

Ten Things To Make Your Orthodontic Practice More Sustainable Today

Healthcare globally is responsible for just under 5% of total greenhouse gas (GHG) emissions on an annual basis; if our sector was a country, we would be the fifth largest polluter in the world. Paradoxically, the waste and emissions we create contributes to the need for more healthcare. (1) Ethically, we are taught to “do no harm”; given the current climate crisis situation we currently face, we have a moral imperative to reduce the environmental impact we are having on our planet.

This article will address ten actionable initiatives you can implement in your orthodontic practice to improve the negative impact your practice may be having on the environment and our climate situation. Most of these initiatives will provide cost savings while also helping to improve sustainable outcomes.

Transportation

Approximately 60-65% of the carbon footprint in the typical dental office (based on data from the UK) comes from the transportation of our patients and staff to and from the dental office.(2) By combining family appointments, judiciously doing as much treatment as possible at one visit per patient, and letting our labs have adequate notice about pick ups and deliveries, such that they can plan their route with other offices, we can decrease our transportation footprint. If your lab is on your way home, drop the cases off yourself. You can also consider implementing teledentistry, and review your treatment online with your patient, with suitable retraction devices to properly visualize treatment progress.

Reprocessing Instruments

Rather than choosing single use paper/plastic sterilization pouches, please consider using reusable surgical wrap (good for 75 uses) with reusable metal cassettes. (3) This will properly separate your instruments during reprocessing, and eliminate the need for paper tray covers (which are not sterile), as you can use the wrap to lay your instruments out on in the operatory. Additionally, instruments can be reprocessed in their cassettes, using a hydrim or washer/disinfection appliance; this will save staff time and therefore money, while being better from a health and safety perspective.

Reusable Products

In addition to the above mentioned reusable protocols, consider using:

- Health Canada approved (as certified medical devices) reusable surgical masks (4), which can be washed and reused 100 times according to the manufacturer's suggested guidelines and eliminate the majority of plastic waste from single use masks.
- reusable cotton disinfectant wipes, which can be used at least 10 times and do not emit microplastic particles into waste water. (5)
- reusable stainless steel high volume suction tips, which can be used infinitely.
- reusable water distillation units, for on site water distillation for autoclaving (6)

- reusable bonding brush handles, where only the microfibre replaceable tip gets discarded and the handle can be autoclaved.

Launder Reusable PPE/Wraps On Site and Use a Microfilter on the Washer

The most sustainable protocols you can employ for PPE and reprocessing instruments is to move to reusable concepts, as previously mentioned; including installing a washer, with an attached microfibre filter, and dryer at your practice. (6) This eliminates a vast amount of plastic waste from single use items as well as transportation footprint from off site suppliers. 35% of all plastic microfibre pollution in the ocean is the result of microfibres shedding from synthetic clothing during laundering (which are petroleum based products, including PPE); it is therefore a responsible initiative to install a filter on all washers to capture these microplastics before they enter the wastewater stream. (7) (8)

Retip Instruments

Instrument handles can have a new life by employing a retipping process that allows you to choose either the same, or a new type of instrument tip, while continuing to use the bulk of the instrument. This can save you up to 65% of the cost of a new instrument while also being environmentally responsible. (9)

Choose Biodegradable Surface Disinfectants, Water Line Disinfectants, and Evacuation System Cleaners

The chemicals we choose for our infection control protocols all have an environmental footprint. There are many products to choose from; please consider not only the product formulation, but the packaging of products. Cardboard packaging will not elicit as many microplastics into the waste stream as plastic-based packaging. Micryllium is a small company out of Toronto that has an entire line of environmentally responsible infection control products with responsible packaging. (10)

Ditch Plastic Barriers

Responsibly wiping down all equipment with an appropriate (and biodegradable) surface disinfectant in between patients is more sustainable than using plastic barriers. Our medical colleagues are challenging the use of paper covers for medical examination tables, ascertaining that wiping down surfaces is not only better for the environment, but for infection control, and for cost. (11)

Challenge Aligner Companies to Institute Extended Producer Responsibility, Choose Compostable Aligner Material, and Consider Recycling Brackets/Bands

More and more governments worldwide are creating policies that require manufacturers to take responsibility for the post-consumer end stage of their products; this encourages companies to implement more sustainable designing of products, such that there is less environmental impact and human health consequence; this is known as **extended producer responsibility**. Aligners

create an incredible amount of plastic waste; most of these products end up in landfill, where they disintegrate into microplastics and nanoplastics. These small particles are implicated in a plethora of health issues. (12) They can act as endocrine disruptors, mimicking hormones, attracting toxic particles, and creating an inflammatory response, which initiates many health issues, including cancers, heart disease, and neuropsychiatric diseases such as Parkinson's disease.

We, as consumers have a voice, as do our patients; Good Fit Technologies makes compostable aligner material that has properties within the range of other aligner products. Their GT Flex Green aligner material can be composted under industrial conditions, which many municipalities now have. (13)

They are also doing R and D for backyard compostable aligner material, and are also working on developing compostable resin model material.

Resin8 is a company that accepts all seven types of plastic waste without the need for sorting; they then reconstitute this waste into very fine particles that mimic sand, and can be a substitute for sand in concrete products, while improving the properties of the concrete, making this an acceptable waste solution for this industry. This company has been working on partnering with a large aligner company.

If aligner companies chose to be responsible, resin models and waste aligner material could be sent to Resin8 for recycling. (14) This company does charge a small “tipping fee” for plastic waste; however they are basing their business model on revenue from the final product, rather than the raw material sourcing.

You can also consider recycling brackets, bands, and other orthodontic appliances; doing so will also improve your environmental impact. (15)

Choose Sustainable Oral Care Products

As a society, we need to move away from creating plastic waste where possible; only 9% of plastic waste is recycled in Canada, and only 5-6 % in the USA. Toothbrushes made from scrap maple wood are available from Quebec; they are a high quality substitute for typical plastic brushes, of which 23 billion get thrown out globally on a yearly basis. (16), (17)

There are many brands of natural fibre floss made of corn, silk, or other materials, and these products are also packaged in a more responsible fashion, using cardboard rather than plastic. SimplyFloss is an innovative reusable personal silicone floss thread that can be disinfected with hot soapy water, alcohol, or mouthwash for multiple uses and little end waste. (18)

1.5 billion toothpaste tubes are discarded globally annually (19). Tooth powder, both fluoridated and non-fluoridated versions, are available delivered in brown paper packaging. Colgate indicates that it has created a recyclable toothpaste tube, however, local municipalities may not accept this in their programs. (20)

Use the Free Oral Care Recycling Programs Available

Terracycle, a global plastics recycling company, has partnered with Procter and Gamble (Crest/Oral B) in Canada, and Colgate Palmolive in the USA, to create free used oral care product recycling initiatives. (21), (22) Have your patients bring their waste oral care products (any brand of toothbrushes, toothpaste tubes, floss containers, and mouthwash bottles) to your office, collect them in a box, generate a shipping label off the Terracycle website, and ship them for free to Terracycle.

More transparency regarding the downcycling of these waste products (material of lower quality that cannot actually be used in a similar manner to the original product) is required, however this initiative can generate conversation about sustainability with your patients and staff, and you can illustrate all such initiatives on your website and social media platforms.

This article has focused on responsible changes you can implement with respect to supply chain. Please be aware that there is much we can do in terms of preventative education to mitigate future unnecessary dental treatment, renewable energy use (solar/ geothermal/ heat pumps) and energy audits for our practices, responsible use of drugs and devices (including moving to digital/AI technologies, although they too, have environmental impact (23)), food and food waste (which creates massive GHG emissions), and natural systems (planting indigenous trees and pollinators when possible).

Ultimately, **leadership is number one**. Continue to educate yourselves, initiate positive change, and demonstrate by example. We can all make a difference. Help be the change for not only this generation, but generations to come.

[1Environmental sustainability of health systems: time to act - The Lancet](#)

[2Environmental sustainability and travel within the dental practice | British Dental Journal \(nature.com\)](#)

[3Sustainable, Reusable Surgical Wrappers| Standard Textile](#)

[4High quality reusable masks | etrēma \(etrema.ca\)](#)

[5Micrylium • Le Cloth](#)

[6VistaPure | Canada \(Dental\) \(scican.com\)](#)

[7LINT LUV-R \(environmentalenhancements.com\)](#)

[8Plastic microfibre pollution: how important is clothes' laundering? - ScienceDirect](#)

[9Dental Instrument Retipping - Progressive Edge Dental Retipping Services](#)

[10Micrylium • Home](#)

[11End of the roll for examination table paper? - PMC \(nih.gov\)](#)

[12Impact of Microplastics and Nanoplastics on Human Health - PMC \(nih.gov\)](#)

[13GT FLEX GREEN - Good Fit Technologies](#)

[14INTRODUCING RESIN8™ – CRDC Global](#)

[15Ortho-Cycle Co., Inc. \(orthocycle.com\)](#)

[16OLA Cycle maplewood toothbrushes by Ola Bamboo – B Factory](#)

[17How your toothbrush became a part of the plastic crisis - mywaste My Waste](#)

[18SimplyFloss | Reusable Dental Floss](#)

19 1.5 Billion toothpaste tubes Trashed around the world annually (thinkzerollc.com)
20 Colgate Launches Groundbreaking Recyclable Toothpaste Tube With "Recycle Me!"
Packaging | Colgate-Palmolive (colgatepalmolive.com)
21 Oral Care Free Recycling Program · TerraCycle (Canada)
22 Oral Care Free Recycling Program · TerraCycle (USA)
23 Generative AI's environmental costs are soaring — and mostly secret (nature.com)