

# G-ænial™ A'CHORD

Advanced Universal Composite

## Simplified direct posteriors

Clinical Guide

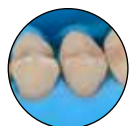




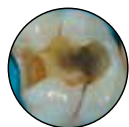
Introduction



Material selection



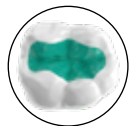
An easy and secure isolation protocol



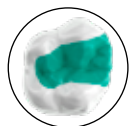
Preparation criteria



Bonding for every indication



Class I lower molar step by step and occlusion



Class II upper molar step by step and occlusion



Finishing and polishing



Clinical cases with one single shade

## Direct posterior restorations



Have you ever stopped to think how many posterior restorations do you treat directly within a week? For the average practitioner that number is above the 70% mark of the total treatments. This is a significant portion of the everyday practice but oftentimes it is neglected as being too routine and the interest is drawn to more “interesting” niche treatment plans with which we are not too familiar yet. We spend time mastering the technique for a case we will treat twice a year and neglect the bread and butter of our daily work, thinking that we

already know a lot on it. But, direct posterior restorations are estimated to have a failure rate of 13%\*. So, one should stop and think how to improve this failure rate by looking at the root cause.

At GC, we aim to increase the efficiency of a treatment plan, by bringing together quality and simplicity. This was what we had in mind when we introduced G-ænial A'CHORD, our universal composite system which covers 16 Vita shades with 5 CORE shades. Easier shade selection, reduced inventory and uncompromised mechanical properties was the offer we had for you. Part of our recommended treatment plan is also our fibre reinforced composite, everX Flow, which aims to tackle the issue of composite and tooth fracture. The fibres inside this material bring a high resistance to fractures caused by loading forces. This will reinforce your restorations and provide further cushioning against failures.

Now, we bring a comprehensive guide on performing direct posterior restorations in a very standardized protocol, limiting mistakes and increasing the longevity of these restorations in the mouth. We worked with Javier Tapia Guadix, who is a renown clinician in this field, to create this guide that covers everything you need to know from isolation and correct bonding protocols to fast and easy to achieve successful long-lasting posterior restorations.

We are confident this guide will bring value to your practice. If you use G-ænial A'CHORD for your treatments and want to share your work online, we invite you to join our community #gaenialachordloveit.

\* N Alvanforoush, et al, 2016, Comparison between published clinical success of direct resin composite restorations in vital posterior teeth in 1995–2005 and 2006–2016 periods, Australian Dental Journal, 62, 2, 132-145

# G-ænial A'CHORD

G-ænial A'CHORD always delivers more: a simplified unishade system of 5 core shades that achieves the aesthetics of the 16 classic Vita shades **with ease**. With this reduced inventory you will save time and costs.



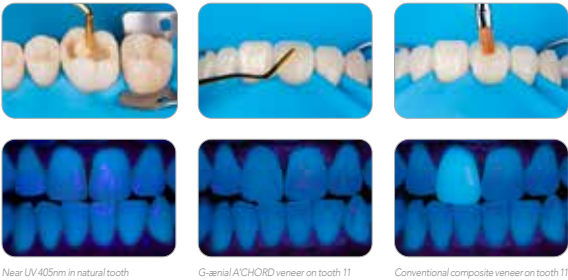
Its unique filler technology mimics natural light reflection resulting in impressive invisible restorations.

## A'CHORD Simplification

- simplified unishade system
- simplified handling
- simply universal (anterior/posterior)

## A'CHORD Aesthetics

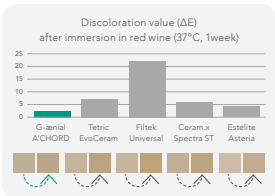
- natural fluorescence
- long-lasting gloss
- extreme challenges



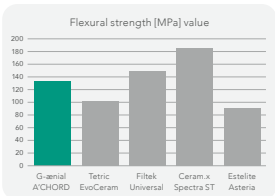
Courtesy of J. Tania Gadea, Spain

## A'CHORD Revolutionary technology

- proprietary filler and coating
- high stain and wear resistance
- excellent radiopacity



Source: GC R&D, Japan, 2020. Data on file.



Source: GC R&D, Japan, 2020. Data on file.

check the shade matching



# G-ænial Universal Injectable

## Inject, shape and contour all at once

Because G-ænial Universal Injectable doesn't slump or string, you have total control to adapt, shape and contour as you inject for fast, effortless restorations. It adapts perfectly to the cavity floor and allows you to easily build contours, cusps and even proximal walls.

Universal placement in all cavities

With effortless extrusion, our syringe and unitips are a joy to use and the bendable tips make precise delivery easy.

No stringing, no slump, no stress



Bendable tips for superior cavity adaptation



Easy extrusion for maximum comfort

Thin nozzle for controlled extrusion



## everX Flow

### Build a rock solid core with everX Flow

Thanks to the short glass fibres it contains, everX Flow efficiently reinforces restorations and displays an exceptionally high fracture toughness. Fibres also help to redirect cracks and avoid catastrophic failures, which makes everX Flow an optimal material to use in weakened or cracked teeth, for instance after amalgam removal.

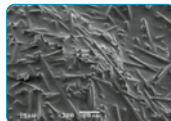
everX Flow has a very thixotropic viscosity which allows it to flow and adapt perfectly to the cavity floor, but without any slumping - even when used in upper molars. This optimal consistency makes your restorative treatment both faster and easier.



Fracture toughness (kN/m<sup>3/2</sup>)

2,88

everX Flow



Courtesy of Dr Lassila, University of Turku, Finland

Bulk shade

Depth of cure 5.5 mm

Optimal for deep posterior cavities

Dentin shade

Depth of cure 2.0 mm

Optimal for more aesthetic results

Filtek Bulk Fill Flowable 1,71

Tetric EvoFlow Bulk Fill 1,69

SDR flow+ 1,65

# An easy and safe isolation protocol

A good isolation protocol is paramount to ensure clinical success of a resin composite restoration. Not only does it protect the patient from inhaling debris, but it creates a comfortable, dry area of work to allow more predictable and longer lasting restorations. Below are some key points to remember when using a rubber dam.

## Rubber dam features



- Heavy gauge:
  - more retraction
  - more resistant to chemicals
  - more resistant to mechanical damage
- Minimum powder:
  - less field contamination
  - easier to clean
- Light blue and opaque shade:
  - reflects light - illuminates the field
  - color contrast with teeth (opposite color)
  - relaxing positive visual effect (blue sky)



## Isolation steps

- Floss and clean all contacts before placing the rubber dam. Food rests may interfere with dam placement
- \* Floss will disclose contact strength and potential problematic areas that can tear the dam
- Punch holes carefully, avoid using big holes or too small ones
- Isolate half arch: central incisor to at least the distal tooth to the one to be treated
- Use lubricant gel to pass tight contacts easier
- Use the floss to finalise passing the contacts
- Invert the rubber dam
- Use floss ligatures when more retraction is required

## Clamps

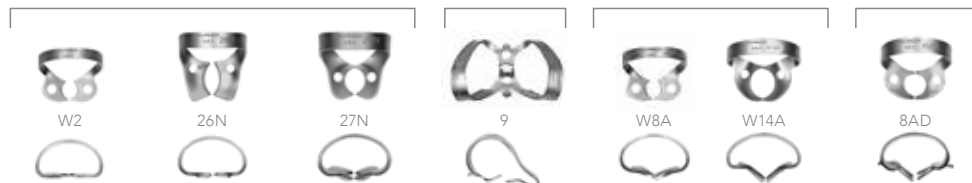
Choosing a clamp adapted to the anatomy of the teeth will help to complete the placement of the rubber dam and secure the isolation.

Standard clamps

N° 9  
Clamp - Universal

Special clamps  
- W8A - Upper Molars  
- W14A - Lower Molars

8AD  
Distal work  
on last tooth



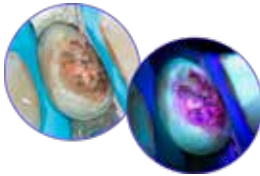
## Preparation criteria

- Precise removal of caries without removing stains
- Rounded internal angles
- Diamond bur for enamel, carbide bur for dentin
- No bevels needed in occlusal area
- Conditioning with aluminum oxide 29 microns or bio-glass
- Interproximal polishing with strips/disc
- Remnant structure evaluation

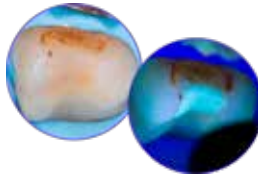


## Use D-Light Pro's Detection Mode to help you detect:

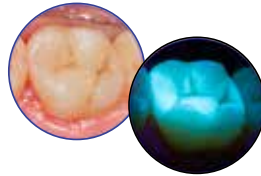
Infected dentin



Microleakage



Composite



- Tooth will appear green/blue fluorescent
- Infected dentin/plaque/ microleakage will appear red/pink fluorescent
- Margin stains will appear as not fluorescent
- Composite/cement will appear highly fluorescent



# Criteria for when to perform cusp coverage

- Wide isthmus: (> than half of the intercuspal distance) and thin walls (< 2mm thickness)
- Unsupported enamel (completely undermined cusp)
- Horizontal crack on the base of a partially undermined cusp
- Longitudinal MOD crack
- Endo treated teeth with MOD restoration
- Endo treated teeth with presence of cracks in pulp chamber



Polishing with strips, discs or swingle instruments help to smoothen the preparation, enabling a perfect adaptation of the matrix to the margins of the cavity.

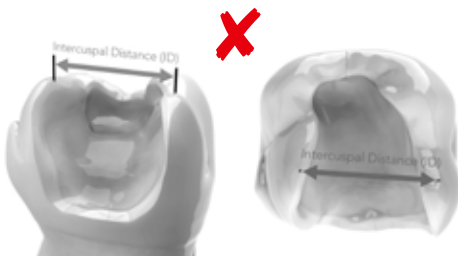


Irregular margins create gaps between the matrix and the tooth which can cause leakage of fluids to the cavity during the procedure as well as overhangs of material when placing composite.

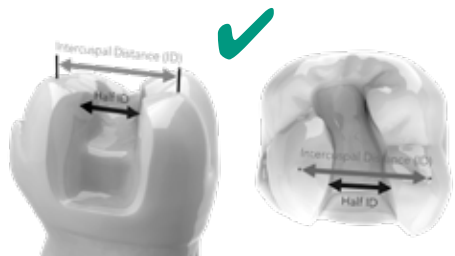
## Isthmus is recommended to be less than half the intercuspal width:

The smaller the cavity, more tooth structure remains to resist functional forces and flexure. When the isthmus is less than half the intercuspal width, the cusps retain a significant resistance to flexure, which reduces the fatigue placed on the bond to the restoration. The wider the cavity gets, the weaker the cusps become, meaning cuspal flexure becomes an increasing problem. This flexure can result in bond failure, the introduction and fracture of the remaining tooth.

Wall thickness and isthmus evaluation



Wall thickness and isthmus evaluation





# Bonding

## Etching Techniques



**Total etch**  
enamel (10-15 sec)  
& dentin (15 sec)



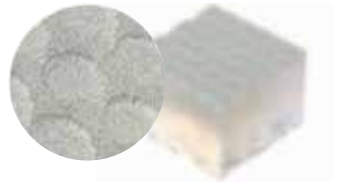
**Selective etch**  
only enamel phosphoric acid etch  
(10-15 sec)



**Self etch**  
no phosphoric acid  
on enamel or dentin

## Etched enamel

Phosphoric acid will dissolve the superficial aprismatic enamel, exposing the surface of the enamel rods.



surface of enamel after etching

## Etched dentin



**Dry dentin**  
collapsed collagen fibres



**Hydrated dentin**  
expanded collagen fibres



surface of the dentin  
after etching

### Dried out dentin:

- Collagen fibre collapse
- Lack of bonding infiltration
- Post-op sensitivity, hydrolysis & degradation of exposed collagen

### Hydrated dentin:

- Collagen fibres are expanded and can be infiltrated properly by the bonding agent

### Smear layer



To increase bonding infiltration one must handle the smear layer (debris) caused during the preparation. It can either be removed or modified. By etching the dentin (in total etch) the smear layer is removed. However, to avoid issues related to the etching of the dentin, one might prefer to use the adhesive on the selective etching mode where only the enamel is etched. In this case the adhesive will modify and infiltrate the smear layer at the same time. If desired the smear layer can be also modified by air abrasion before the adhesive application.

### Total etch



smear layer removed



**Hydrated dentin**  
expanded collagen fibres

If choosing the **total etch technique**, etch the dentin for **15 sec with 35% phosphoric acid**. Timing of acid etching is critical to avoid excessive demineralisation and increased depth of exposure of the collagen fibres.

### Selective or self etch



smear layer modified



**Self etch**  
partially demineralised dentin

The selective etch mode consists on etching only the enamel with 35% phosphoric acid for 30 sec. It will expose the enamel prisms increasing the micromechanical retention. The self etching adhesives or techniques etch and infiltrate at the same time, making virtually impossible to generate gaps during the process, because they do not completely demineralize the dentin surrounding the collagen fibres.

## GC's expertise in bonding

### Both GC's **Universal Bonding Systems**

- Offer high bond strength – for a strong bonding both to tooth & restorations in case of repair
- Contain unique combination of three functional monomers (4-MET, MDP, MDTP), allowing top performance in all situations
- Are HEMA free – for higher durability & lower water sorption
- Have an ergonomic design – for easy use
- Deliver precise dispensing – with a high number of drops per bottle
- Can be used in all etching modes: total etch, selective etch and self etch with virtually no post-operative sensitivity
- Multiple indications: direct restorations, hypersensitivity, repair, indirect restorations, etc.



#### **G-PREMIO Bond** **One-step**

one bottle adhesive system

Check out  
this Step by Step  
if you prefer  
a single bottle system



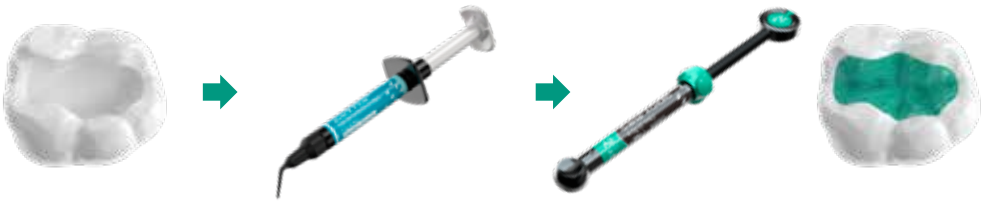
#### **G2-Bond Universal** **Two-step**

two bottle adhesive system  
(primer and bond)

Check out  
this Step by Step  
if you prefer  
a two-step bottle system



## Class I – First lower molar



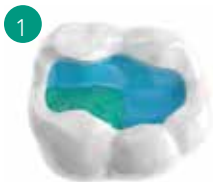
### Dentin Build Up



Filling the cavity up to 2.0mm with everX Flow dentin shade (or use everX Flow Bulk shade in one layer of up to 5.5mm), forming a concave dentin that leaves 1.5mm occlusal space for the enamel replacement.

### Cusp build up (enamel replacement)

There are different ways to build the cusps, but one that never fails is the anti-clockwise technique. For this step we use G-ænial A'CHORD. Start from the mesio buccal cusp, then move to the next cusp, the buccal one. Then move onto the disto-buccal cusp. Continue with the disto-lingual cusp and finish with the mesio-lingual cusp. Always light cure after each cusp placement.



Mesio-buccal cusp



Buccal cusp



Disto-buccal cusp



Disto-lingual cusp



Mesio-lingual cusp

# Occlusion - First lower molar

It is important to respect the occlusal anatomy in order to liberate the cusps in the eccentric movements of the mandible. A wrong anatomy will create interferences which may lead to problems like parafunction, wear, hypersensitivity and chipping of the composite restoration. Attention needs to be given not only on the working side but also in non-working side.

## Laterotrusion

working side



The first upper molar mesio-palatal (MP) cusp (main active cusp on first upper molar) needs to escape between the lingual cusps of the first lower molar (blue and yellow) during the laterotrusion (lateral movement on working side). It is important to rebuild the inner slopes from the cusps to facilitate this route from the central fossa.



Cusp movements during dynamic occlusion

## Latero-protrusion

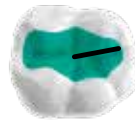
working side



In the combination of lateral and protrusive movement, the inner mesial part of the disto-lingual cusp (yellow) must have a less convex and round shape. A more flat or slightly concave surface will help liberating the first upper molar MP cusp in its movement. Similarly, the inner mesial part of the mesio-lingual cusp (blue) should be able to allow the movement of the second upper premolar palatal cusp.

## Protrusion

non working side



During protrusion, the first upper molar MP cusp needs to escape through the distal marginal ridge on the first lower molar.

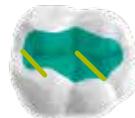
It is important to avoid placing the disto-buccal cusp into this marginal ridge creating a possible interference.



Contact Points

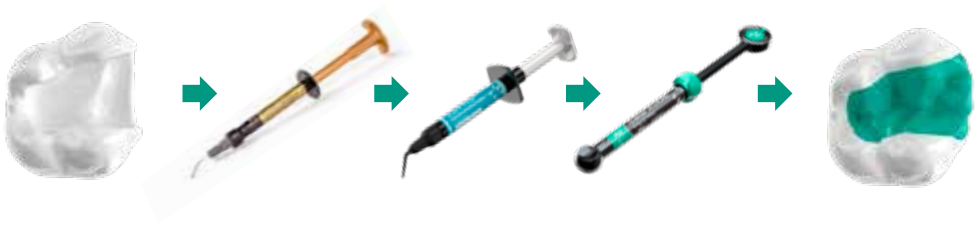
## Mediotrusion

non-working side



The fissure between buccal and disto-buccal cusps determines the escape route for the first upper molar mesio-lingual cusp during the mediotrusion (lateral movement on the non-working side). Thus, it is important to always build three separate cusps in the buccal side of the first lower molar to avoid interference in this movement.

## Class II – First upper molar



### Mesial wall



Position the matrix, wedge and ring. Bonding is applied and a thin layer of composite (G-ænial Universal Injectable) may be used to seal the gingival margin against the matrix. After light curing this first portion of composite, the mesial wall can be built with either G-ænial Universal Injectable or G-ænial A'CHORD changing a class II into a class I cavity. Once the interproximal wall is ready we can remove the matrix, ring and wedge in order to have a better visualisation of the anatomy.

### Dentin Build Up



Filling the cavity up to 2.0mm with everX Flow dentin shade (or use everX Flow Bulk shade in one layer of up to 5.5mm), forming a concave dentin that leaves 1.5mm occlusal space for the enamel replacement. For deeper cavities it is possible to start with a thicker layer of everX Flow bulk shade, since it can be cured up to 5.5mm increments.

## Cusp Build Up

Similarly to the class I in page 12, here also we follow the cusp by cusp technique, but instead of anti-clockwise, we go for the cross way. The first upper molar has a simpler anatomy, so it can be faster. Start from the distal buccal cusp, then move to the biggest cusp, the mesio palatal one. Always light cure after each cusp placement. Then move onto the distal palatal cusp. Continue with the mesio-buccal cusp and finish with the marginal ridge.



Disto-buccal cusp



Mesio-Palatal cusp



Disto-palatal cusp



Mesio-buccal cusp



Mesial Marginal ridge

## The brush technique



Using GC Modeling Liquid kit for the cusp-by-cusp technique makes everything much easier. Wet the brush with the Modeling Liquid and remove the excess of liquid before starting to sculpt with the brush. You will notice how building the anatomy and creating smooth lines will become a breeze.



# Occlusion – First upper molar

## Laterotrusion

working side



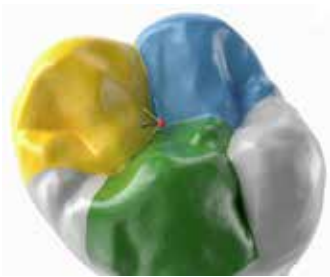
The lower first molar buccal cusp needs to escape through the buccal cusps of the first upper molar (blue and yellow) during the laterotrusion (lateral movement on working side). It is important to rebuild the inner slopes from the cusps to facilitate this route from the central fossa.

## Protrusion

non-working side



During protrusion, the lower first molar buccal cusps need to escape through the mesial marginal ridge on the upper first molar. It is important to build this marginal ridge in a separate increment and different slope angulation from the mesio-buccal cusp in order to avoid interferences.



Cusp movements during dynamic occlusion



Contact Points

## Latero-protrusion

working side



In the combination of lateral and protrusive movement, the inner distal part of the mesio-buccal cusp (yellow) must have a less convex and round shape. A more flat or slightly concave surface will help liberating the first lower molar buccal cusp in its movement. Similarly, the connection between this mesio-buccal cusp (yellow) and the mesial marginal ridge should allow the movement of the mesio-buccal cusp of the first lower molar.

## Mediotrusion

non-working side



The mesial slope of the mesio-palatal cusp (green) should have a more concave shape to allow the escape of the lower first molar buccal-cusp during the mediotrusion (lateral movement on non-working side). In similar way, the fissure between mesio-palatal and disto-palatal cusps should have the same direction to allow escape of the first lower molar disto-buccal cusp.



## Finishing and Polishing

Once the anatomy is built and the composite is polymerized, ideally very little time should be spent on finishing. Hence, a right and standardized polishing protocol is essential to simplify the everyday practice.

To avoid an inhibition layer, apply a layer of an air barrier agent, like glycerin covering the whole surface of the composite, before you do your last polymerization.



Application of air barrier agent



After adjusting the occlusal contacts use a medium grit diamond coated rotating wheel.



Continue with a fine wheel.



Finish with a goat hair wheel and DIAPOLISHER PASTE to achieve outstanding gloss that lasts.



Final result



## Clinical cases with one single shade



Courtesy of R. Asparuhov, Bulgaria



Courtesy of L. Dahan, France



Courtesy of N. Lehmann, France



Courtesy of P. Dimitrov, Bulgaria



Courtesy of K. Saleh, Iraq



Courtesy of M. Dimitrakopoulos, Greece

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