



CHEMOMECHANICAL CARIES REMOVAL WITH BRIX 3000® IN PRIMARY MOLAR TOOTH: A CASE REPORT

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ABSTRACT

Chemomechanical caries removal is a new paradigm in Pediatric Dentistry. This technique philosophizes removal of only infected dentin and promotes availability of affected dentin for remineralization, thus providing a minimally invasive, atraumatic conservative approach towards dental caries management. This case report describes Chemomechanical caries removal in a 7-year old, apprehensive boy using papain based Brix 3000®.

Key words:

Chemomechanical caries removal,
Atraumatic caries removal, Dental
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INTRODUCTION

Dental caries has been a huge burden in Dentistry since times immemorial. With the advent of newer caries removal techniques, management of carious lesions has greatly improved.

Miles Markley, a great leader in Preventive Dentistry once summarized the central concept that “loss of even a part of human tooth should be considered a serious injury, and dentistry’s goal should be to preserve healthy, natural tooth structure.”¹

A paradigm shift has been observed in the treatment of carious lesions as dentists gained better knowledge of carious process and periodontal diseases. “Drilling and filling” is no more effective in treating cariogenic infection but a much modern approach called Minimally Invasive Dentistry (MID) or Microdentistry has now emerged that follows simple principals: Identify, protect and restore.²

MID integrates prevention, remineralization and minimal intervention for placing or replacing restorations by tissue preservation.³ Chemomechanical elimination of carious dentin is thought to be a promise in pediatric dentistry considering child’s anxiety or any medically compromised state and can be applied to patients in whom administration of local anaesthesia is contraindicated.⁴

Chemomechanical caries removal makes use of a solution that chemically alters carious dentine and softens it facilitating easier removal with hand instruments.⁵ The chemical agents can be broadly classified having either sodium hypochlorite as the main ingredient or having enzymes as their main ingredients.

GK-101®/ N—monochloroglycerine, Caridex® and Carisolv® are sodium hypochlorite based agents; whereas, Papacarie®, Carie-Care® and Biosolv® are enzyme based chemical caries removing agents.⁶ Among the enzyme based agents, Brix-3000®, a papain enzyme based chemomechanical caries removal agent has emerged, which is made from enzymatic extract of green papaya (*Carica Papaya*) and latex leaves. It is claimed by manufacturers that Brix-3000® removes carious tissue by proteolysis of collagen.⁷

The present case report describes the use of Brix-3000® as a chemomechanical caries removal agent for treatment of acute dental caries in a primary Mandibular molar tooth.

Case Report

A 7 year old male accompanied by his parents reported to Multispeciality Dental Care Clinic, Modinagar, Uttar Pradesh, India with the complaint of decayed tooth on left side of his lower jaw. After thorough clinical examination, Class-I moderate to deep carious lesion was observed in Mandibular left primary second molar tooth (Figure 1).



Figure 1 Moderate to deep carious lesion.

The child had a negative history of systemic conditions and was not on any medication for a long period of time. On clinical examination, no sinus or fistulous tract associated with the involved tooth was seen and the condition was diagnosed to be Dentinal caries in tooth 75. We also found sufficient tooth structure surrounding the carious lesion. When evaluated, the child ranked II on Frankel's Behaviour rating scale was quite apprehensive and displayed few temper tantrums which led us to the use of Chemo-mechanical Caries removal using Brix-3000[®] gel.

Informed consent was obtained from the patient's parents and the child's behaviour was shaped using Tell-Show-Do technique.

This procedure was performed free of anesthesia. The operating field was isolated using a thick (Nictone Black) Rubber Dam sheet mounted on a (Hager Werken) Foldable Articulated frame that provided photographic contrast and an excellent seal around gingival margin of the tooth thereby facilitating isolation and moisture control. All soft food debris was cleared off the tooth using a spoon excavator. Then, the cavity was dried prior to application of papain-based gel. A drop of Brix-3000[®] was now applied to the carious lesion using an applicator tip. Consistent application of the gel to all surfaces of the cavity was ensured (Figure 2).



Figure 2 Application of Brix 3000[®] gel.

The gel was kept in contact with the cavity for duration of two minutes in which colour change of the gel from translucent blue-green to opaque grey was observed accompanied with appearance of tiny bubbles. Following this, all carious dentin was now removed from the cavity using a blunt spoon excavator without manual pressure (Figure 3). Utmost care was taken not to damage the surrounding tooth structure while excavation of infected dentin.



Figure 3 Removing caries with a blunt spoon excavator.

The cavity was now washed under water and dried to receive an etchant and a bonding agent. Final restoration of the cavity was done using Twinky Star[®] (VOCO) Pink colored compomer (Figure 4). Thus, the entire procedure was

performed under principles of Atraumatic Restorative Treatment (ART).



Figure 4 Pink colored composite restoration done.

DISCUSSION

Conventional caries removal techniques using instrumentation is often associated with discomfort in children and anxious patients. This is related to a rise in temperature during caries excavation which causes irreversible pulpal damage and further tooth destruction⁸ thus reducing regenerative potential of the pulp-dentin complex. Instrumentation also produces vibration, noise, pain and necessity of use of anaesthesia which makes dental treatment unacceptable and a reason of dental resentment in children.

To overcome these disadvantages, various newer alternative methods of caries removal were introduced including lasers, air abrasion, ultrasound and chemomechanical caries removal.⁹ Chemomechanical caries removal is by far the most promising method of caries elimination.¹⁰

Human Dentin contains minerals, water and an organic matrix. The organic matrix is made up of 18% collagen and 2% non-collagenous compounds like chondroitin sulphate, proteoglycans and phosphoporphyrins. Collagen, an unusual protein consists of proline and glycine. Stability of collagen fibrils is brought by cross linking of its tropocollagen units. These fibrils then form a dense network and gain mineralization.

However, when carious attack occurs, acid produced by cariogenic bacteria anaerobically ferments the carbohydrates in environment and causes dissolution of enamel and progress into dentinal tubules. The penetrating acids and subsequent bacterial invasion reduces pH and demineralizes dentin.³ This demineralized dentin has an outer layer of non-remineralizable infected dentin and an inner layer of affected dentin that can be remineralized. The chemomechanical caries removal system works on the infected dentin by further degrading the partially degraded collagen of infected dentin, thus promoting remineralization in affected dentin layer.^{11, 12}

In our case, we have used Brix 3000[®] (Brix SRL Argentina) containing Papain in the concentration of 30,000 U/ mg 10% which is bio-encapsulated using EBE technology (Encapsulating Buffer Emulsion). Brix 3000 is the only chemomechanical caries removing agent which exclusively uses the EBE technology till date; that immobilizes and causes higher proteolysis to remove degraded collagen fibrils from infected dentin. Brix 3000 has been certified dermatologically to be non-toxic and does not provoke any kind of irritation when in contact with healthy tissue.³ This property of Brix 3000 made it possible for us to conserve affected dentin and promote its remineralization, making our treatment readily acceptable by the child patient, intun sufficing principles of Atraumatic Restorative Treatment.¹³ The cavity was bulk filled using a coloured compomer to facilitate its acceptance by the child.

CONCLUSION

Brix 3000[®] serves as an effective, minimally invasive chemomechanical caries removing agent. Caries removal is not only pain free using Brix 3000[®], but it also helps conserve the affected dentin and removes off infected dentin. Patient co-operation in Pediatric Dentistry can be greatly improved with the use of such chemomechanical caries removing agents.

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