



Combined surgical and orthodontic treatment of impacted second lower premolar – Case report

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SUMMARY

Impacted tooth is a tooth that has failed to reach occlusal plane, with 2/3 of completed root growth. There are various reasons for teeth impaction, however, lack of space for its emergence is considered to be the main reason. The most commonly impacted teeth are lower wisdom teeth, then upper wisdom teeth, upper canines, and less frequently lower premolars. There are only few studies that have addressed the issue of impacted lower premolars, their etiology, prevalence and treatment. The patient (22 years old) visited orthodontist for the lower jaw aesthetic teeth corrections, due to crowding. Orthopantomography analysis revealed impacted lower right second premolar that caused resorption of mesial root of the first molar. The treatment plan included tooth #46 extraction and placing orthodontic brackets on the impacted second premolar. The next step was extrusion of the tooth #45, its introduction to occlusal plane and orthodontic treatment resumption. Orthodontic treatment of impacted teeth with fixed orthodontic appliance provides excellent therapeutic results. The treatment success depends primarily on adequate planning, cooperation and joint work of oral surgery and orthodontic specialists.

Keywords: impacted lower premolar; orthodontic extrusion; tooth extraction; root resorption

INTRODUCTION

Impacted lower premolars are not so rare in everyday dental practice. Lower premolars are most frequently impacted teeth, after lower and upper third molars and upper canines [1]. Mandibular premolars erupt after first lower molars and canines, so the lack of space for the eruption of both premolars may lead to impaction of one of them, usually the second premolars [2]. Some of the reasons for their impaction are: lack of space, ectopic position of the tooth bud, presence of obstacles (primary tooth, tumor, scar tissue) on the way of eruption, presence of supernumerary teeth or odontomas. Some of the systemic and genetic diseases such as ccd dysplasia, osteoporosis, Down syndrome, hypothyroidism and hypopituitarism may affect premolars eruption as well [3-5].

Treatment of impacted mandibular premolars depends on tooth position, depth of impaction, relationship with surrounding teeth, as well as planned orthodontic treatment. Treatment includes teamwork: orthodontist who makes treatment plan and oral surgeon who performs surgery to allow access to the impacted tooth. The treatment procedure involves surgical release of the impacted premolar's crown, bonding orthodontic bracket and further fixed orthodontic treatment. One of the conditions for successful therapy is that the angle of the impacted premolars does not exceed 45° [6].

This case report presents surgical release of impacted lower right second premolar with subsequent orthodontic treatment.

CASE REPORT

The patient (22 years old) presented for an orthodontic examination in order to address the problem of irregular position of the tooth (lack of space) in the lower jaw (Figure 1). After orthopantomography analysis it was observed that lower right second premolar is impacted with suspected resorption of mesial roots of the first molar. Also, the first lower left premolar was noticed to be missing as well as unerupted wisdom tooth in the fourth quadrant (Figure 2). The patient was healthy and did not have any previous tooth extraction or orthodontic intervention in dental history. Also, he did not report pain or discomfort in the orofacial region.

Orthodontist sent patient to oral surgeon for consultation. Mutual treatment plan was done which included combined surgical-orthodontic treatment. It included extraction of the first lower right molar (#46) and then orthodontic extrusion of the lower right second premolar (#45). First molar was suggested to extraction primarily due to the resorption of mesial root but also making enough room for premolar.

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Figure 1. Overview of the situation in the mouth
Slika 1. Prikaz stanja u ustima

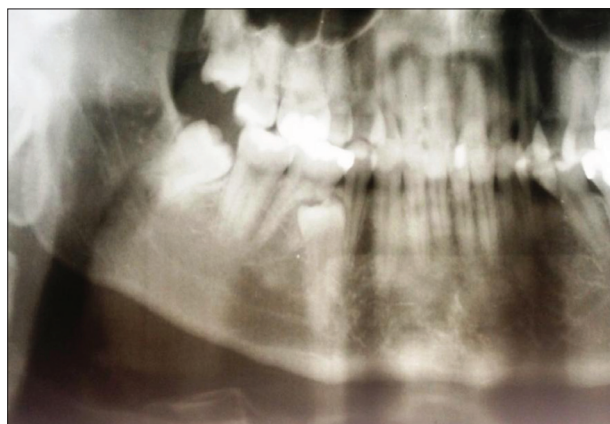


Figure 2. Ortopantomography
Slika 2. Ortopantomogram



Figure 3. Extracted tooth 46
Slika 3. Ekstrahovan zub 46

Oral surgery was performed under local anesthesia after the placement of fixed orthodontic appliance. A corner gingival flap of full thickness was carefully lifted between canine and second molar, with taking care of the mental nerve. The tooth #46 was extracted carefully with forceps when midroot resorption of the mesial root caused by emergence of the impacted premolar #45 was observed. The remaining apical part of the root was extracted as well (Figure 3). The entire crown of the impacted second premolar was exposed (Figure 4). The bone around the crown of #45 was removed with carbide burs under constant cooling with sterile saline. This allowed orthodontic bracket placement on the tooth (Figure 5). Individual su-



Figure 4. Elevated flap after tooth extraction 46 and tooth crown 45 visible

Slika 4. Podignut režanj nakon vađenja zuba 46 i eksponirana krunica zuba 45



Figure 5. Orthodontic brackets placed on the tooth 45
Slika 5. Ortodontska bravica postavljena na zub 45

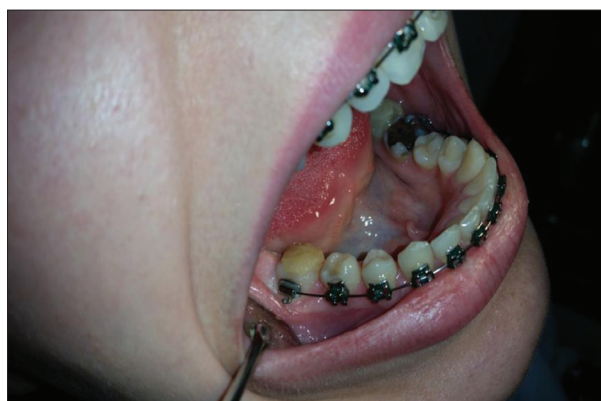


Figure 6. The tooth 45 reached occlusal plane in the dental arch
Slika 6. Zub 45 u zubnom nizu, dostignuta okluzalna ravan

tures were placed for 7 days. The patient was prescribed antibiotics (Dovicin 100 mg, 7 days), Chymoral Forte (5 days) for quicker resorption of edema and hematoma and pain killers as needed.

Further orthodontic treatment was focused on the extrusion of the impacted premolar over the next 6 months, its positioning in the dental arch and reaching the occlusal plane (Figure 6). At the same time the lack of space was corrected as well. Orthodontic therapy will be fully completed after wisdom tooth emergence in the fourth quadrant that will fully stabilize occlusion in lateral region.

DISCUSSION

Literature does not provide sufficient data related to the impacted lower premolars, regardless the fact that frequency of these tooth impaction is quite high [7]. The treatment of these teeth is multidisciplinary and includes cooperation of orthodontics with oral and maxillofacial surgeons, pediatric dentists and sometimes endodontists [8]. Treatment plan depends on several factors, primarily on the amount of space available to initiate the emergence of impacted tooth, depth of impaction, degree of root formation, need for first molar extraction, duration of the therapy and presence of keratinized gingiva. In addition, treatment plan is significantly influenced by the patient's state of general health, other teeth and oral hygiene, as well as function and occlusion [9,10]. Andreasen recommended surgical exposure of impacted premolar to be limited to cases where the angulation of the tooth is not greater than 45° in both jaws. However, in practice, we can find cases of surgical and orthodontic treatment of horizontally impacted mandibular premolars that were successfully placed in their dental line position [8].

In cases where OPT and clinical examination show lack of space for impacted mandibular premolars, regular checkups are needed, extraction of the primary teeth as well as monitoring of the permanent premolars position. If necessary, surgical release of the tooth crown, with or without orthodontic traction or repositioning (autotransplantation) may be performed. However, if impossible to align impacted mandibular premolar in dental arch then surgical removal of the tooth should be done [11].

To align impacted mandibular premolar, orthodontic treatment should be divided into the three phases. The first phase starts 2 to 5 months after surgical exposure of a tooth. The second stage starts when tooth is tracted to its position in dental arch and lasts 12 to 18 months. The third stage is the end of orthodontic treatment when the tooth is in its place in the arch, having in mind that additional 10 to 18 months are required for completion of orthodontic treatment [12].

One of the possible complications of impacted mandibular premolars is the occurrence of developmental cyst of odontogenic origin [3]. These cysts are common in impacted, retained or developing teeth. As they give none or minor symptomatology they are usually diagnosed accidentally during routine examination or radiography. These cystic lesions often reach large dimensions that may lead to mobility and migration of surrounding teeth or resorption of their roots. Therefore, complete removal of cystic lesions (cystectomy) with impacted tooth extraction are necessary [13]. Sometimes, in order to keep the tooth, marsupialization, that has aim to decompress and fenestrate cystic wall is performed with release of impacted tooth and continuation of the orthodontic treatment [14].

There is an increasing number of young patients with impacted permanent teeth problem (not just wisdom

teeth) and successful correction of existing orthodontic anomaly is often complex and lengthy process. Careful and thorough treatment planning, as well as good cooperation of oral surgeon and orthodontists, is crucial to achieving treatment success. Teamwork, regular check-ups and good patient cooperation eventually lead to excellent results.

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Received: 11.04.2017 • Accepted: 08.08.2017

Hirurško-ortodonska terapija impaktiranog drugog donjeg premolara – prikaz slučaja

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KRATAK SADRŽAJ

Impaktirani zub je onaj koji nije uspeo da dosegne okluzalnu ravan, sa završenim rastom 2/3 korena. Različiti su razlozi impakcije zuba, ali glavnim razlogom se smatra nedostatak prostora za njegovo nicanje. Najčešće impaktirani zubi su donji umnjaci, zatim gornji umnjaci, gornji očnjaci i, nešto ređe, donji premolari. Postoji jako malo studija koje su se bavile problemom impaktiranih donjih premolara, njihovom etiologijom, prevalencom i terapijom. Pacijentkinja (22) javila se na pregled kod ortodonta zbog korekcije zuba u donjoj vilici, uzrokovanih teskobom. Nakon analize ortopan snimka uočen je impaktiran donji desni drugi premolar koji je uzrokovao resorpciju mezijalnog korena prvog molara. Plan terapije bilo je vađenje zuba 46 i postavljanje bravice na impaktirani drugi premolar. Sledeća faza je ortodonska ekstruzija zuba 45, njegovo dovodenje u okluzalnu ravan uz dalju ortodonsku terapiju. Ortodonski tretman impaktiranih zuba fiksnim ortodonskim aparatom daje odlične terapijske rezultate. Uspešnost terapije zavisi, pre svega, od adekvatnog planiranja od samog početka, kao i saradnje i zajedničkog rada specijalista oralne hirurgije i ortodontije.

Ključne reči: impaktirani donji premolar; ortodonska ekstruzija; vađenje zuba; resorpcija korena zuba

UVOD

Impaktirani donji premolari nisu tako retka pojava u svakodnevnoj stomatološkoj praksi. Nakon donjih i gornjih umnjaka i gornjih očnjaka oni su najčešće impaktirani zubi [1]. Mandibularni premolari niču nakon nicanja prvog donjeg molara i očnjaka, tako da često nedostaje dovoljno prostora za nicanje oba premolara, što dovodi do impakcije jednog od njih, najčešće drugog premolara [2]. Razlozi za njihovu impakciju su brojni, počevši od nedostatka prostora, ektopičnog položaja zametka, prisustva prepreke (mlečni zub, tumor, ožiljno tkivo) koja se našla na putu nicanja premolara, prisustva prebrojnih zuba ili odontoma. Neka od sistemskih i genetskih oboljenja mogu uticati na pojavu impakcije mandibularnih premolara; pre svega, misli se na kleidokranijalnu displaziju, osteoporozu, Daunov sindrom, hipotiroidizam i hipopituitarizam [3, 4, 5].

Tretman impaktiranih mandibularnih premolara je različit u zavisnosti od položaja zuba, dubine impakcije, odnosa sa okolnim zubima, kao i toga da li je i kakva ortodonska terapija planirana. Način terapije obuhvata timski rad ortodonta koji pravi plan lečenja i oralnog hirurga sa kojim je obavljena konsultacija pre hirurške intervencije, kojom će se omogućiti pristup impaktiranom zubu. Postupak podrazumeva hirurško oslobađanje krunice impaktiranog premolara, lepljenje ortodonske bravice, uz dalji ortodonski tretman fiksnim aparatom. Jedan od uslova za uspešnu terapiju jeste i to da nagib impaktiranog premolara ne sme biti veći od 45° [6].

U ovom slučaju terapija je podrazumevala hirurško oslobađanje impaktiranog drugog donjeg premolara uz kasniji ortodonski tretman.

PRIKAZ BOLESNIKA

Pacijentkinja (22) javila se kod ortodonta na pregled zbog rešavanja problema nepravilnog položaja zuba (teskoba) u donjoj vilici (Slika 1). Nakon analize ortopan snimka utvrđeno je da

je desni premolar u donjoj vilici impaktiran, sa sumnjom da postoji resorpcija mezijalnog korena prvog molara koji je u kontaktu sa impaktiranim zubom. Takođe, primećen je i nedostatak prvog premolara u trećem kvadrantu, kao i prisustvo neizniklog umnjaka u četvrtom kvadrantu (Slika 2). Pacijentkinja je potpuno zdrava i u stomatološkoj anamnezi negira prethodne ekstrakcije zuba i bilo kakve ortodonske intervencije. Takođe, ne navodi postojanje bolova ili neugodnosti u orofacijalnoj regiji.

Ortodont je pacijentkinju zatim poslao na pregled kod oralnog hirurga. Oralni hirurg je nakon kliničkog pregleda, analize ortopana i konsultacije sa ortodontom napravio plan terapije, koji je podrazumevao kombinovani hirurško-ortodonski tretman. S obzirom na to da je impaktirani drugi premolar bio u vertikalnom položaju, planirana je njegova ortodonska ekstruzija uz vađenje prvog molara. Prvi molar će biti ekstrahovan prvenstveno zbog resorpcije njegovog mezijalnog korena od strane impaktiranog drugog premolara, te zbog pravljenja mesta za smeštanje premolara.

Nakon što je prethodno postavljen fiksni ortodonski aparat obavljena je oralno-hirurška intervencija u lokalnoj anesteziji. Pažljivo je podignut ugaoni sulkusni režanj pune debljine od očnjaka do drugog molara, pri čemu se vodilo računa o blizini bradnog živca (n. mentalis). Zub 46 je pažljivo izvađen kleštima, pri čemu je uočena resorpcija središnjeg dela njegovog mezijalnog korena, nastalog usled pritiska krunice impaktiranog premolara 45. Zatim je izvađen i vrh mezijalnog korena prvog molara (Slika 3). Ekstrakcijom zuba 46 eksponirana je cela krunica impaktiranog drugog premolara (Slika 4). Dodatno je diskretno oslobođena kost oko krunice zuba 45 karbidnim borerima uz konstantno hlađenje borera sterilnim fiziološkim rastvorom. Time je omogućeno lepljenje bravice (Slika 5) i dodatno olakšan put nicanja impaktiranom zubu 45. Rana je isprana fiziološkim rastvorom i ušivena pojedinačnim šavovima, koji su uklonjeni nakon sedam dana. Pacijentkinji su dva dana ranije propisani antibiotici (Dovicin 100 mg, sedam dana), za bržu resorpciju edema i hematoma dat je Chymoral Forte 5 dana i analgetici koje je koristila po potrebi.

Dalji ortodontski tretman se tokom narednih šest meseci zasnivao na ekstruziji impaktiranog premolara, kao i njegovom postavljanju na mesto u zubnom luku i dostizanju okluzalne ravni (Slika 6). Ujedno je korigovana i teskoba zuba u donjoj vilici uopšte. Ortodontska terapija će u potpunosti biti završena nakon nicanja umnjaka u četvrtom kvadrantu, kojim će se u potpunosti postići stabilna okluzija u bočnoj regiji.

DISKUSIJA

Podaci o problemima impaktiranih donjih premolara nisu prisutni u literaturi u većoj meri bez obzira na to što je učestalost impakcije tih zuba kod pacijenata prilično velika [7]. Princip lečenja ovakvih zuba je multidisciplinarnan, uz saradnju ortodontata sa oralnim i maksilofacijalnim hirurzima, dečjim stomatolozima, a nekada i endodontistima [8]. Kakav način terapije će biti odabran zavisi od više faktora, pre svega od postojanja dovoljno prostora za nicanje impaktiranog zuba, dubine impakcije, stepena formiranosti korena, potrebe za ekstrakcijom prvog molara, dužine trajanja terapije, prisustva keratinizovane gingive. Osim njih, značajan uticaj imaju i opšte zdravstveno stanje pacijenta, stanje zuba i oralne higijene, kao i funkcija i okluzija zuba [9, 10]. Andreasen [1] preporučuje da hirurško ekspaniranje impaktiranih premolara treba biti ograničeno samo na slučajeve kada angulacija zuba nije veća od 45° i u gornjoj i donjoj vilici. Međutim, u praksi se mogu sresti slučajevi horizontalne impakcije mandibularnih premolara koje su uspešno sprovedenom hirurško-ortodontskom terapijom postavljene na svoje mesto u zubnom nizu [8].

U slučajevima kada se na osnovu analize OPT snimka i kliničkog pregleda dijagnostikuje nedostatak prostora za nicanje impaktiranih mandibularnih premolara, obavezni su redovni kontrolni pregledi, zatim ekstrakcije mlečnih zuba i praćenje položaja stalnih premolara. Ukoliko je potrebno, vrši se hirurško oslobađanje krunice zuba, sa ortodontskom vučom ili bez

nje, ili repozicija (autotransplantacija). Međutim, nekada nije moguće na bilo koji način impaktirani mandibularni premolar dovesti na njegovo mesto u zubnom nizu i tada se vrši hirurško vađenje tog zuba [11].

Ukoliko impaktirani mandibularni premolar želimo da smestimo na svoje mesto u zubnom nizu, primenjuje se ortodontska terapija zuba, koja se može podeliti u tri faze. Prva faza obuhvata početak ortodontske terapije hirurški ekspaniranog zuba u trajanju od dva do pet meseci, u zavisnosti od vrste anomalije. Druga faza nastupa od početka vuče zuba do njegovog smeštanja u zubni luk i traje od 12 do 18 meseci. Treća faza je završetak ortodontske terapije, kada je zub na svom mestu u luku. S tim da se obično planira još oko 10–18 meseci za potpuni završetak ortodontske terapije [12].

Jedna od mogućih komplikacija koje srećemo kod impaktiranih mandibularnih premolara je i pojava razvojne ciste odontogenog porekla [3]. Ove ciste su česta pojava kod impaktiranih, retiniranih zuba ili kod zuba u nicanju. Pošto ne daju nikakvu ili daju slabu simptomatologiju, obično se dijagnostikuju slučajno tokom rutinskog pregleda ili radiografije. Ove cistične lezije dostižu često velike dimenzije koje mogu dovesti do mobilnosti i migracije okolnih zuba ili resorpcije njihovih korenova. Zbog toga je neophodno njihovo uklanjanje u celosti (cistektomija) uz vađenje impaktiranog zuba [13]. Nekada se u cilju zadržavanja zuba vrši marsupijalizacija uz dekompresiju i fenestraciju cističnog zida [14], uz oslobađanje impaktiranog zuba i nastavlja ortodontski tretman.

Sve je veći broj mladih pacijenata sa problemom impaktiranih i drugih stalnih zuba (ne samo umnjaka) i teži se uspešnoj korekciji postojeće ortodontske anomalije, što predstavlja prilično složen i dugotrajan proces. Za postizanje uspeha od ključne važnosti je pažljivo i temeljno planiranje terapije, kao i dobra saradnja oralnog hirurga i ortodonta. Timski rad, redovni kontrolni pregledi uz dobru saradnju pacijenta na kraju daju odlične rezultate u lečenju ovakvih ortodontskih malformacija.