

REVIEW ARTICLE

“GREEN DENTISTRY- CLEAN DENTISTRY”

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Abstract : Eco-dentistry or "green dentistry" refers to the delivery of oral health care and dental treatments using technologies, procedures and materials that promote environmental and planetary health. Eco-dentistry, a term trademarked by the Eco-Dentistry Association (EDA), incorporates high-tech innovations that enhance efficiency and effectiveness while reducing the amount of waste and pollution in the environment. Green dentistry reduces waste and pollution, saves energy, water and money, incorporates high tech innovations and focuses on wellness and integrative practices. It is the wave of the future.

Keywords: eco-dentistry, oral health, recycle, reuse.



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INTRODUCTION

Dentistry is first and foremost a healing profession. We're in this to help people enjoy chewing and absorbing the nutrients in food, flash a winning smile, and be at ease kissing a loved one. Yet unbeknownst to most dentists, our practices contribute significantly to the Earth's heavy load.

The big picture of today's environment is waste and pollution, water crisis, climate changes like species

extinction, severe weather patterns and remapping of the planet. So now, as a health professional it's our duty to take a step ahead to save the planet.

Eco-friendly dentistry is a relatively new term and an emerging concept in dentistry. It is part of a larger movement towards ecologically-sustainable healthcare. In dentistry, a large volume of research has been devoted to the environmental aspects of mercury. And rightly so given that mercury is a significant environmental pollutant (1,2)

Recently, more attention has been given to other sources of environmental pollutants in addition to mercury (3).

More recently, the term “Eco-dentistry” has been pioneered which has taken dentistry beyond the point of preventing pollution to a place of promoting sustainability (4).

The biomedical waste generated in the dental scenario includes sharps, used disposable items, infectious waste (blood-soaked cotton, gauze, etc.), hazardous waste (mercury, lead), and chemical waste (such as spent film developers, fixers, and disinfectants). A major concern in our field is management and disposal of mercury. Mercury (Hg) as amalgam has been used as a direct restorative material for more than 15 decades (5).

Different kinds of disposables used in dentistry are latex gloves, disposable patient bibs, head rest covers, syringes, plastic pouches, plastic suction tips (6). 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.

According to Eco-Dentistry Association, Eco-Dentistry or green dentistry reduces waste and pollution, saves energy, water and money, incorporates high tech innovations, focuses on wellness and integrative practices

Reducing Waste and Preventing Pollution :

By reducing waste and pollution on the front end, there is less to deal with on the back end. If we’ve converted to digital imaging, we’ve set up the foundation for a high-tech green dental practice and we don’t have to deal with the disposal of lead foils and toxic X-ray fixer from conventional X-rays. While most dentists delegate waste compliance to a team member, many don’t realize that the dentist remains personally responsible for proper hazardous waste disposal through the life cycle of that waste.

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The best way to eliminate liability for toxic waste is to not create it in the first place.

Dentists and the dental personnel have been directly and indirectly exposed to Hg emissions from incinerators and Hg in waste water from the different sources which could be either from households or dental clinics (7). The release of amalgam particles into dental office wastewater or in solid waste is an important concern as these particles could then be released into the environment (8). These releases take part in the environmental pollution through direct wastewater, incineration, land-filling, and sewage sludge incineration, although the release from dentistry is less than 1% of the total mercury discharged annually into the environment as a result of mankind activities. Out of the 10000 tons of mercury released by industry, approximately 300 tons were contributed by dentistry all over the world in 1973 (9). Accordingly, dental clinics are playing a major role in mercury discharge (10,11). If the manipulation of amalgam and its waste products are not strictly regulated, it could be responsible for environmental pollution as well as occupational exposure (12,13).

Another big contributor to dental office waste is single use, disposable patient barriers and sterilization methods. These might seem cheaper and safer in the short run, but the opposite is true in the long run. Reusable cloth methods have been used in this country’s best hospital operatory rooms for decades, cost-effectively protecting practitioners and patients, while keeping millions of pounds of trash out of our overburdened landfills.

Following ways can be used as a part of dentistry’s green future by reducing waste and pollution:

- Using digital imaging.

- Installing an amalgam separator and ensuring that waste is properly recycled, not dumped in residential area.
- Using hospital-grade, reusable sterilization items and patient barriers free from plastic.
- Instructing dental suppliers to reduce packaging and combining orders to reduce shipping waste.
- Recycling old hand instruments, giving them new life as other metal items.
- Using nontoxic, biodegradable, approved surface disinfectants and cleaners.
- Buy whatever you can in bulk; e.g., prophylaxis paste and impression materials.
- Using reusable stainless steel or compostable impression trays.
- Cleaning water lines regularly, using biodegradable or enzymatic cleaners, but never use chlorine bleach, which can release airborne mercury into your office.
- Eliminating toxic cold sterilization solutions, like those containing glutaraldehyde, a powerful lung and skin irritant

Saving Energy, Water and Money

Conservation is a critical piece of dentistry's green future. It is the mantra of green dentistry because it extends the life of our precious resources and keeps more money in our bank accounts.

An exciting development in green dentistry's future is the recent introduction of energy- and water-saving dental equipment.

LED operatory lights can reduce electrical energy consumption by 70 percent, eliminating the need for expensive halogen bulbs, and allowing for easier placement of composite restorations. Several manufacturers have engineered waterless vacuum systems, which save about 360 gallons of water per day, per dental office – enough to fill an average-sized hot tub every day.

Following are energy, water and money savers that are part of dentistry's green future:

- Looking for energy star-rated printers, computers, dishwashers and the like.
- Converting LED operatory lights.
- Installing an in-office water distiller.
- Assigning a team member to ensure that everything with an on-off switch is powered off at night.
- Converting a waterless vacuum system.
- Installing LED "Exit" signs and other emergency indicators.
- Using tooth-colored restorative materials.
- Motivating and educating patients to turn off the water when they brush their teeth, saving plenty of water per day, per person.
- Using eco-friendly, waterless hand sanitizers.
- Installing motion sensors to automatically turn off lights when people leave nonmedical areas like business offices, supply closets, and staff lunch rooms.

Green Dentistry is High-Tech Dentistry

It was only about 50 years ago that dentistry was revolutionized by air turbine-driven handpieces and low-risk local anesthetics. Since then, the technology revolution has escalated, with new innovations appearing every few years, not every 50. We know this trend will continue, and high-tech innovations will continue to make the practice of dentistry more reliable, easier on practitioners, and more cost-effective.

It turns out that almost every high-tech innovation in dentistry also has environmental benefits e.g., CAD/CAM systems. The advantage of this system includes single-visit restorations. Single visits by patients mean lower carbon emissions because the patient's travel to dental office is reduced by half. CAD/CAM systems eliminate the need for disposable impression materials, and the freight and transportation impacts associated with sending restorations back and forth to a lab.

Followings high-tech innovations are part of dentistry's green future:

- Digital imaging.
- CAD/CAM systems.
- In-office sharps disposal equipment that renders sharps inert.
- Steam sterilizers that eliminate use of chemicals.
- Digital patient charting, scheduling and billing.
- Digital patient communications, like e-mail appointment reminders, reducing paper and saving staff time.
- Diode lasers, which eliminate the need for packing cords.

- Use of a Web site as a primary marketing tool.
- Electronic media (e.g., iPad) to record patient intake forms.
- Oil-free compressors.

Green Dentistry is Wellness-based Dentistry :

Every branch of medicine is moving from a disease-based model to a wellness-based model – one that is centered upon prevention, early detection, and less-invasive treatments. Dentistry's green future embraces this wellness-based model because our profession is literally on the front lines of total body wellness – we know now that a healthy mouth is the cornerstone of a healthy person.

Followings are wellness-based modalities that are part of dentistry's green future:

- Laser diagnostic tools that allow you to see caries earlier than with the naked eye
- Oral cancer diagnostics
- Salivary testing to determine genetic predisposition to periodontal disease and identify pathogenic bacteria
- Laser treatment of periodontal disease
- Aroma therapy, to help dental patients relax naturally
- Homeopathic modalities like Arnica, which promote reduced swelling and bruising after dental procedures, with no drug interaction
- Hand or foot massage to relax patients
- Live, green plants in the operatory, increasing oxygenation
- HEPA UV germicidal, in-operatory air purifiers to remove particulates from the air
- Nutritional supplements like CoQ10, which are proven to support periodontal health (14).

Pockrass et al discussed the four R's of eco-friendly dentistry i.e. Rethink, Reduce, Reuse and Recycle.

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 the modern practice. Implementing simple changes like things you can add or change, and decrease energy and water consumption are the initial strategies to consider (15).

Reduce

In order to decrease the pressure on the earth's resources, people must decrease or reduce their consumption of them. For example to prevent deforestation of forests, and slow down global warming we must reduce our 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. Finding a new purpose for an item extends its life and decreases contributions to landfills. By reusing items, we take the pressure off of natural resources by decreasing the demand for extractions. 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. To reduce the waste of useful products, reduce the waste of raw materials and energy needed to extract the materials, reduce water pollution and air pollution from landfills and incinerators

respectively, recycling products is a viable way to reduce overall contamination of the environment (16).

CONCLUSION

Eco-friendly dentistry is not merely a 'feel good' endeavour. There is over-whelming evidence of global climate changes and the finite capacity of our planet's eco-system to absorb further depletion and degradation (Keller, 2007). If environmental degradation was a stock, the industrial nations would be the primary share-holders. Thus, it is an ethical duty for the growing world to play a primary role in developing sustainable solutions.

Green is no longer just a color. The going green movement, which is rapidly becoming a worldwide priority, seeks to address environmental contamination, waste and other critical environmental issues. Dentistry can lessen the combined environmental impact by utilizing the "Four R's of Going Green," namely "Reducing, Reusing, Recycling, and Rethinking."

The "Four R's of Going Green" can be easily applied to the dental office.

Reduce: The easiest way to have more of a resource is to use less of it.

Re-use: By re-using instead of throwing away, resources and energy necessary to manufacture new things are saved.

Recycle: According to the Environmental Protection Agency, more than 75 percent of material destined for a landfill could be recycled.

Rethink: Stopping to take notice of the obvious things in the dental practice that could be done in a more environmentally friendly way is an effective way to incorporate "Going Green" in every dental practice.

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How to cite this article:
Rahman H, Chandra R, Tripathi S, Singh S. Green dentistry- clean dentistry. *IJR D* 2014;3(3):56-61.