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TRANSLUCENCY DIFFERENCES OF CONVENTIONAL GICS OVER TIME

BACKGROUND:

Translucency is a significant aspect of modern dental materials and is determined by the amount of transmitted visible light. It is therefore a highly valued characteristic for matching tooth colour and appearance. Glass lonomer Cements (GICs) are commonly criticised for their relatively low translucency when compared to tooth enamel, however, the new generation of GICs aim to address this aesthetic disadvantage.

OBJECTIVES:

To measure and compare the translucency of an experimental GIC and four market-leading products over time.

EXPERIMENTAL METHODS:

Four GICs from two manufacturers were compared with an experimental GIC: Equia Forte Fil (EFF) and Equia Forte HT (EFH), GC Corp, Tokyo, Japan; Ketac Molar (KM) and Ketac Universal (KU), 3M Espe, St Paul, MN; Experimental Prototype (EXP), SDI Ltd., Bayswater, Australia. Opacities were evaluated according to a modified version of ISO9917-1 Annex F¹. Discs (16.0±0.1 x 1.0±0.1 mm) were prepared according to manufacturers' instructions and stored in deionised water (37°C) before and after testing.

Translucency (100-Opacity(%)) was evaluated at 24 hours using an X-Rite™ spectrophotometer (12VDC-700MA-SP64) and retested at 7 and 30 days.

Values at 30 days were compared using an unpaired t-test (p<0.05), and overall change evaluated (ΔT).

RESULTS:

Material	Mean (SD)			ΔΤ (%)		1 Day	7 Days	30 Days
	Day 1	Day 7	Day 30	$\frac{T_1 - T_{30}}{T_{30}} \cdot 100\%$	rersal			
KU	21.61 (0.50)	26.00 (0.82)	32.51 (1.31) ^b	50.5%	. Univ			
EFF	27.91 (0.49)	34.33 (1.51)	38.04 (1.17) ^a	36.3%	Ketad			
EFH	24.18 (0.33)	30.94 (0.38)	31.18 (1.48) ^b	29.0%				
KM	17.21 (0.51)	17.66 (1.18)	21.84 (1.21) ^c	26.9%				
EXP	31.35 (0.66)	37.90 (1.25)	39.71 (1.14) a	26.7%	orte F			





Prototype SC

Ketac Molar

Equ

Equia Forte HT



DISCUSSION:

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As GICs mature, the on-going curing process will affect light transmission, a property that is largely dependent on the difference in the refractive index between the glass (filler)

and polymer (matrix) components². Next generation GIC developments have reduced this mismatch and demonstrate significate enhancements to translucency.

CONCLUSION:

Within this study, all GICs demonstrated a significant (>25%) increase in translucency over 30 days. The Experimental Prototype (EXP) had the highest translucency (39.7%) and greatest stability / least change (26.7 %).

REFERENCES:

¹International Organization for Standardization. Dentistry — Water-Based Cements— Part 1: Powder/Liquid Acid-Base Cements; 9917-1:2017; ISO: Geneva, Switzerland, 2017.

²Fujita K, Nishiyama N, Nemoto K, Okada T, Ikemi T. Effect of base monomer's refractive index on curing depth and polymerization conversion of photo-cured resin composites. Dent Mater J 2005; 24:403–408.