

Dietary supplements for older adults; risk *versus* benefits for oral health.

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In addition to the growing number of older adults worldwide, malnutrition in this age group presents itself as an important challenge. According to the *World Health Organization* (WHO), the term malnutrition covers two groups of conditions related to the lack of and excess of nutrients. The excess is linked to being "overweight" and to "obesity", while being "undernourished" or "malnourished" is related to the lack of nutrients. According to reports originating in different parts of the world, malnutrition among older adults could affect up to 50% or more of the subjects belonging to this population group. The evidence indicates that an inadequate nutritional status is related to the presence of critical systemic or degenerative diseases. During the aging process, the nutritional status of the subject is an important modulator of the physical and physiological changes that this stage of life entails. Particularly during old age, a poor nutritional status is directly associated with frailty, increasing the risk of suffering geriatric syndromes such as falls, fractures, depression, muscular fatigue, functional impairment and depressed immunity, among others.

Related to the above, older adults have poor oral health.¹ In this population, the most prevalent disease and the main cause of tooth loss is dental caries, characterized by lesions that affect the crown, as well as the root surface of the tooth.² Dentin is the tissue that, together with a very thin and sometimes non-existent layer of cement, covers the roots of the teeth. As people age, roots become increasingly exposed to the buccal environment, representing an initiation site for root caries lesions, mostly affecting older people.³ Since the root dentin has a higher content of organic matrix compared to enamel, is more susceptible to rapid demineralization due to the action of the acids produced by the dental biofilm in response to sugars metabolism. For demineralization to occur in enamel, a pH decrease to 5.5 (known as critical pH) is necessary, meanwhile only a slight decrease in the local pH in dentin to about 6.7 is enough to start demineralization.⁴

Dental caries negatively compromises quality of life in many aspects, ranging from self-esteem to functional capacity during mastication.⁵ Tooth loss predisposes to reduced functionality, which has been associated with a restriction in the variety and consistency of ingested food. This is mainly because these people can hardly chew foods of

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greater consistency in a comfortable and effective way, which limits the consumption of fiber-rich foods, such as raw fruits and vegetables.⁶

In general, the diet of the elderly contains low amounts of micronutrients (calcium, iodine, vitamin B2, zinc, phosphorus, and vitamin B12) and it is high in carbohydrates; a common situation worldwide.

In response to this unfavorable nutritional scenario, a series of food supplements for the elderly are commercially distributed to help achieve an adequate daily intake of nutrients. In a general framework, the formulation of these non-specialized nutritional supplements for older adults available in Chile follows a similar pattern, containing different degrees of nutrient fortification.

For example, most contain about 16%-18% protein; 10%-14% fat and 50%-60% carbohydrates. Unfortunately, these supplements contain significant amounts of sugars (20% to 36%). Some of these products are marketed internationally, in different presentations and are accompanied by powerful advertising campaigns that support and direct their choice as safe and highly necessary to achieve an appropriate daily diet. Due to commercial interest, however, these advertisements usually ignore the potential risk for health derived from consuming high amounts of sugars, with potential detrimental consequences for systemic and oral health.

Most dietary supplements are dairy drinks. Studies carried out previously by our research group have shown that sugar-sweetened milk, similar to the food supplements for older adults, have a high cariogenic potential in root dentin.⁷ Additionally, our clinical and experimental investigations indicate that the main nutritional supplements for elderly people marketed in Chile are cariogenic on root dentin. People who consume daily food supplements could present a greater number of root surfaces affected by root caries lesions compared to those who do not consume them.

Currently and based on the best available evidence, it is possible to reemphasize that dietary sugars are the determining factor for the development of dental caries.⁸ According to international recommendations, an adult person should eat less than 10% of the daily caloric intake in free sugars (50g, in a 2000Kcal average

diet), this to avoid a negative effect on systemic health and also to reduce the incidence of dental caries.⁹

It is important to point out that the main nutritional supplement intended for older adults marketed in Chile has, per serving, between 17% to 35% of the total daily calories, based only on its sugars content. It is plausible to speculate, therefore, that these food supplements, widely distributed without any control or prescription, could mean an oral health threat to those who consume them on a regular basis. Hence, it is necessary to create awareness in the health care team about the potential risk that free consumption of food supplements could have. Food supplements should be restricted exclusively to those cases in which the benefits outweigh the risks and when specific protective measures are sought, under tight and careful oral care and follow up. These measures should include restriction of other sources of free sugars, specific reinforcement through the use of high-concentration fluorides and salivary flow stimulation.

results have shown that unsaturated fatty acids; oleic and linoleic, as well as proteins of high biological value such as ovalbumin, are able to counteract the effect of sugars in a highly cariogenic environment.¹⁰ It is important to mention that some of these nutrients with a potential anticariogenic effect are also incorporated within the formulation of the food supplements. Whether the concentration and frequency in which they are used is enough to counteract the cariogenic effect of the sugars contained in the supplements, is still unclear. Although this protection should be taken into account, a reformulation of these food supplements appears as necessary, based on the high obesity rate in the population, along with a severely damaged oral health status. Likewise, users and prescribing physicians must be aware of the dental risks implicit in consuming dietary supplements with high amounts of added sugars. More than restricting consumption, users should be careful to avoid frequent consumption. In addition, it is necessary to deepen the research in this field to generate new knowledge and background information that allows formulating proposals for protocols that consider specific measures for patients consuming this type of supplements.

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