2.25] vs. 1 [1-2], respectively), this difference did not reach statistical significance ($p = 0.15$) (Table 3).

Table 3: Proportion of the spine affected by lumbar disc protrusions (LP). The table reports the total number of lumbar protrusions (LP), the mean percentage of disc protrusion extent (Mean %), median, standard deviation (SD), and range.

Breed	n (LP)	Mean %	Median	SD	Rang
Dachshund	23	14.3	10	5.9	10-3(
French Bulldog	39	14.9	15	5.2	10-3(

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Similarly, the proportion of individuals with multiple lumbar protrusions (two or more affected levels) also did not differ significantly between breeds ($p = 0.31$), indicating that, from a quantitative perspective, the lumbar involvement pattern is relatively comparable between groups. Furthermore, the analysis of the anatomical distribution of lesions by vertebral level and lateralization demonstrated statistically significant disparities at the L3–L4 level ($p < 0.01$), with a higher frequency in French Bulldogs (Figure 2).

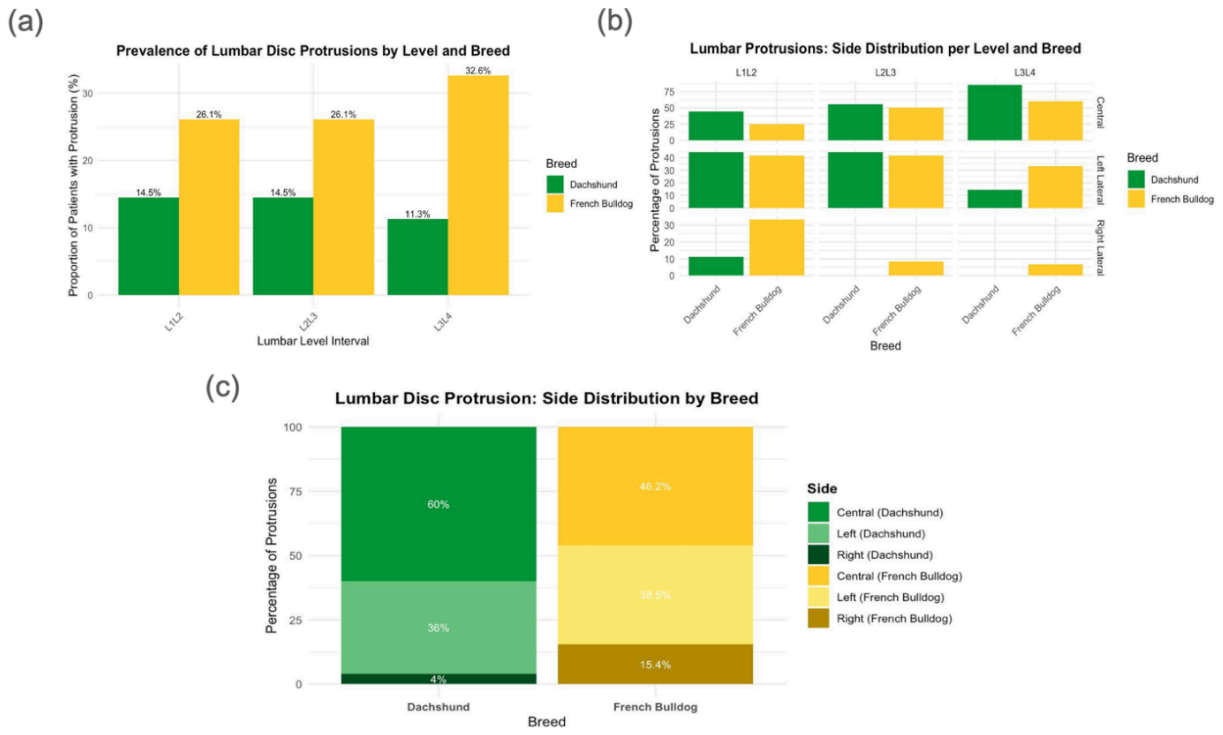

Figure 2: Lumbar intervertebral disc protrusions. (A) Prevalence (%) by vertebral level (L1–L2, L2–L3, L3–L4). (B) Percentage distribution by lateralization (central, left lateral, or right lateral) and vertebral level (L1–L2, L2–L3, L3–L4). (C) Percentage distribution by lateralization (central, left, or right).

4.3. Extrusions

It was observed that 82.3% of all Dachshunds had at least one extrusion, whereas 58.7% of French Bulldogs were affected (95% CI: 6.5–40.7%; $p < 0.01$) (Table 4).

Table 4: Proportion of the spine affected by thoracolumbar disc extrusions. The table reports the total number of extrusions (EX), the mean percentage of disc extrusion extent (Mean %), median, standard deviation (SD), and range.

Breed	n (EX)	Mean %	Median	SD	Rang
Dachshund	54	53.3	50	22.7	15-9

French Bulldog	28	39.5	40	14.6	15-8

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Although no statistically significant difference was found for lumbar extrusions ($p = 0.2$), there was a significant difference ($p < 0.01$) in the presence of thoracic extrusions in Dachshunds compared to French Bulldogs. When comparing the distribution within each breed, a significant difference was noted, with Dachshunds being more frequently affected in the transitional/thoracic region and French Bulldogs more frequently affected in the lumbar region ($p = 0.01$).

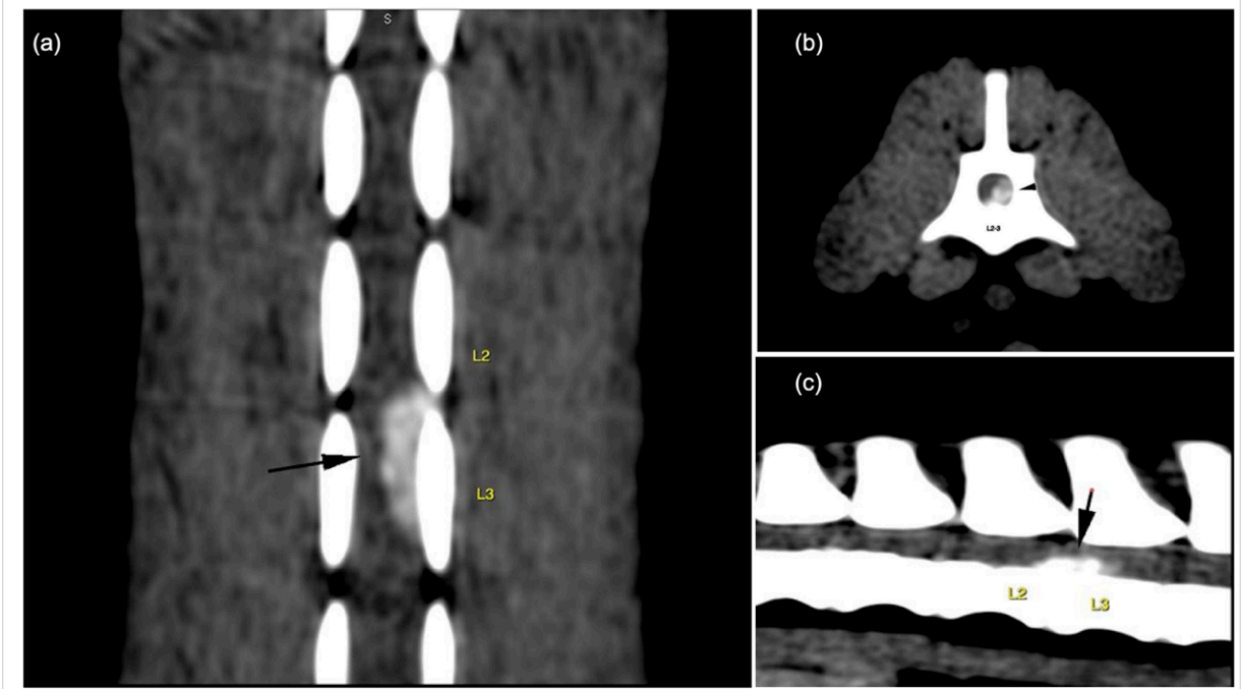

Figure 3: Computed tomography (CT) images of the lumbar spine demonstrating intervertebral disc extrusion at L2–L3. (a) Dorsal reconstruction showing hyperdense extruded disc material at the L2–L3 intervertebral space (arrow). (b) Transverse view at the L2–L3 level demonstrating left-lateralized extruded disc material within the vertebral canal, with evidence of spinal cord compression (arrowhead). (c) Sagittal reconstruction confirming the location of the extruded disc material at the L2–L3 disc space (arrow).

Regarding the severity and extent of extrusions, measured as the percentage of vertebral canal occupancy, Dachshunds showed higher values in the thoracic region (57.8% ± 23.7) compared to French Bulldogs (42.5% ± 18.9) (p = 0.047). No significant difference was found in the severity of lumbar extrusions between the two groups (p = 0.2).

Moreover, the data suggest that the severity of compression caused by extruded material tends to be greater in thoracic extrusions compared to lumbar extrusions in Dachshunds, whereas no statistical difference was found in French Bulldogs, indicating that extrusions in this breed tend to have similar severity regardless of location (as shown in Figure 4).

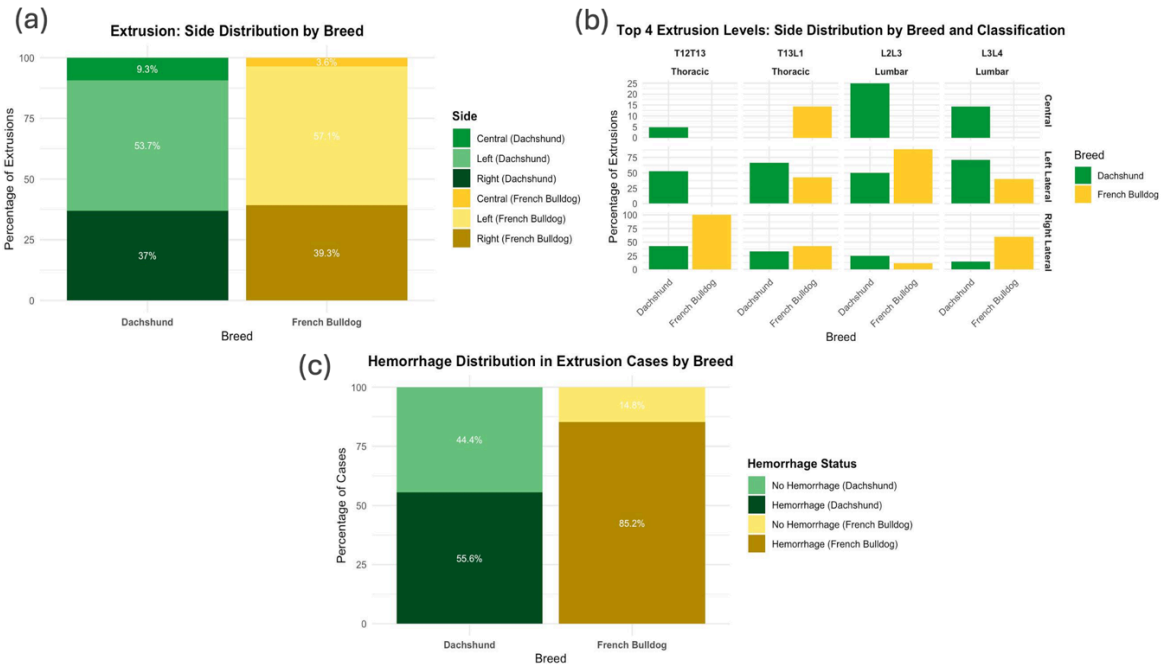

Figure 4: Intervertebral disc extrusions. (A) Distribution according to lateralization (central, left, or right). (B) Lateral distribution at the four most affected levels (T12–T13, T13–L1, L2–L3, and L3–L4). (C) Distribution of hemorrhage presence in cases of disc extrusion.

Evaluation of disc extrusion cases revealed relevant differences between breeds, particularly regarding the presence of associated hemorrhage. French Bulldogs showed a significantly higher proportion of hemorrhagic extrusions compared to Dachshunds (p =

0.02), suggesting a possible correlation between breed predisposition and the occurrence of DEEH.

4.4. Transitional Vertebrae And Hemivertebrae

The hemivertebrae observed in this study were found exclusively in French Bulldogs, primarily at the T7 and T8 levels, which showed a statistically significant difference compared to T3 ($p < 0.05$) (Figure 5).

Transitional vertebrae were observed at the T13 and L1 levels, with French Bulldogs presenting 6.5% of alterations at T13 and 17.4% at L1. In contrast, Dachshunds were more likely to have a transitional vertebra at T13 (16.1%) than at L1 (4.8%) (Figure 5).

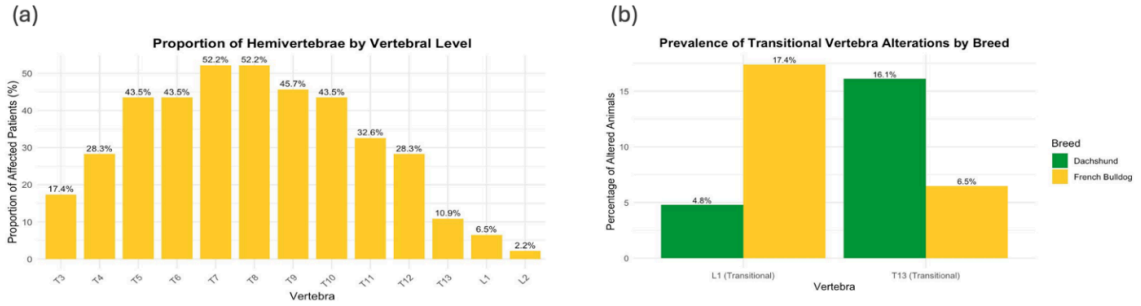

Figure 5: (A) Proportion of hemivertebrae by vertebra. T7 and T8 showed the highest frequency (52.2%), with a progressive decrease toward the caudal regions and (B) prevalence of transitional vertebra alterations at T13 and L1 segments.

5. DISCUSSION

Although both Dachshunds and French Bulldogs are predisposed to thoracic IVDD, Dachshunds were found to have proportionally larger

disc protrusions in this segment, despite no statistically significant differences in the frequency or anatomical distribution of the lesions.

Data from the present study demonstrated that, among thoracic cases, Dachshunds showed a higher mean vertebral canal occupancy by disc protrusions (16.8%) compared to French Bulldogs (12.4%), with a statistically significant difference between groups ($p = 0.01$). Moreover, greater individual variability was observed in Dachshunds (SD = 8.73) than in French Bulldogs (SD = 4.45), which may reflect greater heterogeneity in the biomechanical behavior of the thoracic spine in this breed. These findings are consistent with the literature indicating that Dachshunds, due to their pronounced chondrodystrophic conformation, are more prone to early disc degeneration, with structural changes that favor larger protrusions and, consequently, greater compression of the vertebral canal (BRISSON, 2010; LEVINE *et al.,* 2006).

In the lumbar segment, the number of protrusions per individual was similar between breeds; however, French Bulldogs showed a higher frequency of involvement at the L3-L4 level. This lumbosacral predilection may reflect breed-specific morphofunctional features. In French Bulldogs, lumbosacral protrusion is frequently related to the presence of congenital vertebral malformations, such as hemivertebrae and transitional vertebrae, which can alter segmental biomechanics and lead to abnormal redistribution of axial forces (LA ROSA *et al.,* 2023).

Analogous to the pattern observed in protrusions, the distribution of disc extrusions also varied between the evaluated breeds. In Dachshunds, there was a predilection for the thoracic and thoracolumbar transitional regions, whereas in French Bulldogs,

lumbar involvement was predominant. In addition to this distinct anatomical distribution, thoracic extrusions in Dachshunds were more severe, with a higher proportion of vertebral canal compression, which may be associated with more acute and severe clinical manifestations. In contrast, although lumbar extrusions were more frequent in French Bulldogs, their severity was comparable between breeds, suggesting a potentially less aggressive clinical behavior in this segment (AIKAWA *et al.*, 2014; WANG *et al.,* 2022). This lumbar-predominant pattern in French Bulldogs is consistent with the morphofunctional rationale outlined for protrusions above.

A relevant finding in this study was the higher occurrence of DEEH in French Bulldogs, which supports existing literature regarding this breed's predisposition to such complication. This condition, often associated with anatomical and vascular peculiarities of the breed, can complicate surgical management and may require individualized operative strategies, particularly in cases involving multiple segments (POLI *et al.*, 2022).

Additionally, only French Bulldogs presented hemivertebrae in this study, a finding that supports previous reports identifying this breed as the most affected by congenital vertebral anomalies, particularly in the mid-thoracic segment. Studies (DE DECKER, ROHDIN, GUTIERREZ-QUINTANA, 2024; RYAN *et al.*, 2019; RYAN *et al.,* 2017) have shown that hemivertebrae are highly prevalent in French Bulldogs, frequently located in the mid-thoracic region, even in the absence of neurological signs. This distribution reinforces the findings of the present study, in which T7 and T8 were the segments with the highest frequency of hemivertebrae observed.

Finally, the analysis of transitional vertebrae revealed distinct anatomical patterns between the breeds. In French Bulldogs, the transition was more frequently observed at L1, whereas in Dachshunds it predominated at T13. Although the clinical relevance of transitional vertebrae is not yet fully established, their recognition is important for interpreting lesion distribution and for individualized surgical planning (DE DECKER, ROHDIN, GUTIERREZ-QUINTANA, 2024).

6. CONCLUSIONS

This study demonstrated distinct patterns of thoracolumbar spinal disease between Dachshunds and French Bulldogs. While both breeds are predisposed to intervertebral disc disease, Dachshunds showed a higher prevalence and severity of thoracic extrusions and significantly larger thoracic disc protrusions. French Bulldogs, in contrast, presented a predominance of lumbar extrusions, especially at the L3–L4 level, and a greater frequency of extensive epidural hemorrhage. Hemivertebrae were observed exclusively in French Bulldogs, while transitional vertebrae showed distinct anatomical patterns - more frequently affecting T13 in Dachshunds and L1 in French Bulldogs. These findings highlight the influence of breed-specific spinal morphology on the type, severity, and distribution of disc-related lesions. Recognition of these patterns is essential for accurate diagnosis, individualized surgical planning, and improved clinical management of spinal disorders in chondrodystrophic dogs.

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