

# IATROGENIC MUCOSAL BURN : A CASE REPORT.

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## ABSTRACT

A case of mucosal burn during the placement of fissure sealant on the first permanent molars of a 9-year-old Malay boy is presented. The erythematous lesion with accompanying burning sensation appeared a few minutes after the etching liquid, containing 37% by weight phosphoric acid, had accidentally come into contact with the buccal mucosa on the right side of the angle of the mouth. The mucosa showed complete healing after one week. The use of rubber dam for tooth isolation while doing fissure sealant is essential to avoid accidental contact of potentially caustic chemicals, such as the phosphoric acid etchant, with the oral mucosa as it can result in mucosal burns.

*Key Words: mucosal burn, acid etching, fissure sealant*

## Introduction

Aspirin tablets placed in the mucobuccal fold adjacent to painful teeth have been known to be a common cause of oral mucosal burns<sup>(1,2)</sup>. Other causes of mucosal burns have been attributed to topical abuse or contact with other aspirin-containing compounds or caustic chemicals, as well as an overly fastidious use of alcohol-containing mouthwashes<sup>(3,4)</sup>. It is generally known that even short term exposure to caustic agents are capable of inducing tissue necrosis which can lead to a localised mild erythema<sup>(5)</sup>. Surface coagulative necrosis resulting in a white slough or membrane can occur with higher concentrations and an increase in contact time<sup>(3,5)</sup>.

Fissure sealing constitutes a simple clinical procedure to obliterate pits and fissures on the tooth surface, thus preventing the development of dental caries on susceptible areas particularly the occlusal surfaces. The application of fissure sealant involves etching of surface enamel followed by painting the sealant resin on to the etched surface to seal off the pits and fissures. The etchant most commonly used is orthophosphoric acid in varying concentrations<sup>(6,7)</sup>, either in a liquid or gel form.

The acid etch technique was introduced by Buonocore<sup>8</sup> who demonstrated increased adhesion of acrylic resin to enamel with the use of 85% phosphoric acid. Following this, more acid etch studies have been carried out<sup>(9-12)</sup>. Together with the availability of newer polymeric materials, the technique was developed further. Filled resins became the material of choice and phosphoric acid of lower concentrations were found to give better results. The overall outcome was a major breakthrough in the acid etch technique, eventually resulting in marked advancement in several areas in dentistry. Besides its application in fissure sealants in preventive dentistry, it has also been widely used in restorative dentistry and for bonding orthodontic attachments.

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Consequent to the extensive application of the acid etch technique in dentistry, so is the increased use of phosphoric acid etchant. Although currently available etchants are 30 to 40% phosphoric acid, the chemical is potentially caustic in high concentration. However, to date there have been no reports of adverse reactions specifically caused by its contact with the oral mucosa, references to such occurrence being available only in oral pathology texts<sup>(3-5)</sup>. The report that follows shows the possibility of an adverse reaction to a commonly used liquid etchant occurring during a widely accepted and relatively simple clinical procedure, thus indicating the necessity of taking precautionary measures to prevent it.

## Case Report

A healthy 9-year-old Malay boy attended for dental treatment at the Faculty of Dentistry, University of Malaya, Kuala Lumpur. He was treated by a final year student whereby, as part of the treatment plan, fissure sealant was to be carried out for all first permanent molars. After a few attempts to fix a rubber dam failed, due to patient non co-operation and refusal of local analgesia, the procedure was carried out without using the rubber dam. The fissure sealant material used was Concise Light Cure White Sealant (3M.). In the process of etching the occlusal and buccal surfaces of the lower right first permanent molar, using liquid etchant containing 37 weight % phosphoric acid, the application brush accidentally contacted the buccal mucosa on the right side close to the angle of the mouth. As the student continued the etching procedure, the patient complained of 'pain and swelling' of the affected area. The lecturer on supervision was immediately informed.

On examination, the oral mucosa on the right side of the angle of the mouth was swollen, reddish in appearance (mildly erythematous) and painful on palpation, causing limitation of mouth opening (Figure 1).



Fig.1- Photograph showing swelling and mild erythema of the oral mucosa, with limitation in mouth opening.



Fig.2- Photograph showing completely healed mucosa after one week.

Further questioning of the patient revealed that the 'pain' referred to was actually a burning sensation. The patient was instructed to rinse his mouth with a copious amount of water. A topical corticosteroid oral preparation (Kenalog in orabase) was applied to the affected area. The patient was then reviewed after a week, by which time the affected area was found to have healed completely (Figure 2).

### Discussion

The fact that caustic drugs and chemicals may cause oral mucosal burn is well known<sup>(3-5)</sup>. However, to date there have been very few case reports<sup>(13,14)</sup> and none to demonstrate mucosal burn due to orthophosphoric acid commonly used in enamel etching.

In a review of local and systemic responses related to effects of dental restorative materials, Stanley<sup>(15)</sup> mentioned that inappropriate acid etching procedures using 50% phosphoric acid could lead to ulceration and sloughing of oral tissues. However, no actual reference or case report was cited. In a case report, Hallstrom<sup>(16)</sup> cited an adverse reaction to a chemically-cured fissure sealant Delton (Johnson & Johnson), in which the resulting blistering lesion on the gingiva and buccal mucosa was attributed to a non-specific reaction mechanism due to the monomer component of the sealant material, triethylene glycol dimethacrylate (TEGDMA) and bisphenol A glycidyl methacrylate (BisGMA). The le-

sion was said to resemble urticaria, but the author went on to say that no allergic reaction could be proven from tests undertaken in that case.

Delton and Concise White Sealant both contain TEGDMA and BisGMA and have been shown to cause a foreign body reaction following their subcutaneous implantation in animals<sup>(17)</sup>. These resins are likely to cause an allergic response in a small percentage of the population, as stated by the manufacturer of Concise White Sealant. With the exception of the cases cited by Hallstrom<sup>(16)</sup> and another one related to hypersensitivity to a bonding agent<sup>(18)</sup>, there has been no other report of an allergic reaction to sealant material.

Concise White Sealant is one of the many fissure sealant materials commonly used in preventive dentistry. Besides the sealant resins, which come in separate bottles as Resin A and Resin B, the etching liquid or gel provided in the Concise White Sealant kit is specified as phosphoric acid containing 37% and 35% by weight respectively. In a study to compare effectiveness of etching liquid and gel, Brown et al<sup>(19)</sup> has shown no difference between the two, but an apparent advantage of using the gel would be the better control of the gel during application, compared with the liquid. In spite of this, injudicious use of either type of etchant as well as the fissure sealant resins carry the risks of causing either an oral mucosal burn or an allergic response. In the present case report, the diagnosis of mucosal burn was arrived at because the lesion developed soon after contact, was confined to the area of the contact and resolved without any complication.

To prevent contact of caustic and potentially harmful chemicals such as orthophosphoric acid with the oral mucosa during treatment procedures, tooth isolation is essential. Although the result of a 10-year study on sealant application showed that both rubber dam and cotton roll isolation gave equal sealant retention<sup>(12)</sup>, the use of rubber dam is definitely a more effective method of ensuring a dry field as well as preventing accidental contact of etchant and sealant material with the mucosa. In the application of fissure sealant, laboratory tests<sup>(6)</sup> have indicated that the most critical part of the procedure is effective enamel etching in a dry field, with the etched tooth surface isolated until the sealant has polymerised. The necessity of maintaining a dry field has also led to recommendation for the use of rubber dam with washed field evacuation<sup>(20)</sup> for greater chairside efficiency.

Thus, the use of rubber dam for tooth isolation should be considered essential in view of the various reasons mentioned, and in particular whenever any potentially caustic chemicals are being used. Although other 'simpler' methods of tooth isolation may be regarded by many operators as sufficient, the use of rubber dam need not be 'difficult', nor time-consuming if used constantly over a period of time. In addition to it being an effective method of tooth isolation with numerous advantages, its use will prevent iatrogenic lesions such as the mucosal burn presented in this report.

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On occasion, the normal or supernumerary teeth may erupt into an inappropriate position. This pattern of abnormal eruption is called dental transposition, a misplaced tooth may be confused with a supernumerary tooth because of transposition. This article reports on a case of an aligned supplemental premolar distal to the maxillary left first molar. It is a genuine dental transposition case.

## CASE REPORT

A healthy 24-year-old Indian male Medical student was seen in a private dental clinic with a request for routine dental check-up.

The patient was noted to have no caries or recurrent caries and no periodontal disease. It was discovered that he had extra fully erupted premolar on the maxillary left quadrant (Figure 1). When asked about the supernumerary premolar, the patient did not notice any abnormality about his dentition.

The supernumerary premolar was of the size of a normal maxillary premolar and was located between the maxillary left first and second molar. It was well aligned to the maxillary left buccal segment.

Generally, the patient had occlusal pattern Class I. He