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A New Alkasite Restorative Material – Cention N

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Abstract

Ivoclar Vivadent has launched a new restorative material that belongs to the group of Alkasite materials. Cention N is recently introduced tooth-colored material with self-curing and additional light-curing system. The alkaline filler that is contained in its inorganic part increases the release of hydroxide ions to regulate the pH value during the attacks with acid. As a result, the demineralization can be prevented. In addition, the release of large amounts of fluoride ions and calcium forms a solid basis for the remineralization of tooth enamel. The initiator system allows for a good chemical self-cure.

Keywords: Cention N, Polymerization, Alkasite, Isofiller

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Introduction

A number of esthetic restorative materials are used to restore primary teeth which have grown exponentially in the past years. Glass ionomer cement was used as a suitable alternative restorative material for restoring primary teeth. It was developed by Wilson and McLean at the Laboratory of the Government Chemist in England in 1965.[1] It was first launched in Europe in 1975 and first marketed in the United States in 1977. Glass ionomers have low cytotoxicity, fluoride release, and limited microleakage. They also have less desirable physical and mechanical properties such as poor polishability, susceptibility to dehydration, and moisture contamination during initial setting and low fracture toughness and flexural strength.[2] However, glass ionomer cement has certain disadvantages such as sufficient hardness, resistant to fracture, and has low abrasion resistance and color stability to moisture soon after setting.[3] To overcome these drawbacks, new materials have been introduced.

Cention N

It is new filling material which belongs to Alkasite group of materials. It is self-curing with optional additional light curing. It is a recently introduced tooth colored, Alkasite, basic filling material which can be used as alternative restorative material in primary teeth for bulk placement in retentive preparation. Cention N thus redefines the basic filling, combining bulk placement, ion release, and durability in a dual-curing, esthetic product – satisfying the demands of both dentists and patients.[4] It also includes special patented filler (Isofiller) which acts as a shrinkage stress reliever and due to its low elastic modulus, this shrinkage stress reliever within Cention N reduces polymerization shrinkage and microleakage.[5] Its highly cross-linked polymer structure is responsible for high flexural strength.[6]

Composition

Cention N (Ivoclar Vivadent)

Powder calcium fluorosilicate glass, barium glass, calcium-barium-aluminum fluorosilicate glass, ytterbium trifluoride, initiators, and pigments [Table 1].

Liquid consists of four different dimethacrylates monomers and initiators.

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Table 1: The functions of filler present in Cention N

Filler	*Function*
Barium-aluminum-silicate glass	Strength
Ytterbium trifluoride	Radiopacity
Isofiller (Tetric N-Ceram technology)	Shrinkage stress reliever
Calcium-barium-aluminum fluorosilicate glass	Strength, fluoride release
Calcium fluorosilicate glass	Ion release F^-, OH^-, Ca^{2+}

- Urethane dimethacrylate (UDMA) – main component of monomer matrix and has no hydroxyl side groups, that is, its hydrophobic and exhibits low water absorption
- Tricyclodecane-dimethanol dimethacrylate – low viscosity, difunctional monomer which initiates hand mixing of Cention N
- Tetramethyl-xylylen-diurethane dimethacrylate (aromatic aliphatic-UDMA) – partially aromatic UDMA is a hydrophobic, high-viscosity cross-linker which combines the favorable properties of aliphatic (low tendency to discolor) and aromatic (stiffness) diisocyanates
- Polyethylene glycol 400 dimethacrylate (PEG-400 DMA) – enhances the flowability of Cention N.[7]

Polymerization Technology in Cention N

Self-cure Mechanism

Liquid part of Cention N has hydroperoxide and the standard filler in the powder is coated with the other initiator components.

Hydroperoxide rather than conventional benzoyl peroxide imparts greater temperature-resistance, that is, it is less sensitive to heat, which is an important factor regarding storage stability. Thiocarbamide rather than amine also improves the color stability of the product as color stability of a material decreases with increasing amine content.

Light cure (Dual-cure) Mechanism

It has photoinitiator Ivocerin and an acyl phosphine oxide initiator for optional light curing. Ivocerin, a dibenzoyl germanium derivative, is an amine-free initiator.[8]

Conclusion

Cention N was found to be the best tooth-colored restorative material. This material of choice can be cost effective way to deliver a high-quality, predictable restoration and consumes less time. It can be considered as a suitable material for primary teeth and posterior restorations in permanent teeth.

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