



Fibres bring strength

# everX Posterior

The toughest composite substructure  
for large posterior restorations

**3M**

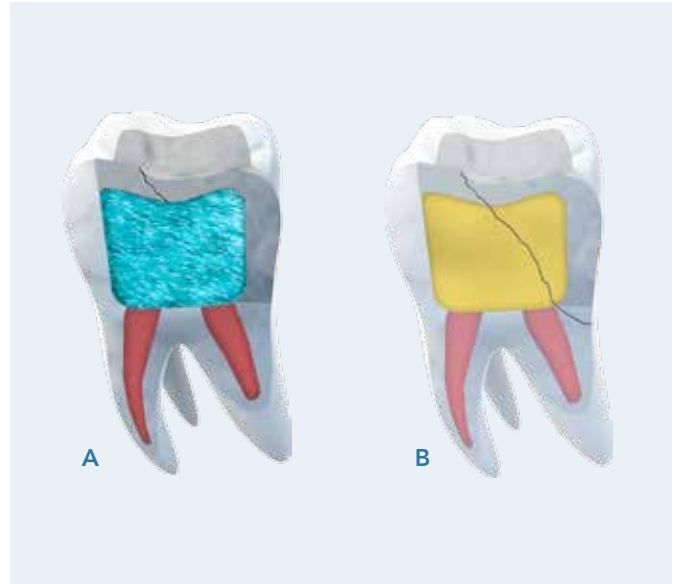
# everX Posterior – a revolutionary fibre-reinforced

everX Posterior is a highly fracture-tough composite substructure able to meet the



## Ideal for large posterior cavities

Use everX Posterior as the reinforcing substructure beneath conventional posterior composite to create a strong, bilayered direct restorative solution for clinical situations where inlays and onlays would usually be indicated.



## Stops fracture propagation

### everX Posterior substructure (A):

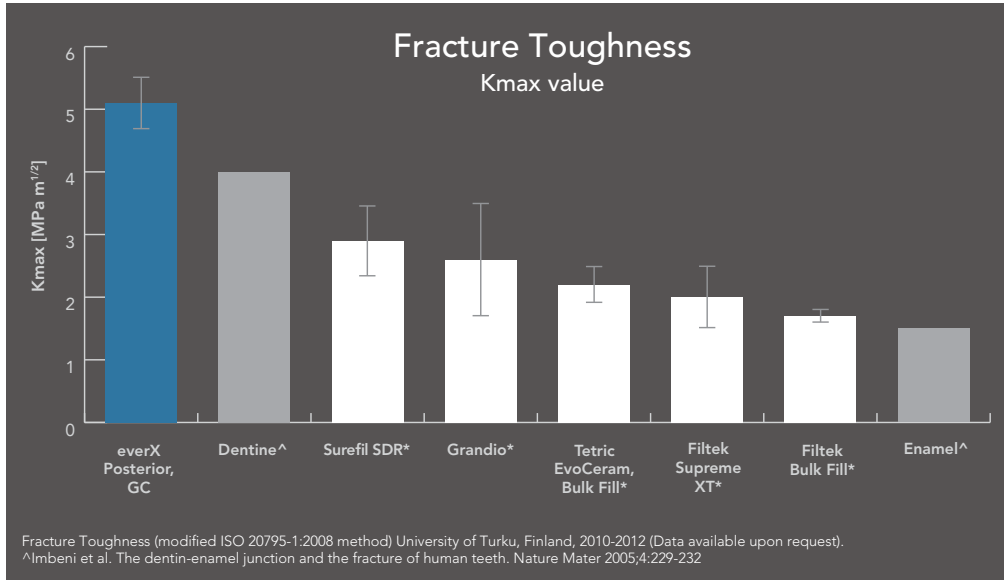
Crack propagation is arrested and redirected by the everX Posterior substructure, allowing repair of the restoration.

### Conventional composite (B):

Cracks propagate along an unfavourable fracture line through the filling AND the tooth structure below the gingival line, making repair almost impossible.

# composite for dentine replacement

challenge for greater strength in large posterior composite restorations



## Unmatched strength, even stronger than dentine

everX Posterior was designed for maximum strength. It features the optimum size and combination of e-glass fibres and barium glass fillers, within a tough polymer matrix. The short fibres used in everX Posterior provide fracture toughness greater than collagen-reinforced dentine and almost double that of conventional composite.

Place everX Posterior as a dentine replacement and overlay with a conventional composite, such as G-ænial POSTERIOR, as an enamel replacement. In large cavities, where strength is important, this new combination of materials creates a biomimetic restoration of the tooth and provides the solution for stronger, more durable posterior composite restorations.



**everX Posterior** contains fibres, optimally sized for maximum strength and fracture toughness.



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# Clinical applications

everX Posterior answers the growing demand for an economic solution for large restorations.

## Key application techniques

everX Posterior is available in a universal shade and should always be overlaid with an external composite material.



everX Posterior is indicated for cavities greater than 3mm width



After bonding, replace any missing walls with conventional composite



Apply everX Posterior



Cover with a final 1-2mm layer of conventional composite

## Extensive preparations involving 3 or more surfaces



Dr. M. Diernaes, Denmark

### Extensive preparations with missing cusps



Dr. Y. Marinova, Bulgaria

### Deep preparations (Class I, II and endodontically treated teeth)



Dr. R. Veleninov, Bulgaria

### Preparations for amalgam replacements (often associated with cracks and cusp fracture)



Prof. M. Peumans, Belgium

# Clinical case

## Challenge



- 1 The MB cusp is reduced and a fracture dissected out.

A patient presented complaining of pain in 16 as a result of biting on confectionery the previous day. The tooth had a MO amalgam and a small DO amalgam. No painful response could be elicited when pressure testing any of the cusps, but the tooth was cold sensitive. The decision was made to remove the old amalgams to visually assess for internal fracturing under any of the cusps.

## Building the substructure



- 2 Tooth after enamel etching and bond placement.



- 3 A thin layer of radiopaque flowable is placed and cured.

## Completing the restoration



- 7 A 1mm layer of A2 G-aenial POSTERIOR is placed and cured.



- 8 A final layer of A1 G-aenial POSTERIOR is placed, contoured and cured.

Dr Graeme Milicich



**4** The cavity wall is built using G-aenial POSTERIOR composite.



**5** A 1mm layer of everX Posterior is placed on the floor of the cavity and cured.



**6** A second increment of everX Posterior is placed and cured.

## Result



In large posterior composite restorations, excellent marginal integrity is achieved by using an incremental build-up technique to control shrinkage stress.

# Innovation from e-glass fibre technology

everX Posterior contains silanated e-glass fibres which are optimised in size and length to provide the maximum reinforcing effect.

## Fibres prevent crack propagation

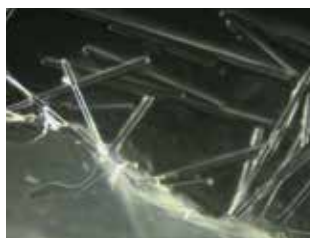
Cracks are a common issue, starting as a result of stress on the surface of composite and then slowly propagating through the filling and the tooth. everX Posterior is fracture resistant and designed to stop crack propagation.



Conventional composite restorations under load – crack propagation can extend through the filling and remaining tooth

## Fibres maximise bonding

To create a bilayered restoration, the adhesion between everX Posterior and conventional composite is a key factor in the success of the layering technique. The fibres in everX Posterior increase the adhesion to overlying composite by providing added mechanical retention.

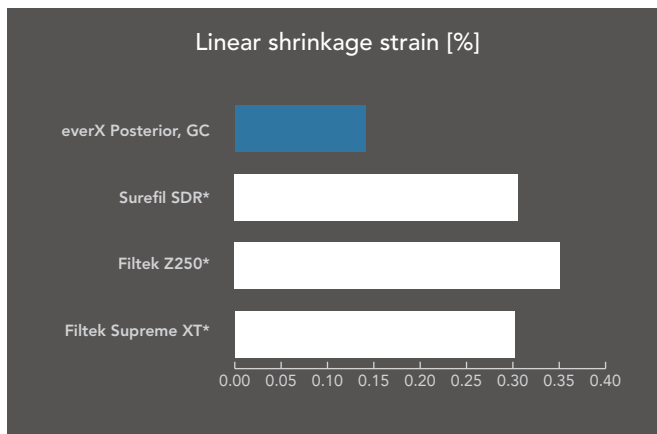


Fibres at the interface with composite

## Fibres direct shrinkage

Like all other composites, everX Posterior will shrink slightly on polymerisation, however its shrinkage characteristics are different to other composites. During placement, fibres orientate into a horizontal plane within the cavity. Due to the strong adhesion between resin and silanated fibres in everX Posterior, the direction of the fibres minimises shrinkage in the horizontal plane after placement.

Garoushi S, et al. Physical properties and depth of cure of a new short fiber reinforced composite. Dent Mater (2013), in press



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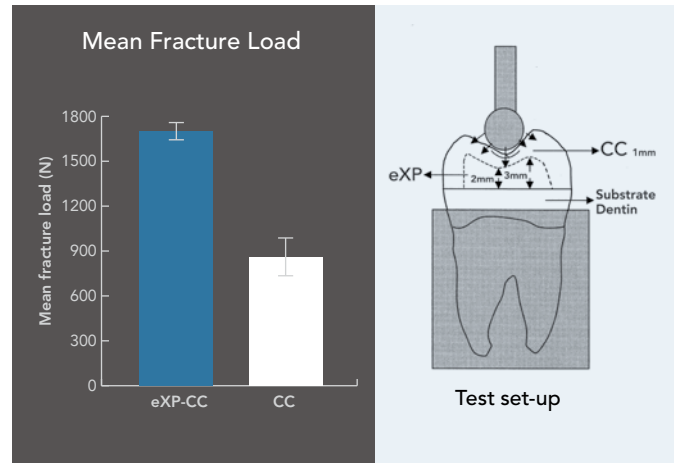


## Fibres increase fracture resistance and load bearing capacity

The synergistic effect of everX Posterior and conventional composite will create a bilayered restoration that can withstand double the load of a restoration made from conventional composite alone.

This test shows the comparative load bearing capacity after 30 day water storage (eXP-CC is bilayered everX Posterior and Z250\*. CC is conventional composite Z250).

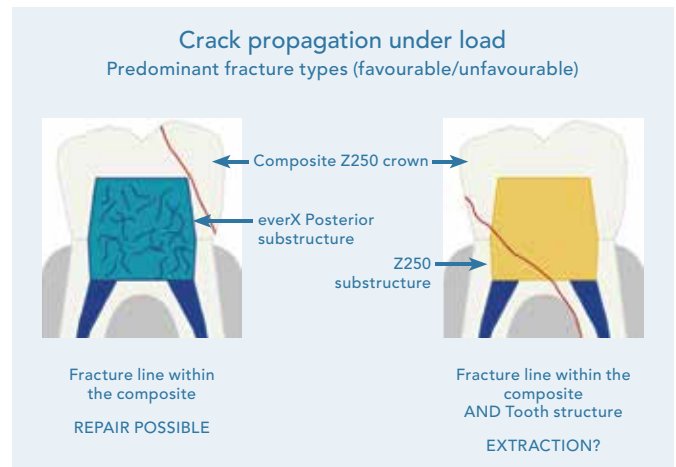
Garoushi S, Lassila LV, Vallittu PK. Fiber-reinforced composite substructure: Load-bearing capacity of an onlay restoration. *Acta Odontol Scand* 2006 64:281-285.



## everX Posterior changes the fracture pattern of endo-treated teeth

When everX Posterior is used as a substructure under conventional composite, not only is strength significantly improved, but also the fracture pattern under load is changed. If the restoration is loaded till failure, the path of a fracture changes and is deflected away from the roots.

Lammi M, Tanner J, Le Bell-Rönnlöf A-M, Lassila L, Vallittu P. Restoration of endodontically treated molars using fiber reinforced composite substructure. *J Dent Res* 2011 90 (Spec Iss A): 2517



# Q&A

## What is the need to develop a stronger composite?

The current range of posterior composite materials is achieving excellent results in small to medium sized cavities. However, there is an increasing demand for direct placement composite in large posterior cavities, both as an alternative to amalgam and as a cost effective alternative for indirect restorations. Unfortunately, the clinical success of these restorations diminishes as the number of walls and missing cusps increases. The primary mode of failure for larger composite restorations is fracture. The solution to this challenge is to build a stronger foundation under posterior composites; a substructure with fracture toughness and fatigue resistance. A substructure that behaves like dentine.

## Fibre reinforcement is dependent on fibre orientation.

### How do the fibres orientate to provide strength?

everX Posterior is easy to manipulate and readily adapts to the cavity walls and floor. During placement and manipulation, the fibres in everX Posterior orientate into a horizontal plane to give a structure that looks like a mass of overlapping "X"s.

## Why can't I use everX Posterior to restore external surfaces?

The size of fibres used in everX Posterior does not provide the level of wear resistance or polish retention that is desirable for the surface of composite restorations.

## How thick should the final external layer of composite be?

The final layer of composite placed over everX Posterior to complete the restoration should be 1-2mm thick

## What is different about the formulation of everX Posterior that makes it so fracture tough?

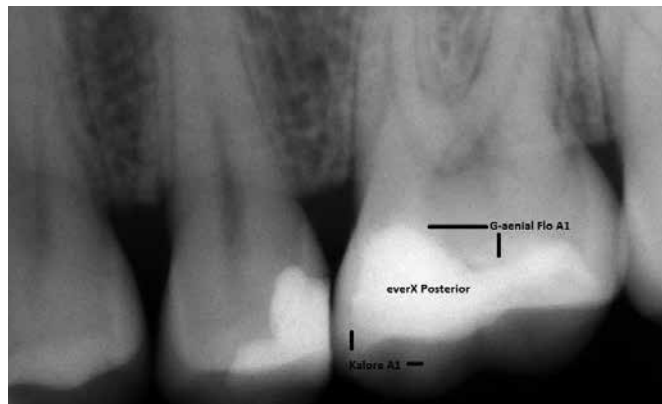
The main difference is the type of fillers used. everX Posterior contains both barium glass fillers and silanated e-glass fibres. The fibres are 17µm in diameter and 1-2 mm in length and are strongly bonded into the surrounding resin matrix. The size and length of the fibres is optimised to provide the maximum reinforcing effect.



Surface of everX Posterior (actual dimensions are 2.3mm x 1.7mm) which looks like a mass of overlapping "X"s

## Is everX Posterior radiopaque?

Yes, it has a good level of radiopacity; 290%Al

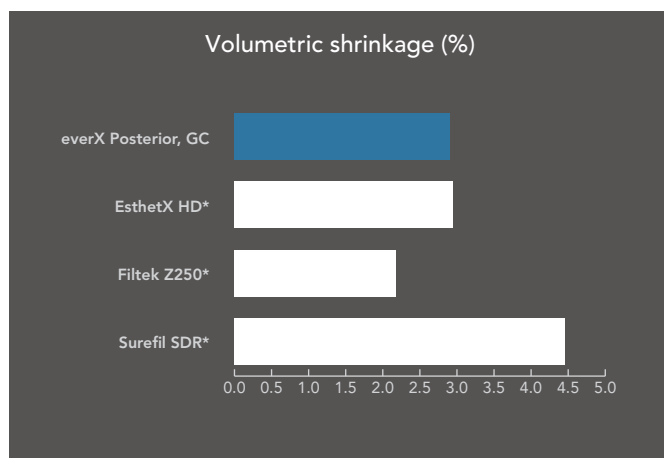


### What is the filler loading of everX Posterior?

76 wt%, 57 vol% (total inorganic fibre and filler content)

### What is the volumetric shrinkage of everX Posterior?

Total volumetric shrinkage is similar to other composites



GC R&D

### What is the depth of cure and recommended duration of cure?

everX Posterior is a translucent composite with up to 4mm depth of cure.

Curing time varies depending on light source:

- 10 seconds for High Power LED Light (>1200 mW/cm<sup>2</sup>)
- 20 seconds for Halogen/Normal LED Light (700 mW/cm<sup>2</sup>)

### Do we recommend the use of a layer of flowable composite underneath everX Posterior?

This is optional and a matter of personal preference. There is no specific need to use a flowable, as everX Posterior readily flows and adapts to the cavity floor and walls, and has a high level of radiopacity.

### Can I use glass ionomer cement under everX Posterior?

Yes. Especially for deep vital cavities, the use of a glass ionomer liner could benefit the health of the tooth. Place the glass ionomer, then apply resin bond, followed by incremental placement of everX Posterior, then finish with a conventional composite.

### When should I use a glass ionomer base under my posterior composite and when should I use everX Posterior?

Glass ionomer cement as a base under posterior composites is a great restorative solution on many levels, with advantages including the ability to bulk fill with no shrinkage stress. As the cavity size increases, so does the risk of fracture due to occlusal load. This is when the strength advantage offered by everX Posterior is an important consideration for restoration longevity.

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## everX Posterior

### Contains:

15 x unitips (0.13ml, 0.25g each)

Universal shade (transparent)



GC Australasia Dental Pty Ltd  
1753 Botany Road, Banksmeadow  
NSW 2019, Australia

T: +61 2 9316 4499  
F: +61 2 9316 4196  
[www.gcasia.info](http://www.gcasia.info)