



**Dr Khaled Aly Nour BDS, MSc, PhD** is Associate Professor of Operative Dentistry at the Ain-Shams University, Cairo (Egypt). He is also the founder of the Conservative Oral Rehabilitation and Esthetics (CORE) Team.

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**Dr Khaled Adel**



**Dr Mona Galal**



**Dr Amr El-Deeb**

Lecturers of Operative Dentistry,  
Ain-Shams University  
BDS, MSc, PhD Ain-Shams University

# The SmART restorative solution: a case series.

By Dr Khaled Aly Nour BDS, MSc, PhD, Egypt.

Before the development of glass hybrids, commercially known as EQUIA Forte/EQUIA Forte HT (GC), glass ionomer cement were the only restorative in dentistry whose mechanical and optical properties improved by the day<sup>1</sup>. These classes of brilliant restoratives possess an array of unique properties that are not available in any other restorative and entitle them as a smart solution for a large variety of clinical challenges where any other material would fail.

They are the only materials that can bond to caries-affected tooth tissues in a similar way as to sound tooth tissues<sup>2,3</sup>, which make them the best restorative option to seal interfaces with demineralized and caries-affected enamel or dentine. They can be inserted in bulk without evoking destructive shrinkage forces that may rupture the attained seal or crack any undermined enamel<sup>4-7</sup>. Therefore, they offer a smart conservative solution in a number of cases with extensive caries

destruction where resort to indirect restorations will be inevitable in case the weakened enamel is removed. They also possess an anti-cariogenic effect which is advantageous in high-caries-risk challenges<sup>8,9</sup> and in sealing caries-prone cracks and defects whenever their removal would complicate the cavity design<sup>10</sup>. Glass hybrids and glass ionomers are the only pulp-friendly restoratives that can achieve restoration and pulp protection in one simple step and are

therefore recommended for cases with compromised and threatened pulps<sup>11</sup>. Being the only bulk-filling, self-adhering materials that need no bonding procedure make their insertion procedure the fastest in dentistry<sup>12,13</sup>. Fast enough to be carried under cotton rolls isolation in less than 2 minutes, which again imposes them as the best solution for geriatric and paediatric dentistry and in cases where rubber dam application is difficult or annoying<sup>14</sup>.

Glass ionomers and glass hybrids do not dissolve in the oral fluids<sup>15</sup>. However, in severe caries challenges where the local pH drops below 5.5

and just before tooth demineralization occurs<sup>16</sup>, their surface acts as a sacrificial anode to elevate the pH and release  $\text{Ca}^{2+}$ ,  $\text{PO}_4^{4-}$  and  $\text{F}^-$ , which counteract demineralization and stimulate remineralization<sup>8,17</sup>.

With the coming of glass hybrid technology, the application is extended to the stress-bearing areas as in compound and complex cavities. This new technology has made it possible to enjoy all the benefits of this brilliant restorative in the posterior part of the mouth<sup>1,18,19</sup>.

The only two tools in the clinician's hand to improve the success of his

treatments are firstly, the wise selection of the most suitable line of treatment and secondly, his ability to manipulate the restoratives involved in a way to maximize its benefits and minimize its deficiencies. Here, clinical situations are discussed in which a glass hybrid offers itself as the wisest choice in view of the available evidence currently present in the dental literature. Choices are based on the benefits attained versus the cost of time, effort, and most importantly, the sacrifice of dental tissues.

## 1. Sealing of marginal cracks (Fig. 1)

In some cases, the cavity is bordered by undermined, yet structurally sound enamel. The stress-free setting of a glass hybrid allows restoration of such cavities without compromising or cracking the undermined enamel. Such enamel can survive well under

normal masticatory and functional forces and can adequately retain a direct restoration. A much shrinking material as resin composite would result in crazing and finally cracking of such enamel. Removal of this undermined enamel to satisfy the

requirements for resin composite placement may create a challenging, non-retentive condition that would also be very difficult to restore directly.



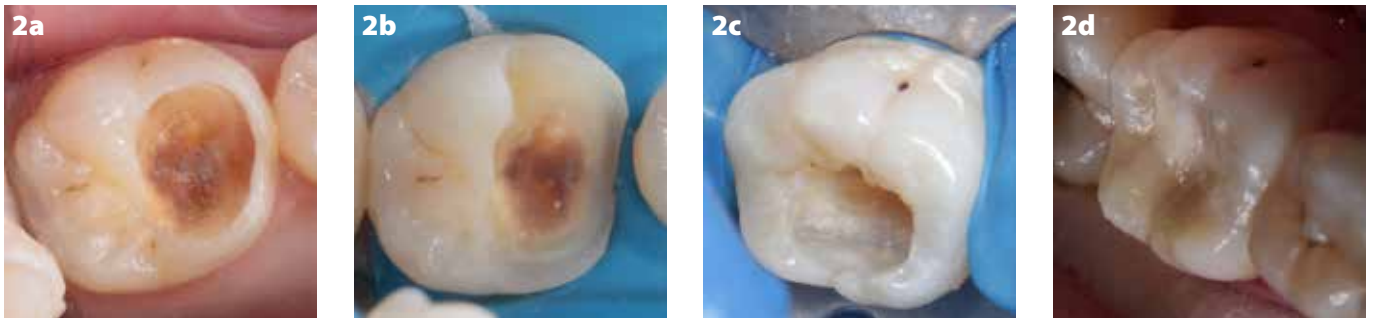
**Fig. 1: (a)** An erupting lower second molar of a 56-year-old woman after amalgam removal. The tooth has remaining thin walls with a crack in the distal wall and a distal operculum, making restoration of the distal wall almost impossible if removed. **(b)** The tooth was restored with EQUIA Forte (HT). Case by Dr Amr El-Deeb.

## 2. Presence of structurally integral yet undermined enamel (Fig. 2)

In some cases, the cavity is bordered by undermined, yet structurally sound enamel. The stress-free setting of a glass hybrid allows restoration of such cavities without compromising or cracking the undermined enamel. Such enamel can survive well under

normal masticatory and functional forces and can adequately retain a direct restoration. A much shrinking material as resin composite would result in crazing and finally cracking of such enamel. Removal of this undermined enamel to satisfy the

requirements for resin composite placement may create a challenging, non-retentive condition that would also be very difficult to restore directly.



**Fig. 2:** (a) Occlusal cavity in a lower first molar resulting from an extensive caries lesion. The buccal, lingual and mesial walls are undermined but are structurally continuous. (b) Removal of the undermined enamel resulted in a non-retentive complicated cavity that cannot be restored directly. (c) Same situation but the undermined enamel was preserved and (d) the tooth was restored with EQUIA Forte (HT). Cases by Dr Khaled Adel and Dr Mona Galal.

## 3. Partial caries excavation (Fig. 3)

Whenever pulpal approximation exists, the caries can be partially excavated to avoid pulpal affection. The restorative material is therefore required to wet and seal caries-affected dentine which cannot be

achieved with resin-based restoratives. EQUIA Forte (HT) can wet, seal and bond to caries-affected dentine in a similar manner as to sound dentine. This is important to allow the repair process to occur and

it has been shown that EQUIA Forte (HT) can enhance remineralization up to a depth of 1.5mm of demineralized dentine.



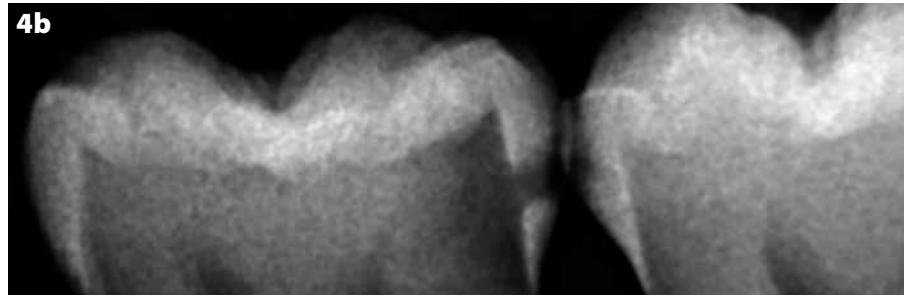
**Fig. 3:** (a) Upper first molar in which the caries was partially excavated. (b) The cavity restored with EQUIA Forte (HT) (c). At 4 years follow up. Case by Dr Mona Galal.

#### 4. Presence of initial contact caries on the adjacent proximal surface (Fig. 4)

Whenever a proximal restoration is to be placed in contact with an initial carious lesion. Placing EQUIA Forte (HT) to be the restoration in contact with

this initial lesion would allow prevention of progression of decay and help in re-mineralization of this un-cavitated lesion. The tooth with

the initial lesion is thus saved from restoration and conventional cavity preparation.



**Fig. 4:** (a) A lower first molar with a carious lesion on the mesial surface that required cavity preparation. The adjacent second premolar had an enamel carious lesion on the distal surface that showed no cavitation and (b) a radiographically sound DEJ. Case by Dr Khaled Adel.

#### 5. Presence of demineralized enamel at the cavity margins (Fig. 5)

In cases where removal of marginal cracks would greatly complicate the cavity restoration, sealing the cracks becomes a better option. The cariostatic, "self-sealing" EQUIA Forte (HT) can be placed, without the need

to extend the cavity to remove the crack. The short isolation time required for placement of EQUIA Forte (HT) allows insertion without the need for rubber dam application. The low shrinkage stress will not exert

any damaging forces on the weak cusps and its high-strength properties would maintain the tooth integrity until passive eruption is completed and the final restoration can be placed.



**Fig. 5:** (a) A lower permanent molar with cervical circumferential demineralization and a simple Class II cavity on the mesial surface in an 11-year-old child. (b) The cavity was restored with EQUIA Forte HT. Case by Dr. Amr El-Deeb.

## 6. Gingival and/or pulpal approximation (Fig. 6)

In cases of extensive carious lesions with subgingival extensions or pulpal approximation, glass hybrids are an excellent choice. EQUIA Forte (HT) does not contain caustic chemicals or residual irritating constituents that may chemically damage the pulp. The setting reaction is not accompanied by heat build-up that may raise the pulpal temperature or

contraction stresses that may rupture a thin dentine bridge. The good sealing ability provides a perfect healing environment to the stressed pulp, away from bacteria and oral irritants. EQUIA Forte (HT) is well tolerated by the gingiva, especially if set against a matrix and after application of its nano-coat.

The moisture tolerance and short isolation time required for EQUIA Forte (HT)'s placement can be easily achieved through application of cotton rolls and retraction cord. Rubber dam application is therefore not necessary.

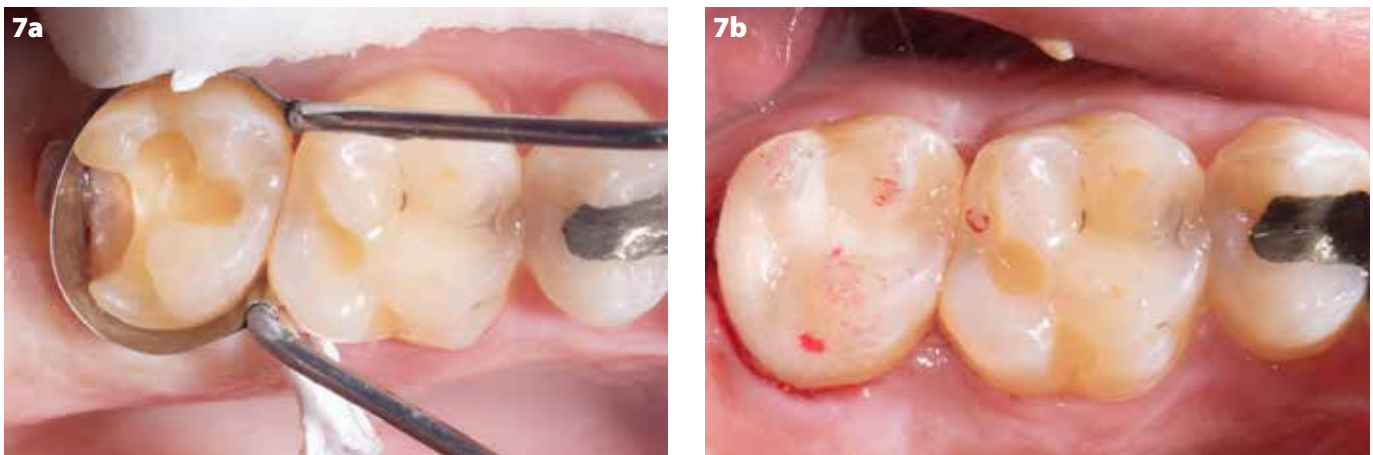


**Fig. 6:** A 38-year-old female complaining of an aesthetic derangement due to a carious lesion on the buccal surface of a lower first premolar. (a) Preoperative view (b) After cavity preparation. The lesion extended apically till the gingival sulcus and pulpal till the pulp shadow was obvious but without detected pulp exposure. (c) After restoration with EQUIA Forte (HT). Case by Dr Amr El-Deeb.

## 7. Postoperative trimming of an inevitable gingival overhang. (Fig. 7)

Whenever the extrusion of excess material beyond the gingival seat is inevitable, it is essential to trim the restoration after treatment. Gingival

overhangs of EQUIA Forte (HT), unlike those of resin composite, can be easily trimmed with scalpels or interproximal carvers.



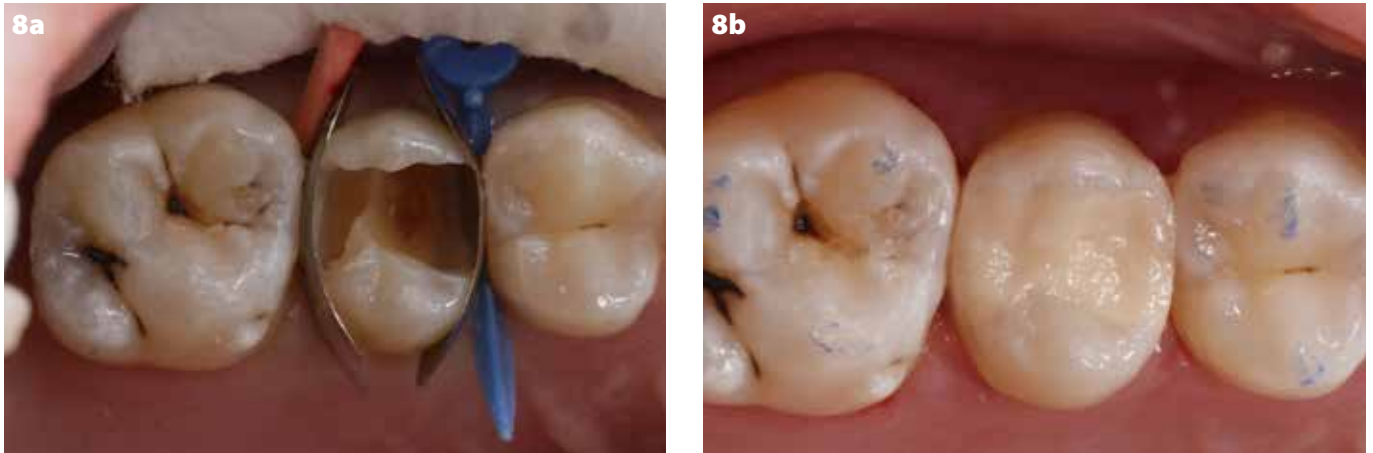
**Fig. 7:** (a) An isolated upper second molar with a deep occluso-distal cavity reaching to the concave root furcation area. Rubber dam isolation couldn't obtain a good seal for more than 3 minutes, and no matrix system could adapt seamlessly, and hermetically seal the gingival seat. (b) Tooth restored with EQUIA Forte (HT). Case by Dr Khaled Adel.

## 8. Geriatric and patients with TMD (Fig. 8)

Often, geriatric patients and patients with temporo-mandibular joint disorders cannot withstand long procedures, or prolonged isolation times, with a continuously opened mouth. EQUIA Forte, being a bulk-fill,

self-adhesive, fast-setting material that needs only 3.5 minutes of isolation time from mixing till setting, is thus a good candidate for those patients. The short isolation time required for EQUIA Forte HT placement can be

achieved using cotton rolls and does not require the application of rubber dam and clamps. EQUIA Forte HT does not require a demanding cavity preparation and therefore, the overall treatment time is minimal.



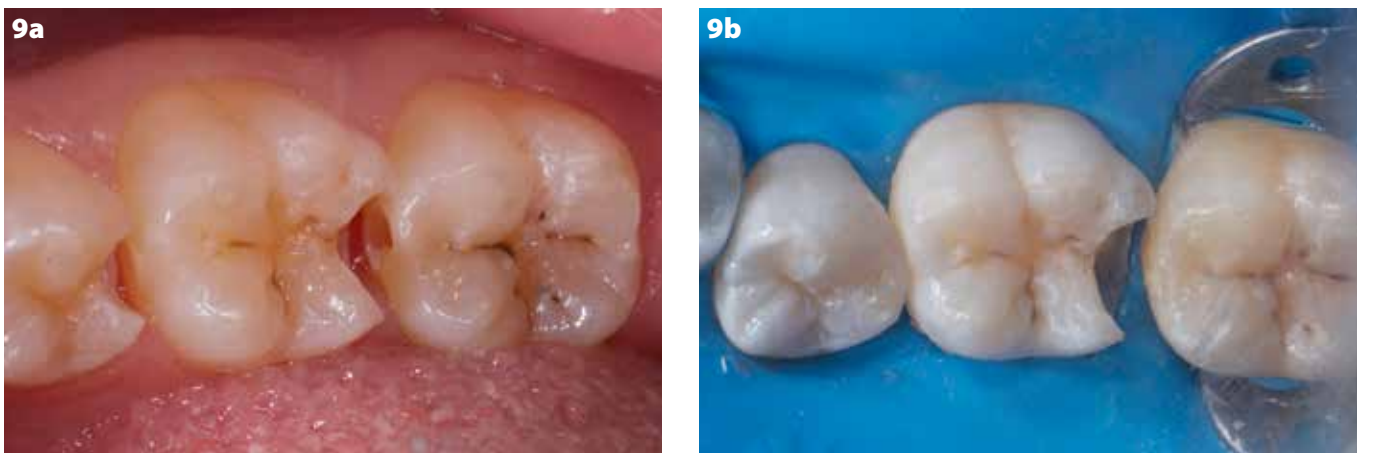
**Fig. 8:** (a) MOD in upper second premolar of a 71-year-old female. The buccal cusp was undermined but was not involved in direct centric occlusion. (b) The patient requested a short procedure time, which was no issue with EQUIA Forte (HT). Case by Dr Khaled Adel.

## 9. Conservative cavities with restricted access cavities (Fig. 9)

In this case, the proximal lesion was prepared through a restricted access from a compound cavity on the adjacent proximal surface of the neighbouring tooth. The prepared simple cavity does not possess direct accessibility to allow for thorough inspection of the occlusal and axial

walls. The possibility of leaving behind caries affected dentine cannot be overruled. Therefore, using an anticariogenic material to restore such cavity would be a big advantage. The compromised accessibility could also limit the possibility of ensuring the adequate passage of light required to

properly polymerize a resin restoration. EQUIA Forte (HT) possesses easy placement without bonding agents, anticariogenicity, autopolymerization and good wear resistance, accounting for a stable contact.



**Fig. 9:** (a) A lower second molar with a mesial carious lesion that was accessed through a distal cavity on the first permanent molar. (b) Simple Class II cavity was prepared and restored with EQUIA Forte (HT). Case by Dr Khaled Adel.

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