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Icon - A Revolutionary Treatment for White Spot Lesions: A Case Series

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Abstract
White marks and white spot lesions are commonly found on anterior teeth and can be unsightly. They ruin the looks through discoloration. Patients often seek treatment to have these marks eradicated. These are generally seen in cases with fluorosis, early carious lesion, molar incisor hypomineralization.
Aim: The goal of this treatment was to fill the microporosities within the lesion body by infiltration with low-viscosity light-curing resins that have been optimized for rapid penetration into the porous enamel.
Methodology: Icon resin infiltration material was used for treatment of white spot lesions.
Results: Success assessment was done through visual assessment by clinician, Photographic assessment and patient satisfaction.

Keywords: Capillary force, infiltrant, The infiltration, resin, white spot lesions

Introduction

These days aesthetic concern and appearance are very important criteria comparable to functional consideration in young adult patient. Demanding aspect of aesthetics depends upon the natural structure of tooth as well as man-made artificial efforts. Aesthetic treatment is a class of art and science, where operator should reach patient stipulation[1-2].

White spot lesions (WSLs) are defined as enamel surface and subsurface demineralisation without cavitation. These manifestations represent the first clinical observation of the progression of dental caries with the possibility of being reversed. These lesions are characterised by a white chalky, opaque appearance[3]. These are commonly found on anterior teeth can be unsightly. Patients often seek treatment to have these marks eradicated. Most commonly associated with fluorosis, early carious lesion, enamel hypoplasia, after orthodontic treatment or due to idiopathic cause.

These conditions are associated with optical phenomenon caused by mineral loss and the difference in the refractive index of water and air that fill the spaces formed in the enamel. This makes lesion whitish with little translucency since there is an increase in enamel porosity.

Dental fluorosis is a condition of enamel hypomineralization that is characterized by greater porosity of the surface of healthy enamel due to excess fluoride consumption during odontogenesis. Defects in the structure of dental enamel are characterized by hypocalcified areas with spots of hypoplasia, which cause

the loss of the enamel structure and could be reason for loss of the tooth shape[4].

The traditional methods of detecting early lesions include visual inspection. In visual examination, reflected light is used to detect changes in colour, texture, and translucency of the tooth substance[5]. As there are different treatment modalities available for white spot lesions whether to go for remineralization treatment or restorative process depends on case. A new technique using resin infiltration has been introduced[6].

Main aim of this treatment is to occlude the microporosities within the body of lesion by permeating with low-viscosity light-curing resins that have been optimized for rapid penetration into the porous enamel.

Case 1

A 26-year-old female patient came to the Department of Conservative Dentistry and Endodontics in Himachal Pradesh Government Dental College and Hospital, Shimla with chief complaint of whitish discoloration on upper front tooth region noticed 3 years back. After proper clinical examination and taking patients medical history it was diagnosed as hypocalcified lesion due to fluorosis. Informed consent was obtained from the subject. Treatment planning was based on alternative minimal intervention thus, enamel resin infiltration technique (ICON, DMG) was selected for treatment of the case.

Preoperative Photograph

Icon Resin Infiltration kit

Application of icon etch containing 15% HCL for 2 min

Application of icon dry containing ethanol for 30 sec

Application of resin infiltrant (TEGDMA) for 3 min

Curing

Post Operative Photograph

6 month follow up Photograph

Case 2

A 23-year-old female patient reported with chief complaint of whitish discoloration on upper front tooth region since 2 years. After proper clinical examination and taking patients medical history it was diagnosed as white lesion due to initial demineralization. Treatment planning was based on minimal intervention; thus, enamel resin infiltration technique (ICON, DMG) was selected for treatment of the case.

Pre operative Photograph

Immediate post operative Photograph

6 month follow up Photograph

Case 3

A 20-year-old female patient reported with chief complaint of whitish discoloration on upper front tooth region noticed 1 year back. After proper clinical examination and taking patients medical history it was diagnosed as a hypocalcified lesion. Treatment planning was based on minimal intervention; thus, enamel resin infiltration technique (ICON, DMG) was selected for treatment of the case.

Pre operative photograph

Immediate Post operative Photograph

6 month follow up Photograph

Discussion

In operative dentistry success depends on proper Diagnosis and Decision-making process. The various treatment options for treating white spot lesions have been advocated. Most conservative of these methods includes micro abrasion and remineralisation. However, remineralization approach is not always successful as it requires good compliance of the patient[7]. Clinically, the degree of remineralization seems to be limited, and this may be attributed to the adherence of organic substances to enamel surface and likely clogging the underlying pores in the carious lesion.

The Icon resin infiltration is based upon principle of perfusion of porous enamel with resin by capillary action, thereby arresting lesion progression by occluding the microporosities that provide diffusion pathways for the acids and dissolved materials[8].Icon resin infiltration technique has shown good results as compared to other remineralization treatment modalities as being less invasive and very less amount of tooth sacrificed by etching.

Paris et al. evaluated effect of Hydrochloric acid on enamel. These researchers compared the etching effect of the hydrochloric acid vs phosphoric acid. They reported that there was a difference between the two acids on the surface of the teeth and that the hydrochloric acid caused higher erosion on the enamel thus allowing deeper penetration of the low viscosity resin[9].

The main aim of masking enamel lesions by resin infiltration is based on changes in light scattering within the lesions.

Sound Enamel	RI – 1.62
Water	RI- 1.33
Air	RI- 1.0
Resin infiltrate	RI- 1.46

The difference in the refractive indices between the enamel crystals and medium inside the porosities causes light scattering that results in a whitish opaque appearance of these lesions, especially when they are desiccated. The microporosities of infiltrated lesions are filled with resin (RI 1.46) that, cannot evaporate. Therefore, the difference in the refractive indices between porosities and enamel is negligible and lesions appear similar to the surrounding sound enamel. As a result, this treatment is used not only to arrest enamel lesions but also to improve the aesthetic appearance of white spots[10].

From the previous literatures it becomes evident that resin infiltration technique has several advantages like mechanical stabilization of demineralized enamel, decreased rate of lesion progress, less risk of postoperative sensitivity and pulpal inflammation, and improved aesthetical outcome. Similar results were seen in the cases we have presented.

Limitations:

Even though the resin infiltration technique has come up with minimal invasive treatment option for management of white spot lesions following concerns may affect outcome of treatment

- Inadequate isolation
- Incomplete resin polymerization
- Depth of the lesion

Conclusion:

Earlier due to unavailability of material it was difficult to conservatively treat such white spot lesions, the

dentist had to 'Wait and Watch 'until its time to 'Drill and Fill'. But recently due to newer material like ICON it is possible to treat enamel lesion as early as possible hence it might be a minimal invasive approach to treat white spot lesions.

Conflict of Interest: None

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