International Journal of Medical and Health Research
ISSN: 2454-9142
Received: 19-08-2020; Accepted: 05-09-2020; Published: 17-09-2020
www.medicalsciencejournal.com
Volume 6; Issue 9; 2020; Page No. 74-76

Micro invasive management of white spot lesions: A case report

Ismail PM[1*], Deepak Baby[2], Sreedevi PV[3], Rajeev KG[4], Babitha Thomas[5], A Gautham[6]

[1] PG Student, Department of Conservative Dentistry and Endodontics, PSM college of dental science and research, Thrissur Kerala, India

[2] Deepak Baby, HOD, Professor, Department of Conservative Dentistry and Endodontics, PSM college of dental science and research, Thrissur Kerala, India

[3] Sreedevi PV, Professor, Department of Conservative Dentistry and Endodontics, PSM college of dental science and research, Thrissur Kerala, India

[4] Rajeev KG, Reader, Department of Conservative Dentistry and Endodontics, PSM college of dental science and research, Thrissur Kerala, India

[5, 6] PG student, Department of Conservative Dentistry and Endodontics, PSM college of dental science and research, Thrissur Kerala, India

Abstract
Enamel microabrasion was developed in the mid-1980s as a method of eliminating enamel discolouration defects and improving the aesthetics of the teeth. Several years after the method was developed, much has been learned about this technique, long-term results of treatment, and microscopic changes to the enamel surface that have distinguishable clinical implications. This case report describes a technique used to treat smooth surface white spot lesions micro invasively by a chemo-mechanical method using the latest treatment protocol of microabrasion.

Keywords: enamel microabrasion; opalustre; chemo mechanical; white spot lesion

1. Introduction
White spot lesions are early signs of demineralization. The reason for the white spot is that the pathogenic bacteria have breached the enamel layer, and organic acids produced by the bacteria have leached out a certain amount of calcium and phosphate ions that fails to replace naturally by the remineralisation process [1, 2]. Aesthetics is a primary concern among young patients and represents a challenge to the dentist. Many attractive smiles are marred by some discoloration or staining, either on an individual tooth or on all teeth [3].

Enamel microabrasion is a conservative method for removing enamel to improve discolorations limited to the outer enamel layer [3]. This technique which involves mild acid etching in combination with the rotary application of an abrasive medium was first described by Dr. Walter Kane (Colorado Springs, 1916). In 1984, McCloskey introduced the use of acid combined with pumice which was named "micro abrasion" by Croll two years later [4].

The first line of treatment of the white spot is remineralisation. There are creams, pastes, and topical remineralisation treatments such as fluoride therapy, casein–phosphopeptide–amorphous calcium phosphate pastes, Novamin (calcium sodium phosphosilicate), invasive approaches such as microabrasion, conventional bonding and various types of veneers [5]. This case report describes how effectively a mild to moderate white spot enamel lesion can be removed effectively by using a novel chemo-mechanical method of microabrasion technique.

2. Case Report
A 22-year-old male patient reported to the Department of Conservative Dentistry and Endodontics. He presented with a chief complaint of white spots in the maxillary anterior teeth that has been noticed for one year. He wanted the least invasive and most cost-effective treatment to remove the discolouration. A review of his medical history and past dental history revealed no contraindications to dental treatment. In consideration of his age, the patient was not interested in treatment options that involved significant removal of tooth structure, such as porcelain or composite resin veneers.

On oral examination, there was a carious white spot lesion concerning maxillary anteriors, extending horizontally at the incisal third of the tooth Figure 1: (a and b). A treatment plan was presented to the patient that would fulfill his request for minimally invasive treatment which proposed microabrasion of the superficial enamel.

The following clinical procedures were conducted: After oral prophylaxis of teeth, initial photograph was taken for reference Figure 1: (a and b). Rubber dam was applied to protect soft tissue and achieve clean and dry working conditions Figure 1: (c and d). Luer lock cap was removed from Opalustre syringe and securely attach White Mac™ tip. The flow was verified before applying intraorally. Opalustre layer was applied selectively over the area of approximately 1 mm for 60 sec Figure 1: (f and g).An intermittent medium to heavy pressure was applied for approximately 60 seconds per tooth using an Opal Cups Bristle at a slow RPM (approximately 500 RPM) Figure 1: (h). After that opalustre slurry was removed using air water spray. After final rinse, the rubber dam was removed. Finishing and polishing was done with opal cups. A fluoride treatment was also done to reduce post-operative sensitivity.

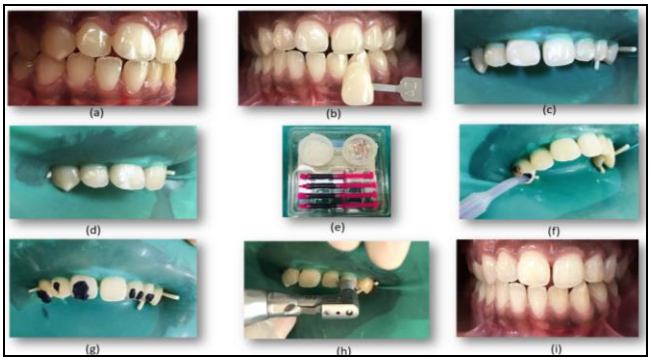

Fig 1: (a) and (b) Preoperative picture showing white spot lesion w.r.t 13, 12,11,22,23 and shade assessment is done. (c and d) Rubber Dam isolation. (F and g) Selective application of opalustre approx. 1mm for 60 sec. (h) pressing the opalustre cups against the tooth surface (i) Postoperative picture

3. Discussion

The initial carious lesions are the so-called "white spot" lesions, which implies that there is a subsurface area with most of the mineral loss beneath a relatively intact enamel surface. Clinically, early caries lesion in enamel is initially seen as a white opaque spot and is characterized by being softer than the adjacent sound enamel and is increasingly whiter when dried with air [6].

The subsurface white spot lesion with an intact surface occurs due to the physicochemical parameters of the demineralization of hydroxyapatite. The mechanistic approach to demineralization of enamel is based upon the primary driving force being hydrogen ion transport from the dental plaque at a pH of 5.0 into the underlying enamel at a pH of 7.0. The concentration gradient for hydrogen is much less in enamel than that in dental plaque, during episodes of acidogenesis by mutans streptococci and lactobacilli [6].

Enamel microabrasion is a conservative method for removing enamel to improve discolorations limited to the outer enamel layer. Sundfeld, *et al.* (2007) noted in an *in vitro* study that the enamel microabrasion technique results in a loss of enamel of around 25 to 200 micrometer, depending on the number of applications and acids concentration [7].

Trying to obtain an acid/abrasive product that is safer for the oral tissues, the operator, the patient and for an easier application, micro-abrasive products were developed with a low hydrochloric acid concentration with silicon carbide powder, such as: Opalustre (Ultra dent Products Inc, South Jordan, UT, USA), PREMA (Premier Dental Products, Plymouth Meeting, PA, USA) and RM (FGM & Dentscare Ltda, Joinville, SC, Brazil). They are safer and more efficient at slow speed rotary microabrasion [8, 9].

Opalustre 6.6% hydrochloric acid slurry contains silicon carbide micro particles [10]. This combination provides chemical stain removal along with gentle mechanical abrasion. OpalCups latch-type bristle polishing cups are used with the Opalustre slurry for micro polishing the newly treated enamel surface.

Following are the advantage of opaluster microabrasion kit

- One-appointment results
- Removes superficial white and brown stains
- Provides minimally invasive treatment for fluorosis
- Hydrochloric acid aids in chemical stain removal
- Silicon carbide microparticles provide gentle mechanical abrasion
- Less than 0.2mm enamel removal

It has also been observed that the teeth of patients subjected to enamel microabrasion have a smooth, prism-free layer of enamel and a lustrous surface that increases over time [11]. This "abrosion effect" (abrasion plus erosion) may be due to the compaction of minerals resulting from the simultaneous erosive and abrasive action of the microabrasion compound on the dental enamel [12, 13]. Fragoso, *et al*. (2011) after evaluating different techniques, concluded that microabrasion followed by polishing with diamond paste or fluoride prophylactic paste provided higher hardness and better surface smoothness of the enamel [14].

4. Conclusions

Correct application of the microabrasion technique, complemented or not by the bleaching or the use of composite resin, allow improvement in the appearance and colour uniformity of the teeth, restoring the patient's self-esteem. Based on this case report with long-term follow-ups, it can be concluded that microabrasion is a safe technique, providing favourable results in the patients' smiles over time.

5. References

1. Kidd EA, Fejerkov O. What constitutes dental caries? Histopathology of carious enamel and dentin related to the action of cariogenic biofilms. J Dent Res. 2004; 83(Spec No C):C35-8.
2. Shivanna V, Shiva Kumar B. Novel treatment of white spot lesions: A report of two cases. J Conserv Dent, 2011; 14:423-6.
3. Sundfeld RH *et al* Microabrasion in tooth enamel discoloration defects: three cases with long-term follow-ups. J Appl Oral Sci. 2014; 22(4):347-354.
4. B Balan, Madanda Uthaiah C, Narayanan S, *et al*. Microabrasion: an effective method for improvement of esthetics in dentistry. Case Rep Dent, 2013, 951589.
5. Ardu S, Castioni NV, Benbachir N, Krejci I. Minimally invasive treatment of white spot enamel lesions. Quintessence Int. 2007; 38(8):633-6.
6. Roopa KB, Pathak S, Poornima P, Neena IE. White spot lesions: A literature review. J Pediatr Dent, 2015; 3:1-7.
7. Roopa KB, Pathak S, Poornima P, Neena IE. White spot lesions: A literature review. J Pediatr Dent. 2015; 3:1-7.
8. Sundfeld RH, Rahal V, Croll TP, De Alexandre RS, Briso AL. Enamel microabrasion followed by dental bleaching for patients after orthodontic treatment - case reports. J Esthet Restor Dent. 2007; 19:71-7.
9. Croll TP, Segura A, Donly KJ. Enamel microabrasion: new considerations in 1993. Pract Periodontics Aesthet Dent. 1993; 5:19-28.
10. Sundfeld RH, Croll TP, Briso AL, Alexandre RS, Sundfeld Neto D. Considerations about enamel microabrasion after 18 years. Am J Dent, 2007; 20:67-72.
11. Croll TP, Segura A, Donly J. Enamel microabrasion: new considerations in 1993. PP and A. 1993 5:19-29.

12. Machado LS, Sundfeld Neto D, Oliveira GB, Carvalho TC, Oliveira FG, Sundfeld RH, *et al*. combining enamel microabrasion and dental bleaching: recovering smile aesthetics. Dent Today. 2013; 32:110-1.
13. Croll TP. Enamel microabrasion: The technique. Quintessence Int. 1989; 20:395-400.
14. Donly KJ, O'Neill M, Croll TP. Enamel microabrasion: a microscopic evaluation of the "abrosion effect". Quintessence Int. 1992; 23:175-9.
15. Fragoso LS, Lima DA, Alexandre RS, Bertoldo CE, Aguiar FH, Lovadino JR, *et al*. Evaluation of physical properties of enamel after microabrasion, polishing, and storage in artifitial saliva. Biomed Mater. 2011; 6(3):035001.