Use of a Disclosed Plaque Visualization Technique Improved the Self-Performed, Tooth Brushing Ability of Primary Schoolchildren

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Background: *Disclosing agents have a long history of use as an aid in children's tooth brushing instruction. However, their benefit when used to improve self-performed tooth brushing ability without any tooth brushing instruction has not been investigated.*
Objective: *To evaluate the effect of disclosed plaque visualization on improving the self-performed, tooth brushing ability of primary schoolchildren.*
Material and Method: *A cluster-randomized, crossover study was conducted in Nakhon Nayok province, Thailand. A total of 122 second-grade schoolchildren, aged 8-10 years old, from 12 schools were randomly divided into 2 groups. The first group was assigned to brush with disclosed plaque visualization, while the other group brushed without disclosed plaque visualization. One month later, the groups switched procedures. Tooth brushing ability was evaluated by the subjects' reduction in patient hygiene performance (PHP) scores. The data were analyzed using repeated-measures analysis of variance, with significance set at $p<0.05$.*
Results: *Disclosed plaque visualization had a significant effect on improving the children's self-performed, tooth brushing ability in all areas of the mouth ($p<0.001$), particularly for anterior teeth, mandibular teeth, buccal surfaces, and areas adjacent to the gingival margin ($p<0.001$).*
Conclusion: *Disclosed plaque visualization is a viable technique to improve children's self-performed tooth brushing ability, and could be used in school-based oral health promotion programs.*

Keywords: *Disclosing agent, Plaque visualization, School-based tooth-brushing, Self-performed tooth brushing*

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Dental caries and gingivitis are plaque-mediated diseases. Poor oral hygiene and inappropriate dietary behavior can lead to increased plaque accumulation, which increases the risk of the initiation of dental caries and gingivitis[1]. Based on the results of the sixth Thailand National Oral Health Survey, dental caries and gingivitis remain public health problems among Thai primary schoolchildren, particularly in rural areas. Primary schoolchildren living in rural areas had a higher prevalence of dental caries and gingivitis, but received less dental services than those living in urban areas[2]. The survey also demonstrated that there is still disparity in dental treatment delivery across the socioeconomic classes. Despite universal health care coverage, socioeconomic inequality in dental care still exists among Thai primary schoolchildren[3]. This is, in part, due to the shortage and unequal distribution of dentists in rural areas[4]. Because of this, strategies to provide oral health education using dental auxiliary personnel should be adopted to reduce oral health inequalities[3,5].

In Thailand, primary schoolchildren are the main target group of oral health improvement programs, such as the universal sealant for permanent molars program, and health care education in schools. School-based oral health education programs have incorporated sessions designed to enhance the tooth-brushing skills of primary schoolchildren[6,7]. When developed during childhood, tooth-brushing skills are more likely to continue into adulthood and become life-long habits[8]. Indeed, good oral health behaviors during childhood were significant predictors of

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periodontal disease in adults based on a ten year follow-up in a study in Denmark[9]. Therefore, it is important to promote tooth-brushing skills at a young age to empower children to have control over their own oral health.

Disclosing agents have long been used as an integral part of children's tooth-brushing instruction. The contrasting color of a disclosing agent provides a helpful means to differentiate plaque, which is white or yellow in color, from similarly colored tooth surfaces, and helps the child see where to brush. Previous studies have revealed that tooth brushing instruction together with plaque self-visualization using disclosing agents and a mirror resulted in a marked improvement in oral hygiene and in gingivitis in children[10,11]. However, currently there are no studies showing the benefits of the use of disclosing agents without tooth brushing instruction.

Therefore, the purpose of the present study was to evaluate the effect of disclosed plaque visualization on improving the self-performed, tooth brushing ability of primary schoolchildren. This is the first study to demonstrate that disclosed plaque visualization could help improve the self-performed, tooth brushing ability of schoolchildren. The results of the present study would be of interest for inclusion in school-based oral health education programs.

Material and Method

This cluster-randomized, crossover study was carried out between December 2011 and February 2012. The Chulalongkorn University Institutional Ethics Committee approved the protocol for this study.

Participants

The present study sample comprised second-grade schoolchildren, from a total of 12 public schools in Nakhon Nayok province, Thailand. All schools agreed to participate in the study. One hundred and eighty-eight children, aged 8-10 years old, with normal physical and mental development, were invited to participate in the present study. None of the children had ever used disclosing agents or received oral hygiene instruction during the 3 months prior to the study. One hundred and thirty-five children (72%) with erupted permanent first molars, maxillary right central incisors and left central mandibular incisors were recruited into our study after signed consent forms were returned by their parents.

The 12 participating schools were assigned as clusters. Each school was randomly allocated to be in either group A or B, by simple random sampling. There were 69 children (5 schools) and 66 children (7 schools) in groups A and B, respectively. The children in group A were assigned to brush with disclosed plaque visualization, and at a later month brush without disclosed plaque visualization, while the children in group B were assigned the opposite sequence.

A dentist from the HRH Maha Chakri Sirindhorn Medical Center, who did not participate further in the present study, carried out participant enrollment and random group allocation.

Plaque assessment

Plaque assessment was conducted after cotton buds soaked with a disclosing agent (6% erythrosine solution, Department of Pharmacology, Faculty of Dentistry, Chulalongkorn University, Bangkok, Thailand) were applied to all the subject's tooth surfaces, and they had rinsed out any excess solution. The patient hygiene performance (PHP)[12] was modified by assessing plaque on both the buccal and lingual surfaces of the following six permanent teeth: all 4 first molars and the maxillary right and mandibular left central incisors. If the designated central incisor was missing, the adjacent central incisor was used. Each tooth surface was divided vertically into a mesial third (M), middle third and distal third (D). The middle third was further divided horizontally into a gingival third (A), middle third (B), and occlusal third (C), as shown in Fig. 1. Each of the subdivisions was examined for the presence of pink stain, with a score of 0 for no stain, and 1 for stain present. The PHP score for each surface, which ranged from 0-5, was obtained by adding the five subdivisions' scores. The PHP score of each area was calculated as the total PHP score of all surfaces in the area divided by the number of surfaces examined. The total PHP score of the M, D, and A subdivisions of all surfaces was divided by 12 surfaces to determine the PHP score of the area adjacent to the gingival margin, and the total PHP score of the remaining subdivisions was divided by 12 surfaces to determine the PHP score of the area distant to the gingival margin. The intra-examiner reliability of the PHP scores, by Cohen's kappa test, was 0.96.

Experimental protocol

In the present study, we used a crossover design to eliminate within-subject variation because individual tooth brushing ability varies according to age and personal skills[13-17]. Each child used both techniques and thus acted as their own control.

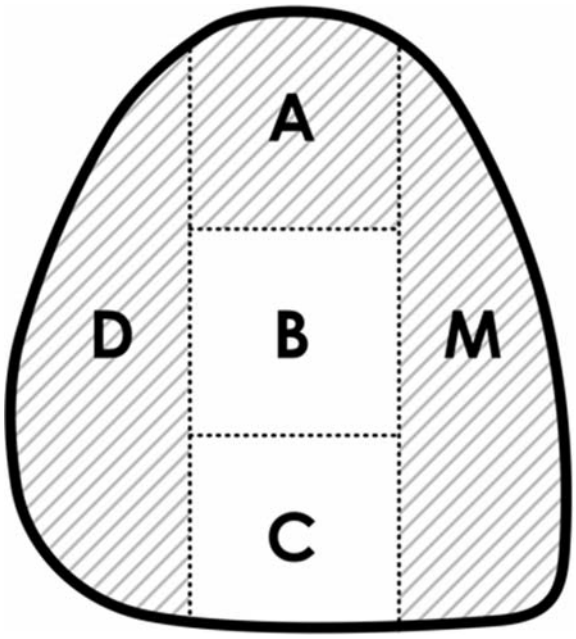

Fig. 1 Tooth subdivisions used in the PHP method: M, D, A, B and C. The M, D, and A subdivisions represent areas adjacent to the gingival margin, whereas the B and C subdivisions represent areas distant to the gingival margin.

At the beginning of the study, the participants were assessed to establish a baseline PHP score and received scaling and rubber cup prophylaxis to reduce their PHP score to zero. Each child was interviewed about their tooth brushing habits, i.e. regular brushing and parental supervision with brushing.

The first session was performed one month after the baseline examination. Children had their plaque disclosed, and their pre-brushing PHP score was assessed. Each child was individually seated at a table and given a new child-size, soft bristle, flat-trim toothbrush (Berman® Standard, Rinchokechai Company Limited, Samutprakarn, Thailand). Group A was assigned to brush with disclosed plaque visualization, and group B was assigned to brush without using this technique. In group A, the child was given a 14x14 cm adjustable table-standing mirror, and a 5x7 cm handheld mirror. A dentist instructed the child to use the two mirrors to see the stained plaque on their teeth and then told the child to "thoroughly brush the stain off". No specific technique or order was suggested, so that each child could brush in his/her own manner. For brushing without disclosed plaque visualization, the child did not receive mirrors. The dentist only directed the child to brush as they did at home. After two minutes of brushing, each child had his/her plaque disclosed again and his/her post-brushing PHP score was assessed. Rubber cup prophylaxis was then performed to reduce the child's PHP score to zero. One month later, the second session was performed the same as the first session but the techniques used by each group were reversed.

The procedures in the present study were carried out at the schools by two trained dentists. The first dentist performed the plaque assessment; he was blinded to the technique assigned to each child, and the second dentist performed the disclosed plaque visualization technique. To maintain blinding, plaque assessment and tooth brushing took place in different rooms.

Statistical analysis

The reduction in PHP score was calculated for each individual as the difference between their pre-brushing PHP score and their post-brushing PHP score. The percentage of PHP score reduction was calculated as the PHP score reduction x100 divided by the pre-brushing PHP score. The independent t-test and Chi-squared test were used to compare the characteristics of each group. The repeated-measures analysis of variance (ANOVA), followed by the Bonferroni post hoc test, were used in data analysis. Techniques and tooth areas were analyzed as within-subject variables. Group, sex, parental supervision while brushing, and a minimum of twice-a-day tooth brushing were analyzed between-subject variables. All calculations were performed using SPSS software version 17.0 (SPSS, Inc., Chicago, IL, USA), with significance set at $p<0.05$.

Results

Of the 135 participants, 122 (90%) children (65 males and 57 females) completely participated in the study and were included in the data analysis. The study flow diagram is presented in Fig. 2. As shown in Table 1, there were no significant differences between the groups with respect to age, sex, baseline PHP score, and tooth brushing habits.

PHP score reduction according to tooth areas/ surfaces

Table 2 shows the reduction in PHP scores based on tooth areas or surfaces. The authors combined the data from both experimental sessions, which was then analyzed using repeated-measures ANOVA. The authors found that brushing with disclosed plaque visualization resulted in a significantly greater reduction

in PHP scores in all areas evaluated (1.24±0.42) than did with brushing without disclosed plaque visualization (0.92±0.35) (p<0.001). The percentage in reduction was 8.22% greater in the disclosed plaque visualization brushing session.

Children using disclosed plaque visualization during brushing demonstrated a significantly greater reduction in the PHP score of their anterior teeth than that of children not using disclosed plaque visualization (p<0.001). In contrast, there was no effect of disclosed plaque visualization on the PHP score reduction of posterior teeth (p = 0.407). The effect of disclosed plaque visualization on PHP score reduction was significant for buccal (p<0.001) and lingual surfaces (p = 0.001), as well as for maxillary and mandibular teeth (p<0.001). However, the data revealed a greater reduction in the PHP scores for buccal surfaces and mandibular teeth (1.78±0.56 and 1.53±0.63) than for lingual surfaces and maxillary teeth (0.70±0.44 and 0.94±0.38) (p<0.001), respectively. The differences in the percentage of PHP score reduction for anterior teeth, buccal surfaces, and mandibular teeth between brushing with and without disclosed plaque visualization were 23.20%, 12.22%, and 12.26%, respectively.

Analyzing the data based on tooth surface subdivision indicated that significantly greater plaque reduction was observed in areas adjacent to the gingival margin when brushing with disclosed plaque visualization (0.72±0.31) than without (0.43±0.27) (p<0.001). However, no significant difference was found between techniques in areas distant to the gingival margin (p = 0.281).

Effect of sex, regular brushing, and parental supervision while brushing on PHP score reduction

The authors observed no significant effect of sex, parental supervision during brushing, or a minimum of twice-a-day tooth brushing on PHP score reduction during brushing with and without disclosed plaque visualization (Table 3).

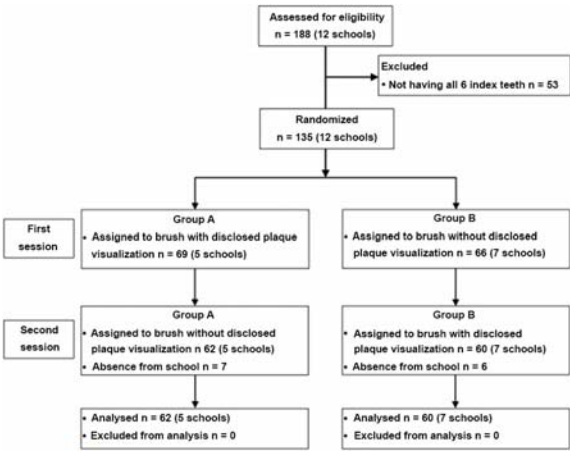

Fig. 2 Flow diagram. Progress of numbers of schools and children through this study.

Discussion

Previous studies have demonstrated that disclosing agents can be successfully used as a tool for oral health education and tooth brushing technique instruction[10,11]. However, there are no studies on improving the self-performed, tooth brushing ability in schoolchildren where only the application of a disclosing agent was used without any tooth brushing instruction. Our results indicate that, even when tooth brushing instruction was not provided, this technique was effective in improving the self-performed, tooth brushing ability of 8-10 year old schoolchildren.

With regard to specific areas of the mouth, the results of the present study demonstrated marked improvement in the subjects' self-performed tooth brushing ability on anterior teeth, buccal surfaces, and mandibular teeth, all which are clearly visible to the

Table 1. Characteristics of the study population

	Group A n = 62 (5 schools)	Group B n = 60 (7 schools)	p-value
Age (Mean ± SD)[a]	8.3±0.4	8.2±0.3	0.447
Males, n (%)[b]	33 (53)	32 (53)	1.000
Baseline PHP score[a]	3.96±0.21	3.97±0.32	0.808
Minimum of twice-a-day toothbrushing, n (%)[b]	40 (65)	37 (62)	0.890
Parental supervision with brushing, n (%)[b]	16 (26)	16 (27)	1.000

[a] Statistical evaluation by independent t-test, [b] Statistical evaluation by Chi-squared test

child and easily accessible. Consistent with the tooth brushing skills of primary schoolchildren observed in earlier studies, the majority of the children in the present study exhibited tooth-brushing skill in these accessible areas, while they demonstrated less skill in brushing posterior tooth areas and lingual surfaces[18,19]. In the present study, the authors attempted to improve the subjects' tooth brushing ability on lingual tooth surfaces by emphasizing the use of both the table and handheld mirrors to detect disclosed plaque, so that the children could see where to brush. However, we observed that most of the children encountered difficulties in using both mirrors. Because the children were not accustomed to using this more complex technique, they were only able to accomplish limited plaque removal from lingual surfaces.

Tooth brushing instruction typically emphasizes removing plaque at the cervical area of the

Table 2. The effect of disclosed plaque visualization on PHP score reduction based on tooth areas/surfaces (n = 122)

Area	PHP score reduction Mean ± SD (%)		*p*-value
	No disclosed plaque visualization	Disclosed plaque visualization	
All	0.92±0.35 (22.89)	1.24±0.42 (31.11)	<0.001
Anterior vs. posterior teeth			
Anterior teeth	1.29±0.70 (32.83)	2.18±0.69 (56.03)	<0.001
Posterior teeth	0.74±0.36 (17.98)	0.77±0.44 (18.90)	0.407
Buccal vs. lingual surface			
Buccal surface	1.29±0.57 (31.52)	1.78±0.56 (43.75)	<0.001
Lingual surface	0.55±0.32 (13.91)	0.70±0.44 (17.82)	0.001
Maxillary vs. mandibular teeth			
Maxillary teeth	0.78±0.45 (19.20)	0.94±0.38 (23.40)	<0.001
Mandibular teeth	1.06±0.47 (26.65)	1.53±0.63 (38.91)	<0.001
Adjacent to vs. distant to the gingival margin			
Adjacent to the gingival margin	0.43±0.27 (14.19)	0.72±0.31 (24.16)	<0.001
Distant to the gingival margin	0.49±0.21 (47.34)	0.51±0.22 (51.46)	0.281

Statistical evaluation by repeated-measures ANOVA, Bonferroni post hoc test

Table 3. The effect of sex, minimum twice-a-day toothbrushing and parental supervision while brushing on PHP score reduction (n = 122)

Variable	PHP score reduction Mean ± SD	
	No disclosed plaque visualization	Disclosed plaque visualization
Sex		
Male	0.91±0.32	1.24±0.38
Female	0.93±0.39	1.23±0.47
p-value	0.722	0.824
Minimum twice-a-day toothbrushing		
Yes	0.88±0.41	1.25±0.38
No	0.94±0.31	1.23±0.45
p-value	0.340	0.820
Parental supervision while brushing		
Yes	0.91±0.33	1.22±0.45
No	0.92±0.36	1.24±0.41
p-value	0.936	0.832

Statistical evaluation by repeated-measures ANOVA, Bonferroni post hoc test

tooth and at the area adjacent to the gingival margin[19,20] because these areas are related to initial smooth surface caries lesions and gingivitis. In the present study, the authors found that plaque reduction in the areas adjacent to the gingival margin was significantly greater after tooth brushing with disclosed plaque visualization. Thus, the authors conclude that disclosed plaque visualization can enhance self-performed, tooth brushing in the areas adjacent to the gingival margin, even if no specific tooth brushing technique is presented to the children.

In lower socioeconomic regions that suffer from a shortage of dentists and poor access to dental services, the implementation of oral health education programs in schools has the potential to reach efficiently a large group of children. According to the World Health Organization, schools are a suitable community-based setting for promoting good oral health at a young age[21]. The present study suggests that disclosed plaque visualization techniques could enhance the self-performed, tooth brushing ability of primary schoolchildren. Plaque visualization techniques could be presented in school-based programs to improve children's tooth brushing practices. These techniques are simple and low-cost, requiring no complicated materials or specially trained personnel for tooth brushing instruction. Dental auxiliary personnel and schoolteachers can work together to promote tooth brushing in the school setting, particularly in rural areas. Schoolteachers are responsible for supervising tooth brushing after lunch[22], and dental auxiliary personnel, e.g. dental nurses, can play a role in giving, and the periodic reinforcement of, tooth brushing instructions for difficult to reach and problem areas of the mouth. However, further long-term study on the effect of the use of disclosing agents when presented in school-based programs to maintain good oral hygiene in children is recommended.

Conclusion

Disclosing agent use significantly improved self-performed, tooth-brushing ability of primary schoolchildren. Disclosed plaque visualization is a viable technique to improve children's self-performed, tooth-brushing ability and could be used in school-based, oral health promotion programs.

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Potential conflicts of interest

None.

References

1. Marsh PD. Contemporary perspective on plaque control. Br Dent J 2012; 212: 601-6.
2. Department of Health, Ministry of Public Health. Report on the Sixth National oral health survey of Thailand Nonthaburi: Dental Health Division, Department of Health, Ministry of Public Health; 2008.
3. Somkotra T, Vachirarojpisan T. Inequality in dental care utilisation among Thai children: evidence from Thailand where universal coverage has been achieved. Int Dent J 2009; 59: 349-57.
4. Wichawut K, Pholdeeyiam S, Sukanwaranil S, Wongkongkathep S, Lexomboon D, Busarakumruha J. Dentists' mobility in Thai oral health service system during 1975-2005. Thai J Dent Pub Health 2008; 13: 17-33.
5. Sheiham A, Alexander D, Cohen L, Marinho V, Moyses S, Petersen PE, et al. Global oral health inequalities: task group—implementation and delivery of oral health strategies. Adv Dent Res 2011; 23: 259-67.
6. Department of Health, Ministry of Public Health. Oral health care system in Thailand. Nonthaburi: Dental Health Division, Department of Health, Ministry of Public Health; 2004.
7. National Health Security Office. Manual of dental care fund administration in Thailand. Nonthaburi: Ministry of Public Health; 2010.
8. Aunger R. Tooth brushing as routine behaviour. Int Dent J 2007; 57: 364-76.
9. Lissau I, Holst D, Friis-Hasche E. Dental health behaviors and periodontal disease indicators in Danish youths. A 10-year epidemiological follow-up. J Clin Periodontol 1990; 17: 42-7.
10. Telford AB, Murray JJ. The effect of systematic chairside oral hygiene instruction on gingivitis and oral cleanliness in children. Community Dent Oral Epidemiol 1974; 2: 50-7.
11. Bellini HT, Anerud A, Moustafa MH. Disclosing wafers in an oral hygiene instruction program. Odontol Revy 1974; 25: 247-53.
12. Podshadley AG, Haley JV. A method for evaluating

oral hygiene performance. Public Health Rep 1968; 83: 259-64.
13. Ogasawara T, Watanabe T, Kasahara H. Readiness for toothbrushing of young children. ASDC J Dent Child 1992; 59: 353-9.
14. Mescher KD, Brine P, Biller I. Ability of elementary school children to perform sulcular toothbrushing as related to their hand function ability. Pediatr Dent 1980; 2: 31-6.
15. Sandstrom A, Cressey J, Stecksen-Blicks C. Tooth-brushing behaviour in 6-12 year olds. Int J Paediatr Dent 2011; 21: 43-9.
16. Sarvia ME, Bush JP, Mourino AP. Psychomotor skills and incentive as predictors in a children's toothbrushing program. J Pedod 1989; 14: 31-5.
17. Unkel JH, Fenton SJ, Hobbs G Jr, Frere CL. Toothbrushing ability is related to age in children. ASDC J Dent Child 1995; 62: 346-8.
18. Livny A, Vered Y, Slouk L, Sgan-Cohen HD. Oral health promotion for schoolchildren - evaluation of a pragmatic approach with emphasis on improving brushing skills. BMC Oral Health 2008; 8: 4.
19. Hawkins RJ, Zanetti DL, Main PA, Otchere DF, Dwyer JJ, Jokovic A, et al. Toothbrushing competency among high-risk grade one students: an evaluation of two methods of dental health education. J Public Health Dent 2001; 61: 197-202.
20. Gibson JA, Wade AB. Plaque removal by the Bass and Roll brushing techniques. J Periodontol 1977; 48: 456-9.
21. Petersen PE. The World Oral Health Report 2003: continuous improvement of oral health in the 21st century—the approach of the WHO Global Oral Health Programme. Community Dent Oral Epidemiol 2003; 31 (Suppl 1): 3-23.
22. Eungpoonsawat W. Oral health care delivery models for schoolchildren in Southern Thailand: A health systems analysis approach. Copenhagen: University of Copenhagen, Faculty of Health Sciences, Department for Community Dentistry and Graduate Studies; 2002.

การใช้เทคนิคการมองเห็นการติดสีของคราบจุลินทรีย์เพื่อเพิ่มความสามารถในการแปรงฟันด้วยตนเองของเด็กชั้นประถมศึกษา

นภา ชวนชัยสิทธิ์, บุษยรัตน์ สันติวงศ์, สิริกาญจน์ สุทธวงษ์, พรพรรณ อัศวาณิชย์

ภูมิหลัง: *สารย้อมคราบจุลินทรีย์ถูกนำมาใช้ร่วมกับการสอนแปรงฟันในเด็กมาเป็นเวลานาน อย่างไรก็ดียังไม่มีการศึกษาถึงประโยชน์ของการใช้สารย้อมคราบจุลินทรีย์เพื่อเพิ่มความสามารถ ในการแปรงฟันด้วยตนเองของเด็กชั้นประถมศึกษาโดยไม่มีการสอนแปรงฟัน*

วัตถุประสงค์: *เพื่อศึกษาผลของการมองเห็นการติดสีของคราบจุลินทรีย์ต่อการเพิ่มความสามารถในการแปรงฟันด้วยตนเองของเด็กชั้นประถมศึกษา*

วัสดุและวิธีการ: *การศึกษานี้เป็นการศึกษาแบบไขว้กันและสุ่มเป็นกลุ่มที่จังหวัดนครนายก เด็กชั้นประถมศึกษาปีที่ 2 อายุ 8-10 ปี จำนวน 122 ราย จากโรงเรียน 12 แห่ง ได้รับการสุ่มแบ่งเป็น 2 กลุ่ม กลุ่มแรกทดสอบการแปรงฟันโดยมองเห็นการติดสีของคราบจุลินทรีย์ ในขณะที่กลุ่มที่สองทดสอบการแปรงฟันโดยไม่เห็นการติดสีของคราบจุลินทรีย์ หลังจากนั้น 1 เดือน ทดสอบการแปรงฟันอีกครั้งด้วยขั้นตอนเดียวกันแต่สลับวิธีระหว่าง 2 กลุ่ม ความสามารถในการแปรงฟันประเมินจากคะแนนดัชนีพีเอชพี (patient hygiene performance: PHP) ที่ลดลงใช้สถิติการวิเคราะห์ความแปรปรวนแบบวัดซ้ำในการวิเคราะห์ข้อมูลที่ระดับนัยสำคัญ 0.05*

ผลการศึกษา: *การมองเห็นการติดสีของคราบจุลินทรีย์เพิ่มความสามารถในการแปรงฟันด้วยตนเองของเด็กชั้นประถมศึกษาโดยรวมทั้งปาก ($p<0.001$) โดยเฉพาะในตำแหน่งฟันหน้า ฟันล่าง ด้านแก้ม และใกล้ขอบเหงือก ($p<0.001$)*

สรุป: *การมองเห็นการติดสีของคราบจุลินทรีย์เป็นวิธีที่ใช้ได้ผลในการเพิ่มความสามารถในการแปรงฟันด้วยตนเองของเด็กโดยสามารถนำวิธีนี้ไปใช้ในการส่งเสริมทันตสุขภาพในโรงเรียนได้*