CLINICAL CASES

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Autotransplantation of a Not Fully Developed Wisdom Tooth. Distant Observations

Autotransplantacja zęba mądrości z niezakończonym rozwojem. Obserwacje odległe

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A – research concept and design; **B** – collection and/or assembly of data; **C** – data analysis and interpretation; **D** – writing the article; **E** – critical revision of the article; **F** – final approval of article

Abstract

In today's dentistry, one more often uses prosthetic restoration based on endosseous implants in dental arch reconstruction in posterior sections. Another convenient method for the patient may be reconstruction using the autotransplantation of wisdom teeth or germs of wisdom teeth. The method of tooth transplantation has been known for a long time, the oldest reports come from ancient Egypt. The first well documented case of autotransplantation was presented by M.L. Hale in 1950. Autotransplantation involves the surgical transfer of the tooth into a previously prepared bone bed. The aim of this paper is to present a method for closed autotransplantation of not fully developed wisdom teeth, which is used to restore the dental arch in the lateral segment. The procedure should begin with a proper patient selection based on clinical and radiological examination. The patient should take care of oral hygiene, be in good general health, and work with his doctor. The attention was also paid of the procedure for donor tooth and the manner of its transfer to the recipient site. A case of siblings, in whom autologous wisdom teeth transplantation was performed and conclusions after sixyear follow-up was presented **(Dent. Med. Probl. 2014, 51, 2, 259–264)**.

Key words: wisdom teeth, teeth transplantation, autologous transplantation.

Streszczenie

We współczesnej stomatologii coraz częściej do rekonstrukcji łuku zębowego w odcinkach bocznych wykorzystuje się uzupełnienia protetyczne oparte na wszczepach śródkostnych. Inną komfortową dla pacjenta metodą odbudowy może być autotransplantacja zębów mądrości lub ich zawiązków. Metoda transplantacji zębów jest znana od dawna. Najstarsze doniesienia pochodzą ze starożytnego Egiptu. Pierwszy dobrze udokumentowany przypadek autotransplantacji przedstawił M.L. Hale w 1950 r. Autotransplantacja polega na chirurgicznym przeniesieniu zęba we wcześniej przygotowane łoże kostne. W pracy opisano metody autotransplantacji zamkniętej zębów mądrości z niezakończonym rozwojem, wykorzystywanej w celu odbudowy łuku zębowego w odcinku bocznym. Procedurę należy rozpocząć od odpowiedniej kwalifikacji pacjentów na podstawie badania klinicznego i radiologicznego. Pacjent powinien dbać o higienę jamy ustnej, być w dobrym ogólnym stanie zdrowia oraz współpracować z lekarzem prowadzącym. Zwrócono również uwagę na sposób uzyskania zęba do przeszczepu i jego przeniesienia w miejsce biorcze. Przedstawiono przypadek rodzeństwa, u którego wykonano autotransplantację zębów mądrości oraz wnioski po sześciu latach obserwacji **(Dent. Med. Probl. 2014, 51, 2, 259–264)**.

Słowa kluczowe: zęby mądrości, transplantacja zębów, autotransplantacja.

In today's dentistry, one more often uses prosthetic restoration based on endosseous implants in dental arch reconstruction in posterior sections. Another convenient method for the patient may be reconstruction using the autotransplantation of wisdom teeth [1, 2].

Transplantation (from Latin *transplantare*: plant again in a different place) is a procedure which consists of implantation of the cells, tissues and organs in the recipient, taken from a donor. We can distinguish: point 1 – autotransplantation – transplantation within a single organism; point 2 – isotransplanatation – transplantation in genetically identical individuals, the donor and recipient are monozygotic twins; point 3 – allotransplantations – transplantation within the same species; point 4 – ksenotransplantations – transplantation between individuals of different species [3, 4].

The method of tooth transplantation has been known for a long time, the oldest reports come from ancient Egypt. The first well documented case of autotransplantation was presented in 1950 according to Yoshino et al. [5].

The procedure should begin with a proper patient selection based on clinical and radiological examination. We can use the CBCT and stereolithographic models, to easier planning the procedure [6]. The patient should take care of oral hygiene, be in good general health, and cooperate with his doctor. The best time to perform autotransplantation of wisdom teeth is the developmental age. At that time, the increase in alveolar bone prevents the use of other methods of reconstruction of the dental arch, implants or fixed prostheses. Recommended age for transplantation of wisdom teeth in the lateral segment (replacing the first or second permanent molar) is 15–19 [7]. At this age, often required is the extraction of first permanent molar, less often the second permanent molar, which is the ideal site of extraction for a transplant. Before the surgery one should assess the proposed tooth for transplantation and its future location. At the age of 15–19, wisdom teeth have incomplete root development, which facilitates the whole procedure to remove the transplanted tooth and at the same time increases the chances of apexogenesis or apexification at the recipient site. According to most authors, it is optimal when the root of the donor is developed in 2/3 or 3/4 of its final length (stage F or G by Demirjan), it allows a better chance for revascularization so that tooth pulp will remain vital [8]. An important element for tooth autotransplantation (AT) is also the location of the donor tooth; the most convenient is the one which will allow for maximum atraumatic removal. Wisdom teeth placed vertically with the chewing surface at the level of the neck of the second molar (class IB or IC by Peell & Gregory) are most likely to reduce the invasiveness of the procedure of extraction; if their position is deeper and more horizontal (class IIIB or IIIC), the procedure is more difficult and sometimes impossible to perform [8]. The shape and configuration of roots is also important. Ideal is a slender, straight, single root [9]. In the recipient site, one should pay attention to proper bone support and no chronic or acute inflammation of periapical tissue [10]. The experience of the authors shows that the lesion of an inflammatory periapical granuloma in the dental alveolus of the recipient is not an absolute contraindication for transplant, but one must carefully remove it. One should also assess the distance between adjacent teeth so the mesial-distal dimension of the transplanted tooth crown will be less than or close to the space between the crowns flanking the teeth recipient site. A slight imbalance can be countered by efficient grinding of the donor tooth's crown [10].

Autotransplantation involves the surgical transfer of the tooth into a previously prepared bone bed. The procedure can be performed by open and closed method. The closed method consists of two phases, bone bed preparation, and of obtaining the donor. After extraction of the tooth which is not eligible for conservative or prosthetic treatment, the alveolus expands and protects at the time of extraction of the transplant tooth. The removed donor is grabbed by the crown and placed in the recipient alveolus. One should avoid contact with the root; this reduces the potential damage to the periodontal ligament and *Hertwig's* sheath, for which a bad state can cause a replacement or inflammatory resorption [7]. A transplanted tooth should be placed in the infraocclusion and the occlusal plane is obtained after several months with continued development of the root. The stabilization of the transplanted tooth can be obtained by using wire 0.2 rail, fibreglass or simply by using surgical sutures over the chewing- occlusal surface for a period of 1–2 weeks. Control visits should be carried out on the next day, every week for a month and after that time in 6 month intervals for 2 years. If the transplanted tooth did not have a completely developed root, one should examine its vitality and radiologically control it during inspection visits. The pulp of the transplanted teeth may show a reaction to the thermal tests after 6 months [7, 11].

Case Series

Description of Case 1

A patient under 15 years old is qualified for the autotransplantation using a closed method. Tooth 37 (mandibular left second molar) is located horizontally, partially impacted with an indication for extraction and tooth 38 (mandibular left third molar) is in the early stages of development of roots half the length of the final length (stage F by Demirjan), not visible in the mouth (Fig. 1). Tooth 37 extraction is scheduled with concurrent autologous tooth 38 transplantation in the resulting tooth bone bed. The autologous tooth transplantation was performed in the block anesthesia (2% lignocainum c.nor) (Fig. 2, 3). The wound was stitched using Dafilon 4.0 with single simple interrupted sutures, the transplanted tooth was covered with a mucoperiosteal flap. The patient was monitored regularly under control visits, and 4 months after the surgery the tooth pierced the mucosa, the reconstruction of bone tissue is also visible (Fig. 4, 5). 3 years

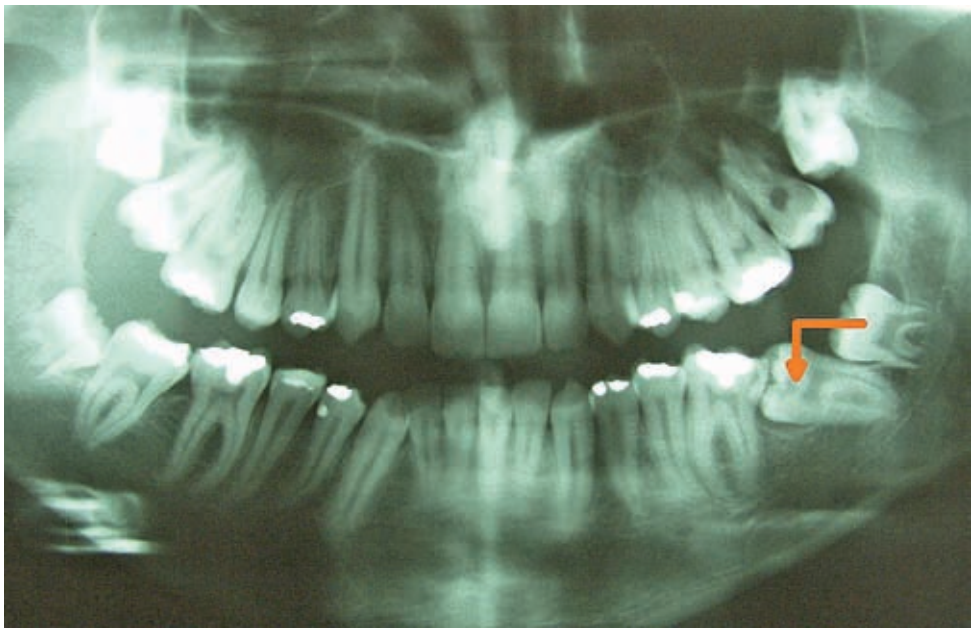

Fig. 1. A panoramic radiograph of a 15-year-old boy

Ryc. 1. Pantomogram 15-letniego chłopca

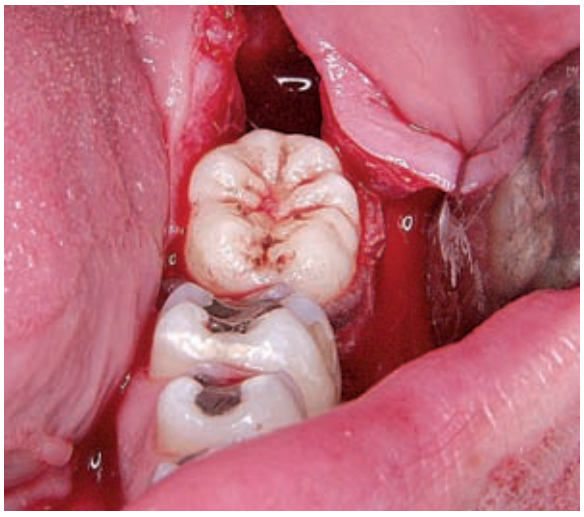

Fig. 2. The clinical condition after the transplant

Ryc. 2. Stan kliniczny po przeniesieniu zęba

Fig. 3. RVG after the transplant

Ryc. 3. RVG po przeniesieniu zęba

Fig. 4. The clinical condition 4 months after the surgery

Ryc. 4. Stan kliniczny 4 miesiące po zabiegu

Fig. 5. RVG 4 months after the surgery

Ryc. 5. RVG 4 miesiące po zabiegu

Fig. 6. The clinical condition 6 years after the surgery

Ryc. 6. Stan kliniczny 6 lat po zabiegu

after autotransplataion decay appeared, which was filled with composite material. Six years after the surgery (Fig. 6) the control X-ray (Fig. 7) revealed closed apical foramens of tooth and lucencies of the cervical area due to the external cervical resorption. The patient does not give out any complaints, periodontal pocket depth is of 1–2 mm, the tooth properly responds to thermal tests. Further observation is recommended.

Fig. 7. RVG 6 years after the surgery transplanted tooth with closed apex

Ryc. 7. RVG 6 lat po zabiegu, widoczna apeksyfikacja

Description of Case 2

The patient under 13 years was admitted to the Department of Oral Surgery for consultation. She was diagnosed with a fractured endodontic instrument located in the mesial canal of tooth 46 (mandibular right first molar) and tooth 48 (mandibular right third molar) was fully covered with mucous membrane in the early stages of development of roots less than quarter the length of the final length (stage E by Demirjan) (Fig. 8). Despite her young age and low level of development of the tooth 48 roots, she was conditionally approved for the closed method autotransplantation of tooth. The tooth 46 extraction was planned with simultaneous transplantation of a tooth 48. The procedure was performed under block anesthesia (Fig. 9, 10). In this case, due to the low level of development of the root, and technical problems with semi riding, it was decided to perform a rigid immobilization of the transplanted tooth for 4 weeks, using Fiber-Splint. The tooth after the initial few months

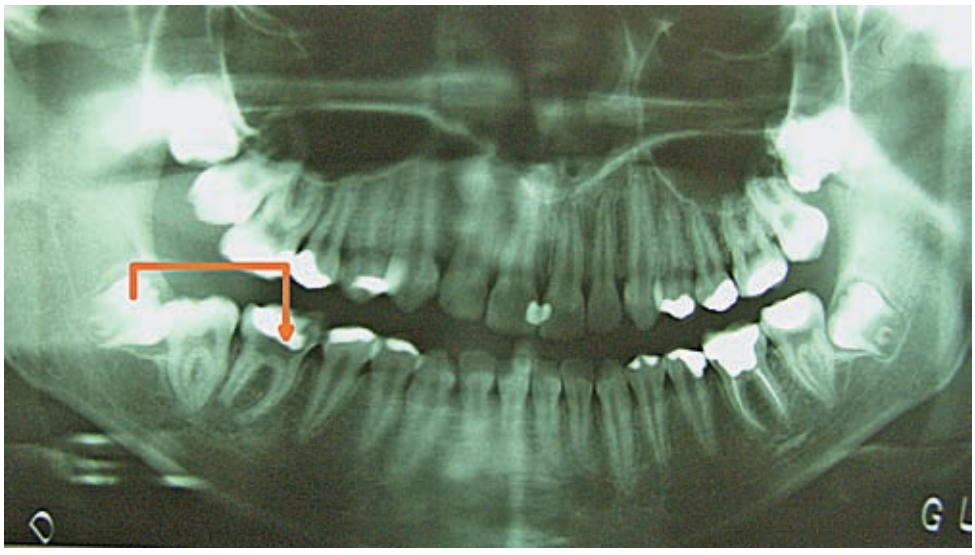

Fig. 8. A panoramic radiograph of a 13-year-old girl

Ryc. 8. Pantomogram 13-letniej pacjentki

Fig. 9. The clinical condition after the transplant (case 2)

Ryc. 9. Stan kliniczny po przeniesieniu zęba (przypadek 2)

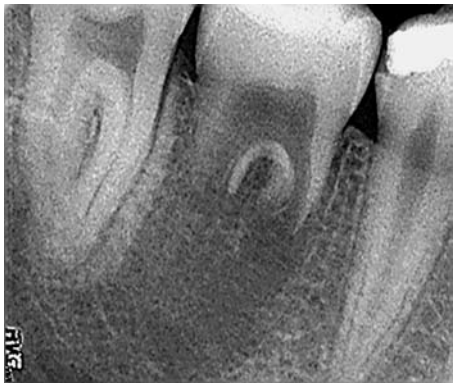

Fig. 10. RVG after the transplant (case 2)

Ryc. 10. RVG po przeniesieniu zęba (przypadek 2)

of observation has been stabilized. Patient did not attend any further control visits. After five years the tooth was removed due to its increased mobility and pain.

Discussion

The autotransplantation of not fully developed wisdom teeth is an interesting surgical method. Possibilities of its application, however, are very limited and do not guarantee success. The procedure may be an alternative to endosseous implants only in a limited group of patients.

The basic condition for the success of autotransplantation of teeth is a proper qualification and preparation of the patient, a well performed procedure and a regular inspection [12]. The latter allows early detection of complications and their treatment, which significantly extends the lifespan of transplanted teeth. Today, a more and more widely discussed aspect is the manner and time of immobilization of the transplanted tooth. Most studies show that better results can be achieved by using only the stitching and limiting the period of immobilization for 1 to 2 weeks However, in teeth immobilized by a rigid method for longer than 2 weeks there often occurs pulp necrosis and replacement resorption (ankylosis) [13]. Bass et al. [13] believes that small movements of the transplanted tooth stimulate revascularization, whereas immobilization has a negative impact on the regeneration of pulp. Our own experience shows that in the case of not fully developed teeth, the rigid or semi-rigid immobilization is not necessary. Sufficient method of immobilization of a tooth in the new position is its stitching, but when we treat the second patient we use only riding spilt at this time.

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