Relationship between *Streptococcus mutans* and *Streptococcus sobrinus*
Detected in Saliva by PCR and the Caries Prevalence Rate
in Students Aged 12–13 Years and 15–16 Years

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Abstract

Purpose: In recent years, the prevalence of dental caries in children has been decreasing in developed countries. From the National Survey of Oral Health, the number of DMFT at age 12 was 1.4 at 2011. However, caries prevalence increases with age, with a DMFT of 3.2 for 15- to 19-year-olds, 5.9 for 20- to 24-year-olds, and 8.5 for 25- to 29-year-olds. The purpose of this study was to focus on the cariogenic bacteria count in saliva using real-time PCR and examine to DMFT in junior and senior high school students (aged 12–13 and 15–16 years, respectively). The relationship between bacterial count and decayed/missing/filled teeth (DMFT) was investigated.

Methods: The subjects were 596 children who were first-year middle school students or first-year high school students. To measure the cariogenic bacteria count in saliva, students were asked to chew unflavored paraffin gum for the collection of stimulated saliva during an oral health examination. *Streptococcus mutans* and *Streptococcus sobrinus* in 1 ml of saliva were measured using real-time PCR. Dental examinations were performed by 8 dentists.

Results: In the group aged 12–13 years (262 students), *S. mutans* was below the detection limit (<10³ cells/ml) in 25.6% (67 students). In contrast, *S. mutans* was >10⁵ cells/ml in 17.9% (47 students). *S. sobrinus* was below the detection limit in 94.7% (248 students) and >10⁵ cells/ml in 1.1% (3 students). In the group aged 15–16 years (334 students), *S. mutans* was below the detection limit in 23.4% (78 students). In contrast, *S. mutans* was >10⁵ cells/ml in 20.7% (69 students). *S. sobrinus* was below the detection limit in 90.1% (301 students) and >10⁵ cells/ml in 1.8% (6 students). The mean number of DMFT was 0.9 in the group aged 12–13 years and 1.8 in the group aged 15–16 years. With regard to the relationship between the two bacterial species and DMFT, in all of the subjects a clear and statistically significant difference in the number of DMFT was seen between the group with *S. mutans* only and the group with neither of the two bacterial species.

Conclusion: In the group aged 12–13 years, and 15–16 years, a clear, statistically significant difference in the number of DMFT was seen between the group with *S. mutans* only and the group with neither of the two bacterial species.

**Key words:** *Streptococcus mutans, Streptococcus sobrinus, DMFT, Saliva, PCR, School dental examination*