Summary of: The effect of disposable infection control barriers and physical damage on the power output of light curing units and light curing tips

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VERIFIABLE CPD PAPER

FULL PAPER DETAILS

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This study investigated the effects that disposable infection control barriers and physical damage through use had on the power output from dental light curing units (LCUs) and light curing tips (LCTs). Five disposable infection control barriers were tested on a number of LCUs and LCTs. Testing involved the repeated measurement of power output of LCUs and LCTs on a radiometer. Two of the barriers tested caused statistically significant reductions in the mean light output intensity when compared to the no barrier control groups. One barrier type reduced the power output by 30 to 40%. It was also noted that physical damage to the LCTs affected power output by between 20 and 30%, which was then further reduced by the disposable barrier. This study showed that three of the five disposable infection control barriers had little effect on the overall efficiency of the power output of the LCUs. It also showed that physical damage to LCUs and LCTs can affect power output significantly. Infection control measures should be carefully considered before use to avoid undue effects on power output delivered from the LCUs/LCTs to ensure that the degree of polymerisation within the resin-based composite and curing efficiency are not affected unduly.

EDITOR'S SUMMARY

Few dentists today would be able to argue that they are unaware of the importance of maintaining high standards of infection control in their practices, such is the constant stream of guidance, legislation, comment and opinion in the wake of HTM 01-05. This journal, amongst many others, has published numerous articles on the subject in recent years, as can be easily seen on the BDJ website by visiting the 'cross infection control' category within BDJ Collections. However, most of these articles concentrate on the problems that may arise when infection control is sub-standard. This article looks at the subject from a different viewpoint: the potential for infection control measures themselves to cause unexpected problems.

As re-usable pieces of equipment, it is naturally important that light curing units (and their tips) are subject to effective decontamination processes

after use. The use of disposable barriers removes the need for repeated autoclaving or disinfecting of light curing tips and is therefore appealing, but if the barrier reduces the intensity of the light emitted by the unit, the performance of the restoration being cured could be decreased. This study aimed to investigate to what extent various barriers affected the output of light curing units and tips, as well as the effects of physical damage to the tips caused by repeated use and disinfection.

The greatest reduction in power output seen was when a dental glove was used as a barrier. The authors mention in the methods section of their article that the barriers they tested 'have been suggested as having potential with respect to infection control in the dental surgery.' It would be interesting to know whether they know of anyone using dental gloves in this way themselves! Importantly, however, the commercially available

barrier sleeve and the two different 'cling-film' wraps tested all had little effect on the power output of the units tested; given that damage to the light curing tips resulted in a reduction in power output, it seems clear that correct use of a suitable infection control barrier is a sensible solution to the potential problem of light curing tip contamination.

The full paper can be accessed from the BDJ website (www.bdj.co.uk), under 'Research' in the table of contents for Volume 210 issue 8.

Rowena Milan
Managing Editor

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IN BRIEF

- Shows that cross infection control barriers can indirectly affect the cure of light-activated resin composite.
- Demonstrates that food wrap material is just as effective a barrier as some commercial products.
- Highlights that the effects of physical damage along with those of cross infection control measures should be considered clinically important.

COMMENTARY

This study investigated the effects of disposable infection control barriers and physical damage to the tip on light output from four dental light-curing units. The radiometer used in the study was not previously calibrated and the curing lights were not retested at the conclusion of each experiment. Neither the distance between the light source tip and the radiometer nor the relative sizes of the tips and the radiometer sensor are specified. Readers of the abstract may be alarmed to learn that one of the barrier methods employed reduced light output by up to 40%. However, examination of the full paper will reveal that the two barriers found to reduce light output significantly were fingers cut from plastic gloves and finger cots! While dentists are certainly inventive professionals and some may indeed use such barriers, the writer of this commentary cannot recall inclusion of the same in any manufacturer's instructions he has read! In confirmation of previously published work, the authors found only modest reductions in light output using more conventional barriers such as cling film and a proprietary plastic sleeve. These reductions were unlikely to be of clinical significance.

The damage to the 'damaged' light curing tips was not standardised or quantified. As might be expected from the samples shown, damage to the tip was associated with a substantial reduction in light output, likely to be of clinical significance. The effect of

damage and use of a barrier on light output was cumulative but again, the contribution of the more conventional barriers was small. The authors rightly emphasise the importance of regular maintenance and care of light curing devices and their tips and the need for regular testing of light output.

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AUTHOR QUESTIONS AND ANSWERS**1. Why did you undertake this research?**

Resin composites are used in a variety of ways in dentistry. Light-activated restorative resin composites are generally believed to have revolutionised operative dentistry and have become one of the most popular filling materials in clinical use. Light-activated resin composite offers many clinical advantages over chemically cured resin composites, most notably command set and ease of manipulation. As resin composites have increased in popularity over the last 20 or so years, a variety of curing lights with different characteristics have been developed. The impact that light sources can have on the final restoration is crucial. The effect that clinical cross-infection control measures have on the light source and indeed the final restoration was believed to be an important area for investigation and was the underlying reason for completing this research.

2. What would you like to do next in this area to follow on from this work?

This research showed that light source and cross infection control measures have the potential to cause significant clinical effects. Further research will be needed to fully assess the physical parameters associated with ineffective curing. This research will strengthen the message that there is potential for significant clinical effects and that clinical practice can be affected. As light sources evolve and newer methods of cross infection control are introduced further evaluations will be needed.