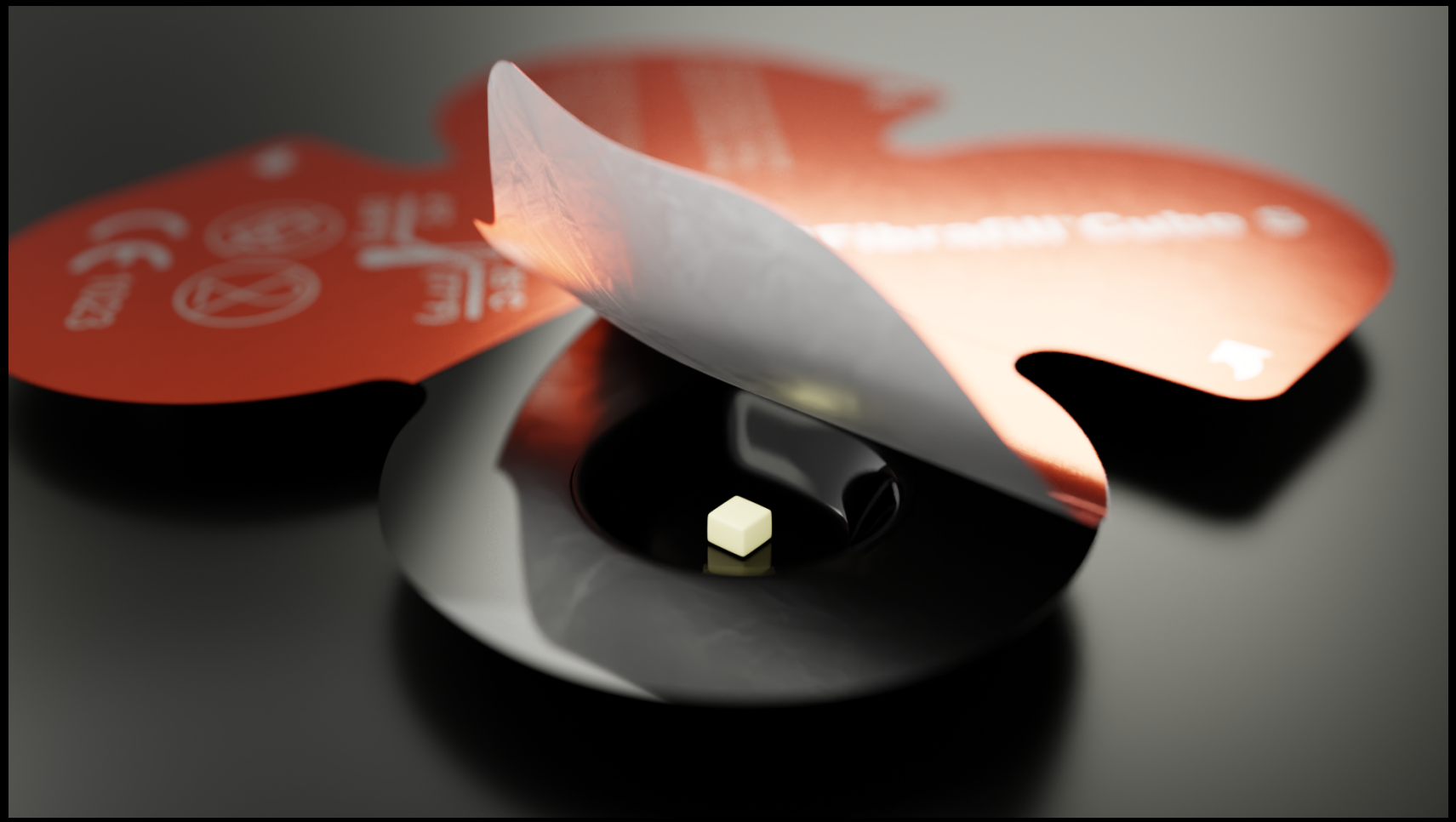
Fibrafill® **CUBE**



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

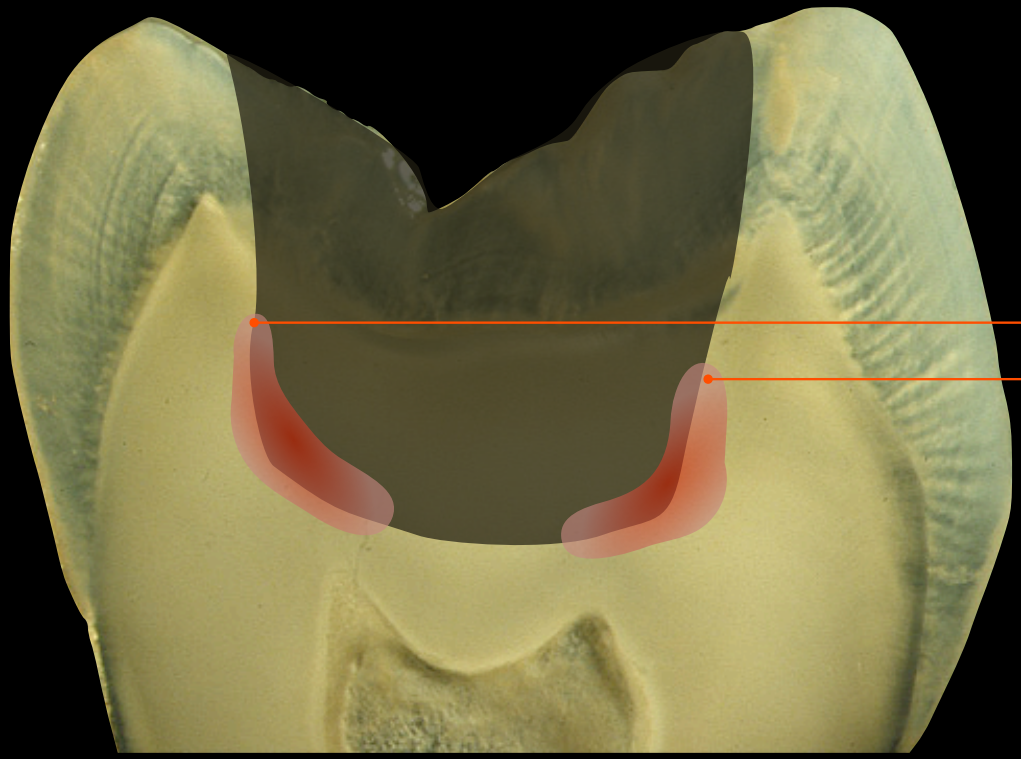
What is the main reason for failure?

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

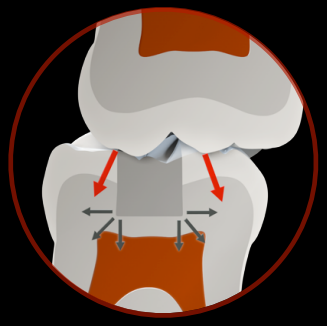


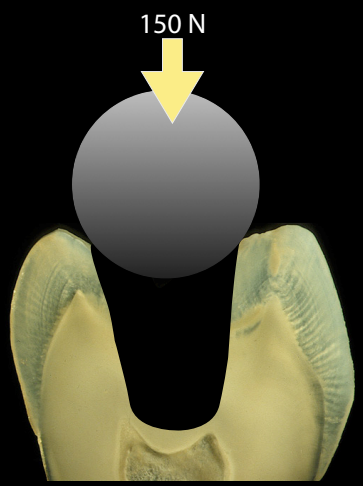
Stress concentration zones in the cavity

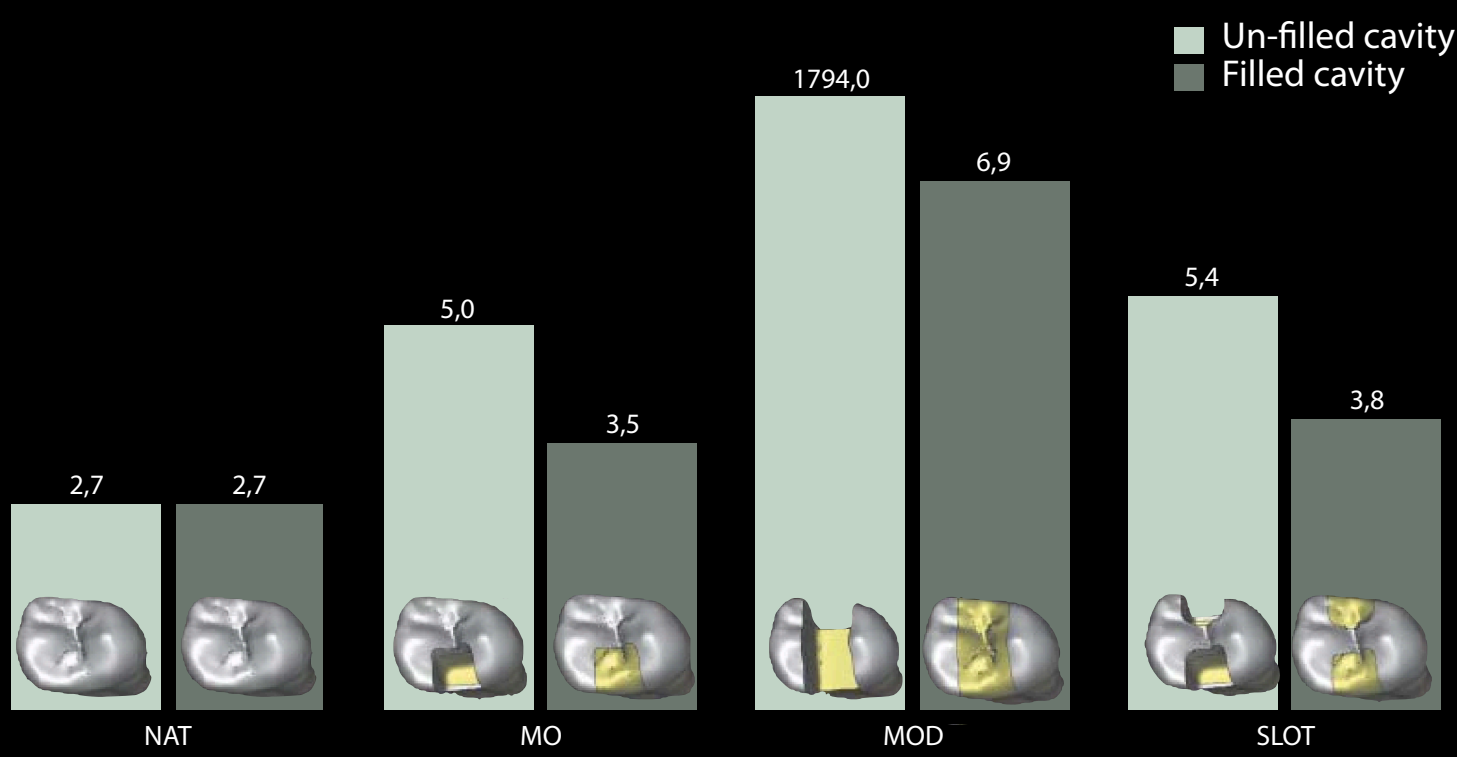
"Shrinkage stress peaks were mainly located marginally along the enamel-restoration interface at occlusal and mesiodistal sites. However, at the internal dentinal walls, stress distributions were critical with the highest maximum stresses concentrated in the proximal boxes" (Ausiello P. et al.: Mechanical 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/j.dental.2017.03.014)

Biomechanics of large-scale restoration failure

Cusp deflection



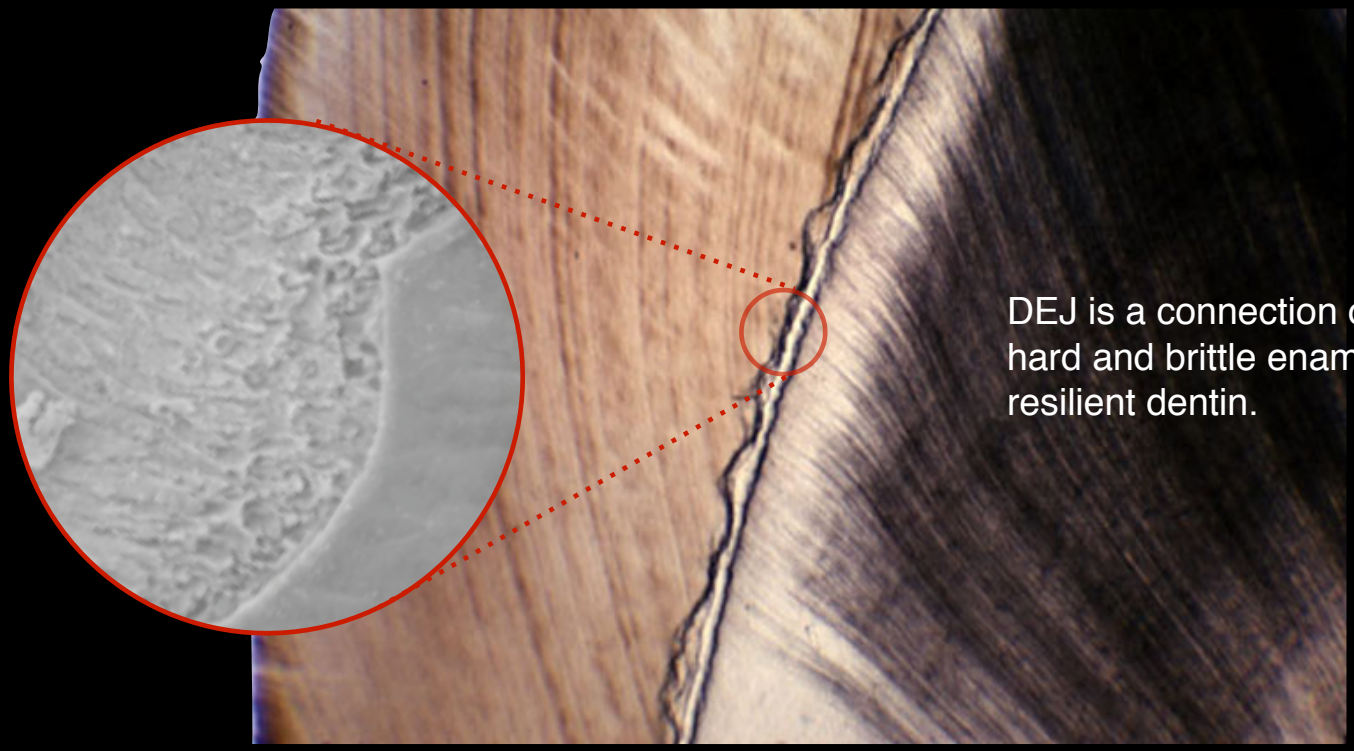




Pascal Magne: CT Scan–Based Finite Element Analysis of Premolar Cuspal Deflection Following Operative Procedures, The International Journal of Periodontics & Restorative Dentistry, Volume 29, Number 4, 2009

The natural approach

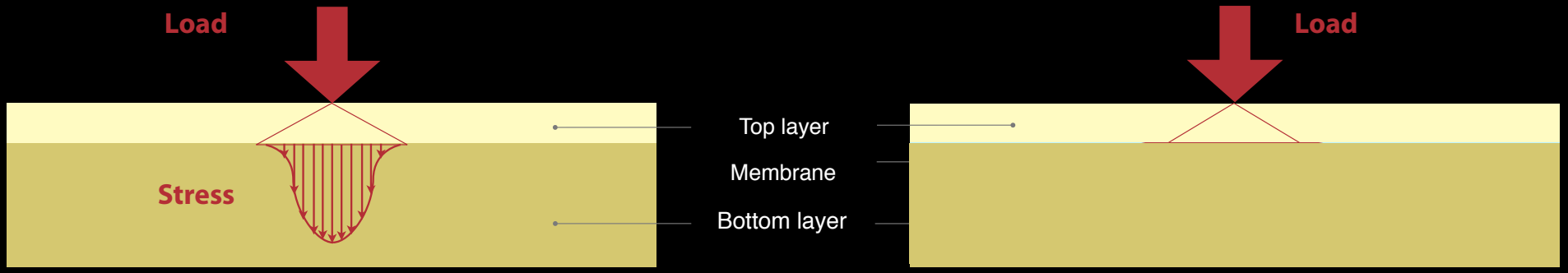
The tooth responds to stress as a graded material, DEJ distributes the stress across a larger zone and prevents the development and propagation of cracks to dentin.



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

Biomimetic solution

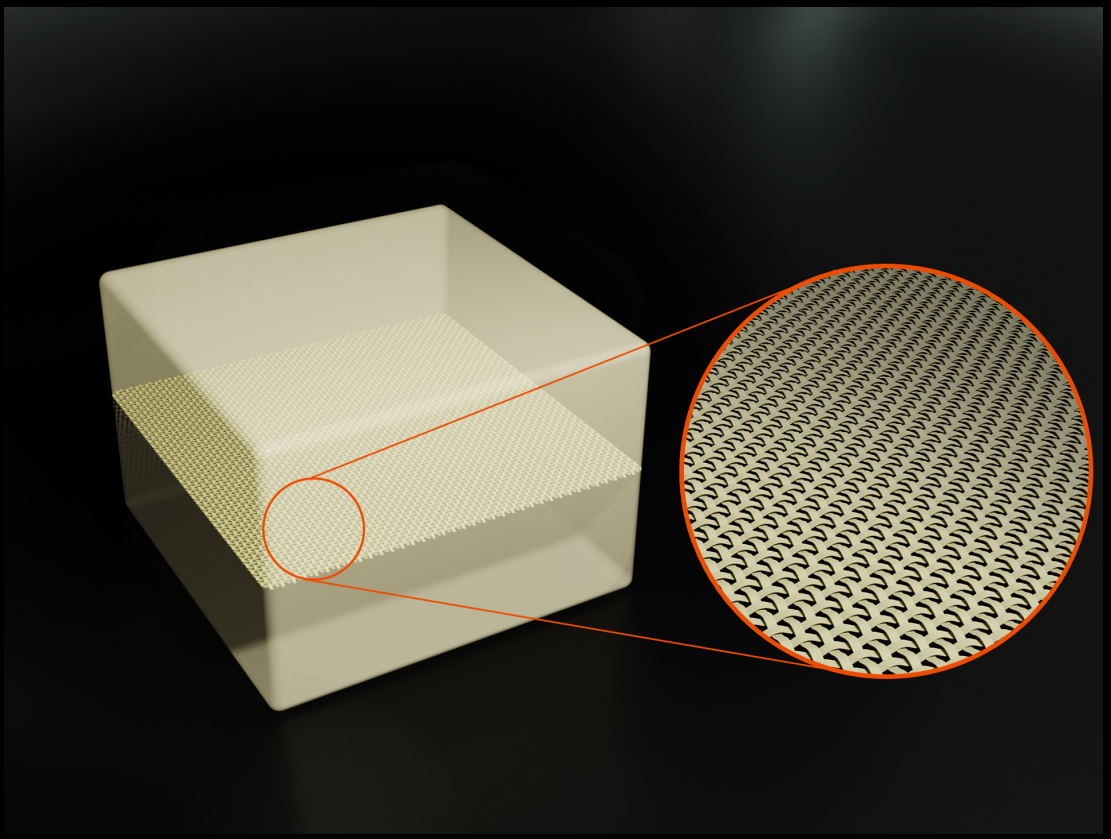
Reinforcing membrane distributes stress across larger zone



Stress distribution without membrane

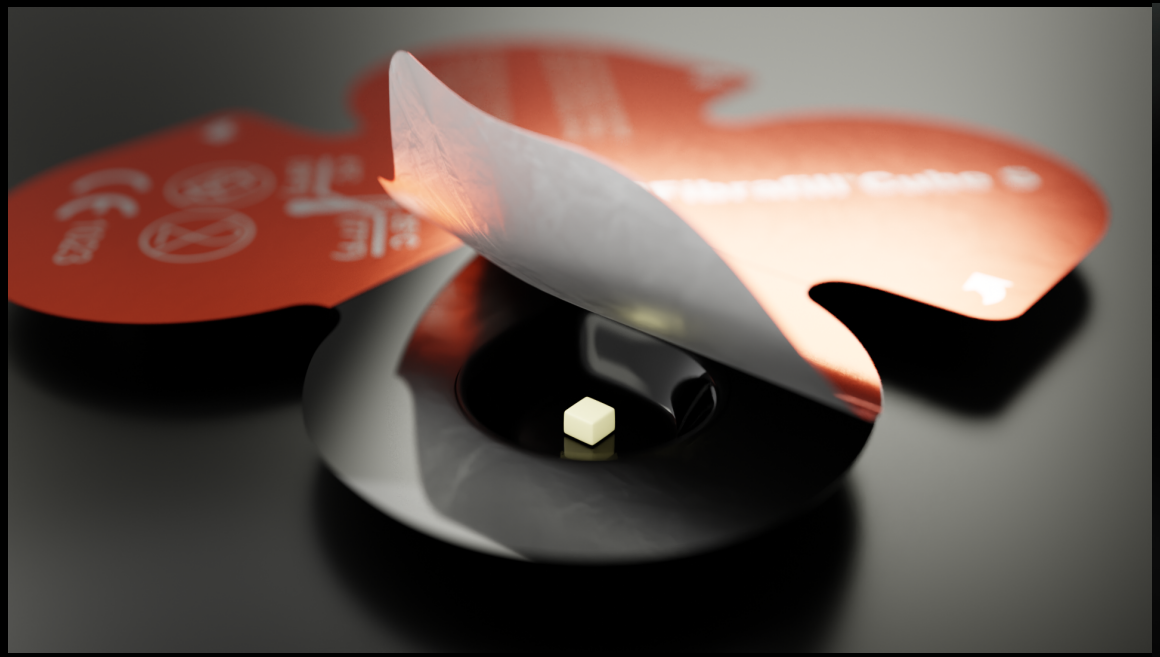
Stress distribution with membrane

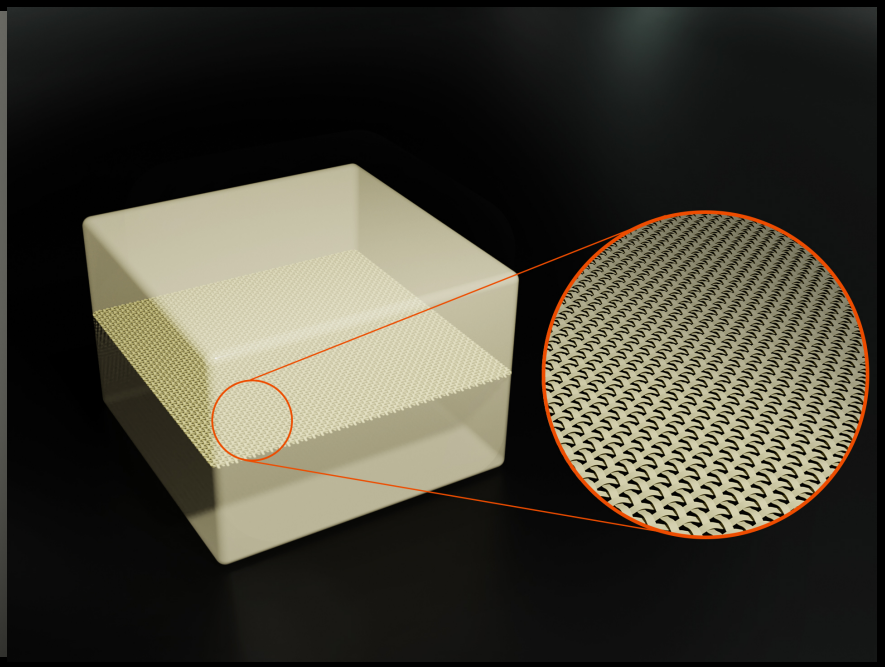
Fibrafill® **CUBE**



- 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**



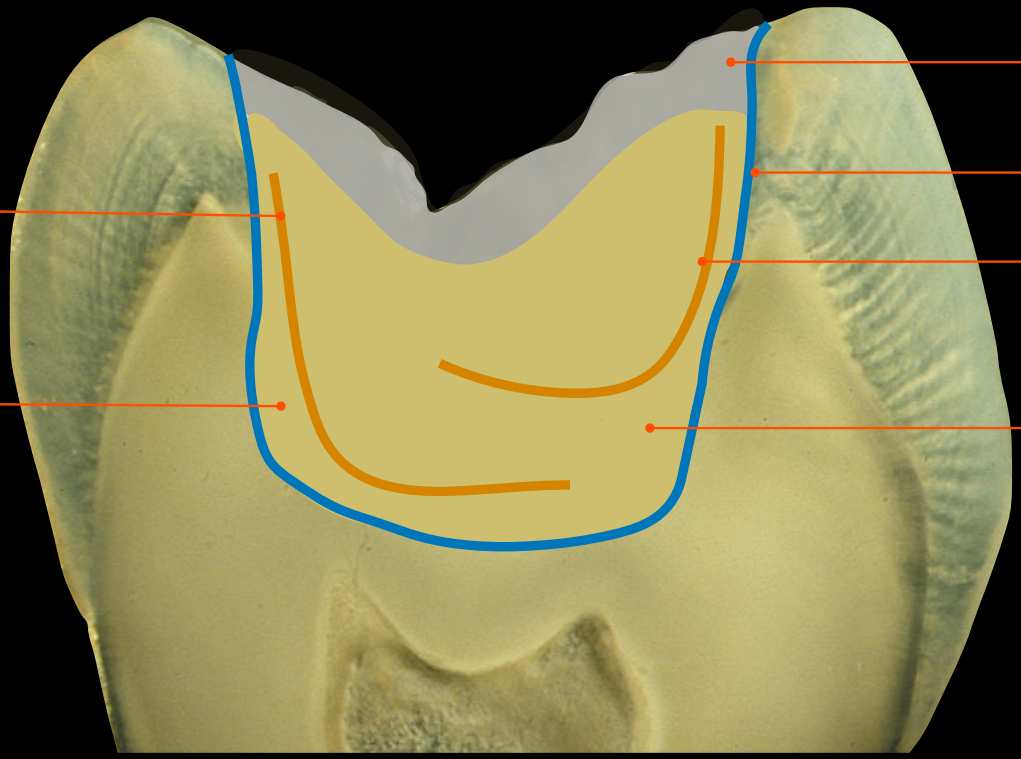


Individually-packed application doses

Adaptation of Fibrafill® **CUBE**

Easy adaptation of Fibrafill® **CUBE**

Fibrafill® **CUBE application principles**

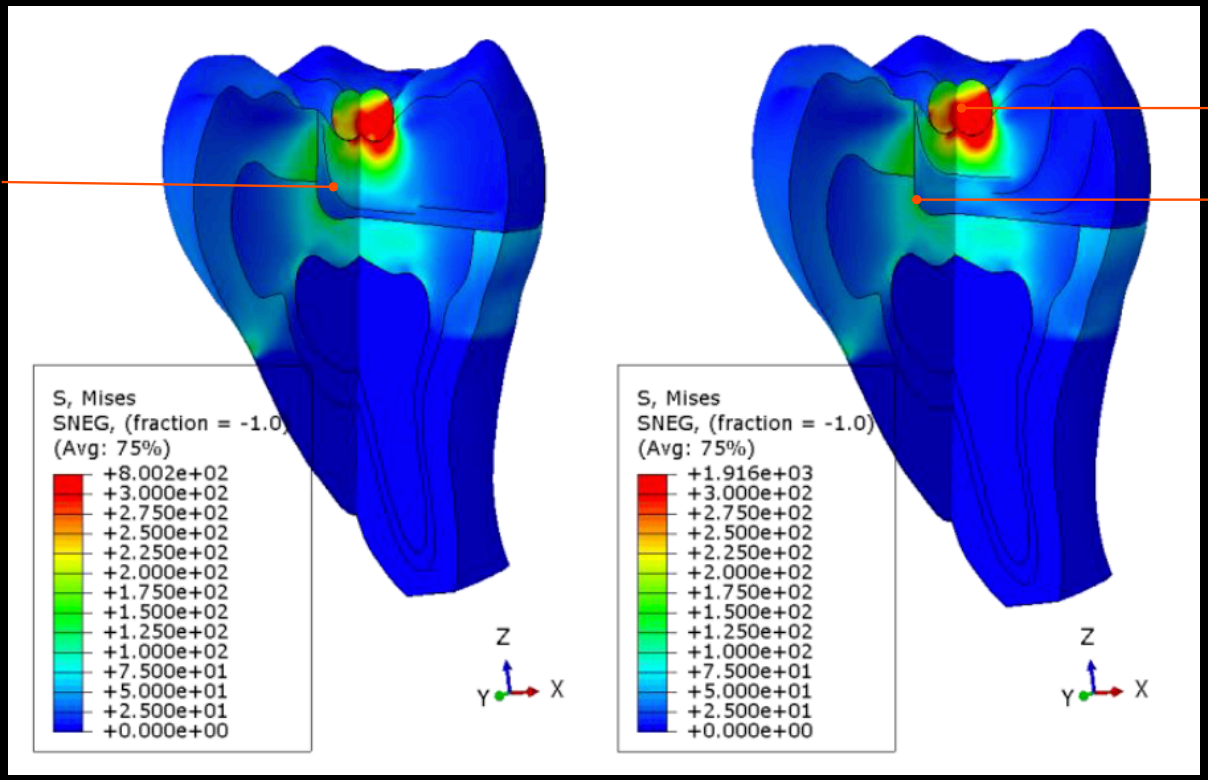


Layering of Fibrafill® CUBE units with reinforcing membrane – distributing the stresses along the bottom and walls of the cavity

Fibrafill® **CUBE application principles**

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

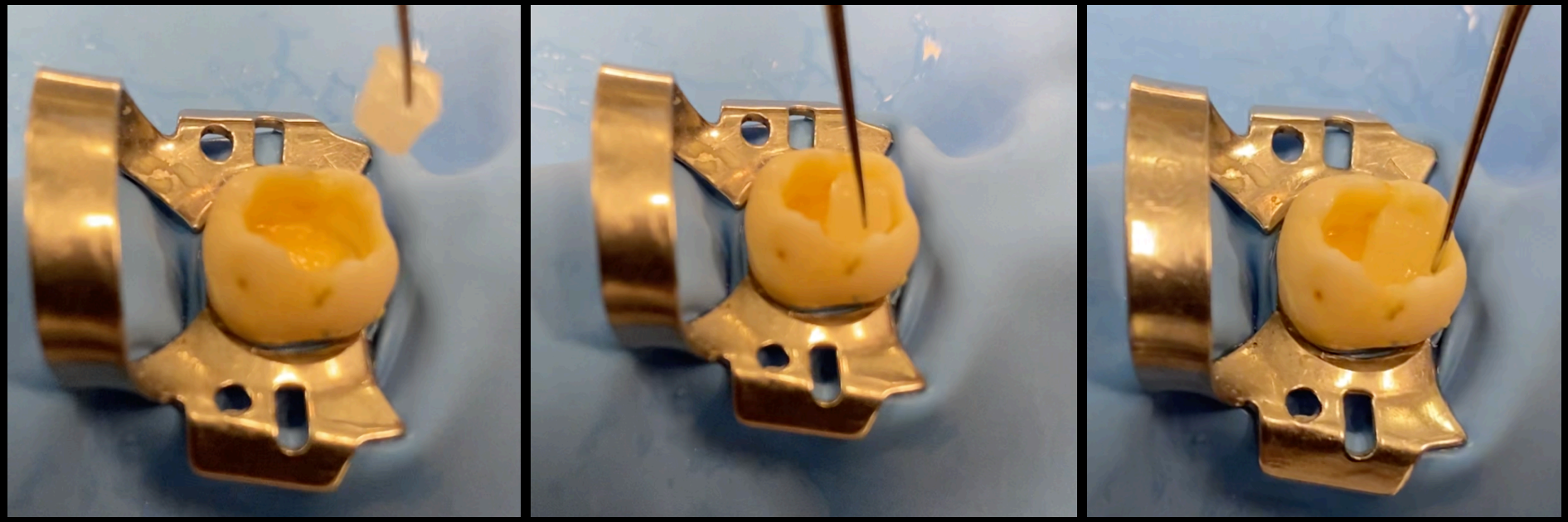
Fibrafill® **CUBE application principles**



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**

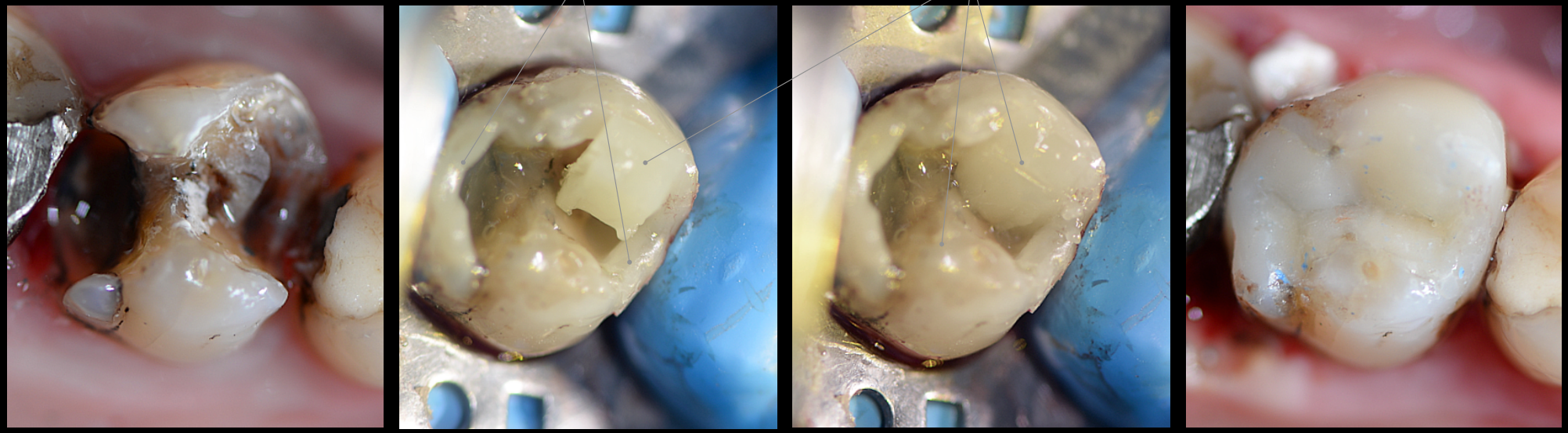
Clinical protocol by MDDr. Tomas Slavicek, Brno, Czech Republic

Initial situation

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

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

Final restoration



Courtesy MDDr. Tomáš Slavíček, Brno, Czech Republic

Restoration of large MOD cavity.

Case report – Fibrafill® **CUBE**

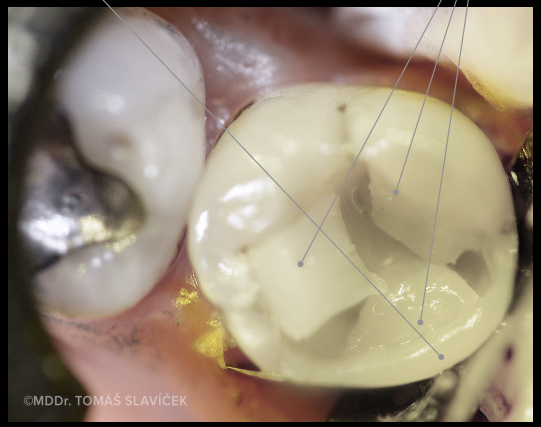
Clinical protocol by MDDr. Tomas Slavicek, Brno, Czech Republic

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.

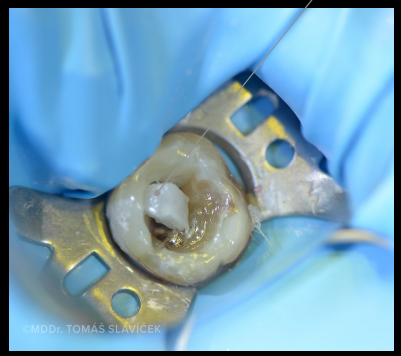
Case report – Fibrafill® **CUBE**

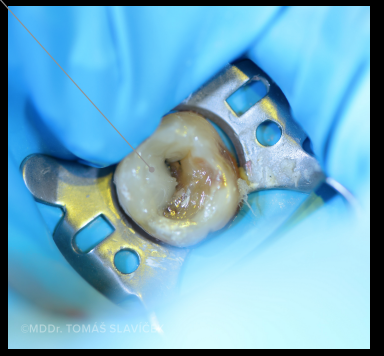
Clinical protocol by MDDr. Tomas Slavicek, Brno, Czech Republic

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

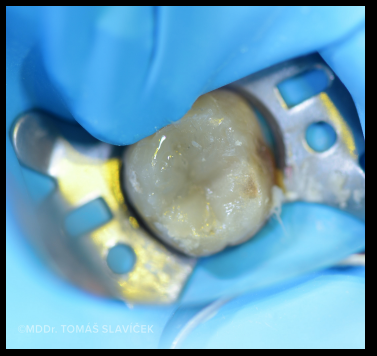
Reconstruction of approximal wall (transformation to first-class cavity)

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





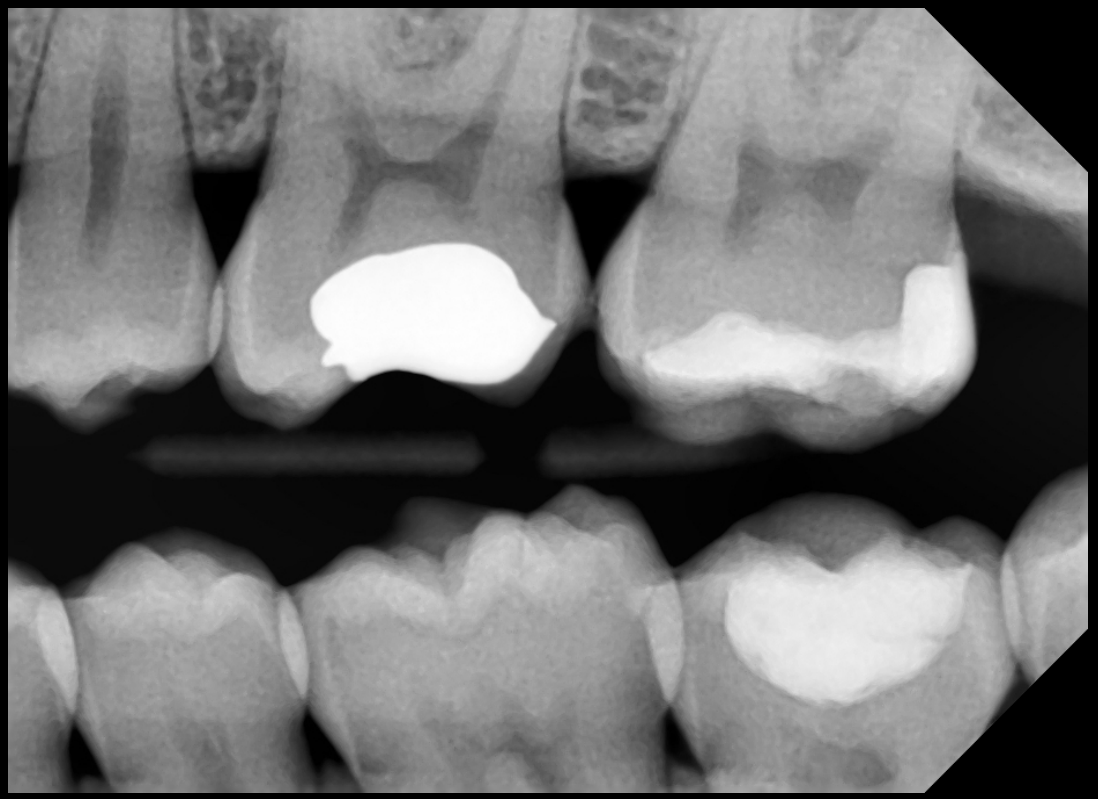
Final restoration



Courtesy MDDr. Tomáš Slavíček, Brno, Czech Republic

Restoration of large MO cavity.

Case report – Fibrafill® **CUBE**

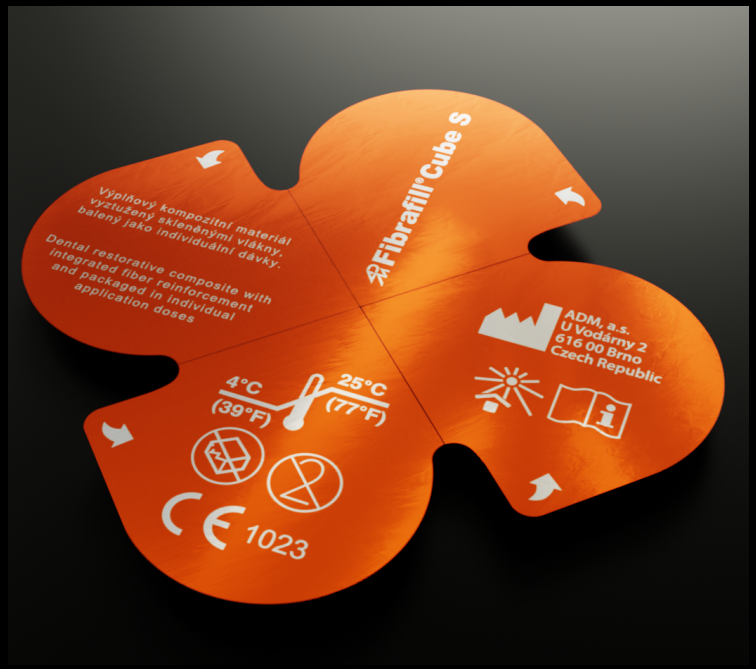


Tooth 17, RTG contrast

Fibrafill® **CUBE**

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

Fibrafill® **CUBE**



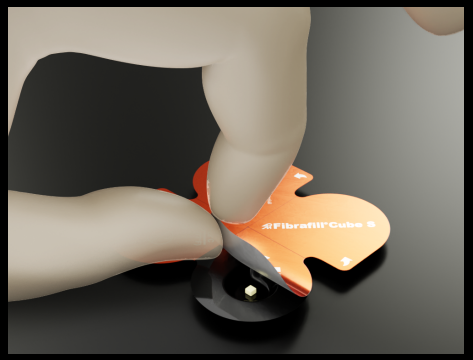
Clinical arguments:

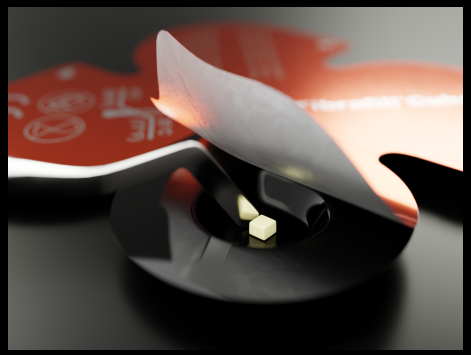
- Distribution of stress, integrated membrane prevents stress concentration (mimics the function of dentinoenamel junction of intact tooth).
- Reduced risk of crack development and propagation through the interface between restorative material and remaining dental tissues.
- Reduced risk of severe failure 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



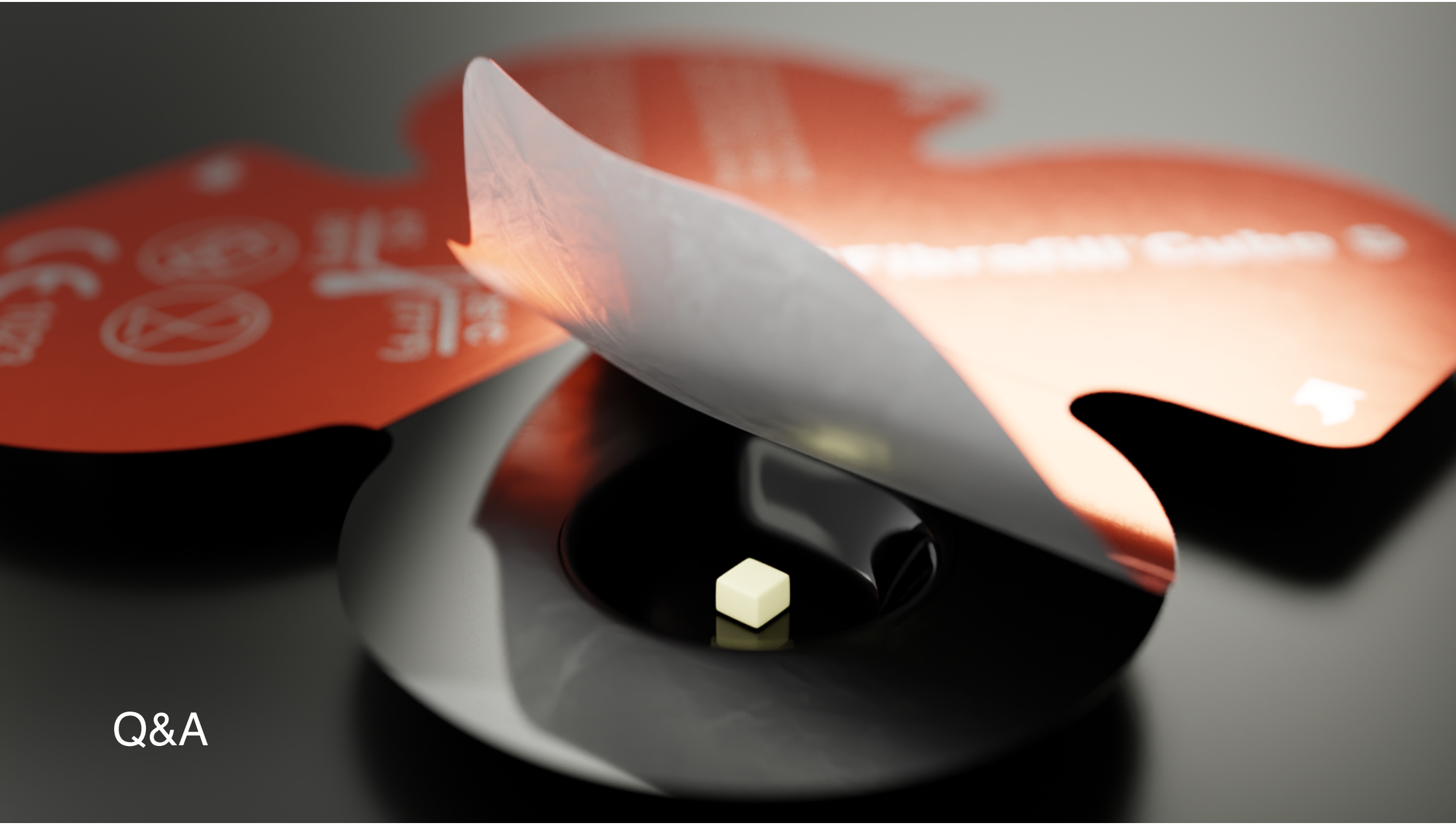


Manipulation with application doses

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)