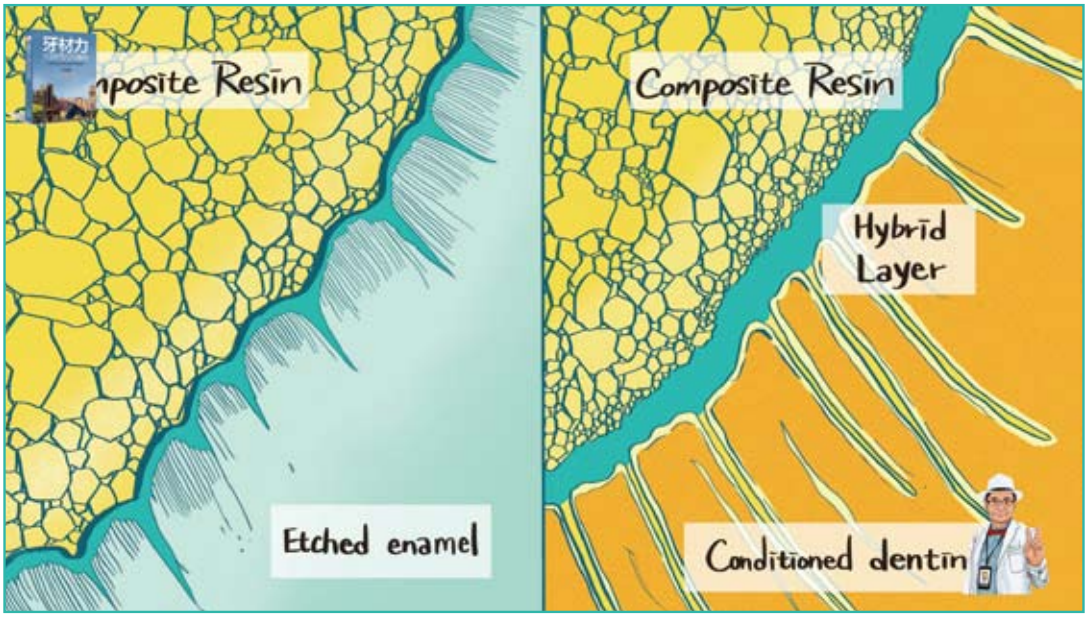
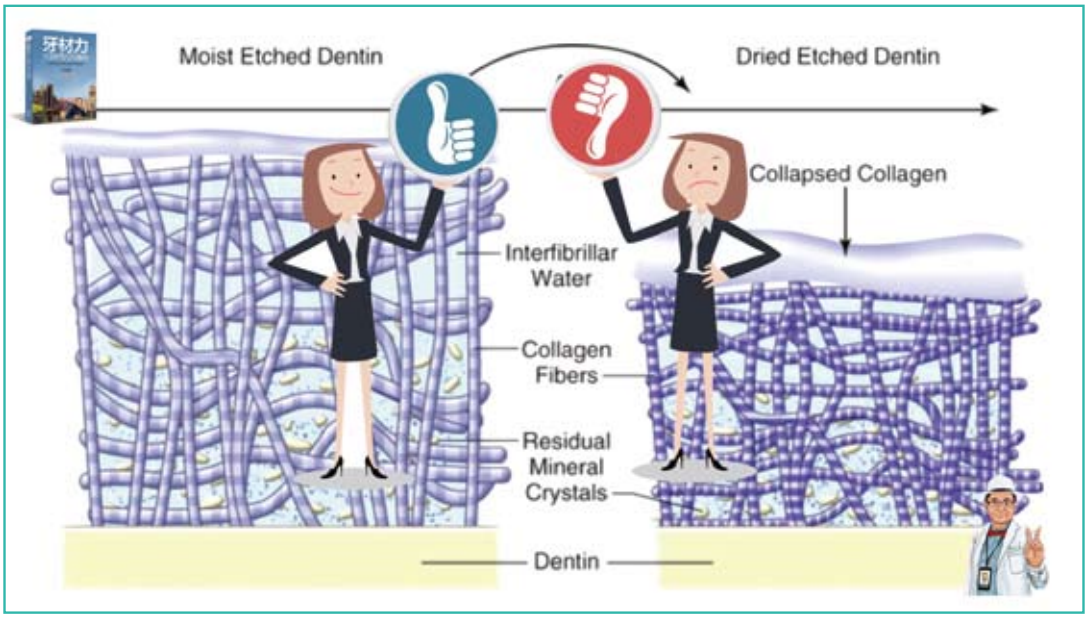
牙材力就是你的超能力


阿雄哥的牙材力教室·聯揚線上公益課程
牙材力就是你的超能力
SCHOOL OF DENTISTRY
牙材力全面提升
讓臨床事半功倍
STAY HOME
您的笑容咀嚼力 我們一起來努力


牙材力教練
林茂雄 阿雄哥
工欲善其事 必先利其器
牙材力全面提升 讓臨床事半功倍
您的笑容咀嚼力 我們一起來努力
臺北醫學大學牙醫學系畢業
美國密西根大學牙科材料學研究所牙醫碩士
臺北醫學大學口腔醫學院臨床助理教授
台灣牙體復形學會專科醫師
峰茂牙醫診所執業牙醫師

Restoration	Longevity Estimate
Large Class II Composite	5-6 years
Complete Denture	5-10 years
IPS e.max Three-Unit Anterior FPD	8-12 years
Removable Partial Denture	4-15 years
Small Class II Composite	8-12 years
IPS e.max Full Crown	8-15 years
Zirconia Three-Unit FPD	10-15 years
Zirconia Full-Strength Crown	10-15 years
Large Class II Amalgam	8-12 years
Three-Unit PFM	10-15 years
Full Porcelain-Fused-to-Metal (PFM) Crown	15-20 years
Small Class II Amalgam	20+ years
Full-Gold Crown	20+ years
Gold Onlay (all cusps)	20+ years


Composite Resin
Hybrid Layer
Etched enamel
Conditioned dentin


Moist Etched Dentin
Dried Etched Dentin
Collapsed Collagen
Interfibrillar Water
Collagen Fibers
Residual Mineral Crystals
Dentin


over-wet
over-dried
nical pictures by courtesy of Dr Andreas Koushan-Rathke

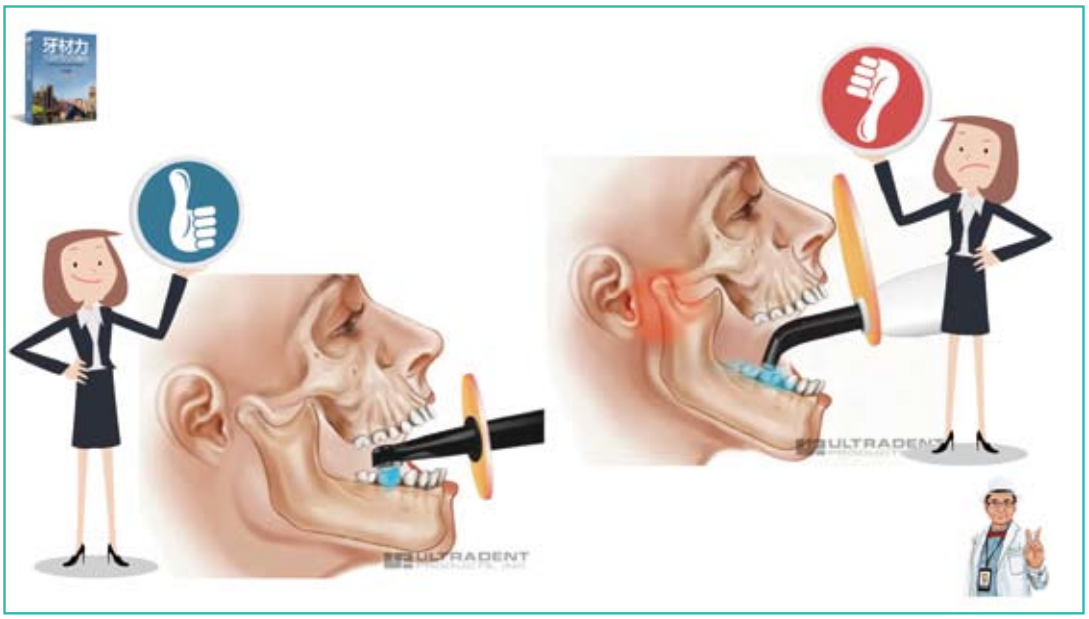
Product	Manufacturer	Indicated for all etching modes (Total-, Self-, and Selective-etch)	Separate dual-cure activator required (with dual-cure materials)	Primes Silica- and Zirconia-based ceramic and metal restorations	Clinical Rating
Single Bond Universal Adhesive	3M	Yes	Yes***	Yes	98%
iBond Universal	Kulzer	Yes	No	Yes**	98%
CLEARFIL Universal Bond Quick	Kuraray Noritake	Yes	Yes	Yes	98%
All-Bond Universal	BISCO	Yes	No	Yes*	96%
G-Premio BOND	GC	Yes	Yes	No	96%
Futurabond U	VOCO	Yes	No	Yes	96%
Adhese Universal	Ivoclar Vivadent	Yes	No	Monobond Plus recommended	93%
OptiBond eXTRa	Kerr Restoratives	Yes	Yes	Yes	Not tested

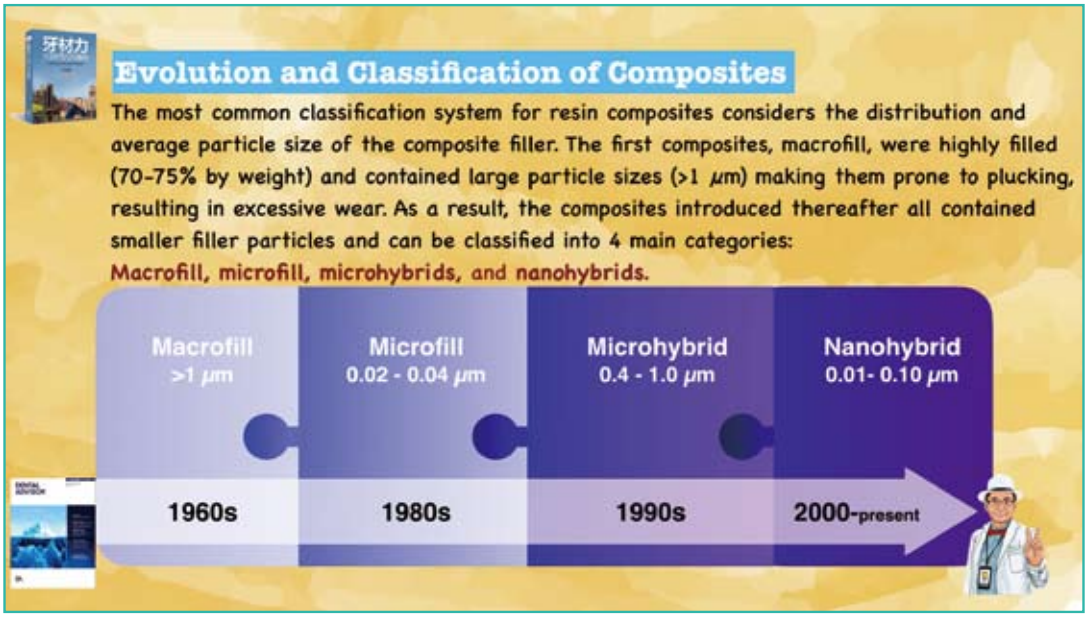
* Separate primer not required if bonding agent is light-cured
**Use of ceramic primer is recommended for silica-based ceramics
***Dual-Cured Activator is not required if adhesive is paired with resin cement form same manufacturer

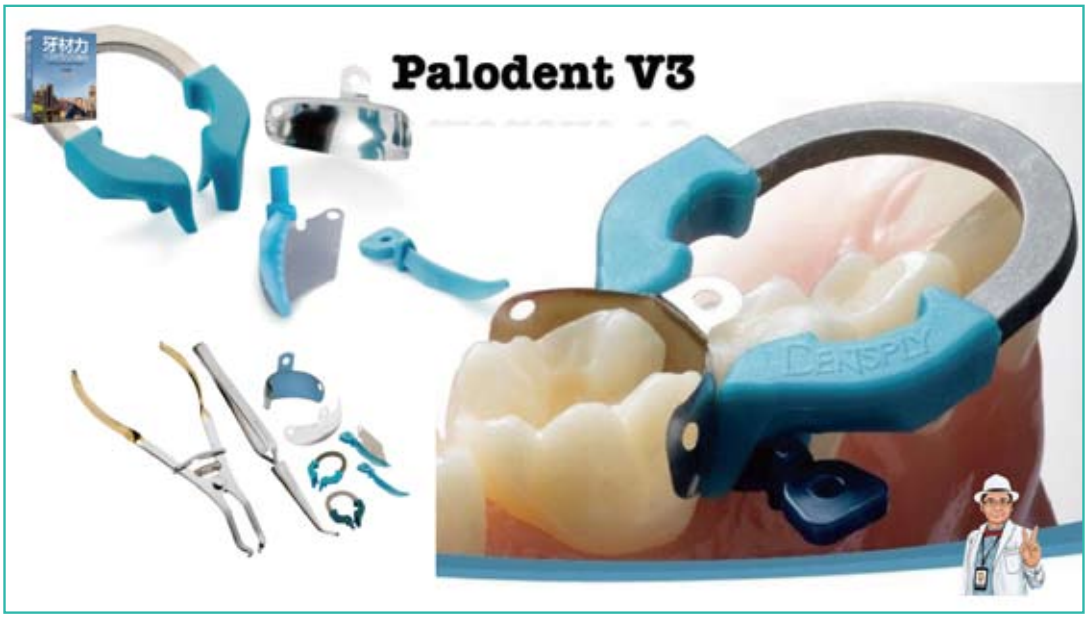
Manufacture	Tokuyama Dental	3M ESPE	GC	Voco	Bisco	Kuraray Noritake Dental	Dentsply		Ivoclar Vivadent	Heraeus Kulzer
Product	TOKUYAMA UNIVERSAL BOND	Single Bond Universal Adhesive	G-Premio BOND	Futurabond U	All-Bond Universal	Clearfil Universal Bond	Prime & Bond Elect	Xeno Select	Adhese Universal	iBond Universal
Total-etch, Self -etch, Selective- etch	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Compatible with all light-curing, dual-curing or self-curing composites	✓	△ *1	⊖ *2	✓	✓	△ *6	△ *3	⊖	✓	✓
Direct restorations	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Indirect restorations	✓	△ *1	△ *3	✓	✓	△ *6	△ *3	⊖	✓	✓
Intraoral Repair	✓	✓	△ *4	✓	△ *4	✓ *7	△ *4	⊖	△ *8	△ *4
Primer for prosthesis	✓	△ *1	⊖	⊖	✓ *5	△ *6	⊖	⊖	⊖	✓


Selective Etch
Etch & Rinse
Self-Etch


Selective-Etching
Etch&Rinse
All clinical pictures by courtesy of Dr Andreas Koushan Rathke


ULTRADENT


Evolution and Classification of Composites
The most common classification system for resin composites considers the distribution and average particle size of the composite filler. The first composites, macrofill, were highly filled (70-75% by weight) and contained large particle sizes (>1 μm) making them prone to plucking, resulting in excessive wear. As a result, the composites introduced thereafter all contained smaller filler particles and can be classified into 4 main categories:
Macrofill, microfill, microhybrids, and nanohybrids.
Macrofill
>1 μm
Microfill
0.02 - 0.04 μm
Microhybrid
0.4 - 1.0 μm
Nanohybrid
0.01- 0.10 μm
1960s
1980s
1990s
2000-present


Palodent V3
DENSPLY


Palodent 360

Gordon J. Christensen

Clinicians Report

April 2021, Volume 14 Issue 4

CR is the original and only independent dental product testing organization with funding only from dentists!

ISSN 2380-0429

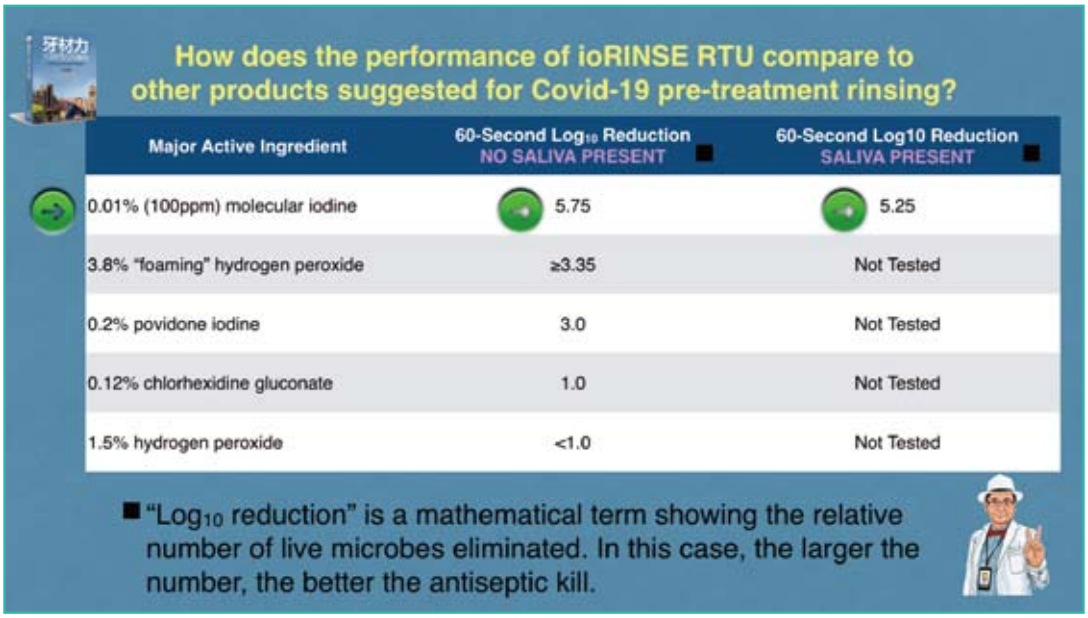
ioRinse RTU: An Effective Pre-treatment Rinse

Gordon's Clinical Observations: Recent research has reported significant quantities of SARS-CoV-2 virus in the oral cavity and saliva. Over the past months you have seen many mouthrinse promotions claiming various levels of deactivation of this virus. Unfortunately, the claims are based solely on clean laboratory tests that ignore the challenges presented by oral cavity secretions which can neutralize many antiseptics. *The information below reports on the performance of a patented iodine antiseptic in controlled testing in the presence of fresh human whole saliva that validates virus inactivation under more realistic conditions.*

TRAC RESEARCH

Mouth rinsing is a widely accepted practice for antiseptic, therapeutic, and cosmetic purposes. Now in the midst of COVID-19, mouth rinsing to inactivate the causative virus within the oral cavity is paramount in the minds of both dental clinicians and the general public. Many mouthrinse products have been suggested based on intuition, empirical evidence, or lab tests that make no attempt to replicate the complex oral environment challenges. In the oral cavity, many components in saliva interfere with a formulation's kill potential *(very high numbers of a wide variety of microbes, complex proteins, debris from soft tissues and food, etc.).* **Clinical information on ioRinse RTU used as a pre-treatment rinse is contained on pages 2 and 3.**

Figure 1. ioRinse RTU (Ready-To-Use) is a 100 ppm molecular iodine rinse available in two flavors: Mint-Apple (left) and Cinnamon Burst (right).



How does the performance of ioRINSE RTU compare to other products suggested for Covid-19 pre-treatment rinsing?

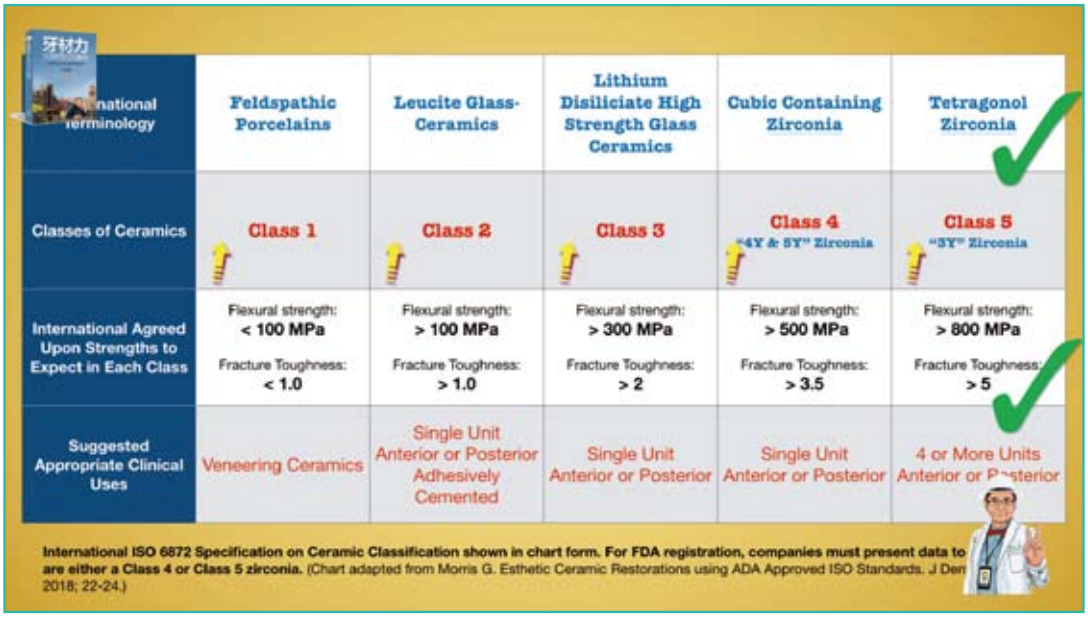
Major Active Ingredient	60-Second Log_{10} Reduction NO SALIVA PRESENT	60-Second Log10 Reduction SALIVA PRESENT
0.01% (100ppm) molecular iodine	5.75	5.25
3.8% "foaming" hydrogen peroxide	≥3.35	Not Tested
0.2% povidone iodine	3.0	Not Tested
0.12% chlorhexidine gluconate	1.0	Not Tested
1.5% hydrogen peroxide	<1.0	Not Tested

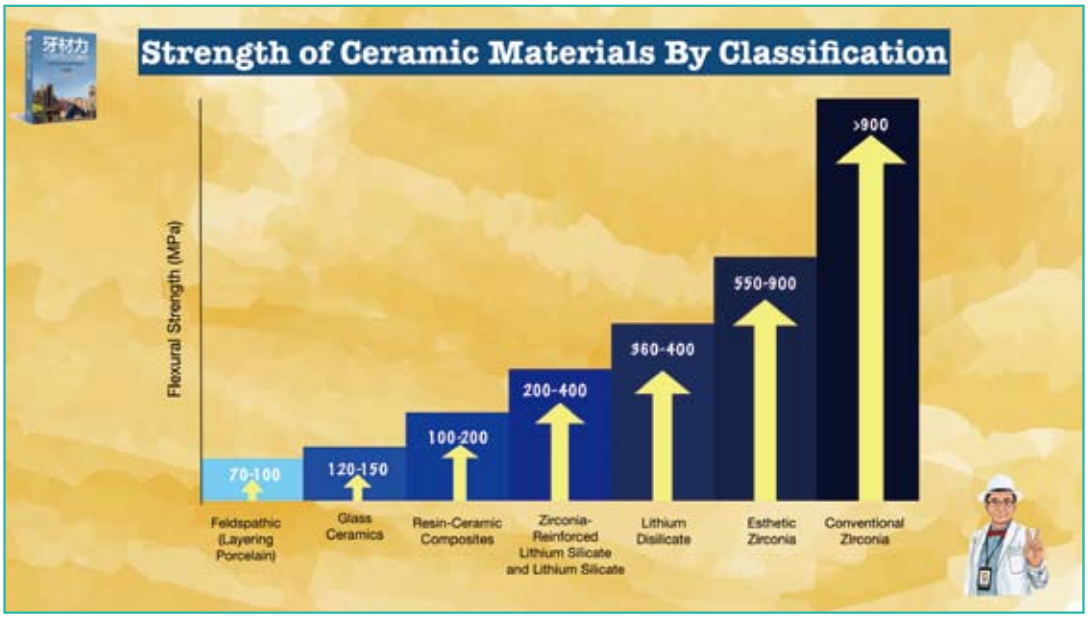
■ "Log_{10} reduction" is a mathematical term showing the relative number of live microbes eliminated. In this case, the larger the number, the better the antiseptic kill.

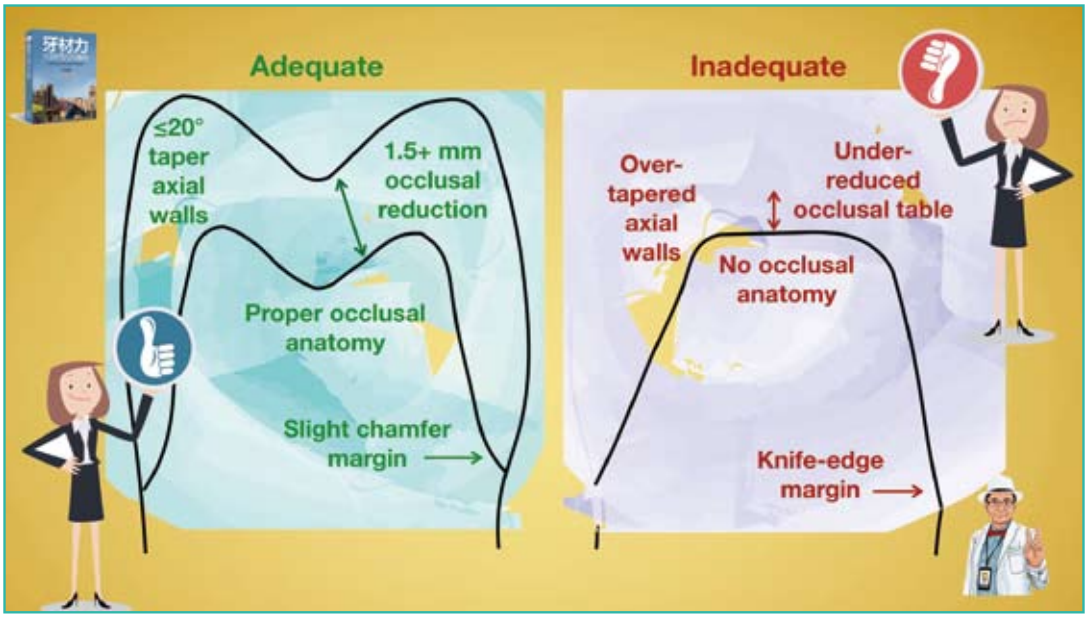
Type	Strength*	Esthetics	Multiple Units
Gold Alloy	High	Poor	Yes
Lithium Disilicate	Moderate	Excellent	Anterior only
PFM	High	Excellent-Good	Yes
Class 5 Zirconia	High	Fair-Good	Yes
Class 4 Zirconia	Moderate	Good	Anterior
Zirconia-base (layered)	Moderate	Good-Excellent	Yes

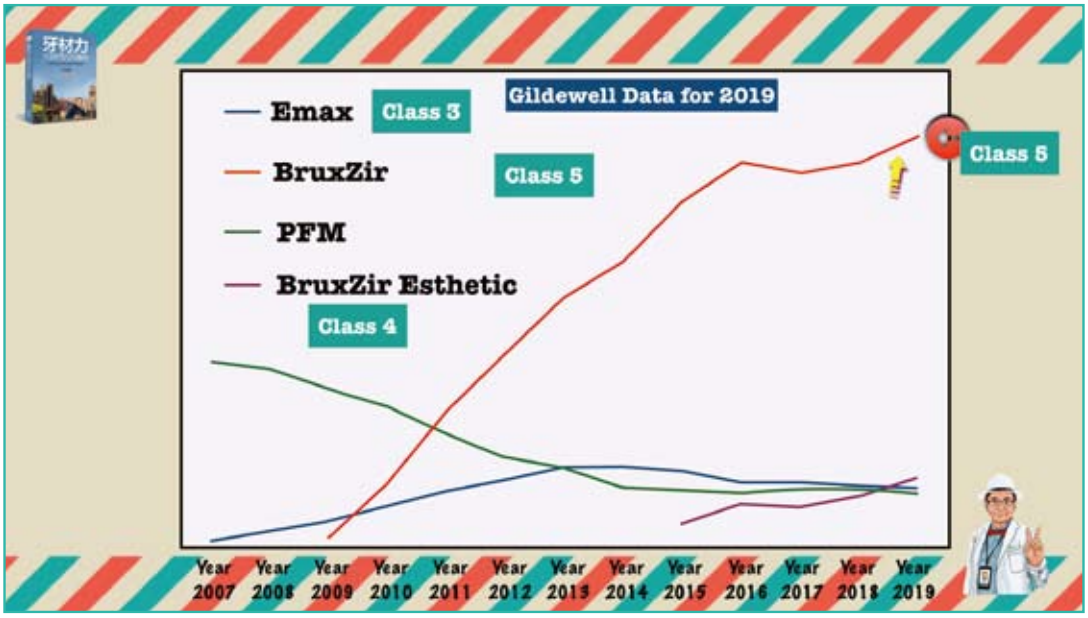
Type	Strength*	Esthetics	Multiple Units
Gold Alloy	High	Poor	Yes
Lithium Disilicate	Moderate	Excellent	Anterior only
PFM	High	Excellent-Good	Yes
Class 5 Zirconia	High	Fair-Good	Yes
Class 4 Zirconia	Moderate	Good	Anterior
Zirconia-base (layered)	Moderate	Good-Excellent	Yes

Type	Long-Term Research	Wear on Opposing Teeth	Failure to Date	Expected Longevity
Gold Alloy	Yes	Slight	Vey-Low	Long
Lithium Disilicate	Moderate	Slight	Low	Long
PFM	Yes	Slight-Moderate	Low	Long
Class 5 Zirconia	Yes	Slight	Low	Long
Class 4 Zirconia	Moderate	Unknown	Moderate for Y7	Unknown
Zirconia-base (layered)	Moderate to Yes	Slight-Moderate	Moderate	Unknown


national Terminology
Feldspathic Porcelains
Leucite Glass-Ceramics
Lithium Disiliciate High Strength Glass Ceramics
Cubic Containing Zirconia
Tetragonol Zirconia
Classes of Ceramics
Class 1
Class 2
Class 3
Class 4
"4Y & 5Y" Zirconia
Class 5
"5Y" Zirconia
International Agreed Upon Strengths to Expect in Each Class
Flexural strength: < 100 MPa
Fracture Toughness: < 1.0
Flexural strength: > 100 MPa
Fracture Toughness: > 1.0
Flexural strength: > 300 MPa
Fracture Toughness: > 2
Flexural strength: > 500 MPa
Fracture Toughness: > 3.5
Flexural strength: > 800 MPa
Fracture Toughness: > 5
Suggested Appropriate Clinical Uses
Veneering Ceramics
Single Unit Anterior or Posterior Adhesively Cemented
Single Unit Anterior or Posterior
Single Unit Anterior or Posterior
4 or More Units Anterior or Posterior
International ISO 6872 Specification on Ceramic Classification shown in chart form. For FDA registration, companies must present data to are either a Class 4 or Class 5 zirconia. (Chart adapted from Morris G. Esthetic Ceramic Restorations using ADA Approved ISO Standards. J Den 2018; 22-24.)

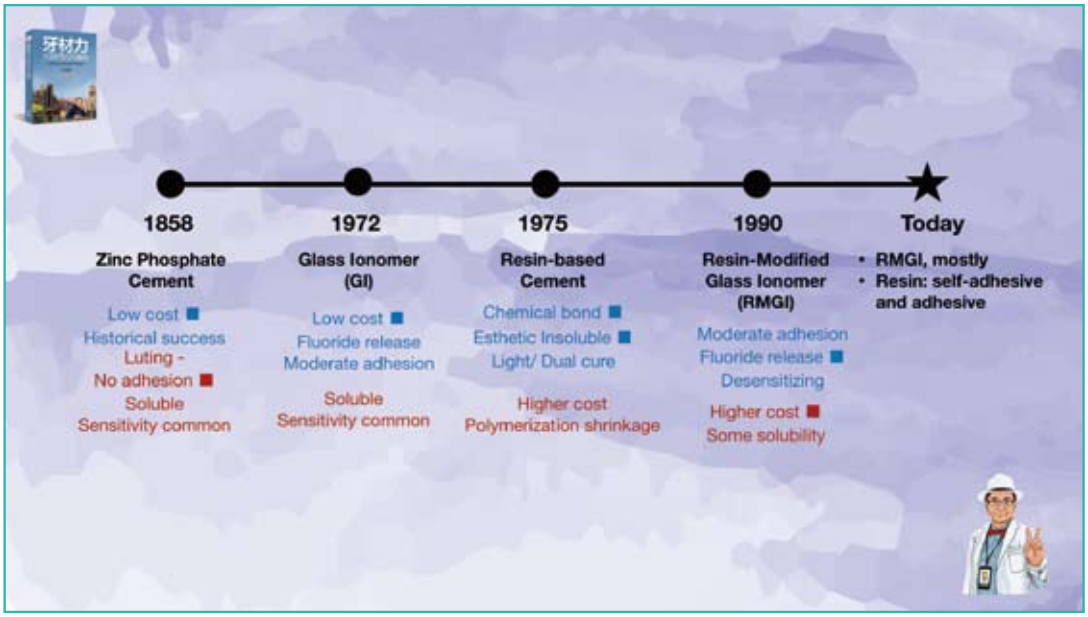

Strength of Ceramic Materials By Classification
Flexural Strength (MPa)
70-100
120-150
100-200
200-400
360-400
550-900
>900
Feldspathic (Layering Porcelain)
Glass Ceramics
Resin-Ceramic Composites
Zirconia-Reinforced Lithium Silicate and Lithium Silicate
Lithium Disilicate
Esthetic Zirconia
Conventional Zirconia

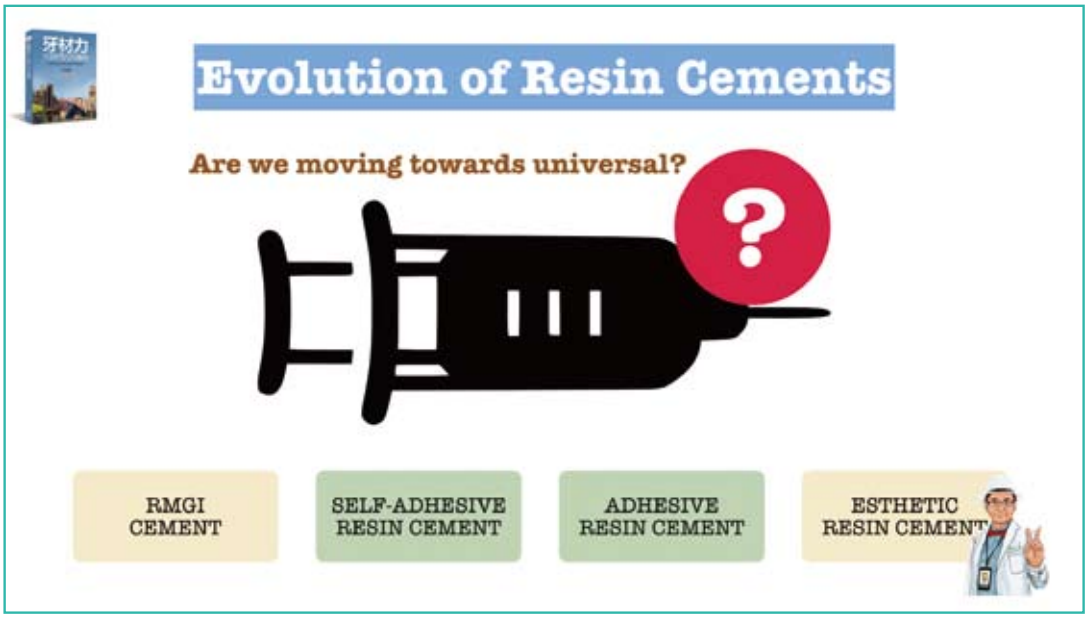

Adequate
≤20° taper axial walls
1.5+ mm occlusal reduction
Proper occlusal anatomy
Slight chamfer margin
Inadequate
Over-tapered axial walls
Under-reduced occlusal table
No occlusal anatomy
Knife-edge margin


Gildewell Data for 2019
Emax
Class 3
BruxZir
Class 5
PFM
BruxZir Esthetic
Class 4
Class 5
Year 2007
Year 2008
Year 2009
Year 2010
Year 2011
Year 2012
Year 2013
Year 2014
Year 2015
Year 2016
Year 2017
Year 2018
Year 2019


結論
患者應被告知，有些新的材料缺少長期研究
患者應參與材料的選擇
最被證實的材料：
metal
PFM
full-strength zirconia
lithium disilicate


Temp-Bond
KERR
premier


1858
Zinc Phosphate Cement
Low cost
Historical success
Luting -
No adhesion
Soluble
Sensitivity common
1972
Glass Ionomer (GI)
Low cost
Fluoride release
Moderate adhesion
Soluble
Sensitivity common
1975
Resin-based Cement
Chemical bond
Esthetic Insoluble
Light/ Dual cure
Higher cost
Polymerization shrinkage
1990
Resin-Modified Glass Ionomer (RMGI)
Moderate adhesion
Fluoride release
Desensitizing
Higher cost
Some solubility
Today
• RMGI, mostly
• Resin: self-adhesive and adhesive


Evolution of Resin Cements
Are we moving towards universal?
RMGI CEMENT
SELF-ADHESIVE RESIN CEMENT
ADHESIVE RESIN CEMENT
ESTHETIC RESIN CEMENT


RMGI優點
• 不敏感
• 不溶於口液
• 氟釋出，制齲齒性
• 與牙齒構造化學性黏著
• 熱膨脹係數與牙齒構造類似
• 相當容易使用
• 足夠的強度（大多數症例）

RMGI缺點

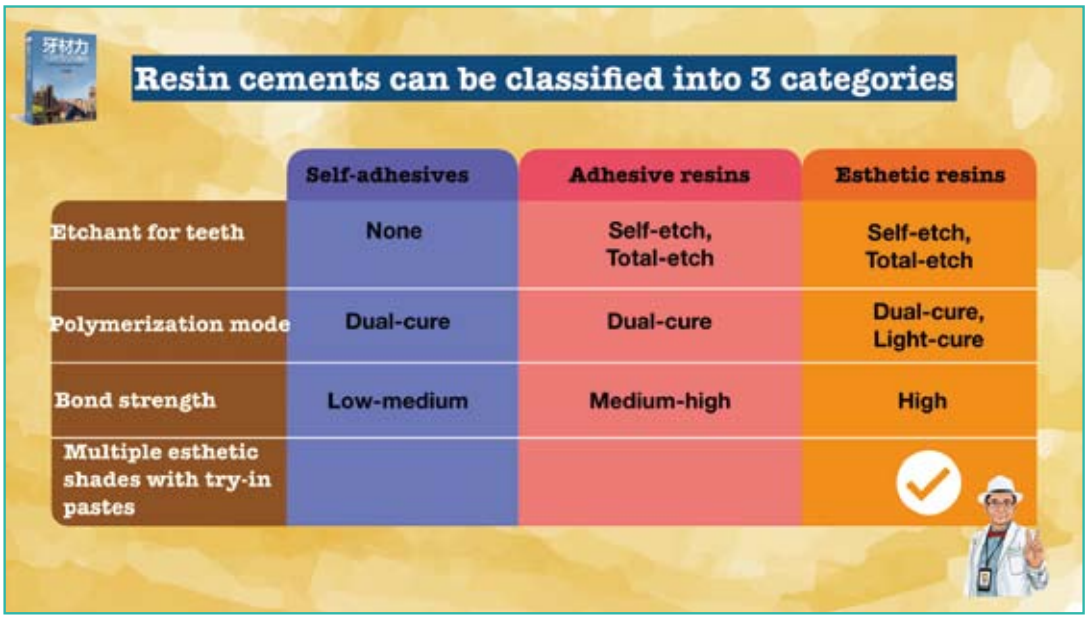
- 待完全固化後，清除多餘材料困難
- 顏色匹配具挑戰性
- 拆卸牙冠困難
- 吸濕性膨脹 (**hygroscopic expansion**)， 黏合根柱禁忌

RESIN CEMENT優點

1. 高強度
2. 黏合快速容易（光固化或雙固化）
3. 顏色與牙齒匹配
4. 好的耐磨度（由於咬合或口衛步驟暴露邊緣）
5. 幾乎不溶於口液裡

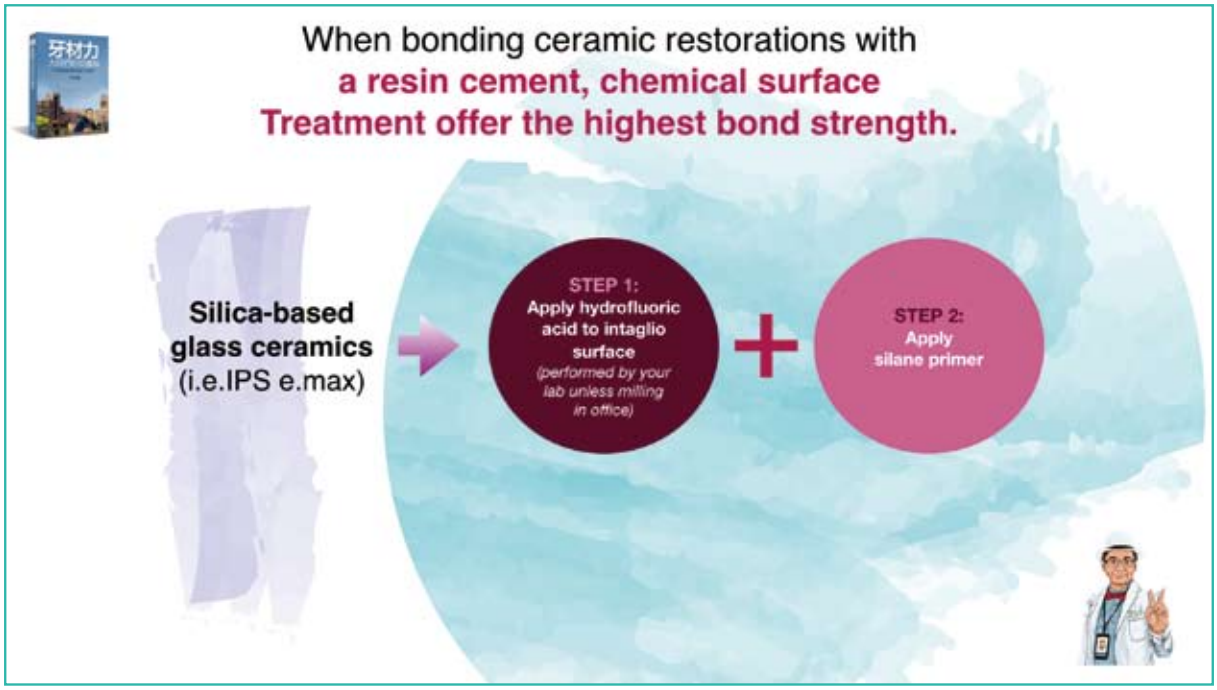
RESIN CEMENT缺點

1. 固化後，過多的材料清除困難
2. 沒有制齲齒性
3. 牙冠將來要拆除時會遭遇困難
4. 有些黏合步驟會造成術後敏感， 甚至牙髓壞死
5. 如果備牙的機械性固位不佳，初期仍然會有復形體脫落



	Self-adhesives	Adhesive resins	Esthetic resins
Etchant for teeth	None	Self-etch, Total-etch	Self-etch, Total-etch
Polymerization mode	Dual-cure	Dual-cure	Dual-cure, Light-cure
Bond strength	Low-medium	Medium-high	High
Multiple esthetic shades with try-in pastes			✓


When bonding ceramic restorations with
a resin cement, chemical surface
Treatment offer the highest bond strength.
Zirconia
(i.e.BruxZir)
STEP 1:
Sandblast
with 50-um
alumina
STEP 2:
Primer not required
if prep is retentive;
use a ceramic primer
to ensure a better
bond


When bonding ceramic restorations with
a resin cement, chemical surface
Treatment offer the highest bond strength.
Silica-based
glass ceramics
(i.e.IPS e.max)
STEP 1:
Apply hydrofluoric
acid to intaglio
surface
(performed by your
lab unless milling
in office)
STEP 2:
Apply
silane primer