



## TO THE QUESTION OF PREPARATION OF PATIENTS WITH OSTEOPOROSIS DURING THE PREMENOPAUSE WHEN PLANNING DENTAL IMPLANTATION

**Barno Zh. Pulatova**

*Associate Professor of the Department of Maxillofacial Surgery, TGSI*

*Tashkent, index 100090, Yunusabad massif 8th quarter, house 32, apartment 27*

*E-mail: [wonderland8540@gmail.com](mailto:wonderland8540@gmail.com)*

**Nodira G. Achilova**

*Assistant of the Department of Otolaryngology and Dentistry, TMA*

*Tashkent city, index 100100, Yakkasaroy district Toshbulok 27A building*

*E-mail: [achilovanodira16@gmail.com](mailto:achilovanodira16@gmail.com)*

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### ABOUT ARTICLE

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**Key words:** implants, osteoporosis, computed tomography, computer modeling, implant bed, menopause.

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**Abstract:** The article describes materials on the literature review on the preparation of patients with osteoporosis in the climacteric period when planning implantation. The clinical significance of osteoporosis in menopause lies in the leaching of calcium from the bone into the blood, which makes it possible to minimize the negative influence of the human factor, the high percentage of patients of older age groups, especially women, for the elimination of defects in the dentition with the help of dental implants makes this problem particularly urgent. , since the asymptomatic, inexpressive course of osteoporosis can be the reasons for the development of complications during the treatment with the use of intraosseous implants.

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**KLIMAKS DAVRIDAGI OSTEPOROZLI AYOLLARNI TISHLAR  
IMPLANTASIYASIGA TAYYORLASH SAVOLLARI*****Barno J. Po'latova****yuz-jag jarrohligi kafedrasi dotsenti,****Nodira G. Ochilova****Otolaringologiya va stomatologiya kafedrasi assistenti*

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**MAQOLA HAQIDA**

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**Kalit so'zlar:** implantlar, osteoporoz, kompyuter tomografiyasi, kompyuterni modellashtirish, implantatsiya to'shagi, menopauza.

**Annotatsiya:** Maqolada implantatsiyani rejalashtirishda klimakterik davrda osteoporozli bemorlarni tayyorlash bo'yicha adabiyotlarni o'rganish bo'yicha materiallar tasvirlangan. Menopauzadagi osteoporozning klinik ahamiyati kaltsiyning suyakdan qonga singib ketishidan iborat bo'lib, bu inson omilining salbiy ta'sirini kamaytirishga imkon beradi, keksa yoshdagi bemorlarning, ayniqsa ayollarning yuqori foizini yo'q qilish uchun. Tish implantlari yordamida tish tarkibidagi nuqsonlarning mavjudligi bu muammoni ayniqsa dolzarb qiladi. , chunki osteoporozning asemptomatik, noaniq kursi intraosseous implantlarni qo'llash bilan davolash paytida asoratlarning rivojlanishiga sabab bo'lishi mumkin.

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## К ВОПРОСУ ПОДГОТОВКИ БОЛЬНЫХ С ОСТЕОПОРОЗОМ В ПЕРИОД ПРЕДМЕНОПАУЗЫ ПРИ ПЛАНИРОВАНИИ ДЕНТАЛЬНОЙ ИМПЛАНТАЦИИ

**Барно Ж. Пулатова**

доцент кафедры челюстно-лицевой хирургии,

**Нодира Г. Ачилова**

ассистент кафедры отоларингологии и стоматологии

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### О СТАТЬЕ

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**Ключевые слова:** имплантаты, остеопороз, компьютерная томография, компьютерное моделирование, имплантационное ложе, менопауза.

**Аннотация:** В статье описаны материалы по литературному обзору о подготовке больных с остеопорозом в климактерическом периоде при планировании имплантации. Клиническая значимость остеопороза в климактерическом периоде заключается в вымывании кальция из кости в кровь, позволяющей свести к минимуму негативное влияние человеческого фактора, высокий процент обращений пациентов старших возрастных групп, особенно женщин, за устранением дефектов зубного ряда с помощью дентальных имплантатов позволяет считать эту проблему особенно актуальной, поскольку бессимптомное, невыразительное течение остеопороза может являться причинами развития осложнений в процессе лечения с применением внутрикостных имплантатов.

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### INTRODUCTION

Osteoporosis is a systemic disease of the skeleton, characterized by a decrease in bone mass per unit volume and a violation of the microarchitectonics of bone tissue, leading to an increase in bone fragility and a high risk of fractures. Osteoporosis is one of the most common metabolic diseases of the skeleton, the frequency of which increases with age. In Europe, among young women, a decrease in bone mineral density was found in 16% and osteoporosis in 0.6%, and at the age of 75 years, a decrease in bone mineral density was found in 94%, and osteoporosis was found in 38% of women ([Toy VE, Uslu MO, 2020](#)). In the United States, 30% of postmenopausal white women have osteoporosis and 54% have osteopenia in the hip, spine, and forearm ([Temmerman A, Rasmusson L, Kübler A, Thor A, Quirynen M, 2017](#)). NHANES 3 studies show that 10,103,000 Americans (8,021,000 women and 2,082,000 men) currently have osteoporosis, and 18,557,000 (5,434,000 women and 3,123,000 men) have low bone mineral density ([Temmerman A, Rasmusson L, Kübler A, 2019](#)). In Russia, according to the data

obtained in the study of the population of Moscow over 50 years old, the incidence of osteoporosis in women was 28%, and osteopenia 50% ([Tariq, Sundus, 2021](#)).

A debatable issue until now is the possibility of dental implantation in patients with osteoporosis. At the same time

**Purpose of the study:** according to the literature data of domestic and foreign scientists, to consider the possibility of carrying out implantation treatment of patients with osteoporosis during the premenopausal period when planning dental implantation.

**Materials and research methods.** For research, we used domestic and foreign literature of the last 10 years.

### THE MAIN RESULTS AND FINDINGS

The problem of osteoporosis in the countries of the world. It is generally accepted that the disease is the cause of 90% of all fractures of the hip and vertebrae in the elderly ([Taga, Tomoharu, 2021](#)), especially for fractures that have arisen spontaneously or from minor trauma. Osteoporosis is considered a disease in countries with a high standard of living, where the highest incidence of osteoporotic fractures is currently recorded. Nevertheless, there is a tendency towards a widespread increase in their number, including in developing countries. So, if in the world in 1990 there were 1.7 million hip fractures, then by 2050 (according to the forecast of mathematical modeling) the number of fractures may increase to 6.3 million, and 75% of them are expected in Asia, Africa and South Africa. America ([Rukmini JN; Sachan R, 2018](#)). Over the past four decades, in countries with socially oriented economies, considerable attention has been paid to the problem of osteoporosis (OS). This is due both to an increase in the life expectancy of the population (the disease is most often detected in the middle and older age groups), and in connection with the rather wide, long-term use of hormonal drugs for a number of diseases that contribute to the onset of OS. The result of OS, which occurs in every 3-4th woman over 45 years old, is increased fragility of bones. Most often, fractures of the bodies of the thoracic and lumbar vertebrae, wrist and femoral neck are observed. Only 25% of patients with hip fractures are completely cured, 50% remain disabled, and in 25% of cases the outcome is fatal. The US health care system costs such patients at least 10-15 billion dollars annually (Bochkova O.P., 1997; Benevolenskaya L.I., 1998; Ershova O.B., Belova K.Yu., 2009; Ametov A S., Doskina E.V., 2011; Skripnikova I.A., Yavisya A.M., 2011; Lesnyak O.M., Toroptseva N.V., 2014; Lesnyak O.M., 2016). Osteoporosis is a skeletal disease characterized by a decrease in bone strength and an increased risk of fractures (Rigz B.L., Melton L.J., 2000; Lesnyak O.M., Benevolenskaya L.I., 2009; Lesnyak O.M. , 2016). In Russia, 14 million people are sick with OS, that the composition 10% of the population, at the same time, 20 million have been diagnosed with osteopenia (15%) (site <http>). Population studies conducted by employees of the

Research Institute of Rheumatology of the Russian Academy of Medical Sciences demonstrate that 33.8% of women and 26.9% of men over 50 suffer from OS (Ametov A.S., Doskina E.V., 2011).

The statistics of the development of complications of OS is depressing. Within 60 seconds, 7 vertebral fractures occur in the world and every 5 minutes - 5 hip fractures (Mikhailov E.E., Mylov N.M., 2003; Shvarts G.Ya., 2008; Ametov A.S., Doskin E V., 2011; Skripnikova I.A., Yavisya A.M., 2011; Courlay ML et al., 2016). In Russia, these problems have already acquired social significance, but for economic reasons, Russian doctors are still taking only the first steps in this direction. Currently, the main attention in our country is given to postmenopausal OS, about which a number of conferences and meetings have been held (Bochkova O.P. 1997; Benevolenskaya L.I., 1998; Blagosklonnaya Ya.V. et al., 2010; Malichenko S. B. et al., 2012; Batudaeva T.I., Spasova T.E., 2015; Zakharov I.G., 2016; Zakharov I.G. et al., 2016). Clinical manifestations of the disease in older women are most often expressed by pain, which increases with exertion, in the lumbar and thoracic spine, in the joints; deformation of the figure (stoop, decreased growth), a feeling of heaviness between the shoulder blades, back fatigue, increased fatigue, gait disturbance, lameness; the development of the phenomena of periodontal disease. this world. The consequences of osteoporosis in the form of fractures of the vertebral bodies and peripheral bones cause a significant increase in morbidity, disability and mortality among the elderly, which causes large material costs in the field of health care.

Deterioration of the quality of life Osteoporosis creates serious medical and social problems and not only significantly worsens the quality of life of these patients, but in some cases also leads to mortality. Consequently, the urgency of the problem is due not only to the medical, but also to the social factor. The urgency of this problem is enhanced by the fact that osteoporosis in elderly patients with RA is a multifactorial phenomenon. On the one hand, these are menopause and dyshormonal disorders, on the other hand, this is the disease itself (RA), the effects of drugs and a number of other factors. The analysis of the literature showed that there are works on the study of the BMD of patients with RA, carried out both in Russia and abroad. However, the study of the frequency of bone fractures in combination with the study of BMD in RA patients, including the elderly, was carried out in single studies only by foreign authors [Spector et al.]. In this regard, it presents! It is important to study the frequency of osteoporotic bone fractures in comparison with BMD data in RA, which began in old age, in a domestic study. Purpose Changes in the demographic situation around the world and in RUSSIA, characterized by an increase in the number of older people, bring menopausal disorders to a number of priority medical problems. Menopause can be viewed as a genetically programmed phenomenon that includes certain stages of structural and functional changes. The extinction of

ovarian function affects all organs and systems of the body without exception. Physiological aging is associated with a decrease in the ability of tissues to recover, a decrease in their elasticity, increased fatty infiltration, cell atrophy, degeneration of nerve endings, a decrease in smooth muscle tone, a decrease in the number of collagen fibers in the connective tissue of the ligamentous apparatus (Smetnik V.P., 2006; Vikhlyaeva E M., 2008; Schneider P., Naftolin F., 2005). With age, the state of health deteriorates, and the need for medical care increases. 25 million women go through the menopause every year, and by 2030 this figure will increase to 1.2 billion. It is believed that 1/3 of women aged 55-60 years have symptoms of urogenital atrophy, and by the age of 75 already 2/3 of women experience urogenital discomfort (Balan V.E. et al., 2006). Urogenital disorders are replaced by violations of the lipid spectrum of the blood, a decrease in bone mineral density. Osteoporosis is not a single painful condition, but is the result of one or several pathogenetic mechanisms, including the extinction of ovarian activity, impaired calcium metabolism, and changes in the production of hormones that regulate bone metabolism. A third of a woman's life falls on postmenopause, at this time there is a decrease in the adaptive capabilities of the body (Manukhin I.B., 2006).

Development of an algorithm for diagnostics and prevention. The presence of a high social significance of an increase in the morbidity and mortality of women after the shutdown of ovarian function served as the basis for the development of an algorithm for early diagnosis and prevention of menopausal disorders in women with natural menopause. CS) in 35-80% of women (Vikhlyaeva E.M., 2000; Kulakov V.I., 2005). According to the forecasts of the World Health Organization, with an increase in life expectancy by 2015, about a third of a woman's life will be postmenopausal. Therefore, it is important to study the physiological and pathological processes in a woman's body during the transition from reproductive age to old age and ensuring health, and, consequently, the quality of life, professional and social activities of women of this age. In postmenopausal women, the incidence of coronary heart disease increases 3 times, stroke 7 times (Eakeg ED, 2003), and the incidence of postmenopausal osteoporosis is 85% of all cases of primary osteoporosis (Volozhin A.I., Oganov BC, 2005; Nasoiyov E. L., 2006).

Treatment of climacteric syndrome In this regard, one of the components of the modern strategy for the treatment of CS is the effective correction of early climacteric disorders (neuro-vegetative and psycho-emotional) that developed in the first years after menopause, and at the same time, the earliest possible correction of metabolic disorders leading to late complications of menopause - osteoporosis and atherosclerosis (Smetnik V.P., 2006). To date, significant advances have been made in the correction of the knee joint using hormone replacement therapy (HRT). Numerous studies have shown that the use of HRT reduces

Risk factors. In recent years, OS occurs at a young age, due to the presence of risk factors. These include genetic and anthropometric characteristics (women of fragile physique are more susceptible to this disease, representatives of the white race are more likely to get sick); the nature of the diet (calcium deficiency in food); decreased physical activity; menstrual irregularities; early onset of menopause; excessive consumption of coffee, alcohol; bad habits (smoking), endocrine diseases (thyrotoxicosis, hyperparathyroidism), prolonged use of glucocorticoids, environmental factors, etc. (Rozhinskaya L.Ya., 2005; Nasonova V.A., Nasonov E.L., 2003; Blagosklonnaya Ya.V. et al., 2010; Dzadzua D. et al., 2011; Malichenko S.B. et al. 2012; Lesnyak O.M., 2016; Bishop N. et al., 2008; IOF, 2011; Schacht E., Ringe JD, 2011; Helke A. et al., 2016).

The multifactorial nature of the disease is expressed in the presence, in addition to postmenopausal, other forms of OS: primary (juvenile), idiopathic and age-related (senile), as well as secondary, associated with the pathology of the endocrine glands, gastrointestinal tract, bone marrow, etc. (Marova E.I., 1998; Mazurov V.I. et al., 1998; Nasonov E.L., 1999, 2003; Benevolenskaya L.I., 2003; Lesnyak O.M., Benevolenskaya L.I., 2009; Blagosklonnaya Ya.V. et al., 2010; Lesnyak O.M., 2016; Courlay ML et al., 2016). Correct early diagnosis is the key to success in the treatment and rehabilitation of this large group of patients. A complete reparative regeneration process is the main factor affecting the mechanical integrity of the implant-bone junction. D. Buser (2000) suggested that the rough (rough) surface of the implant is one of the important factors affecting the success of implantation. As you know, all methods of transforming the surface of dental implants are aimed mainly at increasing the adhesion area of the implant to the bone, i.e. to increase the degree of roughness. But roughness is far from the only parameter of the surface of dental implants that affects the success of osseointegration. It reflects only the physics of the surface of dental implants, but surface chemistry also plays an important role in the early stages of reparative osteogenesis, so some implants contain bioactive ions on their surface that stimulate osteogenesis. Most often, tricalcium phosphate, hydroxyapatite and tetracalcium phosphate act as bioactive coatings. It is known that an important condition at the first stages of osseointegration is the deposition of a blood clot on the surface of the intraosseous part of the implant. The clot contains - fibrin, transforming growth factor, vascular growth factors, insulin-like growth factor, etc. These factors stimulate bone healing, activate angiogenesis and the formation of collagen matrix. In the literature, there are a large number of reports on increased adhesion of protein substances to the surface of dental implants with a biocoating in the form of calcium phosphate materials. Osteoporosis is a systemic disease of the skeleton, accompanied by a decrease in bone mass and a violation of the microarchitectonics of bone tissue, leading to an increase in bone fragility and the risk of

fractures (Consensus Development Conference: Diagnosis, prophylaxis, and treatment of osteoporosis, 1993). The current increase in life expectancy and the associated increase in the number of older people, especially women, leads to an increase in the incidence of osteoporosis, making it one of the most important health problems in the world. The severity of vasomotor and depressive disorders, reduces the risk of osteoporosis, coronary heart disease, atrophic vaginitis, degenerative processes in the urethra and bladder (Belousov Yu.B., 2003; Grady D., 2006; Pinkerton SV, 2009; Taylor HS, 2011). However, along with these facts about the effectiveness of HRT, information appeared about the possible risks associated with its use, including the development of breast and uterine cancer, with long-term use - endometrial cancer and thromboembolism (Greiser S.M., 2005; Keeling DM, Hinds L., 2010; Ohira T., 2010; Toh S., 2010). In European countries, the fear of an increase in the frequency of estrogen-dependent cancers is the main reason for refusing HRT (Smetnik V.P., 2001). In this regard, the use of herbal preparations and selective estrogen modulators is recognized as promising for the correction of CS (Smetnik V.P., 2001). It has been established that these agents are capable of providing positive therapeutic and prophylactic effects without the risk of developing cancer in the reproductive organs and with minimal adverse reactions (Ovsyannikova T.V., 2004). Despite the increased attention of specialists in the field of menopause to the use of phytoestrogens and phytohormones, their effectiveness in relieving certain symptoms of CS and the mechanisms of influence on metabolic changes in bone tissue, atherogenic factors and endothelial function in women with CS have been insufficiently studied (Smetnik V.P., 2006; Balan V.E., 2008; Geller SE, 2006; Boger F., 2010; Kelley KW, 2010).

**Dental implantation for bone atrophy.** In recent years, dental implantation has become the most popular method for treating complete or partial missing teeth. Prosthetics on dental implants is the method of choice in the rehabilitation of patients with defects in the dentition, allowing to resolve issues of a professional, social, psychological, physiological, aesthetic nature (Badalyan V.A., 2014; Avanesyan R.A. et al., 2015; Bayrikov A. I., 2016; Guskov A.V. et al., 2017). Basic dental implantation techniques are designed for standard anatomical conditions in which there is sufficient height and thickness of the alveolar ridge for the implant to be installed. However, in about 30% of cases, due to unfavorable anatomical conditions, basic, standard techniques are used only in certain modifications (Polupan P.V., 2014; Yamurkova N.F., 2015; Govorun N.V., 2016; Kulakov A.A., 2017; Strelnikov E.V., 2018; Martegani P. et al., 2014; Khojasteh A., 2016). Installation of intraosseous rod-type implants of optimal length and diameter turns out to be impossible due to a deficiency of bone tissue caused by jaw atrophy after tooth loss (Saakyan Sh.Kh., 2014; Gulyuk A.G., 2015; Kalamkarov A.E., 2015; Kuritsyn A.V., 2015; Moskvina G.V. et al., 2017; Buser D. et al., 2013; Sakkas A. et al., 2016). The



availability of these technologies to the general population remains low, including due to the high cost. At the same time, dental implants allow not only to restore lost teeth and chewing function, but also are one of the most effective means of preventing bone tissue atrophy (Karayan A.S., 2011; Ivanov S.Yu., 2000, 2016; Yamurkova N.F. 2015). From the point of view of biomechanics, the maxillofacial region has a very complex anatomical and functional structure. Projecting these issues and trends in the development of modern science directly onto the problems of dental prosthetics based on dental implants, it becomes obvious that a gradual change in a purely formal approach aimed at restoring the shape of lost teeth should be carried out with new methods that take into account the individual qualitative and quantitative indicators of the patient's bone tissue., design features of the dental implants themselves and orthopedic structures. However, operations to reconstruct the alveolar ridge and alveolar part do not always fully solve the problem of installing full-size implants. (Vasiliev A.V., 2014; Losev F.F., 2015; Yaremenko A.I., 2015; Bakotina A.V., 2016; Lee EY et al., 2014; Taschieri S. et al., 2018) ... Some researchers believe that it is necessary to avoid the use of additional surgical interventions and minimize invasive manipulations regarding an increase in bone volume (Trunin D.A. et al., 2008; Tarasenko S.V., 2015; Cortese D., 2017; Parshin Yu. V. et al., 2017; Cullum DR, 2015).

To summarize, we can deduce several rules that will allow safe and high-quality dental implant restoration in women at different periods of life. In case of adentia, it is recommended to choose implantation methods, in which implants are installed in deeper parts of the bone tissue (they are less susceptible to atrophy and inflammation), and the process of their implantation itself is less traumatic. Assessment of the initial state of the bone tissue is important not only for the placement of implants in accordance with the chosen treatment plan, but also for the prognosis. analysis of the results of their osseointegration (Becker W. et al., 2000; Chuang S. et al., 2002). For a long time, systemic connective tissue diseases were a contraindication to implantation (Ivanov S.Yu. et al., 2003), although it is believed that osseointegrated contact between the surface of an unloaded implant and the surrounding bone tissue is also possible in osteoporosis (Soroka I.F., 1999). However, the effectiveness of implantation in such cases is questioned (Langer V. et al., 1993), since with a decrease in bone mineral density and a change in its metabolism, an increase in destruction processes often occurs, which leads to pathological bone remodeling (Baxter J., Fattore L., 1993.).

## CONCLUSION

1. Implantation is not carried out with hormonal changes in the body: during pregnancy, menstruation, as well as for a certain time before and after these periods,

2. Women are recommended to have implants with a smooth surface (completely or in the cervical region) and antimicrobial coating, which will reduce the risk of plaque accumulation.

3. The best choice is implants with a hydrophilic surface and a layer of minerals such as phosphorus, calcium or fluoride. Such constructions are distinguished by better engraftment, especially in osteoporosis (important for patients with menopause).

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