

## NANO HYBRID LIGHT CURE COMPOSITE MEDENTAL



### **Introduction:**

Composites or composite resins are synthetic materials mixed heterogeneously forming a compound, as their name indicates. Composite resins are most commonly composed of Bis-GMA and other dimethacrylate monomers (TEGMA, UDMA, HDMA), a filler material such as silica, and in most applications, a photoinitiator.

Hybrid composites were introduced in the 1980s and are most commonly known as resin-modified glass ionomer cements (RMGIC). The material consists of a powder containing a radiopaque fluoroaluminosilicate glass and a photoactive liquid contained in a dark bottle or capsule. The material was introduced because resin composites alone were not suitable for class II cavities. RMGIC can be used instead. This mixture of resin and glass ionomer allows the material to set via light activation (resin), allowing for a longer working time. It also has the benefit that the glass ionomer component releases fluorine and has superior adhesive properties. The hybrid filler contains particles of various sizes with a filler loading of 75-85% by weight.

In the case of nanohybrid resins, they contain nanometric particles that vary between 25 and 75 nanometers (0.025  $\mu\text{m}$ ). These particles can be arranged individually or grouped in “nanoclusters” or nanoaggregates, with approximate sizes of 0.4 to 1.4  $\mu\text{m}$ .

### **Device description:**

Nano Hybrid Light Cure Composites produced by Medental International. It is a composite designed to increase aesthetics and easy polishing in class V, III, and IV cavities in anterior teeth. It's indicated use, as mentioned by the manufacturer, is that the light cure composite can be used in cavities where there is occlusal loading due to its high particle resistance. For aesthetics Restorations in anteriors, premolar, and first molar, Indirect Inlays, onlays and veneers.

**Intention of use:**

Nanohybrid Light Cure Composite: Universal Composite for aesthetics Restorations in anteriors, premolar, and first molar, Indirect Inlays, onlays and veneers.

Direct restorations on anterior teeth:

- Class III (lesions on the proximal surface).
- Class IV (injuries affecting the incisal angle).
- Class V (cervical or gum line injuries).

Aesthetic veneers:

- Nanohybrid resins are used to create dental veneers that improve the appearance of front teeth.
- Indirect inlays and onlays:
- These restorations are fabricated outside the mouth and then cemented into place.

Core reconstructions:

- To restore endodontically treated teeth (with root canals)

In addition to its strength, nanohybrid resin has excellent properties for molding, sculpting and polishing. Provides high shine and satisfactory aesthetic results.

**Colors:**

A1, A2, A3, A3.5, B1, B2, B3, C1, C2, C3, D2, D3 Incisal and Opaque



	Results	ISO 4049:2019 values
Nano Hybrid Light Cure Composite Medental	Curing depth: 2.79 mm	1.0 mm (Opaque) Minimum 1.5mm(Other) Minimum
	Flexural Stress: 120 MPa	80 MPa Minimum
	Water Absorption: 20 mg/μm <sup>3</sup>	40 mg/μm <sup>3</sup> Maximum
	Solubility: 3 μm <sup>3</sup>	7.5 mg/μm <sup>3</sup> Maximum

**Product performance used in other dental applications:**

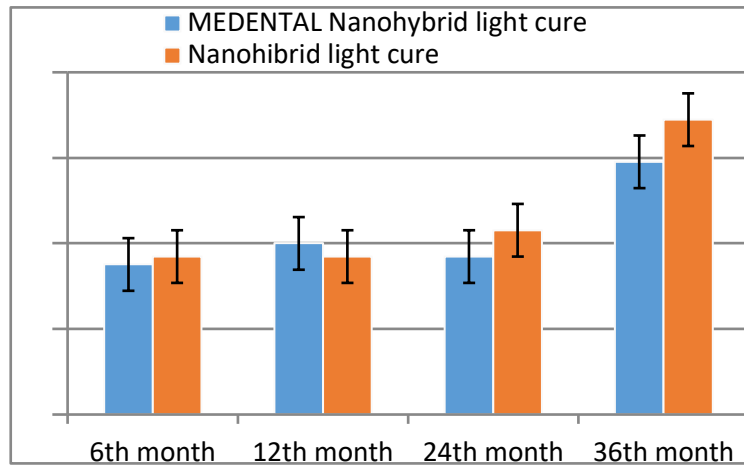
A clinical evaluation carried out on the Nano Hybrid Light Cure Composite resin from Medental Clinical Evaluation Report revealed that it can be useful and almost similar in applications in which another brand of Nanohybrid Composite. The evaluation was carried out with a period of 36 months of monitoring by 3 independent dentists.

The results obtained in the clinical evaluation report the following graph the results were based on the data at 6, 12, 24, and 36 months post observation showing the differences between the Nano Hybrid Light Cure Composite Medental resin and the another brand light-curing nanohybrid resin in their color matching capability, marginal integrity, surface texture and filling finish.

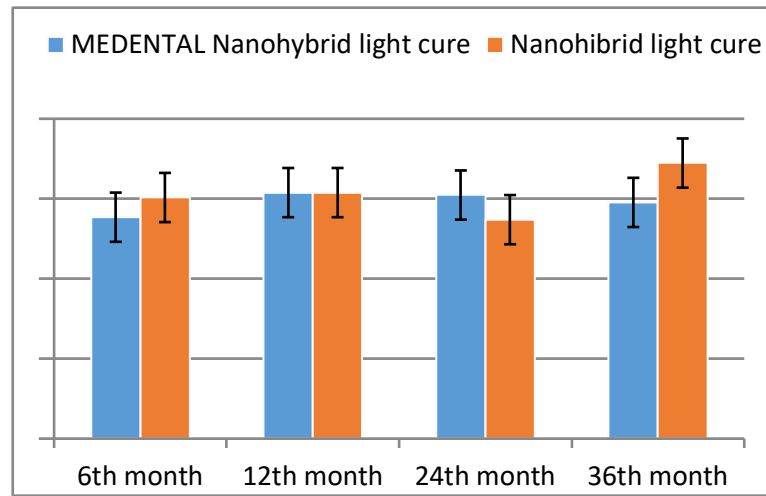


In the control over 36 months the overall clinical success rate was 100%, the Nano Hybrid Light Cure Composite Medental resin shows a constant permanence in the mouth in both class I and V cavities, compared to another brand nanohybrid resin, however, there are no significant differences between both resins. There is no presence of wear in the composite, the tooth color used for the composite gives a very pleasant tooth color in the occlusal areas, there is a slight discoloration of the color after 36 months, and yet it is imperceptible to the human eye.

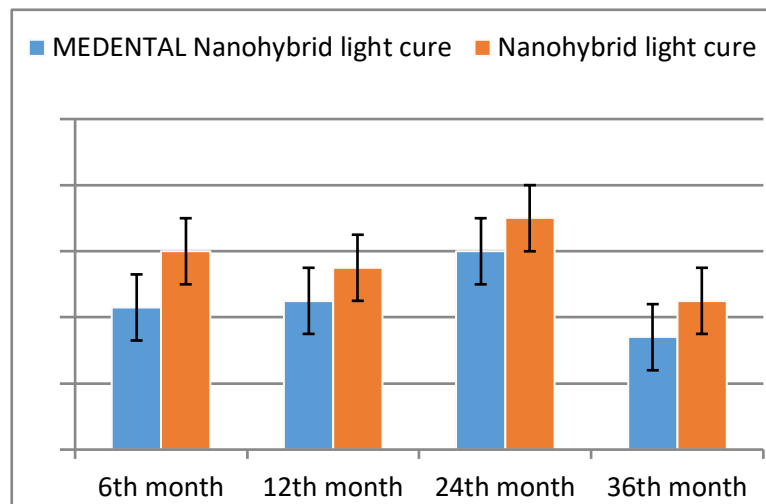
This graph represents the Color matching capability of the MEDENTAL Nanohybrid Light Cure Composite with respect to another light-curing nanohybrid resin at 6, 12, 24 and 36 months.



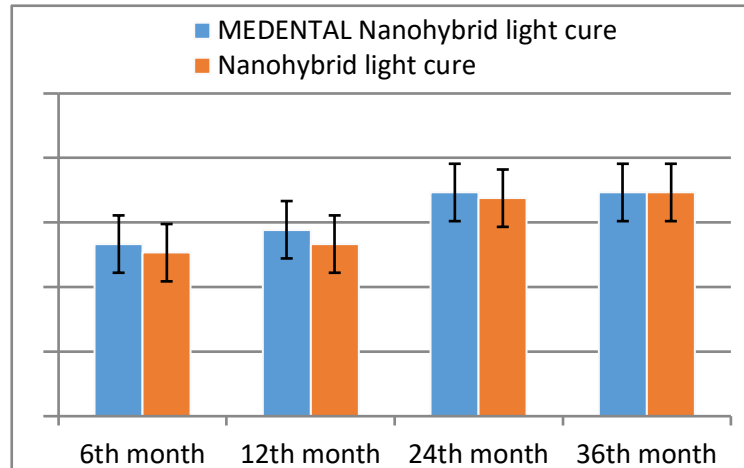
- This graph represents the Marginal Integrity of the MEDENTAL Nano hybrid Light Cure Composite with respect to another light-curing nano hybrid resin at 6, 12, 24 and 36 months.



- This graph represents the Superficial texture of the the MEDENTAL Nano hybrid Light Cure Composite with respect to another light-curing nano hybrid resin at 6, 12, 24 and 36 months.



- This graph represents the Finish of obturation of the MEDENTAL NanoHybrid Light Cure Composite with respect to another light-curing nanoHybrid resin at 6, 12, 24 and 36 months.



After 36 months, the Nano Hybrid Light Cure Composite Medental resin shows a constant permanence in the mouth in both class I and V cavities, compared to the other brand resin, however, after 36 months in terms of surface texture, significant initial wear was observed in both resins without any presenting alteration of the same, this may be due to the different occlusions of the patients participating in this study. The ability to maintain color is directly proportional to the marginal sealing from the beginning to 6 months until the end of the study. There are significant differences between both resins. None of the patients have presented adverse reactions such as allergies, irritation, inflammation, during the follow-up. All individuals report a 100% success rate.