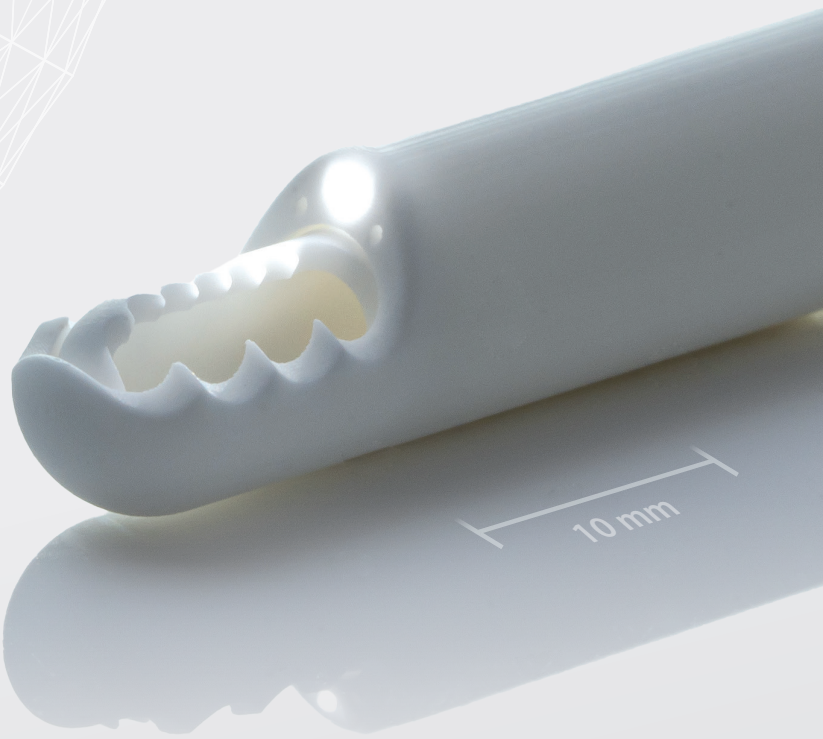
LITHOZ®

We are ceramic 3D printing.

3D Printing of Ceramic Surgical Tools



Arthroscopic shaver for minimal invasive surgeries, alumina-toughened zirconia (ATZ)

Your system provider for the 3D printing of high-performance ceramics.

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In medicine, the 3D printing of high-performance ceramics unlocks previously unachievable properties – not only in geometry, but also economically. Large and small quantities of tools can be quickly and efficiently manufactured, while the many 3D-printable ceramics already in use in medical applications, including alumina, zirconia, silicon nitride and ATZ, greatly expand the range of possible innovative devices.

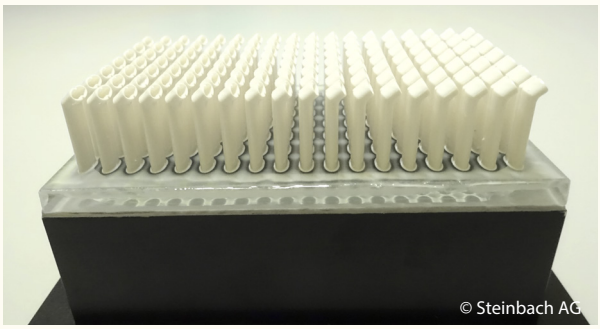
Design Freedom

One example of 3D-printed ceramics is an arthroscopic knee shaver (see cover page). Conventionally, these shavers are manufactured from metal in a simple tube. Thanks to 3D-printed ceramics, new innovative design features can now be added. In this example, the shaver tip has three integrated channels with a diameter of 0.6 mm for fiber optics, allowing constant illumination upon the critical area as well as for rinsing. Such channels could also be used for wiring an electrocautery tip.

Surgical burrs, ATZ (LithaCon ATZ 980)

Surgical burrs for applications like orthopedic, neuro or CMF surgery up to dental use made of ATZ highlight the limitless possibilities opened up via combining cutting-edge geometries with the hardness and durability of ceramics. They also avoid metal debris during operations – important for metal-free surgeries. These parts, manufactured on the Lithoz CeraFab System S65 Medical 3D ceramic printer with its 40 µm resolution, offer both enough detail to design precise and complex parts and a large build envelope for efficient high-volume production. Over 100 burrs can be manufactured in one print run, resulting in a production cost per unit of less than €10.

Bipolar tweezers, alumina (LithaLox 360) and pure copper



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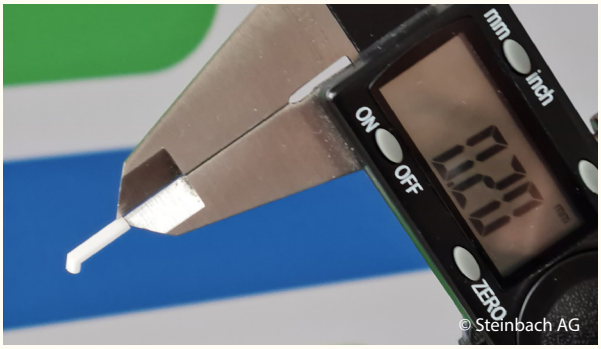
Serial Production

The German company Steinbach, a pioneer in ceramic 3D printing, recently showcased a 3D-printed ceramic tube printed with Lithoz technology for use in the Da Vinci™ surgical robot. 12,000 tiny but highly precise tubes with sharp bends and inner contours were printed per year to feed optical fibres through, featuring perfectly smooth surfaces with roughness values of Ra_{max} of 0.4 µm and minimal wall thicknesses of 200 µm. This success shows how Lithoz ceramic 3D printing processes have already been successfully scaled to large serial production.



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Multi-material Printing

Lithoz is already working on the simultaneous 3D printing of multiple materials in one single component. When looking at bipolar tweezers for electrocauterization (a surgical method to cut through tissue or stop vessels from bleeding), for example, ceramic and pure copper are printed together to combine the powerful insulating capabilities of ceramics with the conductive properties of metal.

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Watch the complete printing process on YouTube