ECO-FRIENDLY DENTISTRY: AN OPPORTUNITY TOWARDS SUSTAINABLE PRACTICE

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Acknowledgement*- All authors have made substantive contribution to this study and/or manuscript, and all have reviewed the final paper prior to its submission.*
Conflict of Interest*- NIL*
Source of Funding*- NIL*

KEYWORDS

Ecofriendly, dentistry, preventive, sustainable

Abstract

Dentistry is developing gradually with latest techniques, materials and definitely the comfort provided to the patients. Green dentistry contrives practice that keeps resource usage in balance with the nature's economy, thus protecting the external environment through elimination or reduction of wastes.

Eco-friendly dentistry implements sustainable approach to minimize the energy consumption and the wastes generated through the profession by the introduction of for R's: Re-think, Reduce, Re-use, Recycle.

Eco-friendly practice is a high-tech approach that reduces the environmental impact on dental practices which further supports and promotes wellness. Nowadays healthcare professionals are more concerned about the impact of their professional practice, thereby focusing more on creating awareness, precaution, prevention and promoting sustainable development towards the country.

INTRODUCTION

Providing a better and satisfying dental care to the patients has always been the primary concern for the dentists. Good oral health is not only essential for good overall health and freedom from the pain and suffering associated with oral health problems, but also influences self-esteem, quality of life, and performance at school and at work.[1] Dentistry is developing gradually with latest techniques, materials and definitely the comfort provided to the patients. But among all these, what should not be compromised is the environment. Conservation of resources and energy, minimizing the waste products, eliminating hazardous toxins that have a devastating effect on the environment as well as the patients, renewability, sustainability, being minimally invasive, are the factors that should go hand in hand with the profession. Thus, reducing the environmental impact of dentistry and providing the best to the patients is what green dentistry is all about.

Improvement in the beauty and harmony of facial appearance has been the main intention of oral health[2] and green dentistry contrives practice that keeps resource usage in balance with the nature's economy,

thus protecting the external environment through elimination or reduction of wastes.[3] We as dentists need to focus on providing our patients with the high quality of dental care incorporating high-tech innovations that augment efficiency and effectiveness and constituting the highest standards of planetary care

The Eco-Dentistry Association defines green dentistry as practice that: **Reduces waste and pollution; saves energy, water and money; incorporates high-tech innovations and is wellness based.[4]**

Green dentistry helps conciliate the planet based on the model of 4R's- Rethink, Reduce, Re-use and Recycle.[5] It is one of the main principles of eco-friendly dentistry. From performing a dental procedure to marketing, from using a simple instrument to office design, we just need to "Rethink" keeping in mind the "Green" and going green with every step, being eco-friendly as much as we can be. Focussing more on prevention, precaution, education and wellness, can significantly contribute in improving the health of our patient, the community and the environment.

Dentistry along with the other medical profession produces an enormous amount of hazardous waste. Although individual dentists generate only a small amount of environment unfriendly wastes, the total waste produced by the profession may have a significant impact on the environment.[6] Atmospheric concentration of gases like carbon dioxide, nitrous oxide, methane is increasing significantly in the recent years and these are highly contributing towards global warming. Simple change in habits and adapting a few tactics in our daily practice can make a big difference for the planet.

REASONS FOR ESTABLISHING AN ECO-FRIENDLY DENTAL PRACTICE

Reducing the direct or indirect detrimental effects of the current dental practice on the environment is the main reason for going eco-friendly:

- Traditional radiography generates hazardous by products like waste fixer containing silver, lead foils in the X-ray films can contaminate soil and the groundwater.
- Use of toxic disinfectants in chemical sterilization techniques.
- Resource wastage such as electricity, water, paper etc.
- Not disposing bio-hazardous wastes carefully.
- Using silver amalgam restorations which contains metals like silver, tin, copper plus the mercury whose toxic effects are well known. Once in the environment can change to more toxic form "organic methyl mercury". Children, foetuses of pregnant women, hypersensitive individuals, and people with renal impairments are known to be particularly susceptible to the neurotoxic effects of dental mercury.[7]

GOING GREEN

- **DENTAL CLINIC DESIGN-** Maintaining green interior design, finishes, with interior elements that are free of Persistent Bio-accumulative Toxins (PBT).

Paints and wallpapers: Use water-based paints containing low or minimal VOC (volatile organic compounds). VOC's tend to be solvents in paints which evaporates releasing pollutants to the environment as the paint dries. Wallpapers used should be created using eco-friendly water-based paints and responsibly sourced high quality paper.

Flooring: Non-toxic and environmentally sustainable flooring and tiles should be used whenever possible. Bamboo flooring, cork flooring, linoleum flooring is some of the best options.

Lighting: Natural light is always considered the best but it cannot be available every time so use fluorescent lighting as they are energy efficient and produce much lesser heat.

Furniture: Use office furniture made from recycled or reclaimed wood.

- **3D SCANNING-** In modern day, patient asks for invisible braces rather than traditional braces and thus are interested in invisalign. 3D scanning technology scans the teeth during the planning

phase of the project and hence reduces the need for alginate impressions thereby minimizing waste generation.

- **DIGITAL X-RAYS-** Using digital radiography reduces the problems associated with traditional X-rays such as film manufacturing, waste fixer and developer disposal, lead waste from empty film packets. Additional benefits are it exposes the patients to 70 to 90% less radiation plus it's easy to store and transfer anywhere across the world, thus conserving the paper, plastic and providing a better quality.
- **DEALING WITH AMALGAMS-**Silver amalgams is one of the most common restorations because of its durability and cost effectivity but as it contains mercury and metals like silver, tin, it has hazardous effects on the environment and animals. Currently it has been estimated that dentists contribute between 3 and 70% [8-10] of the total mercury loads entering waste water treatment facilities. Proper handling and disposal of mercury waste becomes crucial. Installing amalgam separators considerably reduces the amount of mercury entering the water supply as it separates the fine particles from the waste water. Using dry vacuum filtration to dispose of mercury from removed filings also prevents local water mercury contamination.
- **MORE NATURAL LOOKING RESTORATIONS, LESS HEAVY METAL WASTE-** Natural looking tooth coloured restorations have always been the patient's choice. These aesthetically pleasant restorations like direct composites, porcelain veneers (lumineers), are not only effective for smile treatment but these are metal-free and help eliminate the heavy metal waste associated with silver amalgam fillings that end up in main water contamination.
- **GOING PAPERLESS-**Utilize various practice management soft wares available these days, managing records and patient's details through computers as well as communicating via e-mails, electronic patient recall and reminder, not only saves paper but is time efficient, easy in managing with less errors.

When necessary, consider using chlorine-free, high post-consumer recycled paper products instead of regular paper products.

- **INFECTION CONTROL-** Using chemical disinfectants to sterilize the instruments and the office not only has adverse effects on the environment but it also effects the health of patients and the dental professionals in one or the other way. Replacing chemical-based sterilization with the steam sterilization is a step towards eco-friendly dentistry. Biodegradable sterilization solutions like tea tree oil and thyme can be used to clean examination areas.

A study was conducted by Vandrell and Hayden in 2002, comparing the effect of steam and dry-heat sterilization on the wear of orthodontic ligature-cutting pliers. It was found that orthodontic ligature-cutting pliers with stainless steel inserts showed no significant difference in mean wear whether sterilized with steam autoclave or dry heat, hence pliers with stainless steel inserts can be sterilized with steam autoclave sterilization with no deleterious effects.[11]

- **GREEN ELECTRONICS-** Appliance designed to minimize the energy usage and having less impact on the environment is the need of the hour. Consider looking for energy star label, which ensures that electronics are 10 to 25% more energy efficient than government standards. Simple procedures like unplugging the appliances when not in use or switching off the computers or keeping them in sleep mode has a significant impact towards saving energy. Implementing automation system in the clinics controls the light and temperature of the office as per need.

- **MATERIALS AND EQUIPMENTS-** Use of **Green Seal** approved products and materials. Consider using Polyvinyl chloride-free (PVC-free) and Bis (2-ethylhexyl) phthalate-free (DEHP-free) intravenous fluid bags and surgical tubings.
- **UTILIZING RENEWABLE RESOURCES**- Government are nowadays promoting the usage of renewable resources by providing subsidies to utilize the resources which is environmentally acceptable for sustainable development. In dental practice, mobile dental clinics are

transforming into solar powered resource which increases the efficiency of providing better oral healthcare facilities to the rural and underprivileged areas

- **TRAINING YOUR STAFF**- 'We' is always better than 'I'. Guiding the other staffs of the dental clinic about the green practice and asking them to follow the same practice with designated responsibilities and goals is necessary.
- **PROPER WASTE DISPOSAL**- Dental clinics generate enormous wastes like expired drugs, syringes, blood soaked materials, biomedical wastes. These wastes should be disposed carefully using the colour coding bags.

  Demolizer® technology provides a simple, effective, self-contained solution to biomedical waste management, thereby reducing the possibility of disposing of sharps and red bag biomedical waste directly to the environment.
- **PRESERVING WATER**- Waterless vacuum pumps, without using any water, consumes up to 80% less electricity than comparable AC- powered pumps. Water waste is highly minimized using motion sensor water faucets.
- **EDUCATE YOUR PATIENT-** Telling the patients about the eco-friendly practice and advising to adopt them in their day to day lives can help in saving resources like water and conserving energy.

LEARNING AND ADOPTING FOUR R'S- Eco-friendly dentistry implements sustainable approach to minimize the energy consumption and the wastes generated through the profession by the introduction of for R's: Re-think, Reduce, Re-use, Recycle.

- *RE-THINK:* Rethinking is the first step for the change. Taking into consideration the effectiveness, every small change that we make, every new approach we adopt, every new thing we add or remove, needs to be evaluated.
- *REDUCE:* In order to decrease the global warming, we must initiate reducing the consumption of resources and generation of wastes. Measures to reduce includes:
  - Order purchasing items in bulk to reduce the packaging waste and try to combine the orders to decrease the shipping expenses.
  - Execute digital technologies for imaging, screening cancers, marketing and wherever possible.
  - Reduce the paper consumption by using double sided and single spaced printing.
- *RE-USE:* This step is mainly concerned with minimizing the wastes. Prolonging the use of items prevents is from contributing it to waste contributing to landfills. Reusing the materials not only save the resources, but it also provides a new life to the material by using it again in a neoteric way.[12]
  - Use stainless steel impression trays, suction tips rather than the plastic one.
  - Avoid using disposable drapes and the paper lab coats, prefer using cloth made.
  - Implement cassette sterilization method[3] which eliminates the disposable autoclave wraps, disposable patient drapes and bibs.
  - Use washable utensils in the staff break room.
- *RECYCLE:* It is a feasible method of reducing environmental contamination.[13] Recycle paper and discarded instrument that can be turned to industrial metal.

  Programs like Hu-Friedy's Environment Program contribute in recycling of old and discarded instruments. This program provides one free Hu-Friedy instrument for every 12 instruments regardless of the manufacturer sent in for Environment recycling. Instruments are sent to metal scrap recyclers, rather than leaving them to contribute as landfill waste, who use them for non-

medical applications. Hu-Friedy has created a more convenient and greener method by developing an online program Environdent.com.

GREEN DOC™ CERTIFICATION- The EDA's GREEN DOC™ CERTIFICATION is a comprehensive program that rewards dental offices for eco-friendly initiatives in the areas like dental procedures, office administration, marketing, office designs and constructions to achieve bronze, silver or gold EDA certification.

The GREEN DOC™ checklist outlines required standards and recommended initiatives within eight categories of eco-friendly practice.

CONCLUSION

Success is an ongoing process but to achieve success is not an easy task in this competitive world.[14] Today it has become very crucial to adapt eco-friendly approach in every aspect of our lives including dentistry. Dental practice not only has a huge impact on the environment due to metallic unwanted waste generated in various procedures but also due to excessive use of water and electricity which has altogether accentuated the move towards Eco-friendly practice,[15] which is a high-tech approach that reduces the environmental impact on dental practices which further supports and promotes wellness. Nowadays healthcare professionals are more concerned about the impact of their professional practice on the sustainable environment. The moral obligations of the doctors is to act in the patient's best interest,[16] so everyone has to work together as team towards this sustainable approach and they should start implementing the practice of eco-friendly changes from their traditional way of practice to advance eco-friendly practice, thereby focusing more on creating awareness, precaution, prevention and promoting sustainable development towards the country.

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