#whaims
aims.wh.com

Advanced Infection prevention Management Solutions

Article Summary

Cross-transmission in the dental office:

Does this make you ill?

Original article by Volgenant & de Soet in Current Oral Health Reports (2018) 5:221–228.

The article is a review paper of the literature relating to transmission of infections in dental practice. As the authors "aimed to provide the latest insights in the relative risks of transmission of (pathogenic) micro-organisms in the dental office" a number of new scientific publications is presented for which they discuss possible risks of transmission to patients through dental treatment. There is no method section outlining how the literature was searched, but a categorization is provided by the authors in the reference section to indicate important papers.

One major principle is stressed in the beginning: "The prevention of disease becomes more and more important in an era where increased antibiotic resistance results in a rise in untreatable infections." A key element in disease prevention is understanding infection and transmission pathways. Accordingly, three modes of transmission enabling microorganisms to reach potential hosts are exemplified in the text.

Transmission by Direct contact: This can occur via hands, improper sterilised instruments or needle stick accidents. The magnitude of this type of cross-transmission is difficult to estimate as there are no active surveillance programmes in place for post-operative infections in dental practice. Examples given in this section are based on work undertaken on **Methacillin-resistant Staphylococcus aureus (MRSA)** carriage and transmission linked to dental staff or the dental environment. Further difficulties in estimating the risk of transmission in dental practices are highlighted since not all transmissions will result in infection. So, most of these will lead to transient colonization in the case of MRSA rather than infection. Additional studies are discussed, and the authors again showcase challenges in obtaining a good quality evidence base by indicating that the possibility for cross-transmission through dental equipment exists. Although undeniable proof is difficult to obtain, probably due to incomplete reporting and confounding variables.

Transmission by blood contact: A risk of transmission in the dental office exists when pathogens are transported directly from blood (e.g., of the patient) to blood (e.g., of the Dental Health Care Personnel (DHCP). These blood exposure accidents (BEAs) are common in dentistry with frequent work with sharp instruments and needles. In a recent (2016) overview concerning transmission of blood-borne pathogens in the USA, Cleveland et al. found only three reports on cross-infection of HBV and HCV in the dental health care setting. Thus, it is concluded that there is a risk in the dental office, for transmission of blood-borne pathogens but this risk is low. From the perspective of health and safety for DHCP introduction of safety engineered devices or improved injection techniques to prevent BEAs have been recommended and should be adopted wherever possible in dental practice.

Transmission by dental unit water and aerosols: The most reported pathogens from contaminated water are Legionella and Pseudomonas species, but also, opportunistic genera such as Propioniumbacterium, Mycobacterium and Stenotrophomonas species are detected in the dental unit water line (DUWL). In dentistry two cases of legionellosis have been reported recently. However, despite the fact that two people died from a Legionella-pneumonia after a dental treatment, it still is debated whether (contaminated) DUWLs were the source of the Legionella, or that this bacterium had a different origin. Currently, no scientific evidence exists supporting an overall high occupational risk of Legionella infection from DUWL.

In discussion, it is suggested that the research reports described in the review underline the potential for transmission resulting in infection or carriage of micro-organisms. Consequently, maintaining a high standard of infection preventive measures for all patients must take a high priority. But the authors also emphasise their concerns that a number of studies conclude that the knowledge of DHCP about cross-transmission, cross-infection and how to prevent them is low.

A note on relative and absolute risks

A relative risk is a ratio of the probability of an event occurring in the exposed group (in this case patients exposed to dental treatment where there has been a deficiency in infection prevention) versus the probability of the event occurring in the non-exposed group (not receiving dental treatment). Relative risk does not provide any information about the absolute risk of the event occurring but rather the higher or lower likelihood of the event in the exposure versus the non-exposure group.

Thus, to calculate the relative risk, we must know the exposure status of all individuals (either exposed or not exposed). This implies that relative risk is only appropriate for cases where the exposure status and incidence of disease can be accurately determined such as prospective cohort studies – this is very difficult to undertake in dentistry unless one is investigating a specific exposure risk such as, BBV risk in a specific incident investigation.

Relative risks are often reported in newspaper headlines, but without the context of absolute (or baseline) risk, this information is meaningless. Absolute risk numbers are needed to understand the implications of relative risks and how specific factors or behaviours affect the likelihood of developing a disease or health condition.

Absolute risk is the actual risk of some event happening given the current exposure. Absolute risks are needed to understand relative risk. This is very difficult to calculate for routine dental treatment as there is little or no data on adverse events in treated and/or control groups.

For more details on risk see
https://www.harding-center.mpg.de/en/persons/gerd-gigerenzer

Or
D Spiegelhalter https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2937730

Cited article:
Volgenant, C.M.C., de Soet, J.J. Cross-transmission in the Dental Office: Does This Make You Ill?. Curr Oral Health Rep 5, 221–228 (2018). https://doi.org/10.1007/s40496-018-0201-3