

Correction of Class II Malocclusion Using a Resin Block Build up with Class II Elastic in an Adult Patient: A Case Report

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Abstract

Class II malocclusion is one of the most prevalent orthodontic problems that is commonly associated with mandibular retrognathia. Treatment in adults poses a challenge because growth modification is no longer possible, and most corrections rely on camouflage mechanics or orthognathic surgery. This report presents a 23-year-old female with a skeletal Class II normodivergent pattern, retrognathic mandible, and proclined maxillary incisors. A modified fixed twin block appliance was combined with fixed orthodontics as a non-extraction camouflage strategy. After 18 months, the patient achieved improved facial balance, normalized overjet and overbite, and Class I molar relationships. Skeletal change was minimal, while the effects were largely dentoalveolar; however, vertical control and occlusal stability were favorable. This case highlights the limited but valuable role of fixed twin block appliances in adults as a cost-effective camouflage option where surgery or extraction is not preferred.

Keywords: Adult orthodontics, Camouflage, Functional orthodontics, Skeletal Class II malocclusion, Twin block appliance

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Introduction

One of the most prevalent orthodontic problems worldwide is Class II malocclusion, which affects 15 % to 20 % of adolescents and persists into adulthood in untreated cases.^{1,2} In adults, treatment options are constrained because growth modification is no longer possible. Conventional strategies include premolar extractions, distalization with skeletal anchorage, or orthognathic surgery. Each of these treatments has distinct advantages and limitations regarding esthetics, invasiveness, treatment duration, and stability.³

Functional appliances, particularly the twin block technique that was introduced by Clark, remain one of the most effective methods for sagittal correction in growing patients with substantial evidence of skeletal and dentoalveolar improvements.^{4,5} However, in adults, true skeletal modification cannot be expected, and the evidence for functional appliances is limited to minor dentoalveolar adaptations and potential condylar remodeling.^{6,7}

To date, nearly all published reports on adult Class II camouflage with functional appliances have employed removable twin block devices in preliminary phases followed by fixed orthodontics.^{5,8} Reports of

fixed, non-removable twin block appliances used concurrently with comprehensive orthodontics in fully adult patients are virtually absent in the indexed literature.

The present case was an adult Class II patient who underwent treatment with a modified fixed twin block appliance that was integrated with fixed orthodontics from the outset. This approach not only addressed patient concerns about compliance and esthetics but also highlighted a practical, non-extraction, non-surgical camouflage strategy that expands the list of tools for orthodontists for managing adult Class II malocclusion.⁹

Case report

A 23-year-old Thai female presented to the Orthodontic Clinic, Dental Hospital, Faculty of Dentistry, Prince of Songkla University with the chief complaint of protrusive maxillary anterior teeth and crowding of the mandibular teeth. The patient reported no history of systemic disease, allergies, or medication use. Extraoral examination revealed normal facial development. The frontal view showed a mesofacial type with mild facial



Figure 1 Pretreatment extraoral examination



Figure 2 Pretreatment intraoral examination

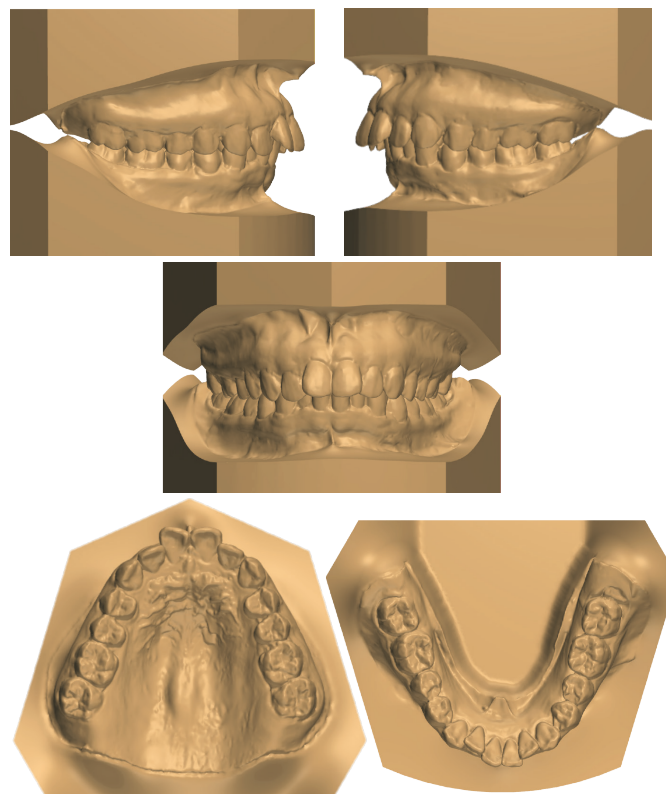


Figure 3 Pretreatment dental casts

asymmetry; the left cheek appeared slightly larger than the right. At rest, the patient exhibited incompetent lips with a 1-mm separation. The smile line was normal on smiling. The facial profile was convex with a normal nasolabial angle (Figure 1). No signs or symptoms of temporomandibular disorders were observed. The patient reported a history of thumb-sucking, which had ceased around the third to fourth grade of primary school.

Intraoral examination revealed asymmetrical arches with tapered maxillary and mandibular arch forms. Bolton's tooth size analysis revealed a discrepancy. The anterior ratio, calculated as $(34/44) \times 100 = 77.27\%$, exceeded the reported mean values of 75.50 – 77.20 – 78.90 %, ¹⁰ indicating that the size of upper and lower anterior teeth are consonant. The overall ratio, calculated as $(82/89) \times 100 = 92.13\%$, ¹⁰ fell within the reported mean range of 89.40 – 91.30 – 93.20 % (Bolton, 1958), suggesting consonance between the upper and lower posterior teeth. The overjet was 6.5 mm

and the overbite was 4 mm. According to Angle's classification, the molars were in a Class II relationship (3.5 mm on the right and 2.5 mm on the left), and the canines were also in a Class II relationship (5 mm on the right and 4 mm on the left) (Figures 2 and 3). The maxillary dental midline coincided with the facial midline, while the mandibular dental midline was deviated 1 mm to the right. Space analysis indicated mild crowding in both arches (Figures 2 and 3). No functional shift or occlusal interference was detected. Oral soft tissues and mucosa appeared normal with adequate attached gingiva. Tongue size and posture were within normal limits. The periodontium was diagnosed with gingivitis.

The mesiodistal tooth size measurements of both arches are presented in Table 1. The Korkhaus analysis indicated that the upper anterior arch width (AAW) was narrower than the lower AAW, while the upper and lower posterior arch widths (PAW) were equal. The upper and lower anterior arch widths (AAW) and posterior arch width (PAW) were within normal

Table 1 Pretreatment tooth size measurements

Tooth number	18	17	16	15	14	13	12	11	21	22	23	24	25	26	27	28
Size (mm)	-	10	9	6.5	7	7.5	7	7.5	8	6.5	7.5	7	6.5	9	10	-
Size (mm)	-	9	10	7	7	6.5	5.5	5	5	5.5	6.5	7	7	10	9	-
Tooth number	48	47	46	45	44	43	42	41	31	32	33	34	35	36	37	38

Table 2 Pretreatment Korkhaus’s analysis

	Maxillary arch		Mandibular arch	
Type	Thai norm ¹¹	Pretreatment	Thai norm ¹¹	Pretreatment
Arch height (mm)	19.10 ± 2.40	23.50	17.3 ± 2.30	17.00
Anterior arch width (mm)	36.40 ± 1.90	35.50	36.2 ± 2.10	36.00
Posterior arch width (mm)	46.80 ± 2.20	46.50	45.7 ± 2.20	46.50



Figure 4 Pretreatment panoramic radiograph

limits. The upper arch height (AH) was greater than the lower AH. Compared with the standard values, the upper AH was larger, whereas the lower AH was within the normal range (Table 2). Space analysis revealed a space deficiency of 1 mm in the upper arch and 2.5 mm in the lower arch.

The panoramic radiograph demonstrated dental development at the permanent dentition stage. The maxillary nasal septum, bone density, and trabeculation appeared normal with no visible pathology. However, the mandibular condyles were asymmetrical with the left condyle being higher and larger than the right condyle (Figure 4).



Figure 5 Pretreatment lateral cephalogram

A lateral cephalometric analysis indicated a skeletal Class II normodivergent pattern with an orthognathic maxilla and a retrognathic mandible. Additional findings included proclined and protruded upper incisors, proclined and normally positioned lower incisors, an acute interincisal angle, a deep curve of Spee, increased overbite and overjet, a convex facial profile, decreased lower facial height (LFH), and lower lip trapping (Figure 5 and Table 3).

Table 3 Pretreatment cephalometric analysis

Area		Measurement	Norm Mean $\pm$ SD	Pre-treatment	Interpretation
Skeletal	Reference line	FH-SN ($^{\circ}$) ¹²	6 $\pm$ 3	9.5	Steep SN plane
	Maxilla to cranial base	SNA ($^{\circ}$) ¹³	84 $\pm$ 4	76.5	Retrognathic maxilla
		A-Nperp (mm) ¹⁴	5 $\pm$ 4	-3.5	Orthognathic maxilla
		SN-PP ($^{\circ}$) ¹⁴	9 $\pm$ 3	10	Normodivergent pattern
	Mandible to cranial base	SNB ($^{\circ}$) ¹³	81 $\pm$ 4	71	Retrognathic mandible
		Pg-Nperp (mm) ¹⁴	0 $\pm$ 6	-13.5	Retrognathic mandible
		SN-Pg ($^{\circ}$) ¹³	82 $\pm$ 3	74	Retrognathic mandible
		SN-MP ($^{\circ}$) ¹³	29 $\pm$ 6	33	Normodivergent pattern
		NS-Gn ($^{\circ}$) ¹³	68 $\pm$ 3	70	Normodivergent pattern
	Maxillo-mandibular	ANB ($^{\circ}$) ¹³	3 $\pm$ 2	5.5	Skeletal Class II
		Wits (mm) ¹²	-3 $\pm$ 2	4.5	Skeletal Class II
		FMA ($^{\circ}$) ¹⁴	23 $\pm$ 5	22	Normodivergent pattern
		MP-PP ($^{\circ}$) ¹³	21 $\pm$ 5	23	Normodivergent pattern
Dental	Maxillary dentition	$\perp$ to NA ($^{\circ}$) ¹³	22 $\pm$ 6	32	Proclined upper incisors
		$\perp$ to NA (mm) ¹³	5 $\pm$ 2	8	Protruded upper incisors
		$\perp$ to SN ($^{\circ}$) ¹³	108 $\pm$ 6	115	Proclined upper incisors
		ADH (mm) ¹⁵	27.23 $\pm$ 2.79	27	Normal ADH
		PDH (mm) ¹⁵	22.24 $\pm$ 2.23	18.5	Decreased PDH
	Mandibular dentition	$\bar{\perp}$ to NB ($^{\circ}$) ¹³	30 $\pm$ 6	35.5	Normally inclined lower incisors
		$\bar{\perp}$ to NB (mm) ¹³	7 $\pm$ 2	8	Normally positioned lower incisors
		$\bar{\perp}$ to MP ($^{\circ}$) ¹²	99 $\pm$ 5	109.5	Proclined lower incisors
	Maxillo-mandibular	$\perp$ to ($^{\circ}$) ¹³	125 $\pm$ 8	108	Acute interincisal angle
Soft tissue	Soft tissue	E line U. lip (mm) ¹⁴	-1 $\pm$ 2	1	Normally positioned upper lip
		E line L. lip (mm) ¹⁴	2 $\pm$ 2	2	Normally positioned lower lip
		NLA ($^{\circ}$) ¹²	91 $\pm$ 8	91	Normal nasolabial angle
		H-angle ($^{\circ}$) ¹³	14 $\pm$ 4	19	Protruded upper lip

Pretreatment facial analysis revealed decreased lower facial height (LFH) measuring 62 mm compared with the Thai normative value of 69 $\pm$ 3 mm, indicating a reduced vertical dimension. Upper facial height (UFH) was also slightly decreased at 45 mm (norm 48 $\pm$ 3 mm). Soft tissue evaluation demonstrated decreased upper lip length (ULL) of 21 mm (norm 23 $\pm$ 2 mm) and

decreased lower lip length (LLL) of 40 mm (norm 46 $\pm$ 3 mm), contributing to an imbalanced vertical facial proportion and chin-lip relationship.

The patient presented with protrusive upper incisors and lower anterior crowding with a history of childhood thumb sucking that had been discontinued. Clinical and radiographic evaluations revealed Skeletal

Class II normodivergent pattern with orthognathic maxilla, retrognathic mandible, dental Class II malocclusion, proclined and protruded upper incisors, mild crowding, large overjet, deep overbite, and a convex profile. The cervical vertebral maturation analysis indicated stage 6, which is beyond the growth spurt that rendered mandibular growth modification inappropriate. As the skeletal discrepancy was mild, orthodontic treatment alone was sufficient.

Three treatment options were considered: 1) conventional orthodontics (non-extraction) with fixed twin block, 2) conventional orthodontics (non-extraction) with whole arch distalization, and 3) conventional orthodontics with extraction of maxillary first premolars (teeth 14 and 24). The fixed twin block option normally provided advantages of avoiding extractions, correcting the deep bite and posturing the mandible forward to allow occlusal seating and potential condylar adaptation rather than true skeletal advancement. Although not inducing true growth in adults, evidence from Prof. Gang Shen and others suggests mandibular repositioning can promote adaptive condylar remodeling that has been supported by animal studies, clinical reports, and case evidence.^{6,7,16} Whole arch distalization also avoids extractions and corrects deep bite, but causes mandibular retrusion and requires longer treatment times and higher costs. Extractions of teeth 14 and 24 shortens treatment and reduces overjet efficiently but risks worsening the deep bite. Therefore, non-extraction treatment with fixed twin block was selected as a balanced approach that offered overjet and deep bite correction, profile improvement, and potential condylar adaptation. Close monitoring was emphasized due to relapse risk and initial discomfort.

After leveling and alignment were achieved, the treatment entered the movement phase. Stiff stainless steel archwires (0.016 × 0.016-inch) were inserted in both the maxillary and mandibular arches to maintain arch form and provide adequate rigidity for mandibular repositioning. Resin block

buildups (Band-Lok) were constructed on both the maxillary and mandibular premolars in the form of inclined planes to posture the mandible forward into a more favorable position. In this protocol, the resin block buildups served as the primary mechanism for mandibular posturing, while short Class II elastics were used adjunctively to facilitate vertical occlusal seating rather than sagittal mandibular advancement. The mandible was guided to a position corresponding to a normal overjet with approximately 30 % overcorrection, resulting in an almost edge-to-edge incisal relationship. This procedure created a posterior open bite, which was managed by applying intermaxillary elastics to seat the occlusion into the new mandibular position. Short Class II elastics (¼-inch, 4.5 oz) were worn full-time while the Band-Lok were in place to provide a vertical seating force, promote posterior interdigitation, and serve as a mandibular positional reminder. As occlusal stops gradually developed, the Band-Lok were selectively reduced to allow for progressive intercuspation



Figure 6 Fixed twin block

while monitoring for any mandibular relapse (Figure 6). During the maintenance phase, short Class II elastics were prescribed for night-time wear only to function as a mandibular positional reminder and to maintain the advanced mandibular position during neuromuscular adaptation. Following the establishment of stable posterior occlusal contacts, elastic wear was limited to nighttime only during the maintenance phase. The forward mandibular position was maintained for approximately six months to permit adaptation and stabilization.¹⁷ Once the Band-Lok were completely removed, finishing mechanics were carried out to refine tooth positions. During this phase, slight tooth mobility was observed in the premolars supporting the resin block buildups; however, the patient did not report pain or discomfort. The resin blocks did not function as definitive occlusal rests but acted as diagonal guiding planes to posture the mandible forward, and the observed mobility resolved spontaneously after their removal. No radiographic evidence of root resorption was detected. Throughout the use of the resin block buildups, the patient was instructed to avoid hard or sticky foods and to maintain a soft diet to minimize excessive occlusal loading and reduce the risk of appliance-related complications. Retention was subsequently applied to monitor stability prior to appliance removal.

After 18 months, the patient demonstrated normalized vertical proportions, improved lower facial height, aligned dental and facial midlines, proper arch coordination, and satisfactory occlusion with a slight Class II canine relationship bilaterally (Figures 7–9, Table 4). Lower lip trapping observed pretreatment was eliminated following normalization of overjet and overbite.

The posttreatment lateral cephalometric radiograph revealed 1) skeletal Class II normodivergent pattern with orthognathic maxilla and rethognathic mandible, 2) normally inclined and positioned upper incisors, but proclined lower incisors, 3) normal



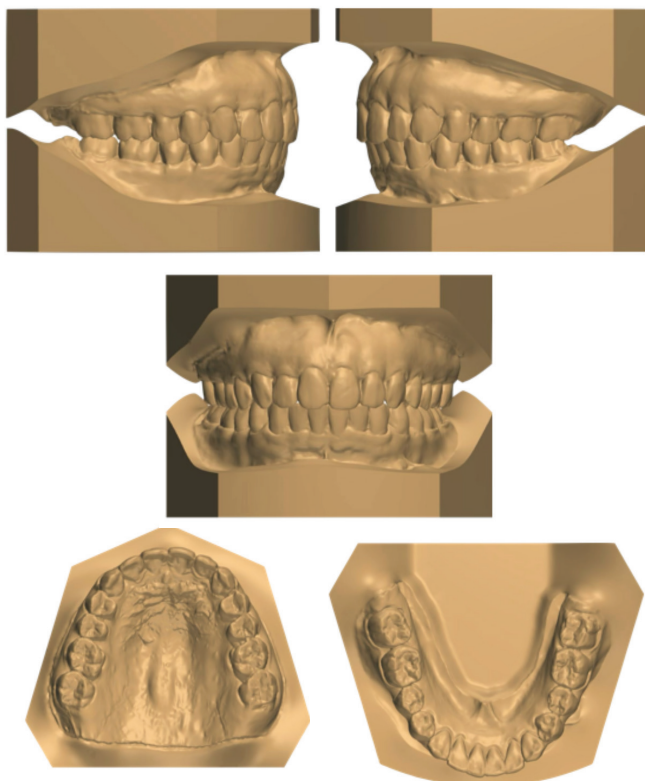
Figure 7 Posttreatment extraoral examination



Figure 8 Posttreatment intraoral examination

Table 4 Comparison of the pretreatment and post-treatment dental cast analysis

Parameters		Pretreatment	Posttreatment
Overjet		6.5 mm	1.5 mm
Overbite		4 mm	1.5 mm
Canine relationships	Right	Class II 5 mm	Class II 1 mm
	Left	Class II 4 mm	Class II 1 mm
Molar relationships	Right	Class II 3.5 mm	Class I
	Left	Class II 2.5 mm	Class I
Upper	Midline	Center	Center
	Arch form	Taper	Paraboloid
	Arch height	23.5 mm	17 mm
	Anterior arch width	35.5 mm	36.5 mm
	Posterior arch width	46.5 mm	47 mm
Lower	Midline	Shift to the right 1 mm	Center
	Arch form	Taper	Paraboloid
	Arch height	20 mm	18 mm
	Anterior arch width	36 mm	37 mm
	Posterior arch width	46.5 mm	47 mm

**Figure 9** Posttreatment dental casts**Figure 10** Posttreatment lateral cephalogram.

interincisal angle, 4) normal posterior dental height, 5) convex soft tissue profile, 6) normally positioned upper and lower lips, and 7) improved LFH (Figure 10 and Table 5).

Table 5 Posttreatment cephalometric analysis

Area		Measurement	Norm Mean $\pm$ SD	Pretreatment	Posttreatment	Difference
Skeletal	Reference line	FH-SN ($^{\circ}$) ¹²	6 $\pm$ 3	9.5	9.5	0
	Maxilla to cranial base	SNA ($^{\circ}$) ¹³	84 $\pm$ 4	76.5	76.5	0
		A-Nperp (mm) ¹⁴	5 $\pm$ 4	-3.5	-4	-0.5
		SN-PP ($^{\circ}$) ¹⁴	9 $\pm$ 3	10	10	0
	Mandible to cranial base	SNB ($^{\circ}$) ¹³	81 $\pm$ 4	71	70.5	-0.5
		Pg-Nperp (mm) ¹⁴	0 $\pm$ 6	-13.5	-14	-0.5
		SN-Pg ($^{\circ}$) ¹³	82 $\pm$ 3	74	76	+2
		SN-MP ($^{\circ}$) ¹³	29 $\pm$ 6	33	35	+2
		NS-Gn ($^{\circ}$) ¹³	68 $\pm$ 3	70	72	+2
	Maxillo- mandibular	ANB ($^{\circ}$) ¹³	3 $\pm$ 2	5.5	6	+0.5
		Wits (mm) ¹²	-3 $\pm$ 2	4.5	4	-0.5
		FMA ($^{\circ}$) ¹⁴	23 $\pm$ 5	22	24	+2
		MP-PP ($^{\circ}$) ¹³	21 $\pm$ 5	23	25	+2
Dental	Maxillary dentition	$\perp$ to NA ($^{\circ}$) ¹³	22 $\pm$ 6	32	18	-14
		$\perp$ to NA (mm) ¹³	5 $\pm$ 2	9	4	-5
		$\perp$ to SN ($^{\circ}$) ¹³	108 $\pm$ 6	115	101	-14
		ADH (mm) ¹⁵	27.23 $\pm$ 2.79	27	29	+2
		PDH (mm) ¹⁵	22.24 $\pm$ 2.23	18.5	20.5	+2
	Mandibular dentition	$\bar{I}$ to NB ($^{\circ}$) ¹³	30 $\pm$ 6	35.5	39.5	+4
		$\bar{I}$ to NB (mm) ¹³	7 $\pm$ 2	8	8.5	+0.5
		$\bar{I}$ to MP ($^{\circ}$) ¹²	99 $\pm$ 5	109.5	113.5	+4
	Maxillo- mandibular	$\perp$ to ($^{\circ}$) ¹³	125 $\pm$ 8	108	118	+10
Soft tissue	Soft tissue	E line U. lip (mm) ¹⁴	-1 $\pm$ 2	1	0	-1
		E line L. lip (mm) ¹⁴	2 $\pm$ 2	2	2.5	+0.5
		NLA ($^{\circ}$) ¹²	91 $\pm$ 8	91	100	+9
		H-angle ($^{\circ}$) ¹³	14 $\pm$ 4	19	18	-1

Posttreatment evaluation showed improvement in vertical facial proportions. Lower facial height (LFH) increased to 66 mm, reaching within normal limits, while upper facial height (UFH) remained within the normal range at 45 mm. Soft tissue parameters also improved, with upper lip length (ULL)

increasing to 22 mm and lower lip length (LLL) to 44 mm, both of which were within normal limits. These changes reflected enhanced vertical facial balance and improved soft tissue support of the chin and lips.

The panoramic radiograph demonstrated nearly parallel roots, except for teeth 13 and 44. Clinically, the alignment of the incisal edges and marginal ridges had already been achieved; however, tooth 13 presented with root prominence, and therefore no additional mesial root torque was applied. No external root resorption was observed (Figure 11). A cranial base superimposition revealed no further growth at either the nasion or basion points, as well as no maxillary growth, whereas slight condylar growth and evidence of adaptive condylar remodeling of the

mandible were detected. The mandible exhibited a clockwise rotation. Maxillary superimposition indicated that the upper incisors were retruded, retroclined, and extruded, along with extrusion of the upper molars. Moreover, mandibular superimposition demonstrated proclination of the lower incisors, with extrusion and mesial movement of the lower molars (Figure 12).

Retention consisted of an upper wraparound retainer without a passive anterior bite plane since the initial deep bite was not severe and overcorrection had already been achieved. Also, a lower wraparound retainer was employed to avoid occlusal interference. The patient was instructed to gradually reduce the duration and frequency of retainer wear until stable occlusion was established. After debonding, the patient was referred for restorative management of tooth 11, which was in progress. Follow-up appointments were scheduled at 1, 3, and 6 months, and annually thereafter (Figure 13).



Figure 11 Posttreatment panoramic radiograph

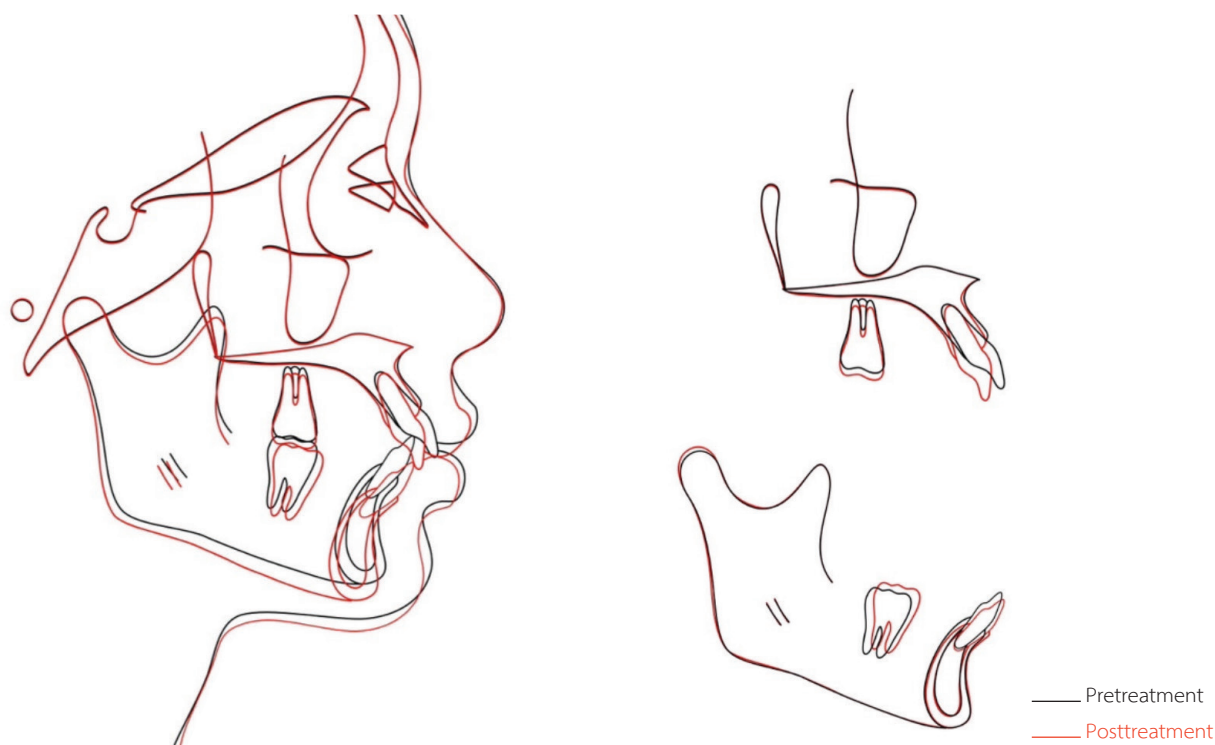


Figure 12 Cephalometric superimposition of pretreatment (black) and posttreatment (red) tracings



Figure 13 Posttreatment with retention appliances

The treatment outcomes were satisfactory. The patient's upper incisor protrusion and lower anterior crowding were corrected, lower facial height increased moderately, and the facial profile improved. The patient was highly satisfied with the esthetic and functional results.

Discussion

This case highlights the management of a borderline adult Class II malocclusion using a novel fixed twin block appliance in combination with comprehensive orthodontics. While the treatment outcomes—reduction of overjet, improvement of overbite, and establishment of Class I occlusion—were comparable to those reported with other functional and camouflage approaches, the main distinction lies in the use of a fixed, non-removable twin block appliance in a fully grown adult. Most previous reports have involved removable twin block therapy in adolescents followed by fixed appliances. However, applications in adults using a concurrent fixed twin block remain very limited in the literature.^{5,9}

A critical aspect of this report is the treatment planning process. Three alternatives were carefully

considered: 1) premolar extractions, which would reduce overjet efficiently but at the cost of possible profile flattening and deep bite worsening, 2) whole-arch distalization with skeletal anchorage, which avoids extractions but increases cost, invasiveness, and treatment time, and 3) camouflage with a fixed twin block. The patient's preference for a non-surgical, non-extraction solution, coupled with the clinician's concern about maintaining vertical control, supported the selection of option three.³ This structured decision-making framework illustrates the importance of patient-centered care and individualized biomechanics in adult Class II treatment.

From a biomechanical standpoint, the fixed twin block produced mandibular advancement through inclined plane mechanics that generated a posterior open bite and thereby facilitated vertical control. This mechanism differs from Class II elastics, which often produce mandibular incisor proclination and molar extrusion.¹⁸ Compared with Herbst or Forsus appliances, which also posture the mandible forward but require anchorage from miniscrews or rigid attachments, the fixed twin block offers a simpler force system with fewer side effects, albeit with more reliance on dentoalveolar compensation.⁹ In this adult patient, a fixed Twin-block-type approach was selected to allow mandibular posturing while maintaining continuous three-dimensional control within an ongoing fixed appliance system. Although removable Twin-block appliances have been more extensively studied, particularly in growing patients, their skeletal effects in fully mature adults remain limited. In the present case, the fixed approach provided a practical and biomechanically integrated solution consistent with the treatment stage and objectives. The present case still demonstrated lower incisor proclination that was consistent with previous findings but within a clinically acceptable range.⁵ Although lower incisor proclination was observed in the present case, this finding cannot be attributed solely to the fixed twin block phase. Lower incisor inclination may have been influenced by

multiple stages of treatment, including initial leveling and alignment, resolution of anterior crowding, and intrusion of the lower anterior teeth during deep-bite correction prior to the application of the fixed twin block. Because no intermediate cephalometric records were obtained before fixed twin block insertion, the precise contribution of each treatment phase to lower incisor proclination cannot be determined.

In the present case, the treatment outcome was achieved through a combination of two complementary biomechanical components. Resin block buildups functioned as the primary mechanism for forward mandibular posturing via inclined plane mechanics, while short Class II elastics were used adjunctively to facilitate vertical occlusal seating and posterior intercuspation. Importantly, during the maintenance phase, short Class II elastics were prescribed for night-time wear only to serve as a mandibular positional reminder rather than as a sagittal force system. This combined approach allowed stabilization of the advanced mandibular position while minimizing unwanted dentoalveolar compensation. To further minimize excessive occlusal loading and appliance-related complications, patients were instructed to avoid hard or sticky foods and to maintain a soft diet during the period of resin block use.

It is important to note that skeletal effects in adults remain minimal. Functional appliances at this stage cannot stimulate true mandibular growth.⁶ While cephalograms suggested minor condylar positional change, such findings must be interpreted cautiously. Advanced three-dimensional imaging, such as CBCT, has been shown to more accurately capture condylar remodeling.¹⁹ Therefore, any skeletal changes in this case should be attributed primarily to dental-alveolar adaptation rather than true growth modification.

Another consideration is the risk of relapse since camouflage corrections often have lower long-term stability compared with orthognathic solutions.¹ Evidence-based protocols emphasize the role of tailored retention strategies in maintaining

alignment and bite correction.²⁰ In this case, retention was designed with wraparound retainers, but clinicians should anticipate long-term monitoring, particularly for vertical stability and lower incisor position.

This case illustrates that a fixed twin block appliance, when used in adults, should not be viewed as a growth modification tool but rather as a biomechanical adjunct for dentoalveolar camouflage. Its value lies in enabling non-extraction correction, enhancing vertical control, and aligning with patient-centered preferences. When appropriately selected, this approach expands the orthodontist's armamentarium for managing borderline Class II adults that offers a balance between effectiveness, patient comfort, and clinical practicality.

Conclusion

The treatment of an adult patient with skeletal Class II malocclusion using a modified fixed twin block appliance combined with fixed orthodontics achieved satisfactory esthetic and functional results. The improvements were primarily dentoalveolar, with minimal skeletal correction. This outcome confirms the role of the approach as orthodontic camouflage rather than true skeletal modification. In adult patients with mild Class II discrepancies who refuse orthognathic surgery, functional appliances may be considered as part of a non-extraction camouflage plan to improve occlusion and facial balance. However, clinicians must emphasize the limitations of skeletal correction, the reliance on dental compensation, and the necessity for long-term retention to maintain stability.

Author contributions

Nicha Kukongviriyapan: Conceptualization, Methodology, Software, Validation, Formal analysis, Investigation, Resources, Data Curation, Writing - Original Draft, Writing - Review & Editing, Visualization;

Pornpimon Kamchai: Conceptualization, Methodology, Software, Validation, Formal analysis, Investigation, Resources, Data Curation, Writing - Original Draft, Writing - Review & Editing, Visualization; **Bancha Samruajbenjakun:** Conceptualization, Methodology, Software, Validation, Investigation, Resources, Writing - Review & Editing, Visualization, Supervision, Project administration.

Ethical statement

The patient's consent was obtained before publication.

Disclosure statement

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AI-assisted writing declaration

The authors used Grammarly Premium (Grammarly Inc.) solely as a language editing tool. All scientific content was developed and verified by the authors, who take full responsibility for the manuscript.

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