

Primljen/ Recived on: 12.03.2014.
 Revidiran/ Revised on: 04.04.2014.
 Prihvaćen/ Accepted on: 11.04.2014.

KLINIČKI RAD
 CLINICAL ARTICLE
 doi: 10.5937/asn1469348J

EKSTRAKCIJA I NEEKSTRAKCIJA TERAPIJA PACIJENATA SA MALOKLUZIJOM II-1 KLASSE

EXTRACTION AND NON-EXTRACTION THERAPY IN CLASS II /1 PATIENTS

Predrag N Janošević†, Mirjana Lj Janošević*†, Gordana Lj Filipović*, †Maja D Stošić*,
 Mirjana V Burić†, Donka K Stojanović, Milena M Kostić*†, Milan S Spasić†*

*MEDICINSKI FAKULTET, UNIVERZITET U NIŠU, SRBIJA; †KLINIKA ZA STOMATOLOGIJU

DEPARTMENT OF JAW ORTHOPEDICS, UNIVERSITY OF NIS

Sažetak

Uvod: Malokluzija II klase karakterise se distokluzijom i deli se na dva odeljenja u zavisnosti od inklinacije gornjih frontalnih zuba. Prvo odeljenje se karakterise protruzijom gornjeg fronta. Mogućnosti terapije malokluzije II-1 klase zavise od prisutne skeletne forme, uzrasta pacijenta i funkcionalnog statusa. Terapija dentoalveolarnih oblika II-1 klase bez velike skeletne diskrepance isključivo je ortodontska. Izraženiji skeletni oblici malokluzije II-1 mogu zahtevati pored ortodontskog i hirurško rešenje.

Prikaz slučaja: U radu je prikazana ortodontska terapija kod pacijenata M.P. (dečak) i I.T. (devojčica) uzrasta 13 godina. Dijagnoza je obavljena na osnovu kliničko-funkcionalnog i intraoralnog nalaza, analize studijskih modela, fotografija lica, ortopana i profilnog snimka glave. Predložena je neekstrakciona terapija kod dečaka i ekstrakciona terapija kod devojčice, uz upotrebu gornjeg i donjeg fiksno aparata. U terapiji fiksno aparatima tehnikom pravog luka korišćene su Dentaurum bravice Root preskripcija, slot 22.

Kod dečaka M.P. postojao je blagi maksilarni prognatizam, mandibularni retrognatizam, anteriorni tip rasta, protruzija gornjeg, a retruzija donjeg fronta. Korpus maksile bio je 2 mm duži u odnosu na kranijalnu bazu. U slučaju devojčice I.T odlučili smo se za ekstrakciju gornjih prvih premolara zbog postojanja maksilarnog prognatizma, mandibularnog retrognatizma, povećane dužine korpusa maksile, smanjene dužine korpusa mandibule i izražene protruzije gornjeg fronta. Nakon završetka terapije, kod oba pacijenta postignita je funkcionalna okluzija i poboljšanje facijalne estetike. Promene na licu bile su vidljivije kod pacijenta kod kojeg je sprovedena ekstrakciona terapija. Po završetku terapije neophodno je sprovesti retenciju postignutih rezultata.

Ključne reči: malokluzija II/1, terapija

Abstract

Introduction: Class II malocclusion is characterized by distocclusion and is divided into two divisions depending on the inclination of the upper front teeth. The first division is characterized by protrusion of the upper front teeth. Treatment possibilities of class II/1 malocclusion depend on the skeletal form. Therapy of dentoalveolar types of class II/1 malocclusion is exclusively orthodontic. More emphasized skeletal forms of class II/1 malocclusion may require surgery apart from orthodontic therapy.

Case report: In this paper, the extraction and nonextraction treatment of 13 years old patients - M.P.(boy) and I.T. (girl) was shown, respectively. The diagnosis was based on clinical and functional intraoral findings, analysis of dental casts, face photos, orthopantomogram and profile x-ray. Nonextraction therapy was suggested for a boy and extraction therapy for a girl, combined with the use of upper and lower fixed appliances. In the treatment, technique of straight arch, Dentaurum brackets, root prescriptions, slot 22 were used. In the male patient, there was a slight maxillary prognathism, mandibular retrognathism, anterior type of growth, protrusion of the upper incisors and retrusion of the lower ones. The body of maxilla was shorter by 4 mm with regard to the cranial base. In the female patient the extraction of the upper first premolars was performed because of maxillary prognathism, mandibular retrognathism, increased length of the body of maxilla, decreased length of the body of maxilla and severe protrusion of the upper frontal teeth. After the treatment, functional occlusion and improvement in facial aesthetics was achieved in both patients. Facial changes were more apparent in the patient who underwent the extraction treatment. After completion of treatment, it is necessary to maintain the obtained results.

Key words: Class II/1 malocclusion, therapy

Address for correspondence:

Predrag Janosevic
 Department of Jaw Orthopedics,
 University of Nis, Faculty of Medicine, Serbia,
 Clinic of Dentistry
 Address: Radoja Dakica 49A/20
 E-mail: predragjanosevic82@gmail.com

© 2014 Faculty of Medicine in Niš. Clinic of Dentistry in Niš. All rights reserved / © 2014. Medicinski fakultet Niš. Klinika za stomatologiju Niš. Sva prava zadržana

Uvod

Malokluzija II klase se karakterise distokluzijom i deli se na dva odeljenja u zavisnosti od inklinacije gornjih frontalnih zuba. Prvo odeljenje se karakteriše protruzijom gornjeg fronta, pri čemu može postojati rastresitost, pravilan kontakt zuba ili teskoba. Maksilarni zubni niz je najčešće izdužen i sužen, mandibularni zubni niz je često kratak zbog retruzije donjeg fronta udružene sa teskobom.

Kod osoba sa ovom malokluzijom često postoji poremećaj orofacijalnih funkcija, inkompetencija usana, infantilno gutanje, kao i konveksni profil lica sa isturenom gornjom, a distalno postavljenom donjom usnom i bradom.

Malokluzija II-1 se relativno često viđa u svakodnevnoj ortodontskoj praksi¹. Njena učestalost varira u različitim delovima sveta. Prisutna je kod 17,6% adolescenata u Iranu², kod 40% adolescenata u Turskoj³, dok je u Brazilu zastupljena kod 18,4%⁴.

Postoje različite skeletne varijacije malokluzije II-1: maksilarni normognatizam sa mandibularnim retrognatizmom, maksilarni prognatizam sa mandibularnim retrognatizmom, maksilarni prognatizam sa mandibularnim normognatizmom, bimaksilarni prognatizam sa dominacijom prognatizma maksile, bimaksilarni retrognatizam sa dominacijom retrognatizma mandibule.

Smatra se da je mandibularni retrognatizam najčešća karakteristika II/1 klase, dok se maksilarni prognatizam ne viđa često⁵. Nasuprot ovoj tvrdnji, Rothstein⁶ kaže da je mandibula kod ovih pacijenata često pravilno razvijena i u normopoziciji, dok je Rosenblum⁷ pronašao da čak 56,6% pacijenata sa malokluzijom II/1 ima maksilarni prognatizam, a samo 26,7% mandibularni retrognatizam.

Mogućnosti terapije malokluzije II-1 zavise od prisutne skeletne forme, uzrasta pacijenta i funkcionalnog statusa. U planiranju terapije najvažnije je razumevanje skeletne morfologije i odnosa vilica kod ovih pacijenata¹.

Terapija dentoalveolarnih oblika II-1 klase bez velike skeletne diskrepance isključivo je ortodontska. Izraženiji skeletni oblici malokluzije II-1 mogu zahtevati, pored ortodontskog, i hirurško rešenje⁸.

Introduction

Class II malocclusion is characterized by distocclusion and is divided into two divisions depending on the inclination of the upper front teeth. The first division is characterized by protrusion of the upper front. Protrusion can be combined with diastemata, correct approximal tooth contact or crowding. Maxillary dental arch is in most cases elongated and narrow, whereas mandibular dental arch is commonly short due to retrusion of the lower front.

Persons with this malocclusion often develop orofacial functional disorders, lips incompetence and infantile swallowing. There is a convex face profile with prominent upper lip and distally positioned lower lip and chin.

Malocclusion II-1 is commonly seen in everyday orthodontic practice. Its appearance may vary in different parts of the world, and it is present in 17,6% of adolescent in Iran², 40% of adolescent in Turkey³, while there are 18,4%⁴ in Brazil. There are different skeletal variations of class II-1 malocclusion: maxillary normognathism with mandibular retrognathism, maxillary prognathism with mandibular retrognathism, maxillary prognathism with mandibular normognathism, bimaxillary prognathism with domination of maxilla, bimaxillary retrognathism with domination of mandible.

Mandibular retrognathism is considered as the most common feature of class II/1 malocclusion⁵, while maxillary prognathism is not commonly seen. Unlike this theory, Rothstein⁶ states that mandible of these patients is often normally developed and in normoposition, while Rosenblum⁷ found that even 56,6% of patients with class II/1 malocclusion have maxillary prognathism and only 26,7% have mandibular retrognathism.

Treatment possibilities of class II/1 malocclusion depend on the skeletal form, patient's age and functional status.

Understanding of skeletal morphology and jaws relationship in these patients is a key element in planning the therapy¹.

Therapy of dentoalveolar types of class II/1 malocclusion without big skeletal discrepancy is exclusively orthodontic. More emphasized skeletal shapes of class II/1 malocclusion may require surgical therapy, apart from orthodontic one⁸.

Kod pacijenata sa maksilarnim prognatizmom ortodonska terapija može podrazumevati ekstrakciju gornjih prvih premolara i retrudiranje gornjih frontalnih zuba⁹.

Neekstrakciona terapija II/1 klase se može sprovesti i onda kada je moguća distalizacija molara uz upotrebu headger-a, mini implanata pozicioniranih distalno ili palatinalnih konstrukcija kakva je pendulum za distalizaciju molara uz ekstrakciju umnjaka¹⁰.

Pacijenate sa malokluzijom II-1 klase i vertikalnim tipom rasta je nešto teže lečiti. U njihovoj terapiji je često potreban headger sa parijetalnim sidrenjem kako bi se postigla impakcija maksile, intruzija maksilarnih prvih stalnih molara i posledična anteriorna rotacija mandibule. Nekada terapija ovih pacijenata koji su završili sa rastom zahteva i hiruršku intervenciju.

U mnogim slučajevima kod pacijenata sa malokluzijom II-1 postoji maksilarna uskost, koja prinudno drži mandibulu u retrognatom položaju ("moccasin-like" effect by McNamara)¹¹.

Ukoliko je distokluzija nastala usled retrognatizma mandibule dobri rezultati u terapiji mogu se postići upotrebom funkcionalnih aparata¹², ali samo u periodu najintenzivnijeg skoka u rastu. Moguća je i upotreba fiksnih funkcionalnih aparata (herbst) ili elastične intermaksilarnе vuče II klase u okviru terapije fiksnim aparatima.

Cilj ovog rada bio je da se uporede rezultati terapije kod dva pacijenta u pubertetskom uzrastu sa malokluzijom II-1 klase, blagim maksilarnim prognatizmom i mandibularnim retrignatizmom, koji su lečeni neekstrakcionom i ekstrakcionom terapijom uz primenu fiksnih aparata.

Ispitanici i metode

Pacijenti M.P. (dečak) i I.T. (devojčica) uzrasta 13 godina su sa roditeljima došli na ortodonsko odeljenje Klinike za stomatologiju u Nišu tražeći mišljenje o postojećem ortodonskom problemu. U školi koju deca pohađaju, na sistematskom pregledu, obavešteni su o potrebi za ortodonskim tretmanom.

Dijagnoza je obavljena na osnovu kliničkofunkcionalnog i intraoralnog nalaza, analize studijskih modela, fotografija lica, ortopana i profilnog snimka glave.

In patients with maxillary prognathism, orthodontic therapy includes extraction of the first pre-molars and retruding of upper front teeth⁹.

Nonextraction therapy of class II-1 patients can be implemented even when molars distalization is possible by using headgear, distally positioned mini implants or palatal structures such as pendulum usually combined with wisdom teeth extraction¹⁰.

Class II-1 patients with vertical type of growth are more difficult to treat. For their treatment headgear is often required, with the parietal anchoring to achieve impaction of maxilla, intrusion of maxillary first permanent molars and consequent anterior rotation of mandible. Sometimes, treatment of these patients also demands surgery.

In many cases, class II-1 patients also have narrow maxilla that forcibly holds the mandible in retrograde position ("moccasin-like" effect by McNamara)¹¹.

If distoclusion is caused by mandibular retrognathism, good results in therapy can be achieved by the use of functional therapy¹², only during the period of most intense stages of growth. Fixed functional appliance (Herbst) and elastic intermaxillary traction can also be used in combination with the fixed appliances.

The aim of this study was to compare the results of extraction and nonextraction therapy in class II-1 patients with maxillary prognathism and mandibular retrognathism at puberty age.

Patients and methods

Patients M.P. (boy) and I. T. (girl), both aged thirteen, came with their parents to the Department of Orthodontics of the Clinic of Dentistry in Nis seeking opinion about the existing orthodontic problem. During general health check at school, they were informed that they needed orthodontic treatment.

The diagnosis was established based on clinical and functional intraoral findings, analysis of dental casts, face photos, orthopantomogram and profile x-ray.

After the diagnostic procedure was completed, non-extraction therapy was proposed for M.P, and extraction therapy for the I.T., with the use of upper and lower fixed appliances..

Nakon sprovedene dijagnostičke procedure, predložena je neekstrakciona terapija kod dečaka i ekstrakciona terapija kod devojčice, uz upotrebu gornjeg i donjeg fiksog aparata.

Nakon pristanka pacijenata i roditelja, otpočeta je terapijska procedura. U terapiji fiksnim aparatima tehnikom pravog luka korišćene su Dentaurem bravice Root preskripcija, slot 22.

Pacijent M.P.

Ekstraoralno ispitivanje: Postojao je konveksan profil. Donja trećina lica bila je skraćena, a labiomenalni sulkus produbljen. Vrh brade je bio postavljen distalno u biometrijskom polju i nije postojala vidljiva asimetrija lica posmatrano an face. Usne su bile kompetentne (slika 1).

Pacijent je imao prepubertetski glas

Upon the consent of the patients and their parents, therapeutic procedures began. In the treatment with fixed appliances, the technique of straight arch, Dentaurem brackets, root prescriptions, slot 22 were used.

Patient M.P.

Extra-oral examination

The profile was convex. The lower third of the face was short and mentolabial sulcus was deep. The chin was placed distally in biometric field, and there was no visible facial asymmetry, the lips were competent (Figure 1).

The patient had a prepuberty voice.



Slika 1. Ekstraoralne fotografije pacijenta M.P. pre i nakon završene terapije
Figure 1. Extraoral photographs of the patient M.P. before and after orthodontic therapy

Intraoralno ispitivanje

Intraoralno ispitivanje je pokazalo prisustvo hroničnog marginalnog gingivitisa, a oralna higijena nije bila najbolja. Pacijent se nalazio u ranom stadijumu stalne denticije.

Sredina donjih sekutića bila je pomerenjena u desno 2mm, a špeova kriva bila je izražena. U donjem frontu je postojala blaga teskoba, dok su bočni zubi bili dobro nivelisani.

Gornji zubni niz bio je simetričan sa protruzijom i umerenom teskobom fronta. Gornji levi lateralni sekutić bio je retrudiran. U bočnim segmentima zubi su bili dobro nivelisani (slika 2).

Intraoral examination

Intraoral examination showed the presence of chronic marginal gingivitis. The patient was in the early stage of the permanent dentition.

The middle of the lower incisors was shifted 2mm to the right, and the curve of Spee was pronounced. Mild crowding was present in the lower front, while molars and premolars were well aligned.

The upper dental arch was symmetrical with moderate crowding and protrusion of the upper front. The upper left lateral incisor was retruded. The molars and premolars were well aligned (Figure 2).



Slika 2. Intraoralne fotografije pacijenta M.P. pre, u toku i nakon završetka terapije
Figure 2. Intraoral photographs before, during and after orthodontic therapy

Analiza studijskih modela pokazala je odnos molara u polu drugoj klasi, sa leve strane očnjaci su bili u polu, a sa desne u punoj drugoj klasi. Incizalna stepenica je bila 4mm, a preklop sekutića 7mm.

Analysis of the dental casts showed $\frac{1}{2}$ class II molar relation, on the left side canines were in the semi class, and on the right in a full class II. Overjet was 4 mm, and overbite was 7mm.

Rendgenografska analiza

Analiza ortopana je pokazala prisustvo svih stalnih zuba, a vidljivi su bili i zameci svih umnjaka.

Radiographic analysis

Orthopantomogram analysis showed the presence of all permanent teeth, and the embryos of all wisdom teeth



Slika 3. Telerendgen pacijenta M.P. na početku i na kraju terapije
Figure 3. Profile X-ray of the patient M.P. before and after therapy

Tabela 1 Vrednosti angularnih parametara analize telerendgena pre i nakon završene terapije (M.P.)
Table 1 Angular parameter values for cephalometric profile X-ray analysis before and after therapy (M.P.)

Parametri/Parameters		Izmerene vrednosti/ Measured values	Treba vrednosti/ Required values	rezultat /Results
		Stepeni /Degree	Stepeni /degree	
SNA	Pre/Before	83°	82°	Maksilarni prognatizam Maxillary prognathism
	Posle/After	83°		Maksilarni prognatizam Maxillary prognathism
SNB	Pre/Before	77°	80°	Mandibularni retrognatizam Mandibular retrognathism
	Posle/After	79°		Mandibularni retrognatizam Mandibular retrognathism
ANB	Pre/Before	6°	2-4°	Odnos vilica u II klasi Distal jaw relationship
	Posle/After	4°		Odnos vilica u I klasi Normal jaw relationship
Bjork sum	Pre/Before	388°	396°	Horizontalni tip rasta Horizontal type of growth
	Posle/After	391°		Horizontalni tip rasta Horizontal type of growth
J angle	Pre/Before	88°	85°	Anteinklinacija maksile Anteinclination of maxilla
	Posle/After	88°		Anteinklinacija maksile Anteinclination of maxilla
Mp angle	Pre/Before	67.5°	65°	Anteinklinacija mandibule Anteinclination of mandible
	Posle/After	64°		Retroinklinacija mandibule Retroinclination of mandible
I/SpP	Pre/Before	65°	70°	Protruzija gornjih sekutića Protrusion of upper incisors
	Posle/After	66.5°		Protruzija gornjih sekutića Protrusion of upper incisors
i/Mp	Pre/Before	86.5°	80°	Retruzija donjih sekutića Retrusion of lower incisors
	Posle/After	73°		Protruzija donjih sekutića Protrusion of lower incisors

Tabela 2. Vrednosti linearnih parametara analize telerendgena pre i nakon završene terapije (M.P.)
Table 2. Linear parameter values for cephalometric profile X-ray analysis before and after therapy (M.P.)

Parametri/Parameters	Izmerene vrednosti/ Measured values	Treba vrednosti/ Required values	Rezultat /Results
	Stepeni /Degree	Stepeni /degree	
Dužina tela maksile/ Corpus max Pre/Before Posle/After	52mm 53mm	56 mm	-4mm -3mm
Dužina tela mandibule/ Corpus mand Pre/Before Posle/After	81.5mm 82.5mm	83mm	-1.5mm -0.5mm

Rezultati analize telerendgena pre početka terapije prikazani su u tabelama 1 i 2 (slika 3). Postojao je blagi maksilarni prognatizam, mandibularni retrognatizam, anteriorni tip rasta, protruzija gornjih, a retruzija donjih sekutića. Korpus maksile je bio kraći 4mm u odnosu na kranijalnu bazu.

Pacijent I.T.

Ekstraoralno ispitivanje

Postojao je konveksni profil, smanjena visina donje trećine lica, produbljen mento labijalni sulkus. Gornja usna je sekla N vertikalnu, donja usna je bila na mestu, a brada je bila postavljena distalno u biometrijskom polju. Lice je bilo simetrično posmatrano en face (slika 4). Postojala je inkompetencija usana. Glas je bio prepubertetski.

Intraoralno ispitivanje

Intraoralno ispitivanje je pokazalo postojanje hroničnog marginalnog gingivitisa i potrebu za poboljšanjem oralne higijene. Pacijent se nalazio u ranom stadijumu stalne denticije.

Gornji zubni niz je bio simetričan, uzak i izdužen. Postojala je protruzija gornjeg fronta i diastema mediana (2mm). Gornji desni očnjak je imao vestibularni položaj uz nepostojanje prostora za njegov smeštaj u zubni niz. Uočena je asimetrija donjeg zubnog niza, pri čemu je sredina sekutića pomerena u levo 2mm. Špeova kriva bila je izražena. Postojala je blaga teskoba u donjem frontu, dok su bočni zubi bili pravilno postavljeni (slika 5). Analiza studijskih modela pokazala je odnos molara u polu drugoj sa desne, a u prvoj klasi sa leve strane. Odnos očnjaka bio je u poludrugoj klasi. Incizalna stepenica i dubina zagrižaja iznosili su 6mm.

Profile x-ray analysis results before the treatment are shown in Table 1 and 2 (Figure 3). There was maxillary prognathism, mandibular retrognathism, anterior type of growth, lower incisors. Body of maxilla was shorter by 4 mm with respect to the cranial base.

Patient I. T.

Extraoral examination

There was a convex profile, reduced height of the lower third of the face, and also deep mentolabial sulcus. The upper lip was cutting the N vertical, the lower lip was in place, chin was placed distally in the biometric field. The face was symmetrical viewed „en face” (Figure 4). There was an incompetence of the lips. The voice was prepubertal.

Intraoral examination

Intraoral examination revealed the existence of chronic marginal gingivitis. The patient was in an early stage of permanent dentition. The upper dental arch was symmetrical, narrow and elongated. There was a protrusion of the upper front and diastema mediana (2mm). The upper right canine had vestibular position with the lack of space in the dental arch. There was an asymmetry of the lower dental arch, while the middle of incisors was moved into the left 2 mm. The curve of Spee was emphasized. There was mild crowding in the lower front, while molars and premolars were well aligned (Figure 5). Analysis of the dental casts showed ½ class II molar relations on the right side, and class I on the left side. The relations of canines were in ½ class II. Overjet and overbite were 6mm.



Slika 4. Ekstraoralne fotografije pacijenta I.T. pre i nakon završetka terapije
Figure 4. Extraoral photographs of the patient I.T. before and after orthodontic therapy



Slika 5. Intraoralne fotografije pacijenta I.T. pre, u toku i nakon završene terapije
Figure 5. Intraoral photographs of the patient I.T. before, during and after orthodontic therapy



Slika 6. Telerendgen pacijenta I.T. pre i nakon završene terapije
Figure 6. Profile X-ray of the patient I.T. before and after therapy

Radiografska analiza

Analiza ortopana je potvrdila prisustvo svih stalnih zuba, pri čemu su bili vidljivi i zameci umnjaka. Rezultati analize telerendgena pre početka terapije prikazani su u tabelama 3 i 4 (slika 6). Postojao je blagi maksilarni prognatizam, mandibularni retrognatizam, anteriorni tip rasta, protruzija gornjeg, a retruzija donjeg fronta. Korpus maksile bio je duži 2 mm u odnosu na kranijalnu bazu.

Pacijent M.P. je u prvoj fazi terapije tretan pokretnim pločastim aparatom u cilju ekspanzije maksilarnog zubnog niza. Terapija je nastavljena fiksnim ortodontskim aparatom tehnikom pravog luka. U prvoj fazi je odrađena nivelacija zubnih nizova, dok je u drugoj fazi korišćena intermaksilarna elastična vuča II klase za uspostavljanje pravilnih okluzalnih odnosa. Odlučili smo se za ovaj terapijski pristup zbog postojanja blagog maksilarnog prognatizma, umerenog mandibularnog retrognatizma i ne tako izražene protruzije gornjeg fronta. Početna nivelacija je sprovedena NiTi lukovima 0,12 i 0,14. U sledećoj fazi, za korekciju distalnog zagrižaja primenjena je intermaksilarna vuča na četvrtastim NiTi lukovima 0,16x0,16 i na čeličnom luku 0,16x0,22. Terapija je trajala 21 mesec. Retencija je sprovedena Havlejevima retejnerima.

Radiographic analysis

Orthopantomogram analysis confirmed the presence of all permanent teeth, with visible embryos of all wisdom teeth. Profile x-ray analysis results before the treatment are shown in Table 3 and 4 (Figure 6). There were a slight maxillary prognathism, mandibular retrognathism, anterior type of growth, protrusion of the upper and retrusion of the lower incisors. Body of maxilla was 2mm longer in comparison to the cranial base.

In the first stage of treatment, the patient M.P. was treated with mobile appliance in order to expand maxillary dental arch. Therapy was continued with fixed appliances (technique of straight arch). In the first phase, leveling of dental arches was done, while in the second phase intermaxillary elastic traction of class II was used to establish a proper occlusal relationship. We decided to use this therapeutic approach because of slight maxillary prognathism, moderate mandibular retrognathism and not so emphasized protrusion of the upper incisors. At the beginning, leveling was performed with NiTi archwires, 0.12 and 0.14. In the next phase of therapy, the correction of the distal occlusion using intermaxillary traction by square NiTi archwires 0,16 x0,16 and the stainless steel archwires 0,16 x0,22 was performed. The treatment lasted 21 months. Retention was conducted with Hawley retainers.

Pacijent (I.T.) je tretiran ekstrakcionom terapijom u gornjoj vilici uz upotrebu fiksnih aparata. Odlučili smo se za ekstrakciju gornjih prvih premolara zbog postojanja maksilarnog prognatizma, mandibularnog retrognatizma, povećane dužine korpusa maksile, smanjene dužine korpusa mandibule i izražene protruzije gornjeg fronta. Nakon ekstarkcije gornjih prvih premolara postavljeni su fiksni aparati. U prvoj fazi terapije sprovedena je nivelacija zubnih nizova, spuštanje gornjeg desnog očajnika u zubni niz, u drugoj fazi je retrudiran gornji front na račun preostalog oslobođenog prostora ekstrakcionim putem. Lečenje je sprovedeno fiksnim aparatima tehnikom pravog luka. Početna nivelacija je izvedena okruglim NiTi lukom 0,12 i 0,14 uz obostranu primenu lace backa. Nakon nivelacije, distalizacija gornjih očajnika je sprovedena na četvrtastom NiTi luku 0,16x0,16 uz pomoć kliznih mehanizama i stopera ispred tuba postavljenih na prvim stalnim molarima. Definitivno zatvaranje prostora i korekcija zagrižaja uz primenu intermaksilarne vuče druge klase sprovedeno je na čeličnom luku 0,16x0,22.

Terapija je trajala 20 meseci, a retencija je sprovedena gornjim i donjim havlejevima retejnerima.

Po završetku terapije, kod pacijenta M.P. postignut je odnos očajnika i prvih stalnih molara u I klasi, dok je na kraju terapije kod pacijenta I.T. postignut odnos očajnika u I klasi, a odnos prvih stalnih molara u drugoj klasi. Ovakav okluzani nalaz na kraju terapije bio je očekivan, s obzirom da je kod pacijenta I.T. sprovedena ekstrakciona terapija.

Rezultati terapije praćeni su i analizirani na osnovu analize fotografija lica (Slika 1 i 4), intraoralnih fotografija (slika 2 i 5), na osnovu analiza pre i postterapijskih profilnih snimaka glave i ortopana (slika 3 i 6), kao i na osnovu skica koje su odrađene superponiranjem profilnih snimaka glave pre i nakon završene ortodontske terapije (slika 7 i 8).

Rezultati analize profilnih snimaka glave pacijenata nakon završene terapije prikazani su u tabelama 1,2,3 i 4.

Patient (I.T.) was treated with extraction therapy in the upper jaw using fixed appliances. We decided to extract the upper first premolars because of maxillary prognathism, mandibular retrognathism, increased length of maxillary corpus, reduced length of mandibular corpus and severe protrusion of upper incisors. After extraction of the upper first premolars, fixed appliances were set. The first stage of the treatment resulted in leveling and placing the upper right canine in dental arch with NiTi archwires 0.12 and 0.14. In the second phase the upper front was retruded on the account of the (remaining) free space which was made by extraction therapy with square NiTi 16x16 and 16x22 and with use of laceback sliding mechanism and stoppers placed in front of the first molars tubes. Final area space closing and bite correction were performed by intermaxillary class II elastics on stainless steel archwire 0,16 x0,22.

The treatment lasted 20 months and it included retention with the upper and lower Hawley retainer. After the treatment was done, in the the patient M.P., the relationship between canine and first molars within class I was obtained, while the patient I.T. had class I canine and class II molar relationship. Such occlusal results at the end of treatment of the patient I.T. were expected according to extraction therapy which was applied.

The results of treatment were observed using the analysis of facial photographs (Figure 1 and 4), intraoral photographs (Figure 2 and 5), analysis of the pre- and post therapy profile x-rays (Figure 3 and 6) and based on sketches which were carried out by superimposing the profile x rays before and after the orthodontic treatment (Figure 7 and 8).

Results of the analysis of profile x rays of patients before and after completion of therapy are shown in Tables 1,2,3 and 4.

Tabela 3. Vrednosti angularnih parametara analize telerendgena pre i nakon završene terapije (I.T.)**Table 3.** Angular parameter values for profile x-ray analysis before and after therapy (I.T.)

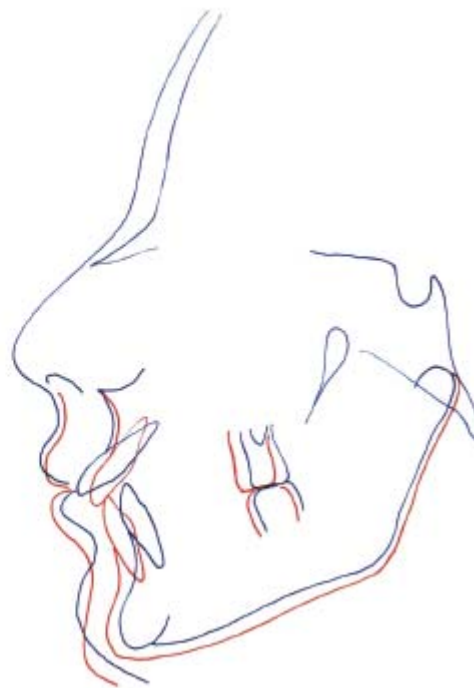
Parametri/Parameters		Izmerene vrednosti/ Measured values	Treba vrednosti/ Required values	Rezultati/Results
		Stepeni/Degree	Stepeni/Degree	
SNA	Pre/Before	83°	82°	Maksimalni prognatizam Maxillary prognathism
	Posle/After	81.5°		Maksimalni normognatizam Maxillary normognathism
SNB	Pre/Before	75°	80°	Mandibularni retrognatizam Mandibular retrognathism
	Posle/After	77.5°		Mandibularni retrognatizam Mandibular retrognathism
ANB	Pre/Before	8°	2-4°	Odnos vilica u II klasi Distal jaw relationship
	Posle/After	4°		Odnos vilica u I klasi Normal jaw relationship
Bjork sum	Pre/Before	391°	396°	Horizontalni tip rasta Horizontal type of growth
	Posle/After	396°		Pravilan tip rasta Normal type of growth
J angle	Pre/Before	84°	85°	Retroinklinacija maksile Retroinclination of maxilla
	Posle/After	84°		Retroinklinacija maksile Retroinclination of maxilla
Mp angle	Pre/Before	68°	65°	Anteinklinacija mandibule Anteinclination of mandible
	Posle/After	65°		Normoinklinacija mandibule Normoinclination of mandible
I/SpP	Pre/Before	53°	70°	Protruzija gornjih sekutića Protrusion of upper incisors
	Posle/After	68°		Protruzija gornjih sekutića Protrusion of upper incisors
i/Mp	Pre/Before	87°	80°	Retruzija donjih sekutića Retrusion of lower incisors
	Posle/After	85°		Retruzija donjih sekutića Retrusion of lower incisors

Tabela 4. Vrednosti linearnih parametara analize telerendgena pre i nakon završene terapije (I.K.)**Table 4.** Linear parameter values for cephalometric profile x-ray analysis before and after therapy (I.T.)

Parametri/Parameters		Izmerene vrednosti/ Measured values	Treba vrednosti/ Required values	Rezultati/Results
Corpus max	Pre/Before	48mm	46 mm	+2mm
	Posle/After	48mm		+2mm
Corpus mand	Pre/Before	68mm	72mm	-4mm
	Posle/After	70mm		-2mm



Slika 7. Superpozicija skica telerendgena pacijenta M.P. na početku i na kraju terapije
Figure 7. Superposition of profile X-rays of the patient M.P. before and after therapy



Slika 8. Superpozicija skica telerendgena pacijenta I.T. pre i nakon završene terapije
Figure 8. Superposition of profile X-rays of the patient I.T. before and after therapy

Diskusija

Kod pacijena M.P. nije došlo do velike promene u inklinaciji gornjeg fronta ali je došlo do protrudiranja donjih frontalnih zuba. Protruzija donjeg fronta nije bila klinički izražena, ali je bila evidentna na telerendgenu. Za vreme terapije intermaksilarnom vučom II klase dolazi do distalnog pomeranja gornjih frontalnih zuba i mezijalnog pomeranja donjih zuba, pri čemu je pomeranje donjih zuba veće u odnosu na zube u maksili. Kao rezultat elastične vuče II klase može nastati izraženija protruzija donjeg fronta, a ona može biti faktor nestabilnosti postignutog rezultata i pojave recidiva usled dejstva muskulature donje usne.¹⁰

Kod pacijenta I.T. postignuta je značajna retruzija gornjeg fronta zahvaljujući prostoru dobijenom ekstrakcijom premolara, dok nije došlo do značajnijih promena u inklinaciji donjih frontalnih zuba.

Discussion

During the treatment of the patient M.P., there was no major change in the inclination of the upper front but there was a protrusion of the lower anterior teeth. The protrusion of the lower front was not clinically expressed but was evident in the profile x-ray. During the treatment with intermaxillary traction of class II there is a distal movement of the upper front teeth and the mesial movement of the lower teeth. Moving of the lower teeth is always more pronounced. As a result of treatment of class II patients using intermaxillary elastics, protrusion of the lower front may occur. That can be a factor of instability of achieved results because of the lower lip pressure.

In the extraction treatment of patient I.T., a significant retrusion of the upper front was achieved, while there were no significant changes in the inclination of the lower anterior teeth.

Imajući u vidu uzrast i godine tretiranih pacijenata, možemo objasniti nastale promene u dužini mandibule pubertetskim rastom. Oba pacijenta su imala anteriorni tip rasta, koji je u toku terapije poboljššan.

Kod pacijenta M.P. nije došlo do većih promena u izgledu lica za vreme terapije, došlo je do blagog pomeranja vrha brade mezijalno i do blagog povećanja visine donje trećine lica.

Kod pacijenta I.T. došlo je do većih promena na licu u toku terapije. Došlo je do distalnog pomeranja gornje usne u biometrijskom polju, mezijalnog pomeranja donje usne i posteriorne rotacije brade, što je dovelo do povećanja visine donje trećine lica pacijenta.

Zaključak

U planiranju terapije pacijenata sa malokluzijom II-1 od izuzetne je važnosti detaljna analiza telerendgenskih snimaka pored analize lica i studijskih modela.

Nakon završetka terapije, kod oba pacijenta je postignita funkcionalna okluzija i poboljšanje facijalne estetike. Promene na licu su bile vidljivije kod pacijenta kod koga je sprovedena ekstrakciona terapija. Po završetku terapije, neophodno je sprovesti retenciju postignutih rezultata, s tim da se veća pažnja u ovom smislu mora pokloniti pacijentu kod koga je sprovedena ekstrakciona terapija, zbog promene inklinacije donjih frontalnih zuba, što može povećati mogućnost pojave recidiva.

Having in mind the age of treated patients, we can explain the change in the corpus length of the mandible as a result of adolescent growth. Both patients had anterior type of growth that was improved in the course of therapy.

During nonextraction treatment of patient M.P. there were no major changes in facial appearance. There was a slight mesial movement of the chin and a slight increase in the height of the lower third of the face.

In treatment of patient I. T. there were major changes in the facial appearance. There was a distal movement of the upper lip, medial movement of the lower lip in the biometric field and posterior rotation of chin, which led to an increase of the lower third of the face high.

Conclusion

When planning the treatment of class II-1 patients, detailed analysis of profile x rays, besides facial analysis and analysis of dental casts, is the most important thing.

After finishing the treatment, both patients had improvements in functional occlusion and facial aesthetics. Facial changes were more apparent in a patient who had extraction treatment. After the treatment it is necessary to maintain the achieved results. More attention should be paid to a patient in whom extraction therapy was not applied, due to changes in the inclination of the lower anterior teeth which can increase the possibility of relapse.

LITERATURA / REFERENCES

1. Sidlauskas A, Svalkauskiene V, Sidlauskas M. Assessment of Skeletal and Dental Pattern of Class II Division 1 Malocclusion with Relevance to Clinical Practice. *Baltic Dental and Maxillofacial Journal*. 2006;8:3-8.
2. Hossein M, Atashi A. Prevalence of malocclusion in 13-15 years old children from Tabriz. *J Dent Res Dent Clin Dent Prospects*. 2007;1(1): 13–18.
3. Gelgör IE, Karaman AI, Ercan E. Prevalence of malocclusion among adolescents in central anatolia. *Eur J Dent*. 2007;1(3):125-31.
4. Bittencourt M A V, Machado A W. An overview of the prevalence of malocclusion in 6 to 10-year old children in Brazil. *Dental Press J Orthod* 2010;15(6):113-22
5. McNamara JA. Components of Class II malocclusion in children 8-10 years of age. *Angle Orthod* 1981; 51: 177–201.
6. Rothstein TL. Facial morphology and growth from 10 to 14 years of age in children presenting Class II Division 1, malocclusion: a comparative roentgenographic cephalometric study. *Am J Orthod* 1971; 60: 619–20.
7. Rosenblum ER. Class II malocclusion: mandibular retrusion or maxillary protrusion? *Angle Orthod* 1995; 65: 49–62.
8. Bishara S. Class II malocclusions: diagnostic and clinical considerations with and without treatment. *Semin Orthod* 2006; 1: 11 – 24 .
9. Miethke RR, Lemke U. The Angle Class II division 1 is most often caused by mandibular retrognathism. *Orthodontics* 2004;1: 133–40.
10. Proffit R. W, Fields W.H, Sarver M. D. *Contemporary Orthodontics* 4 th ed. 2007. Mosby New York, USA 285-291.
11. Echarri P. Treatment of class II malocclusion. 2010 Centro de Ortodoncia y ATM, Ladent.
12. Basciftci FA, Uysal T, Büyükerkmen A, Sari Z. The effects of activator treatment on the craniofacial structures of Class II division 1 patients. *Eur J Orthod*. 2003;25(1):87-93.