

Ozhogan Z.R., Genyk B.L., Bielinskiy M.V., Herashchenko A.S.,
Nyshchuk-Oliinyk N.B., Parakhoniak R.L.
Ivano-Frankivsk National Medical University, Ivano-Frankivsk, Ukraine

EFFICACY OF PLATELET-RICH FIBRIN FOR ORAL LESIONS IN PEMPHIGUS VULGARIS

e-mail: mbelinskiy@ifnmu.edu.ua

Persistent oral lesions in pemphigus vulgaris cause pain, impair nutrition, and may heal slowly despite systemic treatment. This retrospective study included 58 patients treated during 2019–2024: 27 received platelet-rich fibrin plus standard systemic therapy and 31 received standard therapy alone. Outcomes were oral lesion intensity and area, pain, and time to complete epithelialization. Mean reductions in lesion intensity were 9.4 and 4.3 points, reductions in lesion area were 8.6 and 3.8 points, and reductions in pain were 4.8 and 2.6 points in the intervention and control groups, respectively; all between-group comparisons yielded $p < 0.001$. Median healing time was 13 versus 24 days. Complete epithelialization within 21 days occurred in 89 % (24/27) versus 48 % (15/31) of patients. No serious adverse events were recorded. Platelet-rich fibrin may therefore accelerate mucosal healing and improve symptom control as an adjunct to systemic treatment.

Key words: pemphigus, platelet-rich fibrin, mouth mucosa, wound healing, pain measurement, regenerative medicine.

Ожоган З.Р., Генік Б.Л., Белінський М.В., Геращенко А.С.,
Нищук-Олійник Н.Б., Паракхоніак Р.Л.

ЕФЕКТИВНІСТЬ ТРОМБОЦИТАРНОГО ФІБРИНУ ПРИ ОРАЛЬНИХ УРАЖЕННЯХ У ПАЦІЄНТІВ ІЗ ВУЛЬГАРНОЮ ПУХИРЧАТКОЮ

Стійкі оральні ураження при вульгарній пухирчатці спричиняють біль, утруднюють харчування та можуть повільно загоюватися попри системне лікування. До ретроспективного порівняльного дослідження включено 58 пацієнтів, яких лікували у 2019–2024 роках: 27 додатково до стандартної системної терапії отримували тромбоцитарний фібрин, а 31 – лише стандартну терапію. Оцінювали інтенсивність і площу оральних уражень, біль за візуальною аналоговою шкалою та час до повної епітелізації. Середнє зниження показника інтенсивності становило 9,4 та 4,3 бала, показника площі – 8,6 та 3,8 бала, болю – 4,8 та 2,6 бала відповідно; для всіх міжгрупових порівнянь $p < 0,001$. Медіана загоєння становила 13 проти 24 днів. Повної епітелізації протягом 21 дня досягнуто у 89 % (24/27) проти 48 % (15/31) пацієнтів. Серйозних побічних явищ не зареєстровано. Тромбоцитарний фібрин може прискорювати загоєння слизової оболонки та покращувати контроль симптомів як доповнення до системного лікування.

Ключові слова: вульгарна пухирчатка, тромбоцитарний фібрин, слизова оболонка рота, загоєння ран, оцінювання болю, регенеративна медицина.

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Pemphigus vulgaris (PV) is a chronic autoimmune blistering disease caused predominantly by pathogenic immunoglobulin G autoantibodies against desmosomal adhesion proteins. Loss of keratinocyte adhesion produces suprabasal acantholysis and fragile blisters that rapidly become erosions. The disease may be life-threatening, and oral mucosal involvement is common, frequently appears before cutaneous disease, and may remain the most persistent manifestation [7, 13]. Painful oral erosions restrict eating, swallowing, speaking, and oral hygiene; their extent and activity therefore have direct clinical and patient-reported relevance [4, 10].

Current management relies on systemic corticosteroids and steroid-sparing immunosuppressive therapy. Rituximab is recommended as a first-line option for moderate or severe disease, while azathioprine and mycophenolate mofetil remain important alternatives or adjuncts [6, 17]. These regimens suppress disease activity and the formation of new lesions, but healing of established mucosal erosions may remain slow. Prolonged pain, impaired intake, secondary infection, and cumulative treatment toxicity justify investigation of local regenerative approaches that can complement, rather than replace, systemic disease control.

Platelet-rich fibrin (PRF) is an autologous fibrin matrix containing platelets, leukocytes, and bioactive mediators. Advanced PRF (A-PRF) and injectable PRF (i-PRF) are produced without anticoagulants and are intended to provide a three-dimensional scaffold with gradual delivery of platelet-derived growth factor (PDGF), transforming growth factor beta (TGF- β), vascular endothelial growth factor (VEGF), and epidermal growth factor (EGF). These mediators support angiogenesis, fibroblast activity, keratinocyte migration, and extracellular matrix remodeling [8, 9]. Laboratory characterization confirms that cellular and protein composition depends on preparation conditions, reinforcing the need for reproducible protocols [15].

Clinical studies have reported symptomatic and healing benefits of PRF in erosive oral lichen planus and other chronic oral mucosal lesions [1, 3]. Broader reviews suggest a regenerative effect across oral mucosal disorders but also emphasize heterogeneous protocols, small samples, and limited controlled evidence [5, 11]. A recent scoping review identified the lack of comparative studies focused specifically on oral PV [12]. At the same time, oral-specific instruments, including the Pemphigus Oral Lesions

Intensity Score (POLIS) and the Pemphigus Oral Lesions Area Index (POLAI), have improved standardized assessment of severity and lesion area [14, 16]. These developments provide a basis for evaluating PRF as an adjunctive intervention in a clinically defined PV cohort.

The purpose of the study was to compare platelet-rich fibrin combined with standard systemic treatment against standard systemic treatment alone for oral mucosal lesions in pemphigus vulgaris by assessing lesion intensity, lesion area, pain, and healing time.

Materials and methods. A retrospective comparative analysis was performed using the medical records of 58 adults with confirmed PV and active oral mucosal lesions treated at the Dental University Clinic of Ivano-Frankivsk National Medical University (IFNMU), Ivano-Frankivsk, Ukraine, from January 2019 through December 2024. The protocol was approved by the Bioethics Committee of IFNMU (Protocol No. 126/24 dated February 22, 2024). The study complied with the Declaration of Helsinki. All patients had provided written informed consent for treatment and use of anonymized clinical data.

Eligibility required a compatible clinical presentation, suprabasal acantholysis on histopathology, intercellular deposition of immunoglobulin G (IgG) and/or complement component 3 (C3) on direct immunofluorescence, active oral erosions or bullae, ongoing systemic immunosuppression, and at least 4 weeks of documented follow-up [4]. Exclusion criteria were another autoimmune blistering disease, decompensated diabetes mellitus, coagulopathy, active malignancy, reconstructive oral surgery in the affected area during the preceding 6 months, or incomplete records.

Patients were classified by treatment received. The study group ($n=27$) received PRF plus standard systemic and topical therapy; the control group ($n=31$) received standard therapy alone. Allocation reflected historical clinical decisions and was not randomized. Standard treatment included oral prednisolone 0.5–1.0 mg/kg/day with tapering and, when indicated, azathioprine 2–2.5 mg/kg/day, mycophenolate mofetil 2–3 g/day, or rituximab. Supportive care included clobetasol propionate 0.05 % in orabase, chlorhexidine gluconate 0.12 % mouth rinse, and lidocaine gel 2 %.

For A-PRF, 10 mL of venous blood was collected in anticoagulant-free glass tubes and centrifuged at 208 g for 8 minutes. The clot was compressed to a membrane approximately 1 mm thick, applied over the erosion, and

secured with resorbable suture or tissue adhesive. In 11/27 patients (41 %), i-PRF was additionally prepared at 60 g for 3 minutes and infiltrated submucosally at 0.3–0.5 mL per site. Sessions were repeated every 7–10 days; the mean number was 3.5 ± 1.3 (range 2–7). The protocol followed established low-speed preparation principles [8, 15].

Primary outcomes were POLIS, POLAI, pain on a 0–10 visual analogue scale (VAS), and healing time from treatment initiation to complete epithelialization confirmed at two consecutive visits [14, 16]. Secondary outcomes were adverse events and recurrence at a previously healed site within 4 weeks. Antibodies to desmoglein 3 (anti-Dsg3) were recorded when available.

Statistical processing was performed in IBM SPSS Statistics version 28.0. Normality was assessed with the Shapiro–Wilk test. Continuous variables are reported as arithmetic mean (M) and standard error (m), or median and interquartile range (IQR); categorical variables are reported as absolute and relative frequencies. Independent-samples *t* tests or Mann–Whitney *U* tests were used between groups, paired *t* tests or Wilcoxon signed-rank tests within groups, and chi-square or Fisher exact tests for categorical data. Effect size was expressed as Cohen *d* with 95 % confidence interval (CI). Spearman correlation used coefficient rho (ρ). All tests were two-sided; $p < 0.05$ was significant.

Results of the study. The analysis included 58 patients: 27 in the study group and 31 in the control group. Mean age was 51.7 ± 2.5 and 55.8 ± 2.0 years, respectively ($p=0.213$). Women accounted for 63 % (17/27) and 58 % (18/31) of the groups ($p=0.706$). Mean disease duration was 4.3 ± 0.5 and 5.4 ± 0.6 years ($p=0.198$), while median anti-Dsg3 concentration was 161 U/mL (IQR 95–224) and 138 U/mL (IQR 79–198; $p=0.287$). Baseline prednisolone doses were 23.6 ± 1.9 and 27.2 ± 2.1 mg/day ($p=0.218$). Systemic corticosteroids were used by 78 % (21/27) and 77 % (24/31), azathioprine by 30 % (8/27) and 32 % (10/31), mycophenolate mofetil by 19 % (5/27) and 13 % (4/31), and rituximab by 11 % (3/27) and 16 % (5/31). No baseline comparison was statistically significant.

The buccal mucosa was involved in 85 % (23/27) and 77 % (24/31), the hard palate in 67 % (18/27) and 61 % (19/31), and the gingiva in 59 % (16/27) and 48 % (15/31), respectively. The mean number of involved oral sites was 4.1 ± 0.3 versus 3.6 ± 0.2 ($p=0.164$). Changes in the prespecified clinical scores are summarized in Table 1.

Table 1

Between-group comparison of changes in clinical scores

Outcome	Study group change (M $\pm$ m)	Control group change (M $\pm$ m)	Difference [95 % CI]	<i>p</i>	Cohen <i>d</i>
POLIS	-9.4 ± 0.6	-4.3 ± 0.4	5.1 [3.6; 6.6]	<0.001	1.82
POLAI	-8.6 ± 0.5	-3.8 ± 0.4	4.8 [3.5; 6.1]	<0.001	1.95
VAS	-4.8 ± 0.3	-2.6 ± 0.3	2.2 [1.5; 2.9]	<0.001	1.57

All three score changes favored adjuvant PRF. POLIS decreased from 15.8 ± 0.8 to 6.4 ± 0.6 in the study group and from 14.1 ± 0.7 to 9.8 ± 0.6 in controls. This

corresponded to reductions of 59.5 % among 27 patients and 30.5 % among 31 patients. POLAI decreased from 13.1 ± 0.7 to 4.5 ± 0.4 and from 11.6 ± 0.6

to 7.8 ± 0.5 , equivalent to reductions of 65.6 % and 32.8 %. VAS decreased from 7.8 ± 0.3 to 3.0 ± 0.2 and from 7.1 ± 0.3 to 4.5 ± 0.3 , or 61.5 % and 36.6 %. All within-group comparisons yielded $p < 0.001$, while between-group effect sizes were large ($d = 1.57\text{--}1.95$).

Site-specific POLIS analysis showed the largest changes at the buccal mucosa and hard palate. Buccal mucosa scores decreased from 3.6 ± 0.4 to 1.1 ± 0.3 in the study group and from 3.2 ± 0.4 to 2.1 ± 0.3 in controls

(69.4 % versus 34.4 %; $p < 0.001$). Hard palate scores decreased from 3.1 ± 0.4 to 1.0 ± 0.2 and from 2.8 ± 0.3 to 1.9 ± 0.3 (67.7 % versus 32.1 %; $p = 0.002$). Gingival scores decreased from 2.7 ± 0.3 to 1.0 ± 0.2 and from 2.4 ± 0.3 to 1.7 ± 0.3 (63.0 % versus 29.2 %; $p = 0.004$). Differences were smaller for the soft palate ($p = 0.041$) and tongue ($p = 0.067$), where fewer patients had active disease. Healing time, recurrence, and adverse events are summarized in Table 2.

Table 2

Healing time, safety, and secondary outcomes

Outcome	Study group (n=27)	Control group (n=31)	p
Healing time, days, median (IQR)	13 (9–17)	24 (19–30)	<0.001
Healing ≤ 14 days, n (%)	15/27 (56 %)	4/31 (13 %)	<0.001
Complete healing ≤ 21 days, n (%)	24/27 (89 %)	15/31 (48 %)	0.001
Healing > 28 days, n (%)	0/27 (0 %)	7/31 (23 %)	0.012
Recurrence ≤ 4 weeks, n (%)	3/27 (11 %)	9/31 (29 %)	0.092
Mild adverse events, n (%)	5/27 (19 %)	4/31 (13 %)	0.554
Serious adverse events, n (%)	0/27 (0 %)	0/31 (0 %)	Not applicable

Median healing time was 11 days shorter with PRF. Healing within 14 days occurred in 56 % (15/27) versus 13 % (4/31), and complete epithelialization within 21 days in 89 % (24/27) versus 48 % (15/31). The earliest complete epithelialization was recorded on day 6 in a patient with a solitary buccal erosion treated with a membrane and i-PRF. No patient in the study group required more than 28 days, compared with 23 % (7/31) of controls.

Pain relief was evident at the first follow-up. Mean VAS declined from 7.8 ± 0.3 to 4.9 ± 0.3 by day 7 in the study group (change 2.9; $p < 0.001$), compared with 7.1 ± 0.3 to 5.8 ± 0.3 in controls (change 1.3; $p = 0.003$). By day 14, values were 3.4 ± 0.3 and 5.1 ± 0.3 ; final values at complete epithelialization were 3.0 ± 0.2 and 4.5 ± 0.3 . The earlier reduction indicates that the difference was not limited to the final visit.

Within the study group, baseline POLIS correlated strongly with POLAI ($\rho = 0.81$; $p < 0.001$) and moderately with VAS ($\rho = 0.58$; $p = 0.002$). Healing time correlated with baseline POLIS ($\rho = 0.56$; $p = 0.003$) and POLAI ($\rho = 0.47$; $p = 0.014$). In controls, the corresponding coefficients were 0.74 ($p < 0.001$), 0.49 ($p = 0.005$), and 0.38 for healing time and POLIS ($p = 0.034$). Across all 58 patients, greater POLIS reduction correlated with lower post-treatment VAS ($\rho = -0.62$; $p < 0.001$).

Among 11 patients who received i-PRF in addition to the membrane, median healing time was 10 days (IQR 7–14), compared with 15 days (IQR 12–18) among 16 membrane-only patients ($p = 0.028$). POLIS reduction was 10.8 ± 0.8 versus 8.4 ± 0.7 ($p = 0.038$), while the difference in VAS reduction did not reach significance (5.3 ± 0.3 versus 4.5 ± 0.3 ; $p = 0.094$). Patients with at least 5 involved sites had a median healing time of 16 days (IQR 13–19), compared with 10 days (IQR 8–14) in those with fewer sites ($p = 0.018$). No outcome differed by sex or by age above versus below the cohort median (all $p > 0.15$).

Concomitant systemic treatment was also examined. Among study-group patients, those receiving corticosteroids together with a steroid-sparing immunosuppressant had a median healing time of 11 days (IQR 8–14), compared with 15 days (IQR 12–18) among those receiving corticosteroids alone ($p = 0.044$). The corresponding medians in controls were 21 days (IQR 17–26) and 27 days (IQR 22–33; $p = 0.038$). The same direction of association in both groups suggests that systemic disease control contributed independently to epithelialization. Because treatment intensity reflected clinical decisions rather than allocation, these comparisons were considered exploratory and were not used to estimate the primary treatment effect.

Recurrence within 4 weeks occurred in 11 % (3/27) of the study group and 29 % (9/31) of controls; this difference was not statistically significant. All three study-group recurrences were mild and involved the buccal mucosa; two resolved after one additional PRF session and one required adjustment of systemic therapy. In controls, four of nine recurrences required prednisolone escalation and two required addition of azathioprine.

The anatomic pattern of recurrence differed between groups. In the control group, 5/9 recurrences involved the hard palate, 3/9 the buccal mucosa, and 1/9 the gingiva. In the study group, recurrent erosions remained localized to the buccal mucosa and had POLIS values of 5 or lower. The small number of events produced wide uncertainty, so the numerical difference in recurrence cannot be interpreted as evidence of a preventive effect.

No serious adverse events occurred. Mild transient application-site discomfort affected 11 % (3/27) of patients receiving PRF, and localized swelling after injection affected 18 % (2/11) of those receiving i-PRF; all episodes resolved within 48 hours. No PRF-related infection, hemorrhage, allergic reaction, or treatment discontinuation was documented. In controls, oral candidiasis occurred in 6 % (2/31), dysgeusia in 3 % (1/31), and epigastric

discomfort in 3 % (1/31). The overall mild adverse-event rate was 19 % (5/27) versus 13 % (4/31; $p=0.554$).

All application-site symptoms began during the first 24 hours after treatment. Discomfort was described as mild tenderness or a pulling sensation beneath the membrane; swelling occurred only after submucosal injection and resolved without medication within 24–48 hours. No unscheduled membrane removal was required. The two cases of candidiasis in controls resolved after topical antifungal therapy, while dysgeusia and epigastric discomfort did not lead to discontinuation of systemic treatment.

Discussion. Adjuvant PRF was associated with larger improvements in lesion intensity, lesion area, and pain, together with an 11-day reduction in median healing time. The magnitude and early onset of benefit are consistent with controlled studies of injectable PRF in other erosive oral mucosal diseases, where pain and clinical severity improved relative to corticosteroid comparators [1, 3]. Similar signals have been reported in randomized studies and evidence syntheses of erosive oral lichen planus [11, 12]. The present cohort extends that evidence to PV,

a condition in which local repair must occur while systemic autoimmunity is concurrently controlled.

The fibrin network may provide a temporary matrix for cell migration while platelet-derived mediators support angiogenesis, fibroblast proliferation, and re-epithelialization [8, 9]. The shorter healing time in the combined membrane and i-PRF subgroup is biologically plausible because submucosal delivery may distribute the cellular and soluble components beyond the surface defect. However, this subgroup analysis was exploratory and may reflect treatment selection.

The retrospective, non-randomized design, unequal groups, reconstruction of some scores from clinical photographs (inter-rater kappa 0.86), and 4-week recurrence assessment limit causal inference. Systemic regimens were not identical, and residual confounding by baseline disease characteristics remains possible. PRF should therefore be viewed as supportive local therapy and not an alternative to guideline-directed immunosuppression [6, 17]. A prospective randomized trial should standardize systemic therapy and PRF preparation, blind outcome assessment, and follow recurrence for at least 6–12 months.

Conclusions

1. Adjuvant platelet-rich fibrin produced greater reductions in oral lesion intensity (59.5 % versus 30.5 %; $p<0.001$; $d=1.82$) and lesion area (65.6 % versus 32.8 %; $p<0.001$; $d=1.95$) than standard therapy alone.
2. Median healing time was 13 versus 24 days ($p<0.001$), and complete epithelialization within 21 days occurred in 89 % (24/27) versus 48 % (15/31) of patients.
3. Pain decreased by 61.5 % in the study group and 36.6 % in controls ($p<0.001$; $d=1.57$), while no serious adverse events were recorded.
4. These data support prospective evaluation of standardized platelet-rich fibrin protocols as adjunctive local treatment, with longer follow-up required to determine whether the observed recurrence difference is sustained.

References

1. Al-Hallak N, Hamadah O, Mouhamad M, Kujan O. Efficacy of injectable platelet-rich fibrin in the treatment of symptomatic oral lichen planus. *Oral Dis.* 2023;29(5):2256–2264. doi: 10.1111/odi.14261.
2. Al-Maawi S, Becker K, Schwarz F, Sader R, Ghanaati S. Efficacy of platelet-rich fibrin in promoting the healing of extraction sockets: a systematic review. *Int J Implant Dent.* 2021;7(1):117. doi: 10.1186/s40729-021-00393-0.
3. Bennardo F, Liborio F, Barone S, Antonelli A, Buffone C, Fortunato L, et al. Efficacy of platelet-rich fibrin compared with triamcinolone acetonide as injective therapy in the treatment of symptomatic oral lichen planus: a pilot study. *Clin Oral Investig.* 2021;25(6):3747–3755. doi: 10.1007/s00784-020-03702-w.
4. He W, Li K, Hu X, Hua H, Wei P. Direct immunofluorescence analysis of oral Tzanck smears for pemphigus vulgaris: a diagnostic test. *J Oral Pathol Med.* 2021;50(10):1050–1056. doi: 10.1111/jop.13239.
5. Hijazi AH, Al-Hamed FS, Tamimi F, Al-Maweri SA, Hamdan N, Psutka DJ, et al. Regenerative potential of platelet concentrates in chronic oral mucosal lesions. *J Oral Biol Craniofac Res.* 2024;14(2):216–221. doi: 10.1016/j.jobcr.2024.02.007.
6. Joly P, Horvath B, Patsatsi A, Uzun S, Bech R, Beissert S, et al. Updated S2K guidelines on the management of pemphigus vulgaris and foliaceus initiated by the European Academy of Dermatology and Venereology. *J Eur Acad Dermatol Venereol.* 2020;34(9):1900–1913. doi: 10.1111/jdv.16752.
7. Kasperkiewicz M, Ellebrecht CT, Takahashi H, Yamagami J, Zillikens D, Payne AS, et al. Pemphigus. *Nat Rev Dis Primers.* 2017;3:17026. doi: 10.1038/nrdp.2017.26.
8. Miron RJ, Fujioka-Kobayashi M, Hernandez M, Kandam U, Zhang Y, Ghanaati S, et al. Injectable platelet rich fibrin: opportunities in regenerative dentistry. *Clin Oral Investig.* 2017;21(8):2619–2627. doi: 10.1007/s00784-017-2063-9.
9. Miron RJ, Fujioka-Kobayashi M, Bishara M, Zhang Y, Hernandez M, Choukroun J. Platelet-rich fibrin and soft tissue wound healing: a systematic review. *Tissue Eng Part B Rev.* 2017;23(1):83–99. doi: 10.1089/ten.TEB.2016.0233.
10. Ormond M, McParland H, Donaldson ANA, Andiappan M, Cook RJ, Escudier M, et al. An Oral Disease Severity Score validated for use in oral pemphigus vulgaris. *Br J Dermatol.* 2018;179(4):872–881. doi: 10.1111/bjd.16265.
11. Saglam E, Ozsagır ZB, Unver T, Alinca SB, Toprak A, Tunali M. Efficacy of injectable platelet-rich fibrin in erosive oral lichen planus: a split-mouth randomized controlled clinical trial. *J Appl Oral Sci.* 2021;29:e20210180. doi: 10.1590/1678-7757-2021-0180.
12. Samiraninezhad N, Rezazadeh H, Rezazadeh H, Mardaninezhad R, Tabesh A, Rezazadeh F. Platelet-rich fibrin in the management of oral mucosal lesions: a scoping review. *BMC Oral Health.* 2024;24(1):1189. doi: 10.1186/s12903-024-04981-5.
13. Schmidt E, Kasperkiewicz M, Joly P. Pemphigus. *Lancet.* 2019;394(10201):882–894. doi: 10.1016/S0140-6736(19)31778-7.
14. Sindhuja T, De D, Handa S, Goel S, Mahajan R, Kishore K. Pemphigus Oral Lesions Intensity Score: a novel scoring system for assessment of severity of oral lesions in pemphigus vulgaris. *Front Med.* 2020;7:449. doi: 10.3389/fmed.2020.00449.

15. Varela HA, Souza JCM, Nascimento RM, Araújo RF Jr, Vasconcelos RC, Cavalcante RS, et al. Injectable platelet rich fibrin: cell content, morphological, and protein characterization. Clin Oral Investig. 2019;23(3):1309–1318. doi: 10.1007/s00784-018-2555-2.
16. Wang F, Zhang X, Yao Y, Wang J, Shi Y, Liu T, et al. Pemphigus oral lesions area index: a new scoring scale for assessing oral pemphigus vulgaris. Oral Dis. 2025;31(1):160–167. doi: 10.1111/odi.15054.
17. Werth VP, Joly P, Mimouni D, Maverakis E, Caux F, Lehane P, et al. Rituximab versus mycophenolate mofetil in patients with pemphigus vulgaris. N Engl J Med. 2021;384(24):2295–2305. doi: 10.1056/NEJMoa2028564.

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ORCID: Ozhogan Z.R. <https://orcid.org/0000-0003-4220-2658>, Genyk B.L. <https://orcid.org/0000-0002-4177-1413>, Bielinskyi M.V. <https://orcid.org/0000-0001-5013-3838>, Herashchenko A.S. <https://orcid.org/0000-0003-4090-7320>, Nyshchuk-Oliynyk N.B. <https://orcid.org/0000-0002-4338-6121>, Parakhoniak R.L. <https://orcid.org/0000-0002-3230-9331>.

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Orlovskiy I.V., Beliaiev E.V., Vakhovskiy V.V., Kovalchuk L.O., Cherkasova L.A.¹,
Likhitskiy O.O., Plaviuk L.Yu.²

National Pirogov Memorial Medical University, Vinnytsya, Ukraine;

¹Bogomolets National Medical University, Kyiv, Ukraine;

²Ivano-Frankivsk National Medical University, Ivano-Frankivsk, Ukraine

MODELING OF DENTAL ARCH DIMENSIONS IN GIRLS WITH PHYSIOLOGICAL OCCLUSION AND A VERY WIDE FACIAL TYPE DEPENDING ON CEPHALOMETRIC INDICATORS ACCORDING TO THE BURSTONE METHOD AND CT TOOTH DIMENSIONS

e-mail: antilitsoooo@gmail.com

It was established that all 18 possible reliable highly informative regression models of linear dental arch parameters depending on the characteristics of cephalometric indicators according to the Burstone method and CT dimensions of the teeth of the upper and lower jaws were constructed for Ukrainian girls with physiological occlusion and a very wide facial type (coefficient of determination R^2 = from 0.742 to 0.931, $p < 0.001$ in all cases). Analysis of the frequency of inclusion of cephalometric indicators according to the Burstone method and CT tooth dimensions in the regression equations for girls with physiological occlusion and a very wide facial type showed that the models most frequently included cephalometric indicators (28.57 %), crown width in the mesiodistal (22.86 %) and vestibulo-oral (14.29 %) planes. Analysis of the frequency of inclusion of the corresponding teeth in the regression equations for girls with physiological occlusion and a very wide facial type showed that the models most frequently included upper incisors (24.00 %), lower incisors (22.00 %), lower premolars (13.00 %), lower canines and upper premolars (both 11.00 %) and upper canines (10.00 %).

Key words: dentistry, Ukrainian girls with physiological occlusion, facial type, cephalometry according to the Burstone method, CT dimensions of teeth and dental arches, regression analysis.

Орловський І.В., Беляєв Е.В., Ваховський В.В., Ковальчук Л.О., Черкасова Л.А.,
Ліхитський О.О., Плав'юк Л.Ю.

МОДЕЛЮВАННЯ РОЗМІРІВ ЗУБНИХ ДУГ У ДІВЧАТ ІЗ ФІЗІОЛОГІЧНИМ ПРИКУСОМ І ДУЖЕ ШИРОКИМ ТИПОМ ОБЛИЧЧЯ В ЗАЛЕЖНОСТІ ВІД ТЕЛЕРЕНТГЕНОГРАФІЧНИХ ПОКАЗНИКІВ ЗА МЕТОДОМ BURSTONE ТА КТ РОЗМІРІВ ЗУБІВ

Встановлено, що для українських дівчат із фізіологічним прикусом і дуже широким типом обличчя побудовані усі 18 можливих достовірних високоінформативних регресійних моделей лінійних параметрів зубних дуг в залежності від особливостей телерентгенометричних показників за методом Burstone та КТ розмірів зубів верхньої й нижньої щелепи (коефіцієнт детермінації R^2 = від 0,742 до 0,931, $p < 0,001$ в усіх випадках). Проведений аналіз частоти входження до регресійних рівнянь телерентгенометричних показників за методом Burstone та КТ розмірів зубів у дівчат із фізіологічним прикусом і дуже широким типом обличчя показав, що до моделей найбільш часто входять телерентгенометричні показники (28,57 %), ширина коронкової частини зубів у мезіо-дистальній (22,86 %) та вестибуло-оральній (14,29 %) площині. Проведений аналіз частоти входження до регресійних рівнянь відповідних зубів у дівчат із фізіологічним прикусом і дуже широким типом обличчя показав, що до моделей найбільш часто входять верхні різці (24,00 %), нижні різці (22,00 %), нижні премоляри (13,00 %), нижні ікла та верхні премоляри (по 11,00 %) та верхні ікла (10,00 %).

Ключові слова: стоматологія, українські дівчата з фізіологічним прикусом, тип обличчя, телерентгенометрія за методом Burstone, КТ розміри зубів і зубних дуг, регресійний аналіз.

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The title of the publication by the Austrian researcher Fornai C. "Why anthropologists and dentists should work in synergy to improve oral health", is particularly apt. In this work, the author calls for a deeper understanding of the evolutionary causes

underlying orthodontic pathology and for collaboration between anthropologists and dentists in investigating its morphological variations and, through the study of various anthropological aspects, improving the individual health of each population [4].