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Promoting sustainability in restorative dentistry by Rayo 3D printing technique**Pirkko-Liisa Tarvonen**

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Dental care produces a lot of material overuse, waste and residues, for example gloves, masks, impression materials, amalgam, micro-plastics and emissions of fixatives. They end up inside the bodies of patients or into the wider environment. The environmental load varies between the societies according to the waste management systems. In addition to environmental load, repetitive repair and placement of composite fillings places a heavy burden on dental care services which may be regarded at least as an alternative expenditure. Transportation and deliveries produce CO₂ emissions. Oral diseases are mostly preventable and prevention is always the most cost-effective intervention. If treatment is needed, chosen methods and materials should be sustainable. Rayo 3DToothFill is a novel technique utilizing digital imaging and 3D printing to fabricate dental restorations. Based on an in vitro study carried out in University of Eastern Finland, Kuopio, Finland, the accuracy of 3D printing technique overcomes that of milling technique in the fabrication of dental inlay and onlay fillings. Major advantages compared to current solutions in addition to accuracy of the restoration include lower cost, possibility to layering and tailoring properties, suitability for existing filling materials and material use efficiency. The project is devoted to preparation of commercialization. Additional clinical investigations are planned to carry out during 2019 to confirm the findings. This 3D printing technique has been developed by a team of professors and experts from the University of Eastern Finland and University of Oulu.

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