



EFFECT OF LED CURING MODES ON DEPTH OF CURE IN BULKFILL COMPOSITE RESIN

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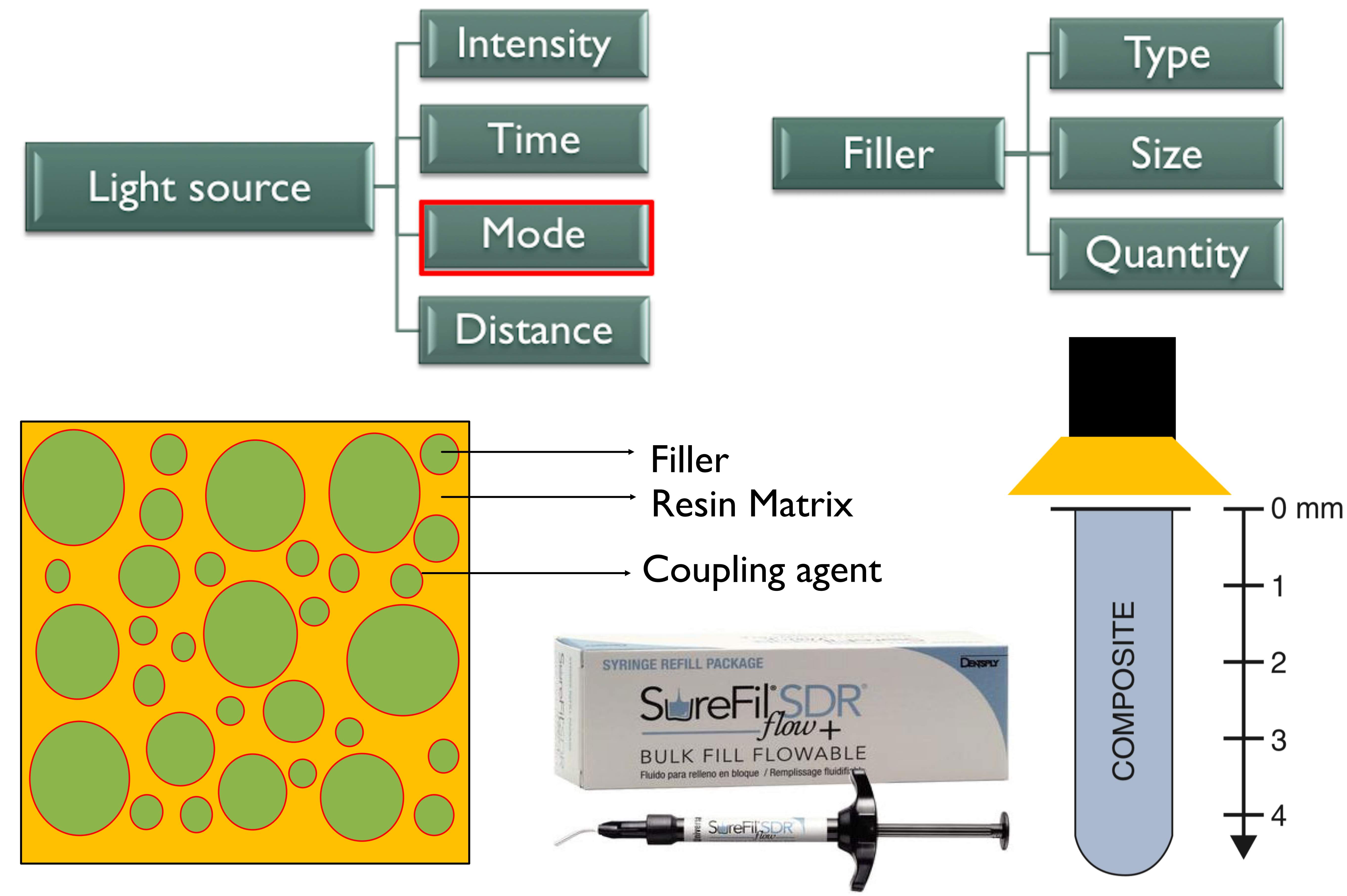
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OPERATIVE DENTISTRY

INTRODUCTION

Composite resin monomers are photocured at a wavelength of 420-480 nm. Various types of light curing units are used for photo polymerization of composite of which LED are commonly used. LED Light has different curing modes with variable intensities that influence the polymerization of the restorative material. Restoring deep cavities has a greater risk of trapping air or contaminants, bond failure and placement difficulty resulting in a sub optimal restoration. Therefore, SDR BulkFill composite materials have been introduced to overcome these problems. However, bulk fill materials have conflicting reports on their success. Hence, the purpose of this study is to explore the curing mode that could results in maximum depth cure in restorative material.



METHODOLOGY

Study Design: Experimental (In-vitro) study



Study Setting: Dental clinic, Aga Khan University



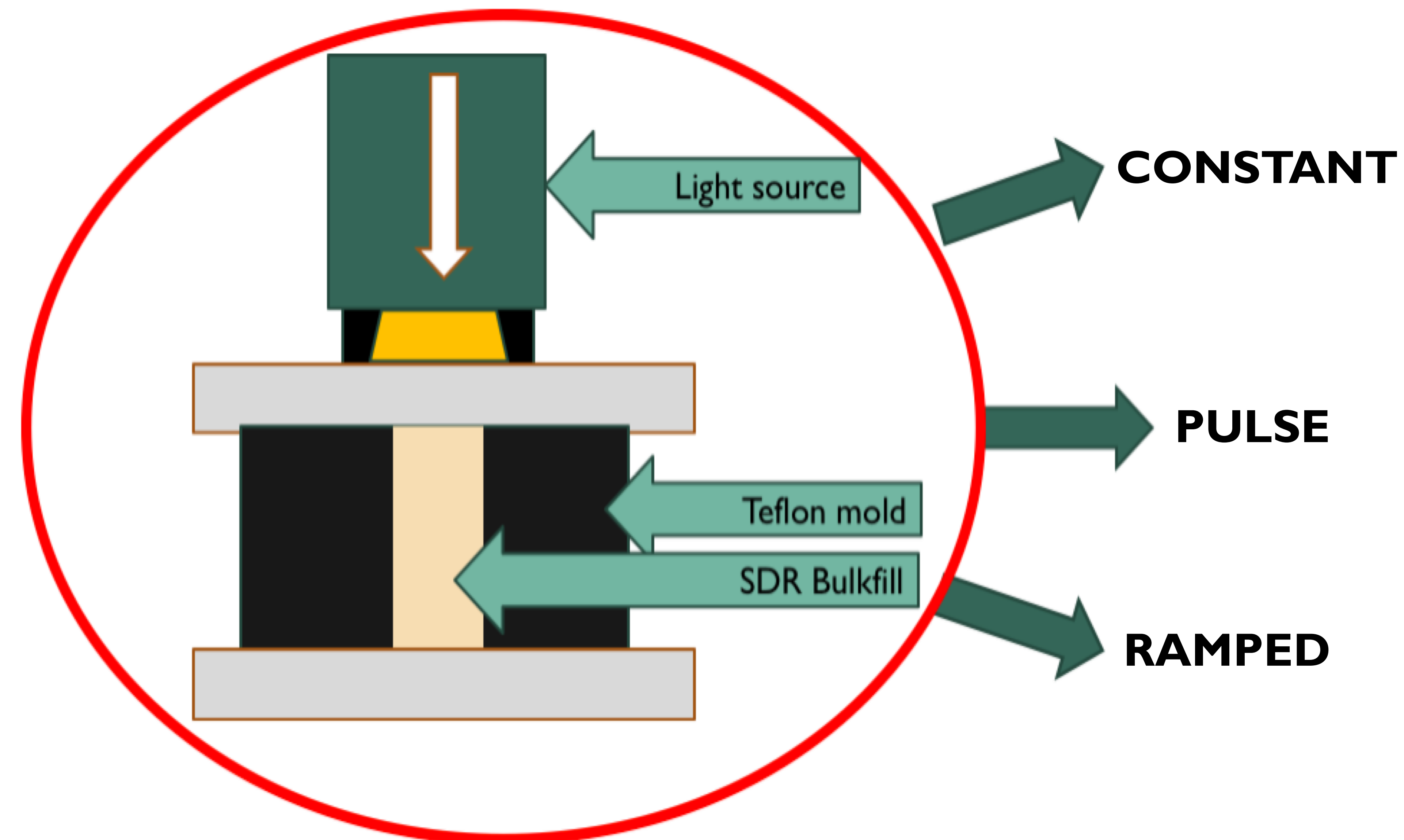
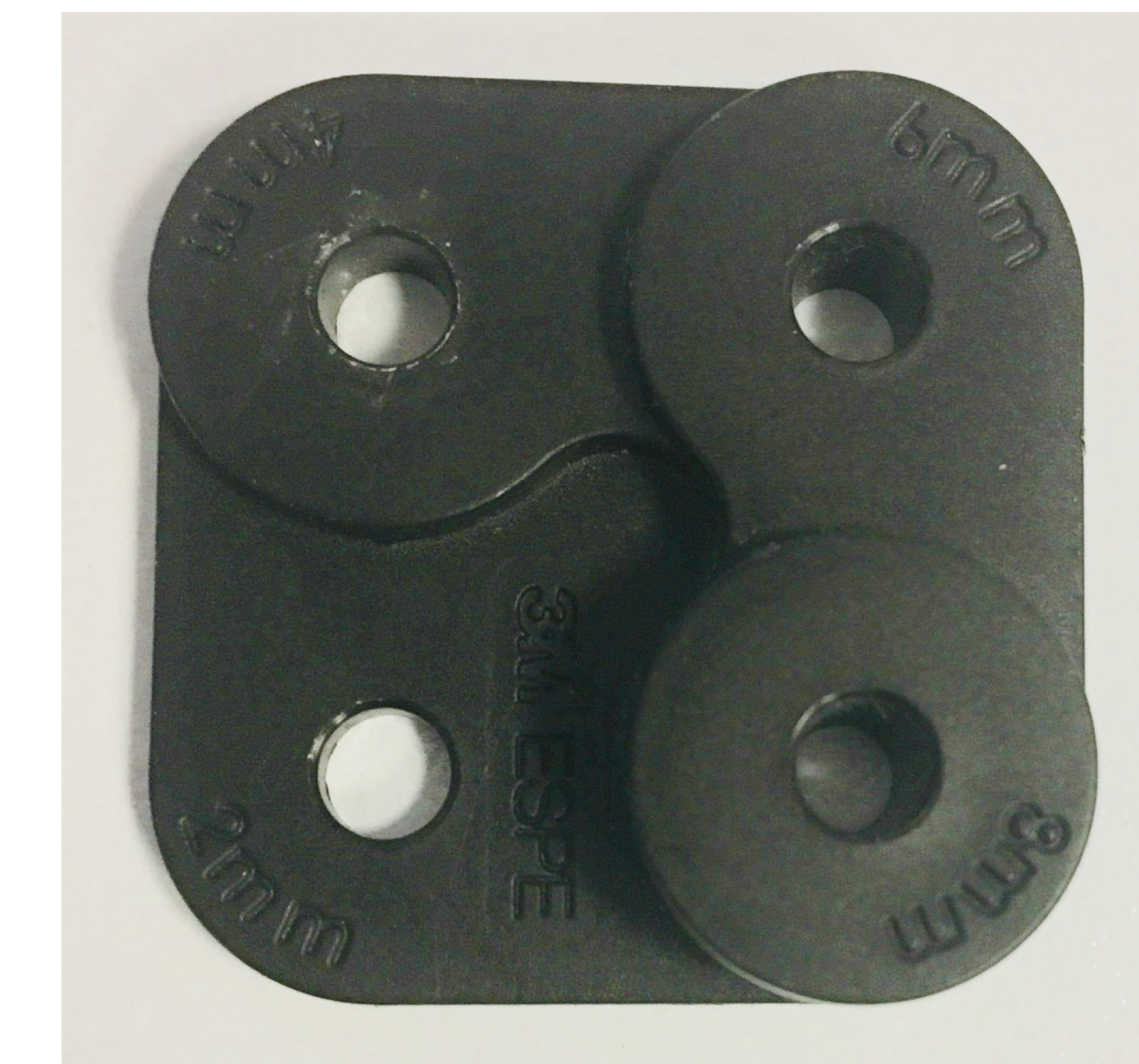
ERC exemption number: 2019-1986-5069



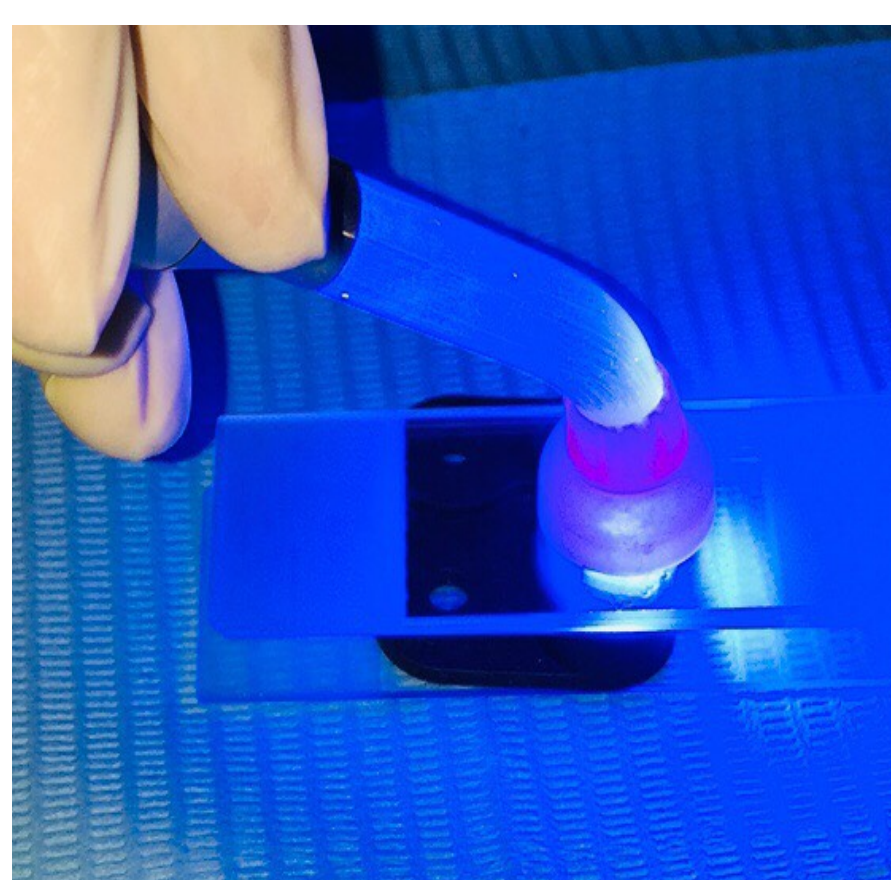
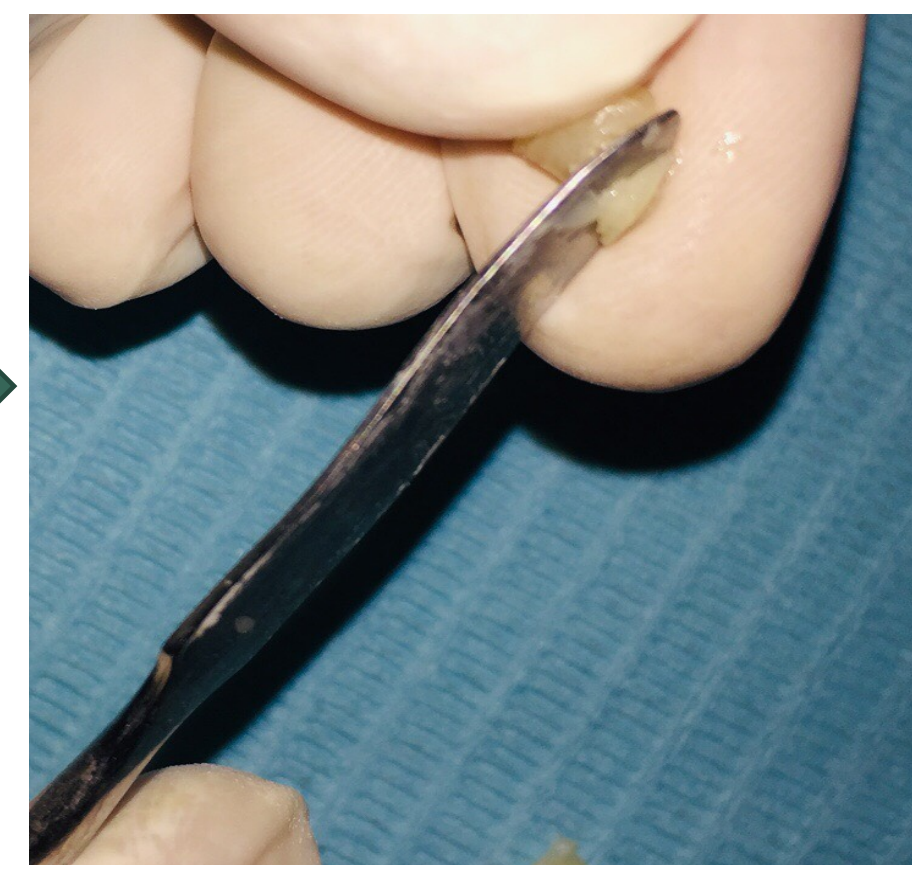
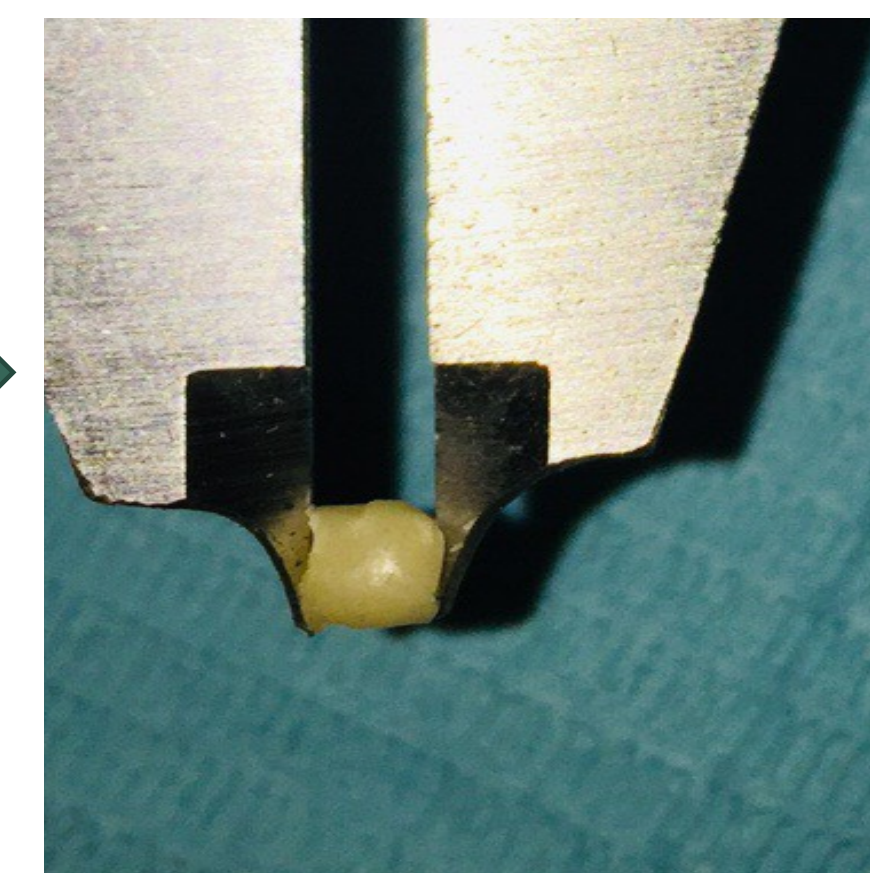
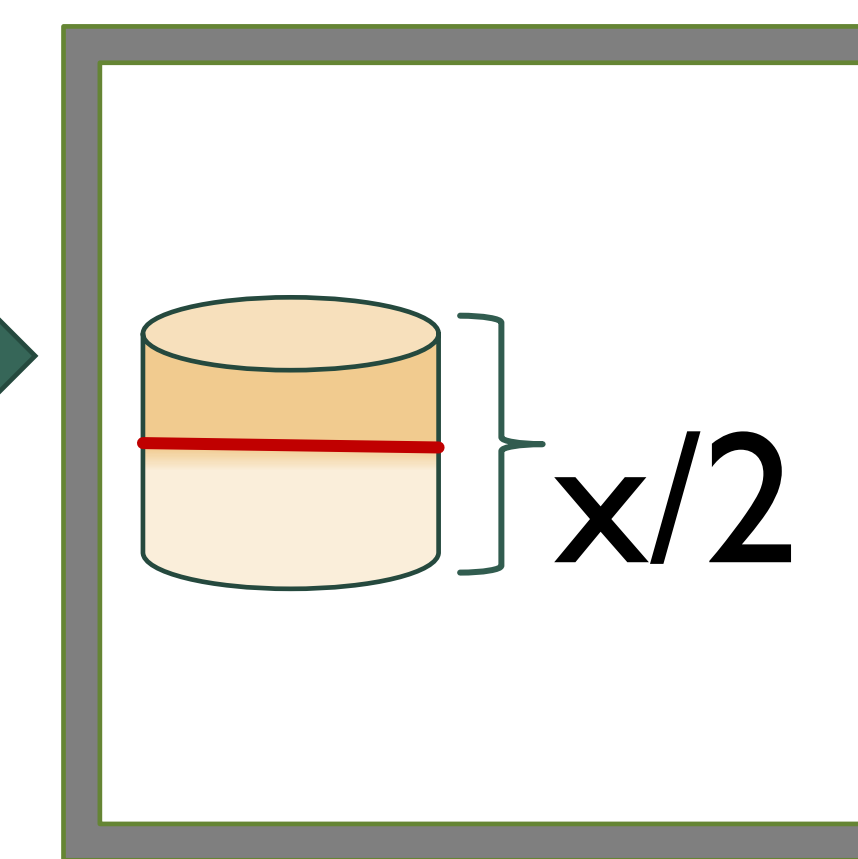
Sampling Technique: Non-probability, Consecutive



Sample size: 33 samples



ISO 4049



RESULTS

Curing Modes	n	Mean (mm)	Std. Deviation	p-value
Constant	11	2.92	0.29	0.03
Pulse	11	2.88	0.27	
Ramped	11	3.18	0.26	
Total	33			

ANOVA
*p-value <0.05

(I) Curing Modes	(J) Curing Modes	Mean Difference (I-J)	p-value
Constant	Pulse	0.05	0.92
Pulse	Ramped	-0.30	0.04
Ramped	Constant	-0.26	0.08

Tukey's post hoc
*p-value <0.05

DISCUSSION

Author year	Difference in DoC	Light Curing Unit	Material	Conclusion
M.S. Soh <i>et al.</i> 2004	Significant	Elipar Trilight	Z100 composite	Pulse Delay mode yield poor results
Monte <i>et al.</i> 2006	Significant	UltraLED	P-60,A-110, Admira, Supreme and Z-250.	Constant and Soft cure performed better than pulse
Poggio <i>et al.</i> 2012	Not Significant	Celalux II	Esthet.X HD,Amaris, Filtek Silorane, Grandio, Ceram.X mono, Filtek Supreme XT	Depth of Cure was not affected by polymerization mode
Alonso <i>et al.</i> 2014	Not Significant	XL2500	Experimental composites	Photoactivation methods had no effect on Depth of Cure
Miljković <i>et al.</i> 2018	Significant	DB 685	Valux Plus	Favoured constant mode
Hasslen <i>et al.</i> 2019	Not Significant	VALO	Filtek Z250,TPH Spectra, and Tetric EvoCeram Bulk Fill	Does not show a significant DOC difference among the three power setting
AKUH	Significant	Aceton Mini LED	SDR Bulkfill	Favoured ramped mode and constant mode

TAKE HOME MESSAGE

CONCLUSION

Pulse mode turned out to be inferior compared to constant and ramped curing methods in achieving appropriate polymerization depth in SDR BulkFill composite materials.

RECOMMENDATION

More research involving the use of other materials and multiple combinations of polymerization modes is warranted.