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## Short Communication

# Fissure sealants on permanent first molars – consequences of a one-year delay

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**Objective** The objective of this study was to compare the dental caries status of the occlusal surfaces of permanent first molars of Grade 2 (7-8 years of age) children who kept, and those who missed their Grade 1 (6-7 years of age) dental public health clinic appointment.

**Design** The data were obtained from the records of schoolchildren attending the clinic for a comprehensive dental public health programme, with emphasis on fissure sealing permanent first molars. The records were grouped into those who had attended the clinic the previous year and those who did not attend. **Results** The permanent first molars were significantly more likely to be carious in children who missed the Grade 1 appointment compared to those who kept the appointment. **Conclusion** A one year delay in fissure sealing the occlusal surfaces of permanent first molars substantially increased the likelihood of dental caries on these teeth.

*Keywords:* Dental caries, eruption, fissure sealants, public dental health

## Introduction

Most dental caries occurs on the occlusal surfaces of permanent first and second molars (Batchelor and Sheiham, 2004); and fissure sealants have been found to be both effective and cost-effective in reducing occlusal surface dental caries in permanent molar teeth (Ahovuo-Saloranta *et al.*, 2004). However the timing of their placement is important, preferably done soon after eruption (Virtanen *et al.*, 2003).

In South Africa more than 80% of the population are dependent on the state for their oral health services (van Wyk and van Wyk, 2004). The Silvertown dental clinic is an ideal primary health care setting for community studies. It is located in a suburb of Cape Town (Western Cape) and provides dental services to a large community of low to medium socio-economic status. Part of the services rendered is a school dental programme serving the primary schools close to the clinic. Recently the staff at the clinic noticed that a number of children entering Grade 1 (1<sup>st</sup> year of formal school) in 2004 missed their appointment. This study compared the dental caries experiences of the occlusal surfaces of the permanent first molars of Grade 2 children who kept and who missed their Grade 1 appointments.

## Methods

The Silvertown public dental clinic provides comprehensive dental care on an annual basis to children attending seven schools in the local community. With parental consent, a Grade 1 child is given an appointment at the

clinic for a visit which encompasses an initial examination, fissure sealants on erupted permanent first molars, scale & polish, surgical and restorative care if necessary (Laloo and Solanki, 1994). In South Africa children enter Grade 1 in the year they turn seven years of age. Generally all permanent first molars are erupted when they attend the clinic for their first appointment and all permanent first molars are sealed irrespective of caries risk. If children miss their appointment they miss out on the comprehensive programme. Lost sealants are replaced up to Grade 4.

This cross-sectional record-based study involved children who attended the clinic in their second year (Grade 2) of schooling. The data recorded on the clinic record were retrieved. They included information on the age and gender and the dental caries status of the teeth (by surface). Whether the child kept or missed the Grade 1 appointment was recorded. Of the seven schools on the comprehensive dental programme, Grade 1 children from three schools did not attend due to time and logistical constraints. The children who missed their appointment are not fundamentally different (for example in terms of socioeconomic status) from the children who kept their appointment.

The status of the occlusal surface of permanent first molars was compared for the children who kept and missed their Grade 1 appointment. Amongst the children who kept the Grade 1 appointment 14% of permanent first molar occlusal surfaces were not sound or decayed, with most being filled without decay. Amongst those with missed Grade 1 appointments almost all (95%) the occlusal permanent first molar surfaces were either sound

**Table 1.** Cross-tabulation and binary logistic regression analysis of occlusal surface status of permanent first molars by children who kept and missed their Grade 1 appointment

	<i>Sound n (%)</i>	<i>Decayed n (%)</i>	<i>OR (95% CI)</i>
<i>Occlusal surface of 16</i>			
Kept Grade 1 appointment*	146 (91)	15 (9)	1
Missed Grade 1 appointment	63 (76)	20 (24)	3.09 (1.49-6.42)
<i>Occlusal surface of 26</i>			
Kept Grade 1 appointment*	145 (89)	18 (11)	1
Missed Grade 1 appointment	66 (80)	17 (20)	2.06 (1.01-4.28)
<i>Occlusal surface of 36</i>			
Kept Grade 1 appointment*	138 (89)	17 (11)	1
Missed Grade 1 appointment	56 (74)	20 (26)	2.90 (1.42-5.94)
<i>Occlusal surface of 46</i>			
Kept Grade 1 appointment*	146 (94)	10 (6)	1
Missed Grade 1 appointment	57 (70)	24 (30)	6.15 (2.77-13.66)

\* reference category

or decayed. Therefore only sound and decayed surfaces were analysed, allowing for 2X2 cross-tabulations and binary logistic regression analyses. An odds ratio (OR) with a 95% confidence interval (CI) excluding 1 was considered significant.

### Results

A total of 270 children were included in the analysis. Of these 59% were female. More than 90% of the children were aged seven (27%) and eight (66%) years at the time of the appointment in Grade 2. Of the 270 children, 185 (68%) attended the dental clinic in Grade 1 while 85 (32%) missed their Grade 1 appointment.

About a quarter of permanent first molars were carious in the group who missed the appointment compared to 10% who attended the clinic in the first year of schooling (Table 1). Of the four permanent first molar occlusal surfaces the 46 (lower right molar) was most vulnerable to caries attack if not sealed in Grade 1. Amongst the children who kept their Grade 1 appointment, 40% of permanent first molar occlusal surfaces were still sound and sealed when they attended for their second visit in Grade 2.

### Discussion

The results of this study show that children whose permanent first molars were fissure sealed in their first year of schooling (ages 6-7 years) were significantly less likely to experience dental caries on these teeth compared to children whose permanent first molars were not sealed in their first year of schooling.

Dental public health sector treatment data from the Western Cape over the last 10-years shows a significant increase in the number of teeth extracted and fewer teeth being fissure sealed and restored (Barrie, 2005) There is an urgent need to reverse these trends in the dental public health sector and increase the provision of proven

preventive oral health strategies such as the fissure sealing of permanent molar teeth to reduce the burden of dental caries and reduce the future costs of surgical, restorative and prosthetic treatments.

The findings of this “action research” indicate that fissure sealing first permanent molars soon after eruption (children entering their first year of schooling) is beneficial to oral health. However a selective fissure sealing programme and reduced re-sealing policy may need to be considered so as to optimally utilise the scarce resources available and to reach children at risk for dental caries in all the schools serviced by the primary dental clinic.

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