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# THE HARMFUL EFFECTS OF CONSUMING ENERGY DRINKS ON THE DENTAL ENAMEL OF YOUTH.

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**Abstract**

Energy drinks, popular among young people and students, may have a negative impact on dental enamel, especially in individuals with immature enamel. These drinks, containing sugar, can lead to tooth decay and damage to dental restorations, as well as increased tooth sensitivity due to low pH levels. Patients who frequently consume energy drinks should be informed about the potential causes of their dental problems. This article explores the harmful effects of energy drinks on the hard tissues of teeth.

**Keywords**

Energy drinks, tooth erosion, pH, caries, adolescents, athletes.

In recent decades, the consumption of energy drinks has increased worldwide. Many studies have shown a direct relationship between dental erosion and the consumption of these beverages, due to their low pH and variable titratable acidity. Dental erosion and caries are typical diseases that cause damage to the hard tissues of the teeth. Recently, there has been an increase in tooth erosion under the influence of a large number of acidic drinks. Caries is the destruction of the hard tissues of the tooth under the influence of inorganic acid produced by oral bacteria. Dental erosion is the irreversible destruction of the hard tissues of the tooth as a result of the chemical action of acid without the involvement of bacteria. The purpose of the study: To analyze the literature data on the effect of energy drinks on the hard tissues of the tooth.

Materials and methodology: We have studied 20 literary sources by various authors studying the effect of energy drinks on dental hard tissues.

Research results: Energy drinks were developed in the United States of America in the 1960s in order to provide rehydration, electrolyte replacement, maintain mineral balance, and increase physical performance in individuals engaged in high-intensity aerobic and endurance sports[1].

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Marketing strategists have focused on the importance of regular rehydration during exercise, especially in conditions of elevated temperature[2]. An adult weighing 68 kg who is engaged in long-term sports needs to take 1250 ml of liquid for one hour to compensate for fluid loss caused by significant sweating[3].

Nutrition and sports experts recommend adding carbohydrates and salts to water to stimulate drinking during workouts. Energy drinks, due to their more pleasant taste, aroma and appearance, are preferable to water[4]. Numerous studies in the scientific literature have tried to clarify whether there are additional benefits from drinking energy drinks compared to water. One study showed that in certain situations, such as those with low initial carbohydrate (glycogen) levels and/or those who exercise for a long time at high or low intensity, these drinks contribute to improved performance[5]. It has been established that the main indication for the use of sports drinks are athletes engaged in intensive sports lasting more than 1 hour. There is insufficient fluid intake during training among a small number of athletes.

Insufficient intake of drinks can lead to dehydration, fever, and impaired cardiovascular function. These drinks have become popular due to intense and widespread advertising related to their ability to increase performance and endurance in various activities. The registration of sports drinks was driven by a steady increase in the number of people engaged in physical exercise, which is often characterized by regularity, duration and intensity.

Despite the fact that sports drinks are mainly used in the field of sports, they are also widely used by ordinary people who are not engaged in such activities. In a few years, the sports drinks industry has become a multibillion-dollar industry, with sales of these drinks totaling over $1.2 billion in the United States alone in 2000[6].

According to a 2010 Euromonitor report, the global sports drinks market grew from 7,563.0 million liters in 2004 to 9678.8 million liters in 2009, representing an increase of 5% in one year. Children and young people have become the main population group consuming significant amounts of sports drinks. The habit of drinking acidic drinks, common among teenagers, also carries over into adulthood. Thus, every year an increasing number of the population resorts to drinking such drinks. The American Academy of Pediatrics noted that regular consumption of these drinks is not recommended for children participating in regular children's activities. Moreover, studies have shown that teenagers have a misconception about the possible performance gains caused by drinking energy drinks. Some studies indicate the presence of subjectively perceived positive effects in athletes

after drinking energy drinks, but they do not show an objective improvement in their performance. [7].

For people who exercise regularly, these drinks do not bring additional benefits compared to water[8]. Energy drinks were developed with the aim of increasing physical concentration, endurance and vigor, stimulating metabolism and removing harmful substances from the body[9]. According to Beverages World, U.S. consumption of such beverages increased from "59.5 million gallons per year in 2003 to 354.5 million gallons in 2009." In 2006, almost 500 new brands of this kind of drink appeared on the market. A significant increase in the consumption of energy drinks was noted, especially among young people. In 2006, it was reported that more than 7 million teenagers drank at least one energy drink. [10].

Other studies have shown that more than 40% of teens consumed energy drinks, and teens ages 12-24 spent $3 billion on this type of drink in 2008. Sports supplement solutions are presented in the form of a powder that needs to be mixed with water, or as a ready-to-use mixture. The chemical composition of sports drinks varies considerably, but they usually contain 6-8% carbohydrates (such as short-chain glucose polymers, fructose and sucrose) and electrolytes such as sodium, potassium, chloride and magnesium [22].

In recent years, a significant number of synthetic polymers of meltodextrins (sometimes also called glucose polymers) have been added to the composition of energy drinks. When selecting the composition of energy drinks, the manufacturer should strive to ensure a balance between the effectiveness of carbohydrates and taste characteristics. There are several types of energy supplements, such as hypotonic, isotonic, and hypertonic solutions, designed for various purposes during and after physical activity. Hypotonic energy supplements promote rapid absorption and rehydration and are usually recommended for use after physical exertion. Isotonic solutions of energy additives are used to replenish fluid and energy, providing an optimal osmotic pressure balance. Hypertonic drinks, due to their slow absorption, are recommended to increase energy before intense and prolonged physical exercise. [11].

There are two main types of stimulating drinks, depending on the carbohydrate content: those with a low carbohydrate concentration (less than 10%) and those with a high carbohydrate concentration (more than 10%). Energy reagents with a high carbohydrate content are usually used mainly because of the carbohydrates they contain, rather than because of the benefits to the body during physical exertion. Drinks with a low concentration of carbohydrates are more popular among the population. Electrolytes are added to energy drinks to improve

the taste and maintain fluid and electrolyte balance. The amount of electrolytes varies depending on the product, and it is impossible to determine unequivocally whether a drink is superior in type and quantity of electrolytes. In everyday life, the population usually does not require additional use of electrolytes.

Some energy-dense drinks contain acids that are added to impart flavor and a characteristic pungent taste that helps balance out the sweetness of sugar. Citric acid is used primarily for preservation purposes and to add flavor to the drink. Malic acid is used to enhance the internal flavor, enhance flavor, and balance other added substances used for flavoring. [12].

Energy drinks are alcohol–free drinks that contain additional vitamins and other chemicals that temporarily boost energy. The main components include caffeine, guarana, taurine, ginseng, L-carnitine, creatine and glucoglucoronolactone. Various acids such as tartaric, malic, lactic, ascorbic, citric or phosphoric acid can also be added to add flavor. The effect of energy drinks on dental erosion. Erosion is a dynamic process that, at an early stage, the structures of the teeth soften, and then layer by layer the main structure wears out by dissolution [13].

In recent decades, the incidence of dental erosion has increased due to increased consumption of acidic soft drinks, sports and energy drinks. Some studies report that between 2% and 18% of the population suffers from dental erosion. Clinical case reports and in vitro studies have found a link between sports drinks and dental erosion. There is an alarming prevalence of dental erosion among young people, which has become a serious problem for oral health in Europe and the Middle East. It is reported that the prevalence rate is 59.7% among 12-year-old British children and 47% among 5-year-old Irish schoolchildren. There is also a high prevalence – 34% among young boys aged 5 to 6 years and 26% among boys aged 12 to 14 years in Saudi Arabia. [14].

A study in Australia conducted on children aged 5-15 years found that 68% of them had at least one tooth erosion. In adolescents aged 11 to 13, the prevalence of dental erosion was 41% in the United States and 37% in the United Kingdom. A review of the literature on dental erosion in children indicated its prevalence in the range from 10 to 80%. The wide variation of prevalence data in different studies may be due to differences in research methodology, population selection, diagnostic criteria, and erosion indices used to quantify the severity of the disease. Nevertheless, there is a steady increase in the prevalence of dental erosion[15].

In her work published in 2002, Tanya Matthew presented the first study on the presence of dental erosion among the American population. According to the results of the study, erosion was observed in 36.5% of athletes with higher

frequency consumption of energy drinks, compared with the population with average consumption. These prevalence rates corresponded to or were lower than the results of other studies. Matthew's study is the first to identify a link between dental erosion and race.

## LIST OF INFORMATION SOURCES

1. Ryan Kruse, P., Evaluation of high-tech sports nutrition for adolescents // Pediatrics. Dent, 1998. - No. 3. – P. 1-7.

2. Hooper C, Methodology for Testing the Destructive Potential of Energy Drinks // Dental Journal, 2005. - No. 33. - P. 541-545.

3. Coyle, E.E., Fluid and Carbohydrate Replacement During Exercise; How Much and Why? // Sports Science, 1994. - No. 2. - P. 3-7.

4. Bowles D., Montastruct P., Cabanac M., Water Intake, Pleasure, and Water Temperature. Human Temperature. // Physiology & Behavior, 1983. -No. 30. - P. 97-102.

5. Coombs, J. S., Sports Drinks and Dentistry. // Dental Journal, 2005. -No. 2 (18). - P. 101-104.

6. Hooper S.M., Hughes J.A., Newcomb R.G., Eddie M., Methodology for Testing the Destructive Potential of Sports Drinks. // Dental Journal, 2005. -No. 33. - P. 343-348.

7. Falstrom M., Henriksso-Larsen K., Positive Short-Term Subjective Effects of Sports Drink Consumption During Recovery. // Journal of Sports Medicine, 2006. No. 46. - P. 478-584.

8. Coombs J.S., Hamilton K.L., Effectiveness of Commercial Sports Beverages. // Sports Medicine. No. 29. - P. 181-209.

9. Alsunni A.A. Consumption of Energy Drinks: Benefits and Health Risks. // International Journal of Health Sciences. - 2015. - No. 4. - P. 468–474.

10. Clapp, O.; Morgan, Minnesota; Fairchild, R.M. The Five Top-Selling Energy Drinks in the United Kingdom: Impact on Dental Health and Overall Health. // Journal of Dentin. - 2019. - No. 7. - P. 493–497.

11. Dukhan, E.; Patel, North Dakota; Feicht, K. Energy Drinks: a review of usage and safety for athletes. // Sports Medicine Physician. - 2010. - No. 38. - P. 171–179

12. Rogers, B.E. The Influence of Acetic, Lactic, and Other Organic Acids on the Formation of Artificial Dental Lesions. // Medicine. - 2005. - No. 15. - P. 377–385.

13. Jäggi, T.; Lussi, A. Prevalence and Distribution of Erosion. Monograph. // Oral Science. - 2014. - P. 55–73.