

Effect of Disinfectant on Bacterial Contaminants on Skin during the Clinical Stay in Dentists:

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Abstract:**Aim:**

To find the effect of disinfectant on bacterial contaminants on skin during clinical stay in dentist's.

Objective:

The objective is to find the effect of disinfectant in removing the bacteria and other commensals after treating the patient from the dentist's skin.

Background:

Patient's oral cavity have lot of bacteria and the dentist treating the patient get contaminated with the bacteria after the treatment, therefore the disinfectant is used to remove those bacteria contaminants from the skin.

Reason:

This research is to find the effect of disinfectant in removing the bacteria from dentist's skin during the clinical stay which helps in prevention from various diseases.

INTRODUCTION:

Dental professionals are predisposed to number of infections. hands are main mode of providing dental care in dentistry. The infections are mainly due to aerosols of saliva, gingival fluid, natural organic dust particles and from dental instruments and devices. bacteria from these sources mainly get transmitted through hands during direct contact with patients and the dental instruments used during delivering treatment, which may also get transmitted to the other patient if the hand is not disinfected with the disinfectants before providing treatment to the other patient. (1,2,3). Hand carriage of resistant pathogens has repeatedly been shown to be associated with nosocomial infections. so hand hygiene is important in the control of cross transmission of infection. The hands of health care workers are commonly colonized with pathogens like methicillin resistant *S. aureus* (MRSA), vancomycin resistant *Enterococcus* (VRE), MDR-Gram Negative bacteria (GNBs), *Candida* spp. and *Clostridium difficile*. In the wake of the growing burden of health care associated infections (HCAIs), the increasing severity of illness and complexity of treatment, superimposed by multi-drug resistant (MDR) pathogen infections, health care practitioners (HCPs) are reversing back to the basic of infection preventions by simple measures like hand hygiene. This is because enough scientific evidence supports the observation that if properly implemented, hand hygiene alone can significantly reduce the risk of cross-transmission of infection in healthcare facilities (HCFs). (4,5,6)

In the earlier days soap and water incorporating an antimicrobial agent chlorhexidine gluconate are used for washing hands (4). But there are several recent advances which includes alcohol-based hand rubs/gels and non-alcohol sanitizers like povidone-iodine (1). In this article three hand rubs 2.5% chlorhexidine gluconate, alcohol based hand rubs-sterillium, povidone-iodine IP5% are compared and the one which reduces maximum bacterial

load is found to be more effective in controlling the cross transmission of infections.

MATERIAL AND METHOD:

In this study 15 dentists participated. Three disinfectants were tested with the dentists before and after the application of disinfectants which includes 2.5% v/v chlorhexidine gluconate solution ip equivalent to 0.5% w/v chlorhexidine gluconate (70% v/v ethyl alcohol (ethanol) ip, skin emollients, perfume), sterillium (2-propanol:45gms, 1-propanol:30gms, ethyl-hexadecyl-dimethyl ammonium-ethyl sulphate : 0.2gms in each 100gms), povidone-iodine ip 5% w/v (0.5% w/v available iodine).

GROUPS:

GROUP 1:-sterillium

GROUP 2:iodine -5%

GROUP 3:chlorhexidine -2.5%

Each disinfectants were given to five dentist to find the efficacy of each disinfectant.

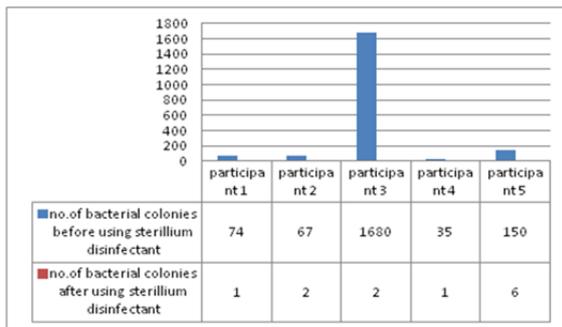
The dentists were briefed to attend the two testing sessions during the clinical stay in the dental clinic. The dentists were randomised into three groups of 5, each group was allocated one of the three hand disinfectants: sterillium, chlorhexidine gluconate and povidone - iodine. Samples were collected by using Moist Swab from the left palm before applying the disinfectants. Then they were asked to use the specific disinfectant according to given specific instructions. After applying the hand rubs, samples are again collected with moist swabs from each dentist left palm after 10 minutes and both the samples are taken to laboratory and they are inoculated into the brain heart infusion culture media by streaking method. then the agar plates are kept in the incubator under aerobic condition at 35 degree Celsius for 24hrs and the number of colony forming units were counted. A statistical analysis of the counted colonies was performed to evaluate the efficacy of each product.

RESULT:

After the application of disinfectant there was a significant overall reduction in bacteria following hand disinfection with all three products. Sterillium, iodine and chlorhexidine disinfectants reduced the bacterial count to 2.4%, 3.82% and 18.0% respectively.

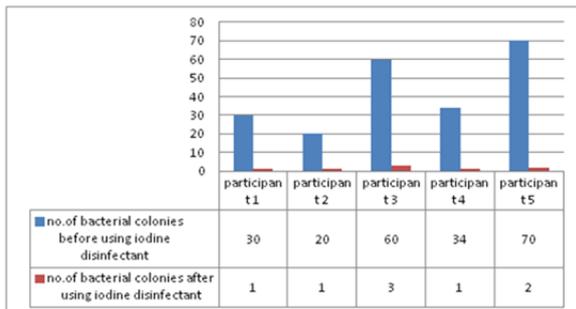
Number of bacterial colonies before and after using sterillium disinfectant:(TABLE 1)

TABLE 1



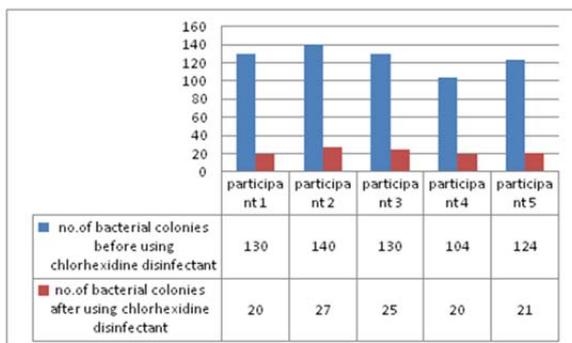
Number of bacterial colonies before and after using iodine disinfectant in dentist:(TABLE 2)

TABLE 2



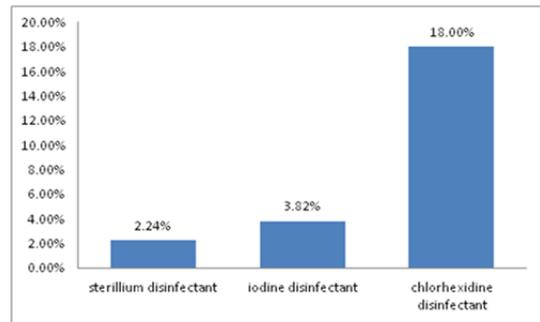
Number of bacterial colonies before and after using chlorhexidine disinfectant in dentist:(TABLE 3)

TABLE 3



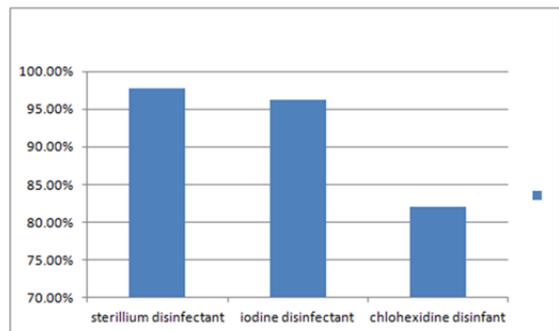
Percentage of mean value of bacterial burden after using the disinfectants in dentist:(TABLE 4)

TABLE 4



COMPARISON OF EFFICACY OF DISINFECTANTS: (TABLE 5):

TABLE 5



DISCUSSION:

The use of sterillium (alcohol based disinfectant) led to a satisfactory bacterial reduction (2.4%). Iodine shows 1.4% less bacterial reduction when compared to sterillium. 2.5% of chlorhexidine gluconate does not showed satisfactory bacterial reduction. 90% of alcohol rubs are more effective against bacteria than most other form of hand washing and results in rapid kill of bacteria but inflammable and irritating on skin with prolonged use. Isopropyl alcohol will kill 99.99% or more of all non- spore forming bacteria in less than 30 seconds on human skin(6). Alcohol based hand rubs containing 60-95% alcohol have the greatest efficacy (7). The anti microbial activity of alcohol solutions within this range is related to their ability to denature protein(8). Concentrations of alcohol above 95% are considered less effective because protein are not readily denatured in the absence of water. Boyce and pittet (2002) confirm that alcohol based hand rubs have excellent germicidal activity against both gram positive and gram negative bacteria (4).But chlohexidine has poor efficacy against virus and bacteria so it shows less bacterial reduction and iodine it may dry and crack the skin and it should be applied multiple times to disinfectant thoroughly and it is not effective against most of the bacterial spores .several

research also concluded that alcohol based hand rubs are most effective against various pathogens so Recently a number of alcohol based hand rubs have become widely used in health care because of its faster action providing health care workers with another range of hand decontamination products.

CONCLUSION:

There is sufficient evidence to support the use of alcohol based hand rubs in fight against health care acquired infection in all the clinical settings,instead of using pumps measured quantity of disinfectants should be used to achieve better efficacy of disinfectants. Study shows alcoholic hand rubs are more effective when compared to other disinfectants.

REFERENCE:

- 1) Ayliffe, G.A. et al (1988) Hand disinfection: a comparison of various agents in laboratory and ward studies. *Journal of Hospital Infection*; 11: 3, 226–243.
- 2) Rogers A H (editor). (2008). *Molecular Oral Microbiology*. Caister Academic Press. ISBN 978-1-904455-24-0.
- 3) Patel, S. (2004) The efficacy of alcoholbased hand disinfectants products. *Nursing Times*; 100: 23, 32-34.
- 4) Larson, E.L., Morton, H.E. (1991) Alcohols. In: Block, S.S. (ed) *Disinfection, Sterilisation and Preservation*. Philadelphia, PA: Lea & Febiger.
- 5) Guide to implementation of the WHO multimodal hand hygiene improvement strategy. [accessed on August 24, 2010].
- 6) WHO Guidelines on Hand Hygiene in Health Care. First Global Patient Safety Challenge. Clean Care is Safer Care. [accessed on August 24, 2010]
- 7) Boyce JM, Pittet D. Guideline for Hand Hygiene in Health-Care Settings. Recommendations of the Healthcare Infection Control Practices Advisory Committee and the HICPAC/SHEA/APIC/IDSA Hand Hygiene Task Force. *Morb Mortal Wkly Rep*. 2002;51:1–44. [PubMed]