

Received: 20.11.2023 Accepted: 25.01.2024 Published online: 29.02.2024
UDC 616.314-089(045)

[DOI 10.53511/PHARMKAZ.2024.43.99.047](https://doi.org/10.53511/PHARMKAZ.2024.43.99.047)

M.A. Mugalbayeva¹, U.R. Mirzakulova¹, G.B. Zaitenova², Z.S. Uglanov¹

¹Asfendiyarov Kazakh National Medical University, Almaty, Republic of Kazakhstan

²Kazakh-Russian Medical University, Almaty, Republic of Kazakhstan

ENHANCING OSTEOGENESIS: OSTEOPLASTIC MATERIAL WITH PLASMOGEL AND PLATELET-ENRICHED PLASMA

Resume. This article is a comprehensive exploration of the clinical and radiological findings derived from the utilization of osteoplastic synthetic material, combined with plasma gel and platelet-rich plasma, to facilitate and augment local osteogenesis subsequent to the atypical extraction of the lower third molar. The study, comprising 80 patients, was meticulously divided into two distinct groups: the experimental group and the control group. The strategic utilization of osteoplastic synthetic material in conjunction with plasmogel for bone wound filling, along with the introduction of plasma enriched with platelet factors into the transitional fold of the surgical site, emerged as a pivotal approach. This multifaceted technique not only acted as a robust defense against wound infections but also exhibited a remarkable reduction in the frequency of postoperative inflammatory complications, impressively plummeting from 10% to a mere 2.5%. Radiological assessments, notably through X-ray examinations, provided compelling evidence of an accelerated and substantially reinforced reparative regeneration of bone tissue within the void left by the extracted lower third molar.

The primary and overarching objective of this comprehensive study was to meticulously scrutinize and document the outcomes arising from the meticulous implementation of osteoplastic synthetic material in conjunction with plasmogel and platelet-rich plasma. This innovative approach was systematically applied to catalyze and amplify local osteogenesis, predominantly in the aftermath of the intricate and atypical extraction of the lower third molar, shedding light on the transformative potential of this multifaceted intervention in clinical practice.

Key words: Difficult Eruption, Lower Third Molar, Atypical Tooth Extraction, Osteoplastic Synthetic Material, Plasma Gel, Plasma Enriched with Platelet Factors.

M.A. Мугалбаева¹, У.Р. Мирзакулова¹,
Г.Б. Зайтенова², Ж.Ш. Угланов¹

¹Казахский Национальный медицинский университет
имени С.Д. Асфендиярова, Алматы, Казахстан

²Казахстанско-Российский медицинский
университет, Алматы, Казахстан

**УЛУЧШЕНИЕ ОСТЕОГЕНЕЗА:
ОСТЕОПЛАСТИЧЕСКИЙ МАТЕРИАЛ
С ПЛАЗМОГЕЛЕМ И ПЛАЗМОЙ,
ОБОГАЩЕННОЙ ТРОМБОЦИТАМИ**

Резюме. В данной статье приведены клинические и рентгенологические результаты применения остеопластического синтетического материала в сочетании с плазмогелем и плазмой, обогащённой тромбоцитарными факторами, для улучшения местного остеогенеза после атипичного удаления нижнего третьего моляра. Исследовательская работа проводилась 80 пациентам, которые были разделены на 2 группы: основная и группа сравне-

M. A. Mugalbayeva¹, U. R. Mirzakulova¹,
G. B. Zaitenova², J. S. Uglanov¹

¹С. Д. Асфендияров Атындағы Қазақ Ұлттық
Медицина Университеті, Алматы, Қазақстан

²Қазақстан-Ресей Медициналық
Университеті, Алматы, Қазақстан

**ОСТЕОГЕНЕЗДІ ЖЕТКІЗУ: ОСТЕОПЛАСТИК
МАТЕРИАЛ ПЛАЗМОГЕЛЬМЕН
ЖӘНЕ ТРОМБОЦИТТЕРМЕН КӨБЕЙТІЛГЕН ПЛАЗМА**

Түйін. Бұл мақалада төменгі үшінші азу тістің күрделі жұпынуынан кейінгі остеогенездің жақсаруы үшін остеопластикалық синтетикалық плазмалық гель мен тромбоцитарлық плазмамен біріктіріп қолданудан кейінгі нәтиженің клиникамиқ және рентгенологиялық нәтижелері көрсетілген. Жұмыс негізі және салыстырмалы деп екі топқа бөлінген 80 науқасқа жүргізілді. Негізгі топтағы сүйек жарасын остеопластикалық синтетикалық материалмен және тромбоцитарлы плазмамен толтыру инфекцияның және

ния. Заполнение костной раны в основной группе остеопластическим синтетическим материалом в сочетании с плазмогелем и введением в переходную складку плазмы, обогащенной тромбоцитарными факторами, предотвращало инфицирование раны и сокращало количество воспалительных осложнений в послеоперационном периоде (с 10% до 2,5%), по данным рентгенологического исследования – обеспечивало более раннюю полноценную репаративную регенерацию костной ткани в области лунки удаленного нижнего третьего моляра.

Ключевые слова: затрудненное прорезывание, нижний третий моляр, атипичное удаление зуба, остеопластический синтетический материал, плазмгель, плазма, обогащённая тромбоцитарными факторами.

Introduction

Currently, in surgical dentistry and maxillofacial surgery, the treatment of difficult eruption of the lower third molar remains topical. Difficult eruption of the lower third molars occur in 30% of the contingent of dental surgical patients and is the cause of several inflammatory diseases of the maxillofacial region: periostitis, osteomyelitis, lymphadenitis, abscess, phlegmon, etc. [1, 3, 4].

It is known that the operation of removing the lower third molars can be complex. This process is carried out with the technique of sewing and can last several hours even in the operating room of the maxillofacial department of hospitals. The healing of the socket after an atypical extraction of the lower third molar can be lengthy. In order to optimize the healing of the socket after an atypical extraction of the lower third molar, the bone cavities are filled with lyophilized allograft, biocomposite materials based on hydroxyapatite and p-tricalcium phosphate [1, 5]. However, the number of complications in this case, according to various authors, remains quite high - 23.7-40.6% [4, 5]. In connection with the above, there is a need for further search and selection of materials in order to optimize the healing of the hole.

PRP-therapy is an injection method of local stimulation of regenerative processes in tissues. The task is not just to achieve the removal of the inflammatory process, but to start the process of natural restoration of the color, shape and structure of the soft and bone tissues of the maxillofacial region. The use of platelet-rich plasma (PRP) represents one of the few possibilities today to modulate and improve wound healing and resist infection. The advantage of this method is the plasma with a high content of platelets, which can accelerate the restoration of bone, cartilage and epithelial tissues, since the regeneration process is universal and differs only in duration. Another advantage of this method is the improvement of microcirculation and metabolism, which stimulates local immunity. At the same time, the process of strengthening bone tissue, the formation of collagen and bone matrix with the participation of bone morphogenetic proteins of collagen takes place. The use of autoplasm reduces the possibil-

отадан кейінгі асқынулардың алдын алды 10% дан 2.5% дейін, рентген нәтижесіне сәйкес жойылған тістің толыққанды сүйек тінінің репаративті регенерациясын қамтамасыз етеді.

Түйінді сөздер: қиын тістеу, төменгі үшінші моляр, атипті тіс шығару.

ity of infection and allergic reactions [4, 5, 10].

According to foreign authors, the use of osteoplastic synthetic material in combination with plasma enriched with platelet factors increases local immunity and has a positive effect on bone wound healing, prevents and reduces complications in the postoperative period, since plasma enriched with platelet factors has antibacterial and anti-inflammatory activity, and also helps to reduce pain in the postoperative period [7, 8, 11].

Plasmogel is an autologous filler based on thermally processed blood plasma. Plasma enriched in platelet factors, when heated to 80°C for 4 minutes, folds and forms a plasma gel, which is rich in amino acids, proteins and cell growth factors [3]. Heat treatment takes place in a special apparatus "Thermostat", while the formation of "fibrin glue" rich in cell growth factors, albumin, amino acids occur. The new technology makes it possible to turn blood plasma into a gel without adding any additional ingredients. Plasmogel has high plasticity and modeling or modulating? properties, as well as multifactorial biological effects. The drug is prepared from the patient's own blood and therefore does not cause allergic reactions and rejection. The plasmogel is a scaffold through which new vessels grow [3, 8, 11]. In the available literature, we did not find data on the use of plasmogel in combination with platelet-rich plasma and osteoplastic synthetic material to optimize reparative osteogenesis of a bone wound.

Methods

The operation of atypical tooth extraction was performed on 80 patients who were divided into 2 groups: the main group and the comparison group. The comparison group consisted of 40 people in whom, after the removal of the lower third molar by an atypical method, the healing of the socket of the extracted tooth occurred under a blood clot. The main group - 40 people, in whom, after the operation of atypical removal of the lower third molar, the tooth socket was filled with a composite of plasma gel and osteoplastic synthetic material "Sorbone", and plasma enriched with platelet factors was injected into the region of the transitional fold at the level of the socket of the extracted tooth [5].

Removal of the lower third molar in case of its difficult eruption was performed the next day after hospitalization in the maxillofacial department No. 2 of the 5th City Clinical Hospital in Almaty after a clinical and radiological examination.

The work was performed in compliance with all ethical requirements for biomedical research involving humans. Voluntary informed consent was obtained from each patient for conducting a clinical trial, performing an operation and using plasmogel in combination with Sorbone osteoplastic synthetic material and plasma enriched with platelet factors.

All patients underwent removal of the lower third molar according to the standard technique with cutting out an angled mucoperiosteal flap. The extraction of the tooth was carried out by an atypical method, in some patients the tooth was fragmented, preserving the surrounding bone tissue. In patients of the comparison group, the operation ended with the creation of a blood clot and suturing the wound.

Plasma enriched with platelet factors was obtained immediately after atypical removal. Blood sampling was carried out in a volume of 9 ml using a "butterfly needle" into vacuum tubes. The blood tubes were then placed in a centrifuge and centrifuged for 4 minutes at 3200 rpm. During rotation in a centrifuge, the blood was divided into two fractions - an erythrocyte-leukocyte clot and plasma enriched with platelet factors. With observance of asepsis, autoplasm was taken from the test tube and 0.5-1 ml of plasma was injected along the transitional fold at the level of the socket of the removed lower third molar. Processing of plasma enriched in platelet factors to obtain plasmogel was carried out in a thermal apparatus at a temperature of 80°C for 4 minutes. Plasmogel was mixed on sterile glass with Sorbone bone-plastic material in a ratio of 1 to 3, then the bone cavity was filled with the obtained biocomposite, and sutures were applied to the mucous membrane.

As an osteoplastic synthetic material, we chose Sorbone, a synthetic bone tissue substitute based on 100% beta tricalcium phosphate (South Korea). It is approved for clinical use in the Republic of Kazakhstan dated February 23, 2018 No. 013763. This material is an alternative to cancellous bone due to its chemical and biological characteristics that contribute to the physiological restoration of a bone tissue defect.

X-ray research methods (orthopantomography, 3D computed tomography) were performed before the atypical removal of the lower third molar and 1, 3, 6 months after the removal of the wisdom tooth.

The statistical analysis of the data was conducted using RStudio 2023.03.1 Build 446 (Posit Software, PBC). Charts visualization has been performed with VSCode software (Version: 1.78.20).

Results.

After atypical removal of the third lower molar, all (100%) patients in both groups complained of pain in the area of

the postoperative wound on the 2nd day. In 37 patients (92.5%) of the comparison group, complaints of pain were recorded on the 3rd day of the study, and in the main group - 30 (75%) patients, $p \leq 0.05$. On the 7th day, spontaneous pain was observed in 12 patients (30%) in the comparison group, while in the main group on the 7th day there was no spontaneous pain, the differences in the groups were significant, $p \leq 0.05$. The blood clot in the wound on the first day was adequately formed in all patients of the two groups. At an objective examination: slight hyperemia of the mucous membrane of the alveolar process in the area of the postoperative wound was observed on the 2nd day of observation in 40 (100%) patients of the main group. In 40 (100%) patients of the comparison group, hyperemia of the mucous membrane of the alveolar process in the area of the postoperative wound persisted for 3-4 days. In the main group, slight hyperemia of the mucous membrane of the alveolar process in the area of the postoperative wound was observed on the 3rd day in 34 (85%) patients, which is statistically significant, $p \leq 0.05$. Edema of the mucous membrane of the alveolar process in the area of the socket of the extracted tooth on the 2nd day was observed in 36 (90%) patients in the main group, and in the comparison group - in 40 (100%) patients, and despite the absence of statistically significant differences ($p > 0.05$), this parameter also requires further study on large samples. Already on the 3rd day, edema after surgery in the main group was observed in only 20 patients (50%) compared with the control group - 38 patients (95%), $p \leq 0.05$.

Discussion

Complaints of pain during palpation of the mucous membrane of the alveolar process in the area of the postoperative wound on the 2nd day were presented by 40 patients (100%) of the comparison group, and in the main group - 31 patients, which amounted to (77.5%), $p \leq 0.05$. On the 3rd day in the main group, complaints of pain during palpation of the mucous membrane of the alveolar process in the area of the postoperative wound were observed in 16 patients (40%), which is almost 2 times less ($p \leq 0.05$) than in the comparison group - in 34 patients (85%). By 5-7 days after surgery, there were no complaints of pain during palpation of the mucous membrane of the alveolar process in patients of the main group, and in the comparison group it was noted in 12 (30%) patients, $p \leq 0.05$. In 27 (67.5%) patients of the main group during the observation period, an increase in body temperature and an increase in submandibular lymph nodes were recorded on the 2nd day after atypical removal, which is significantly less than in the control group ($p \leq 0.05$). On the 3rd day, an increase in submandibular lymph nodes in the main group was observed only in 10 (25%) patients, $p \leq 0.05$. In the comparison group, in 40 (100%) patients, an increase in body temperature and an increase in submandibular lymph nodes were recorded on the 2nd day after removal, in 34 (85%) patients on the 3rd day. Restriction of mouth opening in the main group on the 2nd

day after removal was observed in 30 patients (70%), by 3-4 days in 17 (42.5%). In the comparison group, opening restriction was observed in 37 patients (92.5%), by 3-4 days in 29 patients (72.5%), $p \leq 0.05$ (Table 1).

According to the obtained data, there is a statistically significant relationship between some clinical criteria on different days after removal and the use of osteoplastic synthetic material in combination with plasma gel and plasma enriched with platelet factors, $p \leq 0.05$. So, already on the 2nd day, such manifestations has an increase in body temperature and the reaction of regional lymph nodes are relatively strongly dependent on the method used to improve osteogenesis, while there is an increase in this effect on the 3rd day. On the 7th day after the atypical removal of the third lower molar, significant criteria are the absence of spontaneous pain and pain during palpation of the mucous membrane of the alveolar process.

In the comparison group, healing of the bone wound was complicated by alveolitis in 3 patients (7.5%), prolonged healing of the socket was noted in 2 patients (5%), thus, complications amounted to 12.5%, while in patients of the main group of complications (alveolitis) were observed in 1 patient (2.5%).

X-ray assessment of the processes of organization of the socket of the extracted tooth and restoration of bone tissue was carried out on the basis of an analysis of such indicators as the timing of the formation of osteoid structures in the apical part and along the walls of the socket, the rate of formation of large-loop spongy bone, and the timing of resorption of the contours of the alveolar walls. X-ray studies after 1 month showed that in the comparison group (healing under a blood clot), the first signs of the appearance of primary bone structures were observed in the form of osteoid formations of heterogeneous radio-

graphic density in the apical part of the hole and along its side walls. Such a structure filled no more than 1/3 of the volume of the alveoli.

Three months after the operation, in the comparison group, in the projection of the sockets of the extracted teeth, the formation of a large-looped bone structure was noted, which alternated in some areas with a fine-looped bone substance. The boundaries of the alveolus were well defined. In 27 (67.5%) patients, bone tissue reorganization was slow. In 7 (17.5%) patients, there were islands of incomplete bone regeneration among the osteoid tissue, in 5 (12.5%) patients, only separate inclusions with a bone pattern were observed.

On radiographs taken after 6 months in the comparison group, the walls of the alveolar sockets were determined in the form of barely noticeable shadows located between the tissue filling the hole, which has a trabecular structure, and the surrounding bone with an unchanged pattern. Incomplete regeneration was observed in 13 (32.5%) patients, delayed - in 3 (7.5%)

In the main group, where plasma enriched with platelet factors and plasma gel were used in combination with the Sorbone osteoplastic material, the X-ray picture showed the presence of primary bone structures in the wells throughout the volume (osteoid formations with uniform contrast, in some places with a fine mesh network) with alternation of sufficiently mineralized large-mesh networks. After 3 months, in some areas in the projection of the tooth socket, the remains of the biomaterial were observed, gradually being replaced by the emerging plate-type bone tissue with pronounced bone trabeculae. The cortical plate retained the osteon structure. After six to nine months, the formation of a full-fledged regeneration was noted, the boundaries of the bone defect practically merged with

Table 1 - Clinical results of treatment of patients after atypical removal lower third molar

| Criteria | Control Group, n =40 | | | Experimental Group, n = 40 | | |
|--|--------------------------------|--------------------------------|--------------------|----------------------------|---------------|------------|
| | 2 Days | 3 Days | 7 Days | 2 Days | 3 Days | 7 Days |
| Spontaneous pain | 40 -100% $p > 0,05$ | 30 -75% $p \leq 0,05$ | - $p \leq 0,05$ | 40 -100% | 37 -92,50% | 12 -30% |
| Hyperemia of the mucous membrane of the alveolar process | 40 -100% $p > 0,05$ | 34 -40% $p \leq 0,05$ | - | 40 -100% | 40 -100% | - |
| Edema of the mucous membrane of the alveolar process | 36 -90% $p > 0,05$ | 20 -50% $p \leq 0,05$ | - | 40 -100% | 38 -95% | - |
| Pain on palpation of the mucous membrane of the alveolar process | 31 -77,50% $p \leq 0,05$ | 16 -40% $p \leq 0,05$ | - $p \leq 0,05$ | 40 -100% | 34 -85% | 12 -30% |
| Increase in body temperature | 27 -67,50% $p \leq 0,05$ | - $p \leq 0,05$ | - | 40 -100% | 34 -85% | - |
| Reaction of regional lymph nodes | 27 -67,50% $p \leq 0,05$ | 10 -10% $p \leq 0,05$ | - | 40 -100% | 34 -85% | - |
| Restricted mouth opening | 30 -70% $p \leq 0,05$ | 17 -42,50% $p \leq 0,05$ | - | 32 -80% | 29 -72,50% | - |

their own intact bone tissue.

Thus, bone tissue regeneration in the socket area of the lower third molar proceeds at a faster pace in patients of the main group than in patients of the comparison group (Fig. 1, 2).

Thus, filling the bone wound in the main group with osteoplastic synthetic material in combination with plasma gel and the introduction of plasma enriched with platelet factors into the transitional fold prevented infection of the wound and reduced the number of inflammatory complications in the postoperative period (from 10% to 2.5%), according to according to X-ray examination - provided earlier full-fledged reparative regeneration of bone tissue.

Conclusions

In conclusion, the study's findings demonstrate significant disparities between the main and comparison groups in terms of clinical outcomes following atypical extraction of the lower third molar.

On the second day post-operation, pain during palpation of the mucous membrane in the alveolar process was significantly less prevalent in the main group (77.5%) compared to the comparison group (100%). By the third day, this disparity further increased, with only 40% of patients in the main group reporting such pain compared to 85% in the comparison group. Most strikingly, by days 5-7, the main group had entirely alleviated pain complaints, while 30% of the comparison group still experienced discomfort during mucous membrane palpation ($p \leq 0.05$).

Additionally, the main group displayed fewer cases of increased body temperature and submandibular lymph node enlargement compared to the comparison group on both the second- and third-days post-operation. This demonstrates that the innovative approach resulted in significantly fewer postoperative inflammatory complications ($p \leq 0.05$).

Furthermore, mouth opening restrictions were markedly reduced in the main group, with only 42.5% experiencing such limitations by days 3-4, while the comparison group had a significantly higher percentage of patients (72.5%) facing this issue ($p \leq 0.05$).

Radiological assessments unveiled an accelerated reparative regeneration of bone tissue in the main group, with earlier and more robust bone tissue formation within the extraction site. Notably, in the comparison group, complications, such as alveolitis, were observed in 12.5% of cases, whereas in the main group, alveolitis was recorded in only 2.5% of cases.

In summary, the integration of osteoplastic synthetic material, plasma gel, and plasma enriched with platelet factors in the main group not only reduced postoperative pain and complications but also accelerated the reparative regeneration of bone tissue, as demonstrated by both clinical and radiological assessments [12]. These findings underscore the potential benefits of this innovative approach for enhancing postoperative outcomes in atypical extraction of the lower third molar cases.

Source: made by authors

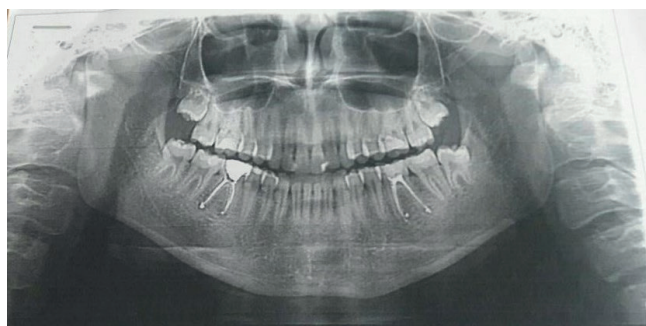


Figure 1 - Orthopantomogram of patient M., 20 years old, before tooth extraction. Difficult eruption of 4.8 teeth. Semi-retention 1.8, 2.8, 3.8 teeth

Source: made by authors

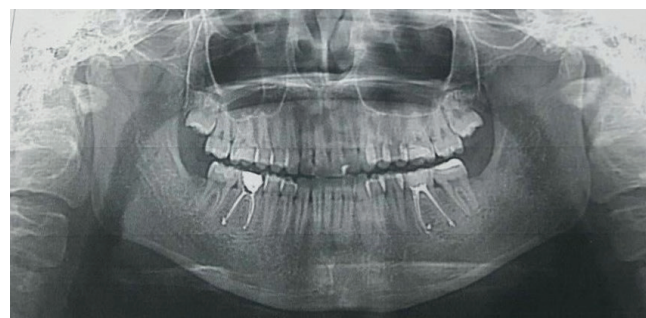


Figure 2 - Orthopantomogram of patient M., 20 years old. After the operation of atypical extraction of 4.8 tooth after 6 months, the main group

Source: made by authors

REFERENCES

- 1 Andreishchev A.R. Complications associated with the lower third molars (Pathogenesis, clinic, treatment). Abstract of the thesis. dis. Candidate of Medical Sciences. 2015;15.
- 2 Andreishchev A. R., Fadeev R. A., Raad Z. et al. New opportunities in the diagnosis and treatment planning of patients with impaired teething. Pediatric Dentistry and Prevention. 2018;(3-4):27-28.
- 3 Afanasyeva VV et al. Surgical dentistry. GEOTAR – Media. 2019; 286-299.
- 4 Azarova E. A. Clinical and experimental substantiation of the use of "Bioplast-Dent", "Klipdent" in the complex treatment of fractures of the jaws and intraosseous formations of the maxillofacial region. Dis., candidate of medical sciences. 2018;161.
- 5 Belozerv M.N. Evaluation of osteoplastic properties of various biocomposite materials for filling jaw defects. Abstract of the thesis. dis. Candidate of Medical Sciences. 2004;22.
- 6 Deliverska E.G., (Deliverska, Elitsa G.); Petkova, M (Petkova, Milena) Complications after extraction of impacted third molars. Literature review. 2020;1202-1211
- 7 Sirak SV, Sletov AA, Alimov ASH et al. Clinico-experimental basis of Kollost usage and bioresorbed membrane Diplen-Gamm and Parodonkol at extraction of impacted and dystopic third mandibular molars. Dentistry. 2008;(2): 10-14.
- 8 Laskin U.B. Usage of bioplastic materials in surgical dentistry at extraction of impacted mandibular wisdom teeth and dystopic teeth. Bulletin of medical stomatology institute. 2008;(1-2):6-10.
- 9 Marx R., Garg AK. Dental and craniofacial applications of platelet-rich plasma. Carol Stream: Quintessence Publishing Co, Inc. 2005;(221):3-4).
- 10 Adda F. Fibrin rich thrombocytes. clinical dentistry. 2003; 1:67-69. Russian (Adda F. Platelets with a high content of fibrin // Clinical Dentistry. 2003. No. 1. P. 67-69).
- 11 Obolenskin VN, Ermolova DA. The use of thrombocytic growth factors and collagen-containing substances in treatment of chronic wounds of various etiology. The Pirogov N.I. 2012;(5):42-47.
- 12 Ivanov PU, Zhuravlev VR, Makeyev OG. The usage of enriched thrombocyte plasma for prophylaxis of jaws atrophy before dental implantation. The Ural Bulletin of academic science. 2011;(1):76-78.

Вклад авторов. Все авторы принимали равносильное участие при написании данной статьи.

Конфликт интересов – не заявлен.

Данный материал не был заявлен ранее, для публикации в других изданиях и не находится на рассмотрении другими издательствами. При проведении данной работы не было финансирования сторонними организациями и медицинскими представительствами. Финансирование – не проводилось.

Авторлардың үлесі. Барлық авторлар осы мақаланы жазуға тең дәрежеде қатысты.

Мүдделер қақтығысы – мәлімделген жоқ.

Бұл материал басқа басылымдарда жариялау үшін бұрын мәлімделмеген және басқа басылымдардың қарауына ұсынылмаған. Осы жұмысты жүргізу кезінде сыртқы ұйымдар мен медициналық өкілдіктердің қаржыландыруы жасалған жоқ. Қаржыландыру жүргізілмеді.

Authors' Contributions. All authors participated equally in the writing of this article.

No conflicts of interest have been declared.

This material has not been previously submitted for publication in other publications and is not under consideration by other publishers. There was no third-party funding or medical representation in the conduct of this work. Funding - no funding was provided.

Information about authors:

- 1) **Madina Amanzholovna Mugalbayeva**, Third year Doctoral Student, MD in Dental Medicine, "Asfendiyarov Kazakh National Medical University", Dentist at Municipal state enterprise with the right of economic management, City Clinical Hospital No. 5. ORCID <https://orcid.org/0000-0002-6331-0538>. E-mail: madina_mugalbaeva@mail.ru. Phone: +77074119891
- 2) **Ulmeken Rakhimovna Mirzakulova**, Doctor of Medical Sciences, Associate Professor of the Department of Surgical Dentistry "Asfendiyarov Kazakh National Medical University". ORCID: <https://orcid.org/0000-0001-7834-3810>. ulmeken@inbox.ru. Моб. тел: +77074119891
- 3) **Gulbaran Baigazinovna Zaitenova**, Head of the Department of Maxillofacial Surgery for Adults and Pediatrics, Kazakh-Russian Medical University. ORCID: <https://orcid.org/0009-0007-5573-4983>. mail: madina_mugalbaeva@mail.ru. Моб. тел: +77074119891.
- 4) **Zharkinbek Shertaevich Uglanov**, Docent of the Department of Surgical Dentistry "Asfendiyarov Kazakh National Medical University". ORCID: <https://orcid.org/0000-0001-8896-4071>. mail: madina_mugalbaeva@mail.ru. Моб. тел: +77074119891.

Сведения об авторах:

- 1) **Мүгалбаева Мадина Аманжоловна** докторант 3-го года обучения КазНМУ им. С.Д. Асфендиярова. ORCID <https://orcid.org/0000-0002-6331-0538>. E-mail: madina_mugalbaeva@mail.ru. Моб. тел: +77074119891
- 2) **Мирзакулова Улмекен Рахимовна** – доктор медицинский наук, профессор кафедры хирургической стоматологии КазНМУ им. С.Д.Асфендиярова. Индекс Хирша Scopus – 2. ORCID: <https://orcid.org/0000-0001-7834-3810>. ulmeken@inbox.ru. Моб. тел: +77074119891
- 3) **Зайтенова Гүлбаран Байгазиевна** - доктор медицинский наук, профессор, заведующая кафедрой челюстно-лицевой хирургии взрослой и детской Казахстана-Российского медицинского университета. ORCID: <https://orcid.org/0009-0007-5573-4983>. E-mail: madina_mugalbaeva@mail.ru Моб. тел: +77074119891
- 5) **Угланов Жаркинбек Шертаевич** – доцент кафедры хирургической стоматологии КазНМУ им. С.Д. Асфендиярова, ORCID: <https://orcid.org/0000-0001-8896-4071>. E-mail: madina_mugalbaeva@mail.ru. Моб. тел: +77074119891

Авторлар туралы ақпарат:

- 1) **Мүгалбаева Мадина Аманжолқызы** D141 Медицина білім беру бағдарламасы бойынша 3-курс докторанты ORCID <https://orcid.org/0000-0002-6331-0538>. E-mail: madina_mugalbaeva@mail.ru
- 2) Ұялы тел: +77074119891
- 3) **Мирзакулова Ұлмекен Рахимовна** – медицина ғылымдарының кандидаты, атындағы ҚазҰМУ хирургиялық стоматология кафедрасының профессоры. Асфендиярова С.Д. Scopus H-индекс – 2. ORCID: <https://orcid.org/0000-0001-7834-3810>. ulmeken@inbox.ru. Ұялы тел: +77074119891
- 4) **Зайтенова Гүлбаран Байгазиевна** – медицина ғылымдарының докторы, профессор. Ересектер мен балаларға арналған жақ-бет хирургиясы кафедрасының меңгерушісі Қазақстан-Ресей медицина университеті. ORCID: <https://orcid.org/0009-0007-5573-4983>. E-mail: madina_mugalbaeva@mail.ru
- 5) Ұялы тел: +77074119891
- 6) **Угланов Жаркинбек Шертаевич** – С.Д. атындағы ҚазҰМУ хирургиялық стоматология кафедрасының доценті. Асфендияров, ORCID: <https://orcid.org/0000-0001-8896-4071>. E-mail: madina_mugalbaeva@mail.ru. Ұялы тел: +77074119891