ISSN: 0975-833X

Available online at http://www.journalcra.com

International Journal of Current Research
Vol. 10, Issue, 12, pp.76492-76495, December, 2018

DOI: https://doi.org/10.24941/ijcr.33482.12.2018

INTERNATIONAL JOURNAL OF CURRENT RESEARCH

RESEARCH ARTICLE

MINIMALLY INVASIVE TREATMENT OF HYPOPLASTIC LESIONS – 'RESIN INFILTRATION TECHNIQUE

***Dr. Aarushi Mahajan, Dr. Roopa R Nadig, Dr. Yashwanth Gowda, Dr. Chandni Gupta and Dr. Nawal Abdul Aziz**

Dept. of conservative dentistry and endodontics, Dayananda Sagar College of dental sciences, Bangalore – 560078

ARTICLE INFO

Article History:
Received 17th September, 2018
Received in revised form
20th October, 2018
Accepted 24th November, 2018
Published online 31st December, 2018

Key Words:
Hypolplastic, Minimally Invasive, Resin, Microabrasion.

ABSTRACT

Purpose: This clinical report presents and describes the case where the minimally invasive infiltrant resin technique was used for hypoplasia white stains related to traumatic dental injuries. **Results:** The Hypoplastic stains showed visually perceptual improvements. The general clinical outcomes of the case was considered successful and recovered the patients' self-esteem. **Conclusion:** Based on the results obtained, it could be concluded that the resin infiltration technique shows promising results and could be considered a minimally invasive procedure for mild-to-moderate fluorosis and hypoplasia stains.

Clinical significance

- This case study allows a better understanding of the concept of resin infiltration technique applied in hypoplastic and porous lesions
- Increasing its use as a therapeutic alternative for esthetic purposes in the philosophy of minimally invasive dentistry.
- This treatment aims upon both prevention of caries progression and improving aesthetics by diminishing the opacity.

Citation: Dr. Aarushi Mahajan, Dr. Roopa R Nadig, Dr. Yashwanth Gowda, Dr. Chandni Gupta and Dr. Nawal Abdul Aziz. **2018.** "Minimally Invasive Treatment of Hypoplastic Lesions – 'Resin Infiltration Technique'.", *International Journal of Current Research*, 10, (12), 76492-76495.

INTRODUCTION

Dentistry has seen an exponential rise in the demand for esthetics in the current population. With the advent of new technologies and techniques every day, the population seeking the esthetic treatment can be satisfied. One of the major concerns in today's population is white spot lesions occuring in the anterior esthetic zone. The etiology of these white spot lesions is known to be due to early enamel caries, post orthodontic demineralisation, fluorosis, enamel hypoplasia to name a few. The white appearance is said to be due to an optical density difference due to mineral loss in the surface or subsurface enamel. Pores are created around the enamel prisms after demineralisation, which alters the refractive index of the particular area. This further leads to surface roughness making the lesion more evident as porous enamel reflects more light (Jeong-Hye Son *et al*., 2011). Various treatment modalitites have been suggested and materialised ranging from minimally invasive to full blown invasive restorations, namely; remineralization, micro/macroabrasion, bleaching therapy, direct/indirect veneers and crowns.

****Corresponding author:*** **Dr. Aarushi Mahajan,**
Dept. of conservative dentistry and endodontics, Dayananda Sagar College of dental sciences, Bangalore – 560078.

However, choice of treatment modality depends on the severity of the lesion. Post-operative sensitivity with bleaching and micro/macro abrasion has been a common disadvantage since ages. Veneers and crowns give a reasonable esthetic outcome, however they are highly invasive procedures. Over the time, modern dentistry has evolved into minimally invasive approach. The best dental materials in existence are still natural human enamel and dentin and thus "Minimally invasive procedures" that conserve a great part of the original, healthy tooth structure, are being focused upon (Andrej, 2017). A new micro-invasive approach, Resin infiltration technique, has been introduced initially for treatment of incipient carious lesions. The resin has low viscosity, high surface tension, low contact angle to enable proper penetration of resin in the enamel defect. It is known to work by blocking out the diffusion pathways for acids in the enamel (Prajapati *et al*., 2017). This technique has also been used for treatment of fluorosis white spot lesions (Neeraj Gugnani *et al*., 2017) and hypoplastic white spot lesions (Samah, 2013). This technique is not only least invasive but also causes least discomfort to the patient and is completed in no time. One such kit available in the market is ICON – kit by DMG, Germany introduced in 2009 (Andrej, 2017; Prajapati *et al*., 2017). The kit consists of three syringes – ICON etch consisting of 15% HCl, ICON dry

having 99% ethanol and Resin infiltrant composed of tetraethylene glycol dimethacrylate, additives, and initiators.

Case report: A 17 year old female patient presented in our department with white spot lesions in 11, 13, 23, 31, 32, 41 and 42. (Fig.1 a and b) A variety of options for treating these lesions were laid out with their ups and downs but the patient requested for a faster and least invasive approach. Hence, resin infiltration was carried out with respect to the teeth involved.

Procedure: After oral prophylaxis, the teeth were isolation with rubber dam. Pumice slurry and rubber cups were used for polishing the teeth (Fig 2). The first syringe, ICON etch (15% HCl), was applied over the involved area in each tooth and left for 2 minutes (Fig 3) This was followed by washing with water for 30 seconds. The second syringe, ICON dry (99% ethanol) was applied over the areas for 30 seconds (Fig 4 a). The opacity of the spots was noticed for any changes and etching was repeated to a maximum of three times along with ICON dry (Fig 4 b.).

After this, the ICON resin infiltrant (tetraethylene glycol dimethacrylate, additives, and initiators) was applied on the tooth surfaces and left for 3 minutes so that it penetrates the lesion. Excess was removed with cotton and after passing dental floss through the contacts, the resin was cured for 40 seconds (Fig 5 a and b). To eliminate superficial porosities, resin infiltrant was applied again for 1 minute and cured for 40 seconds. After the infiltration, polishing of the respective teeth were done. In the next appointment, the same was done for the lower anteriors (Fig 6 a and b). The lesions had become inconspicuous in her smile and the patient went smiling home with the results (Fig 7 and 8). 6 months follow up was done for any color change, sensitivity issues and stability of infiltrated resin (Fig 9)

DISCUSSION

The goal of our treatment was to satisfy the patient needs by reducing/eliminating the appearance of white spot lesions.

Fig 1 a. Pre operative

Fig 1 b. Pre operative- smile photo

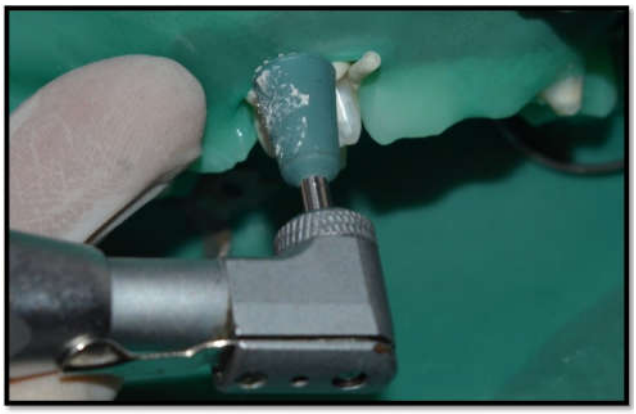

Fig 2. Cleaning with Pumice

Fig 3. Icon etch – 2min

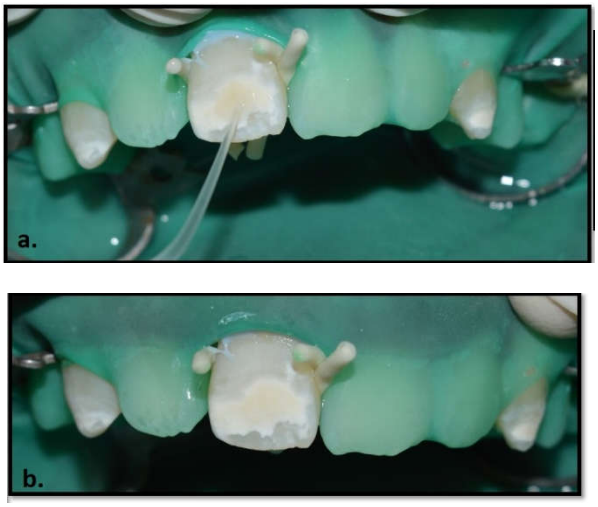

Fig 4a. Drying agent-30sec, b, After 30 sec

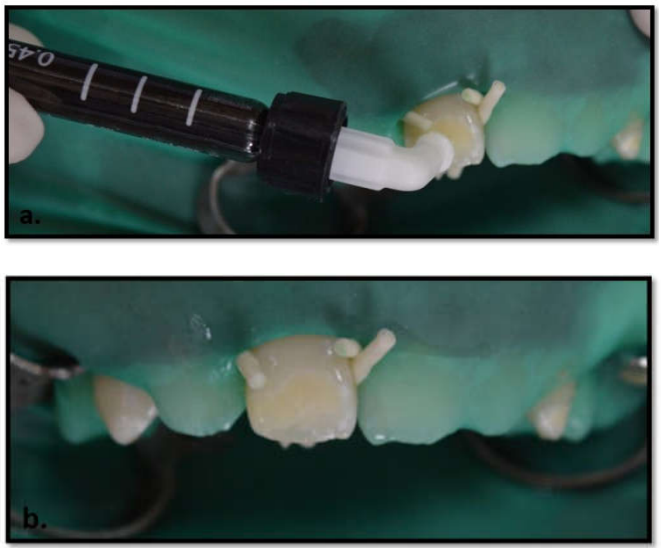

Fig. 5a. Icon resin infiltration, b. After 1st infiltration

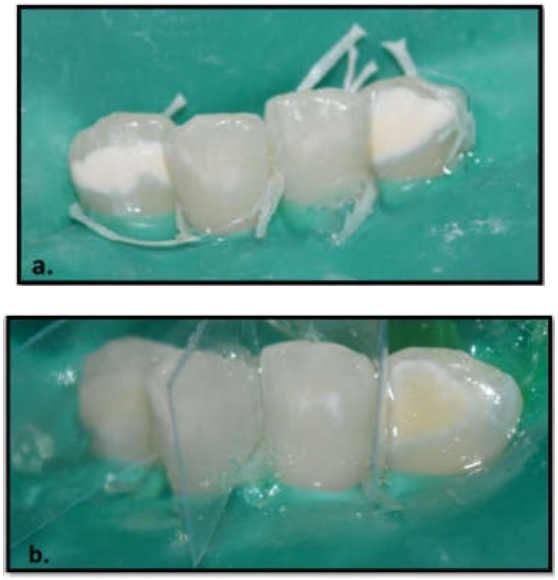

Fig 6a. After drying agent for 41 42 31 32, b. After 1st infiltration

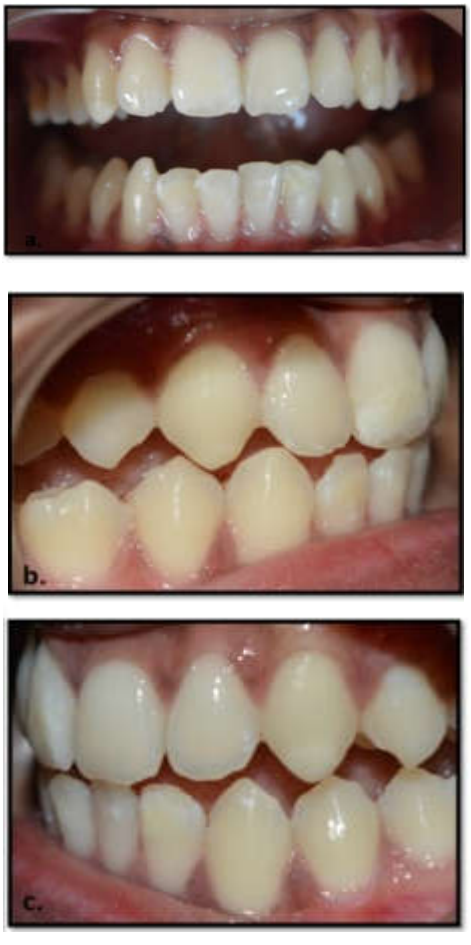

Fig. 7. A,b,c-post-operative

Fig 8 Post operative

Fig 9 – 6 months follow up

Other treatment modalities like microabrasion and bleaching which are also minimally invasive were rejected due to their unpredictable results and complaints of post-operative sensitivity in the patients with bleaching (Dahl, 2003). As for microabrasion, the technique involves removal of enamel, which is considered to be insignificant for any adverse effects (Enamel microabrasion, 2015). However, a proper protocol as to how many times the agent can be used safely for abrasion to produce the desired result has not been devised (Miguel Angel *et al*., 2013) and the teeth have been reported to develop a yellowish discolouration after the microabrasion process as enamel layer reduces in thickness taking the yellowish color of the dentin layer (Sundfeld *et al*., 2014). Hypoplasia is characterized by reduced enamel thickness of varying degrees, as well as pits and other irregularities, and although the hardness and transparency of the enamel remain intact, the extent of irregularities varied from tiny spots to large areas. Micro abrasion has been indicated in cases of white, brown and yellow stains in the superficial enamel layer depending on the severity.

Therefore, in our patient the white spots seemed to be extending deeper than just the superficial enamel layer. Extra coronal bleaching though considered to be less invasive treatment for discoloured teeth, its impact on white flaky discoloration is unsatisfactory. For resin infiltration, there are various articles that prove the success of the technique (Samah, 2013; Miguel Angel *et al*., 2013; Meyer-Lueckel, 2008; Paris, 2010; Paris, 2010). The idea behind resin infiltration is to create a roughened surface by etching for deeper penetration of the resin infiltrant, which then occludes the exposed enamel microporosities.

This prevents any chance of post operative sensitivity and the resin infiltrant without any manipulation gives a shiny smooth finish to the tooth surface. In case of early enamel caries, the resin acts by very minimal removal of enamel (30-40mm) and occluding the surface with resin, further preventing the spread or arresting the lesion (Paris, 2010). The merging of the white spot lesions can be explained by alteration of the refractive index of the lesion to match the refractive index of the tooth. Natural sound enamel has a refractive index of 1.62 whereas porous enamel has that of 1.33 when filled with water. When these lesions are infiltrated with the resin infiltrant, their refractive index becomes 1.52 and hence it mimicks the appearance of sound enamel.[13] As mentioned by Omar (Samah, 2013) in the case report, that the results were seen to improve after 1 or 2 days; the same effect was seen with our patient. The lesion seemed to be better masked with the surrounding enamel. All in all resin infiltration seems to be a promising approach to treat white spot lesions and achieve a more predictable success, if case selection is done wisely.

A combination approach of different techniques can be applied in different clinical situations as studied by Gugnani *et al*.[4] They concluded that resin infiltration shows best results if performed with tailored etching times and increased contact time of the infiltrant. The results were observed to be significantly better than in-office bleaching alone, while non-significant in comparison to resin infiltration (RI) and bleaching + RI strategies. Thus, resin infiltration is a relatively fast and less invasive treatment option for white spot stains on labial tooth surfaces because the procedures are applied to the teeth simultaneously unlike enamel microabrasion procedures in which the product is applied tooth by tooth and usually more than one time.

Conclusion

The use of minimally invasive "infiltrant resin technique" to treat teeth with hypoplastic lesions allow significant improvement in the appearance and color uniformity of teeth in a relatively short working time with least discomfort to the patient. Follow up over the period of time needs to be carried out for a predictable long term success.

Disclosure: The authors do not have any financial interest in any of the companies whose products are discussed in this case report.

REFERENCES

Jeong-Hye Son, Bock Hur, Hyeon-Cheol Kim, Jeong-Kil Park. 2011. Management of white spots: resin infiltration technique and micro abrasion. *J Kor Acad Cons Dent.,* 36(1):66-71.

Andrej M. Kielbassa, Ina Ulrich, Rita Schmidl, Christoph Schüller, Wilhelm Frank, Vanessa D Werth. 2017. Resin infiltration of deproteinised natural occlusal sub surface lesions improves initial quality of fissure sealing *Int J Oral Sci.,* 9(2):117–124.

Prajapati D., Nayak R., Pai D., Upadhya N., Bhaskar VK., Kamath P. 2017. Effect of Resin Infiltration on Artificial Caries: An *in vitro* Evaluation of Resin Penetration and Microhardness. *Int J Clin Pediatr Dent.,* 10(3):250-256.

Neeraj Gugnani, I. K. Pandit, Monika Gupta, Shalini Gugnani, Sugandhi Soni, Virender Goyal. 2017. Comparative evaluation of esthetic changes in non-pitted fluorosis stains when treated with resin infiltration, in-office bleaching, and combination therapies. *J Esthet Restor Dent*., 1:1–8.

Samah I. Omar. 2013. Using resin infiltration to treat developmental defects of enamel: Three case reports. *Journal of Restorative Dentistry,* 1(1):31-35

Dahl, J.E., Pallesen. U. 2003. Tooth bleaching—a critical review of the biological aspects *Crit Rev Oral Biol Med.,* 14(4):292-304.

Enamel microabrasion: An overview of clinical and scientific considerations Núbia Inocencya Pavesi Pini, Daniel Sundfeld-Neto, Flavio Henrique Baggio Aguiar, Renato Herman Sundfeld, Luis Roberto Marcondes Martins, José Roberto Lovadino, Débora Alves Nunes Leite Lima. World J Clin Cases 2015 January 16; 3(1): 34-41

Miguel Angel, Luis Alfonso Arana-Gordillo, Giovanna Mongruel Gomes, Osnara Mongruel Gomes, Nara Hellen Campanha, Alessandra Reis, Alessandro Dourado. 2013. Alternative Esthetic Management of Fluorosis and Hypoplasia Stains: Blending Effect Obtained with Resin Infiltration Techniques. *J Esthet Restor Dent.,* 25:32–39

Sundfeld RH., Sundfeld Neto-D., Machado LS., Franco LM., Fagundes TC., Briso Alf. 2014. Microabrasion in tooth enamel discoloration defects: three cases with long-term follow-ups. *J Appl Oral Sci.,* 22(4):347-54

Meyer-Lueckel H., Paris S. 2008. Progression of artificial enamel caries lesions after infiltration with experimental light curing resins. *Caries Res.,* 42:117–24.

Paris S., Hopfenmuller W., Meyer-Lueckel H. 2010. Resin infiltration of caries lesions: an efficacy randomized trial. *J Dent Res.,* 89:823–6.

Paris S., Meyer-Lueckel H. 2010. Inhibition of caries progression by resin infiltration in situ. *Caries Res.,* 44:47–54.

Gugnani N., Inder K. 2012. Pandit, Monika Gupta, Rohini Josan. Caries infiltration of noncavitated white spot lesions: A novel approach for immediate esthetic improvement. *Contemp Clin Dent.,* 3:199-202

****