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Fluorides in Orthodontics: A Review

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ABSTRACT

Introduction of fluoride in all the various forms has been the greatest advances in the field of orthodontics. Previous studies have concluded that fluoride is effective in reducing the demineralized lesions or white spot lesions. Fluoride is available in various forms like gels, rinses, varnishes. Fluoride gels or fluoride rinses are effective to reduce the white spot lesion, but they act for a shorter duration. Fluoride varnish is having an advantage over other fluoride forms as they are effective for longer duration and easily acceptable to the patients.

Keyword: Fluoride Gels, Demineralization, White spot lesions, Fluoride Varnish.

1. INTRODUCTION

There are several benefits to orthodontic treatment, such as significant improvements in a patient's esthetics, function, and overall self-esteem. However, the esthetic result of orthodontic treatment can be severely compromised by demineralization of the tooth structure around the orthodontic appliances. This could result in white, opaque areas of demineralization, also known as white spot lesions. An opaque white spot lesion looks chalky and could result in cavitation of tooth structure if mineral loss continues [1]. Enamel demineralization associated with fixed orthodontic appliances has been observed for years and continues to be a problem even with advances in materials and techniques [2,3]. The most common method of preventing demineralization around orthodontic appliances is the application of topical fluoride.

2. FLUORIDE AGENT TO PREVENT WHITE SPOT LESIONS

Topical fluoride application methods include fluoride gels, rinses, and dentifrice, which are all patient compliant – dependant treatment. Strateman and Shannon found that when patients used stannous fluoride gel, only 2% developed white spot lesions, compared with 58% of the patients who did not use the gel [4]. Geiger et al found that the use of a fluoride rinse caused a 25% reduction in the number of patients exhibiting white spot lesions. Most of the fluoride applications are dependent on the patient's compliance. Fluoride application can reduce enamel solubility, control plaque activity by blocking bacterial enzyme systems, and assist in enamel remineralization [5]. Studies have been shown that varnishes provide a high concentration of fluoride to decrease enamel demineralization both in vitro and in clinical trials [6,7]. The review of trials found that fluoride varnish can effectively reduce tooth decay in both primary and permanent teeth [8,9]. Fluoride varnishes have the advantage of adhering to enamel surface longer than other topical fluoride products [10,11]. The clinical application is easy and thorough prophylaxis is not required [12].

The efficiency of Fluoride varnish is directly related to patient compliance. Fluoride varnishes are easy to use and do not depend on the patient agreement [13, 14].

4. FLUORIDE VARNISH

Fluoride varnishes were first developed around the late 1960s and early 70s. The idea was that by lengthening the time in which the fluoride is in contact with the teeth the fluoride uptake should be increased and improved [15,16]. In support, Zero et al. state that the primary anti-caries activity of fluoride occurs topically [16]. Moreover, Zimmer et al. note that fluoride uptake, reaction, and release in enamel are strongly dependent on the duration of contact [17]. There are various fluoride varnishes available which include Duraphat, Duraflor, Clinpro, and Fluor Protector.

5. CLINICAL IMPLICATION

The advantages of fluoride varnish over fluoride rinse or a gel is that they work for the longer duration of time. Once they are applied, they work for 4-6 months. Patient compliance is higher in fluoride varnish in comparison to fluoride gels/rinses. The fluoride content is equivalent to 0.1%, or 1000 parts per million (ppm) in solution. As the solvents evaporate, the fluoride concentration at the tooth surface will increase upto 10 times. When the varnish hardens on the applied tooth surface, it will produce a clear transparent film and thus provides a significant aesthetic result. Due to its low viscosity, it is easy to apply even on the proximal surfaces and it is suitable for patients of all age groups. Studies have shown the single application of this varnish is effective for almost 6 months.

6. CONCLUSION

The varnishes and sealants discussed in this article may be helpful in reducing white spot lesions in orthodontic patients who have poor oral hygiene and dietary practices. The fluoride varnish is having added advantage in patient compliance and effectiveness for a long duration of time.

7. REFERENCES

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