

Last Generation Bis-GMA Free Composite For Indirect Posterior Restorations: A Case Report

© Manuel Delgado

University Justo Sierra, Mexico City, Mexico

Abstract:

Scientific literature put in evidence the importance to use biocompatible materials, free from any substance that can be toxic for the human body, for this reason a Bis-GMA free composite material is used that shows cytotoxicity equal to zero. Nowadays composite materials can be used with direct and indirect technique. In this case report we decided to provide an indirect composite restoration, this is an excellent option in absence of coronal destruction, as we improve the anatomic contour, and we also increase the physical properties as we also post curing the element in a light curing unit for indirect technique that must not exceed the 80°C /176 °F to avoid to damage the inorganic matrix of the composite.

Keywords: Bis-GMA, Indirect Posterior Restoration, wear resistance.**Received:** 04.10.2023; **revised:** 27.11.2023; **accepted:** 29.11.2023.**Conflict of interests:** The authors declare no conflict of interests.**Acknowledgments:** There are no funding and individual acknowledgments to declare.**For citation:** Manuel Delgado. Last Generation Bis-GMA Free Composite For Indirect Posterior Restorations: A Case Report. *Endodontics today*. 2023; 21(4):305-307. DOI: 10.36377/1683-2981-2023-21-4-305-307.

Использование композита последнего поколения без Bis-GMA для создания непрямых реставраций в боковом отделе: Клинический случай

© Мануэль Дельгадо

Университет Хусто Сьерра, Мехико, Мексика

Резюме:

Научная литература подтверждает важность использования биосовместимых материалов, не содержащих веществ, которые могут быть токсичными для человеческого организма, поэтому используется композитный материал без Bis-GMA, который демонстрирует цитотоксичность, равную нулю. В настоящее время композитные материалы могут быть использованы с помощью прямой и непрямой техники. В данном случае мы решили провести непрямую композитную реставрацию, что является отличным вариантом при отсутствии деструкции коронковой части зуба, так как мы улучшаем анатомический контур, а также повышаем физические свойства, так как мы также проводим светоотверждаемую постполимеризацию элемента, которая не должна превышать 80°C /176 °F, чтобы избежать повреждения неорганической матрицы композита.

Ключевые слова: Bis-GMA, непрямая реставрация, износостойкость.**Статья поступила:** 04.10.2023; **исправлена:** 27.11.2023; **принята:** 29.11.2023.**Конфликт интересов:** Авторы сообщают об отсутствии конфликта интересов.**Благодарности:** Финансирование и индивидуальные благодарности для декларирования отсутствуют.**Для цитирования:** Мануэль Дельгадо. Использование композита последнего поколения без Bis-GMA для создания непрямых реставраций в боковом отделе: Клинический случай. *Endodontics today*. 2023; 21(4):305-307. DOI: 10.36377/1683-2981-2023-21-4-305-307.**INTRODUCTION**

The majority of dental composites available in the market contain in the resin matrix a monomer known as Bis-GMA (bisphenol A-glycidyl methacrylate) introduced in 1956 Bowen R in dental composites and cements. Bis-GMA can liberate Bisphenol A (BPA) an organic compound that has

been identified as an endocrine disrupter causing health problems in human body [1].

Infants, children and pregnant or lactating women are the most sensitive to these effects and since 2011 the use of BPA in baby bottles has been prohibited in the European Union, in US since 2012 and in Canada since 2008 [2,3].

During the last years, scientific literature put in evidence the importance to use biocompatible materials, free from any substance that can be toxic for the human body, for this reason in my private practice I decided to use a Bis-GMA free composite material that shows cytotoxicity equal to zero [4].

Beside the biocompatibility, it is important for me to be able to use with my patients a composite material with mechanical and physical characteristics close to gold type III and with a wear resistance similar to natural enamel in order to restore the function in harmony with the neuromuscular system maintaining the occlusal balance and with an excellent esthetics. A further big advantage is that I can use the same composite for direct and indirect technique, in anterior and posterior area [5,6].

Dr. Lorenzo Vanini developed investigations and protocols demonstrating the considerable therapeutic advance of using this kind of composite for the treatment of postural syndromes guaranteeing the success also in big composite rehabilitation [1,7,8].

Case report

The patient of age 45 comes to my practice with a sensitivity to temperature in the posterior upper region, we observe a composite restoration in the first lower molar that shows infiltration and consequently sensitivity to cold (Figure 1). X ray does not show any pulp or periapical involvement. After an analysis of the tooth structure and administration of anesthetic we isolate the field with rubber dam to get a better access and visibility of the operatory field, the advantages of this procedure are well known and recognized among the international scientific community.

We make the preparation of the cavity with minimal tooth reduction and we take an impression with polyvinil-siloxane, of the antagonist and bite registration (Figures 2,3). The material of election for the realization of the indirect restoration is a Bis-GMA free composite material with high wear resistance and for this case we use one dentin shade and one enamel shade following the anatomic stratification technique developed by Dr. Lorenzo Vanini (Figure 4).

Once that the indirect restoration is ready, we isolate the field with rubber dam and we check the fitting of the indirect restoration before the cementation phase (Figure 5).

Cementation protocol

We sandblast the indirect restoration with 50 micron aluminium oxide, we clean with alcohol and dry with oil free compressed air. We etch with 37% phosphoric acid all cavity (enamel and dentin- total etching technique) for 15 seconds and enamel for others 20 seconds. We rinse the etching gel and we apply 2% chlorhexidine for one minute. We choose to use a monocomponent light curing V generation adhesive also Bis-GMA free, we cure for 40 seconds and then we apply a layer of a pure bonding of the same brand, also Bis-GMA free, curing for 40 seconds increasing in this way the bonding layer elasticity and reducing the water trees as it is scientifically demonstrated the multilayer adhesive systems give a better hybrid layer.

For cementation we use the same composite material used for the build up of the indirect restoration preheated in a composite heater at the temperature of 55°C/131 °F, in this way the composite becomes flowable and can be used as a dual curing cement giving optimal adaptation to the walls of the preparation, better time to remove the excess and excellent marginal sealing to avoid micro infiltration. In the last years the scientific evidence shows the benefits to warm the composite without reducing the physical and mechanical properties.



Fig. 1. Initial situation.
Рис. 1. Исходная ситуация.



Fig. 2: Preparation.
Рис. 2. Подготовка.

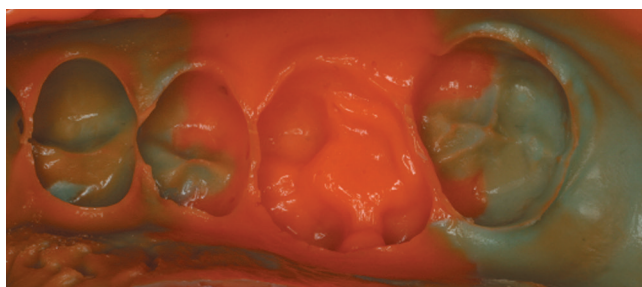


Fig. 3. Impression of the preparation.
Рис. 3. Оттиск после препарирования.



Fig. 4. Composite restoration
Рис. 4. Композитная реставрация



Fig. 5. Try-in of the dry restoration.

Рис. 5. Припасовка высушенной реставрации.



Fig. 6. The restoration after cementation.

Рис. 6. Реставрация после фиксации.

We apply the composite in the internal part of the indirect restoration, we place it in the mouth and apply a small amount of pressure, we remove the composite excess at margins and cure for 80 seconds from each side of the tooth. In case of inlay thickness over 2 mm it is necessary to use a dual curing cement.

Finishing and polishing procedure

We remove the rubber dam and we check the occlusion with a paper of articulation removing the precontact with diamond fine burs, later we use silicon points with water to avoid the overheating of the composite and of the tooth and consequentially the pulp damage.

The Bis-GMA free composite used in my daily practice it is filled with barium silicate, an ultra-fine glass filler (0,3 µm), that allows an excellent and long-lasting polishability. For the polishing phases we use first a 3 micron diamond paste with hair goat brush, later a 1 micron diamond paste with the same brush. The glossy of the surface is obtained with an aluminium oxide paste with felt wheel, first dry with low speed and later increasing the speed and using water.

СПИСОК ЛИТЕРАТУРЫ / REFERENCES

1. D'Arcangelo C, Vanini L, Casinelli M, Frascaria M, De Angelis F, Vadini M, D'Amario M. Adhesive Cementation of Indirect Composite Inlays and Onlays: A Literature Review. *Compend Contin Educ Dent*. 2015 Sep;36(8):570-7.
2. De Angelis F, D'Arcangelo C, Malíšková N, Vanini L, Vadini M. Wear Properties of Different Additive Restorative Materials Used for Onlay/Overlay Posterior Restorations. *Oper Dent*. 2020 May/Jun;45(3):E156-E166. doi: 10.2341/19-115-L.
3. Veneziani M. Posterior indirect adhesive restorations: updated indications and the Morphology Driven Preparation Technique. *Int J Esthet Dent*. 2017;12(2):204-230.

AUTHOR INFORMATION:

Manuel Delgado – an associate at Justo Sierra University, in private practice, ORCID ID: 0000-0002-0874-6638.

Av Acueducto, N. 914, La laguna Ticoman., Mexico City, Mexico

ИНФОРМАЦИЯ ОБ АВТОРАХ:

Мануэль Дельгадо – сотрудник Университета Хусто Сьерра, частная практика, ORCID ID: 0000-0002-0874-6638.

Av Acueducto, N. 914, Ла-Лагуна-Тикоман, Мехико, Мексика

AUTHOR'S CONTRIBUTION:

Manuel Delgado – has made a substantial contribution to the concept or design of the article; drafted the article or revised it critically for important intellectual content.

ВКЛАД АВТОРОВ

Мануэль Дельгадо – существенный вклад в замысел и дизайн исследования; подготовка статьи или ее критический пересмотр в части значимого интеллектуального содержания.

A well finished and polished restoration is more resistant to plaque and respectful of the periodontal tissues, besides the excellent long terms results (Figure 6).

DISCUSSION

Nowadays we can use composite materials with direct and indirect technique, in this case we decided to do an indirect composite restorations, this is an excellent option in absence of coronal destruction, as we improve the anatomic contour, and we also increase the physical properties as we also post curing the element in a light curing unit for indirect technique that must not exceed the 80°C /176 °F to avoid to damage the inorganic matrix of the composite.

CONCLUSIONS

The Bis-GMA free composite with high wear resistance described in this paper is excellent to restore the function and aesthetic in our patient, being minimally invasive and using high quality materials that optimize working times and reduce our costs.

4. Deb S, Di Silvio L, Mackler HE, Millar BJ. Pre-warming of dental composites. *Dent. Mater* 2011; 27 (4): 5-9 .
5. Rickman LJ, Chee B. Clinical applications of preheated hybrid resin composites. *J. Dent* 2011; 211(2):63-70.
6. D' Arcangelo C, Vanini L, Rondoni GD, Vadini M, D'Angelis F. Wear evaluation of prosthetic materials opposing themselves. *OP dentistry*.2018;43(1):38-50
7. Bertoldi HA. Incrustaciones de resina compuesta. *Revista Odontológica Argentina*. 2004. 3: 48-50.
8. Elkaffas A. y col. The effect of preheating resin composites on surface hardness; a systematic review and meta-analysis. *Restorative Dentistry* 2019; 44(4).

Координаты для связи с авторами / Correspondent author:

Мануэль Дельгадо / Manuel Delgado, E-mail: delgadoestoma17@hotmail.com