

Case Report

Management of Fissure Sealant and Oral Screen in Mixed Dentition Stage Pediatric Patients: Case Report

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ABSTRACT

Background: Pit and fissure sealants have been used for almost 50 years to prevent and control caries lesions in primary and permanent teeth. The main purpose of fissure sealants is to prevent further caries by covering the surface of pits and deep fissures which can be a place of cariogenic bacteria colonization by a thin layer of sealant material. The material penetrates and polymerizes into pits and fissures, until has covered the area from bacterial invasion and debris. Patients who have bad habits can suffer malocclusion. For example, patients who breathe by using their mouth and like to bite their nails. Oral screen is one of the orthodontic equipments that can overcome the condition due to these bad habits.

Objective: This case aimed to describe one of caries prevention measures by doing deep pit and fissure filling used Alkasite and Glass Ionomer cement. **Case:** A 7-year-old girl came to the Pedodontics Department of the Padjajaran University Dental and Oral Hospital in Bandung, Indonesia with complaints of her protruding teeth and difficult to close her mouth and had no complaints with other teeth. There was no abnormalities or caries found in the examination, but there were deep pits and fissures in teeth number 16, 26, 36 and 46.

Case Management: Myofunctional therapy was given to overcome that bad habits and train hypotonus in the lip muscles and this therapy was still going on until now and deep pits and fissures covering were done on teeth number 16, 26, 36 and 46 by using alkasite and Glass Ionomer cement as precautionary measure.

Conclusion: oral screen is one of myofunctional equipments that can be used for muscle hypotension of the lips and the use of Alkasite and Glass Ionomer cement can be used to restore deep pits and fissures.

INTRODUCTION

A conservative approach to prevent caries in the pit and fissure was carried out by Bodecker in 1929. Firstly, he cleaned the pit and fissure by using a sonde and applying a thin layer of cement ophosphate in to it as an effort to close the gap in the pit and fissure. Then, there were developed various methods and materials which were used in the prevention of caries in pits and fissures.¹

Pit and fissure sealants have been used for almost 50 years to prevent and control caries lesions in primary and permanent teeth. Sealants are still rarely used but it

success has been proven. Sealant materials and techniques continue to develop to prevent pit-and-fissure caries, so that doctors difficult to make decisions about which materials will be used.²

Fissure sealants are the initial intervention treatment of dental caries before gaining the final stage called cavity. The main purpose of fissure sealants is to prevent further caries by covering the surface of pits and deep fissures which can be a place of cariogenic bacteria colonization by using a thin layer of sealant material. The material is expected to penetrate and polymerize into

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pits and fissures in order to cover the area from bacterial invasion and debris.³

Another consideration that need to be highlighted when administering fissure sealants is the child age which is related to the initial eruption of the teeth. The age range of 3-4 years is the right time for the fissure sealants administratin in primary teeth, 6-7 years is the time of permanent first molars eruption and the age of 11-13 years is the time of premolars and permanent second molars eruption.⁴ This technique has proven to be an effective technique to reduce the incidence of caries by more than 70%.⁵

Beside of conservative approach, there is an orthodontic approach which can be done to prevent malocclusion, especially in patients who have bad habits. Bad habits are repetitive behaviors in the oral cavity that result in loss of tooth structure and include taking a breath through the mouth, sucking on pacifiers, lips, nail biting, bruxism and sticking out the tongue.⁶ The use of oral screen is one of the attempts to overcome bad habits such as breathing through the mouth and nail biting.⁷

CLINICAL REPORT

A 7-year-old female patient came with her mother to the Dental and Mouth Hospital of Padjajaran University, Bandung, West Java, Indonesia on Monday, March 4, 2019, with complaints of her protruding teeth and had difficulty in closing her mouth and had no complaints with other teeth. The patient has no history of systemic disease and congenital abnormalities. The attitude and behavior of the patient before and during cooperative care. Patient plaque index 0.5 (good).

There were no abnormalities found in extraoral examination. But, in intraoral examination showed the patient was in the period of mixed teeth, protruded and crowded upper anterior teeth, there was no teeth

abnormalities and no missing teeth. The patient has a bad habit of breathing through the mouth and nail biting. The diagnosis in these patients was deep pit and fissure in teeth number 16, 26, 36, 46 and class I type 1,2 malocclusions accompanied by bad habit of breathing through the mouth and nail biting. The examination of tooth number 16,26,36 and 46 vitality showed vitality (+), percussion (-) and palpation (-). The treatment in this patient for deep pit and fissure cases was doing application of pit and fissure sealants, while gradual orthodontic treatment were given to overcome the malocclusion anomalies. In the first stage, lip functional muscles treatment was performed by using oral-screen, then the next stage used twinblock and fixed orthodontics. Until now, the patient is still in orthodontic treatment using oral-screen.

CLINICAL PROCEDURE

1. Preparation of equipments and materials
Intra oral glass, tweezers, halfmoon sonde, excavators, cheek pullers, cotton roll, cotton pellets, low-speed handpieces, brushes, toothpaste, Cention N®, GIC fuji 7, plastic instruments, paper pads, spatulas, articulating paper and cocoa butter.
2. Preparation of the work area by cleaning teeth from debris using brushes, toothpaste and lowspeed.
3. Isolate the work area by using a cotton roll.
4. Material application
 - In teeth number 16 and 26 used GIC Fuji 7. Mix powder and liquid GIC Fuji 7 in a ratio of 1: 1 on a paper pad. Apply to pits and fissures of teeth 16 and 26. Wait for them to harden and apply cocoa butter. Polished 1 week after application
 - In teeth number 36 and 46 used Cention N®. Mix Cention N® *powder and liquid in a ratio of 1: 1

then apply to the teeth number 36 and 46. Wait for it to harden.

5. Check the occlusion by using articulation paper.

DISCUSSION

The patient in this case had complaints of her protruding teeth and difficult to close her mouth and had no complaints with other teeth. Based on the history, the patient had a bad habit of breathing through the mouth and nail biting. On intraoral examination there were crowding and 7mm overjet. Clinical, panoramic and cephalometric examinations showed patients had diagnosis of type I and type 1 skeletal malocclusions accompanied by bad mouth-breathing and nail-biting habits, so an orthodontic treatment plan consisting of 3 stages was made. In the first stage was the myofunctional stage by using the oral screen, followed by the use of twinblock as the second stage called orthopedic stage and finally there was the orthodontic stage used fixed orthodontics. Until now the patient is still in stage I treatment.

The patient was diagnosed with deep fissure in teeth 16, 26, 36 and 46 based on clinical examination. Pit is the deepest point of the meeting point between several grooves or the end of the groove. A fissure is a line in the form of a deep gap in the tooth surface or a discontinuity in the cusp that occurs because two cusps unsuccessfully meet on the surface. Fissures on occlusal surfaces are deep enamel invaginations, their shapes vary widely based on their shape and depth, can be U, V, I and K shapes as shown in Figure 1.



Fig. 1: Extraoral



Fig. 2: Intra Oral Pre treatment



Fig. 3: Rontgen Panoramic



Fig. 4: Rontgen Cephalometric



Fig. 5: Oral screen use



Fig. 6: Intra Oral Post Treatment (*Cention N®*)



Fig. 7: Intra Oral Post Treatment (GI Fuji 7)

U and V-shaped pits and fissures tend to be shallow and wide so they are easy to be cleaned and more resistant to caries. While I or K-shaped pits and fissures tend to be deep, narrow and winding so that they are more susceptible to caries. This anatomical form causes pits and fissures to become a place for debris, plaque and microorganisms to accumulate. The occlusal surface

morphology of the teeth varies for various individuals. In general the occlusal shape of the premolars appears with three or four pits, whereas in the molar there are usually ten separate pits with additional fissures.⁹

Research by Griffin et al analyzed the risk of caries in teeth with partial or total degradation of sealants when compared to teeth that had never been given a sealant. Griffin concluded that teeth with sealants did not show a more severe risk of caries development compared to teeth that had not been given sealants despite degradation.¹⁰

A number of types of materials have been developed and tested for sealant effectiveness. Sealant materials are distinguished according to the base material used, the polymerization method and fluoride content.¹¹ There are several types of materials used to prevent caries in pits and fissures, called by resin-based sealants, glass ionomer cement (GIC), polyacid modified resin sealants and modified resins glass ionomer sealant.¹² In this patient Alkasite and GIC fuji 7 were used.

The latest restoration material developed is an alkasite-based restoration material (*Cention N®*, Ivoclar Vivadent; Schaan, Liechtenstein). Alkasite refers to the latest category of restoration materials, with UDMA monomers. This latest category utilizes alkaline filler, so it is able to remove acid neutralization ions. *Cention N®* is also a direct tooth-colored fillings material and acts as a dual-cured material and can be used as material with bulk-fill placement. Light-curing is optional which used blue light with a wavelength of 400-500 nm.¹³

Cention N® contains 78.4% of the total weight of the inorganic filler. Base glass fillers in the form of calcium barium aluminum fluorosilicate glass and calcium fluorosilicate glass emit more significant fluorine ions compared to conventional GI cement. 13 Togoo et al. explains as much as 3% of clinical practitioners choose

children's dental restorative materials capable of releasing fluoride ions.¹⁴ Alkaside refers to fillers, which like compomer or ormocer materials are basically a subgroup of composite material classes that use alkaline fillers that are able to release acid neutralizing ions. Cention-N® is available in powder and liquid form where the liquid is dimethacrylates and initiator and the powder consists of various glass fillers, initiators and pigments. Bulk-filled composites have bisphenol A-diglycidyl dimethacrylate (Bis-GMA), ethoxylated bisphenol A dimethacrylate (Bis-EMA) and urethane dimethacrylate (UDMA). Organic matrices constitute about 1% of the mass. Several types of fillers are also included in the ingredients. Barium, aluminum silicate glass with two different average particle sizes, isofiller consisting of cured dimethacrylates, ytterbium fluoride and spherical mixed oxides are added to achieve the desired physico-mechanical properties according to manufacturer's instructions. This consists of the overall contents of standard fillers of about 75% by weight, 61% by volume and 17% by polymer or isofiller fillers.¹⁴

The diagnosis in this patient was healthy teeth with deep pits and fissures in teeth number 16, 26, 36 and 46. Based on the history there was no discomfort or spontaneous pain in the teeth. Clinical examination of the patient did not reveal any abnormalities and vitality tests showed vital teeth were still vital. In this case report, alkaside (Cention N®, Ivoclar Vivadent; Schaan, Liechtenstein) was used in teeth 36 and 46. The use of Cention N® provides patients with satisfaction because the color is the same as the color of the teeth. Although Cention N® is a resin-based material, it is acceptable for children because it can be applied with or without etching and bonding agents.⁸ When applying Cention N® is more difficult than using other materials such as Glass Ionomer cement.

Cement Glass Ionomer (GI), is the choice of primary tooth restoration material most commonly used and selected by practitioners.¹⁴ GI cement is a material that adheres to the tooth structure, has a filler in the form of fluoroaluminosilicate glass, thus making this restoration as a fluor-releasing restoration, GI Cement was produced by powder and liquid system (powder to liquid system). GI cement has the advantage of releasing fluoride and the technique is easy, but there can be dimensional changes over time due to high wear levels, and its aesthetic properties are not as good as composite resins.¹⁵ Fissure sealant using GI fuji 7 were given in to teeth number 16 and 26 in this patient. GI fuji 7 was easier to apply than Cention N®, patients did not complain about the color given to her teeth using GI Fuji 7 pink because it was used on the upper back teeth and did not interfere with aesthetics.

The caries prevention effect of the Glass Ionomer sealant depends on its retention and ability to release fluoride. Fluoride released prevents the development of caries after the sealant material appears to disappear. Microscopically, the ability of fluoride ions to spread in the enamel provides resistance to the demineralization process

SUMMARY

Oral screen is one of the options that can be used by patients who have bad habits such as breathing through the mouth and biting nails, large overjet and lip muscle hypotonus. Fissure sealants are one of the measures used to prevent and control carious lesions in primary and permanent teeth. The use of Cention N® and GI fuji 7 proves that Cention N® is more aesthetic in terms of color but for the application process is more difficult due to hypersalivation in this patient.

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