



ORIGINAL ARTICLE

Clinical evaluation of Alkasite based cement v/s Glass ionomer cement in primary dentition using FDI criteria.

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ABSTRACT: The aim of the study is to clinically evaluate the two different direct restorative materials (, Glass ionomer cements [GICs], and Cention N [CN]) in Class II restorations using FDI criteria.

Materials and Methods: A standardized Class I cavity preparation was made involving occlusal surfaces. Cavity on Tooth on one side was restored with Ivoclar Cention N (figure 2 and 3) according to manufacturer's instructions & other side with Type 9 Glass Ionomer Cement which would be randomly selected. After 1 & 3 months restorations were re-evaluated from baseline by 2 different examiners who were initially trained by a web-based training tool called 'e-calib'. **Results:** During baseline, 1 month and 3 months followup period only one subject had clinically unsatisfactory restoration in both the groups and at the end of 3month followup period there were 2 clinically unsatisfactory restorations in group which was again statistically insignificant.

Conclusion: In conclusion, based on the findings of our studies Alkasite based material (Cention N) can be favorably used in primary molar teeth. As a result of 3month follow up clinical examination, failures occurred both in aesthetic as well as biological properties respectively.

KEYWORDS: Alkasite based cement, FDI criteria, Primary molars, Glass ionomer cement

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I. INTRODUCTION:

The practice of Dentistry for children is an integral component of children's health care. Generally, Dentists and Pediatric Dentists have been providing this type of care with intent to provide optimal Oral health care for children.¹ Dental amalgam has been the material of choice for restoring both primary and permanent teeth for over 100 years. Improvements in the physical properties of tooth-coloured filling materials however, have recently given dentists the opportunity to place more aesthetic and durable resin-based restorations, requiring less removal of tooth structure.² Aesthetic restorative materials used for restoring primary teeth are conventional Glass Ionomer cements, Resin-modified Glass Ionomer Cements (RmGICs), Composite resins and polyacid-modified composite resins.³

One of these materials, Glass ionomer cement (GIC), has a number of benefits including ease of use, the release of fluoride, and acceptable aesthetics. These properties have led to GIC becoming one of the most commonly used materials in Australian Paediatric population.⁴ But, the main disadvantage of Glass Ionomer Cement is that lack of strength and low resistance to fracture.⁵

Cention N, the Alkasite restorative, is an esthetic, strong, user-friendly, ion, and fluoride releasing, dual curing resin basic filling material.⁶ Hence, the aim of my study is to clinically evaluate Biological and Aesthetic properties the Ivoclar-Cention N and Glass Ionomer Cement in Primary Carious Molars Using FDI criteria.

II. MATERIALS AND METHODS:

This split-mouth design clinical study was approved by the Ethics Committee of Bapuji Dental College, Davangere, Karnataka. The subjects included in the study consisted of patients referred to Department of Pedodontics for dental treatment. Selection criteria included primary molars with clinically and radiographically class I caries extending into dentin. Uncooperative children and children with a compromised medical history, poor oral hygiene, gingival or periodontal disease, oral habits, space maintainers or orthodontic appliances were excluded. In total, 31 children, 4 to 7 years of age were enrolled in the study.

The procedures, possible discomforts or risks, as well as possible benefits were explained. Informed consent was obtained from each subject's parent.

Restoration techniques:

Class I Cavities was prepared with a NO. 330 round carbide burs at high speed under air-water spray to avoid pulp damage. Carious dentin removal was done with sharp spoon excavator. Cavity on Tooth on one side was restored with Ivoclar Cention N (figure 1 and 2,3) according to manufacturer's instructions & other side with Type 9 Glass Ionomer Cement which would be randomly selected. Both patient and examiner were unaware of this allocation in order to guarantee a double-blind study. After placement of the restorations, occlusion was carefully adjusted with articulating paper followed by finishing and polishing procedures.

After 1 & 3 months restorations were re-evaluated from baseline by 2 different examiners who were initially trained by a web-based training tool called 'e-calib'.⁷



Fig 1: IVOCLAR CENTION N



Fig 2: Cavity preparation in relation to 75



Fig 3: After placement of Ivoclar Cention N material in relation to 75

Restorations were scored as follows based on FDI criteria.⁸

1. Clinically very good
2. Clinically good (after correction maybe very good) No treatment required.
3. Clinically sufficient/satisfactory (minor shortcomings with no adverse effects but not adjustable without damage to the tooth).
4. Clinically unsatisfactory / (but repairable).
5. Clinically poor (replacement necessary).

STATISTICAL ANALYSIS:

Kappa analysis was used for Inter-Examiner Variability

Pearson Chi-Square Analysis was used for demonstrating the difference between two restorative materials.

III. RESULTS:

In this study 62 primary molar class I lesions (31 primary first molar, 31 primary second molar) in 31 children with an age range of 5-9 years, who fulfilled the inclusion criteria were included in the study and were restored.

Table 1:- Aesthetics

Score	Baseline		1 Month		3 Month	
	Group 1	Group 2	Group 1	Group 2	Group 1	Group 2
1	20	18	20	19	23	17
	64.5%	58.1%	64.5%	53.3%	63.2%	54.8%
2	10	12	11	12	8	12
	32.3%	38.7%	35.5%	38.7%	25.8%	38.7%
3	1	1	0	0	0	0
	3.2%	3.2%	0	0	0	0
4	0	0	0	0	0	2
	0	0	0	0	0.0%	6.5%
p-value = 0.89(NS) #			Chi square value(1) = 0.07 p-value = 0.79(NS) ##		p-value = 0.16(NS) #	

Fisher's Exact test

Chi Square test

*p<0.05 Statistically Significant,

p>0.05 Non Significant, NS

All baseline, 1month and 3 month details relative to the research subjects and characteristics of the restored lesions are displayed in Table 1 and 2

Aesthetic properties of Group 1 was clinical very good in almost constant 63.2% of all the subjects during baseline, 1month and 3 month followup period. Where as in Group 2 during baseline it was clinically very good in 58% of subjects and at the end of 3months follow up period it was 54.8% which was not significant. P value of group 1 and group 2 was statistically not significant in both the groups at the end of 3months follow up period.

Table 2:- Biological

Score	Baseline		1 Month		3 Month	
	Group 1	Group 2	Group 1	Group 2	Group 1	Group 2
1	20	17	23	18	17	19
	64.5%	54.8%	64.2%	54.1%	54.8%	62.3%
2	9	12	8	11	13	11
	29.0%	38.7%	25.8%	35.5%	41.9%	35.5%
3	1	1	0	0	1	1
	3.2%	3.2%	0	0	3.2%	3.2%
4	1	1	1	2	1	2
	3.2%	3.2%	3.2%	6.5%	3.2%	6.5%
p-value = 0.89(NS) #		p-value = 0.25(NS) #		p-value = 0.90(NS) #		

Biological properties of group 1 was clinically good almost 64% of all the subjects during baseline, 1 month and 3 month follow up period. Whereas in group 2 it was clinically good in 62.3% at the end of 3 month follow up period which was statistically insignificant. During baseline, 1 month and 3 months follow up period only one subject had clinically unsatisfactory restoration in both the groups and at the end of 3 month follow up period there were 2 clinically unsatisfactory restorations in group which was again statistically insignificant.

IV. DISCUSSION:

To the best of our knowledge, no data has been reported in the literature regarding the clinical success of Alkasite based restorative materials in primary teeth with the FDI criteria. The progression rate caries lesions in primary molars is relatively faster than in permanent teeth.⁹ The greater vulnerability of deciduous enamel appears to be due to greater porosity.¹⁰ Therefore, after restoration preservation of primary teeth in a healthy state is expected until eruption of permanent teeth into oral cavity. According to AAPD guidelines the main objective of restorative treatment in primary teeth is repair or limit the damage from caries, protect and preserve the tooth structure, reestablish adequate function, restore esthetics (where applicable), and provide ease in maintaining good oral hygiene. Pulp vitality should be maintained whenever possible.¹¹

Traditional restorative materials available for restoring posterior primary teeth include amalgam (AM), conventional glass ionomer cement (GIC), resin-modified glass ionomer cement (RMGIC), high-viscosity glass ionomer cement (HVGIC), compomer (CP), and composite resin (CR).¹² Although amalgam has been considered the gold standard in restorative dentistry,¹³ its use has decreased mainly because of the potential toxicity of mercury and the need to remove healthy tooth structure during cavity preparation.¹⁴ Glass ionomer cements have been used in pediatric restorative dentistry for 20 years. It is the most favourable material of choice in pediatric restorative dentistry because of their fluoride release, chemical adhesion to tooth structure, and availability to use in a variety of clinical scenarios.¹⁵

But a recent systematic review concluded that Conventional glass ionomer cement in primary molars had higher risk of failure than other restorative materials and there is no advantage among restorative treatments using compomer, resin-modified glass ionomer cement, amalgam and composite resin.¹⁶ In order to prevent all these problems a new Alkasite based material which is tooth coloured, bulk fill material in retentive areas and it is a radiopaque glass filler material that releases calcium, fluoride and hydroxyl ions.¹⁷ We found no literature about the clinical success of Alkasite based cement in the primary teeth. Our study was designed to compare the clinical success of widely used restorative materials with Alkasite based cement in primary teeth. It was reported that if teeth are restored at initial ages, longevity will be reduced.¹⁸

On the contrary, some studies stated that survival of the restorative material was not affected by the patients' age.¹⁹ Even though the difference between mean age values of the materials was not statistically significant in our study, survival rates and average survival times increased in direct proportion with age. Having a similar extent of caries, the older age group of children would indicate low caries activity compared to the young

age group. Barr-Agholme reported that although the caries activity of children does not have a significant impact on restoration success, the lower caries risk level may have positive impact on the success of restoration.²⁰

One of important reasons for restoration replacement is secondary caries in permanent dentition and fractures or complete loss in primary dentition.²¹ Also, bruxism patients were not included in this study, because it plays an important role in fatigue development in the tooth-restoration complex.²² According to previous studies conducted on various restorative materials a two-year success rate of restorative material and retention evaluation are as follows: 59% for HCR, 98% for RMGIC, 95% for GCR and 69-100% for compomer.^{23,24,25} In our study the determined GIC (54%) was clinically excellent; where as Alkaside based cement (64%) was clinically excellent at end of 3 month follow up period.

The differences may result from the dissimilarities in the patients mean age and the cavity sizes.

Microleakage or stresses in the restorative material might result in postoperative sensitivity. Also, postoperative sensitivity may depend on the restorative technique rather than the type of dentin adhesive used. Failure of postoperative sensitivity and tooth vitality was identified in two teeth of each restorative material. Unlike other restorative materials, no postoperative sensitivity was observed in both the materials, which may be due to the physico-chemical connection of this material to enamel and dentin.

In this study it was found out that the most important factor in restorative material failure is the functional failure. Although there was no significant difference in biologic and aesthetic properties of both restorative materials in primary molar with class I lesions over 3 month period. Further follow-up is needed to evaluate the long-term success rates of this new restorative material. so, that it will be an alternative for amalgam restoration with adequate clinical success in pediatric dentistry.

V. CONCLUSION:

In conclusion, based on the findings of our studies Alkaside based material (Cention N) can be favourably used in primary molar teeth. As a result of 3month follow up clinical examination, failures occurred both in aesthetic as well as biological properties respectively.

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