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COMPLETE REMOVABLE PROSTHESIS SUPPORTED BY IMPLANTS

Chakkanov Faxritdin Xusanovich
Samarkand State Medical University, Uzbekistan

ABOUT ARTICLE

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Abstract: The absence of teeth is currently an urgent problem for all mankind. Dentism accounts for 15% of all pathologies of the dental system [1]; 40% of patients over 60 years old are toothless [2]. The most common is the loss of chewing teeth, mainly the first molars. 8.55% of teeth are missing in the anterior dentition, 63.19% in the lateral dentition. Dentition defects, including tooth loss, account for 71.74% of all tooth losses, with terminal defects accounting for 28.26% [3]. Currently, implantation therapy is actively used in the rehabilitation of partially and completely toothless patients. This is due to the fact that prostheses based on implants allow the most complete restoration of masticatory efficiency, lingual function and high aesthetics of the bone system of the alveolar process in comparison with other types of orthopedic treatment. In addition, it is obvious that patients adapt to prostheses faster [3-7]. In this regard, partial and complete removable plate prostheses are currently recognized as a kind of sign of dental incompetence [8-11]. Nevertheless, the problem of choosing the most rational design of the implant abutment remains unresolved: in the mid-1990s, a revolutionary CAMlog system was developed based on the IMZ system, combining all the experience accumulated over the past decades. Standardized universal parts included in this system have greatly simplified the production of restorations based on implants [14].

INTRODUCTION

CAMlog implants In the last decade, it has been recognized that most commercially available implants are osteointegrated, which has shifted the focus from functional durability issues to potential complications associated with overload of prostheses and components of the implant system [6, 15-19]. Prosthetics is the final stage after the implant is installed. Therefore, in particularly difficult clinical situations, the prosthetist has to compensate for the disadvantages of an implantation operation that is not entirely successful. Problems may arise at the surgical stage if the implant head cannot be installed in the planned position. In such cases, the reasonable construction of a prosthesis on an implant becomes difficult. Therefore, an orthopedic surgeon should not only perform prosthetics and subsequent orthodontic procedures, but also, if possible, participate in treatment planning together with a surgeon [14, 15]. During prosthetics, it is necessary to take into account the requirements for the implantation procedure itself, as well as the real technical competence of the dental laboratory [12-15]. Today prosthetics based on implants is based on the same basic principles as prosthetics based on natural teeth [14, 15]. The first concerns the choice of the most suitable prosthesis design that best meets the clinical situation, the requirements for the accuracy of fixation and the physiological concept of occlusion. At the same time, prosthetics on implants has many features. A study of the literature shows that each implant design corresponds to a specific denture, its manufacturing technology and method of fixation [1, 15, 20, 21, 22]. First of all, it is necessary to determine the method of fixing external structures: the implant must be connected to the prosthesis by bonding [1, 15, 20, 21, 22]. This happens either when there is no connection of individual implants (using devices such as spherical heads, telescopes or magnets), or when they are connected to rigid structures (beams or bridges) that can easily distribute the load. In practice, the choice of the type of connection depends on the experience and preferences of the dentist and dental technician [14, 15, 20, 22]. Depending on the specific clinical situation, orthopedic doctors can make various prostheses using implants as abutments. The problem of restoring the integrity of the dentition can be solved by prosthetics according to clearly defined indications, taking into account the clinical condition of the preserved teeth on both sides of the defect (with defects covering the entire dentition) or on the one hand (with marginal defects), which is one of the most important criteria for differential diagnosis of a defect of the dentition. can be achieved [3, 4, 8, 13, 21]. Therefore, all prostheses based on implants can be divided according to the principle of attachment into groups of fixed prostheses (on cements), conditionally removable prostheses (with screw attachment) and removable prostheses [4, 12, 13, 15].In case of defects of single teeth, the optimal solutions are implantation of a single crown supported by an implant [1, 7, 23-27]. Here there are problems with the submucosal position of the implant shoulder and the determination of the angle of inclination of the abutment. Many authors recommend setting the boundary between the shoulder

of the implant and the edge of the crown at a depth of 0.5-1.0 mm below the gum level [28, 29]. The choice of the abutment angle depends on the specific clinical situation and the condition of the patient's oral cavity (for example, the nature of the tooth defect, the shape of the dental arch, the position of the installed implant). Abutments at an angle If the abutment is located obliquely or transversely with respect to the typical position of the tooth, then when using a straight substructure, it is difficult to give an aesthetic appearance to the orthopedic structure. In such situations, the following solutions are possible to reduce the suprastructure to the required angle of inclination, but this often leads to a weakening of the suprastructure. Manufacturing of complex collapsible orthopedic structures using a large number of occlusive screws and attachments (highly technical and expensive). The use of angular suprastructures allows to obtain excellent results and accuracy of prosthetic structures based on any number of natural teeth and implants at minimal cost [14, 30, 31]. There is no denying the advantages of using implants as non-removable supports for prostheses when the teeth limiting the defect are absolutely healthy or not damaged and must be prepared for the manufacture of crowns-abutments for bridge prostheses, which in some cases must be demarcated. This is important to take into account, since, according to the literature, defects limited to two healthy teeth (55.03%) are more common than defects limited to two inactive teeth (15,46%) [3, 4, 14].Zablotsky Yu.V., despite various methods of prevention, when preparing natural teeth for permanent prosthetics, noted that the number of complications associated with prosthetics on implants is significantly lower (3.90%) than with prosthetics on teeth (13.33%); $p < 0.01$ (high probability) [3]. In case of secondary partial absence of teeth (absence of one or several teeth), regardless of whether it is a missing or terminal section, as well as in case of complete absence of teeth, depending on the specific clinical situation, single, composite bridge prostheses or bridge prostheses based on implants should be manufactured [9, 10, 16, 17, 32, 33]. The ratio of abutment teeth and intermediate elements 1:1 is necessary to prevent overload of implants due to improper distribution of masticatory pressure on abutment teeth and bridge implants. In addition, bridge implants should be attached to at least two natural teeth [12, 13, 15]. If it is not possible to install the required number of implants, and the natural teeth are in good condition, then it is possible to manufacture a bridge prosthesis based on implants using natural teeth [13, 34]. However, many authors argue that the concept of implants is not relevant for connecting with natural teeth, since implants are an alternative method of treatment for bridge and cantilever prosthetics. This is due to the fact that teeth have physiological mobility in the horizontal and vertical directions, while ankylosed implants do not. Overload of implants leads to the destruction of the osseointegrative joint, which leads to peri-implantitis and subsequent loss of the implant. Therefore, ideally, the missing tooth should be replaced only by a crown supported by an implant, without using the patient's own tooth as a support

[13, 15, 35]. To prevent overloading of implants, there are several types of structures. These include crushers and load absorbers. In fact, these are semi-reversible locking fasteners, removable connecting elements with screw or lock fixation, combining parts of a non-removable prosthesis and providing some mobility of one of the parts. The only drawback is that the manufacture of prostheses using cargo breakers is technically difficult and requires expensive equipment [13, 15, 21]. In fact, the same role can be performed using conventional removable structures. The threaded connection usually leaves some mobility of the non-removable prosthesis fixed on the implant. This practically compensates for the risk of overloading the implant. Due to the movement of the chewing load along the axis of the implant, the pressure is distributed over the bone tissue, preventing atrophy of the alveolar process. It is proved that the loads in the jaws with prostheses fixed on implants are comparable to the loads in the natural dentition [11, 13, 21]. The use of expensive precious metal alloys, ceramics of the latest generation or metal-free ceramics for prosthetics after the installation of implants raises the question of financial losses in case of complications and the need to remove the prosthesis for restoration. To minimize this risk, many authors recommend using "screw-on" (conditionally removable) or removable structures [9, 10, 12-15, 37]. In this case, the use of plate implants is contraindicated. The exception is cases when plate implants serve as an additional support and are included in one orthopedic structure together with screw or cylindrical implants [15, 29]. An intermediate variant of prosthetics on implants is the manufacture of orthopedic structures with a combined support on the oral mucosa, natural teeth and implants if it is impossible to install the required number of implants [9, 12, 13, 15,]. Prosthetic rehabilitation of the toothless upper jaw is often a difficult task in terms of meeting the expectations of patients and achieving stable long-term results. Removable beam prosthetics with telescopic crowns is one of the possible solutions that provide elderly patients with functionality, aesthetics and, importantly, good access for hygienic care [22, 34,]. Conditional prosthetics based on implants (with screw fixation). It should be noted that the fixation of removable full dentures on the lower jaw remains an urgent problem, despite the widespread use of high-tech technologies and modern materials. Prior to the practical use of dental implants, there were technical and surgical methods to improve the fixation and stability of prostheses. The development of implantology has opened up the possibility of complete rehabilitation of patients with complete absence of teeth, changing priorities in choosing a treatment method [3, 10, 15, 22]. In the manufacture of long structures supporting implants in the lateral part of the lower jaw, it is necessary to take into account the elastic deformation of the lower jaw. This deformation can be avoided by using the technique of manufacturing collapsible bridges, which are connected to natural teeth with the help of beam locks. Such a bridge minimizes the difference between the mobility of one's own teeth and implants, compensates for the elastic deformation of the

lower jaw in the lateral part and allows removing structures supported on implants separately if necessary for hygienic procedures [13, 15, 36,]. Raising the issue of hygiene, it should be remembered that patients with dental implantation should be classified as persons with insufficient oral care. Dentures on dental implants, as a rule, have difficult access to the neck of the implant for hygienic measures. It should be remembered that the neck of the implant has no epithelium and connective tissue. Only soft tissues are a barrier to microorganisms [12, 13, 15, 16]. If the implant is installed in the same position and at the same angle as the natural tooth, then the implant crown falls slightly below the gingival edge and has the contour and shape of a natural tooth. In such cases, implant care is simple, and hygiene measures remain routine. Fixed structures of prostheses are also possible [15]. If hygienic care is difficult due to the position of the implant or the design of the prosthesis, it is recommended to make a removable prosthesis and carry out professional cleaning of both the prosthesis and the implant head. Professional hygiene of prostheses involves the use of implants (plastic or metal with Teflon coating) to avoid injury to the implant surface by metal. During routine inspections, removable dentures should be removed and cleaned in an ultrasonic cleaner [39]. Implant manufacturers As the literature shows, the better the care of prostheses based on implants, the longer they last [5]. Currently, personal hygiene products for oral care are very numerous. The choice of these products for patients with dental implants depends on the number of implants and prosthetic crowns, the presence and size of the spaces to be cleaned, the level of connection of the crown and abutment with the gum, the height and thickness of soft tissues around the implants, as well as on the patient's procedural skills. Along with high-quality individual oral hygiene of patients with prosthetics on implants, including the use of special interdental brushes with silicone or Teflon metal rods (for example, a series of Curaprox SoftImplant brushes), dental floss, superfloss and mouthwashers, dental also considers the issue of restoring and maintaining the normal growth of the oral microflora - an important factor in maintaining health. All these aspects must be taken into account in the work of an orthopedic dentist to extend the service life of prostheses based on implants.

CONCLUSION

Thus, it is advisable to consider implantation treatment as the gold standard in the treatment of occlusive defects limited to healthy teeth, as well as terminal or complete defects, regardless of the number of missing teeth. In such cases, implantation treatment is the only theoretically and practically possible alternative to removable or non-removable prostheses. The screw fixation of prostheses with support for implants allows you to level the chewing loads, facilitate the work during the repair and

restoration of structures with support for implants and simplify the professional oral hygiene of patients with implants as much as possible.

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