

Increased Overjet In Growing Child, Problem Solving In Pediatric Dentistry

Harun Achmad^{1*}, Hasanuddin Tahir², Mardiana Adam², Yunita Feby Ramadhany³

1. Pediatric Dentistry Department, Faculty of Dentistry, Hasanuddin University.
2. Periodontic Department, Faculty of Dentistry, Hasanuddin University.
3. Undergraduate Student of Dentistry Faculty, Hasanuddin University.

Abstract

Child orthodontic of treatment system today has given satisfactory results, but there are still difficult cases that proved to handle. This is because there are still some bad habits that accompany myofungsional on a child, such as sucking fingers, posture problems and the placement of the tongue when swallowing, and abnormal breathing patterns. Overjet is a horizontal relationship between maxillary and mandibular incisors. Normal range from overjet is 2-4 mm.

Increased overjet is marked by maxillary incisor's protrusion. A 6 mm overjet will have impact on psychological and social relationship of children due to the aesthetics of the face profile. Increased overjet has relationship with Class II Angle malocclusion, Class II skeletal sagittal relationship, and mandibular retrognathia. Increased overjet case can be managed by maxillary retraction of labial segment and increasing mandibular labial segment. Case management are based of skeletal and soft tissue pattern and patient's age. Reducing overjet can be based on using several appliances, such as functional removable appliance to modify dental and skeletal relationship, fixed orthodontic appliances with tipping and bodily movement or using jaw reposition by orthognathic surgery.

By using Twin Block functional appliance, we can observe that early treatment can be effective to reduce overjet, to change skeletal pattern, and increasing children psychology such as self-confidence by making aesthetic changes to their faces significantly. This appliances is made with 70o angle to occlusal plane. Maxillary arch lateral expansion can be achieved with expansion screw. Patient will be instructed to use the appliance 24 hours a day.

Case report (J Int Dent Med Res 2017; 10(2): pp. 374-379)

Keywords: Overjet, Growing child, Children malocclusion, Twin Block.

Received date: 02 April 2017

Accept date: 01 June 2017

Introduction

Malocclusion involved complex influence between genetic factors and environmental factors. Inherited mandible growth pattern (genetic) lead the chin to grow downward and backward which can be a predisposing factors of malocclusion. Environmental factors such as a habit, oral habit, the movement of soft tissue and early tooth loss can contribute later. Sucking persistently (thumb sucking) over 4 years old related to high prevalence of increased overjet and the relationship Class II of caninus and

molar.^{1,2} Unbalanced force of oral soft tissue, such as tongue thrust habit, low tonicity of muscle lips and bad tongue rest position, can lead to the displacement tooth position, due to change in balance. Early tooth loss, especially in maxillary primary molar, so mesial drifting on maxillary permanent molar can also be a local factors affecting the development of malocclusion Class II.² Parents' education, birth rate, social and economy status, effect of breastfeeding duration to sucking habit and diet influence affects teeth malocclusion on growing children.^{3,4}

Overjet is a horizontal relationship between maxillary and mandibular incisors. Normal range of overjet is 2-4 mm. Increased overjet marked by protrusion of maxillary incisors. Overjet size over 6 mm can impact on psychology and social burden in children as a result of the aesthetic on child's face profile shapes. Increased overjet related to Class II

*Corresponding author:

Muhammad Harun Achmad
Pediatric Dentistry Department,
Faculty of Dentistry,
Hasanuddin University.
E-mail: harunachmader@gmail.com; febyr.yuferaa@yahoo.co.id

malocclusion usually accompanied with Class II skeletal sagittal relationship and retrognathia of the mandible.^{1,3,4}

Overjet > 5 mm correlated with TMD. The impact of increased overjet on temporomandibular joint's function occurs because of less contact on incisors, much mandible movement and pressure on the muscle mastication.^{5,6,9} The larger space on centric occlusion (teeth relation when the jaw on the rest position) to maximum contact between the cusp (occlusion habit regardless of the location condyle) this effect is one of the symptoms of temporomandibular joint function called the orthopedic instability.^{1,9,10}

Management

Management with the Twin-Block functional appliance

Twin-block functional appliance developed by Clark was functional appliance that widely used for Class II malocclusion treatment especially in efforts to reduce large overjet. This appliance can be used in a long time that allows movement on the mandible, easy to use, patients can be cooperative. But to get maximum treatment results, it depends on good cooperation each patients. This appliance is widely used for child treatment especially at the growing age. Using twin-block functional appliance shows that the early treatment can reduce overjet effectively, change form of skeletal pattern, as well as increase in child's psychology such as, confidence along with aesthetic improvement on children's face significantly.^{7,8,10}

Case Report

A boy, 12 years old, come to Pediatric Dentistry Department, Rumah Sakit Gigi Mulut Fakultas Kedokteran Gigi UNHAS, Makassar, Sulawesi Selatan with chief complaint front teeth of upper jaw more forward (Fig 1, 2). Treatment plan: planning treatment on anteroposterior plane with removable appliance (Twin-block removable). Treatment purposes of this case is to correct relation between maxilla and mandible become Class I. Twin-block consists of maxilla and mandible blocks bite with retention 0,7 mm Adams clasp on permanent first molars and 0,9 mm balls clasp placed on maxillary and mandibular incisors embrassures. Passive maxillary bow labial used for anterior retention and control the incisors proclination. The plane

side sharp interlocked around 70° to the occlusal plane. Block reactivation done when needed. Patients were instructed to use appliance for 24 hours a day (except for the contact sports and swimming).

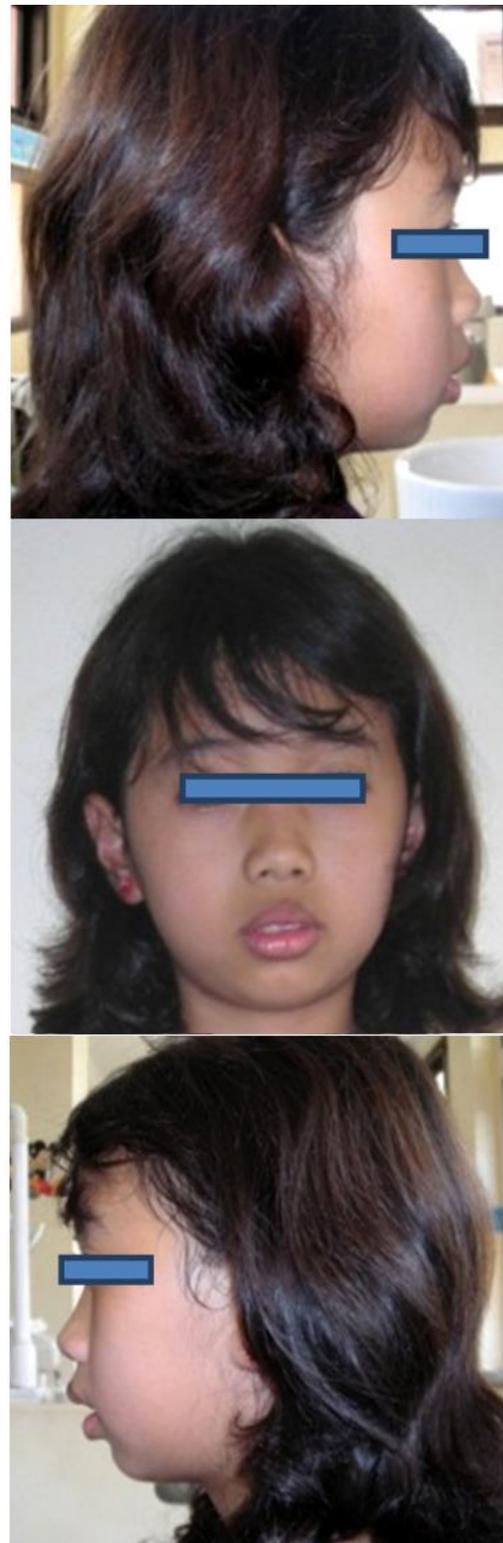


Figure 1. Patient's face profile before treatment.



Figure 2. Final Impression before treatment with high overjet.



Figure 3. Intraoral photograph before treatment.

Treatment progress

Each stage progress of this functional treatment achieved because of patients cooperation (Fig 4). These treatments completed for 7 months. Maxillary incisor retrocline 9° while the mandibular incisor procline 4° . This achievement results in reduced overjet (Fig 5). Patients were instructed to wear and remove the maxillary and mandibular twin-block by himself and instructed to activate the screw expansion twice a week and followed up every three weeks. Patients also instructed to oral hygiene maintenance especially around the covered acrylic plate region.

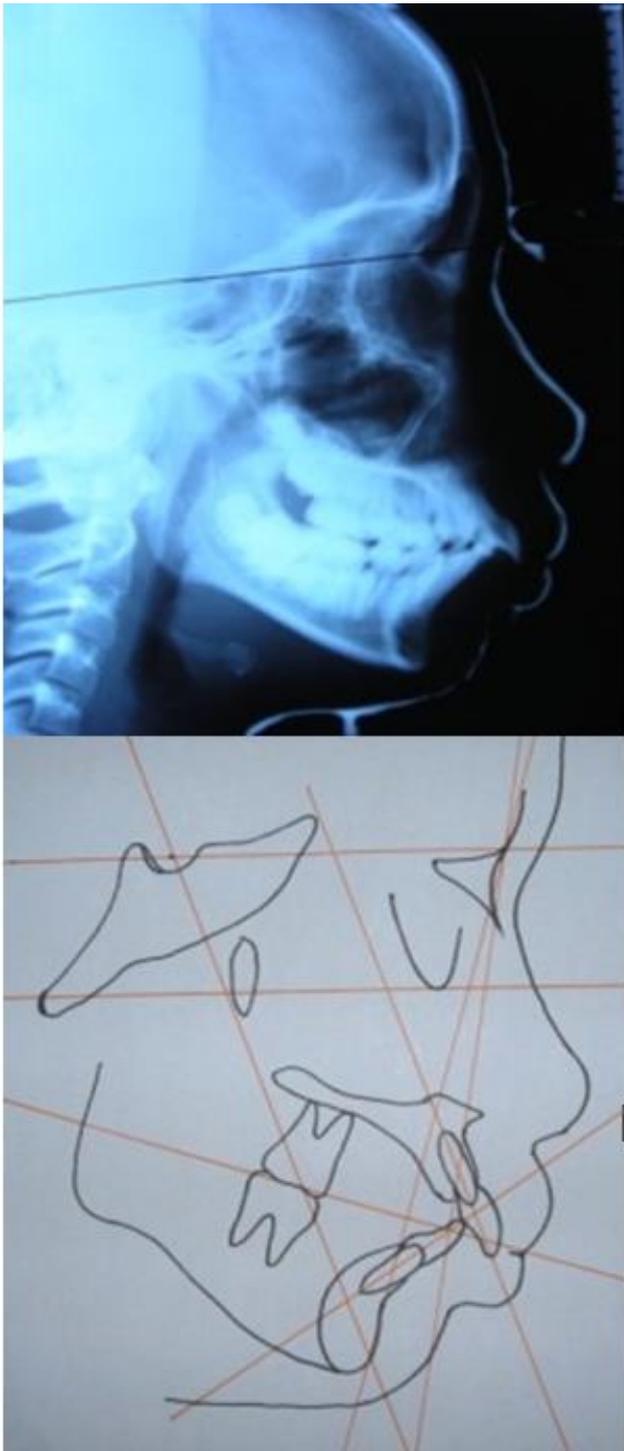


Figure 4. Cephalometric radiographs.

Results

After functional correction by positioning mandible forward, patient's profile showed harmoniation increasing of the face balance (Fig 4), normal occlusion with optimum overbite and overjet can be achieved (Fig 5). Patients were satisfied with facial profile, which has changed

from convex to normal. Cephalometric analysis showed mandible position forwardly, maxilla growth restriction and good interincisal angle.



Figure 5. Clinical photograph of patient's face profile after treatment.



Figure 6. Intraoral clinical photograph before and after treatment.

	Before	Mean	After
<SNA (*)	75	82	80
<SNB (*)	72	80	77
<ANB (*)	5	2	3
1 to NA (mm)	9	4 mm	6
<1 to NA (*)	34	22	28
1 to NB (mm)	3	4 mm	5
<1 to NB (*)	26	25	23
<Pg to NB (mm)	3	2 mm	3
<1 to 1 (*)	113	131	128
<OkI to SN (*)	25	14	16
<GoGn to SN (*)	39	32	35

Table 1. Cephalometric tracing changes before and after treatment.

Treatment results show patient's profile shapes has improved after treatment (Fig 4). Crowding mandible reduced by proclination of mandibular incisor. At the end of treatment showed Class I incisors, canine, and molar relation (Fig 5). Overbite and overjet reduced. Developmental changes shown in (Fig 6 and Table 1).

Discussion

Characteristics Class II skeletal and dentoalveolar malocclusion in patients with large overjet become important reason of early treatment necessity to control amount and direction of mandible growth using ideal functional appliance on this case. Malocclusion prevention and treatment study, as well as health care policy to include a corrective treatment for malocclusion. Educational program will be easy to guide and reduce bad habits, which can caused malocclusion (increased overjet). Teeth trauma in children often associated with aesthetic, psychological, social problems, and therapy. Therefore, required more efforts to health improvement and prevention strategies implementation to reduce level of teeth trauma on preschool children.^{4,7,12}

Twin-block functional appliance has several advantages including the fact that it well received by the patient, strong, repaired easily and suitable for mixed dentition period and permanent teeth. Size of this appliance is easy to use by the patient so that speech interference could be minimized. Treatment purposes can be achieved due to the patient's cooperation. Reduction overjet with functional appliance results in better patient's confidence and minimize risk of trauma on the maxillary incisors.^{8,12,13} The selection of functional appliance depends on several factors, such as patient's age and the level of cooperative and also habit factors as well as availability laboratory facilities. During treatment, the SNA value reduced 1° while the SNB values increased 1°. As a consequence ANB value decreased 2° result in Class I skeletal pattern. Maxillary incisor inclination reduced to 116°. Mandibular incisor proclinate 4°. Vertical proportion increased during treatment.^{10,13}

Proclinating mandibular incisor used capping acrylic reported to reduce amount of proclination maxillary incisor. Mandibular molar

move to mesial. It has been shown in the literature that the functional appliance does not make skeletal changes long term and most of all effects result in dentoalveolar. However, it can be seen in this case that the functional appliance allow fixed appliance stage to achieve good results.^{14,15}

Conclusions

In this case, patient's profile improved. Arrangement have been made to control patient's development regularly during treatment stage. Similarly, use of retention such as hawley retainer required to ensure stability.^{12,13}

Declaration of Interest

The authors report no conflict of interest and the article is not funded or supported by any research grant.

References

1. Baccetti, et.al. Diagnostic performance of increased overjet in class II division 1 malocclusion and incisor trauma. *Progress in orthodontics* II. 2010;145-150.
2. Turasi B, Demirkaya AA, dan Biren S. Comparison of increased overjet cases and controls: normative data for condylar positions. *Journal of oral rehabilitation*. 2007;34: 129-35.
3. Jabbar NSA, et.al. Bottle feeding, increased overjet and class 2 primary canine relationship : is there any association?. *Braz Oral Res*. 2011;25(4):331-7.
4. Antunes LAA, et.al. Increased overjet is a risk factor for dental trauma in preschool children. *Indian Journal of Dental Research*. 2015;26(4):356-60.
5. Wagner Y, Weltzien RH. Occlusal characteristic in 3 years old children-results of a birth cohort study. 2015;15(94):1-6.
6. Antoniou C dkk. Class II Division 1 Malocclusions - Early Diagnosis & Management part . *Australian Society of Orthodontist*, www.aso.org.au; 2010; 1-4.
7. Ramesh N, Guruanthan D, Khartikeyyan SA. Association of Nonnutritive Sucking Habits and Malocclusion: A Cross-sectional Study; *International Journal of Pedodontic Rehabilitation*. 2016;1(1):15-8.
8. Denny JM, Weiskircher MA, dan Dorminey JC. Anterior open bite dan overjet treated with camouflage therapy. *Am J Orthop*. 2007;13(1):670-8.
9. O'Brien K, Wright J, Conboy F, Appelbe P, Davies L, Connolly I, Mitchell L. Early treatment for class ii division 1 malocclusion with the twin-block appliance: a multi-center, randomized, controlled trial. *American Journal of Orthodontics and Dentofacial Orthopedics*. May, 2009.
10. Puri T, Patel D. Skeletal discrepancy correction in class ii div 1 malocclusion using fixed twin blocks. *Journal of Dental and Medical Sciences (IOSR-JDMS)*. 2014;13(7): 65-68.
11. Sood S. Treatment of Class II division 1 malocclusion in a non growing patient. *Virtual journal of orthodontics*. 2010;10(2):97-99.
12. Gupta S, Kumar-Jindal S, Bansal M, Singla A. Prevalence of traumatic dental injuries and role of incisal overjet and inadequate lip coverage as risk factors among 4-15 years old government school children in Baddi-Barotiwala Area, Himachal Pradesh, India. *Med Oral Patol Oral Cir Bucal*. 2011;16(7):960-5.
13. Saltaji H, Flores-Mir C. The relationship between vertical facial morphology and overjet in untreated Class II subjects. *Angle Orthodontist*. 2012;82(3):101.
14. Jazaldi F, Handayani ED, Damayanti YNU, Sarwono AT, Soegiharto BM, Soedarsono N, Auerkari EI. The lepr q223r polymorphisms as a potential bioindicator of class ii malocclusion. *Journal of International Dental and Medical Research*. 2016; 9 (Special Issue, U.I. 1st International Workshop on Dental Research):351-355.
15. Fernanda Riveros Figueroa, Carla Bancalari, Ricardo Cartes-Velásquez, Michelle Sanhueza, Cristobal Palma. Prevalence of malocclusion and its psychosocial impact in a sample of Chilean adolescents aged 14 to 18 years old. *Journal of International Dental and Medical Research*. 2017;10(1):14-18.