

# Enamel Microabrasion in Pediatric Dentistry: Case Report

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## Abstract

Enamel microabrasion technique is a conservative method that improves the appearance of the tooth by restoring bright and superficial smoothness, without causing significant structural loss. It is a safe method that may be used even in the treatment of young children. This paper describes the microabrasion technique using Opalustre® (Ultradent Products, Inc) applied over incipient carious lesions which were remineralized but pigmented, aesthetically compromising deciduous teeth.

**Key words:** Deciduous tooth; Enamel microabrasion; Pediatric dentistry.

## Introduction

The first report about hydrochloric acid application used to improve the aesthetics of teeth with fluorosis was done by Dr. Kane<sup>1</sup>, in 1916. Since the results obtained were favorable, researches were developed in order to verify the effectiveness of the microabrasion technique using different concentrations of hydrochloric acid (6.6% to 18%) and phosphoric acid (30% to 40%) in association with abrasives. The objective of these researches was to obtain a long-lasting result that was safe, even for deciduous teeth<sup>1-9</sup>.

Literature shows that this technique should be considered as the first treatment option when trying to improve the aesthetics of teeth that present intrinsic stains (fluorosis) or extrinsic superficial enamel stains. The clinical result obtained is directly related to the depth of the stains/defects and, thus, the differential diagnosis of such alterations is essential<sup>2, 8, 10-12</sup>.

Microabrasion is effective, safe and may be used in order to improve the aesthetics of children and adolescents, as long as the patient is cooperative. This technique causes reduced wear of tooth surface and minimum discomfort to the patient<sup>1-3, 7-8, 10, 13-14</sup>.

The purpose of this paper is to illustrate the microabrasion technique using Opalustre® (Ultradent Products, Inc) applied over inactive white spot lesions which had been pigmented and were present on deciduous teeth.

## Case Report

A five-year-old male patient sought treatment at the Specialization in Pediatric Dentistry clinic of the São Paulo State Dentists' Syndicate. No relevant systemic alteration was observed during anamnesis, except for the use of a medication containing ferrous sulfate. The mother signed an informed consent, allowing the treatment of her child. During clinical examination, it was noted that the child presented great coro-

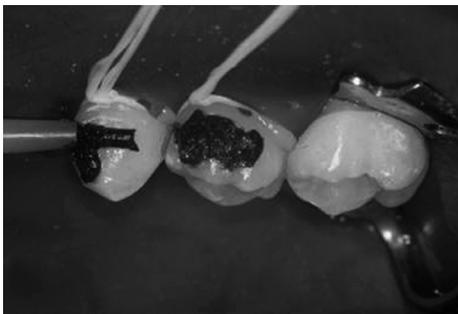
nal destruction of the upper deciduous incisors, occlusal cavities on the molars, inactive white spot lesions with brown stains added to superficial cavities on the buccal and proximal surfaces of the deciduous canines and molars.

The first step of the treatment involved the removal of the infected areas and the modification of dietary and oral hygiene habits. After accomplishing this first step, the microabrasion technique using Opalustre® (Ultradent Products, Inc) was chosen to aesthetically improve the teeth that presented pigmentation. This material contains hydrochloric acid at 6.6% and silicon carbide microparticles, it is purple and it comes in syringes.

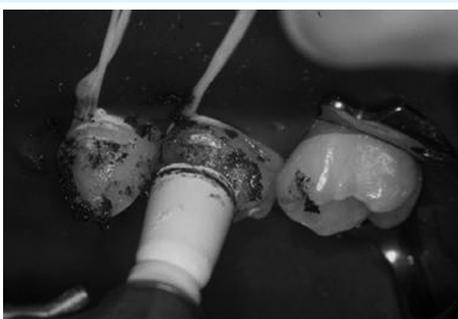
The sequence of the enamel microabrasion technique with Opalustre® (Ultradent Products, Inc) used in this clinical case was: topical anesthesia; infiltrative anesthesia; isolation by rubber dam of the upper left quadrant (primary canine and first and second molars) (Figure 1); dental prophylaxis; application of 1 mm of the product (Figure 2); abrasion using a rubber cup in slow speed and under slight compression during 10 seconds (Figure 3); abundant rinsing after each application, followed by visual observation of the removal of the spots and of the smoothness of the wet surface. After 4 application of Opalustre®, done in a single session, it is possible to visualize the removal of stains and the aesthetic improvement on the wet surface,



**Figure 1:** Initial clinical aspect of the upper left quadrant after isolation by rubber dam. Notice the presence of inactive white spots that were remineralized and present different degrees of brown pigmentation added to small cavities



**Figure 2:** Application of 1mm of the Opalustre® (Ultradent Products, Inc) paste over the stains on the affected teeth in the vestibular face



**Figure 3:** Mechanical removal of stains using a rubber cup at slow speed during 10 seconds



**Figure 4:** Polishing of the teeth using felt discs and paste at slow speed

without need for aesthetic reconstruction. After polishing the region with felt discs and paste at slow speed (Figure 4), a neutral fluoride gel at 2% was applied during 1 minute (Figure 5). Removal of the stains required 4 applications, done in a single session, and a vitreous aspect of the surface was observed, with immediate aesthetic improvement. At the maintenance appointment, after 1 month (Figure 6), it was observed that the shiny aspect and the surface smoothness were maintained and that there was



**Figure 5:** Application of neutral topical fluoride gel at 2% during 1 minute



**Figure 6:** Aspect at the one-month maintenance appointment: observe that the characteristics obtained were maintained

absence of pain or sensitivity on teeth that had been treated with microabrasion.

## Discussion

The aesthetic treatment has not exclusively concerned adults. Children and their parents are becoming more and more appreciative of a beautiful smile during childhood, seeking and demanding resolutions to aesthetic problems. According to Welbury and Shaw (1990)<sup>15</sup>, aesthetic problems may psychologically affect patients, especially teenagers, and may interfere in their social life.

Literature shows that enamel microabrasion should be the first option of treatment because it is a procedure that is less invasive and more conservative. It only requires a small amount of structure removal, it doesn't cause post-operative pain or sensitivity, and, in the majority of cases, it can be done in a single session causing minimum discomfort to the patient<sup>1,7,10,16-18</sup>. Other advantages of this technique include: immediate,

permanent and lasting results due to the fact that microabrasion involves the removal of the stain instead of just covering up the stain or altering the enamel<sup>2,4,6,10-12,19</sup>; shorter time required for the procedure which is easy to execute<sup>2,6</sup>; elimination of the need for dental cavity preparation or restorative materials<sup>6,11-12,18</sup>; it does not cause injuries either to the pulp or to the periodontal tissue<sup>2, 10</sup>.

The association of an acid and an abrasive agent may be used in the treatment of teenagers<sup>9, 11-12</sup> and children who are at least 2 years old<sup>7,13</sup> as long as protective measures are taken to keep safe the eyes and the soft tissue. Such measures must be followed even when using a less concentrated acid<sup>2,4,12</sup>. Therefore, rubber dam isolation is mandatory during the procedure for not only does it protect soft tissues but it is also comfortable, it stops material debris from falling into the mouth, it reduces contact with saliva, and it is a helpful tool for the behavior management of young patients<sup>7</sup>.

In the clinical case reported, 4 applications of Opalustre<sup>®</sup>, done in one session, were necessary in order to remove the brown pigmentation found on the inactive carious lesions of primary maxillary teeth. After using the microabrasion technique, the coloration was improved and a shiny surface was obtained because, during the procedure, the demineralized layer is almost completely removed by the method<sup>18</sup>. Mild surface abrasion of enamel demineralizes with simultaneous acid erosion leads to the formation of a compacted mineralized tissue within the organic areas, replacing the outer layer of prism-rich enamel with a densely compacted prism-free region. When light is reflected off this surface and refracted through it, it does so in a different manner than it would on an untreated surface, and these optical properties of the newly micro-abraded surface camouflage the remaining subsurface stains<sup>5,8</sup>. This vitreous characteristic was observed in the clinical case presented and is known as the "abrasion effect"<sup>5</sup> or "enamel glaze"<sup>9</sup>.

Using microabrasion is also advantageous for the treatment of small structural losses in

inactive carious lesions because the technique only causes a small amount of structure removal and it also forms a regular surface, thus decreasing the need for conventional restorative treatments<sup>6,11,12,18</sup>. Because of the presence of superficial cavities on the buccal surfaces of the deciduous canines and molars was chosen a more abrasive technique. Paic et al (2008)<sup>20</sup> shows that Opalustre<sup>®</sup> caused the highest tooth substance loss compared with other products, and Zuanon et al (2008)<sup>21</sup> shows that mechanical technique (rubber cup attached to a low-speed handpiece) removed more enamel than manual microabrasion using a plastic spatula. The combination of Opalustre<sup>®</sup> and mechanical technique resulted in a surface without roughness and discarded the need for restoration with composite resin even in surfaces that presented small cavities.

## Conclusion

The microabrasion technique using Opalustre<sup>®</sup> (Ultradent Products, Inc) was effective in the removal of inactive carious white spot lesions that had been pigmented after remineralization and to produce a regular surface even in surfaces that presented small cavities.

This technique presents a favorable and lasting aesthetic result, without causing significant enamel structural loss and without need for cavity preparations. Microabrasion may be done in a single session and it is safe to use even in young children.

In order to obtain a favorable and lasting aesthetic result, it is important to make an adequate diagnosis of the alterations found and the patient must be included in a preventive program to reduce caries risk and activity.

## References

1. McCloskey RJ. A technique for removal of fluorosis stains. *J Am Dent Assoc.* 1984;109:63-4.

2. Croll TP, Cavanaugh RR. Hydrochloric acid-pumice enamel surface abrasion for color modification: results after six months. *Quintessence Int.* 1986;17:335-41.
3. Kamp AA. Removal of white spot lesions by controlled acid-pumice abrasion. *J Clin Orthod.* 1989;23:690-3.
4. Croll TP. Enamel microabrasion for removal of superficial dysmineralization and decalcification defects. *J Am Dent Assoc.* 1990;120:411-5.
5. Donly KJ, O'Neill M, Croll TP. Enamel microabrasion: a microscopic evaluation of the "abrosion effect". *Quintessence Int.* 1991;23:175-9.
6. Croll TP, Cavanaugh RR. Enamel color modification by controlled hydrochloric acid-pumice abrasion. I. Technique and examples. *Quintessence Int.* 1986;17:81-7.
7. Sanglard-Peixoto LF, Oliveira LB, Zardetto CGDC, Corrêa MSNP. Enamel microabrasion: esthetic treatment for iron sulfate stains. *JBP – Rev Ibero-am Odontopediatr Odontol Bebê.* 2005;8:18-42 [abstract].
8. Welbury RR, Carter NE. The hydrochloric acid-pumice microabrasion technique in the treatment of post-orthodontic decalcification. *Br J Orthod.* 1993;20:181-5.
9. Croll TP, Helpin ML. Enamel microabrasion: a new approach. *J Esthet Dent.* 2000;12:64-71.
10. Ashkenazi M, Sarnat H. Microabrasion of teeth with discoloration resembling hypomaturation enamel defects: four-year follow up. *J Clin Pediatr Dent.* 2000;25:29-34.
11. Price RBT, Loney RW, Doyle MG, Mouling MB. An evaluation of a technique to remove stains from teeth using microabrasion. *J Am Dent Assoc.* 2003;134:1066-71.
12. Allen K, Agosta C, Estafan D. Using microabrasive material to remove fluorosis stains. *J Am Dent Assoc.* 2004;135:319-23.
13. Croll TP, Segura A. Tooth color improvement for children and teens: enamel microabrasion and dental bleaching. *J Dent Child.* 1996;63:17-22.
14. Da Silva SMB, Oliveira FS, Lanza CRM, Machado MAAM. Esthetic improvement following enamel microabrasion on fluorotic teeth: a case report. *Quintessence Int.* 2002;33:366-9.
15. Welbrury RR, Shaw L. A simple technique for removal of mottling, opacities and pigmentation from enamel. *Dent Update.* 1990;17:161-3.
16. Heymann HO. Nonrestorative treatment of discolored teeth: reports from an International Symposium. *J Am Dent Assoc.* 1997;128:1S-2S.
17. Wray A, Welbury R. UK National Clinical Guidelines in Paediatric Dentistry: treatment of intrinsic discoloration in permanent anterior teeth in children and adolescents. *Int J Paediatr Dent.* 2001;11:309-15.
18. Schmidlin PR, Göhring TN, Schug J, Lutz F. Histological, morphological, profilometric and optical changes of human tooth enamel after microabrasion. *Am J Dent.* 2003;16:4A-8A.
19. Bezerra AC, Leal SC, Otero AS, Garvina DB, Cruvinel VR, Toledo OA. Enamel opacities removal using two different acids: an in vivo comparison. *J Clin Pediatr Dent.* 2005;29:147-50.
20. Paic M, Sener B, Schug J, Schmidlin PR. Effects of microabrasion on substance loss, surface roughness, and colorimetric changes on enamel in vitro. *Quintessence Int.* 2008;39(6):517-22
21. Zuanon AC, Santos-Pinto L, Azevedo ER, Lima LM. Primary tooth enamel loss after manual and mechanical microabrasion. *Pediatr Dent.* 2008;30(5):420-3.



