

A Pragmatic Approach to Asepsis in the Orthodontic Office

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The purpose of this paper is to establish some initial guidelines for asepsis in the orthodontic office. There is a dearth of reference material regarding asepsis in the orthodontic literature. One reference discusses flame sterilization of bands,¹ while another discusses the results of a questionnaire on methods of sterilization of orthodontic instruments used in hospitals and teaching facilities.² The results of the questionnaire show that the majority of orthodontists disinfects orthodontic instruments and bands with alcohol-based cold sterilizing solutions. This lack of information concerning sterilization could be due to the fact that the orthodontic specialty in the past has tended to divorce itself from the general practice of dentistry. Even Angle felt that orthodontics should be taught within its own educational institutions.³ Because of this separation, orthodontics has been on the far end of the spectrum where the accepted methods of bacterial and viral control are concerned. Departments of oral surgery, periodontics and endodontics have been more oriented to disinfection and sterilization.

The need for orthodontic offices to re-evaluate their approach to asepsis is emphasized by one recent study that indicates the orthodontist has the second highest incidence among dental professionals of acquiring hepatitis B.⁴ Most orthodontic practices today are seeing patients from a much broader age and socioeconomic level

Read at the January, 1979 meeting of the Midwestern Component of the Angle Society.

than was previously experienced due in part to the rapid rise of third-party payments. This broadening of the practice base brings into the office patients who have had contact with drug and marijuana usage, various sexual life styles, and those people undergoing exceptional medical treatment such as renal dialysis. These people have a high risk of infectivity especially hepatitis.⁵

Finally, with the increasing risk of malpractice the orthodontist could benefit by having some policy on sterilization set forth in the orthodontic literature which would describe unassailable standards for an orthodontic practice. It would be very easy for an orthodontist to become involved in litigation if a group of people were to develop a particular disease such as hepatitis with their only common source the orthodontic office.

The main concern facing the dentist is cross-infection and, specifically, by the hepatitis virus. Hepatitis virus B causes more death and practice disruption in dentistry than any other pathogen and is of major public health importance in the United States.⁶ Hepatitis B used to be called serum hepatitis and was thought to be transmitted only by parenteral routes such as inoculations or transfusion of blood or blood products. Recent evidence indicates that hepatitis B is spread in other ways. Saliva is now implicated in the nonparenteral transmission of hepatitis B.^{7,8} This viral disease can be spread by any instrument which comes into contact with the blood or saliva of a carrier or a

patient with an active case of the disease.⁹ Hepatitis B can be transmitted from patient to dentist or from patient to patient by very small amounts of infected blood or serum from improperly cleaned instruments.¹⁰ Type B viral hepatitis has been reportedly transmitted by as little as .0004 ml of infected blood.¹¹

It would be unrealistic to assume that complete sterilization of the orthodontic office could take place.¹² The nature of the operative site precludes a sterile state; the oral cavity contains a multitude of organisms, some of which are pathogenic in nature. These pathogens can often exist without causing difficulties as long as they do not enter the blood stream of either the patient, the orthodontist, or some subsequent patient.

An orthodontist often sees many patients during the course of a day, many for just a brief period of time. Providing sterile instruments for each patient would be costly and impractical.

The risk of infection is greater for the orthodontist and his staff than for the patients.⁶ The greatest danger for the orthodontist and members of his staff is from puncture of the skin with contaminated instruments or sharp edges of orthodontic appliances.¹³ Any small cuts or abrasions on the orthodontist's hands may allow the entry of minute amounts of serum which are sufficient to cause infection.

The orthodontist, at least for now, must decide for himself which procedures provide opportunity for contamination and try to prevent such contamination. Since the orthodontist and his staff, the instruments and supplies, and the operatory surfaces are the links in the cross-contamination chain, these are the three areas to which the orthodontist must direct his attention.

Orthodontist and Staff

Good personal hygiene is the keystone of protection against infection. The single most important practice is careful handwashing.¹⁴ During a treatment session, hands become contaminated by microorganisms from the patient's mouth. These must be removed before treating subsequent patients. A good germicidal soap such as Betadine, Phisohex, or Septisol must be used. The hands should be washed for 20 to 30 seconds in cool water because hot water causes the pores to open. This makes disinfection more difficult because perspiration continues to wash deeply lodged microorganisms to the surface of the skin after hand washing is completed.^{9,15} Use a clean paper towel to dry hands.

Rubber finger cots should be worn by individuals when they have cuts or hang nails present.⁹ Protective eye glasses should be worn when scaling teeth prior to band placement or when removing excess cement after band placement.

Lastly, as far as the orthodontist is concerned, a reasonably complete medical history of his or her patients is important in determining those patients who are likely to be carrying pathogenic organisms such as hepatitis.

Instruments and Supplies

One can decrease cross-contamination by decreasing the number of viable microorganisms on dental instruments at some stage between their use on different patients.¹⁶ Since it would be costly and impractical to supply sterile instruments for each patient, the orthodontist must decide for himself which instruments need to be sterilized because of blood and saliva contamination and which instruments and supplies are handled satisfactorily by disinfection.

In our office the following instruments and supplies have been selected for sterilization: bands, scalers, band removers, ligature directors, and band-forming pliers.

These instruments are placed in an ultrasonic cleaner, rinsed in water, dried, and placed in a dry-heat sterilizer for two hours at 350°F. Indicator tape is used to determine that the sterilization temperature has been reached. A toaster oven purchased in an appliance store is used as a dry-heat sterilizer. Unfortunately, the numbers on the orthodontic bands tend to come off when they are placed in an ultrasonic cleaner. Therefore, the bands are soaked in dishwasher detergent and then rinsed in water and dried prior to dry-heat sterilization. The loss of numbers on the bands was one of the two main criticisms of bands reported in a recent survey, but one manufacturer claims to have improved the numbers so that the bands may be cleaned and sterilized without loss of numbers.¹⁷

The following instruments which come into contact with blood and saliva less frequently are placed in a disinfectant solution: ligature and distal end cutters, tying plier, mirrors, and burs and stones.

These instruments are cleaned with soap, rinsed and placed in a buffered glutaraldehyde solution (Cidex) for at least ten minutes. Microbiological testing of the glutaraldehyde disinfection solution indicates that it is fungicidal and bactericidal, even for *Mycobacterium tuberculosis* after instruments are immersed in the solution for ten minutes.¹⁸ Instruments must be rinsed well before immersion in Cidex, although one of its advantages is that its action is not affected by small amounts of soap or detergent remaining on the instruments. Disposable impression trays are used most fre-

quently, but when metal trays are used, they are cleaned and then placed in Cidex for at least ten minutes.

Those instruments that rarely come into contact with the mouth are washed, dried and then wiped with a gauze pad soaked in 70% isopropyl alcohol. In our office these are: arch-forming pliers, torquing keys, and cotton pliers.

Finally, any instrument that becomes contaminated with blood will be sterilized.

Operator Site

The treatment chairs, various syringes, bracket tables, light handles, and handpieces are wiped at noon and evening with gauze pads soaked in 70% isopropyl alcohol.

CONCLUSION

It is incumbent upon each orthodontist to conduct his or her practice in a manner that will not cause harm to anyone. By following the procedures described here the orthodontist can minimize and even prevent the possibility of cross-infection. This is the best protection against the transmission of hepatitis and other diseases and perhaps the filing of a malpractice suit.

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