Conservative Camouflage Treatment of Pre-Treated Asymmetrical Skeletal Class III alocclusion

Abstract

***History**: A 22-year-10-month-old female sought retreatment for an orthodontic correction for skeletal Class III malocclusion. Two years of conservative orthodontic treatment at the age of 11 resolved the malocclusion, but the Class III malocclusion recurred in adolescence. Orthognathic surgery was not an acceptable option.*

***Diagnosis**: Facial examination revealed an acute nasolabial angle, concave profile, protruded lower lip (LL to E-line: 2mm), and facial asymmetry that was associated with a 3mm shift of the dental midline to the right. Cephalometric analysis showed a skeletal Class III relationship (ANB -2.5°) with Class III incisal compensation. Occlusal concerns were Class III buccal segments bilaterally, asymmetric arch form particularly in the mandible, anterior crossbite of the upper right lateral incisor (UR2), and an end-on relationship of the adjacent UR3. The ABO Discrepancy Index (DI) was 30 points.*

***Treatment**: Four third molars were extracted prior to installing a full-fixed passive self-ligating appliance. Bone screws (BSs) were inserted in the Mandibular Buccal Shelves (MBSs) bilaterally to retract the mandibular arch. Class III elastics corrected the intermaxillary relationships, and the dental midline deviation was corrected with asymmetric application of elastics as needed.*

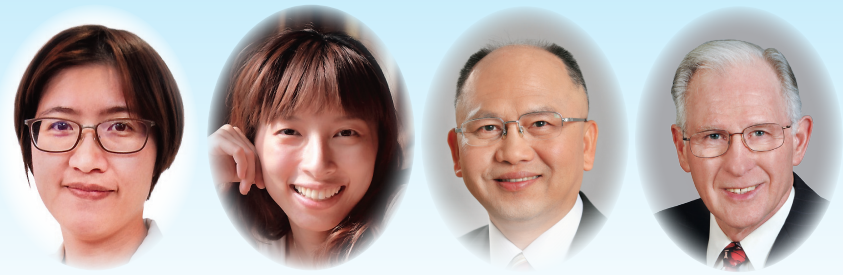
***Outcome**: Following 28 months of active treatment with MBS bone screws, the skeletal Class III malocclusion was successfully aligned. The facial profile was improved by retracting the lower dentition, opening the vertical dimension of occlusion (VDO), and rotating the mandibular plane in a clockwise direction. The final result had a Cast-Radiograph Evaluation (CRE) of 26 and a Pink and White dental esthetic score of 6. (J Digital Orthod 2019;56:68-82)*

Key words:
Self-ligating fixed appliance, miniscrews, buccal shelves, pretreated asymmetric skeletal Class III malocclusion, dental midline discrepancy

Diagnosis and Etiology

Treatment timing for skeletal Class III malocclusion remains controversial.[1-5] A 22-year-10-month-old female presented for orthodontic evaluation of relapse following conservative correction of Class III malocclusion at the age of 11 (*Figs. 1-4*). There was no contributing medical history. Pre-treatment facial photographs revealed acute nasolabial angle, concave profile, prominent lower lip, facial asymmetry, and a chin point that is deviated to the right. Upper arch form is relatively round with maximum expansion between the first molars followed by a progressive constriction in the second and third molar regions (*Figs. 1 and 2*). This pattern

Dr. Joy Hui-Wen Cheng,
Lecturer, Beethoven Orthodontic Center (Left)
Dr. Sheau Ling Lin,
Lecturer, Beethoven Orthodontic Center (Center left)
Dr. Chris H. Chang,
Founder, Beethoven Orthodontic Center
Publisher, Journal of Digital Orthodontics (Center Right)
Dr. W. Eugene Roberts,
Editor-in-chief, Journal of Digital Orthodontics (Right)



is consistent with a history of rapid maxillary expansion (*RME*) and protraction during the initial course of treatment at the age of 11. Clinical examination of the smile documented inadequate incisor display and asymmetry (*Fig. 1*). The panoramic radiograph revealed that mandibular condyles were asymmetric with greater height on the left side (*Fig. 4*) which is consistent with a 3mm mandibular midline shift to the right (*Fig. 5*). Pre-treatment study casts confirmed an end-on Class III molar relationship with a 3mm dental midline

Fig. 1: Pre-treatment facial and intraoral photographs

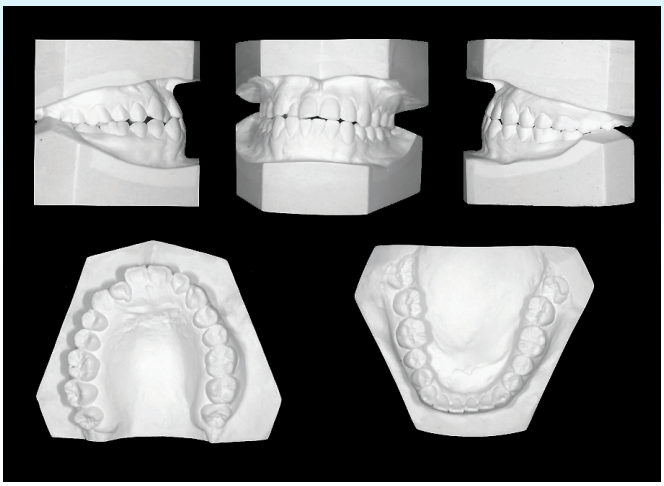


Fig. 2: Pre-treatment dental models (casts)

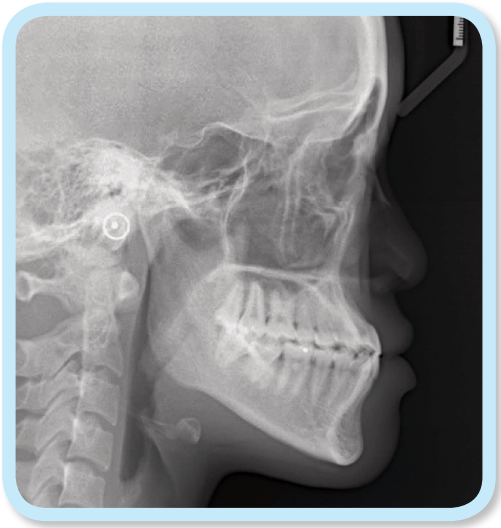


Fig. 3: Pre-treatment cephalometric radiograph

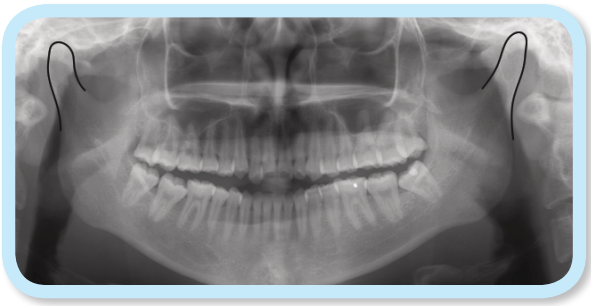


Fig. 4:
Pre-treatment panoramic radiograph with condyles outlined in black to show greater condylar height (length) on the left side. See text for details.

Fig. 5:
Lower dental midline was shifted to the right side in the position of mouth opening and C_o.

shift to the right (*Fig. 2*). Inadequate to negative overjet was noted from the upper right lateral incisor (*UR2*) to the upper right first premolar (*UR4*). Upper second molars (*U7s*) were in lingual crossbite bilaterally. The cephalometric analysis showed a Class III skeletal pattern (*SNA 82°, SNB 84.5°, ANB -2.5°*), increased axial inclination (*proclination*) of 125.5° for the upper incisors, decreased axial inclination of lower anterior incisors (*84°*), and a protrusive lower lip (*LL to E-line: 2mm*). Cephalometric values are summarized in Table 1. The American Board of Orthodontics (*ABO*) Discrepancy Index (*DI*) was 30 points as shown in Worksheet 1.

Treatment Objectives

1. Level and align both arches with the PSL appliance.

2. Retract lower incisors to correct the anterior crossbite and improve the concave profile.
3. Retract the mandibular arch with bilateral MBS bone screws.
4. Correct the dental midline.
5. Expand the upper arch to correct second molar lingual crossbite.

Maxilla (all three planes):

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

Mandible (all three planes):

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

Maxillary dentition:

- A - P: *Slightly retract incisors*
- Vertical: *Maintain*
- Inter-molar/ Inter-canine Width: *Expand*

Mandibular dentition:

- A - P: *Retract incisors and molars*
- Vertical: *Extrude incisors*
- Inter-molar/ Inter-canine Width: *Maintain*

Facial Esthetics: Retract lower lip

Treatment Alternatives

Because of a relapse history following the previous conservative treatment, orthognathic surgery was suggested as the best alternative (*Option 1*), but the patient preferred a more conservative approach. Option 2 was an alternate treatment plan with asymmetric extractions: maxillary second premolars, the right mandibular second premolar, and the left mandibular first premolar. The disadvantages for this approach were that it would result in a more prominent chin point, and retruded lower incisors relative to the apical base of bone. The third option was extraction of four third molars, Class III elastics, and placement of bilateral MBS bone screws to differentially retract the lower arch. After carefully considering the pros and cons of each treatment alternative, the third option was selected.

CEPHALOMETRIC SUMMARY			
SKELETAL ANALYSIS			
	PRE-Tx	POST-Tx	DIFF.
SNA° (82°)	82°	82°	0°
SNB° (80°)	84.5°	84°	0.5°
ANB° (2°)	-2.5°	-2°	0.5°
SN-MP° (32°)	31.5°	33°	1.5°
FMA° (25°)	24.5°	26°	1.5°
DENTAL ANALYSIS			
U1 To NA mm (4 mm)	8 mm	7 mm	1 mm
U1 To SN° (104°)	125.5°	121°	4.5°
L1 To NB mm (4 mm)	4.5 mm	3 mm	1.5 mm
L1 To MP° (90°)	84°	78°	6°
FACIAL ANALYSIS			
E-LINE UL (2-3 mm)	-1 mm	-2 mm	1 mm
E-LINE LL (1-2 mm)	2 mm	0 mm	2 mm
%FH: Na-ANS-Gn (53±3%)	55%	55%	0%
Convexity: G-Sn-Pg' (13°)	-5°	-2°	3°

Table 1: Cephalometric summary

Treatment Progress

All four third molars were extracted prior to bonding a 0.022-in slot Damon Q® Passive Self-Ligating (*PSL*) appliance (*Ormco, Glendora, CA*). Maxillary anterior teeth were bonded with low torque brackets. Standard torque brackets were selected for the lower anterior dentition. All archwires and auxiliaries were supplied by the same manufacturer. The arch wire sequence for the upper arch was 0.014-in CuNiTi, 0.014x0.025-in NiTi, 0.017x0.025-in TMA, 0.019x0.025-in SS, and a 0.019x0.025-in upside-down 20° pre-torqued archwire. The lower archwire sequence was 0.014-in CuNiTi, 0.014x0.025-in NiTi, 0.017x0.025-in TMA, and 0.016x0.025-in SS. The patient was instructed to wear bilateral Class III elastics as follows: 1. Parrot (*2-oz, 5/16"*) for the first month, and 2. Quail (*2-oz, 3/16"*) for the next three months. After positive overjet was established, Class III elastics were continued on the left side to achieve lower midline correction.

Fig. 6:
IPR was performed in the 13th month of treatment. The upper photo at 11 months (11M) was taken before enamel reduction and the lower photo at 13 months (13M) was taken immediately after the IPR procedure .

In the 10th month of the active treatment, extra-alveolar bone screws (*2x12-mm, OBS®, iNewton Dental, Ltd., Hsinchu, Taiwan*) were placed bilaterally in the MBSs. Power chains were stretched bilaterally from the lower canines to the MBS bone screws to retract the entire lower arch. To reduce the overjet created by lower arch retraction, inter-proximal reduction (*IPR*) was performed from UR2-UL2 in the 13th, 19th, and 23rd months of treatment (*Fig. 6*).

Bracket repositioning was performed as indicated by progressive panoramic radiographs throughout the treatment. The upper archwire (*0.019x0.025-in SS*) was expanded. Lingual crossbite elastics to the second molars were used from the 16th to 19th month of treatment. The left side Class III elastic was changed to a right side Class II elastic to help with midline correction because the interdigitation on the left side was much better than the right. A 0.019x0.025-in pre-torqued 20° wire was placed upside down in the upper arch in the 20th month to improve the torque expression of the maxillary anterior teeth (*Fig. 7*).

After 28 months of active treatment, all fixed appliances were removed (*Figs. 8 and 9*). Upper and lower clear overlay retainers were delivered for both arches. Full-time wear was prescribed for 6mo, and nights only thereafter.

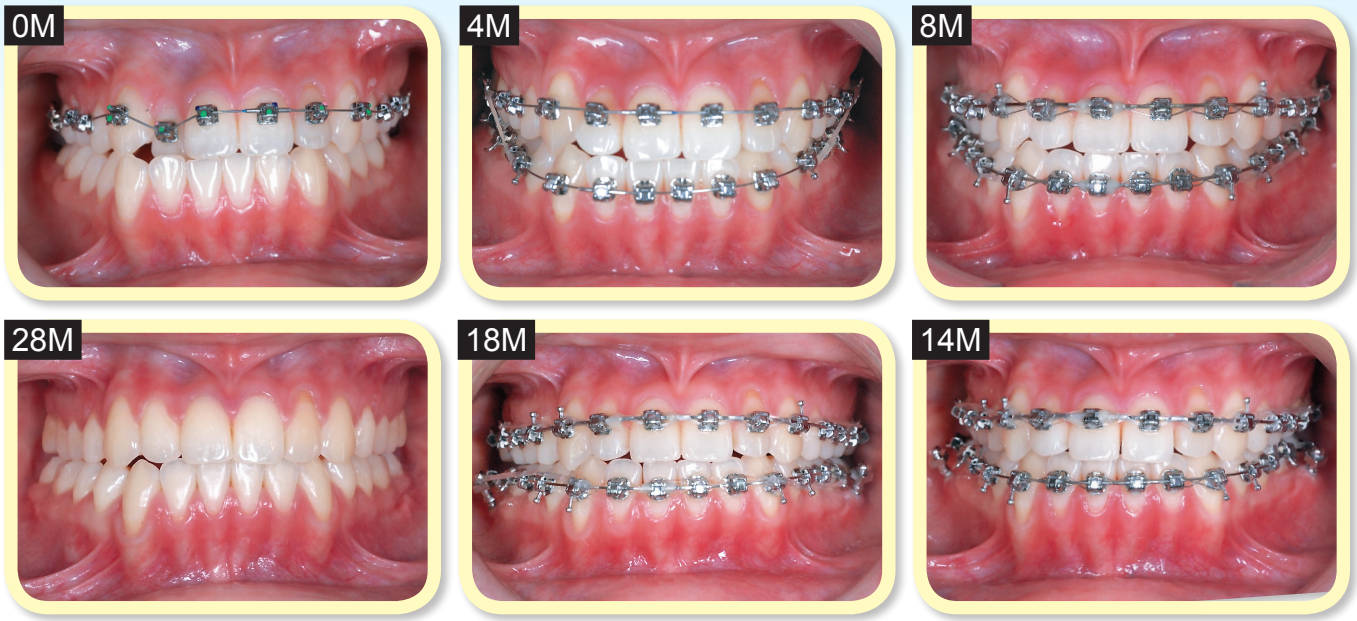


Fig. 7: The process of midline correction is shown in clockwise order from 0-28 months (0, 4, 8, 14, 18 and 28M). See text for details.

Results Achieved

Skeletal: The position of the maxilla was maintained in all 3 planes, and a more natural arch form was achieved for the maxillary arch (*Fig. 8*). The mandible was rotated clockwise about 1.5° to improve the facial profile (*Fig. 9*).

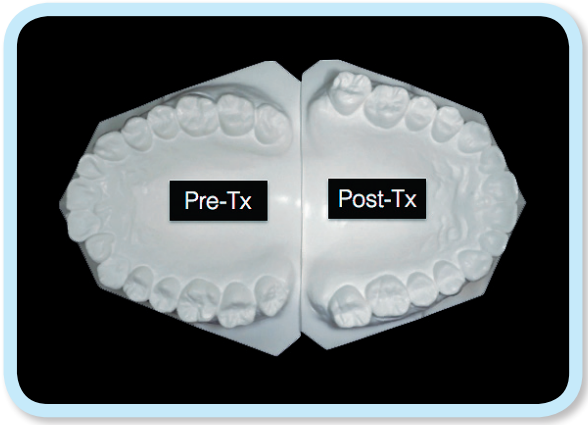


Fig. 8:
The inter-molar widths in the post-treatment cast (right) were larger than pre-treatment model (left).

Dentition: Buccal axial inclinations were near ideal (*Fig. 11*). Maxillary incisors were slightly retracted, and molars were slightly extruded. Intermolar and intercanine widths were expanded. In the mandibular dentition: (*1*) incisors were retracted and extruded, (2) molars were retracted, but (3) both intermolar and intercanine widths were maintained (*Fig. 10*).

Facial: Esthetics were improved by retracting upper and lower lips, and the dental midline was corrected (*Figs. 12 and 13*).

The patient was quite satisfied with the result. Optimal dental alignment was achieved as evidenced by an American Board of Orthodontics (*ABO*) Cast-Radiograph Evaluation (*CRE*) score of 26 points (*Worksheet 2*). Points deducted for the

Fig. 9: Post-treatment facial and intraoral photographs

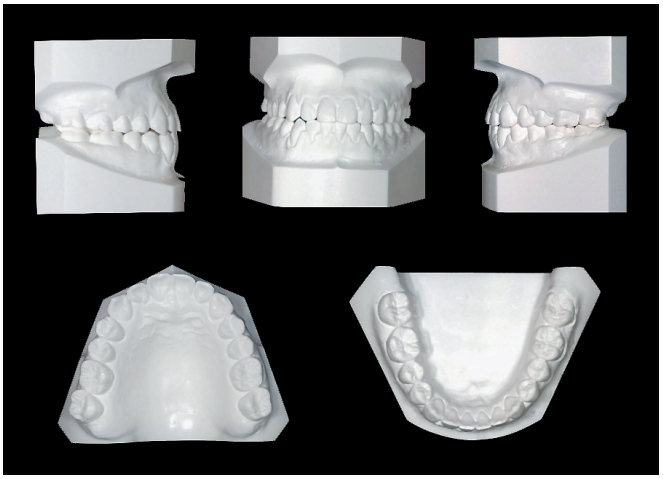


Fig. 10: Post-treatment study models (casts)

Fig. 11: Post-treatment panoramic radiograph

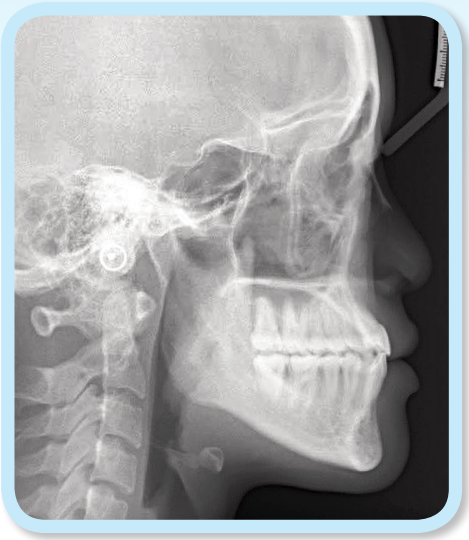


Fig. 12: Post-treatment cephalometric radiograph

principal residual discrepancies were: alignment (5), marginal ridge discrepancies (5), buccolingual inclination (7), overjet (5), and occlusal contacts (5).

Discussion

Correction of Class III Malocclusion

The long-term growth studies of Bjork and Thailander[1] have demonstrated that maxillary growth is essentially finished by the age of 10, but the mandible continues to grow until about the age of 20 (*Fig. 14*). The latter is referred to as late mandibular growth. Early intervention to treat Class III malocclusion is rarely indicated because it is subject to relapse, which ultimately extends treatment time.[2] Prolonged treatment time is associated with periodontal problems, caries, and

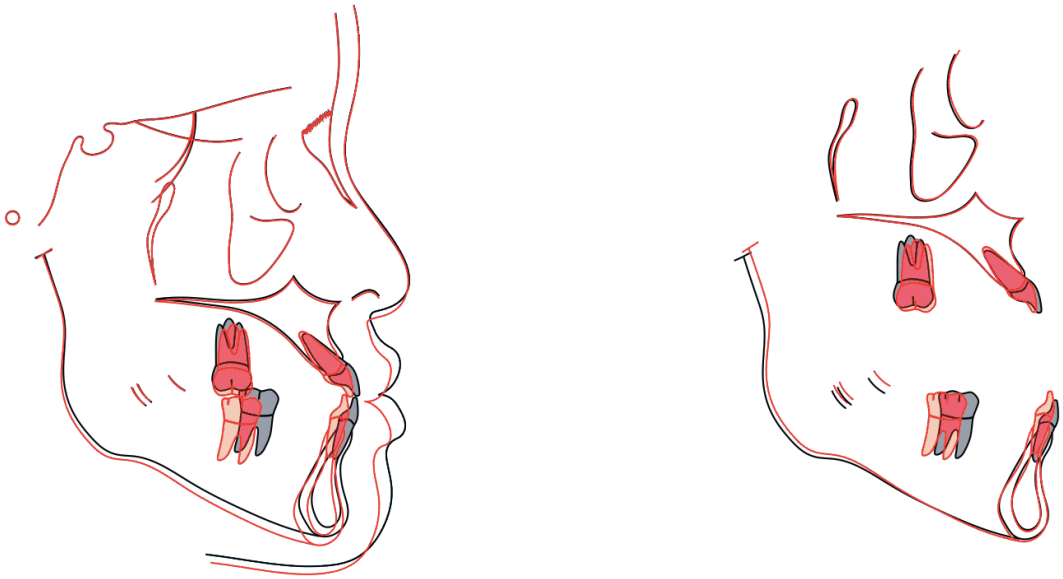


Fig. 13:
Superimposed cephalometric tracings compared changes in dentofacial relationships from before (black) to after (red) treatment. Note that the maxillary incisors were slightly retracted, while mandibular incisors were extruded and retracted. See text for details.

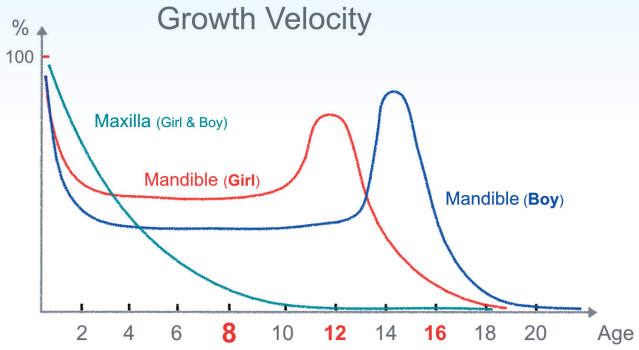


Fig. 14:
Growth curve for the maxilla compared to the mandible (Courtesy Dr. Kazuto Kuroe)

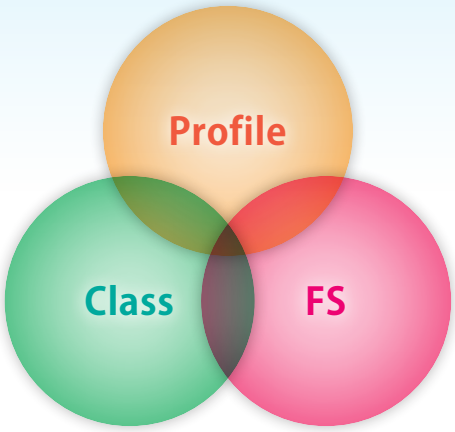


Fig. 15: Lin's 3 ring Class III malocclusion diagnosis system

poor patient compliance.[3] However, early mixed dentition treatment (*Phase I*) of Class III malocclusion may be indicated to help resolve functional disturbances, occlusal interference, severe crowding, and dental eruption problems. In any event, Phase II treatment should be delayed until most mandibular growth is complete.[2] According to the identical twins research by Sugawara et al.,[4] the first stage of Class III treatment helps simplify the overall complexity of treatment.

Lin's 3-Ring diagnosis system[5] assists with the diagnosis of Class III malocclusion (*Fig. 15*). The following characteristics favor the prognosis for conservative orthodontic treatment of Class III with anterior crossbite: orthognathic profile in centric relation (C_R), Class I molar relationship, and an anterior functional shift from centric relation (C_R) to centric occlusion (C_O).

If crowding is minimal, incisor angulations are within normal limits (*WNL*), and there is an acceptable nasolabial angle, a fixed appliance with Class III elastics usually resolves the malocclusion. Class III mechanics tend to extrude maxillary molars, rotate the occlusal plane in a counter-clockwise direction, and change axial inclinations of the incisors of both arches.[6] Hence, low torque brackets and upside-down low torque brackets are bonded for upper and lower incisors respectively.[5] In the absence of torque compensations for the brackets, a similar effect on the incisors can be achieved with pretorqued archwires placed in a normal or upside down position.

Retracting the entire dentition with miniscrew anchorage is a viable alternative, especially for patients with open bite and slightly proclined upper incisors. Placing bone screws in the MBSs[6-11] is effective for extra-alveolar anchorage to retract the entire arch. On the other hand, for patients with a crowded upper arch and protruded upper incisors, IZC bone screws are a better option.[5]

For more severe Class III problems, extractions and even surgery are viable options. Facial asymmetry and a concave profile are important considerations.[12] Conservative treatment without orthognathic surgery is favored by low to average mandibular plane angle, obtuse nasolabial angle, negative overjet <4 mm, and a Class III molar relationship less than the width of a molar (*12mm*).[13]

Extraction treatment is often indicated for Class III malocclusions with lip protrusion and/or substantial crowding. Extraction of the upper 2nd premolars and lower 1st premolars is preferred in relieving crowding and reducing perioral protrusion. Extraction of four 1st premolars is effective in correcting severe bimaxillary protrusions, but it may be necessary to reinforce the lower posterior anchorage with MBS bone screws. Extraction of two mandibular premolars is favored for patients with deficient midface associated with a full cusp or greater Class III molar relationships. However, the finished occlusion is in a Class III molar relationship, so extraction of compromised mandibular molars may be a better alternative.[11]

The present patient (*Figs. 1-3*) has a skeletal Class III malocclusion, concave profile, and facial asymmetry, so orthognathic surgery was initially considered (*Option 1*). However, the patient and her family declined the option because of surgical risk and morbidity. The second alternative (*Option 2*) was orthodontic camouflage treatment with asymmetric extraction of premolars. This is a viable approach for correcting the crossbite, but the lack of lower arch crowding was problematic. Lower incisors would be tipped excessively to the lingual at the end of treatment since the pre-treatment angle between the mandibular incisors and mandibular plane was retroclined (*84°*) (*Table 1*). Because of the deficiencies associated with orthognathic surgery and premolar extractions, a third option was proposed: camouflage treatment plan based on extracting all four third molars, MBS bone screw anchorage, and Class III elastics to differentially retract the lower arch. The patient preferred Option 3 because she thought the conservative treatment would adequately address her major concerns, but she did realize that the outcome would only camouflage the skeletal asymmetry.

Inter-radicular (*I-R*) bone screws in the MBSs are technically less challenging than extra-radicular (*E-R*) placement, but I-R screws interfere with retraction of the entire arch and may be predisposed to failure by contacting the roots of teeth.[5] In effect, a MBS bone screw is not only E-R but also extra-alveolar (*E-A*) because the MBS is the skeletal support for the mandibular alveolar process.[6]

Class III elastics extruded the upper molars and rotated the mandible 1.5° posteriorly, which improved the facial profile (*Fig. 13*). This is a viable approach if lip competence is maintained.[14] It is important to assess lip competence at each appointment during the process of opening the VDO with Class III elastics (*Fig. 13*).

Facial Asymmetry

Facial asymmetry with dental midline discrepancies

must be carefully diagnosed with a series of questions: (*1*) Is skeletal asymmetry in the maxilla and/or mandible? (*2*) Are dental asymmetries in one or both arches? (*3*) Is there a functional shift of the mandible?[15] The dental midline should be evaluated with the mouth open and closed, as well as in centric relation (C_R), initial contact, and centric occlusion (C_O). Midline deviations with a skeletal origin are best evaluated with a postero-anterior radiograph of the head. Zygomatico-frontal sutures are bilateral landmarks that define a horizontal axis, which is bisected with a vertical line constructed that bisects the base of crista galli. Ideally, the dental midlines are along the vertical line, so it is a guide to determining if treatment to coincide the midlines should be directed at the upper and/or lower arch. The panoramic radiograph is advantageous for comparing the shape and size of the mandibular ramus and condyles bilaterally. Since the mandibular condyle is longer on the left side (*Fig. 4*), that is the probable cause of the lower midline shift to the right (*Fig. 1*).

Modest functional shifts may be corrected with minor occlusal adjustments. More severe deviations require orthodontic treatment. Occlusal splints are used to evaluate a functional shift due to habitual posturing. Furthermore, they may be helpful for deprogramming the musculature. Dental asymmetry can be treated with asymmetric mechanics and/or extractions. Skeletal asymmetries treated orthodontically may result in compromises that should be carefully explained to the patient. Severe discrepancies are best managed with orthognathic surgery and orthodontic treatment.

For the present patient, the panoramic film revealed that the left mandibular ramus height exceeded the right side (*Fig. 4*). With the mouth open or in centric occlusion (C_O), the dental midline was deviated to the right side (*Fig. 5*). So orthodontic treatment improved the dental midline deviation, but did not completely correct the facial asymmetry (*Fig. 16*). After 17 months of follow-up, the occlusion and dental midline are both stable (*Fig. 17*).

Axial inclination of the lower incisors to the

Fig. 16:
Compared with the pre-treatment frontal photograph (left), the post-treatment frontal photograph (right) shows the corrected dental midline discrepancy and a more harmonious smile.

Fig. 17:
17-month-follow-up records document the stability of the dental and facial correction.

mandibular plane decreased from 84° to 78°. Periodontally, this is a risky outcome that may be associated with bone dehiscence and an overall lack of osseous support.[9] It is important to consider limits when planning treatment that involves major axial inclination changes. Upper and lower limits for incisal compensation when correcting Class III skeletal malocclusion are 120° to the sella-nasion line, and 80° to the mandibular plane.[16] Upside-down low-torque brackets placed on the mandibular incisors are effective for producing the lingual root torque required to avoid excessive incisal tipping.

Inter-proximal reduction (*IPR*) is a well established adjunct for incisal compensations. However, it is also effective for improving interdigitation in the buccal segments particularly when there is an asymmetric relationship. IPR was performed on the upper right posterior teeth to achieve better intercuspation (*Fig. 10*).

Conclusions

This difficult asymmetric Class III malocclusion (*DI 30*) was treated to an acceptable result (*CRE 26*) without orthognathic surgery or extraction of permanent teeth. Class III elastics and posterior mandibular bone screws provided the asymmetric anchorage to improve both facial and dental outcomes. Extrusion of maxillary molars rotated the mandible posteriorly to improve the profile. Intermaxillary elastics and skeletal anchorage accomplished conservative, camouflage treatment for a severe asymmetric Class III malocclusion.

References

1. Lin JJ. Mandibular growth and Class III treatment. Int J Ortho Implantol 2013;32:4-15.
2. Hsu YL, Chang CH, Roberts WE. Early intervention of Class III malocclusion and impacted cuspids in late mixed dentition. Int J Ortho Implantol 2012;28:66-79.
3. Lin JJ, Long-term follow up and management of a severe Class III open bite case. Int J Ortho Implantol 2012;27:4-19.
4. Sugawara J, Aymach Z, Nagasaka DH, Kawamura H, Nanda R. One-phase vs 2-phase treatment for developing Class III malocclusion: a comparison of identical twins. Am J Orthod Dentofacial Orthop 2012;141(1):e11-e22.
5. Lin JJ. The most effective and simplest ways of treating severe Class III, without extraction or surgery. Int J Ortho Implantol 2014;33:4-18.
6. Chang CH, Roberts WE. A retrospective study of the extra-alveolar screw placement on buccal shelves. Int J Orthod Implant 2013;32:80–9.
7. Su B, Chang CH, Roberts WE. Conservative management of a severe Class III open bite malocclusion. Int J Orthod Implant 2013;30:40–60.
8. Huang C, Chang CH, Roberts WE. 3D cortical bone anatomy of the mandibular buccal shelf: a CBCT study to define sites for extra-alveolar bone screws to treat Class III malocclusion. Int J Orthod Implant 2016;41:74–82.
9. Huang S, Chang CH, Roberts WE. A severe skeletal Class III open bite malocclusion treated with non-surgical approach. Int J Orthod Implant 2011;24:28-39.
10. Chang CH, Liu SSY, Roberts WE. Primary failure rate for 1680 extra-alveolar mandibular buccal shelf mini-screws placed in movable mucosa or attached gingiva. Angle Orthod 2015;85(6):905–10.
11. Tseng LLY, Chang CH, Roberts WE. Diagnosis and conservative treatment of skeletal Class III malocclusion with anterior crossbite and asymmetric maxillary crowding. Am J Orthod Dentofacial Ortho 2016;149(4):555–66.
12. Liaw JL, Roberts WE. Compromised treatment for a Class III asymmetry case. Int J Ortho Implantol 2013;30:22-39.
13. Wei MW, Chris Chang, Roberts WE. Skeletal Class III malocclusion with canine transposition and facial asymmetry. Int J Ortho Implantol 2015;40:66-80.
14. Liaw JL, Paradigm shift in Class III treatment with TADs. Int J Ortho Implantol 2012;28:22-37.
15. Bishara SE, Burkey PS, Kharouf JG. Dental and facial asymmetries: a review. Angle Orthod 1994;64(2):89-98.
16. Burns NR, Musich DR, Martin C, Razmus T, Gunel E, Ngan P. Class III camouflage treatment: what are the limits? Am J Orthod Dentofacial Orthop 2010;137(9):e1-9,e13.

Discrepancy Index Worksheet

TOTAL D.I. SCORE 30

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 = 11

Total = 11

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 = 1

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 _____ pts.
Full Class II or III	=	4 pts. per side _____ pts.
Beyond Class II or III	=	1 pt. per mm. additional _____ pts.

Total = 4

LINGUAL POSTERIOR X-BITE

1 pt. per tooth Total = 3

BUCCAL POSTERIOR X-BITE

2 pts. per tooth Total = 0

CEPHALOMETRICS (See Instructions)

ANB ≥ 6° or ≤ -2° = (4 pts.)

Each degree < -2° 1 x 1 pt. = 1

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 = 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:

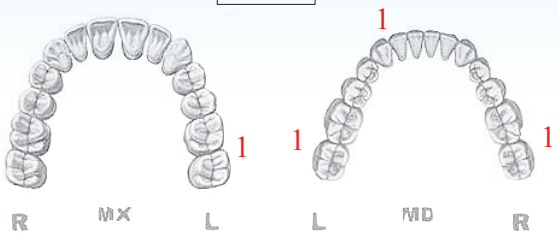
Total = 5

Cast-Radiograph Evaluation

Total Score: 26

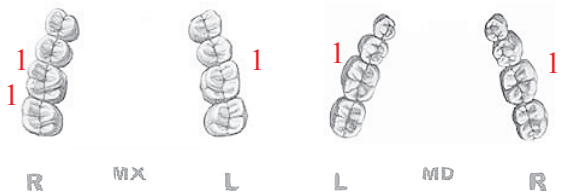
Alignment/Rotations

4



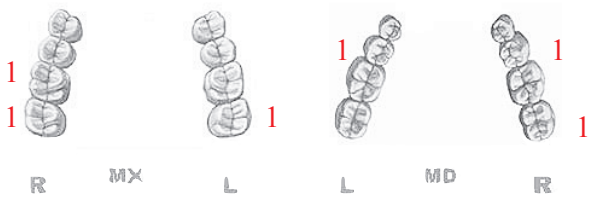
Marginal Ridges

5



Buccolingual Inclination

6

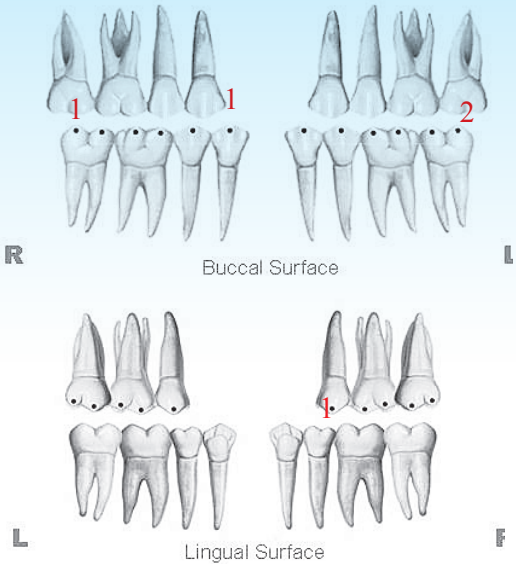


Overjet

5

Occlusal Contacts

5

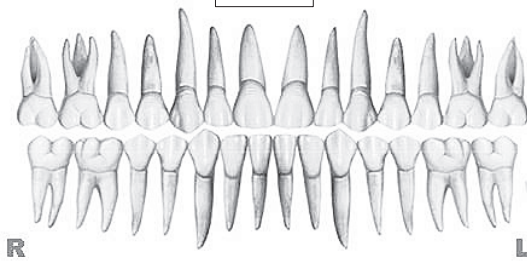


Occlusal Relationships

0

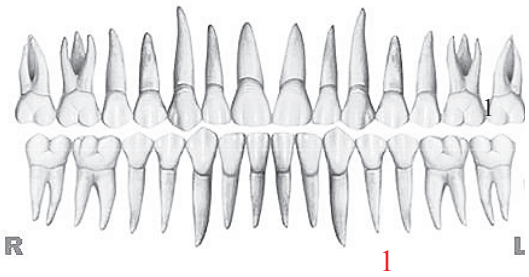
Interproximal Contacts

0



Root Angulation

1



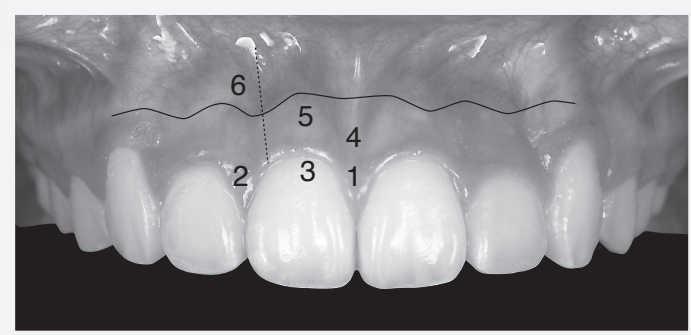
INSTRUCTIONS: Place score beside each deficient tooth and enter total score for each parameter in the white box. Mark extracted teeth with "X". Second molars should be in occlusion.

IBOI Pink & White Esthetic Score

Total Score: = 6

1. Pink Esthetic Score

Total = 2

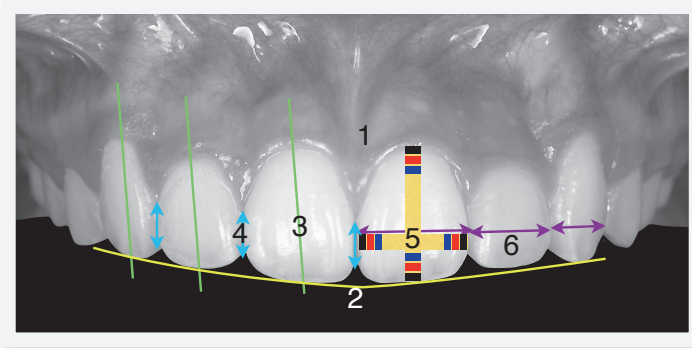


1. M & D Papillae	0	1	2
2. Keratinized Gingiva	0	1	2
3. Curvature of Gingival Margin	0	1	2
4. Level of Gingival Margin	0	1	2
5. Root Convexity (Torque)	0	1	2
6. Scar Formation	0	1	2

1. M & D 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 = 4



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