O-11 Light transmittability of three light curing sources on composite resin

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Ⅰ. Objectives

The purpose of this study is to evaluate the light transmittability of three different light sources: conventional halogen, light emitting diode(LED), and plasma arc, by microhardness test.

Ⅱ. Materials and methods

Stainless steel molds which have a hole, 7mm in diameter, 1, 2, 3, 4, and 5mm in thickness, were prepared. Mold was placed on a microscope slide and a transparent matrix was inserted between the mold and the slide for easy separation of specimen from slide. The hybrid composite Z100 was packed into the hole of the mold with slight excess and covered by a second matrix and microscope slide. Slide was forced to the mold for acquiring the composite thickness equal to the mold. After removal of second slide, the tip of light curing unit was directly placed on the center of the mold and curing light was activated for designated time.

Three different light sources, conventional halogen, light emitting diode, and plasma arc, were used for curing of composite. Two different curing time system applied: one is to follow the manufacturer s recommendation.(40s for halogen and LED, 3s for plasma) Another is to extend the curing time of LED and plasma(14s for plasma, 70s for LED) for balancing the light energy with halogen. Ten specimens were prepared for every combination of curing unit and thickness. Immediately after light curing, the Vickers hardness was measured(200g load, 20s dwell time) at three different points around the center of specimen. Data was analyzed using SPSS Ver 10.0 with ANOVA test.

Ⅲ. Results

1. When the composite was cured by manufacturer s recommendation, plasma showed lower microhardness than the others at all thickness.
2. When the composite was cured by manufacturer s recommendation, LED showed higher microhardnesss than halogen at 5mm level. It didn t show statistically significant difference in microhardness between halogen and LED at all thickness except 5mm.
3. Microhardness of composite cured by plasma and LED for extended curing time was higher than that cured by three light sources for the recommended time by manufact- urer at all thickness.

Ⅳ. Conclusion

Curing of composite with plasma arc for 3s by manufacturer s recommendation resulted in lower microhardness value, that is, inferior light transmittability, than conventional halogen, but microhardness of composite cured by LED was statistically equivalent to that cured by conventional halogen. This study suggested that plasma arc needs properly extended curing time.