

# What's new for the clinician?

## Summaries of and excerpts from recently published papers

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### 1. Longitudinal investigation of the relationship between developmental changes in sagittal occlusion and caries in lower first permanent molars.

The incidence of caries in the teeth of children continues to be of serious concern despite indications that overall the occurrence of caries has diminished and there being considerable optimism that the disease will be eradicated. The majority of caries in children affects the occlusal surfaces of the teeth, the first molars in particular. This study undertook a review of the data on the state of the occlusal surfaces of the lower first permanent molars from first emergence into the mouth to the age of 16 and related the incidence of caries to the sagittal relationship of the first permanent molars.

The Department of Paediatric Dentistry at Tokyo Dental College holds records of a cohort of 60 children (27 boys and 33 girls) from the age of three to 22 years. Throughout this period dental examinations were conducted from the time of eruption of the lower first molars and upper and lower casts were secured every two months. The models were poured in yellow stone and were articulated in centric occlusion. Oral examinations recorded general oral health status and any treatment which had been provided for caries. No applications of sealants were performed. The state of the occlusal surfaces was noted every two months as one of two categories: 1. Sound. 2. Caries (filled). The sagittal occlusion of the molars was assessed every two months and recorded as Class One, Class Two or Class Three.

Analysis of the data revealed that of the total of 120 lower first permanent molars, 36 had been filled by the end of the study, ie 30%. Caries incidence had been most prevalent between 24 and 48 months and again between 49 months and 72 months. However further caries did occur throughout the study period, even though the teeth had been erupted for 14 to 16 years.

As regards the sagittal relationship, those cases having a Class Two molar pattern showed consistently a higher and statistically significant incidence of caries in the lower molars than when it changed from Class Two to Class One. Cases retaining a Class Two pattern showed an increase in caries incidence throughout the study period.

Previous work had indicated that caries susceptibility decreased within a few years of eruption and the conclusion has been that there is little need for preventive pit and fissure sealant after teeth have been in the mouth for several years. However the current evidence points to a relatively constant rate of attack on the lower first molars, at odds with prevailing wisdom. Hence there remains a need to apply pit and fissure sealant in those cases seen as being at moderate or high risk, even though the patient may be in an older age group.

The presence of a Class Two molar relationship was clearly linked to a higher incidence of caries. A possible explanation is that it has been shown that plaque accumulation on the occlusal surfaces of the molars was significantly lower in a Class One occlusion than when there was a  $\frac{1}{4}$ ,  $\frac{1}{2}$  or  $\frac{3}{4}$  cusp distal occlusion. Hence this study supports the concept that incomplete cuspal interdigitation plays a significant role in plaque accumulation and hence caries incidence.

#### CLINICAL IMPLICATIONS

In cases showing a Class Two molar relationship, occlusal sealing is warranted even years after eruption, with caries risk remaining relatively high up to ten years after eruption.

#### Reference

- Yonezu T, Kojima T, Kumazawa K and Shintani S. Longitudinal investigation of the relationship between developmental changes in sagittal occlusion and caries in lower first permanent molars. Bull. Tokyo Dental College. 2013; 54(4): 209-13.

## 2. Can black extrinsic tooth discolouration predict a lower caries score rate in young adults?

Black stain on teeth causes concern for aesthetic reasons only for it does not cause any pathology. When removed by scaling and polishing it tends to return in a few months. It is not associated with smoking although the two stains are often confused. Lower caries rates have been found in children having black stain but the relationship has not been tested amongst adults.

The study population included 280 young soldiers, 175 of whom were males. 110 soldiers showed black stain whilst 170 randomly selected subjects who revealed no black stain formed the control group. The stain was determined as either present or not and was carefully differentiated from other stains, caused for example by coffee or chlorhexidine.

The same clinician examined all patients, recording DMFT scores after both clinical and radiological assessment. Third molars were not included in the study so the possible DMFT score range was 0 to 28. Subjects were allocated to one of three groups depending on their DMFT scores: caries free (DMFT of zero); third quartile (1 to 8), and fourth quartile (above 8).

The average scores and standard deviations for both groups were calculated and a t test applied to effect comparison. A multiple logistic regression analysis was applied to identify independent influences (age, pigmentation, gender and smoker).

Mean DMFT scores of the study group were consistently lower compared with the control group (4.2 + 3.9 in contrast to 6.0 + 4.8). Group one (caries free) had a significantly higher presence in the study group, whilst maximum DMFT score in the study group was 16, and in the control group, 25. Older patients were shown to have a higher caries prevalence but the possibility of a subject with black stain having a DMFT above median score was 2.5 times lower than for a subject without black stain.<sup>1</sup>

The study recorded a high rate of DMFT, indicating that the association between black stain and DMFT is valid. It has

been shown that there is a relationship between the severity of black stain and DMFT scores.<sup>2</sup> The authors conclude that there is a lower caries incidence in subjects with black stain.<sup>1</sup>

There is still uncertainty regarding the etiology of black stain, with changes in saliva composition, differing oral flora or both being proposed as reasons. Calcium and phosphate in high concentrations have been found in the gingival debris of children with black stain.<sup>3</sup> Such concentrations of minerals can facilitate enamel remineralisation.<sup>4</sup>

The authors explore the influence of including bitewing radiographs on the DMFT scores, for their study actually recorded a lower DMFT than previous work 15 years ago which did not use radiographs. The surmise is that over the years the oral health status of the study population had improved.

### CLINICAL IMPLICATIONS

The association between black stain and a reduced incidence of caries was validated for this group of young adults. The timing of recommended check up visits and the scheduling of radiographic examinations may be influenced by the presence of black stain. However the mechanism by which caries incidence is lowered has not been explained and more research is required.

### Reference

1. Shmuly T, Zini A, Yitschaky M, Yitschaky O. Can black extrinsic tooth discolouration predict a lower caries score rate in young adults? *Quintessence International*. 2014;45 (5): 439-44.
2. Gasparetto A, Conrado CA, Maciel SM, Miyamoto EY, Chicarelli MC, Zanata RL. Prevalence of black tooth stains and dental caries in Brazilian schoolchildren. *Braz Dent J*. 2003; 14: 157-61.
3. Reid JS, Beeley JA. Biochemical studies on the composition of gingival debris from children with black extrinsic tooth stain. *Caries Res*. 1976; 10: 363-9.
4. Cochrane NJ, Cai f, Huq NL, Burrow MF, Reynolds EC. New approaches to enhanced remineralisation of tooth enamel. *J Dent Res*. 2010; 89:1187-97.

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