

THE PERFECT SYNTHESIS OF **PERFORMANCE AND SPEED**



x e n o<sup>®</sup> III

HIGH PERFORMANCE BONDING GETS EASY

**DENTSPLY**  
DETREY

# HIGH PERFORMANCE IN SELF-ETCHING TECHNOLOGY

## XENO®III IS UP-TO-DATE IN RESEARCH

Pyro-EMA

### Bonding Technology

The trend in bonding technology: dentists and patients are demanding trustworthy and reliable systems that offer security in handling. The goal: A permanent dentine sealing and a continuous transition without gaps to the filling material.

### Total-Etching Technique

The conventional total-etching technique in bonding creates different effects on enamel and dentine.

### The overall effect of etching on enamel

- Removal of smear layer
- Creation of a microrough enamel to facilitate adhesive penetration and retention (micro-retention)
- Enhance enamel wettability

### The overall effect of etching on dentine

- Removal of smear layer
- Removal of smear plugs from the dentinal tubules, allowing the infiltration of the underlying dentine
- Demineralisation of the surface layer and exposure of the collagen framework

### Drawbacks of Total-Etching

- Over-drying of dentine causes collapse of the exposed collagen fibres. The resulting collagen layer is difficult to penetrate, thus adhesion is reduced
- Over-etching of dentine results in nanoleakage when the demineralised dentine layer is too thick to be fully penetrated by the adhesive within the given time
- Time-consuming and technique sensitive

### Self-Etching Technique

Self-etching adhesive systems are developed to simplify the bonding procedure, overcome the drawbacks of the total-etch technique, thus minimising patient sensitivity.

Xeno®III self-etching adhesive system offers integrated, precise etching/pretreatment of enamel and dentine.

Derived from 5 years of self-etching experience: Xeno®III is the 3rd generation of self-etching adhesives that provides bond strength and marginal quality with no significant difference to conventional adhesive systems using phosphoric acid conditioning.

With water/ethanol as a solvent, Xeno®III contains two unique adhesion promoters invented and patented by DENTSPLY:

- The polymerizable PEM-F releases fluoride, which is bonding to calcium ions and thus enhancing the decalcification of the enamel/dentine
- Pyro-EMA (Fig.1) which forms phosphoric acid groups after hydrolysis

The Benefits - Xeno®III achieves:

- High etching efficacy with pH value below 1
- High adhesive strength
- In one controllable step
- Patients comfort without rinsing

Liquid B: Pyro-EMA

Phosphoric acid group

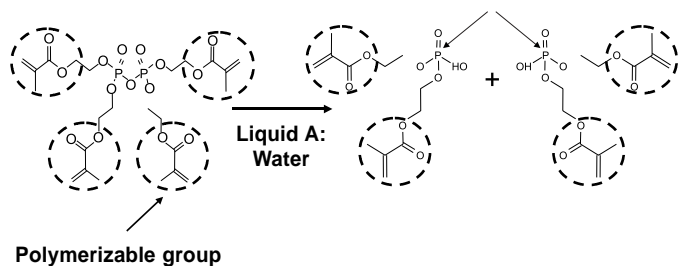


Fig. 1: Pyro-EMA

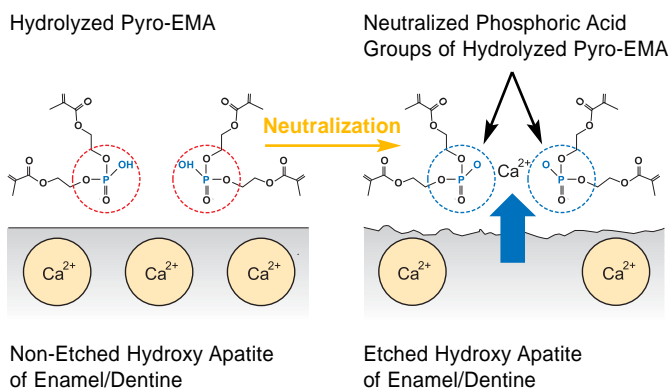


Fig. 2: Neutralization of Hydrolyzed Pyro-EMA

The hydrolyzed Pyro-EMA contributes to:

1. Etching of the dentine / enamel, forming noticeable etching pattern on enamel.
2. Partial dissolution of the smear layer and smear plug.
3. Neutralization by dissolving calcium hydroxy apatite on the tooth surface.
4. Co-polymerization via the methacrylate groups upon light-curing.

### Adhesion to dentine

- Partial impregnation of the smear layer (Fig. 3a + b) and infiltration of the smear plugs
- Penetration of the smear plugs within the dentinal tubules
- Demineralization of the dentine underneath the smear layer to form a homogeneous hybrid layer (Fig. 3c)
- Sealing of the dentinal tubuli to avoid post operative sensitivity, formation of retentive resin tags (Fig. 3c)
- Formation of a strong adhesive layer for bonding to the restorative material, resisting the shrinkage stress

### Effects of “no rinsing step”

- All components of Xeno<sup>®</sup>III except for the solvent, fillers, initiator and stabilizer contain polymerisable double bonds
- Xeno<sup>®</sup>III can completely wet and penetrate all remnants on the tooth surface
- The remnants get incorporated as “filler particles”

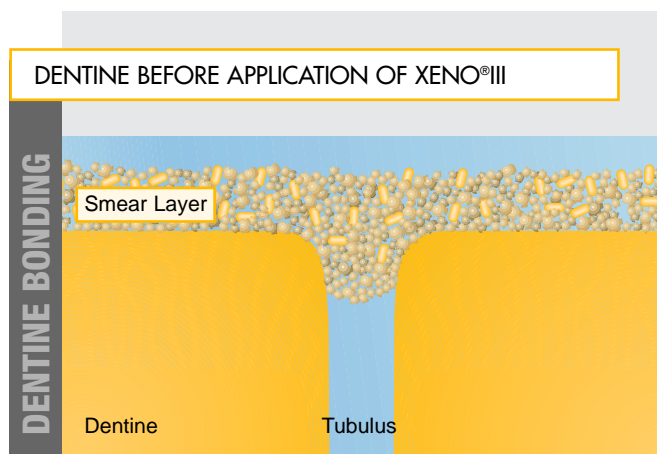


Fig. 3a: Dentine before application of Xeno<sup>®</sup>III

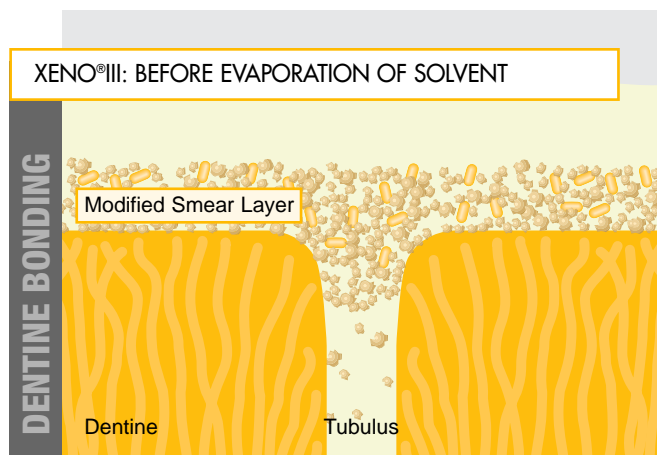


Fig. 3b: Dentine immediately after application of Xeno<sup>®</sup>III

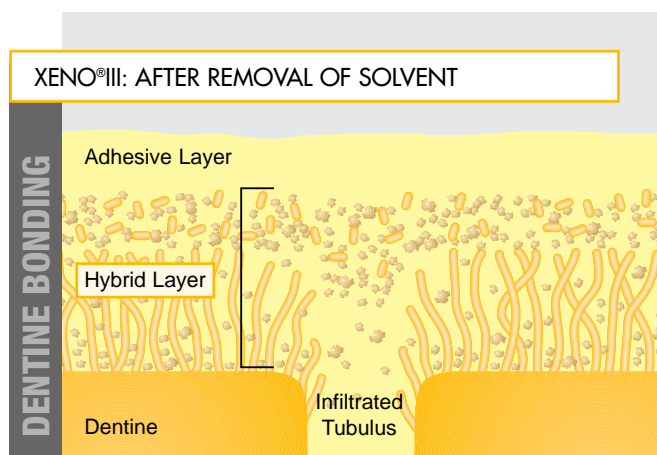


Fig. 3c: Demineralized dentine 20 s after application of Xeno<sup>®</sup>III

# XENO® III HIGH PERFORMANCE GETS EASY



x e n o<sup>®</sup> III  
HIGH PERFORMANCE BONDING GETS EASY

- **EXCEPTIONALLY**  
HIGH BOND STRENGTHS  
WITH SELF-ETCHING<sup>1</sup>
- **NO SEPARATE ETCHING**  
AND RINSING STEP
- **A VISIBLE AND CONTROLLABLE**  
MIXING STEP
- **FOR ALL CAVITY CLASSES,**  
LIGHT-CURED COMPOSITES,  
ORMOCERS AND COMPOMERS

<sup>1</sup> Xeno III is proven to offer high bond strength on dentine and enamel, by 4 of the world's leading universities and institutions: Haller Bernd, University of Ulm; Powers John M., University of Texas, Houston; Latta Mark A., School of Dentistry, Creighton University, Omaha; PameijerCornelis H., DLC International, Simsbury.

# CERTAINTY AND SIMPLICITY IN HANDLING

## XENO®III – A VISIBLE AND CONTROLLABLE STEP

Xeno®III performs etching, priming and bonding of enamel and dentine in one step, offering security and high performance. One drop of Liquid A mixed with one drop of Liquid B – visible, controllable, consistent.

Xeno®III avoids technique sensitivity:

- by solving problems of over-drying and over-etching on dentine, sealing dentinal tubules
- no separate etching and rinsing steps



- 1 Dispensing one drop each into the dappen dish

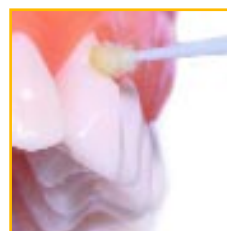
Bottle A



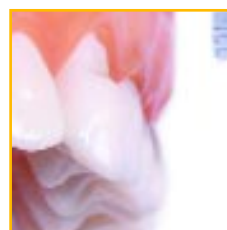
Bottle B



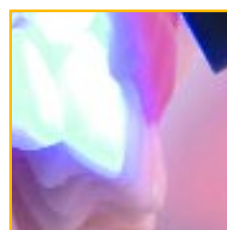
- 2 Mixing of Liquid A and B with the applicator tip



- 3 Apply Xeno®III thoroughly to wet all cavity surfaces



- 4 Leave undisturbed for 20 seconds. Uniformly spread the adhesive using a light blow of air pressure for at least 2 seconds, until there is no more flow of the adhesive (Important: Avoid using strong air pressure which may result in a thin adhesive layer)



- 5 Light-cure for 10 seconds

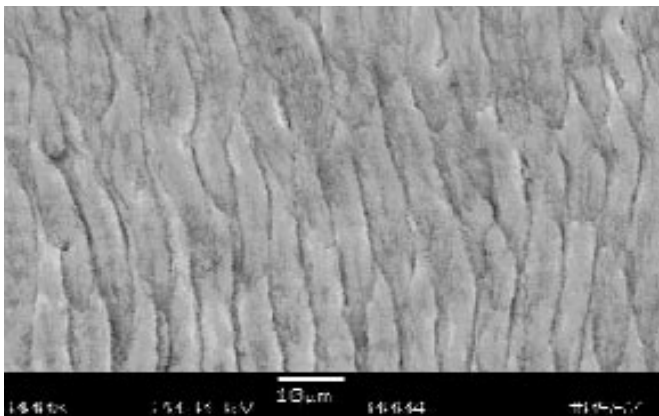
# HIGH PERFORMANCE BY COMPARISON



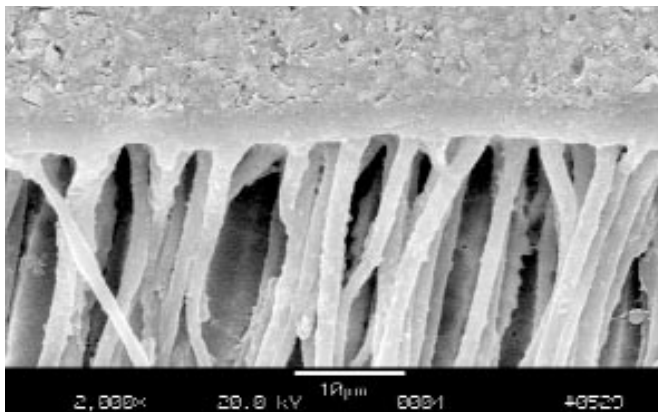
## XENO®III CONVINCES IN CLINICAL STUDIES WORLDWIDE

Xeno®III creates reliable adhesive strength to both structures – etching pattern on enamel and hybridisation ability on dentine, are proven by studies of T. Pioch.

SEM<sup>2</sup> images by Pioch show Xeno®III creates etching pattern on enamel similar as with phosphoric acid.



SEM<sup>3</sup> images by Pioch of the cross-section of the interface between Xeno®III and dentine show distinguished adhesive and hybrid layers with well-established resin tags.



<sup>2</sup> Enamel treated with Xeno®III (in 20 s) then rinsed with ethanol. Study by Thomas Pioch, University of Heidelberg.

<sup>3</sup> Thomas Pioch et al., Abstract submitted to Pan European Festival of Oral Science, Cardiff 2002.

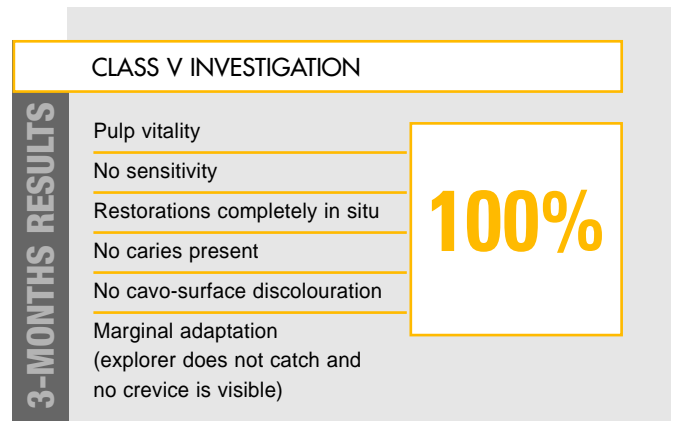
<sup>4</sup> Yamada T., Class V investigation, Toranomon Hospital, the Tokyo Medical and Dental University.

<sup>5</sup> Rosales, School of Dentistry, University of Granada

### 0% Post-operative Sensitivity on Class V Clinical Study

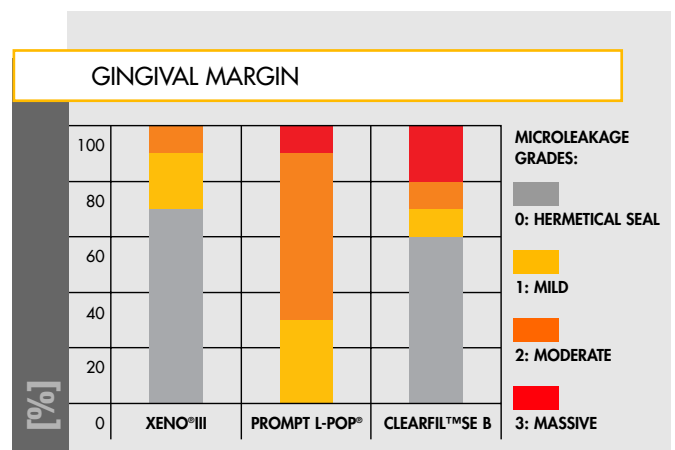
Three-month results from the Class V investigation by T. Yamada<sup>4</sup> showed Xeno®III performed satisfactorily in all clinical criteria specified.

No post-operative sensitivity and other side effects, and all restorations were in situ at the three-month recall.



### Excellent Marginal Quality

The microleakage study by Rosales<sup>5</sup> in Class V showed that Xeno®III

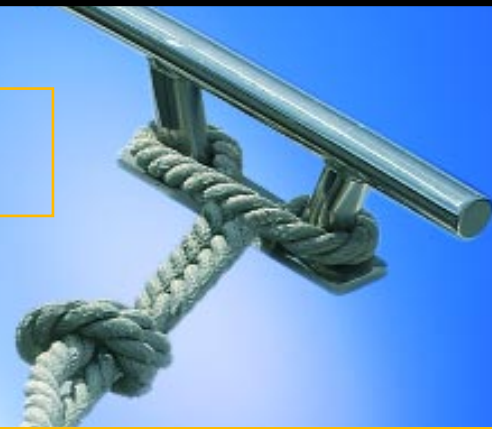


provides the best sealing in the gingival wall in comparison to other self-etching adhesives.

Prompt L-Pop®, Clearfil™SE are not the trademarks of DENTSPLY International.

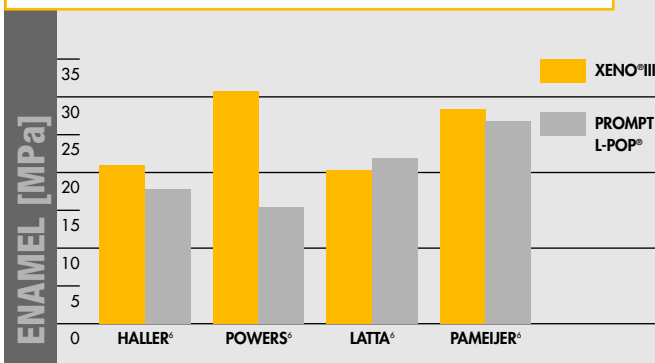
# CERTAINTY IN BONDING

## XENO®III FEATURES ITS EXCELLENT BOND STRENGTH

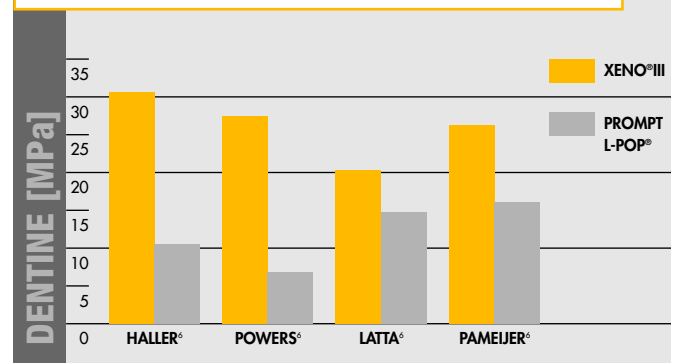


Xeno®III is the reliable and safe applicable self-etching adhesive, which produces excellent bond strength to the structure of enamel and dentine. The visible mixing keeps the application controllable which provides extra security of adhesive strength

XENO®III VS. PROMPT L-POP®: BOND STRENGTH



XENO®III VS. PROMPT L-POP®: BOND STRENGTH



The convincing bond strength was determined and proven in comparative studies of international accredited Universities!

In addition to Xeno®III, DENTSPLY DeTrey offers the established One-Bottle adhesive Prime&Bond®NT.

<sup>6</sup> Haller Bernd, University of Ulm;  
Powers John M., University of Texas, Houston;  
Latta Mark A., School of Dentistry, Creighton University, Omaha;  
Pameijer Cornelis H., DLC International, Simsbury.

# HIGH PERFORMANCE BONDINGS FROM DENTSPLY

## PACKAGING INFORMATION

### YES, I ORDER

**XENO<sup>III</sup> Standard Package** **606.67.290**

**Content:**

- 5ml Bottle A
- 5ml Bottle B
- 50 Application Tips
- 1 Dappen Dish
- Direction for Use

**Each package offers 200 applications.**



**Prime&Bond<sup>®</sup>NT  
Nano-Technology Dental Adhesive**

**Prime&Bond<sup>®</sup>NT Refill Package** **606.67.240**

**Content:** 2 x 4.5ml Prime&Bond<sup>®</sup>NT

**Each package offers 200 applications.**



Dentist stamp

Date/Signature

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**DENTSPLY**  
DeTrey