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REVIEW

Aerosols: A Concern for Dentist

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Abstract:

Potential transmission of disease to personnel during dental procedures has become a source of increased concern to the dental profession. Certain features of the dental practice may potentially contribute to the transmission of infections through the dental office. This potential for transmission of diseases to practitioners, their auxiliary staff and the patients, during dental procedures has become a source of increased concern to the dental profession. Ultrasonic scalers are increasingly being used in dental practice for the removal of dental plaque and calculus, which are known to be composed largely of bacteria. These scalers produce a fine spray which may be heavily contaminated with oral microorganisms and present a considerable microbial challenge to the patients, the dentist and nursing staff. Recent studies have confirmed that an aerosolized bacterial contamination is produced during the use of ultrasonic scalers and other dental equipments that produce an aerosol spray. The various methods by which this contamination may be controlled are; provision of good ventilation, reduction in emissions (the use of a pre- procedural antiseptic mouth rinse, the use of aerosol reduction devices), and purification of air borne microbial pollutants (air conditioning, disinfection with physical and chemical means).

Key words: ***Retreatment, Resilon, Persistent periapical infection, Retreatment files.***

INTRODUCTION

Aerosol is defined as small droplet usually 5µm or less in diameter, which can remain suspended in air for some time. Bacterial aerosols are an important consideration for infection control and occupational health in the dental clinic, since infective agents can be transmitted via aerosols to patients or dental staff.[3,4.] The various dental procedures which produce microorganisms-laden aerosol include turbine hand pieces, sonic & ultrasonic scalers, Polishing cups and air syringes.

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Microorganisms in the mouth and respiratory tract can be transported in the aerosols generated during dental procedures and can contaminate the skin and mucous membranes of the mouth, respiratory passages and eyes of dental personnel as well as the patients.[1,2,5,6,7]

Potential sources of air borne contamination during dental treatment are[11]

a) Dental Instrumentation
b) Saliva and respiratory sources
c) Operative site

Contamination from the dental instrumentation is the result of organisms on instruments and in the dental unit water lines.[9] Mouth is a part of oronasal pharynx. As part of this complex, the mouth harbors bacteria and viruses from the nose, throat and respiratory tract. Any dental procedure that has the potential to aerosolize saliva will cause airborne contamination with organisms from some or all of these sources. Ultrasonic scalers, dental hand pieces and air polishers produce the most viable aerosols[1]. These instruments remove material from the operative site that becomes aerosolized by the action of water sprays and compressed air.

The composition of aerosols probably varies with each patient and operative site. It is reasonable to suppose that components of saliva, nasopharyngeal secretions, plaque, blood, tooth components and any material used in the dental procedure, such as abrasives for air polishing, all are present in dental aerosols[11].

Microorganisms isolated in dental aerosols have been associated with bacterial diseases such as tuberculosis, staphylococcal infection, conjunctivitis, viral infections and other skin infections. Increase in the usage of ultrasonic scalers and turbine hand pieces in recent times caused increase of aerosol contamination and decreased air quality in the dental office.

METHODS OF REDUCING AIRBORNE CONTAMINATION

1. Provision of good ventilation with its diluting effect on the airborne microbial load.
2. Reduction in the emission of bacterial dental aerosols which can be attained by:

A. Flushing of water from ultrasonic scaler device and turbine hand pieces for 5-10 minutes in the beginning of the day and for 2 minutes before treatment.

B. Use of Pre-Procedural antiseptic mouth rinse (0.2% Chlorhexidine, Povidone Iodine). [8, 10]

C. Use of aerosol reduction devices (High volume suction apparatus)

D. Purification of airborne microbial pollutants (Disinfection with physical and chemical means)

E. Rubber dam isolation while using turbine hand pieces.

F. Minimizing biofilm formation in dental unit water lines

- Use of sterile water or sterile saline.
- Drain and flush water for several minutes before beginning clinic each day.
- Perform periodic chemical treatment as recommended by manufacturers.

3. Other precautions like use of facemask and face shield.

   Masks should have at least 95% filtration efficiency for particles 3.0-5.0μm in diameter.

   Should be changed for each patient

   Change of mask after 20minutes in aerosol or 60 minutes in non aerosol environments

   Eye Protection

   Protective eye ware or face shield must be worn while treating patients

CONCLUSION

The aerosols and splatter produced during dental procedures have the potential to spread infection to dental personnel and other people in dental office. It is difficult to completely eliminate the risk posed by dental aerosols; it is possible to minimize the risk with relatively simple and inexpensive precautions like personal barrier protection, preprocedural mouth rinse with an antimicrobial mouth rinse before treatment, use of high volume suction apparatus and use of rubber dam where applicable. The use of these precautions will reduce the risk of an aerosolized spreading of infection to a minimum level.

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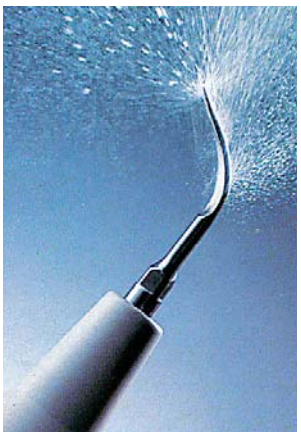

Fig1: Aerosols produced from Ultrasonic Scaler.

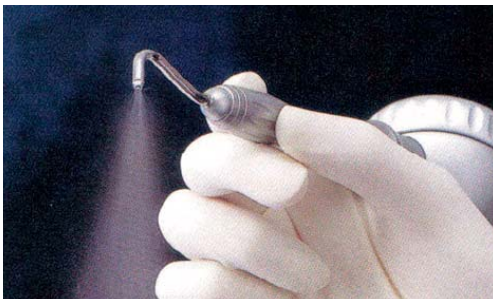

Fig 2: Aerosols produced from Air Polisher

Fig 3: Aerosols produced from airotor.

Fig 4: Personal Protection Ba

Fig5: Use of High vacuum suction apparatus

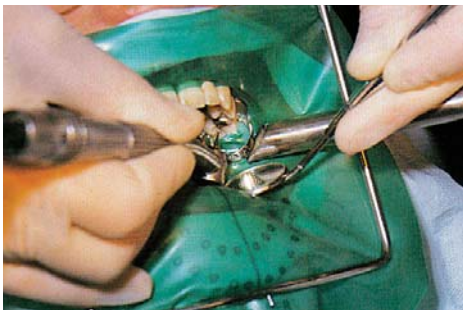

Fig6: Use of rubber dam along with high volume suction apparatus