ОРТОПЕДИЧНА СТОМАТОЛОГІЯ

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REUSE OF THE INTRAOSSEOUS PART OF THE DENTAL IMPLANT (THE CLINICAL CASE)

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Introduction

Replacement of a small included defect in the frontal area of the upper jaw with an implant is the optimal solution. However, even if the implant effectively serves as a support for more than 20 years, there are inevitable changes in both the bone tissue and the alloy from which the implant is made. There is the influence of function and load on changes in the shape and structure of bone tissue according to the law of functional adaptation of Wolf, Zander A.J., Schwarz H. (1983) [1]. These changes provide optimal resistance to mechanical stress within the stimulating functional stimulus. However, these mechanisms are not limitless.

There are a number of methods for determining the stability of implants at the stages of treatment and monitoring [2, 3].

The tooth can be considered as a lever of the first kind with the center of rotation in the middle third of the root from a biomechanical point of view. Modern problems of mechanics include the task of creating a theory of strength and fracture of solids. The laws of mechanics also explain the phenomenon of metal fatigue. The destruction of the material under the action of re-alternating stresses is called fatigue failure. In general, the fatigue of materials (including metals) is the phenomenon of destruction due to the gradual accumulation of damage in them, which leads to cracks during repeated reloading. Destruction can be partial or complete. With complete destruction, there is a division of the body into parts [4].

There are additional internal forces, the magnitude of which depends on the nature and shape of the body in a solid body, in particular in its cross section, under load under the action of external forces [5]. Stress concentration is particularly undesirable in metal structures. It is very dangerous under dynamic, shock and re-variable (cyclic loads) [5, 6].

The following clinical case is an example of a manifestation of a set of destructive factors on a two-stage implant with an orthopedic structure attached to it is.

The aim of the study was to show the possibilities of reuse of the intraosseous part of the two-stage dental implant after fracture of the orthopedic structure together with the abutment in the area of 11 teeth.

Materials and methods

We give an example of long-term monitoring of the functioning of the endoosal implant in a patient born in 1977 to illustrate the possibility of reusing the intraosseous part of the dental implant. She had a two-stage implantation operation in the area of 11 teeth in 1995. That was the implant of own design [7]. A metal-ceramic crown based on an implant was made. Success criteria for osseointegrated implants include clinical stability of the implant, radiological absence of bone resorption around the implant, reduction of bone tissue in height less than 0.2 mm during the second year of observation, high-quality dentures superimposed on implants, also no complaints in five years in 85% cases and in 80% cases in 10 years. Implants must be under functional load and in occlusion [8].

Observations of patient J. (born in 1977) was carried out annually for ten years. In the following years, the patient successfully used the prosthetic construction. There was a fracture of the abutment together with a metal-ceramic crown as a result of mechanical damage in 2015 (domestic injury). Figure 1 shows a photo of a broken metal-ceramic crown together with the abutment.

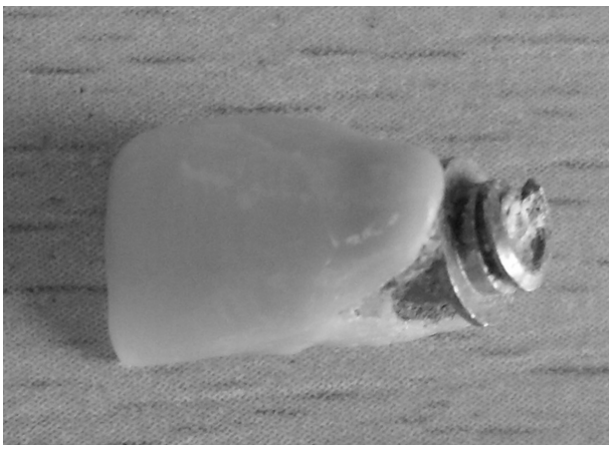

Fig. 1. Broken metal-ceramic crown together with the abutment.

The internal alveolar part of the implant together with the abutment screw remained firmly fixed in the bone. It was not possible to unscrew the rest of the screw. The radiograph of the alveolar process of the upper jaw in the area of the tooth 11 with the integrated remainder of the intraosseous part of the implant is presented in Fig.2.

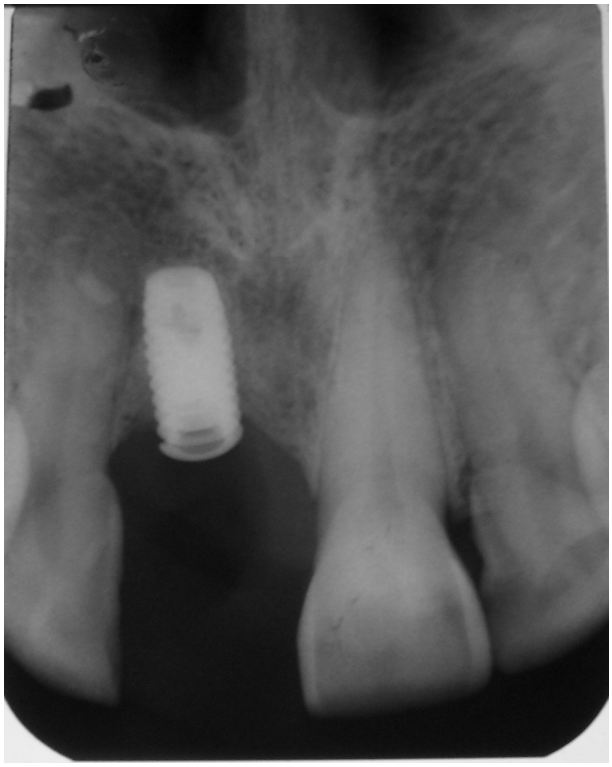

Fig. 2. The radiograph of the alveolar process of the upper jaw in the area of tooth 11 with the integrated remainder of the intraosseous part of the implant.

The object of study was the intraosseous part of a two-stage implant, which existed as a support for a metal-ceramic crown for more than twenty years. It remained firmly integrated into the bone tissue after mechanical fracture in the abutment neck. A thorough clinical and radiological examination of the alveolar process of the upper jaw was performed. Diagnostic models were studied. A consultation with a dental surgeon included a study of the stability of the part of the implant that remained in the bone tissue [2].

Results of the research

We decided to make a solid artificial stump with a pin, which is immersed in the created channel of the intraosseous part of the implant to fix the metal-ceramic crown after clinical and laboratory examination. The problem of reusing the intraosseous part of a two-stage implant, made and immersed in the area of tooth 11 almost twenty years ago, is the impossibility of separating the screw thread between the intraosseous part and the abutment. Removal of the connecting part was performed mechanically using abrasive tools (under constant water cooling to prevent bone overheating). A wide channel with smooth walls was created as a result. A two-layer impression was obtained from the upper jaw with simultaneous reflection of the inner surface of the artificially created channel was made by Genie Ultra Hydrophilic hydrophilic silicone material. Auxiliary impression of the mandible was obtained by alginate mass. Modeling and further production of an artificial stump with a pin was carried out by a laboratory method on collapsible models. The metal construction was fixed with glass ionomer cement after its checking in the oral cavity. An examination of an artificial stump with a pin in the oral cavity of patient J. is shown in Fig.3.

Fig. 3. Examination in the oral cavity of the artificial stump with a pin in patient J.

A complete anatomical impression was obtained from the upper jaw with the above-mentioned A-silicone material at the next clinical visit. The metal-ceramic crown was made according to the classical method. A feature of the manufacture of prosthetic construction in this clinical case was the modeling of the cervical region in order to create an artificial ash edge.

The occlusal ratios were corrected so that the manufactured crown came into contact with the teeth - antagonists last to reduce the load and prevent the development of internal stress in the prosthetic construction. The clinical stage of examination of the cermet crown in the oral cavity of patient J. is shown in fig. 4.

Fig.4. The clinical stage of examination of the metal-ceramic crown in the oral cavity of the patient J.

The metal-ceramic crown was fixed on the stump with glass ionomer cement after the final examination. A photo of the face of patient J. with a fixed metal-ceramic crown on an artificial stump is shown in figure 5.

Fig.5. Photo of the face of patient J. with a fixed metal-ceramic crown on an artificial stump.

In 2020 There was a pathological mobility of the implant, due to which it had to be removed together with the prosthetic construction. Thus, the period of use of the intraosseous part of the implant, which remained after the abutment fracture, was extended for another five years. Therefore, the total period of use of the intraosseous implant immersed in the alveolar process of the upper jaw was twenty-five years.

Conclusion

We can say that we should not hurry to remove the remaining part of the implant, if it has direct close contact with the bone of the alveolar process of the upper jaw according to the results of our study. The broken abutment with prosthetic construction can be replaced by an artificial stump and metal-ceramic crown. Delaying the removal of a well-integrated intraosseous part of the implant is a positive moment for the patient not only from a clinical but also from a financial point of view.

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Summary

Introduction. Replacement of a small included defect in the frontal area with a fixed structure based on the implant is the optimal solution. It is not always required to remove the intraosseous part of the implant if there is a fracture of the abutment due to mechanical injury on the background of metal fatigue after its prolonged use. First of all, the abutment's stability and quality of osseointegration should be determined. After all, a well-integrated intraosseous part of the implant can be further used to fix the pin structure a metal-ceramic crown on it.

The aim. Show the possibilities of reuse of the intraosseous part of the dental implant after fracture of the orthopedic structure together with the abutment in the area of 11 teeth.

Materials and methods. Long-term observation of the functioning of the endoosal implant, made in 1995, in patient J., born in 1977. Careful examination of the stability of the intraosseous part of the implant after abruption of the abutment in 2015 in order to address the issue of its further use for the pin structure.

Results and their discussion. The stability of the intraosseous part for further functioning has been established by its careful examinination. A wide canal with smooth walls was created in the abutment due to the impossibility of detaching the rest of the abutment from the intraosseous part. An artificial stump with a pin by laboratory method and a metal-ceramic crown were made according to the classical method. There was a pathological mobility of the implant, due to which it had to be removed together with the orthopedic structure in 2020. Thus, the period of use of the intraosseous part of the implant left after the abutment fracture was extended for another five years. Refusal of traumatic removal of the intraosseous part of the implant was based primarily on the need to preserve the volume and structure of bone tissue in the frontal area.

Conclusion. There is no need to remove the remaining part of the fractured implant urgently if the intraosseous part has the close contact with the bone of the alveolar process of the upper jaw and can be used as a support for the pin structure. The broken abutment with an prosthetic structure can be replaced by an artificial stump with a metal-ceramic crown. The total period of use of the intraosseous implant immersed in the alveolar process of the upper jaw was twenty-five years. Delaying the removal of a well-integrated intraosseous part of the implant is a positive moment for the patient not only from a clinical but also from a financial point of view.

Key words: upper jaw, abutment, intraosseous part of the implant, artificial stump with a pin, metal-ceramic crown.

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ПОВТОРНЕ ВИКОРИСТАННЯ ВНУТРІШНЬОКІСТКОВОЇ ЧАСТИНИ ІМПЛАНТАТУ (КЛІНІЧНИЙ ВИПАДОК)

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Резюме

Вступ. Заміщення малого включеного дефекту у фронтальній ділянці незнімною конструкцією з опорою на імплантат є оптимальним рішенням. Якщо після тривалого користування відбувається відлам абатмента внаслідок механічної травми на фоні втоми металу, – не варто поспішати з видаленням внутрішньокісткової частини імплантата. Слід перш за все визначити її стабільність і якість остеоінтеграції. Адже добре інтегровану внутрішньокісткову частину імплантата можна буде використати для фіксації штифтової конструкції й виготовлення на неї металокерамічної коронки.

Мета дослідження: показати можливості повторного використання внутрішньокісткової частини дентального імплантата після відламу ортопедичної конструкції разом з абатментом у ділянці 11 зуба.

Матеріали і методи: тривале спостереження за функціонуванням ендоосального імплантата, зафіксованого в 1995 році, у пацієнтки Ж., 1977 року народження. Ретельне обстеження стабільності внутрішньокісткової частини імплантата після відламу абатмента у 2015 році з метою вирішення питання про її подальше використання для виготовлення штифтової конструкції.

Результати. Унаслідок ретельного обстеження стабільності внутрішньокісткової частини встановлено придатність її для подальшого функціонування. Через неможливість від'єднати залишок абатмента від внутрішньокісткової частини в ній було створено широкий канал із гладенькими стінками. Виготовлено штучну куксу зі штифтом лабораторним методом і металокерамічну коронку за класичною методикою. У 2020 році виникла патологічна рухомість імплантата, через що довелося його видалити разом з ортопедичною конструкцією. Таким чином, було продовжено ще на п'ять років термін використання внутрішньокісткової частини імплантата, що залишилася після відламу абатмента. Відмова від травматичного видалення внутрішньокісткової частини імплантата ґрунтувалася перш за все на необхідності збереження об'єму і структури кісткової тканини у фронтальній ділянці.

Висновки. Не варто поспішати з видаленням частини імплантата, що залишилась, якщо вона має безпосередній щільний контакт із кісткою альвеолярного відростка верхньої щелепи й може бути використана як опора для штифтової конструкції. Відламаний абатмент з ортопедичною конструкцією можна замінити штучною куксою з подальшим виготовленням металокерамічної коронки. Загальний термін користування внутрішньокістковим імплантатом, зануреним у альвеолярний відросток верхньої щелепи, становив двадцять п'ять років. Відтермінування видалення добре інтегрованої внутрішньокісткової частини імплантата є сприятливим моментом для пацієнта не лише з клінічної, а й з фінансової точок зору.

Ключові слова: верхня щелепа, абатмент, внутрішньокісткова частина імплантата, штучна кукса зі штифтом, металокерамічна коронка.