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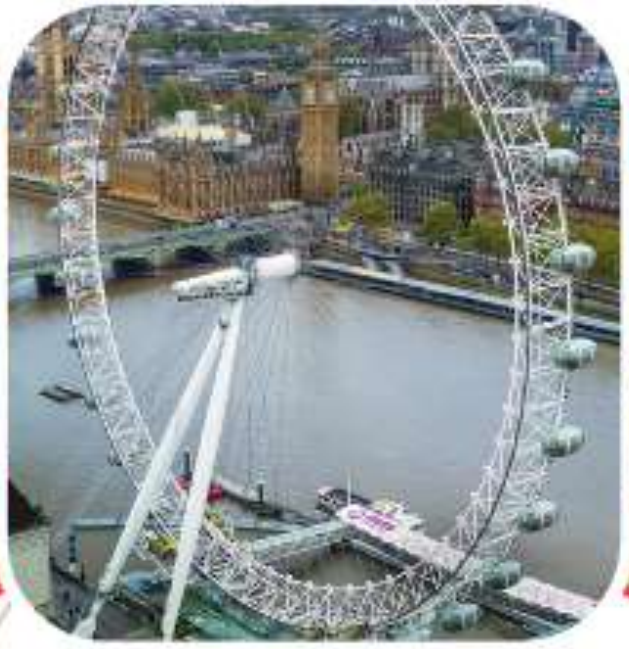


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Assessment of the anatomical and functional condition of the oral cavity in individuals using fixed dental prostheses long-term

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Abstract: This study evaluates the anatomical and functional condition of the oral cavity in individuals who have used fixed (permanent) dental prostheses for a long period, through clinical and radiographic examinations. The study was conducted among 20 patients aged 35–70 in Fergana city, all of whom had metal-ceramic or zirconium dioxide-based prostheses installed for over 5 years. The results showed that 60% of patients had gingivitis, 35% exhibited bone resorption, and 70% experienced reduced masticatory function. The analyses indicated that long-term prosthetic use induces morphophysiological changes in oral tissues, which are aggravated by poor hygiene, leading to inflammatory processes. Based on the findings, the study recommends developing preventive approaches in prosthetic dentistry and using modern prostheses made from biostable and bioinert materials.

Keywords: fixed dental prosthesis, anatomical-functional condition, gingivitis, alveolar bone resorption, masticatory function, oral hygiene, biostable and bioinert materials

Relevance: In recent years, problems related to edentulism have increased. According to the World Health Organization, approximately 30–40% of people over 35 experience tooth loss (partial edentulism), and in those over 60, this figure exceeds 70% [1]. In such cases, fixed (permanent) prostheses are widely used to restore oral functions. They improve masticatory efficiency, enhance esthetics, and positively affect the patient's psycho-emotional state.

However, long-term use of fixed prostheses exerts constant mechanical pressure on oral anatomical structures, including the gums, alveolar bone, mucosa, and abutment teeth. Studies indicate that 60–70% of patients using permanent prostheses for more than 5 years show mild to moderate signs of periodontal inflammation [2–3].

In Uzbekistan, this issue is particularly relevant because many patients do not undergo regular prosthetic check-ups or maintain adequate oral hygiene after prosthesis placement. Consequently, dystrophic and inflammatory changes in tissues beneath the prostheses appear early, reducing the prosthesis lifespan and necessitating retreatment.

Thus, studying the anatomical and functional condition of the oral cavity in individuals using long-term fixed prostheses, clinically assessing observed

changes, and developing preventive measures is of practical and scientific significance in contemporary prosthetic dentistry.

Objective: In recent years, the use of fixed prostheses has been increasing in both Uzbekistan and worldwide. According to WHO data, about 60–70% of patients receiving prosthetic treatment choose permanent prostheses, with over 30% using them for more than 5 years [1–3]. Long-term prosthetic use can lead to varying degrees of anatomical and functional changes in the oral cavity.

The aim of this study is to clinically and radiographically evaluate the anatomical and functional condition of the oral cavity in individuals using long-term fixed prostheses, identify prosthesis-related changes in gingiva, bone, and the masticatory apparatus, and analyze these factors in relation to hygiene levels and duration of use.

Main Tasks: Clinically examine the oral mucosa, gum level, and alveolar bone condition of patients who have used fixed prostheses for over 5 years.

Assess masticatory function and hygiene indices using the Green-Vermillion and Silness-Löe indices.

Statistically analyze the data to determine the main anatomical and functional changes associated with long-term prosthesis use.

The scientific significance of this research lies in providing statistically based analytical data on the prevalence and intensity of changes in oral tissues caused by fixed prostheses and in supporting the development of preventive approaches in prosthetic dentistry.

Materials and Methods: The study involved 20 patients aged 35–70 who visited the dental clinic affiliated with Central Asian Medical University in Fergana. All patients had used fixed prostheses (metal-ceramic and zirconium dioxide bridge-type prostheses) for over 5 years.

Clinical examination – assessment of oral mucosa, alveolar ridge shape, gum level, and sharp edges.

Radiographic examination (orthopantomogram) – evaluation of alveolar bone resorption and condition of tissues under the prostheses.

Hygiene indices – assessed using the Green-Vermillion index and Silness-Löe gingival index.

Functional analysis – evaluation of masticatory efficiency, speech clarity, and prosthetic esthetic compatibility.

The results were compared with theoretical literature, including works by Tylman (1990), Shillingburg (1997), Misch (2005), and Kulaev (2018).

Results: The study revealed the following changes in patients using fixed prostheses long-term:

Gingival tissue changes: 60% of patients exhibited mild gingivitis at the prosthesis margins, while 25% showed signs of chronic periodontitis.

Bone resorption: Radiographs showed 1–2 mm alveolar bone loss around abutment teeth in 35% of cases.
Masticatory function: 70% of patients experienced decreased chewing efficiency, particularly in the posterior region.
Esthetic and speech function: 80% were satisfied with prosthetic esthetics, while 20% reported minor speech discomfort.
According to theoretical sources, long-term fixed prostheses can disrupt oral microflora balance, cause bone atrophy, and increase functional load on abutment teeth [1–4]. Shillingburg (1997) notes that inadequate hygiene under long-term bridge prostheses promotes microbial plaque formation, increasing the risk of gingivitis and stomatitis [2,3].
Discussion and Literature Review: Recent studies indicate that constant mechanical pressure from prostheses can lead to atrophic processes in the oral mucosa, slowing lymphatic and blood circulation, thinning epithelial layers, and reducing immune defense mechanisms [5–7]. Gumpert et al. (2010) emphasized that long-term prosthetic use increases anaerobic bacteria in oral microbiota, activating inflammatory processes [7,8]. Therefore, patients with prostheses are advised to undergo regular professional hygiene and use antiseptic agents. Another critical factor is the anatomical fit of the prosthesis. Poorly adapted prosthesis margins in the gingival sulcus can trap food residues, leading to inflammation [9–13]. Modern zirconia-based prostheses exhibit good biocompatibility with oral tissues, though they are more expensive than metal-ceramic alternatives [10]. Therefore, economic factors and tissue sensitivity should be considered in clinical selection.
Conclusion: Long-term use of fixed prostheses affects the anatomical and functional condition of the oral cavity. The most common changes include gingival inflammation, partial alveolar bone resorption, and reduced masticatory function. In summary:
Long-term prostheses impose continuous mechanical load on jaw bone tissues, increasing periodontal sensitivity.
Professional check-ups and hygiene cleaning every 6 months are necessary.
Poor hygiene under prostheses exacerbates morphophysiological changes.
Modern prostheses made from biocompatible zirconia or titanium have fewer adverse effects.

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