

Supervised at-home bleaching is safest, most effective

An interview with Van B. Haywood, DMD

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More patients are seeking whiter smiles (see related "Trends in Dentistry" feature on page 18), and more manufacturers are claiming to be able to provide these smiles in the form of tooth-whitening products and techniques. Dr. Van B. Haywood tells why he believes supervised at-home bleaching with a custom-fitted tray (nightguard vital bleaching) is the most effective, economical way to brighten one's smile. It is critical to have a dentist oversee the treatment and that patients be told right from the start that results will not come overnight, Haywood said.

Recent developments

Q: What have been the most significant recent advances in professional tooth-whitening systems?

A: One of the most significant advances has been the development of an extended treatment protocol (2 to 6 months) for tetracycline-stained teeth. Before this was proposed, patients with tetracycline stains were not considered candidates for whitening. Up to this point you were looking at porcelain veneers, crowns, or composite bonding to deal with these patients. Practitioners had given up on bleaching because they had only been using in-office techniques; on difficult stains, the cost and the trauma to the patient outweigh the benefits. Many of those with tetracycline staining had taken the antibiotic for ear infections when they were between the ages of 2 and 5, while teeth are forming; the tetracycline chelated with the forming dentin. At-home bleaching every night for 2 to 6 months has been found to eliminate many of these stains. Another significant advance in whitening is the use of potassium nitrate applied in the tray for sensitivity. In my mind,

sensitivity is about the only significant obstacle to a successful outcome with bleaching, other than minor issues of compliance, taste, pregnancy, or too many existing restorations. If patients encounter sensitivity that can't be managed in some way, then they give up. It doesn't occur very frequently, but when it does, it's 100% of the patient's problem. The patient needs some way to be able to continue the bleaching procedure. Potassium nitrate is the same ingredient that's been in desensitizing toothpaste for years. In toothpaste, it takes 3 weeks to measurably reduce sensitivity. If you put it in the tray for 10 to 30 minutes, relief is almost immediate.

Q: Are there bleaching systems with potassium nitrate included?

A: Ultradent, Discus, and Den-Mat offer separate syringes of potassium nitrate. Most of the time, we tell patients to first try an over-the-counter anti-sensitivity toothpaste with the same concentration of potassium nitrate. If that works, they've got something they can use the rest of their lives rather than having to come back to the dental office to get a professionally distributed sample. All desensitizing toothpastes have potassium nitrate and fluoride, which is the ideal combination for sensitivity. It's just that with brushing it takes that first 3 weeks for them to start to work. Tray application is much more efficient.

Q: Do you hold off on adding potassium nitrate in the tray until you determine that the patient does have sensitivity?

A: Correct. That's why buying a product that already includes potassium nitrate may be overkill. There have not been any studies showing whether using it concurrently with bleaching will effect the outcomes, or will break down the

products sooner. It's difficult, if not impossible, to combine it with the bleaching agent because of the reaction that occurs. So I typically like to use a bleaching agent alone, and then if we encounter sensitivity use potassium nitrate with fluoride in the tray. With some of the systems, both are actually dispensed into the tray at the same time. Nobody's evaluated whether this impacts the bleaching efficacy—but it may be minor if it does.

What lies ahead

Q: Do you have any feel for what advances are in the works?

A: Most development is focusing on delivery systems—single syringe or double syringe. Everybody's looking for a different way to make the gel convenient to apply. So far, nobody's been able to put potassium nitrate in with carbamide peroxide because they are two unstable products when you mix them together. It seems to me that laser bleaching is going to die out because of the safety issues. I think you're seeing that it's almost peaked and gone already... now we're into the plasma-arc area. And that may peak and go too for the same reasons. There is no scientific literature that demonstrates that laser bleaching or plasma-arc bleaching is any better than conventional in-office bleaching with 35% hydrogen peroxide. As a matter of fact, the FDA has grandfathered those lights in, saying that they are the same as, not any better than, conventional 35%.

Q: What is your take on light- and laser-activated in-office bleaching?

A: Only two articles in refereed literature have anything to do with laser-assisted bleaching. One of them shows that it is equal to conventional in-office bleaching, and the other one shows that it is not as good as 20% carbamide peroxide in a tray. At a symposium on bleaching at Loma Linda University, data were shared from tests comparing conventional with light-activated bleaching. Split-arch tests were conducted, where you bleach one half of

the arch with a light and the other half without. Results showed no benefit from the light. The motivation behind in-office procedures is: one shot and it's done; but this just doesn't seem to do it for everybody. On average, it takes 2 to 6 visits to take care of stains. And each visit is more expensive than the total treatment of at-home bleaching—there is a cost/benefit as well as a risk/benefit ratio. If you put on rubber dam six times in a row, you increase the chance of its leaking one of those times. Nobody really enjoys in-office bleaching because it's so labor intensive and stressful. And you can't guarantee that one treatment is going to work.

Q: What are the main safety issues with light- and laser-activated in-office bleaching?

A: The main concern is what the light is doing to the pulp and to the nerve tissue in terms of heat generation; a sudden temperature rise can damage the pulp. You're dealing with a potentially dangerous product. If you have the least bit of a leaky seal around the teeth, burns from the 35% hydrogen peroxide can cause gingival tissue to slough. When you use a laser, you can't use rubber dam—and the methods that are available to keep it from leaking aren't as efficient as rubber dam. And if you get leakage, you tend to get some pretty caustic tissue burns just from the material alone, not from the laser.

Q: Can you address the actual clinical testing that has been done, and its results in terms of the long-term safety of tooth whitening in general?

A: I'm a big advocate of using ADA-approved products. The only ADA-approved products (for at-home bleaching) are 10% carbamide peroxide. And that's because the only safety data that exists is on 10% carbamide peroxide. The higher the concentration of the material you use, the closer you get to approaching the caustic level that you have with the 35% hydrogen peroxide. There are two ADA-approved

35% hydrogen peroxide products for in-office use, neither of which use lasers or photo initiators. But in terms of long-term safety, there have been just a number of good double-blind clinical trials that have shown immediate safety, plus short- and long-term safety when using 10% carbamide peroxide. It's got a great safety record. In terms of evidence-based considerations, bleaching with a tray with 10% carbamide peroxide is probably the technique in dentistry right now that has one of the strongest evidence bases for safety and efficacy.

Is supervision required?

Q: Is it critical for a dentist to oversee at-home bleaching?

A: Yes. A proper examination and diagnosis, which probably includes radiographs, can determine why teeth are discolored. Single dark teeth (and sometimes other situations) may be indicative of other problems that require endodontic or restorative therapy or may just need a regular cleaning. After a diagnosis, you can prescribe what's best. You select a product that works well with the patient concerns and the particular gingival architecture. That's where the custom tray comes in; the idea is to make something that's not going to cause one problem while you're trying to fix another. The main thing you're looking for on radiographs are periapical radiolucencies or abscessed teeth, and dissimilar pulp sizes which will effect the rate the tooth changes color. They're basically a screening device to rule out other causes of discoloration. Of course, if you had an individual tooth that was markedly discolored from the others, you'd always take a radiograph of that one because it has a greater chance of being nonvital or abscessed.

Q: Do you discuss existing restorations with patients and how they may fit in with or effect bleaching?

A: Yes. You have to evaluate what they've already got in their mouth: what is going to be replaced, what is an

acceptable color the way it is, and then if you bleached the teeth, what would be the financial investment in restorative care required to change restorations. You don't always have to change them all. But the patient needs to be prepared for the possibility. Some of the composites have good metamerism, or the ability to take on the shade of the tooth. When the teeth get lighter, even though the composites don't quite match they blend in well enough so that they don't need to be replaced. On the other hand, brown composite that matches beforehand is definitely not going to match afterwards.

Day or night?

Q: Do you find that patient compliance is better with those who wear the trays overnight?

A: In my research, if somebody's going to go with an extended period of time, compliance is always better with overnight. In the first 1 to 2 hours, about 50% of the active ingredient is depleted. Over the next 4 to 10 hours, the other half is used up. With daytime wear for a couple hours, about half the active product is being wasted. So overnight wear appears to be better from a cost-effectiveness standpoint as well as safety; the more times you apply it per day the greater chance you have of sensitivity. Some products are designed to release a lot during the first couple of hours, so daytime wearing may work fine with those. I think daytime wearing is going to become more popular, because we're such a "fast food" culture. What spawned the laser and plasma arc lights is not better whitening, but the potential for speed. If I hear any complaints about nightguard bleaching, it's that it takes so long. Some of the quicker products don't seem to give you the depth of the color change that looks so good. I wouldn't be surprised to see more marketing of shorter-application products and people not worrying about the cost of using more materials, or not having the best color change. As long as dentists keep the fee of the at-home

material at its current level, which is around \$200 per arch across the nation, then it is still perceived as a very fair and reasonable fee. So the issue of how much product you use may not be that significant. If a practitioner offers in-office bleaching, I think ethically they need to inform the patient that there are a number of other options for achieving the same end result and let the patient decide. Do they want to do it at home for \$200? Do they want to do it in the office for \$800 to \$1,200? Or do they want to do it with the laser for \$2,000 to \$4,000? It should be the patient's choice.

Recommends single-arch service

Q: Do you recommend dentists offer single-arch bleaching? Are there benefits on top of the reduced cost?

A: I would suggest that all offices offer single-arch treatment. Close to 50% of the patients in my clinical trials choose not to do the mandibular arch even when it's free. That doesn't concern them at all. So if you're making a \$400 or \$500 fee for both arches, you may get a whole lot more patients involved by doing the \$200 to \$300 fee for the one arch. And again let them make the decision. Some people may put it off for a year or two just because of financial constraints or other things and still come back and whiten their other arch.

Q: Having just the upper arch done also gives the patient and doctor something to compare the bleached teeth to, doesn't it?

A: It's amazing how difficult that is for some people to perceive or remember. If you've ever lost or gained weight or watched somebody's child grow up you know just how easily we forget what somebody used to look like 6 months ago, or even 6 weeks ago. So, anything that you can use that gives an ongoing standard or comparison helps with compliance and helps with perceived reward that the patient has achieved. It just helps with the total overall satisfaction.

Educate the patient

Q: What are some crucial points concerning informed consent that need to be clarified with patients before proceeding with bleaching?

A: When I lecture, I share a bleaching analysis form and information consent form. It includes current information about whitening—what we do know and what we don't know—and other treatment options. It covers what they may encounter in terms of sensitivity and how we're going to deal with it, plus how long it may take. My goal is to get that information to as many people as possible. That's why I published a consent form in the early 1990s; dentists would have something that they could take to their offices, and use the consent form and customize it so that it fit their particular style.

Will popularity last?

Q: Do you think the demand for tooth whitening will continue? And do you foresee any developments in restorative technology that might supplant whitening as a cosmetic option?

A: Yes. We haven't even touched it. Every time I give a course on bleaching, 5% to 10% of the participants have never done it in their office. So if you figure each office represents from 1 to 5,000 patients, that's a lot of people who haven't been exposed to it.

Long-lasting smiles

Q: How long does whitening last when you follow your "trio of steps" (see sidebar at right)?

A: We tell people 1 to 3 years. At a year-and-a-half we had about 74% of the patients whose teeth were still the same color. At 3 years it was about 62%. And then all the way out to 7 years it was 35%. We're doing the 10-year recalls now. Eventually you're going to either pick up more stains or whatever happened to the tooth may relapse and have to be retreated. But that's true with any kind of bleaching. Bleaching patients have always been told, "This is going to last 1 to 3 years and then we've got to do something again. The question

is, if you've got to do it again in three years, are you going to pay for in-office bleaching again or are you going to wear a tray for 1 or 2 nights and be back the way you were?" We basically found that on the average it's about 1 to 2 nights of retreatment for every week of treatment that you did originally. So if you go 3 years and then have to wear it 2 more nights, that's not a big outlay. If you go 3 years and have to come back and pay \$400 again, that's a big chunk of money. The more I've looked at this particular technique since we introduced it in 1989, the more convinced I am that

it's the way to go. And best for the average general practitioner, because if you get the least bit sloppy with in-office technique, somebody's going to get burned. And that's never a fun outcome. The best way to avoid this is to not dabble with something unless you're sure you want to take the risk that comes along with it.

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Who are the best candidates, and how long will their teeth stay white?

Dr. Haywood has proposed guidelines to determine whose teeth will look best after bleaching, for how long they should wear bleaching trays, and just how long they should expect the whitening to last.

• **Bleach 'til they're white:** Regardless of what the various marketing claims say about how quickly products work, the limit is not necessarily 2 weeks, or any particular length of time. The process is patient-dependent—when the teeth quit changing color, lightening is complete.

• **Don't bleach until you have seen the whites of their eyes:** The most natural look for most people is when the color of the teeth matches the sclera of the eyes. Using this philosophy, you can look in the mirror and look at others to determine who may get the most improvement in general appearance out of bleaching. People whose teeth are more yellow than the whites of their eyes may end up with the most improved looking smile after using the whitening technique, while those whose teeth already match their eyes may not look noticeably better.

• **Smiles should stay bright for 1 to 3 years:** Dr. Haywood suggests a 3-step protocol to help produce whiter smiles.

1. Lighten the teeth employing an at-home regimen with 10% carbamide peroxide in a custom-fitted tray.
2. Use potassium nitrate and fluoride to treat sensitivity
3. To maintain the whiteness for as long as possible, consider a whitening toothpaste that has peroxide in it help fight off any mild regression that occurs.