

## In-Office Vital Tooth Whitening: Viable Options for Smile Enhancement



### Abstract

The demand for tooth whitening has continued to increase, as have the various methods for achieving results. This article will review the category of in-office whitening, including science, client selection, options, and the role

of dental hygienists. A product comparison chart will assist readers with reviewing current technology available to facilitate in-office procedures.

The demand for tooth whitening has exponentially increased in recent years as people have discovered that whiter teeth improve self-esteem and create a more youthful appearance. In addition, the procedure has a high ratio of success for a significant percentage of the population.<sup>1,2</sup> As such, vital tooth whitening has become one of the most used and recognized forms of smile enhancement and clinicians should be well versed on options that exist within the tooth-whitening category. While vital nightguard, professionally supervised, and dispensed tooth whitening processes have been the most extensively researched and used methods, in-office, chairside, or “power” bleaching methods have become available and represent a viable alternative worth consideration. A review of in-office options, procedures, and potential results will arm clinicians with key information to offer and perform in-office whitening safely and effectively.

### Whitening Science, Candidates, and Safety

Regardless of the whitening method used, all incorporate the use of a form of peroxide. As a general rule, most current in-office systems use a 15% to 38% hydrogen peroxide. Whitening is achieved through oxidation of color-related molecules deep within the enamel structure. It is theorized that peroxide breaks down the bonds of these molecules or chromophores, resulting in a whiter tooth surface. In addition, as enamel whitens it becomes more opaque, masking discolored dentin below the surface of thinning enamel.<sup>3-5</sup> This combination of effects results in a brighter looking smile.

In-office whitening may not exceed the results seen with take-home products, but, it can accelerate the whitening process.<sup>3,6</sup> The use of a higher concentration peroxide combined with or without a light/laser-activated source has demonstrated immediate whitening results. This option is an excellent choice for patients seeking instant results with minimal commitment on their part.<sup>6</sup> Generally, in-office whitening can be accomplished in as little as 60 to 90 minutes. As whitening results and goals vary depending on the type and degree

of staining, additional in-office visits may be necessary to accomplish the desired outcome. For a natural result, matching teeth shade to the whites of the eyes gives clinicians and patients an easy way to evaluate endpoints.<sup>7</sup> Many practices combine in-office procedures with custom trays to provide a complete whitening package, providing a mechanism for whitening touch-up at a later time.<sup>8</sup>

The body of evidence demonstrating the safety of in-office whitening is small in comparison with vital nightguard whitening. However, research has demonstrated no long-term adverse effects with this option. Immediate effects include gingival irritation or burns when coming in contact with the whitening agent and short-term hypersensitivity. Both of these side effects are managed easily through a variety of methods, including gingival isolation and the addition of desensitizing agents within whitening products and posttreatment with fluorides and/or analgesics.<sup>9-11</sup>

### In-Office Options and Procedures

Historically, in-office systems used heat to accelerate whitening. Today, the in-office category of whitening includes chemically, laser- and light-activated systems.<sup>5,12</sup> Chemically activated systems do not require any additional activation source, such as a light or laser. The procedure includes tissue isolation with a rubber dam ligated through the contacts or the more popular option of polymer or liquid isolation. The latter involves application of a polymer gel to the surface of the gingival tissues and subsequent polymerization with a curing light.<sup>5</sup> When using the curing light, a sweeping motion should be used

to avoid excessive heating of the polymer. Once hardened, the polymer becomes an effective barrier to the high-concentration gels and lights used in in-office whitening systems. Chemically activated systems will require isolation at the gingival margin and it is recommended that both the patient and clinician wear protective glasses to avoid ocular contact with any inadvertent hydrogen peroxide exposure. Chemically activated systems require up to three 15 to 20 minute applications of the hydrogen peroxide gel. Complete removal and reapplication of the gel between cycles is required.

Laser-activated systems work by enhancing the ability of the hydrogen peroxide to remove stain-related agents.<sup>5,13</sup> In terms of treatment time, laser whitening represents the quickest option available, requiring on average of 24 minutes for full mouth treatment; however, it is the least researched method and has varying results. As with chemically activated systems, tissue isolation is a must, as is protective eyewear. As research continues, this option may become popular with practices using lasers for other dental procedures. Both diode and argon lasers have demonstrated applications in tooth whitening.

The final category, and the one with the most variance and options, is light-assisted whitening. In these systems, some form of a light—xenon-halogen, gas plasma/LED, and metal halide sources—is used to activate and accelerate the whitening process. Initially, standard curing lights were used along with high-concentration peroxide; however, this process proved time consuming and seemed to rely on the heat generated vs the light output. Curing lights seem to have no added benefit, whereas today’s newer systems have a demonstrated improvement in whitening when the light source is used.<sup>14-17</sup> As with the other systems discussed, tissue isolation is critical. In addition, all intra- and extraoral tissues in the “light” zone must be covered with the appropriate barriers and/or lip balm, and both the cli-

### Learning Objectives

After reading this article, the reader should be able to:

- state the science behind in-office whitening.
- list the methods currently used for in-office whitening.
- discuss post-whitening considerations and client instructions.
- identify the role of dental hygienists in tooth whitening.



### Kristy Menage Bernie, RDH, BS

Kristy is director and cofounder of Educational Designs, a consulting service that devises and implements education-based marketing strategies for dental companies. In addition, she lectures on a wide variety of topics and is an active member of the American Dental Hygienists' Association, currently serving as ADHA delegation chair for the California Dental Hygienists' Association. Kristy welcomes comments at (925) 735-3238 or [kmenageb@aol.com](mailto:kmenageb@aol.com).

## Patient Education Features for Maintaining Whitening Results

- Avoid staining habits, such as use of tobacco products.
- Use drinking straws with chromogenic beverages, such as coffee, tea, and cola.
- Use automated toothbrushes and whitening toothpastes.
- Clean the tongue daily with appropriate devices to eliminate build up of chromogenic materials.
- Practice thorough daily oral hygiene, including use of interdental aids, irrigators, and tongue deplaquing/scraping.
- Seek regular dental hygiene care to maintain periodontal health, keep staining to a minimum, and to determine need for whitening touch-up.

## Whitening Production Formula

- Determine number of patients per day for the hygiene department (16/ 2 RDH per day per practice)
- Estimate number of patients who would accept whitening (4 patients per day would proceed with whitening)
- Multiply by days of the week and by 4 weeks and 12 months (4 x 4 days of hygiene = 16 x 4 weeks per month = 64 x 12 months = 768)
- Multiply by whitening fee (768 x \$500\* = \$384,000)

\*Represents national average for in-office whitening fees.

nician and patient must use protective eyewear. Most systems require up to 3 applications of the peroxide gel for 15 to 20 minutes of light exposure. The gel is removed between each treatment cycle.

Careful adherence to the manufacturer's instructions will ensure safe and effective tooth whitening with any of these systems. As a general rule, isolation is the most critical for success and represents the biggest learning curve for clinicians. Once mastered, the in-office experience represents the ideal solution for busy patients. In addition, many states allow for the administration of chairside whitening by registered dental hygienists or registered dental assistants. Progressive practices have taken advantage of this provision by expanding traditional team roles to include chairside whitening, thereby minimizing dentist time and direct involvement.

## Choosing an In-Office System and Postwhitening Considerations

While little data exists regarding

which system may provide superior results, *Reality NOW* published a comparative study in their July/August 2002 issue where clinicians reviewed 3 light-activated and 1 chemically activated system.<sup>18</sup> A metal-halide system using the lowest concentration of peroxide (25%) had the greatest improvement in shade, with the second lowest posttreatment

sensitivity of all the systems tested.<sup>18</sup> Evaluating equipment cost, percentage of peroxide used, methods included to reduce side effects, and inclusion of material for future touch-up whitening will be important in determining which system is right for the practice.

Postwhitening instructions and procedures will enhance the final

outcome and are important to follow. As a general rule, patients should avoid contact with chromogenic material—red wine, coffee, tea, tobacco, and any food known to have a staining propensity—for 24 to 48 hours. In addition, an application of 1.1% neutral sodium fluoride after the final peroxide exposure may help rehydrate the

Circle x on Reader Service Card

## Maximizing Whitening Results for In-Office Procedures

- Apply 1.1% neutral sodium fluoride immediately after the last application of whitening material.
- Tell patients to avoid staining food and liquids, such as curry, ketchup, mustard, red wine, cola, coffee, and tea.
- Take impressions for a custom tray for future touch-up procedures.
- Reappoint for tray delivery and final shade analysis. Also, reappoint for additional chairside application and/or at-home use for further whitening.
- Instruct the patient on daily maintenance.

teeth, reduce sensitivity, and prevent absorption of chromogenic material. Sensitivity will subside within 24 to 48 hours and can be treated with analgesics.

### The Role of Dental Hygienists

The role of dental hygienists in tooth whitening includes promotion and education of options offered by the practice, as well as pretreatment clinical procedures. By simply asking hygiene patients about their interest in whitening, the dental hygiene department can generate awareness and assist patients with selecting the whitening option best suited for them. Clinicians can educate patients on various options through diverse sources, such as manufacturers' patient education brochures, pamphlets from professional organizations, and professional journals and publications. Dental hygienists also can be helpful in qualifying whitening candidates and promoting additional esthetic services offered by the practice.

Of critical importance to whitening success is a comprehensive dental hygiene experience, including removal of extrinsic stain, calculus, and debris. Prewhitening instrumentation will ensure the best result possible. Additionally, dental hygienists should take prewhitening photos and evaluate the current shade once all stains and accretions have been eliminated. Finally, taking impressions for custom trays will lead to completing prewhitening protocols. If patients are prone to hypersensitivity, pretreatment use of 1.1% neutral sodium fluoride is advantageous.<sup>5</sup>

Additional roles for dental hygienists include actual administration of chairside whitening procedures. Depending on state regulations, dental hygienists can provide these services, under general supervision (the dentist would not need to be in the building). Many clinicians appreciate the break from traditional dental hygiene services and enjoy expanding their skills and knowledge in this area of dentistry.

Finally, maintenance recommenda-

tions for optimizing in-office whitening results can be issued from or reinforced by dental hygienists. A recent survey proved that dental hygienists have found an overall improvement in oral health of those patients undergoing esthetic procedures as basic as tooth whitening.<sup>19</sup> Patients will be interested in methods, such as tongue cleaning, to protect their investment.<sup>20</sup> This will prove advantageous on many levels, including more motivated patients whose oral health may improve as a result of their focus on maintaining whitening results.

### Conclusion

Whitening represents the single most effective means for smile enhancement today. While the evidence suggests that any professionally supervised or administered whitening regimen will achieve the desired result, it also is an issue of time—time on the part of the practice and time and commitment on the part of the client.<sup>5,21-23</sup> Today's range of options provides a vast array of choices to achieve optimal results, including combination treatments and single-therapy opportunities. Regardless of the method chosen, clinicians need to clearly explain all options and assist clients with selecting those that will meet their needs and result in optimal whitening. Progressive practices have made all options available to their clientele; as a result, these practices have tapped into an efficient way to

enhance their patients' smiles and impact overall oral health. **COH**

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- As a general rule, most in-office systems used today use:
  - 3% to 11% hydrogen peroxide.
  - 3% to 11% carbamide peroxide.
  - 15% to 38% hydrogen peroxide.
  - 15% to 38% carbamide peroxide.
- Generally, in-office whitening can be accomplished in as little as:
  - 60 to 90 minutes.
  - 1 week.
  - 2 weeks.
  - 6 weeks.
- For a natural result, matching what gives clinicians and patients alike an easy way to evaluate endpoints?
  - posterior and anterior teeth
  - maxillary and mandibular teeth
  - whites of the eyes
  - shade A1
- Immediate side effects include gingival irritation or burns when coming in contact with the whitening agent and short-term hypersensitivity, which are managed through:
  - gingival isolation.
  - desensitizing agents within whitening products.
  - posttreatment with fluorides and/or analgesics.
  - all of the above
- Chemically activated systems require up to:
  - two 30 to 60 minute applications.
  - three 15 to 20 minute applications.
  - four 20 to 45 minute applications.
  - five 10 to 15 minute applications.
- Laser whitening represents the quickest option available, requiring on average how long for full-mouth treatment?
  - 4 minutes
  - 8 minutes
  - 16 minutes
  - 24 minutes
- Lights used today include:
  - xenon-halogen.
  - gas plasma/LED.
  - metal halide.
  - all of the above
- As a general rule, what is the most critical for success and represents the biggest learning curve for clinicians?
  - timing
  - placement
  - isolation
  - shade management
- What represents the single most effective means for smile enhancement today?
  - whitening
  - veneers
  - laminates
  - bonding
- While the evidence suggests that any professionally supervised or administered whitening regimen will achieve the desired result, it then becomes an issue of:
  - supervision.
  - time.
  - cost.
  - monitoring.

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