

# Autotransplantation of wisdom tooth in the alveolus of extracted first mandibular molar

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## SUMMARY

Dental autotransplantation is a surgical procedure where tooth or dental germ is transferred from one position to another, within the same person. This way an edentulous area after extraction can be successfully restored without the need of other more invasive approaches. This procedure is recommended in young individuals who have lost permanent molars due to caries complications and have an impacted third molar as a potential donor tooth.

The aim of this report is to present a successful transplantation of wisdom tooth into the alveolus of the first mandibular molar in a case of a young individual.

**Keywords:** autotransplantation; wisdom tooth; mandibular molar.

## INTRODUCTION

Autotransplantations in the region of the mouth are surgical procedures that have become everyday praxis. Autologous mucosa, connective tissue, bone grafts are often used as a part of different therapy solutions. However, tooth as a graft material, is very rarely considered. Dental autotransplantation is defined as the movement of one tooth or dental germ from one position to another, within the same person [1]. Based on time when the donor tooth will be inserted in the receptor alveolus, the transplantation can be immediate or delayed [2].

The most common indication for autotransplantation is the loss of first mandibular molar in young individuals, who also have an impacted lower third molar as a potential donor [3]. Fixed dentures are not recommended in young individuals as they require extensive enamel removal of intact teeth. Implant placement is a better solution but also expensive and it isn't recommended until growth and development of jaws is completed [4]. Other conditions, in which transplantation can be considered, include tooth agenesis, traumatic tooth loss, root resorption, cervical root fractures, localized juvenile periodontitis as well as other pathologies [5, 6].

The objective of this report was to present dental autotransplantation in a young adult person as successful solution in reconstructing an edentulous area after molar extraction and avoiding other more invasive and expensive therapy means.

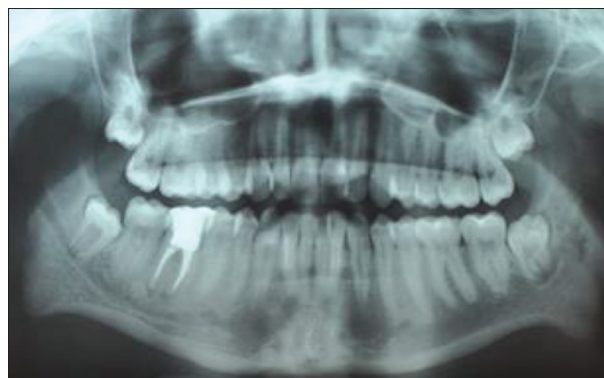
## CASE REPORT

A 20 years old female patient was referred to the Department of Oral Surgery, School of Dental Medicine, University of Belgrade for extraction of the lower right

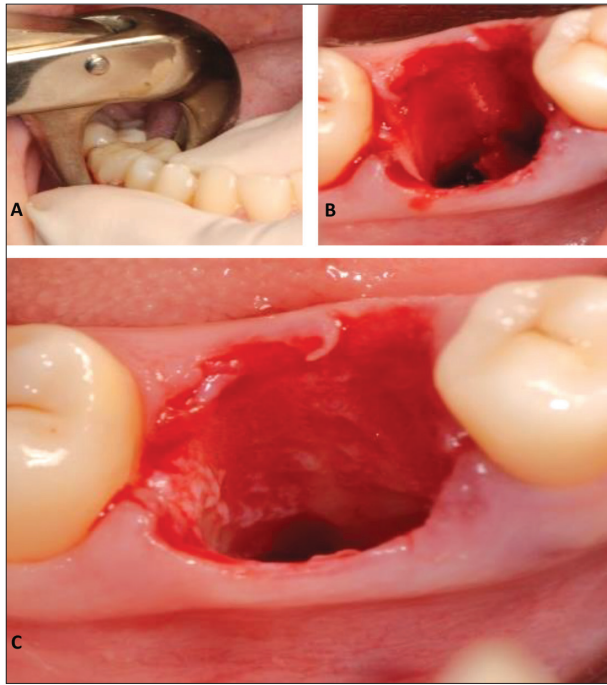
first molar. Dentist noticed an artificial perforation in the furcation area that could not be repaired and referred the patient for extraction (Figure 1). An orthopantogram also showed impacted wisdom tooth in the same quadrant with mesioangular position and two thirds of the root developed (Figure 2).



**Figure 1.** Radiographic finding of the tooth indicated for extraction  
**Slika 1.** Radiološki prikaz zuba indikovanog za ekstrakciju

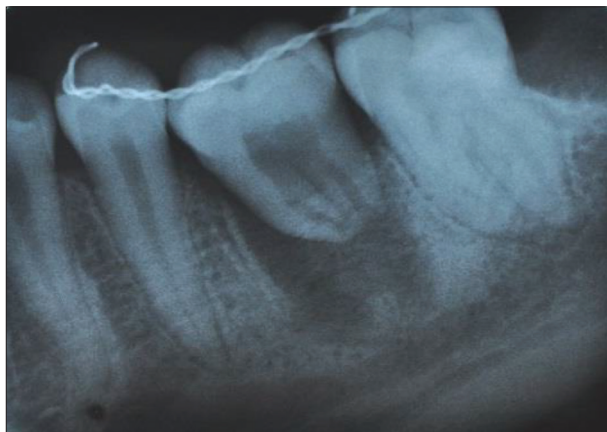


**Figure 2.** Radiographic finding of the impacted lower right wisdom tooth  
**Slika 2.** Radiološki prikaz impaktiranog donjeg desnog umnjaka



**Figure 3.** Tooth extraction (A); presence of interradicular septum (B); interradicular septum removed (C)

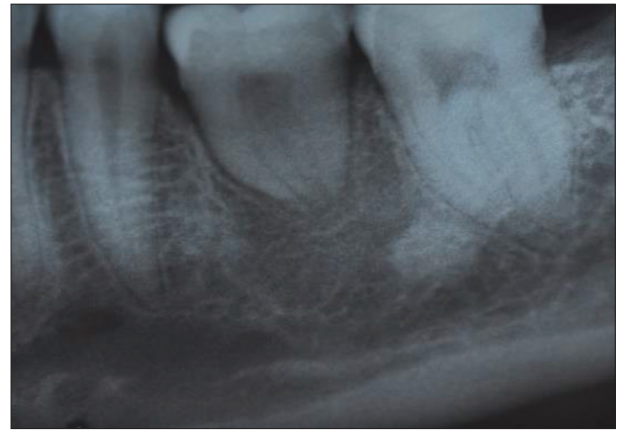
**Slika 3.** Ekstrakcija zuba (A); prisutan interradikularni septum (B); uklonjen interradikularni septum (C)



**Figure 4.** Radiographic finding of the transplanted and splinted lower right wisdom tooth

**Slika 4.** Radiološki prikaz transplantiranog i splintiranog donjeg desnog umnjaka

In the view of patient's age, favorable position and morphology of lower right wisdom tooth, transplantation of wisdom tooth into the alveolus of first molar was suggested to the patient. After getting informed consent, it was decided to perform two stage autologous transplantation. In the first stage, first molar was extracted and interradicular septum was removed (Figure 3). Periapical lesions were curettaged but further curettage of alveolus walls wasn't performed in order to preserve blood clot and prevent alveolar osteitis. Three weeks after extraction, receptor alveolus was further prepared for donor implantation by cutting out a part of connective tissue from the receptor alveolus and making a receptor bed. Wisdom tooth extraction was performed with minimal trauma to the tooth and periodontal fibers. Donor tooth was placed in slight infraocclusion in order to allow reinsertion of periodontal



**Figure 5.** Retroalveolar radiogram after one year

**Slika 5.** Kontrolni retroalveolarni radiogram nakon godinu dana



**Figure 6.** Clinical finding of the transplanted wisdom tooth after one year

**Slika 6.** Klinički nalaz transplantiranog umnjaka nakon godinu dana

fibers and formation of the apical third of the root. With formation of the apical third, transplanted tooth is expected to gradually reach adequate occlusal relation with the teeth in the upper jaw [3, 7].

After placing donor tooth in the receptor alveolus, it was established that the transplanted tooth did not have adequate stability and it was decided to splint the tooth (Figure 4). The splint is normally removed two weeks after as in this period periodontal fibers reinsert themselves onto the alveolus walls [7]. Patient was prescribed an oral antibiotic for the next five days. Sutures were removed after seven days and splint after fourteen days. Follow-ups were scheduled weekly in the first month, then after three months, six months and one year later and they included monitoring soft tissue status, pulp sensibility and tooth stability. One year later, retroalveolar radiogram showed fully formed apical third of the root, presence of periodontal space and no signs of root resorption (Figure 5). Clinically, transplanted tooth was intact and there were no signs of tooth mobility (Figure 6).

## DISCUSSION

Tooth autotransplantation is often perceived as an unpredictable alternative, even though survival rate after six years is in range from 75.3% do 91% [8]. Perhaps the reason why autotransplantation is considered as an

unreliable option, is the unpredictability of ankylosis and root resorption that are the most frequent complications of autotransplantation [9].

Success of autologous tooth transplantation depends of appropriate patient selection, suitable donor tooth and suitable recipient site [3]. Patients need to be in good health, able to follow post-operative instructions and be available for follow-up visits [3]. Our patient was a young person who showed great will and motivation in order to get the best possible result. In our case, donor tooth had favorable characteristics which were described in literature. Donor tooth had two-thirds of root formed and that gave him better chances of success in comparison with completely developed tooth [7]. The most predictable results are obtained with teeth having between one-half to two-thirds of root formed [3, 10]. Teeth, with incomplete root development, have apical foramina with diameter wider than 1 mm which allows successful revascularization of the donor tooth in the receptor alveolus without the need of later endodontic treatment [10]. In our presented case, there was no need for endodontic treatment. Root morphology as well as the position of the donor tooth in our case, were favorable enough to do the transplantation without damaging surrounding hard and soft tissues. Teeth with complex root morphology and position in the alveolar ridge, which require tooth sectioning and significant manipulation of surrounding tissue, are contraindicated for this surgery [3].

One more factor that is recognized as crucial in performing successful autotransplantation is the time that donor tooth spends out of the alveolus. This time ranges from three to sixteen minutes. Risk of inflammatory root resorption increases with time [11]. In our case, donor tooth was immediately transferred in previously prepared receptor alveolus. Recipient site, in the present case, had sufficient alveolar bone support in all dimensions with sufficient amount of attached keratinized tissue to allow stabilization of the transplanted tooth [3, 11].

It was decided to perform the transplantation of the donor tooth three weeks after the extraction of the mandibular first molar. The two stage technique has shown to be more successful than immediate transplantation technique, because it enables the formation of connective tissue in the period of two to three weeks which later favors adaptation of the donor tooth into the receptor bed. As a result of improved vascularization in the receptor bed, the chances of successful treatment are greater [12]. A successful transplantation is achieved when transplanted tooth presents no inflammatory changes, signs of root resorption and demonstrates sufficient root development, confirmed by clinical and radiographic evaluation [6, 12]. Regular check-ups are very important in the first year after transplantation because the highest percentage of complications happen in this period. Inflammatory resorption may become evident after three or four weeks, while tooth ankylosis may not become evident until three or four months after transplantation. The incidence of

both types of resorption can be decreased with atraumatic extraction of the donor tooth and immediate transfer to the recipient site to minimize the risk of injury to the periodontal ligament [6, 13].

Based on literature evidences and experience from our case, we can conclude that autotransplantation gives positive long term results when previously named indications and criteria are carefully analyzed and followed. Autotransplantation is good solution in young individuals who lost their first or second mandibular molars and at the same time have impacted third molars as potential donors.

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# Autotransplantacija impaktiranog umnjaka u alveolu izvađenog prvog molara

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## KRATAK SADRŽAJ

Autotransplantacija zuba je hirurška intervencija prebacivanja zuba ili zubnog zametka u alveolu ekstrahovanog zuba iste osobe. Na ovaj način, bezubo polje može biti uspešno rekonstruisano, bez potrebe za drugim skupljim i invazivnijim rešenjima. Ovaj hirurški zahvat se preporučuje kod mladih osoba koje su izgubile stalni molar zbog karijesa, a istovremeno imaju impaktirani umnjak.

U ovom radu je prikazana uspešna transplantacija umnjaka u alveolu ekstrahovanog prvog mandibularnog molara kod odrasle mlade pacijentkinje.

**Ključne reči:** autotransplantacija; umnjak; mandibularni molar

## UVOD

U regiji usne duplje sprovode se različite vrste autotransplantacija. U svakodnevnoj praksi su vrlo aktuelne transplantacije sluzokožnog, vezivnog i koštanog tkiva u sklopu različitih terapijskih procedura. Međutim, zub, kao vrsta autotransplantata, retko se razmatra kao opcija. Autotransplantaciju zuba definišemo kao prebacivanje zuba ili zubnog zametka sa jedne lokacije na drugu unutar usne duplje [1]. U odnosu na vreme transplantacije zuba, autologna transplantacija može biti imedijatna ili odložena [2].

Autotransplantacija zuba je najčešće indikovana kod mladih osoba kod kojih je neminovna ekstrakcija donjih prvih stalnih molara, a ujedno je prisutan impaktirani umnjak kao potencijalni zub donor [3]. Kod mladih osoba ne preporučuje se izrada fiksne nadoknade ukoliko su susedni zubi intaktni i sa voluminoznom pulpnom komorom. Ugradnja implantata na mestu izvađenog zuba je bolje ali skuplje rešenje, a kontraindikovano je dok se ne završi rast i razvoj vilica [4]. Druge indikacije bi bile anodoncija stalnog zuba, gubitak zuba usled traume, frakture korena, resorpcija korena, lokalizovani periodontitis i generalno zubi sa lošom prognozom [5, 6].

Cilj ovog rada je prikaz uspešne autologne transplantacije zuba kod mlade osobe u cilju ponovnog uspostavljanja kontinuiteta zubnog niza i izbegavanja kasnije primene drugih invazivnijih i skupljih terapijskih modaliteta.

## PRIKAZ SLUČAJA

Dvadesetogodišnja pacijentkinja dolazi po uputu svog stomatologa na Kliniku za oralnu hirurgiju Stomatološkog fakulteta u Beogradu radi ekstrakcije donjeg desnog prvog molara zbog arteficialne i nereparabilne perforacije u regiji furkacije. Na ortopantomogramu je uočeno prisustvo neizniklog umnjaka u donjoj vilici sa iste strane sa nezavršenim rastom i razvojem korenova i angulacijom ka drugom molaru (Slika 2).

S obzirom na godine pacijentkinje, povoljnu poziciju i povoljne morfološke karakteristike donjeg desnog umnjaka, pacijentkinji je predložena transplantacija umnjaka u ekstrakcionu alveolu prvog molara. Nakon dobijene saglasnosti pacijentkinje, intervencija je sprovedena u dva akta. U prvom aktu je izvršena ekstrakcija prvog molara i uklanjanje interradikularnog septuma (Slika 3). Odmah nakon ekstrakcije izvršena je i kiretaža

periapikalnih lezija, pri čemu zidovi alveole nisu kiretirani, kako bi se neometano formirao krvni ugrušak i izbegao nastanak alveolitisa. Nakon tri nedelje, u drugom aktu, isečen je deo mladog vezivnog tkiva, koje je popunjavalo ekstrakcionu alveolu, kako bi se formiralo ležište koje odgovara zubu donoru.

Vađenje impaktiranog umnjaka je izvršeno pažljivo uz minimalnu traumu, kako bi se izbegla povreda tvrdih zubnih tkiva i očuvala periodontalna vlakna. Zub donor je zatim prebačen u prethodno pripremljenu ekstrakcionu alveolu. Transplantirani zub je plasiran u blagoj infraokluziji, kako bi se s jedne strane omogućilo nesmetano zaceljenje periodontalnih vlakana, a sa druge strane adekvatno formiranje apikalne trećine korena zuba i samim tim postepeno dovođenje zuba u adekvatan okluzalni odnos sa antagonistima [3, 7].

Nakon transplantacije umnjaka u ekstrakcionu alveolu donjeg prvog molara, ustanovljeno je da transplantirani zub nema adekvatnu stabilnost i da je neophodno splintiranje za susedne zube (Slika 4). Pacijentkinji je ordinirana antibiotska terapija u trajanju od pet dana. Konci su uklonjeni nakon sedam dana, a splint nakon četrnaest dana jer se smatra da su se periodontalna vlakna u ovom periodu reinsertirala za zid zubne čašice [7]. Kontrolni pregledi su se sprovodili jednom nedeljno narednih mesec dana, a zatim nakon tri i šest meseci, a podrazumevali su praćenje stanja mekih tkiva, proveru vitaliteta i stabilnosti zuba. Nakon godinu dana načinjen je kontrolni retroalveolarni snimak, na kome je uočen završen rast i razvoj apikalne trećine korena transplantiranog zuba, formiran periodontalni prostor kao i odsustvo znakova resorpcije korena zuba (Slika 5). Kliničkim pregledom su uočena zdrava meka tkiva i intaktna krunica transplantiranog umnjaka bez znakova labavljenja zuba (Slika 6).

## DISKUSIJA

Autotransplantacija zuba se vrlo često smatra nesigurnom alternativom od strane oralnih hirurga, iako se stepen preživljavanja transplantiranih zuba nakon šest i više godina kreće u rasponu 75,3% do 91% [8]. Razlog manje zastupljenosti ove intervencije verovatno leži u činjenici da su najčešće komplikacije, ankiloza i resorpcija korena, nepredvidive [9].

Uspeh autotransplantacije zuba zavisi od više faktora, a to su pacijent, zub koji se transplantira i mesto implantacije [3]. Za

uspeh ove intervencije neophodno je da pacijent bude dobrog opšteg zdravstvenog stanja, sposoban da prati instrukcije date od strane terapeuta i dostupan za redovne kontrolne preglede [3]. U našem slučaju radilo se o mladoj osobi, motivisanoj za ovaj način nadoknade zuba. U opisanom slučaju zub koji je bio indikovao za transplantaciju još uvek nije imao završen rast i razvoj korena, što je preduslov za bolji ishod transplantacije, u odnosu na zub sa završenim rastom [7]. Idealnim donatorom se smatra zub koji ima formiranu jednu polovinu do dve trećine ukupne dužine korena [3, 10]. Kod zuba koji još uvek nisu završili rast i razvoj apikalni foramen je širi od 1 mm, što im omogućava nesmetanu revaskularizaciju bez kasnije potrebe za endodontskim tretmanom [10]. U predstavljenom slučaju koren zuba donora nije još uvek imao razvijenu apikalnu trećinu i nije bio potreban postoperativni endodontski tretman. Morfologija korena impaktiranog umnjaka kao i njegova pozicija su predstavljale povoljnu situaciju sa aspekta hirurške ekstrakcije uz minimalnu traumu samog zuba i okolnog čvrstog i mekog tkiva. Zubi sa komplikovanom korenskom morfologijom i položajem, koji zahtevaju separaciju i obimnu manipulaciju okolnim tkivom, po literaturnim podacima su kontraindikovani za transplantaciju [3].

Još jedan faktor koji je ključan za uspešnu transplantaciju je vreme koje je zub donor proveo van alveole. Potrebno je u što kraćem periodu postaviti zub donor u alveolu, kako bi se sprečilo isušivanje periodontalnih vlakana i njihovo posledično oštećenje. Vreme koje zub donor može da provede van alveole a da pritom ne dođe do oštećenja periodontalnih vlakana se kreće od tri do šesnaest minuta. Sa povećanjem vremena koje zub donor proveo van alveole povećava se mogućnost nastanka inflamatorne resorpcije korena zuba [11]. U našem slučaju zub

donor je odmah po ekstrakciji prebačen u već pripremljeno ležište receptorske alveole.

Na mestu implantacije u opisanom slučaju bila je prisutna adekvatna koštana podrška i dovoljna količina keratinizovanog tkiva za povoljno pozicioniranje zuba donora, što je navedeno kao bitan faktor uspešnosti autotransplantacije [3, 11].

U prikazanom slučaju odlučeno je da transplantacija impaktiranog umnjaka bude sprovedena dvofazno, odnosno tri nedelje nakon ekstrakcije prvog molara. U alveoli ekstrahovanog zuba u periodu od dve do tri nedelje dolazi do formiranja mladog vezivnog tkiva, bogatog mladim krvnim sudovima, čime se poboljšava vaskularizacija cele regije, a samim tim i uspešnost tretmana [12]. Autotransplantacija se smatra uspešnom kada transplantirani zub, na osnovu kliničkih i radioloških parametara, ne pokazuje inflamatorne promene na pulpi, znakove resorpcije korena zuba i ankiloze, a razvoj korena zuba je završen [6, 12]. Kontrole u prvih godinu dana su veoma bitne, jer najveći broj komplikacija nastaje u ovom periodu. Inflamatorna resorpcija se obično javlja u prve tri do četiri nedelje od transplantacije, dok se ankiloza javlja tri do četiri meseca nakon transplantacije. Prevencija obe vrste komplikacija jeste ekstrakcija uz minimalnu traumu po periodontalna vlakna i kratko vreme trajanja intervencije [6, 13].

Na osnovu podataka iz literature i prikazanog slučaja možemo zaključiti da je autotransplantacija zuba uspešan zahvat, koji daje dobre rezultate kada se postavi prava indikacija, a intervencija sprovede uz poštovanje svih neophodnih kriterijuma. Ova hirurška intervencija indikovana je pre svega kod mladih osoba kod kojih je neizbežno vađenje prvog ili drugog molara u donjoj vilici, a koji istovremeno imaju prisutne impaktirane umnjake kao potencijalne donore zube.