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EVALUATION OF THE CLINICAL EFFECTIVENESS OF PROFESSIONAL AND PERSONAL ORAL HYGIENE MEASURES IN THE TREATMENT OF CHRONIC CATARRHAL GINGIVITIS IN ADOLESCENTS

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ABSTRACT

Chronic catarrhal gingivitis is one of the most common periodontal conditions among adolescents, and its development is primarily associated with the accumulation of microbial dental plaque and inadequate personal oral hygiene. This study aimed to evaluate the clinical effectiveness of professional and personal oral hygiene measures in treating chronic catarrhal gingivitis in adolescents. A prospective clinical study was conducted at the Surkhandarya Regional Pediatric Dental Clinic in 2025–2026 and included 30 adolescents aged 12–17 years. All participants underwent professional oral hygiene procedures, including the removal of soft and hard dental deposits, and received practical instruction in proper toothbrushing techniques. Clinical status was assessed before treatment and 14 days later using gingival bleeding, redness, swelling, halitosis, the Simplified Oral Hygiene Index (OHI-S), and the Gingival Index (GI). After the therapeutic and preventive interventions, the prevalence of gingival bleeding decreased from 83.3% to 23.3%, redness from 90.0% to 26.7%, swelling from 70.0% to 16.7%, and halitosis from 60.0% to 13.3%. The mean OHI-S score decreased from 2.41 ± 0.48 to 0.86 ± 0.31, while the mean GI score decreased from 1.72 ± 0.36 to 0.52 ± 0.21. These findings indicate that professional oral hygiene combined with individualized hygiene education was associated with short-term reductions in the clinical signs of gingivitis among adolescents.

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Keywords: *adolescents, chronic catarrhal gingivitis, professional oral hygiene, personal oral hygiene, gingival bleeding, OHI-S, Gingival Index.*

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INTRODUCTION

Adolescence is characterized by rapid physical growth, hormonal changes, and the development of the permanent dentition. During this period, inadequate oral hygiene, microbial dental plaque accumulation, poor dietary habits, and the use of orthodontic appliances may create conditions conducive to gingival inflammation. In gingivitis, inflammation is largely confined to the gingival tissues and is clinically manifested by redness, swelling, and bleeding during toothbrushing or probing.

Chronic catarrhal gingivitis is one of the most common periodontal diseases among adolescents. Epidemiological studies have demonstrated a high prevalence of plaque-induced gingivitis in this age group. In particular, a study of schoolchildren aged 12–15 years identified localized or generalized gingivitis in 47.3% of the examined participants [1]. Although early-stage gingivitis does not involve

destructive changes in periodontal attachment or alveolar bone, prolonged inflammation may impair oral health and contribute to gingival bleeding, halitosis, and dental discomfort.

Eliminating microbial dental plaque, the primary etiological factor, is essential in the treatment of gingivitis. Removing soft and hard dental deposits through professional oral hygiene procedures helps reduce gingival inflammation. However, the long-term effectiveness of treatment also depends on adolescents' adherence to daily personal oral hygiene practices, proper toothbrushing techniques, and regular use of interdental cleaning aids. Current clinical guidelines recommend combining professional tooth cleaning with personalized oral hygiene instruction and regular follow-up for the treatment of gingivitis [2].

Nevertheless, local evidence on clinical changes following the combined use of professional and personal oral hygiene measures among adolescents remains limited. Comparing gingival bleeding, redness, swelling, halitosis, and oral hygiene indices before and after treatment can help determine the practical effectiveness of the therapeutic and preventive measures applied.

The aim of this study was to evaluate the clinical effectiveness of professional and personal oral hygiene measures in the treatment of chronic catarrhal gingivitis in adolescents.

LITERATURE REVIEW

The development of gingivitis in adolescents is often associated with microbial dental plaque accumulation and inadequate personal oral hygiene. Because habits established during adolescence may persist into adulthood, the early detection of gingival inflammation, removal of dental plaque, and instruction in proper oral hygiene practices are essential.

Diamanti et al. investigated oral hygiene and periodontal status in 2,478 adolescents aged 12 and 15 years. The researchers used the Simplified Plaque Index and periodontal indices. Gingival bleeding on probing was detected in 23.6% of the 12-year-old participants and 21.6% of the 15-year-old participants. Dental calculus was recorded in 46.2% and 44.3% of the participants, respectively. Adolescents who brushed their teeth less than twice daily and did not use interdental cleaning aids had poorer oral hygiene and periodontal health. The authors emphasized the need to strengthen preventive programs aimed at developing personal oral hygiene skills among adolescents [3].

Soldo et al. evaluated the effects of a motivational oral hygiene lecture and a practical demonstration of proper toothbrushing techniques on dental plaque levels among adolescents. The mean plaque index was 3.52 at baseline, decreased to 2.64 one week after oral hygiene education, and declined further to 1.44 after three months. However, at the six-month follow-up, the index increased to 2.52. The authors demonstrated that oral hygiene education produced positive short-term outcomes; however, adolescents' knowledge and skills require regular review and reinforcement to maintain these improvements [4].

Dimenäs et al. compared a person-centered educational program with conventional verbal instructions among adolescents with poor oral hygiene. The person-centered program considered each adolescent's existing oral hygiene habits, individual difficulties, motivation, and abilities. At the six-month follow-up, dental plaque and gingival bleeding had decreased in both groups; however, the improvement was greater among adolescents who received individualized, behavior-based education. The findings indicated that individualized work with each adolescent and active participation in the treatment process were more effective than general recommendations alone [5].

Al-Hassan, Kazlak, and Kateeb investigated the effectiveness of an interactive, school-based oral health program among adolescents. After two months, mean periodontal and oral hygiene index values were significantly lower in the intervention group than in the control group. Toothbrushing skills, frequency, and duration also improved in the intervention group. The authors found that combining theoretical information with practical activities, interactive teaching methods, and repeated follow-up had a positive effect on adolescents' periodontal health [6].

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The reviewed literature demonstrates that professional oral hygiene reduces microbial dental plaque, the principal local factor contributing to gingival inflammation, while personal oral hygiene education helps maintain these improvements. Nevertheless, a single educational session or toothbrushing demonstration does not always produce stable, long-term outcomes. Treatment effectiveness depends on adolescents' motivation, regular and proper toothbrushing, use of interdental cleaning aids, and attendance at follow-up dental examinations.

Although the reviewed studies examined various educational programs and long-term follow-up periods, assessing short-term clinical outcomes after combining professional oral hygiene procedures with basic personal oral hygiene instruction is also of practical importance. Therefore, comparing gingival bleeding, redness, swelling, halitosis, OHI-S scores, and Gingival Index scores before treatment and 14 days after treatment can help determine the clinical effectiveness of the therapeutic and preventive measures.

RESEARCH METHODOLOGY

This single-group prospective clinical study evaluated the clinical effectiveness of professional and personal oral hygiene measures in treating chronic catarrhal gingivitis in adolescents. Participants' oral health status before treatment was compared with their status 14 days after the therapeutic and preventive interventions.

The study was conducted at the Surkhandarya Regional Pediatric Dental Clinic. It included 30 adolescents aged 12–17 years who underwent dental examinations and were diagnosed with chronic catarrhal gingivitis in 2025–2026. Before the study began, the examination and treatment procedures were explained to the adolescents and their parents, and written informed consent was obtained.

The inclusion criteria were redness and swelling of the gingival margin, bleeding during toothbrushing or periodontal probing, and soft dental plaque on tooth surfaces. Additional inclusion criteria were the absence of clinical attachment loss, pathological periodontal pockets, and alveolar bone destruction. Adolescents with severe systemic diseases; those who had taken antibiotics or antiseptic medications during the month preceding the examination; those with acute inflammatory conditions in the oral cavity; those undergoing orthodontic treatment with fixed appliances; and those who did not attend the recommended follow-up examination were excluded.

The initial dental examination was performed under natural and artificial lighting with a dental mirror and periodontal probe. Gingival color and shape, swelling severity, bleeding on probing, soft and hard dental deposits, and halitosis were assessed. Each participant's clinical findings were recorded on a specially designed examination form.

Oral hygiene status was assessed using the Simplified Oral Hygiene Index (OHI-S) developed by Greene and Vermillion. This index measures the amount of soft debris and dental calculus on the surfaces of six selected index teeth. The OHI-S score was calculated by adding the Debris Index-Simplified (DI-S) and Calculus Index-Simplified (CI-S) scores. A lower OHI-S score indicated better oral hygiene [7].

The severity of gingival inflammation was assessed using the Löe Gingival Index (GI). The vestibular, lingual or palatal, mesial, and distal gingival surfaces of each tooth were examined, and each site was scored from 0 to 3. A score of 0 indicated healthy gingiva; 1 indicated mild redness and swelling; 2 indicated moderate inflammation with bleeding on probing; and 3 indicated severe inflammation with a tendency toward spontaneous bleeding. The final GI score was calculated as the mean score across all examined surfaces [8].

Following the initial examination, all adolescents underwent professional oral hygiene procedures. Soft and hard dental deposits were removed, and tooth surfaces were polished with a specialized brush and prophylactic paste. Each participant then received a practical demonstration of the correct toothbrushing technique. The adolescents were advised to brush their teeth twice daily, pay particular attention to the gingival margins and interdental areas, and use personal oral hygiene aids correctly.

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Fourteen days after the therapeutic and preventive interventions, the adolescents underwent a follow-up clinical examination. The same assessment criteria used at baseline were applied at follow-up. Gingival bleeding, redness, swelling, halitosis, OHI-S scores, and GI scores were compared before and after treatment.

Qualitative variables, including gingival bleeding, redness, swelling, and halitosis, were expressed as frequencies and percentages. OHI-S and GI scores were presented as mean values. Reductions in the prevalence of clinical signs and decreases in oral hygiene and gingival index scores were interpreted as evidence of short-term clinical improvement following the therapeutic and preventive interventions.

Participant confidentiality was maintained throughout the study. Examination forms were coded using unique identification numbers, and participants' names were not disclosed during data analysis. The study was conducted with authorization from the administration of the Surkhandarya Regional Pediatric Dental Clinic.

ANALYSIS AND RESULTS

The study included 30 adolescents aged 12–17 years who were diagnosed with chronic catarrhal gingivitis at the Surkhandarya Regional Pediatric Dental Clinic in 2025–2026. Sixteen participants were boys and 14 were girls, and the mean age was 14.6 years. At baseline, all participants underwent professional oral hygiene procedures, during which soft and hard dental deposits were removed. They also received practical instruction in proper toothbrushing techniques. Clinical indicators were assessed before treatment and 14 days later.

At the initial examination, most adolescents presented with gingival redness, bleeding during probing or toothbrushing, gingival swelling, and soft plaque on tooth surfaces. Fourteen days after the interventions, the clinical signs of inflammation had decreased, and oral hygiene and Gingival Index scores had improved.

Table 1.

Clinical indicators of chronic catarrhal gingivitis in adolescents before treatment and 14 days after treatment

Clinical indicator	Before treatment	14 days after treatment
Gingival bleeding, n (%)	25 (83.3%)	7 (23.3%)
Gingival redness, n (%)	27 (90.0%)	8 (26.7%)
Gingival swelling, n (%)	21 (70.0%)	5 (16.7%)
Halitosis, n (%)	18 (60.0%)	4 (13.3%)
OHI-S score, mean value	2.41 ± 0.48	0.86 ± 0.31
Gingival Index (GI), mean value	1.72 ± 0.36	0.52 ± 0.21

Before treatment, gingival bleeding was observed in 25 adolescents (83.3%). After 14 days, this clinical sign persisted in 7 participants (23.3%), representing a decrease of 60 percentage points. Gingival redness was initially recorded in 27 adolescents (90.0%) and persisted in 8 participants (26.7%) at follow-up.

Before treatment, gingival swelling was detected in 21 participants (70.0%); after 14 days, it was observed in 5 adolescents (16.7%). Halitosis was initially recorded in 18 adolescents (60.0%) and persisted in 4 participants (13.3%) at follow-up. These changes indicate that professional dental cleaning combined with daily oral hygiene instruction was associated with short-term reductions in the clinical signs of gingival inflammation.

A randomized study involving adolescents and young adults found that visual plaque disclosure and individualized oral hygiene recommendations improved plaque control and reduced gingival

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inflammation [9]. These findings are consistent with the reductions in gingival bleeding, redness, and swelling observed in the present study.

Before treatment, the mean OHI-S score was 2.41 ± 0.48, indicating poor oral hygiene. Fourteen days after professional oral hygiene procedures and individualized instruction, the mean score decreased to 0.86 ± 0.31. This change indicates a substantial reduction in soft plaque and dental calculus on tooth surfaces. Similarly, a randomized study involving children aged 12–15 years demonstrated that oral hygiene education delivered by a dentist or trained peers improved plaque and gingival index scores [10].

The baseline mean Gingival Index score was 1.72 ± 0.36, indicating moderate gingival inflammation. Fourteen days after treatment, the mean GI score decreased to 0.52 ± 0.21. This change was consistent with a considerable reduction in gingival redness, swelling, and bleeding on probing. D'Cruz and Aradhya found that oral hygiene education and practical toothbrushing demonstrations reduced plaque and gingival index scores among schoolchildren aged 13–15 years [11].

The findings highlight the importance of combining professional dental cleaning with active adolescent involvement, instruction in proper toothbrushing techniques, and encouragement to maintain oral hygiene at home. Experiential and practice-based oral hygiene education has been reported to improve clinical outcomes among adolescents more effectively than conventional lectures [12].

Overall, gingival bleeding, redness, swelling, and halitosis decreased during the 14-day follow-up period. The reductions in the OHI-S score from 2.41 to 0.86 and the GI score from 1.72 to 0.52 indicate the short-term clinical effectiveness of professional oral hygiene procedures combined with individualized oral hygiene education. However, the persistence of inflammatory signs in some adolescents indicates a need for continued monitoring of toothbrushing practices and reinforcement of individualized recommendations.

Because this study used a single-group prospective design and included only 30 adolescents, its findings reflect short-term clinical changes following professional and personal oral hygiene interventions. The absence of a control group limits comparisons with other treatment approaches and prevents definitive causal inference. The small sample size also requires caution when generalizing the findings to the broader adolescent population. Future research should include multicenter controlled studies with sample sizes determined a priori. Paired t-tests or Wilcoxon signed-rank tests should be used for quantitative variables based on individual-level paired observations, while McNemar's test should be used for qualitative variables. Future studies should also report p-values, 95% confidence intervals, and effect sizes.

CONCLUSIONS AND RECOMMENDATIONS

The study findings showed substantial short-term improvements following the combined use of professional and personal oral hygiene measures in adolescents with chronic catarrhal gingivitis. Before treatment, gingival bleeding was observed in 83.3% of participants, gingival redness in 90.0%, gingival swelling in 70.0%, and halitosis in 60.0%. Fourteen days after the therapeutic and preventive interventions, these rates had decreased to 23.3%, 26.7%, 16.7%, and 13.3%, respectively.

Professional oral hygiene procedures, removal of soft and hard dental deposits, and practical demonstrations of proper toothbrushing techniques were followed by substantial improvements in participants' oral hygiene status. The mean OHI-S score decreased from 2.41 ± 0.48 to 0.86 ± 0.31, while the mean Gingival Index score decreased from 1.72 ± 0.36 to 0.52 ± 0.21. These changes were consistent with reduced gingival inflammation and positive short-term clinical outcomes.

However, gingival bleeding, redness, and other signs of inflammation persisted in some adolescents after 14 days. This finding highlights the need for consistent daily personal oral hygiene, reinforcement of proper toothbrushing practices, and regular follow-up dental examinations to support the long-term stability of treatment outcomes.

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Practical Recommendations

1. In adolescents diagnosed with chronic catarrhal gingivitis, professional oral hygiene procedures should be combined with practical, individualized toothbrushing instruction.
2. Adolescents should be advised to brush their teeth correctly at least twice daily, pay particular attention to the gingival margins and interdental areas, and use appropriate personal oral hygiene aids.
3. A follow-up clinical examination should be conducted 14 days after treatment and repeated after three months. Adolescents with persistent gingival bleeding or other signs of inflammation should receive additional oral hygiene instruction.

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