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International Association of Orthodontists and Implantologists (iAOI) is the world's first professional association dedicated specifically for orthodontists and implantologists. The Association aims to promote the collaboration between these two specialties and encourage the combined treatment of orthodontic and implant therapy in order to provide better care for our patients.

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Certified members of the Association are expected to complete the following three stages of requirements.

1. Member

Doctors can go to http://iaoi.pro to apply for membership to join iAOI. Registered members will have the right to purchase a workbook in preparation for the entry exam.

2. Board eligible

All registered members can take the entry exam. Members will have an exclusive right to purchase a copy of iAOI workbook containing preparation materials for the certification exam. The examinees are expected to answer 100 randomly selected questions out of the 400 ones from the iAOI workbook. Those who score 70 points or above can become board eligible.

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Board eligible members are required to present three written case reports, one of which has to be deliberated verbally. Members successfully passing both written and verbal examination will then be certified as Diplomate of iAOI.

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Diplomates will have the opportunity to be invited to present six ortho-implant combined cases in the iAOI annual meeting. Afterwards, they become Ambassador of iAOI and will be awarded with a special golden plaque as the highest level of recognition in appreciation for their special contribution.

For more information on benefits and requirements of iAOI members, please visit our official website: http://iaoi.pro.

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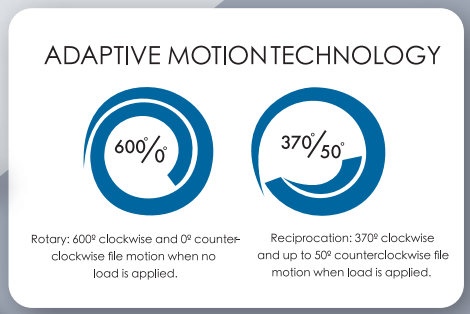

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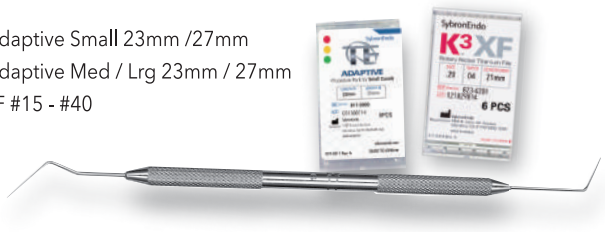

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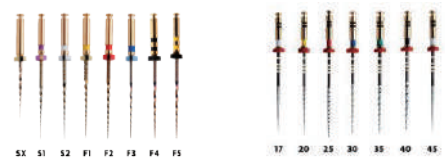

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Class II Malocclusion with Severe Crowding and a Protrusive Profile

Abstract

A 25-year-old female presented with almost end-to-end Class II buccal segments, severe anterior crowding bilaterally in the right lateral incisor and canine areas, and a protrusive profile. The Discrepancy Index (DI) was 19. All four first premolars were extracted, canines were moved distally to resolve crowding, and the anterior segments were retracted to correct lip protrusion. After initial alignment and leveling, the residual space was closed with elastometric chains, and Class II elastics were applied to correct the sagittal discrepancy. At progress evaluation, it was noted that the crowding, protrusion, and flaring of upper and lower incisors were corrected, but the buccal segments were still Class II, the bite had deepened, and a 1-2mm midline deviation was evident. Extra-alveolar miniscrews were inserted to complete the correction. After a total of 36 months of active treatment, an optimal result was achieved. The final Cast-Radiograph Evaluation (CRE) score was 24, and the Pink and White dental esthetic score was 2. (J Digital Orthod 2022;66:48-75)

Key word:

Protrusive profile, four bicuspids extraction, miniscrew, Angle Class II malocclusion, asymmetric crowding

History and Etiology

A 25-year-old female presented for orthodontic consultation with a chief complaint that her front teeth were crooked (Figs. 1-3). There was no contributory medical or dental history. The patient had no known harmful habits which might contribute to the malocclusion. The relatively narrow arches and crowding pattern suggest a primarily environmental etiology associated with a history of inadequate masticatory loading. The patient was treated to a very good result (Figs. 4-6). The pre-treatment and posttreatment cephalometric and panoramic radiographs are shown in Figs. 7 and 8, respectively. Superimposed cephalometric tracings document the dentofacial changes (Fig. 9). The correction of the malocclusion was facilitated by assessing progress records at 11 and 24 months of treatment. Including an interruption in treatment when the appliances were removed for wedding photographs, the total treatment time was 36 months.

Diagnosis

Skeletal:

- Class II with slightly retrusive mandible (SNA, 81°; SNB, 77.5°; ANB, 3.5°)
- Normal mandibular plane angle (SN-MP, 32°)

Dental:

- Angle Classification: *bilateral Class II molar relationship*
- Incisal relationships: *overjet 6mm, overbite ~5mm, increased axial inclination of all incisors (Fig. 10)*

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Publisher, Journal of Digital Orthodontics (Center)
W. Eugene Roberts,
Editor-in-Chief, Journal of Digital Orthodontics (Right)



Fig. 1: *Pre-treatment facial photographs*

Fig. 2: *Pre-treatment intra-oral photographs*

Fig. 3: *Pre-treatment study models (casts)*

Fig. 4: *Posttreatment facial photographs*

Fig. 5: *Posttreatment intra-oral photographs*

Fig. 6: *Posttreatment study models (casts)*

Fig. 7:
Pre-treatment panoramic and lateral cephalometric radiographs

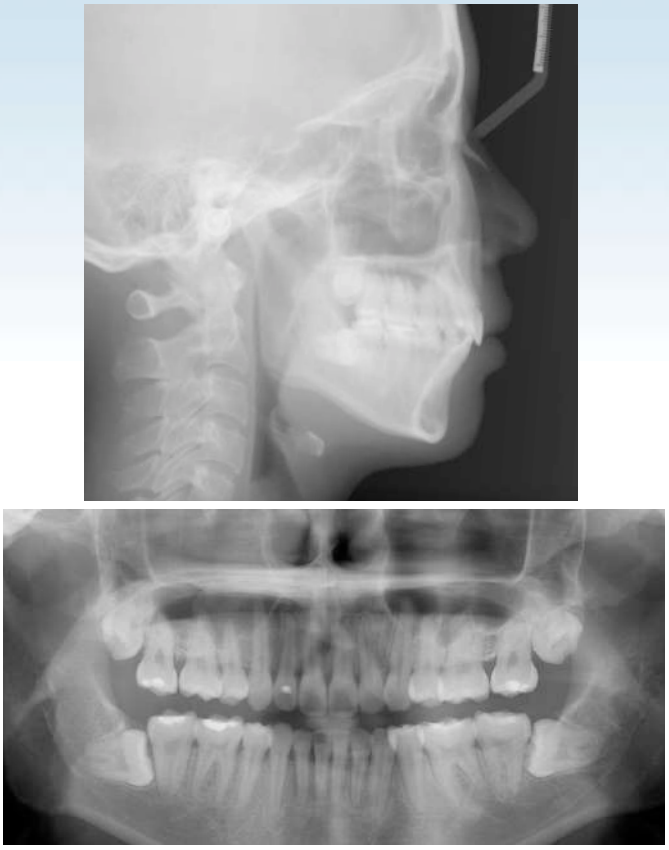

Fig. 8:
Posttreatment panoramic and lateral cephalometric radiographs

- Tooth Size Arch Length Discrepancy: *Maxillary arch 8mm, mandibular arch 10mm*
- UR and LR block-out canines
- LR central incisal edge fractured (Fig. 11)

Radiographic/Panoramic:

- Enlarged maxillary sinuses and low sinus floor (Fig. 7)

Facial:

- Protrusive profile
- Convex due to a retrusive chin

The ABO Discrepancy Index (DI) was 19 as shown in the subsequent worksheet.

Specific Treatment Objectives

Maxilla:

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

Mandible:

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

Maxillary Dentition:

- A-P: *Retract incisors.*

- Vertical: *Maintain.*
- Inter-Molar Width: *Maintain.*
- Inter-Canine Width: *Decrease.*
- Buccolingual Inclination: *Maintain.*

Mandibular Dentition:

- A-P: *Maintain.*
- Vertical: *Maintain.*
- Inter-Molar Width: *Maintain.*
- Inter-Canine Width: *Maintain.*
- Buccolingual Inclination: *Maintain.*

Facial Esthetics: *Correct protrusive lips.*

Treatment Plan

Extract four first premolars, and utilize a full fixed orthodontic appliance to align, level, and close

CEPHALOMETRIC SUMMARY			
SKELETAL ANALYSIS			
	PRE-TX	POST-TX	DIFF.
SNA° (82°)	90°	90°	0°
SNB° (80°)	86°	86°	0°
ANB° (2°)	4°	4°	0°
SN-MP° (32°)	26°	26°	0°
FMA° (27°)	19°	19°	0°
DENTAL ANALYSIS			
U1 TO NA mm (4mm)	7	5	2
U1 TO SN° (104°)	120°	108°	12°
L1 TO NB mm (4mm)	8	6	2
L1 TO MP° (90°)	100°	95°	5°
FACIAL ANALYSIS			
E-LINE UL (-1mm)	2	1	1
E-LINE LL (0 mm)	3	2	1
%FH: Na-ANS-Gn (56%)	55%	56%	1%
Convexity: G-Sn-Pg (13°)	5°	4°	1°

Table 1: *Cephalometric summary*

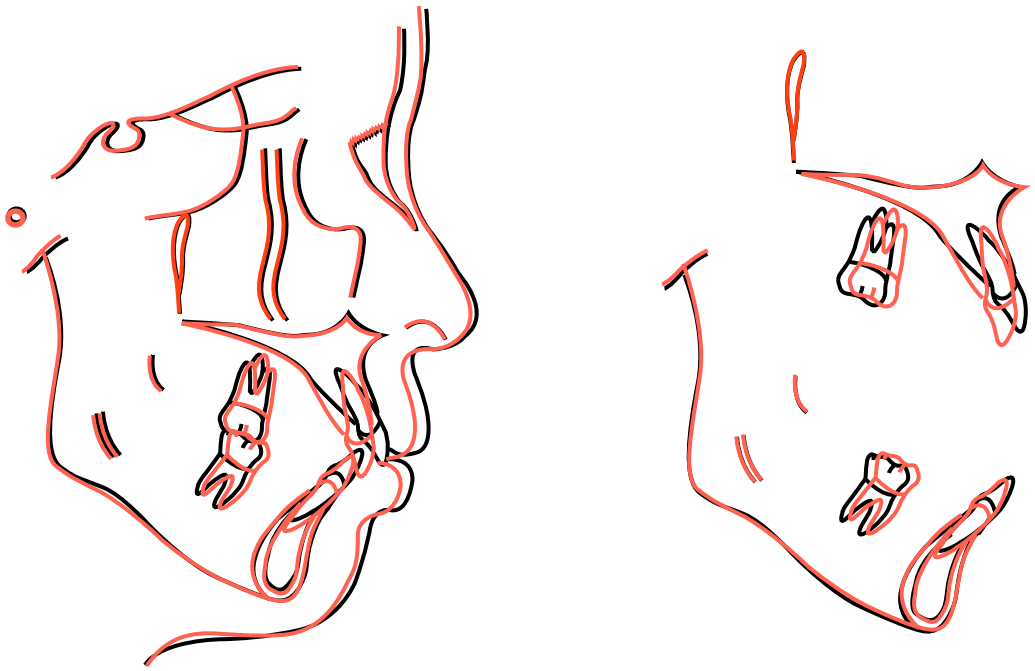

Fig. 9:
Cephalometric tracings superimposed on stable skeletal landmarks in the anterior cranial base, maxilla, and mandible. (Pre-treatement: black; posttreatment: red)

Fig. 10:
Pre-treatment photographs document a 6mm overjet and ~5mm overbite, associated with proclined lower incisors (IMPA=104°).

Fig. 11:
UR and LR block-out canines; LR central incisor with a distal incisal edge fracture

spaces in both arches. Use anterior bite turbos to control the deep bite and early light short elastics (2oz) to correct the Class II buccal segments. Miniscrews (2x12-mm, OrthoBoneScrew®, iNewton dental, Inc., Hsinchu City, Taiwan) in the infrazygmatic crests (IZC) may be needed to retract upper dentition and improve the lip profile. The final occlusion is to be detailed with bracket repositioning, archwire adjustment, and intermaxillary elastics, as needed. When the fixed appliances are removed, the corrected dentition will be retained with upper and lower clear overlay retainers.

Appliances and Treatment Progress

Before the treatment, the patient was referred to a general dentist to extract the maxillary and mandibular first premolars. A 0.022" slot Damon Q® bracket system (Ormco, Glendora, CA) was used, with high torque brackets on the upper incisors (Fig. 12). The initial upper archwire was 0.014" CuNiTi. After one month of initial alignment and leveling in the maxillary arch, the mandibular arch was bonded with standard torque brackets and fitted with a 0.014" CuNiTi archwire. An open coil spring was placed between mandibular right central incisor and canine to open the space for the lingually displaced right lateral incisor. An elastometric chain was used to retract the lower right canine (Fig. 13). The patient was instructed to wear Class II elastics (Parrot 5/16, 2oz) bilaterally full time, from the upper canine to the lower first molar to correct the sagittal discrepancy.

Fig. 12:
High torque brackets were bonded on the upper anterior segment.

In the 3rd month (3M), a 0.016" CuNiTi archwire was placed in the upper arch. One month later, the mandibular right lateral incisor bracket was bonded, and the archwire was engaged (Fig. 14). Five months into treatment, a rectangular 0.014x0.025" CuNiTi wire was placed in the upper arch. One month later, the upper archwire was replaced by 0.017x0.025" low friction TMA, and the anterior segment was ligated with a 0.012" stainless steel (SS) ligature in a figure-eight tie pattern. The lower archwire was fitted with 0.014x0.025" CuNiTi. Class II elastics (Fox 1/4, 3.5oz) were worn bilaterally from the upper canines to the lower first molars.

Eight months after the initiation of treatment (8M), a 0.019x0.025" SS archwire was used on the upper arch, and a 0.017x0.025" low friction TMA was placed in the lower arch. The UR and LR blocked-out canines were both corrected (Fig. 15). One month later (9M), the lower archwire was replaced with a 0.016x0.025" SS. Elastometric chains were attached from the canines to the first molars to close the residual extraction spaces in both arches. L-type elastics (Bear 1/4, 4.5oz.) were applied from the upper canines to lower molars bilaterally. After

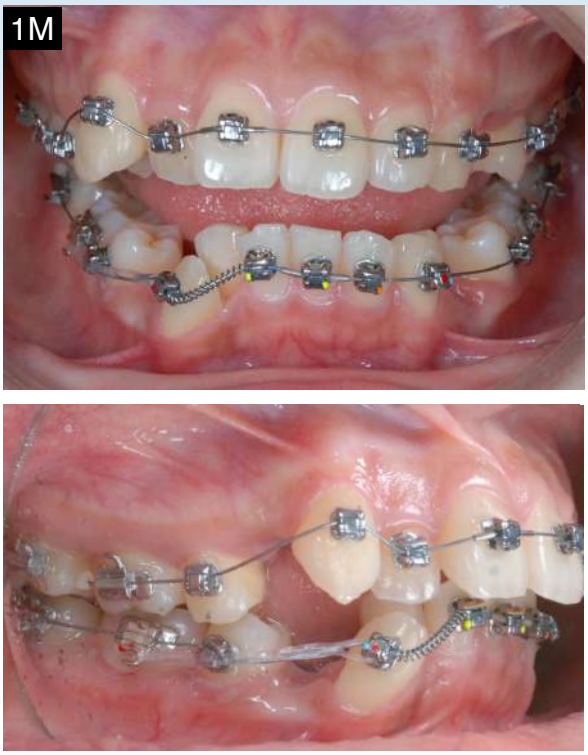

Fig. 13:
An open coil spring was placed between LR1 and LR3 to open the space for the lingually displaced LR2. An elastometric chain was attached from LR3 to LR6 to retract the canine.

Fig. 14:
After space opening, a bracket was bonded on LR2 and the archwire was engaged.

11 months of active treatment, interim records were collected to evaluate the treatment progress and to plan the future treatment (Figs. 16-18).

Interim Treatment Progress-1

Midcourse Corrections after 11 Months

Crowding, protrusion, and flaring of upper and lower incisors are improved. An interim American Board of Orthodontics (ABO) Cast-Radiograph Evaluation (CRE) score of 31 revealed good progress (figs. 19-24), but also identified further treatment needs:

Fig. 15:
The upper archwire was 0.019x0.025" SS and the lower archwire was 0.017x0.025" low friction TMA.

1. Detailed bending to correct rotations (Fig. 19).
2. Bracket repositioning to improve marginal ridges (Fig. 20).
3. Bond lingual buttons on LL5 and LL6 and apply cross elastics to correct lingual tipping (Fig. 21).
4. Use vertical elastics on R7s.
5. Correct the overjet (Fig. 22) and close residual extraction spaces (Fig. 24).
6. Coordinate arches to improve occlusal relationships (Fig. 23).
7. Use miniscrews to correct the Class II buccal segments and midline discrepancy.

In the 15th month of treatment, the anterior overbite was deeper due to space closing mechanics. Anterior bite turbo were used on the palatal side of upper central incisors (Fig. 25). Elastometric chains were attached from the canines to the first molars to close the residual extraction spaces in both arches (Fig. 26).

After 17 months of active treatment (17M), extra-alveolar miniscrews were inserted in the right IZC and buccal shelf (BS) of the left mandibular first molar to correct the midline deviation. Three months later (20M), all extraction spaces were closed (Fig. 27). In the 21st month of treatment (21M), a panoramic radiograph was taken to evaluate axial inclinations for all teeth. Bracket repositioning of LL3, LR5, and LR6 were performed as indicated (Fig. 28). LR1 was restored to normal dental morphology. Additionally, vertical elastics (Chipmunk 1/8, 3.5oz.) were used on the R7s to

Fig. 16: *Interim treatment facial and intraoral photographs (11M)*

Fig. 17: *Interim treatment (11M) study models (casts)*

improve buccolingual inclination. L-type elastics (Fox 1/4, 3.5oz.) were applied from the upper canines to lower molars on the left side to correct the deviated midline.

Two months later (23M), the lower archwire was expanded to improve arch coordination. Lingual buttons were bonded on lower right 2nd premolar, and cross elastics (Chipmunk 1/8, 3.5oz.) were used to correct lingual tipping (Fig. 29). In the 24th month of treatment (24M), interim-treatment records were collected to evaluate the treatment

Fig. 18:
Interim treatment (11M) cephalometric and panoramic radiographs

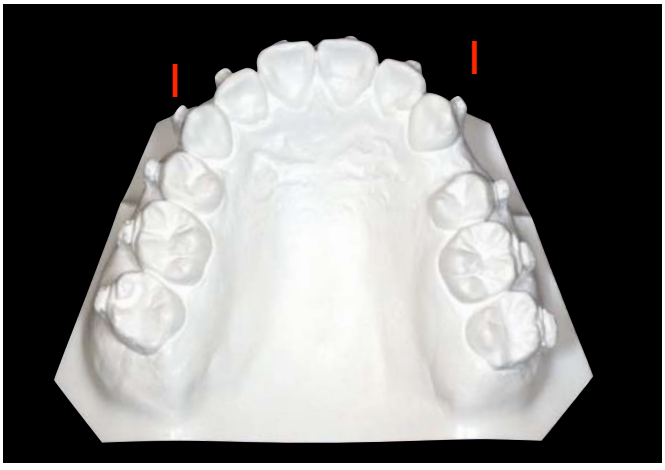

Fig. 19:
The interim treatment CRE (11M): Alignment/rotations had two discrepancies <1mm for a total of 2 points.

Fig. 20:
The interim treatment CRE (11M): A marginal ridge discrepancy >1mm was 2 points.

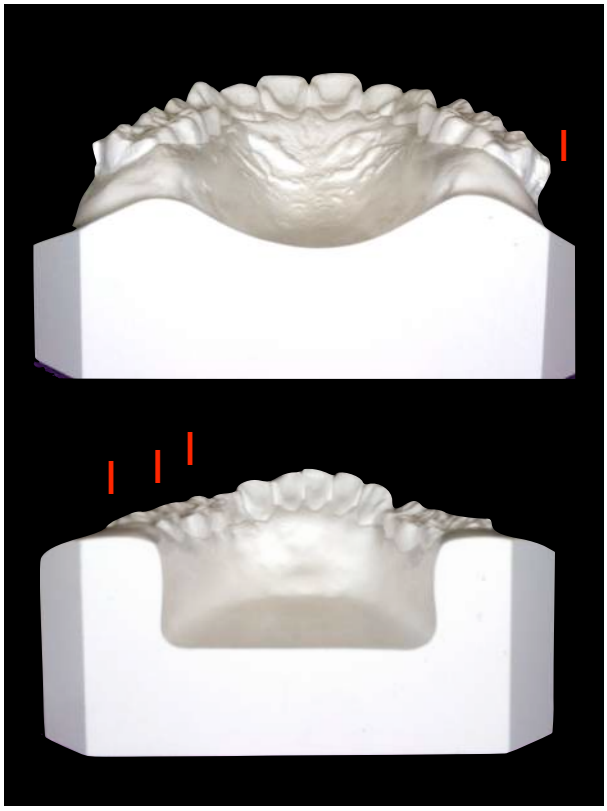

Fig. 21:
The interim treatment CRE (11M): Buccolingual Inclination discrepancies (red) were scored 4 points.

Fig. 22: *The interim treatment CRE (11M): Five overjet discrepancies >1mm resulted in a score of 10 points.*

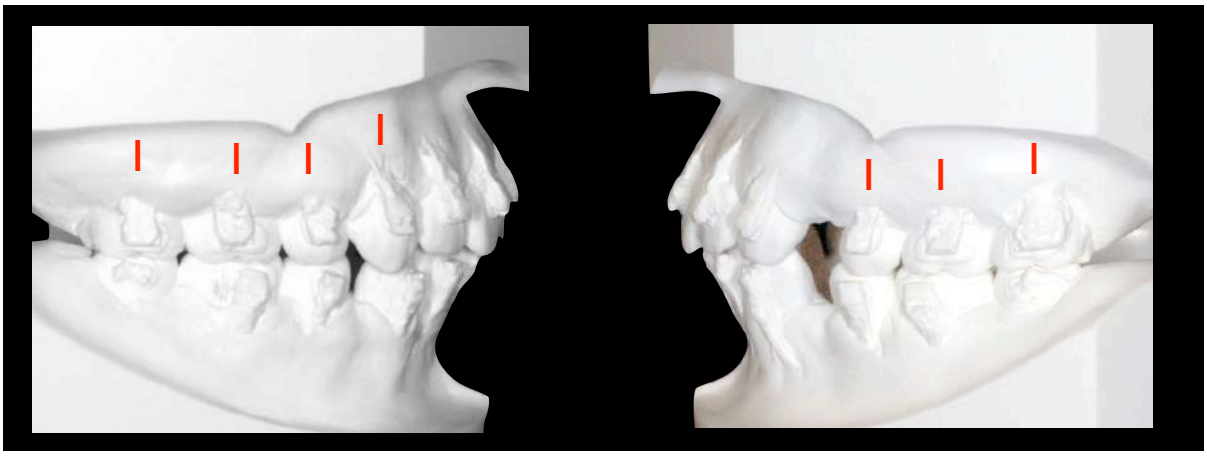

Fig. 23: *The interim treatment CRE (11M): Four occlusal relationships resulted in 7 points.*

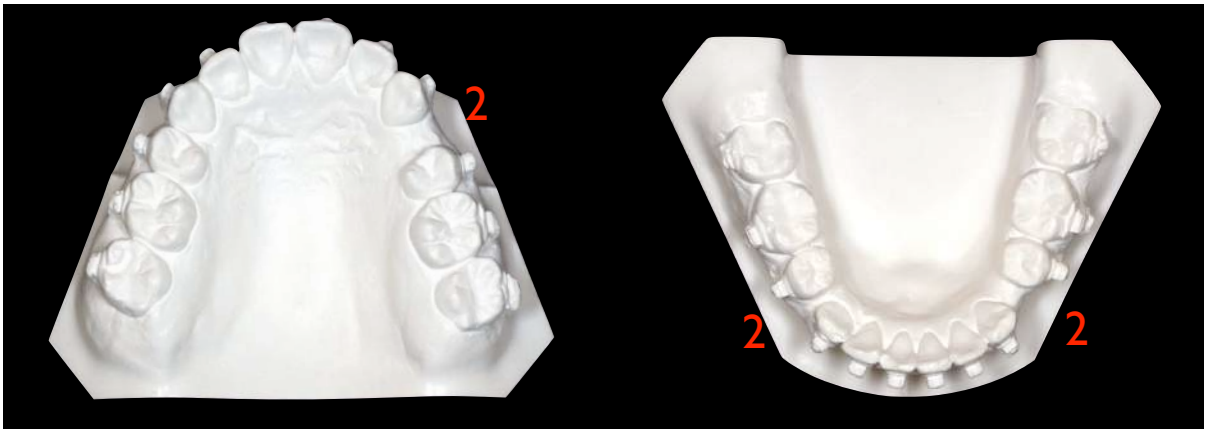

Fig. 24: *The interim treatment CRE (11M): Interproximal contact due to unclosed extraction spaces was scored at 6 points.*

Fig. 25:
Anterior bite turbos were bonded on upper central incisors to correct the deep bite.

Fig. 26:
Elastometric chains were attached from the canines to the first molars to close the residual extraction spaces in both arches.

Fig. 27:
Extra-alveolar miniscrews were inserted in the right IZC and the BS of left mandibular region near the first molar.

Fig. 28:
A panoramic radiograph was taken to evaluate bracket positions relative to the axial inclinations of the teeth, and brackets were repositioned accordingly. See text for details.

progress and to plan the future treatment (Figs. 30-33).

Interim Treatment Progress-2

Midcourse Corrections after 24 months

The progress Cast-Radiograph Evaluation (CRE) score was 31 points (Figs. 34-40). The upper anteriors were excessively retracted due to the extensive use of Class II elastics. The following objectives were generated based on the CRE score.

1. Detailed bending to correct rotations (Fig. 34).
2. Arch coordination to improve occlusal relationship, contacts, and reduce the overjet (Figs. 37-39).
3. Improve occlusal contacts by using vertical elastics (Fig. 38).
4. Reposition brackets on LL3 and LL5 to improve root alignment (Fig. 40).
5. Increase lingual root torque on the upper anteriors by placing torque in the archwire.
6. Correct the midline deviation with BS miniscrews. On the left side, insert the miniscrew with a tilt-forward position in order to protract the left posterior segment.

To correct the midline deviation, BS miniscrews were used as prescribed. Three months later (27M), the patient complained about occlusal canting, so another miniscrew was placed between the UL3 and UL5 to anchor intrusion mechanics to correct the problem. Cross elastics (Kangaroo 3/16, 4.5oz.) were worn from the miniscrew to lower left second premolar and first molar (Fig. 41).

In the 31st month of treatment, continuous vertical elastics were applied to the posterior segments to improve occlusal contacts. One month later (32M), the upper and lower 5-5 brackets were removed for wedding photographs. They were replaced two weeks later. Upper and lower 0.016" NiTi archwires were fitted (Fig. 42). After one month, archwires were changed to 0.016" SS. Detailed bending and intermaxillary elastics were applied for the final correction.

After an optimal correction was achieved, all appliances were removed after 36 months of active treatment. Upper and lower clear overlay retainers were provided.

Fig. 29: *Bond lingual buttons on LL3, LL5, LL6, and LR5 to apply cross elastics*

Fig. 30: *Interim treatment facial and intraoral photographs (24M)*

Fig. 31: *Interim treatment (24M) study models (casts)*

Results Achieved

Maxilla:

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

Mandible:

- A-P: *Maintained.*
- Vertical: *Maintained.*

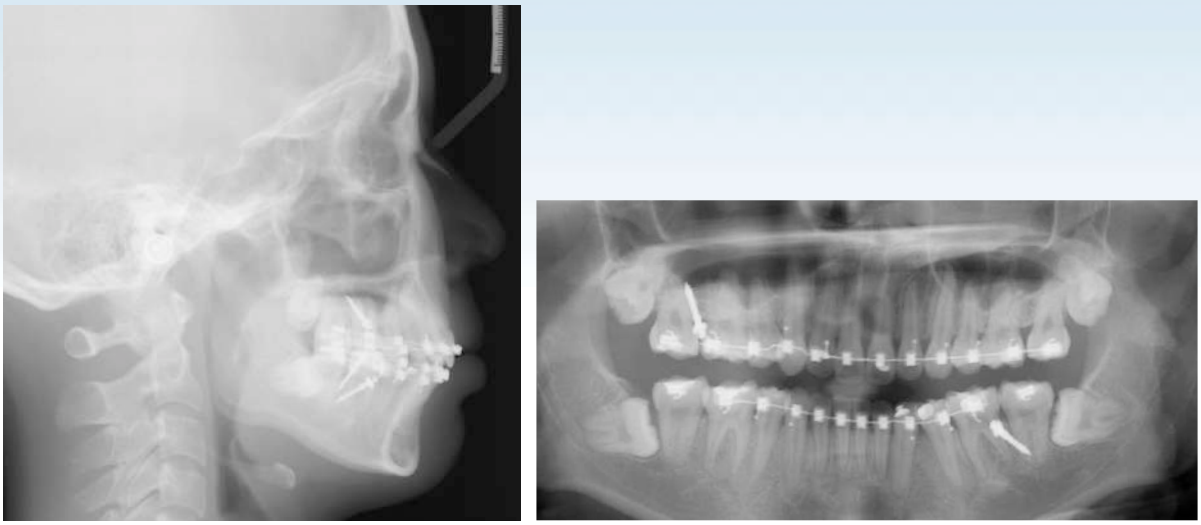

Fig. 32: *Interim treatment (24M) panoramic and cephalometric radiographs*

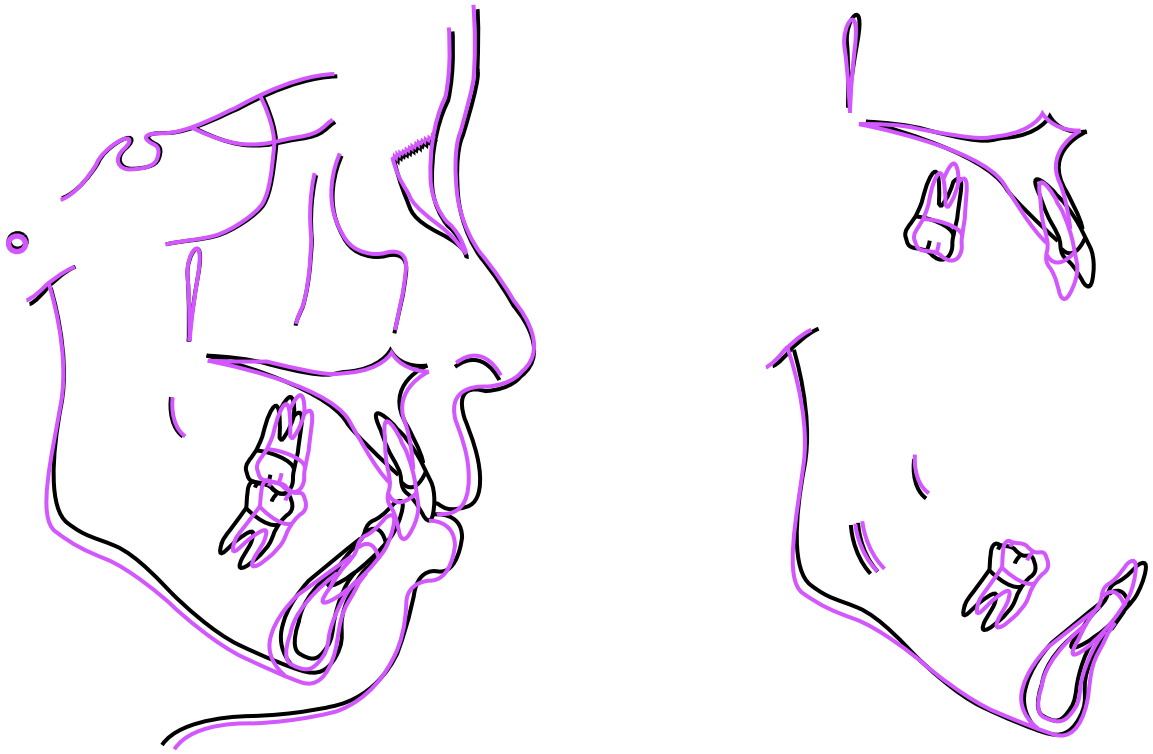

Fig. 33:
Superimposed cephalometric tracings at 24 months of treatment revealed the maxillary incisors were excessively tipped to the lingual (pre-treatment: black; 24M: purple).

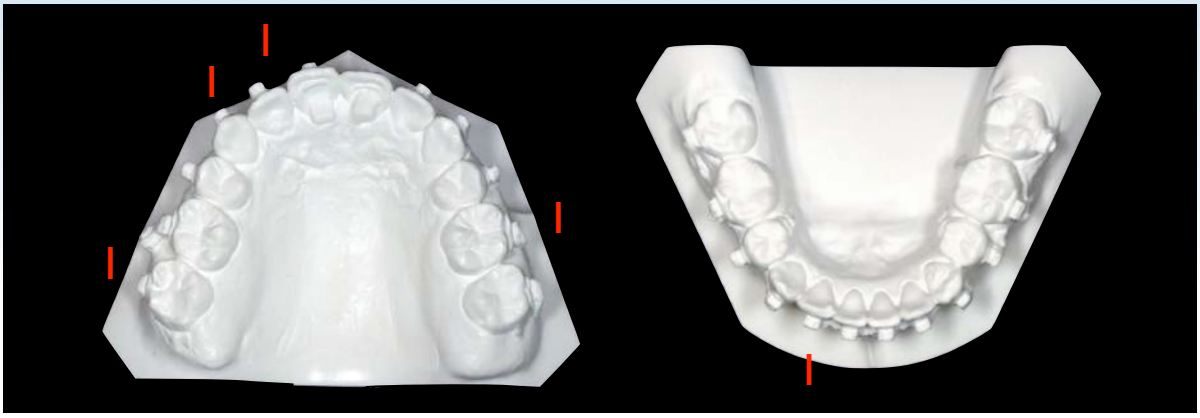

Fig. 34: *The interim treatment CRE (24M): Alignment/ Rotations lost 5 points.*

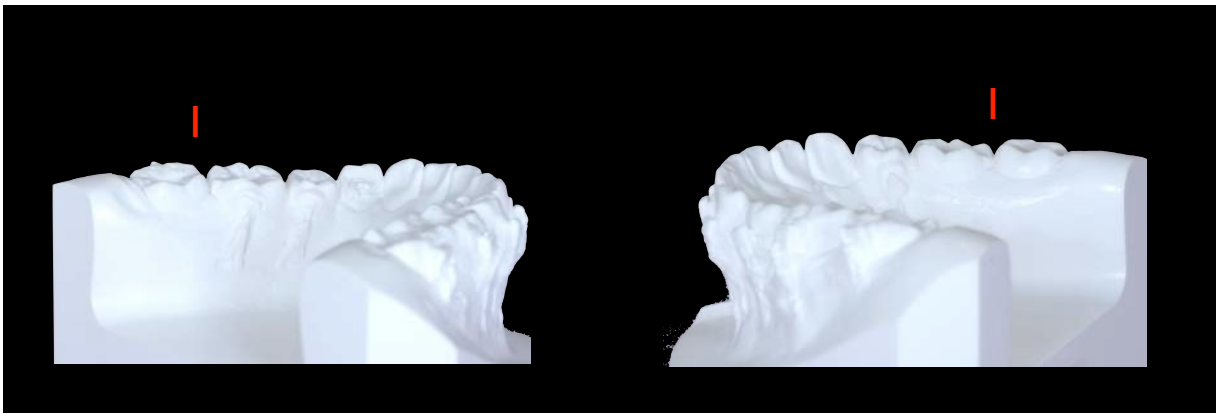

Fig. 35: *The interim treatment CRE (24M): Marginal ridges lost 2 points.*

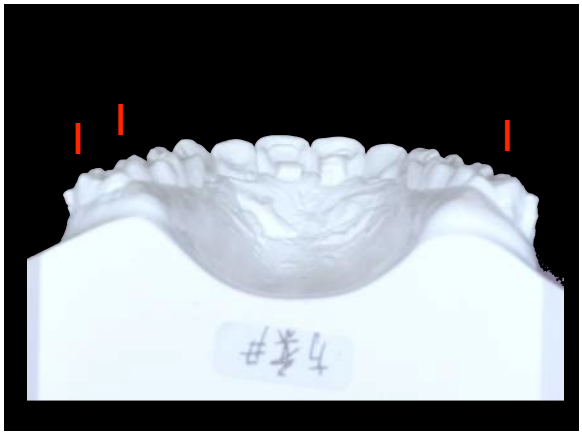

Fig. 36:
The interim treatment CRE (24M): Buccolingual inclination was scored 3 points.

Fig. 37a:
The interim treatment CRE (24M): Overjet lost 3 points in this view.

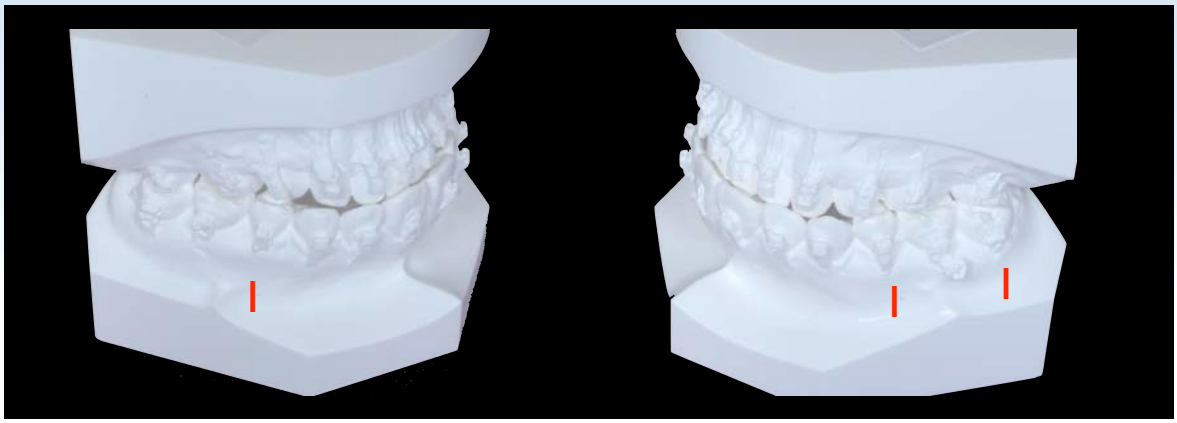

Fig. 37b: *The interim treatment CRE (24M): Overjet lost and additional 3 points (total 6 points)*

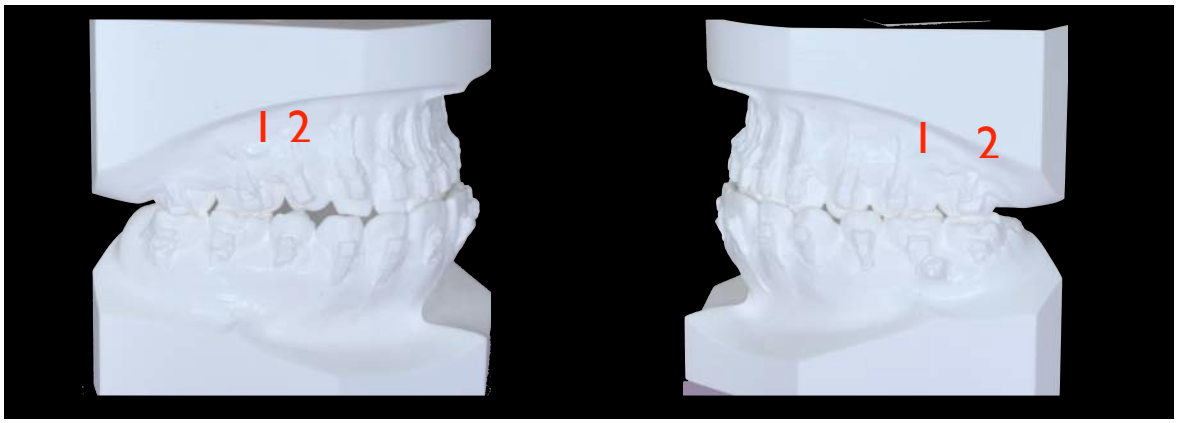

Fig. 38: *The interim treatment CRE (24M): Occlusal contact was scored 6 points.*

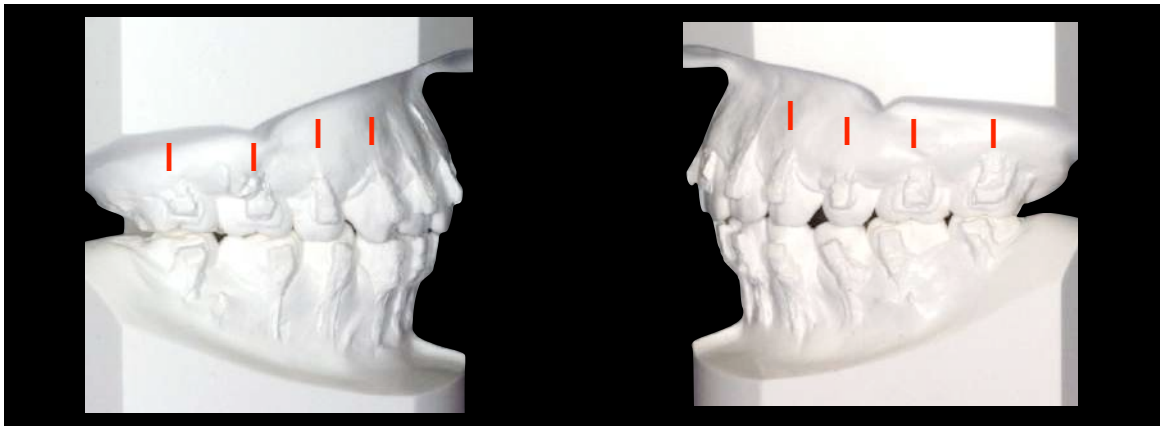

Fig. 39: *The interim treatment CRE (24M): Occlusal Relationships lost 8 points.*

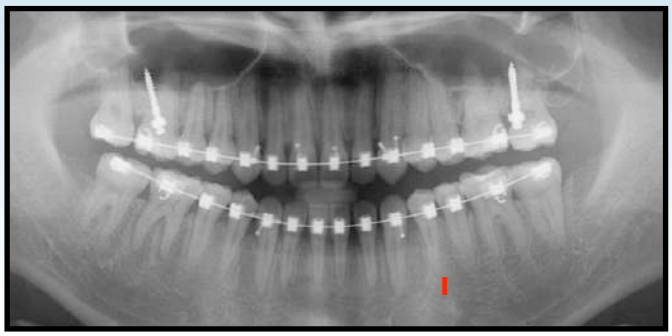

Fig. 40:
The interim treatment CRE (24M): Root angulation lost 1 point.

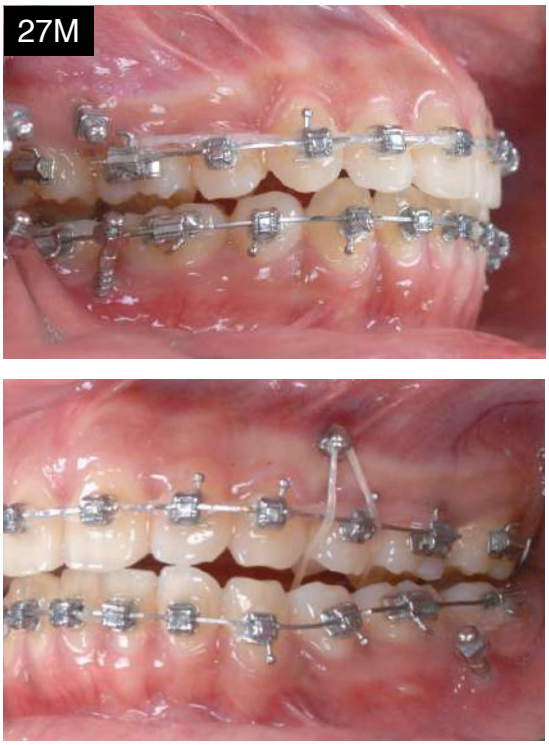

Fig. 41:
The miniscrew on the left side was inserted in a tilt-forward position in order to protract the left lower posteriors forward. Another miniscrew was placed between upper left canine and second premolar to provide intrusion mechanics to correct occlusal canting.

- Transverse: *Maintained.*

Maxillary Dentition:

- A-P: *Incisors were retracted and molars were protracted to close extraction space.*
- Vertical: *Incisors extruded and molars were maintained.*
- Inter-Molar Width: *Maintained.*
- Inter-Canine Width: *Increased.*
- Buccolingual Inclination: *Maintained.*
- Alignment: *Mesial-in rotation of UL3 was achieved.*

Mandibular Dentition:

- A-P: *Incisors were retracted and molars were protracted utilizing extraction space.*
- Vertical : *Incisors intruded and molars were extruded to flatten the plane of occlusion.*
- Inter-Molar Width: *Maintain.*
- Inter-Canine Width: *Increase.*
- Buccolingual Inclination: *Maintain.*
- Alignment: *Mesial-in rotation of LL3 was achieved.*

Facial Esthetics: *Decreased facial convexity and improved lip profile*

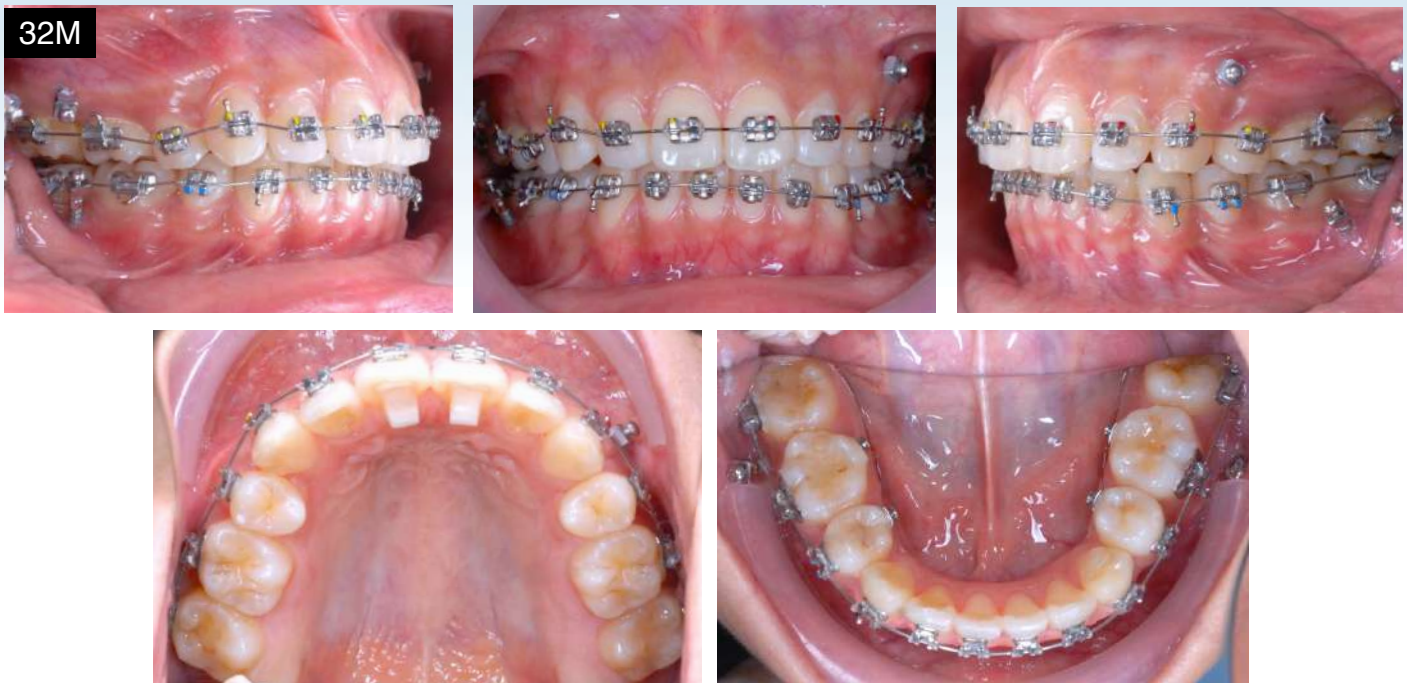

Fig. 42: *Upper and lower 5-5 brackets were re-bonded, with 0.016 NiTi archwires fitted in each arch.*

Retention

The patient was instructed to wear the upper and lower clear overlay retainers full time for the first 6 months and nights only thereafter. Home care and retainer maintenance instructions were provided. All four third molars were impacted so extractions were scheduled.

Final Evaluation of Treatment

Cephalometric superimpositions (Fig. 9) reveal typical reciprocal tooth movement to close extraction sites. The upper molars were protracted more than the lower molars accentuating the Class II molar relationship. This problem could have been avoided with miniscrew anchorage and Class II elastics from the start of treatment. The upper incisors tipped distally, preventing the complete correction of the Class II molar relationship. More lingual root torque was needed at an earlier stage of treatment. Intrusion of the lower incisors was primarily due to the use of anterior bite turbos, which also helped to maintain the proper overbite and overjet. Slight extrusion of the lower molars was noted due to the extensive use of Class II elastics. Overjet and overbite were ideal. The protrusive lips were reduced, improving lower face convexity (Fig. 9).

The final ABO CRE score was 24 points. The major discrepancies are alignment/rotation (5 points), overjet (5 points), occlusal contacts (4 points), and occlusal relationships (6 points) (Figs. 43-46). Miniscrews were inserted in the IZC and BS areas bilaterally for Class II and midline correction.

Another miniscrew was inserted between the left canine and 2nd premolar to solve the occlusal canting. The mechanics were well designed to manage the malocclusion but the patient's personal commitment to an ideal result was compromised by her marriage plans. The appliances were removed and replaced twice for the wedding photographs. After that it was difficult to schedule finishing appointments, so it was necessary to accept an optimal rather than an ideal result.

In retrospect, the maxillary miniscrews were indicated early in the treatment to retract the upper molars to achieve a Class I molar relationship and correct the dental midline. The patient was satisfied with the treatment because the anterior crowding and lip protrusion were corrected. She had no interest in additional treatment to resolve the Class II buccal segments. Despite the incomplete sagittal correction, the prognosis for stability is good,

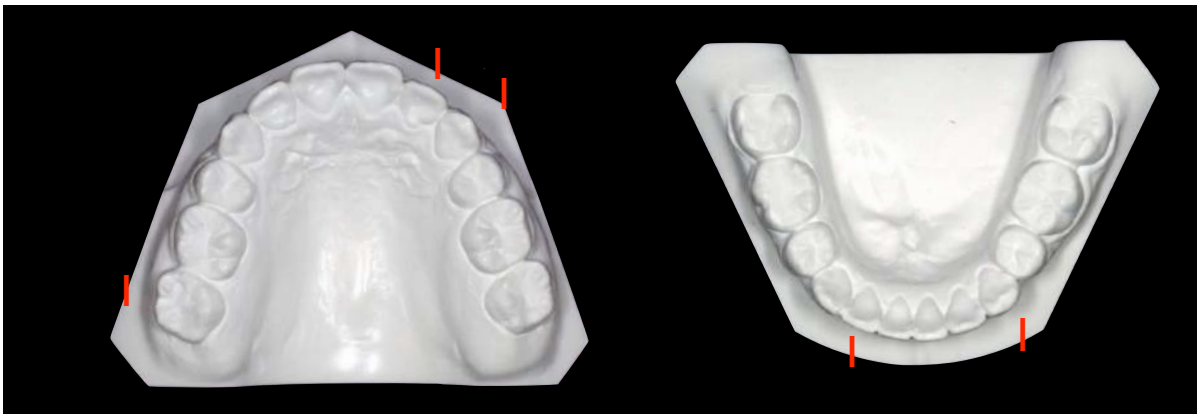

Fig. 43: *The CRE: Alignment/ Rotations was scored 5 points.*

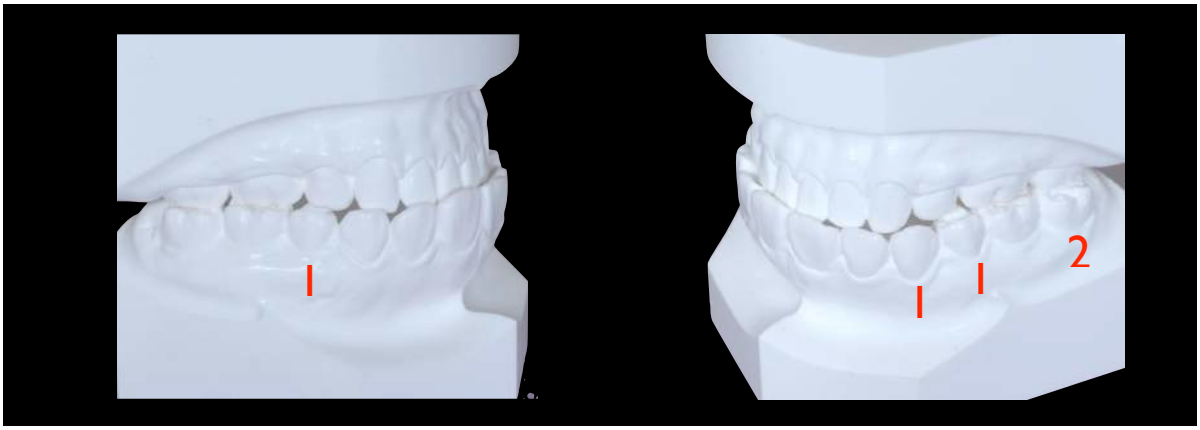

Fig. 44: *The CRE: Overjet lost 5 points as indicated.*

presumably due to the patient's compliance with retainer wear.

Discussion

To resolve a crowded anterior dentition with protrusive lips, extraction of four bicuspids is usually indicated. However, most orthodontic mechanics come with side effects. The vertical component of force for Class II elastics is usually considered to be the biggest problem because it extrudes the maxillary incisors and mandibular molars, thereby leading to steepening of the occlusal plane as well as posterior rotation of the mandible. The horizontal vector of force may cause the mandibular first molars to rotate or tip mesially, increase the axial inclination of the incisors, and displace the entire lower dental arch anteriorly. In addition, the effect relative to extrusion and distal tipping of the maxillary incisors

Fig. 45: *The CRE: Occlusal contacts was scored 4 points*

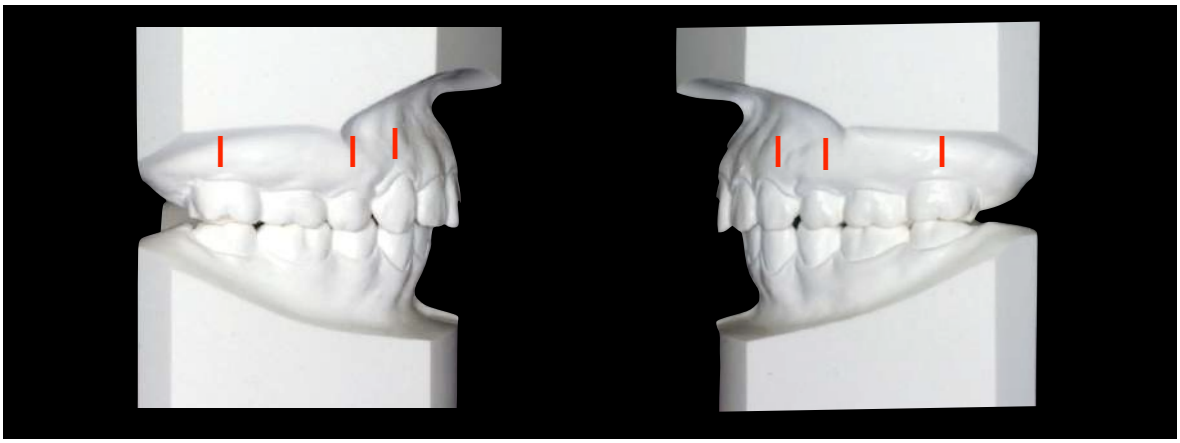

Fig. 46: *The CRE: Occlusal Relationships lost 6 points.*

may adversely affect the smile line, leading to excessive gingival exposure and an increase in the axial inclination of the lower incisors.

It is important to define the use of Class II elastics, relative to diameter, strength, prescription, appropriate archwire, and periods of wear. Ultimately Class II elastics have similar effects to other methods for Class II treatment, such as fixed functional appliances.[1]

Increased torque in upper incisor brackets and less torque in lower incisor brackets would have helped compensate for the side effects of Class II elastics. For the present case, high torque brackets were placed on upper incisors, and standard brackets on lower incisors. However, low torque brackets would have been superior for the mandibular incisors, and additional lingual root torque was needed for the maxillary incisors.

Retracting the dentition may result in an anterior deep bite and sometimes posterior open bite. To prevent over-closure, bite turbos were placed on the palatal side of the upper incisors and cross elastics were used in the posterior segments. Since a deep curve of Spee is usually associated with an increased overbite, a lower .0016x0.022" SS archwire with reversed curve of Spee was indicated for anterior intrusion and posterior extrusion in the mandibular arch.

The asymmetric crowding and decreased anchorage value of maxillary compared to mandibular molars contributed to the midline discrepancy that occurred during space closure. Use of differential anchorage in the buccal segments or extra-alveolar temporary skeletal anchorage devices (E-A TSADs) is the best approach for managing anchorage as the spaces are closed. Midline coordination is an important landmark to guide orthodontists during space closure to achieve maximum intercuspation, optimal function, and anterior dental esthetics. However, small discrepancies of 1mm or so are often insignificant to the final occlusion. In fact, there are no points deducted for a midline discrepancy with the CRE outcome assessment. Midline discrepancies are only a problem if they are associated with a compromised intermaxillary posterior occlusion. Miniscrews are common supplemental anchorage for midline problems because they are simple to place and remove, they are relatively inexpensive, and there is minimal need for patient compliance.

One of the complications that can occur with the use of miniscrews is impingement on structures such as periodontal ligament, tooth roots, nerves, blood vessels, or the maxillary sinus. In case of impingement, the miniscrews should be removed and inserted in a different location. These placement problems rarely affect the treatment prognosis. As a general rule, it is advisable to leave a clearance of 2mm from the roots of teeth, nerves, and other vital stuctures,[2] especially when the miniscrews are inserted in interdental areas.[3] That is why E-A TSADs are highly recommended to prevent damage to roots of teeth and contact with the periodontal ligament (PDL). Inflammation and infection of the tissues around miniscrews are often significant problems, best handled by meticulous oral hygiene, 0.2% chlorhexidine mouth rinses, and/or topical

application of the same solution with dental floss or interproximal brushes.

Although miniscrews have enjoyed routine use for orthodontic anchorage in recent years, there are still many problems particularly failure, defined as loosening and/or loss of the anchorage unit. A recent meta-analysis by Papageorgiou et al.[4] reported that orthodontic miniscrews have a modest mean failure rate of only 13.5%, but much of the published data is reported by authors with a conflict of interest. Miniscrew failure may be due to inflammation of the surrounding bone, location of the miniscrew, thickness of cortical bone, skeletal characteristics, and age.

A higher failure rate is common for miniscrews placed in the mandible compared to the maxilla. By placing the miniscrew at a different angulation, the change in the amount of bone contact may affect the failure rate. The angle of the miniscrew to the long axis of the teeth was generally 43–47°, which resulted in the miniscrew being relatively far from the neighboring tooth roots.[5] Watanabe et al.[6] stated that root proximity is the factor that is most likely to precipitate miniscrew failure, especially when placed in the mandible. They failed to identify an association between miniscrew failure with the patients' age, bone density, or site of insertion. However, the jaw of insertion and root proximity are clearly related to miniscrew failure.[7] Extra-alveolar insertion in the IZC, BS and palate, usually increases the cortical bone contact which enhances the stability of the screw. Furthermore, the more upright position of the screw reduces the possibility of root damage.[8]

During treatment progress, brackets were rebonded to achieve optimal alignment with a minimum of archwire adjustments. The common marginal ridge discrepancy between an adjacent premolar and first molar can be corrected by placing the brackets of first molar more occlusally, and positioning the premolar bracket more apically (Fig. 13). The mesio-distal (M-D) positions of lateral incisors, canines, and upper first premolars should be confirmed with an oral mirror from occlusal view to check the bracket positions relative to the axial inclinations of the teeth. In general, it is wise to bond brackets in a more mesial position on the lateral incisors and canines. For upper first premolars, a more distal position is often preferred.[9]

Conclusions

A challenging Class II malocclusion with severe crowding and lip protrusion (DI=19) was managed initially with premolar extractions, space closure, and Class II elastics. Side effects of these conservative mechanics required additional treatment with bite turbos and miniscrew anchorage. An active treatment time of 36 months produced an optimal result, documented by a CRE score of 24 and a Pink and White dental esthetic score of 2. Utilizing E-A miniscrew anchorage from the beginning of treatment would probably have improved the result and decreased treatment duration. Both the patient and the clinician were satisfied with the result.

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3. Wang YC, Liou EJW. Comparison of the loading behavior of self- drilling and predrilled miniscrews throughout orthodontic loading. Am J Orthod Dentofacial Orthop 2008;133:38-43.

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8. Chang CH, Roberts WE. A retrospective study of the extra-alveolar screw placement on buccal shelves. Int J Ortho Implantol 2013; 32:80-89.

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Discrepancy Index Worksheet

TOTAL D.I. SCORE 19

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 =

Total = 3

OVERBITE

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

Total = 2

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

Total = 0

LINGUAL POSTERIOR X-BITE

1 pt. per tooth Total = 0

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. = _____

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° 104° = 1 pt.

Each degree > 99° 5 x 1 pt. = _____

Total = 6

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)	_____ x 1 pt.	=
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.	=
Addl. treatment complexities	_____ x 2 pts.	=

Identify:

Total = 0

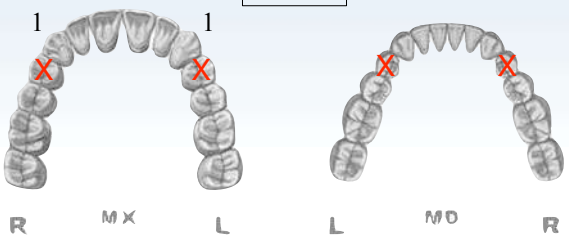
1st Interim Progress (11M)

Cast-Radiograph Evaluation

Total Score: 31

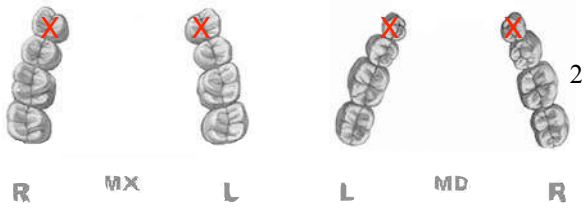
Alignment/Rotations

2



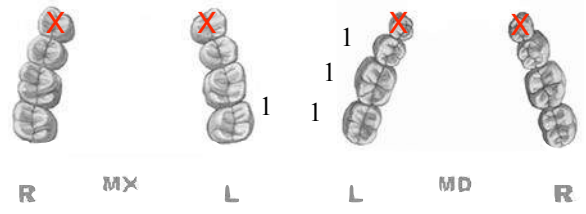
Marginal Ridges

2



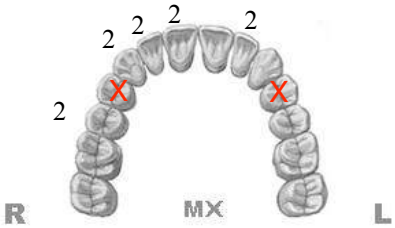
Buccolingual Inclination

4



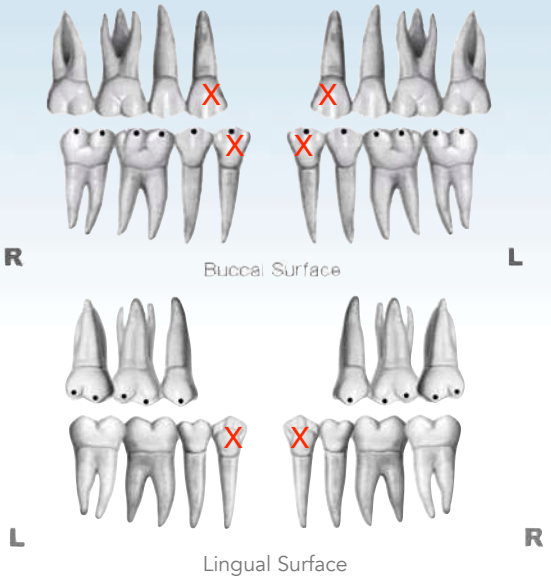
Overjet

10



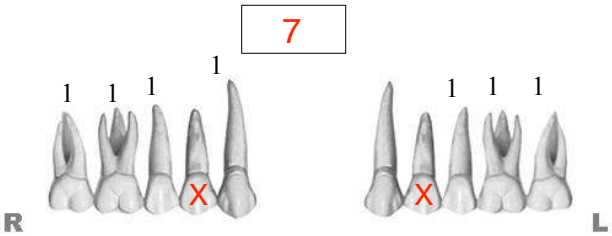
Occlusal Contacts

0



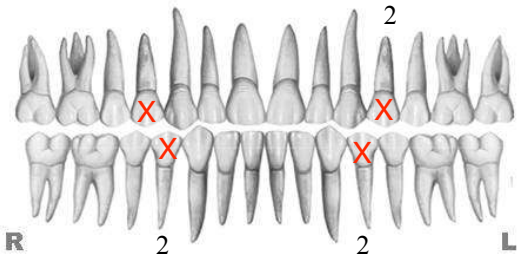
Occlusal Relationships

7



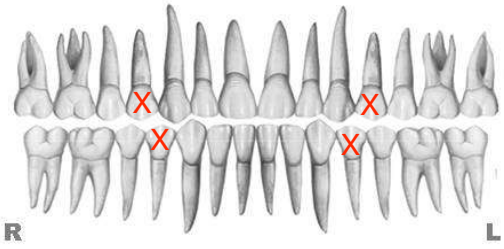
Interproximal Contacts

6



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.

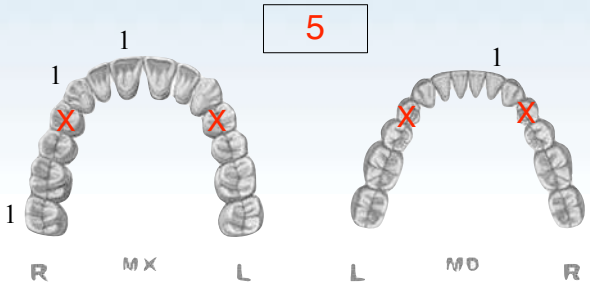
2nd Interim Progress (24M)

Cast-Radiograph Evaluation

Total Score: 31

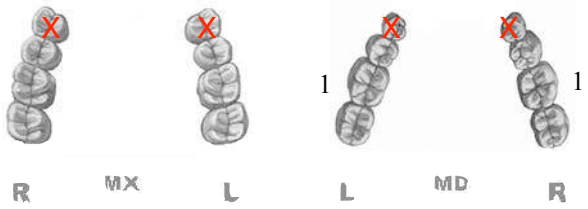
Alignment/Rotations

5



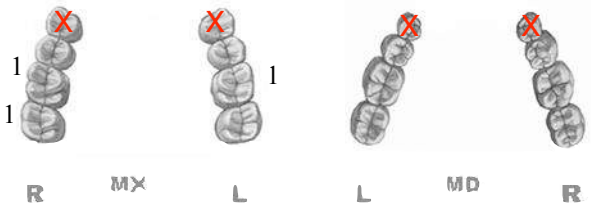
Marginal Ridges

2



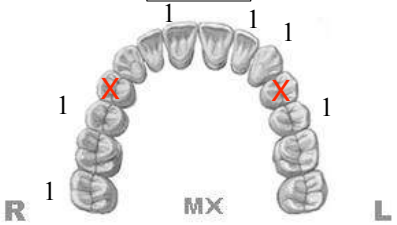
Buccolingual Inclination

3



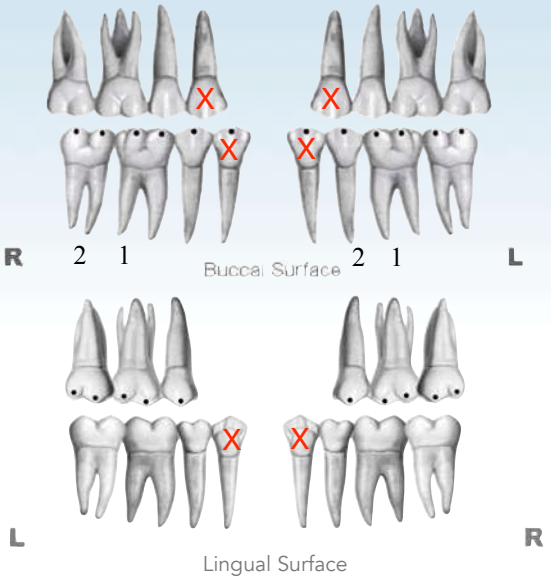
Overjet

6



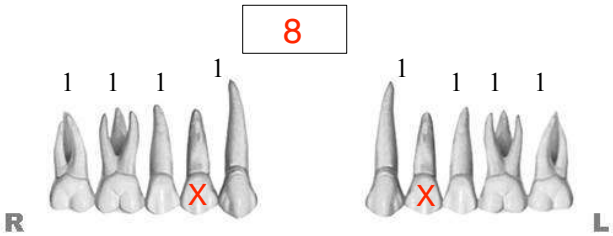
Occlusal Contacts

6



Occlusal Relationships

8



Interproximal Contacts

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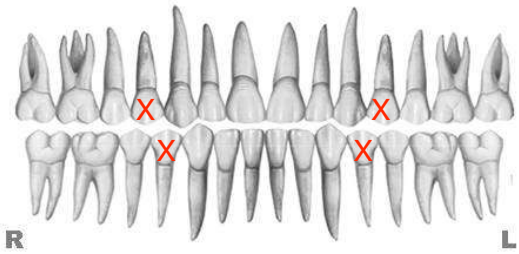
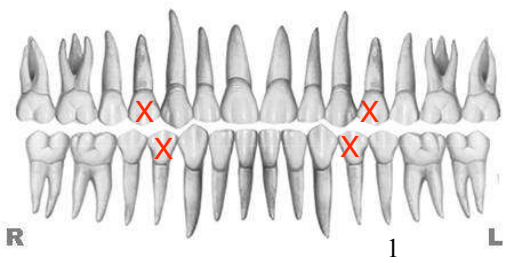


Root Angulation

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.

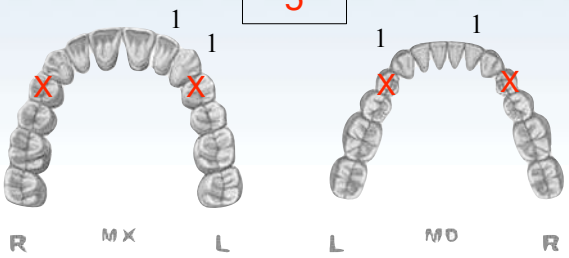
Final Evaluation

Cast-Radiograph Evaluation

Total Score: 24

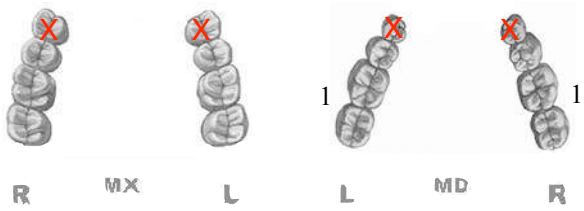
Alignment/Rotations

5



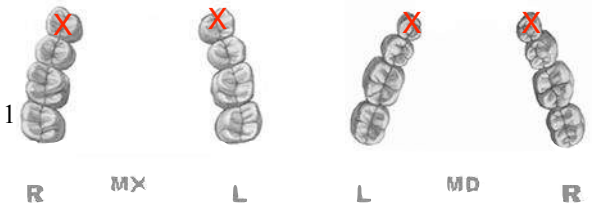
Marginal Ridges

2



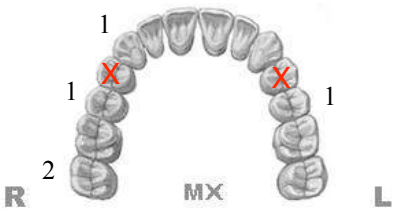
Buccolingual Inclination

0



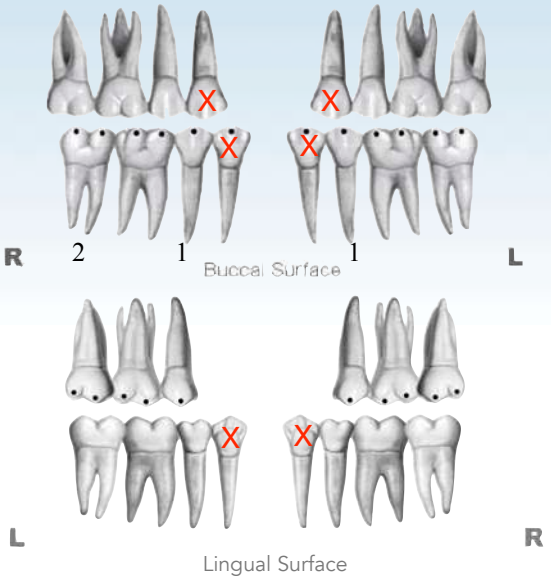
Overjet

5



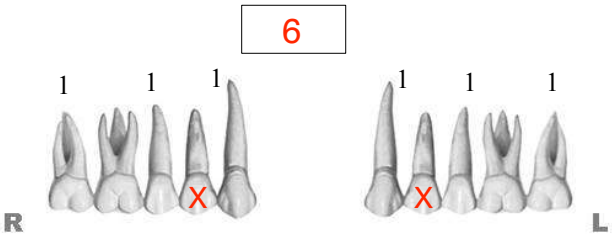
Occlusal Contacts

4



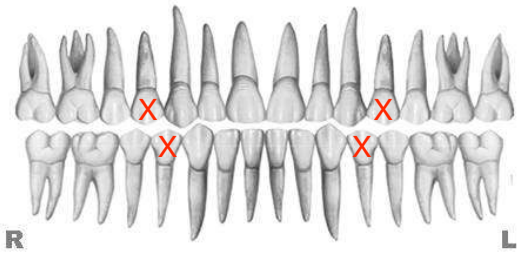
Occlusal Relationships

6



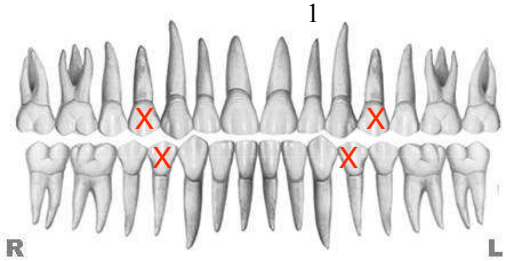
Interproximal Contacts

0



Root Angulation

1



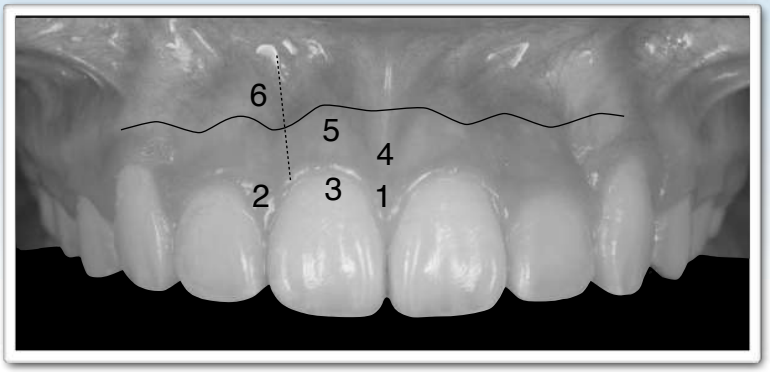
INSTRUCTIONS: Place score beside each deficient tooth and enter total score for each parameter in the white box. Mark extracted teeth with "X". Second molars should be in occlusion.

IBOI Pink & White Esthetic Score

Total Score = 2

1. Pink Esthetic Score

Total = 1

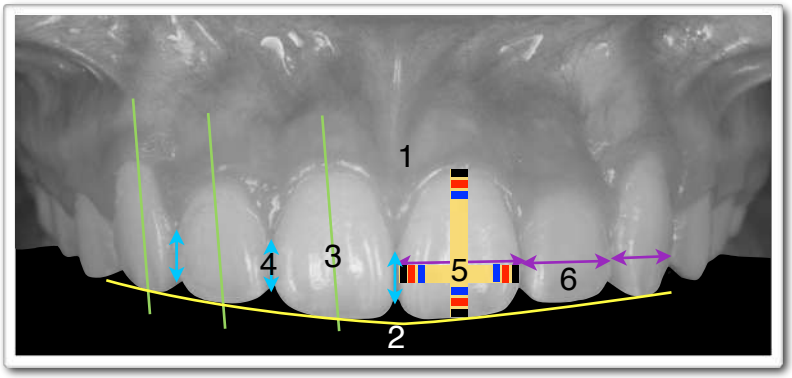


1. M & D Papillae	0	1	2
2. Keratinized Gingiva	0	1	2
3. Curvature of Gingival Margin	0	1	2
4. Level of Gingival Margin	0	1	2
5. Root Convexity (Torque)	0	1	2
6. Scar Formation	0	1	2

1. M & D 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 = 1



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

補綴手冊

From Isolation to Polish

Kerr™

優惠期限自 2022/04/01~2022/12/25 止

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買1 送1

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特價 NT$5,390/盒

MEGA V Rings Refill

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OptiBond S

5th

特價 NT$6,000/5瓶

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OptiBond Universal

8th

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OptiBond eXTRa Universal

9th

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Herculite Précis

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CEMENTATION

處理劑

Silane Primer

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In/Onlay / Crown

一支會變色的 RESIN CEMENT

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讓您精確掌握多餘Cement的移除時機！

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OptiBond eXTRa Universal x1組

(1組/2罐/各5ml)

NX3 Dual Cure x1支

(5g/支)

特價 NT$5,500/套

Veneer

OptiBond eXTRa Universal x1組

(1組/2罐/各5ml)

NX3 Light Cure x1支

(1.8g/支)

特價 NT$5,500/套

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