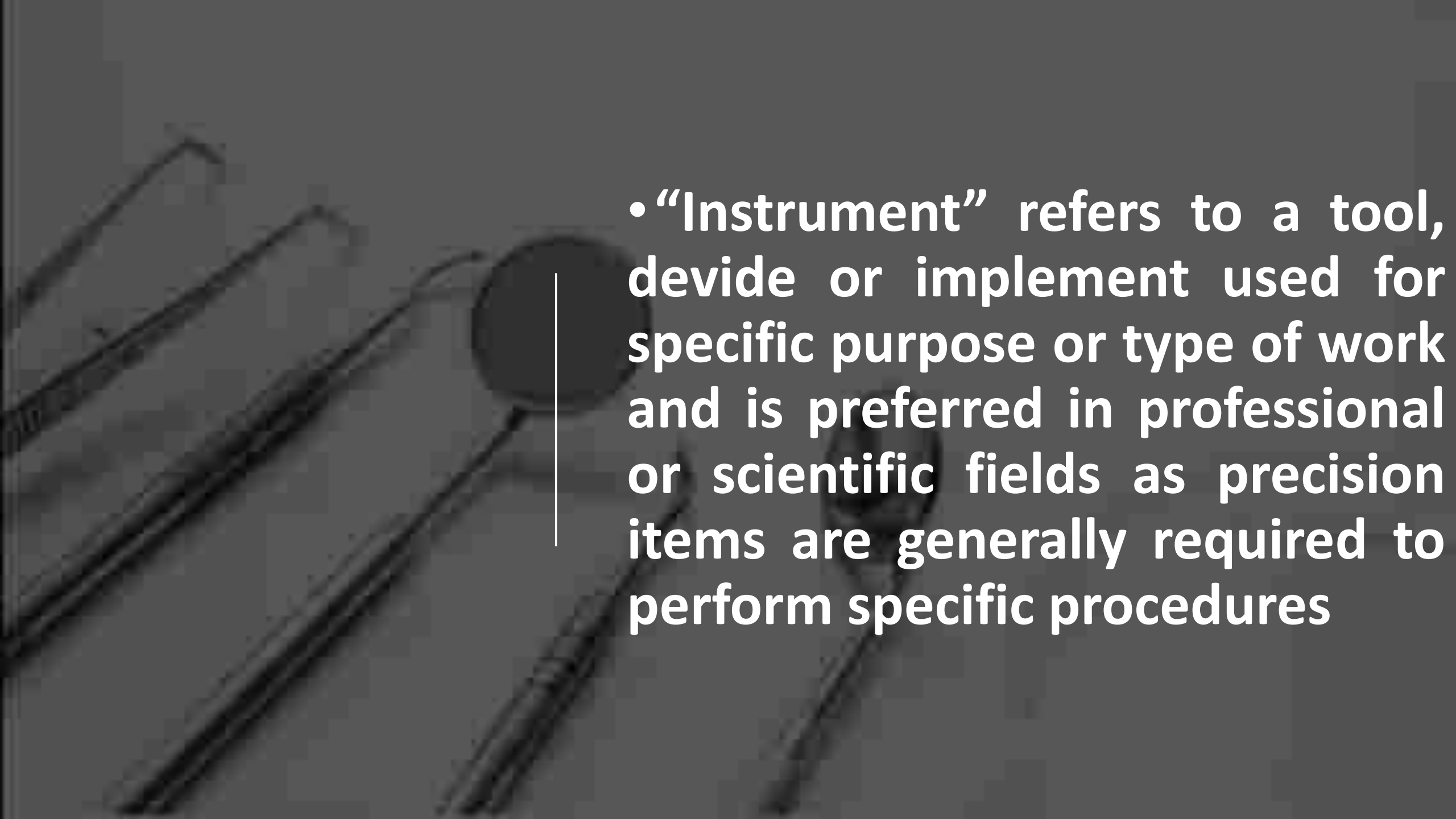
Dental Restorative Instrument



- “Instrument” refers to a tool, devide or implement used for specific purpose or type of work and is preferred in professional or scientific fields as precision items are generally required to perform specific procedures

Stainless Steel

- Chromium 18%, Carbon 1%, Iron 81%
- Chromium reduces the corrosion; Remains bright
- Difficult to maintaining the sharpness; Loses a keen edge during used
- Mostly used for working points and cement instruments

- Carbon 1,5%, Manganese 0,2%, Silicon 0,3%, Iron 98%
- Harder than stainless steel
- It will corrode when unprotected
- Mostly used for cutting instrument

Carbon Steel

- Cobalt 65%, Chromium 30%, Trace amounts tungsten, molybdenum and iron
- High resistance to acid and has good hardness
- Brittle
- Used for mix and insert instrument

Carbide

PREPARATION

- Removal and shaping of tooth structure and dental material is essential aspect for operative dentistry
- Preparation with rotary instrument was 90%
- Penetration, extention, excavation, refinement

Handpiece

- Gear driven (electric, low speed)
- Water driven (100.000 rpm, high torque)
- Belt driven (>100.000 rpm, excellent performance and great versatility)
- Air driven (300.000 rpm)

Handpiece

- Straight handpiece (low speed, oral surgery and dental lab)
- Contra angle handpiece (low speed, oral surgery and dental lab, improve accessibility, visibility and stability)
- Contra angle handpiece (high speed)

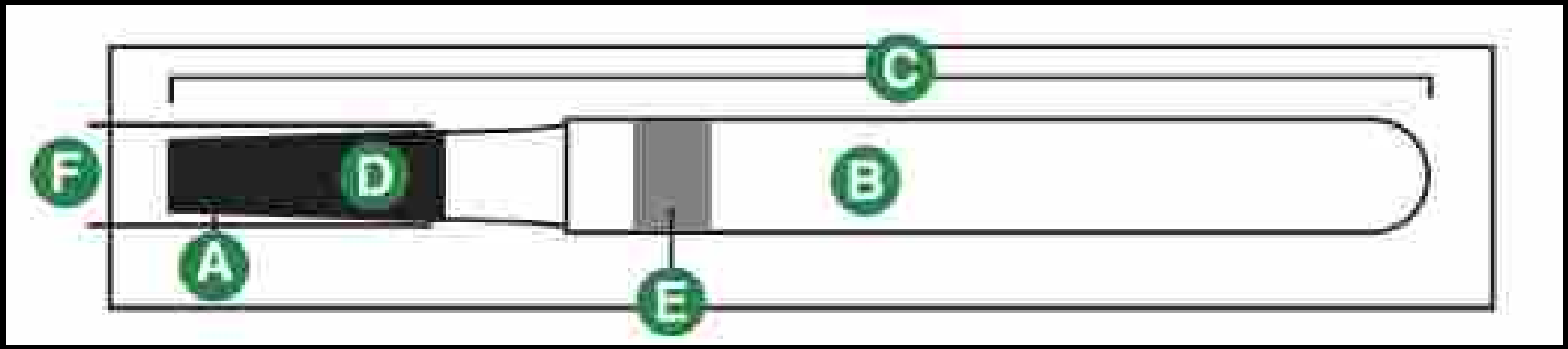
Handpiece

- Low speed
  <12.000 rpm
- Medium speed
  12.000 – 200.000 rpm
- High speed
  >200.000 rpm

Bur

Various shape, size, speed, function (ISO 6360)

Bur



A. Indicate the material
B. Type of shank
C. Bur length
D. Head shape
E. Grit
F. Maximum head diameter

Bur

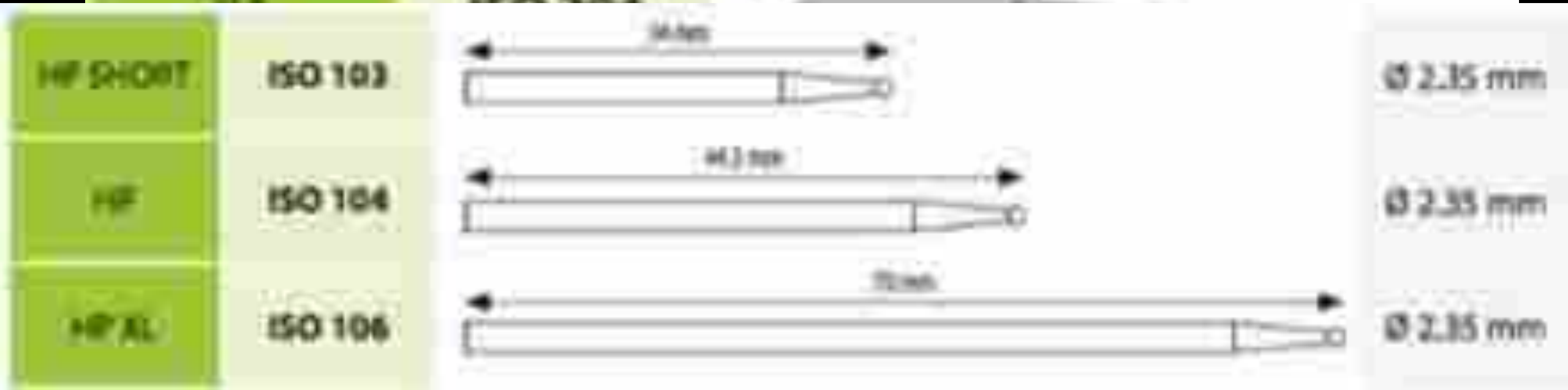
500: tungsten carbide
806: diamond

Bur

FG : friction grip (turbine)

RA : right angle (contra angle)

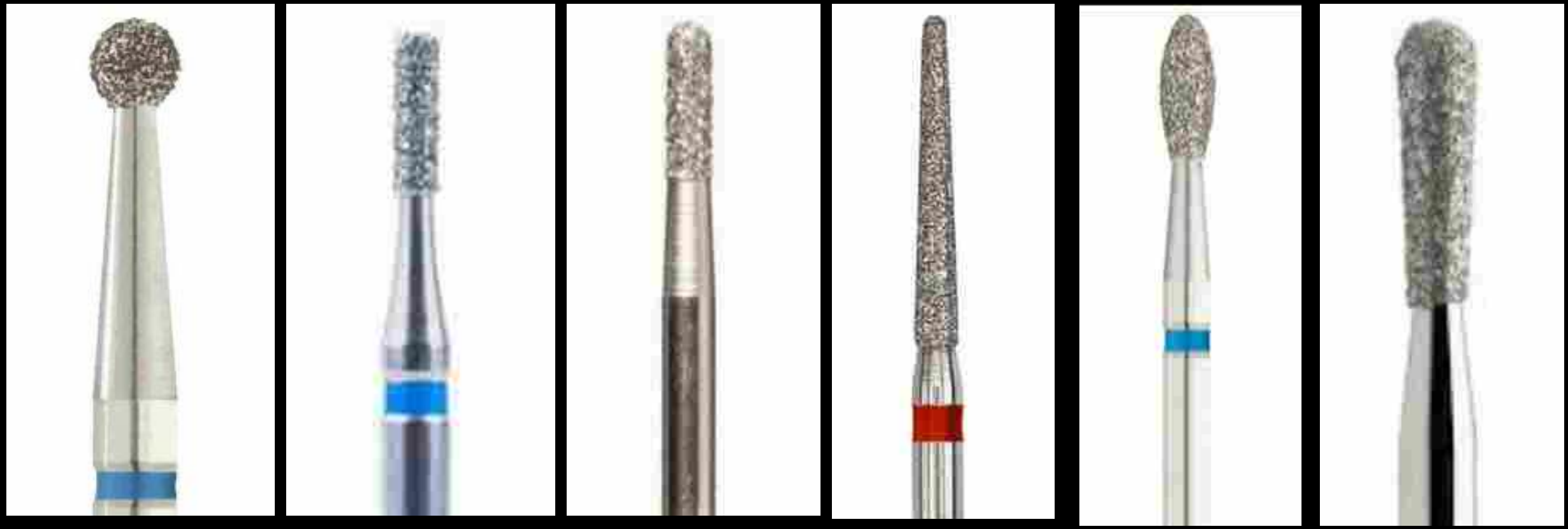
HP : hand part/piece



Bur

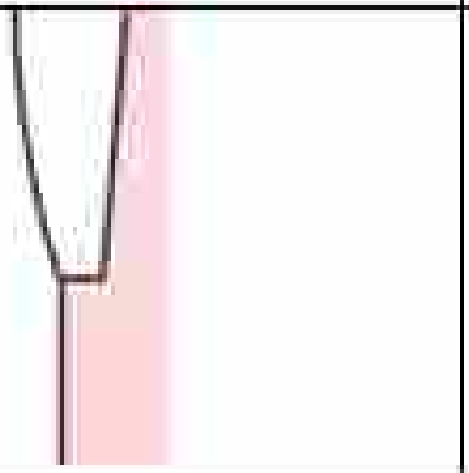
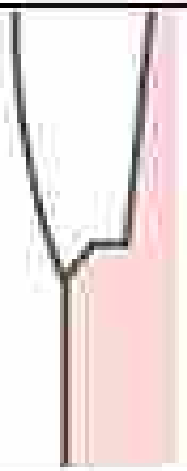
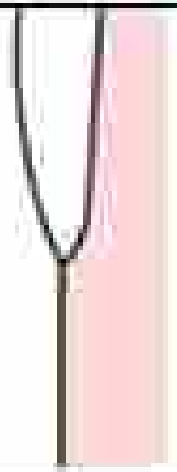
544: super coarse
534: coarse
524: medium
514: fine
504: very fine
494: ultra fine

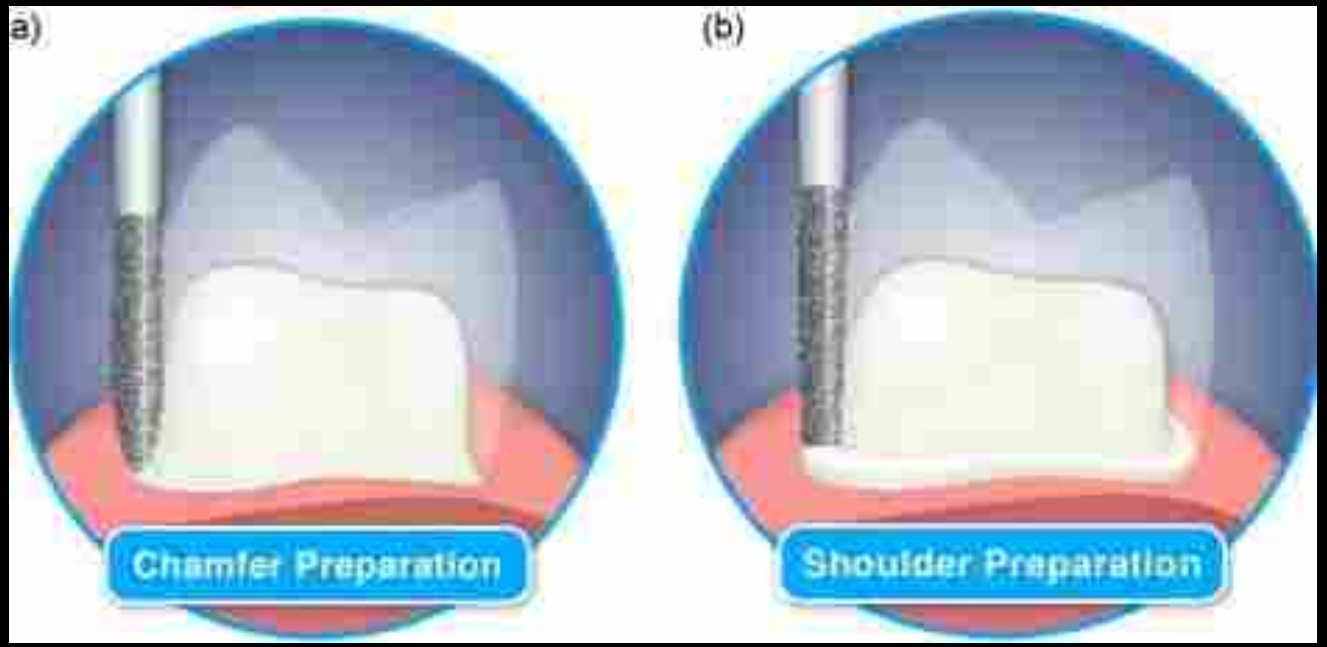
Bur



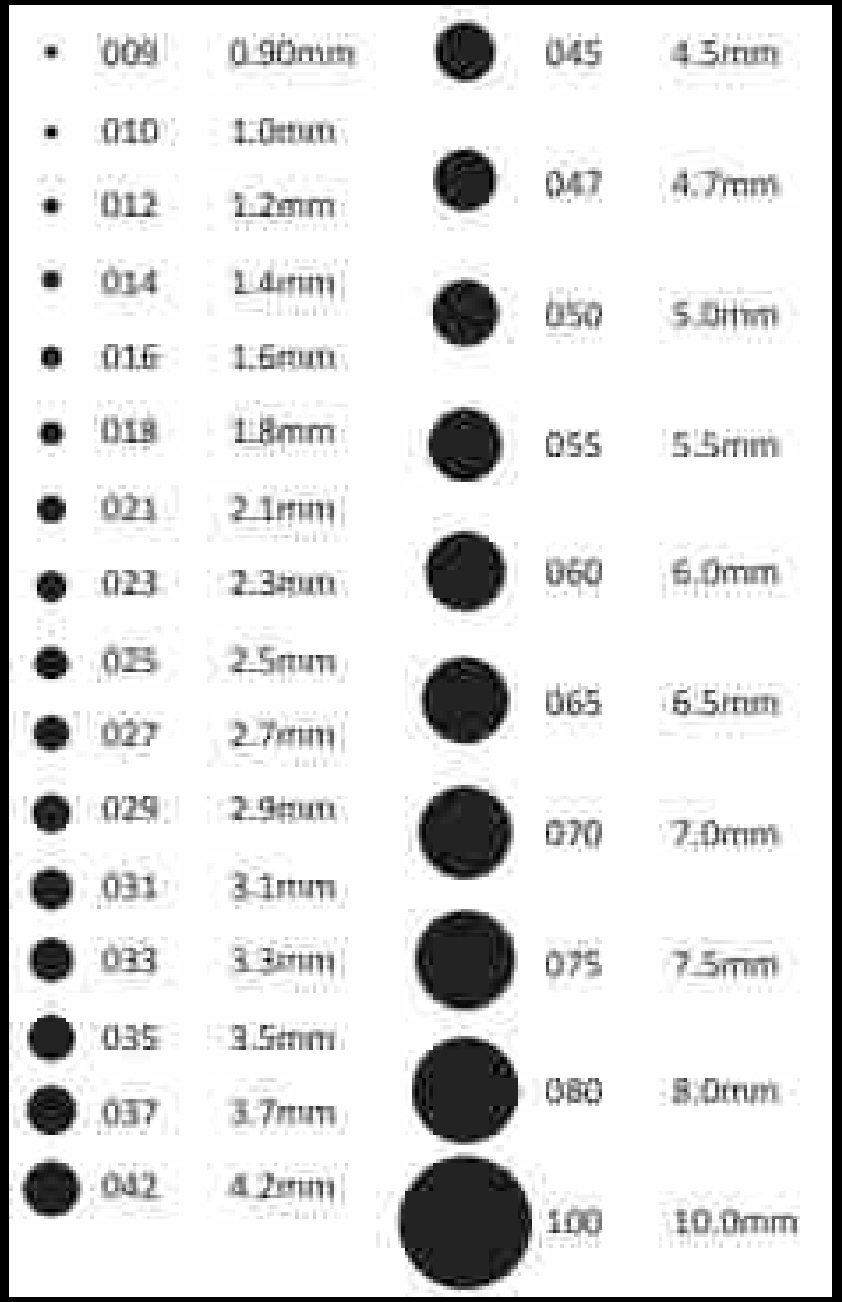
Bur

Bur

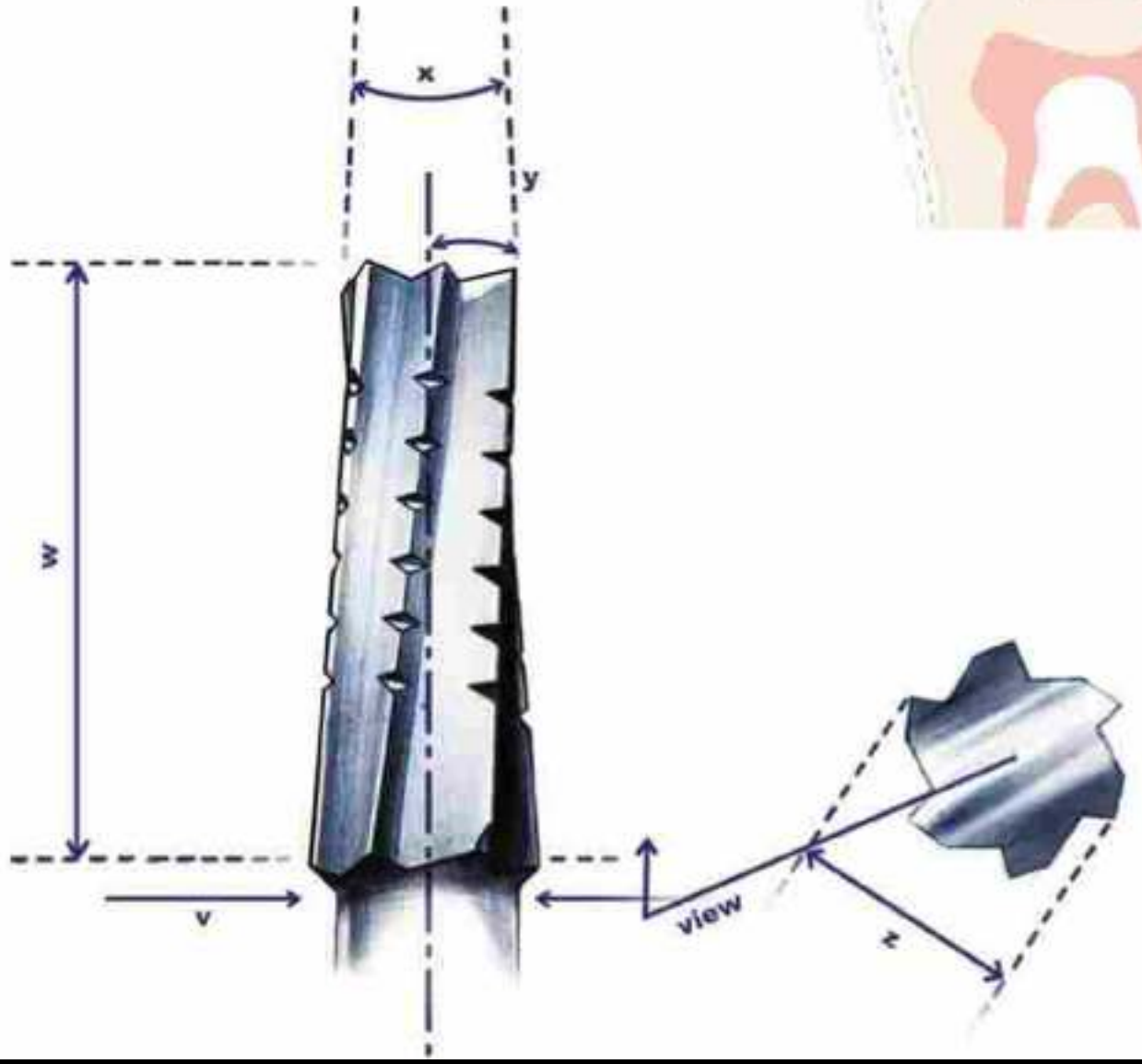
Shoulder	Bevelled Shoulder	Heavy Chamfer	Chamfer
			



Bur

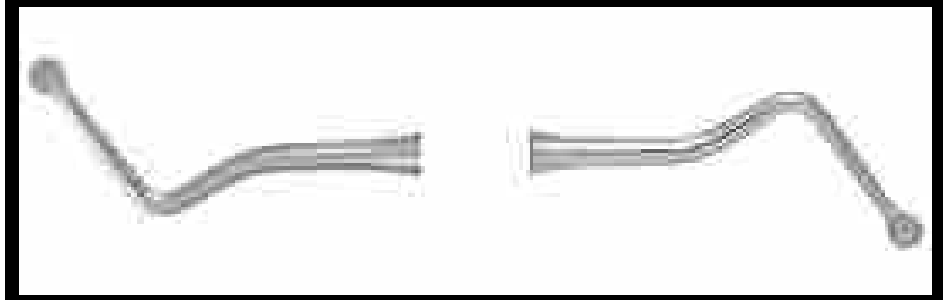

009 0.90mm
010 1.0mm
012 1.2mm
014 1.4mm
016 1.6mm
018 1.8mm
021 2.1mm
023 2.3mm
025 2.5mm
027 2.7mm
029 2.9mm
031 3.1mm
033 3.3mm
035 3.5mm
037 3.7mm
042 4.2mm
045 4.5mm
047 4.7mm
050 5.0mm
055 5.5mm
060 6.0mm
065 6.5mm
070 7.0mm
075 7.5mm
080 8.0mm
100 10.0mm


a
c


x
y
w
v
view
z

Cavity Preparation

Enamel



Dentin

MATRIX SYSTEM

A properly contoured piece of metal or other material used to support and give form to the restoration during its placement and hardening

MATRIX SYSTEM

- Anatomy
- Risk of leakage
- Separate

MATRIX SYSTEM

- Rigidity
- Establish proper anatomical
- Easy adaptation
- Ability to be contoured
- Prevent excess
- Resistance to condensation
- Easy removal

MATRIX SYSTEM

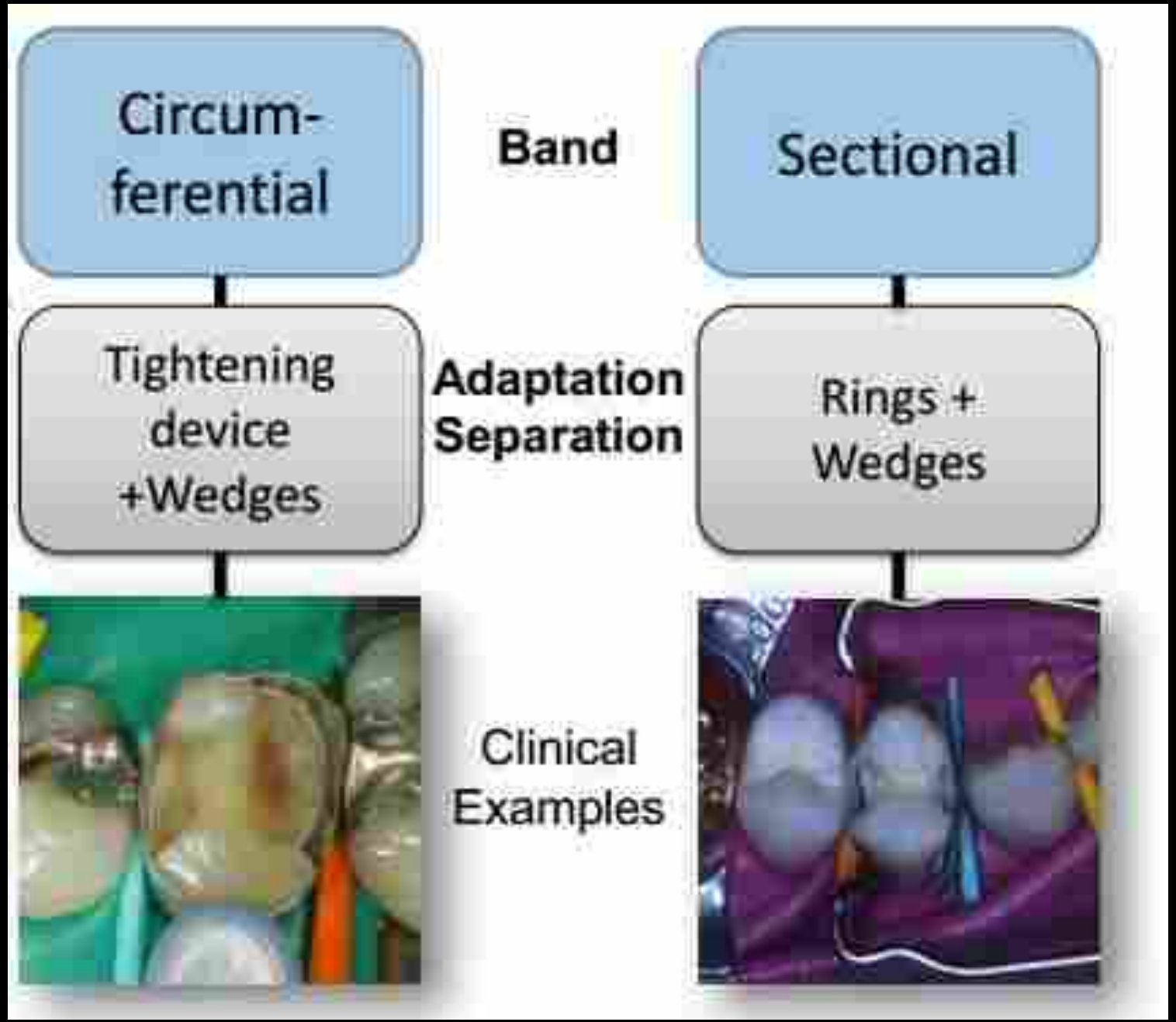
Circumferential

- Tofflemire (universal)
- Automatrix
- Siquveland
- T-band

Sectional

- Palodent
- Composi -tight
- Ivory
- Strip-T matrix

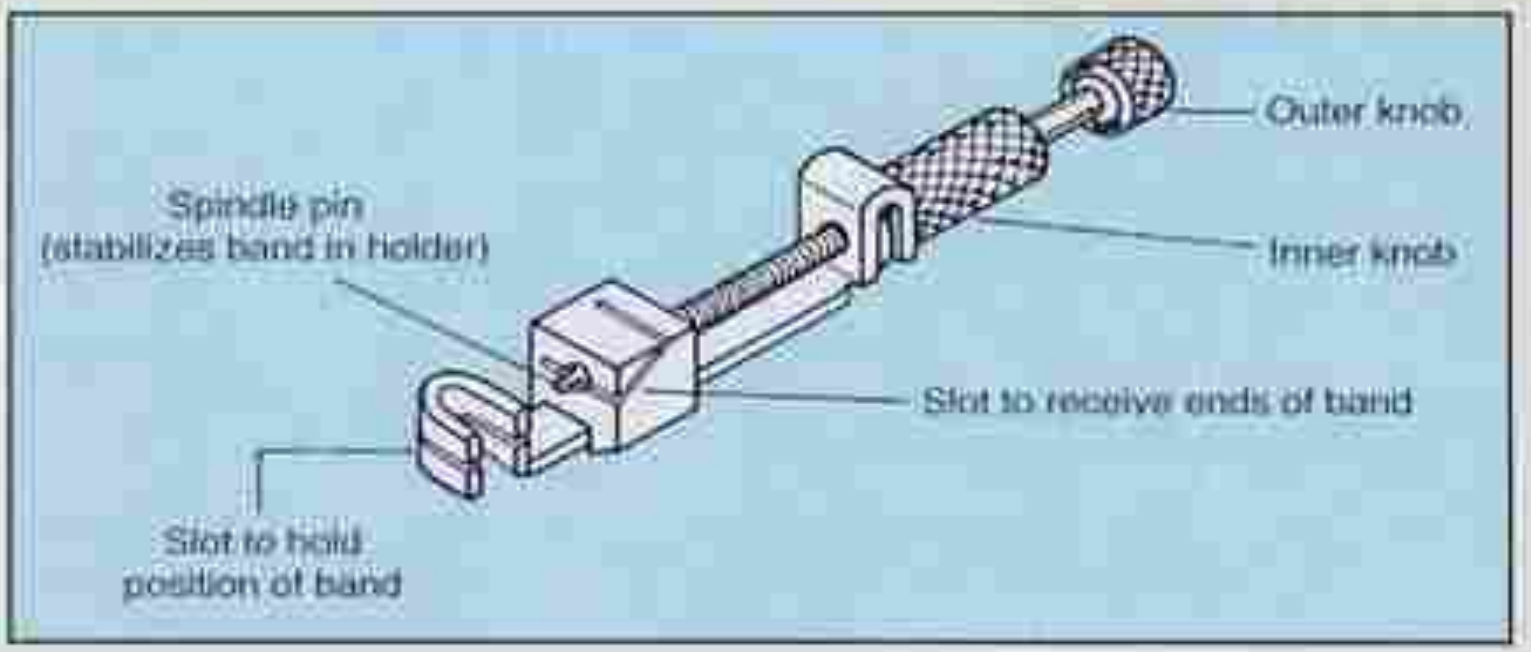
MATRIX SYSTEM



Universal

Also referred to as the *Tofflemire retainer*. This device holds the matrix band in position. The retainer is positioned most commonly from the buccal surface of the tooth being restored.

Components of Universal Retainer



Outer knob: Used to tighten or loosen the spindle within the diagonal slot; this holds the matrix band securely in the retainer.

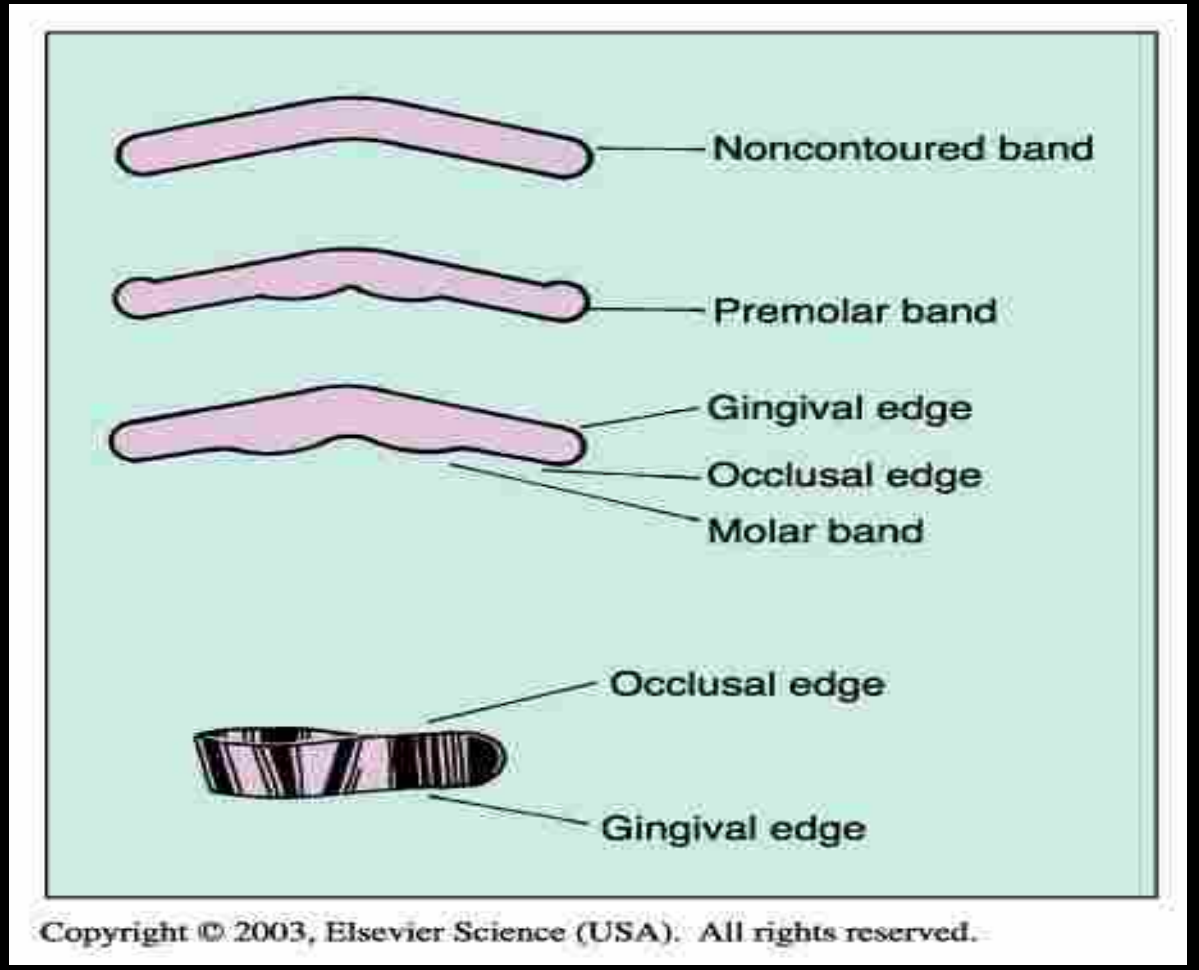
Inner knob: Used to increase or decrease the size of the matrix band loop; when placing the band over the tooth, the size of the loop circumference should be the largest size and then tightened after placement.

Spindle: Internal screwlike pin that fits into the diagonal slot to secure the ends of the matrix band; when assembling the retainer, the spindle point must be clear of the slot into which the band slides.

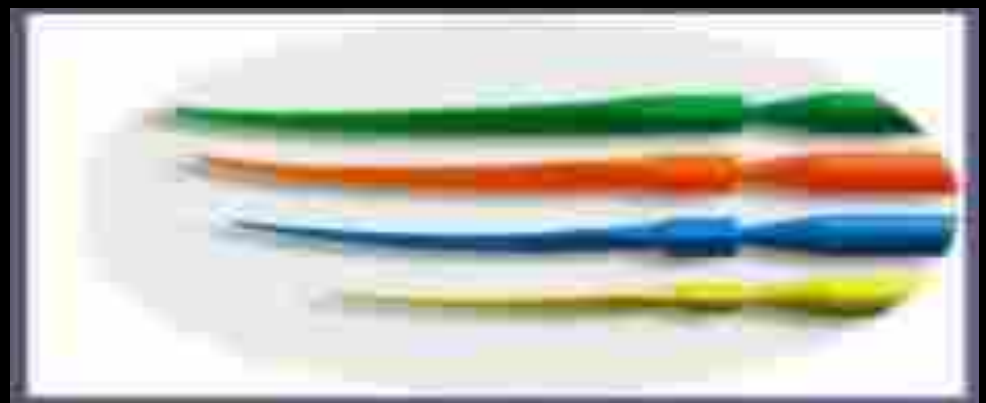
Diagonal slot: Slot within the main body of the retainer that is used to position the ends of the matrix band into the vise; the retainer is always positioned in the mouth with this slot facing *toward the gingiva.*

Guide slots: Slots used to position the matrix band for either the left or the right quadrant.

- Matrix bands are made of flexible stainless steel and are available in premolar, molar, and universal sizes and thicknesses.
- The *larger* circumference of the band is the *occlusal edge* and is always placed toward the occlusal surface.
- The *smaller* circumference of the band is the *gingival edge* and it is always placed toward the gingiva.



- A **wedge** is either triangular or round and made of wood or plastic.
- The wedge is inserted into the lingual embrasure to position the matrix band firmly against the gingival margin of the preparation.

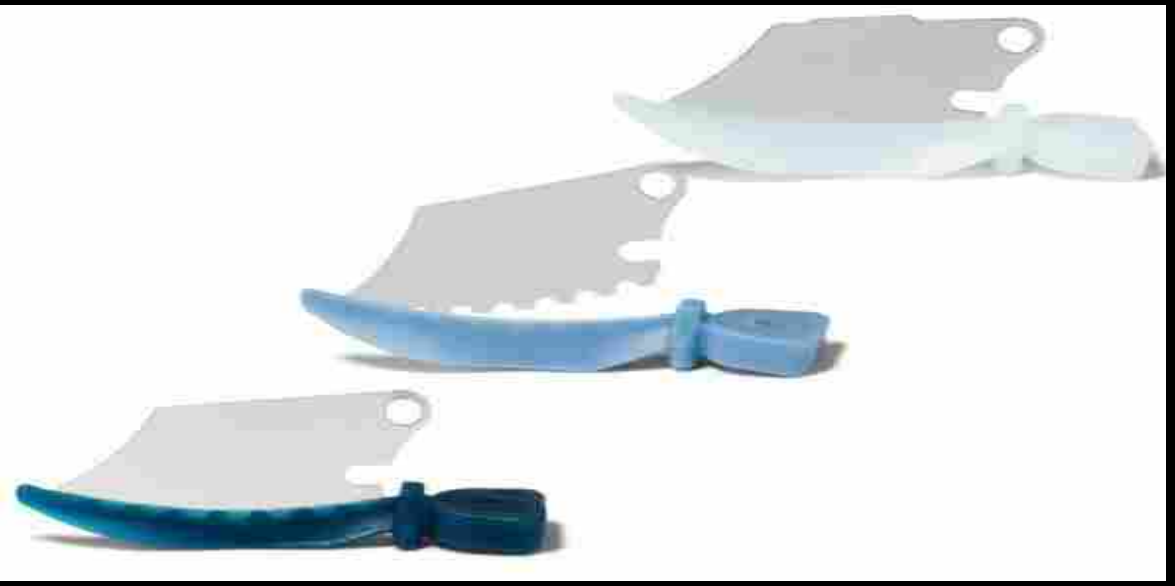


Sectional

A thin polished type band and a tension ring produce a tight anatomic contact for composite resin materials for proximal direct restorations.


STARTER KIT
Palodent V3
Sectional Matrix System
designed by triodent
ReOrder 625.00.005
DENTSPLY
Starter Kit
Palodent V3
Sectional Matrix System
designed by triodent
DENTSPLY
ReOrder 625.00.005

Protective Wedguard

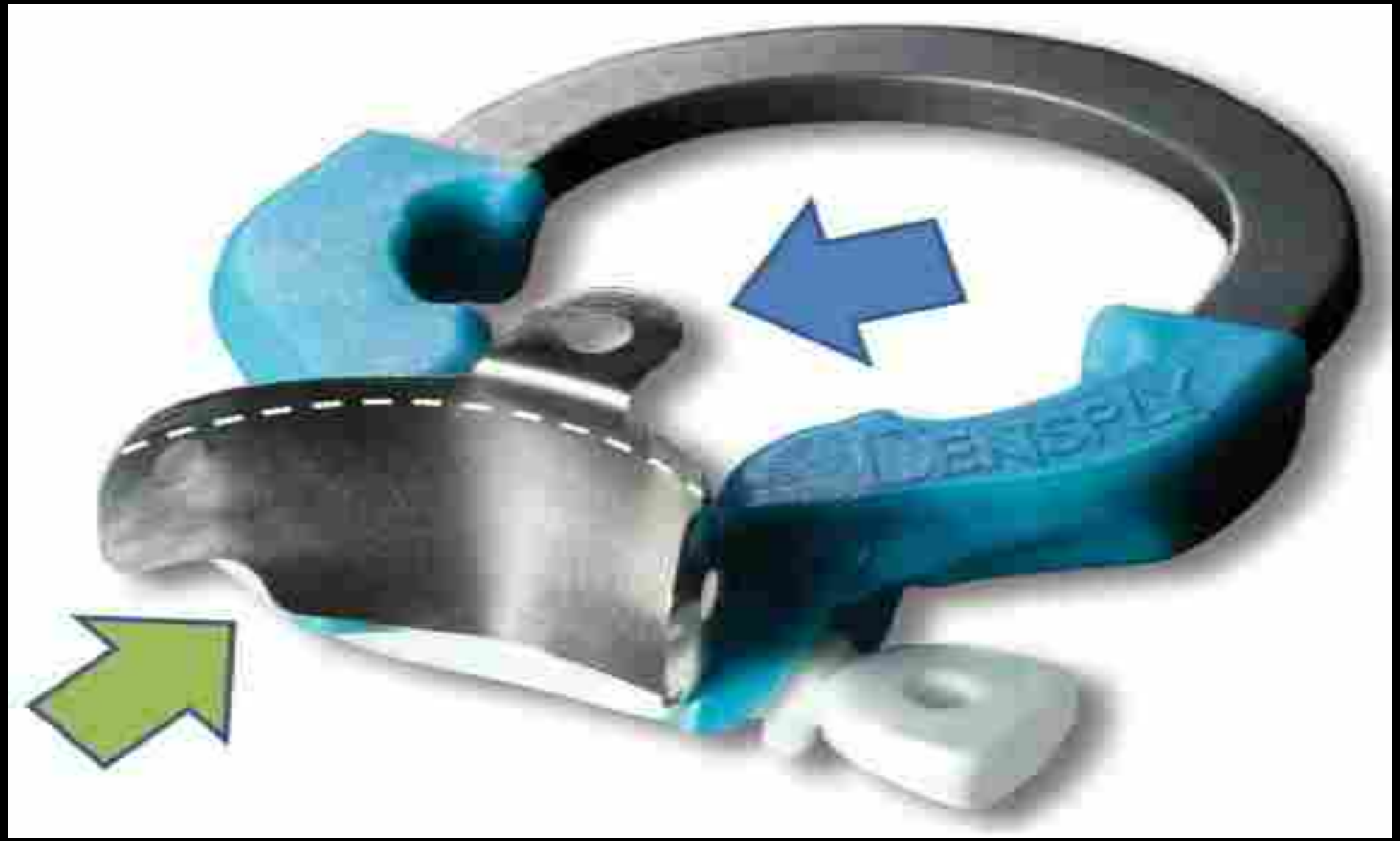


- Protect the adjacent teeth while preparation
- Less damage of adjacent teeth
- Wedge and Wedgeguard in one

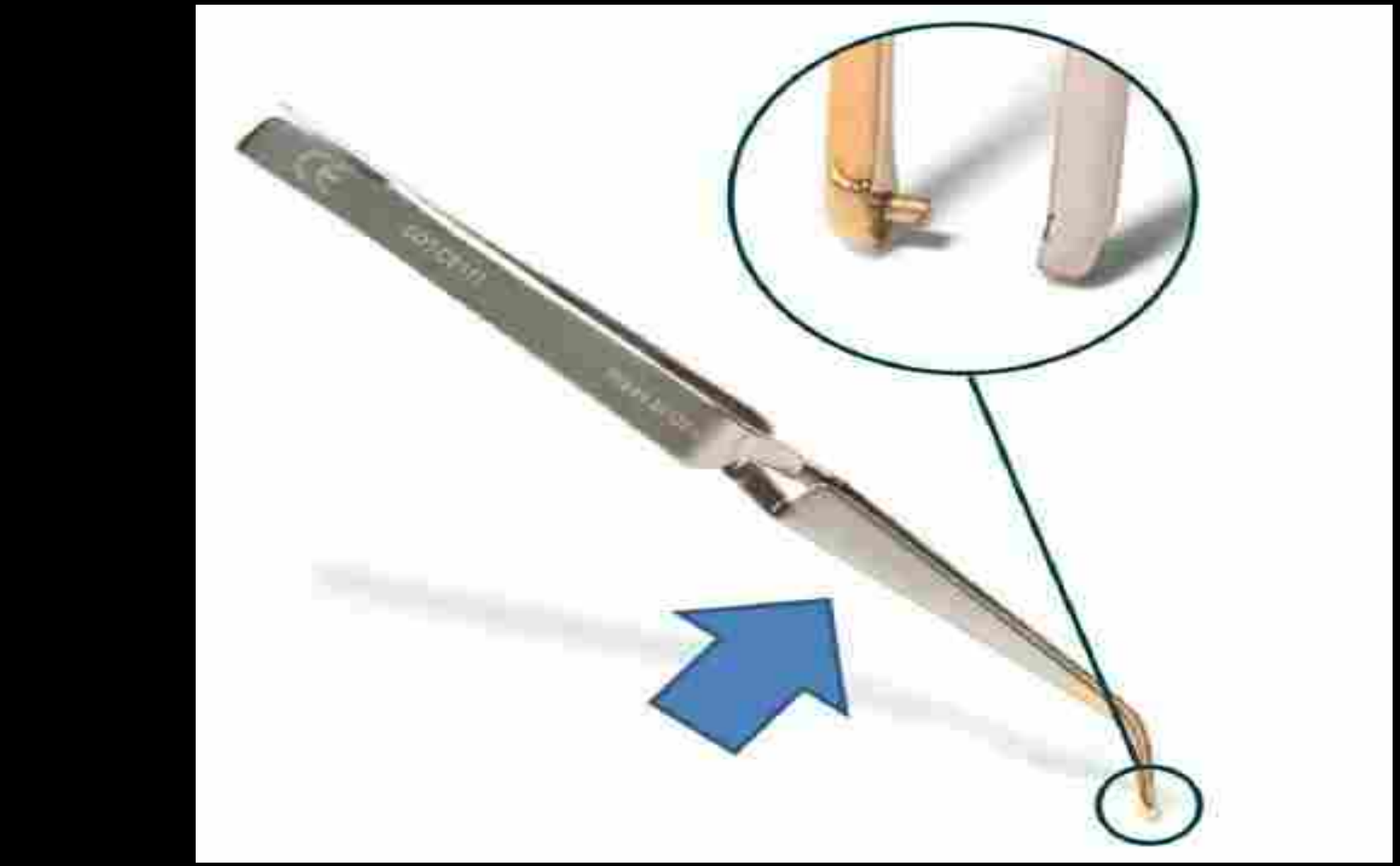
Protective Wedguard

The Matrix

- Easy insertion and removal
- Enhanced gingival seal
- Built-in formation of anatomic ridge contour

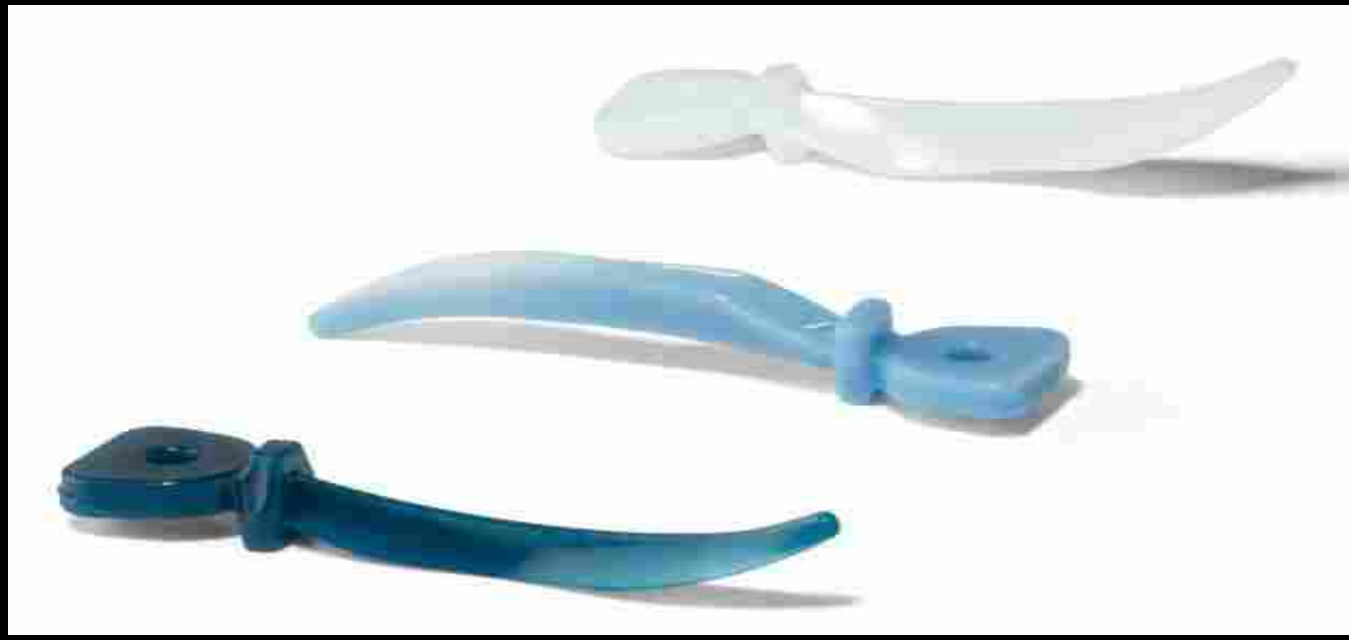


Tweezers

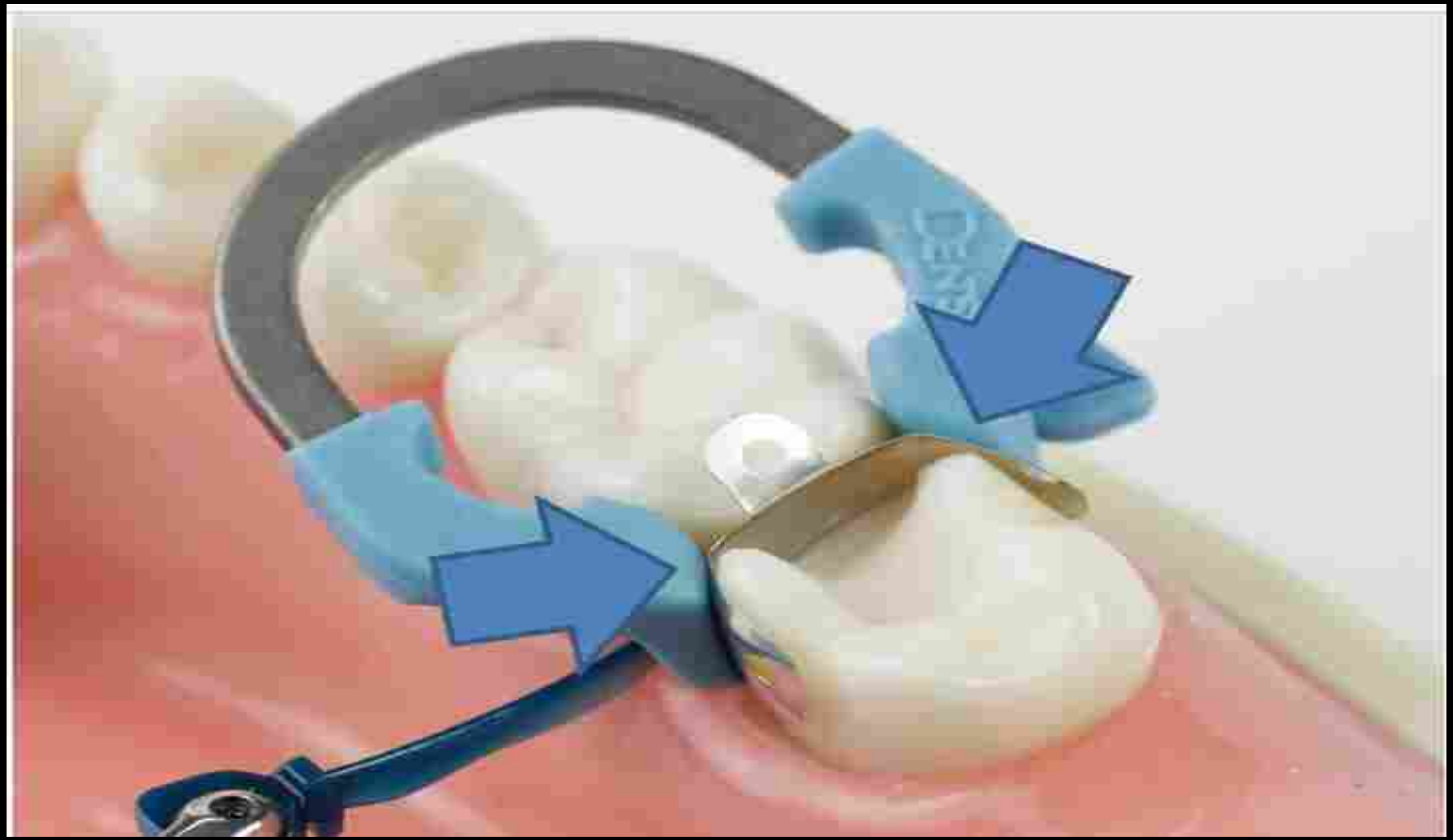


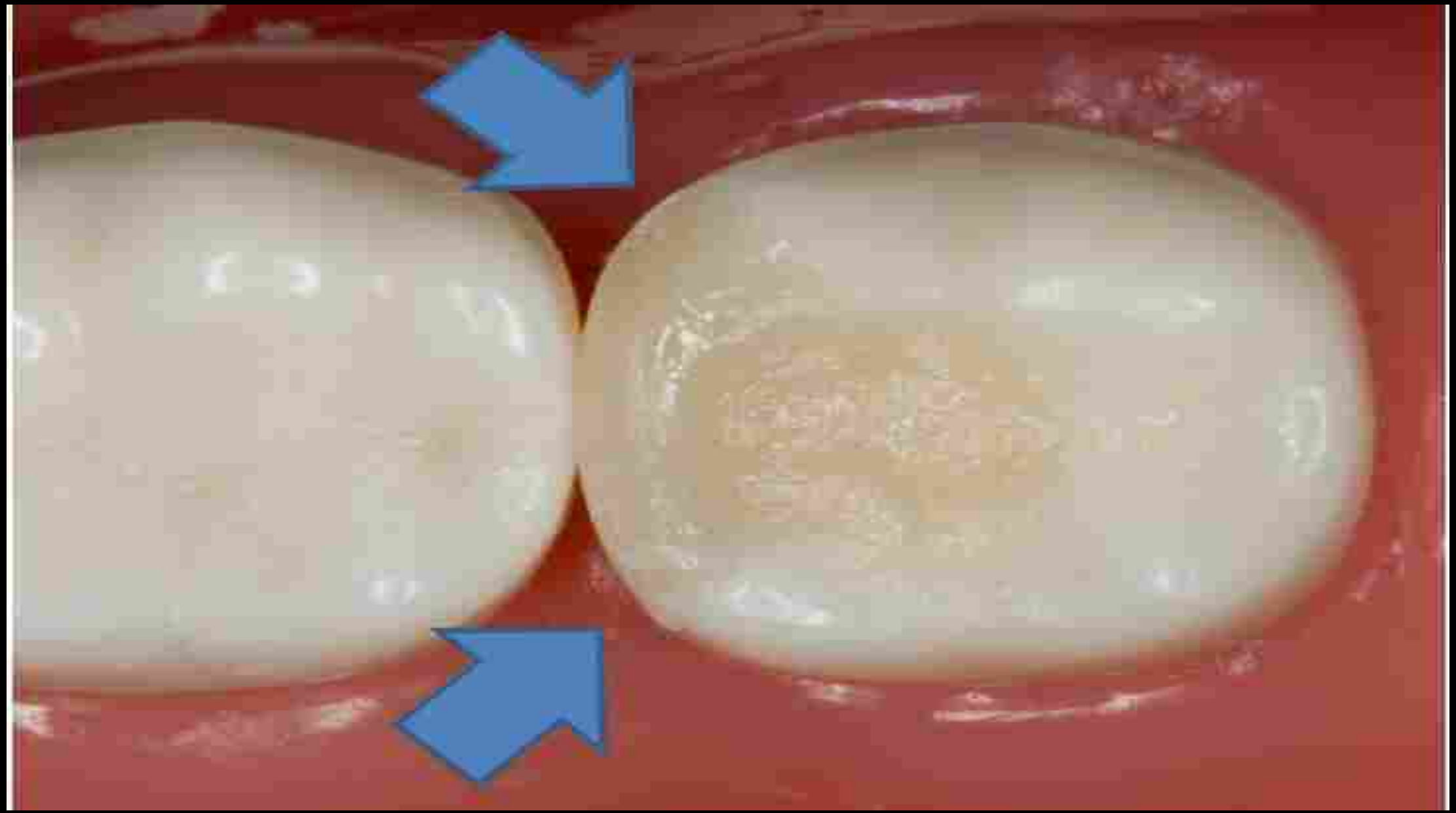
Anatomical Wedges

- Easy placement and removal
- Excellent adaption of matrice band for minimal cervical excess.
- Compress and flare upon entry and removal
- Minimizes damage of papilla, no bleeding

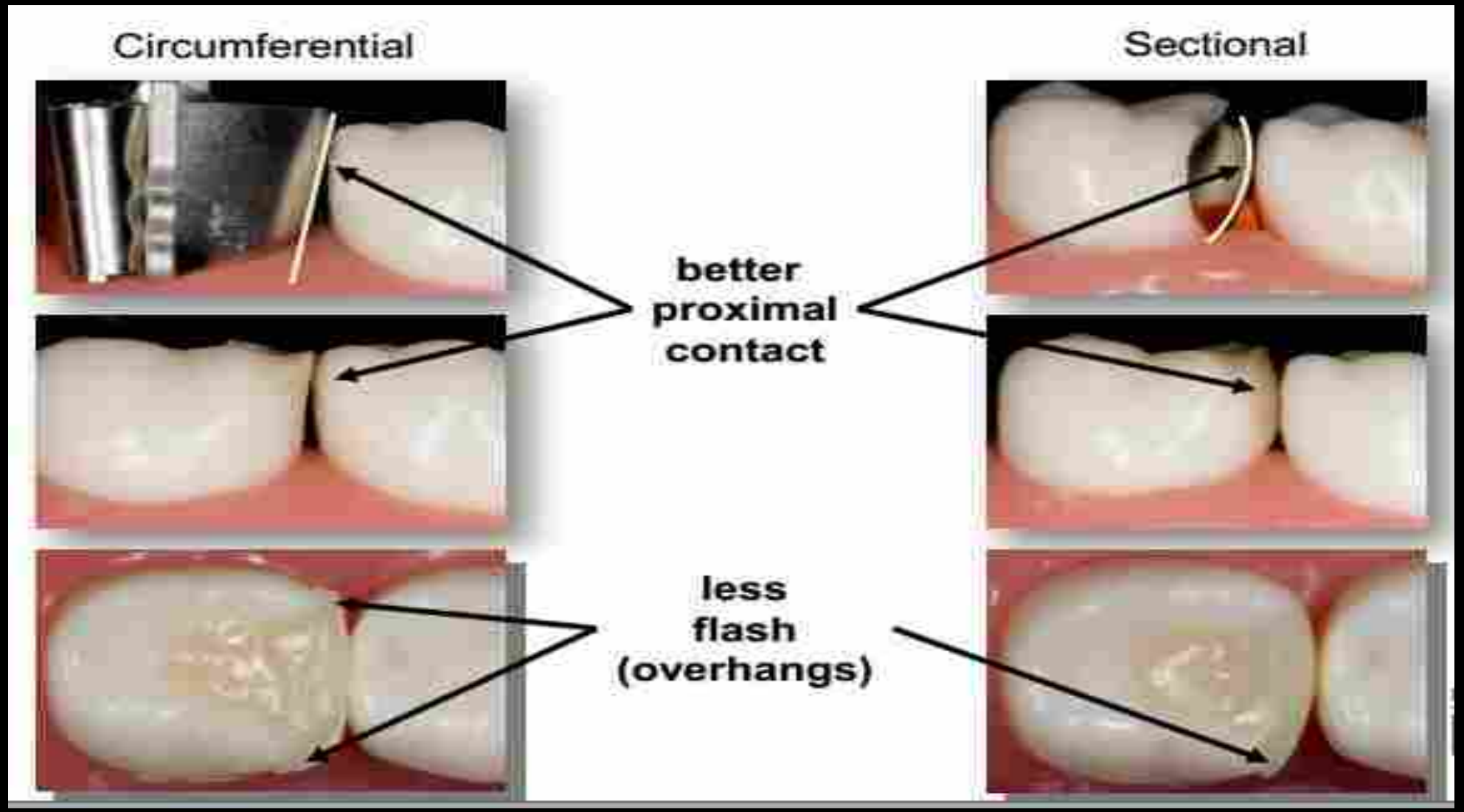


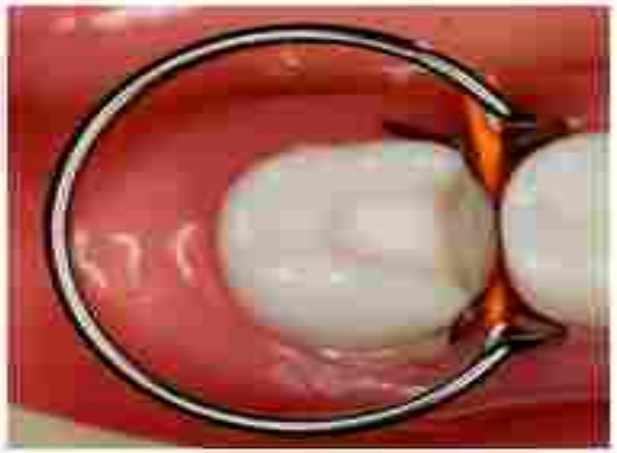
- Facilitated contact point creation
- Excellent adaption of matrice band
- Rings are exceptionally stable on the tooth
- Rings do not fall even into wide preps
- Improved ring longevity





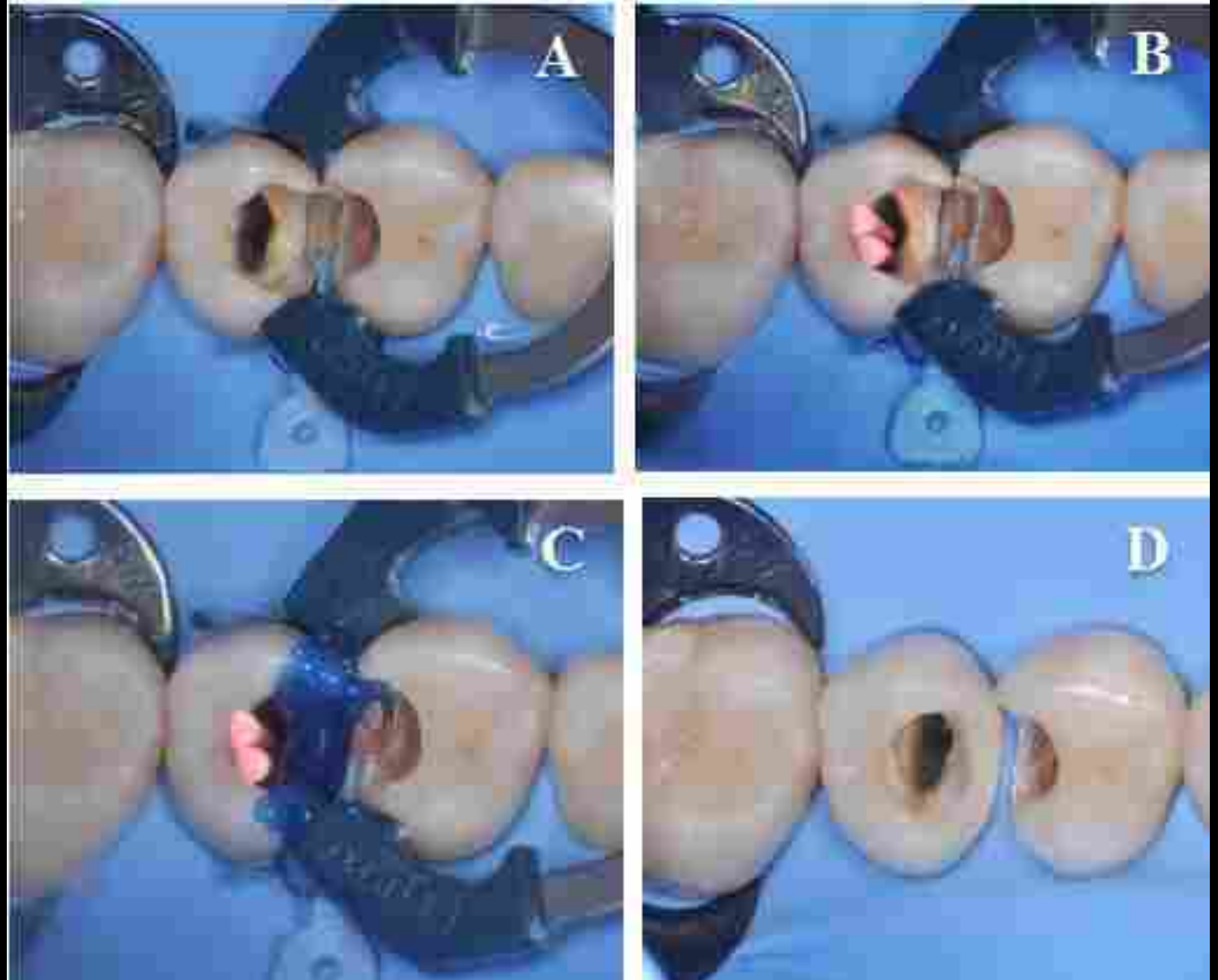
Forcep

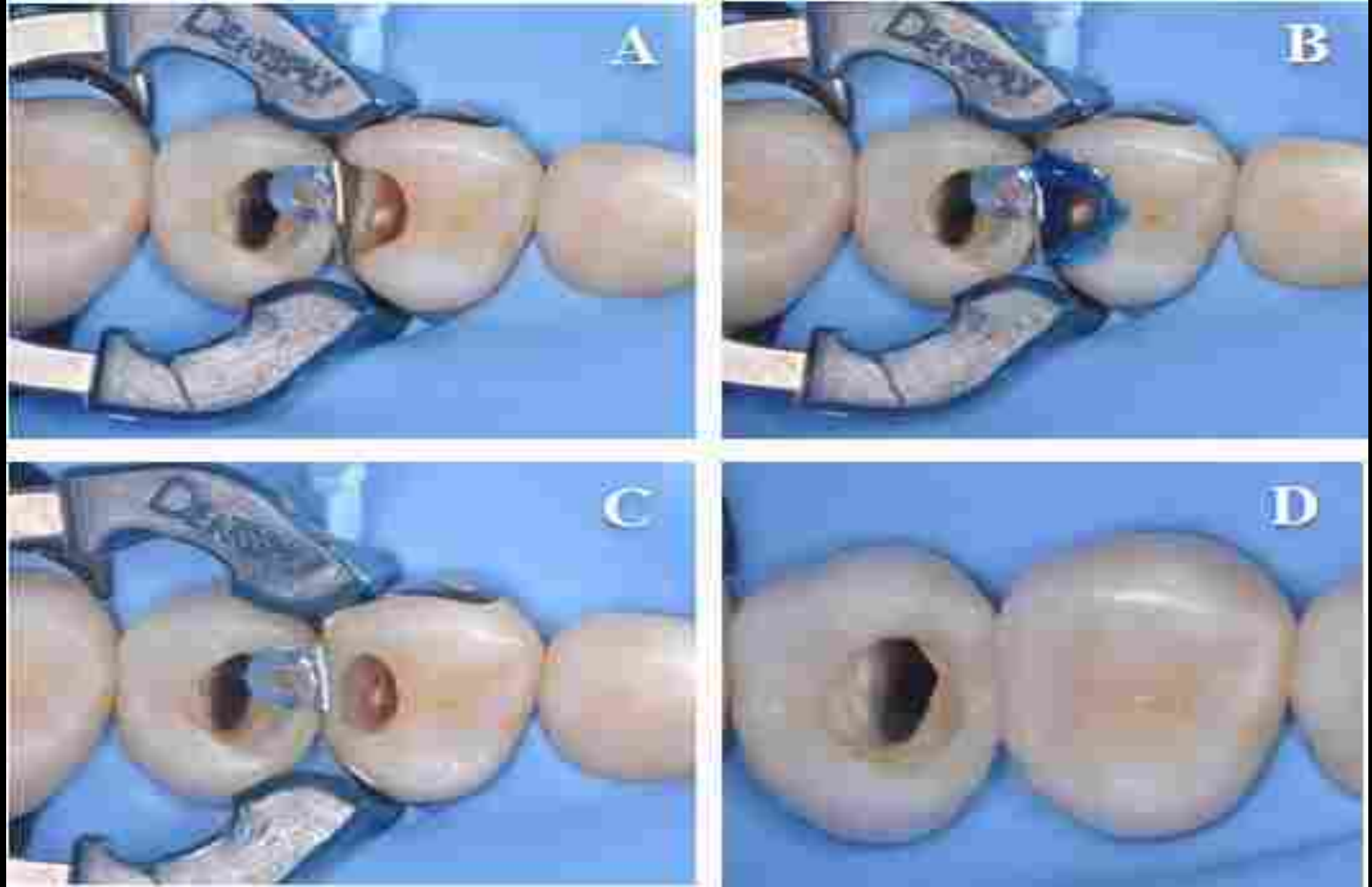

Circumferential
Sectional
better
proximal
contact
less
flash
(overhangs)



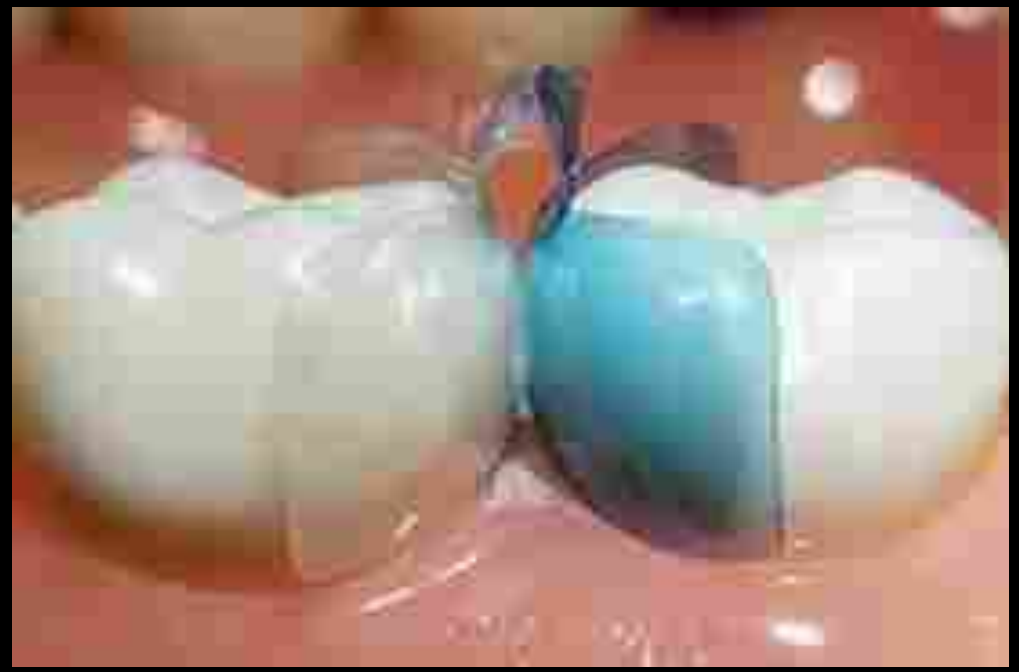
Sectional matrix systems are recommended for small to medium class II cavities

Circumferential matrix systems are recommended for large class II and core build-ups


A
B
C
D

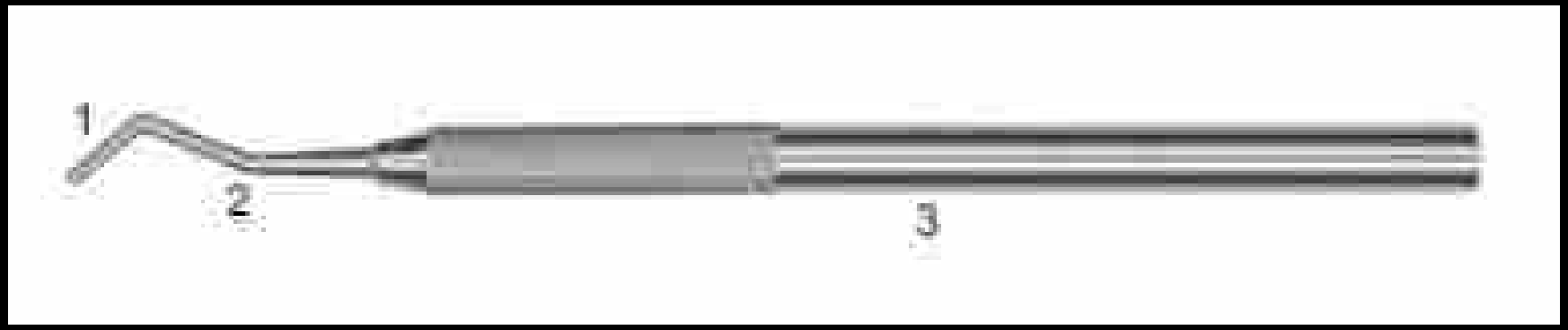

A
B
C
D

Sebelum Perawatan	Setelah Perawatan
	
	

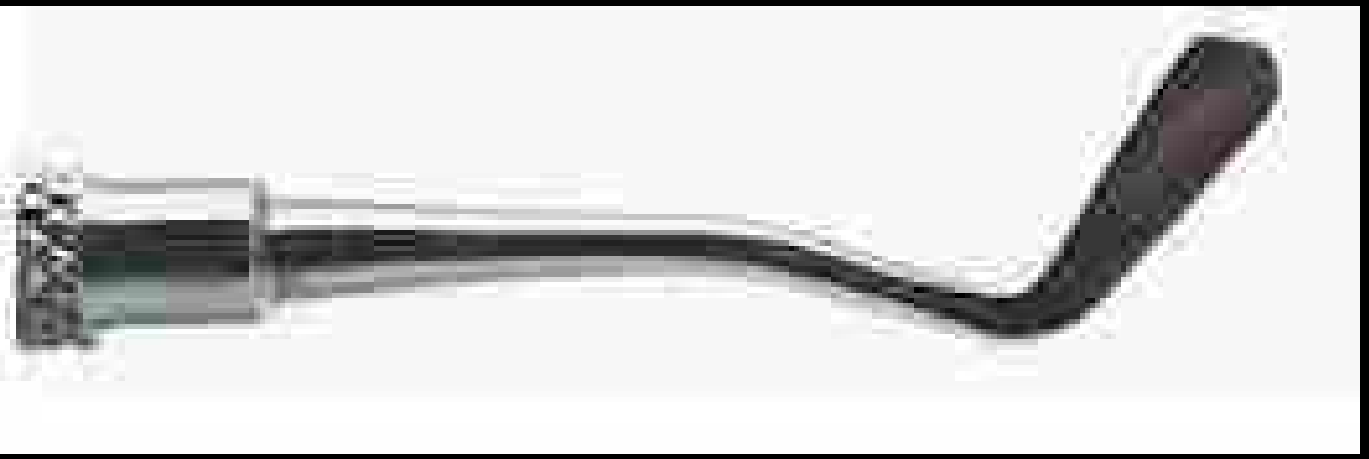


HAND INSTRUMENT

- Working end. The design determines the function and may be a beveled cutting edge (chisel), a point (explorer), a nib (amalgam condenser), a blade (composite instrument) or beaks (pliers).
- Shank. Portion of the instrument that connects the handle and the working end. The shank may be straight or angled to provide better access to different areas of the mouth.
- Handle or shaft. Rounded or hexagonal in different diameters and materials for better fit and grip



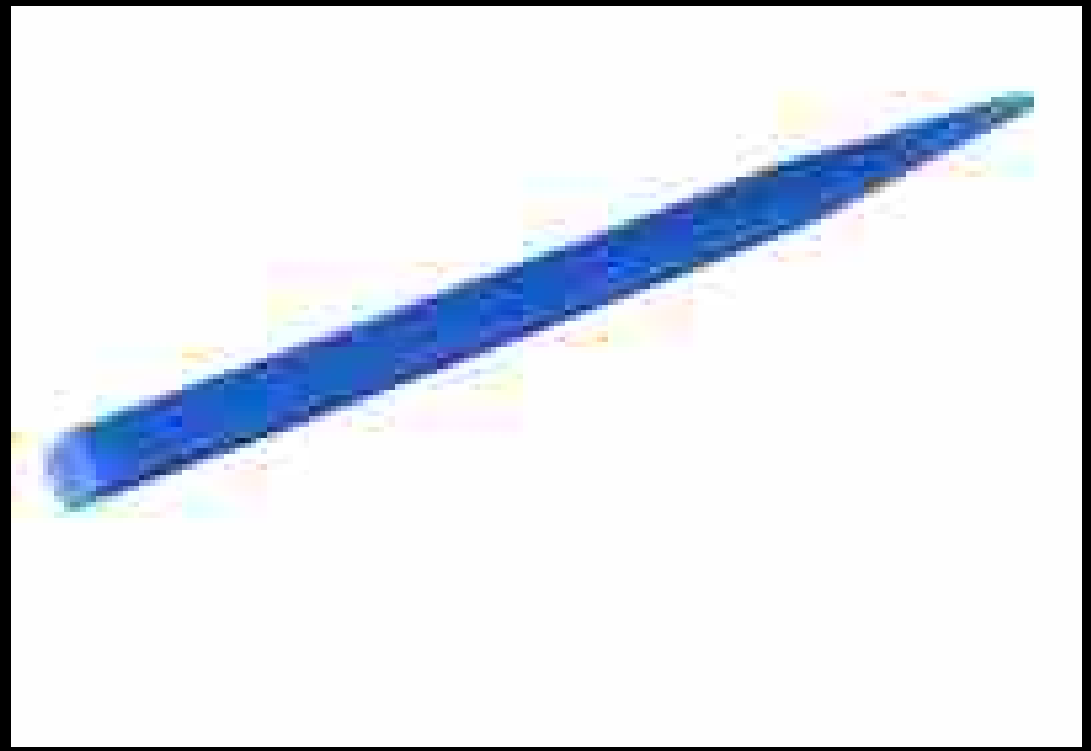
Plastic filling



Condensor

Burnisher

Spatula



Carver

“New” Instrument


LM
feel the
difference

“New” Instrument

“New” Instrument

FINISHING AND POLISHING

FINISHING AND POLISHING

FINISHING AND POLISHING

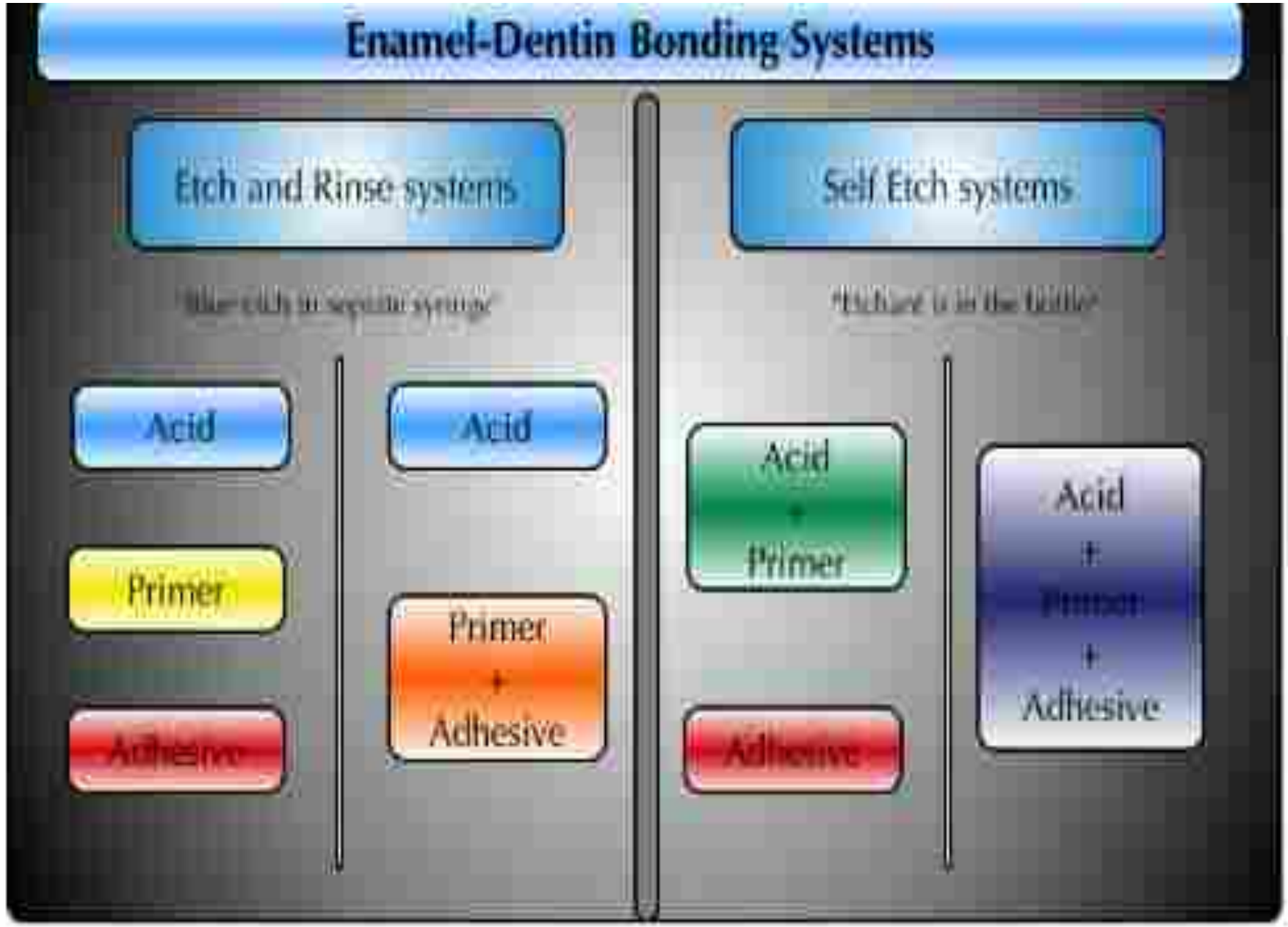
FINISHING AND POLISHING

FINISHING AND POLISHING

FINISHING AND POLISHING

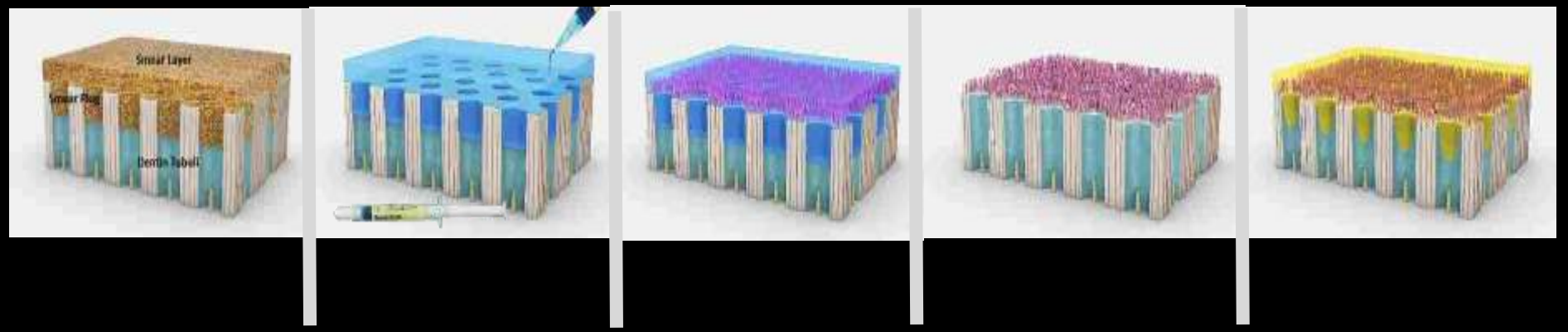
FINISHING AND POLISHING


3M ESPE


Enamel-Dentin Bonding Systems
Etch and Rinse systems
Self Etch systems
Acid
Primer
Adhesive
Acid
Primer + Adhesive
Acid + Primer
Adhesive
Acid + Primer + Adhesive
4th Gen
5th Gen
6th Gen
7th Gen

Total etch or Self etch?

Total Etch



☺ Clinically proven and trusted method (as long as required steps are carefully performed)

☺ Marked etching pattern on enamel provides visual control

☺ Deeper, more pronounced retention pattern on enamel usually achieves higher bond strength

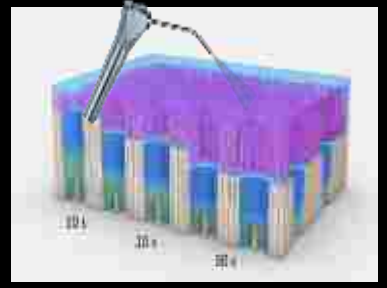
☹ Time intensive and technique sensitive

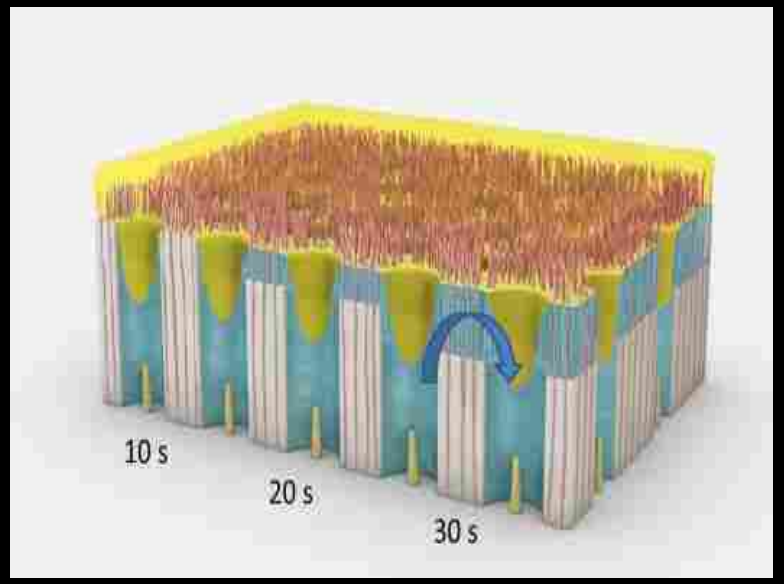
☹ Controlling etching time on enamel (15s) and dentin (10s)

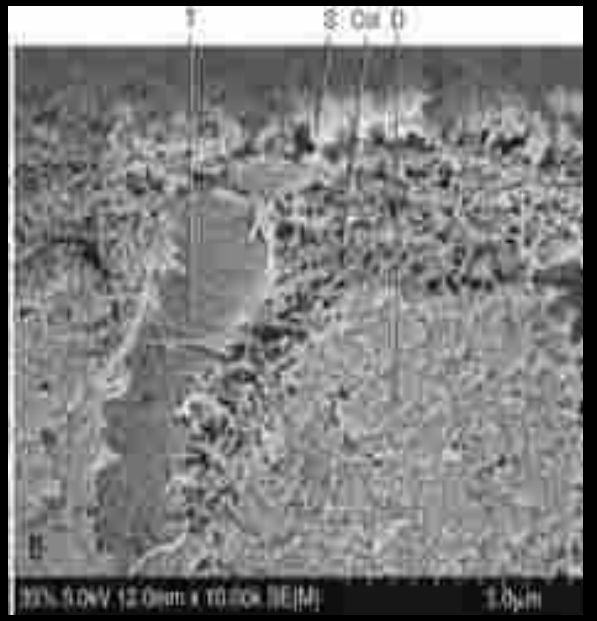
☹ Controlling amount of moisture on dentin
(over-dry or over-wet dentin)

Over-etch dentin

When simultaneously etching enamel and dentin with phosphoric acid, it is clinically challenging to control the etch time on dentin (5-10s) and enamel (15-20s); thus increasing the risk of over-etching dentin.







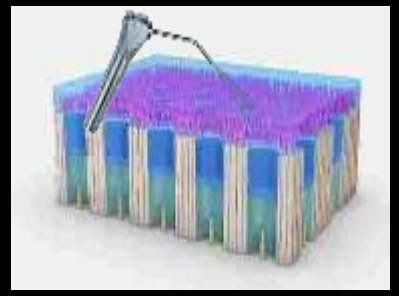
When dentin is etched too long, the demineralized zone extends beyond the ability of the primer and resin to penetrate. The layer of demineralized dentin that is not permeated by primer and resin, allows fluid movement in the dentinal tubules (nano-leakage). Movement of fluid pulls on the odontoblastic process which results in pain or sensitivity. Another consequence is reduced bond strength, since the layer of demineralized dentin is beyond the hybrid zone that was developed.

Risks of over-etching dentin:
⊗ Increased risk of post-operative sensitivity
⊗ Reduced bond strengths

Brady L. A. Restorative Dentistry, Total Etch Technique & Dentin, 2011
Fleming M. Spear Review, Risks of Total-Etch Systems, 2012

Over-dry Dentin

If the tooth surface (dentin) is over-dried after conditioning with phosphoric acid, the collagen network may collapse forming an impermeable layer. Consequently, the adhesive is no longer able to diffuse.



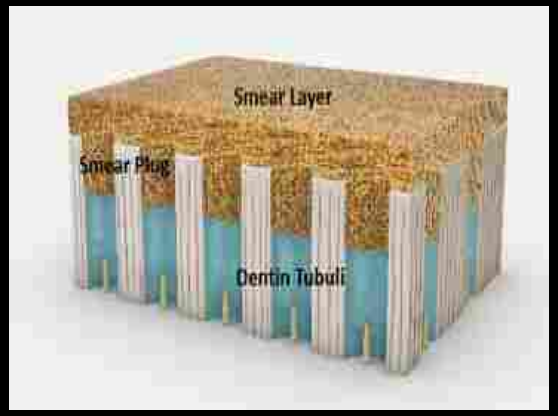

Signs of an "over-dry" tooth surface
☹ Dry appearance
☹ Dull cavity floor

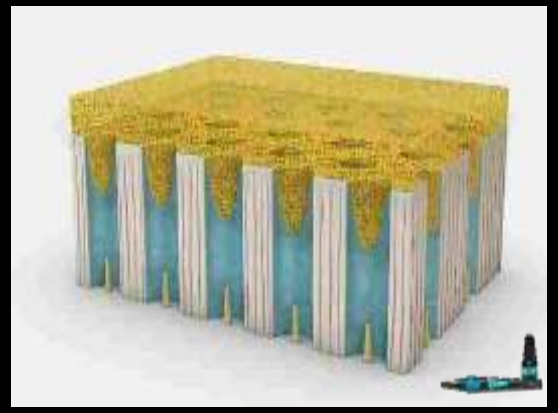
Risks of over-drying the tooth
☹ Lower bond strength
☹ Increased risk of post-operative sensitivity

Haller B, Blunck U. Übersicht und Wertung der aktuellen Bondingsysteme. ZM; 2003:93 (7): 48–58
Carvalho, R. M. et al. Resin diffusion through demineralized dentin matrix. Rev Odontol Univ São Paulo, v.13, n.4, p.417-424, out./Dec.1999

Self-Etch

Acidic primer/monomer is used to **MODIFY** the smear layer without opening the tubules.





☺ Minimum treatment time

☺ Low risk of post-operative sensitivity since smear layer plug remains inside dentin tubuli

☺ Optimum clinical outcome on dentin

☹ Lack of visual control on enamel after conditioning

☹ Typically delivers lower shear bond strength on enamel

Achieving sufficient bond strength & marginal quality to enamel with a self-etch system?

The reduced acidity of self-etch bonding systems can lead to a less pronounced etch pattern on enamel compared to phosphoric acid, especially on unprepared or uncut enamel surfaces. Literature strongly suggests using separate etching with phosphoric acid on enamel surfaces prior to applying adhesive systems using the self-etch technique.

R&D Ivoclar Vivadent AG, Schaan, FL

Selective-Enamel-Etching

- Apply phosphoric acid gel on only the enamel margins for 15-20 seconds
- Rinse off and thoroughly dry
- Then apply a self-etching dentin adhesive

Important! The etching component in a self-etch dentin adhesive results in the product having an acidic pH level. This acidity can interfere with the chemistry of some dual cure resin products. If you are using a self-etching system, it is strongly recommended that you verify the compatibility between your dentin adhesive and the resin systems you use routinely.

Brady L.A. Total-etch or self-etch: The debate continues. Dentistry IQ, 2011

Selective Case?

Stock many bonding system in office?

Stock many bonding system in office?

Universal Bonding System

Mild acidic properties provide effective conditioning and compatibility with all etching protocols

Self-Etch Technique

- Time-saving
- Reduces the risk of post-operative sensitivity

Etch&Rinse Technique

- Enhances adhesion to enamel and dentin
- Improves marginal seal

Selective-Enamel-Etch Technique

- Enhances adhesion to enamel
- Improves marginal seal

☺ Freedom to choose the ideal etching protocol based on the indication
☺ No need to carry additional inventory of a total- or self-etch adhesive systems
☺ Mild acidic properties improves the self life and longevity of the restoration

R&D Ivoclar Vivadent AG, Schaan, FL

Indications for Different Etching Protocol

The choice among the systems is often a matter of personal preference and cases

Self-Etch Technique

- Direct restorations predominantly supported by dentin
- Direct composite resoration
- Indirect full-coverage crowns

Etch&Rinse Technique

- Indirect restoration with large amounts of enamel still present
- Direct veneers
- Indirect veneer cementation
- Small or shallow direct restorations Class I, III, IV

Selective-Enamel-Etch Technique

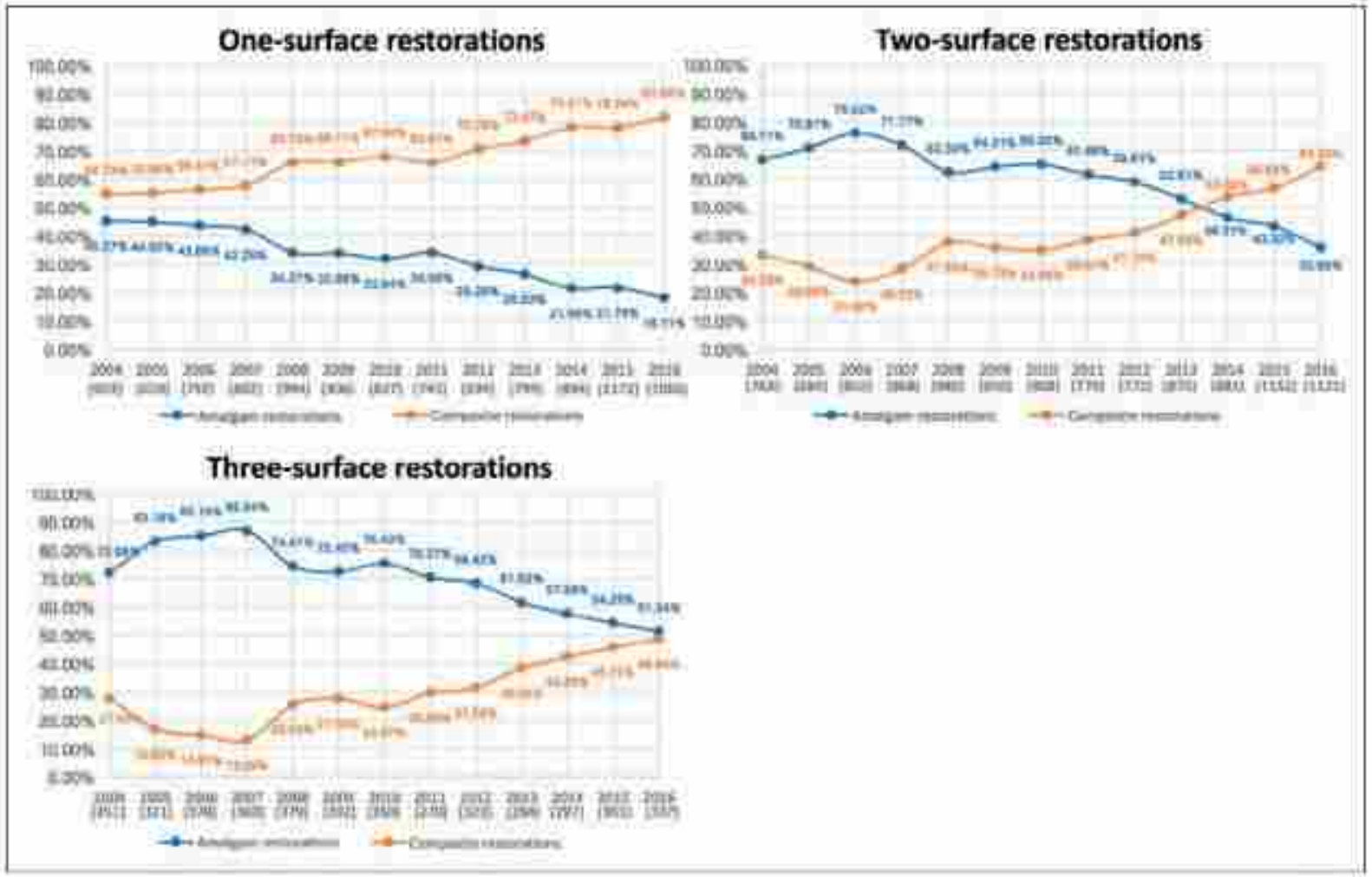
- When enamel and vital dentin are exposed, but optimum retention is still needed
- Non-prepped enamel
- Direct restorations (class I, II, IV)
- Indirect inlay/onlay cementation

COMPENDIUM, January 2013, Vol. 34, Nr. 1

Posterior Direct Restoration

Direct Restoration

Material?



Percentage of amalgam and composite restorations placed by undergraduate students from 2004 to 2016, divided by surface numbe

Figure 2: Restorative material of choice for repair (Frequency of individual items chosen)

Composite Resin

Teeth coloured
Minimal invasive
Bond to teeth structure
Biocompability
Repairability
Free mercury
Lack of corrosion

Marginal gap

Tooth staining

Sensitivity

Composite fracture

Cusp fracture

Secondary caries

Debonding

White line

Composite Resin Polymerization Shrinkage

- Flowable composite
- Monomer system
- Filler
- Incremental technique

Incremental technique

Journal of Conservative Dentistry : JCD
Wolters Kluwer – Medknow Publications

Incremental techniques in direct composite restoration

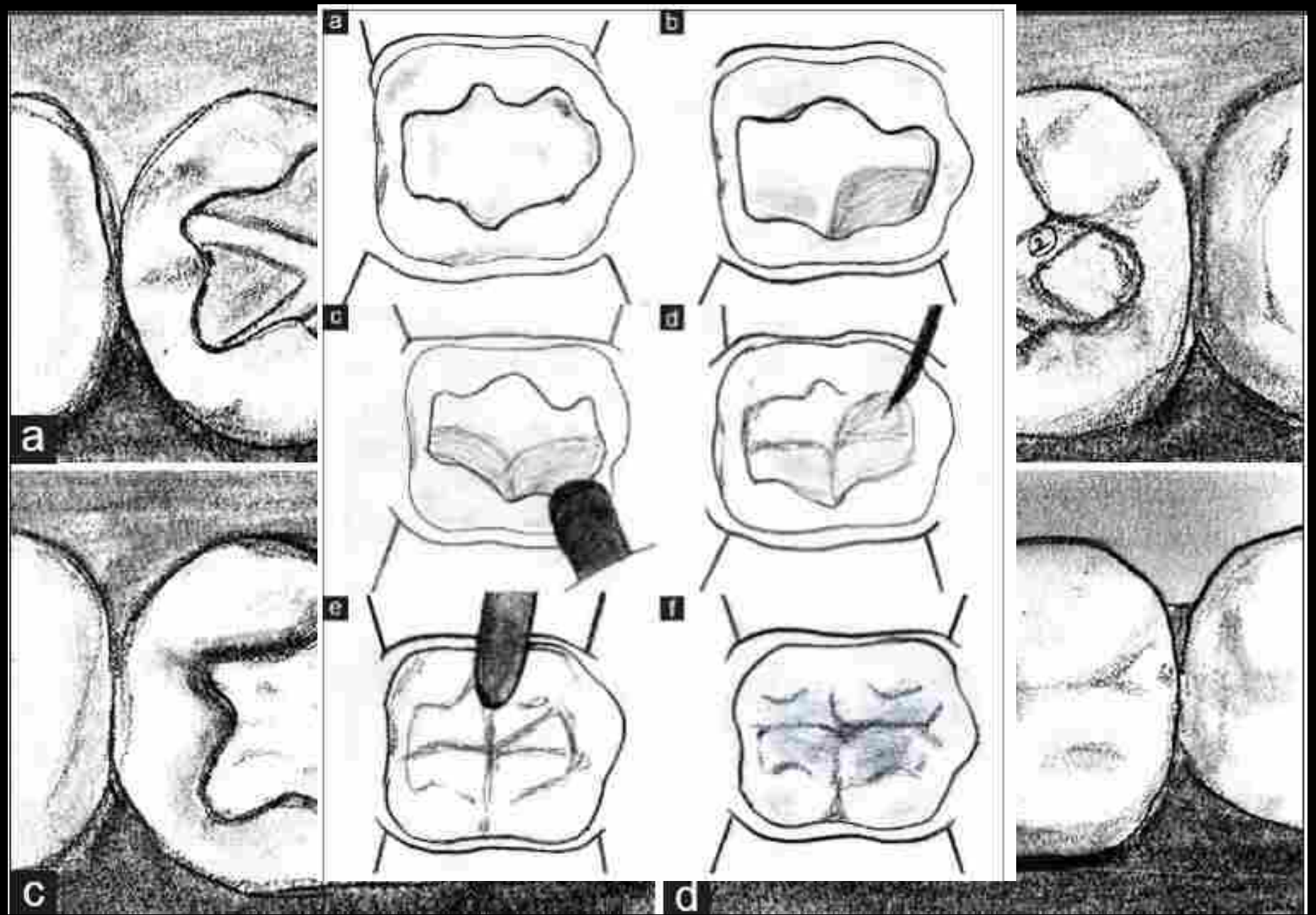
Veeramachaneni Chandrasekhar, Laharika Rudrapati, [...], and Muralidhar Tummala

Additional article information

INCREMENTAL TECHNIQUES FOR DIRECT COMPOSITE RESTORATION

When placing posterior composites, the use of small increments is recommended by many authors for insertion and polymerization so that the after effect of shrinkage stress can be reduced.

Incremental technique?



- Time
- Contamination
- Void

Bulk Fill Composite

Physical properties - shrinkage stress

Challenge

- Chains form during polymerization → volume decreases

- As the filling is adhesively bonded, a pulling force is exerted on the cavity walls

- Effect: marginal gap formation, cusp deformation, proneness to fracture.

Solution

- Shrinkage stress reliever

Low shrinkage stress

- Pre-polymerized filler → low E-Modul

Shrinkage stress relaxator
E-Modul 10 Gpa

Glass filler
E-Modul 71 Gpa

Monomer-chain

Bulk Fill

Self-levelling effect

Tetric® N-Flow Bulk Fill

Volume replacement

Excellent adaptation to cavity walls and self-levelling effect.

Tetric® N-Flow

Liner

Flowable when desired.

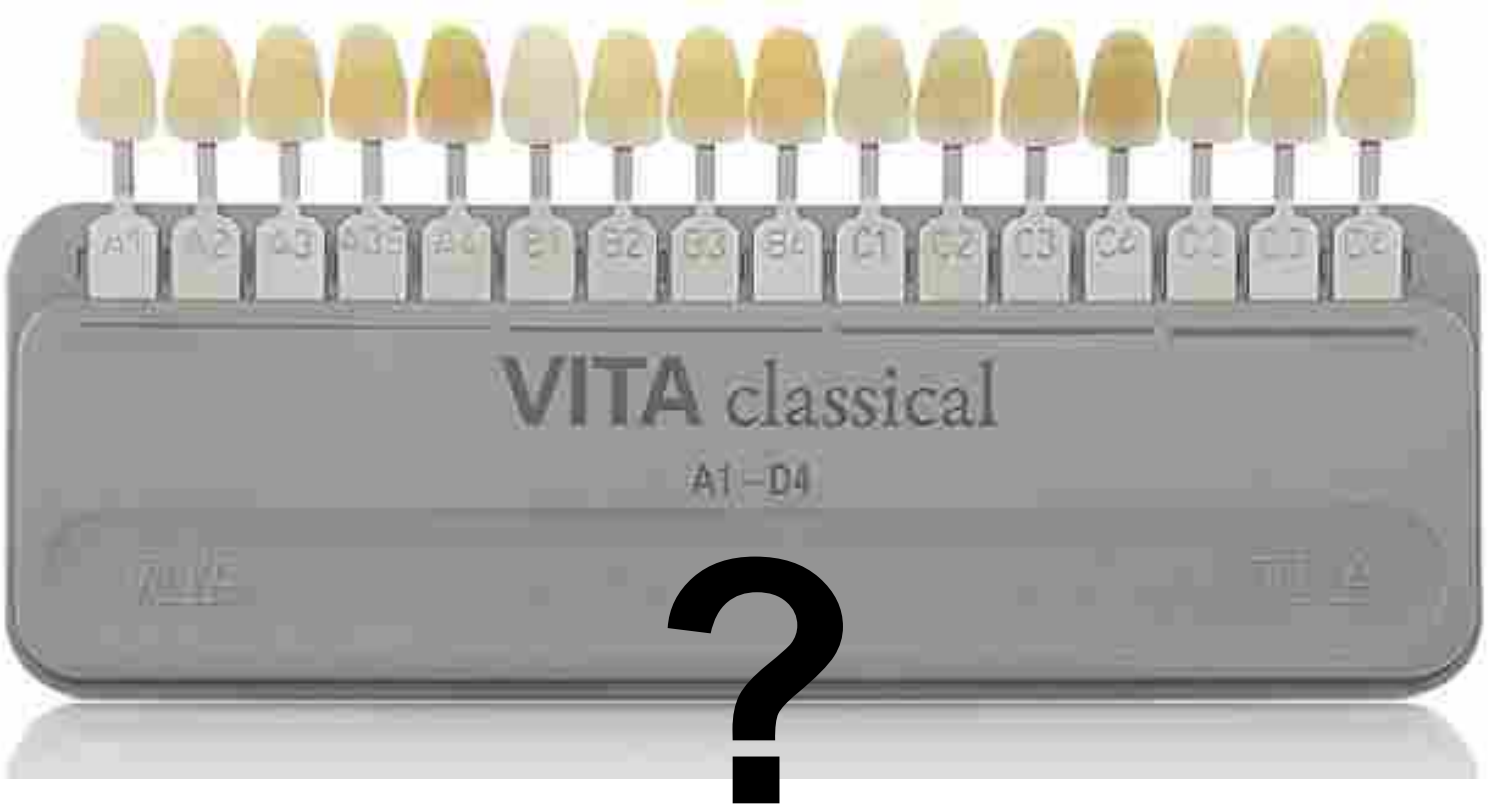
Stable as required.

Anterior Restoration Review

Source: google image

Direct Restoration

SEAL
SHAPE
SHADE

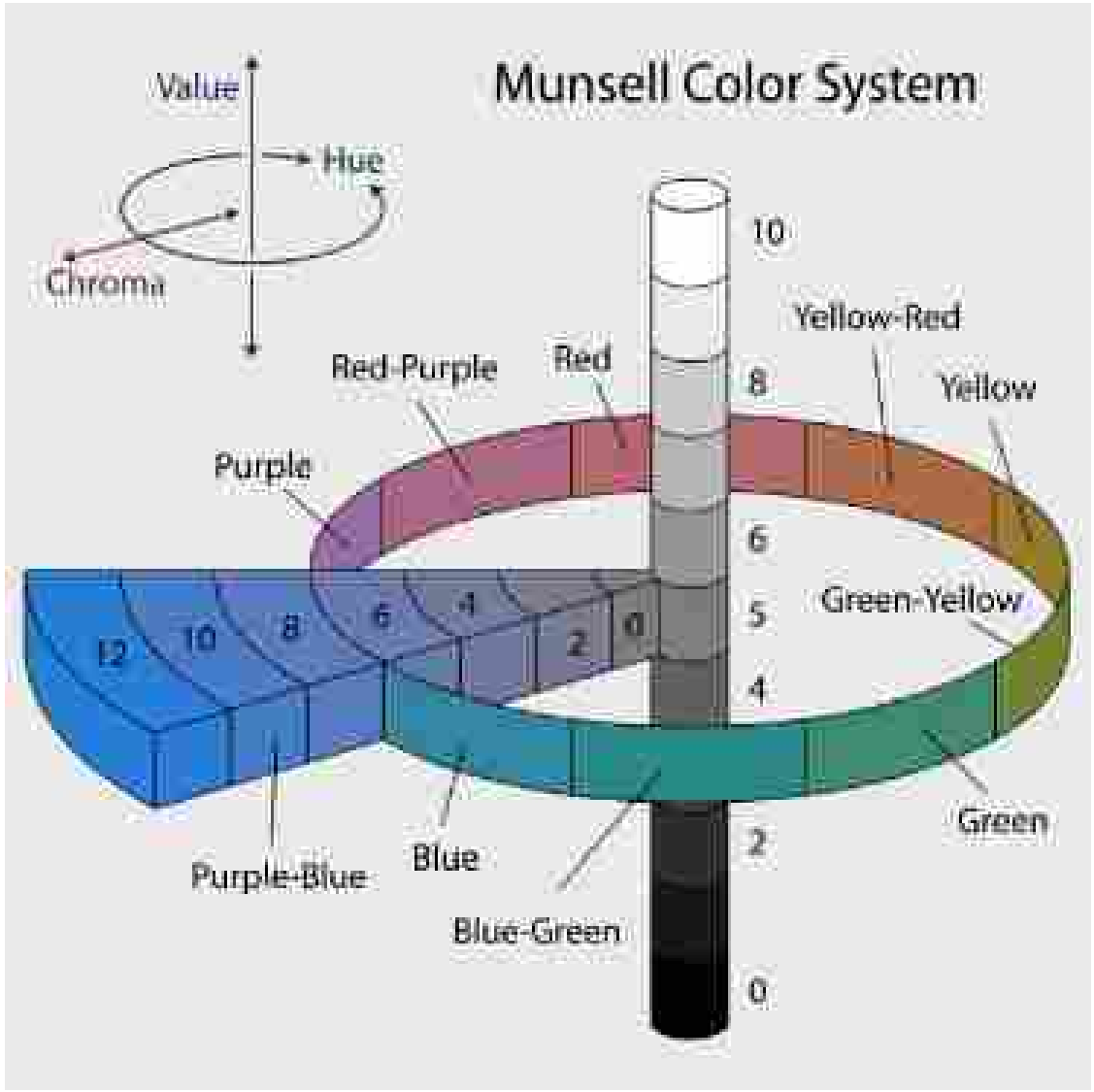


?

A – B – C – D

1 – 2 – 3 – 3,5 – 4

Colour in dentistry



HUE

A = red - yellow

B = yellow

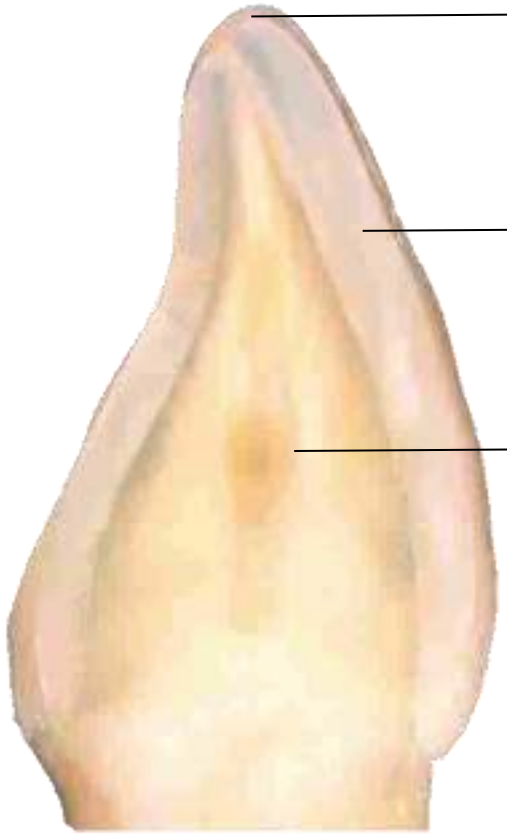
C = grey

D = red - yellow - grey

CHROMA

1 – 2 – 3 – 3,5 – 4

Why does my restoration have unmatched color?

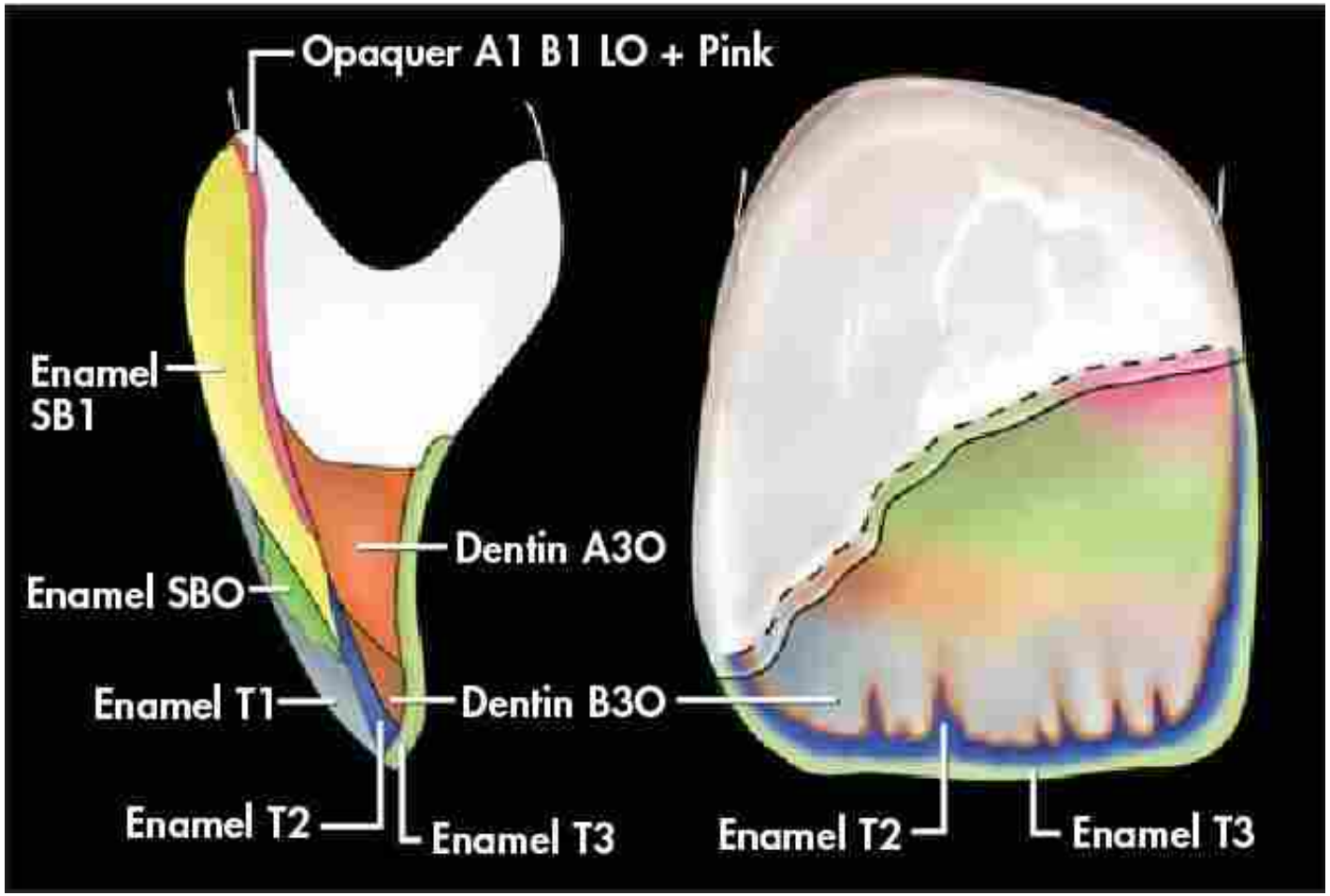


High translucent enamel

Translucent enamel

Opaque dentin

Why does my restoration have unmatched color?



- Opaque
- Dentin
- Body
- Enamel
- Translusent
- Color modifier

- 6 Universal shades
- 1 Dentin shades
- 1 Transparent
- 2 Bleach shades

10 s ≥ 1,000 mW/cm² curing time for all shades

2.0 mm Tetric N-Ceram shades (A, B, T & BL)

1.5 mm Dentin shades

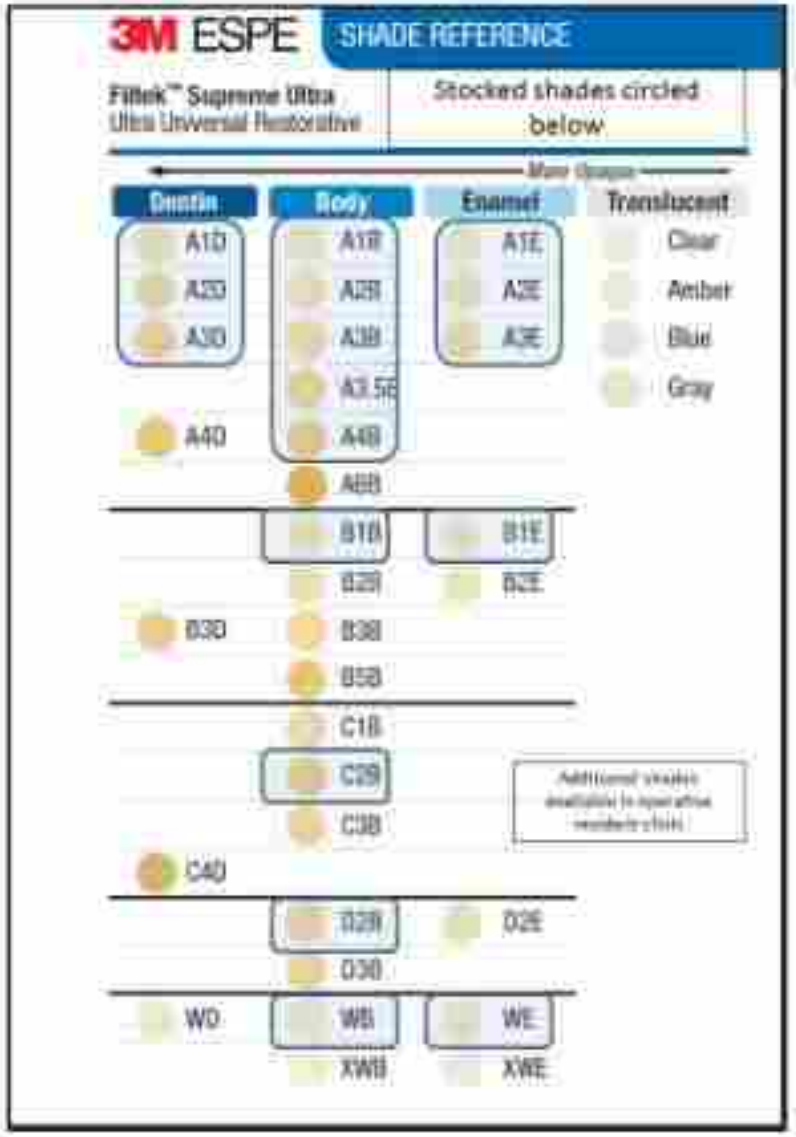
Tetric N-Ceram – layering effects

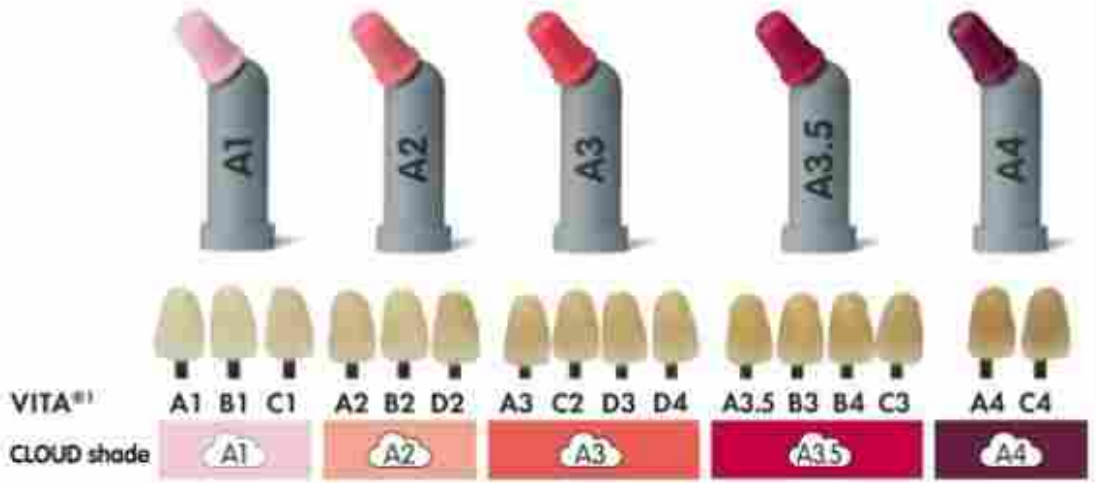
Tetric N-Ceram A2
Tetric N-Ceram Dentin A3.5

Tetric N-Ceram Bleach I (18.0 – 22.0%)
Tetric N-Ceram A2
Tetric N-Ceram Dentin A3.5

Tetric N-Ceram T (14.0 – 16.0%)
Tetric N-Ceram A2
Tetric N-Ceram Dentin A3.5

Dr Anton Lebedenko
Ivoclar Vivadent AG, Schaan, 2017


3M ESPE
SHADE REFERENCE
Filtek™ Supreme Ultra
Ultra Universal Restorative
Stocked shades circled below
More Opaque
Dentin
Body
Enamel
Translucent
A1D
A2D
A3D
A1B
A2B
A3B
A3.5B
A4B
A1E
A2E
A3E
Clear
Amber
Blue
Gray
A4D
A6B
B1B
B2B
B3B
B5B
B1E
B2E
B3D
C1B
C2B
C3B
C4D
D2B
D3B
D2E
W5
W5
WE
XWE
WD


A1
A2
A3
A3.5
A4
VITA®)
A1 B1 C1
A2 B2 D2
A3 C2 D3 D4
A3.5 B3 B4 C3
A4 C4
CLOUD shade
A1
A2
A3
A3.5
A4


ceram.x duo
SphereTEC
DENTSPLY
ceram.x duo