THE REVIEW

Amber® Press

English

Human-Aid
System Supplier
HASS

01

Date (version No.) : 2022.01.29(Ver.01)
Product : Amber Press
Type : In-house

Physical properties of Amber Press

In this study, physical properties of Amber Press were evaluated. Evaluation items include Biaxial flexure strength, Fracture toughness, Chemical solubility, Cytotoxicity, and SEM.

Materials and Method Information

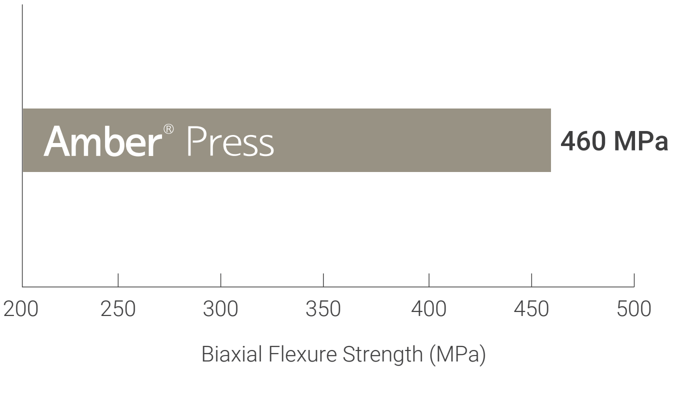
All of test were performed according to ISO 6872 and ISO 10993.
The size of the specimens for mechanical test was as follows:
Biaxial Flexure Strength and Chemical solubility: 12.0 x 1.2 mm (round disk shape) Fracture toughness: 30.0 x 4.0 x 3.0 mm (bar-shape, specimen formed a V-notch with a depth of 0.8~1.2mm.),
In order to obtain an optical finish, the specimens were polished to an average level of 0.012 µm.

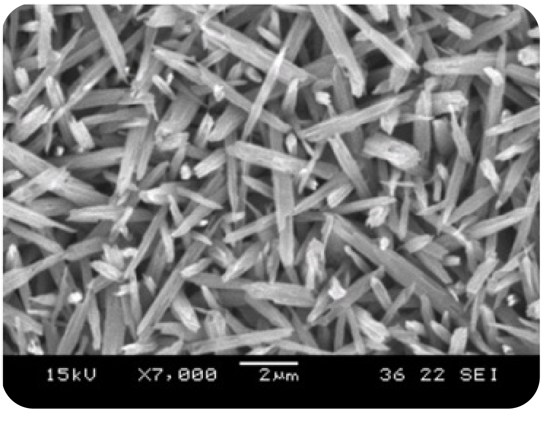
Results and Conclusions

Amber Press exhibits good Physical properties overall compared to other Lithium Disilicate ingots.

Properties	Results
Biaxial flexure strength	460 ± 25 MPa
Fracture toughness	2.1-2.3 MPa·m$^{1/2}$
Chemical solubility	28 ± 6.2 µg/cm^2
In vitro Cytotoxicity	none

Each data was tested in accordance with ISO 6872, ISO 9693 and ISO 10993 05





02

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Product : Amber Press

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Journal : Odontology 2020 Apr;108(2):231-239

Evaluation of fracture strength for single crowns made of the different types of lithium disilicate glass-ceramics

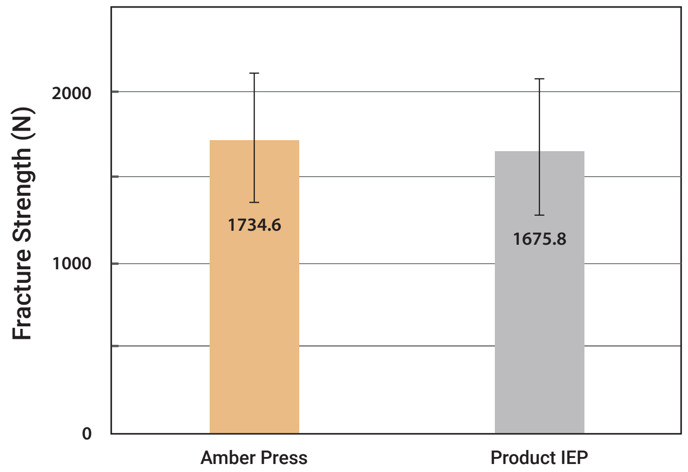
Lithium disilicate glass–ceramics with high mechanical strength are being widely used as ingots for heat-pressing technique and blocks for CAD/CAM processing in clinical dentistry as aesthetic prosthetic materials.
The purpose of this study was to evaluate the fracture strength of single crowns made of the different types of lithium disilicate glass–ceramics.

Materials and Method Information

Two groups of ingots (IEP, Amber Press) were prepared with 15ea of second premolar crown case.
All group for mandibular second premolars with the same size and shape, the metal abutment was first scanned with a D900L scanner. All crown had a thickness commonly used in clinical practice(1.5mm). IEP and Amber Press crowns were produced by heat-pressing according to the schedule provided by the manufacturer.
Bonding Process was as follow: 9.5% HF 30sec, Silane primer 20sec, Resin Cement Subsequently, static load of 49 N was applied on the top of the crown for 10 min after fixing the metal abutment at a static-load device. The fracture strengths of the crowns were measured after storage in distilled water at 37°C for 7 days.
Fracture strength test was performed at 10 degrees of inclination toward the load after bonding crown on metal abutment using dual-curing resin cement.
Statistical analysis of fracture strength was conducted through Weibull statistics (n = 15 per group).

Results and Conclusions

In the results of this study, the fracture strengths of the crowns manufactured with IEP and Amber Press for heat-pressing process were 1675.8 N and 1734.6 N, respectively.
When applying a compressive force inclined 10° with respect to the vertical plane, the stress was concentrated on the buccal cusp of the crown's masticating surface, since both vertical and lateral forces were applied to the crown. Thus, the all crown is buccal cusp fractured starting from the central groove.



Group	$\sigma_{f(0.5)}$	m	σ_0	r^2	$\sigma_{f(evg)}$	SD	N
Amber Press	**1724.8**	**5.16**	**2322.6**	**0.89**	**1734.6**	**373.1**	**15**
Product IEP	1656.2	4.73	2305.9	0.93	1675.8	386.2	15

$\sigma_{f(0.5)}$ median fracture strength (N) when the probability of failure is 0.5, m Weibull modulus, σ_0 characteristic strength (N), r^2 Weibull distribution regression coefficient squared $\sigma_{f(evg)}$ mean fracture strength (N), SD standard deviation, N number of samples

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Flexural strength, fracture toughness, three-body wear, and Martens parameters of pressable lithium-X-silicate ceramics

To test and compare five pressable lithium-X-silicate-ceramics on their mechanical and wear properties.
The present investigation included the above mentioned standardized mechanical tests to evaluate the Flexural strength (FS), Weibull modulus(m), Fracture toughness (KIC), Three-body wear (3BW), Martens hardness (HM), and Elastic modulus of indenter (EIT) of five lithium-X-silicate ceramics.

Materials and Method Information

Five groups of ingots (CP, IL, IEP, LP, Amber Press) were prepared with the shade of A2(or I2, E58).
The number of specimens used in all tests is 15ea per group, and the sizes are as follows:
FS and KIC: 30.0 x 4.0 x 3.0 mm (bar-shape, KIC specimen formed a V-notch with a depth of 0.8~1.2mm.), HM, EIT and 3BW: 14.0 x 1.0 mm (round disk shape).
The wax blank was milled with a 5-axis milling machine according to the size of the specimen, and heat-pressing according to the manufacturer's instructions.
And the specimens were polished with P4000 grit silicon carbide grinding paper (SiC) using a water-cooled polishing machine at 150 rpm.

Results and Conclusions

The conclusions according to the results of this study are as follows:
The tested pressable ceramics showed differences in mechanical properties. The highest values were observed for Amber Press, followed by LP with the highest Weibull modulus.
The tested pressable ceramics showed differences in wear properties, with the highest values for CP having the highest Martens hardness results.

Group	FS (MPa)	m	KIC ($MPa{\cdot}m^{1/2}$)	3BW (mm^3)	HM (N/mm^2)	EIT (kN/mm^2)
Amber Press	324 ± 43	8.6	2.86 ± 0.3	-0.117 ± 0.225	3688 ± 252	78 ± 5.5
Product IEP	303 ± 56	6.8	2.76 ± 0.4	-0.118 ± 0.013	3503 ± 267	74 ± 5.3
Product CP (Powder Fired)	320 ± 63	6.0	2.36 ± 0.4	-0.155 ± 0.034	4004 ± 224	79 ± 5.1
Product CP	189 ± 34	6.7	-	-	3820 ± 325	71 ± 65
Product IL	251 ± 47	6.0	2.38 ± 0.4	-0.106 ± 0.013	3493 ± 311	71 ± 6.5
Product LP	301 ± 22	16.1	2.67 ± 0.2	-0.014 ± 0.039	3590 ± 211	71 ± 5.6

FS: Flexural strength(MPa), m: Weibull modulus, KIC : Fracture toughness ($MPa{\cdot}m^{1/2}$), 3BW: Three-body wear (mm^3), HM: Martens hardness (N/mm^2), and EIT: Elastic modulus of indenter (kN/mm^2)

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Effect of fabrication method of lithium disilicate crown on fitness

The purpose of this study was to evaluate the influence of fabrication methods of lithium disilicate reinforced glass-ceramic crown on marginal and internal fit. Lithium disilicate reinforced glass-ceramic crowns were fabricated using ingots for heat press forming Manufactured by Hass and I.

Materials and Method Information

Two groups of ingots (Product IEP, Amber Press) were prepared by heat pressing after fabricating a wax pattern using a conventional wax-up method and a method of milling a wax block. (Group: EPC, EPM, APC, APM) And two groups of block (Product IEC, Amber Mill) were prepared by CAD/CAM milling. (Group: ECM, ABM) The number of specimens is 6ea per group. Dentiform of maxillary central incisor was prepared with a 6°taper and 1 mm deep chamfer margin and duplicated with silicone. Marginal and internal fit were measured by the silicone replica technique. Each silicon replica was cut into labio-lingual and mesio-distal sections and the thickness of the light body silicon was measured. Fourteen reference points were determined and measured using a microscope.

Results and Conclusions

Table. Fabrication method and materials

	Product	Fabrication method
ECM	Product IEC	CAD/CAM milling
EPC	Product IEP	Conventional wax up & Heat press
EPM	Product IEP	Wax block milling & Heat press
ABM	Amber Mill	CAD/CAM milling
APC	Amber Press	Conventional wax-up & Heat press
APM	Amber Press	Wax block milling & Heat press

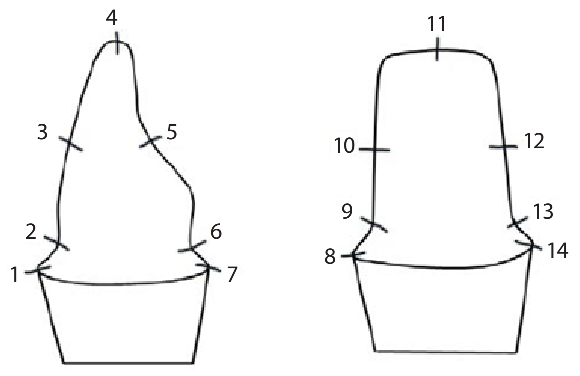

Figure 1. Reference point to measure maginal and inter gap

*Significant differences in values measured between each groups(p<0.016).

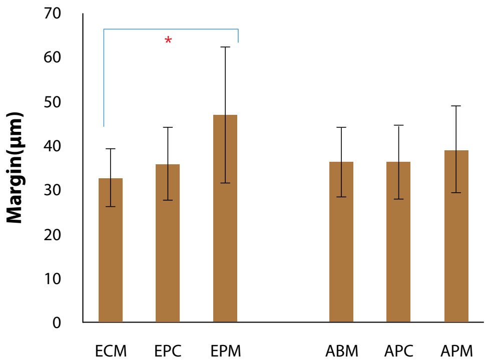

Figure 1. Mean and standard deviation of values measured at the margin (reference point: 1, 7, 8, 14).

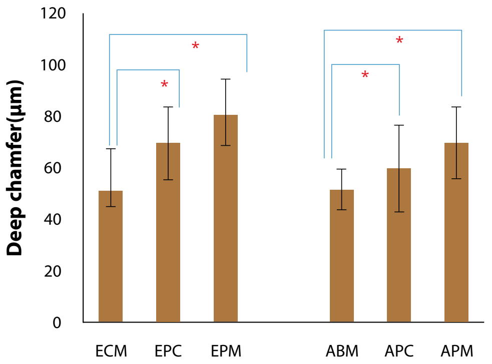

Figure 2. Mean and standard deviation of values measured at the deep chamfer (reference point: 12, 6, 9, 13).

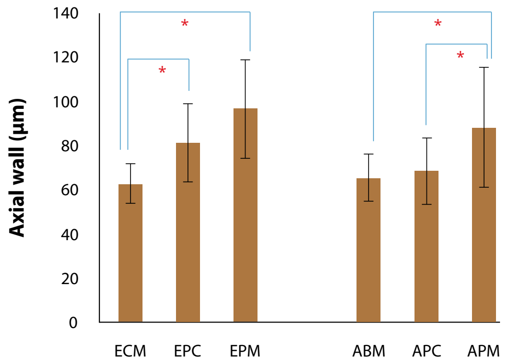

Figure 3. Mean and standard deviation of values measured at the axial wall (reference point: 3, 5, 10, 12).

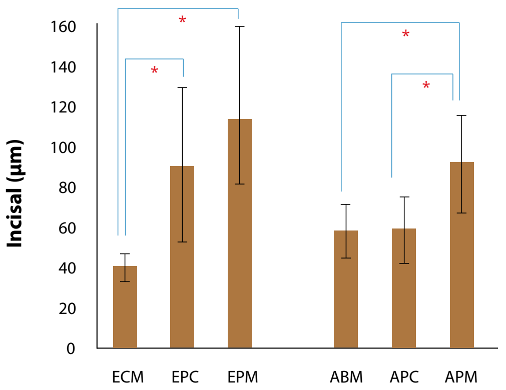

Figure 4. Mean and standard deviation of values measured at the incisal (reference point: 4, 11).

The conclusions according to the results of this study are as follows:

1. In Margin, the ECM group produced by CAD/CAM method showed superior marginal fit compared to the EPM group, and there was no statistically significant difference between the remaining groups.
2. In deep chamfer, the ECM and ABM groups produced by CAD/CAM method showed the best fit.
3. In axial wall and incisal, ECM group showed better fit than EPC and EPM group, and ABM group and APC group showed statistically significantly better fit than APM group.

There were differences in marginal and internal fit according to each manufacturing method, but all groups showed fit within the clinically acceptable range (120 μm).

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