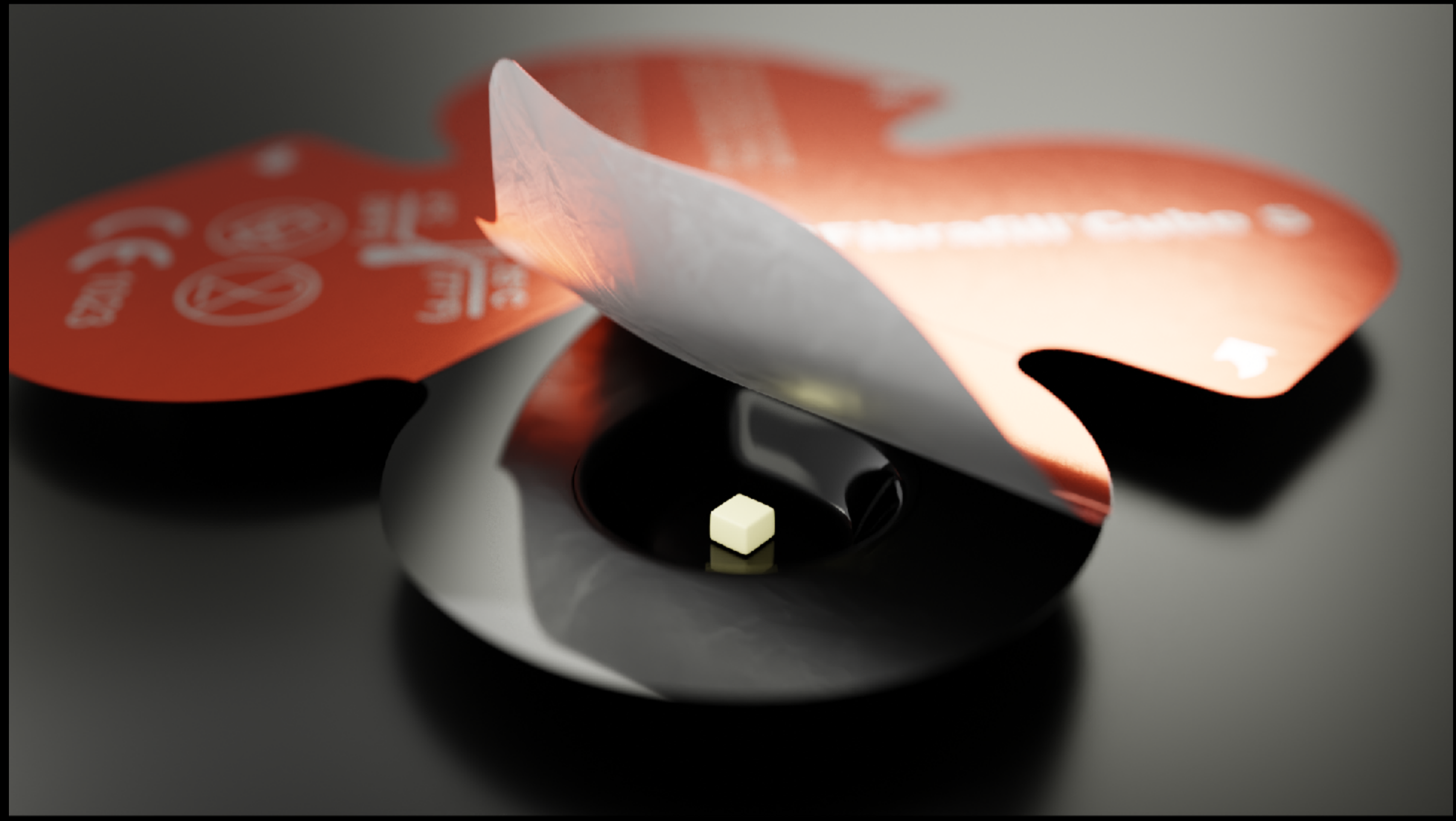
Fibrafill® **CUBE**



Difficulties related to large restorations

Complex structure of dental tissues, including enamel, dentin, cementum and pulp, is characterized by unique mechanical properties.

Clinical success of large-scale restorations depends mostly on the structure of remaining tooth and the choice of materials and their placement to mimic the original structure.

Large-scale restorations

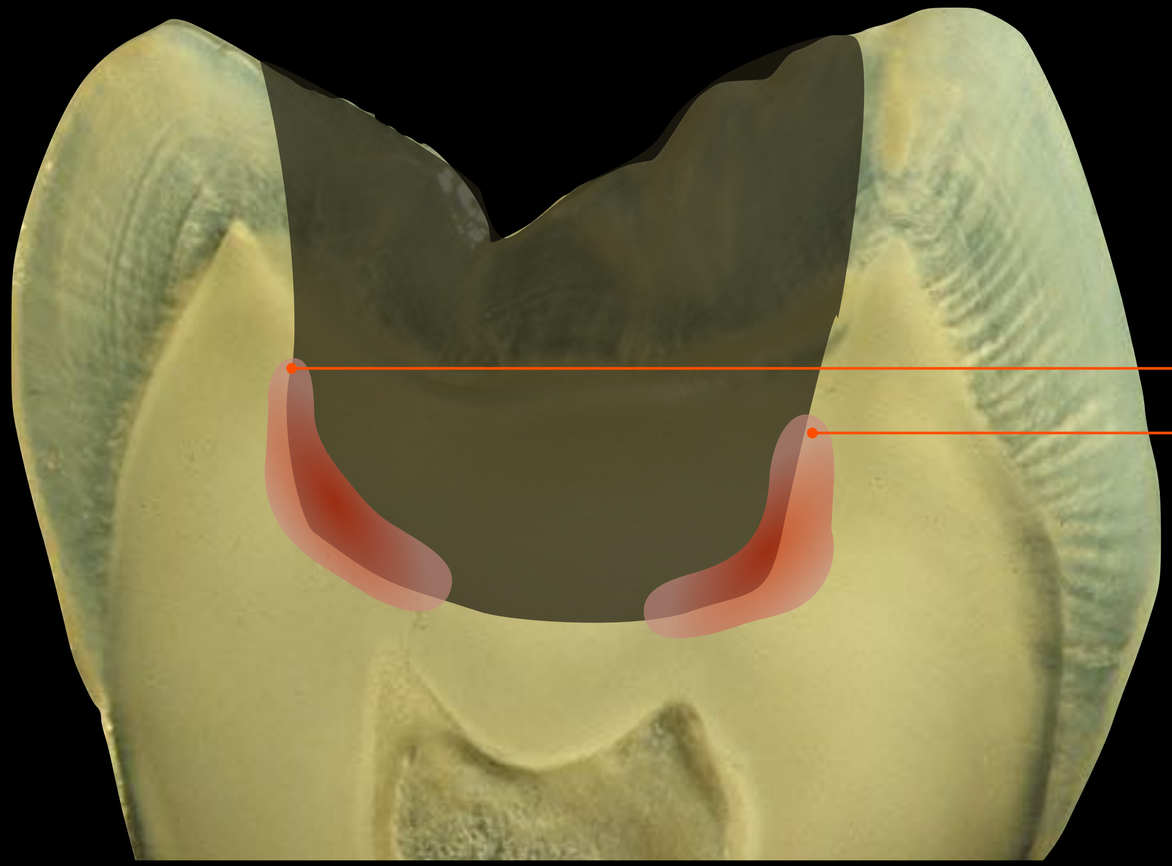
What is the main reason for failure?

Load bearing capacity of remaining tissues, adhesive joint or the filling material is exceeded due to stress concentration.

Biomechanics of large-scale restoration failure

Large restoration is prone to stress concentration and subsequent failure

Biomechanics of large-scale restoration failure

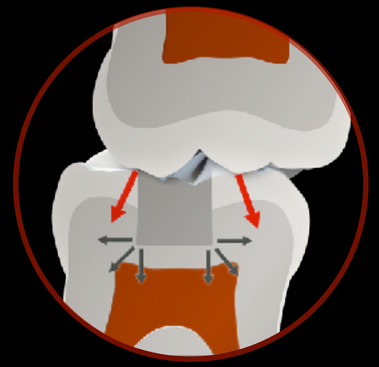


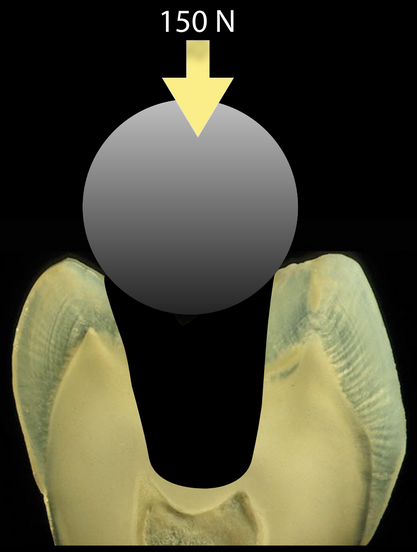
Stress concentration zones in the cavity

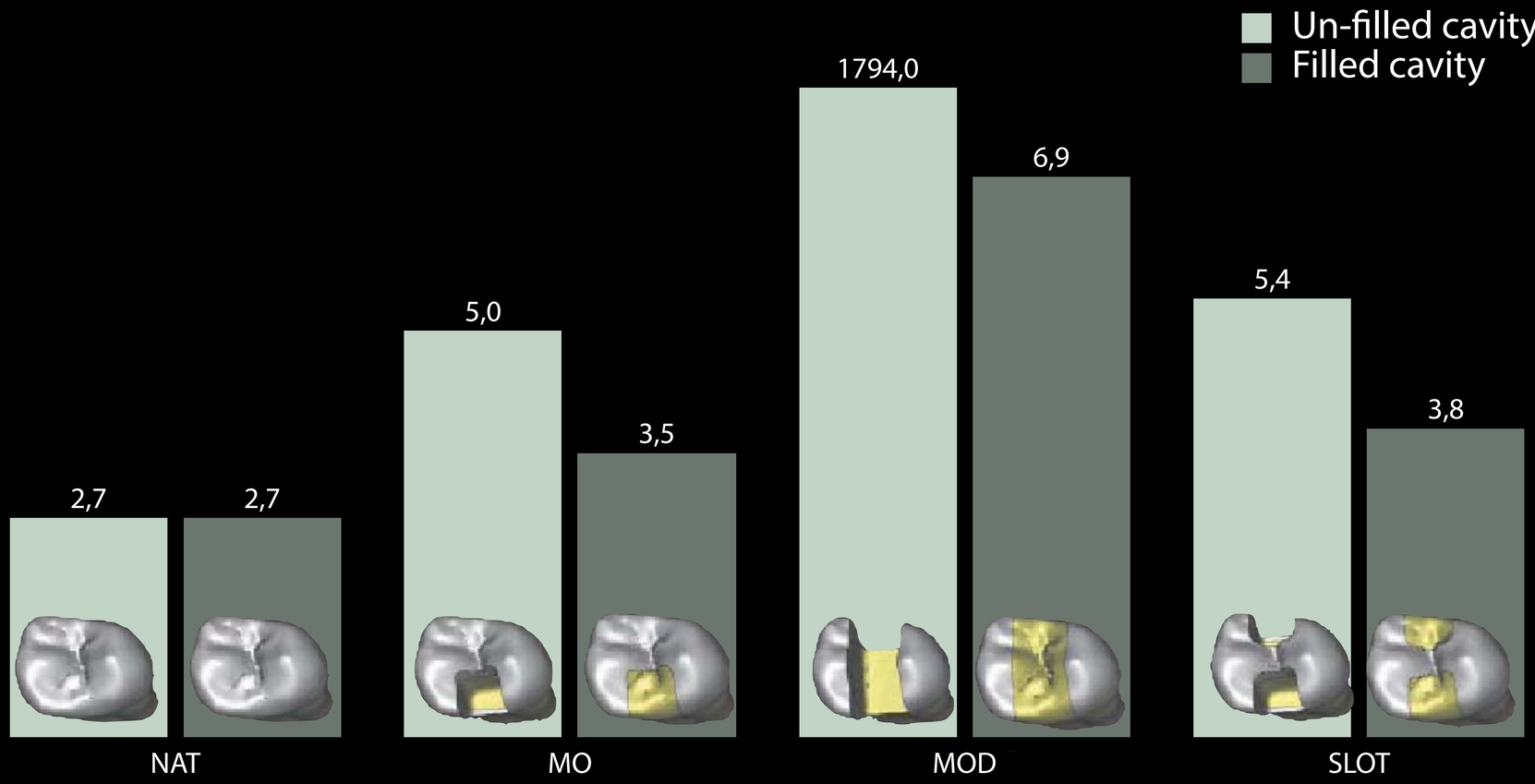
“Shrinkage stress peaks were mainly located marginally along the enamel-restoration interface at occlusal and mesiodistal sites. However, at the internal dentinal walls, stress distributions were critical with the highest maximum stresses concentrated in the proximal boxes” *(Ausiello P. et al.: Mechanical behavior of bulk direct composite versus block composite and lithium disilicate indirect Class II restorations by CAD-FEM modeling in Dental Materials, 33. https://doi.org/10.1016/*

Biomechanics of large-scale restoration failure

Cusp deflection



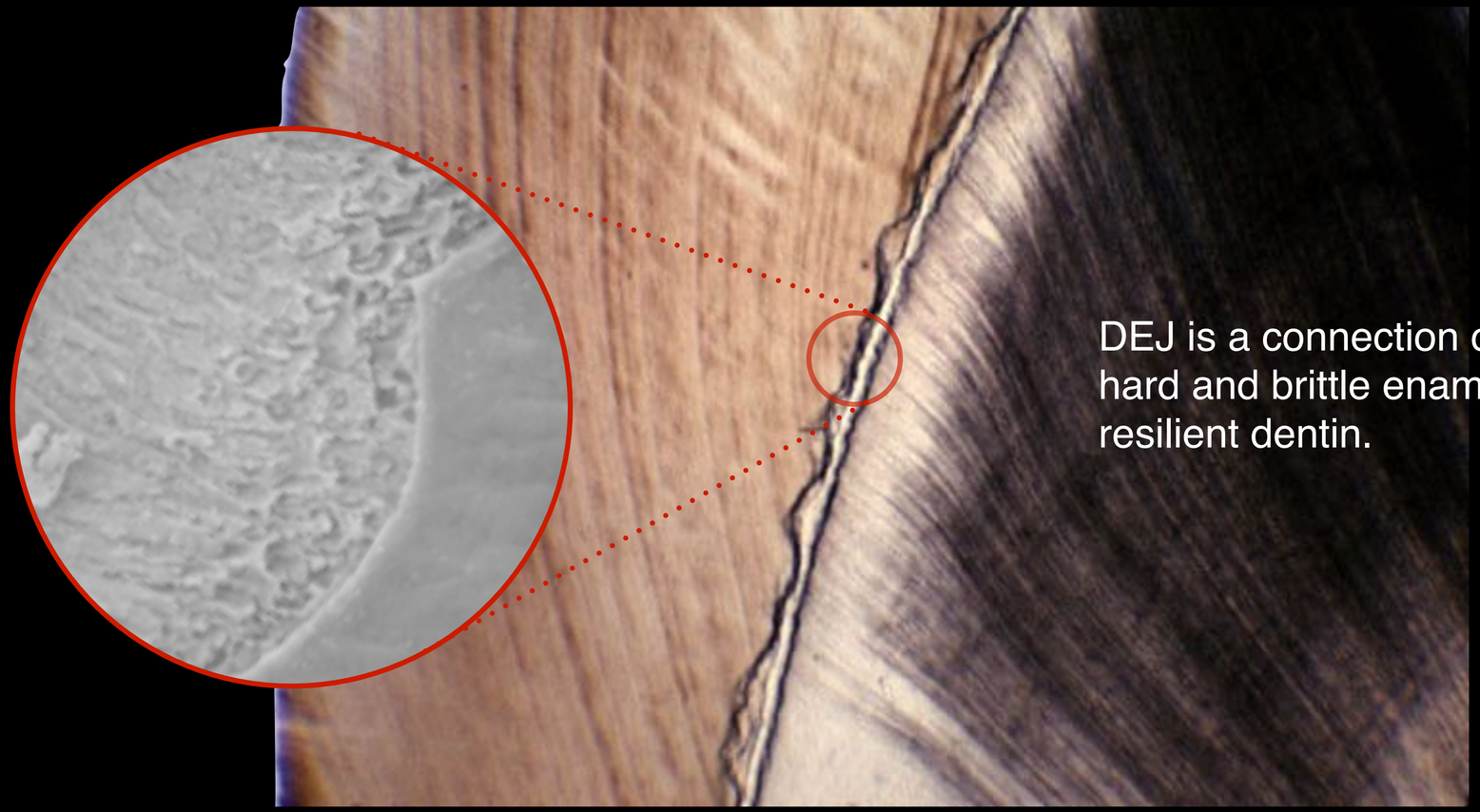




Pascal Magne: CT Scan–Based Finite Element Analysis of Premolar Cuspal Deflection Following Operative Procedures, The International Journal of Periodontics & Restorative Dentistry, Volume 29, Number 4, 2009

The natural approach

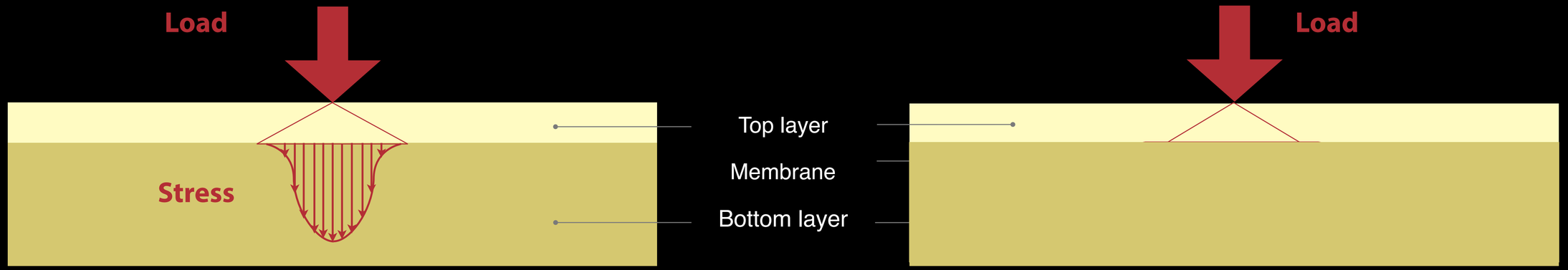
The tooth responds to stress as a graded material, DEJ distributes the stress across a larger zone and prevents the development and propagation of cracks to dentin.



DEJ is a connection of two different tissues: hard and brittle enamel and soft and resilient dentin.

Biomimetic solution

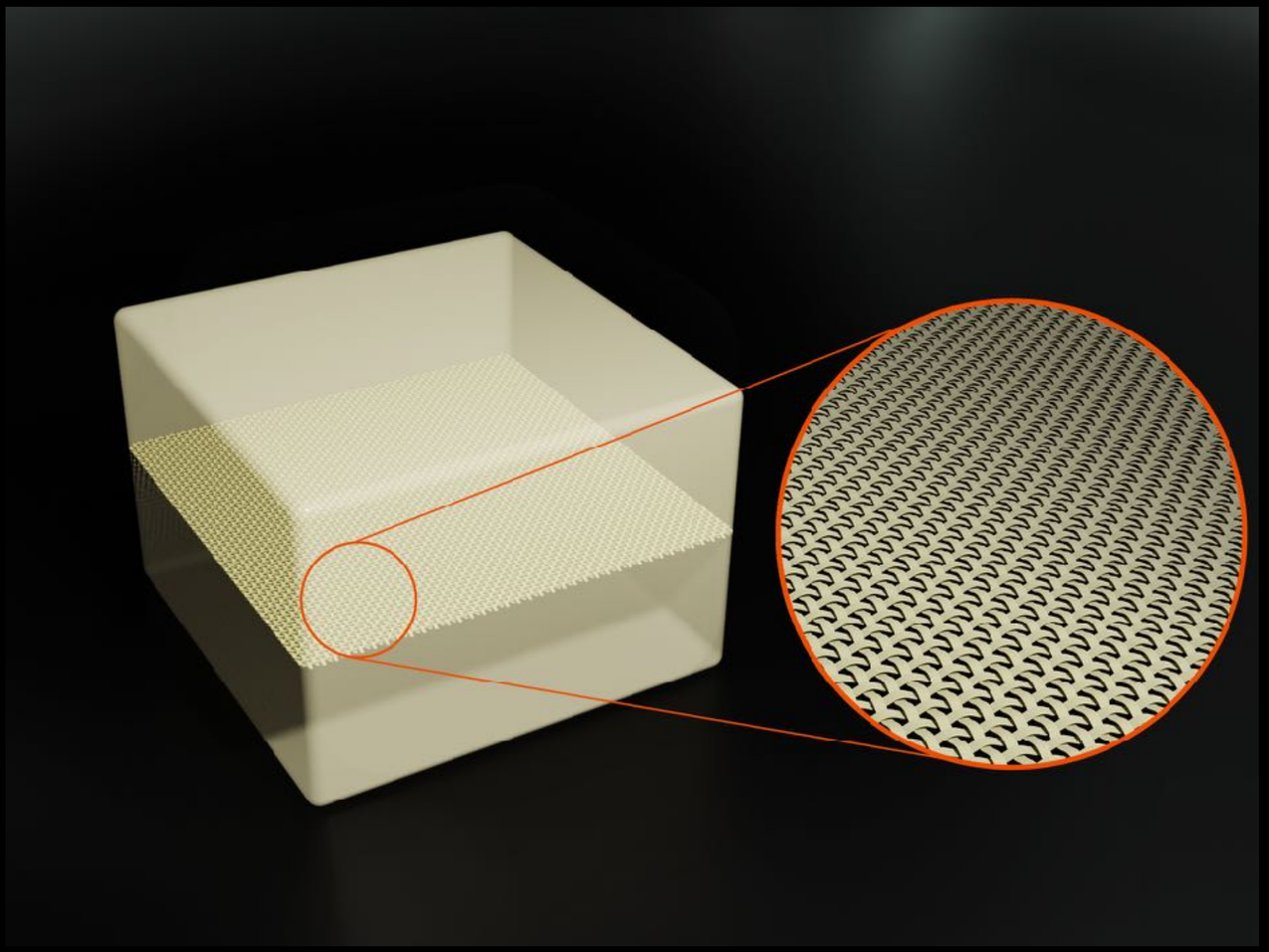
Reinforcing membrane distributes stress across larger zone



Stress distribution without membrane

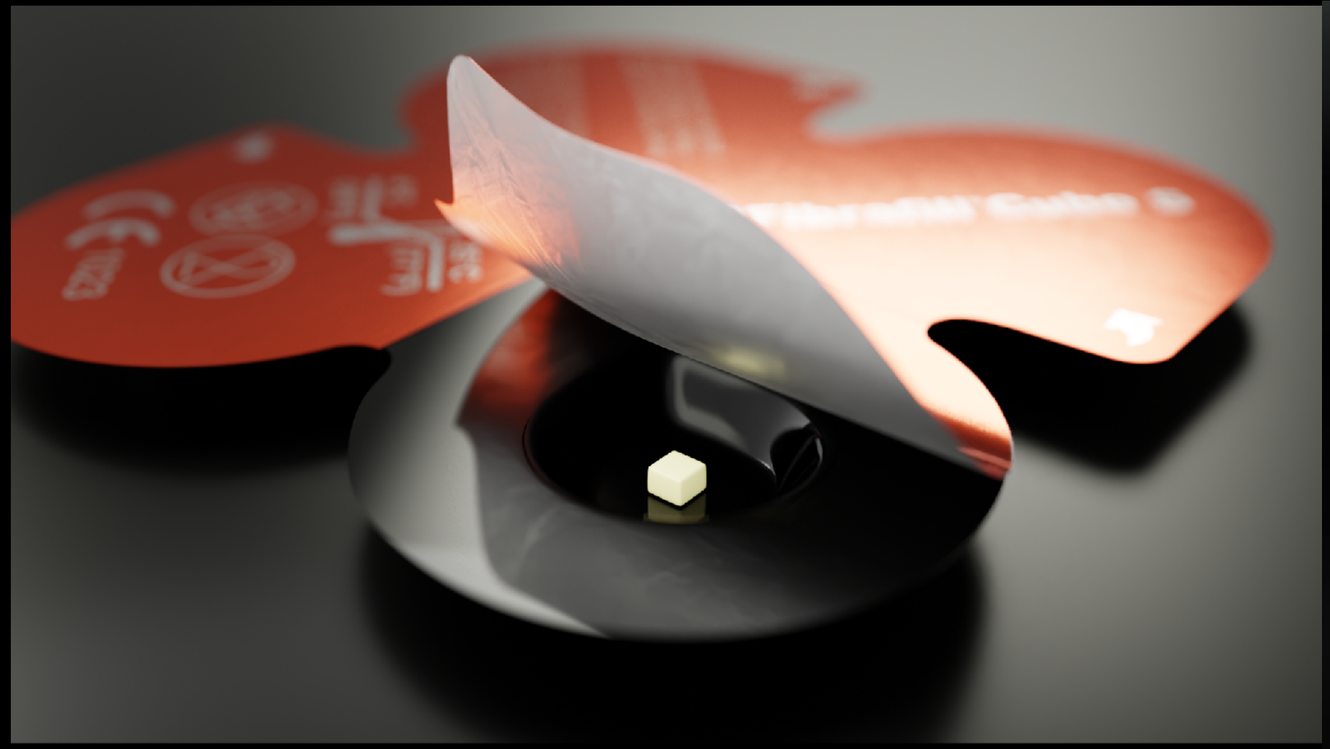
Stress distribution with membrane

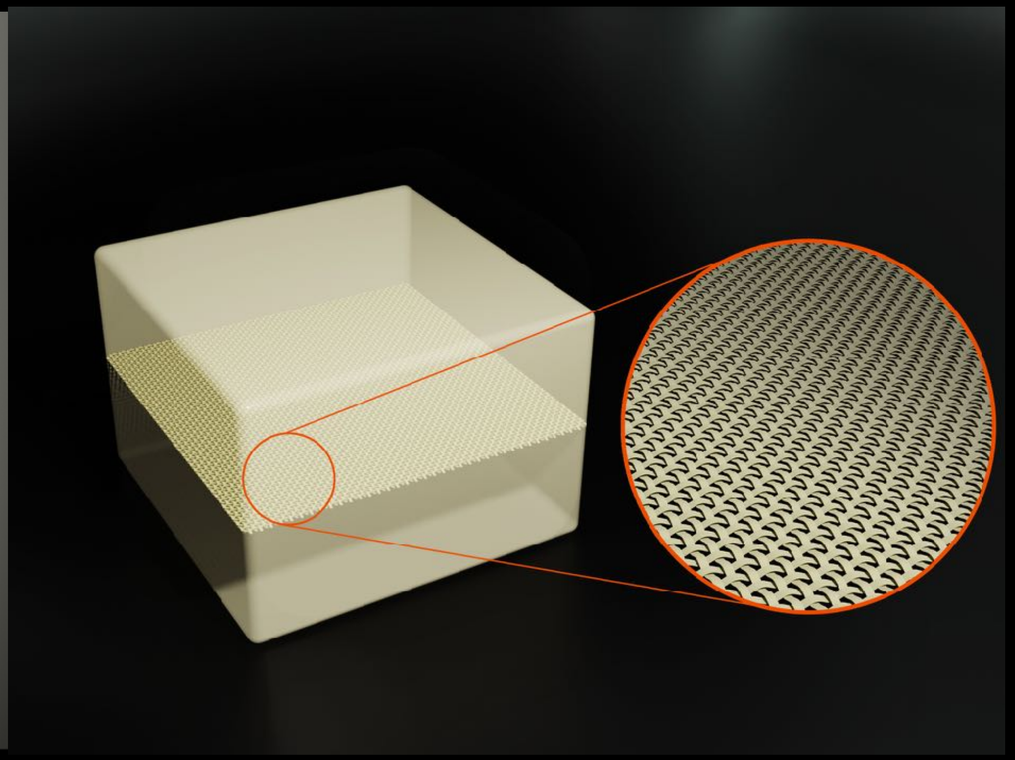
Fibrafill® **CUBE**



- The only resin composite with integrated continuous membrane which distributes stress and mimics the function of dentinoenamel junction (DEJ).
- Extends possibilities for large restorations and build-ups of endodontically treated teeth with severe loss of hard dental tissues.
- Ideal for dentin replacement in large posterior applications (pre-endodontic and post-endodontic build-ups and fillings).

Fibrafill® **CUBE**



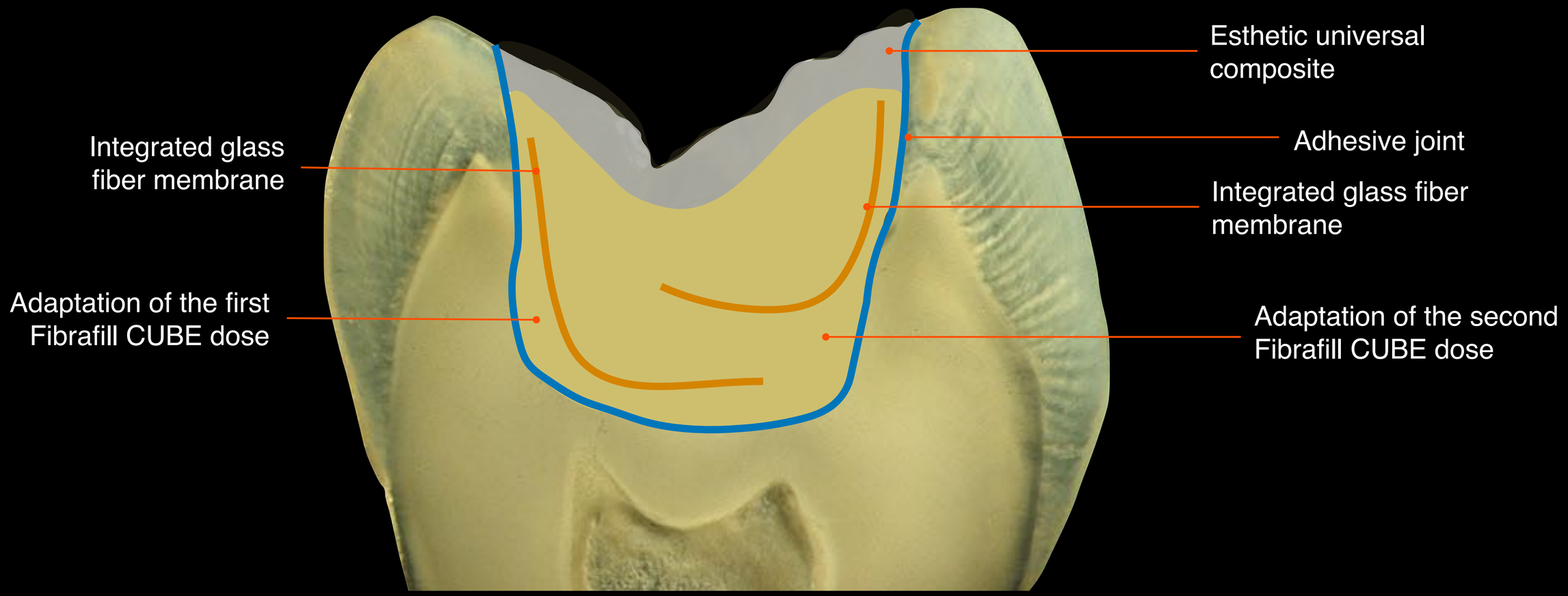


Individually-packed application doses

Adaptation of Fibrafill® **CUBE**

Easy adaptation of Fibrafill® **CUBE**

Fibrafill® **CUBE application principles**

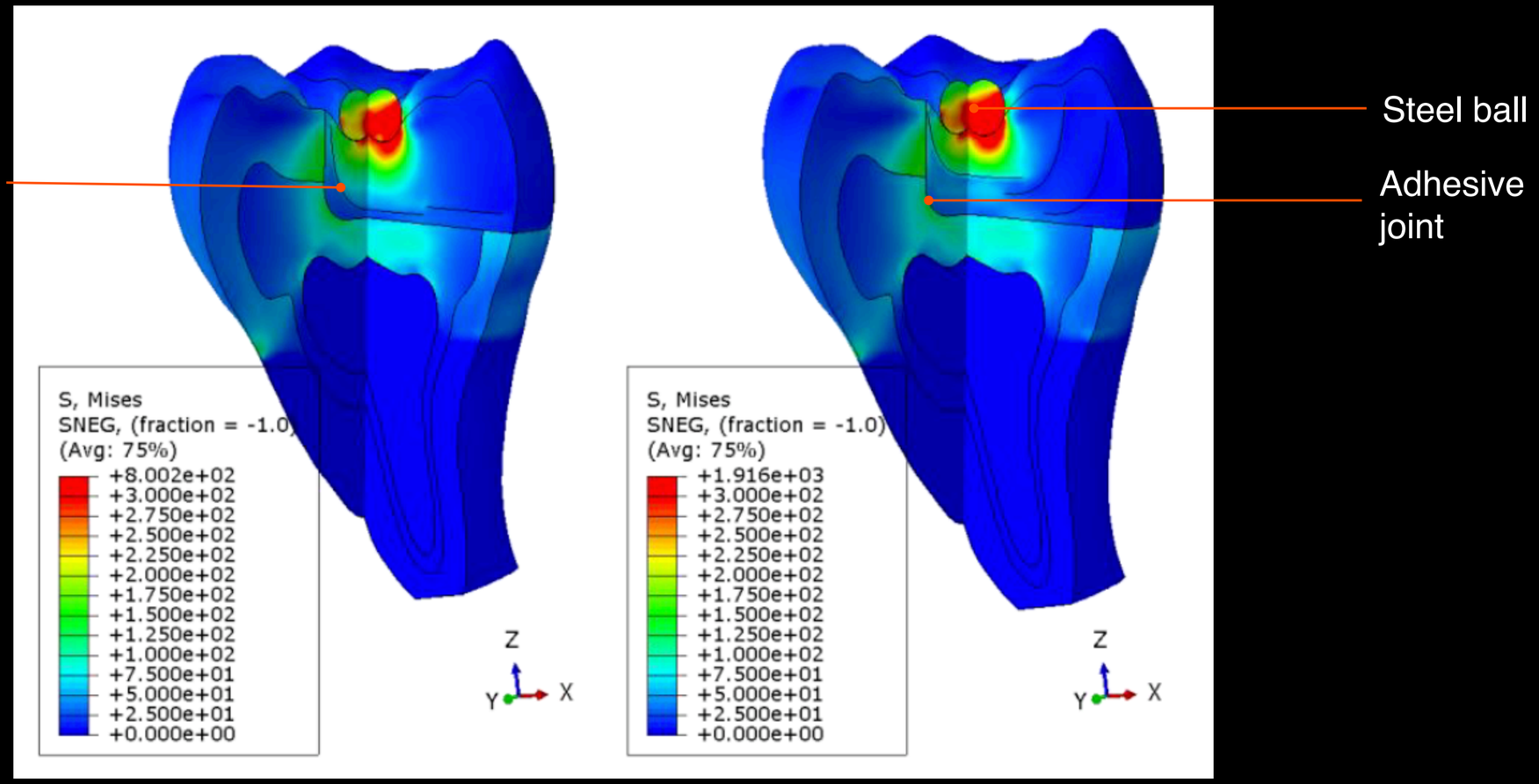


Layering of Fibrafill® CUBE units with reinforcing membrane – distributing the stresses along the bottom and walls of the cavity

Fibrafill® **CUBE application principles**

Incremental adaptation of individual Fibrafill® CUBE units along the bottom-wall curvature of the cavity

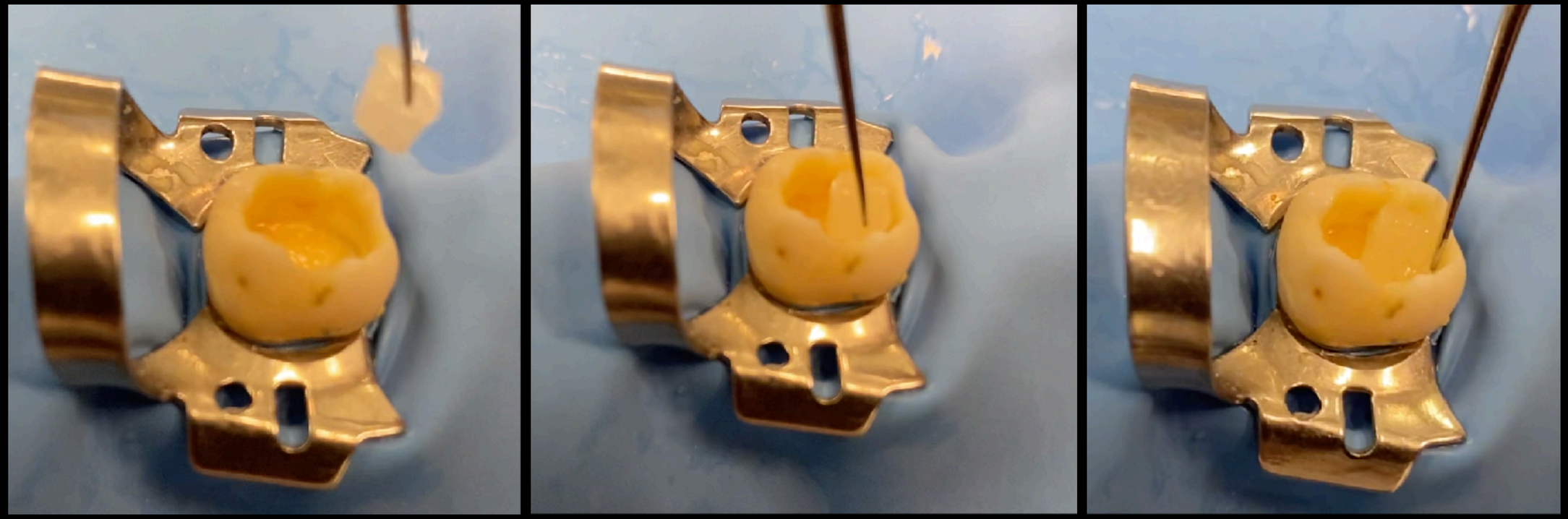
Fibrafill® **CUBE application principles**



Magnitude and distribution of stress [MPa] in model cavity (FEA, loading by steel ball ⌀ 2 mm). Integrated membrane helps to dissipate stress generated by static loading and reduces the shear stress in the adhesive joint, improving the marginal integrity of the filling. *Associate Professor Zdenek Horak, Ph.D., the college of polytechnics, Jihlava, Czech Republic*

Case report – Fibrafill® **CUBE**

Clinical protocol by MDDr. Tomas Slavicek, Brno, Czech Republic



Courtesy MDDr. Tomáš Slavíček,
Brno, Czech Republic

Adaptation of Fibrafill® CUBE along the bottom-wall curvature of the cavity.

Case report – Fibrafill® **CUBE**

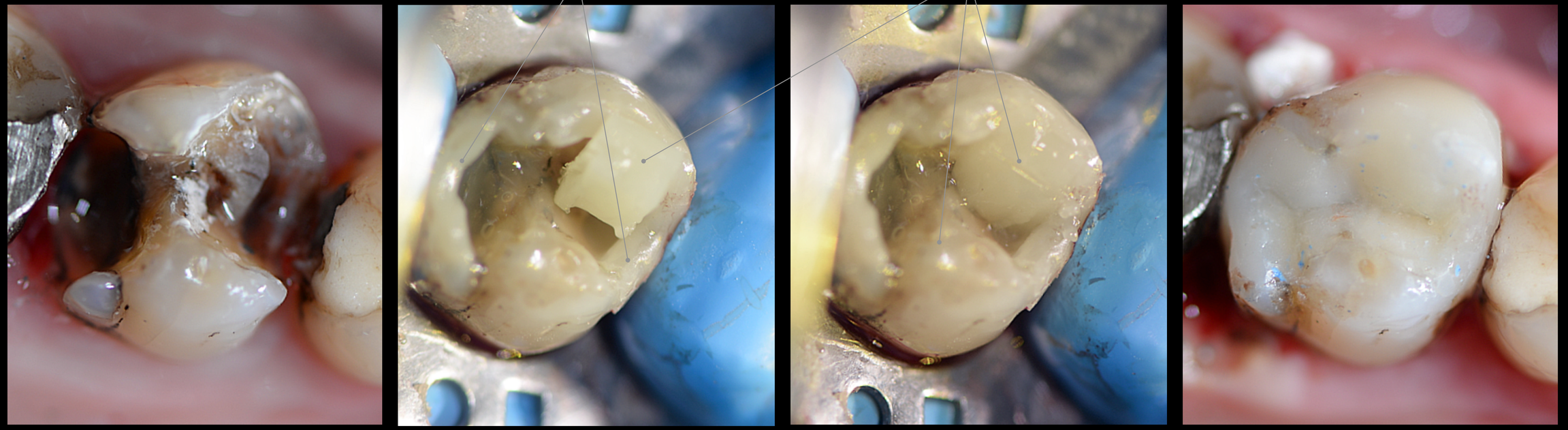
Clinical protocol by MDDr. Tomas Slavicek, Brno, Czech Republic

Initial situation

Reconstruction of approximal walls (transformation to first-class cavity)

Fibrafill® CUBE units adapted along the bottom-wall curvature of the cavity.

Final restoration



Courtesy MDDr. Tomáš Slavíček, Brno, Czech Republic

Restoration of large MOD cavity.

Case report – Fibrafill® **CUBE**

Clinical protocol by MDDr. Tomas Slavicek, Brno, Czech Republic

Initial situation (old amalgam filling removal)

Reconstruction of approximal wall (transformation to first-class cavity)

Fibrafill® CUBE units adapted along the bottom-wall curvature of

Final restoration

Courtesy MDDr. Tomáš Slavíček, Brno, Czech Republic

Restoration of large MO cavity.

Case report – Fibrafill® **CUBE**

Clinical protocol by MDDr. Tomas Slavicek, Brno, Czech Republic

Initial situation (old filling removed due to the progression of secondary caries)

Reconstruction of approximal wall (transformation to first-class cavity)

Insertion and adaptation of Fibrafill® CUBE units along the bottom-wall curvature of the cavity.

Final restoration

Courtesy MDDr. Tomáš Slavíček, Brno, Czech Republic

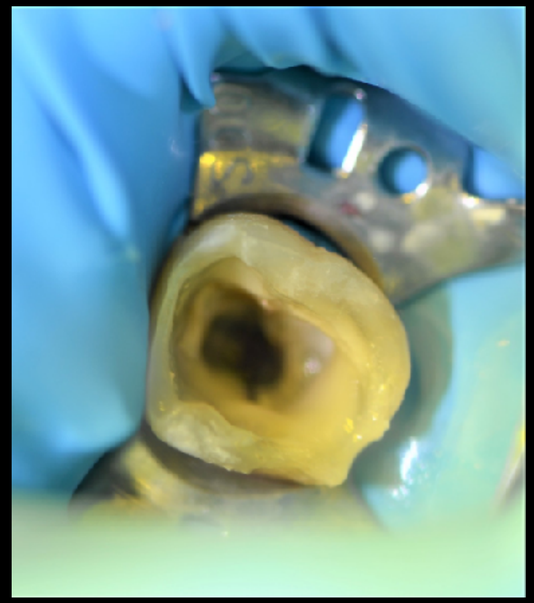
Restoration of large MO cavity.

Case report – Fibrafill® **CUBE**

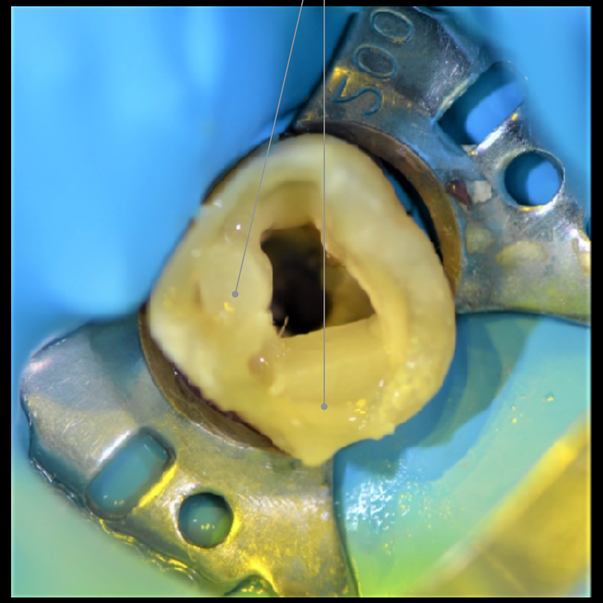
Clinical protocol by MDDr. Tomas Slavicek, Brno, Czech Republic

Initial situation (endodontically treated tooth)

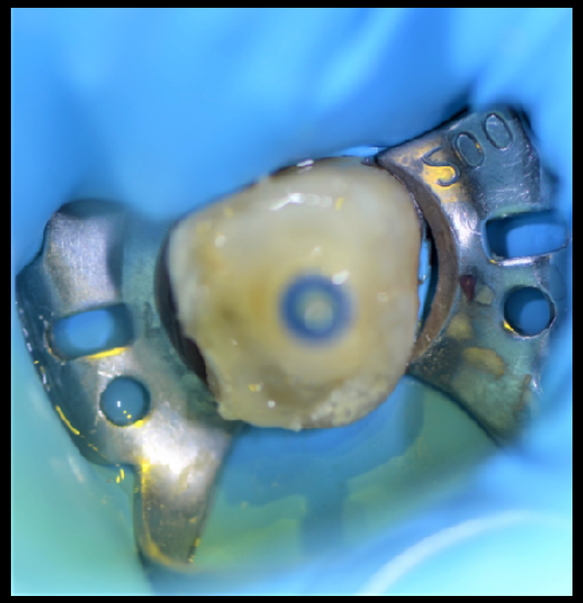
Moisture management, cleaning of cavity, application of flowable liner etc.



Application and adaptation of Fibrafill® CUBE (support of weakened walls)



Insertion of FRC post, followed by prosthetics



Courtesy MDDr. Tomáš Slavíček, Brno, Czech Republic

Post-endo reconstruction

Case report – Fibrafill® **CUBE**

Clinical protocol by MDDr. Tomas Slavicek, Brno, Czech Republic

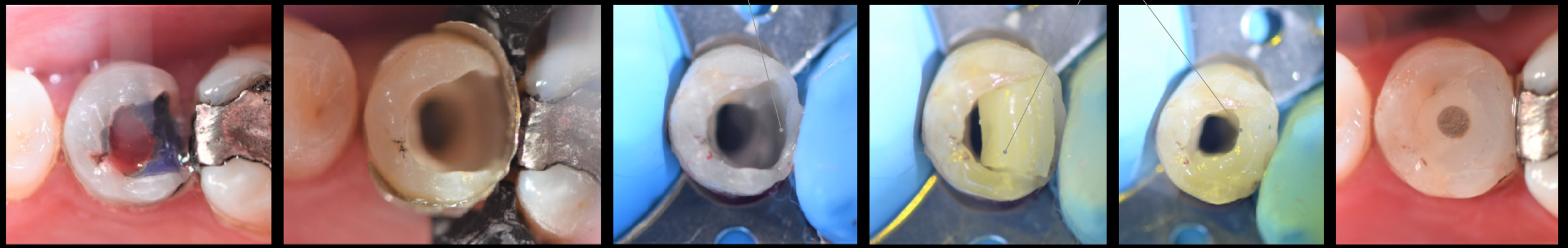
Initial situation

Excavation of carious lesions, application of matrix

Reconstruction of approximal wall

Application and adaptation of Fibrafill® CUBE (support of reconstructed approximal)

Insertion of FRC post, followed by prosthetics



Courtesy MDDr. Tomáš Slavíček, Brno, Czech Republic

Post-endo reconstruction

Case report – Fibrafill® **CUBE**

Clinical protocol by MDDr. Tomas Slavicek, Brno, Czech Republic

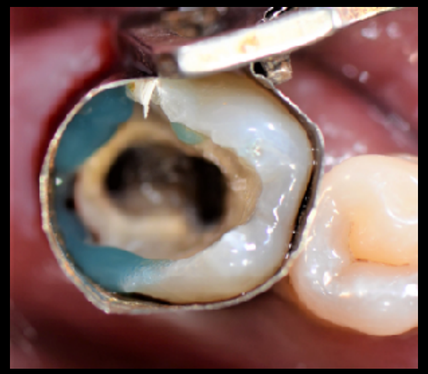
Initial situation

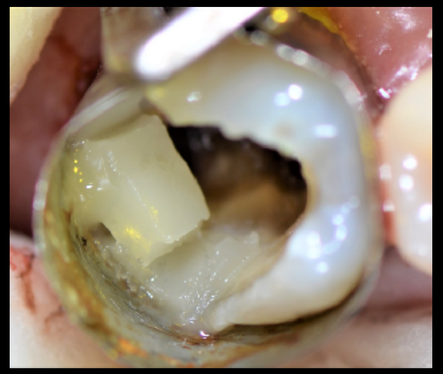
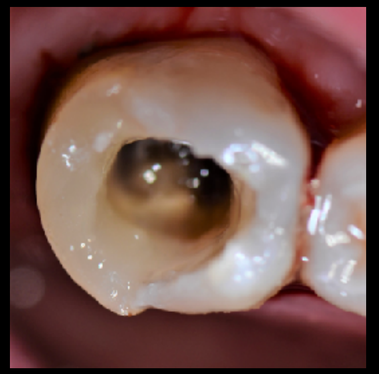
Excavation of carious lesions, cleaning, application of circular matrix

Appplication of flowable liner, insertion and adaptation of Fibrafill® CUBE along the bottom-wall curvature

Finishing by flowable composite, RCTR and indirect prosthetics



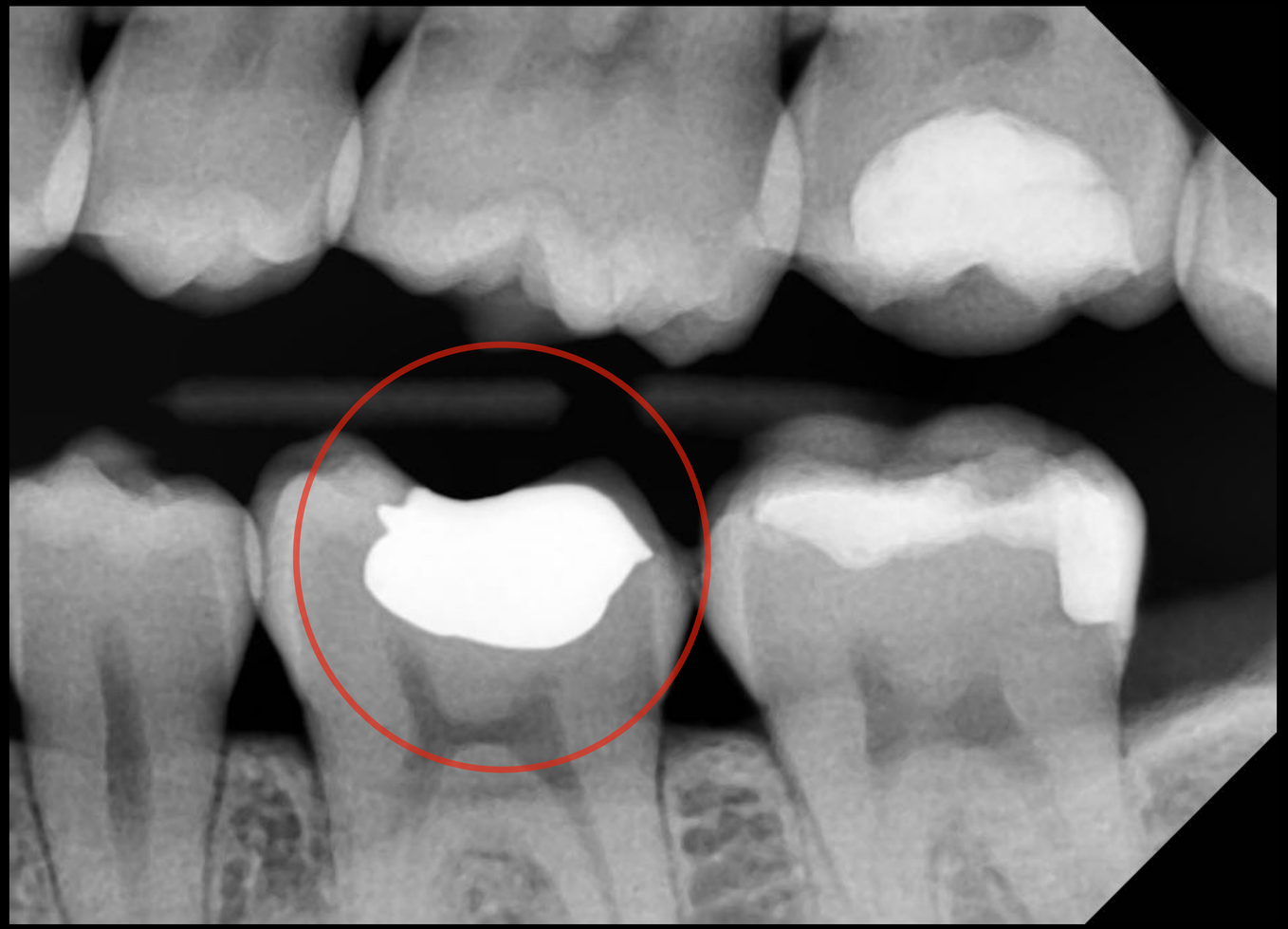


Courtesy MDDr. Tomáš Slavíček, Brno, Czech Republic

Pre-endo reconstruction

Case report – Fibrafill® **CUBE**



RTG contrast

Fibrafill® **CUBE**

The full package includes 36 application doses (cubes) in 9 blisters

Fibrafill® **CUBE**

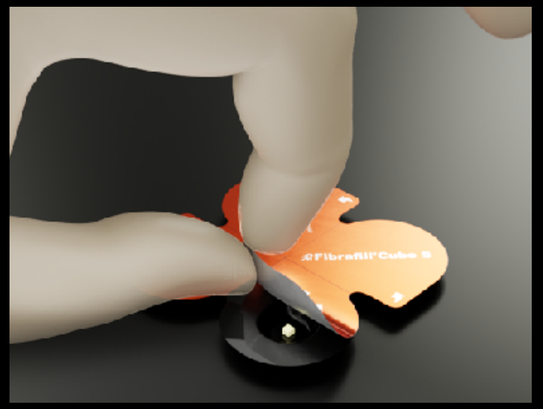
Clinical arguments:

- Distribution of stress, integrated membrane prevents stress concentration (mimics the function of dentinoenamel junction of intact tooth).
- Reduced risk of crack development and propagation through the interface between restorative material and remaining dental tissues.
- Reduced risk of severe failure of remaining hard dental tissues.
- Increased fracture toughness of the filling or build-up.
- Easy handling/packability due to optimized viscosity.
- Reduced risk of material contamination due to discrete dosing of individual units.
- Wide range of applications, economy of treatment.

Fibrafill® **CUBE:** workflow

Cavity preparation, etching, bonding

Fibrafill® **CUBE:** workflow

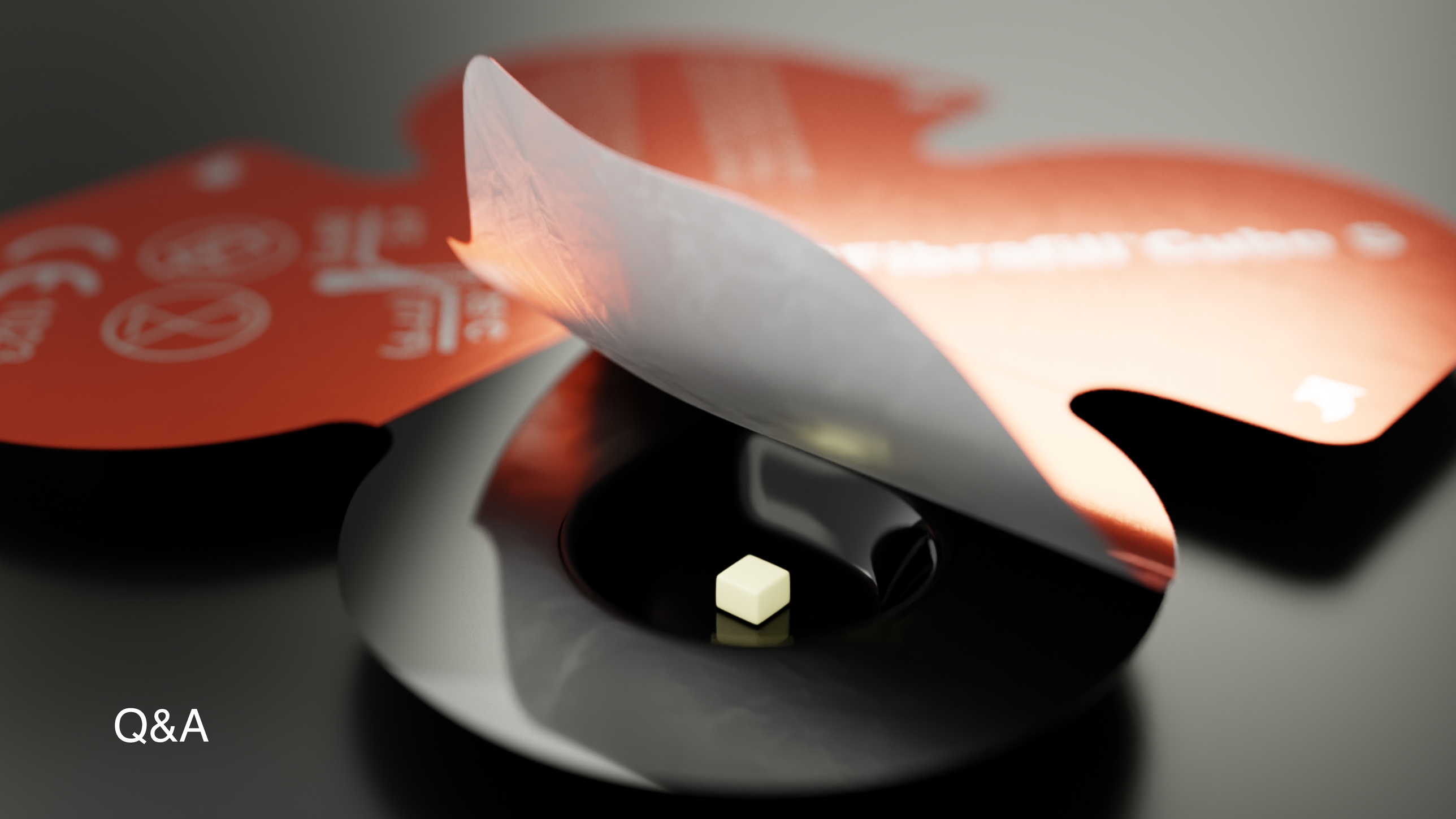


Manipulation with application doses

Fibrafill® **CUBE:** workflow

Adaption of individual doses in the cavity. The number of doses used depends on the size of the cavity. Application of layer of a standard composite (the composite should create 1–2 mm thick layer on the occlusal surface).

Fibrafill® **CUBE:** workflow


Q&A

Coming soon….

Fibrafill® **DENTIN**

Condensable short fibre-reinforced composite (SFRC)

Fibrafill® **FLOW**

Flowable short fibre-reinforced composite (SFRC)