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Effect of Tooth Mousse Plus and Cervitec gel on S.mutans

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Abstract

Prevention of dental caries and minimal intervention dentistry play a vital role in dental practice. Role of fluoride and chlorhexidine as an antimicrobial agent has been well documented. Recently, products containing remineralizing capabilities like amorphous calcium phosphate and casein-phosphor peptide have been combined with fluoride for additional benefits. This study compared the efficacy of Tooth Mousse Plus and Cervitec gel against S. mutans. Results showed that both products were successful in reducing S. mutans, with greater reduction seen with Tooth Mousse Plus.

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Introduction

In the present century, great emphasis is placed on caries risk assessment, early diagnosis and caries control. Thus, the focus has shifted to effective preventive strategies and minimal intervention. The efficacy of fluoride in caries prevention is well documented[1,2]. Another well-tested antimicrobia agent is chlorhexidine. With the advent of newer improved materials and techniques, there has been a progressive evolution in preventive dentistry. One such concept is that of "remineralization" with casein-phosphor peptide – amorphous calcium phosphate (CPP-ACP). The anticariogenic potential of CPP-ACP has been observed by several studies on animals, in-vitro and in situ human studies[3-5]. However, most of these studies have primarily focused on the remineralizing capability of CPP – ACP. Recently, fluoride has been added to products containing chlorhexidine as well as CPP-ACP. Thus, the aim of this study was to assess the efficacy of Tooth Mousse Plus against S. mutans and to compare it with that of Cervitec gel.

Material and methods

For the purpose of selection, healthy children aged between 13 to 18 years from a residential school were examined. Thirty children who fulfilled the inclusion criteria:

- Children aged 13 – 18 years
- Children with permanent dentition, only
- DMFT > 3

formed the study sample.

Prior to the study, the nature of the study was explained to the school authorities as well as the parents and written consent was obtained. Ethical clearance was granted by the ethical committee of the review board.

Firstly, all the children were screened and 30 children were selected based on the inclusion criteria. These children were further randomly divided into two groups of 15 children each, Group I to receive Tooth Mousse Plus (GC Corporation, Japan) and Group II to receive Cervitec gel (Ivoclar Vivadent). Random division was done by asking children to pick a slip out of a bowl, which had either group I or group II written on it. On the first day of the study, following 30 minutes after breakfast, baseline plaque samples were taken from all the children. The plaque sample was collected from the buccal surface of first mandibular permanent molar using a sterile wedge. The samples were immediately transferred to sterile Ependrof tubes containing 1ml of saline each, and were taken within 2 hours to the microbiological laboratory. The samples were then vortexed for 30 seconds and 50 µl of each sample was inoculated into Mitis salivaris agar. These agar plates were incubated for 48 hours at 37^{o}C. Colony Forming Units (CFU) of S. mutans were then counted and recorded. The colony forming units were counted by a single examiner who was not aware as to which group the sample belonged to. On the second day, following 30 minutes after breakfast, children belonging to Group I received Tooth Mousse Plus and children in Group II received Cervitec gel. The paste was dispensed onto the index finger of every child and they were asked to spread it on all the surfaces of their teeth. Following application, the children were asked not to eat or drink for half an hour. For 15 consecutive days, the pastes were dispensed at the same time in the morning, and the children followed a similar procedure of application. On the 16th day, following 30 minutes after breakfast, plaque samples were again collected from the same site. As previously done, the samples were transferred, processed and taken to the microbiological laboratory for inoculation into the agar medium. Following incubation, the colony forming units (CFU) of S. mutans were counted and recorded.

The results were subjected to statistical analysis using student t-test (two-tailed independent) and Student t-test for paired comparison. The statistical software namely SPSS 15.0, Stata 8.0, Medcalc 9.0.1 and Systat 11.0 were used for analysis of the data.

Results

Table 1 shows the S. mutans count before and after application of Tooth Mousse Plus and Cervitec gel. The base line values for Group I and Group II were 30.60 CFU per 50 µl and 39.53 CFU per 50 µl, respectively. After application of both pastes, the values were 6.27 CFU per 50 µl and 19.13 CFU per 50 µl in Group I and Group II, respectively. Reduction in the count of S. mutans following application was found to be statistically significant (Table 1). The percentage of reduction was found to be 79.5% in Group I and 51.6% in Group II (Graph 1). However, there was no significant difference between the two groups.

Discussion

Dental caries has been defined as a diet and saliva modified bacterial disease. Among the various microorganisms present in the biofilm, Streptococcus mutans is predominant. Various new products have been continuously introduced into the market targeting these organisms. It is very important for both clinicians and community oral health workers to understand the

	Group I	Group II	P value
Before application	30.60±18.73	39.53±29.76	0.634
After application	6.27±7.78	19.13±24.69	0.078+
Log Reduction	2.09±1.14	1.30±1.22	0.077+
Significance	t=7.118; P<0.001**	t=4.127; P=0.001**	

Table 1. S. mutans count (CFU/50 µl) before and after application of tooth mousse plus and Cervitec gel.

effectiveness of these products. This would enable them to select the most appropriate preventive agent and gain optimum benefit from their preventive strategies.

In order to keep other parameters like diet and oral hygiene practices constant, children from a residential school were selected. It was also necessary to select an older age group of children because both products contain 900 ppm of fluoride. As reduction of S. mutans counts would be beneficial, especially for children with an increased caries risk. We had selected children with a DMFT score of more than three. The main constituent in Tooth Mousse Plus is CPP-ACFP. Localizing ACP in dental plaque makes it possible to modulate levels of bio available calcium and phosphate and maintain super-saturation of free calcium and phosphate ion activities. There is a buffering of plaque pH and enhanced remineralisation[5,6]. Schüpbach et al. found reduced adherence of S. mutans and S. sobrinus in the presence of CPP[4]. These mechanisms along with the anti-microbial effect of fluoride, could explain the reduction in S. mutans levels in the plaque samples of children in Group I.

One of the constituents of Cervitec gel is an antimicrobial agent, Chlorhexidine (CHX). It is a bisbiguanide with a broad antibacterial activity. The highly cationic nature of CHX makes it both bacteriostatic (at low concentration) and bactericidal. CHX binds to the phospholipids in the inner membrane, leading to its increased permeability and leakage of low molecular weight components such as potassium ions[7]. This change is reversible. With increasing concentration, the leakage of the low molecular weight cytoplasmic components decreases, reflecting the coagulation and precipitation of cytoplasm. This is due to formation of phosphated complexes such as ATP and nucleic acids. This is an irreversible change[7]. The combined antimicrobial effect of both CHX and fluoride could be the reason for reduction in S. mutans in plaque samples of children in Group II. However, the efficacy of CHX per se is reduced when used along with agents that are highly anionic in nature. Thus, the presence of fluoride in Cervitec gel could have resulted in a lesser percentage of reduction in S. mutans, when compared to Tooth Mousse Plus.

The remineralizing effect of Tooth Mousse and Tooth Mousse Plus on initial carious lesions has been well-documented[8,9]. This clinical trial reiterates the antimicrobial efficacy of Tooth Mousse Plus and its role as an anticariogenic agent in minimal intervention.

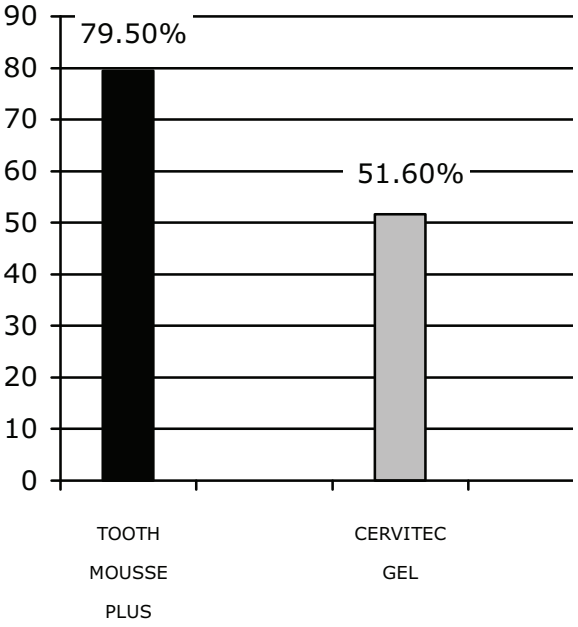

Figure 1. Percentage of reduction in S. mutans level for group I and II

All individuals particularly, those at a risk of developing caries could benefit from regular and prolonged application of Tooth Mousse Plus. However, further clinical studies of longer duration are warranted.

摘引

防止牙龋和最小侵入牙科在牙科实践中扮演着重要角色。
氟化物和洗必泰作为抗菌剂的功能在很多文件中都得到了记述。
近来，含有再矿化功效物质，例如非结晶性磷酸钙、酪蛋白磷酸肽，的产品，与氟化物相结合以获得额外益处。
该研究比较了 **Tooth Mousse Plus** 和 **Cervitec** 胶抑止变形链球菌的功效。结果显示两种产品都可成功降低变形链球菌的数量， 而 **Tooth Mousse Plus** 的功效更为显著一些。

Resumen

La prevención de caries dental y la odontología de intervención mínima, juegan un papel fundamental en la práctica dental. El rol del fluoruro y la clorhexidina como agentes antimicrobiales, ha sido bien documentado. Recientemente, productos con propiedades remineralizantes (como el fosfato de calcio amorfo y el péptido caseína-fósforo) se han combinado con fluoruro para obtener beneficios adicionales. Este estudio comparó la eficacia del Tooth Mousse Plus y el gel Cervitec contra los *S. mutans*. Los resultados mostraron que ambos productos tuvieron éxito en la reducción de los *S. mutans*, observándose una mayor reducción con el Tooth Mousse Plus.

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