

Biological properties

- The G-CAM disc is a biocompatible device according to:
 - ISO 7405:2018 “Evaluation of biocompatibility of medical devices used in dentistry”
 - ISO 10993-1:2018 “Biological evaluation of medical devices”
- G-CAM has passed the cytotoxicity, hypersensitivity, irritation or intracutaneous reactivity, acute systemic toxicity, subchronic systemic toxicity, genotoxicity and implantation tests carried out at the University of Alcalá and by the Valencian Institute of Microbiology (IVAMI).

- The results showed no adverse biological effects in any of the tested items showing adequate biological performance in all cases.

G-CAM

Graphenano Dental
info@graphenanodental.com

Polígono Industrial Táctica. Calle 2, n.º 1
46980 Paterna, Valencia (Spain)
t. (+34) 965 108 102

graphenanodental.com

Graphenano Group:

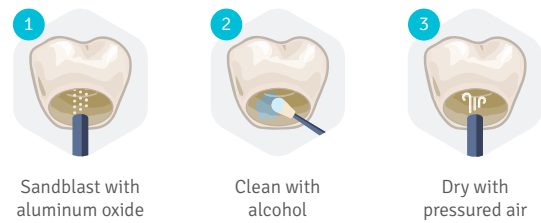


The registration of Graphenano dental and G-CAM in USA may be check under the FDA's Establishment Registration & Device Listing page.
<https://www.accessdata.fda.gov/scripts/cdrh/cfdocs/cfRL/rL.cfm>



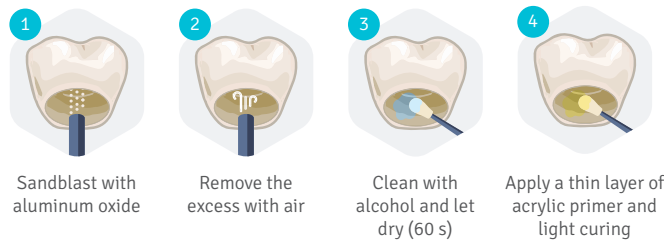
Process in laboratories

Cleaning the graphene crown

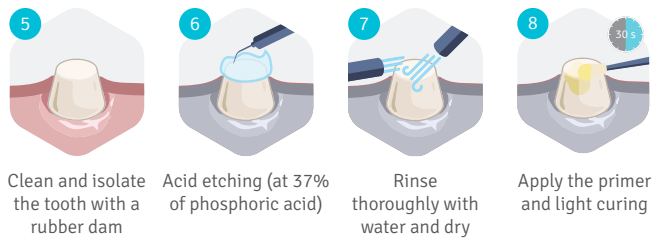


Process in clinic

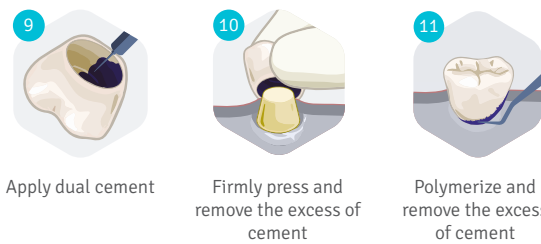
G-CAM structure preparation



Tooth preparation



Cementation of the crown



* The cement we recomend is resin-based and dual-format and read the instruction sheet of the material to be used for cementation, each cement may need a specific protocol.



G-CAM

Graphene reinforced
biopolymer disc
for CAD/CAM milling.

For definitive prosthesis.



graphenanodental.com

The graphene

Graphene is a single graphite layer, consisting of a hexagonally arranged, sp² bonded, stable two-dimensional allotrope of carbon with a plethora of unique properties (Geim and Novoselov, 2004).

Amongst its main properties are great thermal and electrical conductivity, high traction resistance, small density and low coefficient of thermal expansion. Due to these properties, graphene has become an excellent material with big potential for the improvement of industrial applications.

The **incorporation of graphene into polymers** is an innovating strategy to improve its mechanical properties. The increase on the elastic modulus as well as the toughness reduce the appearance of cracks and breaks. The low density of graphene in addition to the excellent mechanical properties lead to the creation of lighthard polymers.

Therefore, graphene is an ideal candidate to improve the performance of thermal-curing acrylic resins for dental use, not only to create polymers with high mechanical resistance, but also polymers with low water absorption capacity, with minimum residual monomers and biocompatible.

Comparison table of dental solutions

Types of prostheses / material	PMMA	Metal	Zirconium	Lithium Disilicate	Resin + Graphene
Individual crowns					
Bridges of up to 3 pieces	-			-	
Bridges of more than 2 implants	-		-	-	
Settings		-	-		
Veneers	-	-			
Complete prostheses		-	-	-	
Implant overdentures		-	-	-	

What is G-CAM?

G-CAM is a thermoplastic acrylic disc made by a principal base of polymethyl methacrylate (PMMA) resin doped with graphene (allotropic form of carbon), suitable for the creation of dental prostheses using CAD/CAM technology.

G-CAM discs are intended to be used for the manufacture of full and partial removable dentures, implant overdentures as well as permanent and temporary restorations such as anterior or posterior crowns and bridges, inlays, onlays, veneers, copings and substructures.

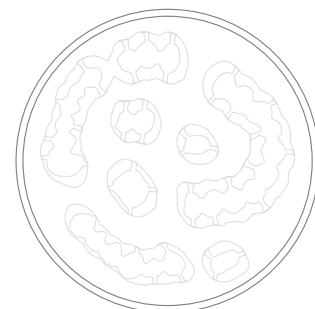


G-CAM Models

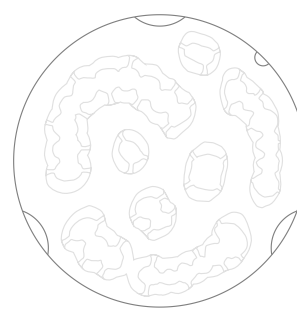
G-CAM is presented as a compacted resin disc offered in two different anchor dimensions. There are two different discs variants based on the specified type of anchor used by the CAM device:

- **Anchorage 98,5 mm (Universal):** disc of 98.5mm diameter. Thicknesses: 14, 16, 18, 20, 22, 24, 26, 30 mm.
- **Anchorage 95 mm:** disc of 95mm diameter. Thicknesses: 14, 16, 20 y 24 mm.

G-CAM device is available in the following colours: BL1, BL2, A1, A2, A3, A3'5, B1, B2, C2 and Transparent (according to VITA classic guide).



Anchorage 98,5 mm (Universal)



Anchorage 95 mm



Properties

The **graphene nanoreinforced biopolymer G-CAM disc**, especially designed for permanent dental structures, is available in different chromatic crowns that have an extremely natural aesthetic appearance.

The G-CAM discs provide innumerable properties to dental structures and comply with the characteristics to be an ideal material for prosthetic works with CAD/CAM technology.

G-CAM Format

G-CAM disc is available in 2 different formats:

G-CAM MONOCHROMA and G-CAM MULTICHROMA.

Monochrome and Multichroma discs may be both used for full anatomical monolithic restorations. When machined, G-CAM Monochroma and G-CAM Multichroma present a different visual effect:

- G-CAM Monochroma, is made of a pure colour based in the VITA Classic guide.
- G-CAM Multichroma, it has a chromatic spectrum based in natural colour imitating the optical effects of the natural dentition.

The more suitable choice between monochrome and multichrome disc will depend on the final application given to the device.



Technical Characteristics

- G-CAM presents high elastic modulus and limit to ensure that the tensions generated during biting and chewing do not cause permanent deformations.
- G-CAM presents high deformation resistance and stress limit, thus avoiding the formation of cracks and fractures.
- G-CAM is low density making the prosthesis lightweight.
- Increased hardness of the material compared with acrylic resins used in dentistry.
- Similar appearance to oral tissue, ideal for areas that are more visible.
- G-CAM has stability color. Wide chromatic range, even within the same piece, making it look extremely natural.
- G-CAM disc is chemically inert.
- G-CAM water absorption is 4 µg/mm³ and a solubility of 0.5 µg/mm². The release of residual monomer is minimum, with a percentage of 0.004% of residual monomer. Thanks to these physical properties G-CAM offers a durable and safety treatment.

Material properties

Elastic modulus ⁽¹⁾ : 3200 ± 7% MPa	Bending strength ⁽¹⁾ : 140 ± 7% MPa	Surface hardness ⁽²⁾ : 88 Shore D ⁽²⁾ 19,5 KHN ⁽³⁾
Compressive strenght ⁽⁴⁾ : 155 ± 5 MPa	Solubility ⁽¹⁾ : 0,5 µg/mm³	Water absorption ⁽¹⁾ : 4 µg/mm³
Residual monomer ⁽¹⁾ : <0,004 %		

⁽¹⁾ UNE-EN ISO 20795-1: 2013 | ⁽²⁾ ISO 48-4:2018 | ⁽³⁾ ASTM E384
⁽⁴⁾ ISO 5833:2002

