

Effect of Herbal Mouthwash on Salivary pH in Orthodontic Patients

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الخلاصة

الهدف: الهدف من هذه الدراسة هو لتحليل تأثير غسول الفم العشبية على درجة الحموضة اللعابية لدى مرضى الذين يضعون اجهزة تقويمية لالاسنان بعد اختبار الحامضية من خلال تناول مشروب غازي (مشروب غازي الكوكا كولا) ومقارنته مع درجة الحموضة الأساسية وتحديد مدى فعالية هذا الغسول العشبية للمحافظة على توازن حموضة الفم وبالتالي حماية الأسنان والغشاء المخاطي للفم من تأثير المادة الحمضية. **المواد وطرائق العمل:** تضمنت هذه الدراسة ٢٠ مريضا واضعين الأجهزة التقويمية الثابتة ويتناولون كوب واحد من المشروبات الغازية (كوكا كولا) ثم يتغرون بغسول الفم العشبي لمدة ١٠-٥ ثواني بعد ذلك تم قياس درجة حموضة اللعاب في ٠, ٥, ١٠, ١٥ دقيقة بعد شرب (كوكا كولا). **النتائج:** اظهرت النتائج ان هناك فرقا معنويا كبيرا في درجة الحموضة بعد شرب الكوكا كولا (6.65 ± 0.303)، بالمقارنة مع درجة حامضية اللعاب قبل استخدام الغرغرة (6.65 ± 0.303) ودرجة الحموضة بعد استخدام الغسول الفموي العشبي في الاوقات (٠, ٥, ١٠, ١٥) على التوالي (6.7 ± 0.115) (6.79 ± 0.110) (6.58 ± 0.139) (6.53 ± 0.188)، في حين لم تكن هناك فروق ذات دلالة إحصائية بين درجة الحموضة اللعابية الأساسية وقياسات درجة الحموضة في الاوقات المختلفة الأخرى. **الاستنتاجات:** استخدام غسول الفم العشبي ادى الى رفع درجة حموضة اللعاب أعلى من درجة الحموضة الأساسية و تحسين قدرة اللعاب في معادلة الحموضة

ABSTRACT

Aims: The aims of present study were to analyze herbal mouthwash effects on salivary buffering capacity of orthodontic patients after acidogenic challenge by taking a carbonated beverage (coca cola® soft drink), in comparison with baseline pH and determine the duration of action of this mouthwash at which it will persist to protect teeth enamel and oral mucosa from acidic pH. **Materials and Methods:** Ten patients wearing fixed orthodontic appliances were included in this study. baseline pH for each patient was detected. Each patient was instructed to take one cup of carbonated beverage (coca cola), the mouth pH was re measured directly after coca cola drinking. The patients were asked to gargle with herbal mouthwash for 5-10 seconds, the saliva pH was re detected for each patient after 0, 5, 10, 15 minute. **Results:** A significant reduction in salivary pH was found after coca cola drinking (5.47 ± 0.689) was found in comparison with baseline pH (6.65 ± 0.303), salivary pH at 0, 5, 10 and 15 mins from herbal Mouthwash (6.79 ± 0.110), (6.7 ± 0.115), (6.58 ± 0.139) and (6.53 ± 0.188) respectively at ($P < 0.05$), while there were no differences among rest pH measurements. **Conclusion:** application of herbal mouthwash elevated saliva pH directly higher than baseline pH and was effective in enhancing saliva buffering capacity. However, there were no significant differences in pH after taking herbal mouthwash at different times.

Key words: Herbal mouthwash, Orthodontic patients, Salivary pH, Buffering capacity

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INTRODUCTION

Saliva is the maximum abundant frame fluid, which was produce by way of salivary glands and secreted in the oral hollow space for lubricating the oral mucosa, digestion of food, cleaning the mouth, helping speaking, facilitating swelling, flushing tooth and protecting the tooth from acidity. It is a mixed frame fluid that consisted from 99% of water and minerals, mucin, enzyme (amylase enzyme which is accountable of first step of starch hydrolysis), protein, antibodies, blood, and inflammatory cells ^[1]. The most essential feature of saliva is to maintain the pH of oral hollow space within range of (6.8-7.4) for saving the tooth from food acidity, which is the origin of dental caries ^[2]. Salivary pH decreases when we take a food rich in carbohydrates that favored dental plaque formation, then the buffering capacity of the saliva returns mouth pH to its resting level. It is very challenging to prevent dental caries, as the prevalence of it is very high in general population and it takes place in economically deprived humans who cannot afford the commercial to had oral hygiene products ^[3]. Fixed orthodontic appliance is increase risk on tooth enamel by accumulation of microorganism, which leads to demineralization process of teeth enamel that seen as white spot on teeth surfaces specially around orthodontic brackets. These appliances are associated with higher risk of dental caries and periodontitis, it had been

showed that up to 6-10% increases in oral bacterial count after placement of orthodontic appliance ^[4]. Orthodontic patients are two to three time more frequent to have dental plaque than patient without orthodontic appliance, additionally, orthodontic appliance affects saliva properties by lowering saliva pH, flow rate and saliva buffering capacity, that increase risk of dental caries in patients wearing orthodontic appliance ^[5]. Both chemical and mechanical oral hygiene aids are utilized for prevention and removal of dental plaque. Even though, the toothbrush is the most widely used oral hygiene aid, a majority of the population is not able to perform mechanical plaque removal effectively ^[6]. Natural mouthwashes have pharmacological impacts such as anti-inflammatory, antioxidant, antiulcer and narcotic impacts errands. In spite of the fact that numerous prevalent natural items have made a difference to control dental Plaque and gingivitis, they have been utilized for a brief time and as it was as an aide to other oral hygiene measures such as brushing and flossing ^[7]. Natural mouthwash contains a natural ingredient called phytochemical that contains desired anti-microbial and anti-inflammatory effect ^[8]. The effects of these herbal mouth washes on improving the buffering ability of the saliva still unknown. Therefore, the aims of current study were to analyze herbal mouthwashes effects on salivary pH of orthodontic weariness patients

after acidogenic challenge by taking a carbonated beverage (coca cola® soft drink).

MATERIALS AND METHODS

The protocol of this study was reviewed and approved by the scientific committee of the Ministry of Health-Nineveh Health Directorate-Mosul-Iraq no:26139

This study was consisting of 10 patients (1 male and 9 females) wearing fixed orthodontic appliance aged range (16.33 ± 3.51) years, Healthy patient without concomitate other mouth or systemic disease, non-smoker, non-alcoholic, without known history of allergy to our tested mouthwash, with at least 2 months from wearing orthodontic appliance and patients wasn't currently on prescribed drugs, was included in the present study, the salivary pH for each patient was measured using compact pH meter (HORIBA's LAQUAtwin in Kyoto, Japan, that consist of mixture of Chamomile, Oak park, sodium fluoride and triclosan), the herbal mouth wash that used in this study was (Vitex maximum orthodontic care mouthwash) it is made by CJSC "Vitex" company in Republic of Belarus, 2 Smirnova str., Minsk. The patients were gargling with this herbal mouthwash for 5-10 second (according to British pharmacopeia).

Procedure of measuring pH:

Patient was informed not to brush their teeth or use any mouth wash or have any other oral hygiene procedure for up to 12 hours before

the testing procedures. Even more, patients were informed not to eat or drink anything's for one hour before testing. All the testing procedures were performed at 10 am each patient was sitting on the chair in upright position with his hand on his knees (for calming him down), Then he spited in the concave part of the pH meter, this pH reading was recorded as baseline pH. Then, each patient was given one cup (100ml) of carbonated beverage (Coca Cola® Irbil, Iraq) and was asked him to gargle with it for 10 seconds (same as mouth wash) before swallowing it, pH of saliva was directly recorded at 0 min for measure the dropping in pH because of it. Directly the patients were gargling with 5ml of herbal mouthwash for 10 seconds then spited it out. Measuring saliva pH directly after gargling to show the effect of gargle on mouth pH at 5,10,15 and 20 minutes.

RESULTS

The results of measurement of the salivary pH for orthodontic patients using herbal mouthwash (pH of the mouthwash solution 7.3) were shown in (Table 1) which reveal the mean and standard deviation of each pH measurement. The result of comparison for pH measurement of saliva for orthodontic patients using herbal mouthwash by One way analysis of variance (ANOVA) reveals a significant difference in pH after coca cola (5.47 ± 0.689) in compare with baseline pH (6.65 ± 0.303), Salivary pH at 0,

5, 10 and 15mins from gargling with herbal Mouthwash (6.79 ± 0.110), (6.7 ± 0.115), (6.58 ± 0.139) and (6.53 ± 0.188) respectively at (P value <0.05), while there weren't any

remarkable differences between baseline pH and pH after 0, 5, 10 and 15mins from herbal mouthwash at (P value >0.05).(Table 1)

Table (1): the means and standard deviation of the pH measurement data of saliva for orthodontic patients using Herbal mouthwash

pH	(Mean \pm Std. deviation)	F	P-value
Baseline	(6.65 ± 0.303) ^a		
After coca cola	(5.47 ± 0.689) ^b		
0 min from herbal gargling	(6.79 ± 0.110) ^a		
5 mins from herbal gargling	(6.7 ± 0.115) ^a		
10 mins from herbal gargling	(6.58 ± 0.139) ^a		
15 mins from herbal gargling	(6.53 ± 0.188) ^a	22.254	0.000

a: mean significant difference between all time and after coca cola

*significant at $p<0.05$

The Duncan's test Figure (1) shows the significant differences among groups in pH

measurement of saliva for orthodontic appliance patients using herbal mouthwash.

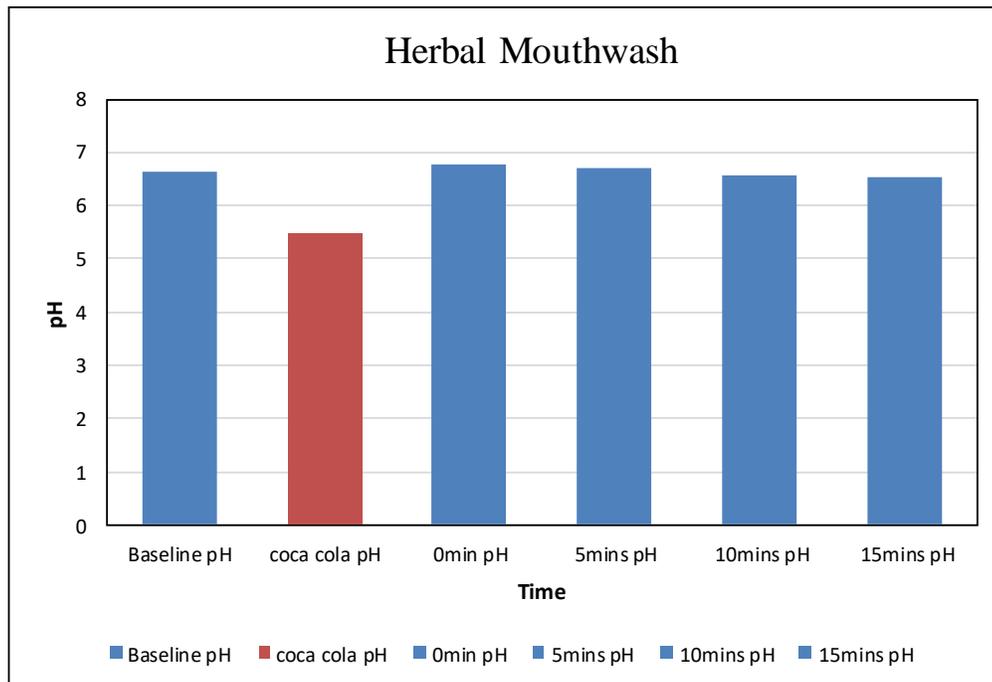


Figure (1): Mean of pH measurement of saliva for orthodontic patients using herbal mouthwash.

DISCUSSION

The importance of saliva within the upkeep of suitable oral health, as its importance mostly presented in Xerostomic patients who frequently develop caries together with atrophic and erosive mucosal lesions, irritation and contamination due to decrease in saliva^[9]. It should be expected that saliva additionally performs an important function in dental erosion, whose incidence has expanded in current years and is presently taken into consideration to be a huge mouth disease and a focus of increasing interest each in clinical dentistry and in research. As this method has been strongly related to acidity of drinks, and assuming that pH is the important threshold for tooth tissue dissolution, checking out of erosive capability on human teeth makes feel with substances having pH values under 5.5. The remarkable raise in salivary pH after utilizing mouth wash appears that spit could be an energetic framework, which the living being is competent of reacting to a boost with changes in its composition^[10]. In the present study it was found that saliva pH drop to 5.47 immediately after drinking carbonated beverage, while, after herbal mouthwash, it re elevated directly to reach 6.79 which is higher than baseline pH (6.65) that persist for few minutes then it retains to approach baseline pH, it also have a refreshing feeling with no bitter test or loss of sensation which seen with other chemical mouthwash. This

result agrees with other study that suggested that the application herbal green tea as a mouth rinse providing increase in saliva pH and produce alkaline environment which is beneficial to the oral health in children^[11]. A mouthwash may be suggested to treat contaminations, diminish irritation and decrease halitosis or for local fluoride administration for caries inhibition. The preventive use of mouthwash is mainly to control dental caries and the therapeutic use is to inhibit or reduce plaque associated bacteria. Usually, the traditional mouthwash comprises of the high alcoholic content. It can cause harm to the teeth and gums^[12]. The oral mucosa gets irritated using chemical mouthwashes. Especially in cases you have sensitive gums, then you may encounter with the ache. While, the natural mouthwash doesn't contain any alcoholic residue and is gentler on the mouth^[13]. Chamomile have therapeutic properties and have a positive impact on the dental anxiety rates, especially in patients undergoing tooth extractions, also used as a mouth wash in gingivitis, periodontal disease and ulcers^[14]. Dental caries had been declined since the start of fluoridation in the developed world. Fluoridation had been started after ensuring that fluoride has the ability to made stronger teeth that more resistant to acid^[15]. Oak bark is good as a mouthwash for treating sore throat, bleeding gums and tonsillitis, or as a tooth powder for treating receding gums and

loose teeth. Oak bark powder is use to stop nosebleeds by snuffing it ^[16]. Triclosan 5-chloro-2-(2,4-dichlorophenoxy) phenol, it is nonionic agent with broad antimicrobial spectrum and favorable safety profile, at low concentrations Triclosan inhibit the growth of several types of bacterial microorganisms and Fungai, while at high concentration it directly kills them. it is incorporated into numerous personal care items including antibacterial hand soaps, deodorant soaps, toothpaste and dishwashing liquids ^[17]. So, it is better to use the natural or alcohol-free mouthwash. The use of mouthwash enhances the saliva buffering capacity but it usually difficult to be taking every time as it is bulk to be transported or taking every ware and patients mostly use it once daily.

CONCLUSION

Orthodontic maximum® herbal mouthwash shows beneficial effects in elevation salivary pH and fast return to alkaline pH of saliva after consuming a cup of carbonated beverage (coca cola). This elevation in salivary pH toward alkaline, is effective in enhancing saliva buffering capacity and improving oral health.

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