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AWARENESS OF ORAL HYGIENE IN ATHLETES AND THEIR NUTRITION. A MINI-REVIEW

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Abstract

Poor oral hygiene is an important issue, as it can cause pain, adverse effects and psychosocial impacts on morale and quality of life, as well as long-term effects. Also self-reporting data also show an effect on the training and progress of athletes. Athlete's oral health can be threatened by multiple items such as dietary supplements, oral dehydration, immune suppression triggered by exercise, lack of awareness and negative behaviors. Oral diseases can be avoided in theory, however, by simple interventions with clear proofs of efficacy. This paper aims to raise awareness, in addition to future study plans of oral health issues in elite sports, and proposes prevention and health promotion strategies**.**

Keywords: *Oral Hygiene, Raise Awareness, Athletes Diet.*

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Introduction

The diet of an elite athlete differs from that of the mainstream population. This difference is attributed to increasing high calories food intake (from a few hundreds to thousands of calories per day) by repeat training sessions every day or even two times daily, which should be balanced by increased consumption of energetic food (Degoutte *et al.*,2006; Zhang, 2015). Food plays a major role and may put them at risk of weariness, illness, and adverse results if food was consumed inadequately or inappropriately. Therefore, disorders may occur, even at the level of oral hygiene, when the diet is not safe, for example, lack of essential compounds or excess quantities of some food (Melin *et al.*,2019; Duchan *et al.*,2010). The most critical problems facing athletes with oral hygiene are cavities and tooth loss (Marks *et al.*,2018; Henriques and Sukekava,2017). The consumption of sugar-rich foods and dry mouth-related acidity encourage these problems. In this context, this minireview aims to study how to avoid the most critical food hazards of eating habits in elite athletes in general. We offer practical recommendations on good oral hygiene for athletes.

1. Athletes diet and its effect on oral health

In the lifestyle, success, and recuperation of athletes, diet plays an important role and directly affects their oral hygiene. Everyone but not only athletes must have mouth and teeth functionally healthy, whereas sportsmen should be able to recognize the value of the food they frequently eat. Since dental issues such as tooth decay or dental deterioration have a serious effect on performance (Piccininni and Fasel,2005). None, or very little is known about the relationship between professional athletes' dietary habits and their oral hygiene (Bryant *et al.*,2011). The key risk factors for athletes are the availability of high energy, repeated ingestion and/or consumption of food, acidification of food intake, sugar intake, and dehydration: players are particularly susceptible to teeth injuries due to the combined effect of intense training and sports food (Sirimaharaj *et al.*,2002; Frese *et al.*,2015). Most of food eaten by athletes is rich in fundamental sugars during exercise. The possibility of athletes who require the highest consumption levels to sustain a steady level of energy is normal in endurance athletes who need constant energy supplies for a long period to balance energy spending, for example, whether the drinks and food they consume during training largely depend on the type of sport they are practicing (Foster and Thomson,2012). According to the latest survey of 31 highly skilled Triathletes, about 84% (1-6 days a week) consume daily sports drinks, 16% consume at least 6 times a week; 94% consume solid food, of which 58% consumes solid foods 6 times a week; only during the training legs by cycle (Bryant *et al.*,2011).

2. How would mouth health affect an athlete's performance?

A few of the consistency determinants of life is oral health (Locker,1988). There is a wealth of literature showing effects on the quality of life of oral diseases, including caries (Foster and Thomson,2012), pericoronitis & Periodontal (Needleman *et al.*,2004; McNutt *et al.*,2008). With high psychosocial effects of mouth health, it could be shocking if those athletes with poor oral health were not affected by training and success. Also, in a setting where the 'grouping of small benefits' is crucial, subtle impacts on training and success might conceivably be quite significant pain (Needleman *et al.*,2013) increased systemic inflammation (Loos and Tjoa,2005) and impaired trust and socialization (Locker,1988) may affect performance due to oral diseases. In short, tooth decay may impact performance through pain resulting from disease conditions, but also more indirectly from effects such as increased inflammation in the body and psychosocial effects that may be less noticeable to sports themselves (Kragt *et al.*,2019).

Table 1: Groups of Tooth decay, pericoronitis & periodontal disease, tooth erosion preventative and risk reduction measures (Gondivkar *et al.*,2018).

case	Purpose
All events	Physical activity, training, and behavioral changes: multi-level strategy involving (sportsman), regional (team supporting medical, dental, and performance), and high-level (main sports organizations)
Teeth decay	Nutritional: decreased frequency and sum of carbohydrate consumption, if possible. appropriate sports drink for reasons such as hydration, hypotonic drink, or water, for example
	Fluorine: such as tooth wash containing at least 1400 ppm of fluoride and could be 5000 ppm fluoride
	hygiene of mouth: successful regular removal of dental plaque (toothbrushing and between teeth cleaning)
Diseases of Periodontal	Evaluation: identification earlier and therapy (second prevention)
	Decrease of the risk factor: smoking by the termination
Tooth necrosis	Dietary: decreased acidic food/drink consumption level
	Energy drinks: where suitable; decreased rate, preventing excessive mouth holding, drinking straw,
Diseases of Periodontal	hygiene of mouth: vigilant removal of plaque surrounded the molar affected
	Removal: the affected molar after no more than 2 episodes of pericoronitis.

3. The key dental conditions that athletes encounter:

3.1 Dental erosion

Dental degradation refers to A loss of teeth enamel as a product of a chemical reaction involving bacteria (acidification). The teeth are uncovered to mechanical wear and are very sensitive to mechanical wear. as enamel is lost. Potentially, any acidic factor (pH<5.5) will dissolve tooth enamel (Sirimaharaj *et al.*,2002; Frese *et al.*,2015). Thus, or a mixture of both, Intrinsic or extrinsic acids may be the cause of tooth decay. Food, drinks, pharmaceutical (Table 2) and atmospheric acids contain external acids, e.g. in chlorinated pools, while acids intrinsic are primarily stomach acids which can come into contact with teeth during puking or rejuvenation (Jarvinen *et al.*,1991).

Table 2: Food factors that pose a risk of erosion (Nunn,1997).

Drug	Drink and Food
Iron-rich supplements	Acidic soft drinks
Tablets with vitamin C	juices for other fruits
Aspirin	Lemon juice
	Wines
	Acidic sport beverages
	teas herbal
	Citrus
	Cider
	Foods preserved in vinegar
	Sweet candies
	Other acidic fruits and berries

High-level athletes are at an elevated risk of tooth decay and dental erosion (Milosevic,1997) because of dehydration and respiration through the mouth, repeated and/or long-term training can reduce salivary flow (Horswill *et al.*,2006). Also, energy consumption among professional athletes is high and frequently includes a high percentage intake of carbohydrates and acidic beverages (Sirimaharaj et al.,2002; Burke *et al.*,2003). Risks are often raised by the frequency and length of the intake of food or acidic beverages. In younger athletes, the danger is much greater Since their teeth enamel is not yet completely grown and acids are more exact and dissolve easily. The saliva bathes enamel under normal conditions with protective ions that are stronger, less porous, and more acid-resistant. This maturation takes time, however, and young sportsmen are particularly susceptible to dental problems (Tahmassebi *et al.*,2006).

3.2 Tooth decay

Tooth decay is associated with dental demineralization, which can contribute to cavities, i.e. to the development of tooth cavities, frequently follow up by pain (Kragt *et al.*,2019). When the acid created by a particular bacteria of the mouth dissolves the enamel in the tooth. When the development of saliva is limited and the hygiene of the mouth is neglected, the risk of cavities is very high (Lippi *et al.*,2009; Volodchenko *et al.*,2019). Sugars are the source of energy most closely related to cavity formation. Bacteria degrade sugars in the mouth into acids, decrease the pH in the plaque of the tooth and weaken the tooth enamel (Murtaza *et al*,2019; Greenwald *et al.*,2009). The following figure gives the formation of the cavity.

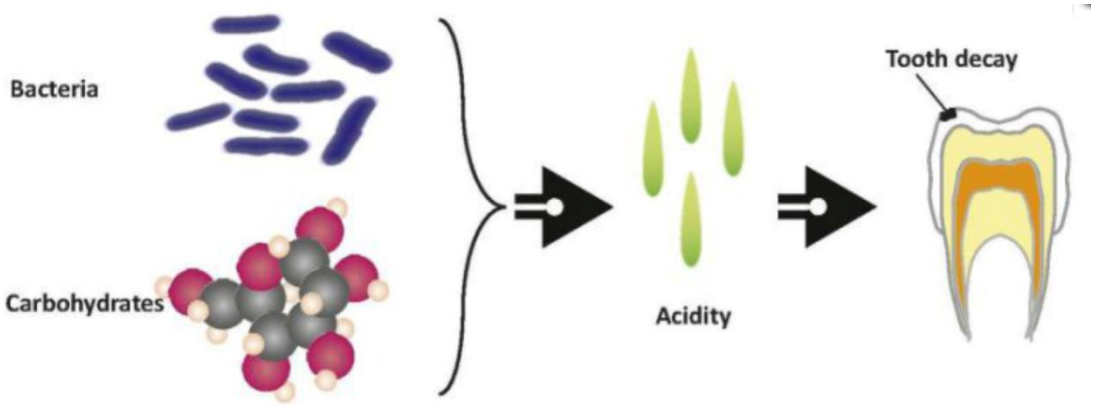

Fig. 1: Tooth decay (Ramalingam *et al.*,2005)

3.3 Tooth health and food

The mouth is considered the body's "mirror" in that many problems related to unhealthy diets can be identified at the level of the mouth. A largely acidic diet, causing gradual demineralization of different tissues, may have adverse implications for the body (Lussi *et al.*,2004). The body absorbs from hair, nails, skin bones, teeth, and joints the minerals it requires, which then appear to become less resistant to decay. The calcium phosphate contained in tissues is released as blood pH drops To aid in neutralizing acidity. Through chronic acidosis, the alkaline reserves are plundered, resulting in decalcification that causes many problems: teeth decay, random broken bones, pain in the joints and bones, broken hair and nails. In the mouth, body acidification is often observed in the form of a reduction in pH salivary Dental degradation and tooth decay may occur when the saliva becomes acidic (Al-Khatib *et al.*,2001).

A reliable method for determining the erosive ability of a food or beverage is known to be the pH measurement (Aerenhouts *et al.*,2011). PRAL is often used to differentiate between various forms of food. PRAL is the possible renal acid load (Aerenhouts *et al.*,2011;Applegate *et al.*,2017). The pH refers to the hydrogen in food when it comes to teeth and PRAL tells about

acidification capacity before digestion and metabolization. Consequently, the foods are graded as acidic or alkaline according to the quality of their residues after ingestion (Chao and Krewski,2008).

The pH value of the food or its value of PRAL usually takes into account individual sugars, including sweets, ice cream or a different cake, meat (red meat), alcoholic beverages and soft drinks (cordials, fruit juices, energy drinks, sports beverage... etc. are the acidifying foods most harmful to the teeth (involving acidic compounds and sugar). Certainly, nutrient food containing (acidic & sweet) foods are the most harmful to mouth health and significantly promote the growth of the cavity (Andrés-Bello *et al.*,2013).

The danger to food high - carbohydrates is much less important than simple sugars - for stuffed foods, such as potatoes, bread, pasta, and rice (i.e. foods that taste sweet). In comparison, food may be used to protect against tooth dentures and degradation by certain low-acid or even alkalizing products. These include cow's milk, which contains about 5% sugar but is not highly cariogenic, and dairy products such as cheese, yogurt, and cottage cheese (Fontijn-Tekamp *et al.*,2000).

The safeguarding impact of milk products is primarily due to the presence of lactose Calcium, phosphorus, and casein, and defensive factors (which is much less cariogenic than other sugar types). For instance, cheese, Although it includes little carbohydrates, is rich in phosphorus and calcium., helps protect against dental cavities. Furthermore, its strong taste induces substantial saliva secretion, Which helps neutralize acid attacks and easily removes food pollutants from the mouth (Nunn,1997).

Finally, sugar-free sweeteners can be Also used to significantly lower sugar's adverse effects on the tooth. The food additives that have a sweet taste are the sweeteners are increasingly used as replacements for sucrose (table sugar) in food products since they are not carogenic, they are less kcal (Chattopadhyay *et al.*,2014; Carocho *et al.*,2017; Ruiz-Ojeda *et al.*,2019).

Sweeteners are also known as sugar substitutes for sugar. For eg, aspartame (synthetic), palm leaves (xylitol), and rebaudioside A, better known as stevia, are also used in sweeteners. Sweeteners benefit from the fact that oral bacteria do not, or seldom do, use them, so they do not cause acid and cavity formation. Teeth can be effectively preserved by chewing sugar-free xylitol-containing gums after meals when teeth cannot be brushed (Hanson and Campbell,2011;Mickenautsch andYengopal,2012; Llop *et al.*,2010).

4. Drinks for sportsmen

The use of “sporting” or “power” drink is almost common during training by athletes. These beverages’ energy and electrolytes are supplied (usually six to ten percent carbohydrates in various types) forms: glucose, glucose polymers, fructose) to make up for lack arising from sweat. It was investigated that 31 triathletes (Ages 18 to 36) from New Zealand researched the intake of energy drinks. The findings eighty-four percent of triathletes

consume daily sports drink throughout training, and sixteen percent drink this type of drink six or more days a week, and 16 percent even consume a sports drink during coaching. these drinks on non-training days and 48% consumed significant amounts of bottled sports drinks. During the cycling leg of the event (58 percent), the highest energy consumption was noted, With the absorption separated during the session into 5 to 7 parts.

The high amount of acidity (low pH) and fermentable carbohydrates in them are responsible for the carogenic, erosive impact of most sports drinks on tooth enamel **(Table 3).** During preparation, intake of sports drinks, coupled with reduced salivary secretion (related to dehydration), generates a mixture of conditions that favor cavity growth and dental erosion. Indeed, the erosive capacity of sports drinks can be enhanced by the dry mouth often experienced during exercise. In this sense, certain sports (which require breathing through the mouth for a long time) or circumstances (hot weather, dry conditions) tend to encourage the creation of problems with the health of the mouth (Mettler *et al.*,2018).

Table 3: Grades of acidity for many available commercial sports drinks contrast to other widely consumed drinks (Mettler et al.,2018).

power full drinks for "sports"	**pH**	**Some Beverages**	**pH**
Lode of carbo	"3.74"	With coffee	"5.00"
Power drinks	"3.05"	Cup of tea	"5.50"
High drinks	"2.52"	Cola Cola	"2.70"
Drinks isostar	"2.38"	stagant water	"7.00"
Fruits drinks	"3.05"	Gas water	"6.00"
Maxi	"4.46"	Orange drinks	"3.75"
Psp23	"2.60"	Milk of goat	"6.50"

Many studies focus on offer guidelines To assist in preventing or minimizing the harmful effects of energy drinks on mouth hygiene by offering alternatives. The addition of maltodextrins-associated calcium (polymers of sugar) to beverages as a replacement for Easy sugars has been able to minimize tooth enamel erosion (Hooper *et al.*,2004). The degradation of bovine enamel samples was also greatly reduced when 0.25 percent of nanoparticles of hydroxyapatite (with high calcium and phosphate compounds) have been added to very well sportsmen drinks (Min *et al.*,2011).

Finally, any realistic suggestions, including well-diluted beverages, may help reduce the adverse effects of a sports drink in your tooth, prefer maltodextrin-based drinks, systematic mouth rinsing with plain water after each sip of a sports drink (preferably rich in calcium and phosphate).

5. Sodas and other sweet drinks

In Western countries, almost half of the beverages consumed are sodas (Tahmassebi *et al.*,2006) . The danger of leading to acid demineralization to dental degradation and cavity formation is increased by excessive consumption of acidic and sugary beverages. In Western countries, almost half of the beverages consumed are sodas (Tahmassebi *et al.*,2006).The danger of leading to acid demineralization contributing to dental degradation and cavity formation is increased by excessive consumption of acidic and sugary beverages (Milosevic,1997 ; Marshall *et al.*,2003; Cairns *et al.*,2002; Hooper *et al.*,2005; Al-Dlaigan et al.,2001).

It has been shown that only maltodextrins (glucose polymers) are less acidifying than other sugar types (some sugar glucose, fructose) *(*Al-Khatib *et al.*,2001; Marshall *et al.*,2003; Cairns *et al.*,2002; Hooper *et al.*,2005; Al-Dlaigan *et al.*,2001). In addition to their high content, soft drinks contain various forms of acids, giving the drink a low pH, and certain acids are not prohibited from drinking due to the presence of ordinary elements such as fruits, grapes, citric acids, tartarean acid, or apple bananas (Wongkhantee *et al.*,2006). This shows that other acids, including phosphoric acid in cola drinks, are present to enhance taste (Llop *et al.*,2010). Finally, preservatives such as vitamin C added to soft drinks can also contribute to their acidity (Grobler *et al.*,1985).

In recent years, the "light" type of soda has become very popular. Decrease their caloric intake and prevent causing Weight benefits, which includes these drinks, artificial sweeteners. Nevertheless, these sodas contain acidic substances that can induce demineralization of the enamel and reflect an essential erosive potential. Also, simple liquids do not trigger the satiation reaction, so consuming them can result in the late-night intake of food or over-consumption of this form of a drink (Korte *et al.*,2019).

To minimize the harmful effect of soft drinks on oral health, several steps can be taken. To counteract the effects of soft drink acidity, the beneficial purpose of increasing calcium phosphate salts has been shown in many studies (Llop *et al.*,2010). These chemicals, however, altered the beverage's flavor. Likewise, applying fluoride to beverages could reduce the incidence of cavities by 30 percent (Castro *et al.*,2020; Cantoral *et al.*,2021). After that, there are other ways to minimize the adverse effects of soda or sugar beverages, such as the use of little units (small containers, one hundred fifty to two hundred fifty ml), the use of a straw to prevent direct touch with the dental resulting in tooth loss, the selection of the least sugar beverage, the dilution of drinks and the avoidance of prolonged consumption. Other guidelines are given to limit the adverse influence of soda as in **(Table 4).**

Table 4: functional guidelines to help minimize the adverse effects of soda drink (Llop et al.,2010).

functional guidelines to help minimize the adverse effects of soda drink
By adding water, dilute the beverage
taking the drink at eat time
Quick drink
As possible Use a straw
Cold drink
Should not keep sodas in containers or bottles to restrict their consumption.
Should not drink or permit soda to stay in contact with the air of your tooth for a prolonged period.
Quickly after drinking acidic beverages, stop cleaning your tooth
Finish foods with a meal that can neutralize acid attacks (e.g. milk and cheese)
Favor low erosional beverages (e.g. milk drinks) instead of acidic sodas.

6. Suggestions for the maintenance of mouth health among athletes

Improving and sustaining athletes' mouth hygiene: dental illnesses should be avoided at a low cost with well-characterized treatments. Some steps are more reliant than others on behavioral improvement and commitment to treatment Taking into account the current problems and interrelationships of athletes within their sport and peer networks, mouth hygiene should be integrated into other areas of health promotion, to achieve a sustained impact. Also, such an approach may have alternate general, well-being and productivity gains. Daily Assessments of oral hygiene by a dental specialist, in particular during the pre-season period, would allow the personalization of preventive projects and early counseling for any illness. In integrating such a strategy, national sports funders and policy organizations can take the lead. Risk reduction techniques can As part of an oral health program, will also be debated.

Study and surveillance: There are insufficient quantity and accuracy of the research basis for informing sporting activities medicine.41 Priority research problem to be addressed include exact pandemic analyses of representative athlete populations to determine oral health needs across multiple competitions, The limitation of the mouth hygiene of both the person and their environment, and the influence of success and associated mouth hygiene mechanisms. The best avoidance, health promotion, and risk reduction strategies must be determined in elite athletes. Such an approach to research calls for the creation of innovative networks using creative research methods with oral health knowledge, Medicine and research for sports and fitness, community consultation, and sports management and funding organizations (Needleman *et al.*,2015).

It is difficult to fully prevent Exposed to risk assessment related to mouth health deficiency when participating in intense athletic activity. Indeed, to sustain the energy levels necessary for their activity, athletes need to eat large quantities of carbohydrate-rich foods and beverages regularly. Athletes should, however, bear in mind and follow these guidelines regularly to improve their oral health.

1. Consuming Regular Alkaline Diets "dairy products, eggs, fiber-rich foods nuts" and seeds, water").

2. In order to elevated the saliva pass to the oral, take time to chew food.

3. Don’t sip sweets or soft beverages (fruit, sports drinks, sodas); any contact with sugar and/or acid products between the tooth must be as minimal as possible (it is possible to use a straw).

4. Quickly after sweet and/or acidic foods or liquids are swallowed, systemically rinse the mouth with plain water.

5. After every meal, 5-Brush teeth (two to three times a day).

6. If brushing is not necessary, After meals, gyms and chew sugar-free gum (usually contains xylitol).

7. To verify the quality of the teeth, have daily dental checkups (Ljungqvist *et al.*,2009).

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