

Comparison of the Effectiveness of Different Oral Hygiene Education Methods in Periodontal Treatment: A Randomized Controlled Study

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Abstract

Objective: The aim of this study was to evaluate and compare the clinical effectiveness of three different oral hygiene education methods (video, brochure and model demonstration) in removing microbial dental plaque and maintaining periodontal health after periodontal treatment.

Materials and Method: A total of 210 patients (105 with gingivitis and 105 with periodontitis) aged 18-60 were included in this randomized controlled study. Participants were randomly divided into three groups (n=70): Group A (Video education), Group B (Brochure education) and Group C (Model demonstration). All patients received Phase 1 periodontal therapy. Clinical parameters including Plaque Index (PI), Gingival Index (GI), Probing Pocket Depth (PPD), Clinical Attachment Level (CAL) and Bleeding on Probing (BOP) were recorded at baseline (T0), 1 week (T1) and 8 weeks (T2) post-treatment. Statistical analysis was performed using SPSS 22.0 (p<0.05).

Results: All groups showed statistically significant improvements in all clinical parameters from T0 to T2 (p<0.001). However, there were no significant differences between the groups regarding PI, GI, PPD and CAL values (p>0.05). A significant difference was found in BOP scores at T2 (p=0.001). Post-hoc analysis revealed that Group C (Model) showed significantly lower BOP scores compared to Group A (Video) (p=0.017) and Group B (Brochure) (p=0.001).

Conclusion: All three oral hygiene education methods are effective in improving periodontal health. Although model demonstration showed slightly better results in reducing gingival bleeding, video and brochure methods can be used as effective alternatives when chairside education is not feasible.

Keywords: Oral Hygiene Education; Periodontal Treatment; Dental Plaque; Patient Motivation

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Abbreviations

PI: Plaque Index; GI: Gingival Index; PPD: Probing Pocket Depth; CAL: Clinical Attachment Level; BOP: Bleeding on Probing

Introduction

Periodontal diseases are chronic inflammatory conditions affecting the supporting tissues of the teeth and microbial dental plaque is the primary etiological factor [1]. If plaque accumulation is not prevented by effective oral hygiene practices, gingivitis can progress to periodontitis, leading to tooth loss [2]. Therefore, the fundamental principle of periodontal therapy is the elimination of the etiological agent, which relies heavily on the patient's daily mechanical plaque control [3]. Despite the importance of professional cleaning, the long-term success of periodontal treatment depends on the patient's ability to maintain oral hygiene at home [4]. However, patients often struggle to adopt correct brushing techniques due to a lack of motivation or

improper instruction [5]. Consequently, various educational methods such as verbal instructions, written materials (brochures) and audiovisual aids (videos) are used to improve patient compliance [6]. While some studies suggest that face-to-face model demonstrations are superior, others report that video-based or written instructions yield similar results [7-9]. The aim of this randomized controlled study was to compare the clinical efficacy of video, brochure and model demonstration methods on periodontal parameters in patients undergoing Phase 1 periodontal therapy.

Materials and Methods

Study Design and Participants

This study was approved by the Bülent Ecevit University Clinical Research Ethics Committee (Date: 24.01.2019, No: 2019-05-05/01) and conducted in accordance with the Declaration of Helsinki. The study included 210 systemically healthy patients (105 with gingivitis and 105 with periodontitis) aged between 18 and 60 years who applied to the Department of Periodontology.

Inclusion criteria

- Having at least 20 natural teeth
- Not having received periodontal treatment in the last 6 months
- Being literate and having no visual or auditory impairments

Exclusion criteria

- Smoking (to eliminate the effect of nicotine on gingival blood flow)
- Pregnancy or lactation
- Use of antibiotics or anti-inflammatory drugs in the last 3 months

Group Allocation and Interventions

Participants were randomly allocated into three groups (n=70 per group) using a computer-generated randomization list:

Group A (Video): Patients watched a 2-minute 40-second video demonstrating the Modified Bass technique

Group B (Brochure): Patients were given a colored A5 brochure explaining the same technique

Group C (Model): The researcher demonstrated the technique on a dental model (typodont) chairside

All patients received scaling and root planing (Phase 1 therapy) prior to education

Clinical Measurements

Clinical parameters were recorded by a single calibrated examiner (R.K.) at baseline (T0), 1 week (T1) and 8 weeks (T2) post-treatment:

1. Plaque Index (PI): Silness and Løe [10]
2. Gingival Index (GI): Løe and Silness [11]
3. Probing Pocket Depth (PPD): Measured from the gingival margin to the pocket base (mm)
4. Clinical Attachment Level (CAL): Measured from the cemento-enamel junction to the pocket base (mm)
5. Bleeding on Probing (BOP): Recorded as present or absent (Ainamo and Bay) [12]

Statistical Analysis

Data were analyzed using SPSS 22.0. The Kruskal-Wallis test was used for intergroup comparisons and the Mann-Whitney U test was used for pairwise comparisons. The Wilcoxon Signed-Rank test was used for intragroup changes. The significance level was set at $p < 0.05$.

Results

Demographic Data

There were no statistically significant differences between the groups regarding age ($p = 0.185$) and gender distribution ($p = 0.981$) at baseline (Table 1,2).

Intragroup Comparisons

All three groups showed statistically significant reductions in PI, GI, PPD, CAL and BOP scores from T0 to T2 ($p < 0.001$ for all)

(Table 3-7 respectively). This indicates that all education methods improved oral hygiene and periodontal health over the 8-week period.

Intergroup Comparisons

At T0 and T1, there were no significant differences between the groups for any parameter ($p>0.05$). At T2, while there were no significant differences in PI, GI, PPD and CAL values between the groups ($p>0.05$), a significant difference was found in BOP scores ($p=0.001$).

Post-hoc analysis revealed that Group C (Model) had significantly lower BOP scores than Group A (Video) ($p=0.017$) and Group B (Brochure) ($p=0.001$). Although Group C showed numerically greater reductions in other parameters, these differences were not statistically significant.

	Group that received oral hygiene education through video viewing (Group A)		Group that received oral hygiene education through brochures (Group B)		The group receiving oral hygiene education on the model (Group C)		p
	Avg.	SD	Avg.	SD	Avg.	SD	
Age	36,59	11,0	36,39	10,9	39,73	12,3	0,185

Table 1: Age distribution in groups receiving oral hygiene education.

		Video (Group A)		Brochure (Group B)		Model (Group C)		Total		p
		N	%	N	%	N	%	%	%	
Gender	Woman	35	50,0	35	50,0	36	52	106	51,0	0,981
	Man	35	50,0	35	50,0	34	48	104	49,0	
Total		70	100,0	70	100,0	70	100,0	210	100,0	

Table 2: Gender distribution in the groups receiving training.

	Video (Group A)		Brochure (Group B)		Model (Group C)		p
	Median	SD	Median	SD	Median	SD	
T0	1,5	0,5	1,5	0,4	1,6	0,4	0,706
T1	1,3	0,4	1,4	0,4	1,5	0,3	0,791
T2	1,1	0,4	1,3	0,3	1,2	0,3	0,614

Table 3: Results of the PI analysis for groups receiving different oral hygiene education.

	Video (Group A)		Brochure (Group B)		Model (Group C)		p
	Median	SD	Median	SD	Median	SD	
T0	1,9	0,5	2,0	0,5	2,0	0,4	0,196
T1	1,9	0,4	1,9	0,4	1,9	0,4	0,402
T2	1,8	0,4	1,9	0,4	1,9	0,3	0,332

Table 4: GI analysis results of groups receiving different oral hygiene education.

	Video (Group A)		Brochure (Group B)		Model (Group C)		p
	Median	SD	Median	SD	Median	SD	
T0	1,5	0,9	1,5	1,1	1,4	1,1	0,954
T1	1,5	0,9	1,5	1,1	1,3	1,1	0,990
T2	1,3	0,8	1,3	0,9	1,1	0,7	0,610

Table 5: PD analysis results of groups receiving different oral hygiene education.

CAL	Video (Group A)		Brochure (Group B)		Model (Group C)		p
	Median	SD	Median	SD	Median	SD	
T0	1,5	2,1	1,5	2,0	1,4	2,0	0,908
T1	1,5	2,1	1,5	2,0	1,3	2,0	0,882
T2	1,3	1,8	1,3	1,8	1,1	1,5	0,502

Table 6: CAL analysis results of groups receiving different oral hygiene education.

BOP	Video (Group A)		Brochure (Group B)		Model (Group C)		p
	Median	SD	Median	SD	Median	SD	
T0	0,5	0,1	0,4	0,1	0,4	0,1	0,717
T1	0,4	0,1	0,4	0,1	0,4	0,1	0,401
T2	0,2	0,1	0,2	0,1	0,2	0,0	0,001

Table 7: Results of the BOP analysis for groups receiving different oral hygiene education.

Discussion

The results of this study indicate that all three oral hygiene education methods-video, brochure and model demonstration-are effective in improving periodontal health when combined with professional mechanical plaque removal. This finding aligns with the literature emphasizing that any form of education is better than no education [13,14].

In our study, the lack of significant difference in Plaque Index between groups suggests that patients can mechanically remove plaque effectively regardless of the education method, provided they are motivated. However, the Bleeding on Probing (BOP) parameter, which reflects tissue inflammation, showed a significant difference at week 8. The model group (Group C) performed significantly better in reducing bleeding. This may be attributed to the "tactile" nature of model demonstrations. When a dentist demonstrates on a model, the patient receives visual, auditory and spatial cues, which may lead to better technique adaptation and less traumatic brushing compared to passive methods like videos or brochures [15].

Şanlıer, et al., reported that model demonstrations were more effective than brochures in students, supporting our finding that physical demonstration enhances learning [7]. Conversely, Williams, et al., and Lim, et al., found no difference between video and written methods [9,16]. These discrepancies might stem from differences in study populations (e.g., orthodontic patients vs. periodontal patients) and follow-up durations.

A limitation of this study is the 8-week follow-up period; longer-term studies are needed to assess the sustainability of motivation. However, for public health initiatives, brochures and videos are cost-effective and scalable alternatives to chairside education, especially in rural areas or schools [17].

Conclusion

Within the limitations of this study:

1. Video, brochure and model-based oral hygiene education methods are all effective in improving periodontal parameters
2. Model demonstration may offer a slight advantage in controlling gingival inflammation (BOP)
3. In clinical settings where time is limited, video and brochure methods serve as effective and practical alternatives

Conflict of Interest Statement

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Consent for Publication

Informed consent for publication was obtained from the patient involved in this case report, as documented in the manuscript.

Authors' Contributions

All authors contributed equally to this paper.

Financial Disclosure

The authors received no external financial support for this study.

Data Availability Statement

Not applicable.

Ethical Statement

This study was approved by the Bülent Ecevit University Clinical Research Ethics Committee (Date: 24.01.2019, No: 2019-05-05/01) and conducted in accordance with the Declaration of Helsinki.

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