What to Know About Whitening

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- Lesley Kupiec worked part-time as a dental hygiene educator for P&G.
- Jane Forrest has done consulting work for P&G.

Overview

As an oral health care professional, it is important to understand what it means to whiten teeth. This course will review the differences between whitening and bleaching and how to identify types of stains or causes of tooth discoloration, how to properly include whitening in individual treatment plans, and how to discuss the options, benefits and potential adverse effects.

Course Contents

Introduction

Do your patients often ask you about whitening their teeth? How prepared do you feel to answer their questions? Tooth whitening or bleaching is one of the most frequently requested dental procedures. The increase in demand for tooth whitening is keeping pace with both the advances in techniques for vital tooth bleaching and the media focus on white smiles. Advancements in technology allow us to see color in high definition which makes the public more aware of their appearance and self-conscious of yellow or stained teeth.[1] According to the American Academy of Cosmetic Dentistry, when patients were asked what they would like to improve about their smile it was to have whiter, brighter teeth. Patients also most commonly reported that discolored, yellow or stained teeth are what makes a smile unattractive.[2] With the introduction of at-home custom tray bleaching in the late eighties, the tooth whitening industry has grown with more products and procedures demonstrated by current research to be safe and effective options.[1,3] In 2000, a strip-based whitening system was introduced, Crest® Whitestrips™ as a convenient alternative for at-home bleaching rather than using a custom tray. Whitening procedures also can be administered in-office or in combination with at-home methods. In addition, there are over-the-counter (OTC) products, from simple, inexpensive options such as AuraGlow® Teeth Whitening Pen to more advanced products like GLO Lit™ Teeth Whitening Tech Kits. Individuals may purchase these without input from a dental professional and more recently, other non-dental options, such as kiosks in malls and spas have expanded the market for tooth whitening.[3]

Learning Objectives

Upon completion of this course, the dental professional should be able to:

- Explain the difference between whitening and bleaching.
- Discuss the etiology of intrinsic and extrinsic stains.
- Identify indications and contraindications for bleaching.
- Discuss the 4 categories of whitening options.
- Discuss the pros and cons for each of the 4 categories of whitening options.
- Discuss the possible side-effects of bleaching.
- Given case scenarios, apply criteria in determining whether candidates qualify for bleaching.

What is the Difference Between Whitening and Bleaching?

The terms whitening and bleaching are often used interchangeably, however there is a difference. Whitening is the umbrella term whereas bleaching is one form of whitening. Teeth can be whitened by physical removal of superficial stains using abrasive agents such as toothpaste or prophy paste, or through bleaching processes, which rely on chemicals to penetrate enamel and dentine.[4] Peroxide based whitening products work to remove the appearance of stain through a redox chemical reaction. Free radicals are produced when the oxidizing agent hydrogen peroxide (HP) breaks down. These free radicals are then available to react with organic molecules in enamel and dentine, breaking down the double bonds of

the chromogens (color causing agents). These new, simpler molecules reflect light differently resulting in the appearance of whiter teeth.[1,4]

The active ingredient found in most bleaching agents is hydrogen peroxide (HP), which can be delivered as HP or as carbamide peroxide (CP). CP is a stable compound which in contact with water will break down into HP and urea.[1] For example, 10% CP breaks down into about 3% HP and 7% urea.[3,5] Consequently, this breakdown process results in a slower release of the HP, and typically requires longer wear times for individuals using CP bleaching agents.

There has been testing of phthalimidoperoxycaproic acid (PAP) as an alternative tooth whitening agent that does not release hydrogen peroxide. Free radicals are not formed during the PAP reaction which may minimize side effects.[35,36] While there is limited research on this novel whitening agent, it may be a promising alternative showing to be reliable, safe, and efficacious.[37]

Staining Types and Causes

A thorough understanding of the etiology of different tooth stains will enable dental professionals to guide patients to the proper whitening techniques for their needs. Obtaining information on diet, lifestyle, behaviors, oral health habits, and occupation will help practitioners identify the cause of the stain, which is critical to the discussion of the best options for that specific individual.[6]

Stains can be classified based on their etiology as either intrinsic or extrinsic. Intrinsic stains are located within the tooth structure, while extrinsic stains usually result from accumulation of chromatogenic substances which build up on the external tooth surfaces, mainly in the pellicle.[1,7] While intrinsic stains can only be lightened by chemical means in a bleaching agent, the appearance of extrinsic stains can be lightened by mechanical removal (from abrasive agents or scaling procedures) and/or chemical bleaching.

Extrinsic Stain

Extrinsic staining is less likely to occur with effective oral hygiene habits. The staining agents (i.e., chromogenic bacteria, food/drink such as coffee, tea, red wine, blueberries, some drug and tobacco use, metallic compound exposure) will not adhere to a smooth enamel surface. Rather, the acquired pellicle and plaque/calculus accumulation incorporates the stain.[6]

Extrinsic stains can present as green, orange, brown, yellow, or black. Green and orange stains are typically found in patients with poor hygiene when certain chromogenic bacteria are present.[6] Brown stains are common and could be due to a number of causes, such as tobacco and foods/beverages. Yellow extrinsic stain is often the result of poor hygiene and heavy plaque buildup, whereas black stain is less common and associated with iron in the saliva. This type of stain does not correlate with poor hygiene yet is commonly found as a line around the gingival margins.[6]

Intrinsic Stain

Intrinsic staining typically presents as yellow, brown, gray or orange. It also includes white or brown spots on teeth that can be caused by dental fluorosis, demineralization, and hypocalcification. Tetracycline staining that is incorporated in tooth structure has a grayish brown hue.[6] For a complete list of types of stain and how to approach removal (Table 1).

Genetics also can play a role in intrinsic staining and the natural color of one's teeth. Intrinsic staining can start during the stages of tooth developmental or can be associated with aging. In addition to the causes previously mentioned, extrinsic stains over time can contribute to intrinsic staining.[8]

Depending on the individual makeup of the patient and the type of stain, varied results from bleaching agents may be seen. For example, brown and yellow stains typically respond better to bleaching than blue/gray stains.[7,8] Some stains, i.e., those caused by metallic compounds, are more difficult to bleach, therefore, discussing other treatment options with patients may be necessary. If the more conservative route of bleaching does not produce the desired degree of whitening, placing crowns, veneers or bonding, may be

Table 1. Types of Tooth Stains.[6]

Type	Source	Clinical Approach
Extrinsic Stains		
Green	Chromogenic bacteria and fungi (*Penicillum* and *Aspergillus* species) from poor oral hygiene most often seen in children with enamel irregularities	Should not be scaled because of underlying demineralized enamel. Have client remove during toothbrush instruction or lightly polish; may use HP to help with bleaching and removal.
Black stain	Iron in saliva; iron-containing oral solutions; *Actinomyces* species; industrial exposure to iron; manganese, and silver	Firmly scale because of calculus-like nature and selectively polish for complete removal.
Orange	Chromogenic bacteria (*Serratia marcescens* and *Flavobacterium lutescens*) from poor oral hygiene	Lightly scale and then polish selectively.
Brown stains Tobacco Food	Tars from smoking, chewing, and dipping spit tobacco Food and beverage pigment and tannins	Lightly scale and then polish selectively. Lightly scale and then polish selectively.
Topical medications	Stannous fluoride, chlorhexidine, or cetylpyridinium chloride mouth rinses	Lightly scale and then polish selectively.
Yellow	Oral biofilm	Have client remove during toothbrush instruction.
Blue-green stain	Mercury and lead dust	Lightly scale and then polish selectively.
Red-black stain	Chewing betel nut, betel leaf, and lime (pan); found in Western pacific and South Asian cultures	Firmly scale and then polish selectively.
Intrinsic Stains		
Dental fluorosis (white-spotted to brown-pitted enamel)	Excessive fluoride ingestion during enamel development	Cannot be removed by scaling or selective polishing.
Hypocalcification	High fever during enamel formation	Cannot be removed by scaling or selective polishing.
Demineralization (white or brown spots on enamel, may be smooth or rough)	Acid erosion of enamel caused by oral biofilm	Cannot be removed by scaling or polishing. Recommend daily 0.5% sodium fluoride rinses for remineralization.
Tetracycline (grayish brown discoloration)	Ingestion of tetracycline during tooth development	Cannot be removed by scaling or selective polishing.

necessary to achieve the desired result.[8]

Indications for Bleaching

While many patients might be curious about whitening their teeth, dental professionals need to understand who the ideal candidates for whitening are and when/how to include bleaching in a treatment plan. A full oral examination that includes checking the medical history and noting potential allergies, asking if there is a history of tooth sensitivity, finding out the possible etiology of stain, and checking for any signs of potential infections or oral disease are necessary to start the process.[3]

An ideal candidate for whitening will be a healthy individual with a complete permanent dentition, preferably someone at least 14 years of age. The individual also must have the desire to be compliant and follow directions, as well as the capacity to understand potential side effects and how to manage them. It is best to avoid the contraindications listed in Table 2.

Four Categories of Whitening Options including Pros and Cons

When it comes to deciding what option may be best for a patient, it is important to incorporate the most current scientific evidence along with your clinical experience and the patient's preferences, values and clinical circumstances. When available, a clinical practice guideline(s) should be reviewed to see if it covers the patient's specific conditions. Since whitening has been a hot topic in dentistry for several years, a considerable amount of research has been conducted on various whitening options, including treatment time, wear time, frequency and dosage or concentration of the active agent, i.e., HP.[12-21]

Whitening procedures can be placed into four categories: professionally applied in-office, professionally dispensed patient take-home, consumer purchased over-the-counter (OTC), and non-dental options.[3]

Professionally Applied In-office

Description: Many dental offices offer chairside bleaching options for patients. Typically, in-office bleaching is performed with a high concentration of HP ranging from 25-40%.[7] This procedure is monitored by a dental professional and precautions are taken to minimize sensitivity and gingival irritation by protecting the soft tissues with isolation techniques.[3,7] Whitening may occur after one treatment, however the desired results may take several visits. After initial in-office bleaching there may be some rebound of the color, which explains why multiple visits may be necessary and why some dentists may fabricate take-home trays for patients to use to lock in the shade.[3]

Light sources, including lasers, light emitting diodes (LEDs), plasma arc lamps (PACs) and halogen lamps are used with some in-office techniques and products in combination with in-office HP whitening procedures.[22] The theory behind using a light source is that by heating the HP gel, the free radicals are made available faster, thus resulting in more effective whitening. However, results of recent systematic reviews and meta-analyses do not confirm this outcome for in-office bleaching gels with either high or low levels of HP. The authors conclude that light activation regardless of sources or protocols is not significantly different than results of non-activated whitening.[22,38] However, there may be instance of shorter gel contact time when activated.38 In addition, they found that the risk of tooth sensitivity was not influenced by light sources. However, another systematic review found some evidence that laser may reduce sensitivity, especially when higher concentrations of HP are used, but offers comparable bleaching results without use of laser.[20] Overall, lower concentrations of HP should be considered for in office bleaching since they have similar color change efficacy with less risk of adverse reactions.[21] When comparing in-office to at-home bleaching, there is no conclusive evidence of increased risk or intensity of tooth sensitivity or better efficacy for in-office bleaching.[14,18]

Pros: Initial assessment to determine causes of discoloration and clinical concerns; professional supervision and soft tissue protection; and, quickest results.

Cons: Most expensive option; may result in

Table 2. Contraindications for Teeth Bleaching.

Contraindications	Reasons
Allergies	Ensure patients are not allergic to any of the ingredients in the bleaching material. If they might be, other options may be necessary for them to improve their esthetics. There are no documented reports of allergic sensitivity to HP or CP.[9]
Tooth Sensitivity	Bleaching can cause transient sensitivity in patients, which usually disappears when treatment is stopped.[1,8] Learning about an individual's current sensitivity or that experienced in the past will help manage patient expectations and allow for potential pretreatment to prevent issues during the bleaching process.
Pregnant	Pregnant patients are generally not included in research studies such as those testing bleaching agents. Thus, research is unavailable on this population. Consequently, there is no evidence stating it is either safe or not safe to bleach teeth during pregnancy. Therefore, it is always better to avoid bleaching until after the baby is born so as not to take any risks.[3,8]
Anterior Restorations	Restorations will not lighten from a bleaching agent. If anterior restorations are needed, or if patient has anterior restorations, it is important to manage expectations by educating patients that only the surrounding tooth structure, not the restoration, will lighten. Patients should bleach their teeth before having new or replacing anterior restorations, so the shade can be matched at the time they have the restoration placed.
Children and Adolescents	It is discouraged to bleach teeth until after all permanent teeth have fully erupted (at least after age 14).[3,10] Primary teeth have thinner enamel and larger pulp chambers that are closer to the outer surface than permanent teeth.[11] Due to these features, a primary tooth may be more susceptible to adverse reactions and a child may not have the capacity to completely understand risks and what the procedure entails. Primary teeth also tend to have a bluish/white hue where permanent teeth may appear more grey/yellow.[11] A difference in shade may be more obvious when a child has a mixed dentition. Evidence-based guidelines for this population are not established and require more research.[3,10]
Periodontal Disease	It is necessary to address periodontal disease and focus on the importance of health before treatment planning a cosmetic procedure such as bleaching. If patients really want whiter teeth, then use this as a motivator to encourage them to take the necessary steps to return their teeth to a state of health. Education on the importance of proper homecare, diet, and the connection of periodontal disease and potential staining also may motivate the patient to continue with maintenance to stay healthy and stain free.[3]
Caries/Failing Restorations	A leaky restoration or active decay can cause teeth to be stained. Bleaching will not remove or fix decay.[3] Always establish health by treatment planning any necessary work prior to addressing cosmetic issues. The exception is if the decay/restoration is on an anterior tooth, because bleaching may be appropriate to do prior to placing a final restoration since restorations will not lighten after the fact.[3,8]

more sensitivity when a high concentration of HP is used;[7,14] the dentist (not patient) controls the outcome when bleaching is completed in the office; and, may need multiple sessions and supplemental take-home trays to accomplish desired results.[3,7]

Professionally Dispensed Take-home

Description: The most common professionally dispensed whitening system is custom fitted bleaching trays made in-office. An appropriate bleaching agent is then given to the patient who is instructed on how to properly use the trays at home.[8] There are a number of different bleaching agents available for use with take-home trays, so it is very important to tell your patients to always follow the manufacturer's instructions for the product dispensed.

Take-home trays are popular for several reasons: patients are still monitored by their dental professionals, patients have control on when the desired whiteness has been achieved, patients can "touch up" as needed, and typically this option costs less than the in-office application. Ten to 30% CP or up to 14% HP products are available to use with home trays with varying wear times.

While both HP and CP are used for whitening, they have very different properties. For example, HP is considered very unstable and releases the HP in 30 to 60 minutes,[13,23,24] whereas the HP in tray-delivered CP gels is slower, releasing 50% of its peroxide in the first 2-4 hours, and the remainder over the next 2-6 hours.[13,23] Thus, the use of CP requires the individual to wear the trays for a longer period of time depending on the concentration of whitening agent, e.g., 2 to 8 hours (overnight) daily.[7] In comparison, due to its faster release, HP products have a much shorter daily wear time ranging from 15-60 minutes.[13]

In addition to take-home custom trays, another professionally dispensed option is whitening strips. The white strip was initially introduced in 2000 by Crest. This flexible polyethylene strip has a pre-measured dose of HP gel. In 2001, Crest Professional Whitestrips included 6.5% HP, which were to be worn 30 minutes twice daily and were available over the counter (OTC). In 2004, Crest Whitestrips Supreme was introduced with 14% HP concentration with a low controlled dose. This higher concentration strip was designed to be professionally dispensed, however, they also are available online. Several studies show the efficacy, efficiency and safety of whitening strips.[12,15,25]

As for visible changes in color using shade guide units, a meta-analysis comparing CP and HP did not reveal any significant differences in the incidence of tooth sensitivity and gingival irritation.[13] Both CP and HP are recommended to be used for at least two weeks, with some products requiring up to 6 weeks to achieve maximum results.[3,8] A lower concentration of the bleaching agent, such as that released in 10% CP, showed a lower risk and intensity of tooth sensitivity when compared to higher concentrations. Although some faster change in color was seen with gels of higher concentrations, results were equivalent over time with potentially less risk of tooth sensitivity with 10% CP.[21,39]

Pros: The majority of bleaching research is on custom fitted take-home trays, and shows high degrees of safety. Patients control the results through self-administration; some professional supervision; and, less costly than in-office procedures with fewer adverse effects, such as tooth sensitivity and oral tissue irritation.[7,12]

Cons: Compliance is necessary; results are not as instantaneous as the in-office option; individuals can misuse and/or excessively wear trays or whitening strips leading to sensitivity.[3,7] Over bleaching can result in an unnatural opaque white and loss of shine on the tooth surface.

Consumer Purchased Over-the-counter (OTC)

Description: OTC bleaching products are readily available and continue to gain popularity.[7] They consist of lower concentrations of HP and are applied by the patient through prefabricated trays, brushing a paint-on gel, or placing whitening strips.[1,5] Daily wear times may vary, yet most require their application over a 2-week period to see a change in color by 1 to 2 shades.[1] Whitening mouthrinses, chewing gums

and toothpastes also can be purchased OTC.[4,5] OTC whitening products have been used for years demonstrating safety.

When compared to a placebo, several studies found that all OTC whitening products had superior whitening efficacy.[5] Of the 71 studies included in a recent Cochrane review, 26 compared a whitening technique to a placebo (vs. another whitening technique) and found similar results over a short period of time, although the evidence was low to very low.[5] For the remaining studies that did compare one bleaching agent to another bleaching agent, the variation in study designs did not make it possible to draw any conclusions regarding which application method, percent concentration, or duration time was superior. Consequently, the review recommended standardizing study protocols so that future research results could be compared.

Pros: Least expensive option, easy access to products, high degree of safety.

Cons: Lack professional supervision (which can result in adverse effects or mismanaged expectations); individuals must be compliant; OTC trays are not custom fit and may be uncomfortable; people with crowded or overlapped teeth may see poor results.[5]

Non-dental Options

Description: Over the past decade non-dental

Table 3. Summary of Pros and Cons for 4 Categories of Whitening Options.

Professionally Applied In-office **Pros:** Quickest results; professional supervision; gingival protection; safe and effective. **Cons:** Most expensive option; may result in more intense sensitivity than other options;[7,14] the dentist (not patient) controls the outcome when bleaching is completed in the office; still may require multiple sessions/take-home trays to accomplish desired results;[7] the most chairside time at the office.[5]
Dentist Dispensed Take-home **Pros:** The majority of research on bleaching is on this option and shows high degrees of safety; patients can control the results through self-administration and still receive professional supervision; lower cost and less chairside time than in-office procedures with fewer adverse effects.[7] **Cons:** Compliance is necessary; results are not as instantaneous as in-office options; patients can misuse and excessively wear trays leading to sensitivity.[5,7]
Consumer Purchased OTC **Pros:** Least expensive option; easy to access products; high degree of safety; no chairside time required. **Cons:** Lack of professional supervision which can result in adverse effects or mismanaged expectations; individuals must be compliant; OTC trays are not custom fit and may be uncomfortable; people with crowded or overlapped teeth may see poor results; compliance is necessary.
Non-Dental Options **Pros:** Access; convenience; less expensive than in-office. **Cons:** Unsupervised by professionals yet gives the appearance of providing professional treatment; unregulated; employees of the kiosks or spas typically do not have the education to determine an individual's contraindications to bleaching or manage adverse reactions.[5,17]

venues, such as mall kiosks or spas have become popular places for teeth bleaching. These options offer convenience and can provide this service without dental professionals by loading bleach in a tray then allowing individuals to administer the product to themselves.[26] It is important to advise patients of the importance of professional dental supervision when bleaching. An issue with non-dental venues is that it may give the appearance of a professional setting, with some employees wearing scrubs or lab coats. However, most do not have the education or training to help someone who may have contraindications to bleaching or experience adverse side effects.[3,26,27]

Pros: Access, convenience, less expensive than in-office.

Cons: Unsupervised by professionals and unregulated; gives appearance of providing professional treatment. Employees of the kiosks or spas typically do not have the education to determine an individual's contraindications to bleaching or manage an adverse reaction.

Side Effects

All bleaching methods have the potential to cause some side effects, although not all patients will experience them. The most commonly reported side effects are increased tooth sensitivity and gingival irritation.[1,3,8,9,13,28,29] Side effects tend to be short lived, clearing up after bleaching is stopped. Effects of bleaching have been studied for 30 years and there have been no long-term systemic or oral health issues discovered.[3]

Tooth Sensitivity: Patients should be advised that tooth sensitivity is a common side effect of the tooth bleaching process. It can happen early in the process, therefore, taking steps to minimize potential sensitivity before it starts will benefit the patient as it is always better to prevent than treat after the fact. Sensitivity may occur if the flow of fluid within dentinal tubules increases. When tubules are occluded, e.g., by smear plugs, there is less flow of fluid. However, during the bleaching process oxygenation occurs, which results in the removal of smear plugs. Consequently, transient sensitivity may occur for some.[30]

Whether one experiences sensitivity depends on different factors such as: concentration of the bleaching agent, contact time of bleach on the tooth, frequency of bleaching, and an individual's susceptibility to sensitivity/history of sensitive teeth.[1,3,8,28,39] Although systematic reviews/meta-analysis have not shown significant differences in tooth sensitivity comparing in-office and at-home techniques, lower concentrations (10% CP) are typically favored when looking to minimize risk for patients.[14,17,28,39] A recent systematic review looking at 37% CP and 35% HP said evidence exists, although limited, showing comparative results with less sensitivity when applied at least 3 times in office for CP.[40] Recommending the application of an in-office desensitizing agent, such as fluoride varnish, before treatment and/or a toothpaste containing stannous fluoride or potassium nitrate starting two weeks before bleaching can help minimize sensitivity.[29]

Gingival Irritation: If HP has access to the gingival tissue, it can cause mucosal irritation. This can appear as a white mark or burn on the tissue. Gingival irritation most commonly occurs with at-home bleaching when custom trays or OTC trays are ill-fitted, excess HP gel is dispensed into trays, or if an individual wears the trays longer than stated in the directions.[4,29] The uniform unit-dose on a whitening strip may help prevent dispensing excess gel and its direct contact with the tooth surface may minimize contact with the gingival tissue. When high concentrations of HP are used, as with in-office bleaching, measures to cover and protect the gingival tissue must be taken to ensure the bleach causes no harm.[29]

Other Side Effects: There have been occasional reports of headaches, TMJ pain, sore throats, gastric pain, tooth erosion, pulpal damage, and increased susceptibility to demineralization associated with tooth bleaching.[1,8,9,29] The integrity of dental restorative material after bleaching has been studied *in vitro* showing the possibility of negative influence.[3,9]

Concerns of HP being deleterious for oral mucosa has led some researchers to investigating more natural, peroxide free teeth bleaching options. While the addition of natural agents to traditional peroxide methods did

show statistically significant improved bleaching results, when natural agents were used alone, they did not perform as well as a peroxide product.[31] A recent meta-analysis concluded that the concerns over potential carcinogenicity of HP may be unwarranted as the results did not support those concerns.[32]

ADA Seal of Acceptance

The dental professional should be knowledgeable about available whitening options for patients, whether they be professionally dispensed or an OTC option. When making suggestions for safe and effective OTC products, dental professionals can confidently recommend those which have earned the ADA Seal of Acceptance.[33]

The ADA has recently expanded the Seal of Acceptance program to include OTC bleaching products. In 2017, the first home use bleaching product, Crest® 3D Whitestrips™ (Glamorous White), received the ADA Seal of Acceptance. Since then, two other Crest Whitestrip products have earned the Seal, 3D Classic Whitestrips Vivid and 3D Whitestrips Gentle.[34] This means they have met the criteria for safety and efficacy that the ADA requires. When this course was developed, no other bleaching/whitening products were listed as meeting the ADA Seal Program's general criteria for Acceptance. For more information on the ADA Seal of Acceptance program and process of earning the ADA Seal please refer to the *ADA's website*.

Whitening in Action: Role of Dental Professionals in Assessing and Recommending Appropriate Options

Case Scenario 1: Whitening – High School Reunion

Mr. Jim Hartwell, is a 38-year old accountant. His chief complaint is the yellowing of his front teeth, which he feels is getting worse as he gets older. He would like them whitened within three weeks before he attends his 20-year high school reunion. When reviewing his health history and behaviors, you learn that Mr. Hartwell drinks coffee and enjoys red wine.

After reviewing his health history and completing an oral assessment, you determine his only treatment needs are preventive care and suggest re-evaluating the discoloration at the end of the appointment since the yellow stain could be removed during his prophylaxis. If additional whitening is needed, making him custom trays for use with an at-home whitening/bleaching system will meet his time requirement. He asks if there are any other options and mentioned he tried whitening strips about 10 years ago, but said he wasn't very compliant since he experienced some sensitivity. However, he now claims to be very motivated and wonders if he should try them again.

You explain several options, including the whitening strips and present the pros, cons and cost.

- In-office – most expensive, quickest results, compliance is not as necessary.
- Custom take-home trays – medium expense, compliance is necessary, 10% CP may have least side effects.[17]
- Whitestrips – least expensive option, compliance is necessary.

All options could get him to his desired whiteness, but he has to take into account time, cost and compliance factors. You also inform him that all options may have side effects, such as tooth sensitivity and/or gingival irritation. If these are a concern, then 10% carbamide might be best option at home with compliance.[17] In addition, fluoride varnish is recommended fluoride for sensitivity as is switching to a sensitivity toothpaste while going through the procedure.[29]

Case Scenario 2: Periodontal Disease – Smoker

Your patient, William Bagley shows up after 5 years of not seeing a dentist or hygienist. His chief complaint is that his teeth have gotten very brown and wants a whiter smile. He admits he hasn't been taking very good care of his teeth because he has been so busy with the construction company that he owns. He wants you to "clean them up" today and is curious about whitening his teeth and his available options.

You review his health history where he reveals he is a smoker and has no allergies or history of tooth sensitivity. When you ask further questions about the stain you learn he drinks 2-3 cups of coffee a day and his home care habits consist of using a manual toothbrush in the morning with "whatever toothpaste my wife buys." He also indicates he has tried to stop smoking but has relapsed. Upon completing an oral assessment, you notice very inflamed tissue with generalized bleeding on probing with pocket depths of 4-5 mm and slight recession throughout his mouth. Radiographs reveal calculus, which is confirmed through exploring. The brown stain he is concerned about is primarily on lingual and interproximal surfaces. No caries are detected and all previous restorations are in good condition.

After all assessments, you decide the patient will need scaling and root planing (SRP) treatment, which will take two-three appointments. You give Mr. Bagley a hand mirror so he can see the condition of his mouth and show him his radiographs pointing out the calculus. Next you explain the SRP procedure, stressing the importance of regaining and maintaining a state of health. You discuss that the brown stain is extrinsic – meaning the SRP will help remove that surface stain and will help address his concern with wanting whiter teeth. You explain that after the SRP treatment, and he regains health, you will be happy to discuss other whitening options if he still feels he would like his teeth to be whiter.

You educate the patient on proper homecare habits including recommending an electric oscillating rotating toothbrush and stannous fluoride toothpaste for his gingival condition and tooth whitening. Use of interdental aides, such as a proxy or interdental brush are stressed since the papilla does not fill the embrasure space in most areas. After having him demonstrate these homecare procedures and suggest he do them twice a day. This, along with counseling him on smoking cessation and regular maintenance appointments should address his periodontal condition and reduce the amount of staining.

Case Scenario 3: Child in Mixed Dentition

Mrs. Shin brings her 9-year-old daughter, Sally, in for her examination and prophy appointment at 9 am. She tells you that she is concerned that Sally's permanent teeth are coming in really yellow and asks if they should be bleached. You explain that it is natural for permanent teeth to appear more yellow due to the differences in deciduous and permanent teeth. Once her permanent teeth have all erupted, they will not appear so yellow since there is no longer a contrast between them and the whiter/blue hue of her primary teeth. The mother admits that the color difference does not bother Sally, but it is something that Mrs. Shin notices.

You strongly discourage them from pursuing bleaching treatment for a mixed dentition and discuss the guidelines from both the ADA and AAPD (American Association of Pediatric Dentistry), which do not recommend tooth whitening/bleaching for children and teenagers before the age of 14.[3,10]

If Sally is unhappy with the color of her teeth after her permanent dentition has fully erupted, you can revisit options, which may be very different than what exists today. Mrs. Shin should know that while Sally is under the age of 18 close supervision of the chosen procedure will be extremely important to ensure proper use and compliance, and to understand and minimize any potential adverse reactions.

Conclusion

As consumers demand easy options for whiter teeth, innovative products and trends will be available to meet those demands. Dental professionals must keep up with these trends and provide valuable evidence-based health insights to patients for safe and effective use of these products. Current evidence suggests that all whitening options can be effective in ideal candidates, while some will experience

Course Test Preview

To receive Continuing Education credit for this course, you must complete the online test. Please go to: *www.dentalcare.com/en-us/ce-courses/ce491/test*

1. Bleaching of the teeth is a form of whitening, however, not all whitening is performed by bleaching.

A. True
B. False

2. The active ingredient found in bleaching agents is _____.

A. Carbamide peroxide
B. Hydrogen peroxide
C. Prophy paste
D. Toothpaste
E. Urea

3. Extrinsic stains can only be lightened by the use of chemical means in a bleaching agent.

A. True
B. False

4. Which of the following is NOT a cause of extrinsic staining?

A. Blueberries
B. Coffee
C. Red wine
D. Chromogenic bacteria
E. Tetracycline

5. Which of the following extrinsic stains should not be scaled?

A. Black
B. Brown
C. Green
D. Orange
E. Red-Black

6. Which of the following is NOT necessary to review to determine if an individual is a candidate for whitening their teeth?

A. Full oral examination
B. Medical history
C. History of tooth sensitivity
D. Signs of potential infections or oral disease
E. All are necessary to review.

7. Which of the following is NOT a contraindication for bleaching?

A. Able to manage potential side effects
B. Active caries or periodontal disease
C. Current tooth sensitivity
D. A mixed dentition
E. Unable to follow directions

8. Typically, in-office bleaching is performed using _____.

A. 35% carbamide peroxide
B. 15% hydrogen peroxide and a light source
C. 35% hydrogen peroxide
D. 15% carbamide perioxide

9. Which of the following statements about in-office bleaching is FALSE?

A. In-office bleaching is the quickest way to get results.
B. In-office bleaching may require the use of take-home trays or multiple visits to accomplish desired results.
C. Isolation techniques are necessary to protect gingival tissue from bleaching gel.
D. Using a light source in conjunction with in-office bleaching increases the effectiveness of the whitening process.

10. Dental offices dispense what kinds of take-home bleaching options?

A. Custom-fitted take-home trays
B. Daily use whitening mouthrinses
C. Flexible polyethylene whitening strips
D. A and C
E. A, B, and C

11. Which of the following is false regarding OTC customer purchased bleaching products?

A. They are a more expensive option for bleaching.
B. Individuals with crowded teeth may see poor results.
C. OTC trays are not custom fitted.
D. Individuals must be compliant to achieve desired results.
E. There is a lack of professional supervision.

12. The best option for bleaching is _____.

A. In-office because it provides the quickest results
B. OTC because it is convenient for individuals to purchase and use
C. There is no "one best option" as different individuals have different needs
D. Professionally dispensed custom-take home trays because they are safe and effective

13. The most common side effect(s) of bleaching is/are _____.

A. Nausea
B. Gingival irritation
C. Sensitivity
D. B and C

14. Natural, peroxide-free bleaching alternatives whiten just as well as traditional, peroxide-based products.

Addition of natural agents to traditional methods may improve bleaching results.

A. Both statements are True
B. Both statements are False
C. First statement is True, second statement is False
D. First statement is False, second statement is True

15. All of the following can contribute to whether one experiences sensitivity from bleaching EXCEPT one, which is the exception?

A. An individual's dental history indicating sensitive teeth
B. Higher concentrations of bleaching agent
C. Longer contact time of bleach on tooth
D. Misuse of the bleaching product
E. None, they all can contribute

16. Which of the following options does not help in minimizing or preventing tooth sensitivity during bleaching?

A. Fluoride vanish application prior to bleaching
B. Using toothpastes containing stannous fluoride or potassium nitrate
C. Use lower concentrations of bleach
D. Non-stannous fluoride toothpaste

17. Which of the following does help to prevent or minimize gingival irritation during bleaching?

A. Using custom trays with pre-measured gel
B. Using isolation techniques during in-office bleaching
C. Using OTC trays
D. Wearing custom-fitted trays as prescribed

18. The ADA Seal of Acceptance program allows dental professionals to confidently recommend products that have earned the Seal. The first OTC bleaching product to earn the Seal was _____.

A. Colgate Optic White Toothpaste
B. Crest 3D Whitestrips Glamorous White
C. Crest 3D Classic Whitestrips Vivid
D. Crest Whitestrips Supreme

19. Denice Hartwell comes into your office 2 weeks after her husband Jim. She will be attending Jim's high school reunion with him next weekend and mentions how great his teeth are lightening up. She drinks green tea daily and feels that her teeth are yellowing too. She wants to know what the best option for her might be given her time frame. She has no history of sensitivity and started using a sensitive toothpaste when Jim did. She has never tried whitening before.

A. She should pick up a box of OTC Whitestrips on her way home since she has never bleached before to try it out first.
B. She likes how her husband's teeth have whitened so she should have custom trays made and get the same bleach he received (10% CP).
C. She only has one week to whiten her teeth so she should use a higher concentration of CP or HP in her custom trays to speed up the whitening effects.
D. Since she only has one week to whiten her teeth, professionally applied in-office bleaching is her best option.

20. It has been one year since you have completed SRP for William and he has been seeing you faithfully every 3 months for periodontal maintenance. He has been very diligent with his home care and has been keeping the surface staining to a minimum, especially since he has quit smoking. He also has not had any further gingival recession. At his perio maintenance visit today he mentioned he still would like to discuss whitening options. Since he has done so well with his homecare and is in a better state of health you are happy to discuss his options. He mentioned he is concerned about the cost but does want to get significant results. Which of the following would be viable options for William?

A. Since William has slight recession but no sensitivity, it may be best to have him use take-home trays with 10% CP gel.
B. William wants to see significant results, therefore in-office bleaching would be a good option.
C. William wants to save money therefore you could recommend Crest Whitestrips and advise to ensure that the bleach is not covering the recessed areas when possible.
D. A and C

21. Annie Walsh recently learned she is pregnant and will be in her cousin's wedding in 4 months. She wants to know if she can bleach her teeth before the wedding since she will be in photos and hasn't bleached them in a few years. Upon completing her oral health assessment, you notice she has slight generalized gingivitis which is commonly seen during pregnancy and no surface stains. What do you recommend for Annie?

A. You tell her that she doesn't have any stain so there is no need to bleach, she should be happy with the color of her teeth.
B. You suggest 10% CP in custom trays since it is the lowest concentration and least chance for side effects.
C. You tell her that she should have an in-office bleaching treatment right before the wedding since she will be monitored by dental professionals.
D. You advise her that it is not wise to bleach her teeth while she is pregnant since there is no research on the topic and it is better to not take risks.

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Additional Resources

- No Additional Resources Available.

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