Every occupation exposes workers to chronic conditions and situations that have an impact on overall health. For example, violin players and other musicians are known to suffer high rates of carpal tunnel syndrome (a musculoskeletal injury) due to the repetitive hand movements and positioning often used when playing their instruments. Obviously, dentistry also involves routine techniques and materials that can result in health issues. Fortunately, in the same way musicians can change their practices to protect themselves from some of the adverse effects of carpal tunnel, dentists can also change their practices to protect themselves from certain occupational health risks.

Specifically, among the materials regularly handled in dental offices, mercury stands out as a notoriously harmful substance. In fact, a report from the World Health Organization warns, “It may cause harmful effects to the nervous, digestive, respiratory, immune systems and to the kidneys, besides causing lung damage…Recent studies suggest that mercury may have no threshold below which some adverse effects do not occur.”

Many dentists, dental staff, and dental students do not realize that a variety of procedures involving manipulation of an old or new amalgam will expose them to levels of mercury that pose an immediate threat to their health unless they take precautions such as instituting work practices and engineering controls to minimize exposure. Research has confirmed adverse outcomes in dentists and dental personnel attributed to occupational mercury vapor and amalgam particulate exposure. This is largely because dangerous levels of mercury are generated in the dental workplace by numerous everyday procedures.

Scientific evidence has associated mercury with a variety of human health problems, including loss of IQ with prenatal exposure, and likewise, research on dentists, dental students, and dental workers has established that toxic harm can occur. To illustrate this point, a 2012 study from Yale University School of Medicine’s Dr. Thomas G. Duplinsky and Dr. Domenic V. Cicchetti reports a high rate of the use of prescription medication in male dentists and relates it to occupational mercury exposure:

Dentists demonstrated significantly more prescription utilization of specific illness medications than did Controls, for the following disease categories: Neuropsychological, Neurological, Respiratory, and Cardiovascular. The greater majority of pediatric and general practice dentists still use mercury amalgam restorations. This places them at greater risk than the general population for those disorders, as well as threatening the future health of America’s children and adults who continue to receive silver amalgam restorations.
A series of other studies have validated this concern, as data has shown that exposure to mercury can cause behavioral, psychological, and cognitive impacts on dental workers. Moreover, genetic variables have been linked to dental workers, mercury levels, and neurobehavioral factors. A common genetic trait known as the CPOX4 polymorphism has been identified as a factor in neurological damage from extremely low mercury exposure in dentists and dental personnel, as well as in children with amalgam fillings. Another study conducted on dental workers even explains that “[c]hronic subtoxic levels of inorganic mercury appear to produce mild changes in short-term nonverbal recall and heightened distress generally, and particularly in categories of obsessive compulsion, anxiety and psychoticism.”

Furthermore, mercury is also known for being toxic to the kidney, and Germany, Finland, Austria, and Canada have worked to reduce the use of dental mercury amalgam fillings for patients with kidney problems and other populations.
consider the results of a 1988 study which evaluated kidney function in dental personnel exposed to mercury compared to workers exposed to lead, cadmium, and chromium. The study concluded that the dentists and dental assistants appeared to have a higher risk of kidney function disturbance than the other industrial workers. A study using sheep found a remarkable decline in kidney function within just two months of receiving multiple amalgam fillings. More recently, loss of kidney function has also been linked to the number and size of amalgam fillings.

Another area that has received much attention is the possible reproductive hazards to female dental personnel. It is known that mercury can have a damaging influence on the developing brain and neurological system, which impacts children, pregnant women, and women of childbearing age. Thus, the dangers of exposure to mercury for pregnant dental workers have been recognized, as well as fertility issues and menstrual cycle disorders.

Other research confirms reproductive dangers caused by occupational use of mercury. The Illinois Teratogen Information Service has reported that pregnant women should avoid all significant mercury exposure and recommended greater caution for women of childbearing age. A 1999 study from Canada noted, “Pregnant women should not work in areas with high levels of mercury vapor. The recommended threshold limit value of 0.05 ug/m3 for mercury vapor may not provide sufficient protection for fetuses. Therefore, women of childbearing age should not be exposed to mercury vapor concentrations of 0.01mg/m3 or greater.”

Dental workers and risks of reactions to mercury or mercury allergies have also been studied. It is estimated that approximately 21 million Americans are allergic to mercury, and studies establish that exposure to dental mercury amalgam correlates with higher prevalence of mercury allergies. Not surprisingly, reactions to mercury have been related to dental personnel for dermatitis, melanoma, and skin diseases. One study even specifies hazards of mercury allergies for dental students: “The fact that the dental students who were the volunteers in this study received only a small fraction of the exposure to mercury that the practicing dentist receives does emphasize the potential of this allergen in actual dental practice.”

In addition to the concerns about mercury levels in the dental office and the exposure of workers there, a variety of studies have called for protective measures to be taken in the dental office as a means of limiting mercury releases. A 2013 study led by Robin Warwick states, “To maximize safety, dental schools should train students to remove amalgam only while using water spray and high volume suction. Alternatively, students should use appropriate occupational hygiene personal protective equipment during amalgam removals.” Unfortunately, many dental students cannot comply with these work practices and engineering controls in their operative technique laboratories.

Taken together, scientific data clearly indicates that the use of mercury in dentistry can be detrimental to dentists and their staff. Many factors contribute to increased incidences of disease and health conditions among dentists, but mercury poisoning is a threat that can be easily avoided by the use of current alternatives to amalgam filling materials.
Perhaps a 2003 study by risk assessment expert Dr. G. Mark Richardson summarizes this issue perfectly: “Various countries are moving to limit the use of amalgam as a dental restorative material in order to protect dental patients from Hg [mercury] exposure. However, dentists’ occupational exposure should also be considered as a justification for reduced amalgam use.”

Many of the key references cited in this article are available upon request to the author. davidkennedydds@gmail.com


