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Camouflage Orthodontic Treatment of Class II Division 1 Malocclusion Using Quad Helix in a Non-Growing Patient

Visita Persia[1], **Fadli Jazaldi[2*]**

[1]Orthodontic Residency Program, Faculty of Dentistry, Universitas Indonesia, Jakarta, Indonesia
[2]Department of Orthodontics, Faculty of Dentistry, Universitas Indonesia, Jakarta, Indonesia

*Correspondence author email : fadlijz@yahoo.co.id

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Abstract : Camouflage treatment is one of the orthodontic treatment options in cases of class II division 1 malocclusion. A 22-year-old female patient felt that her teeth were malposition, the patient wanted her teeth to be levelled and aligned, but the patient was afraid if the treatment need extraction. The patient's space requirements were met by expanding the maxillary arch, while the lower jaw was reduced interproximal and protracted the anterior teeth of the mandibular arch. The expansion performed on the upper jaw used a removable expansion, namely quad helix. The treatment was completed in twenty appointments. After treatment, the inter canine width obtained 2 mm, the inter premolar width obtained 2.5 mm, and the intermolar width obtained 2 mm. The patient was happy with the result of the treatment and the treatment could be done without extraction

Keywords: *Class II division 1 malocclusion, quad helix, non-growing patient*

INTRODUCTION

Class II malocclusion is when the mandibular first molar occludes more distally than the normal relationship of the maxillary first molar[1,2]. Class II malocclusion based on the canine teeth is when the upper permanent canine teeth occlude in front of the embrasure between the mandibular canine and first premolar teeth[3]. The most common problem in orthodontic is class II malocclusion[4,5]. The distal relationship of the mandible to the maxilla in this malocclusion with a combination of differences in dental and skeletal components can affect facial aesthetics. The class II malocclusion is the highest prevalence in the Asian population[6]. The prevalence of malocclusion in Indonesia reaches 80%, which is the third most common oral health problem, after caries and periodontal disease[7]. The malocclusion class II prevalence in Bandung is 40,2%[8], Whereas in Yogyakarta the prevalence of malocclusion class II is 41,6%[9]. Treatments that can be performed on patients with class II division 1 malocclusion include growth modification, a combination of orthodontic and surgical treatment, and camouflage orthodontic treatment[1,6,10,11,12]. Camouflage orthodontic treatment can be

used in class II malocclusion division 1 by restoring the teeth to class I relationship, but with acceptable skeletal conditions[13]. Expansion can generally add space to the arch. Expansion in the field of orthodontics is divided into two, namely rapid expansion and slow expansion[14,15,16,17]. This case report aims to discuss orthodontic camouflage treatment using fixed orthodontic for class II malocclusion with expansion using a quad helix in adult patients.

CASE REPORT

A 22-year-old female patient came to the orthodontic clinic of RSKGM FKG UI with complaints of malposition teeth, so the patient felt less confident when smiling. The patient wanted dental treatment but was afraid that the treatment needed tooth extraction. The extraoral examination showed that the patient had a dolichofacial, symmetrical, and balanced face. The patient's chin was straight, had a convex profile and lips were competent figure 1

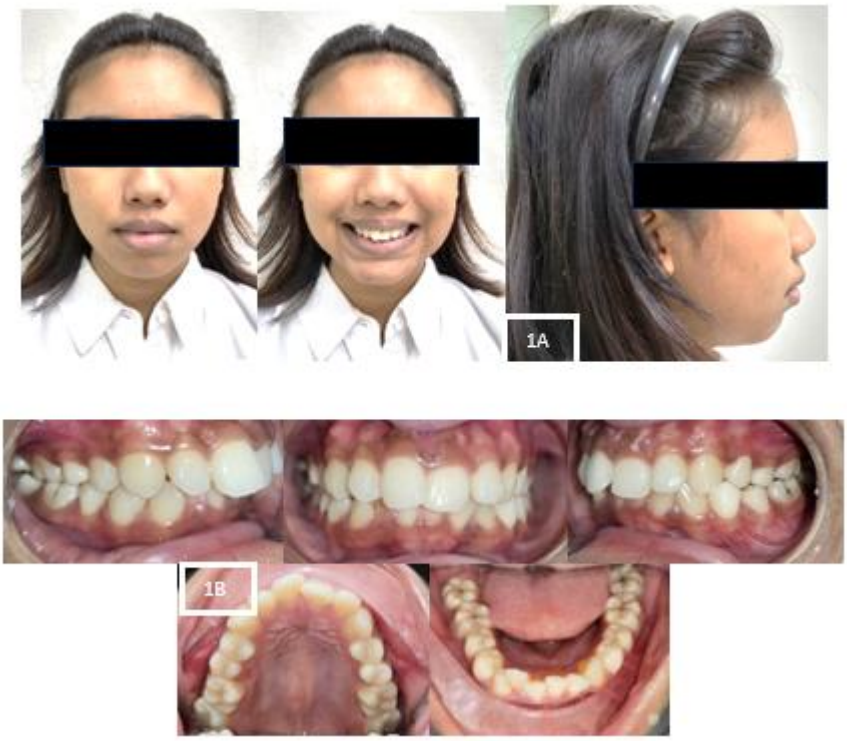

Figure 1. Pre-treatment extraoral (Fig. 1A) and intraoral photographs (Fig. 1B).

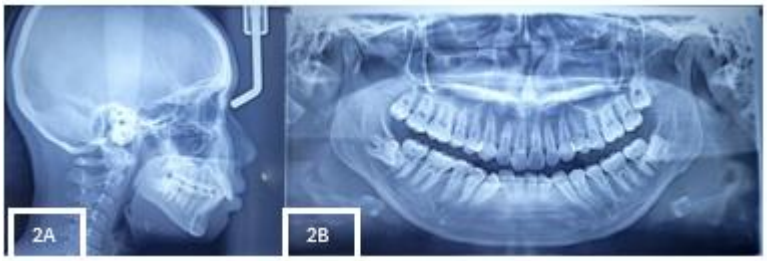

Figure 2. Post-treatment cephalometry radiograph (Fig.2A) and panoramic radiograph (Fig.2B).

The intraoral examination found that the patient's oral hygiene was moderate, there was no tooth mobility, a shallow palate, and a moderate tongue. The intraoral examination of the patient showed incisor relationship is a class II division 1. The molar relationship between the left and right first molars was class I. The left and right canine relationship was class II ¼ unit. Overjet was 7 mm and overbite was 4 mm with coverage of 64.2%.

Patient had a deep curve of Spee of 4 mm, normal midline of upper and lower dental arches, the shape of maxillary arch was triangle and the shape of mandible arch was oval. The result of smile analysis showed that the right buccal corridor looked wider when compared to the left buccal corridor. Upper anterior teeth (12, 11, 21, and 22) looked more protrusive. The smile curve was parallel to the lower lip. The right canine looked more labial when compare to the left canine. The lateral cephalometric analysis obtained class II division 1 skeletal malocclusion with retrognathic mandible and normal maxilla. The result of panoramic analysis showed impaction on the teeth 38 and 48. The roots of the teeth 34, 35, 44 looked dilacerated (figure 2).

Camouflage orthodontic treatment performed on this patient aims to correct the patient's tooth malposition, correct overjet and overbite to normal, so that the patient can be more confident after treatment. This patient refused to have an extraction so that the space needed for the maxillary arch was obtained through expansion using a removable appliance, namely a quad helix.

Figure 3. Post-treatment extraoral (Fig. 3A) and intraoral photographs (Fig. 3B).

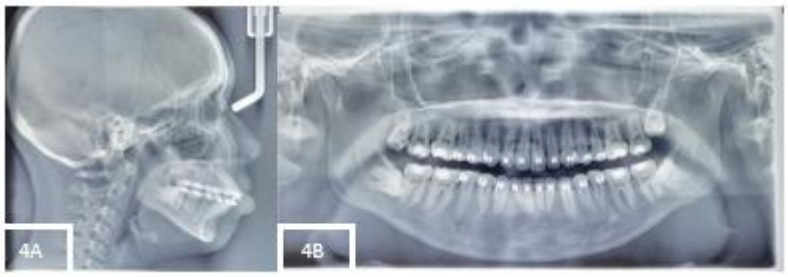

Figure 4. Post-treatment cephalometry radiograph (Fig.4A) and panoramic radiograph (Fig.4B).

CASE MANAGEMENT

Treatment began with bonding brackets with MBT prescription slot .022 on the mandibular arch first starting from NiTi .012 and bypass on tooth 42, then for the maxillary arch it began with the insertion of a quad helix that had been activated first outside the mouth. Activation was carried out on the quad helix until the first maxillary right and left molars were in line with the second maxillary right and left molars. Treatment was carried out for 26 months in twenty appointments. The retainer used at the end of treatment was vacuum-formed retainer on the maxillary and mandibular arch.

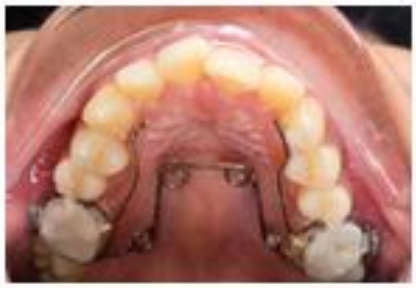

Figure 5. Insertion of a quad helix on the maxillary arch at the beginning of treatment.

DISCUSSION

Treatment begins with insertion of a quad helix on the maxillary arch. Quad helix is a slow expansion device because it uses continuous low-force systems[16,15]. Slow expansion devices basically produce dentoalveolar changes and expansion.14 Quad helix is one of the device to treat a constriction of the maxillary arch[18,15]. The level of device activation is smaller when compared to rapid expansion devices. The indications for the use of this quad helix are in the maxillary arch that requires expansion. Crowding that occurs in mixed teeth or permanent teeth, that require mild expansion that has a lack of space for the lateral upper arch and class II malocclusion where the upper arch requires effective expansion[14].

The insertion of the quad helix begins with activation of 2 mm, then continues with activation of the anterior arm to move the molars towards the buccal direction, the reactivation is carried out on the posterior arm to provide an expansion effect towards the lateral direction on the premolars and canines and activation of this posterior arm can compensate for the movement towards the mesial palatal direction that occurs when activation is carried out on the anterior arm.

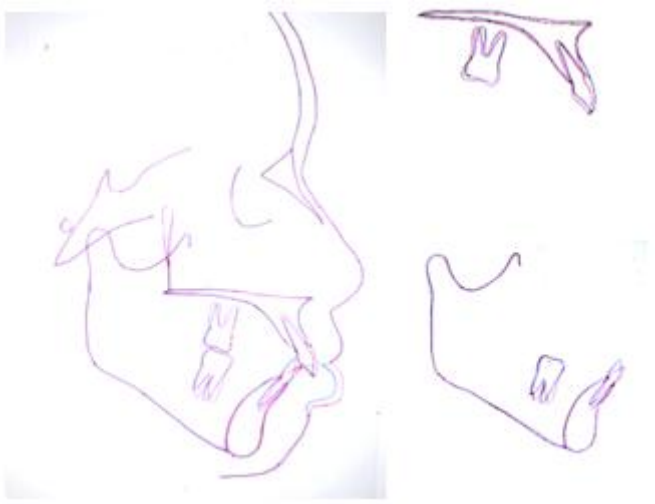

Figure 6. Superimpose lateral cephalometric tracings before treatment (blue) and after treatment (red).

Table 1. Analysis of lateral cephalogram before and after orthodontic treatment

	Mean	**Pre Treatment Value**	**Post Treatment Value**
SKELETAL PARAMETER (HORIZONTAL)			
SNA	81º±3	81º	81º
SNB	78º±3	74º	74º
ANB	3º±2	7º	7º
The Witz	F: 0 (±2) M: -1 (±2)	+4	+4
Facial Angle	87º±3	88º	86º
Angle of convexity	0±10º	18º	17º
SKELETAL PARAMETER (VERTICAL)			
Y-axis	60º±6	63º	64º
MMPA	27º±4	33º	33º
LAFH	55%±2%	52.1%	53%
DENTAL PARAMETER			
Interincisal angle	135º±10	115º	119º
UI- PP	109º±6	107º	102º
LI- MP	90º±4	92º	96º
SOFT TISSUE PARAMETER			
Upper lip- E line	1mm±2	2mm	2mm
Lower lip- E line	0mm±2	5mm	7mm

The patient inter canine width before treatment was 37 mm, while after treatment was 39 mm, so an increase in the inter canine width is 2 mm was obtained. The result of inter premolar width in the patient before treatment was 33.5 mm, while the inter premolar width after treatment was 36 mm, so an increasing of inter premolar width is 2.5 mm was obtained. The result of the intermolar width in the patient before treatment was 43.5 mm,

while the intermolar width after treatment was 45.6 mm, so an increasing of intermolar width is 2 mm was obtained.

The patient is planned to use a vacuum-form retainer when debonding is performed for retention of teeth that have been treated. The selection of this vacuum form retainer is because the vacuum-form retainer has very good aesthetic, low cost, and simple fabrication,[19,20] when compared to other retainers. Clinical trials showed that vacuum-form retainer is slightly better than the Hawley retainer in maintaining the regularity of the anterior segment of the upper and lower arch, at least for the first 6 months. This vacuum-form retainer also helps patients who have a high gag reflex because part of this vacuum-form retainer does not cover the palate.[21]

CONCLUSIONS

Fixed orthodontic treatment using MBT bracket slot .022 with the addition of quad helix on the upper arch provides a good expansion effect on the class II malocclusion treatment with a constricted upper jaw. After 26 months of treatment or twenty appointments, the patient felt that the treatment she had done was very good so that now the patient feels very confident with the condition of her teeth that have been neat. The patient is happy because the dental treatment can be done without extraction.

ACKNOWLEDGMENTS

Nil

DECLARATION OF INTEREST

We declare there is no conflict of interest in this study.

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