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ESTIMATION OF TOPICAL FLUORIDE VARNISH ON OVERDENTURE ABUTMENTS

Dental Science

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ABSTRACT

Objectives: This invitro study assesses the effectiveness of topical fluoride varnish are preferable for the safety of overdenture abutments from acid challenges.

Methods: Freshly Extracted Twenty caries–free Permanent teeth were sectioned and prepared simulating overdenture abutment preparations. Teeth were randomly divided into four groups of 5specimens each. After that all teeth specimen groups were received the assigned fluoride treatment except control group. Teeth were then placed in a cycle of demineralization and remineralizationbesides that teeth were sectioned at 10µm buccolingually with a hard tissue microtomeand evaluated under Polarized light microscope.

Results: The lesions in the control group (A) were homogeneous while there was much variation in depth in the fluoride treatment groups. The remineralization bands were detectable in all groups, and it was particularly evident in weekly MI varnish (weekly) Group C.

Conclusion: With the invitro condition chosen, daily application of MI Varnish is the most efficient and useful treatment of products tested for the improvement of remineralization & preventing demineralization of overdenture abutments.

KEYWORDS

Fluorides Varnish, Overdenture Abutment, Teeth, Demineralization, Remineralization

INTRODUCTION: By the Nineteen Sixties, there was enough data to launch the concept of overdentures as a possible treatment modality.[1] A recent surge of attention in the concept of overdenture has resulted in several publications describing the techniques of overdenture production and the clinical outcomes received.[2-10] However, there was no longitudinal study which has documented the troubles related to overdentures. There is an actual need to objectively verify the effectiveness of this remedy modality.[11]

Van Waas et al additionally pronounced a massive reduction in vertical bone loss with overdentures after2 years of denture wearing compared with control subjects.[12]Overdentures may additionally offer better feature than completedentures via a spread of parameters, together with stepped forward biting pressure and chewing performance and elevated velocity of controlled mandibular movement .[13]

The significance of keeping good enough periodontal health for overdenture abutments has been diagnosed by using numerous authors.Patients who're treated with overdentures aren't always well inspired to use correct oral hygiene techniques, and lots of aged patients lack the dexterity to appropriately clean their teeth. Even if desirable hygiene is practised, the oral environment under an overdenture isn't always conductive to oral fitness .[14]However, a variety of of studies have identified caries and periodontal ailment as important problems related to overdenture abutments. A sizable hassle has been the increased susceptibility of overdenture abutments to dental caries. A tremendous trouble has been the increasedsusceptibility of overdenture abutments to dental caries.[15]

Covering tooth and soft tissues with overdentures probably isn't always conducive to the protection of a plaque-free environment.[16] Brewer and Morrow [17]advice that periodontal ailment and/or caries can end result, with the risk of loss of overdenture abutments.

Keltjens et al[18] cautioned that caries were the maximum generic cause for retreatment of abutment teeth. Because the overdenture covers the abutments and the capability of salivary buffering is decreased, the threat of caries is expanded. Toolson and Smith[16] showed that Simply brushing the overdenture abutments alone changed into no longer sufficient to prevent caries. Therefore a stringent upkeep application, which includes everyday bear in mind appointments and the utility of a domestic preventive regimen, is acceptable.[15]

Evidence suggests that fluoride integrated into the enamel apatite yields less soluble teeth and increases the rate of the remineralization, and may bring about whole arrest of the lesion.[19] The capability to decrease demineralization and intensify remineralization is one of the primary mechanisms of influence of fluoride in preventing dental caries.[15]

The motive of this study was to assess the efficacy of a fluoride varnish in protecting overdenture abutments from demineralization using an in vitro carious model

MATERIALS AND METHODS :

Twenty caries-loose teeth were randomly selected from a huge pool of extracted Permanent anterior and posterior teeth of older patients. From the department of oral Maxillofacial Surgery

Eligibility criteria:

Freshly extracted permanent human anterior and posterior teeth free from any carious lesion and effects of external trauma.

Exclusion criteria:

1. Teeth with carious lesions, fractures [coronal or radicular] will be excluded from the study
2. Teeth which have received crown, onlay or inlay will be excluded from the study.
3. Teeth with abnormal morphology and developmental defects will be excluded from the study.
4. Endodontically treated extracted teeth with displaced /fractured restorations.

After extraction, all the teeth were debrided with 3% solution of hydrogen peroxide to remove any attached calculus and debris, rinsed thoroughly with tap water and fixed in 10% buffered Formalin solution for minimum of 24-48 hrs. The teeth were then divided into four groups A,B,C,D (Illustration 1) in which A group is control group free from fluoride Varnish & group B,C,Dwere treated with fluoride varnish. Extracted teeth were prepared, simulating overdenture abutment. The enamel have been sectioned and domed right away underneath the cementoenamel junction with extended tapered diamond bur (SS White Burs Inc, Lakewood, New Jersey) using water cooling with a excessive-velocity dental handpiece. Two layers of an

acid resistant nail polish (L'Oreal Jet-Set; CosmairInc, New York, N.Y.) were painted on all surfaces besides for a window (2X4 mm) on every tooth (fig 2). The window turned into placed superiorly on the reduce dentin surfaceDental floss was tied to a bur hole drilled inside the root tip to permit suspension of the tooth in the numerous solution.. All the teeth specimens obtained the assigned fluoride treatment. Teeth were then placed in a cycle of demineralization (2.2 mMol/L CaCl22H2O, 2.2 mMol/L KH2PO4, and 50 mMol/L acetic acid at pH 4.3) for 6 hours and remineralization (1.5 mMol/L CaCl22H2O,0.9 mMol/L KH2PO4, and 150 mMol/L KCl at pH 7.0 for 17 hours) for one week. (Fig3) This cycle was maintained constantly for 21 days.

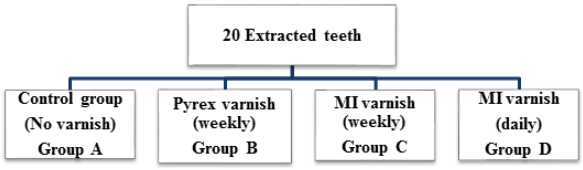

Illustration :1

During the termination of Experimental interval all tooth had been washed, and longitudinal sections were made buccolingually with a hard tissue microtome [series one thousand Deluxe; Scientific Fabrication, Lafayette, Colo.] (fig.4).The thickness of sections was 10 µm (fig 5).The sectionshave been evaluated under 4x5 magnification of polarized light microscopy (Olympus BH-2; Olympus Corporation of America, New Hyde Park, N.Y.) with distilled water as the imbibing medium.

The patterns of demineralization and remineralization of selected teeth sections in each group were assessed. The depth of lesion of every specimen become measuredfrom the inner most point to the surface of the lesions by tracing of polarized light photomicrography.

RESULT:A total of 20 teeth were evaluated from each group (A,B,C,D) Few teeth were lost due to catastrophic breakdown of the teeth sections throughout sectioning with the hard tissue microtome, including4 teeth in the control group, 2 teeth in theweekly gel group, and 2 teeth in the daily gel group. Histologically, the lesions appeared huge and saucer shaped. The lesions in the control group (A) were homogeneous while there was much variation in depth in the treatment groups.In Pyrex Group (B) we found reduction in lesion depth compared with the control group (A). The remineralization bands in the daily MI varnish group (D) were minimum depth of lesion compare to the other groups(Table:2 , Fig 6)

Table 2: Depth of Lesion (µm) in Group B, C, D

GROUPS	DEPTH (µm)
• Pyrex varnish (weekly)Group B	2.9
• MI varnish (weekly)Group C	3.5
• MI varnish(daily)Group D	2.7

The remineralization bands were detectable in all groups, and it was particularly evident in weekly MI varnish (weekly)Group C

Discussion: The Vulnerability of overdenture abutments to dental caries has been diagnosed as one of the most important disadvantage associated with the usage of overdentures.[14,16]

On repeated frequent applications of Fluorides Treatment Overdenture patients verify the effectiveness of fluoride in preventing caries.

The present in vitro study mainly showed that all the fluoride remedy regimens that is Pyrex (group B) , MI weekly (group C), MI daily (group D) ought to significantly inhibit demineralization on cut occlusal dentin surfaces of overdenture abutments.

An acid model was used to generate theartificial carious lesions. This acid model consisted of the remineralizing and demineralizing solution due to the fact reduce dentin surfaces while exposed to oral environment are extra susceptible to demineralization. Results cautioned that the acid model become capable of produce sufficiently deep lesions in the reduce occlusal dentin surfaces after a 1-week cycle. Adequate demineralization is required so that the remineralization is detectable. This changed into crucial on this study whose motive turned into to assess the impact of fluoride varnish on the demineralization and remineralization. The time frame for demineralization was 6 hours in step with day and 17 hours changed into allowed for remineralizition. This cycle of demineralization and remineralization became used to mimic the modifications within the oral environment related to food intake.[20]The remineralizing solution contained no fluoride however furnished calcium and phosphate, which are required for carious lesions to remineralize and in vivo are furnished by saliva.[19]

In this study, some remineralization bands appeared more "hyper-remineralization than the sound dentin and were characterized was found in the groups treated by weekly treated MI varnish Group C.The evidence of "hyper-remineralization" advised that there had been changes occur notonly in the hydroxyapatite crystal of mineralized tooth, but also in the amount of dentin mineral all through remineralization of the lesions whilst fluoride was present.[15]

A clear relationship among net depth and fluoride concentration or application frequency turned into observed. A better concentration or extra common use of topical fluorides produced greater benefit.[15]The results of this study additionally provided evidence that the useful impact of topical fluorides comes from a synergistic interaction between the inhibition of demineralization and enhancement of remineralization. The dynamic cycle among demineralization and remineralization is where fluoride appears to play its maximum significance role in caries prevention.

When the band widths had been subtracted from the lesion depth, the net depth of the lesions turned into obtained. This can be seemed as a measure of the mineral loss or net demineralization.[21]There are limitation this study. This study shows that the daily use of MI Varnish is the treatment of choice for humans who are capable of take responsibility for his or her each day oral fitness care. Further studies must be finished to determine whether or not fluoride varnish is an inexpensive agent for the compromised populations

CONCLUSION: From the present outcome, we therefore speculate that all the topical fluoride treatment were remarkably useful in preventing demineralization on cut occlusal dentin surfaces. The daily application of MI Varnish, which is used currently become shown to be simplest agent for remineralization, of prepared tooth surface.

Figure 2:- Acid resistant nail varnish was painted on all surfaces except for a Window (2 X 4 mm) on the prepared dentin surfaces.

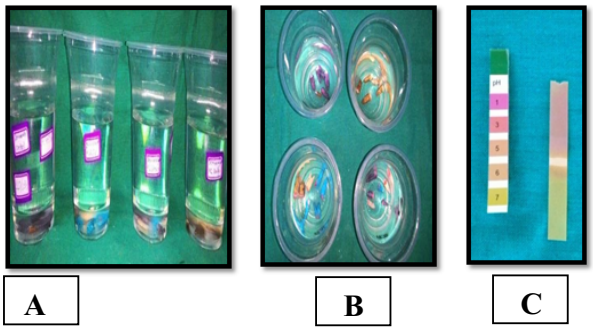

Figure 3: A & B shows teeth are stored in remineralization and demineralization solution . C, shows pH strips

Figure 4: Microtome used to prepare thin tooth sections

Figure 5: 10µm tooth thickness mounted by coverslip

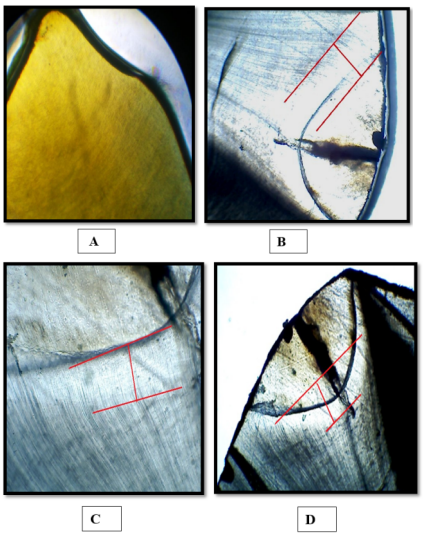

Figure 6 : Photomicrograph showing Lesion in Control Group (A),Weekly Pyrex group (B),MI varnish weekly Group (C), MI varnish daily Group (D). Red Arrow mark indicate the depth of remineralization band

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