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Comparative clinical evaluation of giomer and glass ionomer in primary teeth caries

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Abstract

Introduction: The gomers are a family of dental materials that allow a faster effect and better functional, esthetic and mechanical properties.

Objective: To analyze the restorative ability between giomer and type II glass ionomer in class I cavities.

Methodology: A mouth split design was carried out in which 27 permanent molars ICDAS 4, 5 or 6 were filled with giomer (14) and glass ionomer type II (13), respectively, in patients with high or medium caries risk. Intraoral radiographs and polyvinyl siloxane impressions were taken every 3 months. FDI criteria were used to evaluate radiographic success, material fracture, and marginal adaptation.

Results: Compared to glass ionomer, giomer had better marginal adaptation at 6 and 9 months ($p < 0.05$), was also better in fracture restoration at 3, 6 and 9 months ($p < 0.05$), and better radiographic success at 6 and 9 months ($p < 0.05$).

Conclusions: Giomer has better clinical results in terms of marginal adaptation, radiographic success and fracture of the material than glass ionomer.

Keywords: Giomer, glass ionomer, marginal adaptation, caries risk, intermediate therapeutic restoration

Introduction

Early childhood caries (ECC) has high prevalence (23 to 90%) in several countries [1]. Caries is an oral disease that affects the majority of patients who visit a pediatric dentist. Likewise, it was reported that the prevalence of caries in Mexico was 93.3% and 70.3% of children aged 2 to 5 years with ECC in 2019 [2].

Intermediate therapeutic restorations are used as a temporary treatment since a traumatic restorative treatment (ART) has application to patients who cannot afford definitive treatment, in addition, they reduce the cariogenic level of bacteria [3]. This can also be used as an alternative to general anesthesia [4].

Resin-modified glass ionomer is also used in ART [5] and success has been reported in CCD patient who were given continuity for 4 years [6].

Both clinical and radiographic success has been reported in the application of giomer at 6 and 12 months in class II cavities in primary molars [7] and it even maintains acceptable qualities after 13 years [8].

According to a study conducted to assess the shrinkage of different materials, it was observed that the shrinkage of giomer was lower than glass ionomer when using low level of light curing [9].

Glass ionomers and gomers have both esthetic and functional advantages that, combined with their fluoride release and remineralization capacity, could be materials of good use in patients with high caries index. The aim of this research is to analyze the adaptation in gingival margins, fracture of the material and radiographic evaluation between teeth that were restored with gomers and glass ionomer type in class I cavities.

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Materials and Methods

From 13 patients (5 males, 8 females) aged 8 to 13 years, 27 molars (19 permanent and 8 temporary) of patients presenting class I cavities in left and right molars, ICDAS code 4, 5 or 6, were analyzed. The study design was mouth split where at least 2 fillings per patient were evaluated. CAMBRA [10] was used to select patients with moderate or high caries risk and the FDI criteria [11] to evaluate marginal adaptation, radiographic success, contour and occlusal wear.

Gum dam and staple were used to achieve absolute isolation. The occlusal surfaces were cleaned and dried. The removal of carious tissue was carried out with a dent in spoon and/or carbide bur. The study materials (giomer and glass ionomer) were placed according to the manufacturer's instructions.

At the first appointment, before and after photos were taken of the occlusal fillings with giomer and glass ionomer. Also, impressions were taken of the molars restored with polyvinylsiloxane, as well as at each follow-up appointment. Follow-up appointments were made at months 1, 3, 6 and 9. Intraoral photographs, radiographs and impressions with polyvinylsiloxane were taken at each evaluation.

Duplicates were made with epoxy resin, cut and observed under the stereomicroscope. In addition, photographs were taken and measurements of the images were made using

image J2 software.

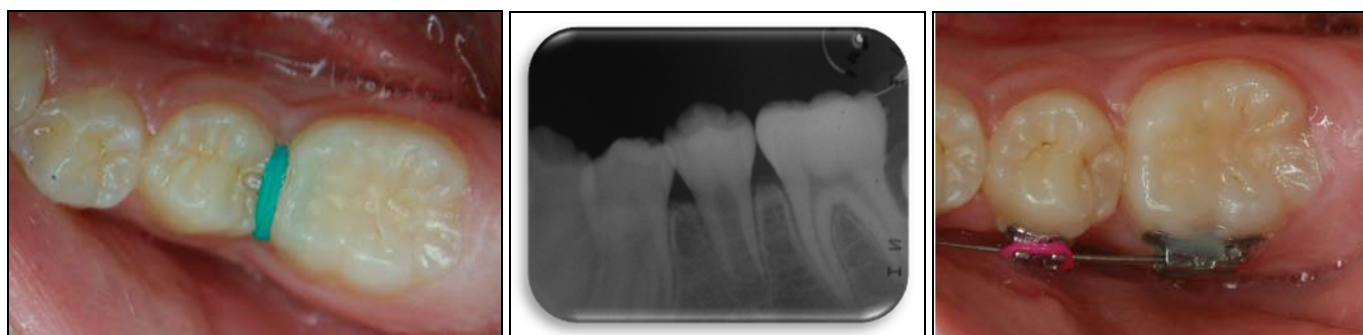
Statistical analysis

The data were captured in a database in the IBM SPSS Statistics 20 program with which frequency tables of three variables were created, including the dependent variable (marginal adaptation, occlusal contour and radiographic success) as well as the independent variables (group with giomer and group with glass ionomer evaluated at different months) and other criteria established in the observation instrument.

Results and Discussion

The patients had moderate and high caries risk according to CAMBRA, of which 3 had moderate caries index and 10 had high caries index.

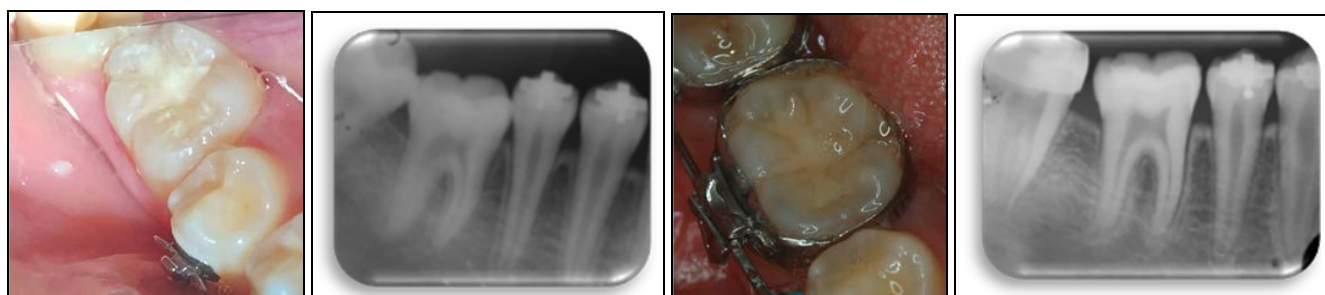
The integrity of the gingival margin of the teeth filled with giomer scored 1 according to the FDI criteria for 6 months. However, at 9 months one of the samples scored 4 for fracture of the material, requiring repair. The samples of the glass ionomer fillings scored 1, except for one restoration which scored 4 (FDI criteria) for fracture of the material at 3 months, requiring a repair of the filling. In addition, at 9 months another tooth scored 3 for material fracture.



A) Image of follow-up appointment (1st month) of the giomer filling placed in a permanent dental organ.

B) X-ray (1st month) of dental organ obturated with giomer.

C) Clinical photograph 9 months after being obturated with giomer.



A) Image of follow-up appointment (1st month) of glass ionomer filling placed in permanent dental organ.

B) X-ray (1st month) of dental organ obturated with glass ionomer.

C). Clinical photograph 9 months after being obturated with glass ionomer.

D) Radiograph of dental organ, 9 months after being filled with glass ionomer.

The integrity of the gingival margin of the teeth filled with giomer scored 1 according to the FDI criteria for 6 months. However, at 9 months one of the samples scored 4 for fracture of the material, requiring repair. The samples of the glass ionomer fillings had a score of 1, except for one restoration which had a score of 4 (FDI criterion) for fracture of the

material at 3 months, for which a repair of the filling was required. In the case of the aforementioned dental organ, there were difficulties in the handling of the material during the filling of the cavity and an extra capsule was required to restore the tooth. In addition, at 9 months another tooth scored a 3.

Table 1: Comparison of the percentage of observations in the FDI 1 criterion according to the study variables.

FDI criteria		Marginal Adaptation	P-Value	Fracture	p-value	Radiographic success	P-Value
Month 1	Giomer	100	1.00	100	1.00	100	1.00
	Ionomer	100		100		100	
Month 3	Giomer	100	1.00	100	0.0328*	100	1.00
	Ionomer	100		92.3		100	
Month 6	Giomer	100	0.0328*	100	0.0328*	100	0.0328*
	Ionomer	92.3		92.3		92.3	
Month 9	Giomer	100	0.0328*	92.86	0.0245*	100	0.0389*
	Ionomer	92.3		84.61		93.33	

Comparison between restorations made with giomer and glass ionomer according to evaluations made at 6 and 9 months ($p < 0.05$) when using the FDI criteria

In the comparison of the evaluation according to the FDI criteria with a value of 1 (Table 1), in the first month all the restorations had a value of 1 in marginal adaptation, enamel fracture and radiographic success.

At 3 months, a difference was observed in terms of fracture of the material in which 92.3% of the teeth obturated with glass ionomer obtained a value of 1 while those obturated with giomer were 100% ($p=0.0328$).

At 6 and 9 months, differences were observed between the giomer and glass ionomer restorations in terms of marginal adaptation, fracture of the material and radiographic success.

Other studies have used the United States Public Health Service (USPHS) criteria [12], however, in this study the FDI criteria were used to assess marginal adaptation [7], fracture of the material and radiographic success. However, there is the comparison study between the use of both criteria showing similarity between both and positive result when using any of the two criteria [13].

There is controversy in the literature about the capabilities between glass ionomer and giomer [7], some authors find no difference between the two, and in the present study it was observed that giomer had better marginal adaptation, radiographic success and fracture of the material than glass ionomer. In contrast, another study shows that resin-modified glass ionomers are better in marginal adaptation than giomer [14]. According to the results obtained, the glass ionomer obtained 92.3% a value 1 according to the FDI criterion, at 6 months; this means that it is clinically acceptable [15].

Conclusions

Based on the FDI criteria, the giomer shows better marginal adaptation, less fracture of the material and better radiographic success at 6- and 9-months post-treatment compared to the glass ionomer.

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References

- Chen KJ, Gao SS, Duangthip D, Lo ECM, Chu CH. Prevalence of early childhood caries among 5-year-old children: A systematic review. *J Investig Clin Dent.* 2019;10(1):e12376.
- Salud S. Informes SIVEPAB; c2019 [Internet]. gob.mx. 2020 [citado 4 diciembre 2020]. Disponible en: <https://www.gob.mx/salud/documentos/informes-sivepab-2019>
- American Academy of Pediatric Dentistry. Policy on interim therapeutic restorations (ITR). The Reference Manual of Pediatric Dentistry. Chicago, ILL: American Academy of Pediatric Dentistry; c2020. p. 72-3.
- Lim SN, Kiang L, Manohara R, Tong HJ, Nair R, Hong C, *et al.* Interim therapeutic restoration approach versus treatment under general anaesthesia approach. *Int. J Paediatr Dent.* 2017;27(6):551-557.
- Tüzüner T, Dimkov A, Nicholson JW. The effect of antimicrobial additives on the properties of dental glass-ionomer cements: A review. *Acta Biomater Odontol Scand.* 2019;5(1):9-21.
- Faustino-Silva DD, Figueiredo MC. Atraumatic restorative treatment-ART in early childhood caries in babies: 4 years of randomized clinical trial. *Clin Oral Investig.* 2019;23(10):3721-3729.
- Inthias SK, G Nirmala SVS, Rudhravarm VR. Clinical and Radiographic Success of Three Adhesive Restorative Materials in Primary Molar Proximal Lesions: A Randomized Clinical Trial. *Contemp Clin Dent.* 2019;10(3):483-488.
- Gordan VV, Blaser PK, Watson RE, Mjör IA, McEdward DL, Sensi LG, *et al.* A clinical evaluation of a giomer restorative system containing surface pretreated glass ionomer filler: results from a 13-year recall examination. *J Am Dent Assoc.* 2014;145(10):1036-1043.
- Spajić J, Prskalo K, Šariri K, Par M, Pandurić V, Demoli N. Dimensional Changes of Glass Ionomers and a Giomer during the Setting Time. *Acta Stomatol Croat.* 2018;52(4):298-306.
- American Dental Association Caries Risk Assessment

Forms. [consultado en marzo 2021].

http://www.ada.org/sections/professionalResources/pdfs/topics_caries_instructions.pdf

11. Hickel R, Peschke A, Tyas M, Mjör I, Bayne S, Peters M, *et al.* FDI World Dental Federation: clinical criteria for the evaluation of direct and indirect restorations-update and clinical examples. *Clin Oral Investig.* 2010;14(4): 349-366.
12. Ozer F, Irmak O, Yakymiv O, Mohammed A, Pande R, Saleh N, *et al.* Three-year Clinical Performance of Two Giomer Restorative Materials in Restorations. *Oper Dent.* 2021;46(1):E60-E67.
13. Cavalheiro CP, Souza PS, Pedrotti D, Casagrande L, Ardenghi TM, Rocha RO, *et al.* Shortening of etching time of the dentin in primary teeth restorations: a randomized clinical trial. *Braz Oral Res.* 2020;34:e081.
14. Rusnac ME, Gasparik C, Irimie AI, Grecu AG, Mesaroş AŞ, Dudea D. Gionomers in dentistry - at the boundary between dental composites and glass-ionomers. *Med Pharm Rep.* 2019 Apr;92(2):123-128.
15. Maillot C, Decup F, Dantony E, Iwaz J, Chevalier C, Gueyffier F, *et al.* Selected and simplified FDI criteria for assessment of restorations. *J Dent.* 2022 Jul;122:104109.

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