

The effectiveness of chewing gum in oral hygiene aid

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ABSTRACT

Background: Chewing gum may serve as an effective oral hygiene device when brushing may not be possible. Sugar-free gums are simple, inexpensive and are readily available. It increases salivary flow, raises the pH of plaque and saliva, reduces oral malodor, and is effective for stain removal. **Aim:** This study aims to evaluate the effectiveness of chewing gum in oral hygiene aid. **Materials and Methods:** The study group consists of 10 patients. Their oral health status is estimated by recording the debris and calculus index to determine the oral hygiene index simplified (OHI-S). The patient is then asked to chew chewing gum for 5 min. The OHI-S is recorded again. The two results are compared. **Results:** Mean OHI score before and after intervention with sugarcane is 2.41 (+/-0.285) and 0.760 (+/-0.184), respectively. A paired *t*-test was used to analyze statistically significant differences at 5% significance. The *t*-test revealed a statistically significant reduction in OHI following sugarcane chewing ($T = 19.19, DF = 9, P < 0.0001$). **Conclusion:** This study shows that chewing gum is very effective in reducing plaque and debris.

KEY WORDS: Cariogenic, Chewing gum, Dental plaque, Remineralization

INTRODUCTION

The use of sugar-free gum has proven anticaries benefit, but other oral health effects are less clearly elucidated. Sugar-free chewing gum promotes a strong salivary flow, which helps to provide a number of dental benefits: Like, the higher flow rate promotes more rapid oral clearance of sugars, the high pH and buffering capacity of the stimulated saliva helps in neutralizing plaque pH after having sweet foodstuffs, and finally, studies have shown enhanced remineralization of early caries-like lesions, and ultimately, prospective clinical trials have shown reduced dental caries incidence in youngsters chewing sugar-free gum. This paper reviews the scientific proof for these functional claims and discusses other advantages, including plaque and extrinsic stain reduction, along with the possibility of adding specific active agents, including antimicrobials, fluoride, urea, and calcium phosphates, to enhance these inherent effects.

MATERIALS AND METHODS

The study group consists of 10 patients. Their oral health status is estimated by recording the debris and calculus index to determine the oral hygiene index simplified (OHI-S). The patient is then asked to chew chewing gum for 5 min and the OHI-S is recorded again. The two results are compared.

RESULTS

Mean OHI score before and after intervention with sugarcane is 2.41 (+/-0.285) and 0.760 (+/-0.184), respectively. A paired *t*-test was used to analyze statistically significant differences at 5% significance. The *t*-test revealed a statistically significant reduction in OHI following sugarcane chewing ($T = 19.19, DF = 9, P < 0.0001$) [Figure 1].

DISCUSSION

Composition of Chewing Gum

Chewing gum is made of gum base, flavoring, sweetening, and aromatic agents. The gum base is a mixture of natural and/or synthetic resins, elastomers, fats, emulsifiers, waxes, antioxidants, and fillers. Natural elastomers have been replaced today by

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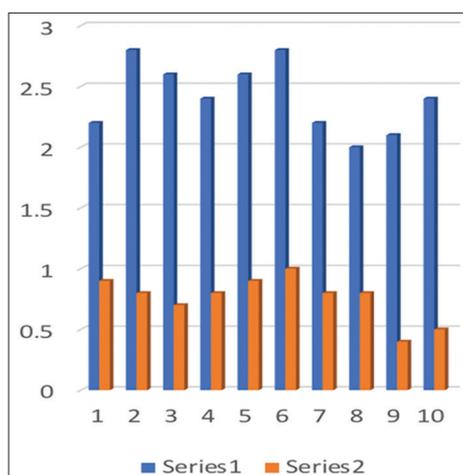


Figure 1: OHI-S before and after chewing Sugarcane

synthetic ones such as polyisobutylene and butyl rubber.

Is chewing gum effective in cleaning teeth?

Several studies assessing the removal of plaque and food debris from the teeth by gum chewing have been published. In early space flights, chewing gum was considered in the search for an oral hygiene method. In a similar study,^[1] 10 volunteers chewed sugar containing, sugar free (5 pieces/day, 30 min each), or no chewing gum during three separate 5-day periods with no oral hygiene. Established plaque was reduced by gum chewing to a small extent, but not interdentally and not along the gingival margin, where, according to clinical experience, oral hygiene is most important in view of proximal caries, gingivitis, and periodontitis. Since conventional chewing gum had proved to be ineffective in removing significant amounts of plaque, the effect of a chewing gum containing 10% of an abrasive agent, zirconium silicate was assessed.^[2] The abrasive chewing gum reduced the area of coronal plaque on posterior teeth by 31% and plaque thickness by 25%. However, this was only a cosmetic effect with no therapeutic relevance. It was found that placebo chewing gum had no plaque-reducing effect at all. The disadvantage is that habitual chewing of gum containing abrasive particles would lead to substantial occlusal wear over the long term.

Is chewing gum effective in stimulating salivary flow?

Apart from the flavor of a chewing gum that may lead to a gustatory stimulation of saliva, mastication is generally agreed to be the main reason for saliva stimulation during gum chewing.

Does gum chewing raise plaque pH?

It is generally accepted that saliva has a major effect in controlling plaque pH that stimulation of saliva by foods affects their acidogenic potential.^[3] Stimulated saliva has an increased bicarbonate concentration and, therefore, increased acid buffering capacity in dental

plaque while concurrently promoting clearance of fermentable substrate and providing more urea for base production. A vast (beyond the scope of this review) number of studies performed in man, and using plaque sampling, contact electrode, and indwelling electrode techniques have established beyond any doubt that low plaque pH values after the intake of fermentable carbohydrates can be reelevated by the chewing of substances such as parafilm or chewing gum because salivary flow rate is stimulated. In general, sugar-free chewing gum is more effective than sugar-containing chewing gum.

Does chewing gum promote remineralization?

Stimulated saliva is known to promote remineralization of early caries lesions due to its mineral supersaturation with respect to dental hard tissue. Several studies have shown that the chewing of sugar-substituted gum after meals and snacks promoted *in situ* remineralization of experimental caries-like lesions in human and bovine enamel specimens which were mounted in the oral cavities of volunteers.^[4-6] When sucrose-containing chewing gum was used, however, remineralization was either not significant or was found only when these gums were chewed for >20 min after meals.^[7,8] Conclusion: The chewing of sugar-free gums after meals and snacks can promote remineralization of enamel.

Does chewing gum reduce gingivitis?

The increased antimicrobial protein concentration of stimulated saliva has anecdotally been claimed to be instrumental in reducing gingivitis. As reported above, gum chewing does not reduce plaque along the gingival margin or between the teeth.

Can gum chewing lead to temporomandibular joint (TMJ) disturbance or pathology?

The literature about this question is extremely sparse. Anecdotal case reports have described reversible adverse effects of prolonged gum chewing on the TMJ, with soreness and clicking, muscle pain, and earache.^[9] An *in vivo* study of possible associations between chewing gum and fatigue and pains of the jaw muscles in adult volunteers showed no evidence supporting the hypothesis that chewing gum might be incriminated as the reason for myofascial pain or dysfunction.^[10]

CONCLUSION

This study shows that chewing gum is very effective in reducing plaque and debris and helps in oral hygiene aid.

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