

REVIEW ARTICLE

MANAGEMENT OF WASTES IN DENTAL OFFICES - A REVIEW

Mohit Makkar¹, Kanwar Anoop Kaur²

¹B.D.S Private Practice, Panchkula, India, ²BDS, Adesh Institute of Dental Sciences and Research, Bathinda, Punjab,

ABSTRACT:

Bio-medical waste collection and proper disposal is a matter of concern for both the medical and the general community. There are a number of wastes typically generated by a dental office which, if improperly handled may pose a risk to human health and the environment. An effective communication strategy is crucial to create awareness among different category of staff in the health care establishments regarding biomedical waste management. The methods of waste management has been discussed and reviewed in this paper.

Key words: Bio-medical waste, waste management, Dental office

Corresponding author: Dr. Mohit Makkar, B.D.S Private Practice, Panchkula, India

This article may be cited as: Makkar M, Kaur KA. Management of Wastes in Dental Offices-A Review. J Adv Med Dent Sci Res 2015;3(3):65-68.

INTRODUCTION

Bio-medical waste collection and proper disposal is a matter of concern for both the medical and the general community.¹ According to the Bio-medical waste rules 1998 of India, Bio – Medical Waste is defined as “Any solid, fluid or liquid waste, including its container and any intermediate product, which is generated during the diagnosis, treatment or immunization of human beings or animals, in research pertaining thereto, or in the production or testing of biological and the animal waste from slaughter houses or any other like establishments.”² Since the implementation of the biomedical Waste Management Rules 1998, every concerned health personnel is expected to have proper knowledge, practice and capacity to guide others for waste collection and management, and proper handling techniques.¹

CLASSIFICATION

Category No. 1: Human anatomical waste (human tissues, organs, body parts)

Category No. 2: Animal waste (animal tissues, organs, body parts, carcasses, bleeding parts, fluid, blood and experimental animals used in research, waste generated by veterinary hospitals, colleges and animal houses)

Category No. 3: Microbiology & Biotechnology waste (wastes from laboratory cultures, stocks or specimens of micro-organisms, live or attenuated vaccines, human and animal cell culture used in research and infectious agents from research and industrial laboratories, wastes from production of biologicals, toxins, dishes and devices used for transfer of cultures)

Category No. 4: Waste sharps. (needles, syringes, scalpels, blades, glass, etc. that may cause disinfection. This includes both used and unused sharps)

Category No. 5: Discarded medicines and cytotoxic drugs. (wastes comprising of outdated, contaminated and discarded medicines)

Category No. 6: Solid waste. (Items contaminated with blood, and body fluids including cotton dressings, soiled plaster casts, lines, beddings, other material)

Category No. 7: Solid waste. (wastes generated from disposable items other than the waste sharps such as catheters, intravenous sets etc).

Category No. 8: Liquid waste (waste generated from laboratory and washing, cleaning, house-keeping and disinfecting activities)

Category No. 9: Incineration ash (ash from incineration of any bio-medical waste)

Category No. 10: Chemical waste (chemicals used in production of biologicals, chemicals used in disinfection, insecticides, etc.)^{3,4}

There are a number of wastes typically generated by a dental office which, if improperly handled may pose a risk to human health and the environment. These include mercury and silver residues from amalgam lead found in lead-foil packets and lead shields silver found in X-ray fixer solutions chromium, used in many X-ray cleaners chemical wastes, such as formaldehyde, acetones, and ketones.⁵

Mercury

Mercury from dental amalgam can get into the environment through wastewater. Amalgam that is rinsed down drains or escapes from poorly maintained chairside traps and vacuum pump filters enters the wastewater stream and eventually the wastewater treatment plant or the septic system. Any

mercury contained in treated wastewater will either end up in the sewage sludge, which may be land applied (under an appropriate permit), or in the liquid effluent to be discharged into lakes or rivers.⁶ Management includes disposal of amalgam scrap as hazardous waste or more aptly sent to a recycler. Since amalgam decomposes on heating, amalgam scrap should not be disposed in the waste that could eventually be incinerated.⁷

Mercury thermometers and blood pressure units are sources of elemental mercury. In the event that one of these items should become broken put on nitrile gloves. (Do not use latex gloves.) All visible elemental mercury should be cleaned using a mercury spill kit. all contaminated items (materials used during the clean up procedure and broken pieces of glass) should be placed in a sealable plastic bag or container and label the bag or container as “Mercury Waste”.⁶

Table 1: Amalgam waste management⁸

Amalgam Waste Management - Best Practices	
<u>DO</u>	<u>DON'T</u>
<i>Do use precapsulated alloys and stock a variety of capsule sizes</i>	<i>Don't use bulk mercury</i>
<i>Do recycle used disposable amalgam capsules</i>	<i>Don't put used disposable amalgam capsules in sharps containers, infectious waste containers (yellow bags) or general waste</i>
<i>Do salvage, store and recycle non-contact amalgam (scrap amalgam)</i>	<i>Don't put non-contact amalgam waste in sharps containers, infectious waste containers (yellow bags) or general waste</i>
<i>Do salvage (contact) amalgam pieces from restorations after removal and recycle the amalgam waste</i>	<i>Don't put contact amalgam waste in sharps containers, infectious waste containers (yellow bags) or general waste</i>
<i>Do use chair side traps to retain amalgam and recycle the content</i>	<i>Don't rinse chair side traps containing amalgam over drains or sinks</i>
<i>Do recycle contents retained by the vacuum pump filter or other amalgam collection device, if they contain amalgam</i>	<i>Don't rinse vacuum pump filters containing amalgam or other amalgam collection devices over drains or sinks</i>
<i>Do recycle teeth that contain amalgam restorations. (Note: Ask your recycler whether or not extracted teeth with amalgam restorations require disinfection)</i>	<i>Don't dispose of extracted teeth that contain amalgam restorations in sharps containers, infectious waste containers (yellow bags), or general waste</i>
<i>Do manage amalgam waste through recycling as much as possible</i>	<i>Don't flush amalgam waste down the drain or toilet</i>
<i>Do use line cleaners that minimize dissolution of amalgam</i>	<i>Don't use bleach or chlorine-containing cleaners to flush wastewater lines</i>

Lead Aprons

Lead aprons should not be thrown into the regular garbage since the lead can contaminate soil and groundwater via the landfills. Contact a certified waste carrier to recycle or dispose of unwanted lead aprons.²

X-ray film foils into common dustbin which is not permitted because lead is a heavy metal that affects neurological development and functions. It should not be incinerated or treated as general waste. It potentially leaches from landfills and can contaminate soil and ground water. Some of the factories may use lead as a raw material for manufacture of batteries, but the quantity required is high.⁹

Silver

Developer solution does not contain silver, so it can be diluted and put into sewer; on the other hand fixer solution contains silver and if put into sewer it will increase the metal load in the sewer which is not allowed as per environmental protection rules. Spent fixer solution contains approximately 4000 mg of silver recovery units as reclaim silver. It should be stored separately and handled over to certified buyers who will extract silver from it.⁹

Chemicals, disinfectants, and sterilizing agents

Staff handling these materials should be trained in Workplace Hazardous Materials Information System (WHMIS). Whenever possible, use steam or dry heat to sterilize dental instruments. Nonchlorinated plastic containers (not PVC) should be preferred to minimize environmental impacts and placed in the solid waste stream. Halogenated sterilants have a detrimental effect on environment. Ignitable sterilants should not be poured down the drain as they have potency to explode. HCHO sterilants should also not be disposed down a drain. One should not pour sterilants into a septic system as this may significantly disrupt the bacteria which normally breakdown wastes.¹⁰

Benefits of Biomedical Waste Management¹¹

- Cleaner and healthier surroundings.
- Reduction in the incidence of hospital acquired and general infections.
- Reduction in the cost of infection control within the hospital.
- Reduction in the possibility of disease and death due to reuse and repackaging of infectious disposables.
- Low incidence of community and occupational health hazards.
- Reduction in the cost of waste management and generation of revenue through appropriate treatment and disposal of waste.
- Improved image of the healthcare establishment and increase the quality of life.

Conclusion The general public's health can also be adversely affected by bio-medical waste. Improper practices such as dumping of bio-medical waste in municipal dustbins, open spaces, water bodies etc., leads to the spread of diseases. Emissions from incinerators and open burning also lead to exposure to harmful gases which can cause cancer and respiratory diseases. Plastic waste can choke animals, which scavenge on openly dumped waste. Injuries from sharps are common feature-affecting animals. Harmful chemicals such as dioxins and furans can cause serious health hazards to animals and birds.¹² Proper management of bio medical waste is a great concern and proper surveys of waste management procedures in various practices are required. There seems to be a need for education about the hazards associated with improper waste disposal. An effective communication strategy is crucial to create awareness among different category of staff in the health care establishments regarding biomedical waste management.

Table 2: Waste material and color coding^{3,11}

Waste material	Color coded bags
Human tissues organs, animal waste, blood and body fluids	Red
Animal and slaughter house waste	Orange
Microbiological and biotechnological waste	Yellow
Waste sharps & discarded medicines	Blue
Solid wastes, disposables and chemical	Yellow/ Black

REFERENCES

1. Sanjeev R, Suneesh Kuruvilla, Subramaniam R, Prashant PS, Meera Gopalakrishnan. Knowledge, attitude, and practices about biomedical waste management among dental healthcare personnel in dental colleges in Kothamangalam: a cross-sectional study. *Health Sciences* 2014;1(3):1-12
2. Agarwal B, Kumar M, Agarwal S, Singh A, Shekhar A. Bio Medical Waste And Dentistry. *Journal of Oral Health and Community Dentistry* 2011;5(3):153-5.
3. Kumar VC, Manjunatha M, Vijetha B , Pradeep PR. Biomedical Waste Management: A Review *J Oral Health Comm Dent* 2012;6(3):141-4.
4. Notification by the Ministry of Environment and Forests, Govt. of India, New Delhi, 20th July, 1998. Available from: <http://www.envfor.nic.in/legis/hsm/biomed.html>.
5. Land Fact Sheet Disposal Requirements & Options For Hazardous Dental Wastes www.deq.state.ok.us
6. The Environmentally Responsible Dental Office: A Guide to Proper Waste Management in Dental Offices. Northeast Natural Resource Center of the National Wildlife Federation and The Vermont State Dental Society June 1999
7. Hegde V, Kulkarni RD, Ajantha GS. Biomedical waste management. *Journal of Oral and Maxillo Facial Pathology* 2007;11(1)5-9.
8. Guidelines to Amalgam Waste Management November 2013. Australian dental Association Inc. www.ada.org.au
9. Singh RD, Jurel SK, Tripathi S, Agarwal KK, Kumari R. Mercury and Other Biomedical Waste Management Practices among Dental Practitioners in India. *BioMed Research International* 2014;1-6.
10. Agarwal B, Singh SV, Bhansali S, Agarwal S. Waste Management in Dental Office. *Indian J Community Med* 2012;37(3): 201–2.
11. Mathur P, Patan S, Shobhawat AS. Need of Biomedical Waste Management System in Hospitals - An Emerging issue - A Review. *Current World Environment* 2012;7(1):117-124.
12. Babu RB, Parande AK, Rajalakshmi R, Suriyakala P, Volga M. Management of Biomedical Waste in India and Other Countries: A Review. *J Int Environmental Application and Science* 2009;4(1): 65-78.

Source of support: Nil

Conflict of interest: None declared