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Surface microbial contamination in a dental department

A 10-year retrospective analysis

KEYWORDS

Health care-associated infection
 Dental clinic
 Environmental decontamination
 Surface microbial contamination
 Contact plates

SUMMARY

Health care-associated infections may not only occur in a hospital setting, but also in dental clinics. Insufficient environmental decontamination could be one of the risk factors. In this retrospective study, we documented and analyzed the results of surface microbial contamination in a dental university-based department over an observation period of ten years. It was the aim of this investigation to identify general tendencies and potentially problematic sites on a long-term basis allowing suggestions for further improvement.

Surface microbial contamination in the Department of Reconstructive Dentistry at the University Center for Dental Medicine in Basel, Switzerland, was evaluated on a regular basis using contact plates. Data gained between January 2007 and December 2016 was collected and summarized

for statistical analysis. Although the overall surface microbial contamination was relatively low during the observation period, significant differences depending on localization and test sites were detected. Certain sites, such as the handle of the dentist's chair and computer surfaces, remained problematic.

Continuous monitoring of surface microbial contamination can help to improve the hygiene level in a dental set-up. Further improvement might be achieved by avoiding hand-touch handles whenever possible and by relying on flat and easy-to-clean surfaces within the reach of the bacterial aerosol. However, during interventions that may pose a higher risk for the patient, additional measures should be taken by working under almost sterile conditions and by avoiding direct hand contact with problematic sites.

Introduction

The role of environmental disinfection has been discussed controversially in the literature (BANI-YAGHOUB ET AL. 2012; DETTENKOFER & SPENCER 2007). Still, environmental decontamination – with or without disinfectants – appears to be associated with reduced infection rates for patients (DANCER 2009). This hazard is not limited to hospital settings, but it applies also to dental clinics. In fact, dental personnel and patients, particularly immunocompromised persons, are at risk for infection with pathogenic and opportunistic microorganisms (LEGGAT & KEDJARUNE 2001; RAUTEMAA ET AL. 2006). Case reports have demonstrated the transmission of pathogens, such as the hepatitis B virus, within a dental set-up (RADCLIFFE ET AL. 2013; REDD ET AL. 2007). Aerosols produced during drilling procedures with modern high-speed rotating instruments can spread oral microorganisms to exposed surfaces as far as two meters (LEGGAT & KEDJARUNE 2001; RAUTEMAA ET AL. 2006). Microorganisms, including nosocomial pathogens, may survive on inanimate surfaces up to several months and they may serve as a reservoir for cross-contamination (KRAMER ET AL. 2006).

By using modern potent surface disinfectants most microorganisms, including bacteria, viruses and fungi, can be reduced to an uncritical level (WIDMER & FREI 2011). The level of surface microbial contamination can be monitored using swabs, sponges, contact plates or dip slides (GALVIN ET AL. 2012). Especially on flat surfaces and in the case of low numbers of organisms, a higher recovery of bacteria can be obtained by relying on contact plates (SCOTT ET AL. 1984).

The aim of our investigation was to document retrospectively the degree of surface microbial contamination in a dental university-based department. In addition, we aimed at identifying general tendencies and potentially problematic sites on a long-term basis.

Material and methods

Following national hygiene management recommendations (GRASSI ET AL. 2015) and manufacturer's instructions, hand-touch sites in the Department of Reconstructive Dentistry at the University Center for Dental Medicine in Basel, Switzerland, were decontaminated after each patient session in a prescribed order defined in the department's hygiene concept. An alcohol-based fast-acting bactericidal, fungicidal, and limited virucidal disinfection solution (FD 322, Dürr Dental, Bietigheim-Bissingen, Germany) in combination with dry wipes (FD multi wipes, Dürr Dental) was used for that purpose. Dwell time was one minute. During disinfection, gloves were worn to avoid skin irritations and safety glasses to protect the eyes.

The department possesses eight similar dental units. Four of them are open double units (i.e., two units located in one examination room), while the other four are closed single units. For each of them, five routine test sites (the lamp handle, the headrest, the handle of the table, the 3-function syringe, and the handle of the dentist's chair) were controlled two to seven times per year. Tests were not previously announced. Units that were still in use at test time could not be tested. Furthermore, 15 to 30 additional sites were selected on an individual basis as requested by the hygiene officer of the department. Additional test sites included the whole examination room, the lobby, the sterilization room, and the dental laboratory.

Microbial contamination was evaluated on a regular basis using contact plates according to the manufacturer's instructions.

From January 2007 to December 2012, Count-Tact™ plates containing the neutralizing agents lecithin, polysorbate 80, L-histidine, and sodium thiosulfate (bioMérieux, Geneva, Switzerland) were chosen, whereas between January 2013 and December 2016 Tryptic Soy Contact plates containing lecithin, polysorbate 80, and histidine as neutralizers (Merck, Zug, Switzerland) were used. Both agar media allow for the growth of several aerobic bacteria and few fungi. All plates had a diameter of 55 mm. Curved surfaces, e.g. handles, were tested by moving the entire plate over the surface.

After incubation at 36 °C for 48 h (TSA plates, Merck) or 72 h (Count Tact plates, bioMérieux), the colonies were enumerated but not further analyzed. The results were expressed as colony-forming units per plate (cfu/plate) and graded as follows (Fig. 1):

- no growth: 0 colonies per plate;
- low growth: 1 to 10 colonies per plate;
- moderate growth: 11 to 49 colonies per plate;
- heavy growth: 50 or more colonies per plate.

Test results had always been presented to the department's staff to discuss possible reasons for insufficient decontamination and to make suggestions for improvement. If a higher microbial surface contamination level was found on a specific unit, the responsible dental assistant was instructed. In case of general tendencies, such as missing out certain spots, the staff was reminded to follow the prescribed order. If necessary, testing frequencies were increased until a satisfying hygiene level was reached.

All test results gained between January 2007 and December 2016 were included in this study. For statistical evaluation, the additional test sites were summarized and categorized in ten groups. All statistical evaluations were carried out using the statistical package R, version 3.3.2 (R Foundation for Statistical Computing, Vienna, Austria). For further analysis, data was summarized using a binary model. No-growth and low-growth results were interpreted as “sufficiently decontaminated” test sites, while moderate-growth and high-growth results were considered as “insufficiently decontaminated” test sites. In order to predict the chance of units or test sites of being sufficiently or insufficiently decontaminated, generalized linear mixed-effects models (GLMMs) were selected. GLMMs are suitable tools to analyze repeated categorical data. Results were presented as odds ratios (OR) with 95% confidence intervals (CI) and p values. A p value < 0.05 was considered as statistically significant.

Results

Over the period of ten years, the clinical contact surfaces were tested 36 times. Overall results of routine test sites showed statistically significant differences among units ($p = 0.002$) as well as among test sites ($p < 0.001$). Figure 2 summarizes the results of the routine test sites for all units. The results of generalized linear mixed-effects model analysis are shown in Table I. The handle of the dentist's chair had a statistically significant higher risk for insufficient decontamination compared to all other test sites. The corresponding ORs ranged from 1.52 (CI: 1.00–2.33) [comparison with the lamp handle] to 6.25 (CI: 3.45–11.11) [comparison with the handle of 3-function syringe]. Thus, the handle of the 3-function syringe had the lowest risk for insufficient decontamination. No differences between double units and single units were found.

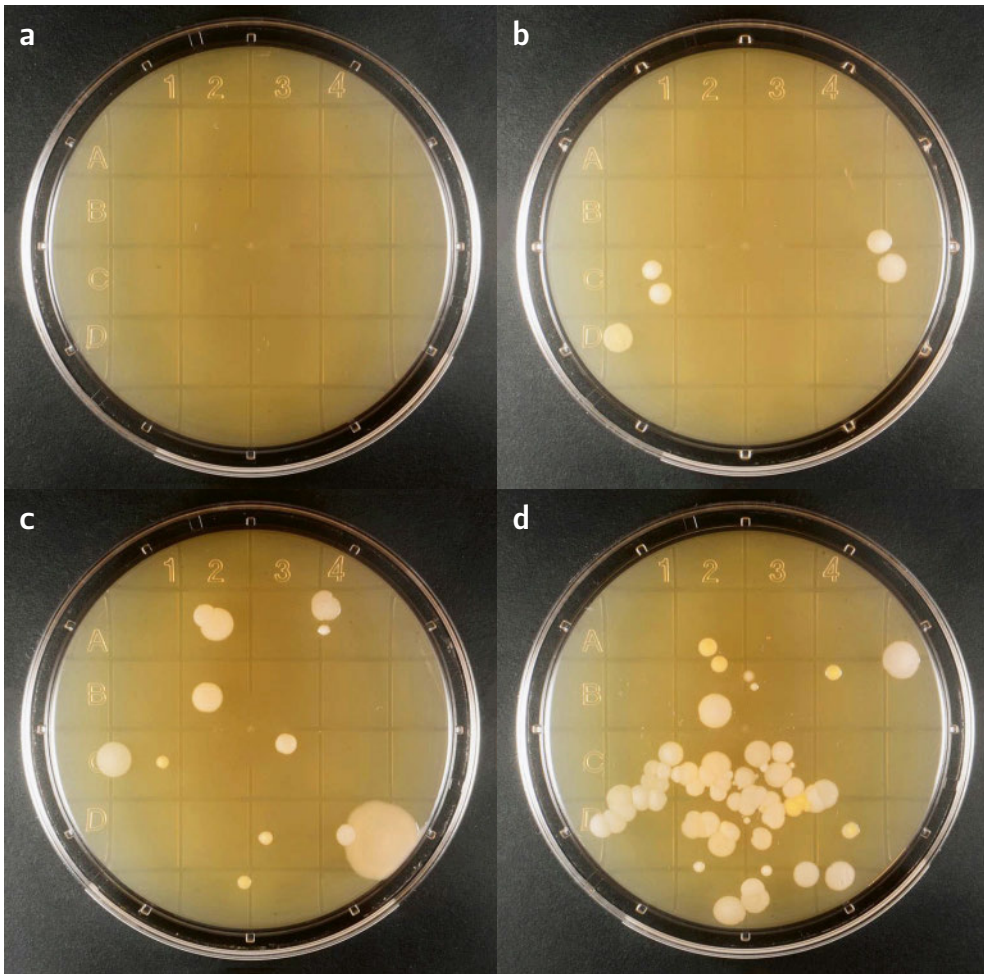


Fig.1 Examples of contact plates after incubation. Shown are representative illustrations of colony counts for the four categories (a) no growth (0 colonies per plate), (b) low growth (1 to 10 colonies per plate), (c) moderate growth (11 to 49 colonies per plate) and (d) heavy growth (50 or more colonies per plate).

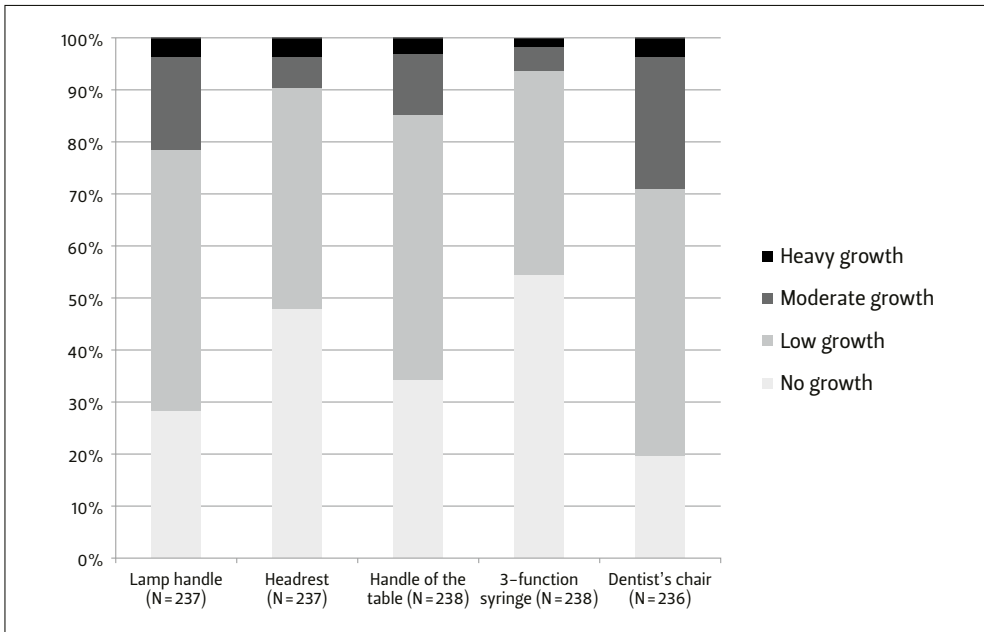


Fig.2 Graphical description of the cumulative results for all units. The five routine test sites include the lamp handle, the headrest, the handle of the table, the 3-function syringe, and the handle of the dentist's chair. Shown are the proportions of test sites with no growth, low growth, moderate growth, and heavy growth, respectively, on the respective contact plate.

For additional test sites, statistically significant differences were also present among units ($p < 0.001$) as well as among test sites ($p < 0.001$). Figure 3 shows the cumulative results for the additional test sites. The results of generalized linear mixed-effects model analysis are shown in Table II. Similar to the routine test sites, most additional test sites were sufficiently

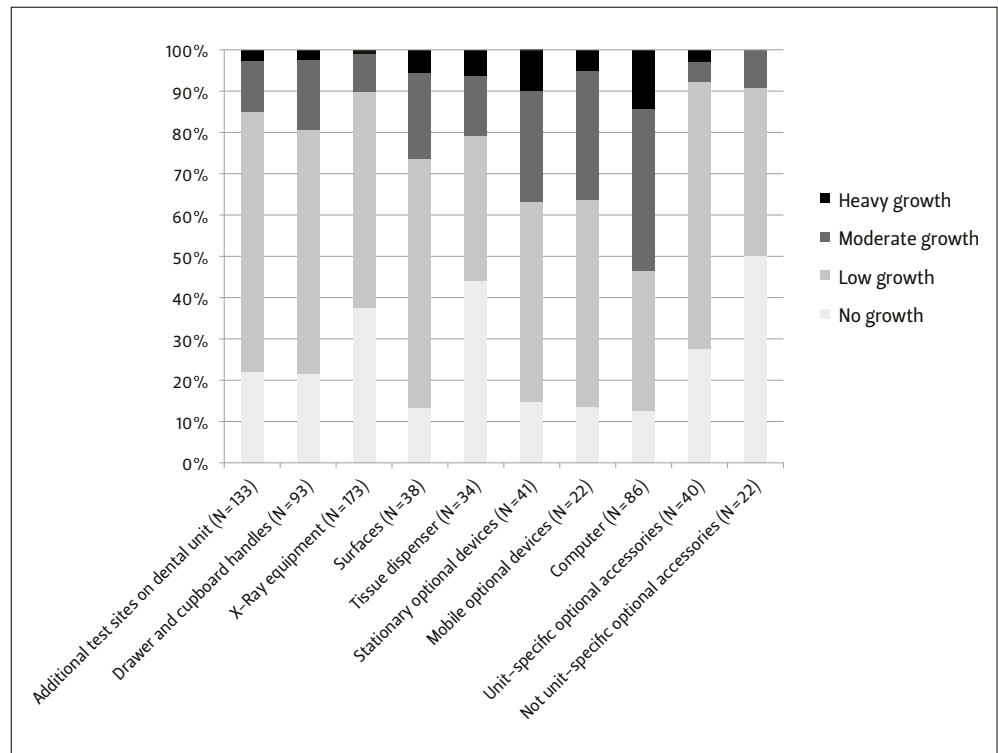
decontaminated with a high proportion of no-growth and low-growth results. However, notable exceptions included test sites in the lobby ($n = 44$; 57% insufficiently decontaminated), computer surfaces ($n = 86$; 53%), stationary optional devices ($n = 41$; 37%), and mobile optional devices ($n = 22$; 36%). Regarding differences among test sites, the computer inside the examination

Tab. I Odds ratio (OR), 95% confidence interval (in brackets) and p value for routine test sites for all pairwise comparisons

	Headrest	Handle of the table	3-function syringe	Dentist's chair
Lamp handle	OR: 2.58 (1.52–4.39) p value: < 0.05	OR: 1.60 (0.99–2.57) p value: 0.055	OR: 4.14 (2.25–7.61) p value: < 0.05	OR: 0.66 (0.43–1.00) p value: < 0.05
Headrest		OR: 0.62 (0.35–1.08) p value: 0.093	OR: 1.60 (0.81–3.16) p value: 0.172	OR: 0.25 (0.15–0.43) p value: < 0.05
Handle of the table			OR: 2.60 (1.38–4.90) p value: < 0.05	OR: 0.41 (0.26–0.65) p value: < 0.05
3-function syringe				OR: 0.16 (0.09–0.29) p value: < 0.05

Fig. 3 Graphical description of the cumulative results of the additional test sites.

The additional test sites were the equipment associated with a specific unit, various surfaces, stationary or mobile optional devices, and optional accessories. Shown are the proportions of test sites with no growth, low growth, moderate growth, and heavy growth, respectively, on the respective contact plate.



room had a much higher risk of insufficient decontamination, which was statistically significant compared to all other test sites except stationary optional devices. The corresponding ORs ranged from 2.17 (CI: 0.93–5.00) [comparison between computer and stationary optional devices] to 14.92 (CI: 4.22–52.75) [comparison with unit-specific optional accessories]. As far as differences among units are concerned it is notable that lobby test sites had a higher risk of insufficient decontamination compared to test sites in examination rooms or in the sterilization room or the dental laboratory. Yet, statistically significant differences were detected only between the upper and the lower outliers. As for routine test sites, no differences between single and double units were found.

Discussion

Within the limitations of this study, we could show that it is possible to reach a high proportion of sufficiently decontami-

nated test sites over an observation period of ten years, when using a best-practice protocol according to official guidelines combined with constant hygiene monitoring. However, despite all efforts even within this university-based set-up it was not possible to completely avoid microbial surface contamination. Previous investigations have noted that hygiene quality management in dental clinics may be problematic (MEHTAR ET AL. 2007; PASQUARELLA ET AL. 2012; SMITH ET AL. 2009). Yet, when comparing the results of several dental clinics, substantial differences in surface microbial contamination were found (PASQUARELLA ET AL. 2012).

Monitoring of environmental surface contamination by the use of contact plates is considered to be an effective way to control the effectiveness of routine cleaning and disinfection practices (GALVIN ET AL. 2012). Short-term changes in general hygiene level can be detected quickly and appropriate steps for future improvement can be taken. Nonetheless, this method

Tab. II Odds ratio (OR), 95% confidence interval (in brackets) and p value for additional test sites for all pairwise comparisons

	Drawer and cupboard handles	X-ray equipment	Surfaces	Tissue dispenser	Stationary optional devices	Mobile optional devices	Computer	Unit-specific optional accessories	Not unit- specific optional accessories
Additional test sites on dental unit	OR: 0.66 (0.33–1.36) p value: 0.263	OR: 1.63 (0.79–3.35) p value: 0.185	OR: 0.47 (0.19–1.18) p value: 0.108	OR: 0.68 (0.25–1.85) p value: <0.05	OR: 0.31 (0.13–0.76) p value: <0.05	OR: 0.45 (0.14–1.46) p value: 0.183	OR: 0.14 (0.07–0.28) p value: <0.05	OR: 2.14 (0.60–7.64) p value: 0.242	OR: 2.11 (0.44–10.18) p value: 0.354
Drawer and cupboard handles	OR: 2.45 (1.15–5.23) p value: <0.05	OR: 0.71 (0.28–1.79) p value: 0.466	OR: 1.02 (0.36–2.86) p value: 0.975	OR: 0.47 (0.19–1.15) p value: 0.098	OR: 0.68 (0.20–2.25) p value: 0.526	OR: 0.22 (0.11–0.43) p value: <0.05	OR: 3.22 (0.88–11.71) p value: 0.076	OR: 3.17 (0.65–15.53) p value: 0.155	
X-ray equipment	OR: 0.29 (0.11–0.75) p value: <0.05	OR: 0.42 (0.16–1.11) p value: 0.080	OR: 0.19 (0.08–0.48) p value: <0.05	OR: 0.28 (0.08–0.90) p value: <0.05	OR: 0.09 (0.04–0.18) p value: <0.05	OR: 1.31 (0.36–4.78) p value: 0.679	OR: 1.29 (0.27–6.28) p value: 0.747		
Surfaces	OR: 1.44 (0.44–4.68) p value: 0.546	OR: 0.66 (0.24–1.81) p value: 0.425	OR: 0.96 (0.26–3.55) p value: 0.951	OR: 0.21 (0.08–0.57) p value: <0.05	OR: 0.31 (0.12–0.75) p value: <0.05	OR: 4.55 (1.10–18.77) p value: <0.05	OR: 4.48 (0.84–23.90) p value: 0.080		
Tissue dispenser	OR: 0.46 (0.15–1.45) p value: 0.186	OR: 0.67 (0.17–2.63) p value: 0.563	OR: 0.46 (0.15–1.45) p value: 0.186	OR: 0.46 (0.15–1.45) p value: 0.186	OR: 0.21 (0.08–0.57) p value: <0.05	OR: 3.16 (0.73–13.74) p value: 0.124	OR: 3.12 (0.56–17.40) p value: 0.195		
Stationary optional devices	OR: 1.44 (0.44–4.77) p value: 0.546	OR: 0.46 (0.20–1.07) p value: 0.071	OR: 0.46 (0.20–1.07) p value: 0.071	OR: 0.32 (0.10–0.99) p value: <0.05	OR: 0.32 (0.10–0.99) p value: <0.05	OR: 6.85 (1.70–27.55) p value: <0.05	OR: 6.75 (1.33–34.12) p value: <0.05		
Mobile optional devices	OR: 4.74 (0.97–23.28) p value: 0.055	OR: 4.74 (0.97–23.28) p value: 0.055	OR: 4.74 (0.97–23.28) p value: 0.055	OR: 14.92 (4.22–52.75) p value: <0.05	OR: 14.92 (4.22–52.75) p value: <0.05	OR: 14.92 (4.22–52.75) p value: <0.05	OR: 14.69 (3.10–69.76) p value: <0.05		
Computer	OR: 0.98 (0.15–6.62) p value: 0.988	OR: 0.98 (0.15–6.62) p value: 0.988	OR: 0.98 (0.15–6.62) p value: 0.988						

will only provide semi-quantitative information, as merely the number of aerobic microorganisms capable of growth on the respective agar is recorded, while no information about the species of microorganisms, their virulence, and their pathogenicity will be provided. Still, an effective decontamination will reduce both pathogenic as well as non-pathogenic microorganisms.

No literature-based and reproducible benchmark for microbial surface contamination exists. Furthermore, the benefit of using disinfectants as opposed to detergents only for surface decontamination remains unclear. For an aerobic colony count (ACC) using contact plates, a critical benchmark of 5 cfu/cm² has been suggested for hand contact surfaces, such as handles, switches, keyboards, and other surfaces in a hospital setting

(DANCER 2004). Using a best-practice protocol in three different wards in an English teaching hospital, an ACC < 2.5 cfu/cm² was achieved (LEWIS ET AL. 2008). For surfaces in dental clinics, the authors of an Italian multicenter study proposed a benchmark value of 0.63 cfu/cm² (PASQUARELLA ET AL. 2012). In our investigation, we defined an even lower threshold level for a sufficient decontamination: ≤ 10 cfu/plate, corresponding to ≤ 0.42 cfu/cm². Although our threshold was stricter than previously recommended benchmarks, a high proportion of more than 75% sufficiently decontaminated samples was found for most test sites. This suggests a proper working hygiene concept within the department.

Nevertheless, certain areas may still require further attention. Among the routine test sites, the handle of the dentist's chair had the highest risk for microbial contamination. As the dental units in our department are shared among various clinicians, the dentist's chair needs to be adjusted before and during work. If not properly decontaminated, it may serve as a source of cross-contamination. A practical solution for this particular problem would be to use chairs that can be easily adjusted by feet without using handles.

Among the additional test sites, the computer inside the examination room had by far the highest risk for microbial contamination. It mostly stands within the reach of the bacterial aerosol and needs to be touched during intervention, for instance to check medical/dental records or radiographs. Unfortunately, its surfaces (e.g., conventional computer mouse or keyboard) are difficult to decontaminate. Touching those parts only after removing gloves or, as suggested by some authors, disinfecting the gloves after touching mouse or keyboard would be possible solutions (KAMPF & LEMMEN 2017). Another option would be to use only flat computer surfaces within the reach of bacterial aerosol, thereby choosing sanitizable touchscreen devices or medical keyboards.

Regarding differences among units, it is notable that no differences between single and double units were detected. The microbial contamination was higher in the lobby than inside examination rooms. Most of the samples taken in the lobby came from mobile optional devices (e.g., impression material mixing device), which had been stored outside the examination room. As in our department several dentists and dental assistants share the same units, the differences in hygiene level among units is most likely due to the varying accuracy of the dental assistant responsible for decontamination of the respective unit at a particular day. This may be due to personal attitude or negligence, but also lack of time or job-related emotional stress may have an impact.

Cost-benefit analysis of microbial surface monitoring needs to be clarified. To realize the proposed hygiene management program in our department, the annual costs for the disinfection products reached about 5000 Swiss francs. Additional costs (about 500 Swiss francs a year) incurred for the material necessary for microbial surface monitoring. While within our university-based set-up it was possible to offer the lab work free of charge, relying on a commercial service provider would require further expenditures.

Besides surface decontamination, other infection control strategies are necessary to prevent cross-contamination and transmission of infections, such as proper sterilization processes, hand disinfection, and the use of personal protective equipment. Recommendations and guidelines on infection prevention have been published in different countries (BECKER ET AL.

2006; KOHN ET AL. 2003). The Swiss Dental Society published the first hygiene management recommendations for their members in 1999. Since then, these recommendations have been constantly revised, most recently in 2015 (GRASSI ET AL. 2015). A national guideline regulates the reprocessing of medical devices (CAVIN ET AL. 2010).

Although the use of contact plates is a good way to monitor the quality of surface decontamination, it is not mandatory as none of the recommendations or guidelines mentioned above requires it. However, continuous monitoring of surface microbial contamination may help to identify problematic sites and to improve the hygiene level in a dental setting. It is important to keep instruments and devices that are not permanently used out of the reach of bacterial aerosol or stored inside aerosol-tight cupboards and drawers. As a general rule, only flat and easy-to-clean surfaces should stay within the reach of the bacterial aerosol. Nevertheless, complete elimination of microbial surface contamination at all time can hardly be achieved. For this reason, interventions with a higher patient-related risk (e.g., dental surgery) need further-reaching measures by working under almost sterile conditions, while direct hand contact with problematic spots should be avoided.

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Zusammenfassung

Einleitung

Nosokomiale Infektionen mit opportunistischen Erregern sowie das gehäufte Auftreten multiresistenter Keime sind zu einem gesundheitspolitischen Problem geworden. Neben Spitälern könnten davon auch Zahnarztpraxen betroffen sein, wobei eine ungenügende Dekontamination des Arbeitsplatzes zwischen den einzelnen Patientenbehandlungen einen möglichen Risikofaktor darstellt. Die Resultate regelmässiger mikrobiologischer Oberflächenuntersuchungen, die an einer universitären Zahnklinik über einen Beobachtungszeitraum von zehn Jahren erhoben worden sind, wurden in dieser Studie dokumentiert und analysiert. Dies erlaubte, mögliche Problemstellen zu identifizieren und Verbesserungsvorschläge für die Praxis zu erarbeiten.

Material und Methoden

Mithilfe regelmässiger Abklatschuntersuchungen mit Agarplatten wurde die mikrobiologische Oberflächenverunreinigung in der Klinik für Rekonstruktive Zahnmedizin der Universitätszahnklinik Basel über einen Zeitraum von zehn Jahren erhoben. Bei den Abklatschtests wurde jede der acht Behandlungseinheiten der Klinik jeweils an fünf Teststellen routinemässig untersucht (Lampengriff, Kopfstütze des Behandlungsstuhls, Schwenkarmgriff, Multifunktionsspritze und Griff des Behandlerstuhls). Weitere 15 bis 30 Stellen wurden jeweils entsprechend den Wünschen des Hygienebeauftragten der Klinik festgelegt und ebenfalls getestet. Diese zusätzlichen Teststellen beschränkten sich nicht auf die Behandlungseinheiten, sondern umfassten weitere Bereiche der Klinik, wie den

Sterilisationsraum und den Flur. Die Agarplatten wurden nach Herstellerangaben inkubiert. Die gewachsenen Kolonien wurden anschliessend ausgezählt und in vier verschiedene Wachstums-kategorien eingeteilt (Abb. 1). Im Rahmen der Studie wurden die Testergebnisse zwischen Januar 2007 und Dezember 2016 zusammengefasst und statistisch analysiert. Dabei sollte geprüft werden, ob Unterschiede zwischen unterschiedlichen Entnahmeorten (verschiedene Behandlungseinheiten, Sterilisationsraum usw.) oder unterschiedlichen Teststellen (Lampengriff, Multifunktionsspritze usw.) bestehen.

Resultate

Insgesamt war die mikrobiologische Kontamination der Oberflächen niedrig. Dennoch fanden sich statistisch relevante Unterschiede in Abhängigkeit von Entnahmeort und Teststelle. Die Ergebnisse aller Entnahmeorte sind in Abbildung 2 (routinemässig untersuchte Teststellen) und Abbildung 3 (zusätzliche Teststellen) zusammengefasst. Unter den routinemässig untersuchten Teststellen wies der Griff des Behandlerstuhls das grösste Risiko für eine ungenügende Dekontamination auf. Die entsprechenden Chancenverhältnisse (engl. *odds ratio*) variierten dabei zwischen 1,52 (Vergleich mit dem Lampengriff) und 6,25 (Vergleich mit der Multifunktionsspritze). Bei den zusätzlichen Teststellen wiesen exponierte Oberflächen des Computers im Behandlungsraum mit Abstand den höchsten Anteil an ungenügend dekontaminierten Proben auf. Die entsprechenden Chancenverhältnisse variierten hier zwischen 2,17 (Vergleich zwischen Computer und stationären optionalen Geräten) und 14,92 (Vergleich mit behandlungseinheitsspezifischem optionalem Zubehör).

Diskussion

Im Rahmen dieser Untersuchung konnte gezeigt werden, dass mit einem strikten Hygienekonzept und regelmässigen Kontrollen ein hoher Anteil an genügend dekontaminierten Teststellen erreicht werden kann. Dennoch scheinen gewisse Teststellen anhaltend problematisch zu sein. Weitere Verbesserungen könnten durch das Vermeiden von mit den Händen zu bedienenden Hebeln sowie durch die konsequente Anwendung von flachen und einfach abwischbaren Oberflächen innerhalb des Aerosolnebels erreicht werden. Nicht verwendete Instrumente und Geräte sollten ausserhalb der Reichweite des Aerosolnebels oder in aerosoldichten Schubladen und Schränken aufbewahrt werden. Bei Eingriffen mit einem höheren Risiko für den Patienten, beispielsweise bei oralchirurgischen Interventionen, sind zusätzliche Massnahmen angebracht, so dass unter annähernd sterilen Bedingungen gearbeitet werden kann.

Résumé

Introduction

Les infections nosocomiales causées par des pathogènes opportunistes ainsi que l'apparition de germes multirésistants sont devenus des problèmes de santé publique. Outre les hôpitaux, les cabinets de dentistes sont aussi touchés par ces problèmes et une décontamination insuffisante du poste de travail après chaque patient représente un risque potentiel. Dans le cadre de cette étude, nous avons documenté et analysé les résultats de tests microbiologiques effectués dans une clinique dentaire universitaire sur une durée de dix ans. Ceci nous a permis d'identifier des zones potentiellement problématiques et d'élaborer des propositions d'amélioration ainsi que leur mise en pratique.

Matériels et méthodes

A l'aide de boîtes de contact polyvalentes et sur une durée de dix ans, des contrôles réguliers ont été effectués à la Clinique de médecine dentaire reconstructive de l'Université de Bâle. Cinq types de surfaces (poignée de la lampe, appuie-tête du fauteuil, poignée du bras pivotant, seringue multifonctions, poignée du siège opérateur) sur chacun des huit fauteuils dentaires de la clinique ont été analysés systématiquement. 15 à 30 types de surfaces supplémentaires ont été analysés à la demande du délégué à l'hygiène de la clinique. Ces surfaces supplémentaires n'étaient pas limitées aux fauteuils dentaires, elles comprenaient aussi d'autres zones de la clinique telles que la salle de stérilisation ou le couloir. Après exposition, les boîtes de contact ont été incubées selon les indications du fabricant. Les colonies ayant poussé sur les boîtes ont été comptées et classées dans quatre catégories de croissances (fig. 1). Dans le cadre de cette étude, nous avons résumé et analysé statistiquement les données récoltées entre janvier 2007 et décembre 2016. Nous avons ainsi examiné dans quelle mesure le lieu du prélèvement (les différents fauteuils dentaires, la salle de stérilisation, etc.) ou la surface test (poignée de la lampe, seringue multifonctions, etc.) avait un impact significatif sur le nombre de colonies bactériennes retrouvées sur les boîtes de contact.

Résultats

Nos résultats ont montré que la contamination microbiologique des surfaces était globalement relativement faible. Des différences significatives entre les lieux de prélèvements ainsi qu'entre les surfaces test ont cependant pu être observées. Les résultats de tous les lieux de prélèvements réunis se trouvent dans la figure 2 (surfaces test analysées systématiquement) ainsi que dans la figure 3 (surfaces test supplémentaires). Au sein des surfaces test analysées systématiquement, la poignée du siège opérateur comportait le plus grand risque d'une décontamination insuffisante. Le rapport de chances (angl. *odds ratio*) correspondant variait entre 1,52 (en comparaison avec la poignée de la lampe) et 6,25 (en comparaison avec la seringue multifonctions). Pour les surfaces test supplémentaires, ce sont les surfaces exposées de l'ordinateur de la salle de traitement qui présentaient la plus grande proportion d'échantillons fortement contaminés. Le rapport de chances variait ici entre 2,17 (en comparaison avec d'autres appareils stationnaires optionnels) et 14,92 (en comparaison avec les accessoires optionnels du fauteuil dentaire).

Discussion

Dans le cadre de cette étude, nous avons pu démontrer qu'en appliquant un plan d'hygiène strict ainsi qu'en effectuant des contrôles réguliers, il était possible d'atteindre une proportion très haute de surfaces décontaminées de manière suffisante. Pour certaines surfaces test, un problème de décontamination semble pourtant persister. Nous proposons ici l'usage de sièges opérateurs sans poignée manuelle ainsi que l'utilisation consécutive de surfaces lisses et facilement lavables dans tout le périmètre du brouillard d'aérosol pour améliorer l'hygiène des cabinets et cliniques dentaires. De plus, les appareils et les instruments non utilisés durant le traitement du patient devraient être installés en dehors du périmètre du brouillard d'aérosol ou rangés dans des tiroirs ou des armoires étanches aux aérosols. Lors d'interventions comportant de plus importants risques pour le patient comme par exemple lors d'interventions de chirurgie orale, il convient de prendre des mesures supplémentaires pour travailler dans des conditions presque stériles.

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