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Effectiveness of Gloves in Dentistry: Health Provider Perspectives

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Abstract:
The use of gloves is an integral part in dental practice. However the effectiveness of gloves as a barrier after coming in contact with saliva and oral mucosa is still uncertain. This study was done to determine the effectiveness of various gloves in general dental practice. Commonly used gloves such as non-sterile examination latex gloves, vinyl gloves and sterile surgical latex gloves were used in the study. Study was done among 15 undergraduate dental students attending clinical posting. They were randomly distributed among three groups. Swabs from different parts of the hand were taken pre and post scaling. The swab was taken for microbial processing. Aerobic culture of the swab sample was done. The results revealed that there was least contamination while using sterile surgical gloves. Maximum contamination was seen while using non-sterile vinyl gloves.
Key words: Gloves, hand contamination, health practitioners, dental practice.

INTRODUCTION:

Health care workers in general are susceptible to contracting infectious while providing patient care if they do not use proper infection control. Dental care providers in particular are at an increased risk as they provide care working with sharp instruments at very high speeds and limited access in an environment that is bathed in saliva and, in many instances, blood [1]. Dental gloves are worn to protect dental care providers from contamination while being in contact with mucous membranes, blood, and saliva. They also protect patients from being infected with any pathogens by the providers. Nonsurgical gloves used in dental practices are single-use, disposable gloves that should be discarded after use. The U.S. Food and Drug Administration (FDA) Centre for Devices and Radiological Health is responsible for regulating gloves [2] and medical gloves are supposed to meet certain quality. However, even intact gloves may fail. Research has found that prolonged use of gloves and use of other products such as disinfectants, alcohols are aid to increase the permeability of the gloves[3].
Hence this study was done to identify hand contamination after scaling while different types of gloves are used.

AIM:

To determine hand contamination after scaling when different types of gloves such as non-sterile latex, non-sterile vinyl and sterile latex are used based on microbiological outcomes

MATERIAL AND METHODS:

A total of 15 undergraduate dental students attending clinical posting were included in the study. They were randomly distributed among three groups. Group A- Non-sterile latex examination glove (NSL), Group B- Non-sterile vinyl gloves (NSV), Group C- Sterile surgical glove (SSG). All students were asked to wash their hands with soap before the treatment. A sterile swab was used to collect the sample from the palm, the swab was taken on the right hand along the finger crevices and finger tips after washing their hands and before wearing the gloves (figure:1). Similarly, one more swab was taken immediately after scaling and after removing the gloves. Randomization was done by lot method. The study was approved by the ethical committee of Saveetha Dental College.

Microbiological processing:

Aerobic culture of the swab samples was done by inoculating the swab sample on nutrient agar and incubating it at 37°C for 24 hours. The colony forming unit was counted after 24 hours.(figure 2)

Statistical analysis:

SPSS software was used for statistical analysis. Paired t-test was used to compare within groups. One way ANOVA – multiple comparison was used to compare between the groups.

RESULTS:

Table: 1 shows the number of colony forming units (cfu/ml) of different group pre and post treatment. Table :2 shows that there was statistically significant difference between the microbial colony forming units pre-treatment and post treatment

in group A (p=0.008) and in group B (p=0.002). this shows the there is significant contamination of the hand while using non-sterile latex and non-sterile vinyl. Table:3 shows One way ANOVA – multiple comparison, comparing between groups. There was statistical difference between group A and group B (p value =0.000); group B and group C (p value =0.00). There was no statistical difference between group A and group C (p value =0.883).

Table 1: Colony forming units (cfu)/ml of different group pre and post

NS Latex (Grp-A)		NS vinyl (Grp-B)		S Latex (Grp-C)	
Pre	Post	Pre	Post	Pre	Post
16	33	12	118	11	12
21	40	38	316	5	5
6	30	7	210	2	3
11	35	30	220	20	23
14	61	7	210	4	5

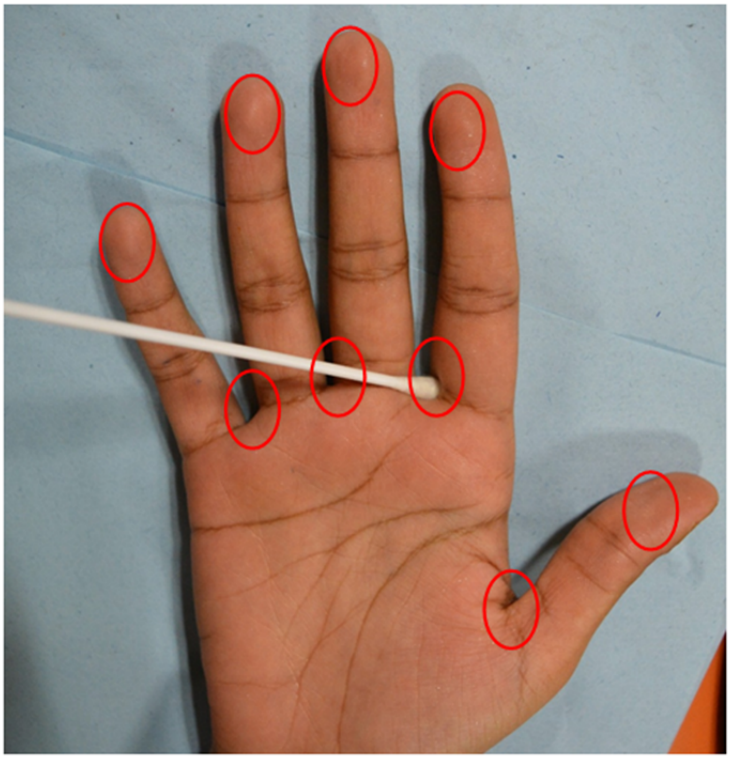
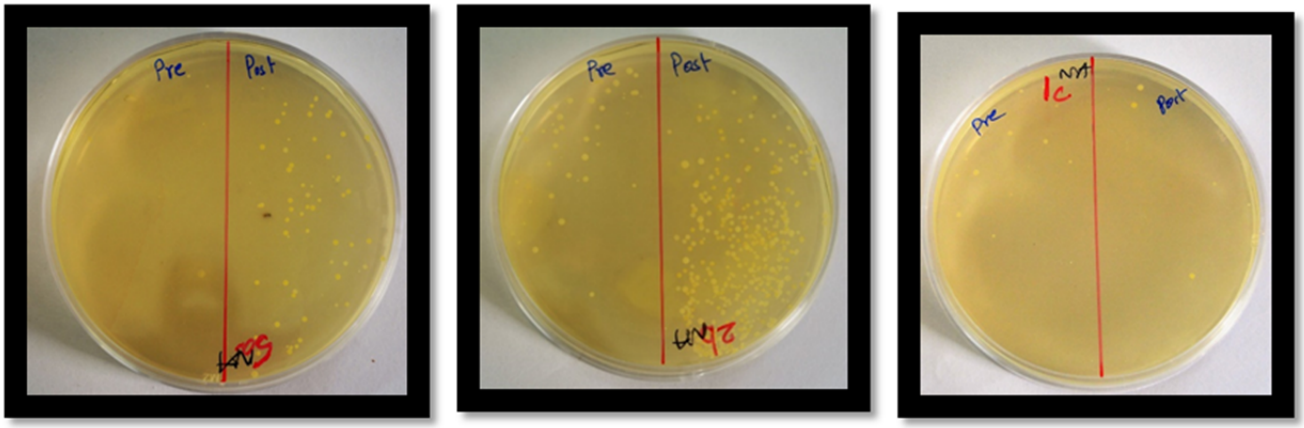


Figure 1: Sites of swab collection



Group A **Group B** **Group C**

Figure 2: colony formation pre and post treatment in various groups

Table 2: Paired t-test comparing pre-treatment and post-treatment values

Paired t test	
Group	p - value
Group A	0.008*
Group B	0.002*
Group C	0.070

* Mean difference is significant at 0.05 level

Table 3: One way ANOVA-multiple comparisons between groups

One way AVOVA – Multiple comparisons	
Groups	p-value
Group A Group B	0.000*
Group C	0.883
Group B Group A	0.000*
Group C	0.000*
Group C Group A	0.883
Group B	0.000*

* Mean difference is significant at 0.05 level

DISCUSSION:

The present study was done in order to find the effectiveness of commonly used gloves in dental practice. The study showed that sterile latex gloves had the least contamination of the hand, followed by non- sterile latex gloves and maximum contamination by vinyl gloves. The result is supported by the study done by Robin J. Olsen et al., [4] were the study was done to compare the hand contamination in clinical practice when examination gloves were used as barriers and result revealed that latex gloves showed less contamination when compared to vinyl gloves.

Apart from the type of gloves used the time period worn also affects the hand contamination. In a study done by Morgan DJ et al., [5] revealed that wearing the gloves for up to 3 hours, between 20% and 50% of the gloves, depending on type, allowed bacteria to pass across the glove causing contamination of the hand. Study done by Denise M. Korniewicz et al., [6] compared the leakage property of different types of latex gloves and vinyl gloves on clinically high risk and low risk settings and it showed the regardless of level of stress and duration worn, 85.3% of used vinyl gloves and 18.4% of used latex gloves leaked which supports the present study. There is large number of medical professionals who suffer from latex allergy. A systematic review on the prevalence of rubber latex allergy among health care workers shows that 4.32% of health care workers are said to have latex allergy and the odd's ratio for risk of hand dermatitis was 2.46 [7]. This shows the need for research in different glove material. Material that would be resistant to leakage and less allergic.

CONCLUSION:

There was a significant difference in colony forming units between pre- and post-treatment in non-sterile latex gloves and non-sterile vinyl gloves. There was no significant difference in colony forming units between pre and post treatment in sterile surgical gloves. There was significant difference in colony forming units between non- sterile vinyl gloves and non-sterile latex gloves; non- sterile vinyl gloves and sterile latex gloves. Thus, latex gloves showed less contamination of operator's hand when compared to vinyl gloves.

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