

Tooth Brush Abrasion and Light Curing Effects on the Gloss Retention and Repolishability of Composite Resins

Jackson Russell, Luis Sensi DDS, MS, PhD- Division Director of Operative Dentistry, Dr. Saulo Geraldelli DDS, MS, PhD – Division Director of Biomedical Materials
Department of General Dentistry, ECU School of Dental Medicine
Greenville, North Carolina, United States

Introduction

- Esthetic restorative treatments strongly rely on material's optical properties for accurate tooth mimicking
- Optical properties of composite resins depend on proper monomer conversion through light curing
- Little is known about the influence light curing procedures have on gloss retention and repolishability after exposure to mechanical wear (brushing)



Study Objective: To compare the effects of light curing and Tooth Brush Abrasion on the repolishability and gloss retention of various composites

Methods



48 specimens (10mm diameter and 2mm thick; N=6) were fabricated using 4 different composites and 2 different light curing settings on Valo Grand LCU:

- Composites:
- Surefil
 - Sonicfill
 - Fusion
 - Quixx
- Settings:
- Standard
 - Xtra



Gloss (GU) measurements taken before and after each polish.

Specimens were submerged in a 2:1 water:toothpaste slurry during aging cycles. 5000 brushing cycles is equivalent to approximately one year.



Results

Table 1: Change in gloss from Baseline to 3rd Polish for Standard Light Curing

Composite	Mean Diff. (GU)	Std. Deviation (GU)	Significance
Surefil	7.4 (± 8.4)	8.0	0.07
Sonicfil	2.6 (±8.9)	8.5	0.49
Fusion	-5.4 (±18.7)	17.8	0.49
Quixx	7.1 (±23.4)	22.3	0.47

Table 2: Change in gloss from Baseline to 3rd Polish for Xtra Light Curing

Composite	Mean Diff. (GU)	Std. Deviation (GU)	Significance
Surefil	-11.1 (±10.5)	10.0	0.04
Sonicfil	-8.6 (±7.6)	2.4	0.00
Fusion	8.9 (±6.8)	6.5	0.02
Quixx	7.0 (±13.5)	12.9	0.24

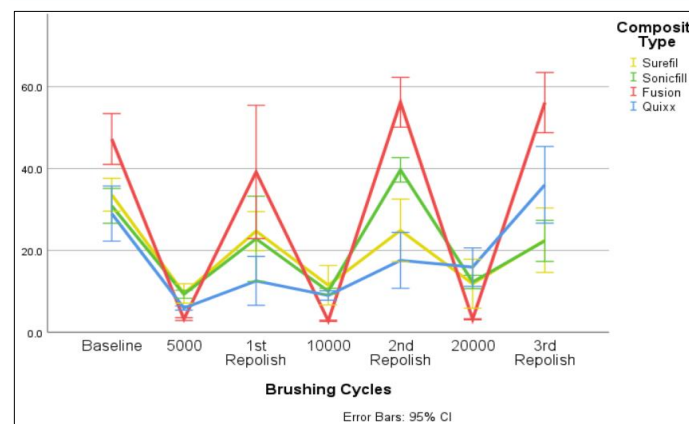
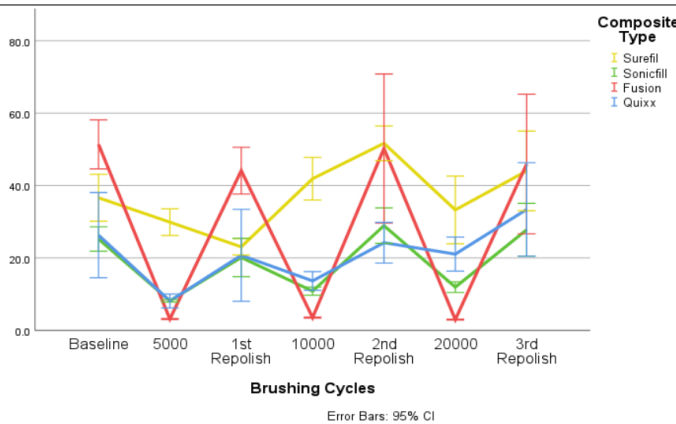


Figure A: Graphical representation of mean for Valo Grand standard light curing procedure

Figure B: Graphical representation of mean for Valo Grand Xtra light curing procedure

Discussion

Preliminary results found significant differences in gloss means while varying of total brushing cycles (.027) and composite type (<.01). Differences in gloss observed between composite groups is likely due to a difference in matrix and inorganic composition while increased cumulative wear explains the differences observed in gloss between aging cycles. Significant differences were also found between Baseline and 3rd Polish of Surefil (0.04), Sonicfill (>0.01), Fusion (0.02), and Quixx (0.24) when lighting curing by Xtra setting.

Conclusions

Light curing procedures had little effect on gloss retention of the specimens; however, differences between baseline and 3rd polishings were more significant when curing using the Xtra setting. Quixx were found to be the lowest gloss of all the specimens while Fusion had the highest. Further research is needed to understand significant differences encountered comparing the baseline and 3rd polishing subsets when utilizing the Xtra light curing setting.

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