

**SOME DISCUSSIONS REGARDING THE MACROSTRUCTURE AND
OSTEOINTEGRATION OF THE JAWS DURING DENTAL
IMPLANTATION**

Ismatov Farrukh Aslidinovich

Assistant teacher Department of Oral Surgery and Dental Implantology,
Samarkand State Medical University, Samarkand, Uzbekistan

Umarova Yulduz Asliddinovna

Master's student at Samarkand State Medical University

Abstract. This thesis analyzes the macrostructure and osseointegration characteristics of the jaws during dental implantation. It describes the structure of the dental prosthesis - implant - the surrounding tissue system elements, pathological conditions causing bone atrophy. In addition, the quality of the bone at the implantation site is important for the treatment of dental implants (osseointegration) and the possible dangerous complications were discussed.

Key words: implantation, osseointegration, bone tissue, morphogenesis, osteoporosis, atrophy.

Annotatsiya. Ushbu tezisdagi tish implantatsiyasi paytida jag'larning makro tuzilishi va osseointegratsiya xususiyatlari tahlil qilinadi. Unda tish protezi implant atrofdagi to'qimalar tizimining elementlari strukturasi, suyak atrofiyasi sababi patologik sharoitlar holati tavsiflangan. Bundan tashqari implantatsiya o'rnidagi suyakning sifati tish implantlarini davolash (osseointegratsiya) uchun muhim ekanligi va yuzaga kelish mumkin bo'lgan xavfli asoratlar borasida ham fikrlar yuritilgan.

Kalit so'zlar: implantatsiya, osseointegratsiya, suyak to'qimasi, morfogenez, osteoporoz, atrofiya.

Аннотация. В этом тезисе анализируются макроструктура и особенности остеоинтеграции челюстей во время дентальной имплантации. Описано строение зубного протеза - имплантата - элементы окружающей тканевой системы, патологические состояния, вызывающие атрофию кости. Кроме того, для лечения дентальных имплантатов (остеоинтеграции) важно качество кости в месте имплантации и обсуждались возможные опасные осложнения.

Ключевые слова: имплантат, остеоинтеграция, костная ткань, морфогенез, остеопороз, атрофия.

Currently, dental implantation has become a generally accepted, affordable and effective method of treating various forms of dentition defects. However, an urgent problem in dentistry remains reducing the number of complications and reducing the time of dental rehabilitation of patients. Long treatment times and associated aesthetic and functional disadvantages can be very unpleasant, and sometimes become reasons for refusal orthopedic restoration on implants.

To find ways to solve the problem, it is necessary to have a clear understanding of the process occurring at the dental implant-bone interface, the process of osseointegration, discovered and described in 1969 by the Swedish professor P. I. Branemark. He determined osseointegration as “the apparent direct (immediate) attachment or attachment of living bone tissue to the surface of the implant without penetration layers of connective tissue”.

The elements of the “denture – implant – surrounding tissue” system are: denture, implant, bone tissue and oral mucosa.

Bone atrophy is a process characterized by a decrease in the volume, size and total bone mass of a bone organ. The cause of atrophy is not only pathological conditions, but also the natural processes of aging of the body.

An increase in the rate of atrophy is a pathology caused by exo- or endogenous factors that disrupt the balance between resorption and osteogenesis in the process of structural reorganization of bone. Endogenous factors of accelerated jaw atrophy (up to 0.4 mm per year) can be changes in hormonal levels and metabolic disorders. Exogenous factors include: acute and chronic periodontal diseases, occlusion and functional overload of the periodontium, adentia, irrational prosthetics, the use of

removable dentures [Tallgren A., 2010; Crum R. J., 2011; Atwood D., 2010; Gavrilov E.I., 2012].

Osteoporosis is a decrease in the amount of bone tissue per unit volume of bone by 30^40% relative to normal values. Osteoporosis is more a response of the skeletal system to the influence of various exo- and endogenous factors than an independent disease.

There are two main forms of osteoporosis - systemic and local (regional) [Soroka N.F., 2015; Rozhinskaya L.Ya., 2016].

With systemic osteoporosis, changes are usually observed in the spine, radius and femur. The development of the bone structures of the jaws is predominantly subject to the functional load during chewing, therefore the main cause of osteoporosis is adentia.

Thus, a decrease in mechanical stress in bone tissue causes its atrophy and regional osteoporosis; the increase leads to disruption of the process of physiological bone regeneration, resulting in its resorption.

From a biological point of view, several options for engrafting the implant into the bone are possible. In each case, a different contact layer is formed between its surface and the bone, which can be formed by scar, fibrous, fibroosseous or new bone tissue.

What is new in the morphogenesis of dental implantation is the discovery of the possibility of achieving bone fusion with implants using dense connective tissue or direct connection to the bone. R.-1 was the first to observe this. Vgapeshtagk et al. (2018), T. Alere^BBOP et al. (2014). R.-1. He introduced the concept of “osseointegration” into scientific terminology, which means the structural and functional connection of living bone with the surface of a load-bearing implant.

The stages of bone wound healing after implant placement correspond to the general patterns of osseointegration of the jaw bone during fractures [Vershap I., 2015]. In the final stage (regeneration stage), tissue may form that differs little from the original one, or connective tissue of a more dense structure may form. This process is most pronounced in the bone, where its resorption and reconstruction occur, as a response to the introduction of an implant, and bone recession. During the process of osseointegration, osteoblasts play the main role in the formation of bone tissue. Matrixes rich in phosphate and calcium ions, alkaline phosphatase and phospholipase

enzymes are formed parallel to the surface of the titanium implant. Osteocytes are observed near and directly on the surface of the implant. In addition, in the same zone there are areas of non-mineralized bone. Newly formed bone, as a rule, is not differentiated, but it is gradually reconstructed [Ivanov A.A., 2017; Paltsev M.A., 2018]. At the final stage, mineralization of the newly formed bone tissue occurs.

Prophylactic administration of alendronic acid during preimplantation preparation provides a 1.7-fold reduction in the incidence of postoperative peri-implantitis and unsuccessful outcomes (the incidence of peri-implantitis in the comparison group was 6.7%, and when using “pharmacological support” - 3.9%). Clinical effectiveness, combined with the physiological nature of the influence of alendronic acid on calcium-phosphorus metabolism and bone tissue metabolism, justifies the advisability of its use in the process of pre-implantation preparation for dental implantation.

Unsuccessful implantation outcomes are closely associated with calcium metabolism disorders and are observed in individuals with a total serum calcium level of 2.0 mmol/l and below. alendronic acid provides normalization of calcium levels, which is accompanied by reciprocal changes in the levels of phosphate and parathyroid hormone only in patients with initially reduced calcium levels. alendronic acid does not affect the production of bone matrix (the level of C-terminal propeptides of procollagen type I), but, regardless of the initial calcium content in the body, it enhances the production of osteocalcin, which indicates an intensification of bone mineralization.

The issue of completing osseointegration is complex; precise and specific criteria have not yet been developed. Of course, the quality of the bone at the implantation site is very important for the healing (osseointegration) of dental implants. Osseointegration is directly dependent on adequate bone tissue metabolism, and the possibility of its pharmacological support can improve this process and reduce the risk of possible complications.

Literature:

- 1 Girina, M.B. Features of studying tissue perfusion with high-frequency ultrasound Doppler / M.B. Girina // Materials of the scientific-practical conference: “Methods for studying microcirculation in the clinic” - St. Petersburg, 2001. - P. 9-21.

- 2 Grudyanov, A.I. Periodontology. Selected lectures / A.I. Grudyanov. - M.: OJSC "Dentistry", 1997 - 32 p.
- 3 Шодиев, С. С., Исмаатов, Ф. А., Нарзиева, Д. Б., Тухтамишев, Н. О., & Ахмедов, Б. С. (2019). Эффективность применения отвара аниса при лечении периимплантитов. *Достижения науки и образования*, (11 (52)), 99-103.
- 4 Исмаатов, Ф. А., Мустафоев, А. А., & Фуркатов, Ш. Ф. (2023). АНАЛИЗ ЭФФЕКТИВНОСТИ НЕСТЕРОИДНЫХ АНТИВОСПОЛИТЕЛЬНЫХ ПРЕПАРАТОВ ПРИ ИЗЛЕЧЕНЬЕ ВЕРХНЕЧЕЛЮСТНОГО АЛЬВЕОЛИТА. *THEORY AND ANALYTICAL ASPECTS OF RECENT RESEARCH*, 1(12), 49-57.
- 5 Исмаатов, Ф. А., Шодиев, С. С., & Мусурманов, Ф. И. (2020). Анализ изучения стоматологического и общего здоровья студентов вузов города самарканда. *Биомедицина ва амалиёт журнали*, (6), 34-39.
- 6 Хасанова, Л. Э., & Исмаатов, Ф. А. (2020). Комплексная социально-гигиеническая характеристика условий, образа жизни и здоровья студентов. преимущества обследования студенческой молодежи. *Проблемы биологии и медицины*, 1, 286-293.
- 7 Ismatov, F. A. (2022). Abdullaev TZ METHODS OF APPLICATION OF SINGLE-STAGE DENTAL IMPLANTS FOR DIFFERENT DEGREES OF ALVEOLAR ATROPHY. *Web of Scientist: International Scientific Research Journal*, 3(8), 636-643.
- 8 Aslidinovich, I. F., & Abdurasulovich, M. A. (2022). STRUCTURE OF SINGLE-STAGE DENTAL IMPLANTS FOR VARYING DEGREES OF ALVEOLAR ATROPHY. *World Bulletin of Public Health*, 10, 156-159.
- 9 Ismatov, F. A. (2020). Comparative tender characteristics of student dental Health indexes. *ACADEMICIA: An International Multidisciplinary Research*, (10), 11.
- 10 Ismatov, F. A. (2023). EVALUATION OF THE EFFICACY OF ALENDRONIC ACID IN DENTAL IMPLANTATION (literature review). *American Journal of Pediatric Medicine and Health Sciences* (2993-2149), 1(7), 199-202.
- 11 Aslidinovich, I. F. (2023). Assessment of the Effectiveness of Alendronic Acid in Dental Implants. *Central Asian Journal of Medical and Natural Science*, 4(3), 1186-1188.

**“CONFERENCE OF NATURAL AND APPLIED SCIENCES IN SCIENTIFIC
INNOVATIVE RESEARCH”**

Issue 4. April 2024

- 12 Khasanova, L. E., & Ismatov, F. A. (2022). INDICATORS OF ORAL HEALTH AT STUDENTS OF THE CITY OF SAMARKAND. *Applied Information Aspects of Medicine (Prikladnye informacionnye aspekty mediciny)*, 25(4), 13-19.
- 13 Ismatov, F. A., & Mustafojev, A. A. (2022). DRUG TREATMENT WITH NON-STEROIDAL ANTI-INFLAMMATORY DRUGS JAW ALVEOLITIS. *Frontline Medical Sciences and Pharmaceutical Journal*, 2(03), 88-94.
- 14 Хасанов, Х. Ш., Исматов, Ф. А., & Мардонова, Н. П. (2022). Применение "prf" в качестве остеопластического материала при одонтогенных кистах челюстных костей. *Вестник магистратуры*, (2-1 (125)), 13-14.
- 15 Хасанова, Л., & Исматов, Ф. (2021). Результаты комплексного стоматологического обследования у студентов высших учебных заведений. *Медицина и инновации*, 1(1), 108-112.
- 16 Ismatov, F. A., & Emilievna, K. L. (2020). Criteria For Evaluating Student Dental Health Index In Accordance With The «8020» Program Methodology. *The American Journal of Medical Sciences and Pharmaceutical Research*, 2(11), 99-105.
- 17 Zafarovich, A. T., & Aslidinovich, I. F. (2022). Use of Single-Stage Dental Implants for Varying Degrees of Alveolar Atrophy. *Central Asian Journal of Medical and Natural Science*, 3(3), 782-786.
- 18 Ibragimov, D. D., Ismatov, F. A., & Narzikulov, F. A. (2022). Results of Complex Treatment with Eludril Antiseptic Solution. *Central Asian Journal of Medical and Natural Science*, 3(3), 689-690.
- 19 Ismatov, F. A., kizi Mardonova, N. P., & Hasanov, K. S. (2022). Morphological experiments to improve the effectiveness of postoperative rehabilitation of cysts in maxillary bones with "prf" osteoplastic material. *World Bulletin of Social Sciences*, 7, 32-34.
- 20 Ismatov, F., Ibragimov, D., Gaffarov, U., Iskhakova, Z., Valieva, F., & Kuchkorov, F. (2021). ASSESSMENT OF RISK FACTORS INFLUENCING DENTAL HEALTH IN HIGHER EDUCATION STUDENTS. *InterConf*, 721-732.
- 21 Ismatov, F. A., & Mustafojev, A. A. (2022). EVALUATION OF THE EFFECTIVENESS OF NON-STEROIDAL ANTI-INFLAMMATORY DRUGS IN THE TREATMENT OF MAXILLARY ALVEOLITIS. *The American Journal of Medical Sciences and Pharmaceutical Research*, 4(03), 29-34.

- 22 Гаффаров, У. Б., Шодиев, С. С., & Исматов, Ф. А. (2018). ВЛИЯНИЕ ПРЕПАРАТА «ХОЛИСАЛ ГЕЛЬ» НА ПОСЛЕОПЕРАЦИОННОЕ ТЕЧЕНИЕ У ПАЦИЕНТОВ ПОСЛЕ УДАЛЕНИЯ РЕТИНИРОВАННЫХ ТРЕТЬИХ МОЛЯРОВ. *ББК 56.6 С 56 СОВРЕМЕННЫЕ ДОСТИЖЕНИЯ СТОМАТОЛОГИИ: сборник*, 37.
- 23 Ismatov, A. F. FORMATION OF SOCIO-CULTURAL COMPETENCE OF FUTURE FOREIGN LANGUAGE TEACHERS DURING THE EDUCATIONAL PROCESS OF HIGHER EDUCATION.
- 24 Ismatov, A. F. THE USE OF INTERACTIVE TECHNOLOGIES IN TEACHING ENGLISH TO PART-TIME STUDENTS.
- 25 Хасанова, Л. Э., Исматов, Ф. А., Ибрагимов, Д. Д., & Гаффаров, У. Б. ОЛИЙ ТАЪЛИМ МУАССАСАЛАРИ ТАЛАБАЛАРИНИНГ СТОМАТОЛОГИК ҲОЛАТИНИНГ ЎЗИГА ХОС ХУСУСИЯТЛАРИ. *МЕЖДИСЦИПЛИНАРНЫЙ ПОДХОД ПО ЗАБОЛЕВАНИЯМ ОРГАНОВ ГОЛОВЫ И ШЕИ*, 182.

Research Science and
Innovation House