

### **A Brief Review. Current Evidence on Feline Oral Home Care: Is Toothbrushing Effective?**

Toothbrushing for cats is a common dental home care recommendation made by many veterinarians nowadays (Ray & Eubanks, 2009). It is, however, questionable whether there is any direct evidence suggesting the effectiveness of toothbrushing in cats specifically. This brief review has examined current evidence and aimed to establish whether toothbrushing is effective, why it is or is not effective, and other oral home care methods for cats.

There is very limited research evidence related to toothbrushing in cats. The research by Ingham et al. (2002) directly examined the effect of toothbrushing on gingivitis and found that toothbrushing reduced the level of gingivitis on the brushed surfaces (buccal) compared to the un-brushed surfaces (lingual/palatal). However, when comparing the brushing group to the non-brushing group, the reduction of gingivitis was not significant (Ingham et al., 2002). On the contrary, Buckley et al. (2011) has conducted a survey and found that there was a significantly lower incidence of dental disease in cats with regular toothbrushing than that in cats with sporadic toothbrushing or no oral hygiene care. Besides, to understand why toothbrushing is frequently recommended, dental care guidelines for pets and literature recommending toothbrushing were also examined. It was found that most of the relevant papers (or all found in the database PubMed) refer to research papers on human beings and dogs (Bellows et al., 2019; Oskarsson, Puurtinen & Penell, 2021; Ray & Eubanks, 2009). Therefore, it can be concluded that currently there is not sufficient evidence validating the effectiveness of toothbrushing.

Dental plaques can form on a cat's teeth within hours of a dental cleaning procedure (Perry & Tutt, 2015). Plaques will start mineralising and form calculus within hours to two weeks (Perry & Tutt, 2015). The gram-negative anaerobic bacteria in the plaque account for gingivitis (and if unresolved, periodontitis), and calculus have rough surfaces which allow an easier attachment of these bacteria (Perry & Tutt, 2015).

Theoretically, assuming the cat starts with perfectly clean teeth with no plaques or calculus and there is no pre-existing gingivitis or periodontitis, daily toothbrushing can be effective in removing the plaque on the teeth, preventing the calculus formation, and therefore maintaining healthy teeth. However, besides its unclear effectiveness, toothbrushing is still not a practical recommendation to cat owners because of three reasons: owner's compliance, cats' intolerance of brushing, and pre-existing dental conditions. Firstly, the owner's compliance includes the correct toothbrushing technique, proper toothbrush and toothpaste for cats, and daily brushing routine (Ray & Eubanks, 2009). Owners may not be aware of the correct toothbrushing techniques, which is a 45-degree angled and circular motion to remove the plaque from the gingival sulcus, not only from the exposed tooth surfaces (Ray & Eubanks, 2009). The daily brushing routine is hard to maintain due to difficulties in brushing the cat's teeth, the owner's lifestyle, or many other reasons. In a survey conducted by Oskarsson, Puurtinen, and Penell (2021) in Sweden, only 28% of cat owners will toothbrush their cats as a preventative measure, out of which only 25% are able to maintain a daily or every second-day toothbrushing routine. Secondly, cats need to be desensitised to the brushing procedure gradually from young at about 8-10 weeks of age such that they will tolerate toothbrushing when mature, which again requires a certain level of commitment from the owner (Ray & Eubanks, 2009). Thirdly, if the cat has periodontitis, brushing will not be useful at all because it cannot reach out to bacteria that are deep inside the periodontal pockets (Perry & Tutt, 2015).

Veterinarians and researchers may consider other oral home care recommendations for cats, such as a predominantly dry food diet, dental treats, application of dental barrier gel, and food supplements. Vrieling et al. (2005) has conducted a clinical trial and found that feeding large kibbles with mechanical cleaning properties was more effective than toothbrushing in terms of less gingivitis and calculus. A dry food diet or dental treats can significantly improve the oral health of a cat (Buckley et al., 2011; Mata, 2015). The use of a barrier gel can slow down the formation of plaques after a dental cleaning procedure (Bellows, Carithers & Gross, 2012). Supplementation of lactic acid at 1.2% may help reduce the deposition of the dental substrate (Scherl et al., 2019). These oral care methods may be easier for the cat owners to implement but more research attention is required in these areas and in feline oral hygiene in general.

In conclusion, no sufficient evidence suggests that toothbrushing in cats is effective. Toothbrushing may be helpful in an ideal situation, but in reality, the owner's compliance and the cat's dental conditions limit its success. More research should be conducted such that a more feasible and effective dental home care regime can be confidently recommended to cat owners.

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