

## GREEN DENTISTRY; ECOFRIENDLY DENTISTRY: BENEFICIAL FOR PATIENTS, BENEFICIAL FOR THE ENVIRONMENT.

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### ABSTRACT

Green dentistry or eco-friendly dentistry is a practice that reduces waste and pollution, saves energy and money, incorporates high tech innovations and is wellness based. Dentists incorporate a variety of materials and equipment in practice, some of them currently in use present potential challenges to the environment. Dentists are responsible for taking several precautions to ensure that patients, staff and the environment are protected. Precautions must be taken to prevent any harmful chemicals or materials from polluting the environment and in turn causing "Global warming". Green dentistry increase environmental awareness and sensitivity among dental professionals. This review article identifies some common wastes produced by dental professionals and suggestions for reducing the impact on the environment which can help ensure patient and worker safety, prevent the risk of future liability and protect our air, water and land.

**KEYWORDS:** Green Dentistry, Eco-friendly Dentistry, Biomedical Waste.

### INTRODUCTION

Global warming due to environmental pollution is one of the most serious problems facing humanity and other life forms on our planet today. Pollution shows health hazards in human beings, animals and aquatic life. Directly or indirectly every human being is responsible for this and dentistry is not an exception. Dentistry among other fields in medical industry contributes to climate change and increasing the pollution of our environment. Though individual dentists generate only small amounts of environmentally "unfriendly waste," the accumulated waste produced by the profession may have significant environmental impact.<sup>1</sup> Nevertheless, ecofriendly dentistry or Green Dentistry has finally arrived. Dental practices are going green to incorporate technologies that improved their practices and procedures, while making their offices more ecofriendly. Ecofriendly dentistry attempts to reduce the detrimental impact on the environment and promote environmental awareness and sustainability to patients. Green Dentistry is a practice that saves energy, water and money and reduces waste pollution and is ecofriendly.<sup>2</sup>

Dentistry is responsible in contributing to pollution by the following:

1. Use of X-Rays
2. Placement and removal of Silver Amalgam

3. Chemical Sterilization (use of toxic chemicals)
4. Usage of disposables during patient care
5. Office activities (energy, water, electronic lamps, batteries, paper)

#### Use of X-rays

Traditional radiography uses various chemical and generates waste fixer containing silver that must be managed as hazardous waste or the silver be reclaimed and recycled properly. An additional by product of traditional radiography is the lead foil contained in each film packet. This material may be hazardous unless it is recycled for its scrap metal content.<sup>3</sup>

#### Mercury in Silver Amalgam fillings

Amalgams are typically 50% mercury with silver, tin and other metals. The detrimental effects of mercury are widely known, therefore it is important to prevent release of mercury to the environment. Once in the environment, changes in pH, oxygen availability, temperature, can allow the mercury in amalgam to be used by bacteria which are able to convert it to the more toxic "organic methyl mercury" and becomes a major source of mercury in the fish people eat. Mercury and other toxic chemicals are accumulating in fish and wildlife to dangerous levels. The mercury in amalgam is a neurotoxin. Vulnerable populations such as children, the foetuses of pregnant women, hypersensitive individuals, and people with kidney

impairments are known to be particularly susceptible to the neurotoxic effects of dental mercury.<sup>4</sup>

#### Bio medical waste

Some of the materials used in oral health care present potential challenges to the environment. Dental clinics generate a number of biomedical wastes, including blood-soaked materials and human tissues, expired drugs, syringes, broken glass, scalpels, specimen tubes, slides.<sup>5</sup>

#### Chemical Sterilisation

Chemical vapour can cause discolouration and deterioration of the interior quality. If chemicals have 'flash point' below 140F, they may ignite if exposed to a spark.

#### Disinfectants

Any chemical is a hazardous waste. Most used disinfectants may be discharged into the sewerage directly. Straight alcohols and ethers are considered ignitable.<sup>6</sup>

#### Disposables

Different kinds of disposables used in dentistry are latex gloves, disposable patient bibs, head rest covers, syringes, plastic pouches, plastic suction tips.<sup>7</sup>

#### Other activities

Dental offices use a lot of electricity to run compressors, drills, overhead lights and operatory lights.

Ecofriendly dentistry uses a sustainable approach to encourage dentists to implement new strategies to try and reduce the energy being consumed and the large amount of waste being produced by the industry. Health professionals are on the leading edge of helping to heal our planet by introducing the four R's; **Rethink, Reduce, Reuse, and Recycle**. By implementing these four easy steps, dentists are beginning to transform the dental industry into a more sustainable one.

**Rethink:** every decision is made with a certain mindset, and redeveloping a mindset is a strategy for change. Environmentalism and sustainability are both considered states of mind. Rethinking the way that dentist offices are run is the initial step in trying to change modern practice. Implementing simple changes like things you can add or change, and decrease energy and water consumption are the initial strategies to consider

**Reduce:** In order to decrease the pressure on the Earth's resources people must decrease or reduce the consumption of them. For example to prevent deforestation of forests and slowdown global warming we must reduce consumption of paper and production of waste respectively.

**Reuse:** This strategy encourages the prolonged use of an item, to prevent the item from contributing to waste being

put in landfills. By reusing products; it also reduces the amount of energy needed to produce new products.

**Recycle:** Much of the waste that is found in landfills can be reprocessed and recycled into a new product. Recycling products is a viable way to reduce overall contamination of the environment. It is a crucial component of the management of waste hierarchy.<sup>8</sup>

#### Dental Pollution- prevention options

The goal of the pollution prevention is to reduce or eliminate the use of toxic substances at the source. These behaviours will reduce the release of materials into the environment.

##### 1. Amalgam disposal

- a) Using substitutes:-The dental professionals are encouraged to use new dental materials that do not contain mercury, or could consider alternative treatment options.<sup>1</sup>
- b) Minimize amalgam discharge :- Mix only as much amalgam as is immediately required by using amalgam capsules. If mixed amalgam remains after a restoration this can be recycled. Do not dispose scrap amalgam into the garbage. Amalgam shavings and bits of amalgam from the drilling or restoration shaping operations should be intercepted by drain traps or screens. The drain traps and screens should be cleaned daily to retain good water flow and to collect amalgam waste for recycling.<sup>9</sup>

2. Silver containing wastes: The Fixer that dental offices use to develop x-rays is a hazardous material that should not be simply rinsed down the drain. Because of the high silver content used, fixer is readily recyclable.

3. X-ray Developer: Waste developer may be flushed down the drain or sent for recycle; but it should not be mixed with fixer.\

4. Lead Containing Wastes: The lead foil inside each x-ray packet is a leachable toxin and can contaminate the soil and groundwater in landfill sites. Lead foil packets should never be thrown in the regular garbage. This material must be either recycled or treated as

5. Chemicals, Disinfectants and Sterilizing agents: The dental office uses many chemicals, disinfectants and sterilizing agents that may be hazardous to the environment if they are not properly disposed. Chemical sterilants should be avoided whenever possible. Steam or dry heat may be used to sterilize dental instruments.

6. Solid Wastes: Office waste is usually non hazardous waste eg. Paper, cardboard, aluminium, plastics etc.

The use of these should be minimized. Office paper material may be recycled.

Eco-friendly dentistry or Green Dentistry means re-thinking dental processes and procedures, administration and office design using the tenets of Green Dentistry as a guide.

1. Switch to re-usable cloth infection control and sterilization products.
2. Choose eco-friendly disinfectant to protect our waterways.
3. Reusable towels to reduce waste. Stop disposables and start reusables.
4. Paperless records to reduce paper consumption and waste.
5. Using digital imaging (not traditional X-rays) which means 75 to 90% less radiation exposure to patient and reduction in use of X-ray development chemicals.
6. Incorporating aromatherapy: The patients who are sensitive to chemicals can easily avoid "chemical dental smell".
7. Using Biodegradable sterilization solutions, which are used to clean the chairs after patient examination.
8. Avid VOC (volatile organic compounds) paints in the clinic.
9. Installing only energy efficient lights in the clinic and making sure electronic equipment is turned off every night.<sup>10</sup>

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#### CONCLUSION

Ecofriendly dentistry attempts to reduce detrimental impact on the environment and promote environmental awareness and sustainability to patients. Infrastructure for proper disposal and treatment of dental waste needs to be better developed and awareness of the same should be created.

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