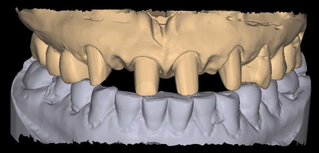
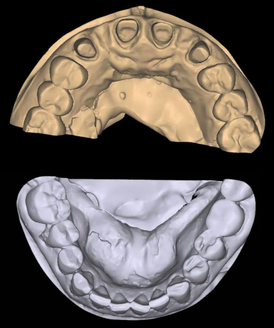
Biomaterials for Digital Dentistry

From impression to final prosthesis

Work-Flow

Working Model



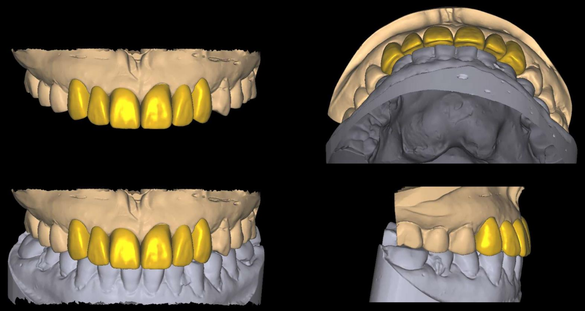


Simple & Easy

Sintering & Glazing

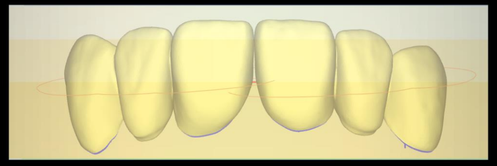
Coloring

Cad Design



Shade Taking

Hyper Dent



18T A3 Multi Layer Block

내면 – White Opaque

Contents

1 Impression : Bite Tray, Putty/Light Body.

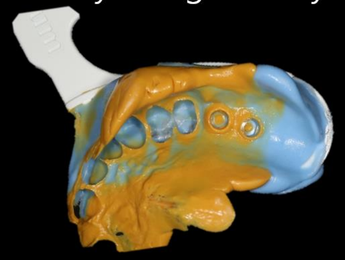
2 Removable Denture : Metal or Polymer Printing

3 Permanent : Zirconia (w/ Coloring & Bonding)

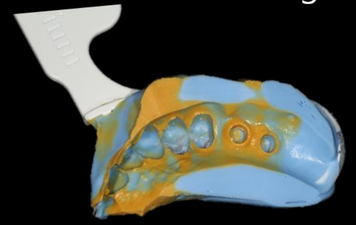
Overall working time

BTS (20 min)

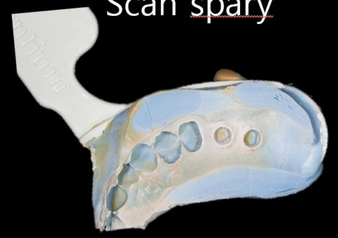
Putty + Light Body

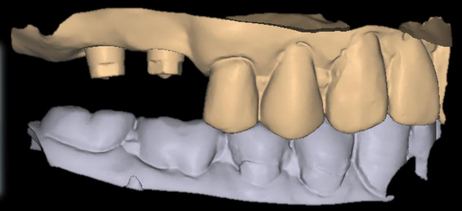


Border Trimming



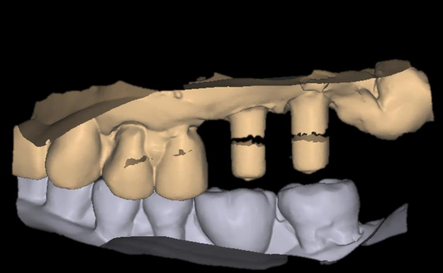
Scan spary





Impression + 1st scanning time : 9 min

(30s) (8 min 30 sec)

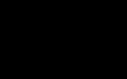


2nd scanning time : 8 min 30 sec

Adjustment time : 3 min ↓

IOS (15 min)

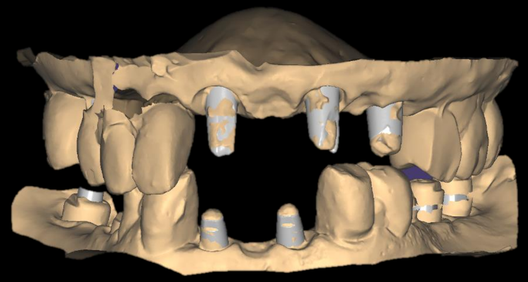
Scanning time : 5 min



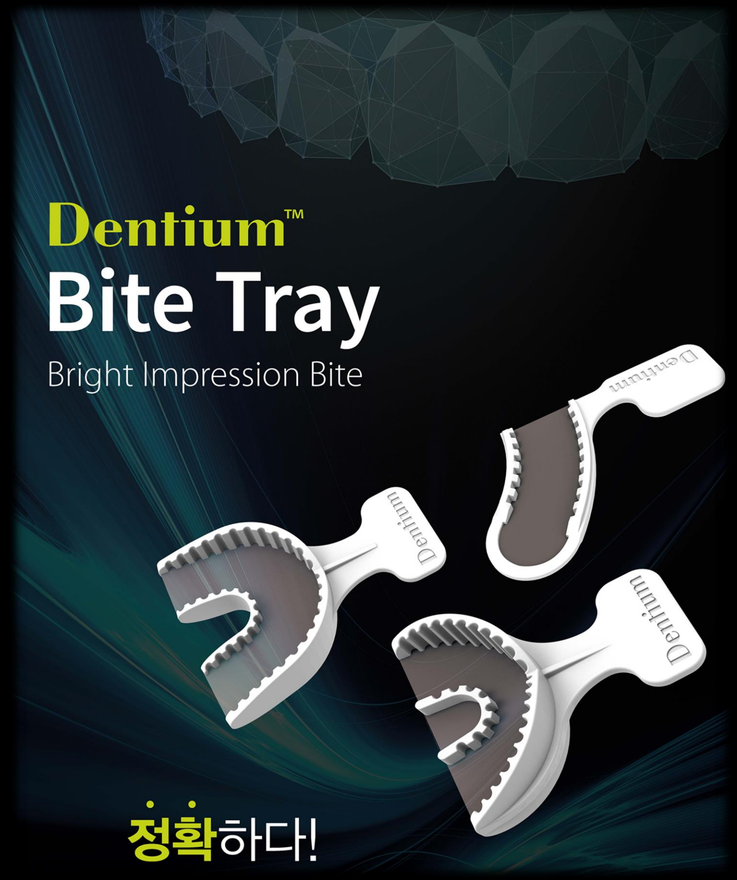
Adjustment time : 10 min

Comparison – BTS vs IOS

Full arch scanning for final prosthesis

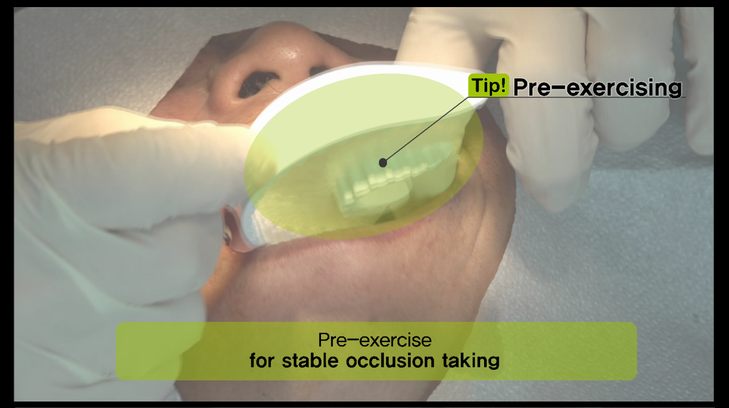
	BTS (Bite Tray Impression Scan)	IOS
Image		
Steps	Impression / Trimming / Scan spray / Double scan	Mandible / Maxilla / Bite scan
Time	20 min	15 min
Cost	7,500,000 ₩ (Bite Tray / Impression / Model Scanner)	Minimal 20,000,000 ₩ (Intro Oral Scan)
Accuracy	★★★★	★★

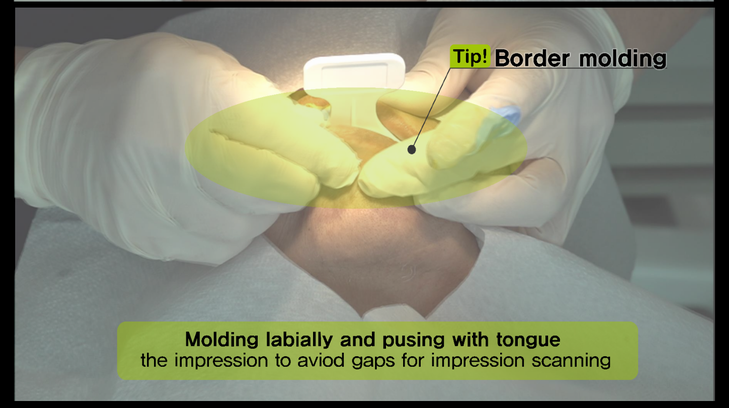
Bite Tray

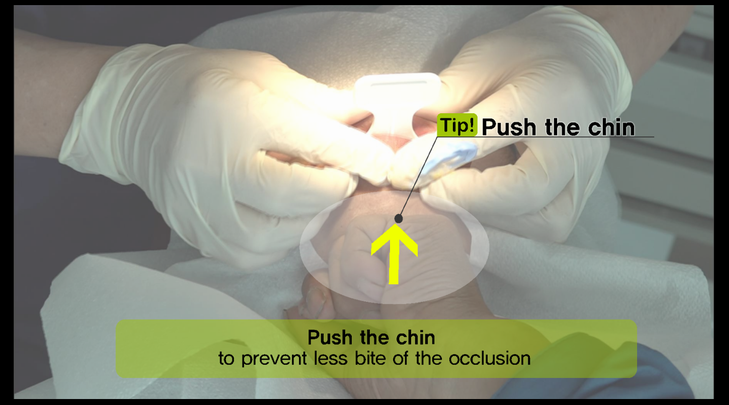


1) 정확한 인상채득
2) 뒤틀림 방지
3) 사용자 식별 스티커 부착
4) 의료기기(1등급)

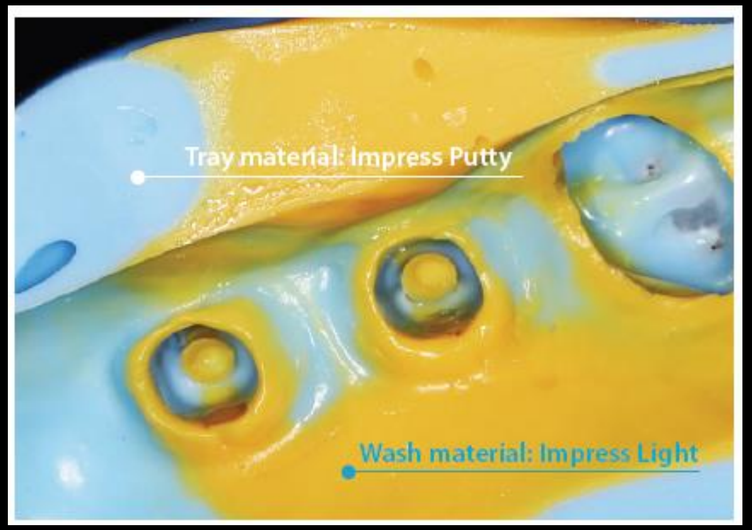
Bite Impression – Tip





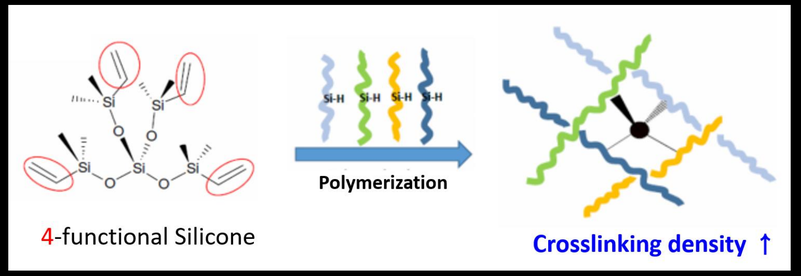


Impression : Putty + Light



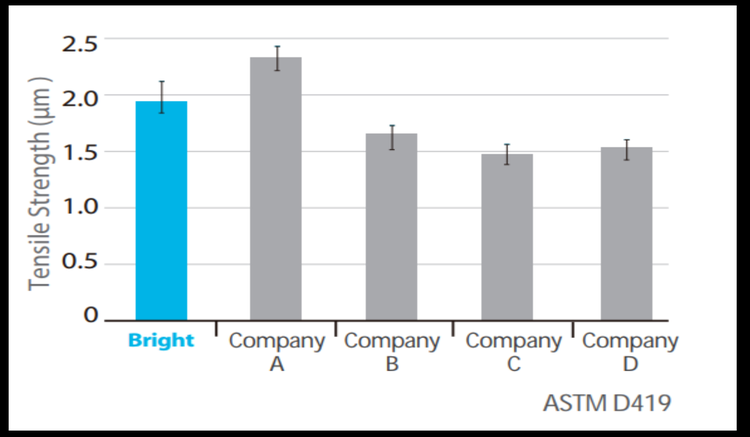
1) Complete Polymerization

→ Dimension stability



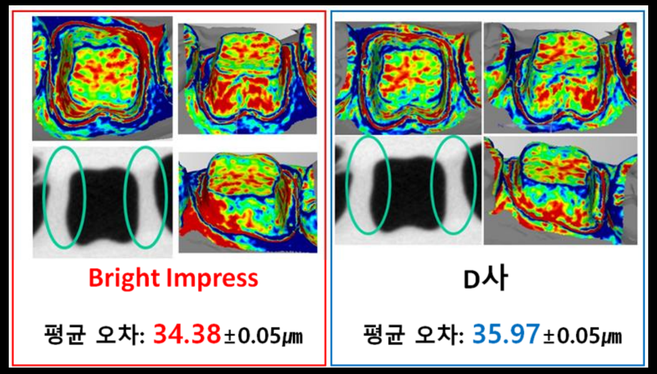
Elastic Recovery Rate ≥ **99.3%**

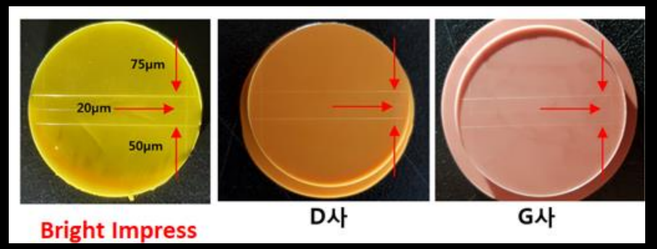
2) Stable Strength



A (Dentsply), B (GC), C (Spident), D (Denkist)

3) Accuracy





Removable Denture by Metal Printing

1) RPD Frame

Teeth arrangement
&
Pink resin add.

2) One body

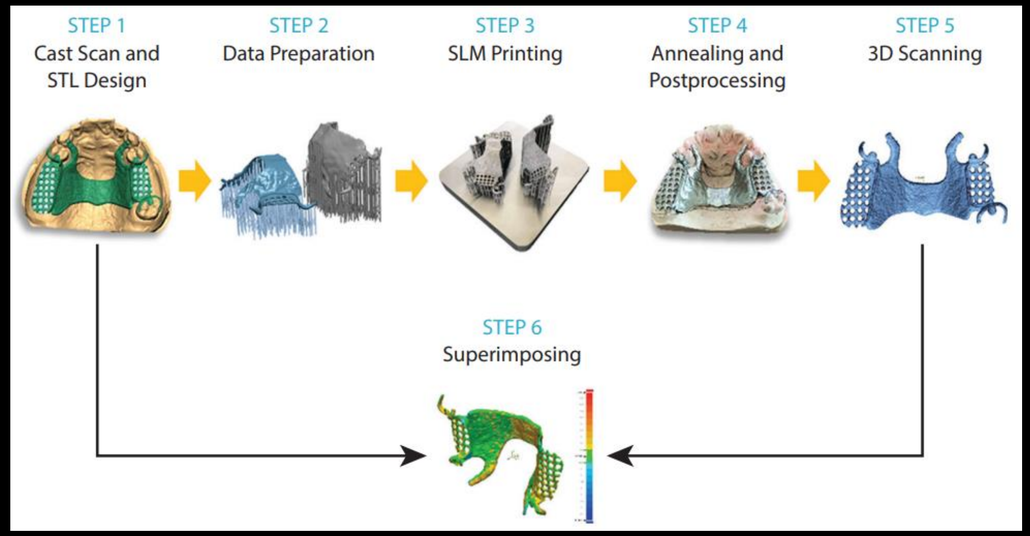
rainbow™
Metal Printer

RPD by Rainbow Metal Printer

THE JOURNAL OF PROSTHETIC DENTISTRY JPD (2023)

Process parameter optimization for removable partial denture frameworks manufactured by selective laser melting

Results. Optimum melt-pool parameters were found with the function of density, surface roughness, and productivity (P=180 W, v=1200 mm/s, h=60 µm, t=30 µm). RPD frameworks fabricated by the optimized process parameters (167 ±105 µm) showed significantly better (P<.05) mean ±standard deviation accuracy than the 3 other groups of RPD frameworks manufactured by using the nonoptimized process parameters (180 ±121 µm to 222 ±136 µm). The best accuracy was found with the transverse orientation and interconnected support structure.



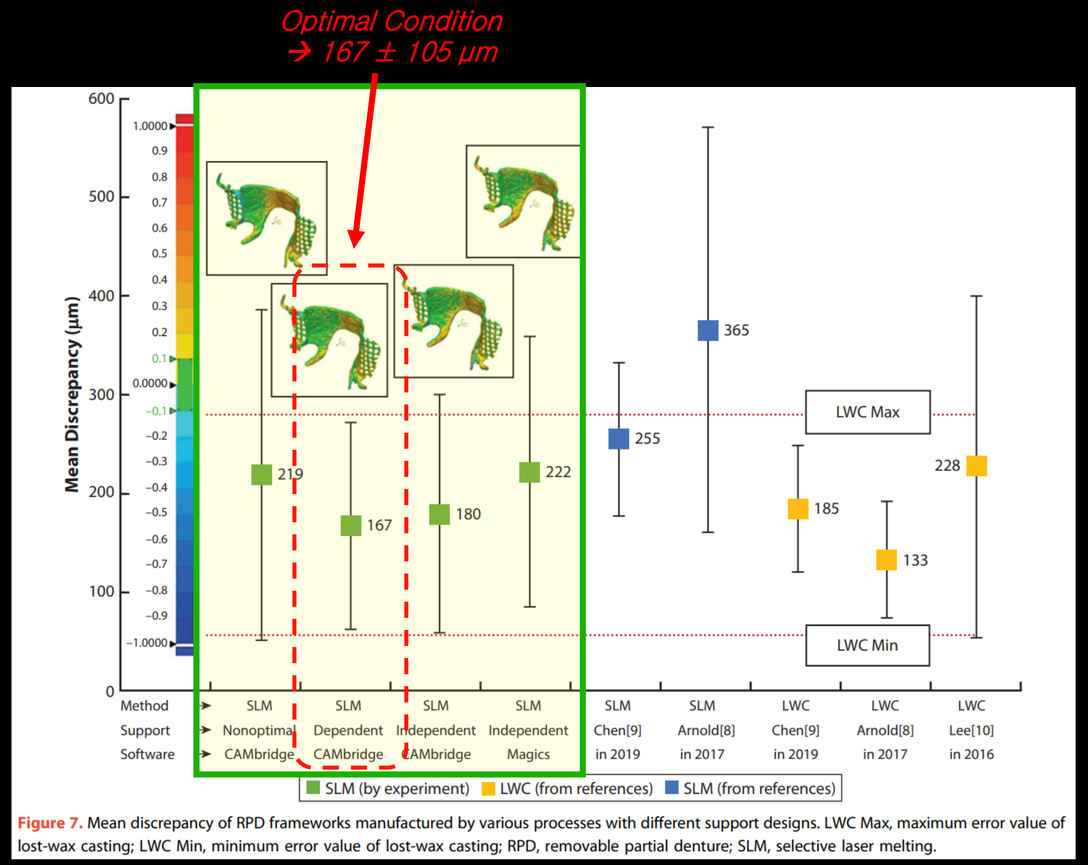
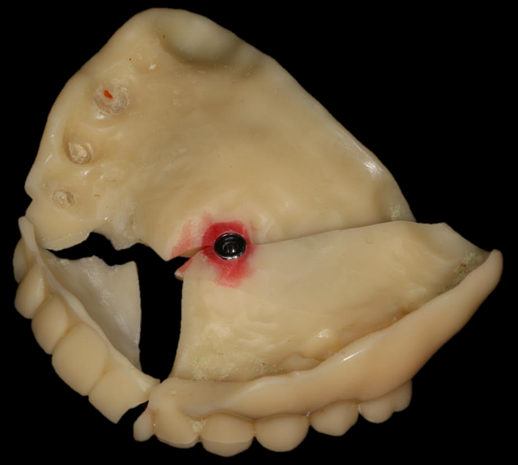


Figure 7. Mean discrepancy of RPD frameworks manufactured by various processes with different support designs. LWC Max, maximum error value of lost-wax casting; LWC Min, minimum error value of lost-wax casting; RPD, removable partial denture; SLM, selective laser melting.

Removable Denture by Polymer Printing

Non Flexible denture

4 months

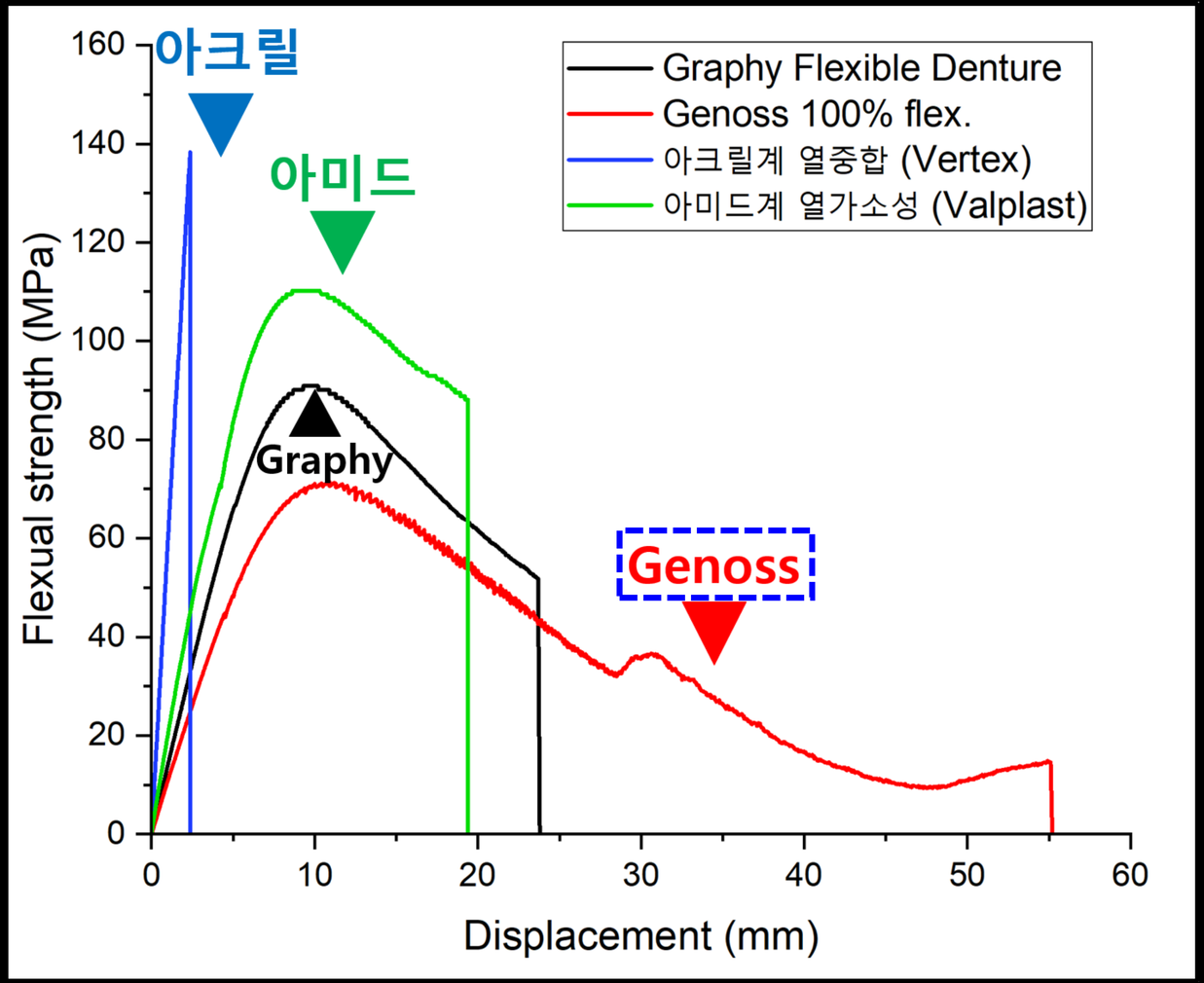


※ Reason to increase the flexibility : Fracture Risk

Polymer Printing (100% flexibility)

Bright 3D : 100 % Flexible Denture Resin

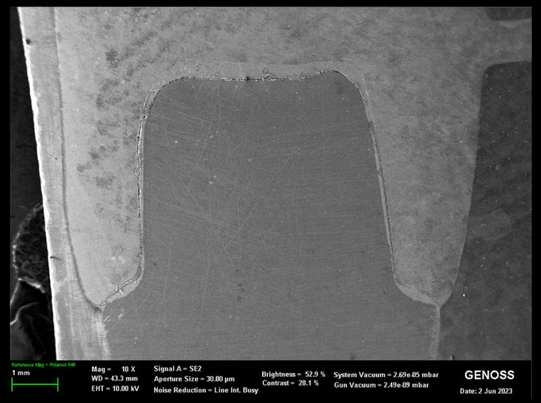
100% Flexible

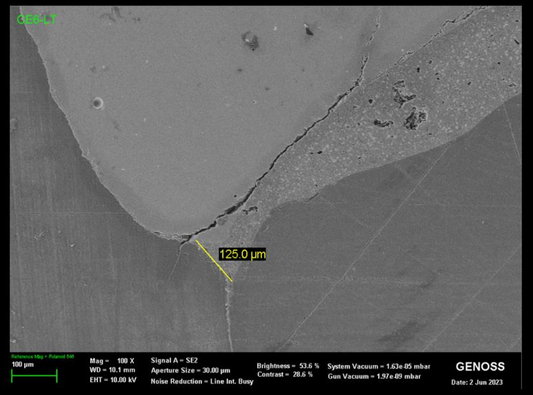


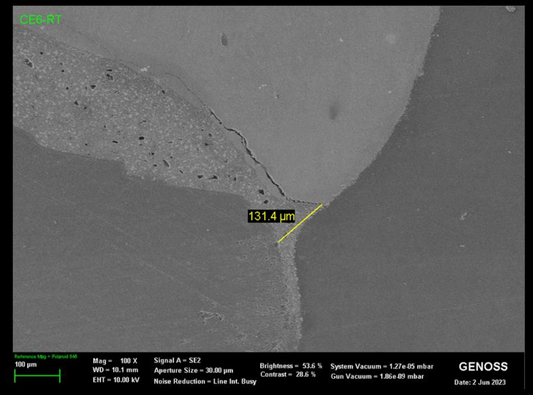
More Ductility ➔ Less Fragile

Fitness of Zirconia after Sintering (vs FeldSpar)

No shrinkage
(w/o Sintering)





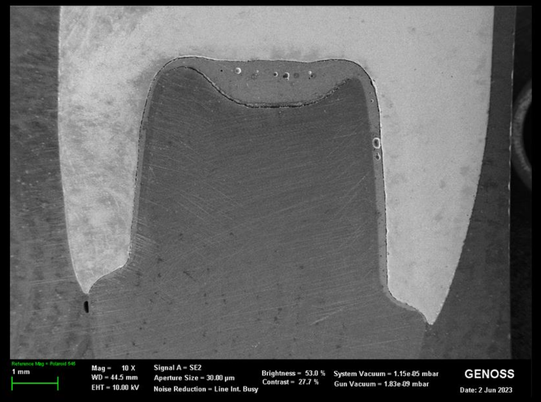


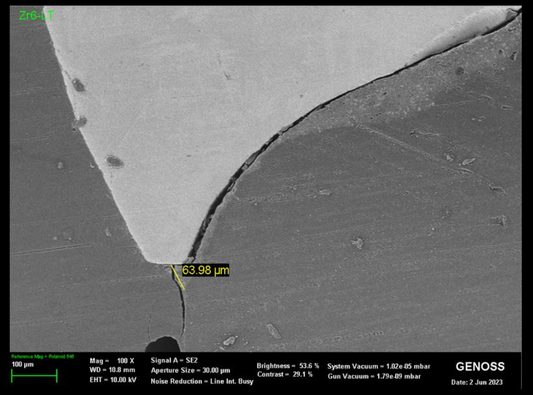
IPS e.max CAD	Leucite glass-ceramic	ivoclar vivadent

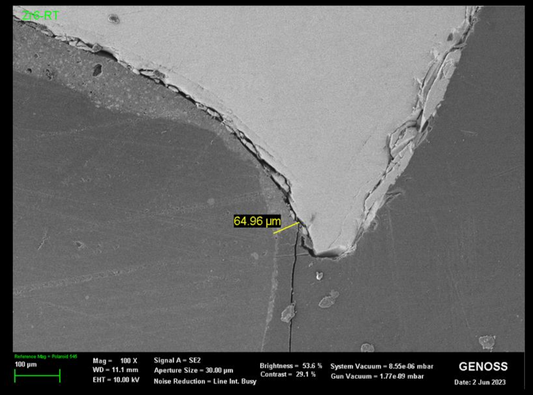
Property	Specification	Typical average value
CTE (25–500°C) [10^{-6}/K]	17.5 ± 0.5	–
Flexural strength (biaxial) [MPa]	≥ 100	185
Chemical solubility [µg/cm²]	< 100	–
Type/Class	Type II/Class 2a	

according to ISO 6872:2015

Shrinkage ~19%







Bright block (4.7Y)

CTE 10.5 x 10^{-6}/K
Strength 850 MPa

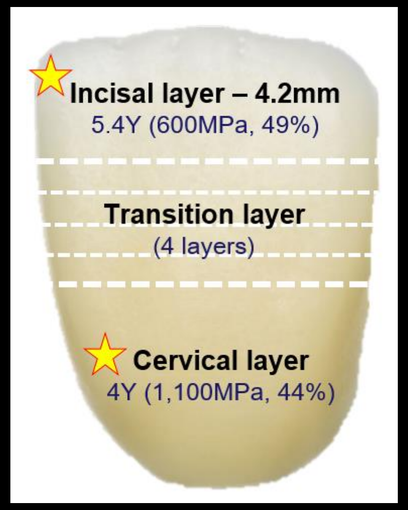
이훈재원장 자료 - Digital Consensus ('23.06.04)

Zirconia Portfolios of Dentium

Y2O3 (Yittria) 3mol%			4mol%	5.4mol%	Incisal 5.4mol % / Cervical 4mol%	4.9mol% / 4.3mol%	4.7mol%
rainbow **CAD/CAM** (opaque)	rainbow **Trans** (transluscent)	rainbow **Shade** (A0.5, A2)	rainbow **Shine T** (A0, A1, A2)	rainbow ***High* Shine** (A0, A1, A2)	rainbow Multi-Layer (A1, 2, 3, 3.5)	bright Multi-Layer (A1, 2, 3, 3.5)	bright (A1, 2, 3, 3.5)
							
2008	2013	2014	2017	2014	2020	New Products (2023)	

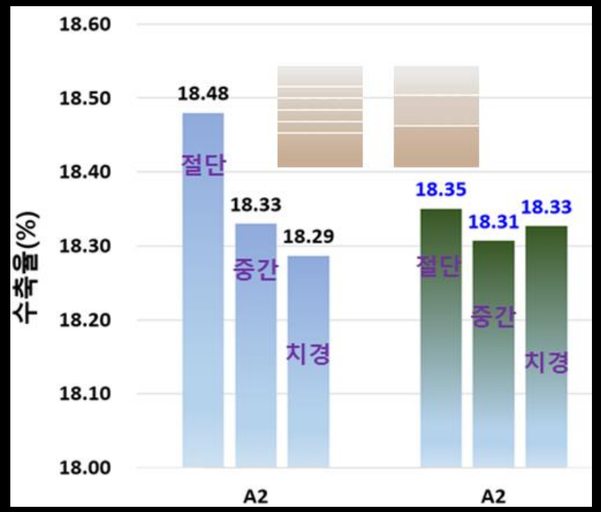
Multilayer (6 & 3 layers)

6 Layer (5.4Y–④–4Y)

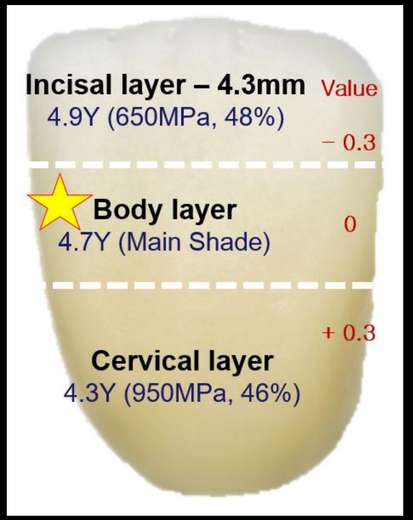


rainbow

Intuitive Shade Selection
& Shrinkage Matching



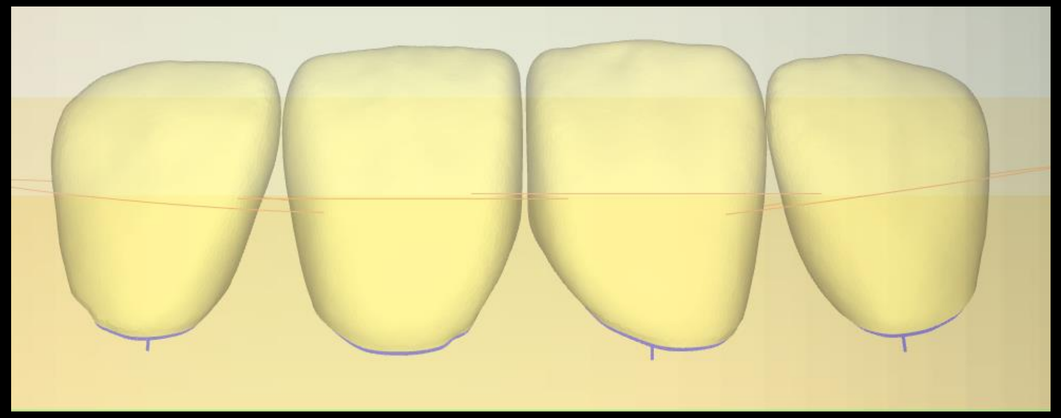
3 Layer (4.9Y–Body–4.3Y)



bright

bright Multi (3 layers)

Multi-layer 3 layer block positioning



Milling

Glazing

Monolayer (4Y, 4.7Y)

Shine T (4Y)

45%
1,100 MPa

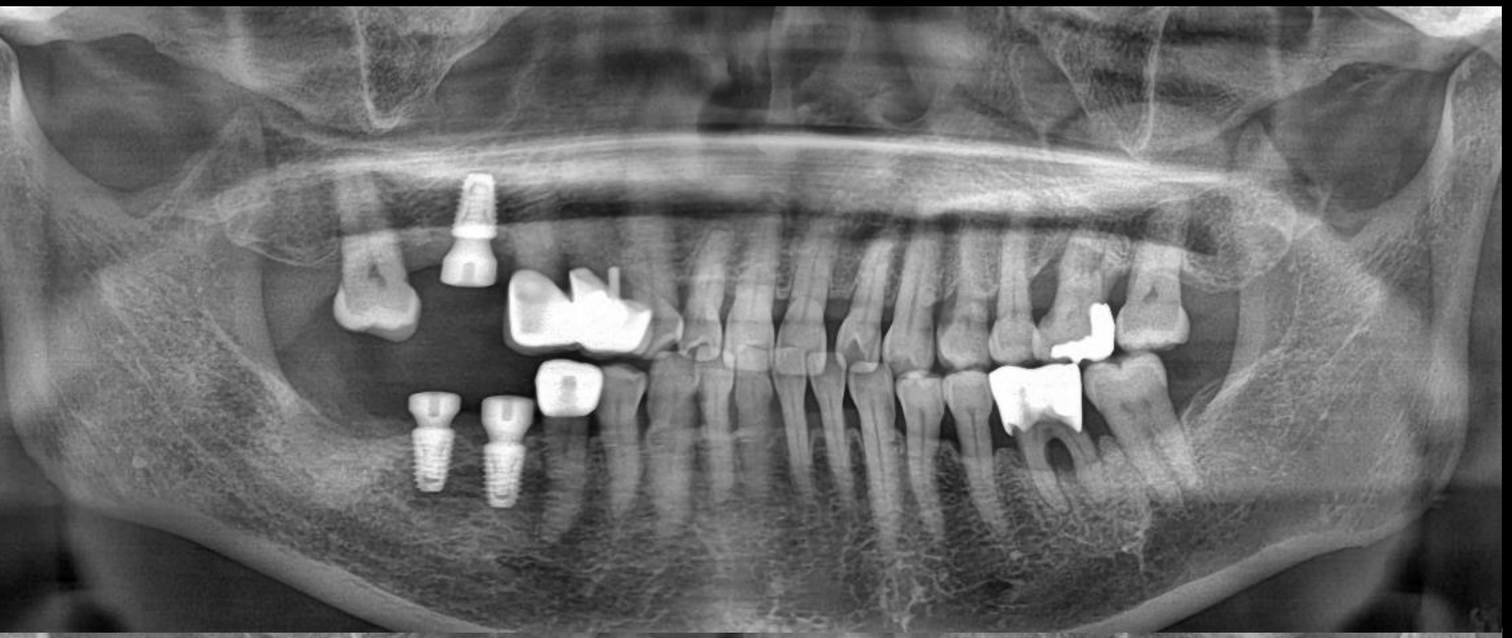
Uniform Shrinkage
(Long-loved product)

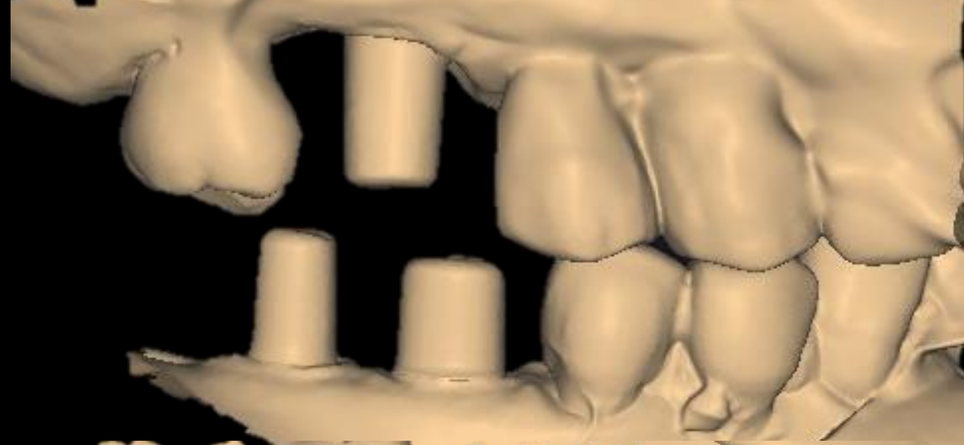
Rapid Sintering
& More Trans.

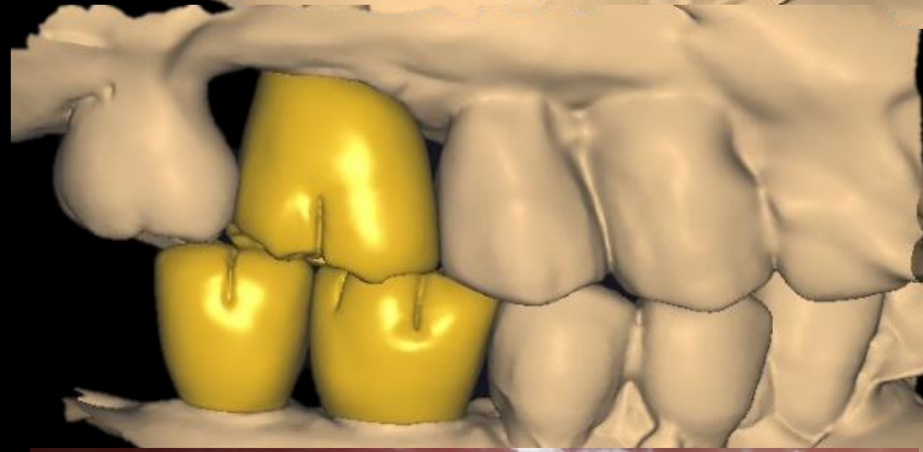
bright (4.7Y)

47%
850 MPa

4.7Y Zr fast sinter monoblock – 2 hr







Coloring

Inner – White Opaque
Occlusal – Trans violet

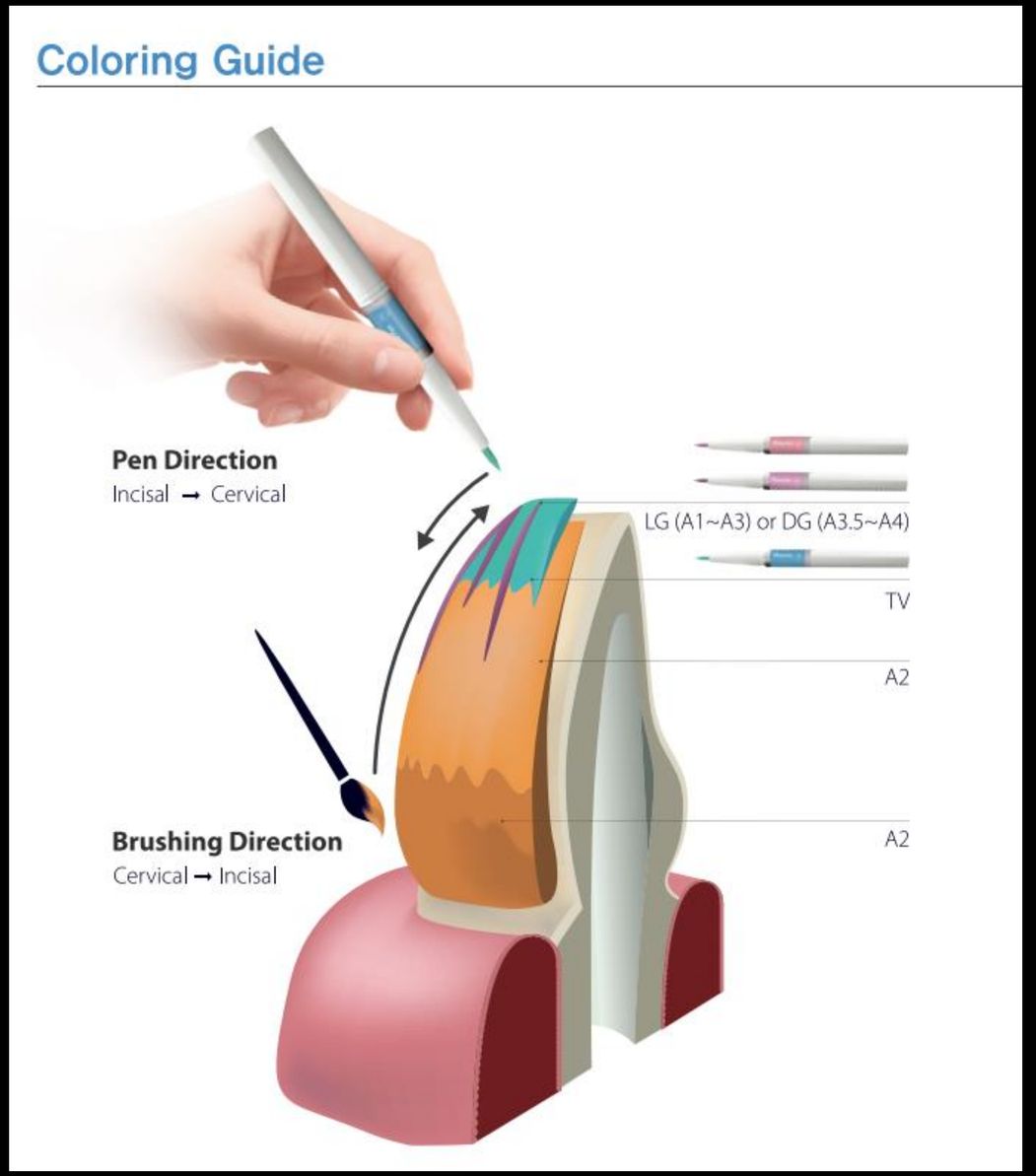
Glazing

Final Prosthesis

Zirconia - Coloring

Brushing Pen
(4ml)

Bottle type (20ml)



<변색치, Ti지대주>

Inner – White Opaque

Zirconia - Glazing

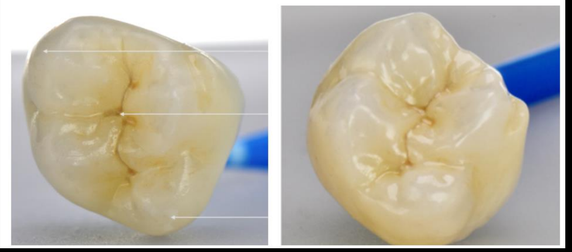
대부분 Glaze로만 마무리 가능
보다 심미적 효과 필요시, Stain 사용

- 온도 안정성

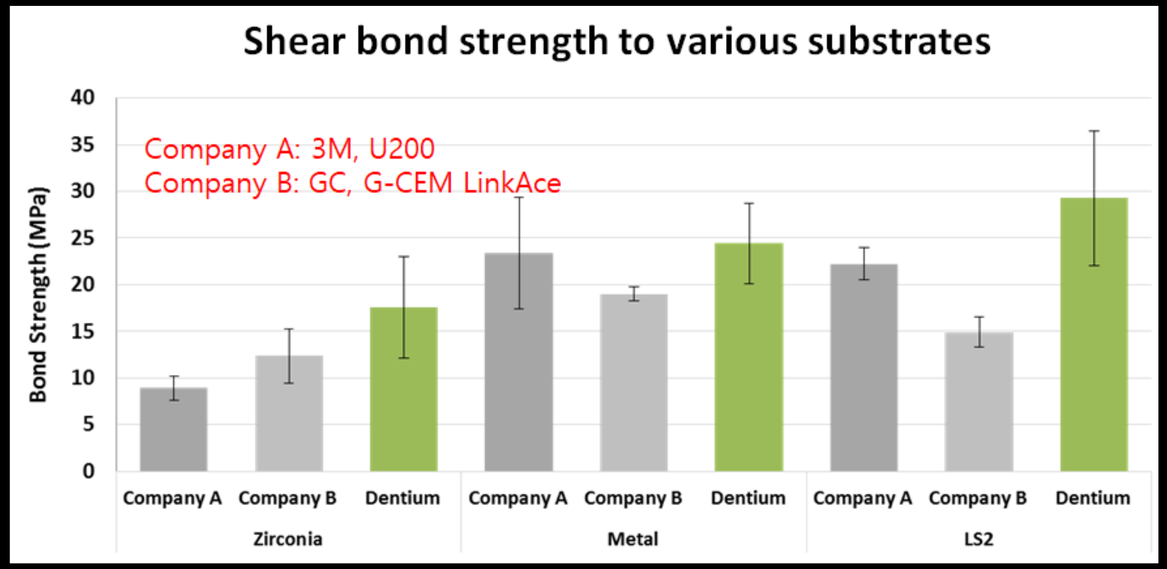
720 °C	760 °C	900 °C
		

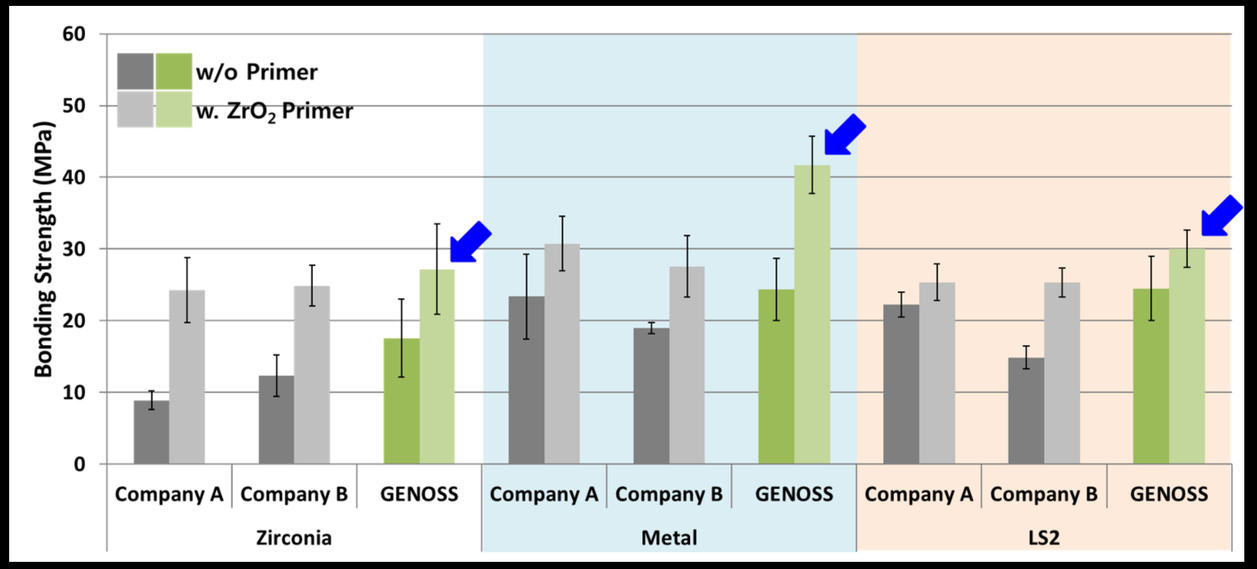
- 소성 후를 예상 가능

소성 전 소성 후



Zirconia - Bonding





Natural Aesthetics

with Simple & Easy Approach