

Biological properties

- Not irritant or toxic for the patient.
- The G-CAM disc has passed the cytotoxicity and genetic tests carried out at the University of Alcalá and by the Valencian Institute of Microbiology (IVAMI).
 - In vitro cytotoxicity test. ISO Standard 10993-5:2009.
 - Reversion of Bacterial Mutations Test. ISO Standard 10993-3:2014 and OECD 471:1997.
- Bacteriostatic. Graphene does not allow the growth of bacteria or mould.
- Antiallergic.
- It includes, through a plasma process, slow-release disinfectant products.

Cementation process of a crown with graphene

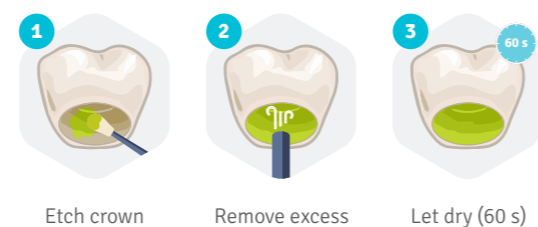
Process in laboratories

Cleaning the graphene crown



Process in a clinic

Cleaning the prepared tooth



Cementation of the crown



G-CAM

Graphene nanoreinforced biopolymer disc for CAD/CAM drilling

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The graphene

Graphene can be described as a two-dimensional material in which the carbon atoms are joined through sp² links to make a flat sheet with a structure similar to a beehive.

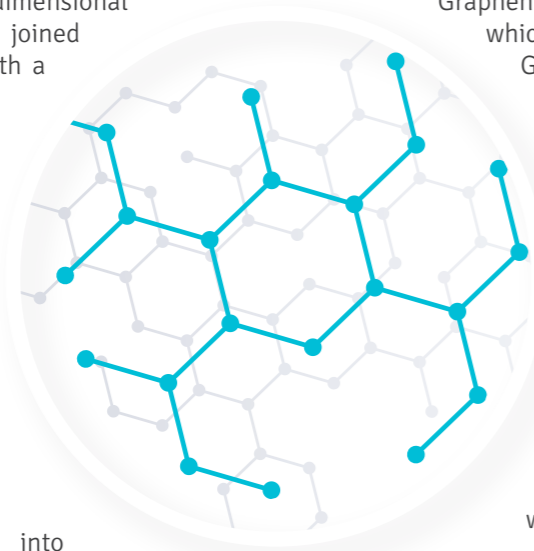
Graphene's properties make it a material with big potential for the manufacture of other compound materials. Amongst its principal properties are its high thermal and electrical conductivity, its high traction resistance, its low density and its low coefficient of thermal expansion. Furthermore, since it is carbon, graphene is ecological and recyclable.

The incorporation of graphene into autopolymerising **acrylic resin** is an innovating strategy to improve its mechanical properties, simultaneously increasing the elastic modulus as well as the tenacity, reducing the appearance of cracks and/or the spreading of them as well as decreasing the shrinkage rate during polymerisation.

Graphene is the ideal candidate to improve the performance of autopolymerising acrylic resins for dental use, not only due to its high traction resistance, coefficient of thermal expansion, high capacity for absorption and lubrication, flexibility and high surface area, but also for its high weight to resistance ratio.

Comparison table of dental solutions				
Types of prostheses	PMMA	Zirconium	Lithium Disilicate	Resin + Graphene
Individual crowns	✓	✓	✓	✓
Bridges of up to three pieces	✗	✓	✗	✓
Bridges of more than two implants	✗	✗	✗	✓
Settings	✓	✗	✓	✓
Veneers	✗	✓	✓	✓
Complete prostheses	✓	✗	✗	✓
Direct rehabilitations and implants	✗	✗	✗	✓

Characteristics

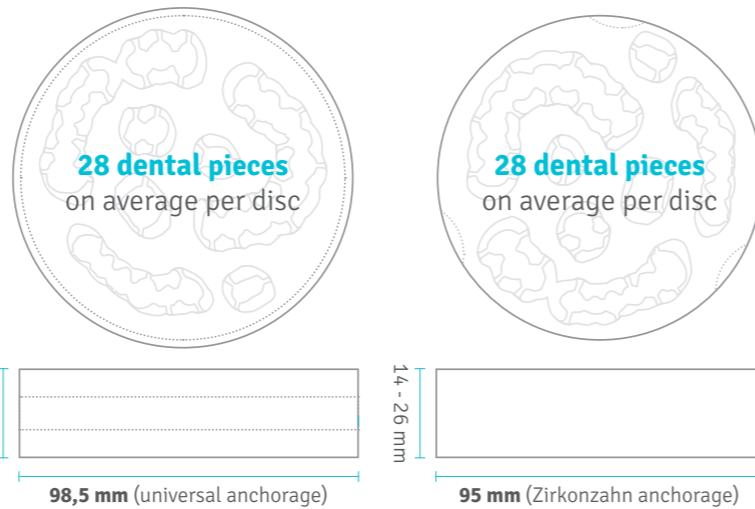


Graphenano Dental offers a **wide chromatic catalogue**, which guarantees comprehensive solutions. The G-CAM colorimetry, based on the VITA classic shade guide, is not only limited to intermediate colours, but also allows for more shades through the make-up of photopolymerisable surfaces in the laboratory.

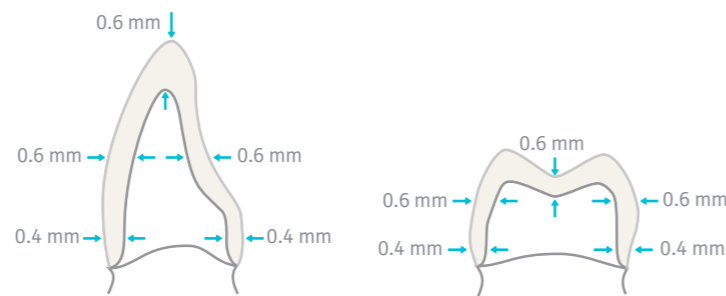
The G-CAM disc comes in two different formats:

- **G-CAM Monochroma**, single colour.
- **G-CAM Multichroma**, a unique wide chromatic spectrum based on natural colours with high translucence.

The thickness of the G-CAM disc can be 14, 16, 18, 20, 22, 24 and 26 mm. Special thickness up to 30 mm are available upon request.



Wall thickness in restoration



See instructions of use for the wall thickness suitable in restorations (e.g. veneers, inlays and onlays).



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, as well as resolving all the mechanical, physicochemical and biological failures of the rest of the materials currently used in the sector.

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

Physical properties

- Similar appearance to oral tissue, ideal for areas that are more visible.
- Wide chromatic range, even within the same piece, making it look extremely natural.
- High glass transition temperature (T_g) that prevents it from softening and distortion during use and cleaning.
- Low density making the prosthesis lightweight.
- High electrical conductivity to maintain a healthy oral mucous and to react normally to hot or cold stimuli.
- Translucent material with high transparency to imitate the natural aesthetic of the tooth, but also allows us to create opaque colours to avoid showing dead teeth or metal pins.
- Totally waterproof and stable material that does not allow plaque build-up, furthermore, due to its closed pores there is no dirt build-up or discolouring.

It does not require an interface process during the make-up of the dental piece. There is no danger of it breaking or chipping, since the enamel is resistant to micro stresses.

Mechanical properties

- High elastic modulus and limit to ensure that the tensions generated during biting and chewing do not cause permanent deformations, and it is possible to manufacture prosthesis of smaller sections.
- High deformation resistance and stress limit, thus avoiding the formation of cracks and fractures.
- High impact resistance, which is useful for removable prostheses.
- High-abrasion resistance that avoids excessive erosion from cleaning or eating.
- Increased hardness of the material compared with acrylic resins used in dentistry.
- High flexibility and ability to insertion of photopolymerisable materials make it the best option to ensure that your treatment is durable.

Chemical properties

- Chemically inert.
- Insoluble in oral fluids.
- It does not absorb water or saliva, meaning that mechanic properties are not altered and it is completely hygienic.
- It does not allow for the phenomenon of bimetalism.

Material properties

Elastic modulus	>3200 MPa
Bending strength	>140 MPa
Surface hardness	88 Shore
Water absorption	15 µg/mm ³
Residual monomer	<0,004 %

