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Defining a new standard for assessing dog chew products for textural safety

Research summary

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Research document

Background

Tooth fractures in dogs can have a severe impact on their health and welfare, potentially causing pain, infection and reduced appetite[1]. They are commonly seen in practice with a reported prevalence of 25-27%,[2-8] and occur most commonly in functionally important teeth with a role in prehension and chewing (i.e. canines and carnassials).[2, 6-9]

With the recent popularity of hard treats and toys for dogs, concern has been raised that chewing on excessively hard objects may contribute to the risk of tooth fractures. Therefore, there was a need to investigate the impact that the hardness of a chewing object has in tooth fracture development.

A study conducted by the University of Pennsylvania and Mars Petcare, has investigated the forces that are required for these fractures to occur.

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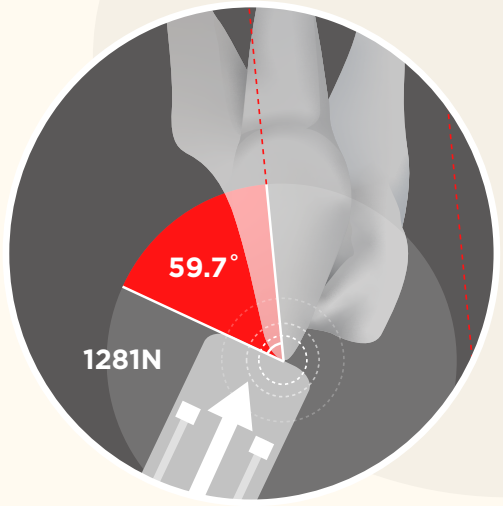
The study

Fracture limits of maxillary fourth premolar teeth in domestic dogs under applied forces



Objective:

To investigate the external mechanical forces required to fracture maxillary fourth premolar teeth in dogs and to describe a clinically relevant model of chewing forces placed on functionally important teeth.

Materials and methods:

Study sample:
24 maxillary fourth premolar teeth (#108 and 208).

Procedures:
Sample teeth were held by an aluminium device at an angle of 60°. This angle was chosen since other angles failed to give clinically relevant fracture configurations. An axial compression test was performed, creating a force upon the crowns of the teeth. The highest compressive force prior to failure was considered to be the maximum load sustained by the teeth.

Results:

The mean maximum load (+/- SD) sustained by the tested teeth at the point of fracture was **1,281 N** (+/- 403 N) at a mean impact angle (+/- SD) of **59.7°** (+/- 5.2°).

The most common fracture type that occurred among all samples was a complicated crown fracture (n=12), followed by an uncomplicated crown fracture (n=6).

There was no statistically significant correlation between dog age, weight or impact angle and the maximum load applied before fracture.

Conclusions and clinical importance:

The study establishes a clinically relevant pattern of fracture of maxillary fourth premolar teeth under angled compression at forces within the maximum chewing capability of the average domestic dog.

Chew toys and treats that fail to yield below the maximum load of 1,281 N should be considered to be a risk of fracturing maxillary fourth premolar teeth. Dogs routinely exposed to hard treats and toys that do not yield significantly below this point might be at increased risk of fracture of maxillary fourth premolar teeth as a result of overexertion during chewing.

Despite the importance of tooth fractures, a study reported that half of owners of dogs with fractured teeth did not notice them, further showing the need for increased awareness and education.[10] In addition, approximately half of the dog owners, based on medical record review, were unable to characterize the consistency of the chewing objects their dogs were exposed to, highlighting the need for education in this area.

Click here to read the full research paper.

References:
1. BSAVA Manual of Canine and Feline Dentistry and Oral Surgery. 4th edition 2018. Pages 102-103
2. Golden AL, Stoller N, Harvey CE. A survey of oral and dental diseases in dogs anesthetized at a veterinary hospital. J Am Anim Hosp Assoc 1982; 18: 891-899.
3. Le Brech C, Hamel L, Le Nihouuannen JC, et al. Epidemiological study of canine teeth fractures in military dogs. J Vet Dent 1997; 14: 51-55, 1997.
4. Hamp SE, Olsson SE, Farso-Madsen K, et al. A macroscopic and radiologic investigation of dental diseases of the dog. Vet Radiol 1984; 25: 86-92.
5. Venturini. Retrospective study of 3055 pets referred to Odontovet® (veterinary dental center) during 44 months. Dissertação (Mestre Em Medicina Veterinária), Faculdade De Medicina Veterinária E Zootecnia, Universidade De São Paulo 2006; 35-37.
6. Gioso MA, Lopes FM, Ferro DG, et al. Oral fractures in dogs of Brazil - a retrospective study. J Vet Dent 2005; 22: 86-90.
7. Butkovic V, Simpraga M, Sehic M, et al. Dental diseases of dogs: a retrospective study of radiological data. Acta Vet Brno 2001; 70: 203-208.
8. Capik I, Ledecky V, Sevcik A. Tooth fracture evaluation and endodontic treatment in dogs. Acta Vet Brno 2000; 69: 115-122.
9. Soukup JW, Mulherin BL, Snyder CJ. Prevalence and nature of dentoalveolar injuries among patients with maxillofacial fractures. J Small Anim Pract 2013;54:9-14.
10. Yamaoka K, Hachimura H, Kuyama T, et al. A survey of the fractured teeth of sixty canines and their treatment. Yamaguchi J Vet Med 2005; 32: 37-40.

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