Simple Solution for Brodie Bite with Skeletal Class II Asymmetry

Abstract

Introduction: *A 30-year-old female presented with a chief complaint of difficulties in chewing due to a constricted lower arch and a unilateral full buccal crossbite (scissor-bite or Brodie bite). She requested a non-surgical treatment, but agreed to extra-radicular temporary anchorage devices and any required extraction of teeth.*

Diagnosis & Eitiology: *Her facial profile was convex, with protrusive lips. Lip incompetence was not obvious. Skeletally, the mandible was retrusive (SNB 75°) with an ANB of 7°, indicating skeletal Class II. There was 7mm of crowding in the upper arch and none in the lower arch. The buccal crossbite on the left side, as well as asymmetrical condylar heads and mandible, resulted in a 5mm deviation of the mandible to the right.*

Treatment: *A non-surgical approach was indicated using passive self-ligating brackets. Glass ionomer bite turbos (BTs) were bonded on the occlusal surfaces of the lower right molars at the beginning of the treatment. The extra-radicular temporary anchorage device (E-R TAD) that was indicated was a 2x12-mm OrthoBoneScrew® (OBS), which was inserted in the left mandibular buccal shelf (MBS). Elastomeric chains, anchored by the OBS, extended to lingual buttons bonded on the lingually inclined lower left molars. Cross elastics were added as secondary up-righting mechanics. The lower right BTs were removed in the third month when the posterior crossbite was corrected. In the nineteenth month, BTs were bonded on the lingual surfaces of the upper central incisors, and an OBS was inserted in each infrazygomatic crest (IZC) and pre-maxillary area. The Class II relationship was resolved with retraction of the maxillary arch using IZC anchorage and intermaxillary elastics. The gummy smile was corrected by intruding the upper anterior teeth with pre-maxillary anchorage.*

Results: *The scissor-bite and lingually inclined lower left posterior segment were sufficiently corrected after 3 months of treatment. The anterior BTs opened space to extrude the posterior teeth and level the lower arch, and the IZC and pre-maxillary bone screws anchored the retraction of the maxillary arch. In twenty-seven months, this difficult malocclusion, with a Discrepancy Index of 29, was treated to a Cast-Radiograph Evaluation of 8, and a Pink & White esthetic score of 3. (J Digital Orthod 2021;62:4-23)*

Key words:
Scissor-bite, Brodie bite, buccal crossbite, lingually inclined lower molars, maxillary protrusion, lip protrusion, cross elastics, occlusal bite turbo, extra-alveolar anchorage, mandibular buccal shelf, mandibular rotation, infra-zygomatic crest, inter-proximal reduction, bone screws, TADs

Introduction

The dental nomenclature used in this report is a modified Palmer notation with four oral quadrants: upper right (*UR*), upper left (*UL*), lower right (*LR*), and lower left (*LL*). From the midline, the permanent teeth are numbered 1-8. Brodie defined a malocclusion as a "*Brodie bite*" or "*Brodie syndrome*" when the mandibular jaw had "*telescoped*" within the upper arch, i.e., the mandibular teeth are completely contained within the maxillary arch. If the scissor-bite is bilateral, the patient's mandible may be functionally retruded, and if it is unilateral, then there is often a cant to the occlusal plane and a lateral deviation of the mandible, a so-called

Bear Chen,
Lecturer, Beethoven Orthodontic Course (Left)
Chris H. Chang,
Founder, Beethoven Orthodontic Center
Publisher, Journal of Digital Orthodontics (Center)
W. Eugene Roberts,
Editor-in-Chief, Journal of Digital Orthodontics (Right)

functional shift.[1,2] To treat a scissor-bite, intermaxillary traction is efficient in some cases, but extrusion of the posterior segments is a common iatrogenic effect.[3] Depending on the severity of the skeletal problem, it can also be corrected by distraction osteogenesis,[4–6] subapical mandibular surgery,[7,8] or othognathic surgery.[9] In some cases, non-surgical treatments such as maxillary contraction[10] and mandibular expansion[11] were used. Additionally, many adults with scissor-bites were treated with intraoral temporary anchorage devices.[12–14]

Fig. 1:
Pre-treatment facial and intraoral photographs. Left posterior buccal crossbite resulted in a 5mm deviation of the mandible to the right. UL5 was blocked out palatally.

This report describes the non-surgical treatment process of a Brodie bite with a Class II skeletal problem in an adult patient using extra-radicular temporary anchorage device (*E-R TAD*).

History and Etiology

A 30-year-old female sought orthodontic consultation for protrusive lips and an asymmetrical face. No contributing medical or dental histories were reported. A clinical examination revealed a convex facial profile and lip protrusion, both of which were greater than the ideal Taiwanese esthetic standard. From the frontal view, it was noted that the mandible deviated to the right and that the occlusal plane was lower on the left side. The extent of gummy smile was acceptable. The patient, however, hoped to reduce gingival exposure when smiling. The overbite and overjet of the anterior teeth were within normal limits. The buccal segment was Class II on the right side, but molar relationship on the left side cannot be observed due to a buccal posterior crossbite (*Figs. 1 and 5*).

The upper midline was coincident with the facial midline, but the lower midline was 5mm off to the right. There were two dominant factors. First, the condyle heads were shown to be uneven on

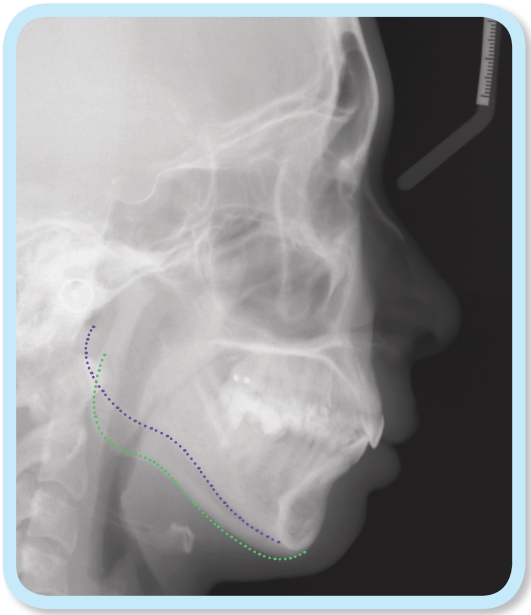

Fig. 3:
Pre-treatment cephalometric radiograph. The discrepancy between the lower border of the mandible correlated with the asymmetrical condyle heads (dotted lines).

Fig. 2:
(Left) When the patient smiled, about 5mm of midline discrepancy showed to the right, and there was over 2mm of gingival display in the upper arch. (Center) When the mouth was only slightly opened, the discrepancy decreased to 3mm. The evidence of a functional shift caused by scissor-bite was obvious. (Right) Transcranial radiographs of the TMJs prior to treatment showed asymmetrical condylar heads, which suggested that the upper and lower midlines may not be coincident after treatment.

the radiographic examination. Second, there was a buccal crossbite from UL4 to UL7, which contributed to the functional shift (*Figs. 2 and 4*).

The cephalometric analysis showed that the case was skeletal Class II (*ANB=7°*), and the angle of the upper incisors was flat. The discrepancy between the lower border of the mandible correlated with the asymmetrical condylar heads (*Fig. 3*).

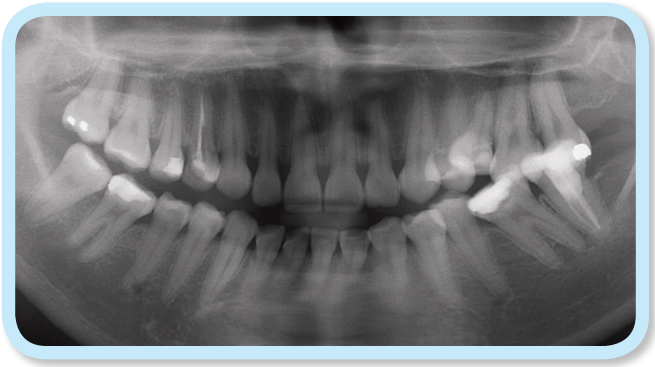

Fig. 4:
Pre-treatment panoramic radiograph showed the overlap of the left posterior segments.

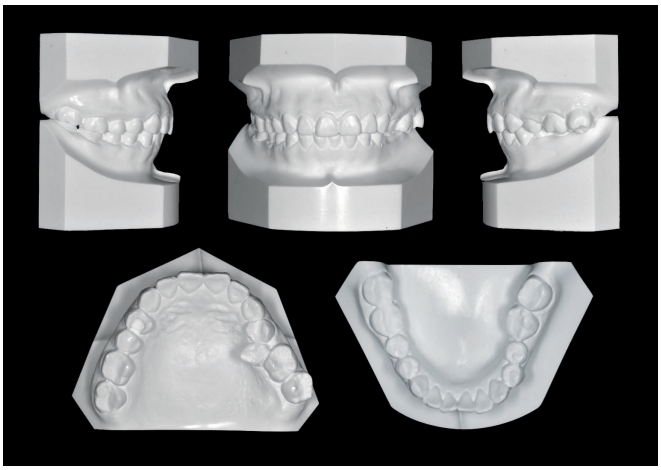

Fig. 5:
Pre-treatment study model showed dental Class II malocclusion and flat incisors. UL posterior teeth cusps nearly touched the LL posterior gingiva.

CEPHALOMETRIC SUMMARY			
SKELETAL ANALYSIS			
	PRE-Tx	POST-Tx	DIFF.
SNA° (82°)	82°	82°	0°
SNB° (80°)	75°	73°	2°
ANB° (2°)	7°	9°	2°
SN-MP° (32°)	47°	49°	2°
FMA° (25°)	40°	42°	2°
DENTAL ANALYSIS			
U1 To NAmm (4mm)	0	-4	4
U1 To SN° (104°)	88°	88°	0°
L1 To NBmm (4mm)	8	5	3
L1 To MP° (90°)	97°	90°	7°
FACIAL ANALYSIS			
E-LINE UL (-1mm)	1.5	-1.5	3
E-LINE LL (0mm)	2	-0.5	2.5
%FH: Na-ANS-Me (53±3%)	50%	51%	1%
Convexity: G-Sn-Pg' (13°)	21°	22°	1°

Table 1: Cephalometric summary

The patient's mouth opening was 40mm with a deviation to the right. Although the condyle shapes were asymmetrical, the TMJ clinical examination did not reveal any clicking, crepitation, or pain with palpation in the porus acusticus externus (*Fig. 2 right*).

Diagnosis

Skeletal:

- Sagittal Relationship: *Skeletal Class II, retruded mandible*
- Mandibular Plane Angle: *High*

Dental :

- Occlusion: *Class II on the right side*
- Overjet/overbite: *1mm/1mm*
- Buccal posterior crossbite: *from UL4 to UL7*

Facial:

- Convexity: *Convex*
- Lip protrusion: *Slightly protrusive (1.5mm/2mm)*

The American Board of Orthodontics (*ABO*) Discrepancy Index (*DI*) was 29, as shown in the supplementary Worksheet 1.

Treatment Objectives

The treatment objectives were to (*1*) correct the posterior crossbite, (*2*) establish a functional Class I molar and canine relationship, (*3*) improve the gummy smile, (*4*) coincide the upper midline with the lower one, and (*5*) improve the occlusal canting.

Treatment Plan

Correction of the posterior scissor bite was the top priority. Install an OrthoBoneScrew® (*2x12-mm, iNewton, Inc., Hsinchu, Taiwan*) (*OBS*) on the left buccal shelf combined with elastomeric chains to up-right LL6 and LL7. To accelerate the progress, join the upper left posterior segments with crossbite elastics. Extract the UR4, UL5, LL5, and LR5 to resolve the lip protrusion. As Class II intermaxillary elastics would be indicated, select high torque brackets to prevent any deterioration of the U1-SN angle (*88°*). Finally, insert OBSs in the infrazygomatic crests (*IZC*) and the premaxilla to correct the Class II malocclusion and gummy smile.

Treatment Alternatives

Option 1: Orthognathic surgery is the best approach for correcting skeletal asymmetry,[16] but the patient flatly refused this option.

Option 2: Using only cross-bite elastics could be another consideration. However, it would be very hard to control the vertical dimension, especially for an adult Class II malocclusion, as the risk of any unwanted extrusion of the posterior teeth must be prevented or lowered.[17]

Treatment Process

To resolve the lip protrusion, the UR4, UL5, LL5, LR5 were first extracted, and all the upper teeth were bonded with a 0.022-in slot Damon Q® fixed appliance (*Ormco, Glendora, California*) and passive self-ligating (*PSL*) brackets. Then, a 0.014-in CuNiTi archwire was engaged. Since correction of the posterior scissor-bite was the top priority, during her second appointment, an OBS was inserted in the left buccal shelf, combined with elastomeric chains connected from the screw to the two buttons on the lingual side of LL6 and LL7. [18-21] Two occlusal bite-turbos were constructed with Fuji II type II glass ionomer cement (*GIC*) (*GC America, Alsip IL*) on the LR molars to increase the intermaxillary space and allow the collapsed LL molars to upright without any resistance (*Fig. 6*). Also, the upper left posterior segments were joined with crossbite elastics

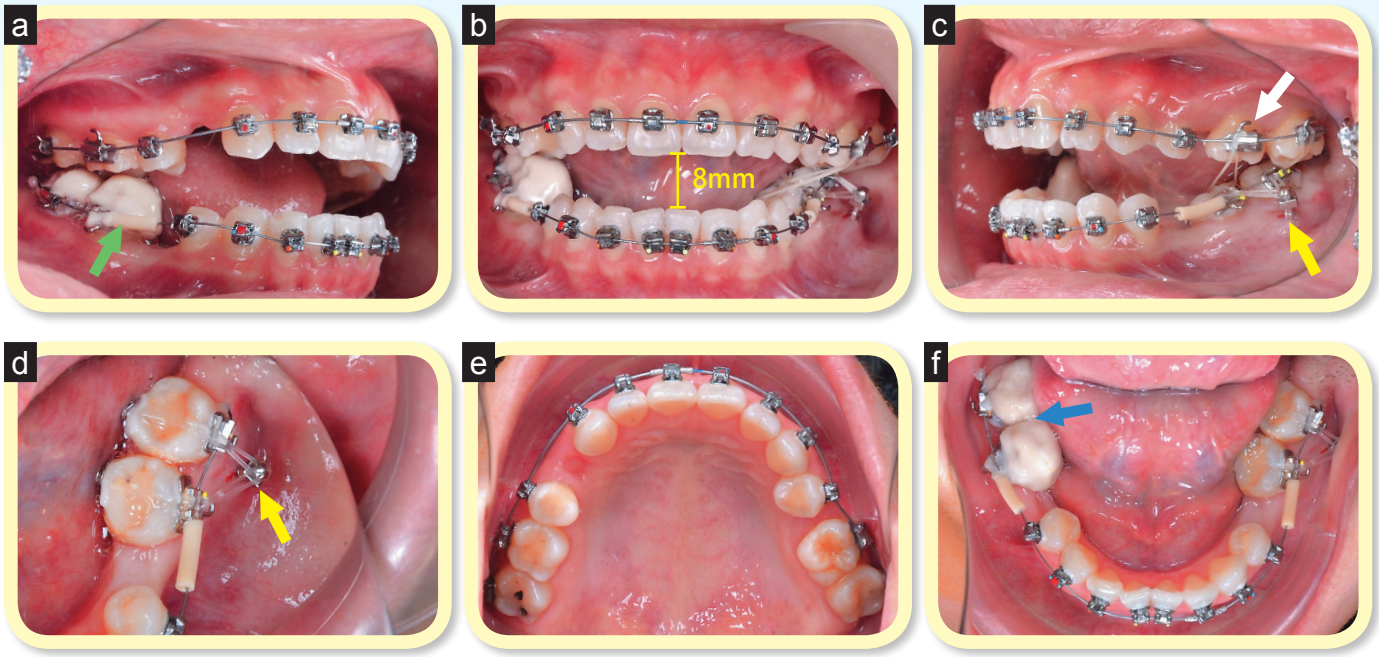

Fig. 6:

a. In the 1st month of treatment, 0.014-in CuNiTi archwires were placed in both arches. BTs were added to the occlusal surfaces of the LR molars (green arrow).

b. The bite was opened approximately 8mm.

c. Cross elastics supplemented the lateral force (white arrow) of the elastomeric chains attached to the MBS bone screw (yellow arrow).

d. Two buttons bonded on the lingual surface of LL6 and LL7 and elastomeric chains hooked to the MBS bone screw to provide buccal force (yellow arrow).

e. UR4 and UL5 were extracted to provide space for retraction.

f. BTs should not be connected, or else the archwire of the lower arch would not work (blue arrow).

(*Chipmunk, 1/8-in, 3.5-oz*) to accelerate the progress. At the same time, all the lower teeth were bonded with standard torque brackets.

By the third month, although the scissor-bite was corrected, a large openbite was created. To solve this, the brackets of the UL6 and UL7 were rebonded closer to the occlusal surface to produce an intrusion force (*Fig. 7 middle*). Meanwhile, the occlusal force also applied an intrusion force on the left posterior teeth. By the sixth month, the anterior openbite had improved a lot, so the archwires were changed to 0.016x0.025-in SS on the maxillary arch and 0.017x0.025-in TMA on the mandibular arch. By the ninth month, the overjet was resolved to a normal relationship. The intermaxillary elastics were changed to Class II elastics to correct the molar relationship, and the lower arch was changed to 0.016x0.025-in SS. The extraction spaces were closed by elastomeric chains.

In the nineteenth month, to improve the gummy

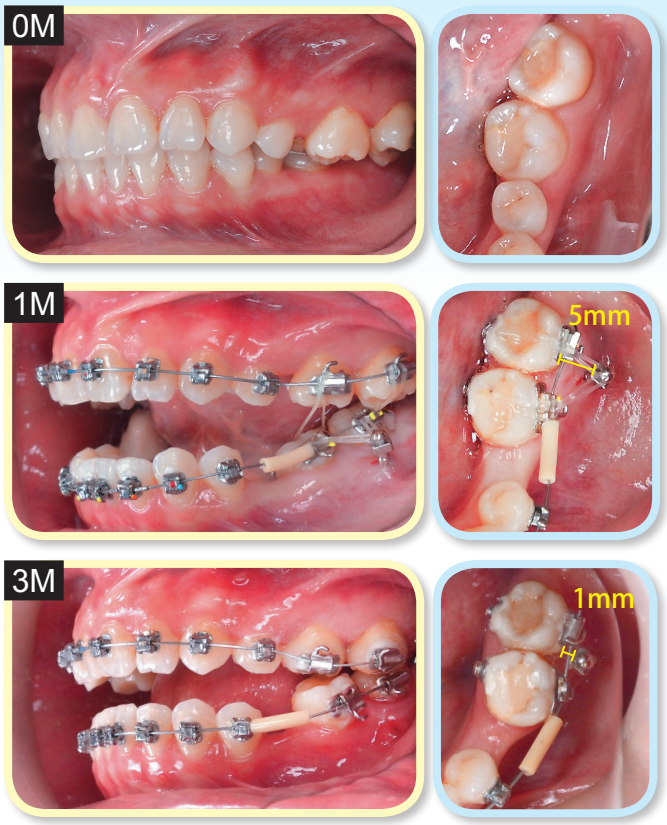

Fig. 7:
The scissor-bite is documented at the beginning of treatment (0M). The elastomeric chains activated by the MBS bone screw are shown at one month into treatment (1M). The yellow bar shows a 5mm distance from the bone screw to the 2nd molar (middle right view). At 3 months into treatment (3M), the molar had moved about 4mm to the buccal, and only 1mm remained between the molar and the bone screw (lower right view).

smile, three miniscrews (*two in the infrazygomatic crests and one on the anterior nasal spine*) were inserted into the maxilla to intrude the whole upper arch (*Figs. 8-10*).[22,23] At the same time, Class II intermaxillary elastics were hooked from U3 to L6 and L7 bilaterally to correct the molar relationship. By the twenty-fourth month, the gummy smile was improved. Thus, the miniscrews were removed, and the treatment entered the detailing phase.

It took another year to detail the occlusion. The brackets were repositioned to correct marginal ridge discrepancies. Inter-proximal reduction (*IPR*) reshaped the maxillary and mandibular incisors to eliminate the black triangles and to reduce flaring. Two weeks before the completion of active treatment, the maxillary archwire was sectioned distally to the canines, and multiple intermaxillary elastics (*Chipmunk, 1/8-in, 3.5-oz*) were utilized to settle the posterior occlusion.[24] After twenty-seven months of active treatment, all appliances were removed, and retention was accomplished with upper, and lower clear overlay retainers. Figs. 8-12

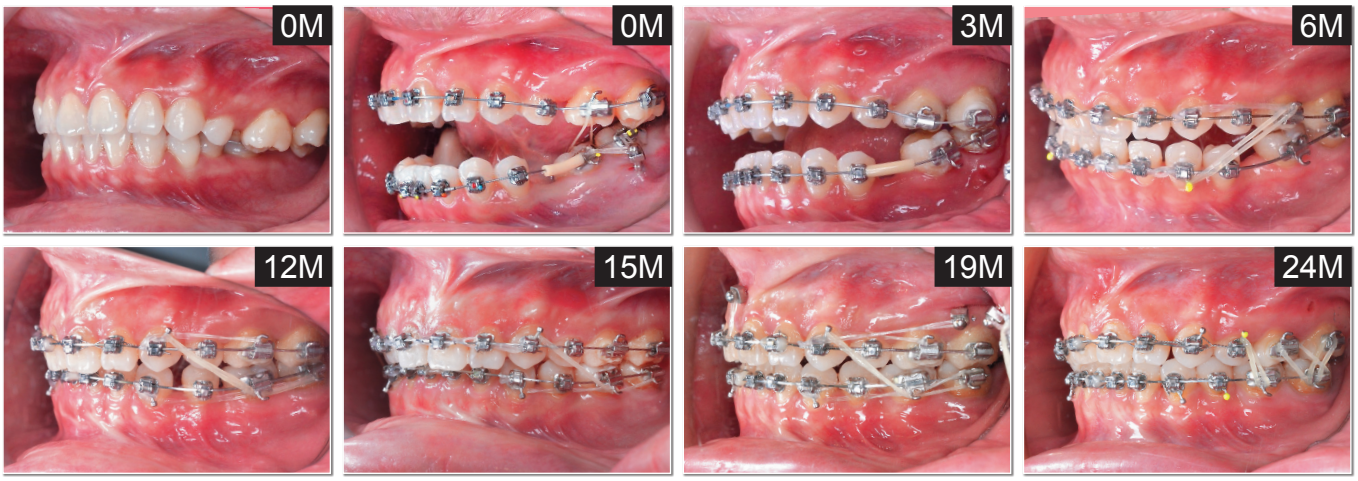

Fig. 8:
Treatment progression from the left buccal view is shown for 24 months (M) of active treatment. In the 3rd month, the brackets of UL6 and UL7 were moved closer to the occlusion to produce intrusion effect.

document the entire treatment sequence from the left buccal, frontal, right buccal, maxillary occlusal, and mandibular occlusal view, respectively.

Treatment Results

The scissor-bite was successfully solved by opening the bite, and up-righting the lingually inclined buccal segment. The deviation of the mandible has improved a lot. A functional Class I molar and canine relationships were successfully established (*Figs. 15 and 16*). The mandibular dental midline deviation was also corrected (*Fig. 13*). The gummy smile was improved tremendously (*Figs. 1 and 15*). A nearly ideal dental alignment was achieved as evidenced in the ABO CRE score of 5 points (*Worksheet 2*). [25]

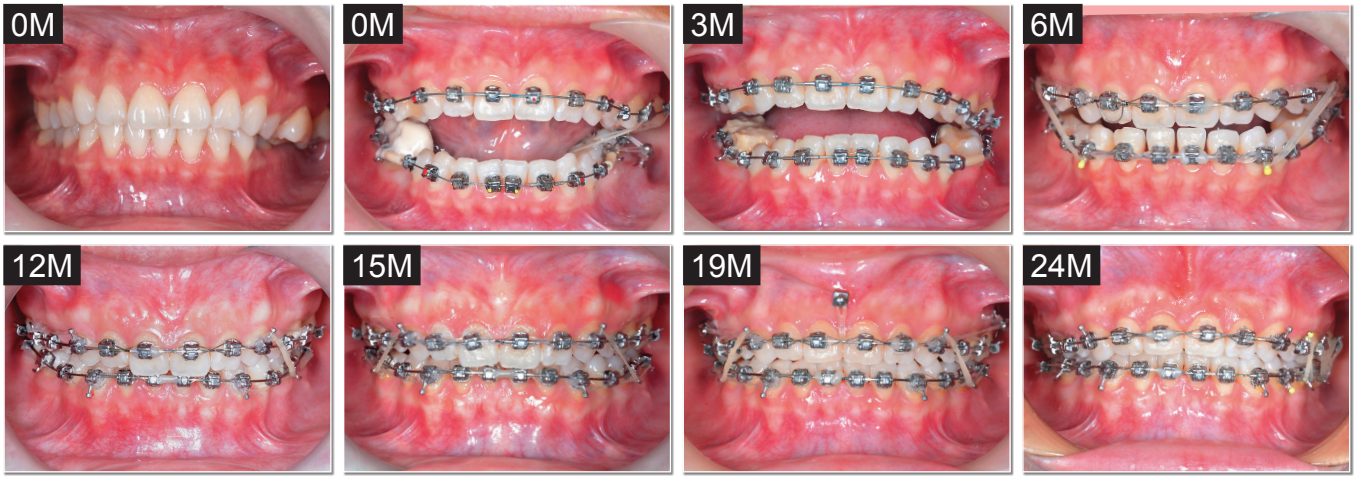

Fig. 9:
Treatment progression from the frontal view is shown for 24 months (M) of active treatment. The openbite was inevitable during the correction of the posterior crossbite (3M). Once the cusp-to-fossa relationship was established, it was resolved.

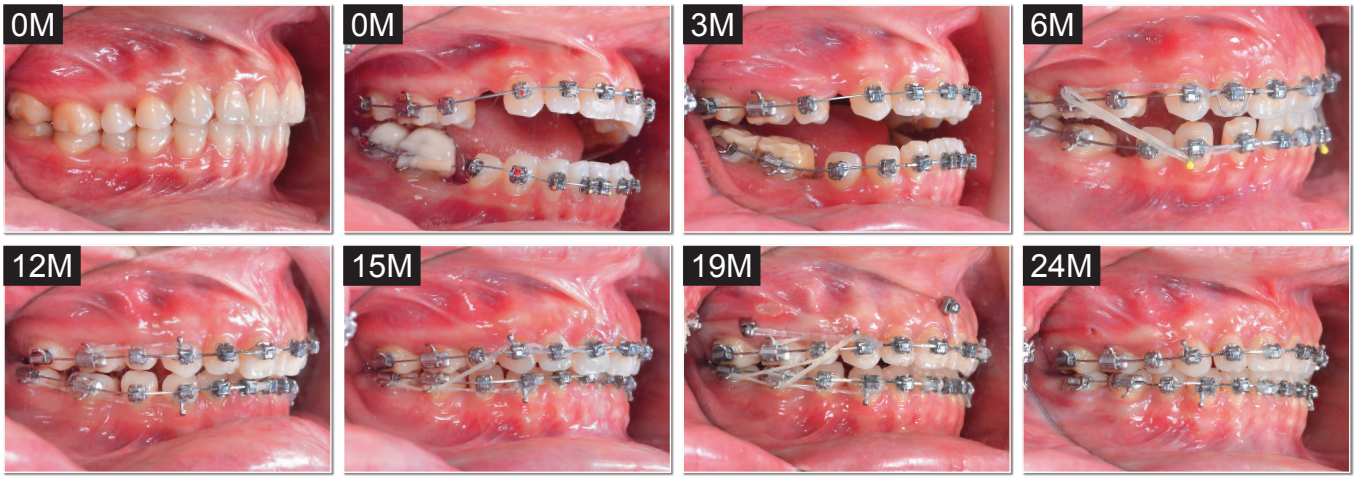

Fig. 10:
Treatment progression from the right buccal view is shown for 24 months (M) of active treatment. The BTs on the LL6 and LL7 were made of GIC type II. To avoid sectioning of the archwire, we suggest not connecting the BTs (3M).

Fig. 11:

Treatment progression of the maxillary arch is shown from the occlusal view. UL5 was extracted due to crowding and UR4 was extracted to correct the midline.

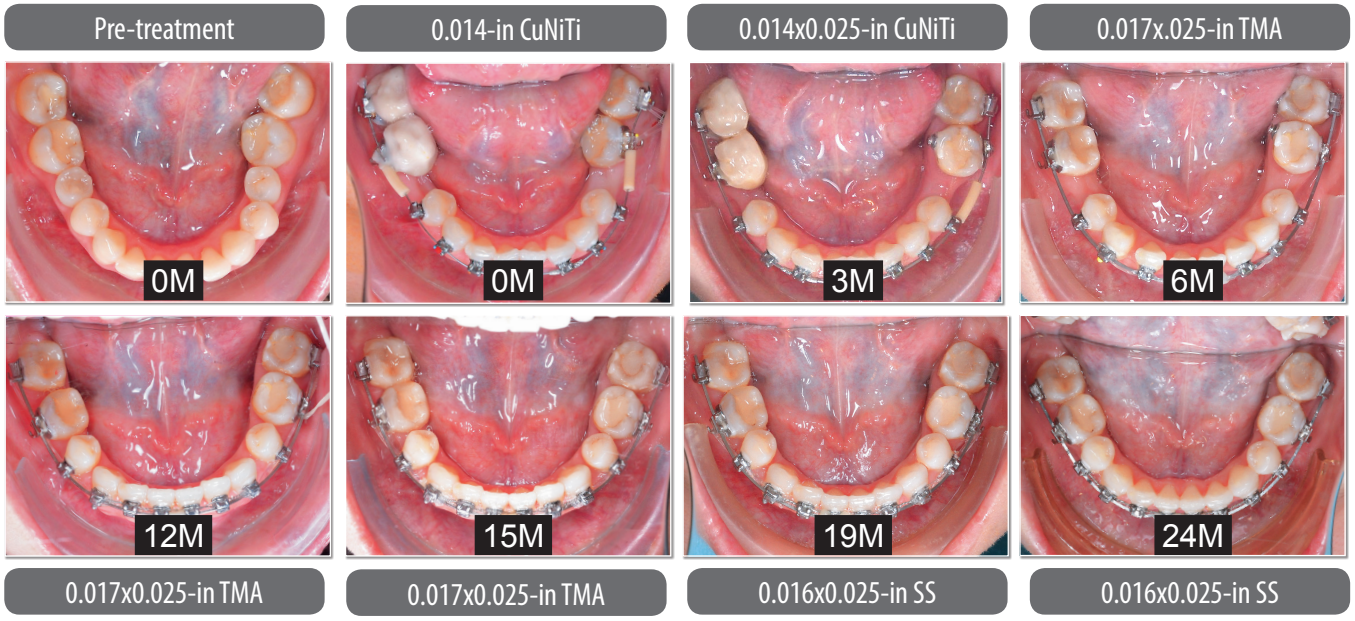

Fig. 12:

Treatment progression of the mandibular arch is shown from the occlusal view. Bilateral lower 2nd premolars were extracted to retract the lower teeth and correct the anterior crossbite. Dumping effect of the anterior teeth was overcome by using pre-torque wire and high-torque brackets.

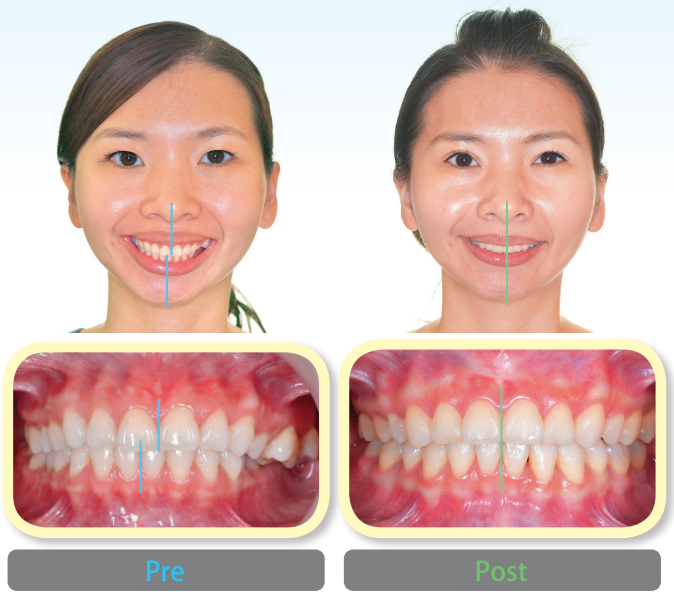

Fig. 13:
Pre- and post-treatment photographs show that the midline discrepancy has been greatly improved, which implies that the major factor influencing the midline was functional shift.

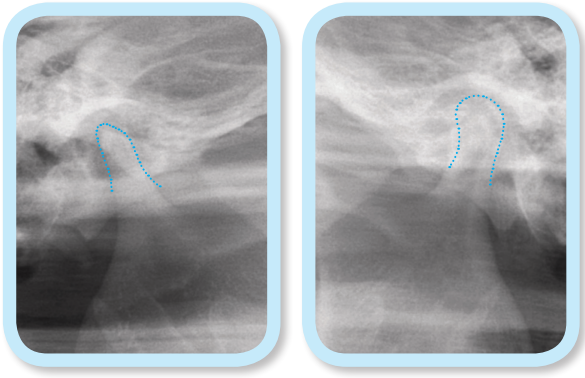

Fig. 14:
Post-treatment TMJ transcranial radiographs show that the condylar heads returned to symmetrical kinematics. There is no compression on the right side.

The post-treatment panoramic film shows good parallelism of all teeth (*Fig. 17*). The cephalometric film and superimposed tracings show that the whole upper arch was extensively retracted and intruded, resulting in the improvement of the protrusive lips (*Figs. 18 and 19*). The angulation of the upper incisors was maintained. The ANB increased from 7° to 9° due to the increase in the vertical dimension. Both SN-MP and FMA have a 2˚ increase due to clockwise mandibular rotation (*Table 1*). From the superimposed tracings of the cephalometric films, it can be observed that lower molars were extruded, while the upper molars were intruded. The maxillary incisors were retracted and intruded, while the mandibular incisors were retracted and extruded (*Fig. 19*). The post-treatment TMJ transcranial radiographs show that the condylar heads returned to a symmetrical morphology and kinematics (*Fig. 14*). The patient did not report any TMD signs or symptoms before, during, or after treatment.

The Pink and White dental esthetic score was 3 points, as shown in the supplementary Worksheet 3. The patient was satisfied with her esthetics and functional occlusion after treatment.

Discussion

Posterior X-bite

There are several case reports in which a segmented Le Fort I osteotomy and BSSO were successfully used to correct posterior crossbites, vertical excess, and maxillo-mandibular width discrepancies.[6,12,23,24] However, some patients, including the current case, refuse to undergo a surgical orthodontic treatment. Thus, other ways were sought. A wide variety of orthodontic mechanics have been proposed: intermaxillary cross elastics,[3,26] TAD anchorage,[12,13,26] removable plates with a NiTi wire,[27] transpalatal arch

Fig. 15:
Post-treatment facial and intraoral photographs document the result after 27 months of active treatment. The scissor-bite, occlusal canting, and protrusive facial profile were corrected to a satisfying result.

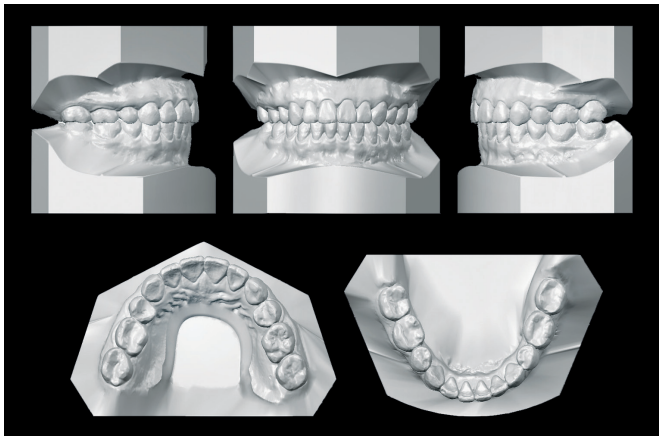

Fig. 16: Post-treatment dental models (cast)

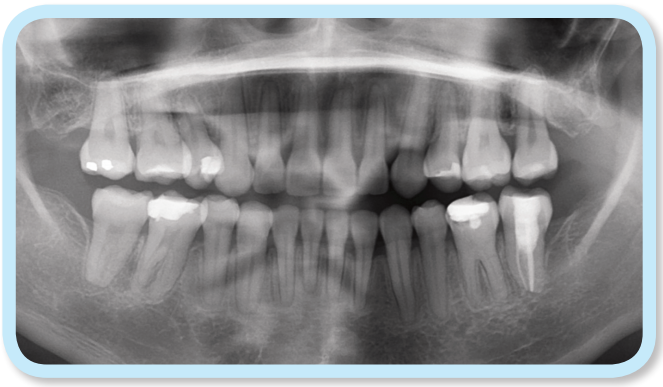

Fig. 17:
Post-treatment panoramic film shows good parallelism of all teeth except for UR5. Mild root resorption is observed. There is no overlap on the left side.

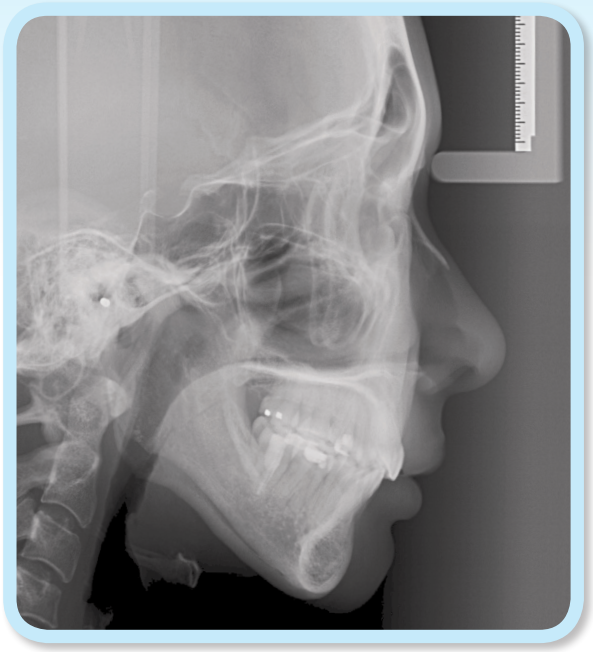

Fig. 18:
Post-treatment cephalometric radiograph shows an improved but still convex profile and Class I molar relationship.

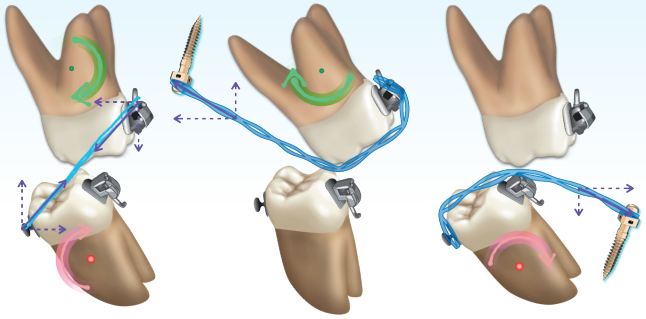

Fig. 20:
Three ways to correct the posterior crossbite: 1. If the overbite is deep (left), pull crossbite intermaxillary elastics to produce rotation and extrusion; 2. if the vertical dimension cannot be changed (center and right), install an OBS combined with elastomeric chains to rotate and intrude.

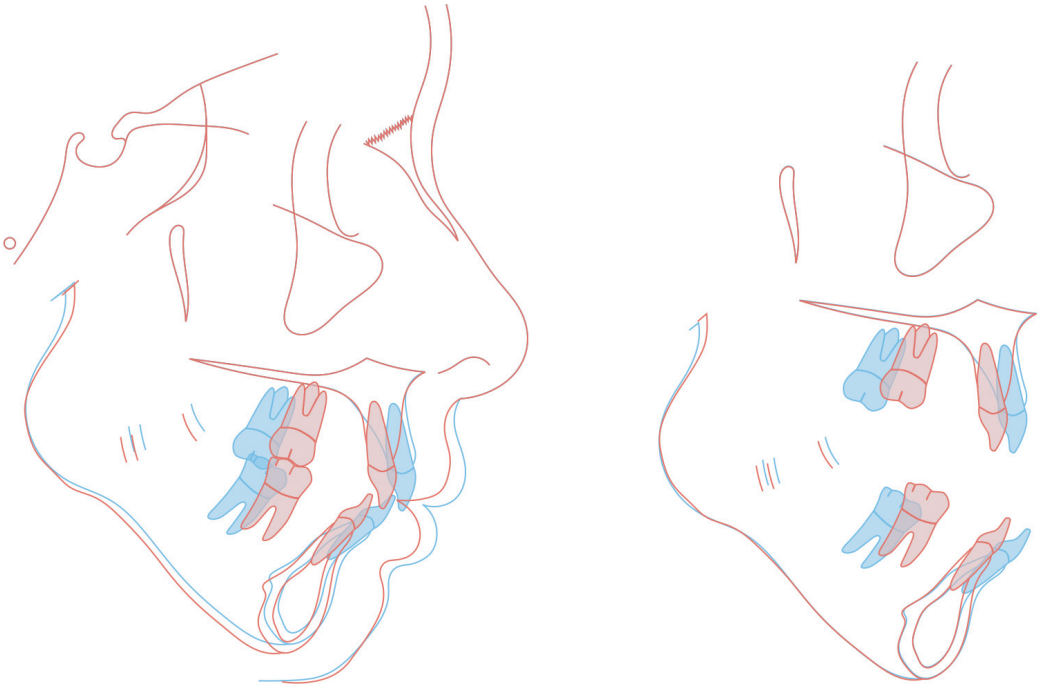

Fig. 19:
Superimposed tracings (Pre-tx: blue, Post-tx: red) indicate that the mandible was rotated clockwise, resulting in lower lip retrusion. The lower incisors was retracted almost a centimeter to correct the anterior crossbite. The mandibular molars was up-righted, which increased lower facial height (%FH: Pre-tx 50%, Post-tx 51%).

(*TPA*) with intramaxillary elastics,[28,29] quad-helix,[30] and lingual arch appliances with intramaxillary elastics.[31] The vertical overlap of a buccal crossbite requires dental intrusion or opening of the bite to correct the cusp in fossa discrepancy. For instance, unilateral cross elastics produce an extrusive force that may result in any of the following: clockwise rotation of the mandible, canting of the occlusal plane, occlusal prematurity, and/or an anterior openbite. In addition, patient cooperation/compliance is a critical factor when treating with a removable plate[27] or cross elastics.[3,26] Many case reports have shown successful corrections of a unilateral scissor bite using miniscrew anchorage.[13,14,32] The advantages of miniscrews are that they can intrude and tip teeth easily without unwanted side effects, and that patient compliance does not have an impact on its effectiveness (*Fig. 20*).

Inter-radicular (*I-R*) bone screws are commonly used as skeletal anchorage because they are relatively easy to insert, provide direct anchorage to intrude teeth, and do not require compliance.[13,26,32,33] However, a multiple-tooth scissor-bite with a large vertical overlap is very difficult to correct with orthodontic mechanics, even with bone screw anchorage, especially in an adult. Therefore, the most severe scissor-bite cases are best managed with surgical orthodontics.[6,8,9]

This patient presented with a scissor-bite of the UL buccal segment that was articulated with a lingually tipped LL buccal segment (*Figs. 1 and 2*). The extruded UL molars and premolars impinged on the lower gingiva. Orthognathic surgery is indicated for such a severe malocclusion.[6,12,23,24] However, extra-radicular (*E-R*) bone screws with contralateral bite turbos allowed the opportunity to reverse the etiology of the malocclusion by intruding the UL buccal segment and up-righting the LL buccal segment. There were three steps in the correction process:

1. **Adequate Bite Opening**: A 7mm posterior open-bite with BTs was created to allow the buccal cusps of the LL molars to pass the lingual cusps of the opposing upper buccal segment. As soon as the posterior overjet was corrected, the BTs were removed (*Fig. 2*).

2. **Simultaneous Intrusion and Buccal Tipping**: Elastomeric chains were attached to the lingual buttons on the LL molars, passed over the occlusal surfaces, and connected to the MBS bone screw. Since the archwire was connected to the teeth, these mechanics intruded and up-righted the entire buccal segment. Supplementary cross elastics provided an additional lateral force for the crossbite correction. The extrusive force on the lower segment from the cross elastics was offset by the intrusive force delivered by the elastomeric chains connected to the MBS bone screw. There are three benefits favoring a MBS bone screw compared to an I-R bone screw:

    a. Prominent Head: The OBS has a large head with deep undercuts to readily retain elastomeric chains, producing efficient up-righting of the LL segment.

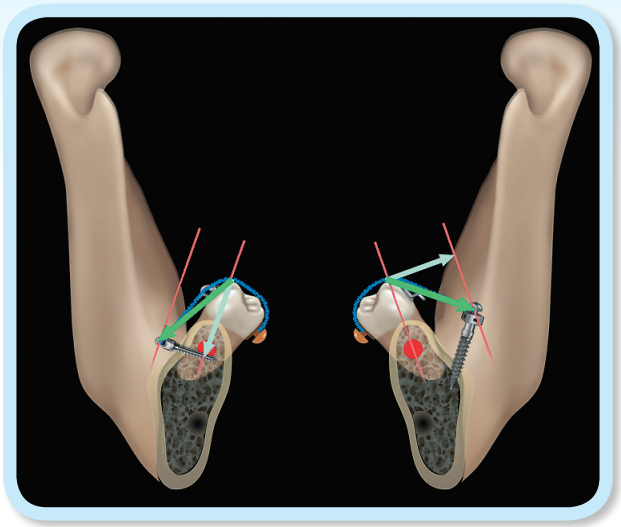

Fig. 21:
A comparison bewteen I-R bone screw (left) and contralateral E-R bone screw (right) evidently shows that the elevated head position and more buccal position of the E-R TAD, relative to the center of rotation of the molar root (pink lines), which provides a mechanical advantage for up-righting the molar (right).

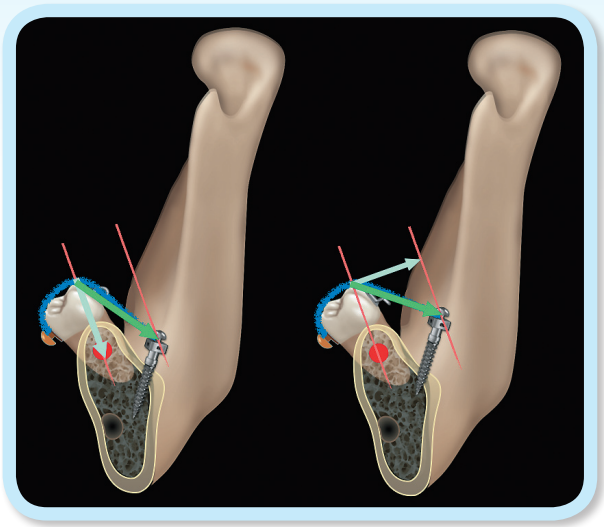

Fig. 23:
The head position height of the E-R bone screw can be controlled by the clinician. The force anchored by the higher (more superficial) bone screw head (right) delivers a more buccal and less intrusive force compared to a screw head positioned more closely to the soft tissue (left).

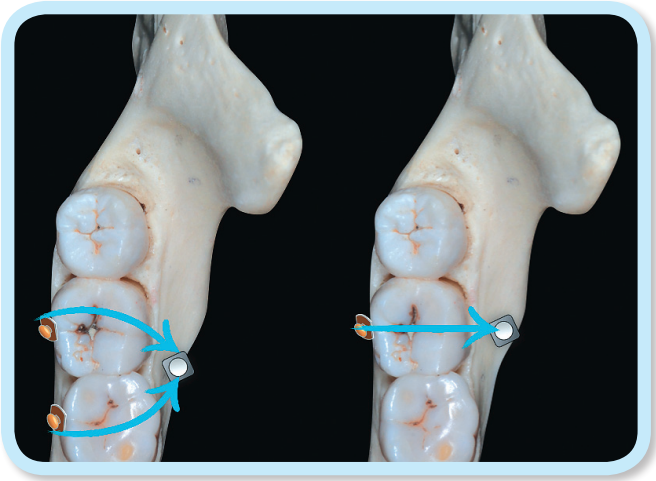

Fig. 22:
The E-R bone screw can be positioned buccal to the second molar or between the first and second molars. Either configuration is a viable alternative depending on the anatomy of the patient because there is an archwire present, which transfers an up-righting force to all teeth in the buccal segment.

b. More Buccal Position: The E-R TAD can be positioned up to 10mm buccal of the lingually tipped molars. This is an adequate space to allow the entire buccal segment to be up-righted with only one bone screw. Elastic chains can be connected to both molars because they are connected with an archwire on the buccal surface. I-R TADs interfere with movement of the teeth, and frequent replacement would then be necessary (*Figs. 21 and 22*).

c. Variable Head Position: The OBS head can be positioned as close to the soft tissue as required. The clinician can screw it in deeper if a more intrusive force component is needed (*Fig. 23*).

3. **Position of the bracket**: There was no need to significantly rotate the UL6 and UL7; therefore, the UL6 and UL7 brackets were bonded near the occlusal surface for intrusion instead of combining with the OBS (*Fig. 24*). Furthermore, the LL6 and LL7 brackets were bonded close to the gingiva to prevent any dislodgement during the up-righting.

Torque Control

Bimaxillary protrusion was noted at the patient's first consultation. As closing space loses the torque of the anterior teeth, three strategies were prepared to solve it:

1. **High torque selection**: Class II intermaxillary elastics were used to correct the molar relationship. Dumping (*excessive posterior tipping*) of the upper incisors was expected, thus, high torque braces were selected for the upper anterior teeth. Besides, the retroclination of the lower anterior teeth would be compensated with the flaring effect caused by the CII intermaxillary brackets, so standard elastics were chosen for the lower anterior teeth instead of low torque ones.

2. **Pre-Q archwire**: Play has an important role in torque expression. When using the Damon Q system, the play for 0.019x0.025-in SS is 11.4° (*Fig. 25*). The major mechanism used in this

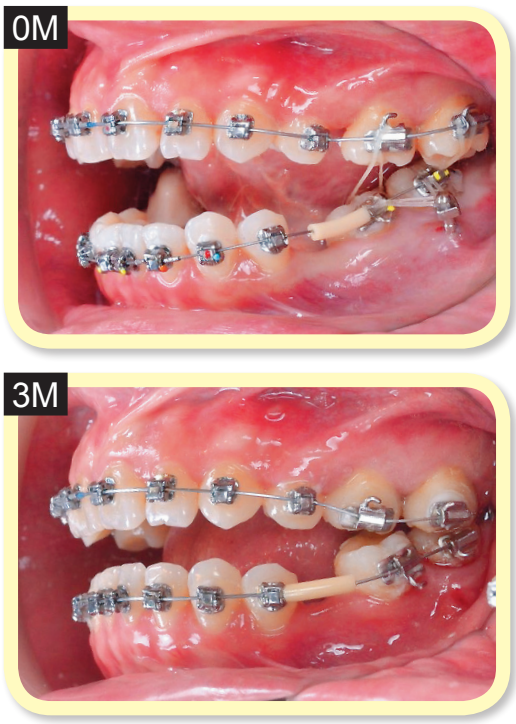

Fig. 24:
Upper - LL6 and LL7 brackets positioned closely to the gingiva to prevent interference during up-righting.
Lower - UL6 and UL7 brackets positioned closely to the occlusion for intrusion.

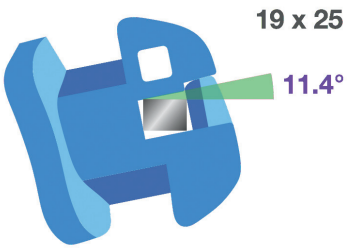

Fig. 25:
There was 11.4° play between the slot of Damon brackets and 0.019x0.025-in archwire, providing low resistance to sliding but loss in torque.

Fig. 26:
The OBS on the premaxilla provided flaring and intruding force to the upper anterior teeth. The mechanism was utilized to compensate the side effect of the Class II intermaxillary elastics.

case worked on the 0.016x0.025 SS-in SS wire as the play was larger than 11.4°. Thus, if the torque expression was found to be insufficient, a 0.019x0.025-in pre-Q CuNiTi archwire could be employed or the incisor segment could be bent 15° to provide more torque.

3. **Miniscrew on the Pre-maxilla**: The most powerful method is miniscrews, which provide a definite anchorage in the oral cavity. To flare the anterior teeth, one miniscrew was inserted in the pre-maxilla and hooked to the elastomeric chains, which corrected not only the incisor torque but also the gummy smile (*Fig. 26*). [22]

Conclusions

1. E-R bone screws are a minimally invasive approach for resolving severe scissor-bite malocclusion.

2. Uprighting the LL buccal segment with a MBS bone screw provided normal occlusion to intrude the extruded maxillary molars. However, it is important to ensure that there is adequate intrusion of upper and lower molars on the affected side to avoid opening the VDO (*clockwise rotation of the mandible*).

3. To correct Class II malocclusion with the flat upper incisors, clinicians should pay more attention to the torque control.

Acknowledgment

Thanks to Dr. Rungsi Thavarungkul for the beautiful illustrations. Thanks to Mr. Paul Head for proofreading.

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Discrepancy Index Worksheet

TOTAL D.I. SCORE 29

OVERJET

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 =

Total = 0

OVERBITE

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

Total = 0

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 = 7

OCCLUSION

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

Total = 4

LINGUAL POSTERIOR X-BITE

1 pt. per tooth Total = 0

BUCCAL POSTERIOR X-BITE

2 pts. per tooth Total = 8

CEPHALOMETRICS (See Instructions)

ANB ≥ 6° or ≤ -2° = 4 pts.

Each degree < -2° ____ x 1 pt. = ____

Each degree > 6° 1 x 1 pt. = 1

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 = 5

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. = 2
Missing teeth (except 3rd molars) ____ x 1 pts. = ____
Missing teeth, congenital ____ x 2 pts. = ____
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. = 3
Addl. treatment complexities ____ x 2 pts. = ____

Identify:

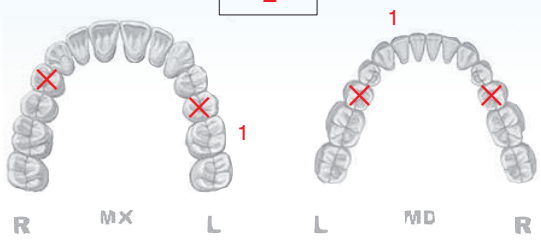
Total = 5

Cast-Radiograph Evaluation

Total Score: 8

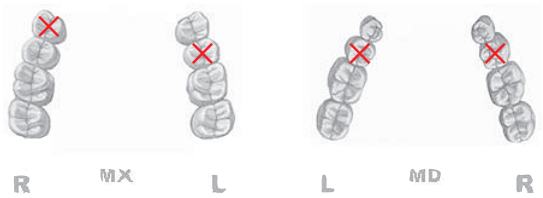
Alignment/Rotations

2



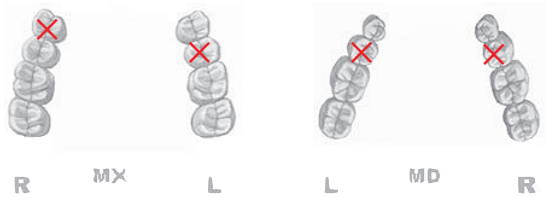
Marginal Ridges

0



Buccolingual Inclination

0

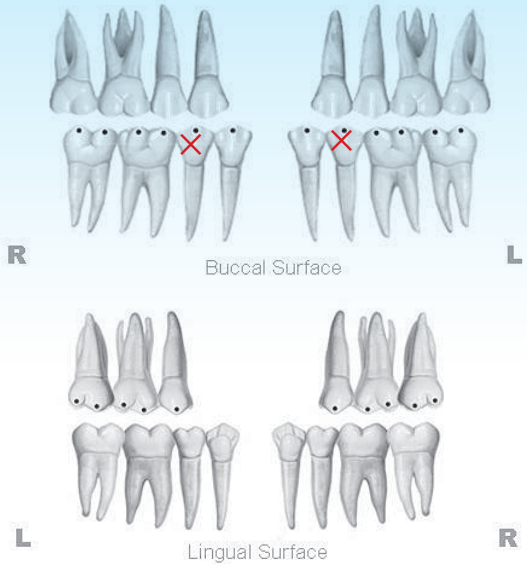


Overjet

0

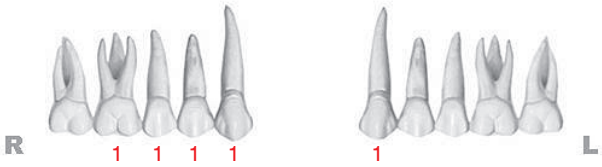
Occlusal Contacts

0



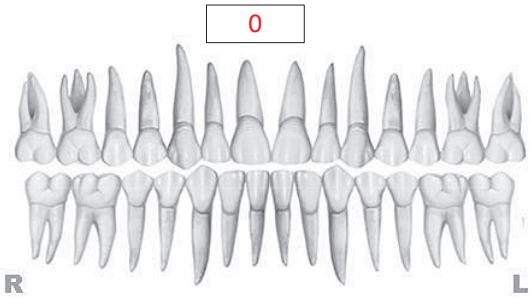
Occlusal Relationships

5



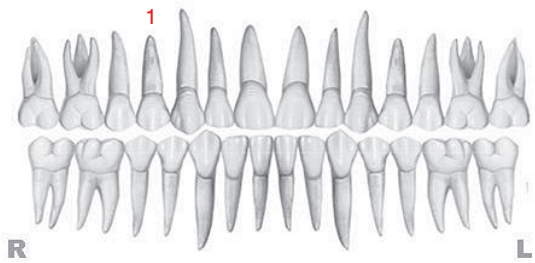
Interproximal Contacts

0



Root Angulation

1



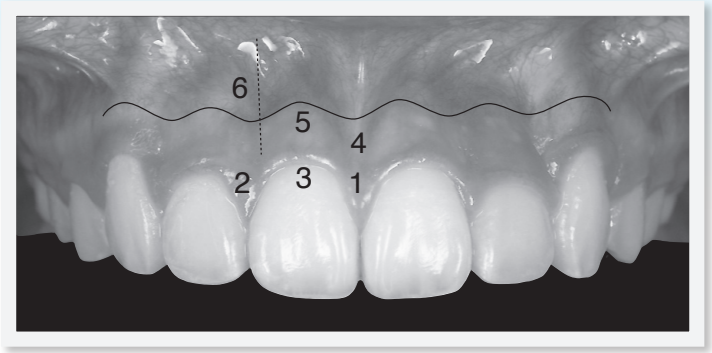
INSTRUCTIONS: Place score beside each deficient tooth and enter total score for each parameter in the white box. Mark extracted teeth with "X". Second molars should be in occlusion.

IBOI Pink & White Esthetic Score

Total Score: = 3

1. Pink Esthetic Score

Total = 1

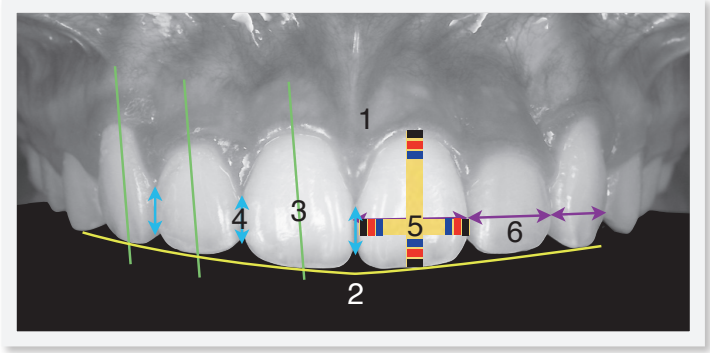


1. M & D Papillae	0	1	2
2. Keratinized Gingiva	0	1	2
3. Curvature of Gingival Margin	0	1	2
4. Level of Gingival Margin	0	1	2
5. Root Convexity (Torque)	0	1	2
6. Scar Formation	0	1	2

1. M & D Papilla	(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-esthetics)

Total = 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 (1:0.8)	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 (1:0.8)	0	(1)	2
6. Tooth to Tooth Proportion	0	(1)	2

光聚機挑選指南

Part 1 -能量

Q：能量越強越好 ?!

高強度能量優缺點

優　點　短時間快速聚合樹脂

缺　點
- 機身容易發燙
- 高熱導致牙髓損傷
- 過熱當機

理想的光聚機

能　量　每秒光能量1100-1130mW/cm2變換

散　熱　良好散熱系統，持續輸出不發燙

黏　著　連續 Curing Case 全口矯正器黏著或 Veneer Cementation 也不過熱

Part 2 -波長

Q：全波長 vs 純藍光 LED光聚機差別

全波長光聚機優缺點

優　點

適用包含非CQ-based 的 Resin Composite

缺　點
- 市面上85%以上樹脂仍以CQ-based為主
- 紫光波長能量不足，須增加照射時間
- 紫光波長能量不足，須配合輔助工具
- 價格昂貴

理想的光聚機

能　量　460-480nm的波長配合超過1200mW/cm2的能量

C/P 值　具有良好的品質以及性價比

您知道嗎？

近年來光聚機所搭配使用的電池以鋰電池為主，不會有記憶效應的問題。因此 使用完畢後就放回基座上充電，除了不會造成電池壽命減少外，也可以讓光聚機穩定在基座上避免摔到。

Part 3 -電池

Q：續電力越久越好？？

高續電力光聚機

優　點　可連續使用3-5天不用充電

缺　點　搭配高電容量的光聚機會使整體重量上升，操作不方便

理想的光聚機

電　池　至少1個工作天使用不充電的蓄電量

重　量　良好散熱系統，持續輸出不發燙越輕巧＋方便使用

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	Session B	12/07–09	12/10

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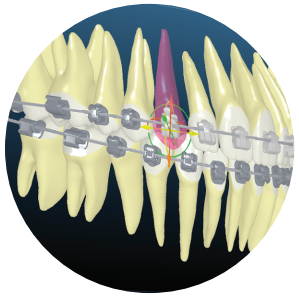

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OBS

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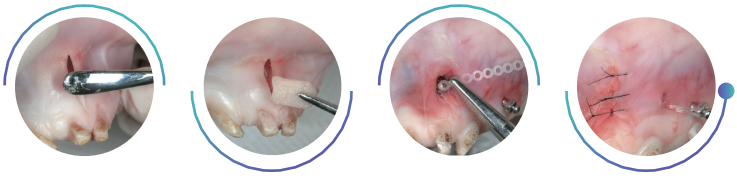

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Day 2 **Insignia Lecture, Chair–side observation**

Chris' Lecture:
Digital Orthodontics with TAD

Day 3 **VISTA Lecture & workshop**

Chris' Lecture:
VISTA for Impacted Cuspids

* The topics for VISTA workshop:

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2. VISTA with connective tissue graft
3. Suture technique

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by Newton's A team

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3. Basic animations and visual aids

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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.