

MILLER (W.D.)

## ASEPSIS AND ANTISEPSIS IN PRACTICE.

BY W. D. MILLER, M.D., D.D.S., BERLIN.

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IN the DENTAL COSMOS for 1891, p. 514 *et seq.*, I published the results of experiments on the sterilization of dental and surgical instruments, which showed that the methods commonly in use are totally inadequate to the purpose. Since that time I have been occasionally asked whether I carry out in practice the measures recommended in the article referred to, and if it does not entail a great sacrifice in time and labor to do so.

It is the object of this communication to show that the methods suggested may be carried out in daily practice with perfect ease. I need not again point out here the desirability—in fact, the necessity—of the strictest aseptic and antiseptic precautions in operations upon the mouth. There may still be dental surgeons who know little and care less about asepsis and antiseptics, and who maintain that they can do just as good work with soiled hands and instruments as with clean ones; the public, however, is becoming too well enlightened on this point to tolerate them.

### THE CLEANSING OF THE HANDS.

It is well known to be an exceedingly difficult matter to completely free the hands from living bacteria. Fürbringer's method,\* which places particular stress upon the sterilization of the subungual space, requires: (1) Dry cleansing of the nails from visible dirt; (2) brushing the hands, particularly the nails, for one minute with soap and warm water; (3) washing for one minute in alcohol, not under eighty per cent.; (4) thoroughly brushing for one minute in a 0.2 per cent. solution of sublimate, or three per cent. solution of carbolic acid. This operation requires about ten minutes, unless everything is placed in readiness by an assistant; in this case it may be gone through with in somewhat less time. Kelly† scrubs the hands and forearms with sterile brushes for ten minutes with olein (common brown kitchen soap) and hot water, the nails with especial care. They are then

\* Fürbringer, P., "Untersuchungen und Varschriften über die Desinfection der Hände des Arztes, nebst Bemerkungen über den bacteriologischen Character des Nagelschmutzes." Wiesbaden, 1888, Bergmann.

† "Gynecological Technique." *The New York Journal of Gynecology and Obstetrics*, July, 1892.

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immersed in a saturated solution of permanganate of potash, and transferred at once to a hot saturated solution of oxalic acid. Finally the hands are rinsed in sterilized water. This operation requires about fifteen minutes.

The question has been asked, whether absolute sterility of the hands is necessary on the part of the dentist. It is reasoned that inasmuch as the human mouth, even when well cared for, contains enormous numbers of micro-organisms, the introduction of a comparatively insignificant number on the fingers would probably result in no difference whatever in the general condition of the mouth. Furthermore, the fingers of the dentist do not come into contact with tissues which are very susceptible to infectious agents; consequently hands that would be fatal to the success of a surgical operation may be introduced into the mouth without any ill results whatever. These conclusions should be accepted only with considerable restrictions, and only with the understanding that the hands do not carry any specific germs, and do not introduce into the mouth any pathogenic micro-organisms not already there.

I have adopted in practice the following mode of procedure:

Before beginning my work in the morning I cleanse my nails, which are not allowed to become over a mm. long, with a penknife, and then brush the hands, giving, of course, particular attention to the nails, for two minutes with a rather stiff brush, in a warm one to two per cent. solution of lysol. Lysol is quite equal, if not slightly superior, to carbolic acid as an antiseptic, and is far less escharotic. It makes a soapy solution, and cleanses the hands beautifully even without soap, though I usually add soap as a matter of habit as well as to make the cleansing doubly sure. The hands are then rinsed in hydrant water and thoroughly dried. The whole operation requires about four minutes. The hands are perfectly clean, but of course not absolutely free from germs. If the fingers are rough or cracked, or the nails long, double the time will be requisite to accomplish the same end. A slight odor of lysol clings to the fingers, but I have not found it disagreeable to the patients; on the contrary, they are glad to be reminded of the fact that the dentist takes proper care of his hands.

Between operations or consultations I wash the hands in soap-water, brushing the nails and fingers for half a minute to a minute.

If, however, I have performed an operation upon a filthy mouth, I return to the lysol solution, even increasing its strength according to indication to two and one-half, three, and even four per cent.

I do not knowingly, under any consideration, take on syphilitic patients during my regular hours of practice. If I am obliged to operate for such a patient I give an appointment at the close of the day, when there is ample time to disinfect hands, instruments, etc. If, however, the discovery is not made until the operation is begun, then it is as well to finish it at once; but in this case an *absolute* sterilization of the hands is called for, either by Fürbringer's or Kelly's method, except that in the former I should recommend lysol instead of carbolic acid, and treat the hands at each step two minutes instead of one.

It may be remarked in this connection that when the hands have been cleansed they should not be contaminated by contact with infected objects before or during the operation. It is not permissible

to handle money or old teeth, or to dive down into the trousers pocket for a jack-knife, nor do I consider it quite proper to hold instruments back of the ear or between the teeth.

#### STERILIZATION OF INSTRUMENTS.

In regard to instruments, particularly forceps and excavators, I hold that absolute sterilization should be demanded, inasmuch as infectious matter is much more readily communicated by them through wounds than by the fingers, and further because the sterilization is so easily accomplished that there is no excuse whatever for our neglecting it.

The method of sterilizing instruments now most commonly in use is by means of boiling water containing one to two per cent. of carbonate of soda to prevent rusting. Three minutes for excavators and five for forceps will be sufficient, unless the instruments are covered with a thick, dry coat of infectious matter,—a condition of things not supposed to exist nowadays in a dental instrumentarium.

Various apparatus have been devised for carrying out the boiling process, some of them, I think, unnecessarily complicated. I have devised a very simple boiling-pan, consisting of a metallic box three inches wide, six inches long, and one and one-quarter inches deep, with a partition wall in the middle parallel to its length, and a rim at the top one and one-half inches wide, making an angle of about one hundred and thirty degrees with the side of the vessel. In this apparatus the hot water does not come into contact with the handles of the instruments, which in many cases would be injured thereby. Fine-edged surgical instruments are said to suffer in the course of time from boiling (become blunt), but this objection can hardly apply to dental instruments. Personally, I have adopted another method of sterilizing instruments. My chief reason is the fact that even a very little boiling in a dental office is sufficient, in summer, to perceptibly raise the temperature of the room, and I have no room adjoining where the boiling might be done. I have found that a four to five per cent. solution of carbolic acid, lysol, or trichlorophenol suffices to completely sterilize mechanically clean instruments in thirty minutes.

I keep two complete sets of instruments constantly in use, and as soon as I have finished operating for one patient the whole set of instruments used is removed from the operating-table and placed in the antiseptic solution, where it is allowed to remain while the other set is in use, or at least half an hour.

I do not only consider it necessary that every patient should have a fresh set of perfectly sterilized instruments, so that germs of disease may in no case be communicated from one person to another, but I hold that while operating for any one patient the instruments should be kept in a clean if not sterile condition. I should, for example, consider it dangerous to wound the mucous membrane with an instrument just employed on infected tissue; consequently instruments which become strongly infected (burs used in opening up putrid pulp-chambers, etc.) should at once be dropped into the antiseptic, and all instruments which become soiled with blood or mucus should be thoroughly cleansed before being used again, even for the same patient. All this is done by the office-girl, who is indispensable for keeping the instruments in a proper condition.

For about a year and a half I used a four to five per cent. solution of carbolic acid, to which one-half to three-quarter per cent. of carbonate of soda was added to avoid rusting. I designate this small quantity because it is just sufficient, and a larger per cent. I have found by experiment to lower the antiseptic power of the carbolic acid.

Since about four weeks I have substituted lysol for carbolic acid, since it is not necessary to add the soda to prevent rusting. It is also cheaper than carbolic acid. All instruments, including, of course, corundum disks, files, and clamps, are subjected to this treatment, whereas those instruments which do not come into contact with the mucous membrane, or do not become soiled in the mouth (gold-pluggers, etc.), are only occasionally sterilized.

*Mouth-mirrors* require extra care, and must be carefully brushed before treating with the lysol solution, in order to remove small particles of infectious matter which may have inserted themselves between the glass and the fastening. I keep so many mirrors on hand that I do not require to use any one twice on the same day. There is consequently no time lost between patients in cleansing mirrors.

#### DRINKING-GLASSES.

In order to be able to place before every patient a glass which at least does not carry any germs from the mouth of a previous patient, I have provided as many glasses as I have patients in a day. These are all placed in a three per cent. solution of lysol in the evening, and remain there for over twelve hours. They are then thoroughly rinsed in hydrant water.

I never use a piece of rubber-dam more than once under any circumstances. If I were to use the same piece repeatedly, I would sterilize it by boiling for ten minutes in the soda solution.

In regard to the sterilization of napkins, teeth for transplantation and implantation, etc., I have nothing to add to what I have already said in the article before referred to.