

MANAGEMENT OF ANTERIOR CROSSBITE CONCURRENTLY IMPACTED MAXILLARY LEFT SECOND PREMOLARS IN GROWING PATIENT

(PENATALAKSANAAN MALOKLUSI GIGITAN SILANG ANTERIOR DENGAN
IMPAKSI PREMOLAR DUA RAHANG ATAS KIRI PADA PASIEN
TUMBUH KEMBANG)

Ervina Sofyanti

Department of Orthodontics
Faculty of Dentistry, North Sumatera University
Jl. Alumni No.2. Kampus USU. Medan 20155
Email: ervina323@yahoo.com

Abstract

Anterior crossbite is a common strike anomaly that may be found in growing patient who is seeking orthodontic treatment for functional reason. On the other hand, impacted tooth is a failure of dental eruption which is sometimes not realized by patient until having proper dental examination. The following case report described an orthodontic treatment of 10-year-old girl with straight profile and impacted maxillary left second premolars. This condition associated with arch length discrepancy causing space deficiency for second premolars eruption. The management of correcting anterior crossbite concurrently maxillary second premolars impaction started with space regaining by eliminate occlusal interference prior to distal movement of the posterior teeth. The most significant drawback of distalization is an equal and opposite mesial force tends to flare the incisors labially. After 12-months of treatment, distal movement of posterior teeth eliminating anterior crossbite and allowed spontaneous upper left second premolars eruption. At the eighteenth month of treatment, overbite and overjet value was +2mm and midline maxillary and mandible arch paralalled with in relation and centric occlusion. In conclusion, early intervention for anterior crossbite and impacted second maxillary left second premolars correction in this case was based on proper treatment timing and accurate diagnose by considering patient's growth trend.

Key words: anterior crossbite, impacted maxillary second premolar, distalization

INTRODUCTION

Pseudo class III malocclusion is a habitual anterior crossbite resulting from functional forward positioning of the mandible from centric relation to centric occlusion. This malocclusion is commonly found in children who have no skeletal discrepancy. The important parameter in distinguishing it from true class III malocclusion is the capability of pseudo class III malocclusion patient to achieve edge to edge position of incisors when in centric relation. Pseudo class III malocclusion also shows a normal SNA if diagnosed early, whereas SNB could be slightly increased because of forward positioning of the mandible.¹ If the anterior crossbite is found in children with pseudo class III malocclusion, it was not treated earlier, it might turn to true class III malocclusion when adult.

Impacted tooth is one of anomaly dental eruptions that commonly found in dental practice. Most of the cases related with development and eruption tooth are second premolar tooth after third molar and canine. Some patients may not realize that their second premolar tooth has not erupted well until they visit their dentist. The increasing occurrence of second premolar dental anomalies such as an impacted tooth or agenesis.² The prevalence of impacted premolars has been found variously according to age.³ This condition can be detected earlier based on accurate clinical and radiography examination.²

This case report would describe systematically orthodontic treatment of anterior crossbite concurrently impacted premolars in a pseudo class III malocclusion patient. Patient was one of growing monozygotic twins who presented with one maxillary second premolars impacted while the other had

both of maxillary second premolars impacted. Conservative surgical exposure of the impacted premolars with orthodontic traction and eruption was treatment option. The aim of this article was to describe the management of anterior crossbite concurrently maxillary second premolars impaction started with the moving maxillary first molars distally. The most significant drawback of such techniques is that an equal and opposite mesial force tends to flare the incisors labially which is favorable in correcting anterior crossbite in pseudo class III malocclusion.

CASE

A 10-years old monozygotic twins patient came with the main complaint that she was not satisfied with her appearance that lower anterior teeth were more protruded than upper anterior teeth. This report case presented the younger sister who had anterior crossbite malocclusion concurrently impacted left second premolars maxillary impaction whereas the other had both maxillary premolars impaction. Both of them had no history of dental extractions or orthodontic treatment. On extra oral examination, the patient had brachyfacial and straight profile (Figure 1).



Figure 1. Before treatment extra oral (frontal and profile photo)

On intra oral examination, it was found that her oral hygiene was good enough, enamel hypoplasia, moderate gingival health, moderate palatal depth and middle-sized tongue. Clinical examination revealed that all primary teeth had exfoliated and maxillary right canines were erupting but maxillary left second premolars were not found. There was no space existing that was available for erupting 25. Molar relation was class III Angle on right side and class I on left side in centric occlusion. Canine relation was class III on left and was predicted class I on right side in centric occlusion. The presence of anterior crossbite that involved tooth elements 12,-11,21,22 with the overjet was -1mm and the overbite was +3,5mm, had been detected in centric occlusion. Patient could edge to edge in functional

analysis. The upper and lower arch form was oval. The curve of spee was accentuated 2,5 mm. (Figure 2).

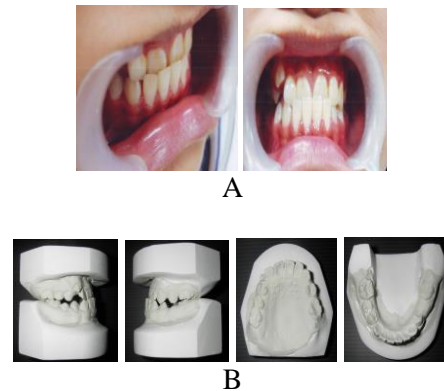


Figure 2. A Before treatment intra ora photo-graphy (Centric occlusion), B. Before treatment study model (Centric occlusion)

The cephalometric analysis in centric occlusion showed that class I skeletal relation. Skeletal and soft tissue profile were concaved while mandible showed a backward growth trend with mandibular length shorter than normal value. Interrelation incisor was retroclination whereas inclination upper incisive to cranial base was normal and lower incisive to mandibular plane proclination. (Figure 3A) The panoramic radiography examination showed elements 15 and 25 impacted between elements 14-16 and 24-26. The elements of 17,27,37 and 47 had not been erupted yet. There was no tooth bud of elements 18 and 28, except 38 and 48. The maxillary sinus and nasal airways were normal and the mandibular ramus was symmetrical. (Figure 3B).

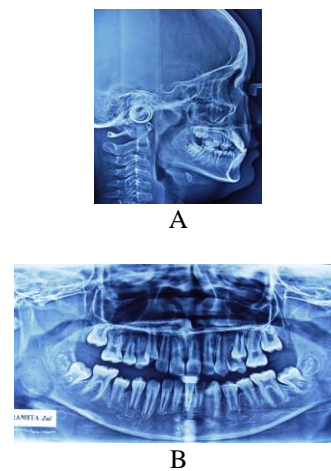


Figure 3. A. Before treatment cephalometry radiography (centric occlusion), B. Before treatment panoramic radiography (centric occlusion)

The treatment objective was to eliminate the etiology factor of anterior crossbite and gaining space for both upper second premolars impacted. The etiology factor was premature contact caused mandible forward positioning. This condition resulted development malocclusion of upper arch that caused inadequate space for eruption maxillary second premolars.

CASE MANAGEMENT

The orthodontic treatment started with minimum anchorage in upper arch using molar tube and lower arch using single band. Then bonded .018 pre-adjusted (ROTH) bracket appliance. Leveling-aligning in upper arch initiated with round archwire .014 superelastic Ni-Ti and continued until round .016 superelastic Ni-Ti in the six month initial treatment. Bite opening with GIC and crossbite elastic helped anterior crossbite correction on the initial stage. Then nickel titanium open-coil springs used to move both maxillary first molars distally.

The treatment plan was surgical exposure by creating a window in the mucosal once the space for maxillary premolars impacted existed. Then let both maxillary premolars erupt naturally until the bracket could be bonded onto the buccal side of those teeth. The ligature, tied up to the half erupted teeth, ligated with the round arch wire 0.16 superelastic Ni-Ti. The anchorage was enforced by full ligation for all teeth, except maxillary left second premolars.

After 12 months treatment, profile patient was better, anterior cross-bite vanished and maxillary left second premolars in alignment period (Figure 4A). Curve of spee depth was normal. The treatment finished at the eighteenth month of treatment whereas overbite and overjet value was +2mm and midline maxillary and mandible arch parallel in centric relation and centric occlusion (Figure 4B). Molar relation was class I Angle on right side and class III on left side in centric relation and centric occlusion. Canine relation was class I on right and left side in centric relation and centric occlusion but the element of 17 was buccally (Figure 4C).



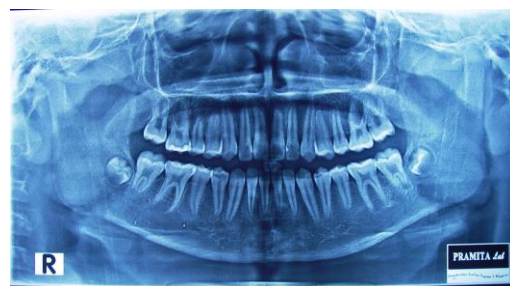
A



B



C



D

Figure 4. A Extra oral photography after treatment
B Intraoral photography after treatment
C Study model after treatment
D Panoramic radiography after treatment

Table 1. Pretreatment and during treatment cephalometric measurement after 14 months treatment (In centric occlusion)

Measurement	N	Pre-treatment	During treatment	Changing
SNA	82°	78°	80°	+2°
SNB	80°	81°	82°	+1°
ANB	2°	-3°	-2°	+1*
Facial Angle	87°	87°	87°	0
Angle of C	0°	-7°	-4°	+3°*
Y-axis	60°	64°	63°	-1°*
Go-angle	123°	114°	110°	-4°*
SN-MP	32°	25°	23°	-2°*
1 - T	130°	140°	131°	-11°*
1 - SN	104°	97°	112°	+5°*
1 - NA	4mm	+5 mm	+8 mm	+3mm*
1 - Apg	4mm	+1 mm	+6 mm	+5mm*
T - Apg	2mm	+5 mm	+3 mm	-2mm*
T - NB	4mm	+4 mm	+5 mm	-1mm*
T - MP	90°	97°	94°	-3°*
Pg-NB	4mm	-1,5 mm	-1,5mm	0
Bibir atas -	1mm	-1 mm	+1mm	-2mm*
E Line				
Bibirbawah -	0mm	0mm	0 mm	0
E Line				
Occl.plane-SN	14°	12°	13°	+1°*
Length of mandible	103mm	73 mm	75 mm	-2mm
Growth trend	65%	65,21%	65,21%	
MT:MB	45:55	38,6:61,4	37:63	

Note: * changing during orthodontic treatment

DISCUSSION

Malocclusion can be treated, if necessary, in many ways. In actively growing patients, the chosen orthodontic treatment may itself has a significant influence on the further development of the dentition. In this case, early intervention was believed to be advantageous to prevent pseudo class III malocclusion became true class III malocclusion and also avoided surgical intervention for impacted maxillary second premolars. The recommendations for the timing of distalization is to treat "earlier" before the eruption of the second molars.

The functional examination showed that premature contact was the primary etiology caused forward functional shift of the mandible. When the mandible is guided into a normal centric relation, a normal overjet or an edge-to-edge position of incisors can be obtained in children with pseudo class III malocclusion.¹ Protraction upper arch and elastic crossbite can support to jump the bite after occlusal interference has been eliminated.

An impacted tooth is one that is embedded in the alveolus so that its eruption is prevented or the tooth is locked in the position by bone or the adjacent teeth.^{3,4} There are multi factors, include genetic and environmental factors, that can influence any stage of tooth development and eruption. Premolars impaction may be due to local factors such as mesial drift of teeth arising from premature loss of primary molars; ectopic positioning of the developing premolar tooth buds; or pathology such as inflammatory or dentigerous cysts. They may be also associated with over-retained or infraocclusal ankylosed primary molars or with syndromes such as cleidocranial dysostosis.³⁻⁵

Treatment options for impacted teeth include observation, intervention, relocation, and extraction. Optional of those treatment depend on tooth's position, depth of the impacted tooth, relationship with adjacent teeth, and orthodontic treatment.^{3,4} There may be interaction among these treatment options occasionally. Observation involves no treatment other than monitoring the patient clinically and radio-logically. Intervention may involve simple extraction of tooth or teeth, usually primary. Occasionally a permanent tooth extraction may be warranted depending on the etiology. Intervention also may include a brief period of orthodontic treatment to eliminate the impaction. Surgical exposure involving creating a window in the mucosal covering with or without subsequent orthodontic treatment, allowing the teeth to erupt utilizing it in active eruption. Relocation refers to either

surgical repositioning of the impacted tooth or more commonly orthodontic eruption of impacted teeth.^{3,6}

McNamara's, reported that patient age, early loss of primary and permanent molars, disruption to dentoalveolar bone development, severity of impaction, premolar root form were not the obstacle factors in treating impacted tooth as long as the patient had a good motivation.³ Inadequate space leads to insufficient space for impacted teeth to erupt within the confines of the arch. Based on all condition that had been described in management of impacted tooth, adequate space was the key for treating as relocation way.

The etiology, position and location of the impacted teeth influences treatment option and prognosis treatment. These condition related to presence of keratinized gingival as one of critical factors that will affect prognosis and treatment outcome. Occasionally, an impacted tooth will obliquely erupt into its correct position after obstacles to eruption have been removed by surgical exposure, but this is rarely obtained if root formation is complete.⁷

Various methods for distal movement of the posterior teeth have been suggested. The most significant drawback of such techniques is that an equal and opposite mesial force tends to flare the incisors labially. Anchorage loss of this type, manifested as an increasing in overjet, can be a severe problem malocclusion in dolichofacial facial types, especially those with tongue-thrust habits.⁸ If the case was class II, the opposite mesial force would tend to flare the incisors labially and worsen the malocclusion. On the other hand in class III malocclusion, there would be incisor inclination correction concurrently with gaining space for those impacted teeth.

The method for moving maxillary molars distally by using nickel titanium open-coil spring had been chosen to gain space for impacted maxillary second premolars. The equal and opposite mesial forces that have been resulted by nickel titanium open-coil spring was favorable while protraction anterior maxillary teeth to correct anterior crossbite. It was also related with early intervention whereas maxillary second molars have not erupted yet and there were also no teeth bud of elements 18 and 28. Distalization or holding back of the molars, aimed at creating anterior space and preventing premolar extractions tend to create posterior space deficiency, must be noticed. This may have significant effect on the developing second and third permanent molars later, example: second molars buccally or third molars impacted. (Figure 5D) ^{1,8}

Superimposition of cephalogram result before and 14 months treatment in Table 1 revealed that the va-

lue of dental inclination became more procline and soft tissue nearly normal. But there was no compromise treatment of upper arch (I-NA=+3mm) and retraction lower anterior (I-NB=-1mm) so the overjet value became positive. This condition related with flare incisors labially which was advantageous in class III patient with brachyfacial. It supported maxillary second premolar eruption adequately in the maxillary arch. The value of upper incisive inclination bigger after treatment (97° before treatment and 112° after treatment) might be due to leveling used round wire and the most significant drawback of distalization is that an equal and opposite mesial force tends to flare the incisors labially. The value of curve spee deeper related with extrusion of lower anterior teeth. It caused overcorrection whereas related with treatment stability. In order to get better upper teeth inclination related with stability after treatment, negative root torque with rectangular wires should be done by considering labial bone density, (Figure 5).

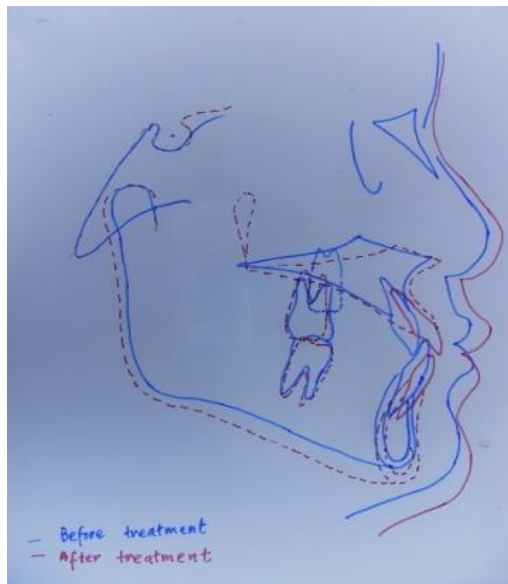


Figure 5. Tracing cephalometric lateral before and after 14 months of treatment

At eighteenth month of treatment, overbite and overjet value was +2mm and midline maxillary and mandible arch parallel in centric relation and centric occlusion has been achieved. In conclusion, early intervention for anterior crossbite correction in actively growing patient can avoid became true class III malocclusion. The success of non extraction treatment in this case based on proper treatment timing, accurate diagnosis and manipulation of side effect of distal movement in class III pseudo malocclusion. Incomplete root formation of maxillary left second premolars and growth trend in

treating actively growing patient have also been considered in obtaining prognosis treatment.

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