

O3C:2 Plaque removal efficacy of a titanium oxide toothbrush with solar battery

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Objectives: Oral hygiene for persons with special care needs is very important but difficult to practice. The photocatalytic technology of titanium oxide (TiO_2) as a semiconductor is widely applied to medical materials and in dentistry it is applied to toothbrushes with its efficacy reported clinically. This study was to examine the plaque removal efficacy of a toothbrush using TiO_2 accelerated by a solar battery.

Methods: A total of 20 healthy subjects without periodontal disease were enrolled and completed the study. Experimental contents and safety were explained to all subjects, and an agreement of participants was acquired. A titanium oxide photocatalytic toothbrush (Solady3, Siken Co., Ltd., Japan: SO) and placebo toothbrush (PL) were used. All subjects received dental plaque score, periodontal pocket depth of 6 teeth and caries activity assessments at baseline and after four weeks of using each toothbrush. **Results:** There was a statistically significant plaque score reduction (average reduction was 42.7%, $p < 0.05$) in the SO group but not in the PL. The reductions of plaque score were observed in all kinds of examined teeth. In the caries activity test, there was no significant difference between the two groups. **Conclusions:** A good plaque removal efficacy of TiO_2 has previously been reported. In this study, tooth brushing using TiO_2 with solar battery was also found to deliver greater plaque removal efficacy compared to the control group. For persons with special care needs, this toothbrush may be useful in their oral care.