

	<h2 style="color: blue;">The Principles of Post-Operative Management and Rehabilitation of Patients Using the Single-Stage Implant Method</h2>
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ABSTRACT	<p>Defects of the dentition (especially without preservation of the antagonists) lead to changes in the facial configuration, lower third height, deformation of the dentition, pathology of the temporomandibular joint (TMJ) and development of myofascial pain syndrome (prosopalgia), which aggravates the primary pathology. Occasionally, significant defects of the dentition are accompanied by habitual subluxation or dislocation of the temporomandibular joint. The absence even of single teeth leads to instability of the whole dentition, their displacement (Popov-Godon phenomenon), overloading of the periodontium of the remaining teeth, disturbance of the biomechanics of the whole dentoalveolar system and the occurrence of traumatic occlusal blocks. This results first in gingivitis, followed by bone destruction and the development of pathological pockets.</p>
<p>Keywords:</p>	<p>radiography, odontometry, height of bone, dental defects</p>

Introduction. Disturbances of mastication function are most pronounced in lateral defects of the teeth. After loss or extraction of teeth local atrophy of the jaw regions occurs, with the loss of more than two teeth extended atrophy gradually develops and is progressive over time. This clinical picture can be characterised by symptoms of sunken lips and cheeks, or even changes in the facial configuration. Often, these patients will seek dental care if there are clear aesthetic concerns, with the aesthetics of the smile being the primary concern. However, even a small included defect in the dentition, which does not significantly impair chewing function, leads to continuity problems and the formation of asymmetric chewing with the prospect of TMJ dysfunction. The loss of teeth without dentures not only leads to a deterioration in mastication, but also in speech. Phonetic disturbances can even occur in the absence of a single frontal

tooth on the upper jaw and/or lower jaw. The special features of this pathology are the absence of pain syndrome and the absence of a sanogenetic mechanism (inability to repair the defect naturally by itself). Diction disorders also affect the social and communicative activity of the person. Together with changes in appearance due to the loss of teeth and the developing atrophy of the masticatory muscles, changes in the psycho-emotional state can occur, up to and including psychiatric and psychosomatic illness. The function and condition of the oral cavity is closely related to other systems of the human body, and tooth loss is one of the most common pathological conditions and not only affects the function of mastication and the entire jaw system. Missing teeth impair a vital function in chewing, which affects digestive processes and causes other diseases. The dental, periodontal and oral mucosa health has been linked to the condition

of other parts of the gastrointestinal tract as well as other body systems (motor system, cardiovascular, endocrine), higher nervous activity, infectious diseases, cancer, sleep quality, obesity and the state of general defences. Oral health is seen by scientists as a useful marker of overall health and healthy ageing. When teeth are missing, the structural, functional and aesthetic equilibrium of the maxillofacial region and many body systems is disrupted, leading to social consequences and a reduced quality of life for the individual. Thus, the high clinical prevalence, practical relevance and insufficient scientific study of the problem of treatment and rehabilitation of patients with missing teeth were the scientific and theoretical prerequisite for the implementation of our chosen research.

Objective of the study: To improve the effectiveness and quality of treatment of patients with dental defects and varying degrees of atrophy of the alveolar processes using a one-stage technique of dental implantation and one-stage dental implants.

Materials and methods of study: Patients were divided into 3 groups depending on the degree of atrophy and the types of dental implants and surgical treatment protocols used. The first group consisted of patients in whom a single-stage surgical protocol of dental implant surgery and monolithic dental implants were used. These patients had dental defects of varying lengths and sufficient bone volume. There were 20 patients in this group. The second group consisted of patients with dentition defects in whom a one-stage surgical protocol of dental implant surgery and one-piece dental implants were used. In these patients, varying degrees of atrophy of the alveolar processes of the jaws were detected. The group consisted of 20 patients. This group included a subgroup of 5 patients in whom we used our proposed minimally invasive method of dental implant placement and our patented new dental implant design. These dental implants were demountable, but were placed by us according to a single-step protocol, simultaneously with gingiva shapers and/or abutments and timely crowns. The third

(control) group consisted of patients with dental defects in whom the traditional two-stage surgical protocol of dental implant surgery and collapsible dental implants were used. These patients had dentition defects of varying lengths and varying degrees of bone atrophy in the alveolar processes of the jaws. There were also 20 patients in this group. In total, 103 dental implants were placed in these 60 patients aged from 18 to 59 years: 24 in position of lower jaw premolars; 16 in position of upper jaw premolars; 27 in position of lower jaw molars; 16 in position of upper jaw molars; 12 in position of upper jaw frontal teeth group; 8 in position of lower jaw frontal teeth group. During the dental implant surgery, we used a surgical physiodispenser, surgical handpiece and original surgical implant system sets. We proposed a minimally traumatic one-stage dental implant surgery. This technique was used in an additional subgroup of 5 patients.

At the third stage of the study, a comparative analysis of the effectiveness of treatment of patients using different surgical techniques of dental implantation was carried out. We carried out a comprehensive study of 103 dental implants installed in the previous stage of the study. We performed the study in the same 60 patients operated on earlier with application of different methods of dental implantation for comparative estimation of treatment results with application of different methods of surgical protocol of implant treatment with application of monolithic and collapsible dental implants in patients with defects of dental rows and different volumes of dental tissue. Out of 274 dental implants placed according to the one-stage protocol, 179 (65, 33%) were placed, out of them, 160 were monolithic (indestructible), which was 89, 38% of the number of the implants placed in a single-stage manner. Using the two-stage technique, in cases of bone grafting operation in case of significant atrophy of the alveolar ridges and more multi-stage techniques, 95 dental implants (34, 67%) were placed, all of them being demountable. Thus, non-dismountable (monolithic, single-stage) dental implants accounted for 58.40% and dismountable implants accounted for 41.60%

of the total number of implants placed. It should be noted that the non-dismountable (monolithic) dental implants demonstrated a lower survival rate compared to the demountable implants placed according to the two-step protocol (92.94% and 95.86%, respectively), however, these differences were not statistically significant ($p>0.05$). Of particular importance is the fact that approximately half of the lost implants were loose single-support prosthesis retainers for anchoring removable dentures in bone of insufficient volume and quality. A comparison of the one-stage and two-stage surgical protocols for dental implants also showed no statistically significant differences in implant survival rates and were as follows: 93.6% for the one-stage and 95.1% for the two-stage surgical protocols. The final survival rate of the placed and analysed dental implants was 94.16% in the retrospective group of patients. Although survival rates differed between the groups, overall, a comparable survival rate was demonstrated for both dental implant designs (92.94% and 95.86%) and no statistically significant differences were detected between the one-stage and two-stage implant protocols. The results of a study showing the survival rate of non-dismountable (monolithic) implants used to support fixed prostheses show their superiority over fixed demountable implants over the period from 2018 to 2021. This can be explained by the more frequent use of temporaries in the placement protocol and functional ligation (splinting) of non-dismountable dental implants, which leads to improved survival due to a more even distribution of functional loads.

Examining the long-term results of dental implantation in patients up to 10 years after the surgery, 93,6% of one-stage implants retained their ability to function (their clinical consistency corresponded to 3-5 according to the five-point scale). The main cause of disintegration was

Developed inflammation around the implant (peri-implantitis), possibly due to inappropriate prosthetics and/or improper distribution of the masticatory load. It is worth mentioning that very rarely, implant mobility

was also observed without symptoms of inflammation, which can be attributed to non-axial osseointegration, i.e., fibrointegration. The condition of the jawbone was assessed mainly by means of orthopantomograms available at the time of surgical treatment, which unfortunately did not always provide complete and reliable information on the bone structure and density. Complications developed when the available anatomical conditions were optimistically overestimated, contraindications were not identified at the preoperative stage or the masticatory loads during prosthetics were unevenly distributed, due to lack of experience and insufficiently thorough examination of the patient. When assessing patient satisfaction with the treatment performed, the following was revealed: the highest satisfaction was observed in patients with fixed prosthesis designs, with implants placed according to a single-stage surgical protocol showing a slightly higher satisfaction score compared to two-stage placement of collapsible dental implants (mean score 4.40 versus 4.14 on a five-point scale). However, no statistically significant differences were found between the surgical protocols and types of prosthesis designs ($p>0.05$). When assessing patient satisfaction with the treatment performed, the following was found: the highest satisfaction was observed in patients with fixed prosthesis designs, with the established. The one-stage surgical protocol showed a slightly higher satisfaction score compared to the two-stage demountable dental implants (mean score of 4.40 versus 4.14 on a five-point scale) (Table 13). In this regard, we can conclude that shortening the treatment period, abandoning multistage and osteoplastic surgery during the surgical phase of treatment by using a single-stage surgical protocol of dental implantation and non-dismountable dental implants leads to increased patient satisfaction with the treatment performed without significant differences or with advantages in the clinical soundness of the dental implants and orthopaedic constructions installed.

The algorithm for choosing the optimal implant design and surgical technique of their installation in patients with maxillary alveolar

atrophy has not been yet completely worked out, and patient satisfaction with successful treatment is very often insufficient.

Conclusion: The obtained retrospective data allows us to consider the one-stage surgical protocol of dental implant surgery and non-dismountable implants as an objective, self-sufficient method of

The data obtained in retrospect allow us to consider a single-stage surgical protocol for dental implantation in patients with varying degrees of atrophy of the alveolar process.