

Table 7. Pl-I scores

Group	Week			
	0	1	2	3
Experimental	1.58 ± 0.42	1.27 ± 0.60	1.16 ± 0.51	0.93 ± 0.43
Control	1.80 ± 0.64	1.45 ± 0.71	1.20 ± 0.70	1.05 ± 0.51

Values are mean ± S. D.

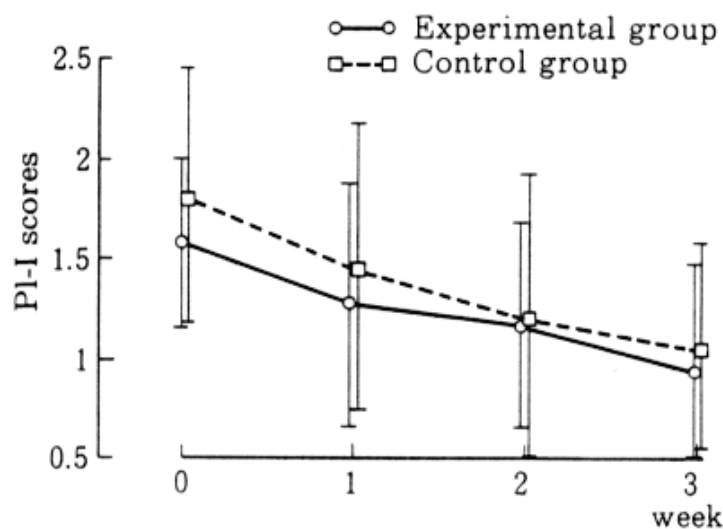


Fig. 8. Changes in Pl-I scores in the experimental and control groups

Figure 8. A clear decrease was found in both groups, however, there was no significant difference between the 2 groups.

Discussion

When examining the efficacy of a toothbrush, *in vitro* as well as *in vivo* research methods can be used. Due to the differences with respect to knowledge concerning of toothbrushes, brushing customs, age, gender etc., a rather difficult and complicated experimental plan is usually required for a clinical study. In order to overcome these difficulties in the present research, dental hygiene school students, a group with a significant degree of knowledge concerning oral hygiene, were used as subjects. The TiO₂ semiconductor of the toothbrush used in

study was equipped with a cylindrical shaped TiO₂ semiconductor located in the neck of the toothbrush. *In vitro*, the TiO₂ photocatalytic reaction is known to readily occur, however, the effects during actual use of the toothbrush must also be investigated.

In Japan, a clinical report on semiconductor TiO₂ toothbrushes has been conducted by Kusunoki et al [4]. They reported that in 24-39 year-old adults with normal gingival tissue who used the TiO₂ semiconductor toothbrush, the dental plaque removal effect was large during the early phase of dental plaque formation. In their report, plaque adhesion amount was evaluated with the plaque scoring system, a different method to the one used here. However, the plaque removal effect during the early phase of plaque formation in the present study was quite large, and somewhat resembled that of Kusunoki et al. The reason for this may be mainly related to the brushing effect. Weiger [5] investigated the dental plaque cleaning effect of a TiO₂ semiconductor toothbrush over 4 weeks in 20 dental university students. The evaluation method used, Pl-I, was the same as this study. It was found that the toothbrush had an obvious dental plaque cleaning effect. The results obtained were thought to be due to the improvement in the subjects' brushing habits, as well as to the inhibitory effect of the light

tnis experiment has been shown in *in vitro* research to have an anti-bacterial effect against the cariogenic *Streptococcus mutans* [1]. The decomposition of lactic acid by the photocatalytic reaction of semiconductor TiO₂ fine powder has also been reported [2].

The semiconductor toothbrush used in this

current on dental plaque adhesion.

Oral bacteria, saliva and plaque can be used as caries activity indices, however, in this study lactobacilli acid production in the oral cavity was focused upon. Various points of debate remain concerning the predictability of the caries activity test. Yoshikawa et al [6] examined