

# SMILE Analysis Form

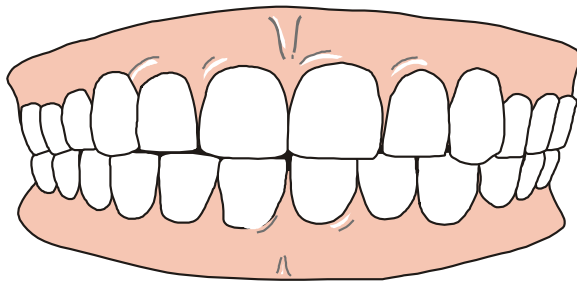
## Clinical Evaluation (VBH 2013)

### FACIAL COMPONENTS

#### Smile / Facial Symmetry (Describe deviations)

- YES NO Face Proportion: divided into equal thirds? \_\_\_\_\_
- YES NO Eyes Level: Interpupillary Line = Horizon? \_\_\_\_\_
- YES NO Midline of eyes, nose and chin in line? \_\_\_\_\_
- YES NO Interpupillary line perpendicular with facial midline? \_\_\_\_\_
- YES NO Commissure line perpendicular with facial midline? \_\_\_\_\_
- YES NO Incisal edges line perpendicular with facial midline? \_\_\_\_\_
- YES NO Proper functional incisal edge length and position? (say "F", "V" for wet dry) \_\_\_\_\_
- YES NO Does patient guard their smile? \_\_\_\_\_

Maximum Smile ----->



Draw lips relative to teeth to demonstrate smile line and amount of teeth / gingivae showing during smile

At rest smile (M), \_\_\_\_ mm of centrals showing  
 Full smile (E): \_\_\_\_ % of centrals showing  
 Full smile: \_\_\_\_ mm tissue above centrals showing  
 Full smile: \_\_\_\_ Discoloration in gingivae above teeth  
 Full smile: \_\_\_\_ mm of lip movement from rest

#### Smile Form of lower lip:

- ☐ Curved  
☐ Straight  
☐ Reverse  
☐ Asymmetric

#### Smile form of upper lip?

- ☐ Curved  
☐ Straight  
☐ Reverse  
☐ Asymmetric

- YES NO Maxillary centrals 50% of #6-#11 width? \_\_\_\_\_
- YES NO Interproximal spaces visible laterals and canines? \_\_\_\_\_
- YES NO Mandibular lip line follows incisal edges? \_\_\_\_\_
- YES NO Incisal edges touch mandibular wet-dry line? \_\_\_\_\_
- YES NO Balanced bilateral negative space? \_\_\_\_\_
- YES NO Occlusal plane correct anterior-posteriorly? \_\_\_\_\_

### GINGIVAL COMPONENT

- YES NO Gingiva in harmony with maxillary lip? \_\_\_\_\_
- YES NO Gingiva confluent with DEJ? \_\_\_\_\_
- YES NO Proper canine-lateral-central position from gingival line \_\_\_\_\_
- YES NO Proper gingival embrasures? \_\_\_\_\_
- YES NO Healthy gingival papillae? \_\_\_\_\_
- YES NO Inflammation/discoloration present? \_\_\_\_\_
- YES NO Excessive gingival tissue (Cause)? \_\_\_\_\_
- 1/3 facial problem
- Short lip
- Hyper-active lip
- Altered-passive eruption)

## DENTAL COMPONENTS (Describe deviations)

### Dental Midline

YES NO Maxillary dental midline coincident with facial midline \_\_\_\_\_  
YES NO Max / Mand midlines coincident? \_\_\_\_\_

### Tooth Proportion

YES NO Tooth height to width ratio (80%) approximates Golden Proportion (1/1.617)?  
YES NO Length of central incisors 10-12 mm?  
YES NO Central-lateral-canine in proper ratio (golden proportion)?  
YES NO Anterior teeth with proper line angles location and shape?  
YES NO Posterior teeth length in harmony and appear progressively smaller?

### Axial Alignment

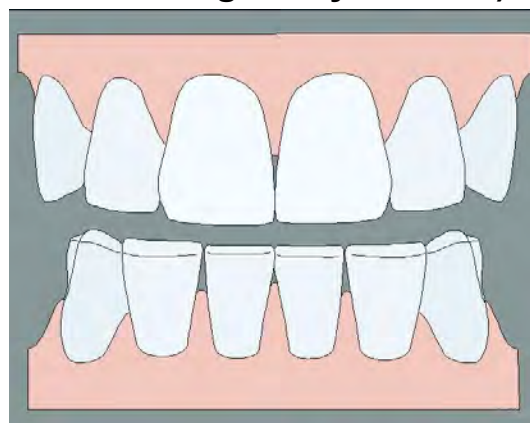
YES NO Axial alignment inclines to midline? \_\_\_\_\_  
YES NO Any flared teeth present? \_\_\_\_\_  
YES NO Buccal corridors visible? \_\_\_\_\_

### Proximal Contacts

YES NO Proper inciso-gingival proximal contact position? \_\_\_\_\_  
YES NO Proper incisal embrasure form? \_\_\_\_\_  
YES NO Spaces gingival to contacts (black hole) \_\_\_\_\_  
YES NO Diastemas? \_\_\_\_\_

### Tooth Shade and Surface Characterization (see Bleaching Analysis form)

YES NO Overall shade discrepancy present? \_\_\_\_\_  
YES NO Individual tooth shade discrepancy? \_\_\_\_\_  
YES NO Notable surface characterization? \_\_\_\_\_  
Smooth – Textured – Glossy -Dull



### Restorations

YES NO Defective Restorations Present  
Tooth # \_\_\_\_ / Description  
Tooth # \_\_\_\_ / Description  
Tooth # \_\_\_\_ / Description  
Tooth # \_\_\_\_ / Description  
Tooth # \_\_\_\_ / Description  
Tooth # \_\_\_\_ / Description

### Patient Comments (+ they complete following form)

YES NO Is the patient pleased with overall smile? \_\_\_\_\_  
YES NO Is there anything the patient would like to change about their smile? \_\_\_\_\_

Chief Complaint \_\_\_\_\_

### Summary Diagnosis:

### Consultation Required

YES NO Prosthodontic \_\_\_\_\_  
YES NO Periodontic \_\_\_\_\_  
YES NO Orthodontic \_\_\_\_\_  
YES NO Oral Surgery \_\_\_\_\_  
YES NO Endodontic \_\_\_\_\_

## Patients' Esthetic Self-Analysis

PATIENT INSTRUCTIONS: Looking into a full face, close-up mirror, analyze your smile in two positions: - 1) slight smile and 2) full smile.

### **TEETH**

YES NO In a slight smile, with your lips slightly parted, do the tips of your front teeth show?

YES NO In a full smile, is there anything you do not like about your smile? Explain:

### **Look at the two upper front teeth:**

ARE THEY: slightly longer than the others, equal in length or shorter? (circle one answer)

### **Look at all the teeth:**

YES NO Do any teeth look too long or too short?

YES NO Do any teeth look too pointed or too flat?

YES NO Do any teeth have a shape you do not like?

YES NO In a full smile, does the top lip rise above the necks of the teeth so that the gums show?

YES NO When you bite on your back teeth (when you swallow), do all the front teeth come into contact?

YES NO When you bite on your front teeth (biting a sandwich), do all the front teeth come into contact?

YES NO Are the upper front teeth straight (versus being crooked, overlapped, or protruding)?

YES NO Are the lower six front teeth straight?

YES NO Are the lower front teeth even in appearance?

YES NO Are the teeth of one color from top to bottom?

YES NO Do you like the color of your teeth?

YES NO Is one front tooth darker than the rest?

YES NO Do the teeth contain any stains? (white or brown)

- YES NO Do the front teeth contain fillings that are not matched with other teeth so they are noticed?
- YES NO In a full smile, sometimes the back teeth show.  
Are these teeth free of stains and discolorations?
- YES NO Do the necks of any teeth have erosion  
(a ditched-in "V" appearance that can be seen or felt with the fingernail)?

## **GUMS**

- YES NO Are the gums pink and healthy-looking everywhere?\_(not red and swollen).
- YES NO Have the gums receded from the necks of the teeth anywhere?
- YES NO Is the curvature of the gum tissue good\_around the teeth (half-moon shape)?

## **BREATH**

- YES NO Is your breath always pleasant?
- YES NO Do you use mouthwash or some other treatment for bad breath?
- YES NO Do you brush your tongue?
- YES NO Do you have a problem with throat drainage or sinuses?
- YES NO Is your mouth free from decay or gum disease that cause bad breath?
- How frequently do you brush (and with what toothpaste and firmness of toothbrush)?  
Brush: 1 – 2 – 3 – 4 – times/day  
Toothpaste used: \_\_\_\_\_  
Toothbrush used: super-soft – soft – medium – hard

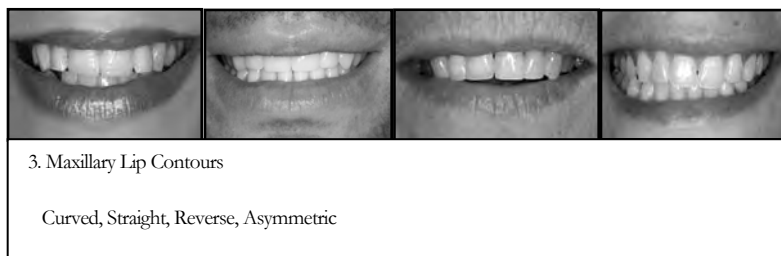
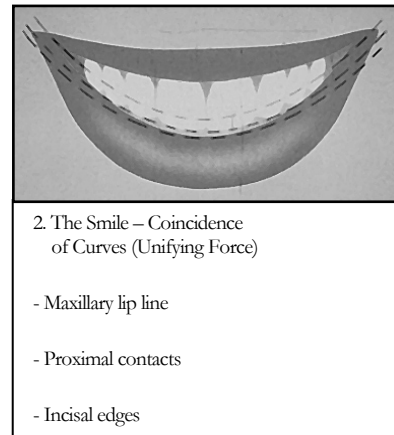
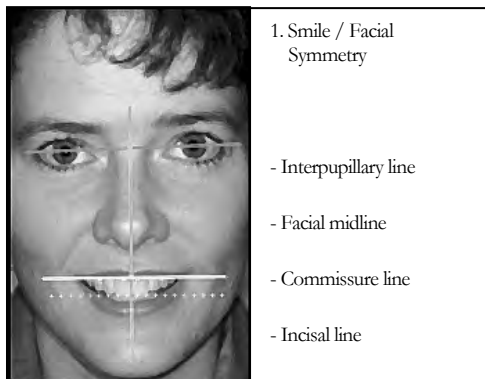
How frequently do you floss (and with what kind)?

## **SNORING**

- YES NO Does anyone tell you that you snore?
- YES NO Does your snoring annoy anyone?
- YES NO Does anyone tell you that you stop breathing while sleeping?'
- YES NO Do you grind your teeth at night?

# Principles of Esthetics

## FACIAL COMPONENTS



# DENTAL COMPONENTS

## 1. Dental Midline – 2 Theories

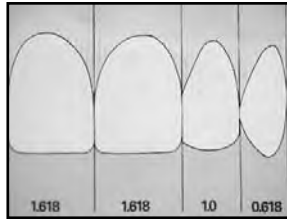
**A.** Align midline **PRECISELY** with facial midline or with lingual papilla

- Philtrum = facial midline 70%

- Mx and Md midline **FAIL** to align 75% of the time  
(Never use Md midline as a guide)

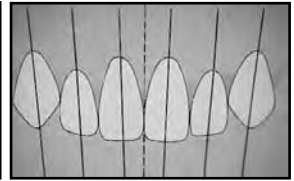
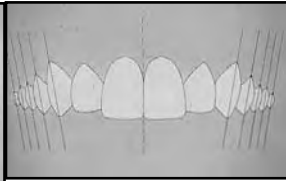
OR

**B.** **NEVER** precisely align dental midline to facial midline... it may contribute to an artificial appearance



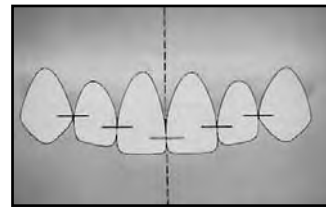
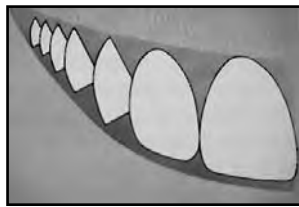
## 2. The Golden Proportion

1.6 – 1.0 – .618



## 3. Axial Alignment

- Posterior and anterior segments
- Mesial inclination toward the dental midline
- Creates a balance around a central fulcrum
- The farther distal a deviation in inclination, the greater the influence around a central fulcrum.
- A disrupted balance creates visual tension

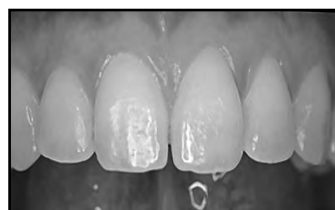
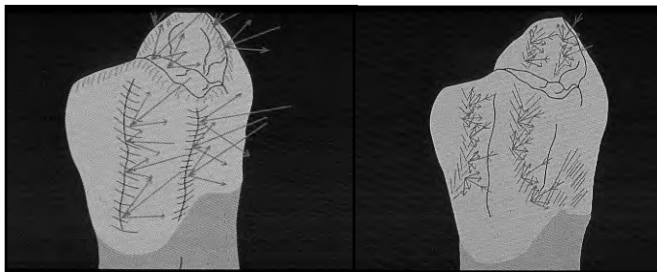


## 4. Perspective

- The illusion which perceives a nearer object to be larger than an identical object which is further away from the observer
- Anterior to posterior progression of posterior teeth

## 5. Proximal Contacts

- Progress from incisal to more gingival (central to canine)
- A curved component of the “ideal” smile
- Dictates size of incisal embrasures



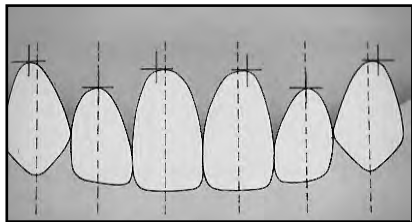
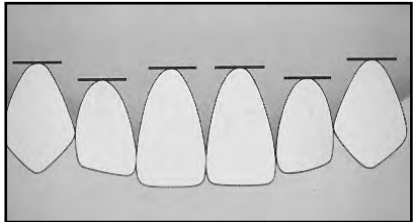
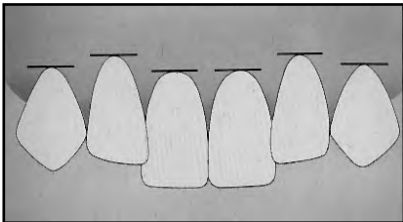
## 6. Tooth Surface Texture

- Characterized by differences in convexities and concavities
- Differences in reflectivity of various tooth surface textures

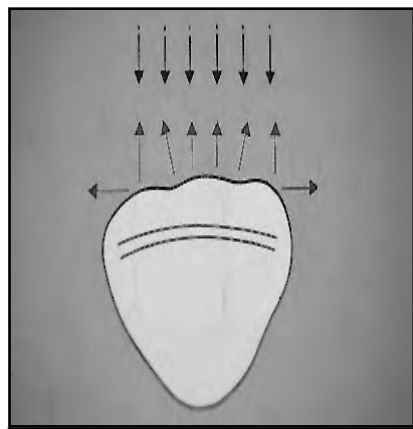
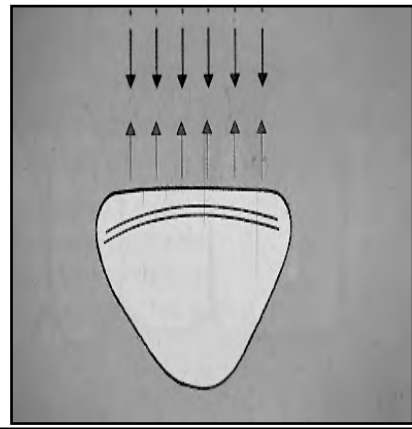
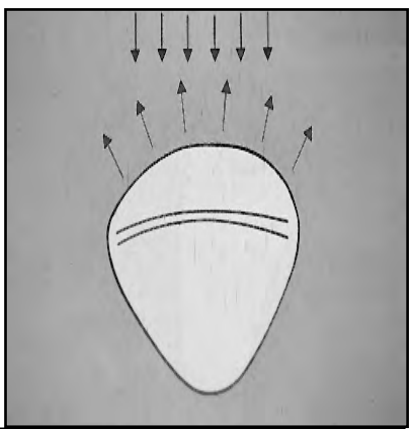
## 7. Aging Characteristics

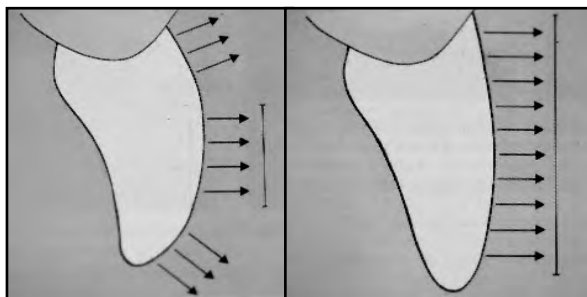
- Young (left) - bright, no wear
- Older (right)- smooth, darker, excessive wear

## GINGIVAL COMPONENTS

		
<p>1. Apex of Gingival Crest</p> <ul style="list-style-type: none"> <li>- Distal to long axis of tooth (Centrals and Canines)</li> <li>- Aids in illusion of mesial inclination of teeth</li> <li>- Influences curvature of gingival embrasure</li> </ul>	<p>2. Gingival Height – Class I</p> <ul style="list-style-type: none"> <li>- Marginal gingiva of CENTRALS parallel to horizontal</li> <li>- Creates bilateral symmetry</li> <li>- Similar for LATERALS and CANINES, but at different levels</li> </ul>	<p>3. Gingival Height - Class II, Div 2</p> <ul style="list-style-type: none"> <li>- Similar to Class I with respect to bilateral symmetry</li> <li>- Laterals overlap centrals due to crowding</li> </ul>

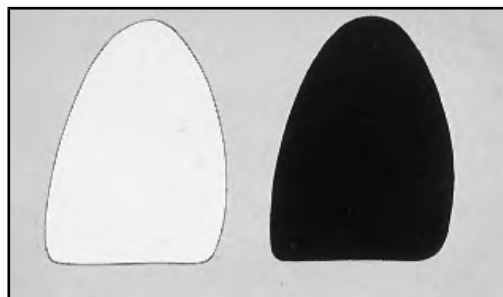
## PHYSICAL COMPONENTS

		
<p>1 – 3 Illusions of Contour - Tooth Width</p> <ul style="list-style-type: none"> <li>- Line Angles - created by intersection of two planes</li> <li>- Modification of line angles results in variations in apparent dimension, affects amount of reflected light</li> </ul> <p>Left – “Normal” line angles. The apparent width of tooth is defined by the distance between the MF and DF line angles</p> <p>Middle – Moving the line angles farther apart (flattening the tooth) creates the illusion of a wider tooth</p> <p>Right – Moving the line angles closer together (rounding the tooth) will make the tooth appear narrower</p> <p>NOTE: The apparent width of a tooth is controlled by how much light is reflected directly back to the observer.</p>		



#### 4, 5 Illusions of Contour – Tooth Length

- Same principle as above
- Left – the more curved inciso-gingivally, the shorter the tooth appears
- Right – the flatter the tooth, the longer the tooth appears



#### 6. Darker vs. Lighter

- Variations in value affect apparent size

Darker appears smaller

Lighter appears larger

ALSO:

Longer teeth appear narrower

Shorter teeth appear wider

## Summary of Basic Components of Anterior Esthetics

### FACIAL COMPONENTS

Smile / Facial Symmetry  
The Smile  
Maxillary Lip Contours  
Negative Space  
“The Perfect Smile”

### DENTAL COMPONENTS

Dental Midline  
Golden Proportion  
Axial Alignment  
Perspective  
Proximal Contacts  
Aging Characteristics  
Surface Texture

### GINGIVAL COMPONENTS

Apex at Crest of Gingival Tissue  
Gingival Height – Class I  
Gingival Height – Class II, Div 2

### PHYSICAL COMPONENTS

Illusions of contours – Tooth Width  
Illusions of contours – Tooth Length  
Darker vs. Lighter  
Length vs. Width



## Dental Midline Studies:

1. Miller EL, JPD 1979 Jun;41(6):657-60  
Maxillary dental midline located in middle of the upper arch 70% of the time.  
Maxillary and mandibular midlines coincide 25% of the time.
2. Johnston CD, Eur J Orthod. 1999 Oct;21(5):512-22  
Viewers gave lower scores for attractiveness if the maxillary dental midline and the facial midline differed more than 2 mm.
3. Thomas JL, Angle Orthod. 2003 Aug;73(4):359-64  
Attractiveness scores and acceptability ratings declined as the axial angulation of the dental midline increased.
4. Cardash HS, JPD 2003 Mar;89(3):282-85  
Nearly half of the viewers were unable to detect midline deviations of  $< 2$  mm.  
Oblique midline deviations were so easily detected they were removed from the study.

## Youthful Characteristics in dental esthetics:

More surface texture  
Lighter teeth – higher value  
Lower chroma – less saturation  
Incisal edges uneven  
Incisal embrasures open and unsymmetrical  
Gingival embrasures filled with tissue  
Free gingival margin is incisal to the CEJ

Basics of Color: Hue- name of the color  
Value – brightness of the color (most important in shade selection)  
Chroma – saturation of the color

Shade: Shade is a combination of hue, value, and chroma  
Maxillary central incisors – normally the lightest anterior teeth  
Lateral incisors – similar hue to the centrals but lower in chroma and value  
Canines – greater chroma and lower value than centrals and laterals  
Premolars – value is similar to the lateral incisors

# In Practice

FOCUS ON

MATERIALS | TECHNOLOGY | CLINICAL BRIEF | TECH PROFILE

## A Pre-Bleaching Exam is Vital for Optimum Whitening

Determining the cause of discoloration determines the method and outcome of the bleaching technique.

By Van B. Haywood, DMD

**T**he most critical factor in the tooth whitening process is proper examination prior to initiating bleaching treatment.<sup>1</sup> The examination is necessary to correctly diagnose the cause of discoloration in a timely fashion. Questions to be answered as a result of the examination include the following:

1. Is bleaching the treatment of choice, or is another treatment more appropriate for this condition?
2. Should other treatment be performed prior to bleaching, either for discoloration improvement, or to avoid sensitivity or poorer esthetic outcomes?
3. Should other treatment—whether essential or optional—be performed after bleaching to achieve the smile the patient desires?
4. Of the bleaching options, which procedure is best suited to the condition exhibited by the patient's dentition, concerns, finances, and lifestyle?

A proper pre-bleaching examination should include both a clinical and radiographic component in order to address all possible etiologies of discolored teeth. If the patient is a patient of record, radiographs of the anterior teeth may already exist. However, because most anterior caries is more easily diagnosed from transillumination, and only posterior caries requires radiographs, even a patient of record may only have posterior bitewing radiographs.

In the absence of anterior radiographs, dentists should consider a “screening radiograph” of the incisors. This radiograph can usually be obtained with a single bitewing film rotated longwise to obtain a periapical radiograph to screen for pathology. However, any single dark tooth or teeth should have a periapical radiograph taken to check for any apical pathology or resorption.

### Radiograph Plays Key Role

The purpose of the radiograph is to evaluate for apical pathology, which may have never resulted in any pain, swelling, mobility, or other clinical symptoms or signs other than discoloration. After trauma, teeth may take up to 20 years before demonstrating evidence of apical pathology,<sup>2</sup> showing little or no symptoms. Teeth that have been subjected to trauma may become slightly darker, with or without pulpal death.<sup>3</sup> Pulp testing may be indicated, although in the absence of clinical signs of an abscess or symptoms of pain, the tooth with non-vital pulpal status is still preferable for bleaching treatment rather than endodontic therapy.

Even more critical regarding the radiograph is that internal or external resorption be determined. Teeth with resorption, however, are also associated with trauma and may still be vital, just discolored.<sup>4</sup> Only a radiograph will reveal the resorption, and oftentimes aggressive endodontic therapy will be required to save the tooth. Any loss of time due to improper diagnosis of the cause of discoloration may result in the ultimate loss of the tooth. Periodontal surgery may be required for access to the resorption, or orthodontic extrusion with crowning may be needed rather than bleaching.

The radiograph is also used to determine if the tooth has experienced calcific metamorphosis, where the pulp chamber has been obliterated by secondary dentin. Such teeth may indicate a positive or negative response to vitality testing, but, again, in the absence of radiographic evidence of an abscess or clinical symptoms of pain or swelling, no endodontic therapy is advised.<sup>5,6</sup> However, the patient will need to know that this situation may take longer to bleach and achieve the desired result. Also, a special tray may be appropriate to first treat that tooth alone to determine the maximum color change that can be obtained.<sup>2</sup>

As in a typical dental examination, the radiograph will also screen for abnormalities such as tumors or

cysts, which may be affecting the color of the tooth, as well as caries. Supernumerary teeth may be present and may compromise endodontic therapy options.

**“Because exposed roots do not bleach, the patient should be prepared for a less-than-ideal outcome if this condition presents itself. Existing esthetic restorations, whether composite or ceramic, do not change color.”**

The clinical examination will include an evaluation for caries, in addition to screening soft and hard tissue for cancer, abscesses, or other abnormalities and pathology. Caries may be present interproximally or lingually and cause the facial surface of the tooth to appear dark. Also, the discolored tooth could be a result of a discolored restoration. The clinical examination should identify exposed root surfaces, because the root does not bleach in the same manner as the anatomic crown. Because the root does not change color as readily as the crown, stronger discolorations at the gingival interface will be less responsive to bleaching. White spots should be identified, because they cannot be removed by bleaching.<sup>7,8</sup> When white spots exist, the goal is to lighten the rest of the tooth such that the white spots are less noticeable.

Also involved in the clinical examination is the esthetic evaluation of the patient's smile. This includes the amount



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[dentalaegis.com/go/id376](http://dentalaegis.com/go/id376)

**“After trauma, teeth may take up to 20 years before demonstrating evidence of apical pathology, showing little or no symptoms.”**

of the teeth that is showing and whether or not the patient has a gummy smile. Typically, short teeth and a gummy smile do not look better with bleaching, as the whiter teeth accentuate the gummy smile. Periodontal plastic surgery would be better indicated first. Defects in gingival architecture and cross-arch harmony should be addressed, as these will tend to be more noticeable when the

teeth are whiter. Because patients tend to look best when the color of their teeth match the white portion of their eyes, matching patients' teeth to their eyes serves as a better endpoint than trying to achieve a certain color on a shade guide.<sup>9</sup>

Because exposed roots do not bleach, the patient should be prepared for a less-than-ideal outcome if this condition presents itself. Existing esthetic restorations, whether composite or ceramic, do not change color. Patients should be informed of any additional treatment that may be needed to replace these restorations should they not match the new tooth color. The patient should also be evaluated for translucent incisal edges on the anterior teeth, often called a “bluish” halo. Some teeth become more opaque with bleaching while others become more translucent, which can accent this area. One way to determine whether the bluish area of the tooth is translucent or discolored is to place a white-gloved finger behind the blue area. If the discoloration goes

away, it is translucency; if the discoloration stays, it is discoloration, which will generally respond well to bleaching. The patient could also have translucency from lingual erosion of the teeth, resulting in thin enamel incisal edges. This situation may be associated with medical issues and may require additional bonding to protect dentin from further erosion.

If the patient is a bruxer and has worn the incisal enamel thin, then bonding may not be an option due to occlusal factors. Another cause of a similar discoloration involves tetracycline-stained teeth. Dentistry has often thought of tetracycline staining as only occurring during tooth formation, but recent reports have cited minocycline, a common treatment of acne, as staining fully formed adult teeth.<sup>10</sup> Tetracycline-class drugs such as minocycline are deposited in the secondary dentin and secreted in the saliva to absorb into the tooth, much like an iron stain. There is no good substitute for minocycline, so patients will need to continue taking it for acne treatment; therefore, initial bleaching treatment may take longer, and re-treatment may be needed after a number of years.

### Other Issues to Consider

Questions about history or presence of sensitivity should be addressed. Patients with sensitive teeth should use the lowest concentration of bleach in the tray technique. They will need instructions on brushing with desensitizing toothpaste containing potassium nitrate, placing desensitizing materials containing potassium nitrate in the tray, and proper treatment techniques to minimize or avoid sensitivity. Pre-brushing for 2 weeks with a desensitizing toothpaste before bleaching is initiated can reduce sensitivity. Bleaching should not be initiated the same day as a prophylaxis, as the teeth and gingiva may be more sensitive.<sup>11</sup>

An occlusal evaluation of the patient will identify any temporomandibular joint issues, as well as how close to ideal occlusion the patient's dentition is. Different tray designs or wear times may be appropriate for both issues. Using a single tray on one arch minimizes the occlusal insult, as does shorter in-office treatment options. Using a single tray also minimizes tooth sensitivity and gives the patient a way to determine progress and have a lower entry cost.

Teeth that have received endodontic therapy present a myriad of options. They can be bleached from the inside, outside, or both. Special single-tooth trays are indicated to determine whether the single dark tooth will lighten sufficiently to justify lightening the remaining teeth. Material in the pulp chamber should be removed, because it influences the color of the tooth. Teeth with silver points are best undisturbed unless the patient is willing to re-treat the endodontic therapy if the silver point is contacted (which breaks the apical seal).

Once a thorough examination has been completed, including radiographs, the dentist can render a proper diagnosis of the cause of discoloration and prescribe the appropriate treatment.



**For additional content on Tooth Whitening, visit:**

[dentalaegis.com/go/id377](http://dentalaegis.com/go/id377)

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Patient education helps eliminate confusion regarding treatment options

# Tooth Whitening Is Not Always Tooth Bleaching

**T**hroughout history, dentists have provided many services that change the color of their patients' teeth. The oldest bleaching techniques date back to the 1800s and were performed in the dental office. Today, the most popular bleaching technique involves the use of trays made in the dental office for at-home wear. When the first article on this tray technique was written in 1989, the technique was called "Nightguard Vital Bleaching." As this technique gained popularity in the profession and around the country, dentists became concerned that when discussing "bleaching," a technique that relied on the patient applying a material in the tray at home, the use of the term "bleach" might lead some patients to use laundry bleach (ie, sodium hypochlorite) in an attempt to change the color of their teeth. Therefore, to reduce the potential for patients to become confused and possibly cause harm to themselves, the profession shifted its terminology to the word "whitening," which sounded both more professional and less dangerous. In addition, because color measurement instruments are used to measure whiteness values, the term "whitening" has a more scientific basis.

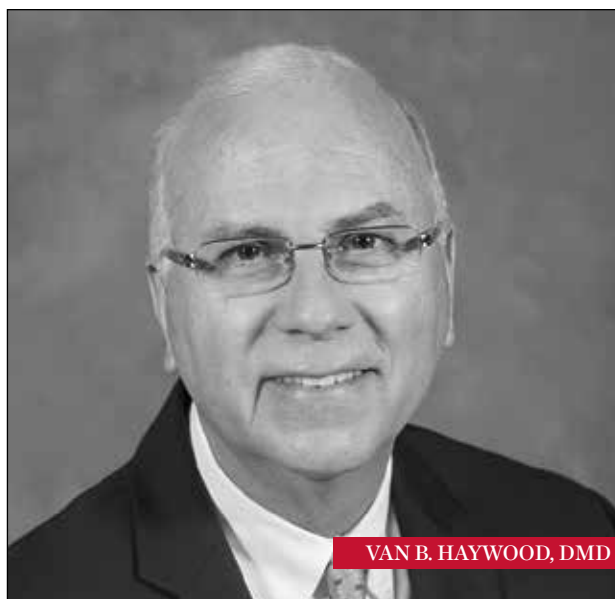
As the esthetic aspect of the dental profession has evolved, there has been a proliferation of over-the-counter (OTC) products and techniques that claim to perform "whitening." However, in this evolution to a broader group of products and techniques, the definitions of the terms relating to tooth color change have diverged into two meanings: the term "whitening" now primarily refers to "the removal of extrinsic stains from the tooth," whereas "bleaching" refers to "changing the inherent color of the tooth." Bleaching produces a whitening effect, but in a different manner than products that merely remove surface stains.

Unfortunately, this differentiation between the meaning of "bleaching" and "whitening" has caused some patients to confuse the OTC products sold for "whitening" teeth with the "bleaching" treatments that a dentist provides. When the American Dental Association

approved the first "whitening toothpaste" in 1999, the company had to state on the package what the toothpaste was capable of doing. The label on this whitening toothpaste stated that it "polishes away stains," but also noted that it "is not bleaching." Today, many toothpastes are being sold as "whitening" toothpastes. A close look at the product brochure of one of the popular whitening toothpastes reveals that the toothpaste "does not change the color of the teeth, but removes surface stains." However, this does not appear until the second page. Because manufacturers have deemphasized this fact, some consumers may believe that whitening toothpaste is an equally effective alternative to bleaching treatments. There has been little research conducted on the many OTC whitening toothpaste products without peroxides, but what has been done has demonstrated that there is no inherent color change in the teeth, only the removal of surface stains.

The challenge with using the scientific term "whitening," which is the measurement used by colorimeters and other scientific color measuring instruments, is that the term does not represent what is occurring during "bleaching" treatment. Whether you remove black surface stains from a tooth, paint a tooth white on the surface, or change the internal color of a tooth by bleaching the dentin, the instrument still records that the tooth is "whiter." However, two of these processes only result in surface color changes, whereas the other achieves a true internal tooth color change.

Dentists need to educate their patients that in general marketing terms, "whitening" products only remove surface stains, but "bleaching" treatment changes the internal color of the tooth. Because there is some crossover with a few effective OTC products, this will not totally remove the confusion, but in most circumstances, patients will better understand what type of treatment they are seeking and use their finances appropriately.



VAN B. HAYWOOD, DMD

**Bleaching produces a whitening effect, but in a different manner than products that merely remove surface stains.**

## ABOUT THE AUTHOR

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## Matrices for Posterior Composite Restorations



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Dept of Restorative Sciences  
Dental College of Georgia  
Augusta University,  
Augusta, Georgia USA



1

### Matrices: 1. Traditional Toffelmire

Three sizes:  
Universal, molar,  
premolar

Humps for box  
extension

may remove  
one hump

Standard thickness vs. "HO" band for universal



2

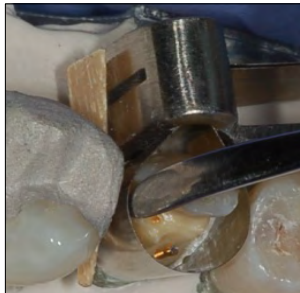
Once band is selected, need to burnish



3



Push or "burnish"  
band against adjacent  
tooth to see if will  
maintain contact



4

With composite  
restoration  
placement, if the  
contact is not in  
the matrix, it  
won't be in the  
restoration



5

### "Dixieland Band": Pre-contoured



6

Clinician's Choice:  
pre-contoured band



7

Wooden wedges provide separation.  
wedge shape determines contour



8

### Pre-polymerized ball for proximal contact

Place the first increment on  
the gingival floor and cure.

Place the second increment  
in and form a "pocket"  
against the matrix band, but  
don't cure.

Place ball of set composite  
into unset material;  
press hard against the matrix  
band and hold during cure



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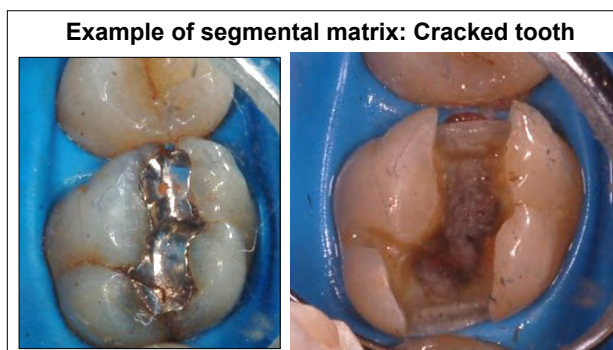
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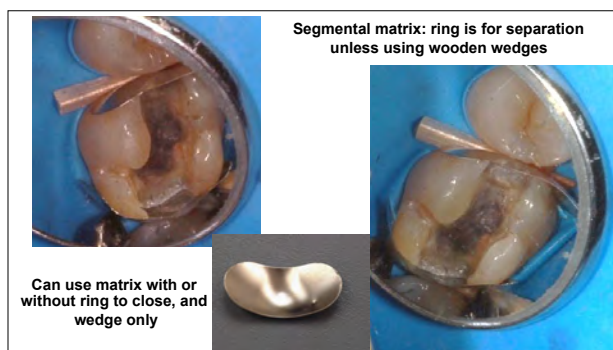
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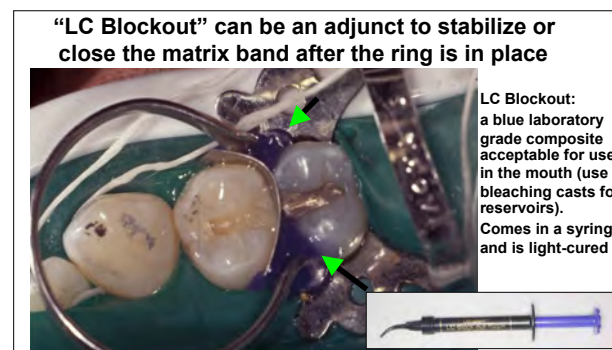
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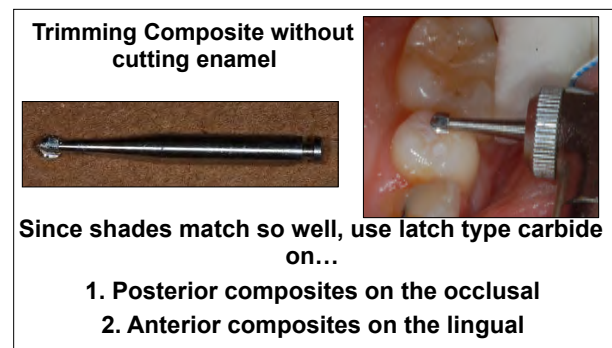
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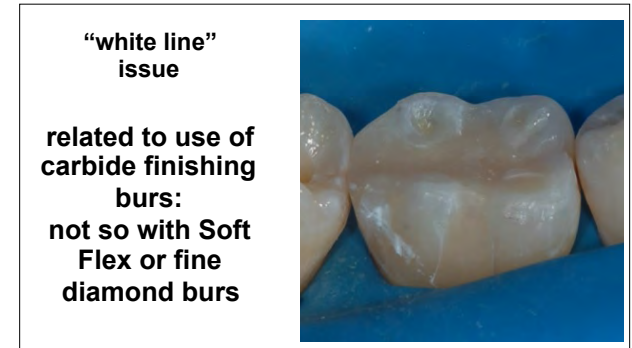




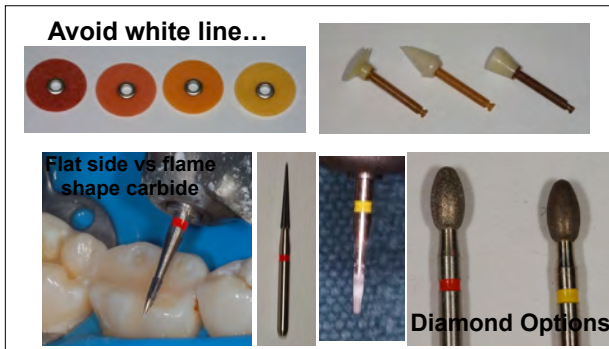
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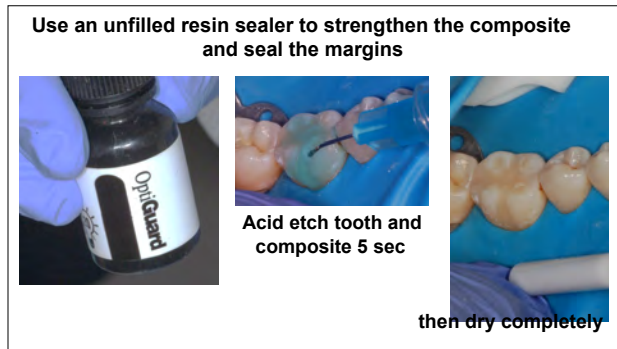
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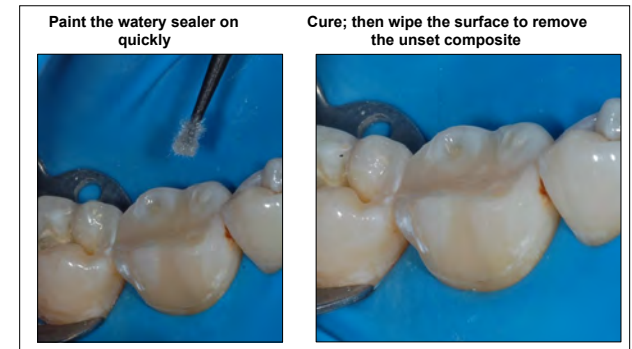
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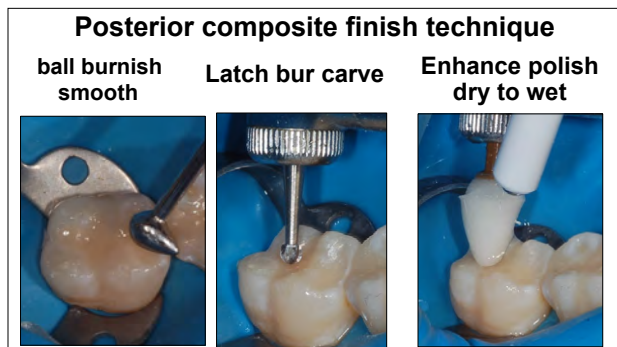
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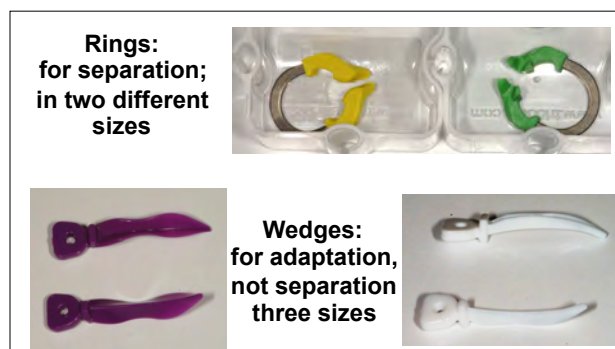
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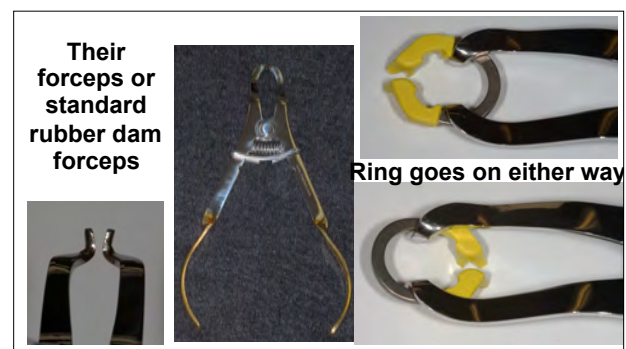
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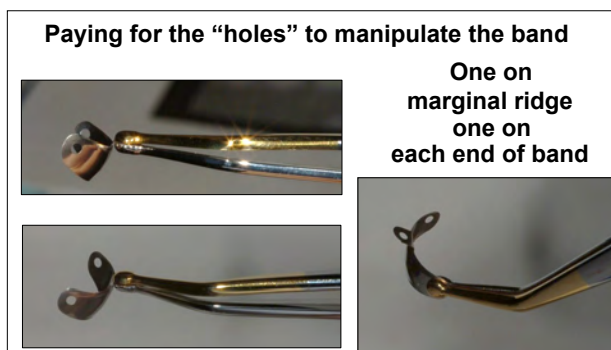
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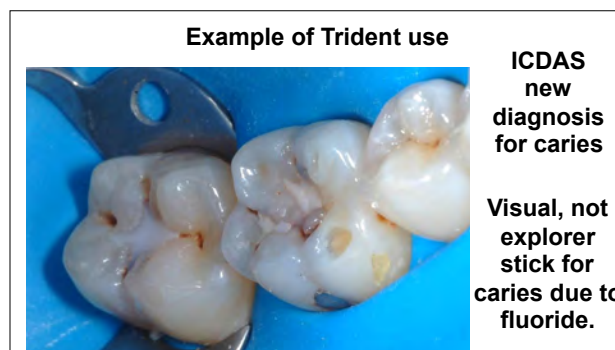
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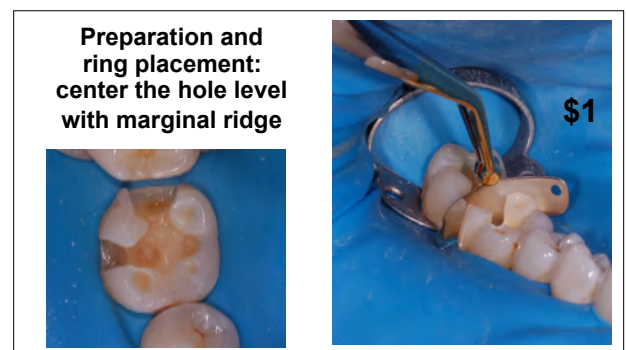
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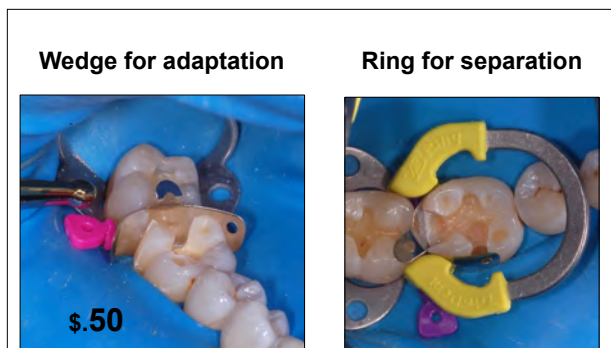
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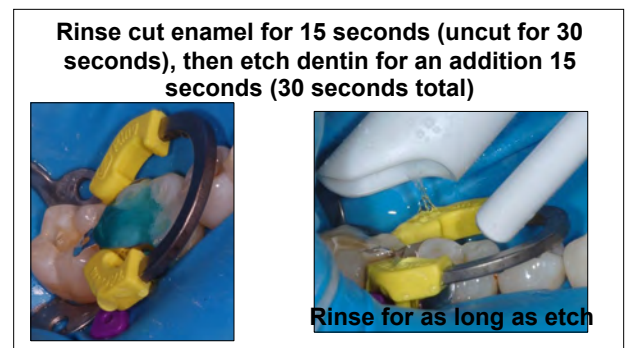
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2. Prime until shiney, which takes about 2-6 applications

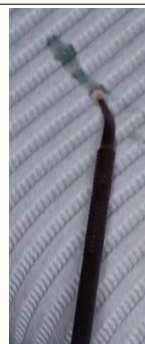


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After 2-4 coats, then blot excess with same brush



38



3. Air dry the primer from a distance to evaporate the solvent

4. IF not shiny, prime more... dentin varies in the tooth



39

Place bonding agent; avoid pooling at gingival of matrix band

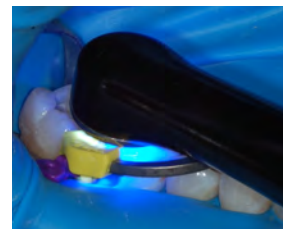


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Air thin

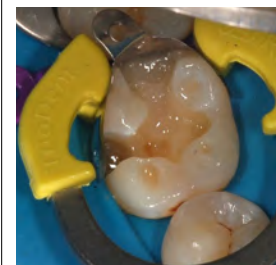


Light cure



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First increment at gingival area



"Pat" until smooth with no seams



42

May use additional technique to insure contact

Make a "pocket" against the matrix band



Use a "pre-polymerized ball" of set composite in the pocket



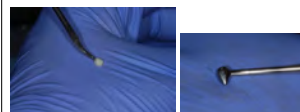
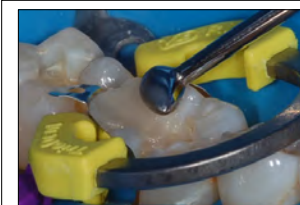
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Press ball firmly against matrix to deform to contact, then hold while curing



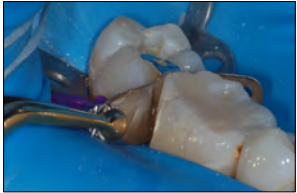
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Fill, using burnisher on occlusal with bonding agent to avoid sticking



45

**Remove the band**

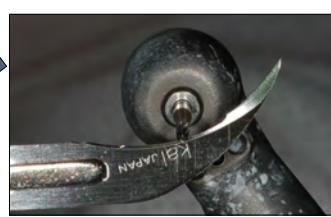


**Remove the wedge**



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**Adjustment of 12 blade (not 12-B) to allow palm-thumb grasp for control**



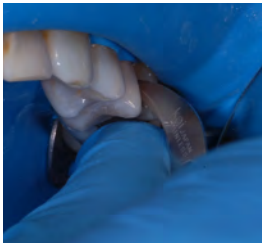
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**Use metal-cutting bur (1958) to remove all but end for cutting**



48

**Palm-thumb grasp allows careful control**



49

**12-blade scapel used for gingival and occlusal embrasure, and flash**



50

**12-blade much smaller than burs to recontour proximal and gingival areas**



51

**Class V: Use retraction cord to place composite or RMGI  
Then bulk finish with fine round-end diamond, then final carve with 12 blade**



52



**#12 blade used to carve composite resin**

53

**12 blade scapel good on gingival of class V area to avoid nicking cementum while removing excess**



54



Triodent gives good tight proximal contact



Why floss the other contact? (mesial on a DO restoration)



55

Thread under contact and pull bonding agent out from gingival



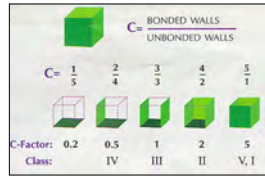
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### C-factor

- Ratio of unbound surfaces to bound surfaces determines the effect of contraction shrinkage on bonding
- Class I & V most difficult placement option
- Have to alter placement technique to reduce sensitivity and white line

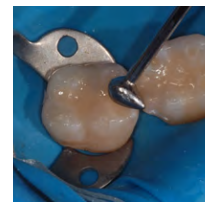


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Restoring the Class I one wall at a time

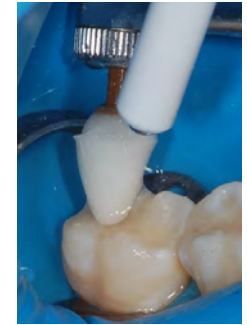


If strong bond on enamel and bulk fill, may debond from pulpal floor, and cause sensitivity when occluding forces placed on the tooth.



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Finishing

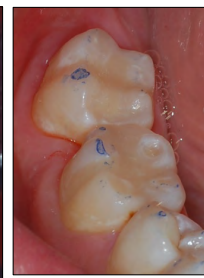
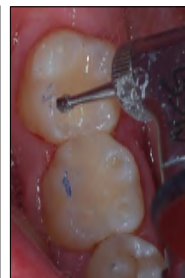


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REVIEW: When patient feels like it is high, but it marks OK...



62

### Which matrix do you use?

- Tofflemire
- Burnished
- Altered extension
- Dixieland/ConVexi-T
- Garrison
- Retainer type
- Triodent
- Retainer & holes
- Automatrix
- Custom
- Type Wedges?
- How far apart from depth of box to adjacent tooth
- How deep the box O-G
- How wide the box B-L
- How many surfaces M-D

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# Tray tooth bleaching

*The right thing at the right time*

By Van B. Haywood, DMD

If you rob a bank and give the money to the poor, have you done the right thing? If you restore teeth with the best possible porcelain veneers when the teeth do not need veneers, have you done the right thing?

Bleaching teeth is one of the many treatments that everyone should have in their treatment options in order to do the right thing at the right time. Once you have determined to do the right thing, then you need to do the thing right



(according to the wisdom of my late esteemed colleague Dr. Dick Tucker).

When considering bleaching, the most cost-efficient, safe and efficacious technique for both the dental office and the patient is generally recognized as tray bleaching using a 10 percent carbamide peroxide (CP).

The following checklist on tray bleaching may be helpful.

1 Everybody's teeth respond differently, both in how white they get and how quickly that whitening occurs. Tray bleaching expectations include:

- ▶ Normally discolored teeth can take three days to six weeks.

- ▶ Nicotine-stained teeth can take one to three months.

- ▶ Tetracycline-stained teeth can take two to 12 months or longer. The average for tetracycline-stained teeth is three to four months to get lighter, but not necessarily white.

Once teeth reach their maximum whiteness, further treatment or different products or concentrations will not improve that shade. Teeth look the

best when they match the color of the sclera of the eyes.

2 Prior to bleaching, the dentist should conduct a proper examination and analysis of the smile. This examination should include:

- ▶ Evaluating how much of the teeth are showing in a full smile because the gingival area of teeth do not bleach as well as the incisal portion.

- ▶ Identifying the gummy smile because whiter teeth make the gummy smile more noticeable. Periodontal therapy for altered passive eruption may be first indicated.

- ▶ Identifying the existing restorations revealed in a full smile because the restorations do not change color.

- ▶ Evaluating the results of the periodontal conditions because exposed roots do not bleach.

- ▶ Recording all existing decay, gingival disharmony, history of sensitivity or occlusal problems.

3 The dentist should take a screening radiograph of the anterior teeth to be bleached and any single dark tooth to determine the cause of the discoloration. That cause could include:

- ▶ An abscessed tooth.

See BLEACHING, page 6



## BLEACHING

*Continued from page 5*

- ▶ Internal or external resorption.
- ▶ Calcific metamorphosis (the pulp chamber obliterated by secondary dentin).
- ▶ Different size pulp chambers.
- ▶ Caries.
- ▶ Cysts or tumors.

**4** There are two different bleaching materials that require different instructions for the patients. CP is composed of hydrogen peroxide and urea. CP is best worn overnight, as it is active for 6 to 10 hours. Hydrogen peroxide (HP) is only active for 30 to 60 minutes, so it is applied during the day. A 10 percent CP product is comparable to a 3.5 percent HP product. Because CP has a long activity time, it takes fewer nights to reach the same shade as HP worn during the day. Conversely, HP worn during the day will take more days of less wear time to equal the nighttime bleaching with CP.

**5** The pH to get tooth decay on dentin is below 6.8 and in enamel is below 5.5. Because CP has urea, the pH of the mouth and in the tray is elevated above 8 within five minutes of insertion such that patients cannot get tooth decay while wearing the bleaching tray with CP. Hence CP in a tray may be used for caries control when fluoride in a tray is not working. HP has a pH of 5, so does not favor tooth protection for long-term wear.

**6** Different tray designs are important for different products, different concentrations and different patients. Ten percent CP was originally designed to treat the gingivae as an oral antiseptic (Glyox-

ide), so trays can be made that extend onto the tissue 1-2 millimeters for a more comfortable, better seal. The gingival health in research projects always improves during bleaching. Concentrations higher than 10 percent require scalloping the tray such that there is no tissue contact to avoid tissue burning.

**7** Spacers or reservoirs are not needed to bleach teeth as only a thin film of material is required with tray isolation, but reservoirs account for tight or ill-fitting trays. A proper alginate impression (where the adhesive has set for 10 minutes in the tray before use, the impression is held in the mouth for one minute past tacky and poured within 15-45 minutes without bubbles) creates an excellent fitting non-scalloped, no reservoir tray for 10 percent CP.

**8** Tooth sensitivity is a result of the easy passage of peroxide through intact enamel and dentin to the pulp in five to 15 minutes. This easy passage changes the color of the dentin as well as the enamel. Sensitivity is a transient pulpitis, and the higher the concentration, the greater the sensitivity.

**9** In addition to a proper fitting tray and low concentration of CP, the best treatment for sensitivity involves the tray application of 5 percent potassium nitrate for 10 to 30 minutes prior or after bleaching. Potassium nitrate is found in most desensitizing toothpastes in the U.S. Professional products are also available, as well as bleaching products, which contain potassium nitrate.

**10** Bleaching should not be started immediately after a prophylaxis. Before initiating bleaching and to reduce sensitivity issues, it is best to wait two weeks, during which time the



patient should brush with a desensitizing toothpaste to further reduce the chance of sensitivity.

**11** Because bleaching materials penetrate the tooth and release oxygen, the bond strengths of composite to enamel are reduced by 50 percent if bonding is performed immediately after bleaching. The dentist should wait two weeks after bleaching for the oxygen to dissipate before initiating bonding procedures.

**12** The oxygen released during bleaching also affects the shade of the tooth, so the patient should not be bleaching for two weeks prior to a shade being taken for a crown or composite. Since some patients may be using over-the-counter products unknown to the dental office, it is important that the receptionist question the patient before scheduling an appointment that involves bonding or shade matching.

**13** Restorations will not change color from any type of bleaching. While the surface will be cleaned, which may result in a more favorable-appearing restoration,

*See BLEACHING, page 7*



## BLEACHING

*Continued from page 6*

the color is the same. Patients need to be informed of the cost of replacing unaesthetic restorations as a separate fee from the bleaching fee.

**14** A single dark tooth is best treated with a single tooth bleaching tray rather than a full-mouth tray. This allows the single tooth to reach its maximum whitening before changes are attempted on the adjacent teeth. A single-tooth tray is fabricated by taking a full mouth tray extended further onto the tissue, and removing the tooth molds so that the bleaching material only contacts the single dark tooth.

**W**hile there is much more information about how to do the thing right with bleaching, these points provide a starting point for good quality patient care. ♦



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*Georgia at Augusta University in Augusta, Georgia. In 1989, he co-authored the first publication in the world on nightguard vital bleaching (at-home or tray bleaching) with Dr. Harald Heymann, and in 1997, he co-authored the first article on extended treatment of tetracycline-stained teeth using this technique. He has completed further research and over 145 publications on the tray bleaching technique and the topic of bleaching and esthetics, including first papers on treating bleaching sensitivity with potassium nitrate, direct thermoplastic tray fabrication, bleaching primary teeth and caries control with bleaching materials. He has lectured in over 30 countries and 30 states. His book titled "Tooth Whitening: Indications and Outcomes of Nightguard Vital Bleaching" was published in 2007 and is available online from iBooks, or on his personal website, [www.vanhaywood.com](http://www.vanhaywood.com).*