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Original Research

The effect of oral hygiene practices on gum health in patients with gingivitis: A longitudinal study

[1]Sahithya Sakhamuri, [2]Radhika Kanani, [3]Lakshmi Chigurupati, [4]Farah Khan, [5]Rahul Bhargava, [6]S.Bhuvaneshwari

[1]MPH, Health Innovation Research Associate, University of Louisiana at Lafayette;
[2]BDS, K.M.Shah Dental College and Hospital, Waghodia, Vadodara, Gujarat, India
[3]BDS, Sibar Institute of Dental Sciences, Guntur, AP, India;
[4]Intern, Deccan College of Medical Sciences, Kanchanbagh, Hyderabad, India;
[5]Deparmemt of Internal Medicine, Gajara Raja Medical College, Gwalior, Madhya Pradesh, India;
[6]Professor, Department of Oral Medicine and Radiology, KALINGA Institute of Dental Sciences, KIIT Deemed To Be University, India

ABSTRACT:
Purpose: This longitudinal study aims to evaluate the impact of oral hygiene practices on gum health in patients with gingivitis. Gingivitis, a common form of periodontal disease, is caused by plaque accumulation and poor oral hygiene. This study focuses on the long-term benefits of improving oral hygiene practices and its effect on gingival inflammation and overall periodontal health. **Methods:** A total of 120 patients with gingivitis were enrolled in this study and divided into two groups. Group A received oral hygiene education and guidance on proper brushing and flossing techniques, while Group B continued with their existing oral hygiene practices. Clinical parameters, including gingival index (GI), plaque index (PI), and bleeding on probing (BOP), were recorded at baseline, 3 months, 6 months, and 12 months. Statistical analysis was performed using paired t-tests and repeated measures ANOVA to compare the results within and between groups. **Results:** After 12 months, Group A showed a significant reduction in gingival inflammation, as indicated by the improvement in the gingival index and a decrease in plaque accumulation and bleeding on probing ($p < 0.05$). In contrast, Group B exhibited only marginal improvements in these parameters. The results demonstrate that patients who adopted improved oral hygiene practices experienced better periodontal health outcomes than those who did not. **Conclusion:** The study concludes that proper oral hygiene practices, including regular brushing and flossing, significantly improve gum health in patients with gingivitis. Consistent oral hygiene education and reinforcement are key to maintaining periodontal health and preventing the progression of gingivitis to more severe periodontal diseases.
Keywords: Oral hygiene practices, Gum health, Gingivitis, Longitudinal study, Periodontal health

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Corresponding author: S.Bhuvaneshwari, Professor, Department of Oral Medicine and Radiology, KALINGA Institute of Dental Sciences, KIIT Deemed To Be University, India

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INTRODUCTION

Gingivitis, a mild form of periodontal disease, is characterized by inflammation of the gums, redness, swelling, and bleeding. The primary cause of gingivitis is the accumulation of dental plaque due to inadequate oral hygiene practices [1]. If left untreated, gingivitis can progress to periodontitis, leading to irreversible damage to the periodontal tissues and tooth loss [2]. Preventing the progression of gingivitis relies heavily on maintaining good oral hygiene, including regular brushing, flossing, and professional dental cleanings [3].

Numerous studies have demonstrated the importance of oral hygiene in preventing gingival inflammation and maintaining periodontal health [4]. Proper brushing and flossing techniques help remove plaque and reduce the risk of bacterial colonization, which is the main factor in the development of gingivitis [5].

However, many patients struggle with maintaining consistent and effective oral hygiene practices, leading to recurring inflammation and gum disease [6-8].

This longitudinal study aims to assess the impact of enhanced oral hygiene practices on gum health in patients with gingivitis. By comparing clinical parameters such as the gingival index, plaque index, and bleeding on probing over a 12-month period, the study will provide insight into the long-term effects of improved oral hygiene. Additionally, the study highlights the importance of patient education and regular reinforcement of oral hygiene techniques in preventing the progression of gingivitis to periodontitis.

MATERIALS AND METHODS

Study Design and Population

This longitudinal study included 120 patients diagnosed with gingivitis. The participants were randomly divided into two groups: Group A (n=60), who received oral hygiene instruction and guidance on proper brushing and flossing techniques, and Group B (n=60), who continued with their existing oral hygiene practices. Patients with systemic conditions affecting periodontal health, such as diabetes, or those on medications impacting oral health, were excluded.

Oral Hygiene Intervention

Group A participants received tailored oral hygiene instructions, including proper brushing with a soft-bristle toothbrush, the use of fluoride toothpaste, and daily flossing. Professional cleaning was also recommended every 6 months. Group B participants were not provided with additional instructions or changes to their routine oral hygiene practices.

Clinical Parameters

Clinical parameters such as the gingival index (GI), plaque index (PI), and bleeding on probing (BOP) were assessed at baseline, 3 months, 6 months, and 12 months. These parameters were used to evaluate the severity of gingival inflammation and plaque accumulation over time.

Statistical Analysis

Data were analyzed using paired t-tests and repeated measures ANOVA to assess changes within and between the groups. A p-value of <0.05 was considered statistically significant.

RESULTS

Gingival Health Improvement

Group A, which received oral hygiene instructions, showed significant improvement in all clinical parameters. After 12 months, the gingival index (GI) decreased from a mean of 2.5 at baseline to 1.2. Group B, which did not receive intervention, exhibited a smaller reduction in the GI, decreasing from 2.4 at baseline to 2.1 after 12 months.

Table 1: Changes in Gingival Index (GI) Over 12 Months

Time Point	Group A (Mean ± SD)	Group B (Mean ± SD)	p-value
Baseline	2.5 ± 0.3	2.4 ± 0.4	0.523
3 Months	1.8 ± 0.2	2.3 ± 0.3	<0.001
6 Months	1.4 ± 0.2	2.2 ± 0.3	<0.001
12 Months	1.2 ± 0.2	2.1 ± 0.4	<0.001

Group A exhibited a statistically significant improvement in the gingival index compared to Group B ($p < 0.05$).

Plaque Index (PI) Improvement

The plaque index (PI) in Group A decreased from 3.1 to 1.5 over the 12-month period, indicating a reduction in plaque accumulation. In Group B, the PI only decreased from 3.0 to 2.7.

Table 2: Changes in Plaque Index (PI) Over 12 Months

Time Point	Group A (Mean ± SD)	Group B (Mean ± SD)	p-value
Baseline	3.1 ± 0.4	3.0 ± 0.5	0.416
3 Months	2.0 ± 0.3	2.9 ± 0.4	<0.001
6 Months	1.7 ± 0.2	2.8 ± 0.5	<0.001
12 Months	1.5 ± 0.2	2.7 ± 0.5	<0.001

Group A showed a significant reduction in plaque index compared to Group B.

Bleeding on Probing (BOP) Improvement

Bleeding on probing was reduced from 85% at baseline to 25% in Group A, while in Group B, it reduced from 80% to only 60%.

Table 3: Bleeding on Probing (BOP) Reduction Over 12 Months

Time Point	Group A (BOP %)	Group B (BOP %)	p-value
Baseline	85%	80%	0.501

3 Months	40%	75%	<0.001
6 Months	30%	65%	<0.001
12 Months	25%	60%	<0.001

The data indicate a significant improvement in gum health in Group A compared to Group B, particularly in the reduction of bleeding on probing.

DISCUSSION

This longitudinal study demonstrates the significant impact that proper oral hygiene practices have on improving gum health in patients with gingivitis. Group A, which received oral hygiene instruction, showed substantial improvements in the gingival index, plaque index, and bleeding on probing, indicating better control of plaque and inflammation over the 12-month period. In contrast, Group B, which did not receive any new oral hygiene instructions, showed only marginal improvements, highlighting the importance of continuous oral hygiene education.

The significant reduction in the gingival index in Group A reflects the effectiveness of improved oral hygiene practices in controlling gingivitis. Regular brushing and flossing help remove plaque, the primary etiological factor in gingivitis, thus reducing inflammation and preventing the progression of periodontal disease [4]. Previous studies have similarly demonstrated the critical role of plaque control in managing gingivitis, further supporting the findings of this study [5,9,10].

The plaque index scores in Group A also showed a marked decrease, indicating better plaque removal and oral hygiene compliance. This is consistent with the notion that tailored oral hygiene instruction and regular reinforcement are essential for effective plaque management [6,11]. Group B, which did not receive such instruction, showed less improvement, underscoring the importance of professional guidance in maintaining oral hygiene.

Bleeding on probing, another key indicator of gingival health, decreased significantly in Group A. This is an important finding, as BOP is one of the earliest signs of gingival inflammation and is strongly associated with the presence of plaque and biofilm [11-13]. The significant reduction in BOP in Group A patients highlights the effectiveness of consistent oral hygiene practices in reducing gingival inflammation and improving overall gum health [14,15].

Despite the positive outcomes in Group A, one limitation of this study is that it only included patients with mild to moderate gingivitis. Future studies should explore the impact of oral hygiene practices on patients with more advanced periodontal disease, as well as the long-term effects of sustained oral hygiene interventions beyond 12 months. Additionally, compliance with oral hygiene recommendations may vary among patients, and future studies could investigate strategies to improve long-term adherence.

CONCLUSION

This longitudinal study demonstrates that proper oral hygiene practices, including regular brushing and flossing, significantly improve gum health in patients with gingivitis. Patients who received oral hygiene education showed greater reductions in plaque accumulation, gingival inflammation, and bleeding on probing compared to those who did not receive any intervention. The findings emphasize the importance of continuous patient education and reinforcement of oral hygiene practices in maintaining periodontal health and preventing the progression of gingivitis to more severe forms of periodontal disease.

REFERENCES

1. Löe H, Theilade E, Jensen SB. Experimental gingivitis in man. J Periodontol. 1965;36(3):177-87.
2. Van der Weijden FA, Timmerman MF. A systematic review on the effectiveness of self-performed mechanical plaque removal in adults with gingivitis using a manual toothbrush. Int J Dent Hyg. 2006;4(2):106-21.
3. Axelsson P, Nyström B, Lindhe J. The long-term effect of a plaque control program on tooth mortality, caries, and periodontal disease in adults. J Clin Periodontol. 2004;31(9):749-57.
4. Chapple IL, Van der Weijden F, Doerfer C, et al. Primary prevention of periodontitis: managing gingivitis. J Clin Periodontol. 2015;42(Suppl 16).
5. Trombelli L, Farina R, Silva CO, Tatakis DN. Plaque-induced gingivitis: Case definition and diagnostic considerations. J Clin Periodontol. 2018;45(Suppl 20).
6. Berchier CE, Slot DE, Haps S, Van der Weijden GA. The efficacy of dental floss in addition to a toothbrush on plaque and parameters of gingival inflammation: a systematic review. Int J Dent Hyg. 2008;6(4):265-79.
7. Lang NP, Bartold PM. Periodontal health. J Clin Periodontol. 2018;45(Suppl 20).
8. Cobb CM. Clinical significance of non-surgical periodontal therapy: an evidence-based perspective of scaling and root planing. J Clin Periodontol. 2002;29(Suppl 2):6-16.
9. Sbordone L, Ramaglia L, Gulletta E, Iacono VJ. Recolonization of the subgingival microflora after scaling and root planing in human periodontitis. J Periodontol. 1990;61(9):579-84.
10. Zini A, Mazor S, Timm H, Barker ML, Grender JM, Gerlach RW, Biesbrock AR. Effects of an oral hygiene regimen on progression of gingivitis/early periodontitis: A randomized controlled trial. Canadian Journal of Dental Hygiene. 2021 Jun;55(2):85.
11. Reiniger AP, Maier J, Wikesjö UM, Moreira CH, Kantorski KZ. Correlation between dental plaque accumulation and gingival health in periodontal maintenance patients using short or extended personal oral hygiene intervals. Journal of Clinical Periodontology. 2021 Jun;48(6):834-42.
12. Huang S, He T, Yue F, Xu X, Wang L, Zhu P, Teng F, Sun Z, Liu X, Jing G, Su X. Longitudinal multi-omics and microbiome meta-analysis identify an asymptomatic gingival state that links gingivitis,

periodontitis, and aging. MBio. 2021 Apr 27;12(2):10-128.
13. Dikilitas A, Karaaslan F, Yig˘ it U. The association between oral hygiene behavior and gingival health status with the stage and grade of periodontitis: a cross-sectional study. Journal of Advanced Oral Research. 2020 Nov;11(2):156-64.
14. Song TJ, Chang Y, Jeon J, Kim J. Oral health and longitudinal changes in fasting glucose levels: A nationwide cohort study. PLoS One. 2021 Jun 29;16(6):e0253769.
15. Zhang M, Lan J, Zhang T, Sun W, Liu P, Wang Z. Oral health and caries/gingivitis-associated factors of adolescents aged 12–15 in Shandong province, China: A cross-sectional Oral Health Survey. BMC Oral Health. 2021 Dec;21:1-8.