

# Aesthetic Anterior Composite: A Simple Technique

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New Orleans  
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Prepared & Presented by

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# Menlo Park Dental Excellence



# Los Altos Dental Excellence

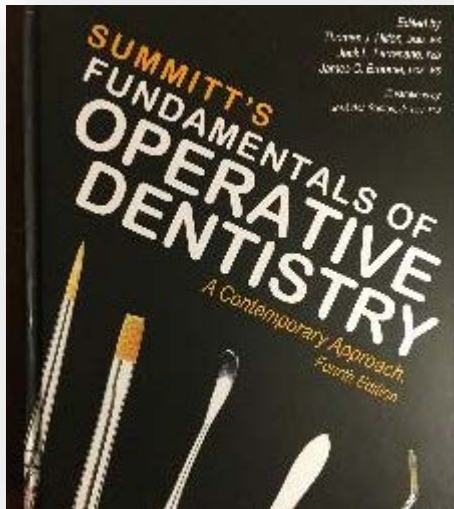




As doctors, our goals are to promote good oral health and to give patients the best quality of life with our up to date knowledge and skills.

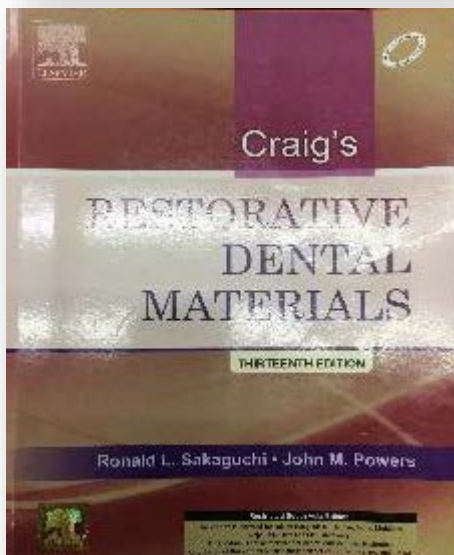
# I am here because of this patient





# References

- ▶ (1) For topics in Objective 2, please reference: page 9, Summitt's Fundamentals of Operative Dentistry, A Contemporary Approach, 4th Edition)
- ▶ (2) For topics covered in Objective 3, please reference: Page 328, Craig's Restorative Dental Materials, 13th Edition
- ▶ (3) Page 164; Craig's Restorative Dental Materials, 13<sup>th</sup> Edition



# Objectives

1

Recognize restorable Class III, IV, V, VI cavities

2

Review the structures of enamel and dentin

3

Review the basic components of dental adhesives and composite

4

Learn the simple technique of restoring class III, IV, V, VI cavities

# Objective 1

Recognize  
Restorable  
Class III, IV,  
V, VI cavities

# Class III



- ▶ Interproximal of canines, laterals, and central incisors as in photos

# Class IV

- ▶ Marginal edges and corners of canines, laterals, and central incisors as in photos





## Class V

- ▶ Cervical/Gingival 1/3 of canines, laterals, and central incisors as in photos

# Class V: Porcelain Repair



# Class VI



- ▶ Incisal edges of canines, laterals, and central incisors as in photos

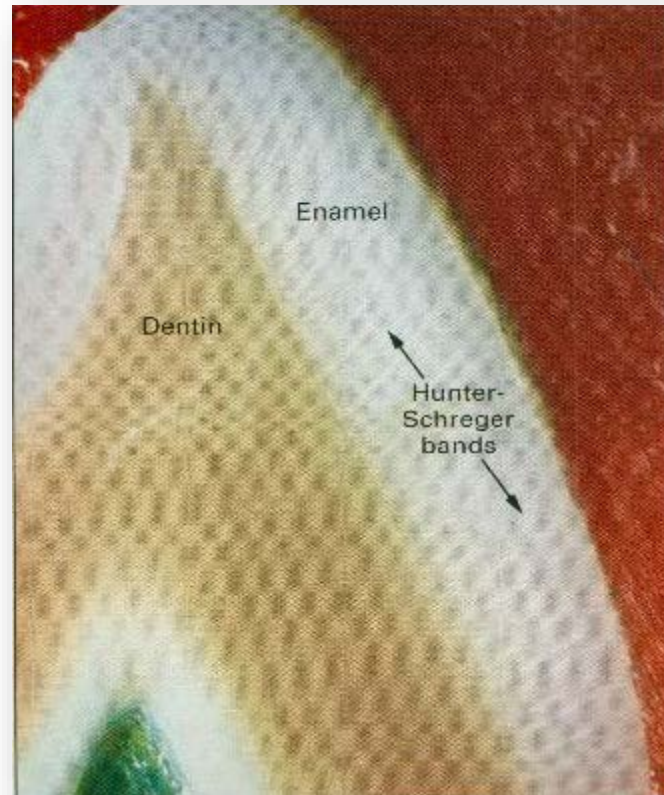
# Objective 2

Review the structures of enamel and dentin

(1) For topics in Objective 2, please reference: page 9, Summitt's Fundamentals of Operative Dentistry, A Contemporary Approach, 4th Edition)



# Enamel

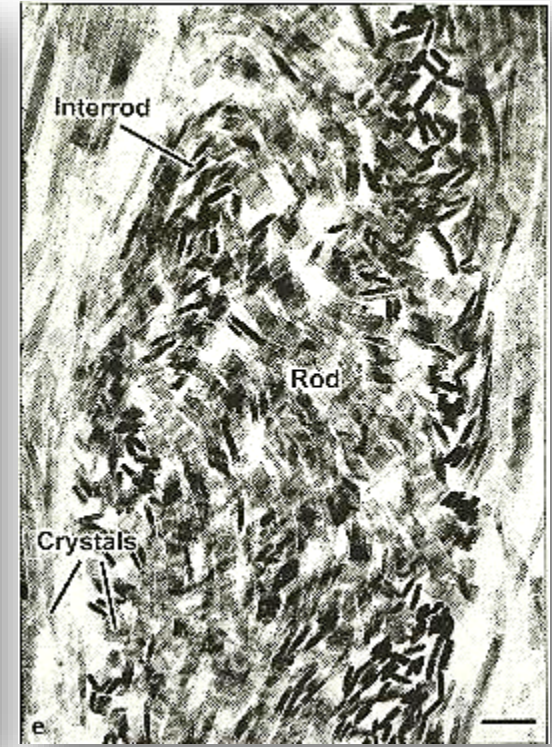
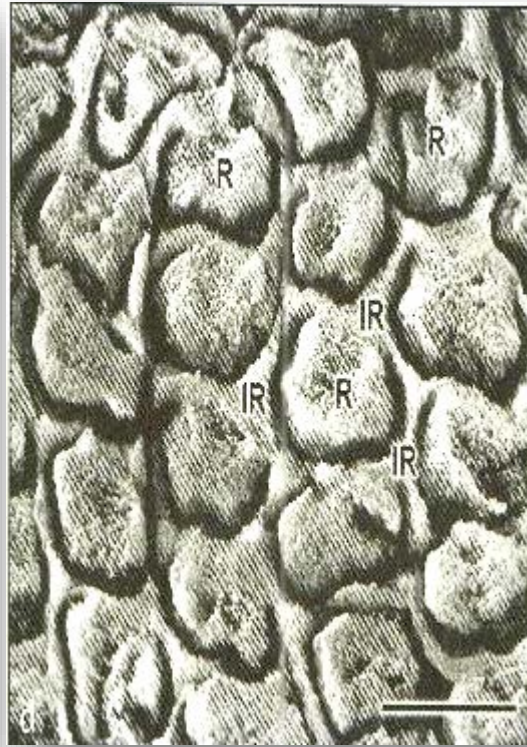
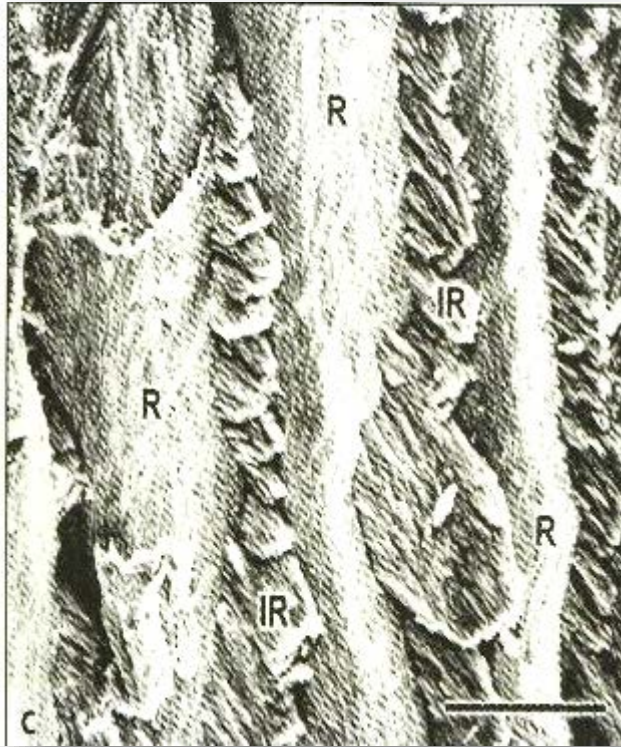


- ▶ Enamel is made by ameloblasts beginning at DEJ growing outward to tooth surface. Enamel has tensile strength of 11.4MPA. Its rods & interrod enamel intertwine to make a strong latticework and prism structures giving its strength for occlusal stress.

# Enamel

## Composes of:

- ▶ For the bonding and adhesion surface area, we focus more on its volume:
- ▶ 85% Hydroxyapatite mineral of Ca & P - Calcium & Phosphorous, 12% water, 3% organic of fat & protein
- ▶ By weight, 96% Hydroxyapatite mineral of Ca & P - Calcium & Phosphorous, 3% water, 1% organic

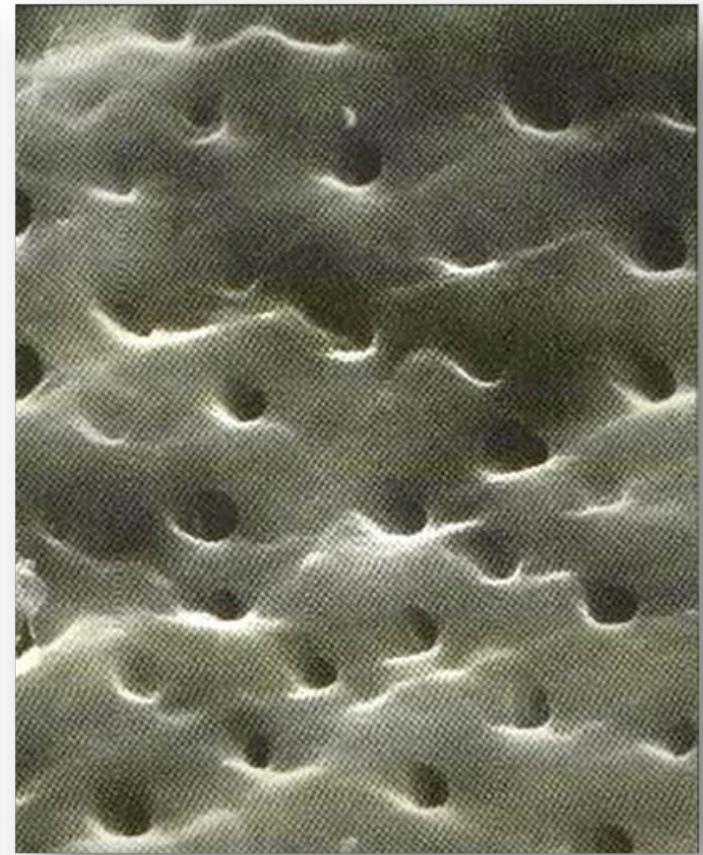
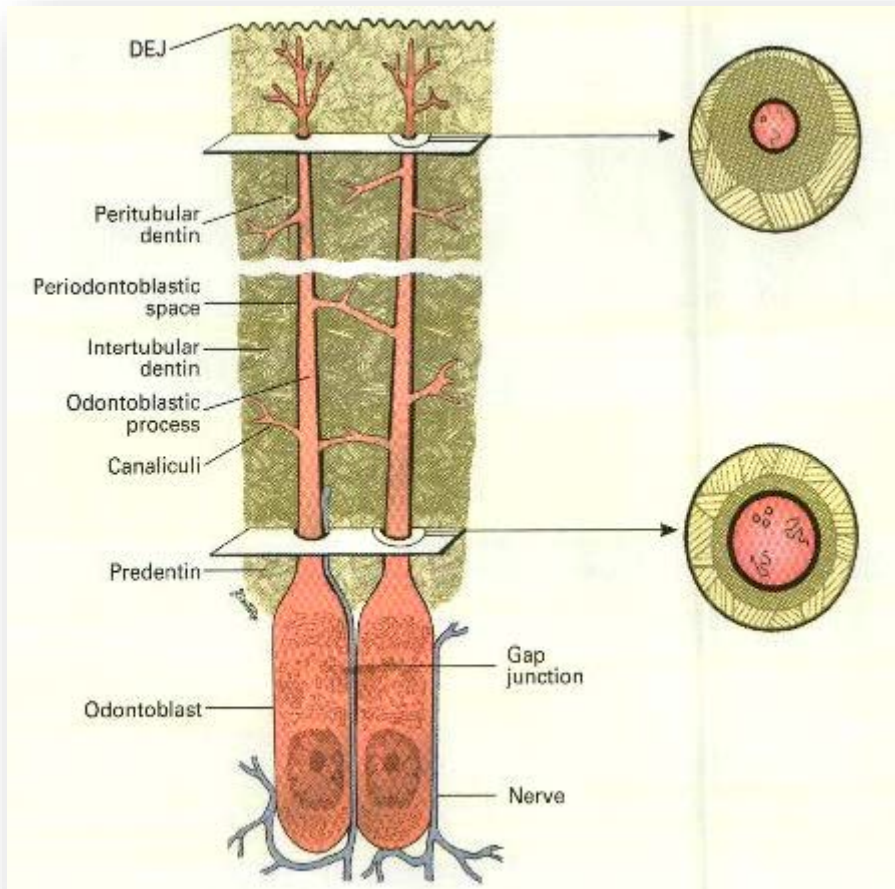


## Scanning Electron Photomicrographs of Enamel

- 1) Complex of Enamel Rods and the DEJ (Bar = 100um)
- 2) Enamel Rods (R) and Interrod Enamel (IR)
- 3) Cross section of Enamel Rods (R) and Interrod Enamel (IR)

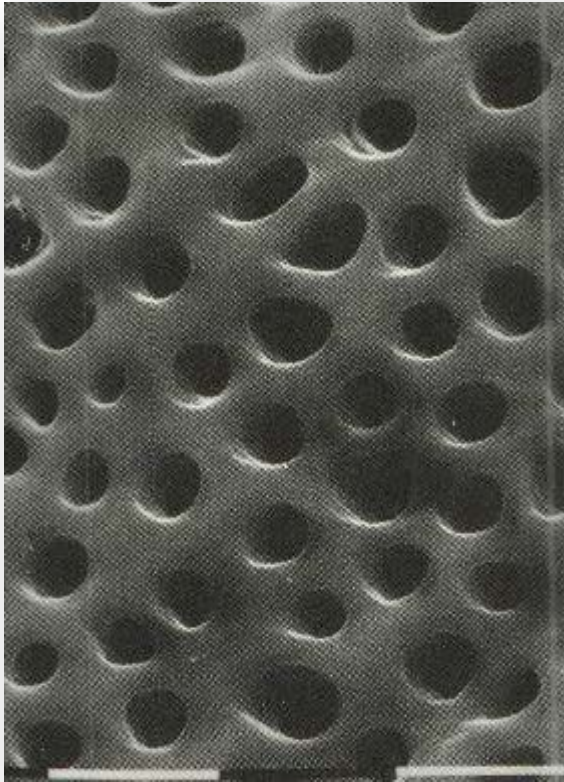
# Dentin

- ▶ Dentin is made by odontoblasts and give color and elasticity to support enamel and also occlusal stress. Its tensile strength is 40MPA.
- ▶ The structure composes of: 45-50% of inorganic apatite crystal, 30% organic matrix, 25%-20% water



- 1) Odontoblastic cell process and tubule system through dentin
- 2) Scanning of electron photomicrograph of tubules in inner dentin of tooth

## Dentin Structure



- 1) Scanning of electron photomicrograph of tubules in outer dentin
- 2) Odontoblastic cell process and tubule system through dentin
- 3) Scanning of electron photomicrograph of resin penetration into a dentinal tubule system after etching with phosphoric acid

## Dentin Structure

# Objective 3

Review the basic  
concept and  
components of  
dental adhesives  
and composites

(2) For topics covered in Objective 3, please  
reference: Page 328, Craig's Restorative Dental  
Materials, 13th Edition.



# Dental Adhesives

- ▶ Strong and durable adhesion is accomplished by cleanliness of tooth structures, molecular interactions and micromechanical interlocking between tooth structure, adhesive and composite resin through covalent, ionic, and/or van der Waals forces.





# Dental Adhesives

Compose of two main systems:

- ▶ 1. Total Etch is also called Etch-and-Rinse or 3- Steps system
- ▶ 2. Self-Etch systems

Total Etch Dental Adhesives  
consist of Etch, Primer, and Bond

# Etch



- ▶ Etch gels have 30%-40% phosphorous acid to demineralize tooth structures and remove the smear layers on the dentin.

# Primers

- ▶ Primers are solvents of hydrophilic monomers, oligomers, or polymers.
- ▶ Solvents in primers can be acetone, ethanol-water, or just mainly water.
- ▶ Dimethacrylate oligomers and lower molecular weight monomers are added in primers of adhesives.
- ▶ ClearFil SE Protect Primer from Kuraray has primarily water as its solvent. It contains Hydroxyethyl methacrylate and others as listed in the MSDS below:

Monomer for dental resin materials. 12-Methacryloyloxydodecylpyridinium bromide (>90wt%) **Dangerous components:** -868-77-9 2-hydroxyethyl methacrylate H315; H319; H317 25-45% **Other ingredients:** 10-Methacryloyloxydecyl dihydrogen phosphate, 12-Methacryloyloxydodecylpyridinium bromide, Hydrophilic aliphatic dimethacrylate, Water, Initiators, Accelerators, Dyes, Others





# Bonding Agents

- ▶ Bonding agents are light-cured and contain Bisphenol- A diglycidylmethacrylate, hydroxyethyl methacrylate, and camphorquinone as photo initiator and other accelerators.
- ▶ MSDS of ClearFil SE Protect from Kuraray lists these in their bond bottle:

**Chemical characterization: Mixtures - Description:** Mixture of substances listed below with nonhazardous additions. **Dangerous components:** 1565-94-2 bisphenol A diglycidylmethacrylate H315; H319 25-45%, 868-77-9 2-hydroxyethyl methacrylate H315; H319; H317 20-40%, 7681-49-4 sodium fluoride H301; H315; H319 <1%, **Other ingredients:** 10-Methacryloyloxydecyl dihydrogen phosphate, Hydrophobic aliphatic methacrylate, Colloidal silica, di-Camphorquinone, Initiators ,Accelerators, Others

## The Effects of Hemostatic Agents and Bonding Strength

- ▶ If cavity preparations are deep and have bleeding, use soft tissue LASER with Hemostasis Mode or either of the following Hemostatic agents to control bleeding and give a dry clean preparation without any blood or moisture contamination.
- ▶ Astringedent, ViscoStat, ViscoStat Clear, Hemogin, GIngiv-Aid, ect.

# The influence of hemostatic agents on dentin and enamel surfaces and dental bonding

## A systematic review

Karina de Oliveira Bernades, DDS;  
Leandro Augusto Hilgert, DDS, MS, PhD;  
Ana Paula Dias Ribeiro, DDS, MS, PhD;  
Fernanda Cristina Pimentel Garcia, DDS, MS, PhD;  
Patrícia Nóbrega Rodrigues Pereira, DDS, PhD

Cavity preparation procedures often cause gingival bleeding, which may be a result of tissue trauma or gingival inflammation.<sup>1,2</sup> In addition, the need to control moisture and contamination is common in restorative dentistry, especially when rubber dam isolation is not feasible.<sup>3</sup> In these cases, hemostasis becomes of utmost importance in maintaining the ideal, contaminant-free operative field.<sup>4,5</sup>

The most common procedures used to control bleeding and decrease the flow of gingival fluid involve the use of a topical hemostatic agent.<sup>6,7</sup> These agents are based on two categories of pharmacological action: astringents (blood coagulation factors) and vasoconstrictors (adrenergic agents).<sup>5,8</sup> Meanwhile, the use of these agents raises doubts about whether bonding on hemostatic-contaminated dentin and enamel results in decreased bond strength.

Abundant information is available regarding the local effects of hemostatic agents on the

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## ABSTRACT

**Background.** Hemostatic agents have been used clinically in dentistry for many years to control bleeding. The authors reviewed scientific publications in which researchers investigated the effects of hemostatic agents on dentin and enamel surfaces and on bonding of adhesive systems and resin cements.

**Types of Studies Reviewed.** The authors screened PubMed and Scopus databases for studies in English published from 1980 to 2013. They read the titles and abstracts to identify literature that fulfilled the inclusion criteria. The authors included studies in which researchers evaluated the hemostatic action on the dentin and enamel surfaces or its influence on the bond strength of adhesive systems or resin cements. They used cross-referencing to identify more articles.

**Results.** Twenty in vitro studies met the inclusion criteria. Investigators in 12 of these studies evaluated the bond strength to contaminated dentin. Investigators in 10 of these studies reported a significant decrease in bond strength. Those in two studies evaluated the influence of a hemostatic agent on the dental enamel and reported decreases in bond strength. Researchers also reported significant increases in microleakage of self-etching adhesives on contaminated dentin. Scanning electron microscopy revealed partial removal of the smear layer or an etching effect of dentin as a result of the application of hemostatic agents on dentin.

**Practical Implications.** Adhesive procedures may be affected adversely when performed on dentin and enamel contaminated by hemostatic agents. Hemostatic agents may induce changes in the dentin surface morphology. The results of this review indicate that the bond strength of self-etching adhesive systems is affected more negatively than is that of etch-and-rinse systems. The authors found that a 60-second application of ethylenediaminetetraacetic acid followed by a water spray restored the bond strength of a self-etching adhesive to dentin; use of phosphoric acid for 15 seconds followed by a water spray also was an effective cleaning method. Direct comparison of selected studies was not possible, however, mainly because of methodological differences hampering definitive conclusions.

**Key Words.** Bonding agents; adhesives; aluminum chloride; cementation; dental adhesives; dental bonding; hemostasis.

JADA 2014;145(11):1120-1128.

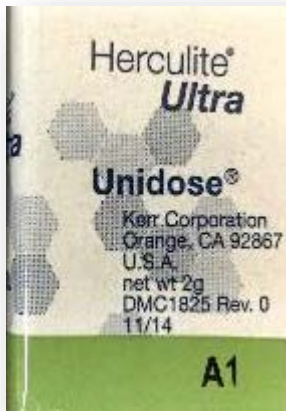
doi:10.14219/jada.2014.84

## Solution to Hemostatic Agent Contamination

- ▶ Studies in JADA November 2014 journal show that when enamel and dentin of cavity preparation are contaminated with Hemostatic gel, Bond Strength is more negatively reduced and affected in Self-Etch Adhesive than in Etch-and-Rinse Adhesive system
- ▶ Solution to this problem is to use either phosphoric acid etch gel for 15 seconds followed by thorough water spray rinse or EDTA (EthylineDiamineTetraacetic Acid) for 1 minute followed by thorough water spray rinse.

# Composites

Resin Composite is composed of 4 components:



01

Organic  
polymer  
matrix

02

Inorganic  
filler  
particles

03

Coupling  
agent

04

Initiator-  
activator  
system

# 01. Organic Polymer Matrix

Organic polymer matrix is a cross linked matrix of aromatic dimethacrylate monomers such as Bis-GMA ( 2,2-bis[4(2-hydroxy 3-methacryloxy-propyloxy-phenyl)] and UDMA (Urethane dimethacrylate) are the most used monomers in resin matrix.

- ▶ The following that are listed in the MSDS of Kerr Herulite Ultra Nanohybrid composite: 7,7,9(or 7,9,9)-trimethyl-4,13-dioxo-3,14-dioxo-5,12-diazahexadecane-1,16-diyl bis-methacrylate, 2,2-bis(acryloyloxymethyl)butyl acrylate 2-ethyl-2-[[[(1-oxoallyl)oxy] methyl]-1,3-propanediyl diacrylate, 10-30 15625-89-53-trimethoxysilylpropyl methacrylate 3-trimethoxysilylpropyl methacrylate

## 02. Inorganic Filler Particles

Inorganic filler particles consist of ground glass or quartz, sol gel derived ceramics, microfine silica, or nanoparticles.

# 03. Coupling Agents

- ▶ Coupling agents or silanes are added to inorganic particles to surface treat the fillers before being mixed with the unreacted monomer mixture.
- ▶ Silanes form a bond between the inorganic and organic phases of the composite.
- ▶ (3) page 164; Craig's Restorative Dental Materials, 13<sup>th</sup> Edition

# 04. Initiator- Activator

- ▶ Initiator-activator (Camphorquinone/amine) polymerize and cross-link the mixture into a hardened mass.
- ▶ TEGDMA or triethylene glycol dimethacrylate or Bis-EMA6 (2,2 bis(4-(2-methacryloxyethoxy)phenyl)propane ) are added to composite to reduce or control the high viscosity of Bis-GMA

# Objective 4

Learn the simple technique of restoring class III, IV, V, VI cavities



# Armamentarium



# Armamentarium

Brasseler Burs of Super Coarse  
Cylinder 5835 diamond, #4 or 6  
round bur, Brasseler DET9F FG Fine  
Needle Diamond 135F.31.014,  
7901 FG Flame Carbide  
H246.31.009, 7408 OS1 FG  
Football Carbide H379.31.023  
Hollenbeck, condenser, mirror,  
explorer, mandrel, 3M softflex  
discs, Taflon tape/roll, 2x2 gauzes,  
ultra thin 0.0001 micron matrix  
band, unidose Kerr Herculite Ultra  
/ Tokuyma Estelite composite  
capules, Biso Resin Modeling  
Wetting agent, composite gun,  
light cure unit.

[https://youtu.be  
/n3smeE\\_bYC4](https://youtu.be/n3smeE_bYC4)

**YouTube Link: Shows  
Procedure & Techniques**

# Summary of Steps

1. Check occlusion
2. Etch
3. Isolate prepared tooth for restoration with 2 x 2 gauzes, Teflon Tape, & 8-10 mm long 0.001 Ultra thin #1 Dead Soft Tofflemire matrix band, & wedges if necessary
4. Place Primer 15 seconds
5. Place bond
6. Light cure 20 seconds
7. Place tiny drop of Flowable comp
8. Place Dentin Composite with Unidose in one continuous firm pressure either from cervical or incisal surface depend on what your prep is.
9. Use clean dry pinky to shape the Facial and Incisal surface

# Summary of Steps

10. Use either condenser or Hollenbeck carver to shape and carve to desire shape and cavosurface margins

11. Light cure 20 seconds on each surface

12. Finish and polish with 3 M Softlex disc course, fine, ultra fine on Incisal & Facial surfaces

13. Finish and polish Lingual surface with carbide football Brasseler 7408 bur

14. Finish and polish Interproximal surface with carbide Brasseler 7902 bur

15. Check occlusion again

16. Clean all excess bonding residues

17. Floss through and make sure patient feels smooth around all tooth surfaces

# Always ask patient to sign Photograph consent form to keep for your records

ChauLong T Nguyen Dental Corporation  
Menlo Park Dental Excellence (650) 838-0260  
Los Altos Dental Excellence (650) 509-7917  
ChauLong Nguyen, D.D.S., MAGD, AF AAID.  
\_\_724 Oak Grove Avenue, Ste 120, Menlo Park, CA 94025  
\_\_881 Fremont Ave Ste A4, Los Altos, CA 94024

## Patient Photograph Authorization Form

I hereby give my consent for \_\_Menlo Park Dental Excellence\_\_Los Altos Dental Excellence to take photographs, slides and/or videotape of \_\_\_\_\_'s jaw and teeth.  
Patient's Full Name

I understand that some of these images may be used by laboratories for fabrication of crowns, veneers, bridges or dentures and that these images will become part of the patient record.

### ***Please circle "do" or "do not" and initial each statement.***

- I do do not consent to the use of these images in professional articles and presentations. \_\_\_\_\_
- I do do not consent to the use of these images within the dental practice to be seen only by individuals who walk into the practice. \_\_\_\_\_
- I do do not consent to the use of these images to promote the dental practice through various media, including but not limited to print advertising, brochures and the practice website. \_\_\_\_\_

By consenting to the use of these photographs as described above, I do not expect compensation, financial or otherwise, from \_\_Menlo Park Dental Excellence\_\_Los Altos Dental Excellence. I hereby release and discharge \_\_Menlo Park Dental Excellence\_\_ Los Altos Dental Excellence from any and all claims and demands arising out of or in connection with the use of my name, photograph or other information provided by me, including any and all claims for libel and invasion of privacy.

## Patient Photograph Authorization Form

I understand the receiving party may not further disclose this health information without first obtaining a new written authorization from me. I understand this authorization may be cancelled or modified at any time upon provision of a written notice to this dental practice. I understand that I may refuse to sign this authorization and that my refusal to sign will not affect my ability to obtain treatment, payment, enrollment or eligibility for benefits. Unless revoked by me, this authorization expires 10 years from the date I sign below. I understand I may have a copy of this authorization.

\_\_\_\_\_  
Print Patient's or Legal Guardian's/Representative's Name

\_\_\_\_\_  
Patient's or Legal Guardian's/Representative's Signature/Date

1	Take photos before touching or doing any procedure
---	--



2	Check occlusion before cutting any tooth structure
---	--



3

Completely Remove all caries as in photos -  
This is extremely important to remove ALL  
caries!



3  
(cont.)

Completely Remove all caries as in photos -  
This is extremely important to remove ALL  
caries!



4

Remove all undercut irregular enamel / dentin



5

Roughen up at least 5 mm beyond the cavo surface or the final prep on facial of preparations



6

Clean thoroughly all blood or saliva



7

Etch 15 seconds on all enamel surface and 5 seconds on dentin



8

Rinse thoroughly for 30 seconds with air/water spray



9

Make sure no etch gel is present



10

Isolate prepared teeth from lips and tongue using firmly rolled 2 x 2 gauzes, Teflon tape, soft Tofflemire matrix band or wedges

11

Air / Blot dry but not too dry



12

Apply ClearFil SE Protect Primer for 15 seconds then air dry gently



13

Apply ClearFil SE Protect Bond then air dry gently



14

Light cure for 20 seconds on bonded surfaces

15

Apply minute amount of flowable composite then packable composite with one continuous firm pressure from largest/widest surface of cavity to smallest as shown on video (\*This is the most important step to avoid bubbles & voids in the final restoration\*)

16

Use clean pinky tip or ring wearing finger tip with thin layer of Biso Resin Modeling agent to apply pressure and mold or shape composite to desired structure as shown on video (\*This is the 2<sup>nd</sup> most important step to save time & give a whole veneer or filling surface\*)

17

Then shape the composite with Condenser.  
(If necessary, apply the next composite layer in continuous firm motion as in Steps 15 & 16)  
Then shape with Hollenback carver until the final restoration is achieved.

18

Light cure for 20 seconds on the applied composite



19

Polish with 3M Solflex 9.5 mm (3/8 in) coarse disc on incisal and facial surfaces first



20

Then use Brasseler football carbide # 7408 bur to finish and adjust occlusion

21

Sitting the patient at an upright position, Check and adjust occlusion again at this time - This step is extremely important to avoid any composite fracture



22

Use Fine Needle Diamond bur & carbide finishing bur #7902 to finish the cervical and interproximal surface of restoration



23

Then use the used coarse disc to give final shape, and then use fine and ultra fine discs to do final polishing



24

Floss and remove all layers of residues of bonding agent on gingiva and on adjacent teeth

25

Take final photos / Finish!



# Summary of Steps

1. Check occlusion
2. Etch
3. Isolate prepared tooth for restoration with 2\*2 gauzes, Taflon Tape, & 8-10 mm long 0.001 Ultra thin #1 Dead Soft Tofflemire matrix band, & wedges if necessary
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14. Finish and polish Interproximal surface with carbide Brasseler 7902 bur
15. Check occlusion again
16. Clean all excess bonding residues.
17. Floss through and make sure patient feels smooth around all tooth surfaces.







Before



After 3 hours in 1 visit



2 years later





# **Thank you so much!**

Please visit my websites for more information, sample consent forms, handouts, and contact:

- 1) [www.mpdentalexcellence.com](http://www.mpdentalexcellence.com)
- 2) [www.Implantforme.com](http://www.Implantforme.com)