

Case Report

PRR Using Cention N® in Children's Teeth

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ABSTRACT

Background: Preventive Resin Restoration (PRR) is a caries prevention treatment by isolating pit and fissure through minimum preparation and covering with sealant material. Alkasite (Cention N®) can be considered as new material in PRR.

Objective: The aim of this case report is to describe management the use of Alkasite in PRR.

Overview: Alkasite has patent filler that can reduce polymerization shrinkage and microleakage, high flexural strength and simple application techniques. Alkasite can release fluoride and OH⁻ ions which are higher compared to GIC.

Conclusion: Alkasite has many advantages that can be a solution to disadvantages of other restoration materials.

INTRODUCTION

Preventive Resin Restoration (PRR) is the development of occlusal sealants utilization, which unites the prevention of sealant therapy for caries-prone pit and fissure with caries restoration therapy using composite resins that occur on the same occlusal surface. The initial lesion on the tooth surface is removed with minimal preparation, patched, then it is layered with sealants to prevent future caries.¹ Preventive resin restoration is a clinical procedure used to isolate pit and fissure while preventing caries. This technique was first introduced by Simonsen in 1977, covering enlargement of the pit and fissure areas then removing enamel and dentin that had been exposed to caries along the pit and fissure.

The purpose of preventive resin restoration is to stop the initial caries process found in pit and fissure, especially

in permanent molar tooth that has deep pit and fissure, as well as to take caries prevention measures in pit and fissure that have not been exposed to caries in the same tooth.²

The three types of material used in preventive resin restoration (type A, type B and type C) are classified based on caries expansion and depth. This classification is to determine the restoration material that will be used. The materials used are sealants without filler particles (unfilled) for type A, diluted composite resin which is lined for type B and filled composite resin for type C. With technological developments, material that is more resistant to usage and hardening is activated by light that is composite resin for posterior tooth was found. The new generation of this material will enhance the success of preventive resin restoration. In addition to composite

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resins, other patching materials are also used to obtain greater strength. As in the technique of glass ionomer resin preventive restoration, glass ionomer preventive restoration and sealant-amalgam preventive restoration.² The newest material used in preventive resin restoration is Cention N®.

Cention N®

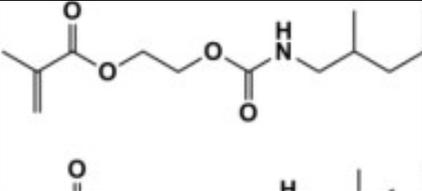
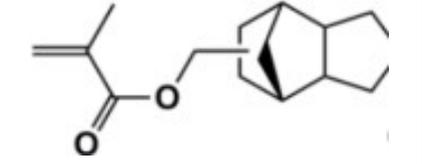
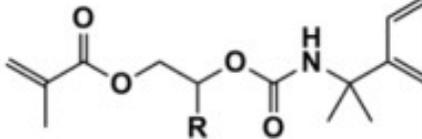
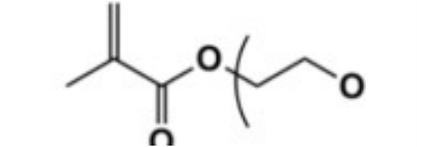
Cention N® is the latest restoration material developed with compomer or ormocer material and is a subgroup of composite restoration material, which is capable of neutralizing acid. Cention N® is applied directly as a whole (bulk-fill). Previously it could be applied with or without etching and bonding agents, and polymerized by self-curing as well as light-curing, available in A2 shade, radiopaque, releasing fluoride, calcium and hydroxide ions.³

Cention N® is available in powder and liquid packaging and is stirred manually before use. One spoonful of powder is used for one drop of liquid with a weight ratio of powder to liquid is 4.6 to 1. The liquid contains dimethacrylate and initiator, while the powder contains filler glass, initiator and pigment. The indications are for deciduous teeth restoration, preventive resin restoration, class I, II and V permanent teeth restoration.³

Monomers, initiators, catalysts and additives form a reactive part of Cention N®. Monomers form the final matrix of material and generally range from 12-40% of the mass of whole material. Monomers that are often used is dimethacrylate monomer. Four different types of dimethacrylate monomers are found in Cention N® liquid as much as 21.6% of the total weight of the material. The combination of UDMA (urethane dimethacrylate), DCP (tricyclodecan-dimethanol dimethacrylate), Aromatic aliphatic-UDMA (tetramethyl-xylene-diurethane dimethacrylate) and

PEG-400 DMA (polyethylene glycol 400 dimethacrylate) are interrelated when polymerizing, which produce strong mechanical properties and good long-term stability.³

Table 1: Monomer Cention N® Composition³

	Monomer	Formula
1	UDMA (urethane dimethacrylate)	
2	DCP (Tricyclodecan-dimethanol dimethacrylate)	
3	Aromatic aliphatic-UDMA (Tetramethyl-xylene-diurethane dimethacrylate)	
4	PEG-400 DMA (Polyethylene glycol 400 dimethacrylate)	

Ion release is very dependent on the pH value in the oral cavity. When the pH value is low (acid) due to the biofilm plaque and cariogenic bacterial activity, Cention

N® produces a greater number of ions than when the pH value is neutral.³ The glass material from Cention N® releases hydroxide ions so that it can neutralize the excess acid produced by bacteria. The release of hydroxide ions occurs gradually. An increase in pH value inhibits bacterial activity. Cention N® is also a self-curing material, therefore the depth of the restoration is unlimited and can be applied in bulk-fill quickly and easily. But to accelerate polymerization can be done with LED with 4mm thick penetration. Cention N® is also a self-adhesive material, does not require cement base, with low polymerization shrinkage.³

Cention N® shows higher flexural strength than Glass Ionomer Cement material. Cention N® is more translucent (11% transparency) compared to Glass Ionomer Cement, that is Fuji IX GP and Ketac Molar Easymix/3M Espe. Cention N® can naturally mixed with tooth structure.³

Manipulation

Cention N® will undergo polymerization when the powder and liquid are mixed for 45-60 seconds. Working time for 2.5 minutes, and overall time setting for 4 minutes.



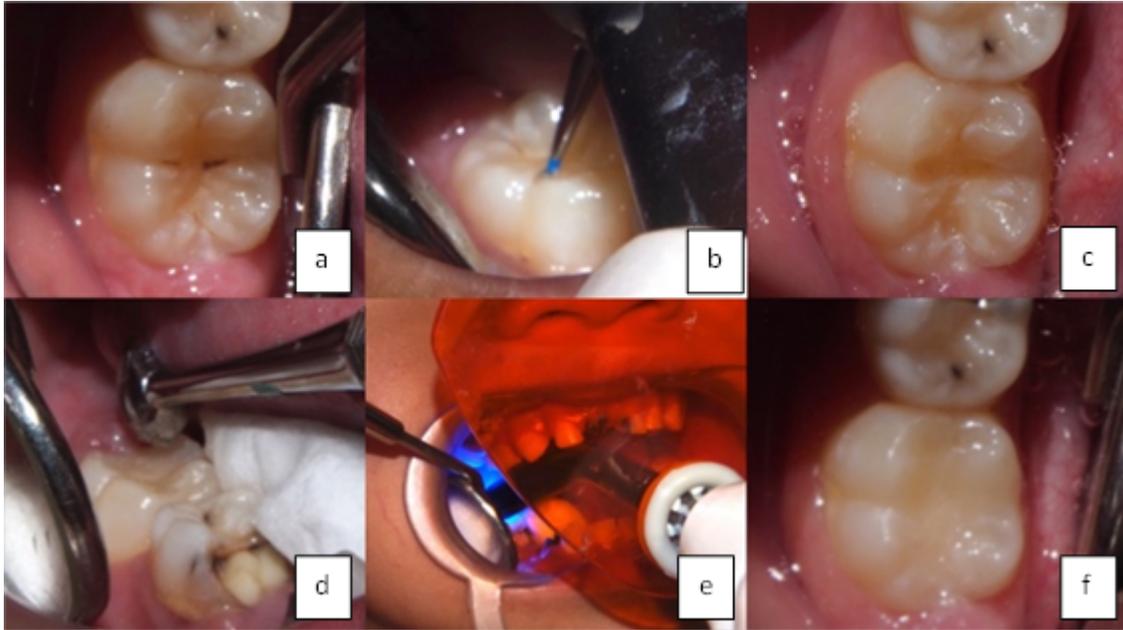
Fig 2: a. Cention N® b. Comparison of Cention N® powder and liquid

Management of Preventive Resin Restoration in children

Case 1

Male patients aged 6.5 years came to RSGM Padjadjaran University with complaints of having his teeth examined.

Clinical examination EO: no abnormalities, IO: teeth 46 percussion (-), palpation (-) with a diagnosis of reversible pulpitis. The treatment plan that will be performed on tooth 46 is preventive resin restoration.

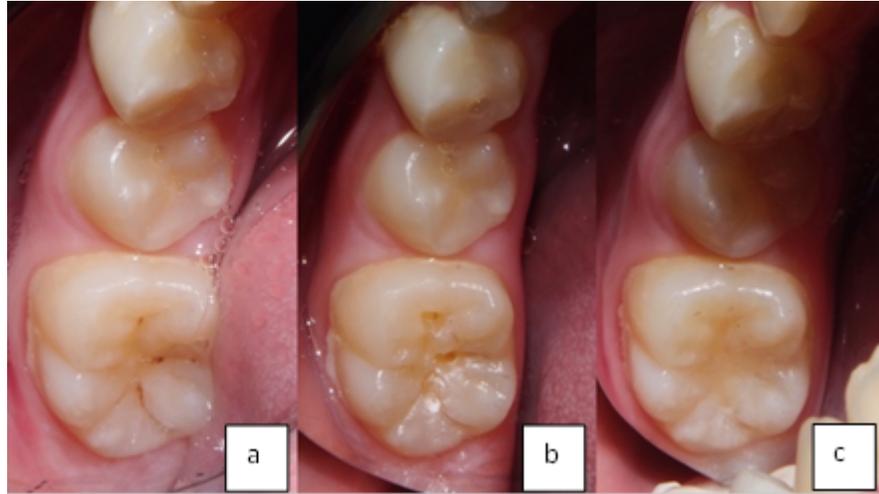


- a. Initial tooth 46 has superficial caries in the occlusal area
- b. Caries tissue removal using a small round bur
- c. Preparation results for tooth 46
- d. The application of alkasite and carving
- e. Light cure for 20 seconds
- f. Final result of preventive resin restoration using alkasite (Cention N®)

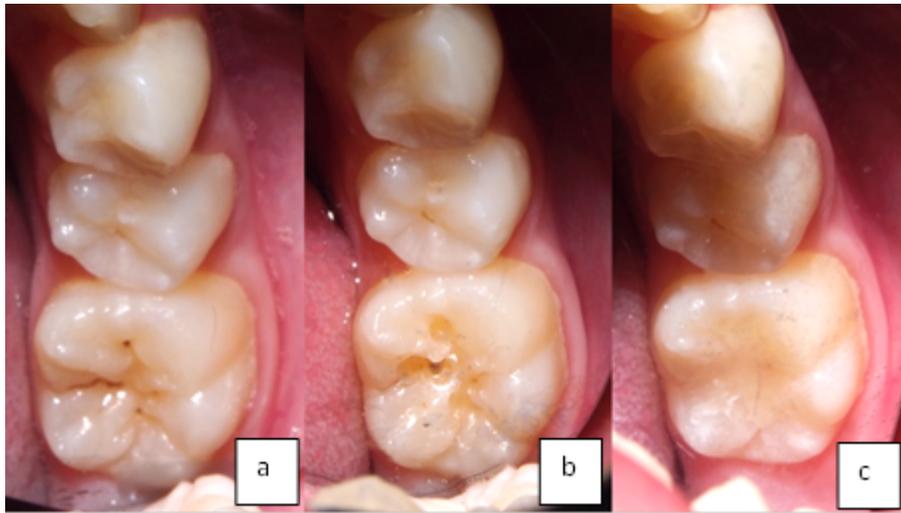
Case 2

Male patients aged 11 years came to RSGM Padjadjaran University with complaints of wanting to be given topical fluorine. Clinical examination EO: TAK, IO:

teeth 36 and 46 percussion (-), palpation (-) with a diagnosis of reversible pulpitis. The treatment plan that will be performed on teeth 36 and 46 is preventive resin restoration.



- a. Initial tooth 46 has superficial caries in the occlusal area
- b. Preparation results for tooth 46
- c. Final result of preventive resin restoration using alkasite (Cention N®)



- a. Initial tooth 36 has superficial caries in the occlusal area
- b. Preparation results for tooth 36
- c. Final result of preventive resin restoration using alkasite (Cention N®)

DISCUSSION

Preventive resin restoration is a widely accepted technique in caries restoration in pit and fissure also prevention of the development of adjacent caries.

Damaged tooth tissue is filled with resin material and at the same time the pit and fissure are sealed with sealant.¹⁰ The newest material used in preventive resin restoration is Cention N®. Cention N® has many

advantages that can be a solution to some of the shortcomings of preventive resin restoration material. First, Cention N® has a patent filler (isofiller) that can reduce shrinkage due to lower elasticity modulus and reduce polymerization shrinkage and microleakage.⁴ There are studies that show that microleakage reaches 20% in preventive resin restorations using amalgam and composites.¹⁰ Cention N® has high flexural strength (100mPa), and is an economical substitution for amalgam.⁵ In addition, application method using Cention N® is not as complex as composite resins which have to fill with layering techniques.⁴ Capability of Cention N® for self-curing help the hardening process if the child is less cooperative, or if patching is done in an area that does not have electricity or light curing LED.³

Child in case 1 has a tendency to be rather fussy and less cooperative, but during PRR, Cention N® material can be easily and quickly applied to tooth without the need for etching and bonding techniques. Apart from that, it does not require layering techniques and material polymerization occurs fast with the help of light cure.

Cention N® also has a 24.6% bases filler that can release quite high fluoride ions and OH- ions compared to Glass Ionomer Cement, thus triggering remineralization, acid neutralization, and anti caries. Research has shown that the ability of composite resins and sealant materials that can release fluorine can inhibit secondary caries at the edge of the restoration, and rapid reduction of bacteria near the material that releases fluorine.^{8,9}

Cention N® has similar physical properties to amalgam in terms of hardness and endurance so that it can be applied to posterior tooth and resist chewing force. Child molar in case 2 is included in type B, namely the depth of the caries reaches the dentin. Cention N® can be used for PRR in that type because it has resistance to chewing power. Another advantage is that Cention N® has a

relatively affordable market price, so that it can be considered a selection of restoration materials.³

In vitro studies conducted by Chole, et al., showed that Cention N® had the highest flexural strength compared to bulk-fill composite restorations, nanocomposites by light cure, and Resin-Modified Glass Ionomer Cement.⁷ Cention N® has been on the market since 2016, therefore more research is needed on the use of this restoration material in children's teeth, especially in primary teeth.

SUMMARY

Cention N® has many advantages that can be a solution to some of the shortcomings of other preventive resin restoration materials.

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