Investigating the Effects of Vitamin D Supplementation on Juvenile Dogs: A Preliminary Study

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Background

Recent research highlights that juvenile dogs frequently experience vitamin D deficiency, as national veterinary standards indicate.This deficiency is associated with significant health issues, underscoring the need for effective dietary interventions. Previous research by Kali Striker (2021), demonstrated that short-term nutritional intervention, in this case Alaskan Salmon, could maintain adequate vitamin D levels in sled dogs. Building on these findings, our study aimed to investigate whether dietary supplementation with vitamin D caplets can effectively increase vitamin D levels in juvenile dogs. Additionally, we attempted to quantify the vitamin D content in a commercially available dry dog food that was widely available on the market to determine if dry dog food alone can maintain sufficient vitamin D levels or if additional supplementation is necessary.

Methods

This study was conducted using eight juvenile dogs, aged 9 to 24 months; the dogs served as their own controls. The study was divided into three phases over a 90-day period: (1) baseline, (2) supplementation, and (3) washout. Throughout the 90-day period, the dogs were fed Annamaet Extra dry dog food (average kibble per day range = 477g) and received Annamaet Endure, a joint-health supplement. Upon completion of phase 1 (day 30), blood samples were collected. During the second phase (days 31–60), each dog received a 1000 IU vitamin D3 caplet (Nature Made Vitamin D3, 1000 IU caplet). A second blood sample was taken on day 60. During phase 3 (days 61–90), vitamin D supplementation was discontinued. A final blood sample was collected on day 90.

The blood samples were analyzed using a chemiluminescent assay (CLIA) at the Michigan State University Veterinary Diagnostic Laboratory to quantify circulating 25-hydroxyvitamin D levels. The dog food and joint supplements were analyzed by Heartland Assays using Liquid Chromatography Tandem Mass Spectrometry (LC/MS/MS) for vitamin D2 and D3.

Takeaways

While a previous study (Dr. Hohenhaus 07/28/21) suggested that a daily dose of 1000 IU of vitamin D significantly increased circulating vitamin D in dogs, our results did not support those previous findings. Our study showed that supplementing a cohort of juvenile sled dogs' diet with vitamin D3 did not significantly change circulating vitamin D levels. One possible explanation is that the sled dogs analyzed were already vitamin D sufficient, which may have triggered the down-regulation of the 25(OH)D production pathway. In turn, this limits the further conversion of vitamin D in its circulating form. This feedback mechanism should be further investigated to understand its role in vitamin D metabolism in dogs.

Kibble: Contains approximately 1.67 IU/g of Vitamin D3.
Endure: Contains less than 0.5 ng/g of Vitamin D3, so virtually 0 IU/g, as it is below detection levels.

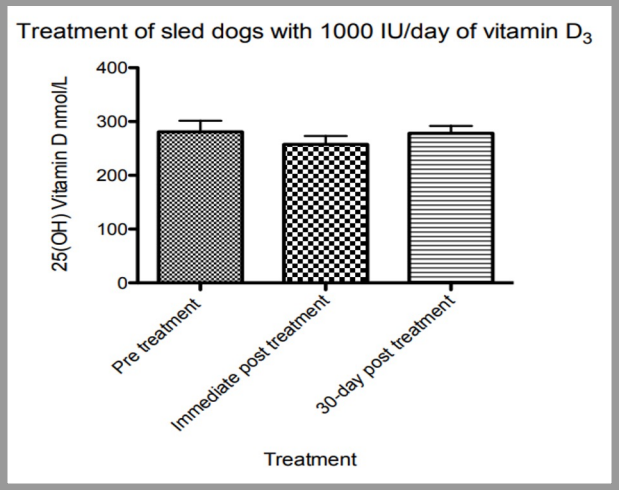

Figure 1. Average serum 25(OH)D levels across Baseline, Supplementation, and Washout phases.

Statistic	Pre-treatment	Immediate Post-treatment	30-Day Post-treatment
Mean	280g	258g	278g
Standard Deviation	58.8g	44.6g	38.7g
Standard Error	20.8g	15.8g	13.7g

Figure 2 (Above). Summary of treatment effects: mean, standard deviation, and standard error per group over time.

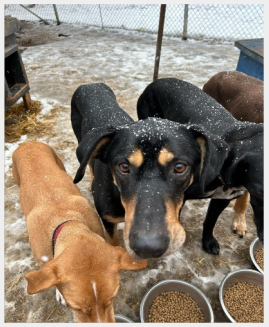

Figure 3 (Right)."Sled dogs consuming Annamaet Extra dry dog food."
Photo Courtesy Dr. Jerome

Average Kibble Per day range = 477g
Total Daily Vitamin D from Dog Food: 477 g × 1.67 IU/g = 797 IU/day

Conclusion

The results of this study demonstrate that vitamin D supplementation can significantly increase the circulating levels of this nutrient in juvenile dogs. While the Annamaet Extra Dry Dog Food provided some baseline vitamin D, adding vitamin D caplets led to a marked improvement, suggesting that supplementation may be necessary to achieve optimal levels depending on the canine itself. These findings highlight the importance of considering dietary supplements when maintaining the health of juvenile dogs. This can be particularly seen in areas where vitamin D deficiency is prevalent like Alaska. Further research could expand on these results, potentially leading to broader applications in both canine and human nutrition.

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