SYNOPSIS

KEY POINT SUMMARY

OBJECTIVES

The purpose of the study was to investigate the effects of building renovation and infection control practice changes on bacterial contamination of environmental surfaces in dental operatories at a large teaching clinic.

DESIGN IMPLICATIONS

Environmental design is an important part of infection prevention in dental operatories. Designers may select environmental surfaces that are likely to be contaminated and easier to clean and maintain.

Further research is needed on the effects of individual environmental changes in this study (e.g. reduction of environmental surfaces, foot-operated sink).

Surface Contamination in the Dental Operatory: A Comparison Over Two Decades

Williams, H.N., Singh, R., Romberg, E.
2003 | Journal of the American Dental Association
Volume 134, Issue 3, Pages 325-330

Key Concepts/Context

Infection prevention is a major concern in dental healthcare settings. Patients and dental healthcare professionals may be exposed to pathogenic bacteria and viruses (e.g. cytomegalovirus, herpes simplex virus types 1 and 2, HIV, staphylococci) that colonize or infect the respiratory tract or the oral cavity. These pathogens can be transmitted through direct contact, indirect contact with contaminated surfaces, droplets, and airborne microorganisms. Environmental surface contamination is an important factor contributing to infection transmission in dental settings because dental procedure may produce aerosols and spatter and airborne microorganisms may settle on environmental surfaces and survive for extended period.

Methods

This before-after study compared bacterial contamination levels on selected environmental surfaces in dental operatories in 1976 and in 1998. In 1990, the clinic was renovated to incorporate several environmental measures for infection prevention: reduction of the number of surface areas, mobile countertops that replaced stationary countertops, central sterilization facility, autoclavable handpieces, and foot-pedal controlled sinks that replaced sink handles. At the same time, infection control practice was enhanced through policy changes and education. Environmental surfaces (e.g. walls, floor, sink, light handles, instrument tray, and headrest cover) in about 30 randomly selected dental operatories were sampled (through culture and incubation) twice a day (i.e. morning and afternoon) and the number of bacterial colony-forming units per sampling plate was calculated. Statistical analyses were conducted to compare the bacterial counts on the same type of surfaces sampled in 1976 and 1998.

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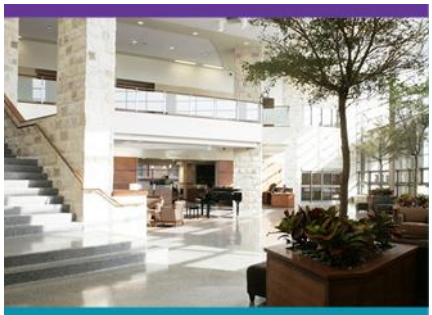

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Findings

Bacterial contamination level was higher at the end of the day than in the morning. Significant differences between 1998 and 1976 were found on the bacterial contamination level of light handles, headrest, floor, and jacket cuffs. Except for the floor, bacterial contamination was higher before the renovation than after, showing the possible effects of changes in physical environment and infection control practice. More bacterial counts were found on the floor in 1998 than in 1976. This increase might be related to the reduced frequency of floor cleanings and maintenance due to cost-saving considerations.

Limitations

There were several limitations of this study:

- In this before-after study, the effects of environmental improvement and changes in infection control practice could not be separated out. In addition, many other potential confounding factors (such as environmental cleaning) might have changed during the long study period but were not recorded and controlled. A direct linkage between environmental design and surface contamination was not clear and needed further investigation.
- The study measured bacterial counts on environment surfaces. This outcome measure might not accurately represent the risk of infection transmission because some bacteria may not pose a threat in dental care settings. A more accurate method probably was to measure the contamination level of certain bacteria types that were known pathogens often found in dentistry.

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