

Combining home bleaching and microabrasion

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Linda Greenwall looks at how dentists can combine bleaching and microabrasion and increase versatility



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Abstract

With the increased popularity of tooth whitening procedures, there are now even more opportunities that exist for treating different types of tooth discolourations. There are many patients who do not have an even colour on the entire tooth and may have small white or brown flecks on their teeth. These small white, brown or mottled lesions that appear on front teeth can be unsightly. Some patients and their parents can be concerned about this type of discolouration. The brown and white discolourations seem to be more prevalent in the younger age group as the new teeth start to erupt. These young adults are psychologically affected (Bryan and Welbury, 2003) by the markings on their teeth. They are often teased at school which is upsetting for them. They often refuse to smile because of the taunting and this causes continued distress.

Before the introduction of acid etching, teeth that had these discolorations were cut down to have full coverage restorations. Some enamel discolourations, although intrinsic, are confined to the outermost layers of enamel. The microabrasion technique can be used in combination with home bleaching or power bleaching to remove these discolourations more effectively.

Which procedure is carried out first depends on the specific case. It is the intention of this article to elaborate on the ways of combining bleaching and microabrasion to help dentists increase the versatility of their bleaching treatment.

Incidence

The microabrasion technique can be used in many different ways, on patients as young as 8 – 10 years old, as well as adolescents (Wray, 2001) and adults.

Definition of microabrasion

Enamel microabrasion is a procedure in which a microscopic layer of enamel is simultaneously eroded and abraded with a special compound, leaving a perfectly intact enamel surface behind. It is used to treat enamel discolouration, which may be the result of hypermineralisations, hypomineralisations or staining. Croll (1991) called the process 'enamel dysmineralisation', which describes the superficial enamel coloration defects resulting from some disturbance of the normal mineralisation process. There are advantages in using a combination of chemical and mechanical surface microreduction. In successful cases enamel loss is insignificant and unrecognisable and the patient is left with tooth surfaces that

appear normal (Wong and Winter, 2002).

What is the difference between bleaching and microabrasion treatments?

Bleaching improves tooth colour by lightening, whitening and brightening the teeth. Unlike microabrasion, bleaching preserves the intact fluoride rich layer of enamel and the tooth shape. The shade of the teeth over many years may darken slightly, but the teeth never return to their original dark colour (Greenwall, 2001).

Microabrasion improves tooth colour by eliminating the superficial discoloured enamel. Once the discolouration is removed, it is permanent. Microabrasion is preferred when general tooth colour changes are not needed, but a defined isolated surface discolouration is present (Hayward, 1995).

The two techniques can be used in conjunction with each other depending on the specific case. The best results and improvements are achieved with a combination of both treatments (Croll, 1997).

Advantages of the technique

- It is easily performed
- It is conservative treatment
- Teeth require minimal subsequent maintenance
- It is fast acting

- It removes yellow-brown, white and multicoloured stains
- It is effective
- Results are permanent.

Disadvantages of the technique (Greenwall, 2001)

- It removes enamel
- Hydrochloric acid compounds are caustic
- It requires protective apparatus for patient, dentist and assistant
- It requires a visit to the dental office
- It cannot be delegated and must be carried out by a dentist.

The clinical procedure: bleaching first

It is recommended that home bleaching is undertaken prior to microabrasion. The bleaching procedure will help to remove the staining more quickly and permanently. Normally home bleaching may be undertaken for two to three weeks. However with the combination of home bleaching followed by microabrasion, it may be necessary to prolong the home bleaching time until the brown stains are completely eradicated. With prolonged home bleaching, most of the brown staining can be completely removed and the white stain is left behind. As the background of the tooth gets lighter, the white areas become less visible and sometimes fade. With the microabrasion the staining becomes less dull even though it may not be completely eradicated. The patients are normally delighted with the results even though not all the white stain is completely removed.

Bleaching the teeth often masks the discrepancy between the difference of the dark yellow-brown stains and the natural colour of the white

Indications for microabrasion

- Developmental intrinsic stains and discolourations (Croll, 1997; Greenwall, 2001)
- Superficial surface enamel stains and opacities
- Yellow-brown areas
- Multicoloured stains (brown, grey or yellow)
- Superficial hypoplastic enamel (Croll, 1991, calls this 'enamel dysmineralisations')
- Areas of enamel fluorosis (Croll, 1998; Limeback et al, 2006)
- White patches, white spots
- Decalcification lesions from stasis of plaque and from orthodontic bands
- Some irregular surface textures.

Contraindications

Microabrasion cannot be used for the following conditions (Greenwall, 2001)

- Age-related staining
- Tetracycline staining
- Deep enamel hypoplastic lesions
- Some concentric areas of hypocalcification that extend to the dentine
- Most amelogenesis imperfecta
- Most dentinogenesis lesions
- Carious lesions underlying the regions of decalcification
- Areas of deep enamel and dentine stains.

colour and the colour of natural teeth. Patients often ask to have the yellow colour removed and are not aware that the yellow is the natural colour of the tooth, while the white areas are the areas of dysmineralisation. When bleaching treatments are undertaken, patients need to be warned that the white areas may appear whiter at first. Once the colour of the teeth changes, the difference becomes hardly noticeable. Microabrasion can be used to remove or reduce in size the remaining white areas after the bleaching process. Again the camouflaging effect should be carefully evaluated and only those white areas which are noticeable should be treated.

Evaluation of moist teeth

Teeth should be in their usual moist state, and saturated with

saliva before and after they are evaluated for the microabrasion technique. There is a camouflaging effect, which is present in the presence of saliva. Although the enamel stain may still be present, the saliva hides it. It is thus not necessary to remove the stain entirely and to evaluate this phenomenon first, before removing more.

Planning treatment, consent and review (Greenwall, 2001)

Case selection is particularly important with this technique. Options for treatment should be discussed and the need for further restorative treatment should be mentioned. Careful discussion with patient and their parents (if the patient is underage) as to the consequences, side effects, benefits and further options for treat-

ment such as bleaching, veneers bonding and crowns needs to be discussed. Do not raise the patient's expectation of the expected results. Rather, give a slightly pessimistic prognosis. Consequently, the patient is not disappointed with the results. They are pleased when the microabrasion manages to remove the defect in its entirety.

The enamel should be assessed from the incisal edge with the aid of a mouth mirror. This way the labiolingual enamel thickness of the tooth and enamel lesion can be assessed. The depth of the enamel lesion can also be checked.

The recommended step-by-step technique

1. Clean teeth with rubber cup and prophylaxis paste
2. Isolate the teeth and protect the soft tissues



Figure 1a: Before bleaching: Shade A3



Figure 1b: Full facial shot of subject



Figure 2: During bleaching: Upper are lighter. Lower teeth not yet bleached

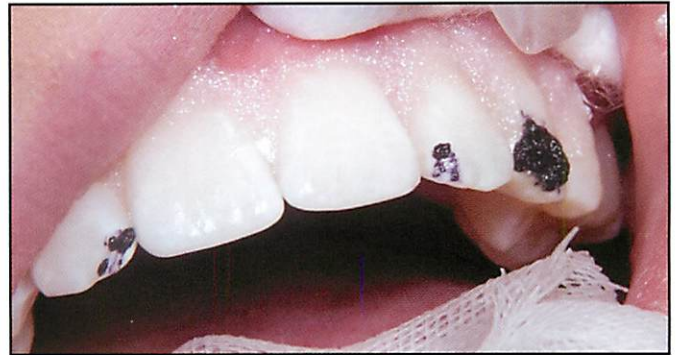


Figure 3: During microabrasion



Figure 4: The previous restoration on the upper left canine was removed after completion of microabrasion and bleaching



Figure 5: After bleaching: Even though the hypocalcified lesion on lower right lateral is not entirely removed, the appearance is considerably improved

3. Protect the lips with Vaseline
4. Microreduce the lesion to begin the treatment, by using a fine diamond. This decreases the overall treatment time
5. Apply the microabrasion compound to the areas in 60 second intervals with appropriate rinsing
6. Use a timer to ensure correct time for application of the

- compound and bristle cup
7. The applicator head has special fluting to capture as much material as possible and compress the compound on to the tooth and to keep it in contact with the tooth
8. Apply the material to the tooth for short periods of time only. Damage to soft tissue can occur if the material is left for too long. This may be in the

- form of blanching or whitening of the gingivae or soft tissues or may result in small ulceration of the mucosa. Some patients complain of a bitter taste
9. Wipe off first to prevent splashing and wash the teeth
10. Check periodically from the labiolingual aspect that minimal enamel reduction is taking place

11. Rehydrate the teeth with cotton wool rolls soaked in water
12. Repeat the procedure
13. Rinse the teeth
14. Re-evaluate the teeth when wet as some white areas disappear when wet. The rubber dam desiccates the teeth and some of the whiter areas become more vivid, thus evaluation needs to be done when

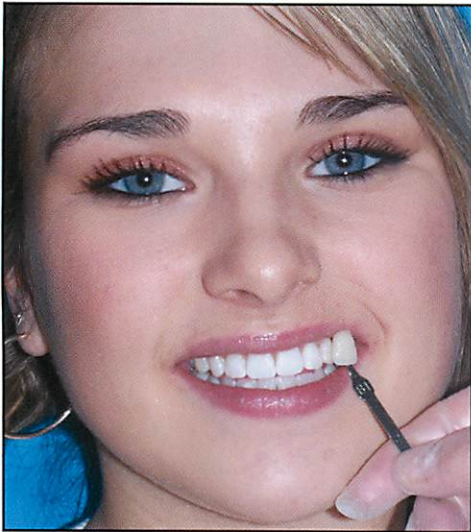


Figure 6: End result of bleaching and microabrasion treatment



Figure 7: Tray set up for microabrasion. Material used is Opalustre: this kit packaged in purple syringes, contains 5% hydrochloric acid and silicon carbide microparticles in a watersoluble paste. (Opalustre Kit, Optident UK)



Figures 8 and 9: Before and after photographs of a patient with fluorosis stain. Treatment involved prolonged bleaching for five to eight weeks followed by two sessions of microabrasion. The results of the bleaching did not entirely remove the brown crescent shape lesion on the anterior teeth. However after two sessions of microabrasion and further home bleaching, these lesions were completely eradicated

the teeth are wet

15. Remove rubber dam
16. Apply a topical fluoride (neutral sodium fluoride gel), application to the teeth for one to four minutes
17. Re-evaluate the result. More than one visit may be necessary
18. Review the patient four to six weeks later (and take post-operative photographs)

Recommended equipment to be used

- Contra-angle slow hand-piece: Alternating speed reduction 10:1 or normal rotary slow handpiece. The alternating handpiece prevents splashing
- The microabrasion material
- Polishing prophylaxis paste
- Patient protection: gingival

protection is normally required in some form such as rubber dam or paint-on dam and lip retractors, protective spectacles

- Protective covering: for dentist and assistant
- Fluoride gel to replace the fluoride rich layer which is removed
- Cup of water with cotton wool rolls soaked in water for rehydration of the tooth during microabrasion treatments

Microabrasion and further treatment

Sometimes the depth of a lesion cannot be ascertained until the tooth is treated. Another technique, called Megabrasion can be used to treat more extensive lesions that do not respond to

microabrasion. This involves the use of a high speed hand-piece and a diamond bur to gently reduce the size of the lesion (Limeback et al, 2006), followed normally by a composite restoration if necessary. A composite restoration may need to be placed to mask the discolouration. When this is necessary, the enamel surface of the lesion can be roughened with a coarse diamond bur to expose fresh enamel for the phosphoric acid to etch. The enamel surface of the microabraded area should be etched for 60 seconds instead of the usual 15-30 seconds as the mineral pattern and density of the enamel changes.

Results of microabrasion

After the treatment the enamel

appears smooth and lustrous. Normally less than 200µm in total of enamel is removed, but it may be much less. In many cases the results may be permanent. Remineralisation of the enamel surfaces can occur. It appears that the surfaces do not retain plaque and stain as easily. The treated surfaces resist dissolution more easily. They colonise fewer Streptococcus mutans bacteria. In successful cases enamel loss is insignificant and unrecognisable and the patient is left with tooth surfaces that appear normal.

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Figure 10: After bleaching the concentric ring of staining from the fluorosis is still present



Figure 11: After microabrasion, the concentric ring is removed

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Q1 What age patients can the microabrasion technique be used on?

- a) Adults only
- b) Teenagers and adults
- c) Eight years old and upwards

Q2 What is the difference between bleaching and microabrasion techniques?

- a) Bleaching lightens, whitens and brightens teeth and microabrasion improves tooth colour by eliminating the superficial discoloured enamel.

- b) Bleaching improves tooth colour by eliminating the superficial discoloured enamel and microabrasion lightens, whitens and brightens teeth.

Q3 What period should home bleaching normally be undertaken for?

- a) 1-2 weeks
- b) 2-3 weeks
- c) 3-4 weeks
- d) 4-5 weeks

Q4 Microabrasion cannot be used for:

- a) Yellow-brown areas
- b) White patches and spots
- c) Deep enamel hypoplastic lesions
- d) Areas of enamel fluorosis