

# 3D Printing of Ceramic Dental Restorations





3D-printed dental veneers (in situ for try in) made of lithium disilicate. In situ image shown has been produced within the scope of a preliminary case experience.



Exact reproduction of the occlusal surfaces with sharp and natural representation of the fissures. Photo courtesy of Josef Schweiger, M.Sc.

## Limitations of conventional restorations

Several dental treatments are necessary on average throughout life to ensure chewing ability, proper speech, aesthetics, and an overall healthy state. In order to preserve as much healthy tooth structure as possible, state-of-the-art dental restorations are increasingly being performed in a minimally invasive manner. This is especially challenging using conventional methods, the limits of which are reached quickly when it comes to the production of ceramic veneers thinner than 0.5mm.

## More detailed, more cost-effective, minimally invasive

3D printing is increasingly proving to be a cost-effective, sustainable and scalable alternative to CAD/CAM and heat pressing. Specifically, LCM technology has the ability to manufacture unprecedented details in fissure geometries and significantly thinner veneers with wall thicknesses as low as 0.3mm. Furthermore, it can shorten the manual process of adapting the veneer to the patient's individual needs.

## Automation of print preparation – easy to use

The finished design of the restoration can be automatically prepared for the print job via DeskArtes 3Data Expert software. In the first step, the restoration will be oriented on the build platform, after which a support structure will be generated. This process can be repeated for each restoration until the build platform is fully loaded, offering an easy workflow when preparing a high volume of restorations in a short time.

## Innovative technology

The base material is a slurry, which essentially consists of ceramic powder and a photocurable binder. First, a so-called green part – a ceramic/photopolymer composite – is built up layer by layer by using a DLP system. The second step involves the debinding and sintering of the lithium disilicate with subsequent staining and glazing.

## Mass customization and productivity

When it comes to the production of thin veneers or detailed fissures, CAD/CAM limits your possibilities due to cutting force and tool diameter. In comparison, 3D printing is a far more affable technology, providing you reliable results and requiring less specialist experience and training. Restorations for many different patients can be produced simultaneously, boosting productivity.

## The advantage of technology integration

By building up your knowledge and expertise in ceramic 3D printing today, you and your clients will pioneer a more efficient dental treatment process for patients worldwide and benefit from a more economical workflow throughout – all the way from design to treatment.

Lithoz lithium disilicate slurries are based in IPS e.max lithium disilicate powder. The solutions presented here did not yet have FDA clearance at the time of this folder's printing.

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