

KNOWLEDGE, ATTITUDES AND PRACTICE REGARDING THE USE OF DENTAL CARTRIDGES FOR LOCAL ANAESTHESIA BY DENTAL PRACTITIONERS

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ABSTRACT

BACKGROUND: A dental cartridge for LA contains Nitrogen Bubble, 1-2mm in diameter and is present to prevent Oxygen from being trapped in the cartridge and potentially destroying the Vasopressor or vasoconstrictor, so this is the function of Nitrogen Bubble in the LA cartridge. Hence dental cartridges have their own significance in delivering LA drugs.

AIM: The aim of the study is to assess the knowledge, attitudes and practice regarding the use of dental cartridges for LA by dental practitioners.

OBJECTIVE: The study is done as a questionnaire survey among the practitioners in a region. The questionnaire is framed under the criteria of knowledge, attitude, preference, practice, advantages and disadvantages of dental cartridges for LA.

RESULTS: Results shows that the knowledge, attitudes and practice regarding the use of dental cartridges for LA by dental practitioners is inadequate (70%).

CONCLUSION: The study is concluded that vigorous dental awareness program needs to be initiated to address this concern.

Key words: Local anaesthesia, dental cartridges, dental practitioners

INTRODUCTION:

Dental cartridges are precision instruments used in dentistry to deliver LA. The major advantage of cartridges include relative ease for the operator during the delivery of the drug and reduced pain perception during anaesthetic delivery.^[1] A dental cartridge for LA contains Nitrogen Bubble, 1-2mm in diameter and is present to prevent Oxygen from being trapped in the cartridge and potentially destroying the Vasopressor or vasoconstrictor, so this is the function of Nitrogen Bubble in the LA cartridge.^[6,7] So, knowledge about the cartridges are needed to be assessed among the practitioners. This study aims to assess the knowledge, attitudes and practice regarding the use of dental cartridges for LA by dental practitioners.

METHODOLOGY:

A cross sectional survey was carried among 100 dental practitioners in Chennai city. A self assessed questionnaire comprising of 10 questions eliciting information about the knowledge, attitude and practice of dental cartridges were given to them. The responses obtained from the participants were processed further and analyzed. The printed questionnaires were collected and analyzed using Microsoft excel and graphs were made to represent the obtained data. Various studies were referred to gain more knowledge to improvise the study.

RESULTS:

Knowledge:

Of the 100 practitioners included in the study, 12% were aware about the use of dental cartridges for LA in dentistry and 84% were not aware, while 4% are not sure about the use of dental cartridges for LA in dentistry. Figure-1 shows the knowledge about the use of dental cartridges for LA in dentistry.

Do you know that Local Anaesthesia can be delivered by cartridges?

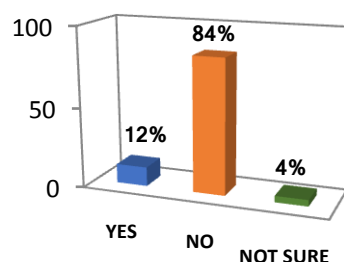


Figure 1

Of the 100 practitioners included in the study, only 12% had knowledge about the parts of a dental cartridge, 82% were not aware, while 6% had no idea about the parts of a dental cartridge. Figure-2 shows the knowledge about the parts of a dental cartridge among the practitioners.

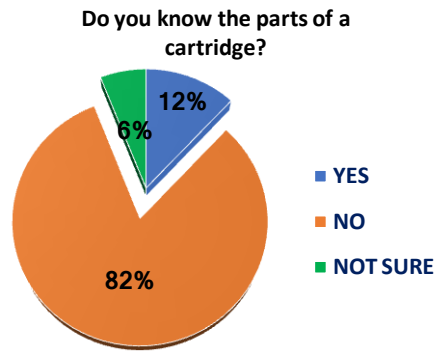


Figure 2

The diaphragm of the cartridge is made of latex. This is the reason for reduced pain perception during anaesthetic delivery. ^[1]Of the 100 practitioners included in the study, only 13% answered as diaphragm, while the rest 87% were wrong. Figure-3 shows the knowledge about the latex material and its role in the dental cartridge.

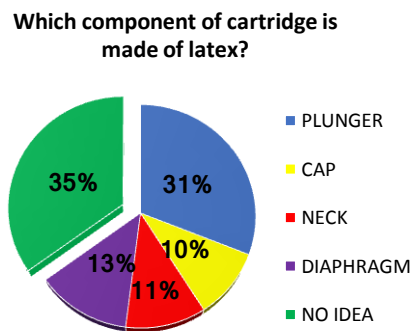


Figure 3

There is a small nitrogen bubble in the cartridge. It is present to avoid oxygen from oxidizing the vasopressor. ^[1]Of the 100 practitioners included in the study, only 33% answered as nitrogen bubble, while the rest 67% were wrong. Figure-4 shows the knowledge about the small bubble which is sealed in the dental cartridge.

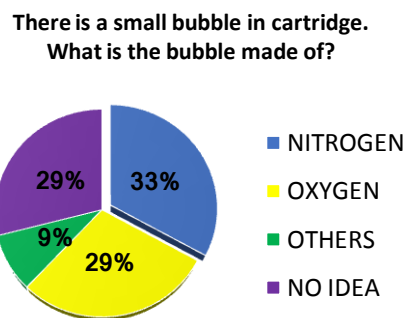


Figure 4

Practice:

Of the 100 practitioners included in the study, 97% were using injections and syringes for LA delivery and 3% were using LA cartridges for practice. Figure-5 shows the knowledge about the use of dental cartridges for LA in dentistry.

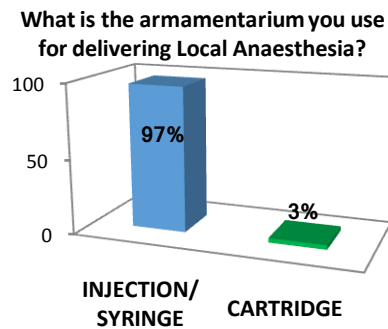


Figure 5

Attitude:

Regarding the attitude of the practitioners, the last question was framed to know their preference after a proper awareness about the dental cartridges for local anaesthesia. Of the 100 practitioners included in the study, 73% were preferring to use cartridges for LA delivery after proper awareness and 27% were not preferring cartridges for practice. Figure-6 shows the knowledge about the use of dental cartridges for LA in dentistry.

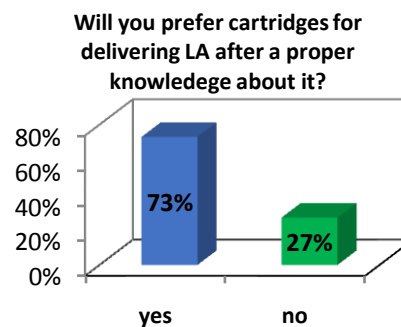


Figure 6

DISCUSSION:

Knowledge about the components of dental cartridge is discussed to understand the need of each component in the cartridge.

The local anesthetic solution, which is the major component, provides pain control during dental therapy. It interrupts propagation of impulse preventing it from reaching brain through one of the various mechanisms of actions based on the chemical present in the drug. Drugs are listed by their (%) concentration. The number of mg of an agent contained in the cartridge can be calculated by multiplying the (%). Thus, a cartridge containing 2 ml of 2% local anesthetic solution contains 40 mg of local anesthetic agent.

The local anesthetic solution is quite stable, capable of being autoclaved, heated or boiled without deterioration. However, other contents of cartridge, such as Vasopressor and cartridge seal are more labile. These are broken down easily.

Vasopressor is added in various concentrations, to some dental cartridges and it has got several roles like to increase safety of the Local Anesthesia, prolong the duration of action and helps in controlling bleeding. The pH of dental cartridge containing local anesthetic agent with a vasoconstrictor is lower than that without a vasoconstrictor. Because of this pH difference, plain anesthetics have somewhat more rapid or clinical action and are more comfortable.^[2,3]

Antioxidant that acts as a preservative for vasoconstrictors, most frequently Sodium bisulfite is also present. It prevents biodegradation of vasopressor by oxygen which might be present in the cartridge either introduced during manufacturer, or which got diffused through semi permeable membrane or the rubber diaphragm after filling at the time of storage of the cartridge. The Sodium bisulfite reacts with oxygen before oxygen can destroy the vasopressor. There is increased discomfort upon injection of an older cartridge with a vasopressor than with a fresher cartridge and thus once the cartridge container is opened, it should be used within a reasonable time. Local anesthetic solutions without vasoconstrictors have a shelf-life of about 48 months. Local anesthetic solutions containing vasoconstrictors have their shelf-life reduced to 18 and 12 months for epinephrine and phenylephrine respectively. This is so because of the instability of the vasoconstrictors. Hence fresh solutions produce better analgesia and cause less irritation to the tissues.^[4,5]

Sodium chloride is added to the contents of dental cartridge to make the solution isotonic with the tissues of the body. Hypertonic solution produces tissue edema, paresthesia, sometime lasting for several months following drug administration. Distilled water is used as a diluent to provide the volume of solution. Preservatives like are added to increase the shelf-life.^[2,3]

The end cap of the cartridge may be either color-coded to match the ADA Color- Coding System or given a neutral color. Table-1











Product	Color Code		
Lidocaine 2% with Epinephrine 1:100,000	 Red 185	Prilocaine 4% with Epinephrine 1:200,000	 Yellow 108
Lidocaine 2% with Epinephrine 1:50,000	 Green 347	Prilocaine 4%	 Black
Lidocaine Plain	 L. Blue 279	Bupivacaine 0.5% with Epinephrine 1:200,000	 Blue 300
Mepivacaine 2% with Levonordefrin 1:20,000	 Brown 471	Articaine 4% with Epinephrine 1:100,00	 Gold 871
Mepivacaine 3%	 Tan 466	Articaine 4% with Epinephrine 1:200,000	 Silver 877C

Table 1- COLOR CODES

The attitudes towards the use of dental cartridges is inadequate due to the lack of proper knowledge. Practice(3%) is also veryNo previous studies have been reported. The knowledge, attitudes and practice regarding the use of dental cartridges for LA by dental practitioners is inadequate(70%).

CONCLUSION:

The practitioners are not aware due to the lack of adequate practice and familiarity. All practitioners should be aware of all the recent advancements so as to ease their practices and pave more comfort for the patient.

This study concludes that the knowledge, attitudes and practice regarding the use of dental cartridges for LA by dental practitioners is inadequate. Hence, vigorous dental awareness program needs to be initiated to address this concern.

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