

Surface Roughness Of Teeth After Application Of Rematerializing Toothpastes- An In Vitro Study

¹Dr Hussain Mookhtiar, PG Student, Dept. of Conservative Dentistry & Endodontics, M.A. Rangoonwala dental college and research centre, Pune, Maharashtra.

²Dr Srilatha Shanmugasundaram, Department of conservative dentistry and Endodontics, M.A. Rangoonwala dental college and research centre, Pune, Maharashtra.

Citation Of This Article: Dr Hussain Mookhtiar, Dr Srilatha Shanmugasundaram, “Surface Roughness Of Teeth After Application Of Rematerializing Toothpastes- An In Vitro Study”, IJDSR March - April - 2020, Vo2. – 2, Issue -2, P. No. 28-30.

Copyright: © 2020, Dr Hussain Mookhtiar, et al. This is an open access journal and article distributed under the terms of the creative commons attribution non commercial License. This allows others to remix, tweak, and build upon the work non commercially, as long as appropriate credit is given and the new creations are licensed under the identical terms.

Corresponding Author: Dr Hussain Mookhtiar, PG Student, Dept. of Conservative Dentistry & Endodontics, M.A. Rangoonwala dental college and research centre, Pune, Maharashtra.

Type of Publication: Original Research Article

Conflicts Of Interest: Nil

Abstract

The aim of this study reduction of surface roughness of teeth after application of Fluoridated, Calcium Sucrose Phosphate and CPP-ACP Toothpastes.

Materials and Method

The specimens were mounted on acrylic blocks and placed in demineralising solution for 72 hrs. After 72 hrs, initial surface roughness was assessed. The teeth specimens were divided into three groups: Group A: Fluoridated toothpastes Group B: calcium sucrose phosphate toothpaste Group C: CPP-ACP tooth paste. The toothpastes were applied on the specimens for 3 mins and washed with distilled water and placed in artificial saliva. This routine was carried out for 30 days. Final surface roughness was assessed.

Results

In Group 1 (Fluoride), the distribution of mean initial surface roughness did not differ significantly compared to mean final surface roughness. In Group 2 (CSP), the distribution of mean initial surface roughness is significantly higher compared to mean final surface roughness. In Group 3 (CPP-ACP), the distribution of mean initial surface roughness is significantly/ higher compared to mean final surface roughness (P-value<0.001).

Conclusion

Within the limitations of this study, CPP-ACP and calcium sucrose phosphate showed the significant reduction in the surface roughness compared to fluoridated toothpaste.

Keywords

CPP-ACP, Calcium Sucrose Phosphate, Dental Caries, Surface Roughness

Introduction

Dental caries is most prevalent chronic disease affecting the human race. Its prevalence has been noted since the time of pre-Neolithic humans. With respect to all the definitions by various authors, dental caries is initiated via demineralisation of the dental hard tissues resulting in roughing of the hard tooth surface Caries results from an imbalance between many cycles of demineralization and remineralization rather than from continued demineralization. The earliest clinical sign is the “white spot lesion” which result in roughening of the surface of teeth.

Specimen Preparation

After obtaining the Institute Ethical clearance, the study was conducted in the Department of Conservative Dentistry and Endodontics. Sixty human extracted single-rooted teeth with single canal and well-formed root apices, were collected from Department of Oral and Maxillofacial Surgery with informed consent of the donor.

Preparation of Demineralization solution

Dematerializing solution was prepared in the Department of Biochemistry. A digital pH meter (Slope Labtronics, Model LT-11, Punchkula, Haryana, India) was used to check pH during and after preparation of solution.

Preparation of Artificial Saliva

We made the artificial saliva we used in our study according to the formulation used by McKnight Hanes and White ford which contained 0.65 grams per liter potassium chloride 0.058 g/L magnesium chloride BP, 0.165 g/L calcium chloride BP, 0.804 g/L dipotassium hydrogen phosphate, 0.365 g/L potassium

dehydrogenate phosphate, 2 g/L sodium benzoate, 7.8 g/L sodium carboxymethyl cellulose BP, deionized water to make 1 L.

Specimen Treatment

The acrylic blocks were placed in artificially prepared demineralization solution using Standard Ph cycle. A daily schedule of 3 cycles of 30 mins of demineralisation and 2.5 hrs of remineralization was performed after which the specimens were placed in artificial saliva for 72 hrs. The specimens were then divided into 3 groups:

Group A: Specimens with application of fluoridated (Colgate, Colgate-Palmolive, India) toothpaste

Group B: Specimens with application of Calcium sucrose phosphate (Tooth in, Abbott India Ltd.) toothpaste

Group C: Specimens with application of CPP-ACP toothpaste.

Initial Surface roughness was analysed using surface profilometry prior to the application of the toothpaste. Toothpastes were applied on the crown disks using a micro brush applicator tip and tooth brushing was performed using a micro motor and bristle brush for about 3 mins.

Discussion

It marks the beginning of early enamel caries. During demineralization, Ca^{2+} , OH^- , PO_4^{2-} , F^- , CO_3^- , Na^+ and Mg^{2+} get displaced from the enamel surface to the exterior. More the acidic environment, greater is the outward flow of ions. However, mineral content of surface is higher than the body of the lesion.^[11] Thus, pH plays a major role in the loss of these ions resulting in surface roughness.

Conclusion

Within the limitations of this study, CPP-ACP and calcium sucrose phosphate showed the significant

reduction in the surface roughness compared to fluoridated toothpaste.

References

1. Loesche WJ. Role of *Streptococcus mutans* in human dental decay. *Microbiol Rev* 50:353-80,1986
2. Riordan PJ. Dental fluorosis, dental caries and fluoride exposure among 7-year-olds. *Caries Res* 27:71-7,1992.
3. Riordan PJ, Banks JA. Dental fluorosis and fluoride exposure in Western Australia. *J Dent Res* 70:1022-8,1991. Riordan PJ. Perceptions of dental fluorosis. *J Dent Res* 72:1268-74, 1993.
4. Elizabeta S, John W. A preliminary study of enamel remineralization by dentifrices based on recaldent™ (CPP-ACP) and NovaMinR (calcium-sodium-phosphosilicate). *Acta Odontol Latinoam* 2010; 23: 234-239.
5. Petrou I, Heu R, Stranick M, et al. A breakthrough therapy for dentin hypersensitivity: how dental products containing 8% arginine and calcium carbonate work to deliver effective relief of sensitive teeth. *J Clin Dent* 2009; 20: 23-31.
6. White DJ. The application of in vitro models to research on demineralization and remineralization of the teeth. *Adv Dent Res* 1995; 9: 175-193.
7. Heshmat H, Ganjkar MH, Jaberi S, et al. The effect of Remin Pro and MI paste plus on bleached enamel surface roughness. *J Dent (Tehran)* 2014; 11: 131-136.
8. Cheng ZJ, Wang XM, Cui FZ, Ge J, Yan JX. The enamel softening and loss during early erosion studies by AFM, SEM and nanoindentation. *Biomed Mater* 2009; 4: 015020.
9. Remineralization of early enamel caries lesions using different bioactive elements containing toothpastes: An in vitro study. *Technology and Health Care* 24 (2016) 701–711
10. Kumar VL, Itthagaran A, King NM. The effect of casein phosphopeptide-amorphous calcium phosphate on remineralization of artificial caries-like lesions: an in vitro study. *Australian Dental Journal*. 2008 Mar;53(1):34-40.