

ORTHODONTICS TREATMENT OPEN BITE WITH FIXED DAMON TECHNIQUE

AUTHORS

Pavlović Jasna, Simić Sanja, Vujačić Amila, Vukićević Vladanka

Clinic of Orthodontics, Medical Faculty-Dentistry, University of Pristina, Kosovska Mitrovica, Serbia

CORRESPONDENT

JASNA PAVLOVIĆ

Faculty of Medicine, University of
Pristina, Kosovska Mitrovica, Serbia
✉ drjasnapavlovic@gmail.com

SUMMARY

The complexity of the open bite is attributed to the combination of the skeletal, dental and soft tissue elements. Depending on the etiology there are different approaches in their solution from conventional to surgical orthodontic treatment. In boys, aged 15 years, was found anterior open bite. After diagnostic procedures and growth assessment, the Damon nonsurgical orthodontic treatment technique was performed. The use of mild force, low friction and early use of intraoral elastics, anterior vertical and class II in the area of the side teeth, have enabled us to take advantage of favorable growth type maxillofacial complex by which we have achieved a satisfactory therapeutic effect and close the open bite.

Key words: open bite, orthodontic therapy, etiology of malocclusion

INTRODUCTION

Open bite - irregularity of occlusion in the vertical direction, is generally separated dentoalveolar and skeletal type of the open bite. Dentoalveolar is commonly located in the region of incision and premolar, and is joined with the normal craniofacial skeleton, vestibular-inclined and intruded teeth in the front and irregular function of the tongue. Skeletal open bite characterises an increased vertical growth of dentoalveolar complex, especially in the molar region and very often is joined with the changes, as well on the basis of the skull. As an open bite is ordinarily a combination of dental and skeletal orofacial bite, it is difficult to classify them separately.

In majority of definitions found in literature [1,2], the frontal open bite is defined as malocclusion where in central occlusion a contact between front teeth does not exist. Its frequency varies between 1.5% to 11%. [3]

Despite the little procuration, the necessity of healing this malocclusion is relatively large. Out of the amount of all orthodox patients, nearly 17% have frontal open bite [3] which binds us therapists to find effective and stable way of healing.

Etiology of open bite is a multifactorial and includes genetic, anatomical and environmental outer-area factors.

Concoction of orofacial functions and the presence of bad habits affected that 4.2% of open bite with six year olds drops to 2% with 14-year olds. [2] That confirms that oral functions, bad habits, presence of adenoid vegetation, breathing through mouth, irregular swallowing and pressing of the tongue can be a possible factor of creating this malocclusion.

Orofacial functions, power and pressure of muscles that take part in it highly influence on alveolar bone and the position of teeth [5]. Balancing forces from the reverse direction which affect in calmness contribute to the correct position of teeth. On the other side, the affected orofacial functions can be the cause to an irregular position of teeth and the open bite. Usually derived from: breathing habit, breathing through mouth, improper swallowing and tongue pressing. [6]

Depending on etiology, these malocclusions and different therapeutic approaches exist, from conventional to orthodox surgical therapy. Orthodox therapy of the open bite includes intraoral and extraoral appliances as well functional appliances which have a task through intrusion of molars change back in forward rotation of the lower jaw.[7, 8, 9]

Same effect achieved in fixed therapy is achieved in use of intraoral elastic which through intrusion of molars and extrusion of incisors change the rotation of occlusal plane to forward. [10]

Damon system of fixed orthodox technique uses passive self-ligating locks and specifically designed wires of high technology, which secures low vibrations and very mild forces. This technique enables simple and effective therapy in rather complicated cases through application of small numbers of arch wire, and through shorter amount of therapy and less visits to the orthodontist.

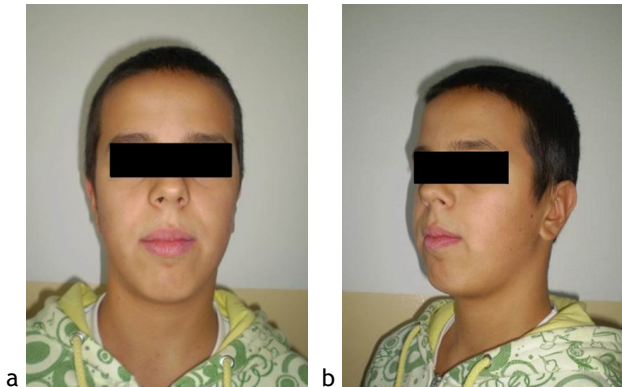
Therapy of the open bite is a difficult challenge for the orthodontist: careful diagnosis and timed intervention with adequate therapeutic procedure, and choice of appliances will improve the outcomes of treatment and long-lasting stability.

CASE REPORT

Through clinical examination of a 15-year old it is concluded that it is a case of a frontal open bite. Oral hygiene went perfectly, teeth without cavities, soft tissues without alterations. Because of the open bite, the patient cannot bite food and pronounce particular consonants.

DIAGNOSIS AND ETIOLOGY

Photographs of the face prior to treatment show long face, convex profile with potential competent lips (Picture 1). Intraoral photographs and study model show sagittal relation of the jaws in Class II, 3mm frontal open bite between incisors, protrusion of upper and lower incisors and shifted middle of the lower dental arch 2mm to the right (Picture 2). Patient pressed his tongue in that intermaxillary space.

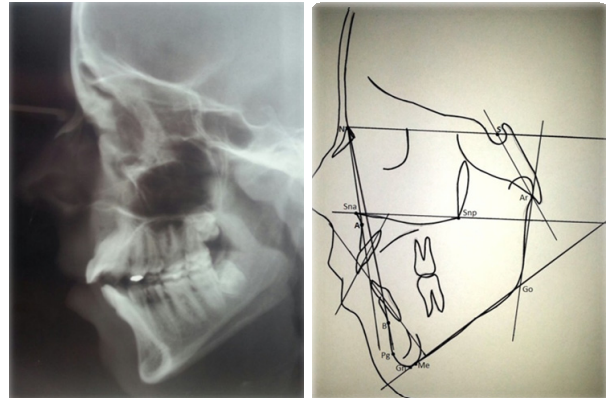


Picture 1: Photographs of the patient before treatment



Picture 2. Intraoral photographs before treatment

Cephalometric analysis show the skeletal Class II, angle SNA is $81,5^\circ$, angle SNB is 78° and angle ANB is $3,5^\circ$. Intermaxillary angle SpP/MP is 40° which points to skeletal open bite. Upper incisors from maxillary plane fold an angle of 64° , and lower incisors with mandibular plane 91° . Bjork's analysis shows horizontal type of growth (sum of angles is 392°).



Picture 3. Teleroentgenogram snapshot before treatment

THERAPY PLAN (AIM)

Primary aim of treatment is the mesial moving of the lower jaw, reducing the incisal step and achievement of incisal overbite whilst improving enhancing the aesthetic profile.

Specific aims of the treatment are:

- Achieving the skeletal class I
- Avoiding the extrusion of molars
- Extruding and retruding upper and lower incisors
- Close the frontal open bite, straighten the middle of the jaw, and provide a correct overbite and overjet
- Retract the upper and lower lip
- Achieve the correct function of tongue

A non-extraction plan of therapy, with both fixed appliances with early application of elastic traction in the frontal area and with everyday tongue exercises to reexamine manner of swallowing is recommended. After removal of appliance due to preserve of occlusion and retainers that are mutually bind are handed.

ALTERNATIVE THERAPY

Due to skeletal characteristics of this anomaly (SpP/MP is 40°), an orthodontic surgical treatment was discussed, though the patient and parents consider it as too aggressive.

DURATION OF TREATMENT

The upper and lower fixed appliances Damon 3MX (Ormco Corporation) is set up. Already during the following check up, instructions are given to the patient of how he should place the elastics (II class) in the shape of an inverted trapeze. Along with them, explanations of swallowing exercises are given, lying the tip of the tongue to the hard palate. Patient cooperated well. After six months clear improvements are noticed, the right intercuspation (molars in first class) reached and reduced interincisal distance.

Therapy is handled in the following phases:

1. Brackets of 7 to 7 and set 0.14 CuNiTi arch wire bow on both jaws. The patient was instructed to early wear intermaxillary elastics class II, the weak force, are affixed all the time.

2. After ten weeks, an arch wire 0,14 x,25 CuNiTi is changed. In addition elastics class II are included and elastics to close the frontal open bite.

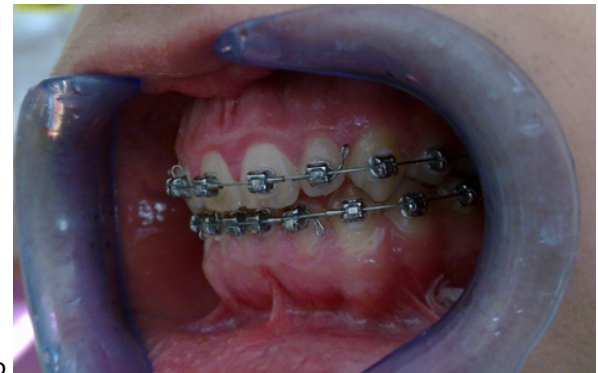
3. At the next control after 12 weeks, a .016 v .025 CuNiTi arch wire is placed in the upper jaw and the lower jaw continued with the .014 x .025 NiTiSe arch wire to commence the leveling of tooth's arch.

4. Working phase is continued with placing the .017 x .025 arch wire in the upper and .016 x .025 arc in the lower to secure flow and vertical hyper-correction.

5. Final phase in therapy is enabled with placing the .019 x .025 SS arch in the upper and .017 x .025 SS arc in lower jaw. Patient continued wearing the elastics II class for frontal open bite from the lower to the upper incisors and canines.



Picture 4. The initial phase of leveling bite with Cu-NiTi arc of little diameter



Picture 5. The final phase of closing the frontal open bite and mesialisation of lower jaw

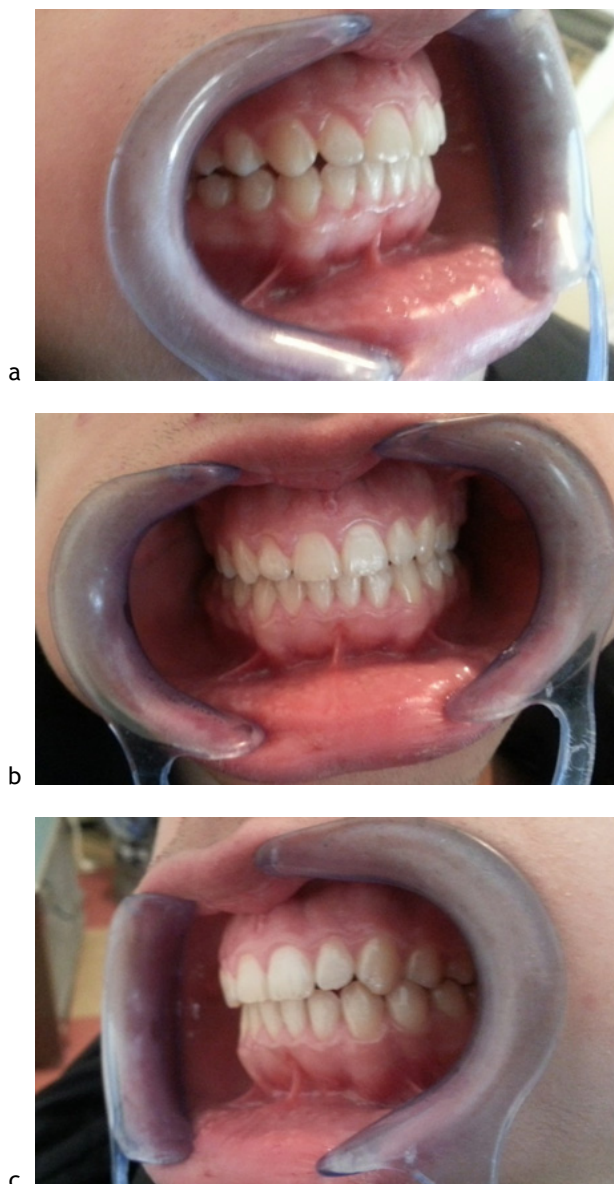
Photographs after treatment portray harmony of the face and competent lips.

Upper and lower fixed appliances are removed after 24-month therapy. To stabilise results mobile retainers are placed in both jaws.

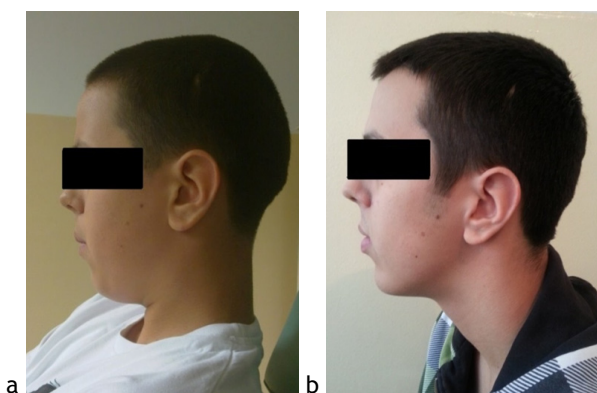
TREATMENT RESULTS

Compiled results are acceptable, partly thanks to the excellent cooperation with the patient, regular exercise, proper carrying of elastics and optimal oral hygiene. On intraoral photographs class I is achieved around molars and canines. An ideal overbite and overjet of 2mm are accomplished.

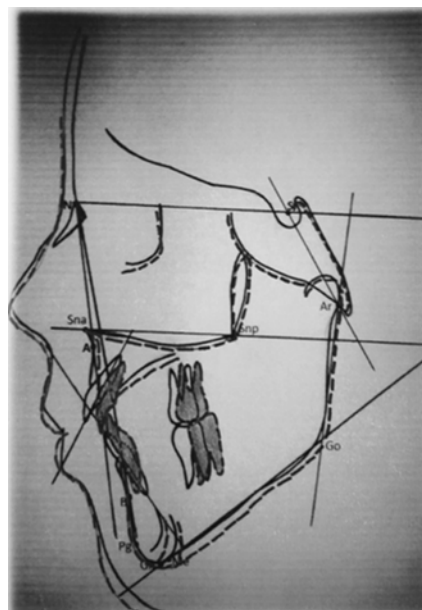
Facial photographs after the treatment show harmony in the face and competent lips.



Picture 6. The final results after therapy of the open bite: a, b and c (intraoral status)



Picture 7. Profile photographs of the face a) before and b) after therapy



Picture 8. Cephalometric superimpositions comparing the beginning and end of the treatment.

Cephalometric analysis show I skeletal class (angle ANB = 3°); incisal angle of upper incisors was 64° and now is 72° ; angle of lower incisors to the mandibular plane is from 91° changed to 95° . The interincisal distance was 3 mm before treatment; now overbite is 2mm and overjet is 2mm, too.

DISCUSSION

Open bite represents malocclusion which is very differently interpreted, from the incisal overbite less than what is considered normal (2-3mm.) to complete lack of contact of incisors in the vertical direction. Our patient has been diagnosed with lack of incisors contact in the frontal area from 3mm and it is reduced through orthodontic therapy, and an ideal overbite of 2mm achieved.

Complexity of the open bite is attributed to the combination of the skeletal, dental and soft tissue elements [11]. As well the etiology of this malocclusion is complex and very oftenly combined with genetic predisposition and adding of local etiological factors. Hence why is considered as one of the biggest challenges of dentofacial deformities to be treated. This includes understanding the etiology, orofacial morphology and finding ways to most correct treatment. Depending on the acquired analysis results, therapy can be orthodontic and combined as orthodontic-chirurgical. In our case, the age of the patient and the incomplete growth of craniofacial complex made a decision to opt for an orthodontic treatment. Success of this non-chirurgical plan complicates facts that majority of orthodontic mechanic therapies extrudes teeth, which resulted in rotation of the lower jar clockwise and continuation of face height [12]. Auspicious growth rate with our patient gave us an excuse to close the frontal open bite with extrusion of front teeth [13].

Simultaneously in our case, the intrusion of lateral teeth allowed for a positive, forward rotation of a maxillofacial complex that contributed to a very rapid clo-

sure of the open bite and contact among the front teeth [14]. Rectification of class II was also an auspicious effect of forward rotation. That is supported by the early usage of intermaxillary class II elastics and simultaneously bands to close the frontal open bite.

Another risk to solving this malocclusion with extrusion of frontal teeth is excessive disclosure of incisors and gingival tissue [12]. As this is a consequence of therapy in patients with an anterior vertical growth of the maxilla, affordable type of growth in our case did not lead to it. Another problem is the stability of results [8, 9, 10]. More than one third of cases that are handled by conservative correction of the open bite show a significant post-treatment relapse [15]. Relapse is most probable with younger patients, who most often manifest post-treatment vertical growth and eruption of the back teeth, which in our scenario is not the case. A non-surgical treatment due to stabilising results often demands a longer retention period. Particular attention must be focused on eliminating habit of tongue pressing [16]. A study of orofacial miofunctional activity to conserve results of therapy of the open bite show that the double-access application and orthodontic and functional therapy more effective in comparison to orthodontic treatment without miofunctional exercises [17]. Our patients was advised to continue exercises of swallowing and pressing lateral teeth. Orofacial miofunctional therapy is recommended after the therapy and only to elimi-

nate incorrect tongue position, and with that to reduce vertical dimension [18]. The patient and parents are satisfied with the final results. A challenge for this case will of course be long-lasting stability. Out of that reason, regular examinations with accompanying evaluations of the current situation in the mouth are advised.

CONCLUSION

Due to the complexity of the open bite its therapy remains controversial. Therapy with fixed Damon orthodontic technique allows us to take advantage of favourable growth type maxillofacial complex and correct this anomaly without surgery and extraction therapy. Application of slight forces, weak friction and early-applied elastic bands in the frontal area and lateral teeth helped us in accomplishing the set up therapeutical goals. Key of successful treatment of the open bite and stabilisation of achieved results is along with the adequate active orthodontic therapy and correction of the infantile swallowing habit during and after therapy.

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SRPSKI

ORTODONTSKA TERAPIJA OTVORENOG ZAGRIŽAJA FIKSNOM DEMON TEHNIKOM

Pavlović Jasna, Simić Sanja, Vujačić Amila, Vukićević Vladanka

Klinika za stomatologiju, Medicinski fakultet, Univerzitet u Prištini, Kosovska Mitrovica

SAŽETAK

Kompleksnost otvorenog zagrižaja pripisuje se kombinaciji skeletnih, dentalnih i mekotičnih elemenata. Zavisno od etiologije postoje različiti pristupi u njihovom rešavanju od konvencionalne do ortodontsko hirurške terapije. Kod dečaka, starog 15 godina konstatovan je frontalno otvoren zagrižaj. Nakon dijagnostičke procedure i procene rasta pristupilo se nehirurškoj ortodontskoj terapiji Demon tehnikom. Primena blagih sila, slabog trenja i rano korišćenje elastičnih gumica u predelu fronta i bočnih zuba, omogućilo nam je da iskoristimo povoljan tip rasta maksilofacijalnog kompleksa, čime smo postigli zadovoljavajući terapijski efekat i zatvaranje otvorenog zagrižaja.

Ključne reči: otvoreni zagrižaj, ortodontska terapija, etiologija malokluzija