



ORAL MICROBIOECENOSIS IN DENTURE STOMATITIS
AND THE ANTIMICROBIAL EFFICACY OF LICORICE
(GLYCYRRHIZA GLABRA L.) ROOT INFUSION

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Annotation: *The article analyzes the oral microbiocenosis in denture stomatitis and the antimicrobial efficacy of complex treatment with licorice root infusion in 131 patients. Complex treatment reduced *C. albicans* and *S. aureus* by 4.2–4.8 log while preserving the resident commensal flora.*

Keywords: *oral microbiocenosis, *Candida albicans*, *Staphylococcus aureus*, *Glycyrrhiza glabra* L.*

Introduction: *Candida* species play a central role in the pathogenesis of denture stomatitis: the *Candida*-associated form occurs in 60–65% of denture wearers [1, 2]. Glycyrrhizic acid, glabridin and other flavonoids of licorice (*Glycyrrhiza glabra* L.) root show antimicrobial activity against *C. albicans* and *Streptococcus mutans* [3]; however, its efficacy in denture stomatitis has been insufficiently studied in controlled trials. The aim of the study was to characterize the oral microbiocenosis in denture stomatitis and to compare the microbiological efficacy of complex treatment with licorice root infusion with that of conventional treatment.

Main part: In 2023–2025, a total of 131 patients aged 45–74 years with denture stomatitis were divided by type of edentulism and treatment method into four groups: partial edentulism – conventional (1A, n=43) and complex treatment (1B, n=48); complete edentulism – conventional (2A, n=19) and



complex treatment (2B, n=21). Conventional treatment used 3% hydrogen peroxide and topical nystatin (7 days); in complex treatment these were replaced by licorice root infusion (1:10) – 15-min applications twice daily for 7 days and daily soaking of the denture. The counts (CFU/mL) of six microorganisms – *Staphylococcus aureus*, *Enterococcus faecalis*, *S. mutans*, *Streptococcus salivarius*, *Candida albicans* and *Candida tropicalis* – were determined by standard bacteriological culture before treatment and after 3 days, 7 days and 1 month. Because baseline counts differed between subgroups, log₁₀ reduction was used as the primary criterion (Mann–Whitney U and Wilcoxon tests).

Before treatment, all six microorganisms were detected in every patient, indicating pronounced dysbiosis [4]. Quantitatively, commensal *S. salivarius* predominated (27.7–33.3 million CFU/mL); among fungi, *C. albicans* dominated (2.6–3.1 million CFU/mL), and *S. aureus* was also abundant (1.8–2.0 million CFU/mL) [5]. Counts of the key pathogens did not depend on the type of edentulism (*S. aureus* $p=0.190$; *C. albicans* $p=0.593$). After treatment, opportunistic bacteria and fungi decreased significantly in all four groups ($p<0.001$). *C. albicans* fell from 3,952,708 to 144 CFU/mL in group 1B and from 2,179,524 to 25 CFU/mL in group 2B, versus 5,552 and 121 CFU/mL in the conventional groups 1A and 2A. The magnitude of reduction is shown in Table 1.

In partial edentulism, complex treatment produced a significantly greater reduction in *C. albicans* (4.77 vs 3.63 log; $p<0.001$), *S. aureus* and *S. mutans* ($p\leq 0.007$); *C. tropicalis* fell more in group 1A (higher baseline), and *E. faecalis* did not differ ($p=0.267$). In complete edentulism, differences in favour of complex treatment were found for *S. aureus*, *E. faecalis*, *C. albicans* (4.75 vs 4.30 log) and *C. tropicalis* ($p=0.015$ – 0.038). The resident commensal *S. salivarius* changed least (0.5–2.2 log), indicating that the treatment spared the normal microflora. Groups with a greater reduction of the key pathogens also





showed a greater improvement of the overall clinical index (61.6–67.2% vs 27.9–34.9%).

Table 1

Reduction in microbial counts after 1 month of treatment (log₁₀ CFU/mL)

Microorganism	1A	1B	2A	2B
<i>S. aureus</i>	3.66	4.41	3.52	4.21
<i>E. faecalis</i>	3.61	3.40	2.61	3.36
<i>S. mutans</i>	1.82	3.04	0.60	0.35
<i>S. salivarius</i>	1.77	2.22	0.55	0.53
<i>C. albicans</i>	3.63	4.77	4.30	4.75
<i>C. tropicalis</i>	3.66	2.84	2.07	2.80
Total microbial load	3.03	3.45	2.28	2.67

Conclusion: The denture-bearing microbiocenosis is dysbiotic, with predominance of *S. salivarius* and colonization by *C. albicans* and *S. aureus*, independent of the type of edentulism. Complex treatment with licorice root infusion reduced *C. albicans* (4.75–4.77 log) and *S. aureus* (4.21–4.41 log) to a greater extent than conventional treatment (3.63–4.30 and 3.52–3.66 log, respectively) without adverse effects on the resident commensal flora. The log reduction of *C. albicans* and *S. aureus* paralleled clinical improvement and may serve as a criterion for monitoring treatment efficacy.

REFERENCES:

1. Sugio C.Y.C., Garcia A.A.M.N., Albach T., et al. Candida-associated denture stomatitis and murine models: what is the importance and scientific evidence? // J Fungi (Basel). – 2020. – Vol. 6, № 2. – P. 70. doi: 10.3390/jof6020070.



2. Qiu J., Roza M.P., Colli K.G., et al. Candida-associated denture stomatitis: clinical, epidemiological, and microbiological features // *Braz J Microbiol.* – 2023. – Vol. 54, № 2. – P. 841–848. doi: 10.1007/s42770-023-00952-0.
3. Sharma H., Yunus G.Y., Agrawal R., et al. Antifungal efficacy of three medicinal plants *Glycyrrhiza glabra*, *Ficus religiosa*, and *Plantago major* against oral *Candida albicans*: a comparative analysis // *Indian J Dent Res.* – 2016. – Vol. 27, № 4. – P. 433–436.
4. Manzoor M., Pussinen P.J., Saarela R.K.T., et al. Metagenomic analysis of the denture-associated oral microbiome in patients with denture stomatitis // *Sci Rep.* – 2025. – Vol. 15, № 1. – P. 31913. doi: 10.1038/s41598-025-16915-4.
5. Fifolato M.A., Clemente L.M., Ribeiro A.B., et al. *Candida* spp. in denture stomatitis: prevalence, microbial load, and antifungal resistance across severity levels // *Microorganisms.* – 2025. – Vol. 13, № 9. – P. 2057. doi: 10.3390/microorganisms13092057.