

THE INFLUENCE OF PREGNANCY ON THE PROCESSES OF OSSEOINTEGRATION OF JAW BONES WITH INSTALLED DENTAL IMPLANTS.

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Annotation. Pregnancy is a period of significant physiological changes in a woman's body that can affect many aspects of her health, including her oral health. Dental implants have become a widely used and effective technique in dentistry for restoring lost teeth and restoring oral functionality. However, the effect of pregnancy on osseointegration of the jaw bones after dental implant placement remains a subject of study and debate. This article discusses the effect of pregnancy on the healing of a dental implant and on the processes of osseointegration of the jaw bones.

Keywords: dental implantation, pregnancy, osseointegration.

Introduction: Pregnant women have one of the highest risks of dental disease. The main oral diseases that women face are periodontitis and caries. These problems arise due to very specific reasons [4.10]. Pregnancy is always a change in hormonal levels, which results in a change in blood circulation in the skin and mucous membranes. For the skin, this means the appearance of stretch marks and exacerbation of acne, for mucous membranes - a deterioration in blood supply. This in turn contributes to the exacerbation or occurrence of periodontitis. This happens so often that, according to statistics, most pregnant women suffer from gingivitis of varying severity. Pregnancy is always accompanied by changes in calcium metabolism. Normally, in a healthy woman, these changes occur unnoticed. If there are any problems in the body, the lack of calcium immediately makes itself felt.[10.11].

Physiological changes during pregnancy

Pregnancy initiates a cascade of physiological adaptations aimed at supporting fetal development and maternal well-being. These changes extend to the oral cavity, where pregnant women may experience:

- **Gum changes:** Hormonal fluctuations, especially increased levels of estrogen and progesterone, can lead to increased gingival vascularization and swelling. This can manifest as gum inflammation, bleeding and discomfort, a condition commonly referred to as pregnancy gingivitis.
- **Increased susceptibility to caries:** Pregnancy is associated with changes in diet, food cravings and changes in oral hygiene habits, all of which can contribute to an increased risk of tooth decay. Moreover, frequent snacking and vomiting,

common during pregnancy, expose teeth to acidic substances that contribute to erosion and destruction of enamel.

- **Periodontal issues:** Pregnant women may be predisposed to periodontal disease, which is characterized by inflammation and infection of the gums and supporting structures of the teeth. Hormonal changes and immune modulation during pregnancy can aggravate existing periodontal disease or predispose a person to new onset of periodontal disease.[4.5.10.11]

Hormonal fluctuations and bone metabolism

The hormonal environment of pregnancy has a profound effect on bone metabolism, which is of particular importance for dental implantation. Estrogen and progesterone, the main hormones of pregnancy, play key roles in bone remodeling and homeostasis. However, their influence on bone physiology is complex and multifaceted:

Estrogen: Estrogen is known to promote bone formation and inhibit bone resorption, promoting overall bone health. However, during pregnancy, estrogen levels fluctuate significantly, peaking in the second and third trimesters. These fluctuations can influence bone turnover and remodeling processes, potentially affecting the osseointegration of dental implants.

Progesterone: Progesterone, another hormone whose levels increase during pregnancy, is involved in bone metabolism through its effect on the activity of osteoblasts and osteoclasts. Although progesterone may have anabolic effects on bone formation, its role in modulating bone resorption remains less clear. However, fluctuations in progesterone during pregnancy may contribute to changes in bone density and composition, affecting the stability and longevity of dental implants.[1.5.10]

Dental implants are commonly used to replace missing teeth. The main causes of tooth decay are gum inflammation, poor root canal conditions, infections, etc. Replacing missing teeth with a long-standing dental implant is a sophisticated alternative, one of the most promising treatments for broken teeth. Dental implants can be made from various types of materials such as ceramic, shell, cobalt chromium, gold, copper, titanium and iridioplatinum.[3.12]

All implantology is based on the phenomenon of osseointegration - the ability of living tissue to fuse with the implant. This is a unique manifestation of a physiological process inherent in all forms of life - regeneration. In general, the healing of an implant is no different from the healing of a wound after a cut or the healing of bones as a result of a fracture. The main condition for rapid regeneration is the absence of agents that irritate the immune system. [6.7.8.13]

Purpose of the study: To analyze the effect of pregnancy on the processes of osseointegration of the jaw bones after the installation of dental implants.

Material and methods: Modern scientific literature on the effect of pregnancy on the osseointegration of the jaw bones after the installation of dental implants. The search was carried out in Pubmed, e-library, cyberleninka and other systems using the keywords: dental implantation, pregnancy, osseointegration. In total, 78 works published on the research topic in Russian and English between 2012 and 2023 were critically analyzed.

Results: Analysis of modern literature made it possible to highlight the influence of pregnancy on the processes of engraftment of dental implants with surrounding tissues, changes in the processes of osseointegration during pregnancy.

Pregnancy entails a number of physiological changes affecting calcium metabolism - an increase in the volume of extracellular fluid, an increase in the rate of glomerular filtration, and the transfer of calcium from mother to fetus. Because of this, calcium decreases in the maternal body and its level is maintained within the narrow limits necessary to maintain homeostasis [1.4.5]. Studies have shown that calcium levels decrease progressively throughout pregnancy, remaining low in the early postpartum period and gradually returning to its level in the first trimester by the 6th week after birth. During pregnancy, the importance of the mother's regulatory mechanisms is emphasized by the presence of significant changes in the accumulation, metabolism, and absorption of calcium. The most obvious changes are associated with the peak of mineralization of the fetal skeleton, since the fetus acquires about 80% of calcium during the third trimester of pregnancy [1.5.11]. As you know, pregnancy is a natural physiological process that should not have a negative effect on the body. But, unfortunately, due to various reasons, the condition of the teeth during this period still worsens. Nausea, vomiting, changes in food habits and deterioration of appetite lead to a lack of calcium necessary for the fetus, and the unborn baby begins to obtain it to the detriment of the health of his own mother's teeth [4.5.10].

Early toxicosis, accompanied by vomiting, constant nausea and lack of appetite, leads to a decrease in calcium intake into the body. At 6-7 months of pregnancy, intensive calcification of the skeleton of the unborn child begins. A lack of calcium in the mother's blood leads to an activation of the process of resorption of her own bones. And the first to suffer from this process are the upper and lower jaws. The alveolar ridges that create the socket for the tooth lose calcium, which ultimately contributes to periodontitis. During pregnancy, many chronic diseases become aggravated: gastritis, duodenitis, enteritis, colitis - all this can lead to impaired absorption of calcium, which in turn also leads to a decrease in its level in the body [1.5.9].

Changes in hormonal levels, restructuring of all types of metabolism, including calcium, a decrease in the body's defenses, changes in the function of the salivary glands - these factors that accompany any pregnancy are also risk factors for the development of dental diseases. There are two reasons for dental problems that appear

during pregnancy: firstly, hormonal changes in the body, and secondly, the gestation process itself, which requires the mother to give back in the form of essential microelements (for example, calcium). Hence the development of diseases such as gingivitis (inflammation of the gums) and caries [1.10.11]. In addition, during pregnancy there is a decrease in the remineralizing ability of saliva; this means that the concentration of calcium and phosphates in saliva decreases, which means that the ability of saliva to quickly bring the acid-base balance in the oral cavity to normal decreases [4.5.9].

It has been established that for the successful functioning of a dental implant, the regeneration processes in the bone tissue must be completed. The most favorable outcome of regeneration is contact osteogenesis, in which the processes of osteoconduction, the formation of young bone tissue and its structural restructuring occur successively. This is called osseointegration [3.8.13].

Osseointegration is the process of forming a stable and durable connection between the surface of the implant and the surrounding bone tissue. This process is key to successful implant integration and long-term functionality. Osseointegration ensures stable attachment of the implant, which allows it to withstand mechanical loads comparable to natural teeth [2.6.7].

For successful osseointegration it is necessary achieving primary stability of the dental implant. The quality and volume of bone tissue, implant geometry and surgical protocol can significantly affect the success of dental implantation. [6.8.13]. Initial stability cannot be considered as osseointegration, since osseointegration is the result of osteoconduction of the implant system. Initial (primary) mechanical stability is determined by the mechanical locking between the bone and the implant, without biological interaction. It depends on the implant geometry and topography, as well as osteotomy protocols, which control the stress applied to the bone tissue in the immediate vicinity of the implant [2.3.7].

During pregnancy, significant hormonal changes occur that can affect the body's response to implantation and the process of osseointegration. For example, levels of progesterone, the main pregnancy hormone, may be significantly elevated. Elevated progesterone levels may contribute to inflammatory processes such as gingivitis and periodontitis, which may have a negative impact on implant osseointegration [2.3.6]. Also, changes in the immune system during pregnancy may affect the body's response to implanted materials. Physical changes such as weight gain, changes in posture and pressure on bone tissue can also affect the osseointegration of implants [5.8.12].

Conclusion: It must be taken into account that data on the effect of pregnancy on osseointegration of implants is limited and requires further research. However, before undergoing an implant procedure during pregnancy, it is important to discuss all possible risks and recommendations with your dentist or surgeon. This will help you

make an informed decision, taking into account the individual characteristics of each woman and her overall health. Maintaining good oral hygiene and regular dental visits can also help reduce the risk of complications and ensure successful healing after dental implants.

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