

بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ
"قَالُوا سُبْحَانَكَ لَا عِلْمَ لَنَا إِلَّا مَا عَلَّمْتَنَا إِنَّكَ أَنْتَ الْعَلِيمُ
الْحَكِيمُ"

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The effect of Sodium Fluoride and Xylitol containing varnishes on Streptococcus mutans count In the Plaque of preschool children a comparative study

Thesis

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Dedication

To my Family

for their endless Love and Support.

To My Husband

for always being there

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INTRODUCTION

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Dental caries is the most common chronic disease in childhood, consisting in a severe public health problem for worldwide. It has a multifactorial etiology and is developed upon the presence of the dental biofilm, which is responsible for mediating the demineralization of dental hard tissue. The interaction among three factors during a period of time promotes the development of caries. These factors are: cariogenic microorganisms (*Streptococcus mutans*), fermentable substrate (such as saccharose) and a vulnerable host (***Loesche, 1986***).

The infection with *Streptococcus mutans* plays an important role in the onset and progression of the disease. When the mothers have high concentration of *Streptococcus mutans*, children are exposed to early infection and have higher prevalence of caries (***Köhler and Andéen, 1994***).

Recent studies carried out in Brazil have demonstrated that the prevalence of childhood caries ranges from 12 to 46%, and the age group having the highest amount of caries is that including children from one to three years (***Dini et al., 2000***).

The most recent national epidemiological surveillance of oral health found a prevalence of 26.85% of caries in children between 18 and 36 months, showing an evident increase as children grow older, regardless of sex (*Davidoff et al., 2005*).

The development of carious lesions is associated with infection, pain, chewing difficulty, psychological trauma and early teeth loss. Dental pain is the immediate most common consequence of untreated caries. Children with dental pain have their daily activities affected such as eating, sleeping and playing, as well their school performance can be impaired (*Edelstein et al., 2006*).

AAPD, 2008 classifies early childhood caries as the presence of one or more decayed (non cavitated or cavitated lesions), missing (due to caries), or filled tooth surfaces in any primary tooth in a child 71 months of age or younger. However, any sign of smooth surface caries, with or without cavity in children younger than three years old, is considered severe early childhood caries (S-ECC). S-ECC replaces the previous term known as "nursing bottle caries".

When there is early loss of the upper anterior teeth, there might be abnormal production of speech sounds and eating difficulty. Loss of vertical dimension in 63% of the children with extensive carious lesions in the upper incisors caused by S-ECC was also detected. Early loss of deciduous molars leads to chewing

difficulty, in addition to space loss problems in the permanent dentition (***Rokbe, 2008***).

The development of deciduous teeth begins in the intrauterine period, this is important to control infectious diseases and maternal diet. Therefore, the prevention of S-ECC must begin during pregnancy. Visiting the dentist is important for evaluation of the mother's oral status, providing curative and preventive treatment, mainly to stimulate oral care with the purpose of controlling streptococcus mutans levels and therefore, decreasing the transmission of cariogenic bacteria to their infants (***AAPD, 2008***).

Preventive measures usually involve a combination of dietary counsels, oral hygiene measures and fluoride applications (***Tinanoff et al., 2002***). Fluorides are delivered to the teeth in different dosages and a variety of ways. They can be delivered topically or systemically. Low doses of topical fluoride are found in most over the counter tooth pastes and optimally fluoridated water. Higher doses are found in oral rinses and fluoride supplements (pills or liquids) that are used at home. Using a fluoride supplement or drinking optimally fluoridated water provides both topical and systemic effects (***Featherstone, 2004***).

Recent studies have shown that sodium fluoride varnish is effective in reducing decay in the primary teeth of high risk children. There is evidence that the preventive effect is strongest when the

fluoride varnish is applied before onset of detectable dental caries (*Autio-Gold and Tomar, 2005*).

Within this context, the utilization of xylitol is highlighted, which was initially studied as a sugar substitute because of its similarity as regards the sweetening power and later was also employed in other forms of caries prevention and control (*Bastos et al., 2005*).

Xylitol is a naturally occurring sugar substitute that has been shown to reduce the levels of streptococcus mutans in plaque and saliva and to reduce tooth decay. Its specific effect on oral flora and especially on certain strains of streptococcus mutans add to its caries preventive profile and give it a unique role in preventive strategies for dental caries (*Ly et al., 2006*).

Therefore, the present study was designed to throw light on the additional effect of xylitol containing sodium fluoride varnish on the colonization of streptococcus mutans in dental plaque and compare its effect to another sodium fluoride varnish without xylitol.

REVIEW OF LITERATURE

REVIEW OF LITERATURE

Dental caries is a common, complex, chronic disease resulting from an imbalance of multiple risk factors and protective factors over time. Once dental caries occurs, its manifestations persist throughout life, even though the lesion is treated (**Shafer et al., 1983**). Dental caries can be defined as "an infectious microbiological disease of the teeth that results in localized dissolution and destruction of the calcified dental tissues" (**Sturoevant et al., 1995**).

Historically, there are three main theories describing the etiology of dental caries the chemico-parasitic (acidogenic) theory proposed by **Miller, 1890**, the proteoic theory by **Gottlieb, 1944** and the proteolysis chelation theory by **Shafer et al., 1983**.

The proteolytic theory postulates that the organic structures of the tooth provide the initial pathway for the invasion of microorganisms and their products and this is followed by the loss of the inorganic phase. The proteolytic bacteria act on the organic matrix of enamel liberating sulfuric acid from sulfated mucopolysaccharides of the organic matrix; this acid dissolves enamel minerals (**Gottlieb, 1944**)