

THE DIFFERENT ASPECTS OF BLEACHING: PART TWO

The last article in this series, which featured in January's issue, discussed required prescriptions for bleaching. **Diane Rochford** now turns her attention to how different bleaching approaches work

This article will look at how bleaching works: the types of treatment we can provide to patients following the initial comprehensive dental and oral evaluation by the dentist; the prescription treatment plan; and consent from the patient to proceed.

'Does whitening my teeth damage them?'

Describing how bleaching works to a patient helps them to understand the process of bleaching, the treatment options available to them and why they need to comply with instructions, especially with home bleaching. This alleviates any concerns they have that 'whitening their teeth causes damage'.

How bleaching works

- Bleaching is a chemical process involving the oxidation of organic material; this is broken down to form less complex molecules, which are lighter in colour (Kelleher, 2008).
- Greenwall (2001) says: 'Hydrogen peroxide breaks down into oxygen and water, the oxygen molecules penetrate the tooth and liberate the pigment molecule, causing the tooth to whiten'
- Hydrogen peroxide must be present long enough and frequently enough break down the pigment molecules (Greenwall, 2001).

Safety of carbamide peroxide

Carbamide peroxide (CP) is frequently used in home bleaching kits, and has a long history of therapeutic use. CP has been used for wound healing following oral surgery. In the late 1800s, low concentrations were used as rinses to prevent caries in children. Research was performed in the 1970s on orthodontic patients to reduce white spot lesions following de-banding. There have been no reported side-effects of all these applications on any patients.

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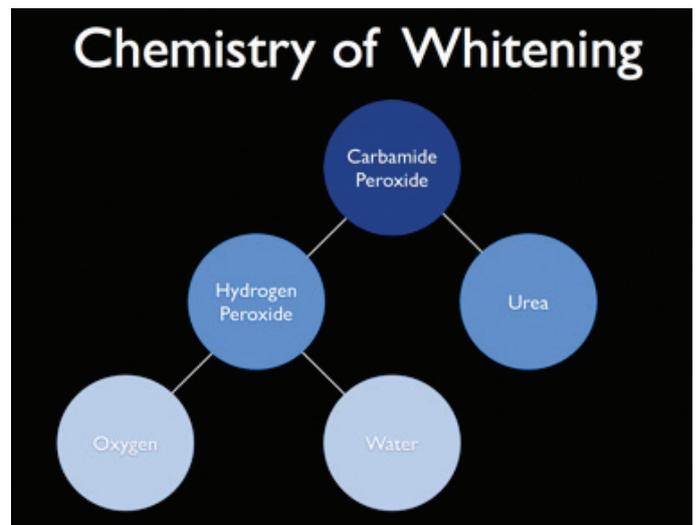


Figure 1: Chart showing the breakdown from carbamide peroxide into oxygen and water

While there have been concerns relating to the formation of free radicals in the breakdown of hydrogen peroxide and its effects on the soft tissues, organisations such as the American Dental Association and World Health Organisation have stated that low concentrations of hydrogen peroxide do not cause cancer. More recently, the European Commission and Scientific Committee on Consumer Products reviewed all the safety literature and concluded that bleaching with low concentrations of hydrogen peroxide was safe.

'What is the best way to whiten my teeth?'

Home bleaching

As with any treatment prescribed by a dentist for patients there are benefits and risks, advantages and disadvantages.

Home bleaching is a simple technique (Christensen, 1997), it is cost-effective (Greenwall, 1992) and easy for dentists and dental care professionals (DCP) to monitor. Sensitivity can be greatly reduced as opposed to other methods. Patients can bleach at their convenience and, most importantly, they are usually happy with the result.

Patients should, however, be aware that they have to actively participate in the treatment. Shade changes depend on the length of time the trays have been worn. Change can be slow if they refrain from wearing their trays consistently. Alternatively, patients can also become addicted and insist on wearing the trays for too long each day.



Figure 2: Application of bleaching gel



Figure 3: Taking photographs



Figure 4: Reviewing the shade

Home bleaching is a good option for patients with staining caused by smoking and dietary habits, age-related yellowing, tetracycline staining, brown and white spots caused by fluorosis and colour changes due to pulp trauma.

Stages of home bleaching

Following a prescription from the dentist and consent from the patient:

- Appointment one: impressions are taken of the upper and lower teeth, using alginate. Accurate impressions are required so the technician can make well-fitting bleaching trays
- Appointment two: the bleaching trays are fitted, firstly by the dentist or DCP, so they can check that the trays fit well and not likely to cause irritation to the soft tissues, or leakage of the bleaching gels. The patient is instructed on the day-to-day use, care of their trays, duration of time the trays should be worn, and most importantly the amount of gel that should be dispensed into the trays. It is beneficial for the patient to practice the application of gel and fitting the tray during this appointment. Dealing with sensitivity and the products they can use is also essential
- Appointment three: regular review appointments one to two weeks apart are essential. They help to maintain patient compliance, allows the dentist or DCP to monitor progress, answer any questions the patient may have. The current shade should be recorded, and photographs taken for the patients' records (Figures 2-6).

Ten per cent carbamide peroxide solution is most commonly used for home bleaching. There are many brands and concentrations of bleaching gels available to the profession. Dentists and DCPs should decide which brand(s) works best for them and their patients.

Carbamide peroxide systems work more slowly and need longer exposure than hydrogen peroxide, which works much faster and requires a shorter exposure time. Neither system is better; they both work equally well.

In-office bleaching

This type of procedure involves the use of a high concentration of hydrogen peroxide, which is applied to the tooth surface following isolation of the soft tissues. A light or laser is used to speed up the process. The clinician is in control of the process, so able to continue or stop treatment at anytime.

This technique is preferred by some dentists. Patients may



Figure 5: Fluorosis before home bleaching



Figure 6: Fluorosis after home bleaching

also prefer this type of treatment as they don't have to comply with home bleaching protocols, such as wearing the bleaching trays. Less time is taken overall to achieve a result, which is almost immediate. In-office bleaching can be more expensive due to the extended surgery time required for the procedure; several visits are required. Research shows that 50% of the lightening effect remained after one week, and only 14% after six to nine months (Rosensteil et al, 1991).

Dehydration that takes place during treatment can lead to a false evaluation of the change in shade. High concentrations of hydrogen peroxide can also increase the risk of sensitivity (Hayward, 2008) as well as cause burning and blanching of the soft tissues, such as lips, cheeks and gingiva.

Procedure for in-office power bleaching

As with home bleaching, the patient should be thoroughly evaluated, benefits and risks must be discussed, a prescription written for the prescribed treatment and the patient must fully consent to treatment.

- Step one: preoperative shade and photographs must be taken of the teeth, and the shade recorded. The patient should see and agree with their current shade

Brand	Carbamide peroxide (CP)	Hydrogen peroxide (HP)
Discus	Nite White 10% 16% 21%	Day White 7.5% 9.5%
SDI	Pola Night 10% 16% 22%	Pola Day 3% 7.5% 9.5%
Ultradent Opalescence	10% 15% 20% 35%	
Optident White Dental Beauty	10% 16% 22%	6%
Voco	Perfect Bleach 10% 17%	
Ivoclar	VivaStyle Gel 10% 16%	

Figure 7: Table showing the brands of home bleaching gels and their percentage concentration of HP or CP



Figure 8: Isolation



Figure 9: Curing the light cure dam



Figure 10: Undergoing power whitening treatment

- Step two: the teeth are isolated with a protective light cure dam. Gauze and cotton wool barriers may also be used to protect the cheeks, lips, and form retraction so that the teeth are clearly visible
- Step three: once the clinician is happy with the isolation and no soft tissue is visible, the bleaching gel can be applied to the tooth surface. If a light is being used as an activator, this should be placed close to the teeth. Manufacturers' instructions should be adhered to in regards to the timing of the gel remaining on the teeth and the number of intervals required. Throughout treatment, the patient should never be left on their own; they can be given paper and a pencil, should they need to communicate any discomfort, sensitivity or burning sensations. If they do, the clinician must act immediately and deal with the issue. Ask the patients frequently if they are experiencing any discomfort
- Step four: at the end of each interval, the gel should be removed using a high volume aspirator and damp gauze or cotton wool to avoid splutter of the gel. Once the tooth surface is clear of gel, the next application can commence
- Step five: once the full procedure is complete and the teeth are clear of gel, the light cure dam and gauze can be

removed. The shade must be recorded and post-operative photographs taken. Post-care instructions need be explained to the patient and any questions they may have answered (Figures 8-11).

Conclusion

Patients want to know what is going to work best for them to achieve a lighter, brighter smile. They also need to know if whitening is safe.

As clinicians, it is our responsibility to provide them with correct and up-to-date information. Explain to them in laymen's terms how hydrogen peroxide breaks down into oxygen and water and that the oxygen molecules lighten the tooth. Extensive research over many years shows that carbamide peroxide is safe, especially in low concentrations such as 10% CP = 3% HP.

Which option for treatment is best depends on the individual and their compliance to treatment. Home bleaching can be successful in nine out of 10 cases (Greenwall, 2001). However, the patient must be compliant and follow the advised protocols. There is little research using clinical controlled studies to suggest that in-office power bleaching is more effective than home bleaching. [PD](#)



Figure 11: Completed power whitening

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