

# “Go Green” In Dental Practice

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## Introduction

Dentistry, among other fields in the medical industry contributes to the 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> The concept to conserve natural resources can be traced back to the 1800s. However, it was not until 1970 that the first Earth Day was established. Increasing consumption of diminishing natural resources, air and water pollution, ever-growing landfills, and the effects of global warming makes saving our environment imperative<sup>2</sup>; So going green is the right thing to do. The concept of going green involves a person, family or a group becoming more conscious about the destruction of the environment and adopts practices that help reduce waste or become more energy efficient. The color green is used because it reminds us of the environment<sup>3</sup>; similarly, the field of dentistry has also adopted this concept so as to make it

## A B S T R A C T

*Green dentistry is a high-tech approach that reduces the environmental impact of dental practices and encompasses a service model for dentistry that supports and maintains wellness. It is an approach of dentistry that encourages sustainable practices by reducing resource consumption and waste. Eco-friendly dentistry also tries to increase the health of patients by reducing chemical use in the clinics and using low volatile products. Eco-friendly dentist offices take into consideration patient volume, consumption of dental resources, electricity, energy, chemical and water usage and waste and try to implement environmentally friendly alternatives. By conserving water, using digital imaging and recycling the many recyclable items that pass through the office of a green dentist, a great impact is made. This article provides a series of 'green' recommendations that dentists around the world can implement as going green is need of the hour.*

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environment-friendly. **Green Dentistry** has been defined by the Eco Dentistry Association as "a high-tech approach that reduces the environmental impact of dental practices and encompasses a service model

for dentistry that supports and maintains wellness."<sup>4</sup> It is an approach of dentistry that encourages sustainable practices by reducing resource consumption and waste. Eco-friendly dentistry also tries to increase the health of patients by reducing chemical use in the clinics and using low volatile products. Eco-friendly dental offices take into consideration patient volume, consumption of dental resources, electricity, energy, chemical and water usage and waste and try to implement environmentally friendly alternatives.<sup>5</sup> The Eco-Dentistry Association (EDA), and educational and membership association for green dental professionals has developed a model for eco-friendly dentistry that is environmentally conscious and wellness-based, helping dentists to protect the environment although integrating dental practices that advance preventive dentistry and serving the needs of green dentistry consumers.<sup>5,6</sup>

### History

In 2008, the Eco Dentistry Association was co-founded by Dr. Fred Pockrass and his wife, Ina Pockrass.<sup>5</sup> The Eco-Dentistry Association (EDA) provides "education, standards and connection" to patients and dentists who practice green dentistry. The EDA aims to help dentists "come up with safe and reusable alternatives that lower a dentists' operating cost by replacing paper with digital media whenever possible."<sup>6,7</sup>

### Basic elements in dentistry responsible for pollution

Dentistry is responsible in contributing to pollution by the following:<sup>8,9</sup>

1. X-rays: Traditional radiography uses various chemical and generates waste fixer containing silver that is a hazardous waste. The lead foil contained in each film packet may be hazardous unless it is recycled for its scrap metal content. The lead foil 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 hazardous unless it is recycled for its scrap lead content.
2. Silver amalgam: Amalgams are typically 50% mercury with silver, tin, and other metals. The detrimental effects of mercury are widely known; therefore, it is crucial to prevent the 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. The mercury in amalgam is a neurotoxin. Vulnerable populations such

as children, the fetuses of pregnant women, hypersensitive individuals, and people with kidney impairments are known to be particularly susceptible to the neurotoxic effects of dental mercury.<sup>4,5</sup>

3. Toxic chemicals: Any chemical is a hazardous waste. Straight alcohols and ethers are considered ignitable.
4. Usage of disposables items: Different kinds of disposables used in dentistry are latex gloves, disposable patient bibs, head rest covers, syringes, plastic pouches, plastic suction tips. Office waste is usually non-hazardous waste e.g., paper, cardboard, aluminum, plastics etc. The use of these should be minimized. Office paper material may be recycled.

### Waste reduction plan

One of the easiest ways to start a going green initiative is to develop a waste reduction plan. Whenever possible, waste reduction plans should include the four R's:<sup>3</sup>

- a. Recycle
- b. Reduce
- c. Reuse
- d. Rethink.

### Recycle

Recycling triangle is made up of the three green arrows. Collecting materials to be recycled is the first arrow in the recycling triangle. "Remanufacturing", or making something new out of the recycled materials, is represented by the second arrow and "resale," or offering for-sale items created from recycled materials is represented by the third.

Various ways of recycling are:<sup>10</sup>

1. Capture and recycle: Dentists can collect and store all contact and noncontact scrap amalgam for recycling. This waste must be sent to an approved recycler that is able to reprocess the mercury.<sup>11</sup>
2. Installing an amalgam separator not only keeps this mercury-containing material out of the water system, but recycling waste amalgam means that more of the material does not have to be created.<sup>12,13</sup>
3. If using traditional x-rays, recycle fixer and developer solutions and recycle lead foil from x-rays.
4. In the office rest room, discontinue the use of disposal kitchenware or make sure to only use biodegradable plastic ware. Washing and reusing basic kitchenware will reduce plastic waste.

5. Another way to recycle is to always use recycled toner and inkjet cartridges and it is a great cost saving measure for the practice.
  6. Buy rechargeable batteries for digital cameras and flashlights, and re-tip or transform broken instruments for other purposes also aid in recycling efforts.
  7. Hand instruments: For over 12 years, Hu-Friedy has offered a program called 'Envirodent', which allows practitioners to recycle old hand instruments and receive a free instrument for helping the planet.<sup>14</sup>
  8. Use a community's existing recycling program to separately recycle the paper and plastic halves of autoclave bags.
    - iii. Low flow aerators can be installed.
    - iv. Check for leaks throughout the office every 6 months.
2. Reducing the consumption of disposable items used in dentistry would help in the preservation of the environment.
  3. The ultimate way to reduce in the dental office is to go "paperless". Going paperless involves the office using computer and digital technology whenever possible to create, use and store office records.
  4. Eliminate the use of plastic bags by using paper when possible.

## Reduce

The easiest way to have more of a resource is to use less of it. These can be done in following ways:

1. Saving water: Some ways in which dental office can help in saving water includes the following:
  - i. Follow Centre for Disease Control hand sanitation guidelines and use hand sanitizer instead of hand-washing when appropriate.<sup>15</sup>
  - ii. When hand-washing is required, turn off the water while lathering

## Reuse

By reusing items instead of throwing them away, resources and energy necessary to manufacture new products are saved. It includes the use of reusable and biodegradable sundries wherever possible.<sup>16</sup>

- Reusable operating room cotton towels instead of disposable plastic or paper patient drapes.
- Reusable stainless steel high- and low-volume, surgical/endodontic suction tips as an alternative to disposable plastic.
- Reusable glass irrigation syringe as a substitute for disposable plastic.

- Biodegradable disposable cups instead of regular paper cups.
- Chlorine-free, high postconsumer recycled paper products instead of traditional paper products.
- Reuse paper when appropriate. Shred used paper to use as packing and/or reuse packaging materials.

### **Rethink**

Implementing small, affordable changes can make a significant impact on long term environmental sustainability. Thinking about practices and protocols and discussing them with dental team may reveal ways to reduce reuse and recycle.

### **Elements of Eco-Friendly Dentistry**

Specific elements in office and building construction, office operations and patient practices distinguish the practice of eco-friendly dentistry in comparison to traditional dentistry.<sup>7,8</sup>

### **Building and office construction**

- Careful planning and construction of a green building in accordance with benchmarks for constructing green buildings.
- Utilizing green interior design finishes, and textiles, including interior elements that are free of persistent bio-accumulative toxins and VOCs and that are made from post-industrial or post-

consumer waste or come from sustainable resources.

### **Office operations**

- Paperless patient charting and registration, electronic claims, electronic patient recall, and reminders.
- Digital radiography eliminating film manufacturing, toxic chemical processors and fixatives, and reducing patient exposure to radiation.
- Environmentally conscious purchasing of products and services.
- Significant decreases in solid waste production and high ratios of recycling.
- Utilizing 100% sustainable energy to power any facility.
- Offsetting Carbon dioxide with certified carbon offsets and investment into reforestation campaigns.
- Formulating a green team with designated responsibilities and goals.
- Recording and publishing metrics in relation to bio-hazardous waste, solid waste, recyclables, water consumption and energy consumption in order to set annual goals, implement improvements and to compare to national benchmarks
- Use of amalgam separator or mercury eliminator to prevent mercury from entering and contaminating municipal water system

- Use of dry vacuum systems and bulk instrument sterilization systems, in addition to automated low-flow faucets, and toilets for water conservation.

#### Patient practice

- Practicing metal-free, mercury-free dentistry with no amalgam.
- Use of non-toxic, green cleaning and sterilization products and supplies.
- Use of only green seal approved products and materials.
- Certification with EDA green DOC (Dental Office Certification) Program (The DOC program provides a road map for implementing eco-friendly initiatives)
- Use of dry-heat or steam sterilization versus chemical sterilization
- Recycling of broken or non-usable instruments in a program like Hu-Friedy's environment program.
- Utilizing bis (2-ethylhexyl) phthalate-free phthalate, polyvinyl chloride-free surgical tubing and Intravenous fluid bags.
- Use of lead-free patient X-ray aprons and shielding.
- BPA BisphenolA-free composite resins and oral appliances.

#### Conclusion

As it is rightly said by Albert Einstein-“We shall require a substantially new manner of thinking if mankind is to survive”. Dentist should take a leading role in the society by implementing 'green' initiatives to lessen their impact on the environment. This article provides a series of 'green' recommendations that dentists around the world can implement to become a leading Stewards of the Ecodentistry.

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