



Original Research Article

Glass-Ionomer cements in the restorative therapeutics in primary teeth and permanent teeth

Akpe J Adou^{1,*}, Jean N'dre¹, Konan B. Kouam², Koboh S. Atse Nguessan³, Affiba E. N Cho-oka²¹Dept. of odontology Conservative & Endodontics, Felix Houphouet Boigny University, Abidjan, Côte d'Ivoire²Dept. of Odonto-Stomatology Peadiatrics, Felix Houphouet Boigny University, Abidjan, Côte d'Ivoire³Dept. of Pathology, Felix Houphouet Boigny University, Abidjan, Côte d'Ivoire

ARTICLE INFO

Article history:

Received 19-06-2020

Accepted 07-07-2020

Available online 07-09-2020

Keywords:

Abidjan

Glassionomer cements

Restorative dentistry

ABSTRACT

Background : Glass-ionomer cements (GICs) are biomaterial compounds of basic glasses and an acid polymer with a setting reaction of acid-base type. They are booming these decades due to the improvement in their properties and the development of minima dentistry.

Aim: The present study aims at assessing the awareness, aptitudes and practices of dental surgeons in Abidjan with regard to the use of glass ionomer cements.

Methods and Materials : A cross-sectional study was carried out using a self-administered questionnaire to 102 dental surgeons in Abidjan (Côte d'Ivoire).

Results: This study has shown that 100% of the surveyed practitioners were trained to use the glass ionomer cements restorations at the university, but 19.61% did not realize it. For 22.55%, GIC restorations concern only primary teeth while 55.88% concluded that they concern both primary and permanent teeth. Finally, for 1.96%, GIC concern solely permanent teeth. In their daily practice, 14.71% of practitioners had made GCI their preferred material in restorative therapeutics.

Conclusions: A better indication accuracy of those materials and practitioners' motivation is needed with the view of increasing their use.

© 2020 Published by Innovative Publication. This is an open access article under the CC BY-NC license (<https://creativecommons.org/licenses/by-nc/4.0/>)

1. Introduction

Glass-Ionomer Cements (GICs) or glass polyalkenoate are biomaterials comprising the mixture of aluminosilic oxide powder with an aqueous solution having an acid-base type reaction.¹ According to their use, they are distinguished sealing GIC cements, restorative GICs and intermediary bases or protectors.

For children in primary teeth, restorative GICs facilitate the reconstitution of the form and aesthetic of injured teeth espousing the integrity of residual tooth tissues in order to allow the tooth to ensure its functions. In permanent teeth and conservative odontology, these materials are indicated in small cavities not submitted to masticatory forces, in

temporization among high carious risk patients and as intermediary base in sandwich technique. Set up in 1971 by Wilson et Kent.² to lessen the impacts of silicates and resins of yesteryear, these cements are booming.³ with the improvement of their proprieties and a minima dentistry practice.⁴

In Ivory Coast, the prevalence of dental decay is 70% in primary teeth and 60% in permanent teeth.⁵ That high prevalence requires not only prevention means but also the treatment of the injuries. According to sites and lesion evolution stages, GICs could constitute luxury materials in primary teeth restorative therapeutics^{6,7} and some permanent teeth. Thus, have we assessed the awareness, aptitudes and practices of dental surgeons in Abidjan about GICs and their frequent use with regard to other restorative materials.

* Corresponding author.

E-mail address: adoussma@yahoo.fr (A. J. Adou).

2. Materials and Methods

We conducted a descriptive transversal study over 30 working days from 15 March to 20 April 2012. Our population was made up of dental surgeons operating in private and public dental clinics in Abidjan, accepted teacher-practitioners. The choice of those dental clinics did not obey any rule.

Prior to our work, we carried out a pilot study with ten dental surgeons in order to assess the quintessence of our questionnaire. The shortcomings noted at the end of this study allowed us to readjust our protocol and to finalize the self-questionnaire. The self-questionnaires were administered to practitioners practicing in dental clinics. The data was collected by a single operator. The anonymity and confidentiality of the participants were kept secret.

The data were processed through a microcomputer equipped with Epi Info version 6, Word 2010 and Excel 2010 software applications

3. Results

The results are shown in Tables 1, 2, 3 and 4.

Table 1: Practitioner awareness of GICs

Source	Size	Percentage
Initial training course	100	100%
Others or individuals formations		
Scientific journals	48	29.09%
Workshops and seminars	17	10.30%
Internet	13	7.88%
Dental products vendors	2	1.21%

Table 2: GIC frequency of use

Frequency of use	Size	Percentage
Daily	29	28.43
Weekly	25	24.51
Monthly	28	27.45
Never	20	19.61
Total	102	100

Table 3: Type of teeth habitually restored with GICs

Types of teeth	Size	Percentage
Primary teeth	23	22.55
Permanent teeth	2	1.96
Primary teeth and permanent teeth	57	55.88

4. Discussion

Our sample is made up of 102 practitioners, among which 66.70% men and 33.30% women, i.e. a 2/1 sex ratio. This random distribution is linked to the random character of

Table 4: Dental surgeon preferred materials

Materials	Size	Percentage
Amalgam	52	50.98
Composite	35	34.31
Glass-ionomer cements	15	14.71

our sample. Among these practitioners, 17.60% have less than 5 years experience, 30.40% have between five and ten years experience and more than half (52.00%) have more than ten years of experience. All of these practitioners acknowledge having been instructed in the use of GIC in university programs.

Besides, they testify that they received each course on GICs in initial training. These programs made up more than half our sample (51.52%), the main source of their awareness on GICs (Table 1). The other sources of awareness mentioned are: scientific journals (29.09%), workshops and seminars (10.30%), data via internet (7.88%) and dental care products (1.21%) which are the sources frequently cited.⁸

But, in practice, 19.61% practitioners have never realized any Glass Ionomer Cements restoration, 28.5% of our people use GICs in restoration on a daily basis; 24.50% realize at least one restoration per week and 27.50% realize at least one once a month (Table 2). This frequency depends on the dental clinic attendance rates and the type of patients received. Dental clinics with high-frequency rate and those receiving a great number of children are those using GICs daily. In fact, the principles of preparing ideal cavities are not always applicable to children because of the difficulties in obtaining their cooperation.⁹ Hence the necessity of resorting to an adhesive material easier to use with the minimum possible preparation. Furthermore, the morphological particularities of primary teeth, especially the convergence of lingual and vestibular surfaces make it difficult to fix the dental dam or the matrixes and matrix holders. All these reasons lead practitioners to prefer GICs, especially in the restoration of occlusal and proximal cavities.¹⁰ For 22.55%, of surveyed practitioners, these restorations are carried out solely on primary teeth, while 1.96% carries them solely on young permanent teeth. But, for more than half of our sample (55.88%), restorations are carried out in both primary and permanent teeth (Table 3).

The choice of teeth to be restored should rely on a good knowledge of the indications of glass ionomer cements and on a clinical case.

Despite glass ionomer cement unanimously recognized benefits (3,6), especially Fluoride re-mineralisation,^{11,12} and the self-adhesive nature of these cements,¹³ the amalgam remains the preferred material for the practitioners of our study (50.98%), followed by composites (34.31%) (Table 4). Glass ionomer cements come third (14.71%) with coronary restorative materials used by dental surgeons, because of their weak resistance to abrasion and relatively

high cost. Weak resistance to attrition more or less marked according to cement families, is one of the disadvantages of glass ionomer cements. But, this could be minimized by using these materials in primary teeth restoration or cavities in young and adult permanent teeth.^{1,2,9} The relatively high cost could be compensated by product rigorous management.

Glass ionomer cements have many advantages.^{7,14-16} Their adherence power to cement-substrate interface is superior to cement cohesive force. This is why, in case of excessive tensions, we observe generally a fracture of the easily detectable material, rather than less visible detachment likely to bring about infiltrations and recurrent dental caries. GICs release fluorides when in contact with the oral environment and allow hard tissue re-mineralisation with they are in contact with.^{1,17} They are well tolerated by periodontal tissues.¹⁸

5. Conclusion

Dental caries high frequency in primary teeth and in permanent teeth in Côte d'Ivoire requires both preventive and curative actions. Glass ionomer cements could serve as primary teeth restorative therapeutics and in less serious lesions in permanent teeth.

This study showed that 80.39% of practitioners practice GIC restorations against 19.61%. Due to the numerous advantages of these materials, better precision of their indications and practitioner motivation could be necessary to popularize their use in Abidjan.

6. Source of Funding

None.

7. Conflict of Interest

None.

References

1. American Academy of Pediatric Dentistry. Guideline on restorative dentistry. Reference manual. 2015;36(6):230-41.
2. Arends J, Christoffersen J, Ruben J, Jongbloed WL. Remineralization of bovine dentin in vitro. The influence of F content

- in solution on mineral distribution. *Caries Res.* 1989;23(5):309-14.
3. Aykut-Yetkiner A, Simşek D, Eronat C, Ciftçioğlu M. Comparison of the remineralisation effect of a glass ionomer cement versus a resin composite on dentin of primary teeth. *Eur J Paediatr Dent.* 2014;15(2):119-21.
4. Bakayoko-Ly R. Etude épidémiologique de l'état bucco-dentaire de la population scolaire de la région Abidjanaise. Thèse : 3ème cycle Sc; 1985.
5. Bougrier C. Applications cliniques des CVI en odontologie conservatrice et en prothèse. *Thèse Chir Dent Nantes.* 2011;
6. Chalmers JM. Minimal intervention dentistry: Part 1. Strategies for addressing the new caries challenge in older patients. *J Can Dent Assoc.* 2006;72(5):427-33.
7. Daou MH, Attin T, Gohring TN. Clinical success of compomer and amalgam restorations in primary molars. Follow up in 36 months. *Schweiz Monatsschr Zahnmed.* 2009;119(11):1082-8.
8. Deschepper EJ, Berry EA, Cailletau JG. Fluoride release from light-cured liners. *J Am Dent.* 1990;3:97-100.
9. Horváth A, Papp Z, Dobó-Nagy C, Gera I. Clinical examination of the gingival effects of three glass ionomer restorative materials. *Fogorv Sz.* 2014;107(4):125-30.
10. Kouame KB, Adou AJ, Kouakou KF, Coulibaly M. Usage de la radiovisiographie dans la pratique de l'odonto-stomatologie: enquête auprès des praticiens de la ville d'Abidjan. *Rev Iv Odonto-stomatol.* 2014;16(1):7-11.
11. Tran LA, Messer LB. Clinicians choices of restorative materials for children. *Aust Dent J.* 2003;48(4):221-32.
12. Lasfargues JJ, Bonte E, Goldberg M, Jonas P, Tassery H. Ciments verre ionomère et matériaux hybrides. *Encycl Med Chir.* 1998;18.
13. Lupi-Pegurier L, Bertrand MF, Muller M, Jasmin JR, Bolla M. Matériaux de restauration utilisés sur dents temporaires: enquête épidémiologique. *Rev Odont Stomat (Paris).* 2001;30:185-91.
14. Markovic DL, Petrovic BB, Peric TO. Fluoride content and recharge ability of five glassionomer dental materials. *BMC Oral Health.* 2008;8(1):21-8.
15. Mathieu F. Chirurgiens-dentistes et ciments verres ionomères en odontologie restauratrice en 2010. Enquête auprès de 260 praticiens. *Dent Bordeaux II.* 2010;
16. Qvist V, Laurberg L, Poulsen A, Teglers PT. Longevity and Cariostatic Effects of Everyday Conventional Glass-ionomer and Amalgam Restorations in Primary Teeth: Three-year Results. *J Dent Res.* 1997;76(7):1387-96.
17. Smith DC. Composition and characteristics of glass ionomer cements. *J Am Dent Assoc.* 1990;120(1):20-22.
18. Wilson AD, Kent BE. A new translucent cement for dentistry. The glass ionomer cement. *Br Dent J.* 1972;132(4):133-5.

Cite this article: Adou AJ, N'dre J, Kouam KB, Nguessan KSA, Cho-oka AEN. **Glass-Ionomer cements in the restorative therapeutics in primary teeth and permanent teeth.** *IP Indian J Conserv Endod* 2020;5(3):97-99.