Reaction of Heat to Polishing Tools

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Annotation

Studies of the surface roughness of composite restorations in scientific works, foreign, demonstrate its significant impact on various aspects, including aesthetics, staining, propensity for plaque accumulation (which can provoke gingival inflammation and caries), abrasive properties, restoration wear, and the patient's tactile sensations. Ryge's criteria for determining polishing quality are closely linked to this parameter [1]. It is important to remember that polishing is essentially friction, which generates heat. Excessive heat can negatively affect adhesion and lead to pulp damage [2]. Despite the existence of studies dedicated to examining the reaction of composite materials to mechanical, chemical, and thermal effects, little attention is paid to the influence of the heat generated during the finishing and polishing of composites on the dental pulp .

Materials and methods

The following polishing systems were used: based on a urethane binder: "Enforce Pin," "Diamond Sun"; based on a silicone binder: "Ensmart Pin," "Diamond Moon," "StarFlex septum". A thermal imager "Testo 875-1" was used to measure the temperature. Pre-fabricated samples (dentin, enamel, incisal edge, transparent) were subjected to polishing, applying the systems described above.

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Purpose of study

This study is aimed at analyzing the effect of various polishing systems on the temperature increase of composite material surfaces..

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Result of study

The study investigated how various polishing systems and their operating modes affect the temperature rise on composite surfaces. Key findings indicate that for the urethane-based "Enforce Pin" composite, the optimal polishing speed was 3000–5000 rpm, resulting in a heating temperature of ≤35 ◦C for dentin, enamel, and the transparent layer. The "Incisal Edge" sample consistently reached higher temperatures (up to 40 ◦ C), regardless of the system or sWhile urethane-based systems ("Enforce Pin," "Diamond Sun") at lower speeds (≈3000–5000 rpm) produced lower temperatures (≤35 ◦ C), silicone-based systems at higher speeds (≈6000–12000 rpm) heated more (up to 45 ◦ C). Notably, the "StarFlex septum" (silicone, 8000–12000 rpm) was cooler (40 C) than the "Diamond Moon" (silicone, 6000–12000 rpm), likely due to its use of reinforced silicone and unique shape. The degree of polish abrasiveness did not significantly affect sample temperature.

Conclusion

These results suggests that facpeed, suggesting the tooth area/composite layer significantly impacts heating. tors beyond the rotation speed and the type of polish, such as the composition of the composite, can influence surface heating.

References:

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