

A Comparison of the Antiplaque Effectiveness of Meridol (AmineFluoride/ Stannous Fluoride) and Irsha Kids Mouth Rinses in 7-9 Year-Old Children

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Article information	Abstract
<p>Article history: Received: 4 Jan 2012 Accepted: 18 Jan 2012 Available online: 15 Oct 2012 ZJRMS 2013; 15(1): 10-14</p> <p>Keywords: Mouth rinse Irsha Meridol Plaque Children</p> <p>*Corresponding author at: Department of Pedodontics, Children And Adolescent Health Research Center, School of Dentistry, Zahedan University of Medical Sciences and Health Services, Zahedan, Iran E-mail: ramazani77@gmail.com</p>	<p>Background: Mechanical method of plaque control is still considered the most effective method in reducing microbial dental plaque, however, considering the limitations of this technique in children, the assistance of chemical plaque control methods have been suggested. The purpose of this study was to compare the effects of Meridol and kids Irsha mouth rinses on plaque accumulation in 7-9 year-old school children, referred to Community Dental Health Department of Zahedan Dental School in 2010.</p> <p>Materials and Methods: A double-blind clinical trial was conducted. Fifty samples were randomly allocated to four groups including Meridol, Kids Irsha, chlorhexidine (positive control) and normal saline (negative control). Prophylaxis was done for all samples, and plaque index was determined for each sample after 48 hours on days 0 and 30. Samples used mouth rinses every day during this period. The data was analyzed with SPSS-17 using Kruskal-Wallis, Mann-Whitney and Sign tests. In this study, a significance level of $p \leq 0.05$ has been considered.</p> <p>Results: At the end of the study, 45 samples attended for plaque index documentation. Plaque index was reduced significantly in all four groups on day 30 compared to day 0. Meridol, Kids Irsha, and saline groups did not show any significant difference with each other with respect to plaque reduction percentage between days 0 and 30, whereas chlorhexidine showed significant difference with Meridol, Kids Irsha and Saline ($p=0.001$).</p> <p>Conclusion: The effect of Meridol and Kids Irsha mouth rinses on plaque reduction was not significant compared to that of Chlorhexidin.</p> <p>Copyright © 2013 Zahedan University of Medical Sciences. All rights reserved.</p>

Introduction

Caries and periodontal disease, as the most common infectious diseases in humans, are caused by dental plaque accumulation. For this reason, the control and removal of this bacterial biofilm has a very important role in prevention and treatment of oral and dental diseases [1]. Although mechanical control is considered as the most effective method for plaque control, many people, especially children, are not sufficiently skilled and motivated for complete removal of microbial plaque by mechanical methods. In addition, specific medical or dental problems (periodontitis, immunodeficiency diseases) and/or the existence of orthodontic device in the mouth have required other methods in addition to the mechanical removal of plaque [2].

Considering these limitations, the assistance of chemical plaque control methods have been suggested, among which the use of mouth rinses is more common [3]. Anti-plaque property of mouth rinses is achieved through a bacteriostatic, bactericidal effect, or prevention of bacterial adhesion to teeth, even in parts of the mouth

inaccessible by a toothbrush [2, 4]. Digluconate chlorhexidine has a long history in dentistry and is more popular than other mouth rinses [5]. The anti-plaque effects of this mouth rinse have been proved [6], but its positive effects are accompanied with some side-effects such as tooth discolorations, mucosal irritation and desquamative mucosal lesions [3, 5].

Meridol and Irsha are two brands of commercially available mouth rinses without the mentioned side-effects of chlorhexidine.

Containing amine fluoride/stannous fluoride, Meridol mouth rinse acts as a bactericidal and anti-plaque agent because of tin and fluoride and their inhibitory effects on bacterial metabolism and prevention of plaque adhesion to tooth Enamel [7]. In addition, due to fluoride content, it has remineralization potential on initial caries lesions [8].

Irsha mouth rinse is also a chemical compound containing thymol, menthol, eucalyptol, and methyl salicylate in the alcohol base whose composition is the same as essential oils and it has anti-microbial and anti-inflammatory effects [9].

By conducting a research on the anti-plaque effects of Listerine (essential oils) and Meridol mouth rinses, Riep et al. concluded that Listerine mouth rinse is more effective on plaque reduction compared to Meridol mouth rinse [10]. Also, in the study by Pizzo et al. mouth rinses containing essential oil and amine fluoride/stannous fluoride were effective in the inhibition of plaque accumulation, and showed no difference in this respect [11].

Given that relatively little research is performed on the impact of existing commercial mouth rinses on plaque removal in the children population, especially in Iran, in this study, we aimed to compare the effectiveness of Meridol (Meridol®, Germany) and Kids Irsha (Irsha®, Iran, Shafa pharmaceutical and health-healing laboratories) mouth rinses on plaque accumulation in 7-9 year-old children.

Materials and Methods

In this clinical trial study that was approved by ethics committee of Zahedan University of Medical Sciences, 50 student children (25 girls and 25 boys) who were visited by the community oriented groups and referred with their parents to receive preventive dental services to the community oriented of Zahedan School of Dental Medicine were studied. Criteria for selection of these 50 children was to use brush and dental floss daily, not to use mouth rinse in the previous month, not to use antibiotics in the past two weeks, not to use orthodontic devices, lack of developmental defects of teeth or kerating, absence of tooth decay or extensive fillings in existing teeth. Sampling was conducted using convenience sampling method in February 2000.

After presenting the necessary explanations about the study purpose, procedure and signing of consent form for participation in a research project by parents, prophylaxis was done for all patients and the absence of plaque on teeth was approved by detector tablet. The children were asked to avoid any oral hygiene procedures for 48 hours and to refer back to the center for plaque index documentation at day 0 of the study. At day 0, the child plaque index was determined using Green & Vermillion method on the dental chair using mirror, pure air and unit light by a calibrated person [12].

Thus, in each sextant, the tooth with the highest area covered by plaque was determined and the plaque level in the mid-buccal and mid-lingual surfaces of that tooth was recorded (code 0: no plaque is seen, 1: visible plaque that covers less than a third of the tooth surface, 2: visible plaque that covers more than a third but less than two-thirds of the tooth surface, 3: visible plaque that covers more than two-thirds of the tooth surface). Then, plaque index was obtained by summing up the obtained codes in buccal and lingual surfaces and dividing this number on the number of segments examined.

In order to blind the study, all mouth rinses were poured in uniform containers with transparent (calibrated) doors. Each container was given a code by a second person and

the subjects randomly received one of the coded mouth rinses. Then, the required instructions were given to the children and their parents by a second person who coded the containers according to the manufacturer's instructions of each mouth rinse.

Thus, 10 ml of Meridol mouth rinse (Meridol®, Germany), once a day for 30 seconds, 15 ml of Chlorhexidine 0.2% mouth rinse (Behsa®, Iran), twice a day for 30 seconds and 7 ml of Kids Irsha mouth rinse (Irsha®, Iran, Shafa pharmaceutical and health-healing laboratories), twice a day for 30 seconds were used. To determine the amount of mouth rinse usage during the study, mouth rinse containers were initially weighed and parents were asked to monitor the correct use of mouth rinses.

Parents were asked to refer back together with their kids 30 days later. In this period, the children used a toothbrush and dental floss for cleaning teeth, like before the study, and they avoided any oral health practices 48 hours prior to the review on day 30. On day 30, like day 0, the child's plaque index was determined using Green & Vermillion method by the same examiner. To determine the child's cooperation level in the use of mouth rinse, the mouth rinse containers were weighed again. In this study, all subjects were present at day 30 except for two people from the Meridol groups; more than 75 percent of the weights of mouth rinses were consumed. So, the subjects showed the necessary cooperation for the implementation of plan.

At day 30 of the study, 5 cases of discoloration resulting from the use of chlorhexidine were observed in the participating children's teeth that were removed by prophylaxis. At the end of the study, the needed advice was presented about the required dental treatment.

Data analysis was performed by SPSS-17 software. To evaluate the effect of each of the studied mouth rinses on plaque accumulation, non-parametric sign test was used, and to compare the mouth rinses, non-parametric Kruskal-Wallis test was deployed. Non-parametric Mann-Whitney test was used to compare the mouth rinses as pairs.

Results

In this study, mean plaque index at day 0 was obtained 3.73 ± 0.45 . At day 30, 47 of the children who participated in the plan referred back, 2 of whom (Meridol group) were not examined due to lack of sufficient cooperation in the use of mouth rinse. Thus, at the end of the study, 9, 12, 15 and 9 patients were studied from the groups of Meridol, Kids Irsha, chlorhexidine and saline, respectively. Mean plaque index on this day was 1.51 ± 0.37 . About the effectiveness of mouth rinse on plaque index during the study period, non-parametric sign test showed that the use of all mouth rinses (Meridol, Kids Irsha, chlorhexidine and saline) has led to significant reduction in percentage of plaque index at day 30 compared to day 0 of the study (Table 1).

Table 2 shows data on plaque index in the studied groups at days 0 and 30. As can be seen in this table,

plaque index in all kinds of mouth rinses at day 30 is less than day 0. Chlorhexidine group showed the highest reduction and Kids Irsha group showed the lowest reduction in plaque index.

In order to compare the effects of pairs of mouth rinses on the percentage of plaque index reduction, non-parametric Mann-Whitney *U* test was used.

According to Table 3, Meridol and Kids Irsha mouth rinses have not significant difference with each other and with Saline mouth rinse with respect to effects on the percentage of plaque index reduction; only chlorhexidine has significant difference with others ($p=0.001$).

Table 1. Effects of the studied mouth rinses on reduction percentage of plaque index at day 30 compared to day 0 based on sign test

Mouth rinse	<i>p</i> -Value	Confidence interval	
		Low Limit	High Limit
Meridol	0.04	46.54	68.53
Kids Irsha	<0.001	39.10	61.43
Chlorhexidine	<0.001	74.94	85.26
Saline	0.016	18.64	62.11

Table 2. Statistical indicators of the plaque index variable in different types of mouth rinses in 7-9 year-old children referred on days 0 and 30

mouth rinse	Plaque Index	
	Before using mouth rinse (day 0) (Mean±SD)	After using mouth rinse (Day 30) (Mean±SD)
Meridol	4.1±1.12	1.69±0.63
Kids Irsha	2.96±1.11	1.45±0.91
Chlorhexidine	4.07±1.5	0.74±0.39
Saline	3.97±1.52	2.17±1.15

Table 3. Comparison of different pairs of mouth rinses based on Mann-Whitney test

Mouth rinse	Mean rank of plaque index reduction	<i>p</i> -Value	Confidence interval	
			Low Limit	High Limit
Meridol	12.33	0.393	-0.46	2.26
Kids Irsha	10			
Meridol	6.56	0.001	-2.21	0.38
Chlorhexidine	16.63			
Meridol	11	0.083	-0.67	2.25
Saline	6.57			
Kids Irsha	7.58	< 0.001	-3.01	-0.62
Chlorhexidine	19.69			
Kids Irsha	11.75	0.246	-1.47	1.25
Saline	8.63			
Chlorhexidine	16.53	<0.001	0.41	2.10
Saline	5.78			

Discussion

This clinical trial study was carried out in order to investigate inhibitory effect of Kids Irsha and Meridol mouth rinse on plaque accumulation in 7-9 year-old children with regard to parallel groups and positive and negative control groups. Based on the findings of this study, reduction percent of plaque index in the groups of Kids Irsha and Meridol mouth rinses was significant at

day 0 compared to day 30. Also, compared to different types of mouth rinses with respect to reduction percent of plaque index on days 0 and 30, Kids Irsha and Meridol mouth rinses showed no significant difference with Saline, and only chlorhexidine had significant difference with other mouth rinses. In this study, chlorhexidine was considered as the positive control. Chlorhexidine was first introduced in 1970 as the golden standard for bacteriostatic and bactericidal substances [13].

Several studies have been conducted on the anti-plaque effects of chlorhexidine, all of which represent the extraordinary effect of this substance on the control of dental plaque [1, 3, 14-17]. Also, in the present study, chlorhexidine mouth rinse significantly reduced plaque accumulation compared to other mouth rinses. In this study, the use of mouth rinse in all four groups reduced plaque accumulation at day 30. This reduction can be related to the following two cases:

1- Entering the child in the study and parents' encouragements has motivated him/her to perform better the oral health care, regardless of the effects of the used mouth rinse.

2- The supposition of the participant child and his/her parents that the examiner would expect improvement of the studied condition regardless of the prescribed mouth rinse has led to better plaque control.

Despite all groups showed reduced plaque accumulation, no significant difference was observed between Meridol, Kids Irsha and Saline user groups. Kids Irsha mouth rinse (red) is made in Iran and is newer than any other mouth rinse with Irsha brand including antiseptic Irsha and anti-plaque Irsha. This mouth rinse has different ingredients but is similar to anti-plaque Irsha and Listerine (essential oils) mouth rinses and has flavoring material suitable for use by children [2, 18]. This mouth rinse has never been studied in any article. Esfahanian et al. compared chlorhexidine and anti-plaque Irsha and concluded that unlike chlorhexidine, Irsha is not effective in plaque reduction [3].

In our study, although Kids Irsha mouth rinse showed no difference with Saline mouth rinse, its effect on reducing plaque accumulation was significant. In a study by Sekino and Ramberg about the comparison of anti-plaque listerine and chlorhexidine, results similar to our study were obtained, i.e. listerine and chlorhexidine both reduced plaque accumulation, although the effect of chlorhexidine on plaque reduction was much greater [19]. Also, Meridol as an antiseptic mouth rinse containing fluoride and tin has been compared with other mouth rinses in several studies. Brex et al. compared the effect of listerine, chlorhexidine and Meridol mouth rinses on plaque index. In this study, plaque index in the chlorhexidine group was lower than that in the Meridol and Listerin groups [15].

The result of this study about the effects of Meridol mouth rinse is consistent with the study by Riep et al. The results of the study by Riep et al., which was conducted to examine the anti-plaque effects of chlorhexidine, essential oils and Meridol, suggests that Meridol mouth rinse is not significantly different from negative control in terms of

dental plaque reduction; however, in their study, listerine is more effective than Meridol [10]. It seems that the difference between the results of our study and other studies can be attributed to differences in the studied population characteristics (in terms of gender, age, sample size, health habits) or the study methods (parallel, cross). As mentioned above, so far no study has been conducted to investigate these mouth rinses in this age group, so a comprehensive comparison between this study and similar studies is not possible.

In this study, Green & Vermillion method was used for plaque index documentation. This method has been approved by WHO and has sufficient validity and reliable results. In this method, in each sextant, the buccal and lingual surfaces of only one tooth were studied with respect to plaque accumulation, without the use of detector material [12]. Conducted studies have shown that as the child gets closer to adolescence, the effect of discoloration caused by detector material on reduction of the child's cooperation increases [2]. Also, the use of detector material can be effective on the bacterial nature of dental plaque [20].

Also in this study, the duration of the study for plaque index in samples was decided based on the principles related to the effect of chemical agents on plaque index. This period have been suggested to be from several weeks to several months for studies that are designed as parallel groups [20].

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The study results suggest that chlorhexidine mouth rinse can have the greatest impact in reducing plaque accumulation in this age group. Although Meridol and Irsha both reduced plaque accumulation, they were not different from Saline.

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Authors' Contributions

All authors had equal role in design, work, statistical analysis and manuscript writing.

Conflict of Interest

The authors declare no conflict of interest.

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