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Influence of the semiconductor TiO₂ on Streptococcus mutans. F. NISHIKAWARA¹, Y. TAMAKI², S. KASTUMURA¹, T. IKEJIRI³, K. WADA³, Y. NOMURA¹, and N. HANADA⁴, ¹Tsurumi University, Yokohama, Japan, ²Kanagawa Dental College, Yokosuka, Japan, ³SHIKEN CO., LTD, Osaka, Japan, ⁴National Institute of Public Health, Saitama, Japan

Objectives: It is known that the semiconductor TiO₂ has a bactericidal effect on Streptococcus mutans (S. mutans). Our study examined the influence of the TiO₂ semiconductors specifically on S. mutans growth. **Methods:** S. mutans MT8148 was inoculated into phosphate-buffered saline solution. We directly inserted into the bacterial suspension either (a) a welding rod made of TiO₂ (group S), or (b) a powder of TiO₂, or (c) a stainless steel welding rod (group P, a control). S. mutans growth was estimated on Mitis Salivarius agar medium after anaerobic incubation for 48 h. A biofilm of S. mutans was observed using confocal laser scanning microscopy (CLSM) after incubation with TiO₂ powder. In addition, we obtained, at baseline, total counts of Streptococci and S. mutans from stimulated saliva. After 8 weeks, the suspensions containing the semiconductor TiO₂ (group S) or the stainless steel (group P) were compared with baseline data. Plaque removed from teeth surface was evaluated by Patient Hygiene Performance (PHP). **Results:** No significant change in the bacterial count of S. mutans was found in solutions that had rods inserted. TiO₂ powder had a pronounced propensity to kill S. mutans in biofilms. Compared to baseline and after 8 weeks, there were no significant changes in total Streptococci or S. mutans counts between group S and group P. The amount of plaque removed from teeth surface was greater for group S than for group P. **Conclusion:** Influence of the TiO₂ was not observed in laboratory strain of S. mutans and number of total Streptococci as well as S. mutans in stimulated saliva. However, it is possible that TiO₂ can influence biofilm formation of S. mutans. For prevention of dental caries, toothbrushes using semiconductor TiO₂ have an effect on removal of plaque from teeth surface.