Silicosis and Dental Laboratory Technicians (5/04)


Silicosis is a debilitating, sometimes fatal, yet preventable occupational lung disease caused by inhaling respirable crystalline silica dust. Although crystalline silica exposure and silicosis have been associated historically with work in mining, quarrying, sandblasting, masonry, foundry, and ceramics, certain materials and processes used in dental laboratories also place technicians at risk for silicosis.1-3 During 1994–2000, occupational disease surveillance programs in five states identified nine confirmed cases of silicosis among persons who worked in dental laboratories. This Centers for Disease Control and Prevention report describes three of the cases and emphasizes the need for employers of dental laboratory technicians to ensure appropriate control of worker exposure to crystalline silica. The findings in this report suggest that dental laboratory technicians might be at risk for silicosis as a result of uncontrolled exposure to airborne crystalline silica dust. For the patients described in this report, the only identified source of crystalline silica exposure was their work as dental technicians. Exposure to respirable crystalline silica in dental laboratories can occur during procedures that generate airborne dust (e.g., mixing powders, removing castings from molds, grinding and polishing castings and porcelain, and using silica sand for abrasive blasting). The proportion of crystalline silica in mold and porcelain materials, by weight, can range up to 70%. A study of dental technicians in South Korea4 that described materials and processes similar to those used in the United States found exposures during polishing operations that exceeded the NIOSH recommended exposure limit of 0.05 mg/m³.5 The authors do acknowledge several limitations of this report. Data for some variables (e.g., month or year of diagnosis and job history) were not available for all cases, the risk for exposure to crystalline silica could not be quantified because data on exposure levels among dental laboratory technicians are limited, and silicosis case determination is not complete.

DIS Comment: The Occupational Safety and Health Administration (OSHA) requires employers to identify occupational health hazards and control them by instituting engineering and work-practice controls, issuing personal protective equipment (PPE), and ensuring that PPE is working and used properly. Dental technicians should be trained in the hazards of crystalline silica exposure and the methods to control exposure.

Exposure-control methods for crystalline silica in dental laboratories include:

- Substituting nonsilica-containing materials for silica-containing materials (e.g., aluminum oxide as an abrasive blasting media instead of silica sand);
- Isolating the source of silica exposure from the dental technician (e.g., perform divestment of castings while materials are immersed in water);
- Removing dust at its point of generation by using engineering controls (e.g., local exhaust ventilation system with dust collection);
- Incorporating work and housekeeping practices that minimize the release of dust into the workroom (e.g., use high-efficiency particulate aerosol-filtered vacuums for clean-up instead of dry sweeping); and
- Using respiratory protection devices (e.g., half-mask air-purifying respirator fitted with type N-100 filters).

Guidance for controlling silica exposure in dental laboratory settings is available at www.osha.gov/SLTC/dentistry/index.html and additional information about silica and silicosis is available at www.cdc.gov/niosh/topics/silica.

References