Asymmetric Skeletal Class III Malocclusion with Missing Molars and Deep Anterior Crossbite

Abstract

History: *A 25-year-old male presented with chief complaints (CC) of anterior crossbite and protruded lower lip.*

Diagnosis: *The patient was diagnosed with a Class III malocclusion, associated with anterior crossbite (overjet = -3mm), deep bite (overbite = 8mm), asymmetric missing teeth (UR6, UL5, LL7), and a concave profile. The ABO Discrepancy Index (DI) was 43.*

Treatment: *This severe malocclusion was corrected with extraction of mandibular first premolars and a passive self-ligating (PSL) fixed appliance. Class III early light short elastics (ELSE) and bite turbos were used to resolve the anterior crossbite.*

Results*: Following 30 months of active treatment, the skeletal Class III malocclusion was successfully aligned, and the anterior corssbite was corrected by retracting the lower anterior segment. Both the concave profile and the protrusive lower lip were improved. This malocclusion, with a Discrepancy Index of 43 points, was treated to a Cast-Radiograph Evaluation (CRE) of 8 and a Pink and White (P&W) dental esthetic score of 5 points. The patient was pleased with the treatment outcome.*

Conclusions*: A severe skeletal malocclusion was corrected in 30 months with a full-fixed PSL appliance, bite turbos, early light short Class III elastics, and space closure mechanics. (J Digital Orthod 2023;69:4-22)*

Key words: *Class III anterior crossbite malocclusion, passive self-ligating brackets, asymmetrical dentition*

The dental nomenclature for this case report is a modified Palmer notation with four quadrants: upper right (UR), upper left (UL), lower right (LR), and lower left (LL). Teeth are numbered 1-8 from the midline in each quadrant.

History and Etiology

A 25-year-old male sought orthodontic evaluation with chief complaints of an unattractive smile and protruded lower lip (Fig. 1). Clinical evaluation revealed a Class III molar relationship, anterior crossbite, and missing teeth (UR6, UL5, and LL7) (Figs. 1-5). Dental examination revealed an anterior crossbite malocclusion. Because of early loss of permanent molars due to caries, the etiology of the anterior crossbite was probably posterior occlusal collapse in late mixed dentition combined with atopic eruption of maxillary incisors.[1]

Facial analysis revealed a decreased vertical dimension of occlusion (VDO), concave profile, and a protrusive lower lip. No contributing medical history was reported. There were no signs nor symptoms of temporomandibular dysfunction. This severe malocclusion was corrected in 30 months with a passive self-ligating (PSL) appliance, anterior bite turbos, and Class III early light short elastics (ELSE). Orthognathic surgery was not required for this severe discrepancy (ANB, -6˚).

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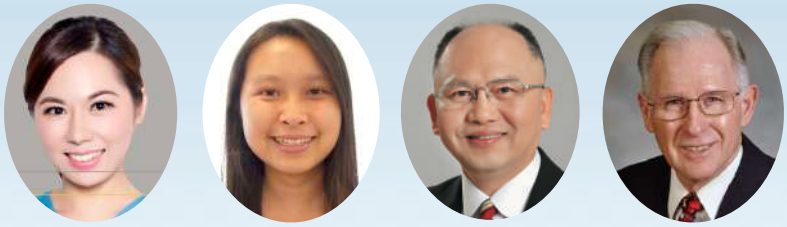

Diagnosis

Skeletal:

- Class III malocclusion (SNA, 78˚; SNB, 84˚; ANB, -6˚) in centric occlusion (C_O)
- Normal mandibular plane angle (SN-MP, 36˚; FMA, 29˚)

Dental:

- Molar relationship in C_O: *Class III on the right and Class I on the left*

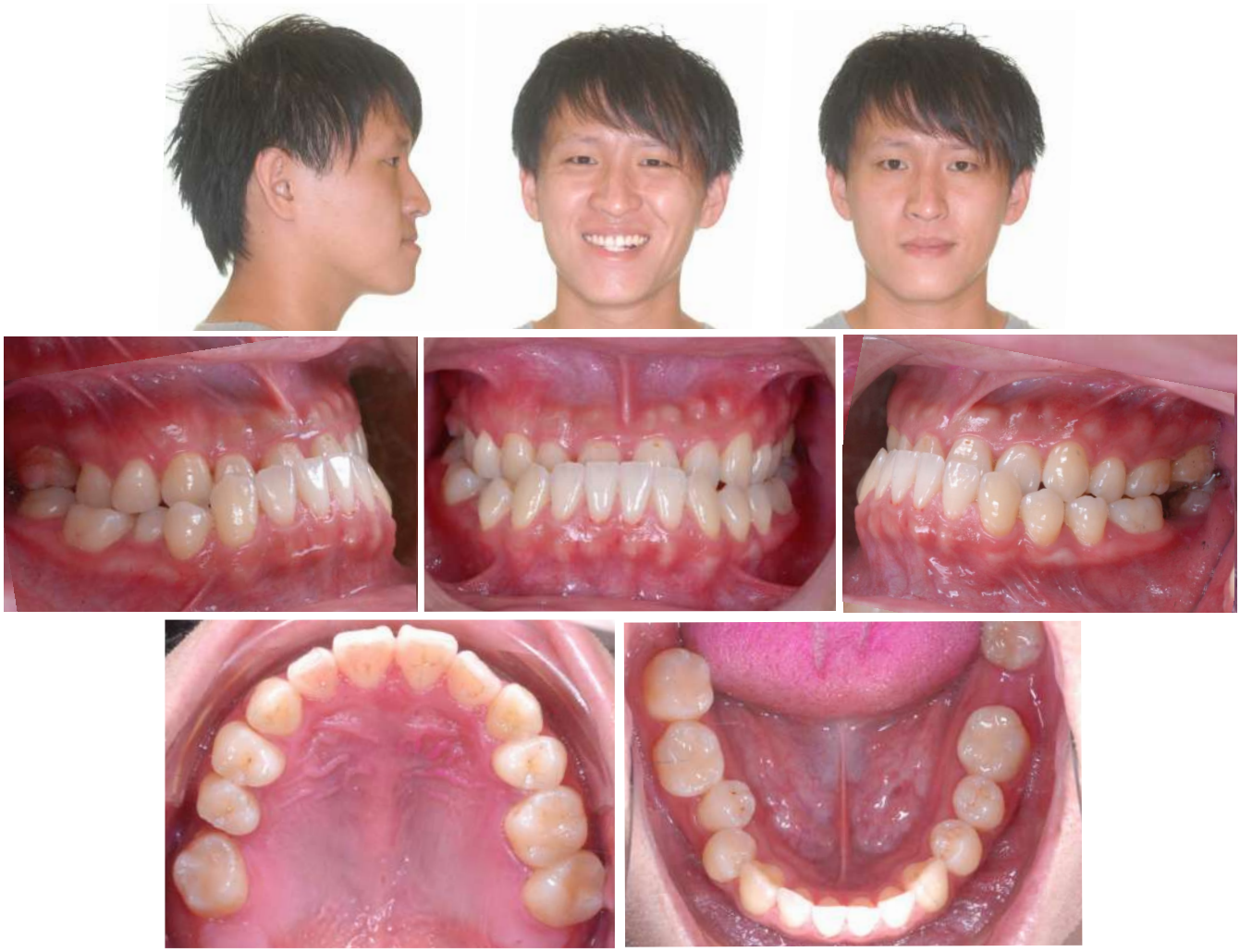

Fig. 1: *Pre-treatment facial and intraoral photographs*

Fig. 2: *Pre-treatment dental models (casts)*

Fig. 3: *Pre-treatment panoramic radiograph*

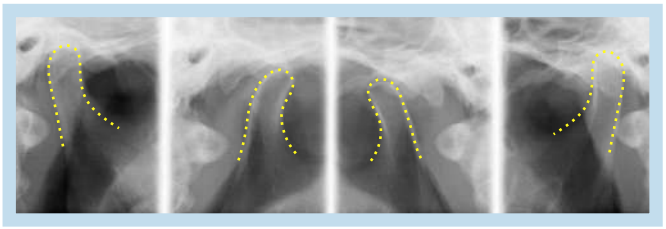

Fig. 4:
Pre-treatment transcranial radiographs of the temporomandibular joints (TMJs). From the left to right are right TMJ closed, right TMJ open, left TMJ open, and left TMJ closed.

- Canine relationship: *Bilateral Class III*
- Negative overjet: *-3mm*
- Deep overbite: *7mm with a deep curve of Spee*
- Crowding: *1mm in the lower arch*
- Third molars: *All missing, except LL8*
- Midlines: *The upper dental midline was shifted 2mm to the left, but the lower dental midline was coincident with the facial midline.*
- Arch forms: *Oval-shape form in both maxillary and mandible arches*

Facial:

- Profile: *Concave*
- Lips: *Protrusive lower lip*
- Vertical dimension of occlusion (VDO): *Decreased*

Treatment Objectives

The principle objectives were to: (1) correct the anterior crossbite by opening the bite and retracting the lower anterior segment, (2) extract LR4 and LL4 to retract the anterior teeth and protract the posterior teeth, (3) improve the facial profile by retracting the lower lip, (4) use a full-fixed appliance to level and align both dental arches, (5) protract UR7 and LL8 to close posterior spaces, and (6) achieve an ideal finish.

Fig. 5: *Pre-treatment lateral cephalometric radiograph*

Maxilla (all three planes):

- A-P: *Increase.*
- Vertical: *Increase.*
- Transverse: *Maintain.*

Mandible (all three planes):

- A-P: *Retract the anterior teeth.*
- Vertical: *Intrude the incisors by correcting the curve of Spee.*
- Transverse: *Maintain.*

Maxillary Dentition:

- A-P: *Maintain.*
- Vertical: *Maintain.*
- Inter-molar/Inter-canine Width: *Expand to properly occlude with the lower dentition.*

Mandibular Dentition:

- A-P: *Decrease by retracting the anterior teeth.*
- Vertical: *Decrease by intruding the incisors .*
- Inter-molar/Inter-canine Width: *Maintain.*

Facial Esthetics:

- Retract the protrusive lower lip and increase the maxillary incisor exposure.

Treatment Alternatives

Implant-supported prostheses to restore missing UR6 and UL5 was an option to increase the A-P plane and to protrude the upper lip. However, the disadvantages for this treatment were the cost and that it was a more invasive approach. The patient preferred using a full-fixed orthodontic appliance to correct the anterior crossbite, as well as extracting L4s to retract and level the lower anterior segment. Because of the asymmetric extraction spaces, closing all spaces and retracting the incisors risked deviation of the midline and asymmetric molar relationship. The patient was warned about the potential side effects, but was also informed that a 4mm midline deviation is clinically acceptable.[2]

Results Achieved

Maxilla (all three planes):

- A-P: *Maintained*
- Vertical: *Maintained*
- Transverse: *Maintained*

Mandible (all three planes):

- A-P: *Retracted*
- Vertical: *Anterior segment was intruded.*
- Transverse: *Maintained*

Maxillary Dentition:

- A-P: *Incisors were slightly tipped labially.*
- Vertical: *Maintained*
- Inter-molar/Inter-canine Width: *Slightly expanded*

Mandibular Dentition:

- A-P: *Anterior teeth were retracted.*
- Vertical: *Anterior segment intruded*

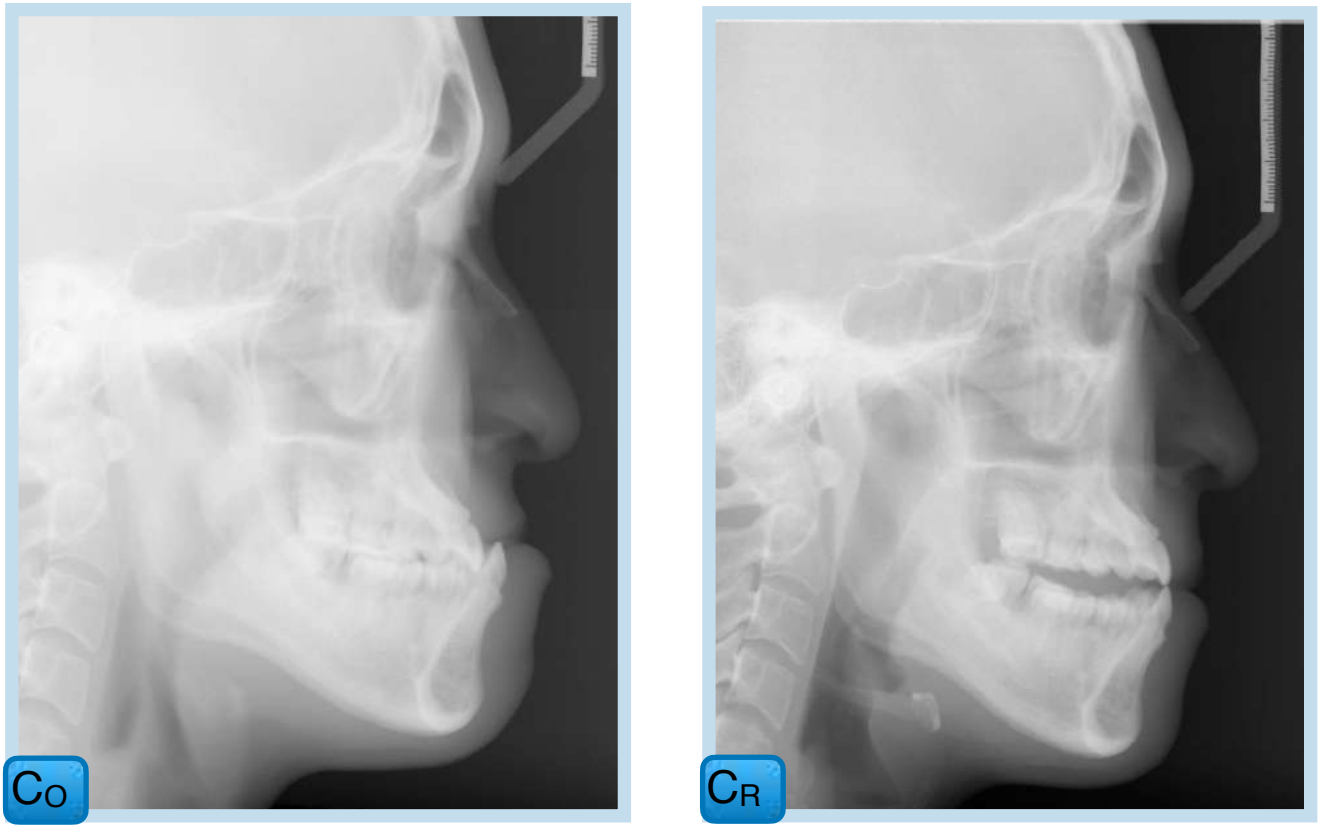

Fig. 6: *With the mandible positioned in centric relation (C_R), the incisors were in an end-to-end occlusion, and the facial profile was straight.*

- Inter-molar/Inter-canine Width: *Slightly decreased*

Facial Esthetics:

- Protrusive lower lip was retracted.

Treatment Progress

All treatment and sequencing details are outlined in Table 2, and the treatment progress is documented in the following views: right buccal, frontal, left buccal, upper occlusal, and lower occlusal, respectively (Figs. 8-12).

A 0.022-in Damon Q (Ormco, Glendora, CA) passive self-ligating (PSL) fixed appliance was selected along with all specified archwires and orthodontic auxiliaries. Prior to active treatment, the mandibular first premolars (LR4 and LL4) were extracted.

In the beginning, brackets were bonded on the lower teeth. High-torque brackets were placed on the lower canines (LR3 and LL3), and low-torque brackets were bonded upside down on the lower incisors. The purpose of this bracket selection was to achieve increased torque control and to provide more lingual root movement of the lower anterior teeth. One month later, standard torque brackets were placed on the upper anterior teeth except for upper canines (UR3 and UL3), which were bonded with high-torque brackets.

The initial archwires for both upper and lower arches were 0.014-in copper-nickle-titanium (CuNiTi) followed by 0.014x0.025-in CuNiTi, 0.017x0.025-in TMA, and 0.016x0.025-in SS. Early light Class III elastics (Quail 3/16-in, 2oz; Ormco)

CEPHALOMETRIC SUMMARY			
	PRE-TX	POST-TX	DIFF.
SKELETAL ANALYSIS			
SNA° (82°)	78°	77°	1°
SNB° (80°)	84°	83°	1°
ANB° (2°)	-6°	-6°	0°
SN-MP° (32°)	36°	35°	1°
FMA° (25°)	29°	28°	1°
DENTAL ANALYSIS			
U1 TO NA mm (4 mm)	10	11	1
U1 TO SN° (104°)	114°	116°	2°
L1 TO NB mm (4 mm)	5	-1	6
L1 TO MP° (90°)	82°	71°	11°
FACIAL ANALYSIS			
E-LINE UL (-1 mm)	-8	-6	2
E-LINE LL (0 mm)	0	-4	4
%FH: Na-ANS-Gn (53%)	48%	48%	0%
Convexity:G-Sn-Pg' (13°)	-6°	-4.5°	1.5°

Table 1: *Cephalometric summary*

Fig. 7:
Anterior bite turbos are constructed on the lingual surfaces of the lower central incisors for the correction of the anterior crossbite.

Appointment	Archwire	Notes
1 (0 month)	L : 0.014-in Damon CuNiTi	Bond all lower teeth from LL8 to LR7. LL4, LR4, and LL6 were already extracted. Bond low torque brackets upside down to achieve high torque on the lower incisors. Place high torque brackets on the lower canines.
2 (1 month)	U: 0.014-in Damon CuNiTi	Bond all upper teeth from UR6 to UL7 with standard torque brackets except for UR7 and UL5, which were missing prior to treatment. Bond composite resin bite turbos on the lingual surfaces of the mandibular incisors to open the bite. Start using early light short Class III elastics (Quail 3/16-in, 2oz) from UR5 to LR3 and UL6 to LL3 to retract the mandibular anterior teeth.
3 (2 months)		Rebond the bite turbos on lower incisors.
4 (3 months)	U: 0.018-in Damon CuNiTi	Rebond the bite turbos on lower incisors.
5 (4 months)	U: 0.014x0.025-in Damon CuNiTi	
6 (5 months)	L: 0.014x0.025-in Damon CuNiTi	
7 (6 months)	U: 0.017x0.025-in Damon TMA	Use power chains to re-activate space closure. Replaced early light short Class III elastics (Fox 1/4 in, 3.5 oz) from UR5 to LR3 and UL6 to LL3 to retract the mandibular anteriors.
8 (7 months)	L : 0.016x0.025-in Damon Pre-Torqued CuNiTi	Add 15° on the lower archwire from LL2 to LR2. Apply anterior root torque to increase incisor torque. Ligate anterior teeth with a stainless steel ligature, and tie in a figure-eight pattern to maintain firm contact. Close extraction spaces with power chains.
9 (8 months)		Use power chains to re-activate space closure.
10 (9 months)	U: 0.018-in Damon CuNiTi L: 0.019x0.025-in Damon Pre-Torque	Rebond UR1 and UR4 to conform with the axis. Stop using elastics.
11 (10 months)	U: 0.014x0.025-in Damon CuNiTi	
12 (11 months)	L : 0.016x0.025-in Damon SS	Add 15° on the archwire from LL2 to LR2.
13 (12 months)		Continue to close all the space with power chains. Place lingual buttons on LL5 and LL8 to enhance posterior teeth space closure.
14-15 (13-14 months)	U: 0.017x0.025-in Damon TMA	Expand the upper archwire and constrict the lower archwire. Ligate anterior teeth with a stainless steel ligature.
16-18 (15-17 months)		Use Class III elastics (Fox, 1/4-in, 3.5-oz) from L3s to U6s and U7s, to add more horizontal vector to retract the lower anteriors and to protract the upper posteriors. Close spaces with power chains.
19 (18 months)	U: 0.016x0.025-in Damon SS	Expand the upper archwire.
20 (19 months)		Continue to close space with power chains.
21 (20 months)	L : 0.014x0.025-in Damon CuNiTi	Rebond LL6. Continue to close spaces with power chains and Class III elastics.
22 (21 months)	L : 0.017x0.025-in Damon TMA	Perform inter-proximal reduction (IPR) on maxillary incisors to correct black triangles. Close spaces with power tube and power chains.

Table 2: *Treatment sequence (continued on the next page)*

Appointment	Archwire	Notes
23 (22 months)	L : 0.016x0.025-in Damon SS	Expand the lower arch wire. Perform IPR on LR2, LR3 and LL1, LL2 to eliminate the V shape. Close spaces with power chains.
24 (23 months)		Continue to close space with power chains.
25 (24 months)	L : 0.017x0.025-in Damon TMA	Expand the lower arch wire. Rebond LL5 to conform with the axis. Close the anterior segment with power tube. Stop using elastics.
26-27 (25-26months)		Continue to close all the spaces with power chains and power tube. Bond lingual buttons on UR4 and UR6 to attach a power chain for space closure between the posterior teeth.
28 (27 months)	L : 0.014x0.025-in Damon CuNiTi	Rebond LR2 and LR6.
29 (28 months)		Continue to close all the spaces with power chains and power tube. Cut the upper arch wire distal to the U3s, and prescribe intermaxillary elastics (Chipmunk 1/8-in, 3.5-oz) to settle the canines and second molars.
30 (29 months)		Apply Chipmunk (1/8-in, 3.5-oz) to settle R7s and applied Fox (1/4-in, 3.5 oz) from UL3 to LL6-7.
31 (30 months)		Remove all appliances. Bond anterior fixed retainers from canine to canine (3-3) on the mandibular arch. Deliver removable clear overlay retainers for both arches, and instruct the patient to wear them full time for the first 6 months and nights only thereafter. Provide instructions for home hygiene and maintenance of the retainers.

Table 2: *Treatment sequence (continued from the previous page)*

were used from UR5 to LR3 and UL6 to LL3 to retract the mandibular anterior teeth. In the 6th month, the anterior crossbite was already corrected. Power chains were used to facilitate space closure.

In the 7th month, the upper archwire was changed to 0.017x0.025-in TMA, and the lower archwire was changed 0.016x0.025-in pre-torqued CuNiTi with 15 degrees added to the incisors (LR2 to LL2) to increase root torque control and to prevent the crown from tipping lingually. In the 12th month, lingual buttons were bonded on LL5 and LL8 to enhance space closure. Thereafter, both upper and lower archwires were changed to 0.016x0.025-in SS in order to correct the posterior crossbite by expanding the upper archwire and constricting the lower archwire.

The sequence for the lower archwire was changed back and forth several times due to correction of the crossbite, space closure, and repositioning of brackets. The sequence was 0.016x0.025" pre-torqued CuNiTi, 0.019x0.025" pre-torqued CuNiTi, 0.016x0.025" SS, 0.014x0.025" CuNiTi, 0.016x0.025" SS, 0.017x0.025" TMA, and 0.014x0.025" CuNiTi.

Treatment Result

After 30 months of active treatment, the patient was satisfied with the outcome. The posttreatment evaluation revealed that the mandibular anterior

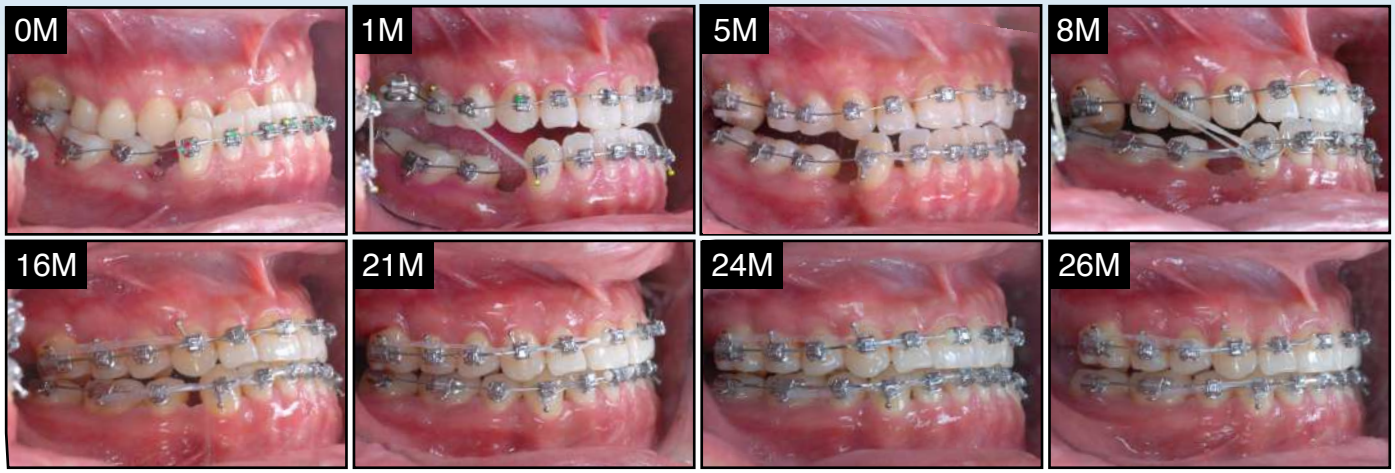

***Fig. 8**: Right buccal view progression from the start of treatment (0M) to 26 months (26M)*

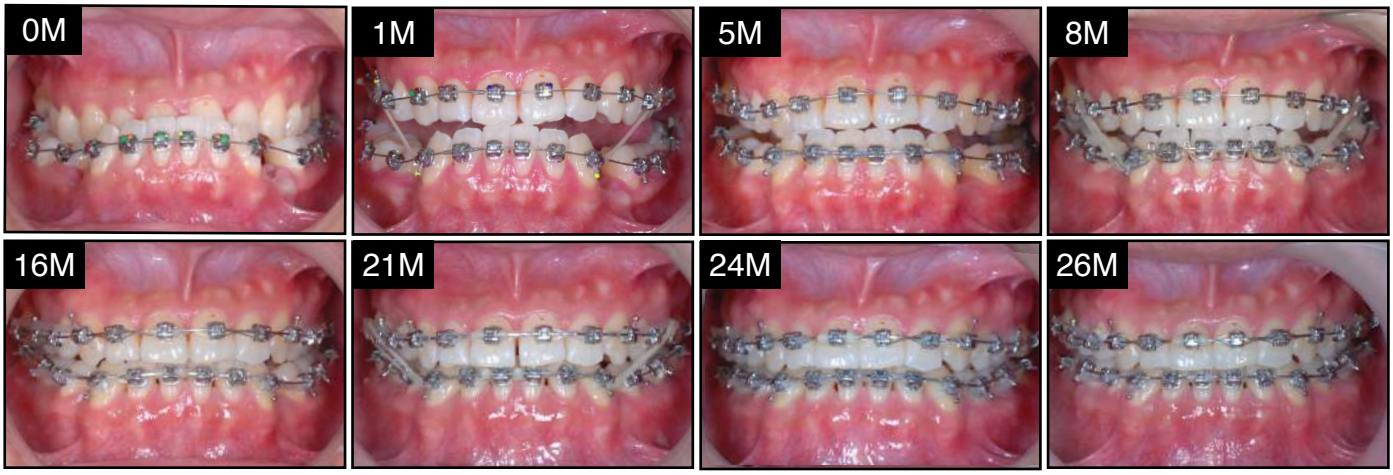

***Fig. 9:** Treatment progression from the frontal view*

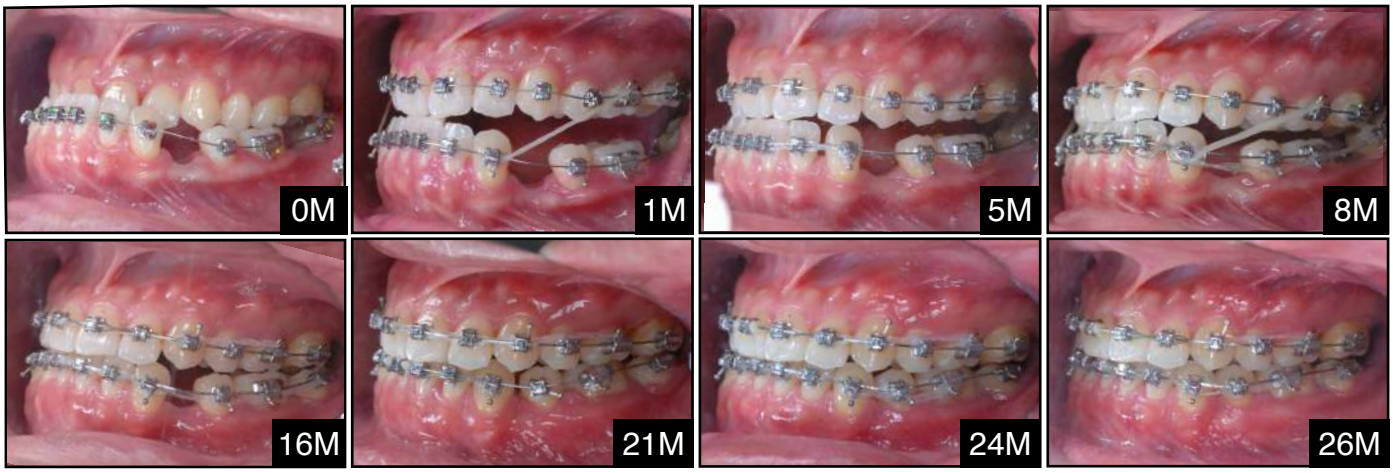

***Fig. 10**: Treatment progression from the left buccal view*

Fig. 11: *Treatment progression from the maxillary occlusal view over the 29 months of treatment with archwires specified in grey labels*

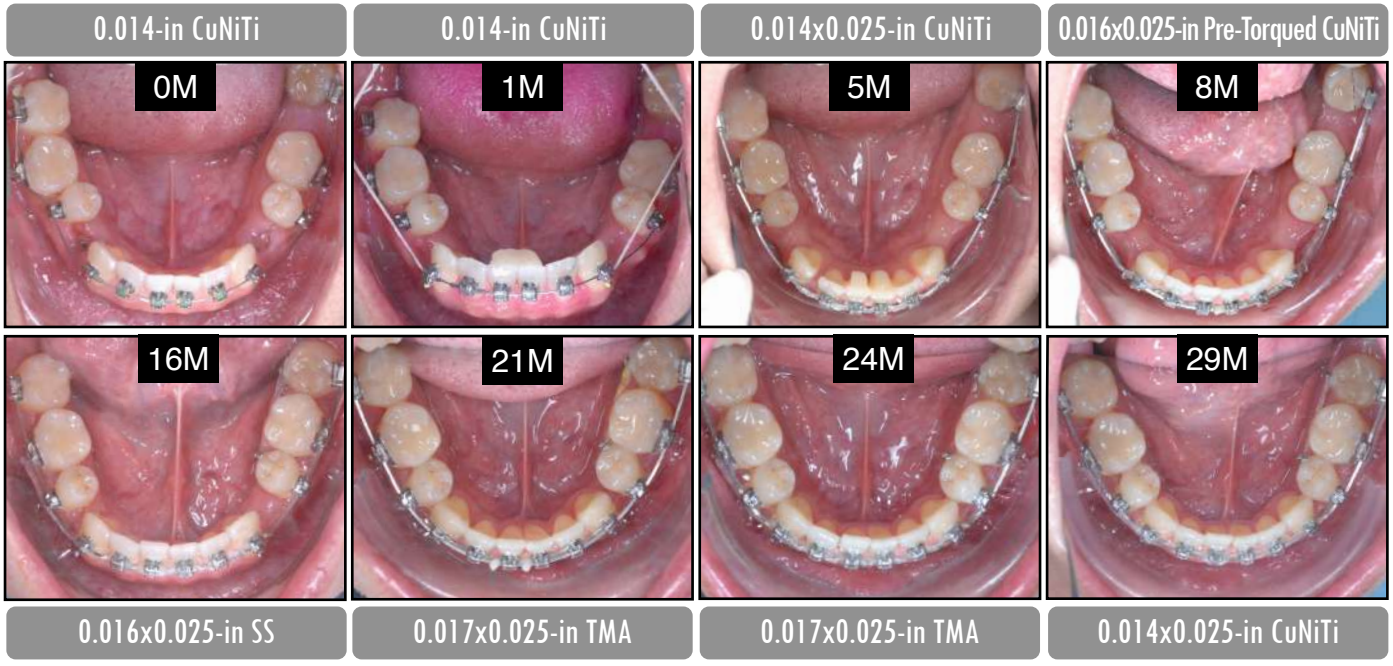

Fig.12*: Treatment progression from the mandibular occlusal view with archwires specified in grey labels*

segment was retracted, and the anterior crossbite was corrected. The ABO Cast-Radiograph Evaluation (CRE) score was 8. The major discrepancies were occlusal contact (5 points), occlusal relationship (2 points), and marginal ridge (1 point). A comparison of the pre- and posttreatment records revealed a significant improvement in facial profile and dental alignment. The patient was well satisfied with the result.

Retention

An anterior fixed retainer was bonded on the lingual surfaces of the lower dentition from canine to canine. Removable clear overlay retainers were delivered for both arches. The patient was instructed to wear them full time for the first 6 months and nights only

***Fig. 13**: Posttreatment facial and intraoral photographs*

Fig. 14: *Posttreatment cephalometric radiograph*

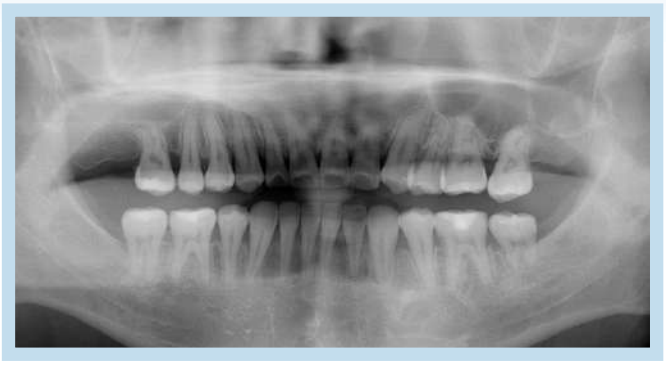

Fig. 15: *Posttreatment panoramic radiograph*

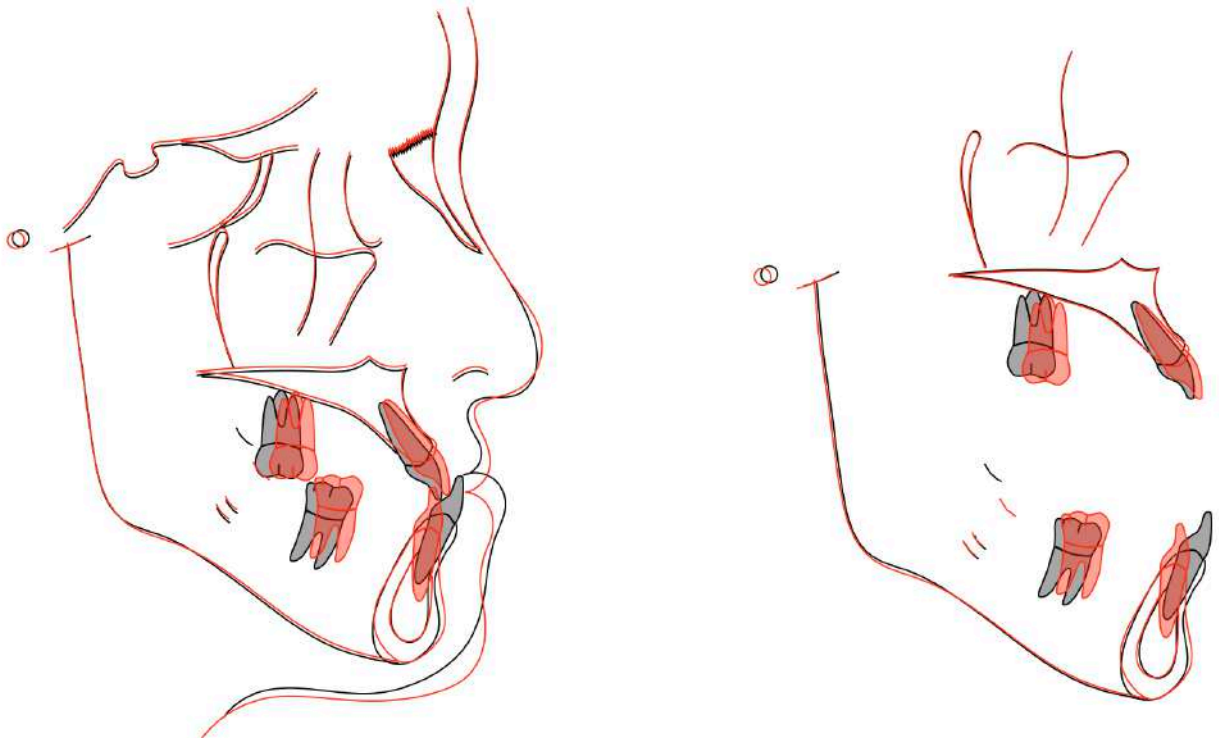

Fig. 16:
Superimposed cephalometric tracings show dentofacial changes after 30 months of treatment (red) compared to pre-treatment (black). The protrusive lower lip was corrected, resulting in a more balanced facial profile.

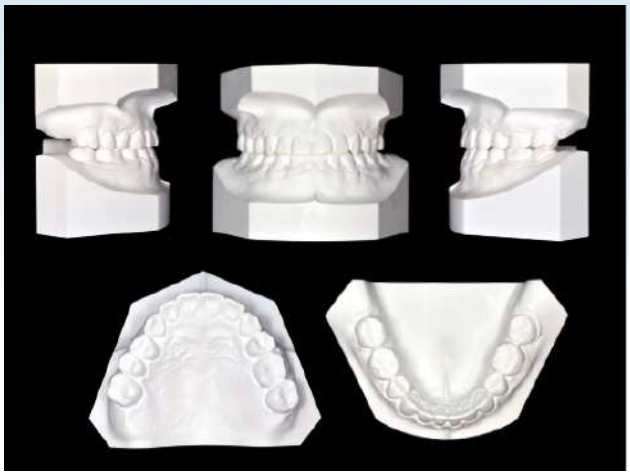

***Fig. 17**: Posttreatment panoramic radiograph*

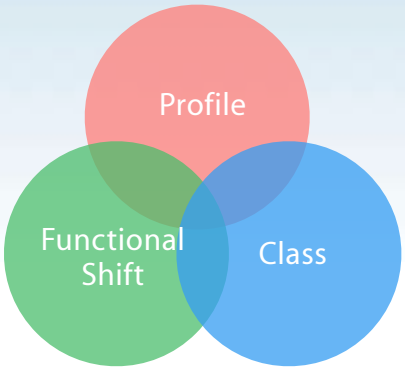

***Fig. 18**: The 3-ring diagnosis introduced by John Lin*
Profile: Orthognathic profile in C_R position
Class: Canine and molar Class I relationships
FS: Functional shift ($C_O \neq C_R$)

thereafter. Instructions were provided for home hygiene, as well as for maintenance of the retainers.

Discussion

Treatment for Class III malocclusion is often quite challenging primarily due to an inadequate diagnosis. Based on Lin's Three-Ring Diagnosis system (Fig. 18), it is possible to predict a good conservative treatment prognosis for 90% of anterior crossbite patients[3,4] with these three characteristics: orthognathic profile in centric relation (C_R), Class I molar relationship, and an anterior functional shift from C_R to centric occlusion (C_O) (Fig. 18).[5-7]

The present Class III patient had a straight facial profile in C_R and an anterior functional shift from C_R to C_O (Fig. 6). Although the patient's mandible could be manipulated backward to an edge-to-edge position,[8] his occlusion was still diagnosed as dental Class III on the right side and dental Class I on the left. The mandibular manipulation was important to determine if there was a functional shift, as it suggests good response to dentoalveolar treatment.

To facilitate anterior crossbite correction, brackets with appropriate torque, bite turbos, and light force Class III elastics were used in malocclusion treatments.[9] The Class III mechanics extruded maxillary molars, rotated the occlusal plane in a counter-clockwise direction, and changed the axial inclinations of the incisors in both arches (Fig. 19).[10] Protraction of the molars with intra-arch mechanics resulted in retraction of the lower anterior segment.[11,12] Therefore, for this patient, bite turbos were bonded on the anterior teeth to create intermaxillary space and to increase the vertical dimension of occlusion (VDO). The anterior bite turbo helped open the bite for correction of the excessive curve of Spee. Early light short Class III elastics were used to increase the axial inclination of the maxillary anterior teeth and retract the mandibular anterior teeth.

For better control of axial inclination of the upper and lower anterior segments, differential bracket torque was selected.[13] Standard torque brackets (+15˚) were used on the upper incisors to help control labial tipping. In the lower arch, upside-down low torque brackets (+13˚) were used on the lower incisors to express high torque, and high torque brackets (+7˚) were bonded on the lower canines to provide more labial crown torque to offset the retraction force applied by Class III elastics (Fig. 20). However, upside-down low torque brackets bonded on the lower anterior teeth were insufficient for controlling axial inclinations. Therefore, progressive pre-torqued archwires and auxilliaries root torque (ART) devices were used to complete the desired root retraction of the mandibular incisors.[14]

Patients with hypodontia often need to have complex interdisciplinary treatment, especially when there are multiple missing teeth. Orthodontic treatment focuses on space distribution and pre-prosthetic alignment to facilitate restoration of the occlusion.[15] The present patient had a complex problem involving skeletal, dental, and functional elements: skeletal Class III (prognathic mandible), anterior crossbite, bilateral canine Class III relationships, and a right molar Class III occlusion. In order to resolve the dentofacial asymmetry, the best option would be to expand the maxillary arch by placing two implant restorations on UR6 and UL5. This would improve the prognathic facial profile and achieved a Class I molar relationship with retroclined mandibular incisors. Because the patient was concerned with extra cost of the implant restorations and more invasive surgical procedure, the current treatment plan involving extractions was chosen, with informed consent that

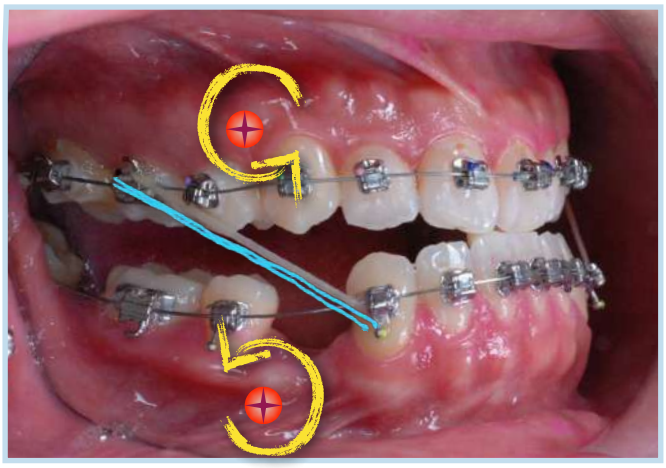

Fig. 19:
Class III elastics produced counterclockwise moments around the center of rotation in both arches, which flared maxillary incisors and tipped mandibular incisors lingually.

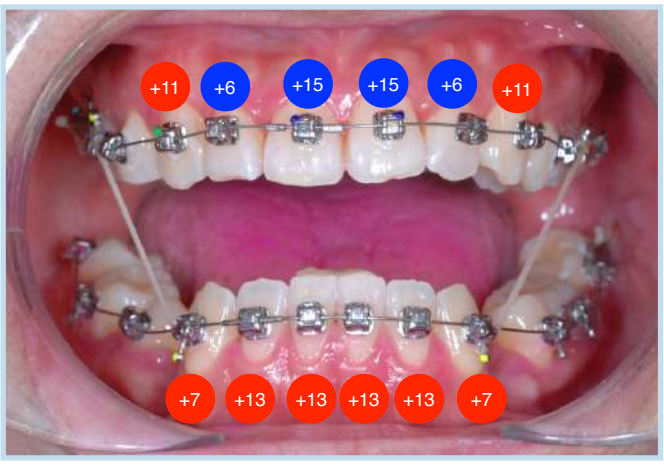

Fig. 20: *Bracket Torque Selection.*
Standard torque brackets were bonded on the upper incisors. Upside-down low torque brackets were used on the lower incisors to express high torque and high torque brackets on the lower canines to provide more labial crown torque while retracting the lower anteriors to correct the anterior crossbite.

while the overall outcome would be acceptable, the dental midlines and molar relationships could be compromised. After 30 months of active treatment, the patient was satisfied with his improved facial profile, extraction space closure, and overall dental alignment, although dental midline deviation on the lower arch was present and Class I molar relationship on one side was not achieved. The patient was able to have functional occlusal contact on both arches. For skeletal malocclusions, a dental midline deviation of 3mm is often acceptable.[16]

Conclusions

Diagnosis of Class III malocclusion with anterior crossbite requires careful evaluation based on Lin's 3-Ring Diagnostic System in order to achieve a good outcome. Anterior crossbites can be treated with appropriate bracket torque selection and Class III mechanics. The key to dentofacial asymmetry treatment is to achieve a harmonized outcome, with mutual understanding between the clinician and the patient that minor discrepancies are acceptable.

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Discrepancy Index Worksheet

TOTAL D.I. SCORE **43**

OVREJET

0 mm. (edge-to-edge)	=	
1 - 3 mm.	=	0 pts.
3.1 - 5 mm.	=	2 pts.
5.1 - 7 mm.	=	3 pts.
7.1 - 9 mm.	=	4 pts.
> 9 mm.	=	5 pts.

Negative OJ (x-bite) 1 pt. per mm. Per tooth = 1+2+2+2+2+2+1+1

Total = **13**

OVERBITE

0 - 3 mm.	=	0 pts.
3.1 - 5 mm.	=	2 pts.
5.1 - 7 mm.	=	3 pts.
Impinging (100%)	=	5 pts.

Total = **5**

ANTERIOR OPEN BITE

0 mm. (Edge-to-edge), 1 pt. per tooth
Then 1 pt. per additional full mm. Per tooth

Total = **0**

LATERAL OPEN BITE

2 pts. per mm. Per tooth

Total = **0**

CROWDING (only one arch)

1 - 3 mm.	=	1 pt.
3.1 - 5 mm.	=	2 pts.
5.1 - 7 mm.	=	4 pts.
> 7 mm.	=	7 pts.

Total = **1**

OCCLUSION

Class I to end on	=	0 pts.
End on Class II or III	=	2 pts. per side **2** pts.
Full Class II or III	=	4 pts. per side **4** pts.
Beyond Class II or III	=	1 pt. per mm. additional **2** pts.

Total = **8**

LINGUAL POSTERIOR X-BITE

1 pt. per tooth Total = **4**

BUCCAL POSTERIOR X-BITE

2 pts. Per tooth Total = **0**

CEPHALOMETRICS (See Instructions)

ANB ≥ 6° or ≤ -2° = 4 pts.

Each degree < -2° _____ x 1 pt. = **4**

Each degree > 6° _____ x 1 pt. = _____

SN-MP

≥ 38° = 2 pts.

Each degree > 38° _____ x 2 pts. = _____

≤ 26° = 1 pt.

Each degree < 26° _____ x 1 pt. = _____

1 to MP ≥ 99° = 1 pt.

Each degree > 99° _____ x 1 pt. = _____

Total = **8**

OTHER (See Instructions)

Supernumerary teeth	_____ x 1 pt.	= _____
Ankylosis of perm. Teeth	_____ x 2 pts.	= _____
Anomalous morphology	_____ x 2 pts.	= _____
Impaction (except 3rd molars)	_____ x 2 pts.	= _____
Midline discrepancy (≥ 3mm)	@ 2 pts.	= _____
Missing teeth (except 3rd molars)	**2** x 1 pt.	= **2**
Missing teeth, congenital	**1** x 2 pts.	= **2**
Spacing (4 or more, per arch)	_____ x 2 pts.	= _____
Spacing (Mx cent. diastema ≥2mm)	@ 2 pts.	= _____
Tooth transposition	_____ x 2 pts.	= _____
Skeletal asymmetry (nonsurgical tx)	@ 3 pts.	= _____
Addl. treatment complexities	_____ x 2 pts.	= _____

Identify:

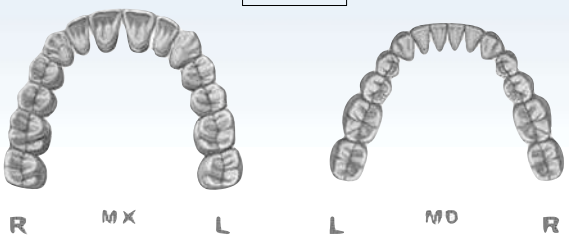
Total = **4**

Cast-Radiograph Evaluation

Total Score: 8

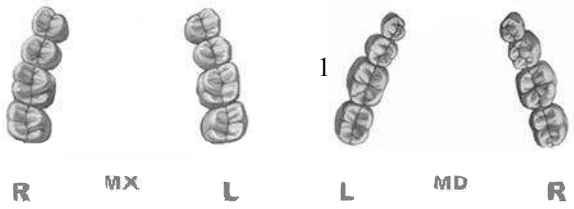
Alignment/Rotations

0



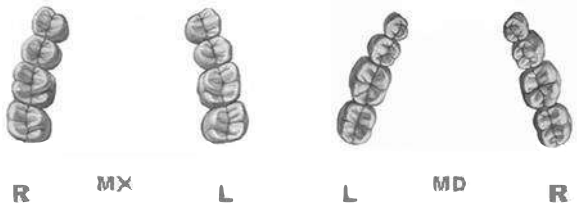
Marginal Ridges

1



Buccolingual Inclination

0

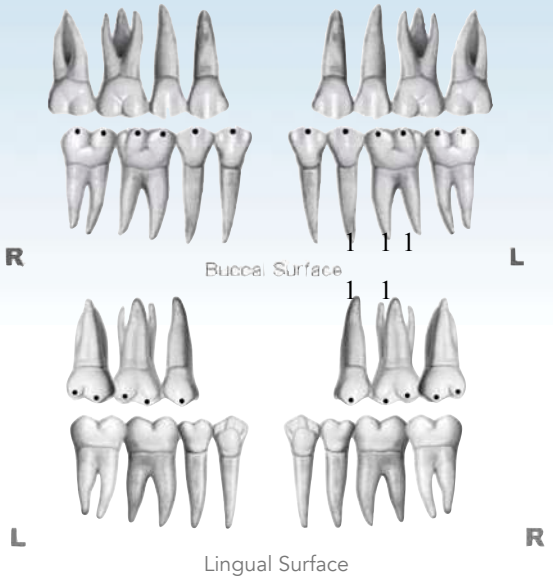


Overjet

0

Occlusal Contacts

5

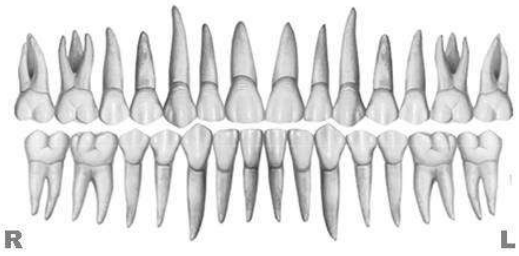


Occlusal Relationships

2

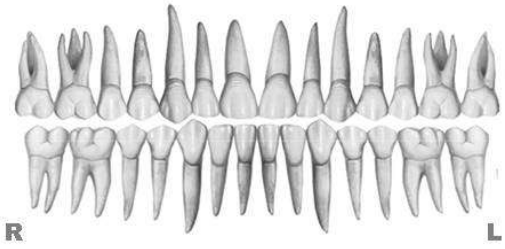
Interproximal Contacts

0



Root Angulation

0



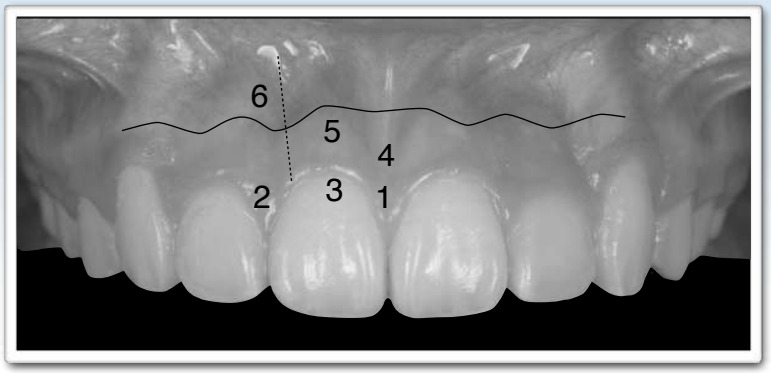
INSTRUCTIONS: Place score beside each deficient tooth and enter total score for each parameter in the white box. Mark extracted teeth with "X". Second molars should be in occlusion.

IBOI Pink & White Esthetic Score

Total Score = 5

1. Pink Esthetic Score

Total = 2

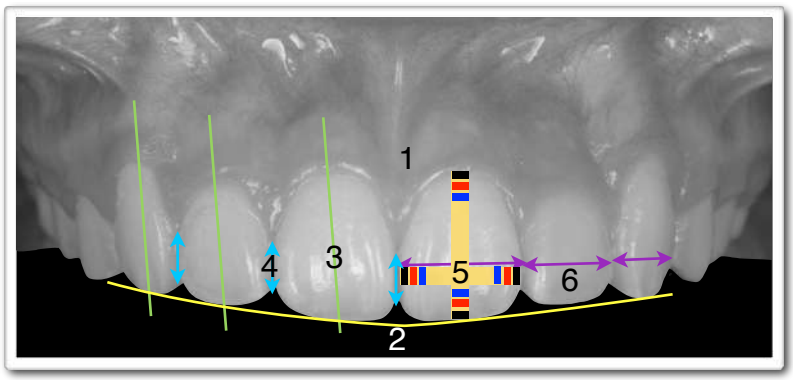


1. M & D Papillae	0	1	2
2. Keratinized Gingiva	0	1	2
3. Curvature of Gingival Margin	0	1	2
4. Level of Gingival Margin	0	1	2
5. Root Convexity (Torque)	0	1	2
6. Scar Formation	0	1	2

1. M & D Papillae	(0)	1	2
2. Keratinized Gingiva	(0)	1	2
3. Curvature of Gingival Margin	(0)	1	2
4. Level of Gingival Margin	0	(1)	2
5. Root Convexity (Torque)	(0)	1	2
6. Scar Formation	0	(1)	2

2. White Esthetic Score (for Micro-esthetic)

Total = 3



1. Midline	0	1	2
2. Incisor Curve	0	1	2
3. Axial Inclination (5˚, 8˚, 10˚)	0	1	2
4. Contact Area (50%, 40%, 30%)	0	1	2
5. Tooth Proportion	0	1	2
6. Tooth to Tooth Proportion	0	1	2

1. Midline	(0)	1	2
2. Incisor Curve	0	(1)	2
3. Axial Inclination (5˚, 8˚, 10˚)	0	(1)	2
4. Contact Area (50%, 40%, 30%)	(0)	1	2
5. Tooth Proportion	(0)	1	2
6. Tooth to Tooth Proportion	0	(1)	2

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全新**不鏽鋼口鏡**曲線設計**更舒適**亦方便握持，一支即可拍攝全口照片，提供照相最廣可視範圍。

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TPDAPV MICRO PLAIN STRAIGHT DIAMOND DUSTED, 18CM

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NH5024CORT CORTELLINI MICRO CASTROVIEJO STRAIGHT PERMA SHARP, 18CM, ROUND HANDLE

KPAX ALLEN END-CUTTING INTRASULCULAR

PPAELAX ALLEN, ANTERIOR

PPAELX ALLEN

PPAELPX ALLEN, POSTERIOR

KO12KP3R49 ALLEN ARROWHEAD

KO12KPO3R9 1/2 ALLEN MODIFIED ORBAN, ROUND

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Dental Clinic Established 1996
Beethoven

International Workshop

Digital Orthodontics, OBS, VISTA

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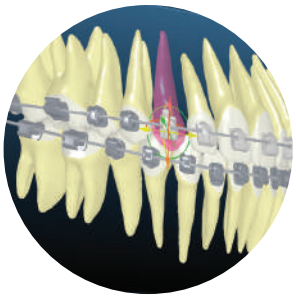

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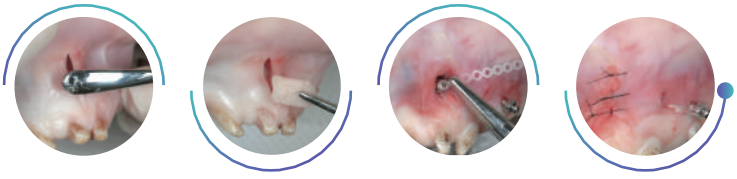
OBS

Beethoven's International Workshop is designed for doctors who provide orthodontic treatment using the Damon and Insignia System. This workshop is consisted of lectures, hands-on workshops as well as chair-side observation sessions. Participants will have the opportunity to observe clinical treatment, didactic lectures, live demonstration and gain hands-on practice experiences involving TAD placement, indirect bonding, CBCT-enhanced digital treatment planning for Insignia.



VISTA Vertical Incision Subperiosteal Tunnel Access

Registration:

Day 123	USD	3,600	Early bird rate: $100 off (advanced registration two months prior to the course date)
Day 4	USD	600	Early bird rate: $100 off (advanced registration two months prior to the course date)

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Course Schedule

Day 1 **Chair–side observation**

Day 2 **Insignia Lecture, Chair–side observation**

Chris' Lecture:
Digital Orthodontics with TAD

Day 3 **VISTA Lecture & workshop**

Chris' Lecture:
VISTA for Impacted Cuspids

* The topics for VISTA workshop:

1. VISTA with screw placement
2. VISTA with connective tissue graft
3. Suture technique

Prof. Dr. Paulo Fernandes Retto, Portugal

"Dr. Angle would be glad to know that contemporary orthodontics has a professional as Chris Chang!"

Digital Orthodontics, OBS & VISTA

Day 4 **Keynote workshop** (Optional)

by Newton's A team

1. Patient clinical records management
2. Patient communication presentation
3. Basic animations and visual aids

Dr. Rungsi Thavarungkul, Thailand

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KEYNOTE

THE LECTURER

Dr. Chris Chang

CEO, Beethoven Orthodontic and Implant Group. He received his PhD in bone physiology and Certificate in Orthodontics from Indiana University in 1996. As publisher of Journal of Digital Orthodontics-*A journal for Interdisciplinary dental treatment*, he has been actively involved in the design and application of orthodontic bone screws.