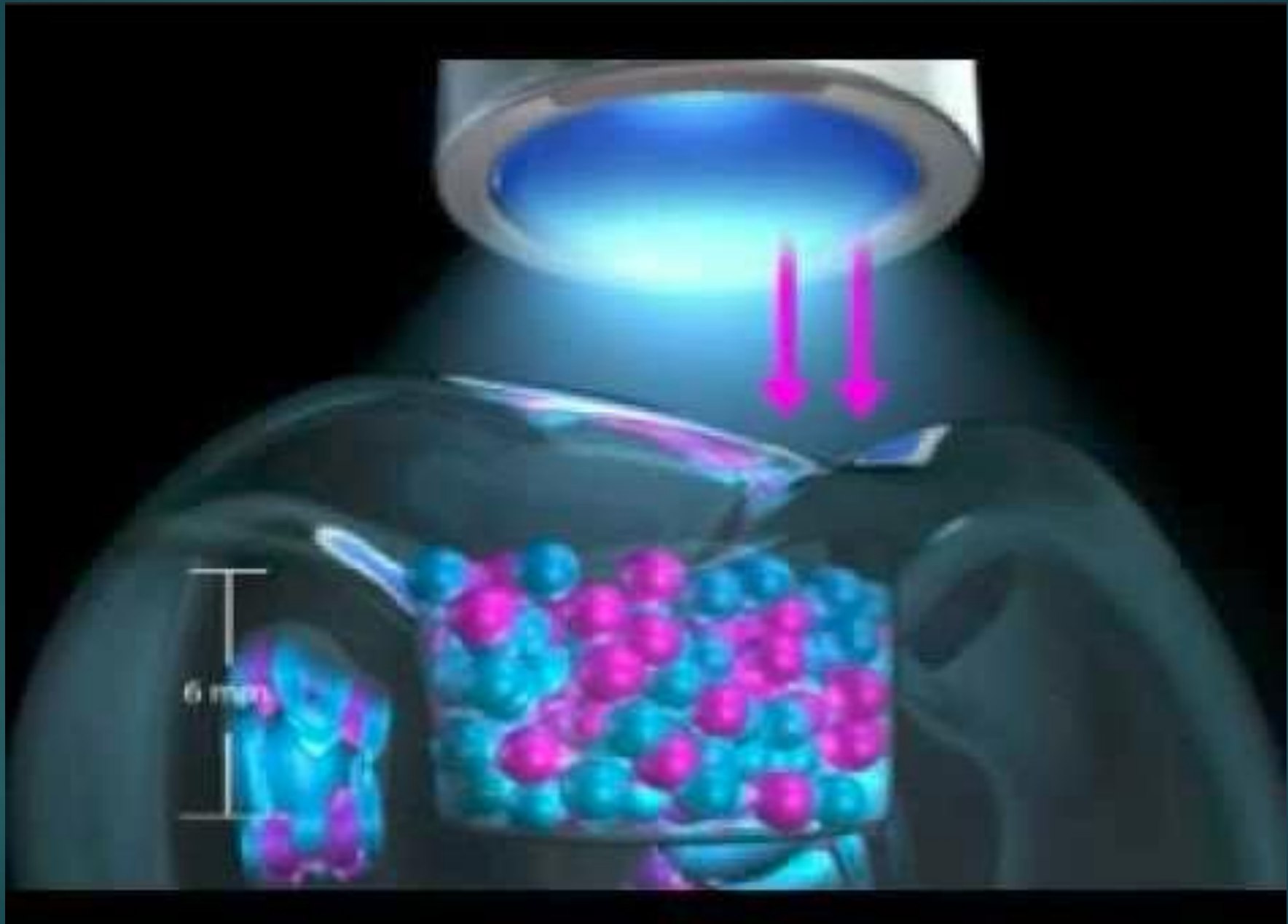
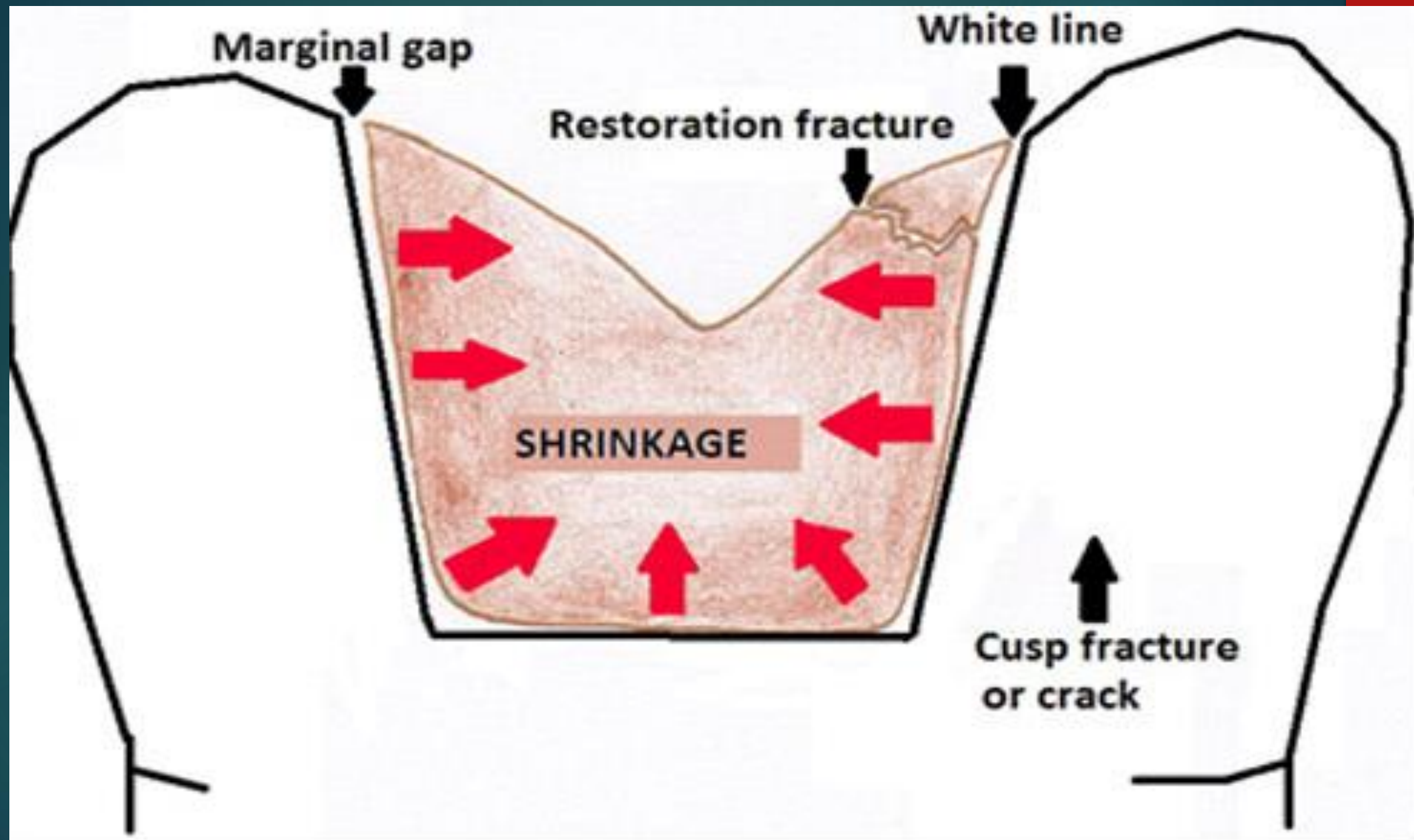


Polymerization of composite

that mean solidify by chemical process which produces gelation in restorative material transformed from **viscous-plastic** into **rigid-elastic** phase.





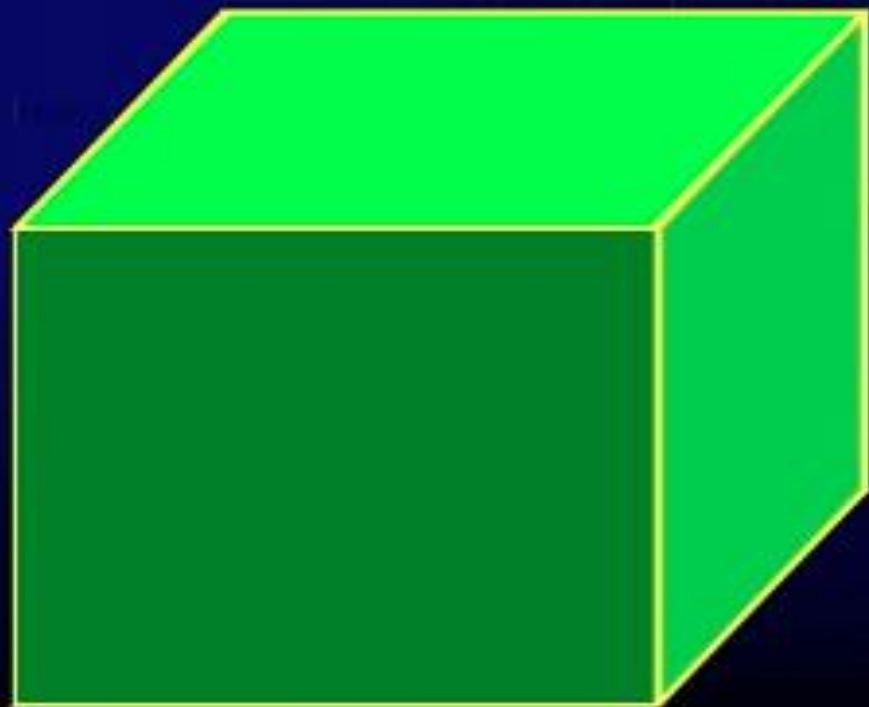
Factors affecting polymerization shrinkage stress

1- factors related to the cavity design:

stress developed during curing can be minimized by consideration of the ratio between the bonded and un bonded surface (configuration factor or C-factor)

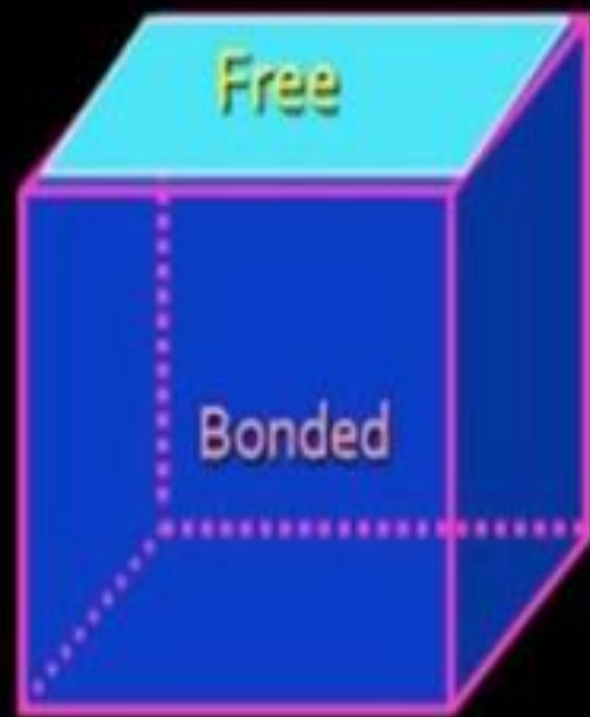
C- Factor – Cavity Configuration

C-FACTOR



$$C = \frac{\text{BONDED WALLS}}{\text{UNBONDED WALLS}}$$

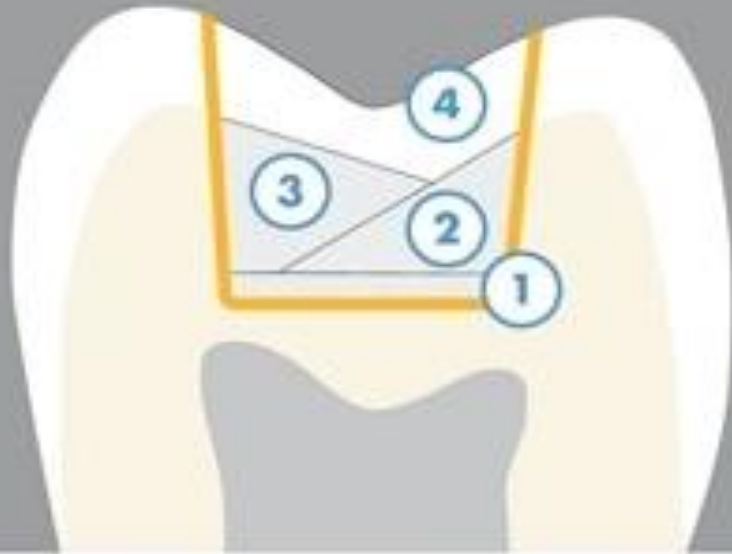
Polymerization Stress in composite resin in relation to configuration of the restoration (C-Factor).



$$C = \frac{\text{BONDED walls (5)}}{\text{FREE walls (1)}}$$

2- factor related to the placement technique:

the second factor to reduce polymerization shrinkage is inserted resin composites in increments to reduce the volume of the resin that is shrinkage .



Conventional procedure

Bonding

- ① Flowable Liner
- ② Increment 1: Universal Composite
- ③ Increment 2: Universal Composite
- ④ Increment 3: Universal Composite



SDR procedure

Bonding

- ① SDR
- ② Capping Layer: Universal composite

SINGLE-FILL™
THE TRUE SINGLE-STEP
BULK FILL UP TO 5MM



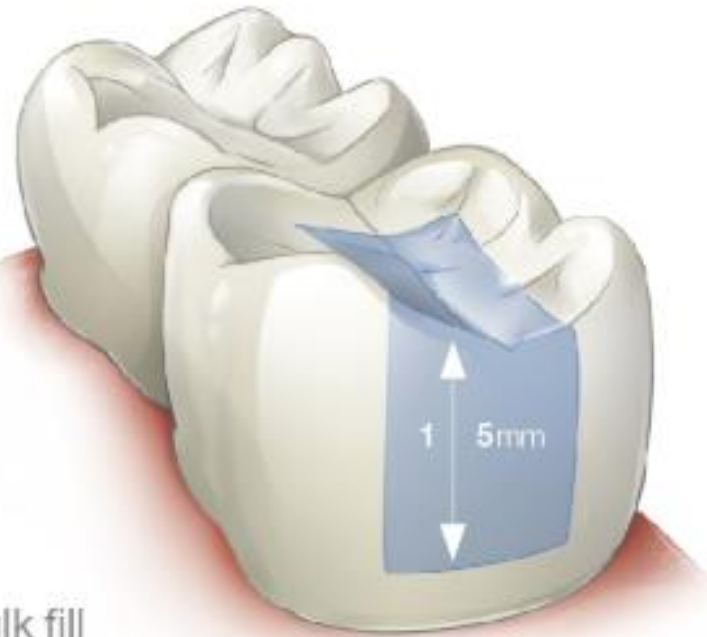
Traditional layering technique.
Several Layers.



Bulk fill flowable with universal cap.
Two Layers.



High viscosity bulk fill restorative with flowable liner.
Two Layers.



SonicFill™ System
ONLY ONE LAYER

Acid Etching:

physical process that creates a microscopically rough enamel surface (enamel tags).

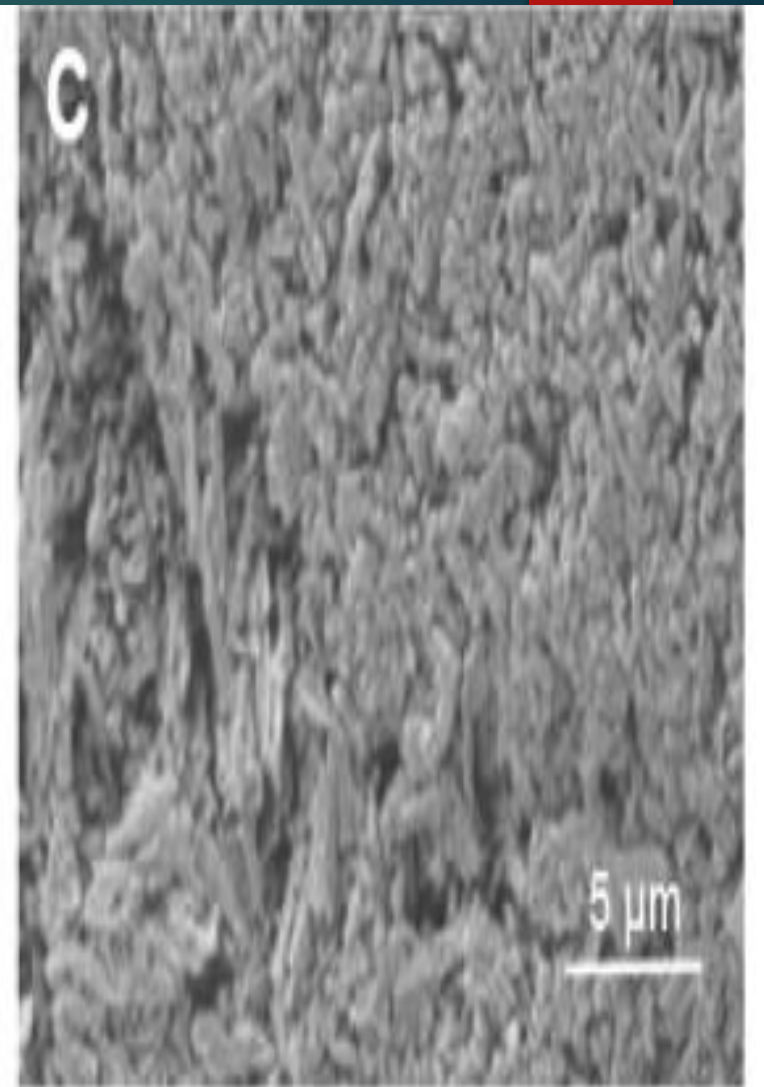
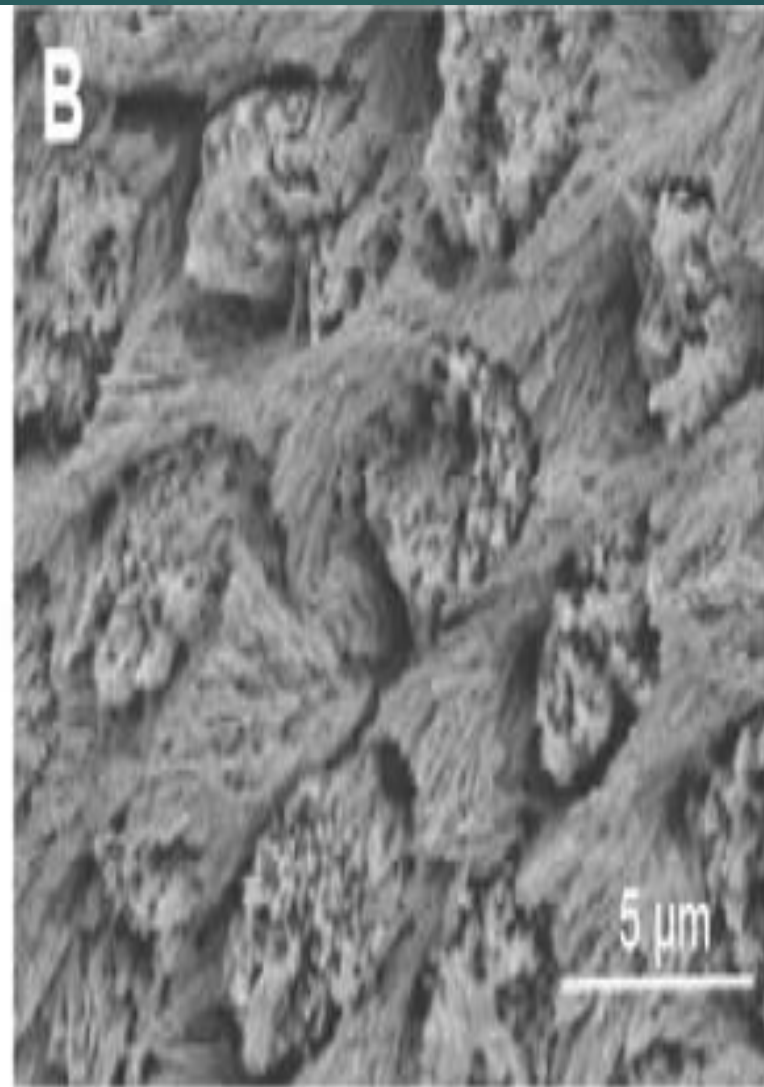
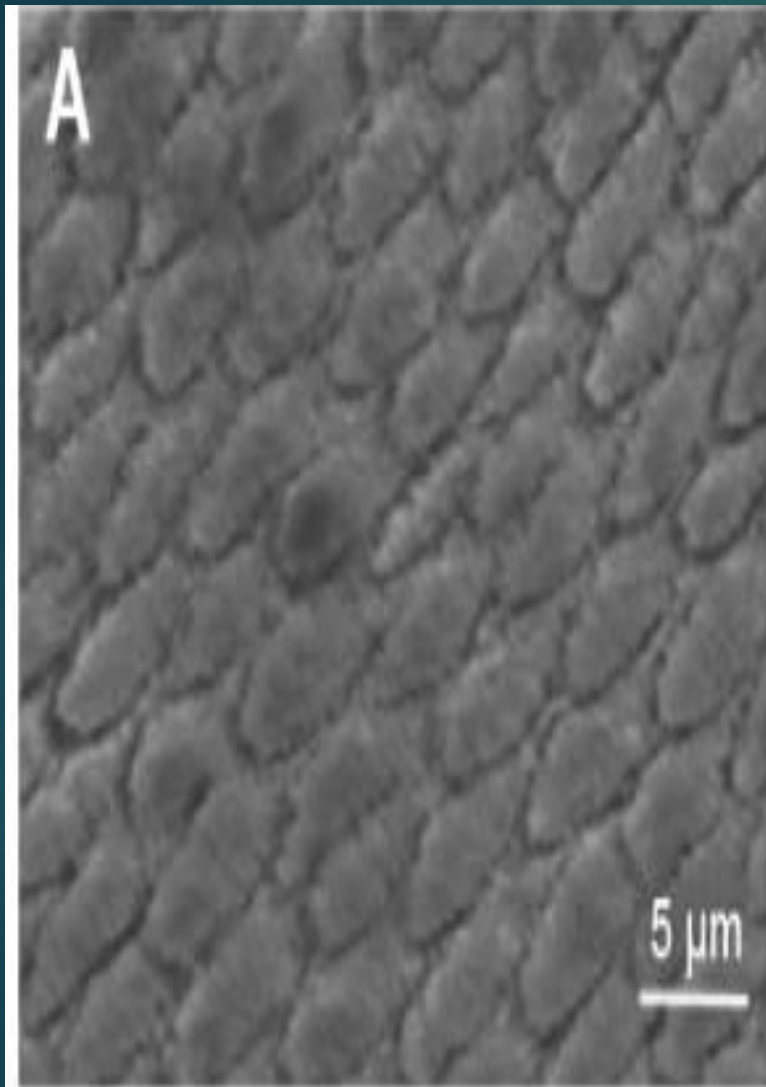
Facilitate bond dental materials to tooth structure .

37% phosphoric acid .

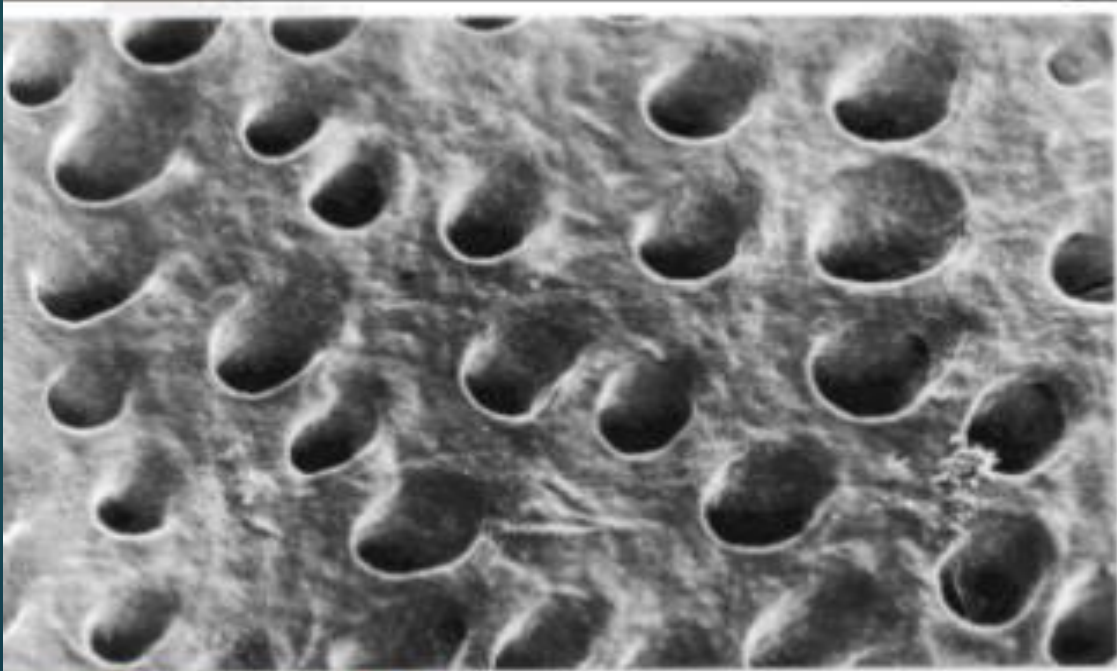
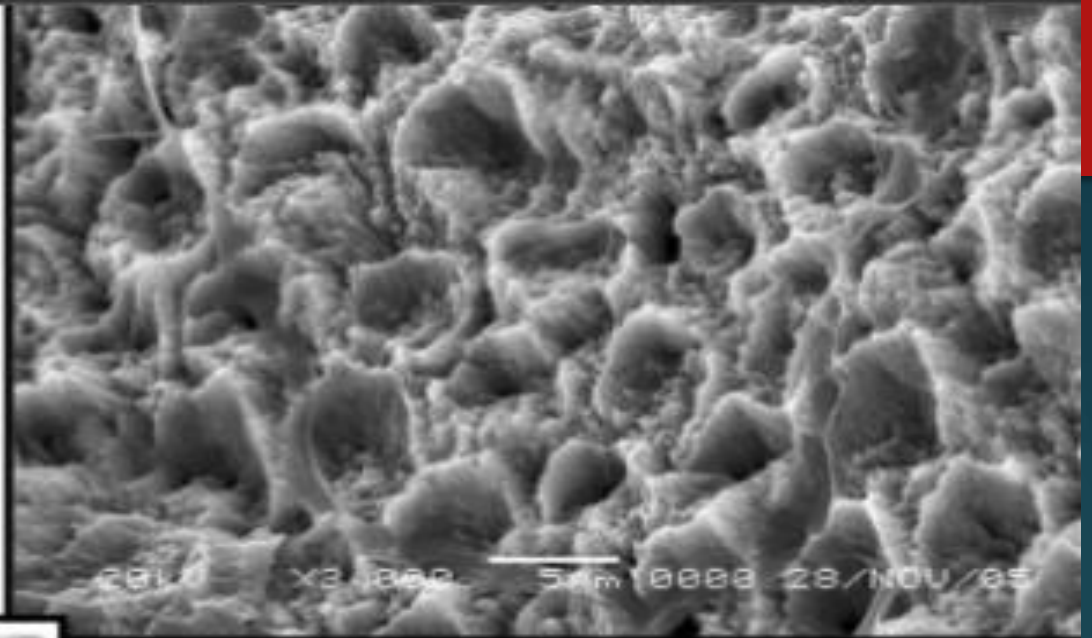


Smear layer:

when rotary instrument used on dentin creates a special surface texture called a smear layer that closes off the dentin tubules. This layer adhered to dentin surface and contains tooth cuttings ,saliva ,bacteria and other surface debris.



Enamel Etching



Dentin Etching

Enamel etching

- Introduced by Michael Buonocore in 1950s
- Etching time: 10-30 seconds (around 15 seconds)
- Primary teeth and fluoride treated teeth require more time
- Etched enamel looks frosty white when dried
- Etching produces a rough surface (pits) into which resin flows and forms resin tags = micromechanical retention

DENTINE ETCHING

- Etching time:
 - 10 sec (less than enamel)
- Keep the surface moist (but not with saliva)
 - Because dentin contains more collagen fibers than enamel and when dried they will collapse and occlude the porosities created by etching

Dentine etching

- 1979 etching was done for dentine as well as enamel using 37% phosphoric acid. Research proved enhanced bonding
- Over etching, effects on dentine structure and pulp?
- Over etching dentine leads to weaker bond and sensitivity
- Over drying should be avoided to prevent collapse of collagen and occluding tubules

Acid Etching

- *Enamel*
 - Selective Demineralization
 - Increases surface area
 - Increases life of composite
 - Decreases marginal staining
 - Decreases secondary caries
 - Decreases post-operative sensitivity
 - Permits efficient wetting by hydrophobic resin
 - Tag formation in microporosities
- *Dentine*
 - Demineralizes dentine surface
 - Opens dentinal tubules
 - Exposes collagen
 - Conditions dentine for better wetting of the primer

PRIMER or CONDITIONERS

- Primers condition the dentin surface, & improve bonding.
- Acidic in nature
- eg. EDTA, nitric acid, Maleic acid

Functions:-

- Removes smear layer & provides subtle opening of dentinal tubules.
- Provides modest etching of the inter-tubular dentine.



COMPOSITE
PRIMER
3ml

GC

レジン面
処理

光照射
20秒

DENTINE BONDING AGENTS

- ▶ It is defined as "a thin layer of resin applied between conditioned dentin and resin matrix of a composite."
- ▶ The term dentine bonding agents is no longer relevant as current bond agents bond to enamel and dentine.
- ▶ Due to acid –etching ,micro leakage or loss of retention is not a hazard at the resin-enamel interface but its encountered at the resin-dentine interface.
- ▶ Due to the differences in the composition of enamel and dentine,developing agents that will adhere to dentine was challenging due to the following reasons:
 - ▶ The high water content interferes with bonding.
 - ▶ Presence of a smear layer on the dentine surface.

Bonding Generations

- 4th Generation



Primer,
Adhesive, Etch

- 5th Generation



One Bottle, Etch

- 6th Generation



Etch-Primer,
Adhesive

- 7th Generation



One Bottle

Total etch adhesive



Self etch adhesive



Thank you

