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English 102

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Mercury in Dentistry

Mercury, one of the most toxic elements known to man, has been used in the medical field since the mid-1500s. It was known to be toxic throughout most of this time, but it was used to treat various illnesses regardless. Today, mercury is no longer used for treatment. It is, however, a key component in amalgam dental fillings. The mercury in these fillings has worried many people. Many governments are working to reduce the use of mercury amalgam fillings because of their potential negative effects on humans and the environment.

The deadly, yet useful, element mercury is used in amalgam dental fillings. In fact, nearly 50% of this filling is mercury. This filling is also known as a silver filling because of its appearance. Mercury is used in amalgam because it helps to bind together the alloys in the filling. According to Sarker "Dental amalgam is a mixture of metals, consisting of liquid mercury and a powdered alloy composed of silver, tin, and copper" (7-8). Mercury is also used because it is liquid at room temperature. This means that it is very malleable once it has been combined with the other metals in amalgam. The malleability of amalgam also means that it can easily be inserted into a tooth cavity. Amalgam is also inexpensive compared to other forms of fillings. Because of this, amalgam has been used for a very long time. In fact, amalgam fillings have been in use for over 150 years. Even now, amalgam is still used on about 45% of dental patients ("Business News; International Group Supports"). Unfortunately, amalgam fillings have a downside. This is the toxic element mercury that they contain.

Mercury is extremely toxic to humans. It can easily enter the human body through skin contact, consumption, or even though the lungs if mercury vapor is inhaled. The worst part about mercury is the fact that it takes a very long time for mercury to exit the body. This means that it can easily build up over time. The effects that come with an overdose of mercury can include: a damaged immune system, brain damage, respiratory problems, hair loss, and even cancer (Sarker 8-9). According to some sources, mercury can leak out of amalgam fillings and into the blood stream where it can cause life threatening damage. On the other hand, many other sources agree that the amount of mercury that leaks from amalgam is of no concern to human health. A single amalgam filling can leak around 1 or 2 micrograms of mercury vapor daily, but this is not enough to cause any damage to the average person. According to John M. Powers "despite the toxicity of mercury, dental amalgams are unquestionably safe restorations" (64). As long as carefully designed and safe procedures are used to work with the mercury in amalgam, no harm should come to the patient or dentist. While most credible sources agree that there is no reliable evidence that the mercury which leaks out of amalgam is a concern to human health, most sources agree that the production and installation of amalgam can release mercury into the environment.

Mercury can easily transfer from dental amalgam to the environment where it can cause harm. It can transfer from amalgam to the environment in a number of ways. For example, mercury vapor can escape the amalgam filling when the filling is being inserted into a tooth cavity (Sarker 9). This vapor eventually settles on the ground where it can enter the environment through the groundwater. Another way that mercury can enter the environment is through the disposal of excess amalgam into both land and water bodies. Mercury can also escape into the environment from a person whose body was contaminated by the mercury in

amalgam. This is because some of that mercury will slowly work its way out of a human body just as any material would. Once in the environment, some microorganisms will transform the mercury into more dangerous organic forms of mercury such as methyl mercury. These microorganisms could eventually get consumed by predators. These predators might be consumed by another predator, and so on. This means that as mercury moves through the food web, it is concentrated into top predators such as tuna. With tuna being a common food, people can get mercury poisoning by eating too much tuna. Because of the vicious cycle of mercury, a person could hypothetically be poisoned by mercury that originated in an amalgam filling. This person might consume an animal that was contaminated from the mercury of an improperly disposed amalgam filling.

Because of the potential dangers of mercury based amalgam fillings on both people and the environment, governments around the world are working together to put an end to amalgam fillings. The UN and the EU are both working on this issue. Some methods of amalgam reduction include: educating dentists and students on the dangers of amalgam, discouraging programs that favor amalgam fillings while encouraging the ones that do not favor them, and promoting more environmentally friendly dental procedures (Sarker 13). This is not as easy as it sounds, though. Removing mercury fillings from being used in future operations is difficult partly because alternatives to amalgams are more expensive. It will also take a long time to replace the amalgam fillings that are already in place because hundreds of millions of people worldwide currently have amalgam fillings. Replacing amalgam fillings from people's teeth is even more difficult. Because of how deadly mercury is, removing the fillings is a very dangerous process. Mercury can get on people skin and can be released in the air if it is not done properly. This can harm the dentists, patients, and the environment around

them. Luckily, a procedure created by the International Academy of Oral Medicine and Toxicology (IAOMT) called the Safe Mercury Amalgam Removal Technique (SMART) is being implemented. SMART "utilizes dental amalgam separators, water irrigation, high-volume suction, mercury-filter masks, and other rigorous safety measures" ("Business News; International Group Supports"). It is a safe, albeit complicated, way to remove mercury fillings. The fillings can then be replaced by different kinds of filling that are non-toxic such as resin or ceramic fillings. The IAOMT has also created a campaign called The SMART Choice to raise awareness about the dangers of mercury and tell patients where to find dentists who use SMART ("Business News; International Group Supports").

While the mercury used in amalgam is probably not a direct danger to people, it is still a danger to the environment and poses some health risks. Because of this, governments are working to prevent the further use of amalgam. Many people get worried once they learn that their silver fillings contain the deadly element mercury, but in reality, they have very little to worry about. Many sources agree that the amount of mercury released from amalgam once it is in use is not significant. Amalgam is usually only a problem before it is inserted into a tooth cavity and if it is removed. Today, the use of amalgam is declining, although some businesses prefer amalgam because of its low price and easy use.

Works Cited

"Business News; International Group Supports Global Efforts to End Dental Mercury Usage." *Pediatrics Week*, 2016, p. 128, *Family Health Database*, ezproxy.scc.spokane.edu/login?url=http://search.proquest.com/docview/1850864322?accountid=1169.

Gray, Theodore. *The Elements: A Visual Exploration of Every Known Atom in the Universe*. Black Dog & Leventhal Publishers, 2009, p. 185.

Powers, John M., and John C. Wataha. *Dental Materials: Properties and Manipulation*. 10th ed., Elsevier Inc., 2013.

Sarker, Biddut Chandra. *Mercury in Dentistry: Risks to Human Health and the Environment*. Edited by Shahriar Hossain and Siddika Sultana, Environment and Social Development Organization-ESDO & Asian Center for Environmental Health, 2014, doi:10.13140/2.1.2035.2807.

Weisse, Allen B. *Medical Odysseys: The Different and Sometimes Unexpected Pathways to Twentieth-Century Medical Discoveries*. Rutgers University Press, 1991.