

Benco Dental welcomes you to the supervised self study course:

Tooth Whitening for the Twenty-First Century

PAMELA MARTIN, DDS

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COURSE AUTHOR

Pamela Martin, DDS

COURSE OBJECTIVES

Upon completion of the course, each participant will have a better understanding of the following:

- causes of tooth staining
- how whitening gel works
- determining cost for tooth whitening
- instructions for restoring teeth after they are whitened
- non-vital or "walking bleach" technique
- in-office tooth whitening
- case selection of tooth whitening
- how to treat tooth sensitivity if it occurs after tooth whitening
- concerns with over-the-counter whitening products

COURSE SPONSOR

Benco Dental is the course sponsor. Benco's ADA/CERP recognition runs from November 2000 to December 2003. Please direct all course questions to the director: Kevin Scott, DDS, 2901 Wilshire Blvd., Suite 401, Santa Monica, CA 90403. Fax: (253) 550-6171. e-mail: drkSCOTT35@yahoo.com

SCORING & CREDITS

Upon completion of the course, each participant scoring 80% or better (correctly answering 24 of the 30 questions) will receive a certificate of completion verifying three Continuing Dental Education Units. The formal continuing education program of this sponsor is accepted by the AGD for FAGD/MAGD credit. Term of acceptance: September 1, 1994 to December 31, 2003. Please contact your state dental board for your state's continuing education requirements.

COURSE COST/REFUNDS

The cost for this course is \$49.00. If you are not completely satisfied with this course, you may obtain a full refund by contacting Benco Dental in writing: Benco Dental Education Department, 360 North Pennsylvania Avenue, Wilkes-Barre, PA 18702.

IMPORTANT INFORMATION

Any and all statements regarding the efficacy or value of products or companies mentioned in the course text are strictly the opinion of the author and do not necessarily reflect those of Benco Dental Company. This course is not intended to be a single, comprehensive source of information on the given topic. Rather, it is designed to be taken as part of a wide-ranging combination of courses and clinical experience with the objective being to develop broad-based knowledge of, and expertise in, the subject matter.

PARTICIPANT COMMENTS

Any participant wishing to contact the author with feedback regarding this course may do so through the course director: Kevin Scott, DDS, 2901 Wilshire Blvd., Suite 401, Santa Monica, CA 90403. Fax: (253) 550-6171. e-mail: drkSCOTT35@yahoo.com

RECORD KEEPING

To obtain a report detailing your continuing education credits, mail your written request to: Kevin Scott, DDS, 3401 Richmond Road, Suite 210, Beachwood, OH 44122. Fax: (253) 550-6171. e-mail: drkSCOTT35@yahoo.com

COURSE ASSESSMENT

Your feedback is important to us. Please complete the brief Course Evaluation survey at the end of your booklet. Your response will help us to better understand your needs so we can tailor future courses accordingly.

Why Take This Course?

PROFITABILITY—Stay competitive with the latest information on whitening products and techniques.

CE CREDITS—Fulfill your continuing education requirements. Successful completion of this course earns you 3 Continuing Dental Education Units.

HIGH VALUE—Continue your education without traveling, taking time away from work and family, or paying high tuition, registration and materials costs.

HIGH QUALITY—Authored for dental professionals, by dental professionals, Benco Continuing Education courses are engaging, concise and user-friendly.

Who Should Take This Course?

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Tooth Whitening for the Twenty-First Century

Patients have several options today to achieve a whiter looking smile, including tooth whitening (bleaching), bonding veneers and crowns. Tooth whitening is usually more simple and the most conservative option. The most common form of tooth bleaching is the at-home bleaching system, in which the patient wears a custom-made bleaching tray containing carbamide peroxide gel for a couple hours or overnight. Its increased popularity is related to the good esthetic results achieved with at-home bleaching and the safety of dentist-supervised products.

Teeth can be stained due to several factors. The use of tetracycline during tooth development can cause teeth to turn gray, yellow or brown. Excessive ingestion of fluoride during tooth calcification can also cause teeth to become discolored. Severe trauma can cause staining in non-vital teeth. This occurs when blood in the ruptured vessels in the pulp oxidizes within the tubules, causing the tooth to turn darker. Smoking, food and beverage stains and age also can lead to staining of the teeth.

The active agent in bleaching systems is hydrogen peroxide. Carbamide peroxide is commonly utilized because it is a more stable form of hydrogen peroxide. Carbamide peroxide in the bleaching material breaks down to form hydrogen peroxide, ammonia and urea in the presence of saliva. When hydrogen peroxide breaks down, free radicals are released which penetrate enamel and dentin,

changing stained molecules in the dentin to clear ones. The free radicals oxidize stains in the teeth. During the bleaching process, enamel does not change color significantly. The dentin is what is lightened. More bleaching is required in teeth with thicker dentin. Since the carbamide gel flows freely through enamel and dentin, it is important that all superficial debris is removed. Higher concentrations of hydrogen peroxide yield a greater oxidative effect of stain removal. Higher temperature and longer exposure time of the whitening gel on the teeth also increases the oxidative effect. About 85% of carbamide-based bleaching gel contains glycerin or propylene glycol, with a thickening agent, such as carbopol, polyox, sodium stannate and flavoring. Carbopol has been known to improve the whitening process by inhibiting the enzyme that breaks down bleach in the mouth (salivary peroxidase), and thus the bleach stays active longer. In addition, carbopol thickening agent provides greater a viscosity which reduces the loss of bleach from the tray. The shelf life is approximately one year or so if not refrigerated and up to two years if refrigerated.

If the bleaching patient is to have restorations placed after whitening, it is very important to wait at least two weeks before restoring. During the bleaching process, oxygen bubbles diffuse from the teeth, inhibiting the bonding of composite restorations. Delaying placement of

restorations will provide enough time for the oxygen to be released. This delay also allows for tooth color relapse to occur, enabling the practitioner the ability to achieve a closer shade match for the restorations being placed. Prior to placing a restoration on a bleached tooth it is essential to remove a layer of enamel first. This will expose a new layer of enamel rods prior to restoring the tooth.

Non-vital bleaching on discolored endodontically treated teeth can also be done. The “walking bleach” technique involves the use of Superoxol and sodium perborate. Superoxol hydrogen peroxide solution is a concentrate of naturally occurring H₂ and O₂. It is also a strong oxidizer and by oxidizing the tooth enamel it masks stains on the tooth. A rubber dam is recommended for this procedure. The access is opened and the coronal gutta percha is removed to the cemento-enamel-junction level of the tooth. It is important to seal the cervical level of gutta percha with a cement base, light cured composite material or modified glass ionomer base to avoid damaging the root canal filling, root and possibly causing external root resorption. This technique should not be used on patients with dental restorations having deteriorated margins, exposed dentin or coronal defects. The Superoxol and sodium perborate mixture on a cotton pellet is placed inside the access opening. This can be heated to help activate the lightening process. The

Superoxol and sodium perborate mixture can be left inside of the access opening and sealed with a temporary filling. The patient should return in 3-7 days and, if the desired results are not achieved, the procedure can be repeated. Once the tooth is lightened, a composite restoration can be placed in the access opening, making sure to remove the Superoxol and sodium perborate first.

Case selection is an important aspect in achieving success in tooth whitening. Yellow and brown stains in the Vita? A and B shade ranges usually lighten more than gray and blue stains in the Vita? C shade range. Deep tetracycline-stained teeth are less predictable to lighten, although blue tetracycline stains can be lightened with longer bleaching periods of six months. Horizontal bands may lighten at a different rate than the rest of the tooth. Always document the existing shade before bleaching. Prior to the initiation of treatment it is important to inform the patient of any side effects, such as tooth sensitivity and gingival irritation during bleaching. The use of "informed consent" is valuable in the patient understanding expectations and limitations. It should include general information about bleaching, including instructions, cost, different types of bleaching available, patients' responsibilities when bleaching and potential problems that could occur while bleaching. Patients with root sensitivity may not want to bleach their teeth

since the whitening materials can enhance tooth sensitivity. Pregnant women or those expecting to be pregnant should not bleach their teeth since long term effects of bleaching materials on pregnancy have not been studied. It is important to emphasize compliance as an issue to patients when discussing it as an option. This can sometimes get overlooked. If the patient does not appear to be compliant with brushing, flossing or regular recare appointments, they may follow the same pattern during tooth whitening. It is very important that the patient is given all instructions for at-home tooth whitening. This can often be accomplished by a dental auxiliary. Patients should also be informed that whitening their teeth is usually not permanent. Normally it will last one to three years, although it can vary with each person. Factors such as drinking coffee or tea, and smoking can return the teeth to their darker appearance quicker.

Some patients may experience tooth sensitivity while bleaching. This can last up to several days initially and usually lessens. Once bleaching has ended the sensitivity will also end. Stronger bleaching gels can cause more sensitivity. Options to treat sensitivity while bleaching include: switching to a lower concentration gel, wearing 3%-5% potassium nitrate gel in the bleaching trays either before whitening or on alternating days of whitening, and in-office desensitizing with a

gluteraldehyde solution and neutral fluoride. If the sensitivity is mild enough, desensitizing toothpastes containing potassium nitrate can also be used. Some whitening gels contain potassium nitrate to help reduce sensitivity. The concentration used for most at-home whitening gels varies from 10% - 22% carbamide peroxide or 6%-10% hydrogen peroxide. A 10% concentration of carbamide peroxide gel is equal to 3% hydrogen peroxide based gel.

In-office bleaching utilizes hydrogen peroxide gels ranging from 30% - 50%. Since these solutions are much stronger, it is very important to isolate and protect the patient's soft tissue with a rubber dam or paint-on dam. Most in-office bleaching gels are activated by light, laser or heat. The newer systems incorporate the use of Xe-halogen lamps to initiate the bleaching gel. The dentist and patient should also wear eye protection. The gel can be placed directly on the teeth or in a matrix and usually left on the teeth for 20-30 minutes. In-office gels work quicker due to a higher concentration of free radicals which penetrate the enamel, causing the tooth to release more oxygen bubbles which reflect light. This effect causes the tooth to look lighter. Some in-office bleaching gels contain photoinitiators. These photoinitiators are activated by lights or lasers. Disadvantages of light and laser in-office bleach-

ing include more trauma to the teeth, shorter lasting results and more sensitivity experienced than at-home bleaching. In-office bleaching can be followed up with at-home bleaching. The in-office process offers the patient an initial “boost” and can speed up the whitening process, but is more costly to the patient. If it is followed up with at-home whitening, it is recommended to wait a few days before wearing trays to help prevent increased tooth sensitivity. In-office bleaching can be very attractive to patients who want quicker results. Since the newer whitening lights and lasers can be very expensive, your fee should reflect this.

When arriving at the fee for bleaching, it should reflect the cost of approximately 20 minutes spent by the doctor and approximately 40 minutes spent by the dental assistant. The assistant’s time is spent taking the impression(s), fabricating the bleaching tray(s), giving instructions to the patient, plus materials. Fees vary across the country and generally range from \$300-\$500 for dual arch treatment. In-office bleaching can generally range from \$500-\$800. Some offices charge lower fees for bleaching hoping to attract new patients.

Over-the-counter or unsupervised at-home bleaching kits are becoming more popular. However, these products are not as effective as dentist-prescribed whitening products. Some of these products can be dangerous to oral tissues, since they are not supervised by dentists. The trays or carriers that contain the bleach are usually ill-fitting, causing the bleach to flow out freely over the teeth. Whitening Strips aren’t custom made and don’t cover all of the teeth. The stock-type trays are too thick, uncomfortable and cover much of the gingiva and soft tissue beyond the teeth. The recommended wearing time is two times per day for two weeks.

One concern with bleaching is that the body of teeth are not as effectively whitened as the incisal aspect. Higher viscosity whitening gels, snug-fitting trays and consistent bleaching can help combat this. Cuspids are also known to remain darker than the incisors after at-home bleaching. If this is a concern for the patient they can continue to wear the bleaching trays, filling only these darker teeth with the gel until they become lighter.

THE FOLLOWING ARE BLEACHING OXIDE-BASED PRODUCTS

- 15 % Carbamide Peroxide (Life-Like Cosmetics)
- Nupro Gold (Dentsply Professional)
- VivaStyle (Ivoclar/Vivadent)
- Zaris (3M ESPE)
- Perfecta (Premier Dental)
- Perfecta Trio (Premier Dental)
- Perfecta 3/15 (Premier Dental)
- Pola Day/Pola Night (Southern Dental Industries)
- Contrast (Spectrum Dental)
- Star White (Temrex)
- Aspire (Dent Zar)
- Contrast P.M. (Interdent)
- Copalite Star White (Cooley & Cooley)
- Crystal-White Tooth Whitening System (Heath-Dent International, Inc.)
- Dentl-Brite (Cura Pharmaceutical)
- Denta-Lite/Denta-Lite Plus (Challenge Products)
- Gel White (Temrex)
- Gly-Oxide (Marion Merrell Dow Inc.)
- Karisma (Confi-Dental)
- Life Like Cosmetic Solutions (Harbor Dental Bleaching Group)

PRODUCTS THAT ARE AVAILABLE:

- Nu-Smile/Progressive Whitening Gel (M & M Innovations)
- Opalescence (Ultradent)
- Platinum Overnight Professional Whitening System (Colgate Oral Pharmaceuticals, Inc.)
- Proxigel (Reed & Carnrick)
- Quick White (LumaChem)
- Radiant / Radiant Plus (SciCan)
- Rembrandt Gel Plus 10%, 15%, 22% (Den Mat)
- Rembrandt Lighten (Den-Mat)
- Rembrandt Xtra-Comfort (Den Mat)
- Spring White (Spring Health Products)
- Trio Step-Bleaching System (Premier)
- Ultra-Lite (Ultra-Lite, Inc.)
- Varishade Tooth Bleaching System (Lo Chemco)
- White & Brite Ultimate (Omnii Products)

AT-HOME CARBAMIDE PERIN-OFFICE CARBAMIDE PEROXIDE-BASED PRODUCTS

- Denta-Lite (Challenge)

IN-OFFICE HYDROGEN PEROXIDE-BASED PRODUCTS

- Cosmetic Solutions (Harbor Dental Bleaching Group, Inc.)
- Niveous (Shofu)
- Arcbrite (Biotrol)
- Denta-Lite (Challenge)
- Illumine (Dentsply Professional)
- LumaWhite (Lumalite)
- Perfect White (Premier)
- Pola Office (Southern Dental Industries)
- Hi-Lite (Shofu)
- Quasarbrite (Spectrum Dental)
*In-Office/Take Home Combo
- Starbrite (Spectrum Dental)
- Encore Home Whitening (Stardent)
- Laserbrite Laser Whitening System (Stardent)
- LumaArch Bleaching System (Lumalite)
- Opalescence Xtra (Ultradent)
- Perfecta 3/15, 3/15 extra (Premier)
- Quick Start (Den Mat Corp.)
- Quick White Laser (Luma Chem)

AT-HOME HYDROGEN PEROXIDE-BASED PRODUCTS

- Perfecta Ultra (Premier Dental)

SODIUM PERBORATE PRODUCTS

- Sodium Perborate (Sultan)

Tooth whitening can be one of the most exciting and non-invasive procedures dentists can offer to patients. It can also be an incredible practice builder. When supervised, it is a safe and effective option for achieving whiter teeth. However, unsupervised at-home whitening products can lead to increased sensitivity and gingival irritation. Benefits of in-office whitening include quicker results and the need for less compliance. Higher incidence of sensitivity and increased cost to the patient may direct the patient to accept an at-home whitening gel. At-home bleaching also reduces chair time. Since tooth whitening is time and concentration dependent, in-office laser or light bleaching is no more successful than using a 10% carbamide peroxide gel for about six weeks. Informed consent is highly recommended to formally advise the patient about treatment, their responsibilities and possible risks associated with tooth whitening.

Self-Test

- 1. The active ingredient in bleaching systems is:**
 - a. sodium perborate
 - b. hydrogen peroxide
 - c. sodium hydrochloride
 - d. ammonia
- 2. During the bleaching of teeth, free radicals:**
 - a. are released when hydrogen peroxide breaks down
 - b. can penetrate enamel and dentin
 - c. oxidize stains in teeth
 - d. all of the above
- 3. More bleaching is necessary in teeth with thicker dentin.**
 - a. true
 - b. false
- 4. All of the following can improve whitening results except:**
 - a. using higher concentrations of hydrogen peroxide
 - b. increasing the temperature of the bleaching gel
 - c. administering a fluoride treatment prior to bleaching
 - d. longer exposure time to the bleaching gel
- 5. Which of the following is a thickening agent used in carbamide-based bleaching gels?**
 - a. polyox
 - b. carbapol
 - c. ammonia
 - d. both a and b
- 6. Which of the following inhibits the enzyme that breaks down bleach in the mouth?**
 - a. carbapol
 - b. polyox
 - c. sodium stannate
 - d. propylene glycol
- 7. In non-vital bleaching, it is necessary to seal the cervical level of the gutta percha with:**
 - a. a cement base
 - b. light cured composite
 - c. modified glass ionomer
 - d. any of the above
- 8. During the bleaching process, the enamel is the portion of the tooth which is lightened.**
 - a. true
 - b. false
- 9. Which by-product of the bleaching process inhibits the bonding of composite restorations?**
 - a. ammonia
 - b. urea
 - c. oxygen bubbles
 - d. all of the above
- 10. What is the minimum recommended length of time to wait before restoring teeth which have been bleached?**
 - a. 2 days
 - b. 1 week
 - c. 2 weeks
 - d. it is not necessary to wait before restoring bleached teeth
- 11. Which of the following is not considered to be a potential side effect of bleaching?**
 - a. gingival irritation
 - b. tooth sensitivity
 - c. increased prevalence of decay
 - d. uneven bleaching rates of horizontal banding
- 12. Gray and blue stains in the Vita? C range achieve better lightening results than yellow and brown stains in the Vita? A and B ranges.**
 - a. true
 - b. false
- 13. Patients undergoing the “walking bleach” technique should return to have the bleaching mixture removed in:**
 - a. 24 hours
 - b. 1-3 days
 - c. 3-7 days
 - d. 2 weeks
- 14. The “walking bleach” technique involves the use of:**
 - a. hydrogen and carbamide peroxide
 - b. superoxol and sodium perborate
 - c. hydrogen peroxide
 - d. b and c
- 15. Failure to create a seal in the cervical level of the gutta percha may result in:**
 - a. internal root resorption
 - b. external root resorption
 - c. discoloration of the dentin
 - d. all of the above

- 16. If following up in-office bleaching with at-home bleaching, it is recommended to wait how long to prevent tooth sensitivity?**
- a few days
 - at least 2 weeks
 - one month
 - it is not necessary to postpone treatment
- 17. A disadvantage of light and laser in-office bleaching as compared to at-home bleaching is:**
- more trauma to the teeth
 - shorter lasting results
 - increased tooth sensitivity
- 18. In-office bleaching gels can be activated by which of the following:**
- agitation
 - light
 - argon laser
 - heat
- 19. The concentration of most at home whitening gels is:**
- 10%-22% carbamide peroxide
 - 6%-10% carbamide peroxide
 - 30%-50% hydrogen peroxide
 - both a and b
- 20. The use of informed consent is only recommended for in-office bleaching.**
- true
 - false
- 21. Which of the following statements is true regarding over-the counter bleaching kits?**
- they are as effective as dentist-prescribed kits
 - the trays can be ill-fitting
 - Whitening Strips don't cover all of the teeth
 - all of the above are true
- 22. It is not necessary to use a rubber dam while using an in-office bleach.**
- true
 - false
- 23. Which of the following is not true regarding bleaching?**
- if monitored carefully, pregnant women can bleach their teeth
 - yellow and brown stains usually respond better than gray stains
 - tetracycline stains can be effectively lightened
 - all of the above are true
- 24. The main ingredient in Perfecta whitening gel is made up of:**
- glycerin
 - carbopol
 - propylene glycol
 - a and c
- 25. Which of the following is not a contributory factor in the staining of teeth?**
- trauma
 - excessive ingestion of fluoride in adults
 - use of tetracycline in the late teens
 - all of the above contribute to the staining of teeth
- 26. Which of the following cases would be recommended for bleaching?**
- a patient with yellow stained teeth
 - a patient who is eight months pregnant
 - a patient who visits the dentist every few years
 - all of above are recommended for bleaching
- 27. One would expect to achieve better results using the in-office bleaching technique versus the take-home bleaching technique.**
- true
 - false
- 28. Which of the following teeth usually don't lighten the most while bleaching?**
- central incisors
 - lateral incisors
 - cuspid
 - all of the teeth respond equally
- 29. Generally, how long should patients expect their teeth to stay lightened after bleaching?**
- 6-12 months
 - 1-3 years
 - 3-5 years
 - forever
- 30. Which of the following can help reduce sensitivity while bleaching?**
- potassium nitrate
 - carbopol
 - glutaraldehyde
 - a and c

Please check box if you would like to receive your score with your certificate of completion.

Whitening For The Twenty First Century

CONTINUING DENTAL EDUCATION COURSE

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INSTRUCTIONS:

When you finish reading the course text, use the form to submit your answers to the self test. Fill in the correct box for each question indicating your answer. Pen or pencil may be used. There should be only one correct answer for each question. Upon completion of the course, mail the answer sheet to:

Benco Dental Education Department
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Wilkes-Barre, PA 18702

NOTE: We recommend that you photocopy your answers before mailing this course. This will ensure that you have a record of your course completion in case of loss due to postal system error.

COURSE EVALUATION:

Your feedback is important in evaluating the content and value of our courses.

Please indicate how well the course met the criteria below.

Circle one number in each criteria: 1=Poor, 2=Average, 3=Good, 4=Excellent.

The course provided clear information about the topic. 1 2 3 4

The course had relevance for my practice. 1 2 3 4

Overall rating 1 2 3 4

The course evaluated my understanding of the topic through the post-course questions. 1 2 3 4

How likely would you be to take a similar course on a different topic in the future? HIGHLY UNLIKELY HIGHLY LIKELY

Additional Comments: _____

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1. (A) (B) (C) (D)

2. (A) (B) (C) (D)

3. (A) (B) (C) (D)

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