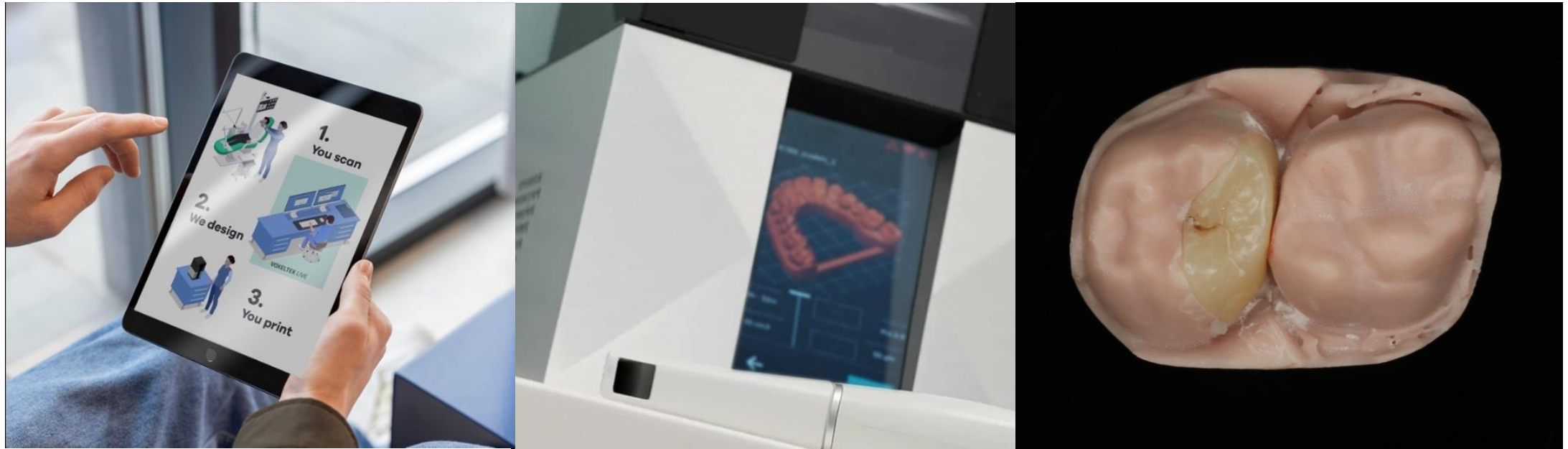




VOXELTEK
ACADEMY



A chairside story: 3D printed permanent inlay



YOU SCAN



WE DESIGN

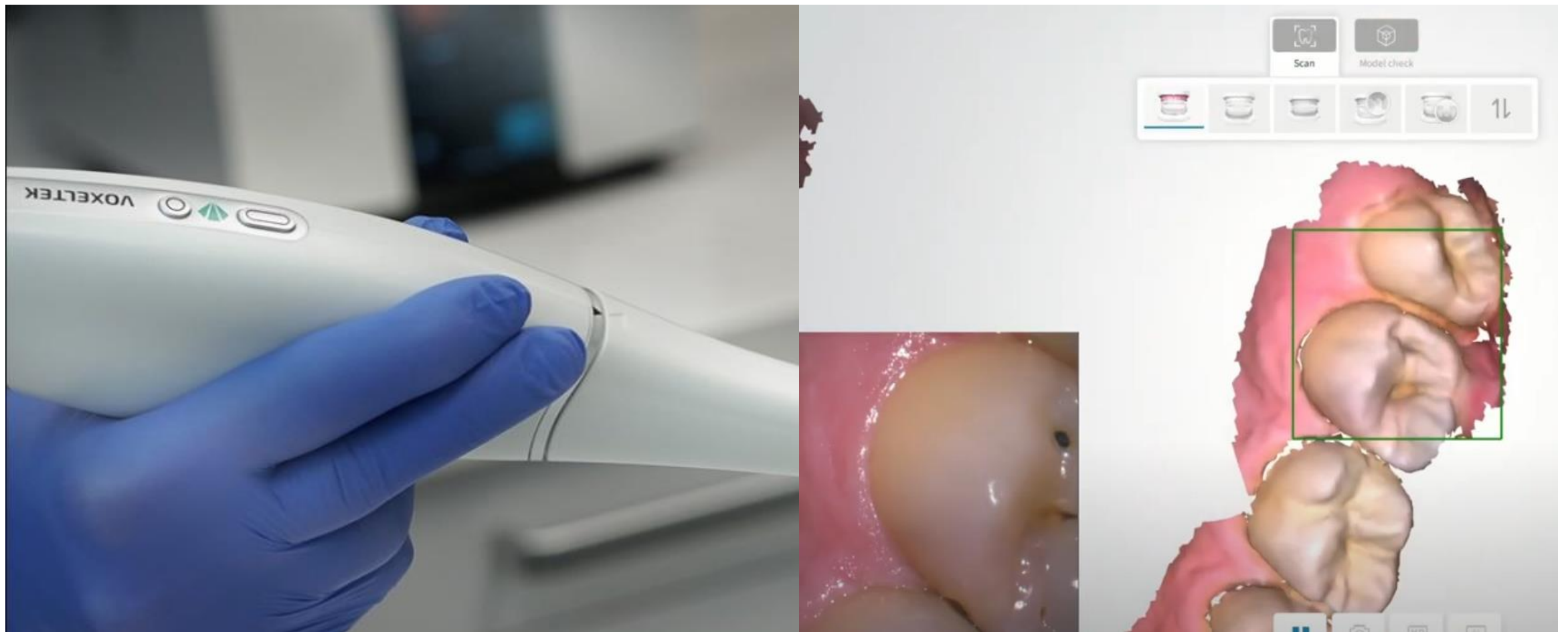


YOU PRINT

VOXELTEK.LIVE provides a chairside solution in which the dentist uses digital technology to prepare permanent restorations for the patient in a single session. The procedure uses digital impression from an intra-oral scanner to create a computer-aided design and 3D printing to fabricate inlays or crowns, instantly in the office, eliminating the need for the patient to return to the dentist's office multiple times.



The case presented features a molar with a cavity that would normally be repaired with a filling. However, as composite dental filling materials unavoidably shrink during treatment, a 3D printed inlay was prepared and installed to achieve the perfect result. An inlay fills the cavity seamlessly as opposed to a normal filling; and as permanent inlays can now be designed, printed and finished in a matter of a few hours, this method was preferred.



Intraoral scanning before treatment. The patient is anaesthetised and until the drug starts to take effect the lower and upper jaws as well as the occlusion are scanned. This way the exact original shape of the tooth can be restored.



The tooth is being prepared for treatment with a rubber dam and clamps. Note that the cavity is not under the small black spot but it is hiding under the two cusps opposite. The cavity is opened up, revealing the decay under the cusps.



Decay is made visible with a caries detecting dye of a purplish colour.



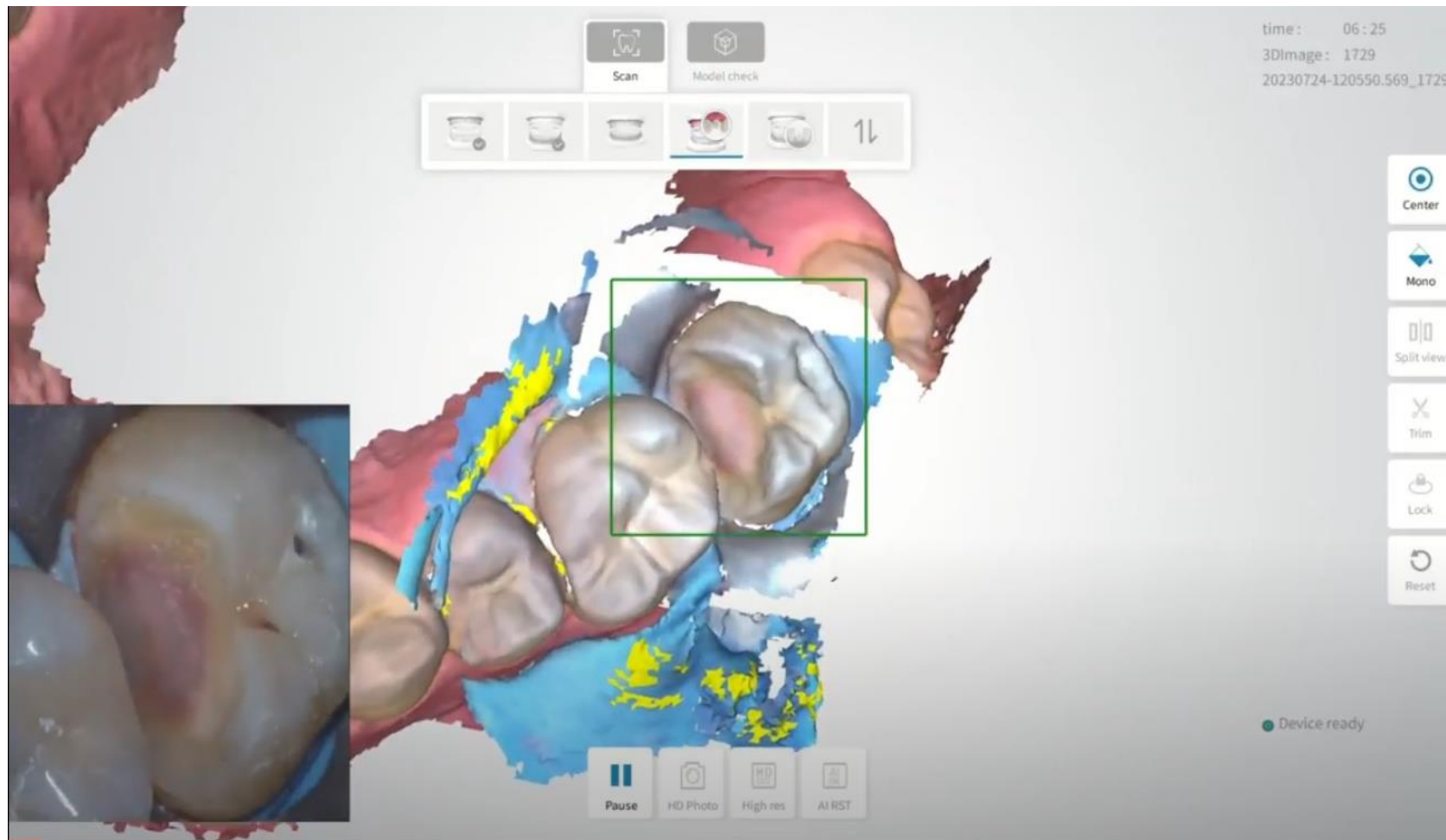
The depth of the cavity is measured to see if a root canal treatment can be avoided. There is no need to do a root canal in this particular case.



The cavity is burred clean around the edges until healthy dentin tissues become visible. Some caries-affected dentin is left in the middle - trapped under an inlay the bacteria are rendered harmless and the affected tissue will remineralise over time. Some sandblasting finishes up cavity preparation.



Adhesive layer applied. The adhesive primer creates a strong bond with the dentin tissue, its molecules turning their hydrophilic ends towards the prepared cavity. The hydrophobic ends will bond with the other component of the composite adhesive.



A second intraoral scan is taken of the molar with the prepared cavity. The software recognises the tooth and automatically incorporates it into the scan of the jaw done previously in step 0. As an intraoral scan may easily be ruined by bleeding, the use of a rubber dam is strongly recommended.

Your dental lab in the cloud.

✓ Fair and calculable design costs, starting from **6 EUR / unit.**



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Through the Voxeltek.live online platform, the assistant uploads the scans and, if necessary adds comments and special requests to the designer's work. Within 30 minutes the completed designs are sent back to the assistant.



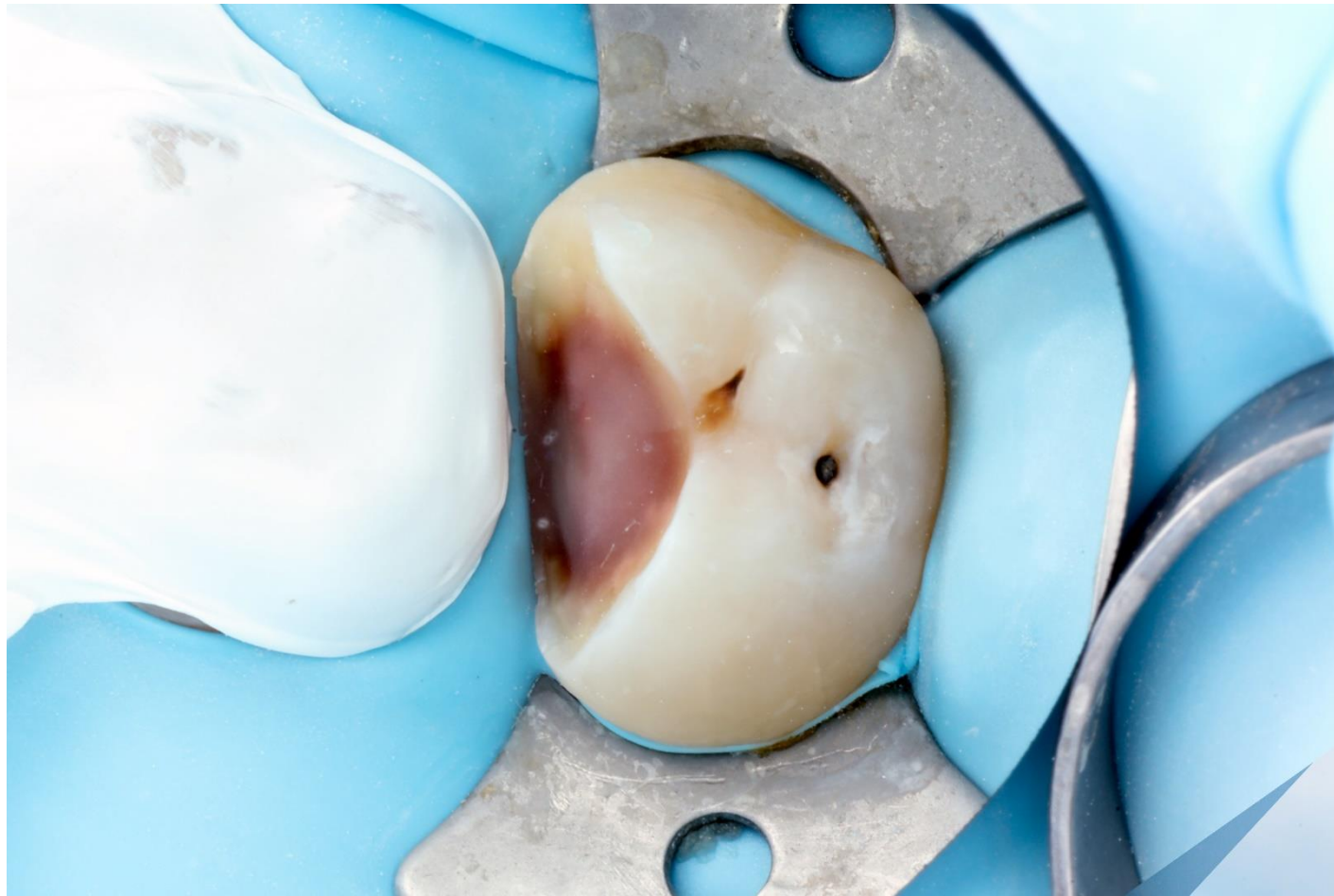
Once the assistant has received the plans and the dentist has approved them, the print file can be sent to the Voxeltex M4 dental 3D printer with the click of a button, and the restoration can be made from Class IIa biocompatible material in 30 minutes.



The finished inlay, 3D printed to replicate the exact original shape of the cusps removed during treatment. Post-processing work include glazing and the application of fissure tint.



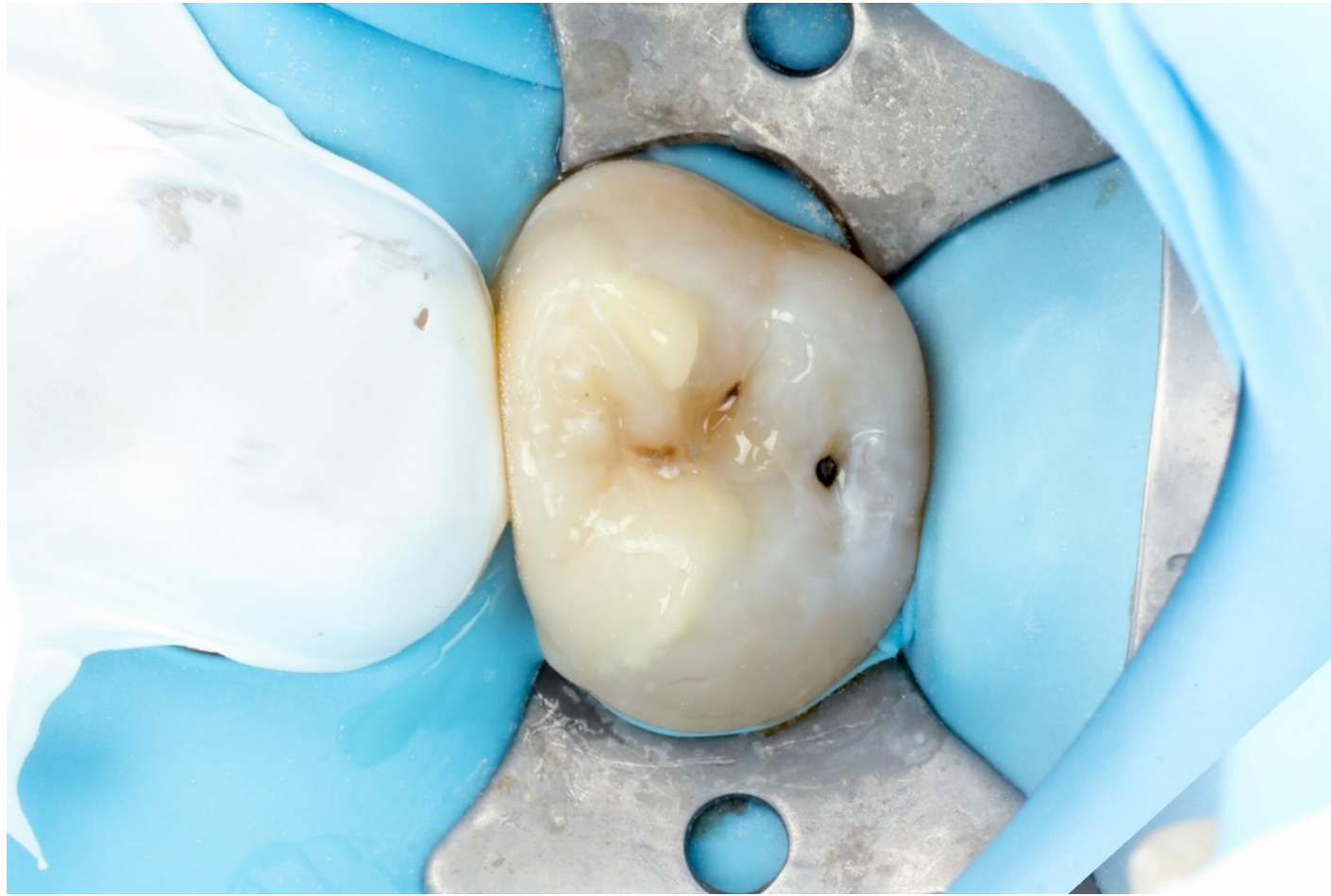
The inlay placed on an instrument to facilitate insertion. A composite layer is applied, which contains short glass fibres that give the inlay extra strength and also some elasticity preventing later cracks potentially caused by accidents to stop before reaching the dentin tissues. (an innovation by Dr. Péter Farkas, generally the adhesive is a preheated composite material).



Before cementation the cavity is sandblasted to promote the best adhesion possible.



Adhesive layer (component 2) applied onto the cavity. Both ends of the molecules of component 2 are hydrophobic, creating a strong bond between the primer and the fibreglass-reinforced composite applied on the inlay.



The inlay fixed in place, note the excess adhesive at the joint.



The end result. Excess adhesive was removed and the tooth illuminated from all sides with UV light.



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