

**Non-invasive Treatment Approach in Treating Enamel Hypoplasia- A Case Report**

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**Abstract**

Enamel hypoplasia is one of the major aesthetic concerns among patients visiting the dentist. Resin infiltration is a new non-invasive technique which can be employed as a treatment modality for mild to moderate enamel hypoplasia. With the advantages of masking the discoloration, increasing micromechanical strength, less chair side time makes it apt for use among pediatric population.

**Keywords:** Resin infiltration, Enamel Hypoplasia, Remineralization, Non- Cavitated lesions, ICON

**Introduction**

Aesthetics is of prime importance in today’s era and children aesthetics forms a part of their appearances.<sup>1</sup> In

Pediatric dentistry we do come across a lot of cases in which the chief complaint is often discoloration of anterior tooth, a certain amount of these cases are due to Enamel Hypoplasia. The etiology of enamel hypoplasia is broad can be a result of genetic as well epigenetic factor contributing to the disruption of laying down of matrix by the ameloblasts. As a consequence of this, it can be characterized as white spots, tiny grooves, depression and fissures in enamel surface.<sup>2</sup> The treatment may range from bleaching of enamel or when both enamel and dentin is involved a conservative restorative approach can be taken after proper evaluation. Another treatment which has gained

popularity of late in treating cases of mild Hypoplasia are Resin Infiltration.

It is a non-invasive technique which was developed after experiments conducted by Robinson et al to arrest caries in proximal lesions. Later on, it was modified and used as a non-invasive technique of managing smooth surface and non cavitated proximal caries lesion the principle behind this is that a low viscosity resin is introduced into the caries lesion after removing the first layer of less porous enamel allowing the less viscous resin to percolate the micro porosities thereby establishing a barrier between within lesion without any material on enamel surface.<sup>3</sup>

Resin infiltration technique was also found to be effective on hypoplastic teeth as it has the ability to fill, reinforce and mask the white lesions without sacrificing the tooth structure.

#### Case Report

A 9-year-old male patient had reported to the private clinic with a chief complaint of discoloured anterior tooth on examination it was found out that the child had mild enamel hypoplasia, after explaining the treatment plan to the patient consent was obtained the treatment was carried out with respect to 12,11,21 and 22.

#### Treatment Procedure

- Icon<sup>®</sup> the resin infiltrate is marketed for proximal and vestibular lesions but the usage remains the same. The kit consists of an Icon etchant i.e; 15% Hydrochloric acid, Icon dry i.e; 99% Ethanol and Icon resin Tetra ethylene glycol Di methacrylate.
- The teeth were isolated and Icon Etch was applied for a period of 2 minutes. In order to remove the surface layer to enable deeper penetration of the resin.
- It was washed using water for 30 seconds and was dried properly.

- Icon dry was applied for desiccation of water and air dried for 30 seconds. Dry solution is also reported to provide a preview of what to shade to be expected after resin infiltration

- Icon infiltrate was applied to all the teeth using a micro brush and it was allowed to percolate the lesion for a span of 5 mins, excess was removed using cotton and it was cured for a span of 40 seconds. It is again repeated for a period of 1 minute and then its cured.

- Any rough areas were polished using polishing burs.<sup>4</sup> Adequate isolation methods were followed.

#### Discussion

Resin infiltration has shown excellent results with respect to caries incipiens, fluorosis and enamel hypoplasia. The technique is effective due to its property to fill the subsurface areas of enamel which is hypo mineralized to make it look similar to the sound enamel. The masking affect is brought about by the change in Refractive Index (RI), the RI of a sound enamel is 1.62 whereas of hypermineralised enamel its 1.33 due to the air or water filling the microporosities, hence when these microporosities are filled with low viscous resin the RI increases to 1.46.<sup>5</sup> Since the differences in the RI of sound enamel and hypo mineralized enamel are negligible it appears to be of the same colour as the sound enamel.

The etchant in the kit is 15% hydrochloric acid is known to be superior in removing the mineralized layer when compared to 37% phosphoric acid when applied for 120 seconds, it also brings about an increase in penetration depth of 58µm hence enabling the penetration of resin to greater depths.<sup>6,7</sup> The use of ethanol wet bond i.e; icon dry replaces the water at demineralized areas with ethanol which helps in better penetration of hydrophobic resin into collagen matrix without shrinkage or separation of the resin from the intermatrix regions.

The resin infiltration is done for the second time, so as to fill the spaces caused after the shrinkage of resin from the first application.<sup>8</sup> As with any case the success of resin infiltrate technique also relies on apt selection of cases i.e it gives better results when treating small lesions than bigger ones.

Resin infiltration has been used in primary teeth to treat non cavitated caries lesion in an vitro study by Paris et al it was shown to have better infiltration when compared to permanent teeth.<sup>9</sup> Ekstrand in a split mouth study conducted had used resin infiltration in proximal carious lesions after the use of fluoride varnish and on the other side had used only fluoride varnish the progression of caries was found to be lower in the side which was followed by resin infiltrate.<sup>10</sup> Resin infiltrate has also been used widely to treat post orthodontic white spot lesions as it brings about an aesthetic improvement, increases microhardness and at the same time arrests the progression of caries. A case report of efficacy of icon infiltrate on post orthodontic white spot lesions it was followed up for a period of 4 years and it was seen that the aesthetic results as well as progression of lesion remained stable for the said span hence concluding that it has several advantages like permanent closure of micro porosities and bringing about stabilization of demineralized enamel.<sup>8</sup> In a randomized control trial of comparatively evaluating Clinpro Xt and Icon on restoring the colour and lightness of white spot lesions found that resin infiltrate showed better results at 3 and 6 months interval.<sup>11</sup>

The advantage of resin infiltrate is that it is non-invasive, can be done in a single visit in most of the cases, arrests the progression of enamel caries, minimum risk of secondary caries, no risk of postoperative sensitivity, improved aesthetics<sup>5</sup> and high patient acceptance as no

operative instruments are involved especially in Paediatric age group.

But resin infiltration also has its limitations as the procedure can fail without proper isolation, there can be incomplete polymerization of resin or inadequate etching and it cannot be used if the carious lesion is deep or if the discolouration is brownish as it cannot mask the brown discolouration.<sup>5</sup> There is a dearth of studies with respect to resin infiltration with long follow ups which could actually ascertain and confirm the advantage.

### **Conclusion**

Resin infiltration is an excellent treatment option for treating aesthetic concerns of enamel hypoplasia in paediatric population as it is minimally invasive and also has more patient acceptability in this age group.

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### Legend Figures



Fig 1: Preoperative photographs



Fig 2: interoperative photographs.



Fig 3: postoperative photographs.