

## Original article

# INCREASING OF ORAL HYGIENE LEVEL IN ADULTS BY THE ORAL HYGIENE INSTRUCTIONS

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**Abstract:** Aim: The objective was to assess effectiveness of oral hygiene instruction for adults.

Materials and methods: A total of 14 male and female patients aged 22–46 years were assigned into two groups: group 1 was given oral individual instruction; group 2 was given group oral hygiene instruction with demonstration of tooth brushing technique on jaw models. On the baseline two parameters were evaluated: (1) the Silness-Loe index (SLI), (2) Muhlemann periodontal bleeding index (MI). All participants had professional tooth cleaning at the end of the baseline examination. The final evaluation was conducted 3 weeks later.

Results: All patients showed a poor oral health status at the beginning of the study (mean scores in Group 1 SLI=1.3±0.7, MI=1.5±0.7; in Group 2 SLI=1.4±0.7, MI=1.5±0.8). After three weeks in Group 1 indices decreased statistically significant (SLI=0.5±0.7, MI=0.5±0.8; p<0.05), in Group 2 indices decreased a little bit without statistical significance (SLI=1.2±0.8, MI=1.0±0.8; p>0.05).

Conclusion: This study demonstrated that oral hygiene instruction with demonstration of tooth brushing technique on jaw models have beneficial effects for improving oral hygiene status in adults.

**Keywords:** oral hygiene instructions, individual oral hygiene.

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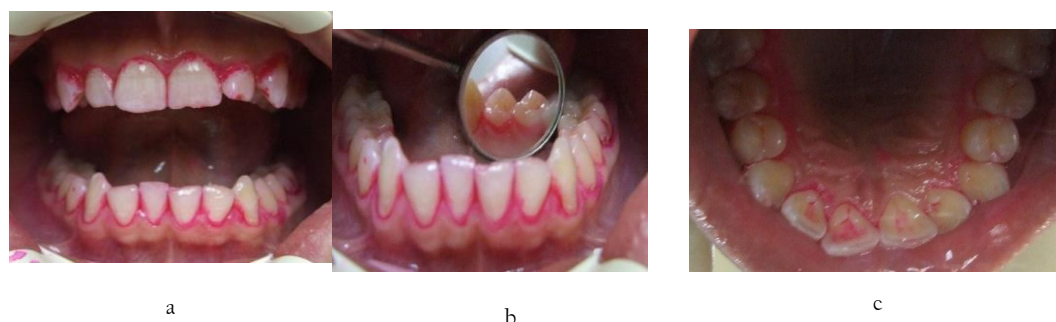
## 1. Introduction

Data from various studies show that many patients do not know how to brush their teeth properly [1]. We often encounter situations where oral hygiene is the last thing on patients' minds. Typically, such patients believe that dental health depends on environmental factors, genetics, diet, vitamins, stress, and other significant yet secondary factors [2,8]. Meanwhile, it has been proven that microorganisms play the primary role in the pathogenesis of dental caries and periodontal diseases [3,4,7]. Bacterial colonization on the surface of tooth hard tissues is the leading factor causing dental caries and periodontal diseases. The intensity of caries and inflammatory periodontal diseases is directly related to the amount and distribution of dental plaque [4,9]. A dynamic equilibrium exists between the resident microflora and the host organism in a healthy state, while disease is a consequence of the disruption of this delicate balance. The pathological process is associated with an overgrowth of species that normally constitute only a minor part of the oral microbial flora. It is essential to maintain dental plaque at a level compatible with health to preserve microbial homeostasis, as its disruption increases the risk of disease [8,9]. Poor oral hygiene leads to increased plaque thickness, which, under significant changes in the oral environment, can affect the competitiveness of different bacterial species within the biofilm. The rapid proliferation of microorganisms best adapted to the altered conditions disrupts homeostasis [10]. Dental plaque primarily accumulates in hard-to-clean areas, which are also the most prone to disease. These include fissures, contact surfaces, and the gingival margin [3,5]. Plaque prevention can be effective if proper hygiene measures are strictly followed, which must be communicated to patients. Unfortunately, due to time constraints in dental practice, patient education and motivation often receive insufficient attention, resulting in inadequate hygiene instruction. However, such instruction is necessary for the following reasons: 1. Proper toothbrushing is not an innate skill—it requires training and practice. The most effective time to instill good habits is childhood, especially since the first permanent tooth erupts at age 6 [5], and these teeth must last a lifetime. 2. Changes in oral conditions (e.g., complex prosthetics, including implants) may render habitual brushing techniques inadequate, necessitating adjustments. 3. Age-related diseases (e.g., diabetes, which increases periodontal risks, or medications causing xerostomia) may require heightened oral hygiene attention. Many

adults must relearn brushing—either due to years of incorrect technique or changing oral/health conditions. All patients need hygiene instruction. In our study, 14 patients (8 men and 6 women, aged 22–46) were divided into two groups. Participants were selected from morning appointments, with the conditions of brushing after breakfast and no snacking before the visit. Group 1 received verbal instructions on proper brushing, while Group 2 received hands-on instruction using jaw models and a toothbrush. The Plaque Index (Silness & Loe, 1962, SLI) and Modified Muhlemann Index (1971, MI by Cowell, 1975) were recorded at baseline and after 3 weeks. All patients underwent professional oral hygiene at the first visit post-assessment. Model-based instruction included: brushing demonstration on the model, plaque disclosure staining and mirror-assisted patient review, patient brushing under guidance, and post-brushing staining with result demonstration. Only a toothbrush and paste were used—no interdental cleaners.

## 2. Clinical Case Example

The photo shows patient R., 25 years old, from group 2. Patient R. agreed to participate in our study and therefore, according to the study protocol, came for a morning appointment, brushed his teeth after breakfast, and did not consume any food on the way to the clinic. He received individual oral hygiene instruction using a demonstration model and toothbrush, followed by dental plaque staining with a disclosing agent (Fig.1), after which the patient examined the stained areas in a mirror.



**Figure 1.** (a-c) - Patient R. (25 years old, group 2) immediately after staining. Stained soft dental plaque is visible on the vestibular and oral surfaces of the upper and lower jaw teeth. Next, the patient brushed his teeth following the instructions received during the training. The dentist first examined the initial brushing results (Fig. 2) and then, using a mirror, pointed out to the patient the areas where stained dental plaque remained uncleaned.



**Figure 2.** (a-c) - Patient R. after hygiene instruction using demonstration models and subsequent self-performed toothbrushing. Stained plaque remains in the area of teeth 4.1, 4.2, 4.3, and 4.4

A small amount of dental plaque remained visible on the lingual surfaces and in the interdental spaces of the mandibular anterior teeth. This was attributed to their crowded position, which makes proper cleaning impossible without supplementary tools (floss, interdental brushes, etc.),

as was explained to the patient. Additionally, minor plaque accumulation was detected on the lingual surfaces of the right maxillary and mandibular molars and premolars in the cervical areas.



a

**Figure 3.** (a,b) - Patient R. A small amount of stained plaque remains visible in the area of teeth 1.4, 1.5, 1.6, 4.4, 4.5, and 4.6.

### 3. Results

At the beginning of the study, patients in both groups demonstrated oral hygiene levels ranging from fair to poor (Table 1). After 3 weeks, Group 1 showed a statistically significant reduction in plaque indices, while Group 2 exhibited only a minor, statistically non-significant decrease in indices.

**Table 1.** Dynamics of Silness-Löe and Muhlemann Index Changes

| Period, index / group | Before the start of the study |         | In 3 weeks |         |
|-----------------------|-------------------------------|---------|------------|---------|
|                       | SLI                           | MI      | SLI        | MI      |
| Group 1               | 1,3 ±0,7                      | 1,5±0,7 | 0,5±0,7    | 0,5±0,8 |
| Group 2               | 1,4±0,7                       | 1,5±0,8 | 1,2±0,8    | 1,0±0,8 |

In working with patients, we observed that not only brushing technique and duration matter, but also whether the patient is right-handed or left-handed. Right-handed patients typically begin brushing on the left side of the jaw and clean this side more thoroughly because it's more comfortable for them, while the right side receives less effective cleaning. Left-handed patients show the opposite pattern. It's important to bring this to the patient's attention, as this typically occurs on a subconscious level, and individuals don't notice the difference themselves.

### 4. Discussion

Numerous clinicians have studied the effectiveness of oral hygiene instruction. Ziebolz D. et al. (2009), in their study of 104 patients, demonstrated equal efficacy of both individual and group training [10]. Arunakul M. et al. (2015) conducted research involving 75 visually impaired patients, showing that oral hygiene education yields significant results (reduction in plaque and bleeding indices, decreased *S. mutans* counts in saliva), with the most effective approach combining instruction with sodium fluoride mouthrinse use [11]. Levin L. et al. found that supervised individual training with parental involvement proves most effective for teaching children proper toothbrushing techniques [12].

### 5. Conclusions

Our study findings corroborate these authors' conclusions. Hygiene instruction demonstrably improves patients' oral health status, with mirror-assisted visualization of immediate results during dental visits serving as powerful motivation for sustained proper brushing technique. Based on our clinical observations, practitioners should account for patients'

handedness during instruction. We found particularly effective results when recommending patients start brushing from their "non-dominant" side (right side for right-handed individuals, left for left-handed), as this approach promotes more balanced effort distribution and achieves more comprehensive cleaning across all tooth surfaces.

**Informed Consent Statement:** Informed consent was obtained from all subjects involved in the study.

**Conflicts of Interest:** The authors declare no conflict of interest.

**The use of artificial intelligence:** the article is written without the use of artificial intelligence technologies.

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