

Green Dentistry A Step Towards A Sustainable Development

Dr. Rachel Ann Joseph¹, Dr. Vijaylaxmi S Basavaraddi²,
Dr. Kirty R Nandimath³

¹(Postgraduate, Department Of Oral Medicine & Radiology, Sdm College Of Dental Sciences, Sattur, Dharwad., A Constituent Unit Of Shri Dharmasthala Manjunatheshwara University)

²(Associate Professor, Department Of Oral Medicine & Radiology, Sdm College Of Dental Sciences, Sattur, Dharwad, A Constituent Unit Of Sri Dharmasthala Manjunatheshwara University)

³(Professor And Head., Department Of Oral Medicine & Radiology, Sdm College Of Dental Sciences, Sattur, Dharwad, A Constituent Unit Of Sri Dharmasthala Manjunatheshwara University)

Abstract

Dentistry is a noble and healing profession. It needs growth in all aspects especially in the frame of sustainable development. It is necessary for the dental professionals to understand and to act accordingly to control the metallic wastes and other hazardous by-products that are being emitted in large amounts in daily practice. Green is the colour of growth. Going green also means that going in hand with nature and restoring the life in it. A sustainable growth is inevitable to save the resources. Green dentistry is an innovative, environmentally friendly and sustainable dental care practice. At the same time, it saves money and time by reducing waste, saving energy and reducing pollution through the use of the latest techniques and procedures. Green dentistry therefore protects the environment and humanity from the dangers of rapid urbanization in developing countries. For an eco-friendly clinical practice, a thorough knowledge of different newer techniques and materials are ineluctable. This article reviews different methods that can be implemented on daily dental practice for a sustainable growth and also throws light on the importance of going green in dentistry.

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I. Introduction

Colour 'Green' represents growth, tranquillity, prosperity and rejuvenation. Going green restores the exhausted resources and refills the emptied biosphere. Going green also means that going in hand with nature and restoring the life in it. Dentistry being a noble profession has its responsibility to safeguard the existing resources and not to harm them especially during each step of its growth.

The main aim of green dentistry is the conservation of water and energy, reducing the amount of harmful waste products and its safe disposal, reducing the emission of toxic substances to the environment and researches on developing eco-friendly dental materials and dental procedures.

Eco-Friendly dentistry is a newly evolving practice of dentistry, which encompasses a simultaneous devotion to sustainability, prevention, precaution, and a minimally invasive patient-centric as well as global-centric treatment philosophy.⁽¹⁾

It is based on the model of four R's – Rethink, Reduce, Re-use and Recycle⁽²⁾



Dentistry has a toxic face due to the numerous chemicals used as dental materials. Mercury is being used in the form of dental amalgam restorative material for more than 150 years. In recent years the impact of heavy metal contamination of water systems by dentists, via the production of dental amalgam waste is much of a concern. Dental amalgam is 50% mercury with silver, tin and lead and other minerals that can contaminate the environment. (3)

II. Mercury a major threat:



Once mercury enters water or soil, bacteria convert it into methyl mercury, a potent neurotoxin that can cause brain, kidney and lung damage in humans. As severe as the consequences of mercury poisoning are, it's amazingly easy for people to reach high levels of exposure. (1)

III. X rays paves array of risks:

All of the traditional dental offices use conventional X-ray film. Silver and lead are two major environmental risks associated with this technique. Unused fixer and film and lead foil in film packets are the sources of contamination for silver and lead, respectively.

IV. Smaller steps to a greater revolution:



(Internet source)

Being a dentist, it is our responsibility to conserve and maintain the resources starting from our dental chair and the tip of the mouth mirror we grab everyday and reflect these smaller steps for a greater revolution of renewable resources and sustainable practice in the future.

- **Use of energy** - Dental procedures uses huge amount of electricity which can be reduced by using latest technologies such as motion sensors, turning off light and use of CFL in the clinics.
- Use of more renewable resources like **solar panels** in dental clinics for the power supply not only helps to conserve several units of electricity but also reduces the electricity bills and gives a greater positive economic impact.
- Sparingly use of water - Wastage of water should be avoided by turning off the tap during washing hands. (3)
- Curtail radiation - Usage of digital X-rays rather than conventional X-rays scales down the amount of radiation and the quality of the images will also be more improvised.
- Reprocessing - Many materials found in a dentist's clinic can be recycled, including paper cups, paper, magazines, general waste and cloths which helps to reduce costs as well as waste. (3)

- Applying technology - Use of computers for the storage of data in relation to patient records will not only eliminate the paper usage but will be more accurate. (3)
- More tooth – coloured materials, Less Heavy Metal Waste – Eco-dentistry embraces the modern world's metal – free dental restoratives using composite bonding or ceramic veneers and crowns (3)

V. Arrays of ways to manage dangerous xrays

The following are a few methods for preventing the pollution of X-ray waste:(4)

1. Capture waste lead.
2. Filter the utilized fixer.
3. If required, dilute the developer. .
4. Use cleansers for non-chromium system developers.
5. Utilize scrap metal to recycle X-ray film,
6. Use digital imaging instead.

VI. Little steps to manage dental litters

Latex gloves, disposable patient bibs, head rest covers, syringes, plastic pouches, plus plastic suction tips are a few examples of disposables used in dentistry. To reduce pollution, these throwaway items ought to be disposed of and these oughts to take their place: (5)

1. Patient bib made of fabric
2. Reusable cups.
3. Headrest covers made of cloth.
4. Metal suction tips that can be reused.



(Metal suction tips-Internet source)



Prevention from mercury pollution can be achieved by the following ways Usage of alternate substances like GIC, composite. ii. Incorporation of an amalgam separator in clinics. iii. Recycling waste amalgam (6)

V. Be wise when it comes to waste

Waste should be disposed of in color-coded bags that are appropriate for biomedical waste management, (7)

1.Coloured non-chlorinated plastic bags or containers were used to collect yellow waste.

- Human anatomical waste, including organs, body parts, and tissues.

- Soiled trash, including blood-contaminated objects, casts, cotton swabs, and bags containing leftover or discarded blood.
- Expired or discarded medications: this category includes ampoules and vials of pharmaceutical trash.
- Chemical liquid waste: discarded formalin, aspirated fluids, contaminated secretions, liquid from laboratories, and floor washings.

2. Red: Selected in non-chlorinated plastic bags of the coloured

- Polluted waste originating from the use and disposal of items including tubes, bottles, intravenous tubes, catheters, urine bags, syringes, and others.

3. White - Needles, syringes with immovable needles, needles from tip cutters or burners, scalpels, blades, or any other infected needle-like instrument collected in puncture-proof, leak-proof, and tamper-proof containers.

4. Blue: Gathered in cardboard boxes with blue markings.

- Glassware: Any broken, abandoned, or tampered-with glass item, excluding ampoules and containers of medicine that have been contaminated with cytotoxic waste.
- Metallic body implants.

VI. Dry ejectors are the best!

Dental vacuum systems, commonly referred to as saliva ejector systems, are a vital piece of equipment for any dental clinic. These dental vacuum systems use a lot of water, which results in waste and water contamination. Therefore, using a dry vacuum system is more necessary. (8)



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VII. Save water,energy and money

Conservation is the guiding principle of dentistry of the future since it increases the lifespan of our limited resources while also allowing us to save money. The next time we leave the office, we should make sure to check and look for those omnipresent blinking lights coming from electrical equipment. Computers, intraoral cameras, televisions, and lights left on when no one is in the office are examples of this. We can save a significant amount of energy by unplugging these devices, which take power even when they are not in use. The current initiative of energy- and water-saving dental equipment represents an encouraging milestone in the development of green dentistry.

VIII. Let's be hi- tech

High-tech improvements are essential to assisting dental practitioners in meeting their waste reduction and resource conservation goals. Premature diagnosis, preventive treatments, and education are all made available by digital technology in an effort to meet the needs of patients who follow a healthy lifestyle and are committed to preserving long-term eudemonia while avoiding needless or expensive operations.(9) Here are a few cutting-edge developments for dentistry's green future

System for digital imaging (10)

1. System CAD/CAM
2. Steam sterilizers do away with artificial preservatives.
3. Electronic patient scheduling, billing, and documentation.
- 4 Digital, paperless patient communication technology that saves staff time by emailing appointments and reminders.
5. Using websites to market and as the main tool for marketing.
6. Convert to an electronic format for patient records.
7. Using compressors without oil.

XI. Keep away the lifestyle related diseases:

Dental experts who practice a wellness lifestyle use their vast knowledge to evaluate the condition of periodontal tissue as a window into general health. Scientific studies have connected the so-called lifestyle disorders to an unbalanced immune response. The body's immunological response can be observed through the mouth. Gums that are inflamed and bleeding are an indication that the body's immune system is weakened and about to be ambushed. Possible temporary bleeding or oedema.

Periodontal cells suggest that an immune system attack is necessary. Periodontal tissue may develop chronic inflammation if the bacteria are not returned to their initial state. In its early stages, this illness is known as gingivitis, and as it progresses, it turns into a condition known as periodontitis or periodontal disease. Up to 80% of people may have a periodontal problem, according to estimates. If unchecked, the bones and periodontal tissue that support our teeth are destroyed by our body's immune system. Unrestricted oral bacteria can spread throughout the body through the circulation, causing chronic disease in the rest of the body's organ systems as well. systematic evaluation of the periodontium. (11)

XII. Dental advice for maintaining body wellness (12)

- A dental expert should perform a salivary diagnostic test to evaluate the balance of oral bacteria.
- The hygienist is in charge of performing periodic exams. Charting will inform you of your outcomes at each appointment. putting them to use to improve your home health.
- Make sure you eat things and take supplements that contain anti-inflammatory and anti-oxidant qualities.
- As directed by your dentist, schedule regular suggested timetable.
- Obey your dentist's instructions for home care.

XIII. Why green dentistry is inevitable?

We can contribute to dentistry's clean, green, and highly profitable future by implementing cutting-edge technology and using excellent judgment. By using these straightforward tools like said above.

In the present world, it is crucial to comprehend the value of being environmentally friendly in all facets of life, including dental practice because it has a significant impact on due to the substantial waste generated by various dental operations and the excessive consumption of water and power that results, this emphasizes the need for conservation. to transition toward "green dentistry." Green dentistry includes being environmentally friendly as well as technology that reduces waste and conserves energy in order to save time and money and pollution reduction using the most recent technology and practices, protecting the environment. (4)

Let's conclude in green:

By incorporating dental advancements, green dentistry lowers supply costs and raises productivity by making better use of time, cutting down on waste, and eliminating pollution, Patients ultimately gain from receiving high-quality care while paying less for it. We will end by quoting Ray Kroc. "You are growing as long as you are green. When you are fully ripe, you begin to decay. In order to protect Mother Earth from biohazards and ensure a brighter tomorrow, let's go green today (1). Let the problems we face today; the polluted water we sip, the poisonous air we breathe, the unhealthy lifestyle that burdens us with polished diseases and all those that refrains us from growth have only one solution, to choose green, the colour that enhances the visual capacity and clears off the blurred polluted vision. Let's close and conclude these hazardous scenarios in GREEN. Let it clear your vision and let the greenery spread to a better and safe future ahead not only for us but for the coming generation.

Reference

- [1]. Srinivasan K, Chitra S. Green Dentistry: A Metamorphosis Towards An Eco-Friendly Dentistry: A Review. *International Journal Of Information Research And Review*. 2015 Oct 29;2(12):1521-5.
- [2]. Pockrass F, Pockrass I. The Four "R's" Of Eco - Friendly Dentistry. *Am Dent Hyg Assoc*. 2008; 22: 18-21
- [3]. *Journal Of Dentistry And Oral Biology* 2018 | Volume 3 | Issue 6 | Article 114
- [4]. Palenik Cj. Managing Regulated Waste In Dental Environments. *J Contemp Dent Pract*. 2003;4(1):76
- [5]. High Tech Dentistry. *Eco Dent Association*. 2016.
- [6]. F Pockrass, Pockrass I. Eco-Dentistry: A Model Of Mercury-Free Dentistry. *J Ecologically Sustainable Med*. 2005;2(3):17-22.
- [7]. Sawant Ph, Vimala N, Padhye L. "Let's Go Green To Get Our Globe Green": Green Dentistry. *J Oper Dent Endod*. 2017;2(1):19-24.
- [8]. Anderson K. Creating An Environmentally Friendly Dental Practice. *Cds Rev*. 1999; (1): 12-8
- [9]. Hiltz M. The Environmental Impact Of Dentistry. *J Can Dent Assoc*. 2007; 73(1):59- 62.
- [10]. Rathakrishnan M, Priyadarhini A. Green Dentistry: The Future. *J Int Clin Dent Res Organ*. 2017;9(2):59-61.
- [11]. *Oral System Link*. *Eco Dent Association*. 2016