Concentrations of Scattered Dust during Tooth Grinding and the Dust-reducing Effect of Extra-oral Vacuum Aspiration
— Comparison of Simultaneous Measurements at 4 Locations during Grinding of Mandibular Bilateral Central Incisors —

Tamie OHASHI, Hiroyasu TOKUTAKE, Kohji OZAWA, Etsuko ISHIZU, Akiko HIROSE, Sachiko IWATA, Tetsuo YONENAGA, Kenji YOKOI, Masato FUKUI, Masahiko KOIDE and Atsunori ISOZAKI

Abstract: When teeth are ground, the generated dust can cause environmental pollution and expose dental staff to pathogenic microbes. Therefore, it is important to remove the dust at its origin.

In this study, we examined the concentrations of scattered dust due to grinding of the mandibular bilateral central incisors. The measurements were made at the center of a clinic and at three "chair-side" locations: the respiratory orifices of the patient (phantom head), at the position of the assistant, and at the position of the dentist. We also examined the dust-reducing effect of an extra-oral vacuum aspirator. We measured the scattered dust concentrations by dust particle size using a total of four laser particle counters operating simultaneously.

Our results suggested that the extra-oral vacuum aspirator was an effective method for removing approximately 75% or more of the dust at the patient’s position. It removed 60% or more of the dust at the dentist’s position. In this study, the extra-oral vacuum aspirator was confirmed to be effective for reducing dust in the patient’s and dentist’s positions.

In our previous study, we ground maxillary bilateral central incisors, and performed simultaneous measurements at the same 4 locations. When these results were compared with those of the present study, the concentrations of the scattered dust from maxillary bilateral central incisors were clearly higher than those from mandibular bilateral central incisors. However, their dust concentrations decreased to almost the same level using an extra-oral vacuum aspirator. The dust removal rates tended to be lower at the patient’s and dentist’s positions in the present than in our previous study.

In this study, we examined the concentrations of fine particle size dust from tooth grinding, and compared the concentrations with and without the extra-oral vacuum aspirator. The concentrations tended to be higher with than without the aspirator at the positions of the vacuum assistant and the center of the clinic. This finding indicated a suction leakage in the extra-oral vacuum aspirator after accounting for the rotational directions of the bur and distances from the grinding site to the measurement sites.

The results confirmed the necessity of general ventilation even with the use of an extra-oral vacuum aspirator.

The placement of the extra-oral vacuum aspirator needs to be examined to obtain the highest dust-reducing effect at the dentist’s, vacuum assistant’s, and patient’s positions, and in the clinic.

Key words: Extra-oral vacuum aspirator, Tooth grinding, Scattered dust, Dust-reducing effect, Mandibular bilateral central incisors

Introduction

In dental clinics, dust from tooth grinding with an air turbine engine might contain various bacteria and viruses, blood, saliva, and dental plaque. This type of dust scatters into the extra-oral environment. The scattered dust is suspended for a long period of time in a clinic, contaminating it. Tooth grinding can cause environmental pollution and the exposure of dental staff in a dental clinic to scattering dust. Thus, the removal...