Light curing may not be as simple as it seems: again!

F J Trevor Burke

In a Comment in 2011, I drew readers’ attention to a number of problems associated with Light Curing Units (LCUs), today an essential part of the dental clinicians’ armamentarium. These included deficiencies in the disinfection of LCUs, and anxieties regarding the delivery of sufficient light energy to a given resin composite restoration. Given that the use of resin composite restorations is increasing and will continue to increase as the phasedown in the use of amalgam gathers pace, the optimum use of an LCU will become increasingly relevant.

In lecturing engagements, I have had occasion to ask the question – Do you ever check the intensity of your LCU? Generally, a small proportion of hands go up and, when the supplementary question is asked, – Do you think you should?, everyone agrees that they should! Not that I am trying to make people feel guilty, but this is nothing new! In a survey conducted by the FGDP (UK), fewer than 30% of respondents reported that they had access to a radiometer, with this figure being little different from that reported in 1997 when it was reported that only 20% of dental practices had a means of checking the light intensity of their LCU. Recent results from the US-based Clinicians Report indicated that 21% of dentists never checked the output of their LCU.

Does it matter? While it would be ethically unsound to conduct a clinical trial of inadequately cured resin composite restorations, one can surmise that, if the restoration does not receive adequate energy, either because the light is not directed correctly or because the LCU is performing suboptimally, the properties of inadequately cured resin composite will have a negative effect on restoration longevity. Five years ago, I concluded by writing – Do we now take light curing too much for granted? Perhaps this is still the case, but perhaps this Comment will stimulate readers into initiating a process whereby a given member of staff will, on a monthly (or at least on a regular) basis, be given the task of checking the output of each LCU in the practice, with the aim of monitoring whether the output is remaining constant with time, using the same measurement device and light guide, and replacing or repairing an LCU whose output is decreasing.

There is an added potential complication. The most commonly used initiator, camphorquinone, is yellow in colour (albeit turning almost clear when light cured). Accordingly, manufacturers may use alternative initiators which are not yellow when they are manufacturing bleached white or translucent shades of composite, and these alternative photoinitiators are sensitive to lower wavelengths of light. It is therefore important that clinicians know the wavelengths transmitted by their LCU and the optimum wavelength for curing the particular brand of composite that they are using. It is here that the manufacturers can help – by stating if a given (bleached white) shade of composite has an alternative photoinitiator and thereby might require an LCU with the appropriate spectral output.

Lastly, great thanks are due to Professor Edwina Kidd (Emeritus member of the Dental Update Editorial Board) and her co-authors for the very different, very beautiful lead article in the present issue. How many readers were previously aware of Winnie-the-Pooh’s relevance to dentistry? The Editorial Director certainly was not!

References
1. Burke FJT. Light curing may not be as simple as it seems. Dent Update 2011; 38: 148.