



Knowledge, Awareness and Perception of Cention Being Used as a Replacement for Amalgam Restoration

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ABSTRACT

Cention N, a newer replacement for amalgam used in posterior restoration, has been proven to provide superior aesthetics and better retention in comparison to Amalgam. The study was carried among 150 Undergraduate, Post-graduate Students and staff in Saveetha Dental College. Each student and staff were asked to independently fill the survey, which consisted of questions related to Cention N being used as a replacement to Amalgam in posterior restorations. This study mainly gave us an idea of the extent of how many dental students and dental practitioners know about Cention N and it's a progressive increase from dental practitioners to postgraduates when compared to the final years. This can be accredited to increased awareness, knowledge and training into clinical practice and in-depth knowledge into various recent advancements in restorative material. Thought most of the students and staff seemed to be aware of Cention N, very few had used it in the clinical setup for treatment.



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INTRODUCTION

Over the years, numerous filling materials have been manufactured and are available right from amalgam to the bulk filled composites. Amalgam restorations were first introduced into clinical dental practice in the 19th century; Glass ionomer cements were introduced in the 1970s. Composite resins started becoming a standard during the 1980s. Later

on, many innovations have been incorporated to increase its properties and various other materials have been introduced for better posterior restorations with better standard and quality (Mazumdar *et al.*, 2018; Kent *et al.*, 1973). Evolutionary development and growth in filling materials have given the need to find tooth coloured restorative materials with superior aesthetics and increased strength to replace the missing teeth and maintain the tooth colour and contour (El-Nawawy *et al.*, 2013).

Cention N is an innovative filling material and in recent years, it has been used for the and permanent restoration in posterior teeth. For many years, Amalgam and Glass Ionomer cements have been used with a good clinically outcome rate for posterior restorations. Though the presence of all these materials is there, there has been an emerging need and requirement for alternative filling materials. These may mainly include that Glass Ionomer Cement has low flexural strength, the fact that amalgam contains mercury as it's its main core compo-

nent and also the grey colour of the amalgam. In contrary to Amalgam and GIC, Cention N provides high flexural strength along with providing good tooth coloured aesthetics (Cention, 2016).

Cention N belongs to the group of Alkasites. Alka-site refers to newer filling material, which like compomer materials are mainly subgroup of composite class that employs alkaline fillers, which release acid-neutralizing ions (Chole *et al.*, 2018). Cention N increases the hydroxide ions and its release and, in turn, manages the pH value during acid attacks. In a result, demineralization can be stopped. In addition to this, large numbers of calcium and fluoride ions are released and help in the remineralization of dental enamel (Cention, 2016). The clinical durability of these materials is strongly influenced by their physical properties.

Cention-N is available as powder and liquid of which liquid has dimethacrylates and initiators and powder is composed of various glass fillers, initiators and pigments (Cention, 2016). Bulk-fill composite has bisphenol A-diglycidyl dimethacrylate (Bis-GMA), ethoxylated bisphenol A dimethacrylate (Bis-EMA) and urethane dimethacrylate (UDMA). The organic matrix constitutes approximately 1% of the mass. Many types of fillers have also been incorporated into this material. Aluminum silicate glass, barium has 2 different mean particle sizes, is an is filler comprising of cured dimethacrylates, spherical mixed oxide and ytterbium fluoride are included to attain required physicomechanical properties as per manufacturer's instructions (Sadananda *et al.*, 2017). It comprises of general standard filler content of approximately 75% by weight, 61% by volume and 17% polymer fillers or is fillers (Abuelenain *et al.*, 2015).

The cross-linked polymer structure is responsible for the high flexural strength. This initiation system helps in proper Self-curing.

Composite fillers are comprised and filled with inorganic materials. These filler properties make the composite filling more resistant to wear, colour adjustable, and easier to polish. The various composite fillings used are micro filled composites, hybrid composites, nano filled composites (Menon *et al.*, 2016). Composite resin serves as an esthetic alternative to amalgam and cast restorations. Posterior teeth can be restored using direct or indirect composite restorations. The selection between direct and indirect technique is a clinically challenging decision-making process. A most important influencing factor is the amount of remaining tooth substance (Azeem and Sureshbabu, 2018). To increase the mechanical, physical, chemical prop-

erties in the material, a few changes were incorporated: the inclusion of monomers, newer initiation systems and new technologies like nanotechnology for inorganic filler production (Monteiro and Montes, 2010).

Resin-modified glass-ionomer is light-cured and possesses advantages such as fluoride release as well as at the same time increasing the wear property. To attain this increased property, the water is partly replaced with hydrophilic monomer often hydroxyethyl methacrylate (HEMA). The resin-modified glass-ionomer has two setting reactions; one which includes the acid-base reaction of conventional glass-ionomer and a polymerization reaction similar to that of composite resin. The set cement will tend to have both the properties (Azillah *et al.*, 1998).

The flexural strength is a measure of fracture resistance of the material which indicates the flaws within the material that may possess the potential to bring about failure once subjected to loading (Rodrigues-Junior *et al.*, 2008; Fujishima and Ferracane, 1996). This property is incorporated to evaluate the strength of the material and the amount of distortion under bending stresses (Cention, 2016).

The main basis of this study was to mainly look over the knowledge, awareness and perception of Cention N being used as a replacement for amalgam in posterior restorations.

MATERIALS AND METHODS

A cross sectional questionnaire survey (Figure 1) was carried out to assess the knowledge, perception and awareness on Cention N being used as a replacement for amalgam in posterior restorations among final year, post-graduate dental students and dental practitioners. The convenient sample size of 150 dental students and practitioners was decided and data was collected by questionnaire. From them, about 45 Interns and 70 post-graduate dental students and 35 dental practitioners filled the questionnaire. This questionnaire was approved by the scientific research board of Saveetha dental college. A specially designed survey was designed to assess the knowledge on resorbed alveolar ridges among final year and PG dental students and dental practitioners. This questionnaire was distributed to the final year and postgraduate dental students and dental practitioners in Chennai. The name and identity of the students and the practitioner was maintained anonymously. All the students were given half an hour to one hour time to complete the questionnaire. The completed questionnaires were

1. Which material do you most commonly use for posterior restorations?
 - a) Amalgam
 - b) GIC
 - c) Composite
2. Why do you feel that amalgam should not be used as a restorative material ?
 - a) Poor aesthetics
 - b) Micro leakage
 - c) Allergy
3. Which property is most important for posterior restorations ?
 - a) Aesthetics
 - b) Longer durability
 - c) Better retention
 - d) Occlusal morphology / carving
4. Which material has high compressive strength ?
 - a) Amalgam
 - b) Composite
 - c) Cention
 - d) GIC
5. Are you aware of cention being used as restorative material ?
 - a) Yes
 - b) No
6. If previous question answered yes ,How did you come to know about cention ?
 - a) Books
 - b) Research article
 - c) Clinical trials
7. Cention is most often used for ?
 - a) Anteriors
 - b) Posteriors
8. What kind of restorative material is cention ?
 - a) Dual cure
 - b) Heat cure
 - c) Light cure
 - d) Cold cure
9. What fillers are used in cention?
 - a) Metafillers
 - b) Isofillers
 - c) Micro fillers
 - d) Macro fillers
10. What is compressive strength of cention ?
 - a) 110
 - b) 500
 - c) 200
11. Which material has highest fracture resistance ?
 - a) Amalgam
 - b) GIC
 - c) Composite
 - d) Cention
12. Which group of restorative Materials does cention belong to ?
 - a) Alkasaites
 - b) Methacrylate's
13. Which material provides highest aesthetics in posterior restorations?
 - a) Cention
 - b) Amalgam
 - c) GIC
 - d) Composite
14. Which material has the highest micro-hardness ?
 - a) Cention
 - b) Amalgam
 - c) GIC
 - d) Composite
15. Which material has highest polymerisation shrinkage ?
 - a) Cention
 - b) Amalgam
 - c) GIC
 - d) Composite
16. Have you used cention ?
 - a) Yes
 - b) No
17. Have you used cention has a replacement for other restorations ? if so ,how did u feel it as a restorative ?
 - a) Better than amalgam
 - b) Better than GIC
 - c) Better than composite
 - d) Equivalent to Amalgam
 - e) Have not used it yet
18. Do you feel that cention can you be used a replacement for posterior tooth ?
 - a) Yes
 - b) No

Figure 1: Questionnaire used for the assessment

immediately collected and were analyzed.

Data Analysis

Table 1: Most common material used in posterior restoration

Material	No. of students
Amalgam	61
GIC	16
Composite	73

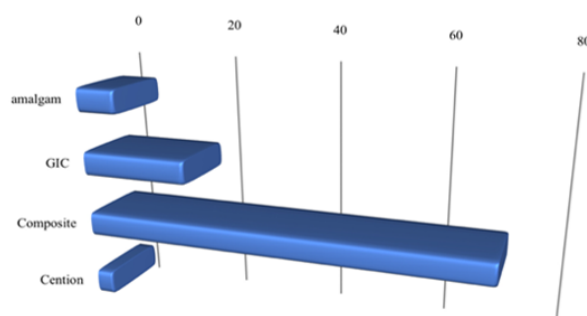


Figure 2: Graphical representation of Material which provides the highest aesthetics In posterior restorations

Table 2: Most important property required for posterior restorations

Material	No of students
Aesthetics	28
Better retention	37
Longer durability	53
Occlusal morphology	32

According to the graph in (Figure 2), we were able to notice that Composite was the material that provided the highest aesthetics in posterior restorations.

According to the graph shown in (Figure 3), we were able to see that almost 57% of the students and practitioners were aware of Cention N

According to the graph shown in (Figure 4), we see that the awareness of Cention N being used as a replacement for amalgam restoration in recent years is not well known. This can be attributed to the lack of awareness among students and professionals

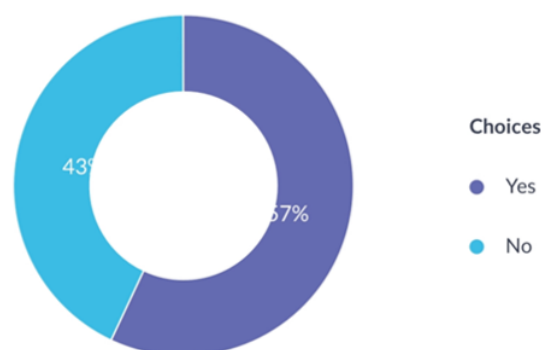


Figure 3: Graphical representing of data on the number of students and professionals being aware of Cention N

on the recent developments and changes that have took place in conservative restorative dental materials.

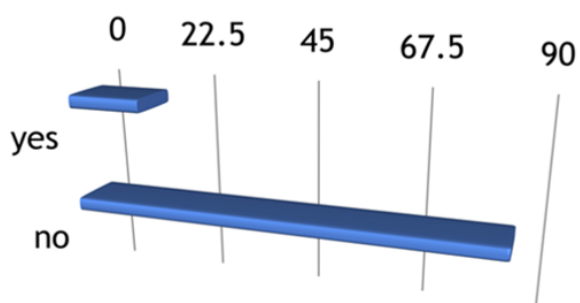


Figure 4: Graphical representing data on the number of students and professionals have used Cention N

RESULTS AND DISCUSSION

The extent to how many dental practitioners and dental students are aware of Cention N progressively expands from dental practitioners to post-graduates then when compared to the undergraduate. This can be attributed to increased awareness, knowledge and experience into clinical practice and in-depth knowledge of various recent advancements in restorative materials. A proper correlation and comparison can be drawn from the survey as to what the students and practitioners preferred in their practice and felt about the use of these different restorative materials in a clinical setup.

Achievement of efficient, durable and at the same time aesthetic direct posterior restoration is a major concern for dental practitioners, which may be attributed to technique sensitivity and various steps involved in proper placement of material (Sadananda *et al.*, 2017). Restoring a tooth with composite material at one time is advantageous for both patient and dental practitioners (Didem *et al.*, 2014; Ilie and Hickel, 2011; Üçtaşı *et al.*, 2004).

From the survey conducted, it was seen that the most common and preferred restorative material for posterior restorations was found to be composite. About 53% of those who took the survey answered that poor aesthetics and the intrinsic Grey color, which amalgam gave, were the reason why they did not prefer using amalgam in posterior restorations. We could also see based on Table 1, that Composite was the most commonly used posterior restorative material due to their aesthetic properties.

As mentioned in Table 2, about 43% felt that longer durability and better retention were the most important factors required for any posterior restorative material.

About 51% answered that Amalgam had the highest compressive strength. About 57% were aware of Cention N being used as a restorative material

and 55% knew that fillers were used in Cention N and about 33% of people answered that amalgam had the highest fracture resistance. From the survey, it was seen that 40 people knew that Cention N belonged to the Alaska site group. 71% of those who took the survey preferred composite the most as a posterior restorative material for better aesthetics.

From the present survey conducted we mainly see that 57% were aware of Cention N being used as a restorative material but of that 57% only 20% had used Cention N in their clinical practice

Dental materials in the recent years have been manufactured to keep in mind their easy handling, biocompatibility, aesthetics and adhesive properties; however, these materials due to their long phase in the oral cavity are prone to easy discoloration and also end up with poor marginal sealing, these disadvantages can be attributed to their poor prosperities and micro-hardness of the material (Almuhaiza, 2016). In reality, the oral environment is constantly subjected to constant change pH and temperature that can alter the organic and inorganic matrix of these composite resins hence leading up to their decreased durability in the oral cavity (García-Contreras *et al.*, 2015). While physical and mechanical properties of these materials may be remarkably changed by the effects of solvent uptake and component elution, the greatest concerns are the short-term release of unreacted components and the long-term elution of degradation products in the oral cavity, which should be considered the development of restorative materials (Ferracane, 2006).

Amalgam, which we use clinically, is a mixture of main components such as silver, mercury, tin and copper. After many types of research were done, mercury still is to be the only element that will combine these metals in such a way that it can be easily handled to fill a cavity. Amalgam showed higher maximum stress and strain values than enamel and also had the highest compressive strength making it the material with the best properties for any restoration. Still, it's only drawback being poor aesthetics and patient preferring a more tooth-colored restorative (Shenoy, 2008).

Glass ionomers are mainly known for their strong chemical bond to the tooth structure, achieved by the interchange of ions between the tooth and restoration. Although their clinical performance in terms of retention, glass ionomers is comparatively is seen to be far less aesthetic than composite (Khoroushi and Keshani, 2013).

Introduction of bulk-fill resin-based composites in the dental material market has initiated research studies investigating various physicomechanical

properties, but the number of available research is limited. Resin composites are mostly used in posterior restoration due to their superior properties in dealing with masticatory stresses (Sabatini, 2013). Resin composites with better mechanical properties have been developed over these years.

The Cention N is self-curing, the curing depth unlimited. Cention N is a complete bulk replacement material, which is designed to be used as a bulk restorative. It is important that the material shows low polymerization shrinkage and force (Cention, 2016).

According to research conducted by (Dayanand Chole et al), Cention-N showed the highest flexural strength followed by bulk-fill composites, light-cure nano-composites and least flexural strength is shown by resin-modified glass ionomer cement.

Cention N includes a special patented filler that keeps shrinkage stress as minimum as possible. This material helps in reducing the shrinkage stress. The organic/inorganic ratio helps in the low volumetric shrinkage. Fillers are responsible for imparting restorative materials with the adequate strength to withstand the stresses and strains of the oral cavity and to achieve acceptable clinical longevity (Lazarchik et al., 2007).

CONCLUSIONS

According to the present study which assessed the awareness and knowledge levels of students and professionals on Cention N being used as an alternative and better replacement for amalgam in posterior restorations, the results obtained show that very few know about Cention being a better replacement for amalgam, So, some in vivo studies upon usage of Cention-N, bulk-fill composites, light cure nano-composites and RMGICs as restorative materials are required. Very few studies have been conducted to evaluate the clinical success of Cention N being a better tooth colored restorative. With better properties than amalgam, further in-vitro and in-vivo studies must be conducted to understand the clinical efficiency of Cention N.

The Cention N resin-based filling material is easy to restore clinically and does not require any special products or learning additional skills. As there is demand in tooth colored restorations, this material of choice can be an easier and cheaper way to deliver a less time consuming, High-quality restoration. It can be considered as a suitable material for posterior restoration.

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