

RESEARCH SUMMARY

Contamination by air turbine handpieces

Discharge of lubricant from air turbine handpieces. **A. S. M. Pong, J. E. Dyson and B. W. Darvell**
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Objective

To demonstrate and quantify the discharge of lubricating oil from high-speed air turbine handpieces whilst running.

Materials and methods

Dye-marked oil (Kavospray, KaVo) was used to lubricate four handpieces (Quiet-Air, Midwest) and the air discharged from around the lower bearing was directed at the moving chart paper on a recorder whilst running for 40 minutes. Secondly, seven new handpieces (Quiet-Air, 300SE, Midwest; Topair 796, Topair 795, W&H; VIP-Σ, Pana-air, NSK; Lares, Lares Research) were cleaned, weighed and then lubricated with unmarked oil (Kavospray, KaVo). Oil discharge was determined gravimetrically over runs of 240 minutes. Data were fitted to the logistic dose response function.

Result

The dye-marked oil tests showed that oil was discharged for at least 40 minutes in the direction of the bur. The gravimetric tests showed that oil continued to be discharged up to at least 240 minutes, and that the usual practice of removing excess lubricant by running for 1–2 minutes was ineffective in preventing cut-surface contamination.

Significance

Bonding procedures in dentistry may be jeopardised by oil contamination from handpiece lubricants. Decontamination with a detergent is suggested as a means of ensuring effective adhesive dentistry.

IN BRIEF

- Oil contamination will occur when oil-lubricated air turbine handpieces are used.
- Decontamination of cut surfaces is essential to ensure proper bonding, especially for self-etching systems.
- Oil-free handpieces may be a preferable alternative from this point of view.

COMMENT

Within dental practice the use of ball-bearing type air-turbine handpieces is common and routine lubrication for reduced friction and associated wear and increased corrosion protection. Routine lubrication prior to autoclaving generally involves the pressurised injection of oil, however, it has been identified previously that contamination of acid-etched enamel by handpiece lubricants can reduce the bond strength achievable between enamel and the restorative material.

In response to the commonly held belief that running the turbine for a short period prior to use is adequate to expel the excess lubricant following routine lubrication the current study by this group addresses the discharge of lubricant from air-turbine handpieces with a view to characterising the risk and identifying procedures that could eliminate or minimise the associated risk.

Dye-marked lubricant was employed to lubricate ball-bearing type air-turbine handpieces by injecting into the drive air-supply for two seconds at a pressure consistent with that of a spray can. A gravimetric determination of the oil discharge was also made by the authors using similar unused ball-bearing type air-turbine handpieces. The authors ascertained that a considerable amount of oil was discharged within the first few minutes but that oil continued to be detected up to 40 minutes. The study demonstrates the potential of enamel contamination which will result in a compromise of the bond strength achievable between enamel and the restorative material which is crucial for adhesive dentistry.

This timely and well controlled study highlights the importance of an appropriate decontamination procedures following routine lubrication prior to autoclaving which commonly involves a pressurised injection of oil.

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