

Temples Contamination In Spectacle Worn By Dentist In Dental Clinics

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Abstract

Introduction

Dental practice has a risk of its own. Aerosol, splatters, fumes and irritating chemical vapours are the day to day events. During long hours of clinical work, auto inoculations are also possible. Then the next comes the fomite contamination which is carried out of the clinic area. Contamination on cell phones, ipads, watches and spectacles are always a risk factor. This study is done to screen the spectacles for the contamination occurring during the clinic hours.

Material and Methods

Study done in dental clinics in dentists wearing spectacles .Samples were collected from the spectacles frame at temples using moistened swab swabs samples were collected and transported to the microbiology laboratory. They are inoculated onto Blood agar and Brain heart infusion agar. The plates were incubated at 37 degree C for 24 hrs aerobically. After incubation the plates were checked for the total colony forming units and for the presence of bacteria of oral origin.

Result

The screening of spectacles for the microbial load show a heavy increase of bacterial count in the spectacles, which includes salivary streptococci and CoNS

Conclusion

The spectacle frame is frequently touched by the dentist during the treatment. The area touched is close to the eye lens and eye itself. So this practice carries a definite risk for the dentist

Introduction

Human body is colonized by approximately 10¹³ microorganisms. Cell densities on the human skin can vary from 10² cm⁻² up to 10⁶ cm⁻² . Therefore, surfaces regularly touched by humans or those in close contact with the physical body can consequently become contaminated with microorganisms and these surfaces are often considered fomites. As an example , mobile communication devices and therefore the touch screens of computers, tablets, and smartphones are notorious for contributing to fomites in clinical environments . A recent study reported the ambient bacterial load of smartphone touchscreens from a non-clinical university environment . Uncleaned touchscreens were just moderately (1.37 CFU cm⁻²) contaminated with bacteria of mostly human origin, including significant amounts of probably pathogenic ones. Cleaning with alcohol-impregnated lens wipes effectively reduced bacterial contamination by 96%, thereby lowering any potential risk of infection.

Spectacles are globally widespread optical devices that aid human vision. Thanks to their environmentally exposed position within the center of the face, their close contact to the human skin, nose and mouth and regular contact with human hands, explains that spectacles are contaminated with microorganisms. A very few studies have analyzed the microflora of spectacles. In clinical environments, surgeons' spectacles were identified as fomites. Their spectacles were highly contaminated with *Staphylococcus epidermidis* and it's been suggested that this represents a risk to patients during operations. Consequently, it had been recommended that surgeons disinfect their spectacles on a daily basis. Another recent study addressed the microbiological safety of glasses distributed at 3D movie theatres and therefore the study compared manual vs. automated sanitation systems. The spectacles under investigation were discovered to be contaminated with bacteria and fungi, however, the study didn't clearly recommend an efficient sanitation system(1–9).

In a study that quantified the microbial load of 31 worn spectacles at 7 different sampling sites, each, and subsequently identified the dominant bacteria. 11 spectacles were obtained from a university environment, 10 spectacles from a home and another 10 spectacles were obtained from the university environment, but were cleaned before investigation. In effect, we analyzed spectacles from two different populations—from students and employees at a non-clinical university environment and from inhabitants of an area home. Moreover, we investigated the antimicrobial efficacy of 4 widespread spectacle cleaning methods by using test bacteria that had been previously identified as being dominant on spectacles and smartphone touchscreens. To the simplest of our knowledge, this is often the foremost comprehensive study on the microflora of spectacles so far. This study intends to make a solid basis which will invite a deeper understanding of the hygienic relevance of those widespread objects and of the evaluation of suitable cleaning and disinfection measures.

Our team has extensive knowledge and research experience in quality analysis and quality control has translated our experience into high quality publications (10–21),(22–26). (27) (28) (29)(30–32)

Materials and Methods

Study is done in dental hospitals with dentists wearing spectacles. A total of 19 samples were collected. All the selected candidates were informed in the morning and their spectacles were disinfected with 2 % glutaraldehyde and were advised to be normal and to avoid purposeful contamination. Samples were collected after a period of 4 hours of clinical work. Samples were collected from the spectacles frame at temples using moistened swab swabs. The collected samples were transported to the department of microbiology. Samples were stored at 4 deg.C till it was processed. Samples were inoculated on Blood agar, Nutrient Agar and MacConkey agar and incubated at 37 deg .C for 24 hours. The growth on the media was identified by grams staining and followed by standard microbiological protocols. The results were tabulated and analysed .

Result

The results are tabulated according to spectacles and the no. of bacterial colonies and organisms grown. From table 1 we can illustrate that the organism grown in most of the spectacles is Cons and Alpha Streptococcus. The confluent growth colonies represent that the bacterial load is innumerable.

| Sample No | Organism grown | Total CFU |
|-----------|---------------------|-----------|
| 1 | Alpha streptococcus | 961 |
| 2 | Enterococcus | 659 |
| 3 | CoNS | 228 |

| | | |
|----|---|-----|
| 4 | CoNS | 127 |
| 5 | Alpha Streptococcus | 278 |
| 6 | Nil | 740 |
| 7. | Alpha Streptococcus | 263 |
| 8 | Enterococcus | 548 |
| 9 | CoNS | 278 |
| 10 | CoNS, Enterococcus, Alpha Streptococcus | 200 |
| 11 | CoNS | 193 |
| 12 | Bacillus | 550 |
| 13 | Micrococci, Staphylococcus | 425 |
| 14 | Enterococcus ,CoNS | 850 |
| 15 | Alpha Streptococcus,CoNS | 93 |
| 16 | Alpha Streptococcus | 202 |
| 17 | CoNS | 109 |
| 18 | CoNS | 397 |
| 19 | CoNS | 165 |

Table 1 : Table showing the types of bacteria grown and the total colony forming unit

Discussion

The microbes on the temple region in the spectacles, in all possibility, primarily by touching hands. The next possible reason is the aerosol and the splatters. In this situation we should have profound knowledge to handle the spectacles to prevent microbial colonisation. To prevent microbial colonisation in the spectacles ,it should be disinfected and sterilised in an appropriate manner to retard the microbial growth so that the multiplication of the microbes does not occur. As we compare with the previous study Spectacles - widely used devices that aid human vision - carry a highly diverse bacterial load. The study insights into this spectacle bacteriota, which is especially composed of bacteria of human skin and epithelial origin. The community was dominated by bacteria typical for the skin areas that are in physical contact with the spectacle frames. The bacteria on the lenses differed significantly from the opposite sample sites and showed the very best diversity. As many of the identified genera comprise the skin and the oral flora, there is possible presence of potentially pathogenic species which will cause skin and eye infection, thus spectacles must be considered as a fomites. This is often of particular importance in clinical environments, but also for people daily working with worn spectacles, like opticians. Future studies should address the role spectacles play as fomites in additional detail, e.g. regarding the role as carriers and vectors of multi-resistant bacteria in clinical environments or as reservoirs for microorganisms which will cause recurring eye [space] infections. Clearly, such investigation should also consider less easily accessible parts of spectacles, like the hinges.

All of the examined worn spectacles were found to be contaminated with bacteria, predominantly from human skin, particularly at areas where there was direct skin contact. Staphylococci, particularly *S. epidermidis*, dominated the bacterial community. There were no propionibacteria detected, which is likely due to the aerobic cultivation conditions.*S. epidermidis*, in particular. Many of the bacteria found were potential pathogens, and a few of them have been linked to skin and eye problems. As a result, spectacles should be considered fomites, especially in clinical settings where disease transmission could occur through spectacle contamination. Furthermore, spectacles may act as a reservoir for germs that cause recurrent eye

infections. However, we showed that superficial lens cleaning with impregnated lens wipes can reduce microbial burden by 2 log scales, preventing bacterial translocation.

In the future, we'll use 16S rRNA gene next generation sequencing to analyse the microbiota of spectacles in order to better account for aerotolerant anaerobic, slow-growing, and yet-uncultured microorganisms. Dentists have a higher risk compared to any other speciality. It should be borne in mind the splatters and droplet carries many pathogenic bacteria from the patients mouth. Studies have proved that blood stained saliva droplets may transmit HIV and HBV, posing risk to the dentist. Eye can be a route of entry for many viruses and bacteria. Presence of bacteria should be considered as an indicator of contamination level during dental practice..

Conclusion

conclusion: The spectacle frame is frequently touched by the dentist during the treatment. The area touched is close to the eye lens and eye itself. So this practice carries a definite risk for the dentist .And this can cause various bacterial infections in the eye lens and eye region .If there is proper care and maintenance of eye lens and preventing the temple region from getting contaminated we can prevent the risk of various bacterial infections .

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CONFLICT OF INTEREST

The authors would like to declare no conflict of interest in the present study.

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