

Comparison of the Efficacy of Plaque Removal of Listerine Smart Rinse Kids and Vi- One Junior Fluoridated Mouthwash in Children Aged 6 To 10 Years

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Abstract

Objectives: In this study, a comparative study was done on the effects of Vi-One and Listerine fluoridated mouthwashes on the reduction of dental plaque in pediatric patients between 7-11 years of age in dental clinics of Sepideh and apple in Shiraz, Iran. Listerine Smart Rinse Kids is a product of the United States and Vi-One Junior mouth wash is the domestic production of the country at Rozhin Corporation. This research was conducted by Mohammad Karimi and Hassan Dehghan in 2018-2019.

Material and Methods: In this study, 100 individuals were selected and divided into two groups of 50. During the study, no other method of controlling the plaque was used. In this method, the first group first used Vi-One mouthwash for 10 days and after two weeks of rest and minimizing dental plaque, they used Listerine for 10 days. While the second group used Listerine first, then they applied Vi- One in the same way. The results of this review were then evaluated.

Results: The mean of plaque index in total mouth and in the posterior teeth area with the use of Listerine Smart Rinse Kids was lower than that of Vi-One Junior mouth rinse. In another words, Listerine had a better effect on plaque removal than the Vi-One mouthwash in the posterior mandibular region.

Conclusion: The results show that although Listerine mouthwash had a better effect on dental plaque removal, none of the two mouthwashes had a significant difference in effects on maxillary and mandibular jaws.

Keywords: Dental Plaque; Vi- One, Listerine, Fluoridated Mouthwash; Periodontal Diseases; Plaque Index

Introduction

Currently, dental caries and gingivitis are common oral and dental diseases in this country. One element that can prevent tooth decay is Fluoride. In the oral health program of the country, fluoride mouth wash 2% was used to prevent dental caries in elementary school students all over the country [1]. In the other hand, dental plaque is an important factor in the formation of dental caries and periodontal diseases. Leo and his colleagues have identified dental plaque as the main cause of gingivitis [2]. With the use of mouthwashes, one can control the dental plaque, chemically [3,4]. In fact, mechanical plaque removal is one of the most common and effective methods for preventing caries and inflammation of the gum [5]. Fluoride mouthwash usage is contraindicated in children younger than six years of age due to the risk of swallowing and causing systemic toxicity and fluorosis [6-8]. Symptoms of acute oral fluoride toxicity in children include

severe nausea, vomiting, hyper salivation, abdominal pain, and diarrhea [9]. In severe or fatal cases, these symptoms can be followed by convulsions, cardiac arrhythmias, and coma [10-12]. Laboratory and animal data have shown that prevention the accumulation of plaque and consequently, reduction in dental plaque can be achieved when fluorides is applied topically which inhibits the bacterial multiplication [13]. The fluoride from mouth rinse is retained in dental plaque and saliva to help prevent dental caries [14]. In one review, the average caries reduction in non-fluoridated communities attributable to fluoride mouth rinse was 31% [15]. Another study in Sweden reported that the use of fluoride mouthwash along with brushing has a significant effect in decreasing of dental caries [16]. Listerine Smart Rinse Kids has been used for the purpose of this study. This product is an alcohol-free mouthwash. The ingredients include Sodium fluoride 0.02% (0.01% w/v fluoride ion), Water, Sorbitol, flavor, phosphoric acid,

Sucralose, Cetylpyridinium chloride, disodium phosphate, sodium saccharin, menthol, blue 1 and green 3 [17]. One study reported that use of this mouthwash can strengthen teeth 99% better than brushing alone [18]. Another source indicated that it gives 12-hour cavity protection [19]. Vi-one Junior Mouthwash is specially designed for children. This mouth rinse contains Sodium fluoride 0.05%, Cetylpyridinium chloride 0.05% and Disodium phosphate agents. The respective flavors contain sugar-free and harmless sweetener. This brand also is an alcohol-free product [20]. The purpose of this study was to compare the efficacy of two types of mouthwashes, one the domestic mouthwash (Vi-One Junior) and the other, the brand name Listerine Smart Rinse kids fluoridated mouthwash in the removal of the dental plaque.

Material and Methods

This study was a cross-over clinical trial. The eligibilities for entering in our study were as follow:

- Children having at least 20 teeth with no large restorative area.
- No history of periodontal Diseases.
- Not having any Prosthodontic or Orthodontic appliances.

The condition for withdrawal from the study, if there was any sign of reactions to any of these mouth rinses. There was no obligation to have any food regimen.

The study population consisted of 100 patients who were in a 50-member group. Before taking oral mouthwash, plaque index was minimized, and all subjects underwent tooth scaling at the beginning and, if necessary, teeth polishing were done before taking mouthwash. Oral hygiene was assessed via a plaque index. First, in both groups, the Silness-Löe plaque index was recorded. It is an Index for evaluating the thickness of the plaque in the gingival region, which measures the thickness of plaque on all surfaces (M, B, D, and L) [21].

Coding for the plaque index was carried out according to the criteria [22]:

- Code 0:** No plaque
- Code 1:** A film of plaque is adhering to the free gingival margin and adjacent area of the tooth. The plaque may be seen in situ only after application of disclosing solution or by using the probe on the tooth surface.
- Code 2:** Moderate accumulation of soft deposits can be seen with the naked eye within the gingival pocket, the tooth, or gingival margin.
- Code 3:** Abundance of soft matter can be seen within the gingival pocket and/or on the tooth, and gingival margin.

In this index, each tooth is divided into four surface area but in our purposes in the present study, we modified the surfaces area from 4 to 6; thus, we have three surfaces in the buccal area (Mesiobuccal, Midbuccal, and Distobuccal) and three surfaces in the lingual area (Mesiolingual, Midlingual and Distolingual). The

first group used Vi-One & Listerine mouthwash (kids mouthwash), for 10 days in the following way. Needless to say, this process was supervised by parents at home. The kids have to gargle 5 cc 's of Vi-One mouthwash 2 times per day for 30 seconds, and during this period of time, no other plaque control methods and tooth brushing should be used. At the end of the period of 10 days, the plaque index was recorded again. Then, the subjects were given a week to rest and stop using the mouthwash while they had permission to start brushing like before. Again, the plaque index was minimized for patients with polishing the teeth, and they used Listerine mouthwash for 10 days. In the same way, 5 cc 's of the mouthwash twice daily was used for 30 seconds, and at the end of the one-week period, the plaque was recorded. For the second group, in the first 10 days, mouthwash. Listerine was prescribed and in the second 10 days, the Vi-One mouthwash was applied. All procedures were performed according to the above pattern.

Results

Paired T-test was used for statistical analysis of the findings. The findings showed when Listerine Smart Rinse_Kids was used; the mean of plaque index in all area of the mouth (especially in the mandibular jaw and the posterior region) was significantly less than the time Vi-One was applied. However, there was no significant efficacy difference between the use of both types of mouthwash in the upper jaw and the anterior region.

There was no significant difference between the mean plaque index in Vi-One mouthwash between upper and lower jaw, and there was no significant difference between the maxillary and lower jaw in the case of Listerine Smart Rinse Kids either. The presence of this indicator in both types of mouthwash in the anterior region was significantly less than the posterior region. The mean and standard deviation of the plaque index in both groups, as well as in different regions of the mouth, are listed in Table 1.

Table 1: The amount of dental plaque in terms of area and type of Mouthwash.

	Listerine Smart Rinse Kids	Vi-One	Test
Mouth area	1.29(+/-)0.22	1.47(+/-)0.28	P= 0.03
Mandibular Jaw	1.25(+/-)0.21	1.49(+/-)0.35	P=0.04
Maxillary Jaw	1.30(+/-)0.25	1.44(+/-)0.29	P=0.14
Posterior Area	1.34(+/-)0.25	1.62(+/-)0.25	P=0.005
Anterior Area	1.18(+/-)0.30	1.33(+/-)0.39	P=0.25

Discussion

In general, the anti-plaque properties of mouthwashes are completed through bactericidal and bacteriostatic effects, separation of microorganisms from dental surfaces, loosening of joints to these surfaces or lowering of the surface tension of the tooth [2,21,23]. Some mouthwashes can be useful for preventing tooth decay or periodontitis [6,24]. Furthermore, mouthwashes are recommended for children and adolescents with orthodontic appliances or adults who need deep cleansing (such as curettage)

[6]. These types of mouthwashes were generally used before and after surgery (especially Chlorhexidine) and have a very positive effect on the treatment of gum and ulcerative inflammation [6]. Use of this type of mouthwash should not last longer than 2 to 3 weeks due to some side effects such as staining the teeth and soft tissue staining, increased calculus deposition, unpleasant taste, burning sensation, and mucosal irritation [6]. It's time to use this mouthwash after brushing and before bedtime, and it's best not to eat anything after half an hour after use. Fluoride-containing mouthwashes are another type of mouth rinse that has a fairly large use. These mouthwashes have a significant effect on teeth strengthening. Fluoride in the mouthwash cause bonding with enamel and dentin, and with bonding with calcium and phosphorus, they form Fluorapatite, which is more resistant to caries than Hydroxyapatite. Fluorides also accelerate the mineralization, repair the decayed teeth surfaces, and help to increase the reverse processing of damaged tooth surface area [25,26]. Fluoride also reduces the effect of oral bacteria on teeth. It is done by interfering with the function and formation of the microorganisms. The best fluoride mouthwash protects the teeth against the acids which are produced by dental plaques. "Neglecting the oral hygiene of children leads to the accumulation of plaque and as a consequent the formation of dental calculus which will have a devastating effect on the both child's gums and teeth" [27].

In one study, the statics showed an alcohol-free mouthwash containing a combination of 0.075% CPC and 0.05% Na F produces statistically significant reductions in dental plaque and gingivitis after three and six months compared to baseline [28]. In another research, Jessica E. Koopman, et al argued that the oral microbial community displayed remarkable resilience towards the disturbances it was presented with. The effects of the fluoride mouthwash on the microbial composition were trivial [29]. On the other side, in another study, the research showed that all four fluoride mouth rinses were effective in decreasing the plaque levels of *S. Mutans* [30]. In this study, we investigated the effect of two mouthwashes of Listerine Smart Rinse Kids and Vi-One in which Vi-One mouthwash in the posterior region was less efficient than the Listerine mouthwash, and the interesting point that most kids mentioned the taste of Listerine was more acceptable. Given that the contents of sodium fluoride were equal in both mouthwashes, due to the fact that Listerine mouthwash was more acceptable than the mouthwash, it could be related to the other materials present in this product which can be a part of the manufacturer's secrets. This difference in taste can be a factor in the effect of improving Listerine's efficacy in the posterior regions.

Conclusion

Listerine Smart Rinse Kids had a better effect on plaque removal than the Vi-One mouthwash in the posterior mandibular region. Both types of mouthwash had a better effect on the anterior region than the posterior region, but none of the two mouth rinses had a different effect on the maxillary and lower jaw. Although many popular types of mouthwash may help to control dental plaque

and gingivitis, they should only be used as an adjunct to other oral hygiene measures such as brushing and flossing. Fluoride mouthwashes should be encouraged in children above the age of 6 with a high risk of caries.

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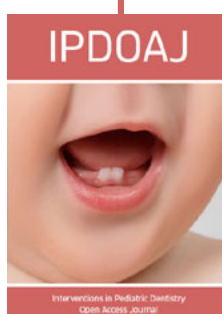
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