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# OPPORTUNITIES FOR ENVIRONMENTAL SUSTAINABILITY IN DENTISTRY

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## ABSTRACT

**Introduction:** Life on Earth is at risk due to human activity. It is estimated that daily the world generates 3.5 million tons of plastic and other solid waste. The sea levels are rising, the pH level of the oceans is decreasing, deforestation is the main cause for the release of greenhouse gases into the atmosphere. Acknowledging these facts businesses, including dental practices, can make decisions for reducing the consequences on the climate.

**Aim:** The aim of the present study is to examine the types of materials and methods contributing to the development of sustainable and resource-efficient dental practices.

**Materials and Methods:** For the period September 2021–February 2022, in the available database (PubMed, BioMed Central, ScienceDirect, Scopus, Web of Science, Embase), a systematic analysis of scientific publications investigating the ecologically friendly resources methods used in dentistry was conducted.

**Results:** In recent years, technology has developed rapidly, thus allowing the replacement of obsolete with new environmentally friendly methods. It is now possible to use computer technologies, new materials, and approaches in the treatment.

**Conclusion:** It has been concluded from the conducted research that it is required to use sustainable materials and methods in dentistry. The correct approach and patient instruction aid in reducing the negative impact on the environment.

**Keywords:** *sustainability, ecologically-friendly, environment, dental medicine*

## INTRODUCTION

Life on Earth is at risk due to human activity. It is estimated that daily the world generates 3.5 million tons of plastic and other solid waste. Every year 5 to

13 million tons of plastic is accumulated as marine litter (1). The sea levels are rising, the pH level of the oceans is decreasing, and deforestation is the main cause of the release of greenhouse gases into the atmosphere. Acknowledging these facts businesses, including dental practices, can make decisions to reduce the consequences on the climate. Along with technological innovations, dental medicine is constantly developing. Green dentistry is a way of dental practice whose main focus is to protect the environment by decreasing pollution and conserving energy (2). Transitioning to green dentistry decreases the influence on natural resources and at the same time provides the best oral care (3).

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## MATERIALS AND METHODS

For the period September 2021–February 2022, in the available database (PubMed, BioMed Central, ScienceDirect, Scopus, Web of Science, Embase), a systematic analysis of scientific publications investigating the ecologically friendly resources methods used in dentistry was conducted.

## RESULTS

The term eco-friendly dentistry was first used in a publication by the University of Waterloo, Canada in 2007. The authors define the term as an “approach to dentistry that implements sustainable practices by keeping resource consumption in line with nature’s economy, by safeguarding the external environment by eliminating or reducing outgoing wastes and by promoting the well-being of all those in the clinical environment by conscious reduction of the chemicals in the breathable air” (4). Two different sides of this issue should be considered in our opinion: the dental office and instructing patients on how to perform oral hygiene procedures at home. In the dental office, dentists should identify the waste, their everyday energy and water consumption. Mercury has always been considered dangerous in dentistry. Its use in dental fillings does not pose a risk for intraoral use but its disposal after use in dental operations and emissions from cremators poses serious environmental problems (5). Cellulose is a leading polymer in the world and it is known for its properties, such as biocompatibility, high mechanical strength, and light weight. Nanocellulose shows better properties compared to natural cellulose fibers. Nanocellulose is beneficial for routine use, especially in healthcare. In the biomedical field, cellulose-based products are used in applications such as wound healing, dental applications, and antimicrobial materials (6).

Green dentistry is based on the model of four R’s—Reduce, Reuse, Recycle, and Rethink. By reducing the number of resources, we directly reduce the amount of generated waste. It is possible to reduce the consumption of electricity and water, and paper waste. Reusing an instrument or material prolongs its life and avoids contributing to new waste. Reusable and sterilizable instruments, patient curtains, and water glasses reduce the amount of plastic generated by disposable equipment use (1). Oral hygiene at home

consists of using products such as toothbrushes, toothpaste, and dental floss. Toothbrushes are made from propylene plastic and nylon, sourced from non-renewable fossil fuels. The bristles are made from nylon, and manufacturing them creates the greenhouse gas nitrous oxide. The handle is made of polypropylene plastic, and when not recycled it does not biodegrade. Eco-friendly alternatives for toothbrushes can be: 1) wooden toothbrushes with pig bristles, 2) wooden toothbrushes with nylon bristles, 3) silicone toothbrushes, 4) plastic handle toothbrushes with changeable bristles. Toothpaste tubes can be eliminated directly by using toothpaste tablets. Alternatives for nylon dental floss may be: 1) silk floss, contained in a glass or aluminum dispenser, and 2) silk and beeswax floss in a cardboard box that is biodegradable (7).

## CONCLUSION

It has been concluded from the conducted research that it is required to use sustainable materials and methods in dentistry. The correct approach and patient instruction aid in reducing the negative impact on the environment. It is estimated from a survey of the general public that 89% think healthcare should be more sustainable and 36% think this method should be adopted even if it costs more money (5).

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