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The survival of dental implants with different implant-abutment connection systems

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ABSTRACT

The aim of the study was to evaluate the survival of implants with different implant-abutment connection systems, in patients who had two kinds of implants implanted. In total, 240 implants were implanted – 91 implants with conical abutment Morse connection, and 149 with an internal hexagonal connection. During the follow-up period of 3 years and 10 months, the percentage of lost implants with a conical implant-abutment connection was 1.1%. Regarding the implants with hexagonal implant-abutment connection, this figure was 0.7%. Our work shows that there is a need for further research on the survival of dental implants. In this, the influence of other factors should be explored that are related both to the specific implant treatment, as well as to socio-demographic factors.

INTRODUCTION

Prosthetic treatment using implants, consists of reconstruction – in the most natural way – of dental defects arising as a consequence of caries, periodontal disease, or congenital lack of teeth. The final result of treatment should have, additionally, a beneficial effect on the functioning of the stomatognathic system, together with improved chewing function, speech and aesthetic appearance. Implantoprosthodontic treatment is a method that allows for a fully functional and esthetic filling of the missing teeth, and has been shown to satisfy the high expectations of patients. Lack of the implant-bone abutment during the first stage of treatment, and loss of bone-implant integration – in the second stage – lead to the loss of the implant. This is equivalent to the lack of success of the implant treatment [3,11,15,16].

MATERIAL AND METHODS

The study comprised 28 patients aged 37-66 years (mean age 55.8 years), including 11 men and 17 women, who had at least one of the two kinds of implants seated – type I – implants with conical abutment Morse connection (DENTSPLY Friadent ANKYLOS®) and type II – implants with an internal hexagonal connection (MIS Seven®, Alpha-Bio SPI and DFI®, Adin Tuareg RP®, AB I2®, DENTSPLY Friadent Xive®). In total, 240 implants were implanted

(91 type I and 149 type II implants). The shortest observation time was 4.9 months, the longest – 46 months after the implantation procedure.

AIM

The aim of the study was to evaluate the survival of implants with different implant-abutment connection systems, in patients who had two types of implants implanted.

RESULTS

In the course of implant treatment, in the case of two implants, there was no osseointegration, and the dentist decided to remove them during the implantoprosthodontic treatment. This was one implant with conical abutment (DENTSPLY Friadent ANKYLOS®), and this incident represents 1.1% of the total number of type I implanted implants. The second implant was an internal hexagonal abutment implant (Alpha-Bio DFI®), and this incident represents 0.7% of the total number of type II implanted implants.

DISCUSSION

In our research, through an observation that lasted up to 46 months, 98.9% of conical abutment implants survived, as did 99.3% of hexagonal abutment implants.

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The most valuable information relating to the survival of implants is contained in the publications which describe the results of multicenter studies. They show that on the basis of 10-year follow-up, a survival rate of 96.7% among 5590 implants of six different connection systems was demonstrated (Brånemark System®, Friadent Frialit-2®, IMZ®, Ankylos®, Camlog®, Komet®). Moreover, the percentage of surviving implants largely depended on the kind of implant and the center where the treatment was carried out [6].

The survival of implants might be related to the type of implant-abutment connection. In the case of a hexagonal abutment for the reconstruction of prosthetic toothless jaws, in 221 patients with 995 implants (four or more implants NobelSpeedy® using the All-on-4™), some 98.6% of the implants survived a period of 5 years [8]. Tandlich *et al.* [17] describe the effect of prosthetic solutions in the form of implant-based prostheses MIS®, on the survival of implants, in 82 patients. During a follow-up lasting over 30 months, 95.8% of 265 MIS® implants survived. In contrast, Levin *et al.* [5] evaluated the survival of 1387 implants of type MIS®, Zimmer Dental®, Biomet 3i® with single prosthetic restorations in the form of crowns, over 6 years. They found that the average survival rate was 93.1%.

Numerous publications concerning the survival of implants with a conical abutment show that such had the greatest relative survival rate, as compared to other types. Morris *et al.* [10] in their publication, showed that within a 5-year period, from among 1500 implants, 98.3% of all conical abutment (DENTSPLY Friadent ANKYLOS®) implants survived. What is more, relatively high survival rates (98.2%) were seen involving 275 DENTSPLY Friadent ANKYLOS® implants loaded prosthetically in the form of a single crown, during an 8-year follow-up period [2]. Beyond the aforementioned, in one of his works, Nentwig [12] rated the survival of 5439 DENTSPLY Friadent ANKYLOS® implants, with an average prosthetic restoration loading time, as equal to 56.8 months. In the case of a single tooth, the survival rate was 98.7%, while the survival rate with a prosthetic supplement restoring missing posterior teeth was 97.9%. Furthermore, in cases, where a high number of missing teeth were reconstructed by implant prosthetics, the survival rate was 97.3%, while for a smaller number of missing teeth, it was 95.8%.

The survival of the implants involves the following factors as well: the experience of the implantology center (multicenter study) [1,6], the dimensions of the implants (length, diameter) [19], the use of single or combined implants in the prosthetic phase [12], the place of implanting [6,7] and the habit of smoking [8,14]. At the same time, other publications have not demonstrated the effect of the above-mentioned and other factors on the survival of implants [4,5,7,9,13,18].

Regardless of the above-mentioned factors, there is a need for further research – the analysis of the relationship between the loss of the implant and the socio-demographic characteristics (gender, age) and the factors associated with specificity of implant treatment, such as raising the bottom and reconstruction of the maxillary sinus, the construction of implants, the impact of position of the implants relative

to the compact bone, the type of restoration and the time between implantation and loading of the implant with prosthetic restoration.

CONCLUSIONS

1. The percentage of lost implants with a conical implant-abutment connection was 1.1%, while the figure for implants with hexagonal implant-abutment connection was 0.7% – during the period of a follow-up of 3 years and 10 months.
2. There is a need for further research on the survival of dental implants. This should explore the influence of other factors related both to the specific implant treatment, as well as to socio-demographic factors.

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