

COMBINED ORTHODONTIC AND SURGICAL TREATMENT IN PATIENT WITH CLASS III AND FACIAL ASYMMETRY

Zorana Stamenković¹, Nenad Nedeljković¹, Vladan Mirjanić², Zoran Jezdić³,
Jovan Marković¹, Vanja Stojić*¹

¹University of Belgrade, Faculty of Dentistry, Clinic for Jaw Orthopedics, Belgrade, Serbia

²University of Banja Luka, Faculty of Medicine, Study Program Dental Medicine, Banja Luka, Republika Srpska, B&H

³University of Belgrade, Faculty of Dentistry, Clinic for Maxillofacial Surgery, Belgrade, Serbia

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

Abstract: Severe skeletal Class III and facial asymmetry requires combined orthodontic and surgical procedure in order to correct of sagittal and transversal deviations between upper and lower jaw.

Aim: The aim of this case was to present effects of combined orthodontic and surgical treatment on cranio-facial morphology and whole facial aesthetics.

Material and method: In this case a 17-year-old female patient years was treated. Patient had severe skeletal Class III caused by mandibular prognathism, lathernognathism, open bite and crossbite. At the beginning of the treatment overbite was - 3.5mm and overjet - 6mm. Parameters on lateral cephalogram at the beginning of the orthodontic procedure were: SNA 83°, SNB 88°, ANB -5°, SN/SpP 9°, SN/MP 38°, SpP/MP 29°, sum of angles of Björk's polygon 396°, Jarabak ratio 63.26%, I/SpP 47°, i/MP 98°. Orthodontic preparation for surgical treatment lasted 21 months with upper and lower fixed appliance. Surgical procedure was done on both jaws and lower wisdom teeth were extracted. Orthodontic treatment was finished 6 months after surgical intervention.

Results and conclusion: Parameters on control lateral cephalogram at the end of treatment were: SNA 83°, SNB 85°, ANB -2°, SN/SpP 10°, SN/MP 32°, SpP/MP 22°, sum of angles of Björk's polygon 394°, Jarabak ratio 64,20%, I/SpP 47°, i/MP 94°. Patient had stable occlusion in Class I with overjet 1.5mm and overbite 3mm. Both segment of treatment improved significantly facial aesthetics in profile and en face and provided correct occlusion in all three directions.

Key words: skeletal Class III, mandibular prognathism, facial asymmetry, bimaxillary surgery, orthodontic presurgical therapy.

1. INTRODUCTION

Mesial bite is an irregularity in mesial direction with mesial position of the lower arch compared to Class I. Etiological factors for this malocclusion are heredity, local factors, trauma, environmental factors, some syndromes, acromegaly and achondroplasia.^{1,2,3} Incidence of mesial bite is the highest in Asian population with 4-14%, in black population 5-8%, while in white population 1-3%.^{4,5} Frequency of this malocclusion increases over time.

Malocclusions of Class III can be skeletal, neuromuscular and dental.⁶ Skeletal Class III malocclusion may be a consequence of mandibular prognathism, maxillary retrognathism, mandibular prognathism and maxillary retrognathism, prognathism of both jaws with domination of mandibular prognathism and retrognathism of both jaws with domination of maxillary retrognathism.

Patients with skeletal mesial bite have changed relationship between the upper and lower jaw in the sagittal plane, in terms of domination of

the lower jaw. They have typical concave profile. The upper lip is in correct position, while the lower lip and chin are moved forward in the biometric field in patients with mandibular prognathism. In patients with maxillary retrognathism, the upper lip is moved back in the biometric field, while the lower lip and chin are in correct sagittal position. Patients with combination of mandibular prognathism and maxillary retrognathism have irregular position of all structures, upper and lower lip and chin.⁷ Often skeletal class III caused by mandibular prognathism is accompanied with increased lower third of the face and facial asymmetry. Skeletal laterognathism occurs when there is a mandibular deviation to one side caused by asymmetrical development of mandible. Severe mandibular prognathism and facial asymmetry are not only functional problems, but also aesthetic problems that affect patient self esteem and quality of life.⁸

Treatment of skeletal Class III is very complex and time consuming. In mixed dentition, we can use different mobile, active and functional appliances. If skeletal irregularities are not severe in permanent dentition camouflage treatment can be done with fixed appliance. Severe skeletal malocclusion in combination with laterognathism requires a combined surgical and orthodontic treatment after the end of growth.

2. MATERIAL AND METHOD

Female patient, 17 years old was diagnosed with severe skeletal Class III caused by mandibular prognathism, laterognathism, open bite and crossbite. Clinical examination, study cast analysis, intraoral and extraoral photos, orthopantomogram and lateral cephalogram have been done before the treatment. Clinical examination showed concave profile with lower lip and chin moved forward, facial asymmetry and increased lower third of the face (Fig.1). Intraoral



Figure 1. Extraoral photos of patient before orthodontic treatment



Figure 2. Intraoral photos of patient before orthodontic treatment



Figure 3. Lateral cephalogram before the treatment, before surgical procedure and after surgical procedure

examination showed mesial bite, unilateral cross bite and open bite with overbite of -3,5 mm and overjet of -6 mm (Fig.2). Lateral cephalometric analysis indicated maxillary normognathism (SNA 83°), mandibular prognathism (SNB 88°), skeletal Class III (ANB -5°), anteinclination of maxilla (SN/SpP 9°), retroinclination of mandible (SN/MP 38°), increased B angle (SpP/MP 29°), neutral facial growth pattern (Bjork's sum 396°, Jarabak ratio 63.26%), proclined upper incisors (I/SpP 47°), retroclined lower incisors (i/MP 98°) (Fig.3). The preparation for surgical treatment

was done with upper and lower fixed appliance and it lasted for 21 months (Fig. 4). Before surgery control lateral cephalogram was done and the parameters were: SNA 83°, SNB 88°, ANB -5°, SN/SpP 8°, SN/MP 35°, SpP/MP 27°, sum of angles of Björk's polygon 395°, Jarabak ratio 63.26%, I/SpP 46°, i/MP 97° (Fig. 3). Surgical procedure was done on both jaws and lower wisdom teeth were extracted. The patient's jaws were wired closed for 4 weeks after which the intermaxillary elastics were used. The postsurgical orthodontic treatment lasted for 6 months.



Figure 4. Intraoral photos of patient during presurgical treatment

3. RESULTS AND CONCLUSION

Analysis of the final lateral cephalogram at the end of the treatment showed maxillary normognathism (SNA 83°), mandibular prognathism (SNB 85°), skeletal Class III (ANB -2°), anteinclination of maxilla (SN/SpP 10°), normoinclination of mandible (SN/MP 32°), B angle (SpP/MP 22°), neutral facial growth pattern (Bjork's sum 394°, Jarabak ratio 64.20%), proclined upper incisors (I/SpP 47°), retroclined lower incisors (i/MP 87°) (Fig.3). At the

end of the treatment patient had improved profile and facial aesthetics (Fig. 5). Stable Class I occlusion, proper transverse jaw relation, overjet of 1.5 mm and overbite of 3 mm was achieved (Fig. 6). Patient is now in retention period, without signs of relapse and wears splints every night.

Combined surgical and orthodontic treatment of skeletal mesial and open bite gives stable therapeutical results, stable occlusion, corrects orofacial functions and improves facial aesthetics.



Figure 5. Extraoral photos of patient after combined orthodontic and surgical treatment



Figure 6. Intraoral photos of patient after combined orthodontic and surgical treatment

4. REFERENCES

[1] H. Iwagaki, *Hereditary influence of malocclusion*, American Journal of Oral and Maxillofacial Surgery, Vol.92 (1983) 328-338.

[2] T. Graber, T. Rakosi, A. Petrovic, *Dentofacial orthopedics with functional appliances*, Mosby, St Louis, 1985.

[3] R. J. Kanas, L. Carapezza, S. J. Kanas, *Treatment classification of Class III malocclusion*, The Journal of Clinical Pediatric Dentistry, Vol. 33 (2008) 175-186.

[4] M. S. Alhammadi, E. Halboub, M.S. Fayed, A. Labib, C. El Saaidi, *Global distribution of malocclusion traits: A systematic review*, Dental

Press Journal of Orthodontics, Vol. 23 (2018) 40.e1–40.e10.

[5] P. F. Infante, *Malocclusion in the deciduous dentition in white, black and Apache Indian children*, Angle Orthodontics, Vol. 45 (1975) 213-218.

[6] R. Moyers, *Handbook of orthodontics*, Year-Book Medical, Chicago, 1997.

[7] Z. Stamenković, *Upotreba Frenklovog regulatora funkcije u tretmanu skeletne klase III*, Zadužbina Andrejević, Beograd, 2014.

[8] H.G. Sergi, T. Ruppenthal, H.G. Schmitt, *Disfigurement and psychosocial handicap of adults with extreme mandibular prognathism*, The International Journal of Adult Orthodontics and Orthognatic Surgery, Vol.7 (1992) 31-35.

КОМБИНОВАНА ОРТОДОНТСКО-ХИРУРШКА ТЕРАПИЈА III КЛАСЕ И ФАЦИЈАЛНЕ АСИМЕТРИЈЕ

Сажетак: Изражена скелетно III класа и фацијална асиметрија захтевају комбиновану ортодонтско-хируршку терапију ради корекције сагиталних и трансверзалних одступања између горње и доње вилице. Циљ: Циљ овог рада је да се покажу ефекти комбиноване ортодонтско-хируршке терапије на краниофацијалну морфологију и естетику целог лица.

Материјал и метод: Девојчици, старости 17 година дијагностикована је изражена скелетно III класа узрокована мандибуларним прогнатизмом, латерогнатизам, отворени и укрштени загрижај. Пре почетка терапије дубина преклопа је била – 3,5 mm и инцизални размак – 6 mm. Параметри на профилном цефалограму су били: SNA 83°, SNB 88°, ANB -5°, SN/SpP 9°, SN/MP 38°, SpP/MP 29°, збир улова Björk-овог полигона 396°, Jarabak 63,26%, I/SpP 47°, i/MP 98°. Прехируршка ортодонтска припрема фиксним апаратима је трајала 21 месец. Хируршка интервенција је рађена на обе вилице и извађени су доњи умњаци. Ортодонтска терапија је завршена 6 месеци после хируршке интервенције.

Резултати и закључак: Параметри на профилном цефалограму на крају терапије су били: SNA 83°, SNB 85°, ANB -2°, SN/SpP 10°, SN/MP 32°, SpP/MP 22°, збир улова Björk-овог полигона 394°, Jarabak 64,20%, I/SpP 47°, i/MP 94°. Пацијент је имао стабилну оклузију I класе са инцизалним размаком од 1,5 mm и дубину преклопа 3 mm. Комбинована ортодонтско-хируршка терапија је значајно побољшала фацијалну естетику и обезбедила стабилну оклузију у све три равни.

Кључне речи: скелетно III класа, мандибуларни прогнатизам, фацијална асиметрија, бимаксиларна хирургија, ортодонтска прехируршка терапија.