

## Letter to editor

# Dental caries and athletes

Shahin Beyranvand<sup>1\*</sup>, Behzad Bazgir<sup>1</sup>

### Dear Editor-in-Chief

Performing intense exercise on the body's organs is associated with various risks. At the same time, it is necessary for athletes to be aware of the dangers of intense exercise, for this purpose, studies have shown that the health of the oral cavity helps improve the performance of athletes (Gallagher et al., 2020). On the other hand, the disorder in the oral cavity with intense exercise significantly impacts the quality of life of athletes.

One of the most common diseases of oral cavity diseases caused by exercise is dental caries (D'Ercole et al., 2016). Dental caries is a chronic disease among humans and is one of the most common oral diseases worldwide. It is an important oral and dental disease that prevents achieving and maintaining oral health in all age groups. Dental caries refers to the local destruction of sensitive dental hard tissues by acidic by-products resulting from the bacterial fermentation of carbohydrates food. This disease is caused by an ecological imbalance between dental minerals and oral biofilms (plaque) (Selwitz et al., 2007; Thean et al., 2007; Yadav et al., 2017).

According to statistics announced by international organizations related to dentistry, approximately 2.43 billion people (about 36% of the population) around the world have dental caries in their permanent teeth and it affects about 620 million people or 9% of the population in milk teeth (Yadav et al., 2017). The statistics of athletes suffering from dental caries show that oral and dental cavity disorders among athletes were first recognized during the 1958 World Cup in Sweden. So that one dentist performed 118 tooth extraction surgeries on 33 athletes from different countries (Soares et al., 2014). Dental caries has also been reported among athletes in Olympic competitions. However, in the 2004 Athens Olympics, the visit of athletes by dentists

took the second place among the visits of athletes to different departments of the clinic. In the 2008 Beijing Olympics, 1.600 people visited the dental department of the clinic at the venue of the competition. Similarly, in the 2012 London Olympics, 55% of the athletes were suffering from tooth decay (Needleman et al., 2013; Vougiouklakis et al., 2008; Yang et al., 2011). Azeredo et al. (2020), in a review article, investigated the prevalence of dental caries in athletes. The findings showed that the prevalence of dental caries among athletes is 46.25% (Azeredo et al., 2020). Larson et al. (2015), in a study, evaluated the intervention of exercise and energy drink consumption with health risk behaviors among adults. Findings suggest that health care providers should differentiate energy drink consumption and exercise from other unhealthy behaviors when designing programs for adults (Larson et al., 2015).

Research conducted in the field of exercise shows that exercise plays a role in reducing PH and increasing blood CO<sub>2</sub>. On the other hand, the decrease in the PH of saliva is related to the level of Co<sub>2</sub> in the blood and the level of Co<sub>2</sub> in the blood increases after exercise, and as a result, a high concentration of Co<sub>2</sub> in the blood is transferred to the oral saliva, which is effective in reducing the PH of the saliva. In the same context, when the PH of saliva drops below the value of 5.5 that is assumed as the "Critical PH", hydroxyapatite crystals in enamel begin to dissolve and decalcified areas occur (Ceyhan et al., 2020; Farsi, 2008; Milosevic et al., 1997; Okada et al., 2012). Borchers et al. (2022), analyzed saliva in their study to monitor intense exercise among male ultra-marathon runners. In this study, 9 healthy men who finished the distance of 160 km were selected as the statistical population of the research. The salivary markers were compared with blood markers following acute exercise stress in ultra-marathon runners at three baselines, shortly after the ultramarathon competition and after recovery. The findings showed that different blood markers and salivary cortisol had significant changes after the ultra-marathon running (Borchers et al., 2022).

1. Exercise Physiology Research Center, Life Style Institute, Baqiyatallah University of Medical Sciences, Tehran, Iran.

\*Author for correspondence: [shahinberan@gmail.com](mailto:shahinberan@gmail.com)

Thus, it is recommended that athletes should be aware of the biochemical variables and other factors leading to dental caries and observe the oral and dental hygiene requirements. Moreover, due to the fact that athletes of various sports are affected by oral cavity diseases, it is necessary that athletes of competitive sports such as football, swimming, track and field, etc., pay more attention to the health of their oral cavity.

## References

- Azeredo, F. N., Guimarães, L. S., Luís, W., Fialho, S., Antunes, L. A. A., & Antunes, L. S. (2020). Estimated prevalence of dental caries in athletes: An epidemiological systematic review and meta-analysis. *Indian Journal of Dental Research*, 31(2), 297. DOI: [https://doi.org/10.4103/ijdr.ijdr\\_764\\_18](https://doi.org/10.4103/ijdr.ijdr_764_18)
- Borchers, J., Merle, C. L., Schöneborn, D. D., Lyko, L. R., Thouet, T., Wolfarth, B., . . . Diederich, S. (2022). Salivary diagnostic for monitoring strenuous exercise: A pilot study in a cohort of male ultramarathon runners. *International Journal of Environmental Research and Public Health*, 19(23), 16110. DOI: <https://doi.org/10.3390/ijerph192316110>
- Ceyhan, D., & Tolga, E. (2020). The effects of sports on oral and dental health. *Turkish Journal of Health Science and Life*, 3(2), 1-5.
- D'Ercole, S., Tieri, M., Martinelli, D., & Tripodi, D. (2016). The effect of swimming on oral health status: competitive versus non-competitive athletes. *Journal of Applied Oral Science*, 24, 107-113. DOI: <https://doi.org/10.1590/1678-775720150324>
- Farsi, N. (2008). Dental caries in relation to salivary factors in Saudi population groups. *The Journal of Contemporary Dental Practice*, 9(3), 16-23. PMID: 18335115.
- Gallagher, J., Ashley, P., & Needleman, I. (2020). Implementation of a behavioural change intervention to enhance oral health behaviours in elite athletes: a feasibility study. *BMJ Open Sport & Exercise Medicine*, 6(1), e000759. DOI: <https://doi.org/10.1136/bmjsem-2020-000759>
- Larson, N., Laska, M. N., Story, M., & Neumark-Sztainer, D. (2015). Sports and energy drink consumption are linked to health-risk behaviours among young adults. *Public Health Nutrition*, 18(15), 2794-2803. doi: <https://doi.org/10.1017/s1368980015000191>
- Milosevic, A., Kelly, M., & McLean, A. (1997). Sports supplement drinks and dental health in competitive swimmers and cyclists. *British Dental Journal*, 182(8), 303-308. DOI: <https://doi.org/10.1038/sj.bdj.4809372>
- Needleman, I., Ashley, P., Petrie, A., Fortune, F., Turner, W., Jones, J., . . . Donos, N. (2013). Oral health and impact on performance of athletes participating in the London 2012 Olympic Games: a cross-sectional study. *British Journal of Sports Medicine*, 47(16), 1054-1058. DOI: <https://doi.org/10.1136/bjsports-2013-092891>
- Okada, M., Kawamura, M., Oda, Y., Yasuda, R., Kojima, T., & Kurihara, H. (2012). Caries prevalence associated with *Streptococcus mutans* and *Streptococcus sobrinus* in Japanese schoolchildren. *International Journal of Paediatric Dentistry*, 22(5), 342-348. DOI: <https://doi.org/10.1111/j.1365-263x.2011.01203.x>
- Selwitz, R. H., Ismail, A. I., & Pitts, N. B. (2007). Dental caries. *The Lancet*, 369(9555), 51-59. DOI: [https://doi.org/10.1016/s0140-6736\(07\)60031-2](https://doi.org/10.1016/s0140-6736(07)60031-2)
- Soares, P. V., Tolentino, A. B., Machado, A. C., Dias, R. B., & Coto, N. P. (2014). Sports dentistry: a perspective for the future. *Revista Brasileira de Educação Física e Esporte*, 28(2), 351-358. DOI: <https://doi.org/10.1590/1807-55092014000200351>
- Thean, H., Wong, M. L., & Koh, H. (2007). The dental awareness of nursing home staff in Singapore – a pilot study. *Gerontology*, 24(1), 58-63. DOI: <https://doi.org/10.1111/j.1741-2358.2007.00138.x>
- Vougiouklakis, G., Tzoutzas, J., Farmakis, E.-T., Farmakis, E.-E., Antoniadou, M., & Mitsea, A. (2008). Dental data of the Athens 2004 Olympic and Paralympic Games. *International journal of sports medicine*, 29(11), 927-933. DOI: <https://doi.org/10.1055/s-2008-1038489>
- Yadav, K., & Prakash, S. (2017). Tuberculosis: An airborne disease. *Global Journal of Microbiology Research*, 5, 225-243.
- Yang, X.J., Schamach, P., Dai, J.P., Zhen, X.Z., Yi, B., Liu, H., . . . Ma, C.M. (2011). Dental service in 2008 Summer Olympic Games. *British Journal of Sports Medicine*, 45(4), 270-274. DOI: <https://doi.org/10.1136/bjsem.2010.075283>