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Ilana Bresky

Anthony Le

Kristi Soileau DDS, MEd, MSHCE, FACD, FICD
New Orleans Dental Association

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Oral Health Problems in Athletes

Submitted by Anthony Le, B.S. & Ilana Bresky, B.S.

Introduction

Many athletes in this regard find difficulty with access to dental/oral advice, and their views on prevention are often influenced by their network of peers, support staff, and affiliated sports organizations (1).

A consistent finding in published studies is that oral health of elite athletes is poor, in spite of the avoidable nature of most oral diseases, and their potential for impact on health, well-being, and performance in otherwise robust and highly prepared athletes. A review of 39 studies on oral health of athletes revealed dental caries in 15-75%, moderate to severe periodontitis in up to 15%, dental erosion in 36-85%, pericoronitis/impacted third molars in 5-39%, and dental trauma in 14-57% (2). Another two studies showed athletes generally had 46% caries, gingival inflammation at 58-85%, and periodontitis at 5-41% (3).

Caries

A study by the University College of London Dental Institute that was conducted on 352 athletes found that 49% of the athletes had untreated decay, and 32% of the athletes' oral health negatively affected training and performance (4). The high consumption of sports drinks, protein bars, and energy gels, as well as dry mouth from vigorous activity, all played a role in the negative effects on the athletes' oral health (5).

Normal pH levels of saliva ranges from 5.6 to 7.9, as described by the International Journal of Drug Testing. Saliva cleanses

the tooth surface and is saturated with calcium and phosphates that prevent acidic demineralization, which occurs when salivary pH is less than 5.5. Athlete's propensity for consuming high levels of sugar can result in demineralization and caries formation (6). For example, a 20-ounce beverage such as a vitamin water can contain as much as 32 grams of sugar (7). Thus, giving preference to plain water, which has a neutral pH of 7.0, will replenish dry mouth thereby increasing the pH levels of the saliva.

Topical fluoride use by athletes is also important in reducing dental caries; the fluoride binds and remineralizes the enamel surface providing a protective coating from acid and its destructive power (8).

Periodontal disease

A high carbohydrate diet has pro-inflammatory effects that can increase risk of periodontal disease (9), as can lack of attention to oral care and professional maintenance. In one study, it was found that those who had the highest physical fitness test scores had significantly better periodontal conditions than those who had greater pocket depth, attachment loss, and bleeding on probing (10).

Malocclusion/temporandibular joint disorders

Studies showed that lateral deflection of the mandible increased asymmetric muscular contractions from 14% to 86% in participants, while affecting a 17.7% reduction in athletes' muscular power (11).

The masticatory muscles and periodontal ligament provide the proprioception that contributes

to body balance; furthermore, missing teeth may affect the maxillomandibular position, which also may disrupt the symmetry of the sternocleidomastoid muscles' contraction pattern, and therefore affect head posture and body balance (12).

Erosion

Acidic foodstuffs and beverages are causes for erosion. Sport drinks have a pH ranging from 2.4-4.5, and many mineral salt replacements are also highly acidic (14). Additionally, salivary pH can decrease as intense physical activity produces high concentrations of CO₂ in the bloodstream (15).

Dehydration and drying of the mouth during sporting activity might further increase the impact of acidic drinks on erosion by reducing salivary flow and its protective properties (16).

Immune suppression/ host regulation

Immunoinflammatory protection against microbial challenges in the oral cavity could be compromised by exercise-induced immune suppression. Inflammation can increase levels of cytokines, which play a role in muscle fatigue and oxidative stress (17).

The systemic changes affected by dental/oral problems, such as changes in serum levels of inflammatory biomarkers, like C-reactive protein and interleukin, also appear in muscle injury (18), and thus may influence physical fitness, specifically muscle mass, strength, and function (19).

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Injury, mouthguard issues, and appliance maintenance

Approximately 11% to 40% of all sports injuries involve the face, with the most common types being soft tissue injuries and fractures of the nose, zygoma, and mandible.

Besides its primary function against trauma, the mouthguard can also serve as a carrying agent for protective materials, such as chlorhexidine, fluoride, and casein, for microbial inhibition, decay prevention, and prevention of plaque adhesion, respectively (20).

Salivary diagnostics

Saliva hosts a broad spectrum of proteins, nucleic acids, electrolytes, heavy metals, hormones, drugs, and neurotransmitters. It can be defined as a veritable “body mirror”, reflecting the physiological, and pathological conditions of the entire body, as well as of the oral cavity (21). Saliva can therefore represent an important diagnostic and monitoring tool to help healthcare professionals assess athletes’ health or disease status (22).

Conclusion

Athletes should aim to better understand the risks associated with sport activities particular to their various fields of interest, and need to direct adequate attention to personal oral health status. There is a negative effect of poor dental health on physical fitness, performance, and cognitive function. Maintaining good fitness also requires striving for optimal oral health, which includes regular and proper diagnosis, treatment, and monitoring.

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