Case study

RESIN INFILTRATIONTECHNIQUE-A MICROINVASIVE TREATMENT APPROACH FOR WHITE SPOT LESIONS

ABSTRACT

White spot lesions (WSL) are defined as surface and subsurface demineralisation of enamel without formation of a cavity.These lesions have always been an aesthetic concern for patients. There are different treatment options for these lesions.Recently a new microinvasive technique have been introduced for the treatment of WLS, by infiltrating the lesions with a low ~~viscocity~~ viscosityresin.This technique is simple, painless and improves easthetics.This case report explains the ultra conservative method of treating white spots using resin material-ICON. ~~The~~ Thistechnique relies on the infiltration concept and helps treat white spot lesions on proximal regions and smooth surfaces.

Keywords – white spot lesions, resin infiltration, microinvasive,DMG Icon

INTRODUCTION

Dental caries is one of the most common diseases of the hard tissues of teeth. Usually the first sign of dental caries is a white spot on the enamel surface without the formation of a cavity. These lesions are referred to as white spots and are defined as surface and subsurface demineralisation of enamel. They are more porous than the surrounding enamel and appears more opaque due to the differences in refraction of light compared to the sound ~~enamel.[~~enamel. [1,2,3]

Etiological factors include plaque accumulation around orthodontic brackets, poor oral hygiene, fluorosis, developmental defects,molar incisor hypomineralisation,traumatichypomineralisation.[1]. These lesions may present esthetic problems as well as the progression of demineralisation.

Remineralisation can stop the progression of white spot lesions. Remineralising agents like CPP ACP and Fluorides have been used to treat these lesions, but their action is limited to the surface of the lesion and they usually ~~takes~~take more ~~time.[~~time. [6,7].Micro abrasion is a commonly used approach for white spot lesions. This technique, however, may cause the aggressive reduction of enamel as a function of the duration, intensity, and number of applications.[6,9,10]

Also,restorations with tooth reduction which is quite invasive, have been used considerably.However, most patients demanding treatment for white spots are children, adolescents, or young adults. The invasive procedures usually result in excessive sacrifice of tooth material, which accelerate the destruction of the tooth at an earlier ~~age.[~~age. [6,11]

Recently a new concept of resin infiltration was ~~developed ,which~~developed, which helps in arresting the incipient lesions by penetrating the low viscosity resin into the enamel and by obstructing the pathways for acid diffusion in the enamel.This technique also strengthen the enamel structure mechanically, thereby preventing breakdown of the enamel ~~surface.[~~surface. [6,12,13]

This case report explains the ultraconservative approach of treating white spots using resin material-ICON. The technique relies on the infiltration concept and helps treat white spot lesions on proximal regions and smooth surfaces.

CASE REPORT

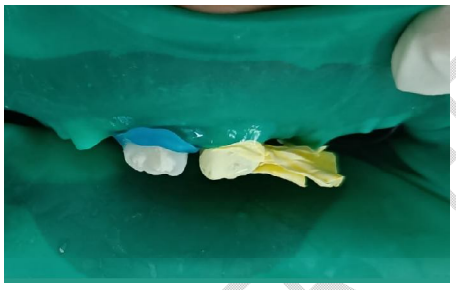
An ~~8year old~~8-year-old female patient was referred from Department of Paediatric ~~dentistry~~ Dentistry to the Department of Conservative Dentistry and Endodontics D A P M RV Dental ~~college~~College. Patient had white spot lesions on her right maxillary central incisor and ~~lower~~ mandibularright lateral incisor and left central incisor. She had undergone oral prophylaxis previously. The ~~patients~~patient's mother was informed about various treatment options, and the most conservative approach, resin infiltration technique, was chosen.

Fig 1. Preoperative viewshowing white spot lesions on ~~upper~~ maxillaryright central incisor,~~lower~~ mandibularright lateral incisor and left central incisor

After obtaining the informed ~~consent ,~~consent, oral prophylaxis was performed, followed by polishing using rubber cup and prophylaxis paste. Isolation was achieved using a rubber dam (Dental Dam, Coltene, USA) and gingival barrier (name the brand) was placed to ensure gingiva protection as the mandibular isolation is using split dam technique (Fig 2)

Icon-Etch HCl 15% (Icon, Dental Milestones Guaranteed) was ~~placed~~ appliedon the white spot lesion using an applicator tip for 2 min. In figure 3(a) ~~(Fig 3a)T~~the tooth surface was rinsed for 30 seconds to remove the acid, followed by drying with oil- and water-free air. The lesion was desiccated using Icon-dry (99% ethanol) for 30 seconds, which helped remove water from the pores of the lesion(Fig 3b).~~On~~ Uponvisual examination, the white spot was still visible, hence, Icon-Etch and Icon-Dry were reapplied. Whitish opaque lesion diminished significantly after the reapplication, following which Icon-resin was applied on the lesion for three minutes(Fig 4a).The excess resin was removed using an applicator tip followed by interdental flossing.

Fig 2 Isolation using rubberdam and gingival barrier



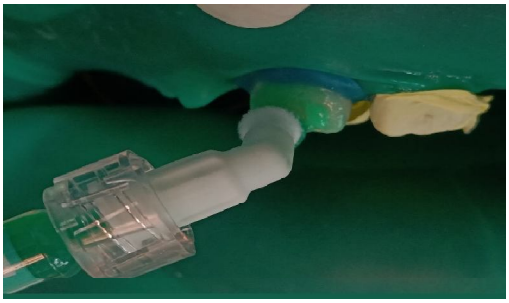


Fig 3a Etching using Icon etch HCl 15%

Fig 3b Application of Icon dry

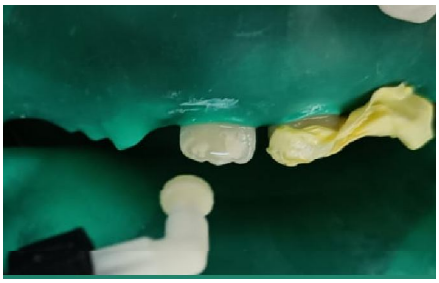


Fig 4a Application of resin infiltrant

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Fig 4b Postoperative view showing significant reduction in white spots (recommended to increase photo brightness)

It was then light-cured for 40 seconds. Iconresin was reapplied on the surface for one minute. Excess material was removed and light-cured for 40 seconds. Polishing was carried out using rubber cups and polishing paste.

The results of the treatment showed a satisfactory outcome as displayed in the post-operative photographs that were taken (Fig4b). There were no reports of gingival or soft tissue irritation, also no post-operative sensitivity or pain. The patient was overwhelmed and happy with the outcome and final result.

DISCUSSION

White spots occur due to subsurface demineralization of enamel beneath the hyper-mineralized superficial enamel surface. Because of differences in refractive indices of enamel, water, and air, white spot lesions appear more prominent when the tooth is dried.The refractive index of sound enamel is 1.62. When enamel is demineralized, it becomes more porous. When the tooth is desiccated, water from these porosities is replaced by air (refractive index 1.0) and becomes more opaque compared to the sound enamel.[14,15]

However, when these micro-porosities get filled with resin infiltrant, their refractive index becomes 1.52 and the difference between the refractive indices of infiltrated lesion and enamel becomes negligible, and the lesions appear similar to the surrounding sound enamel.[6]. Infiltration with resin helps mask the spot, even within the deeper regions of the lesion. The resin infiltration technique diminishes the white spots immediately compared to remineralizing agents.This technique is a more conservative approach, as it is less invasive than micro-abrasion, macro-abrasion, or restorations. Instead of removing the lesion, this technique helps to arrest incipient lesions by blocking the diffusion of acid into the enamel. Enamel also gets mechanically strengthened with the help of this resin infiltration.[12,16]

Etching helps to erode the superficial hyper mineralized enamel layer and expose the body of the lesion. The hyper-mineralized enamel on the surface is removed by the etchant which helps the resin infiltrate to the body of the lesion.In comparison to microabrasion which removes upto 360 µm of demineralised enamel,etching with 15%HCl removes approximately 40 µm of the hypermineralized surface layer,allowing the resin to penetrate in to the lesion.[17,18]. Water present in the lesion's porosities is removed with the help of 99% ethanol, which permits the infiltrant to penetrate the pores driven by capillary forces.[19]

The ICON infiltrant has low viscosity,high surface tension and low contact angle, which enables it to penetrate easily into enamel.[20] Compared with the other infiltrants, the Triethylene-glycol-dimethacrylate-resin infiltrant has shown deeper penetration. Resin is applied twice as there is a chance of shrinkage of the material after the first application, leading to the formation of spaces. The second application of resin helps to completely occlude these spaces.[16] The resin infiltration

technique is especially advantageous in the management of aesthetics of mild white spot lesions present post-orthodontic treatment. It can be used as an adjunctive therapeutic measure in the management of early caries lesions.

CONCLUSION

Resin infiltration is a promising technique for masking the initial enamel white spot lesions and also inhibits their progression into deeper areas. The enamel's resistance is increased by hampering the demineralization process by sealing the micropores, and it is also a suitable method to arrest further caries. But the long-term color stability of this technique should be continuously evaluated with more clinical studies.

CONSENT.

All authors declare that written informed consent was obtained from the patient (or other approved parties)for publication of this case report and accompanying images.

ETHICAL APPROVAL

As per the international standard or university standard written ethical approval has been collected and preserved by the authors. (please state the ethical approval numbers)

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