

# HYGIENIC PROCEDURES IN SIX REGIONAL DENTAL CLINICS

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## Introduction

In many developing countries the level of hygiene in dental practice is poor, partly due to lack of facilities and supplies but also because of neglect among dental personnel regarding the risks of cross-infection in dental practice (1).

The aim of the present study was to assess the level of hygiene in six regional dental clinics in the country.

## Materials and methods

Six regions of Tanzania were selected to compile a sample of dental clinics in the country. Each dental clinic was visited by one DDS V student in January 1991. The students were thoroughly instructed how to collect the information. Information regarding hygienic procedures were recorded with the aid of a checklist. Some information was obtained in an interview, for instance, the frequency of needle stick accidents, but most information was collected by observing the daily routine in the clinic during a 2 week period.

## Results and Discussion

Most clinics had sterile instruments at the beginning of the day since they made use of the central autoclaving unit in the hospital or because they started the day by exposing the instruments to the dental autoclave. During the day, a boiling water bath was used in 4 clinics whereas 2 clinics utilized a small autoclave. The water in the water bath was frequently not

boiling and instruments were regularly removed without regard to exposure time. This of course is not acceptable. The reason for this faulty procedure, lack of sufficient instruments, can never justify this form of mal practice, since it is executed on the patient's health expense. The boiling water bath should be used in an appropriate way that is: within a period of 20 minutes after the last load no instruments should be removed or added. An adequate routine is to load the water bath with used instruments and keep them for 20 minutes in boiling water before removal and storage or re-use. Thereafter the water bath is ready for a next charge. However the boiling water bath practice should actually be banned from dental clinics since they easily invite misuse and boiling water on higher altitude does not reach the required temperature of 100° C (2). Steam sterilization is the method of choice and this can be achieved with a pressure cooker (2).

Table 1 shows the various methods used in the clinics to store sterilized or disinfected instruments. It is adequate to store the instruments in clean *closed* containers or *closed* drawers or under towels so as to avoid recontamination by splashing and aerosols. There is no need to store instruments in chemical disinfectants. It only increases the running costs of the dental clinic. Instruments after intra-oral use need at least to be heat disinfected in boiling water for 20 minutes, before use on the next patient.

Table 1 Storage of instruments

Storage	No. of clinics
Scales with disinfectant and drawers in cabinet	2
Dry closed containers	2
Dry closed containers and drawers in cabinet	1
Dry closed containers and in the boiling water bath	1

Table 2 presents the current practice in the 6 clinics. It is appalling to notice that many

Table 2 Sterilization or at least heat disinfection of different instruments between patients

Instruments	Number of clinics		Instruments not used
	At least heat disinf.	Not heat disinfected	
Mouth mirror	3	3	0
Dental probe	4	2	0
Tweezers	4	2	0
Scaler and curette	4	2	0
Forcep	6	0	0
Elevator	5	1	0
Handpiece	1	4	1
Bur	3	2	1
Excavator	6	0	0
Matrix band	5	0	1
Matrix holder	5	0	1
Amalgam stopper	2	3	1
Amalgam carrier	4	1	1
Non disposable needle	5	1	0
Syringe	4	1	1
Suture needle	3	0	3

instruments, which are regularly contaminated with blood such as scalers and curettes, elevators and burs are not exposed to heat disinfection. Those instruments that are exposed are often removed prior to the end of the minimum required exposure time (20 min. boiling water, 20 min. 120° C, 60 min. 160° C dry heat).

Those dental clinics that applied heat disinfection or heat sterilization on instruments did not do so routinely in all cases. For instance burs were sterilized at the beginning of the day but during the day the same burs were used for the next patient without cleaning.

Older types of handpieces cannot withstand high temperatures. A quick routine wipe with alcohol is inadequate. Handpieces should be scrubbed with a detergent and water and then wrapped in a papertowel or gauze impregnated with an effective disinfectant (2). The same routine should be applied to the three way spray syringe.

5 clinics used disposable needles and 4 clinics re-used those needles after sterilization. Some clinics used disposable carpules and re-used them after adequate sterilization. This was done by using the central sterilization unit of the hospital.

Prick accidents caused by needles or other sharp instruments either during treatment or during domestic washing prior to sterilization or

disinfection were reported by dentists and other dental personnel. Table 3 depicts the annual frequency of such prick accidents. Self reported prick accidents occurred on an average 6.3 times per year among dentists and 6.6 times per year among other dental personnel. There seems to be ignorance or unawareness among dentists and other dental personnel regarding the risks of contracting serious infections through prick accidents. It was observed that where needles were recapped it was often done in a dangerous way (3). Domestic cleaning of instruments was not performed with heavy duty domestic gloves in order to avoid prick injuries. If one continues to experience 6 prick accidents per year during the next 30 years of professional life the chance of contracting HIV infection is approximately 3% (3). There seems to be a need to educate dental personnel on the hazards of careless handling of potentially contaminated instruments.

The frequency of prick accidents can substantially be reduced by applying preventive measures: use heavy duty domestic gloves or pre-boil instruments in water for 10 minutes before cleaning them prior to sterilization. Keep needles separated from other instruments during treatment. If disposable needles are used discard them in special made puncture resistant containers or if recapping is necessary adopt a non dangerous way of recapping (3).

Table 3 Annual prick accidents reported by dentists and other dental personnel in the surgery

Number of dentists	Number of dental personnel	Annual prick accidents
-	2	0
2	2	1
-	1	2
-	1	4
-	2	5
1		6
-	1	8
3	6	10
-	1	12
-	1	15

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Table 4 shows for which treatment modalities gloves were utilized. For oral examination, cavity preparation and application of fillings, gloves were not used in all clinics. The use of gloves is recommended for *all intra-oral* procedures because otherwise the prevention of cross-infection in daily practice cannot be guaranteed (4).

In all clinics disposable gloves were re-used. They remained on the hands of the operator who washed his hands with gloves on with water and a detergent after each patient. However it was observed that washing was not always performed between patients. The number of patients treated with the same pair of gloves on one day was in the different clinics respectively 4, 5, 8, 10, 18 and 30 patients. In most clinics gloves were re-used again on the next day after they had been sterilized. There is documented evidence that 5 times washing with water and a detergent makes disposable latex gloves permeable for microorganisms (5). The effects of heat sterilization on the barrier function of gloves have never been investigated (6). Re-use of gloves remains controversial.

Table 4 Gloves used for different intra-oral treatment procedures

Treatment procedures	Number of clinics	
	Used	Not used
Oral examination	5	1
Cavity preparation	4	2
Filling	4	2
Impression taking	1	5
Extraction	6	0
Minor surgery	6	0
Scaling	6	0

Repeated use produces small defects that allow microorganisms to pass. Probably the numbers of microorganisms that may pass are limited and since infection depends on dose (7) the risks of contracting disease by the operator may be small. However if the operator exhibits existing lesions on the hand or when the gloves become heavily contaminated with blood the risks will increase if gloves are re-used. Because of the smooth surface gloves can be more effectively washed than bare hands (8),

but prevention of cross-infection cannot be avoided with certainty. Re-use of gloves is internationally condemned because the barrier function and the prevention of cross-infections cannot be guaranteed (4).

Masks and protective spectacles were used by three dentists and by none of the other operating dental personnel. Particular during procedures where splashing of material and aerosols are produced protective wear is needed. Sharp materials in the splash during cavity preparation and scaling may cause small lesions to the eye and face of the operator which may serve as an entry for pathogens. Dental aerosols can contain respiratory pathogens (7). Face mask and eye wear can prevent infection of the operator.

Working surfaces on which instruments are kept during treatment must be cleaned after each patient. Four clinics did not do so and two clinics did it now and then.

Water in the dental unit must be refreshed *daily*, preferably in the morning, because it may contain high numbers of opportunistic pathogens eg. *Pseudomonas*, *Alcaligenes* and *Acinetobacter* that can cause pneumonia in medically compromised patients. These microorganisms may even reach numbers as high as  $10^6$  per ml if the dental unit is not used for some days (1). Three out of six dental clinics had a spray system on the dental unit. Refreshing of the water was done once a week in 2 clinics and twice a week in one clinic.

Contamination due to aspiration of microorganisms in the tube system of handpieces can be reduced by flushing the spray system during 15 seconds prior to treatment of the next patient. Two out of three clinics executed this precaution now and then.

The dental surgery should be *daily* cleaned by mopping the floor with water and soap. Most clinics failed to adhere to such simple routine. Two clinics cleaned the floors only once a week and 2 clinics performed only dust sweeping. Dust sweeping should be banned since this method causes the dust to swirl around. Surrounding surfaces become recontaminated since microorganisms in the dust are not removed but redistributed in the surgery by sweeping.

## Conclusion

The data in this study were not obtained by interviewing or questioning which always raise doubt about the validity of the data. This is because data based on statements are not necessarily true. Particular when the dentist is aware of shortcomings in the hygiene practised in the surgery, he may likely present a better image than the actual situation. As opposed to the "soft" data from questionnaires and interviews "hard" data can be derived from observations. Hard data are more likely to reflect the actual situation than "soft" data do. The present data were obtained by observation and hence considered to give a valid image of the current situation on hygiene in dental practice.

Since most patients cannot be identified as carriers of pathogens, *all* patients should be considered as a potential source of pathogens. Hence the dental personnel must apply infection control procedures at *all times*.

Many precautions to reduce cross-infection in the dental clinics were not taken. This could partly be explained by lack of sufficient supplies. However it is appalling to realize that several omissions in the daily infection control were observed that could not be excused by lack of facilities but only by ignorance of the dental personnel. This problem needs serious attention from the respective authorities.

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