

DYNAMICS OF LOCAL IMMUNE RESPONSE AND MICROBIAL ECOLOGY IN THE EDENTULOUS RIDGE MUCOSA FOLLOWING COMPLETE PROSTHETIC REHABILITATION

Kudrat-Zoda Kamola Alisherovna

Assistant of the Department of Orthopedic Dentistry

Mukhtarova Shirinabonu

Student of faculty of the department dentistry

Department of orthopedic Dentistry

Samarkand State Medical University

Background

The oral environment is primarily governed by the presence or absence of natural teeth. Dental fissures, gingival sulci, and plaque serve as specialized niches for microbial activity. Consequently, the loss of dentition and the introduction of orthopedic structures significantly transform the ecological conditions and the composition of the oral microbiota.

Aim

This study sought to analyze the dynamics of the oral microbiome in edentulous individuals before and six months following the installation of complete removable prostheses.

Materials and Methods

The research involved 12 edentulous subjects prior to treatment and 14 patients who had used dentures for six months (average age 71.6 ± 5.2 years). A control group consisted of 13 healthy volunteers of similar age.

Diagnostic methods included:

- **Salivary pH assessment** and hygiene evaluation via the **Ambjørnsen index**.
- **Microscopy and PCR** to determine the qualitative and quantitative density of microorganisms (categorized from sparse to abundant).

• **Local immunity analysis** focusing on **NETosis** (Neutrophil Extracellular Traps). DNA presence in NETs was identified using the Feulgen reaction and Schiff reagent.

Statistical processing was performed in **IBM SPSS v.27.0** using the **Mann-Whitney U-test** ($p < 0.05$).

Results

Salivary acidity remained stable after tooth loss (7.2 ± 0.6). While coccal and mixed flora were prevalent in all groups, the edentulous state was associated with a significant rise in rod-shaped bacteria (*Enterobacteriaceae* and *Eubacterium spp.*) and a decrease in fungi.

Six months of denture wear led to:

1. A significant resurgence in **fungal colonies**.
2. A decline in *Eubacterium spp.* with a simultaneous increase in *Leptotrichia spp.* and *Fusobacterium spp.*
3. A growing trend in *Peptostreptococcus spp.*

Regarding immunology, while edentulous patients initially exhibited active neutrophils and NETosis on the mucosa, these cells were absent six months after prosthodontic intervention. This indicates that the denture serves as a **mechanical barrier**, obstructing neutrophil migration and suppressing the local immune response, which may hinder the clearance of cellular debris and pathogens.

Conclusions

- Total tooth loss shifts the microbial balance toward rod-shaped flora without disrupting the acid-base equilibrium.
- The long-term use of dentures promotes fungal proliferation and a shift toward a more complex mixed microbiota.
- Prosthetic rehabilitation appears to inhibit localized immune mechanisms (NETosis) by physically shielding the supporting mucosal tissues.

Reference :

1. Stafeev, A.A. Kolichestvennyi i kachestvennyi analiz mikrobioty polosti rta pri ortopedicheskoi reabilitatsii patsientov polnymi i chastichnymi s"emnymi plastinochnymi protezami / A.A. Stafeev, M.G. Chesnokova, V.A. Chesnokov // *Stomatologiya*. – 2015. – №5. – S. 48 – 51. DOI: 10.17116/stomat201594548-51
2. Rol' narushenii proteoliticheskoi sistemy v patogeneze proteznogo stomatita / O.M. Lavrovskaya, Ya.A. Lavrovskaya, S.K. Severinova [i dr.] // *Tavricheskkii mediko biologicheskii vestnik*. – 2019. – №1. – S. 164-169.
3. Pisarevskii, Yu.L. Stomatologicheskii sindrom u patsientov s akrilovymi s"emnymi zubnymi protezami na fone nedostatochnosti nizhnego pishchevodnogo sfinktera / Yu.L. Pisarevskii, I.V. Kibalina, A.I. Zhilina [i dr.] // *Zabaikal'skii meditsinskii zhurnal*. – 2024. – №3. – S. 9-14.
4. Fousert, E. Neutrophil extracellular traps (NETs) take the central stage in driving autoimmune responses / E. Fousert, R. Toes, J. Desai // *Cells*. – 2020. – №9. – 915 p. DOI: <https://doi.org/10.3390/cells9040915>.