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RESEARCH ARTICLE

NEGATIVE EFFECTS OF SPORTS ON ORAL HEALTH: A SYSTEMATIC REVIEW

***Dr. Ahmed Sayed Khashaba, M.B.B.CH. MD. PhD.**

Associate Professor of Medical Physiology at Riyadh Elm University, Senior Consultant of Medical Physiology Sports and Exercise Medicine- University of Bath-United Kingdom

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ABSTRACT

Background: The aim of this study is to systematically review the impact of sports on oral health.
Objective: Understanding the physiological effects of sports on the oral health.
Methods: A review of previous literatures from different journals in the same subject will be discussed; Data was collected during the period from 2013 to 2018.
Results and conclusion: The findings of this systematic review showed that sports have a negative impact on oral health.

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INTRODUCTION

Oral health is one of the most important needs for human health since it has an effect on the human body.Despite the well-known benefits of sports to human health, some types of sports effect negatively the oral health (Frese *et al*., 2015).

METHODS

A systemic review of previous literatures is conducted to determine the impact of various sports on oral health.

Data Collection Method: Data collected from previous research papers during the period from 2013 to 2018 by searching in MEDLINE, EMBASE, and EBSCO up to May 2018, with no language restrictions, duplicate screening, eligibility assessment, data abstraction and methodological quality were conducted of observational studies.

Sports and impact on oral health: Sports play an important role in our lives. It promotes human health and prevents many diseases;

Corresponding author:* **Dr. Ahmed Sayed Khashaba,
Associate Professor of Medical Physiology at Riyadh Elm University, Senior Consultant of Medical Physiology Sports and Exercise Medicine- University of Bath-United Kingdom.
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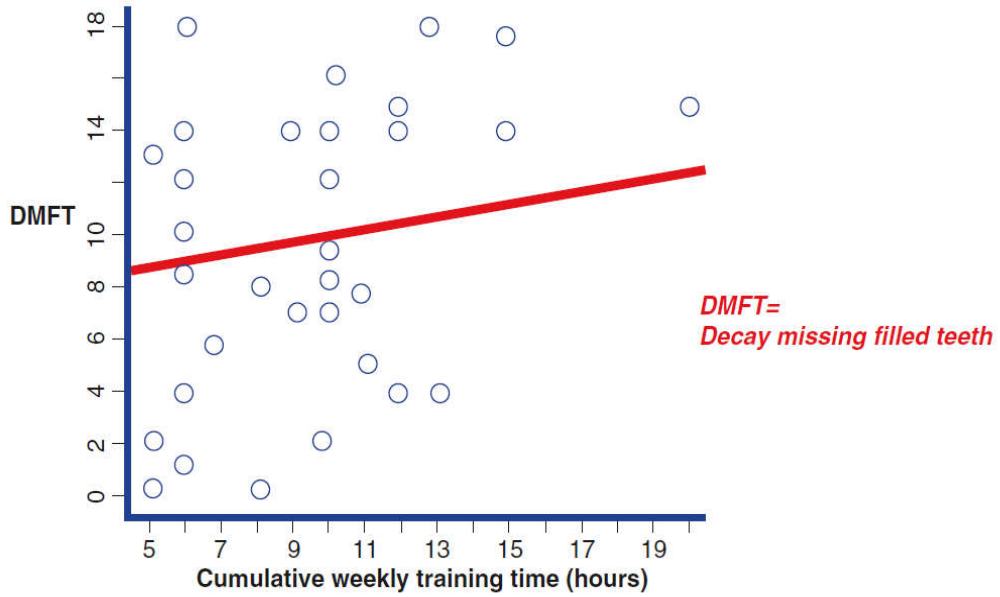
Oral health is one of the most important factors of life quality (Locker, 1988). Oral health is defined by World Health Organization as "A state of being free from mouth and facial pain, oral and throat cancer, oral infection and sores, periodontal (gum) disease, tooth decay, tooth loss, and other diseases and disorders that limit an individual's capacity in biting, chewing, smiling, speaking, and psychosocial wellbeing" (WHO, 2012). There are many types of sports such as physical sports that include wide fields of activities, from the explosive to endurance. There are many risk factors related to physical sports on oral health; this is due to several reasons.

Sports Supplements: Increased use of sports drinks, Carbonated Cola Beverages, Energy Drinks and supplements, which increases tooth decay and cause problems in oral health(Noble *et al*. 2011).Main aim of supplements is to improve the performance. However, usage of these supplements products lead to risk of dental erosions and exercise-dependent dental caries. A study on New Zealand elite triathletes highlights certain sports-related oral health risks. These high-level athletes were evaluated as high-risk candidates for both dental erosion and dental caries due to their high consumption of sugar-rich food and acidic drinks during training. A total of 84% consumed sports drinks, and 94% ate during sessions. Interestingly, only 3% were conscious of their detrimental behavior towards oral health indicating a lack of

Table 1. The role of saliva and its effect on oral health

Role of saliva	Protection mechanism
Antibacterial	• Salivary buffer capacity • Inhibition of bacterial adhesion to dental surfaces
Lubrication	• Enables deglutition – phonation
Immunity	• Presence of immunoglobulins, lysozymes, mucines and antimicrobial peptides
Protection against acidic dissolution of dental surfaces	• Flushing action on acids • Selectively permeable layer and buffering action of its bicarbonate content • Inhibition of adhesion of acidic alimentation onto the tooth's surface



Source (Frese *et al*. 2014)

Figure 1. Illustrate the correlation between cumulative weekly training and tooth decay ((Frese *et al*. 2015).

knowledge or education in oral health issues despite an accentuated awareness of general health (Bryant *et al*. 2011).

Consumption of a large proportion of sugar: A large amount of sugars are taken during physical sports exercise resulting in the presence of bacteria produced an acidic by product which is the main cause of the removal of minerals from enamel (World Sugar Research Organization 2011).

Injury duringphysical sports exercises: Among the reasons that cause problems in oral health are the injuries that occur during exercise of physical sports so World Health Organization gave advice on the need to use the protection tools in the physical sports to protect against injury (WHO, 2012).

Intensity of Training

Saliva: Saliva has an important and vital role in the formation of membranes on the surface of the teeth. Sports lead to increases the amount of salivary alpha amylase found in the saliva which led to increased increase risk of erosion, xerostomia and dental caries (Levine, Scannapieco, and Torres, 1993). Saliva has vital functions like working to protect the oral cavity from infection, removing acidic minerals, protecting the mucous membranes and forming a barrier to the hard teeth (Gonsalez and Sung, 2014).

Increased training intensity increases the risk effects on the oral cavity. Hyposalivation during physical exertion leads to oral infections and removal of solid surface minerals, the acids remain stagnant in the oral cavity and the treatment of the tooth surfaces becomes more difficult making the tooth more prone to decay (Buzalaf *et al*. 2012).

Causes of hyposalivation during sport as following:

- The effort associated with competition reduces the nervous system to reduce the secretion of saliva.
- High body temperature during physical exertion works to reduce the secretion of saliva because Humidity in the human body is an important factor in the salivation of the saliva, where the water level of the body is reduced by 8% then Saliva flow is zero to maintain water in the body (Dawes, 1987).
- The buccal cavity is exposed to external climatic elements on the surface of the oral components.

Cumulative Training: Previous studies have clarified that there is a positive relationship existing between the time devoted to training and the exposure to oral health risks, the reason for this is the increased frequency of carbohydrate consumption, associated with decreased salivation (Frese *et al*. 2015).

The following figure illustrate the correlation between cumulative weekly training and tooth decay.

Psychological state of those who perform physical exercise: The psychological state of people may be caused by the problem of oral health where there are two risks to oral health; the first is the anxiety and stress associated with competition in sports because Stress causes problems for the teeth and affects the oral cavity, the second risk is eating disorders. This is due to the extra pressure in performance. It leads to reduced oral complications.

Eating Disorders and Oral Health

Table 2. Oral complications of anorexia nervosa and bulimia nervosa

Oral complication	Anorexia nervosa	Bulimia nervosa
Dental erosion	No	Yes
Tooth sensitivity	No	Yes
Xerostomia	Yes	Yes/No
Dry mouth (complaint)	Yes	Yes
Dental caries	No	Yes
Periodontal disease	No	Yes
Enlarged parotid glands	Yes	Yes
Atrophic mucosa	Yes	No
Poor oral hygiene	No	Yes
Temporomandibular disorders	No	Yes
Craniofacial disorders	No	Yes

Sports with high risks on oral health

Table 3. High and medium risks (American Academy of Paediatric Dentistry, 2013)

High risk	Medium Risk
American football	Football
Hockey	Handball
Ice hockey	Basketball
Lacrosse	Diving
Martial Arts	Racquet sports
Rugby	Parachuting
Skating	Water polo
Skateboarding	
Mountain biking	

RESULTS AND CONCLUSION

From this systematic review, it may be concluded that athletes are therefore particularly at risk from dental caries or erosion if they:

- Frequently consume sports drinks of a high carbohydrate
- Frequently use sports supplements.
- Participate in many prolonged efforts, resulting in frequent episodes of hypo salivation and impairment of saliva's protection against enamel demineralisation.

Systematic review clarified that Physical Exercise Sports has negative impact on oral health.

Recommendations

The following preventive measures are advised:

- Athletes should wear orofacial protectors such as mouth guards and face masks during contact sports.
- Athletes have to visit the dental clinics continuously.
- Awareness should be spread among athletes by their dental national associations about the seriousness of the sports they have chosen and how to take appropriate protection.
- Limit the intake of sports drinks and supplements.
- Reduce the intake of sugars to compensate for energy loss because it causes damage to oral health.
- Use of telemedicine to maintain oral health, such as the use of oral cameras, which enables the person to visualize the oral cavity and presentation to the dentist.

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