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THERAPY OF SKELETAL OPEN BITE AND SKELETAL CLASS III USING BIONATOR ACCORDING TO BALTERS TYPE III

Zorana Stamenković[1], Jovan Marković[1], Ivan Arsić[1], Vanja Stojić[1*], Nemanja Marinković[1], Nenad Nedeljković[1], Vladan Mirjanić[2], Vanja Krčić[2]

[1] University of Belgrade, Faculty of Dentistry, Clinic for Orthopedics of the Jaws, Belgrade, Serbia
[2] University of Banja Luka, Faculty of Medicine, Study Program Dental Medicine, Banja Luka, Republic of Srpska, B&H

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

Abstract: In the period of puberty growth spurt, functional therapy can be successfully performed using the Bionator according to Balters. This case report aims to show the successful treatment of a skeletally open bite and overbite in a 13- year-old girl. The clinical examination revealed an enlarged lower third of the face, an open bite in the area of the frontal teeth (1.5 mm), and occlusion of / class III. Analyzing the initial profile teleradiograph, she was diagnosed with skeletal class III (ANB= -2°), skeletal open bite (B= 31°)), increased corpus of the mandible (by 8 mm), and a tendency towards a vertical type of facial growth (Bjork=400°). Balters type III bionator was indicated. The active phase of therapy lasted 19 months. During this period, the patient wore the appliance continuously during the day and night. Control examinations were performed every 6 weeks. After finishing the active phase of therapy, the value of the ANB angle on the control profile teleradiograph was 1°, with the presence of a vertical growth tendency (Bjork= 402°) and an enlarged body of the mandible of 3.3 mm. Clinical examination revealed a stable Class I occlusion and a flap depth of 2 mm. A bionator according to Balters, is a tooth-worn functional appliance, that gives a successful therapeutic result by affecting the change in the position and activity of the tongue while suppressing the excessive sagittal growth of the lower jaw.

Keywords: Bionator according to Balters, functional therapy, skeletal open bite, class III.

1. INTRODUCTION

Pubertal growth spurts offer both significant opportunities and challenges in orthodontic treatment, particularly when addressing complex skeletal discrepancies such as open bites and class III malocclusions [1]. During this critical developmental phase, orthodontic diagnostics are crucial in assessing and managing these conditions [2]. Skeletal open bites, characterised by a vertical discrepancy where only the posterior teeth occlude, often result from abnormal growth patterns. Class III malocclusions, marked by a prognathic mandibular relationship relative to the maxilla, further complicate treatment by necessitating both functional and skeletal corrections [3].

Treatment options for class III malocclusions vary depending on the severity of the malocclusion and the patient's stage of growth. In early adolescence, non-surgical approaches like functional appliances are often preferred to modify growth patterns and improve occlusion [4]. For adult patients depending on the severity of malocclusion, options can be just orthodontic treatment with fixed appliances or combined orthodontic and surgical treatment.

The Bionator, a functional appliance developed by Balters, has emerged as an effective tool for

addressing skeletal discrepancies during the pubertal growth spurt [5]. This appliance works by modifying the position and function of the tongue and the mandibular position, thereby influencing the growth of the maxilla and mandible. This case report illustrates the successful application of the Balters type III Bionator in a 13-year-old girl presenting with a skeletal open bite of 1.5 mm and a class III malocclusion (A class III). The aim is to demonstrate the efficacy of this appliance in correcting significant skeletal discrepancies and achieving both functional and aesthetic improvements during the critical period of pubertal growth [3].

2. MATERIAL AND METHOD

A female patient, 13 years old, came to the Clinic for Orthodontics, School of Dental Medicine, University of Belgrade. It was determined that the patient had no systemic diseases, congenital craniofacial anomalies, substantial head trauma or any previous orthodontic treatment. Furthermore, it was confirmed by a patient that no near relatives had orthodontic anomalies of a similar nature.

An extraoral clinical examination revealed an asymmetrical facial appearance, increased lower face height, a concave profile, and acceptable lip contact at rest (Figure 1.).

The intraoral clinical examination (Figure 2.) showed / class III malocclusion on both sides and an open bite of 1.5 mm in the frontal teeth. There was a misalignment in the midline of the upper and lower dental arches. Dental plaque and calculus were not visible on any tooth surfaces due to good oral hygiene, with no cavities (Figures 2. and 3.).

Figure 1. *Extraoral photography of a patient before orthodontic treatment.*

Figure 2. *Intraoral photography of a patient before orthodontic treatment.*

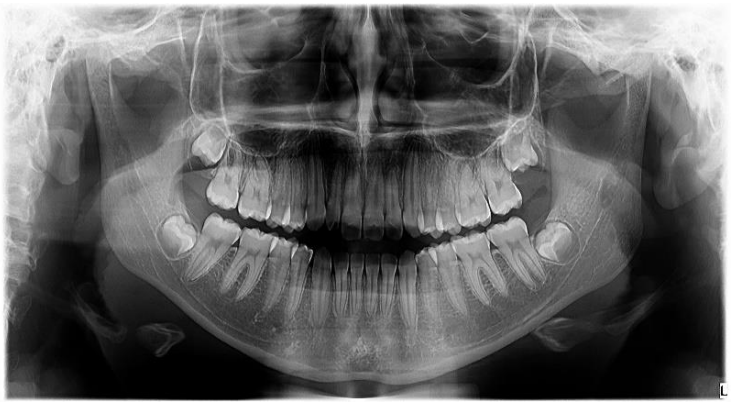

Figure 3. *Panoramic X-ray before orthodontic treatment*

At rest, the patient's tongue was positioned anteriorly, and she exhibited a tongue-thrust swallowing pattern. No symptoms of temporomandibular joint disorder were detected during the initial examination. From the analysis of dental casts, the mandibular arch, respectively, showed a 1,5 mm space deficit.

The initial profile teleradiograph indicated a skeletal class III relationship, with an ANB angle of -2°,and a skeletal open bite, evidenced by a B angle of 31°. Additionally, the radiograph showed an increased mandibular corpus length of 8 mm and a vertical growth pattern, as indicated by a Bjork angle of 400° (Figure 4.). These findings underscored the complexity of her malocclusion and formed the choice of treatment strategy.

Based on the initial assessment, a Balters type III Bionator was selected for treatment (Figure 5.). The active phase of therapy spanned 19 months,

Figure 4. *Lateral cephalogram before the orthodontic treatment.*

during which the patient was instructed to wear the appliance continuously both day and night. Control examinations were conducted every 6 weeks to monitor progress and adjust the treatment plan as needed.

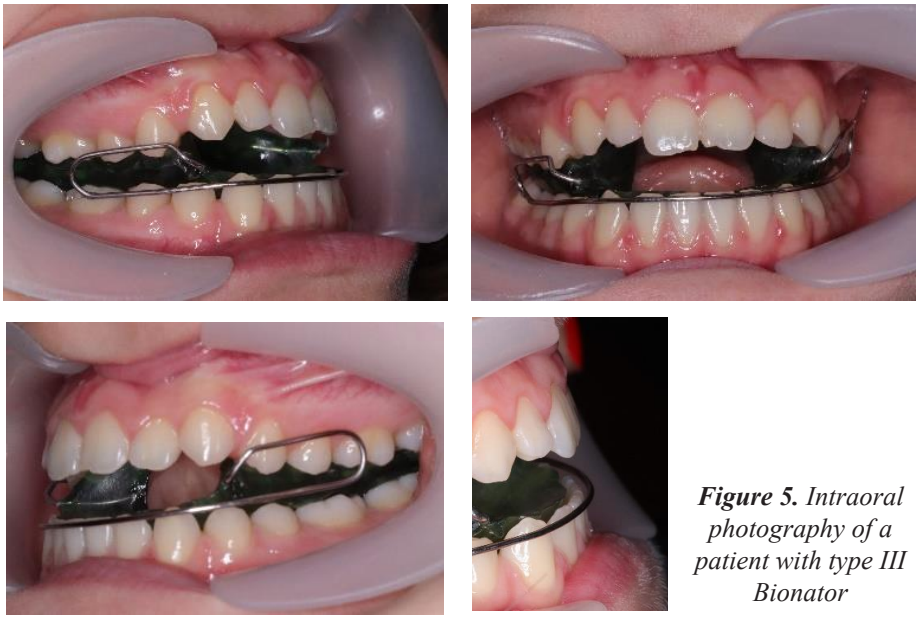

Figure 5. *Intraoral photography of a patient with type III Bionator*

3. RESULTS

After the 19-month treatment period, follow-up assessments revealed notable improvements. The ANB angle on the control profile teleradiograph increased to 1°, indicating a shift towards a more balanced skeletal relationship. The Bjork angle remained relatively stable at 402°, showing a continued tendency towards vertical growth. The mandibular corpus length decreased to 3.3 mm, reflecting a reduction in excessive growth (Figure 6.).

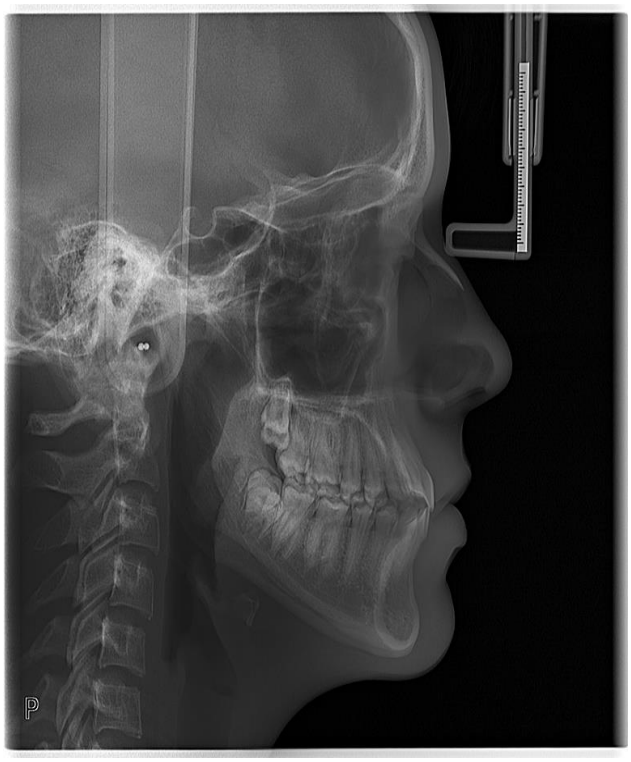

Figure 6. *Lateral cephalogram after the orthodontic treatment.*

Clinically, the patient achieved a stable Class I occlusion, with the open bite reduced to a depth of 2 mm. These results demonstrate the successful correction of the skeletal discrepancies and the stabilization of the occlusion (figure 7.). Dental plaque and calculus were not visible on any tooth surfaces due to good oral hygiene, with no cavities after the treatment (Figures 7. and 8.).

An extraoral clinical examination revealed a less asymmetrical facial appearance, reduced lower face height, an improved profile, and satisfactory lip contact at the end of the treatment (Figure 10.).

The retention period following therapy extended for 18 months, during which the type III Bionator was worn exclusively during night time. A functional analysis conducted after the active treatment phase assessed the tongue's retraction and its physiological positioning.

The use of the Balters type III Bionator during the pubertal growth spurt proved to be an effective therapeutic approach for managing the skeletal open bite and class III malocclusion in this 13-year-old patient. The appliance facilitated favourable changes in mandibular growth and occlusion, highlighting its efficacy in treating complex skeletal issues during adolescence. The results underscore the potential of functional appliances like the Bionator in achieving significant orthodontic and skeletal improvements during crucial growth periods.

Figure 7. *Intraoral photography of a patient before orthodontic treatment.*

Figure 8. *Panoramic X-ray before orthodontic treatment*

4. REFERENCES

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ТЕРАПИЈА СКЕЛЕТНОГ ОТВОРЕНОГ ЗАГРИЖАЈА И III СКЕЛЕТНЕ КЛАСЕ БИОНАТОРОМ ТИП III ПО БАЛТЕРСУ

Сажетак: У периоду наглог пубертетског раста, функционална терапија може се успешно спроводити коришћењем бионатора по Балтерсу. Овај приказ случаја има за циљ да покаже успешно лечење скелетно отвореног угрижаја и отвореног загрижаја код 13-годишње девојчице. Клиничким прегледом утврђена је увећана доња трећина лица, отворени загрижај у пределу фронталних зуба (1,5 mm) и оклузија / III класе. Анализом почетног профилног телерендген снимка, дијагностикована је III скелетна класа (ANB = -2°), отворени скелетни загрижај (B = 31°)), повећан корпус доње вилице (за 8 mm) и склоност ка вертикалном типу раста лица (Bjork = 400°). Индикован је бионатор тип III по Балтерсу. Активна фаза терапије је трајала 19 месеци. Током овог периода, пацијент је непрекидно носио апарат током дана и ноћи. Контролни прегледи вршени су сваких шест недеља. По завршетку активне фазе терапије, вредност ANB угла на контролном профилном телерендгену износила је 1°, уз присуство тенденције вертикалног раста (Bjork = 402°) и увећаног тела мандибуле за 3,3 мм. Клиничким прегледом утврђена је стабилна оклузија I класе и дубина преклопа 2 мм. Бионатор по Балтерсу је функционални апарат зубно ношен, који даје успешан терапијски резултат утичући на промену положаја и активности језика уз сузбијање прекомерног сагиталног раста доње вилице.

Кључне речи: Бионатор по Балтерсу, функционална терапија, скелетно отворен загрижај, III скелетна класа.

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