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LETTER TO THE EDITOR: AUTHORS RESPONSE

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### Allergic rhinitis and dental caries: A systematic review

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Dear Dr. Öner Özdemir,

Thank you for your interest in the systematic review we have conducted.<sup>1</sup> This is a widely debated and multidisciplinary study topic that has remained uncertain over the years, leaving us with many questions and few certainties. Throughout this letter, we will attempt to provide the requested clarifications.

Addressing the first issue you raised, indeed, the systematic review included three studies that found an association between allergic rhinitis (AR) and dental caries,<sup>2-4</sup> two of which were conducted in pediatric populations. Only two studies (Ho et al., 2019 and Chuang et al., 2018) adjusted the measure of effect of asthma as a potentially confounding variable (Table 3 of the review).<sup>1</sup> Asthma has been a common candidate as a risk factor for caries, periodontitis, and gingivitis. In fact, there have been more studies investigating the association between asthma and caries, periodontitis, and gingivitis than on the association with AR. Many studies have reported a positive association between

asthma and caries.<sup>5</sup> However, most of the studies did not adjust for AR, which might be an important confounder. The fact that a positive association is found between AR and caries while controlling for the asthma factor suggests that the issue may be due to the persistent mouth breathing (in the case of AR) rather than the prolonged use of inhaled corticosteroids (in the case of asthma).

Specifically, the study by Ho et al. had a sample size of 51,439 subjects, of which 1232 (2.4%) were in the asthma group. Their study found an association between AR and dental caries, periodontitis, pulpitis, gingivitis, and aphthae or stomatitis. However, they did not find any association between asthma and these five oral diseases after adjusting for AR. The study by Chuang et al. also yielded similar results. Before adjustment for AR, asthma was associated with the development of caries, except in the age group of 1-5 years. After adjustment for AR, the association became insignificant. Because AR and asthma often coexist, there may be a spurious relationship between asthma and caries if the confounding factor is not accounted for.

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With regards to the second problem, the word highlighted by the author is a correctable spelling mistake. Thank you for bringing it to our attention.

Regarding the third issue, the authors do not share Öner Özdemir's view. In no case can an observational cross-sectional study provide a measure of effect or establish a causal relationship. It is one of the main limitations of this type of study design. Therefore, the statement "Herrström et al. studied the effect of dental restorative materials on the prevalence of eczema, allergic rhino-conjunctivitis, and asthma in schoolchildren" is incorrect. The work by Herrström et al. consists of two articles with the same sample,<sup>6,7</sup> in which a possible relationship between allergic pathology and dental fillings is evaluated, considering the latter as an indirect measure of dental caries. As mentioned in the review, these authors did not find an association between AR and different fillings (amalgam  $P = 0.93$ , composite  $P = 0.68$ , glass ionomer  $P = 0.65$ ). On the one hand, these results may be biased due to the method of dental health measurement. On the other hand, not all patients with caries necessarily received dental filling treatment, so the sample may not be representative of the at-risk population.

Regarding the terms "dermatitis," "eczema," or "atopy," it is worth noting that they are sometimes used interchangeably and incorrectly in the literature. In the study by Herrström et al., it appears that they use the term eczema to refer to an allergic skin condition. It is advisable to always define the pathology under study in the methodology section to avoid such misconceptions. The authors of the review did not want to dwell further on this fact, as it was not the aim of our study.

Finally, we would like to congratulate Dr. Öner Özdemir for his work. Unfortunately, we could not find the specific article mentioned, as it is likely still in the process of publication. However, we found information about an oral communication he made at the 2021 Continental European and Scandinavian Divisions Meeting (Brussels, Belgium, Hybrid) of the International Association for Dental Research.<sup>8</sup> His results supported the hygiene hypothesis, showing an inverse relationship between caries and allergic diseases.

These findings only reinforce our conclusion that further studies are needed to clarify the potential relationship between AR and dental caries. Thank you once again for the letter and the constructive criticisms. We appreciate your feedback, as it helps us improve and grow.

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