

RE-USE AND LIFE SPAN OF GLOVES

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Introduction

The use of gloves is a prerequisite for hygienic performed dental treatment since:

1. It prevents cross-infection through existing lesions on the operator's hands from patient to the operator and vice versa.
2. It blocks the route of transmission of microorganisms via the operator's hand from one to another patient if the gloves are discarded after each patient.

Sterile and non-sterile disposable gloves

A variety of disposable gloves are now available on the market. In principle they can be distinguished into two groups, the sterile ones for medical surgery and the non-sterile but disinfected (free of pathogenic microorganisms) ones. The latter, cheaper, group is appropriate for use in dentistry, since the field of operation, the oral cavity is not sterile, and hence does not demand gloves completely free of microorganisms. As long as pathogenic microorganisms are not involved (from a previous patient) non-sterile gloves are acceptable for use in dentistry.

Latex and polyvinylchloride gloves

The materials used for the production of disposable gloves are latex, a natural rubber product and polyvinylchloride a synthetic product. The latex material is more elastic and latex gloves fit better and are therefore preferred by most clinicians. Some people develop allergic skin reactions against additives in the latex. In such cases it is recommendable to try the polyvinylchloride gloves. However allergic reactions are also triggered by the powder added to the gloves in order to facilitate donning of the gloves. If the powder is the culprit of the allergy a glove without powder should be tried.

Powder additives

Powder has been added to the gloves to ease the donning of gloves. In the past talcum powder was used but when it became evident that talcum exerted toxic effects on the tissues it was replaced by starch powder. However there is now documented evidence that starch powder also causes undesirable side effects(1). It has been reported that granuloma were induced after extractions and periodontal surgery when gloves with starch powder were utilized (2). It is therefore recommendable before treatment to wash the gloves with the hands inserted so as to remove remnants of powder on the outer surface of the gloves. As has been mentioned above, the added powder may also be responsible for allergic skin reactions on the operator's hands.

The 'biogel' glove

A new disposable glove has now appeared on the market. It is a product of the London Rubber Company which meets the above mentioned drawbacks regarding powder additives. This glove is produced with a gel coating which replaces the powder. The problems of allergy and post-surgical complications seem to be solved with this 'biogel' glove. A further advantage of this glove is that since the coating does not change its composition during washing (and heat sterilization?), the original ease of donning gloves remains, in contrast to the powder gloves which lose that property due to problems of coagulating powder.

Re-use of disposable gloves

Disposable gloves should actually be discarded after each patient. In this country, disposable gloves are re-used because of insufficient supplies. In hospitals disposable gloves are

cleaned, heat sterilized and powdered before re-use. In dental clinics it is 'normal' routine to use disposable gloves for more than one patient. Cross-infection between patients is dealt with by washing the gloves while still on the hands with water and a detergent. This is probably the second best method to avoid cross-infection between patients, if supplies are not sufficient to change gloves after each patient. Because gloves have a very smooth surface, a simple washing has proved to be quite effective in removing almost all microorganisms (3). In contrast, washing of the hands does not easily reduce the bacterial numbers since bacteria are entrapped in minute breaks in the epidermis and in the subungual (under nail) areas.(4)

The question arises whether the re-use of disposable gloves is acceptable since disposable gloves have never been produced to meet the criteria for re-use. Even the 'biogel' glove, which remains its ease for donning gloves, is not produced for re-use.

Safety of re-using disposable gloves

Washing and heat sterilization may induce perforations in the gloves through which microorganisms may pass. One should not be confused by reports which claim that most disposable gloves exhibit 'perforations' even before their first use (5,6). It should be understood that those 'perforations' had been assessed in electric conduction experiments, whereby the passage of sodium chloride molecules through the glove was used as criterion for perforations. It is unlikely that microorganisms which are thousands of times larger than the sodium chloride molecule could pass through those 'perforations'.

Disposable gloves are produced for the market in the industrial world. Costs of using disposable gloves for each patient are passed on

to the patients or insurance companies. Therefore the problem regarding re-use and safety are not of particular interest in those countries. Consequently research on the safety of re-using disposable gloves is almost completely lacking. One study (7) has aimed to determine the times of washing non-sterile latex gloves before microbial penetration of the gloves occurred. Table 1 presents the results. The 'Regent Biogel D' glove proved to be more durable under washing regimes with detergents than the Surgikos Mikrotouch. The 'Biogel' glove could be washed 15 times irrespective of the type of detergent before it starts to lose its barrier function and allows bacteria to pass. No data are available regarding the effects of heat sterilization on the permeability of disposable gloves.

It is noteworthy that repeated use of a single pair of gloves by washing between patients has been condemned by the American Dental Association, the Occupational Safety and Health Administration, and the Centers for Disease Control in the USA because the barrier function and the prevention of cross-infections cannot be guaranteed in daily practice.

References

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Table 1. Times of washing with different detergents before microbial permeability of 2 different latex gloves could be assessed

Detergent	Times of washing	
	Surgikos Mikrotouch	Regent Biogel D
Simple soap	4	15
Hibiscrub (soap solution with 4% chlorhexidine)	5	15
Hibisol (0.5% chlorhexidine in 60% isopropylalcohol)	10	15

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