International Journal of Medical and Health Research
ISSN: 2454-9142; Impact Factor: RJIF 5.54
Received: 10-12-2020; Accepted: 11-01-2020
www.medicalsciencejournal.com
Volume 6; Issue 2; February 2020; Page No. 42-43

Effect of different types of chewing gum on dental caries of 4-12 years old children

Dr. Prabhav Chauhan[1*], Dr. Garima Chauhan[2], Dr. Mody Anuja[3]
[1] Assistant Professor, Department of Pediatric Dentistry, Darshan Dental College and Hospital, Udaipur, Rajasthan, India
[2] Consultant at Multispecialty Dental Care Clinic, Modinagar, Uttar Pradesh, India
[3] Consultant Pediatric Dentist at ToothSi Clear Aligners Company, Mumbai, Maharashtra, India

Abstract
Aim: To study the caries susceptibility of Snyder test to assess caries susceptibility in school children.
Material & Methods: A total of 30 school children of 4-12 years age group were randomly selected. The collection of saliva was made under similar conditions at the same time. The patients were instructed to take lunch and drink water at 11 am and not to consume anything after that. The saliva was collected for the Snyder test.
Results: With decrease in pH of the saliva the children are more susceptible to dental caries. At ph above 6, children did not show any change in colour, demonstrating that as the pH of saliva is increased or towards normal the tendency towards dental caries decreases
Conclusion: The caries experience was found to be significantly more in children who showed marked changes in the colour indicating a high degree of correlation of Snyder test with DMFT/dmft Index.

Keywords: chewing, dental, children, susceptibility

1. Introduction
Dental caries is a complex and dynamic process where a multitude of factors influence and initiate the progression of disease. One prime factor which has immense capacity to modulate the initiation and progression of dental caries is saliva. Alterations in the physicochemical properties of saliva such as altered composition decreased salivary flow rate (SFR), pH, and buffering capacity favors the caries process. This is clearly evident in xerostomic patients. The prime sign associated with xerostomia is drastic increase in incidence of dental decay; other symptoms include cheilosis, glossopyrosis, glossodynia, thirst, dysphagia, dysphonia and masticatory inadequacy; hence, it is important to have an adequate salivary flow [1].
Chewing gum is made of gum base, sweetening, flavoring, and aromatic agents. The gum base is a mixture of elastomers, natural and/or synthetic resins, fats, emulsifiers, waxes, anti-oxidants, and fillers. Chewing gum has been claimed to remove food debris and plaque from teeth [2].
A study reported a 24% higher DMFS increment in a group of sucrose-gum-chewers than in the no-gum control group, although dose and duration of the test were not reported [3].
Thus, the aim of the study is to evaluate the effect of chewing gums on dental caries of 4-12 years old children.

Material & Methods
The study was conducted in the Modinagar city of Uttar Pradesh. The ethical clearance was obtained from institutional ethical committee before conducting the study and necessary permission was obtained from the Heads of the schools. The sample size was calculated based on population size of preschool and school going children (age group 6 to 12 years) of city. Informed consent was obtained from the parents of the children before conducting the study.
The clinical examination was carried out along with demographic profile, personal habits and oral hygiene practices. DMFT/DMFS index by Henry Klein, Carrole Palmer and Knuston 1938 and deft/defs index by Grubell 1948 was used to assess the caries status of the children.[4] The ph of the saliva was recorded using pH meter. The saliva sample was collected by spitting method[5], the child was asked to rinse the mouth with distilled water. Immediately after rinsing the child was asked to chew a small piece of paraffin wax. The saliva that accumulated in following three minutes was collected in a sterile container.
After vigorous shaking 0.2 CC of the sample was withdrawn into the pipette and then transferred into a melted medium of agar at 50° C. The medium had Bromocresol green as pH indicator. The inoculated medium was then incubated at 37° for a period up to 72 hours.
The rate of colour change from blue-green to yellow is indicative of the degree of caries activity. If yellow within 24 hours - Marked susceptibility to dental caries. If yellow with 24-48 hours - Definite susceptibility to dental caries (moderate susceptibility). If yellow within 48-72 hours - Limited susceptibility to dental caries (slight susceptibility) No color changes - Caries inactive group. (negative susceptibility)
Statistical Analysis
The data was analysed using SPSS software.

Results

Table 1: Proportion of study population according to age and dmft index

Age (Years)	0.00-0.10	0.11-0.50	0.51-1	1.1-1.5	Total
4-6	29 (19.6%)	30 (20.3%) **	1 (0.7%)	0 (0.0%)	60 (40.5%)

6-8	8 (5.4%)	13 (8.8%)*	3 (2.0%)	0 (0.0%)	24 (16.2%)
8-10	18 (12.2%)	15 (10.1%)*	8 (5.4%) **	1 (0.7%)	42 (28.4%)
10-12	14 (9.5%)	2 (1.4%)	6 (4.1%) **	0 (0.0%)	22 (14.9%)
Total	69 (46.6%)	60 (40.5%)	18 (12.2%)	1 (0.7%)	148(100.0%)

Table 2: Proportion of study population according to pH of saliva and caries activity test (Snyder test)

pH of saliva	Marked (After 24 hrs)		Definite (After 48 hrs)		Limited (After 72 hrs)	
	Changed	No Changed	Changed	No Changed	Changed	No changed
3-4	1 (0.7%)	3 (2.0%)	2 (1.4%)	2 (1.4%)	2 (1.4%)	2 (1.4%)
4.1-5	12 (8.1%)	15 (10.1%)	16 (10.8%)	11 (7.4%)	19 (12.8%)*	8 (5.4%)
5.1-6	41 (27.7%) **	11 (7.4%)	43 (29.1%) **	9 (6.1%)	43 (29.1%) **	9 (6.1%)
6.1-7	2 (1.4%)	38 (25.7%) **	4 (2.7%)	36 (24.3%) **	3 (2.0%)	37 (25.0%) **
≥7	2 (1.4%)	23 (15.5%) **	2 (1.4%)	23 (15.5%) **	3 (2.0%)	22 (14.9%) **
Total	58 (39.2%)	90 (60.8%)	67 (45.3%)	81 (54.7%)	70 (47.3%)	78 (52.7%)

Discussion

The Snyder test measures the time required for the Lactobacilli in the saliva test sample, used to inoculate a suitable culture medium with a pH indicator, to produce a degree of acidity which causes a particular colour change of the indicator. This time is proportional to the initial number of Lactobacilli in the test sample [5]. This would help to identify high risk group individuals by assessing the change in colour in the patient's saliva sample. Then appropriate preventive and treatment measures for the individuals can be planned.

In this study caries was found to be in 89% of children. DMFT and DMFS was found to be significantly more in age group of 9-11 years and 12-14 and the dmft was found to be more in 4-6 years though it was not found to be statistically significant. The caries experience was found to be significantly more in the children who showed marked change in the colour in the first 24 hours. Also it was found that the decrease in pH (less than 6) was significantly more with marked changed in colour. This demonstrates that Lactobacilli counts are positively correlated with caries activity. Snyder and Clarke, Jullian J.H. and Fitzgerlad R.J.10 in their studies reported a close relation between Snyder test and lactobacillus count [6].

Snyder supports his test by proving it in 63 children and found it accurate for selecting caries active and caries negative cases as established by clinical examination. Cohen A H6 also observed a high degree of correlation between the Snyder's test and caries experience by DMFT index [7].

The calorimetric test was developed from an attempt to simplify the quantative technique for ordinary clinical use. Its reflects the acid production of all the organisms of saliva inoculated in the selective carbohydrate medium of pH of 4.7-5.0 Acceptance of the colorimetric method for diagnosis of caries activity involves not only the practical consideration of simplicity, accuracy and economy but also the idea that acidogenic or aciduric organisms other than lactobacillus have some part in the process [7].

In both the studies the only correlation between the presence and number of aciduric or acidogenic bacteria in the saliva and caries activity was that which was found with lactobacillus and yeast [8]. Neither streptococci nortaphylococci were isolated any more frequently in the caries active than caries negative cases.

Conclusion

The present study concluded that the caries experience was found to be significantly more in children who showed marked changes in the colour indicating a high degree of correlation of Snyder test with DMFT/dmft Index. This study opens new vistas for future research.

References

1. Lenander-Lumikari M, Loimaranta V. Saliva and dental caries. Adv Dent Res 2000; 14:40-7.
2. Addy M, Perriam E, Sterry A. Effects of sugared and sugar-free chewing gum on the accumulation of plaque and debris on the teeth. I ClinPeriodontol. 1982; 9:346-54.
3. Baron HI. Modifying the cariogenicity of foods with dicalcium phosphate. In: Foods, nutrition and dental health. Hefferren JI, Koehler HM, editors. Park Forest South, IL: Pathotox Publishers, 1981, 61-68.
4. Shakir A, Ismail M, Abdulla Y. Dental Caries and gingivitis associated with Mutans Streptococci among children: JODR. 2017; 4:1.
5. Yamuna Priya K, MuthuPrathibha K. Methods of collection of saliva - A Review International Journal of Oral Health Dentistry. 2017; 3(3):149-1534.
6. Nishimura M, Oda T, Kariya N, Matsumura S, Shimono T. Using a caries activity test to predict caries risk in early childhood. J Am Dent Assoc. 2008; 139(1):63-71.
7. Lorne Koroluk, Jay Hoover N, Kunio Komiyama. The sensitivity and specificity of a colorimetric microbiological caries activity test (Cariostat) in preschool children. Pediatric Dentistry, 1994, 276-281.
8. Sánchez-Pérez L, Acosta-Gío AE, Méndez-Ramírez I. A cluster analysis model for caries risk assessment. Arch Oral Biol. 2004; 49(9):719-25.