PULP CHAMBER TEMPERATURE VARIATIONS USING THREE TYPES OF LIGHT CURING UNITS

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INTRODUCTION: In light cured composite resins, a light source of adequate intensity and wavelength from 400 to 500 nm activates camphorquinone with peak absorption at 468 nm. Three essential components are required for an adequate polymerization: sufficient radiant intensity, correct wavelength of the visible light and optimum curing time. Other factors such as type of composite resin, shade and translucency, temperature of the composite material [1], thickness of the increment, distance of the light tip from the surface of the material, curing time and post-irradiation time [2], also influence the depth, and therefore the efficiency of polymerization.

METHODS: For determining the pulp chamber temperature, a KTY 11-6 Infineon traductor was inserted. The main advantages of this traductor are: the reduced size (2,1/1,9 mm), weight (0,02 g), linear output, excellent long term stability, fast responding time. A class I cavity was prepared in an extracted molar, leaving a 1 mm thick dentin layer between the pulp chamber and the bottom of the cavity. The cavity walls were divergent to allow the filling to be taken out. A 2 mm composite resin (the same in each sample) layer was applied into the cavity and light cured. For the reproducibility process a mark was done on the tooth cavity walls in order to maintain the 2 mm composite layer. No etching or bonding materials were used. Taking out the filling was done by high speed drilling in permanent cooling and sharp instruments for leaving a 1mm thick dentin layer between the pulp chamber and the bottom of the cavity. The curing units used were: halogen unit (Degulux, Degussa), LED (Bluphase C5, Vivadent and MiniLed, DeTrey Dentsply) and plasma unit (Apollo 95E, DMDS). 20 seconds were considered for the curing procedure for halogen and LED curing units and 6 seconds for the plasma unit.

RESULTS: Measurements of the pulp chamber temperature were done in every second for each type of curing light unit, untill the temperature reached a constant level. The results of the temperature measurements were mediated in order to obtain as realistic values as possible.

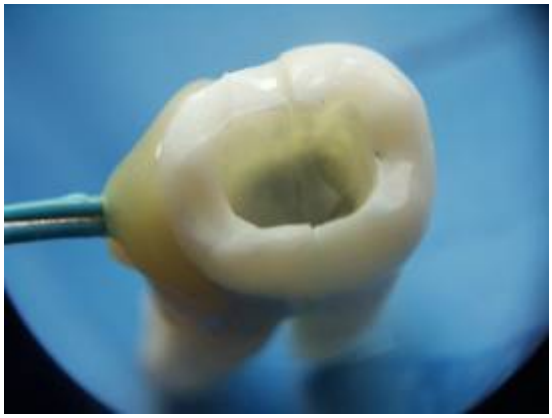

Fig. 1. The tooth with the traductor inserted in the pulp chamber.

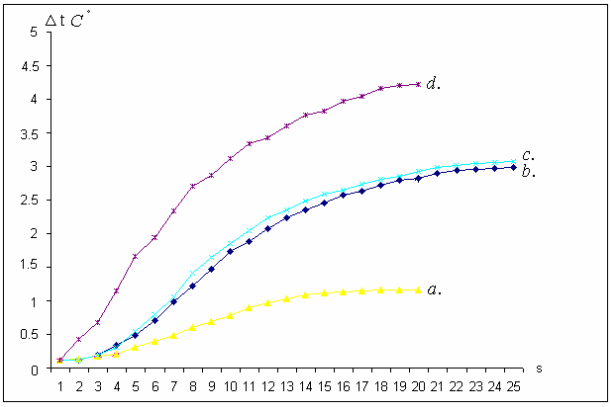

Fig. 2. The graphic represents the pulp chamber variation temperature until the maximum is achived. Temperature variation in pulp chamber for: a –Apollo 95E; b – Bluphase C5; c –MiniLed; d – Degulux .

DISCUSSION & CONCLUSIONS: The results obtained with this type of traductor points out a higher risk of overheating the pulp chamber when halogen lamps are used, compared to the LED curing units (fig. 2). The plasma curing unit induced the lowest temperature variation, being the minimal invasive curing device from the selected ones.

REFERENCES:

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