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BASIC CONCEPTS OF FACIAL BONE DEFECTS AND MODERN APPROACHES TO THEIR RECONSTRUCTION

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Abstract: Facial bone defects are a complex and pressing problem in the medical field. These defects are often the result of trauma, surgery, congenital defects, or illnesses. Facial bone defects not only negatively affect appearance, but can also damage vital functions such as breathing, digestion, and speech. For this reason, effective restoration of facial bone defects is of great importance in medicine and plays an important role in improving the quality of life of patients.

Keywords: facial bones, modern technologies, medicine, diseases, patient, donor, immunity, biomaterials.

Modern approaches to restoring facial bone defects include many innovative technologies and materials. Traditional methods include autologous bone transplantation, the use of the patient's own bone tissue, which is widely used. The main advantage of this method is the high level of biological compatibility and the low risk of immunological rejection. However, the process of obtaining bone from the

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donor site in this way can cause additional injuries and pain, and the limited amount of bone limits the chances of recovery in some cases. In recent years, biomaterials and biotechnology have been of great importance in restoring facial bone defects. Synthetic biomaterials, including biofaolized ceramics, bioactive glass, and polymers, are widely used as substitutes for bone tissue and as promoters of regeneration. These materials have a high mechanical strength, slowly dissolving in the biological environment and supporting the formation of new bone tissue. At the same time, they make it possible to reduce the risk of infection and simplify surgical procedures.[1]

Advances in the areas of cell therapy and regenerative medicine are also important in the recovery of facial bone defects. New bone tissue is formed at the defect site by transplantation of mesenchymal stromal cells, osteoblasts, and other bone-forming cells. These approaches accelerate bone regeneration and improve the quality of recovery. More effective results can be achieved when cell therapy is used in conjunction with biomaterials. 3D printing technologies provide new opportunities in restoring facial bone defects. With this technology, individual implants can be made that are tailored to the patient's specific anatomical characteristics. 3D printed implants have high precision and flexibility, simplifying surgery and speeding up the recovery process. In addition, this technology is used in conjunction with biomaterials, allowing the creation of biologically active implants. Biological activating factors, such as growth factors and cytokines, are widely used in the recovery of facial bone defects. These substances stimulate the regeneration of bone tissue and promote the growth of new cells. By integrating growth factors into biomaterials, the recovery process can be improved in efficiency. This method supports the natural recovery mechanisms of bone tissue and helps to close defects faster. Surgical techniques are also constantly improving when restoring facial bone defects. Minimally invasive surgical procedures, laser therapy, and microscopic surgery increase the safety of the recovery process and reduce the patient's recovery time. Modern surgical methods provide an accurate diagnosis of the defect site and an individual approach, which guarantees a high quality of recovery results.[2]

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A multidisciplinary approach is important in restoring facial bone defects. Surgeons, biologists, material scientists and engineers work together to develop the most appropriate and effective treatments for the patient. This approach allows you to create an individual treatment plan, taking into account the complex nature of defects. Also, when restoring facial bone defects, the general health and individual characteristics of the patient are taken into account. Treatment methods are selected depending on the age of the patient, medical history and other factors. This increases the success of the recovery process and prevents complications. Another important aspect of modern approaches to restoring facial bone defects is long — term monitoring and rehabilitation. In the period after recovery, the patient's condition is regularly monitored, if necessary, additional treatment measures can be applied. The rehabilitation process ensures not only the restoration of bone tissue, but also the restoration of the functional and aesthetic appearance of the patient.[3]

As a result, modern approaches to restoring facial bone defects include biomaterials, cell therapy, 3D printing, biological activating factors, and advanced surgical techniques in combination with traditional methods. These approaches provide patients with access to high-quality, safe, and effective treatment. In the future, more innovative technologies and methods are expected to appear in this area, which opens up new opportunities for the restoration of facial bone defects. At the same time, scientific research and clinical experiments continue to be carried out in the restoration of facial bone defects. The effectiveness and safety of new biomaterials and cell therapy methods are constantly being evaluated. This provides quality growth and development in the area of facial bone defects restoration. Facial bone defects are considered not only as a medical, but also as a psychological problem. Aesthetic and functional restoration is essential to improve patients ' self-confidence, social activity and quality of life. Therefore, modern approaches are aimed not only at anatomical restoration, but also at improving the overall quality of life of the patient.[4]

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3D printing technology has brought revolutionary changes in the medical field in recent years, particularly in facial bone restoration. Compared to traditional surgical methods, this technology offers many advantages for patients and radically improves the quality of surgery. The facial bone restoration process is a complex and delicate surgical procedure, in which it is very important to create clear and suitable implants. In traditional methods, implants are often standard sizes and may not fully match the individual anatomical characteristics of the patient. This increases the complexity of the recovery process and negatively affects the quality of recovery. 3D printing technology, on the other hand, allows individual customized implants to be created based on the patient's exact anatomical data. This process begins with the processing of Computed Tomography or magnetic resonance tomography data using 3D modeling programs. As a result, a clear and detailed 3D model of the patient's facial bones is created, which ensures perfect implant alignment. One of the biggest advantages of 3D printing in facial bone recovery is accuracy. Facial bones have complex geometric shapes that can be difficult to recover by traditional methods. 3D printing, on the other hand, allows for complex shapes in high resolution. This provides the surgeon with great comfort in implanting the implant and allows the patient to regain his natural appearance. Also, 3D printed implants are better integrated with the patient's bone tissue, which speeds up the recovery process and ensures long-term stability.

Another important aspect of technology is the choice of materials. Various biomaterials can be used in 3D printing, including biofaolized ceramics, bioactive polymers, and metals. These materials support the growth of bone tissue and increase the biological flexibility of the implant. Also, some materials are rich in biologically active substances that stimulate bone regeneration. This helps the recovery process to be more efficient and fast. The speed and efficiency of the process also increases the importance of 3D printing technology in facial bone recovery. Traditional implant preparation is time-consuming and resource-intensive, extending waiting times for patients and increasing the overall cost of surgery. 3D printing, on the other hand, allows fast and accurate implant preparation, which increases the effectiveness of

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surgery and reduces costs. Also, 3D models made for surgeons allow pre-surgical planning and training, which reduces the risk of surgery and improves the result. 3D printing technology also makes it possible to perform minimally invasive surgical procedures in facial bone recovery. Due to the precise and perfect adaptation of implants, it will be possible for surgeons to restore bone defects directly and with minimal incisions. This reduces the patient's recovery period, reduces the risk of pain and complications, and improves overall health status. In the future, the role of 3D printing technology in facial bone restoration is expected to increase further. Due to developments in biomaterials and bioprinting, 3D Printed Implants not only act as mechanical support, but are also rich in biologically active substances, stimulating the natural regeneration of bone tissue. In addition, 3D bioprinting technologies used in conjunction with cell therapy and genetic treatments will trigger a new era in facial bone recovery.[5]

Conclusion:

In conclusion, the restoration of facial bone defects is one of the most complex and promising areas of modern medicine. When innovative technologies, biomaterials, cell therapy and advanced surgical techniques are used together, high-quality and effective treatment is provided for patients. Advances in this area set new standards and approaches to restoring facial bone defects in the future.

References:

1. Akhmedov, S. (2021). "Surgical restoration of facial bones: modern methods and technologies". Journal of medical science, 12(3), 45-58.

2. Karimova, L. (2020). "The role of 3D printing technology in the treatment of facial bone defects". Publications of the Academy of Medicine of Uzbekistan, Tashkent.

3. Rustamov, D. (2022). "Restoration of facial bone defects by biomaterials". Innovations in medicine and biology, 8(1), 23-34.

ISSN 2181-3187

4. Islamov, M. (2019). "New approaches to surgical restoration of facial bone defects". Doctor of Medical Sciences dissertation, Tashkent.

5. Tursunov, B. (2023). "The possibilities of bioprinting technology in bone defect recovery". Issues of modern medicine, 5 (2), 12-25.

6. Kadyrova, N. (2021). "Minimally invasive surgical techniques in the treatment of facial bone defects". Medicine and Health, 14(4), 67-79.

7. Sobirov, A. (2020). "Computer modeling and 3D implants in facial bone restoration". Journal of Uzbek medicine, 10(3), 38-50.

8. Mirzaeva, F. (2022). "Biologically activated materials in the restoration of facial bone defects". Biomedicine and innovation, 7(1), 55-68.