Qualitative and Quantitative Bacterial Analysis of Aerosols generated in the Dental Departments of Yenepoya Dental College, Mangalore

Dr. Mohammed Arshad*, Dr. Ganesh Shenoy Panchmal**, Dr. Vijaya Hegde***, Dr. Sevitha Bhat****

ABSTRACT

In dentistry one of the common modes of disease transmission is through inhalation of aerosols or droplets containing pathogens. The aim and objectives of this study was to perform qualitative and quantitative bacterial analysis of dental aerosols before, during and after clinical procedures in multichair dental environments, and to compare the consequent findings. The study was performed by collecting aerosol samples from the respective dental departments by placing the culture media plates 2 feet away from the patient's mouth, before, during and after clinical procedures. The samples were incubated aerobically at 37°C for 48 hrs. Bacterial colony counting was performed and expressed as colonies per media plate (C/plate). The results revealed three main organism types (S. Epidermidis; S. Aureus; Diphtheroids) followed by other species. The largest bacterial colony counts were seen in the periodontics department, and the least count in the department of prosthodontics. t-test carried out to see if any significant difference existed in the colony counts between the various departments failed to demonstrate significant variations. The data from the present study confirms a potential transmission route for infectious agents in a multichair dental environment and supports the importance of protecting against cross infectious agents contained in dental aerosols.

Key Words: bioaerosols, airborne, bacterial, blood agar culture media, dental clinics

INTRODUCTION

The potential for diseases to spread via an airborne route has been recognized historically over a long period of time. In dentistry one of the common modes of disease transmission is through inhalation of aerosols or droplets containing pathogens1.

Dental aerobiology is the study of airborne particles in the dental office and laboratory environment and the relationship of these particles to the health of the dental staff and patients2. Aerosols are defined as solid or liquid particles suspended in a gas with a diameter of less than 50μm3-5. Aerosols which are laden with microbes and endotoxins are referred to as bioaerosols. Bioaerosols may reach up to 12-16 feet from the source during patient care and may stay suspended in the air for over 24 hours if there is “inadequate ventilation of air exchanges” and therefore have a potential for exposing the dental staff to contaminants over time1. Bioaerosols in the 0.5 to 10 diameter range are capable of penetrating deep into the respiratory system, reaching as far as the pulmonary alveoli2,6.

Dental aerosols originates from the patients, and includes, saliva, nasal-and throat secretion, dental plaque, gum secretion, blood, tooth tissues and materials used for dental treatment. Aerosol composition varies from patient to patient, and depends on the site and type of procedure in the oral cavity (tooth preparation, polishing, scaling)7. The most intensive aerosol and splatter emission occurs during the work of an ultrasonic scaler tip and a bur on a high-speed handpiece5,7.

Although the existence of dental bioaerosols has been known for a long time, the scientific analysis of the role they have in dentistry has been investigated only recently10. Furthermore, data concerning bacterial contamination of air in multichair dental clinics, such as those found in dental schools, hardly exists11. Hence, the present study was undertaken to analyze the implications of bioaerosols in the context of a multichair dental environment.

*PG Student - Dept. of Community Dentistry, **Senior Prof. & H.O.D - Dept. of Community Dentistry, ***Associate Prof. - Dept. of Community Dentistry, ****Assistant Prof. - Dept. of Microbiology, Yenepoya Dental College, Deralakatte, Mangalore - 575018