

Personal protective equipment: a commentary for the dental and oral health care team



Personal protective equipment for preventing highly infectious diseases due to exposure to contaminated body fluids in healthcare staff (Review)

During epidemics/pandemics of highly infectious diseases, such as COVID-19, healthcare workers (HCW) are at greater risk of infection than the general population. Personal protective equipment (PPE) offers a way of reducing the risk of infection, when treating patients, by minimising exposure to contaminated body fluids.

The recently published Cochrane Review (Verbeek et al, 2020), aimed to evaluate which type of full-body PPE and which method of donning (putting on) or doffing (removing) PPE have the least risk of contamination or infection for HCW, and which training methods increase compliance with PPE protocols. For COVID-19, this entails preventing droplets from entering mouth, nose or eyes and preventing them from contaminating the skin elsewhere. Dentists and members of the dental team work in close proximity, usually face-to-face, with patients often for sustained periods of time. As part of routine care, they are exposed to saliva and blood and carry out aerosol-generating procedures (e.g. use of high-speed air rotors and ultrasonic scalers), making the findings of this review highly relevant to them.

Despite the review setting out to include a broad range of HCW, none of the 24 identified studies (controlled studies, either randomised or non-randomised) was based in the dental environment or included members of the dental team. However, the findings of the review can be seen to be applicable to the dental care setting.

The certainty of the evidence, across all comparisons, was judged to be low or very low. This is predominantly because for each comparison there was only one or two small studies, at either high or unclear risk of bias and all but two studies were based on simulation of exposure with a fluorescent marker or harmless microbes. In addition, most studies did not indicate if the PPE that they used complied with one or more of the international standards for protective clothing.

Whilst members of the dental team are very experienced in the use of standard PPE, most

work within primary care settings and may be less familiar with more extensive forms of PPE. The review suggests that covering more parts of the body (e.g. using a long gown rather than merely an apron) provides better protection against contamination. However, the authors highlight the difficulty in donning and doffing such PPE which could potentially increase self-contamination. PPE made from more breathable material may help increase user satisfaction, with little impact on contamination. The head and neck areas of the dental team are particularly at risk during dental procedures and PPE coverage protecting these areas, is highlighted within the review. Better fitting PPE, sealed gown and glove combinations and tabs to grab during doffing and donning may all help reduce contamination. The review did not specifically address protection for airborne transmission such as occurs during aerosol generating procedures. During such procedures dental staff should take care of the proper level of respiratory protection.

Additional measures to reduce the risks of contamination relevant to the dental team include the use of Center for Disease Control (CDC) guidance for donning and doffing, additional spoken instructions during doffing, and techniques including one step removal of PPE, sanitation of gloves prior to removal and double gloving.

Recommendations for education and training in donning and doffing are particularly important for dental teams who may not be familiar with the processes involved in using more extensive types of PPE. Face-to-face training opportunities may reduce the likelihood of errors alongside computer simulation or videos to support these skills. Space and time for donning and particularly doffing of PPE must also be considered as part of dental surgery design and management.

Research is urgently required to build evidence on what type(s) of PPE, and which modifications provide most appropriate, manageable protection for members of the dental team in delivering care safely. This review provides helpful insights on the research required and the importance of registering and co-ordinating research with comparable outcomes.

First, we urge centres delivering emergency dental care during this pandemic to contribute real life evidence on the setting, staff, patients, care and outcomes. This should include details of the setting, education and training of staff, fit testing, details of PPE used, donning and doffing methods, nature of patient care delivered, and exposure to the virus. Follow-up of staff will further add to the evidence on outcomes.

Second, trials simulating a range of dental care processes and procedures with exposure to harmless viruses, bacteria or chemicals in dental settings considering droplets and aerosols, possibly using mannequins, should be established. These should be relevant to hospital, primary care and community settings, including domiciliary care.

Third, comparison of PPE for highly infectious patients with standard PPE in simulation exercises will be particularly helpful to determine additional benefits and requirements for different aspects of dental care. This includes the effect of goggles and face shields which are vital for dental care and for which there are currently no studies with healthcare staff.

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