

## TREATMENT OF SEVERE CROWDING WITH SELF-LIGATING FIXED ORTHODONTIC APPLIANCE

Zorana Stamenković<sup>1</sup>, Nenad Nedeljković<sup>1</sup>, Vladan Mirjanić<sup>2</sup>, Vanja Stojić<sup>1\*</sup>,  
Nemanja Marinković<sup>1</sup>, Ivan Arsić<sup>1</sup>, Jovan Marković<sup>1</sup>, Vanja Krčić<sup>2</sup>

<sup>1</sup> University of Belgrade, Faculty of Dentistry, Clinic for Jaw Orthopedics, Belgrade, Serbia

<sup>2</sup> University of Banja Luka, Faculty of Medicine, Dental Medicine Study Program, Banja Luka, Republic of Srpska, Bosnia and Herzegovina

\* Corresponding author: dr.vanja.stojic@gmail.com

**Abstract:** Introduction: Crowding in orthodontics presents a discrepancy between tooth size and dental arch length. Crowding of teeth is more often diagnosed in mandibular dental arch. Crowding was classified as moderate (-5.1 mm or more of discrepancy), mild (-0.1 and -5 mm) of discrepancy, and no crowding (zero or a positive discrepancy) by W. Proffit. Over the last few years, the use of self-ligating brackets in orthodontics has progressed considerably. According to some authors, selfligating appliances are more effective in treating moderate crowding.

Aim: To present the treatment of severe crowding of both dental arches without premolar extractions, using self-ligating fixed orthodontic appliance.

Material and method: Male patient 12 years old was diagnosed with severe crowding in both upper and lower dental arches. Study cast analysis showed severe crowding of 8 mm in the upper and 9 mm in the lower dental arch with dental class I. Lateral cephalometric analysis showed slight mandibular retrognathism (SNB 78°) with skeletal class I (ANB 4°). There were no significant vertical skeletal deviations (SpP/MP 20°, Bjork's sum 389°, Jarabak 67,7%). Both upper and lower central incisors were retroinclined (I/SpP 102°, IMPA 95°). There were no deviations in maxillary corpus and mandibular corpus and ramus length. Treatment with self-ligating fixed orthodontic appliance was indicated. The active phase of the treatment lasted 26 months. During the treatment, interproximal reduction (IPR) was performed on upper and lower front teeth.

Results and conclusion: Stable class I occlusion was achieved. Both upper and lower dental arches were slightly expanded. Severe crowding was treated successfully. Treatment result was stable, with no signs of relapse, with the overjet of 2 mm and overbite of 3 mm. Severe crowding in young patients can be successfully treated without extractions with self-ligating fixed orthodontic appliance in cases of horizontal growth pattern, with retroinclined upper and lower incisors.

**Key words:** severe crowding, self-ligating fixed orthodontic appliance, interproximal reduction.

### 1. INTRODUCTION

Crowding is one of the most common malocclusions with the frequency of around 25%. Crowding in orthodontics presents a discrepancy between tooth size and dental arch length, (1) Dental crowding occurs when the space required for the correct

alignment of the teeth exceeds the space available in the dental arch. (2) Besides tooth size, according to some authors, crown proportion has been previously suggested as significant determining factor. (3)

Crowding of teeth is more often diagnosed in mandibular dental arch. Crowding was classified as moderate (-5.1 mm or more of discrepancy), mild

(-0.1 and -5 mm) of discrepancy, and no crowding (zero or a positive discrepancy) by W. Proffit.(4)

Over the last few years, the use of self-ligating brackets in orthodontics has progressed considerably. (5) Shortened chair time and slightly less incisor proclination appear to be the advantages of self-ligating systems over conventional systems.(6) According to some authors, self-ligating appliances are more effective in treating moderate crowding.(7) There are published data that show reduced treatment time compared to conventional fixed orthodontic appliances by around 25%. (8) However, recent studies showed that the use of self-ligating brackets results in enlarging intercanine width at cusp level.(9)

## 2. MATERIAL AND METHOD

Male patient at the age of 12, with permanent dentition, was diagnosed with severe crowding in both upper and lower dental arches. Clinical examination showed flat profile, proper position and relation between upper and lower lip (Fig. 1). Intraoral examination showed upper midline shift to the right with increased overbite and class I occlusion (Fig. 2). Study cast analysis showed severe crowding of 8 mm in the upper and 9 mm in the lower dental arch. Lateral cephalometric analysis showed slight mandibular retrognathism (SNB  $78^\circ$ ) with skeletal class I (ANB  $4^\circ$ ) (Fig. 3). There were no significant vertical skeletal deviations (SpP/MP  $20^\circ$ , Bjork's sum  $389^\circ$ , Jarabak



*Figure 1. Extraoral photos of the patient before orthodontic treatment*



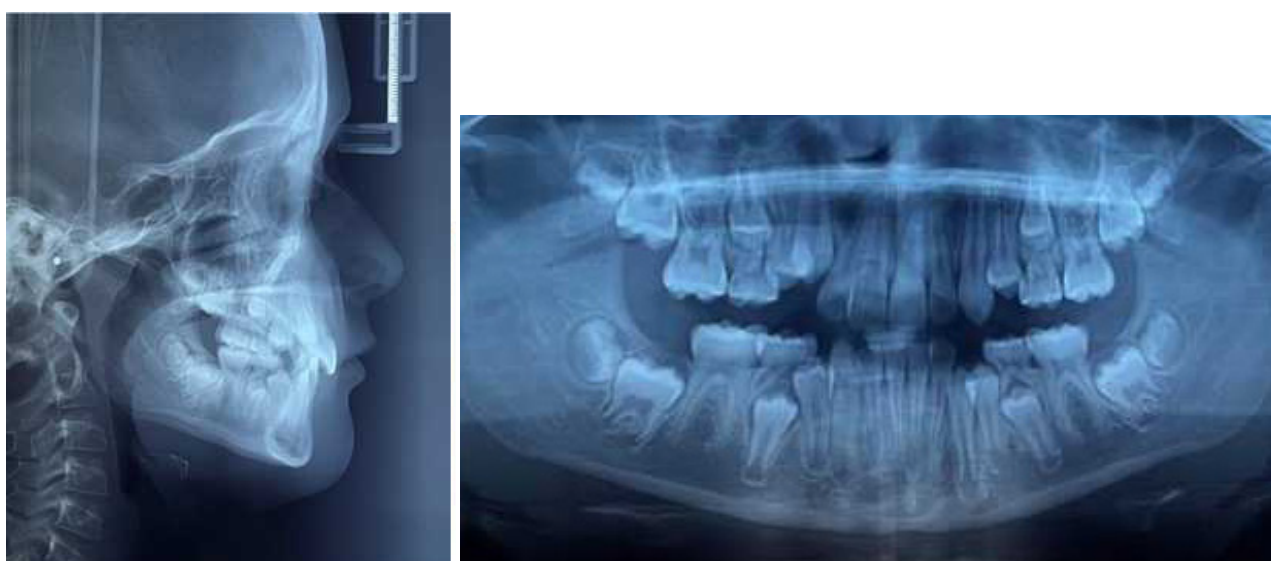
*Figure 2. Intraoral photos of the patient before orthodontic treatment*

67,7%). Both upper and lower central incisors were retroinclined (I/SpP 102°, IMPA 95°). There were no deviations in maxillar corpus and mandibular corpus and ramus length (Fig. 3). Having in mind oral inclination of upper and lower incisors, horizontal facial growth and well balanced profile, treatment with self-ligating fixed orthodontic appliance was indicated (Fig. 4). Self-ligating multibracket system with 0,022 in slot and Roth prescription was used. Check ups were done every 4 to 6 weeks. The active phase of the treatment lasted 26 months. During the treatment, interproximal reduction (IPR) was performed on upper

and lower front teeth. At the end of the active phase of the treatment, intraoral and extraoral photos were made to asses the results of the treatment (Fig. 5,6). During the retention period, treatment results were preserved with removable essix retainers. The patient wore the retainers night time only.

### 3. RESULTS AND CONCLUSION

Position and relation of the lips and harmonic profile were maintained at the end of the treatment (Fig. 5). Stable class I occlusion was acheieved. Both



*Figure 3. Cephalometric and panoramic x ray of the patient before orthodontic treatment*



*Figure 4. Intraoral photos of the patient at the beginning of orthodontic treatment, with selfligating fixed orthodontic appliance*





**Figure 5.** Extraoral photos of the patient at the end of the orthodontic treatment



**Figure 6.** Intraoral photos of the patient at the end of the orthodontic treatment

upper and lower dental arches were slightly expanded. Severe crowding was treated successfully (Fig. 6) which corresponds with the data from the literature.(6,7) During the treatment, additional space for adequate positioning of upper and lower teeth was gained by dental arch expansion, proclination of upper and lower incisors and IPR. Treatment result was stable, with no signs of relapse, with the overjet of 2 mm and overbite of 3 mm.

Severe crowding in young patients can be successfully treated without extractions with self-ligating fixed orthodontic appliance in cases of horizontal growth pattern and skeletal class I with retroinclined upper and lower incisors and narrow dental arches.

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## TRETMAN IZRAŽENE TESKOBNE PRIMENOM SAMOLIGIRAJUĆIH FIKSNIH APARATA

**Sažetak:** Uvod: Teskoba zubnih nizova predstavlja nesklad između veličine zuba i dužine zubnog niza. Češće je prisutna u donjoj vilici. W. Proffit je klasifikovao kao umerenu (više od 5,1 mm nedostatka prostora), blagu (do 5 mm nedostatka prostora) i bez teskobe. Poslednjih decenija je primena samoligirajućih fiksnih ortodontskih aparata značajno zastupljenija. Prema nekim autorima, samoligirajući sistemi su efikasniji od konvencionalnih u terapiji teskobe.

Cilj: Prikazati terapiju izražene teskobe zubnih nizova bez ekstrakcija premolara, pomoću samoligirajućeg fiksnog ortodontskog aparata.

Materijal i metod: Kod dečaka uzrasta 12 godina sa kompletiranom stalnom denticijom dijagnostikovana je izražena teskoba gornjeg i donjeg zubnog niza. Analizom studijskih modela utvrđen je nedostatak prostora od 8 mm u gornjem i 9 mm u donjem zubnom nizu, u I klasi okluzije po Englu. Na početnom profilnom telerendgenskom snimku uočen je maksilarni normognatizam SNA 82°, mandibularni retrognatizam SNB 78° i I skeletna klasa ANB 4°. Nije bilo vertikalnih skeletnih odstupanja, ugao SpP/MP je iznosio 20°. Zbir uglova Bjorkovog poligona bio je 389°, odnos zadnje i prednje visine lica po Jarabaku 67,7%, nagib gornjih sekutića I/SpP 78°, nagib donjih sekutića i/MP 95°, bez odstupanja u vrednostima dužine korpusa maksile, mandibule i ramusa mandibule. Primenjena je terapija samoligirajućim gornjim i donjim fiksnim aparatom. Terapija je trajala 26 meseci uz interproksimalnu redukciju gleđi u predelu gornjih i donjih frontalnih zuba.

Rezultati i zaključak: Tokom terapijskog postupka prošireni su zubni nizovi i obezbeđen prostor za pravilan smeštaj svih zuba. Terapijski rezultat je stabilan, bez znakova recidiva, obostrano okluzija I klase, incizalni razmak 2 mm i dubina preklopa 3 mm. Samoligirajući fiksni ortodontski aparati su efikasno terapijsko sredstvo u lečenju izražene teskobe bez ekstrakcija premolara, kod mladih pacijenata sa horizontalnim tipom rasta i retroinkliniranim gornjim i donjim sekutićima.

**Ključne reči:** izražena teskoba, samoligirajući fiksni ortodontski aparat, interproksimalna redukcija.

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