Advance in cavity preparationmethod

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Chemomec-hanical Caries Removal

- The chemomechanical method is an effective alternative for caries removal because it brings together atraumatic characteristics and bactericide / bacteriostatic action. The method was created so as that an active ingredient would soften the predegraded collagen of the lesion without pain or undesirable effects to adjacent healthy tissues.

- The chemomechanical method for caries removal was developed to overcome these limitations. It is not only more comfortable for the patient but also able to better preserve the healthy tissue.
GK-101 was the first chemomechanical agent for caries removal.

Advantages

1. – Safe
2. – Neither local anesthesia nor bur is used
3. - lower anxiety
4. - conservation of the sound tissue

Types

1-CARIDEX

was developed by CM Habib in 1984 from a formula made of N-monochloroglycine and amino butyric acid and was called as GK-101E.

It consisted of two solutions which were mixed immediately before use and was stable for only one hour. A delivery system consisted of a reservoir for the solution, a heater and a pump which passed the liquid warmed to body temperature through a tube to a handpiece and an applicator tip available in various shapes and sizes . Both the solutions in Caridex required immediate mixing followed by warming in the heater to the body temperature and pump used to pass to the hand piece.

1. Efficacy and speed of caries removal needed improvement.
2. It was expensive.
3. Large quantities were required for intermittent use during excavation.
4. The solution had to be heated.
5. A large reservoir with pump was needed for application and the product was delivered in large containers.
6. The shelf-life of an opened container was short.
7. The hand instruments were not optimal.
8. The product was launched in an era when new dentine bonding agents were not considered reliable, instead mechanical undercuts created by drilling were needed for retention.

Caridex disadvantages

2-CARISOLV

Discovered in 1998, it was a more efficient and effective than Caridex. Despite its effectiveness, Carisolv was not a blockbuster mainly because it required extensive training and customized instruments which increased the cost of the solution. Cariosolv can be used with either hand instruments or Power Drive which is a combined electronic instrument for power-operated, minimally-invasive caries removal.

- Where the preservation of tooth structure is important
- The removal of root/cervical caries
- The management of coronal caries with cavitation
- The removal of caries at the margins of crowns and bridge abutments
- The completion of tunnel preparations
- Where local anesthesia is contraindicated
- The care of caries in dentally anxious patients, notably needle phobics
- Management of primary carious lesions in deciduous teeth
- Atraumatic restorative technique procedures
- Caries management in patients with special needs

Indication

CARISOLV

Presently, it is available in two forms, single mix and multi-mix. In single mix, two syringes are available, one containing sodium hypochlorite solution and the other containing three aminoacids: lysine, leucine and glutamic acid with carboxymethyl cellulose, to make a viscous consistency. Recently, a multi-mix syringe has been introduced which contains the ingredients of both the syringes and dispenses the exact amount of required material

3-PAPAIN GEL

A new type of chemomechanical agent was developed in Brazil in 2003 comprised of papain, chloramines, toluidine blue, salts, thickening vehicle and called as Papain gel.

Papacarie
Biosolv
Brix 3000

Papacarie

Papacarie is a Portuguese word meaning 'caries eater'. Papacarie gel was introduced in 2003 by Bussadori et al., and consists of papain enzyme, chloramine, toluidine blue, salts, preservatives, a thickener, stabilizers and deionized water.

Although Papacarie contains a small amount of chloramine, the main action depends on the presence of the papain enzyme.

The chloramine was added to enhance removal of denatured tissues. Papain is a proteolytic enzyme with bactericidal and anti-inflammatory actions. It is extracted from the latex of leaves and fruits of the green adult Carica papaya tree, which is cultivated in tropical regions such as Brazil, India, South Africa and Hawaii.

Caries excavation time

Few clinical trials and laboratory studies have evaluated Papacarie caries excavation time, and most studies compared the results with rotary and Carisolv caries excavation methods.

All of these studies reported that there was no significant difference in caries excavation time between Papacarie and rotary caries excavation methods.

Moreover, Papacarie exhibited significantly shorter excavation times than Carisolv

Brix 3000

AIR ABRASION (MICROABRASION AND KINETIC CAVITY PREPARATION

AIR ABRASION

- Air abrasion for restoration preparation removes tooth structure using a stream of aluminium oxide particles generated from compressed air or bottled carbon dioxide or nitrogen gas. The abrasive particles strike the tooth with high velocity and remove small amounts of tooth structure.

Efficiency of removal is relative to the hardness of the tissue or material being removed and the operating parameters of the air abrasion device. Like any air stream air abrasion can cause subcutaneous emphysema.

AIR ABRASION

- ***Clinical Uses of air abrasion***
  - Class I, II, III, IV and V cavity preparations
  - Sealants and preventive restorations
  - Repair of composite and porcelain especially margin of veneers
  - Removal of composite and amalgam

Advantages of the air abrasion:

- It is painless
- Local anesthesia is rarely needed
- It works quickly and work quietly without the whine of the all too familiar dental headpiece
- There is no vibration or pressure to cause micro fractures that weaken tooth
- There is no production of heat to damage the dental pulp
- Lesser sound tooth structure is removed.

LASER

3-Laser

- One of the main uses of laser in dentistry is the removal of dental caries and preparation of restorative cavities. The use of laser with high power in preparation of cavities presents the advantages of less vibration and pain during procedure and reduced need for local anesthesia. Similarly, using laser in preparation of restorative cavities is accompanied with low risk of damage to adjacent teeth. It also makes the tooth structure more resistant to acid and decay.

- As laser acts with a different mechanism to prepare dental cavities, the morphology of laser prepared surfaces is different from that of those prepared by conventional method. laser-prepared permanent and primary tooth dentin reveals non-uniform scaly rough surfaces and opened tubules without formation of smear layer and any evidence of thermal damages

Smart prep. Burs

It conserve remaining healthy dentin to avoid inadvertent pulp exposure.

It will not traumatize healthy dentinal tubules, thereby reducing post operative sensitivity

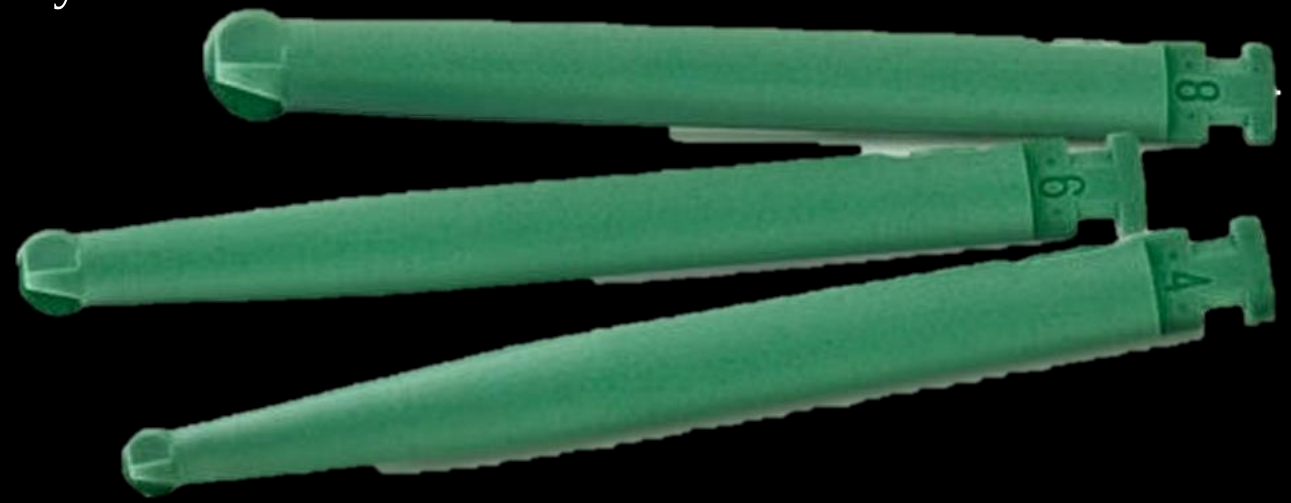
Patients may experience a more comfortable caries removal procedure without anesthesia.

The traditional approach using mechanical rotary instruments is not fundamentally conservative because it often results in cavity preparations extending beyond the infected outer carious dentin layer into the noninfected or lightly infected inner carious dentin or into normal dentin.

Carbide dental burs are designed to efficiently remove non-decalcified enamel and dentin but do not facilitate the differentiation between carious and normal dentin during cavity preparation.

Polymer burs consist of cutting elements that cut softer dentin efficiently but are unable to cut normal dentin[2]

The cutting blades of Polymer burs will deflect and deform upon encountering normal or partially decalcified dentin, thereby enabling the reduction of cutting efficiency and alteration of the operator's tactile sensation.



Ceramic smart bur

Listed advantages of ceramic bur over conventional burs are corrosion resistant, smooth in operation, and excellent cutting efficiency.

- Ceramic burs is acceptable for minimally invasive caries excavation as they proved to be more efficient. Polymer burs although selective in carious dentin removal has the disadvantage of incomplete caries removal that led to the repeated change of burs and lesser patient acceptance due to vibration and more time consumption

THANK YOU!