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Comprehensive Retreatment of a 60yr Female: Skeletal Class II Division 2 Malocclusion, Severe Deepbite and Extraction Spaces

Drs. Irene Yi-Hung Shih, John Jin-Jong Lin & W. Eugene Roberts

Early Treatment of a Class III Malocclusion with Severe Crowding and Deep Bite

Drs. Sheau Ling Lin, Chris Chang & W. Eugene Roberts

Insignia® System with Bone Screw Anchorage: Class I Crowded Malocclusion with Severe Maxillary Protrusion

Drs. Wen Hsin Lee, Angle Lee, Chris Chang & W. Eugene Roberts

Early Interceptive Treatment for Maxillary Lateral Incisor and Canine Transposition

Drs. Yu-Hsin Huang, Chris Chang & W. Eugene Roberts

Dr. Chris Chang speaking to a full house in the last session on the final day of the 2018 AAO meeting in Washington, DC.

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2018-19
熱愛學矯正

全新的貝多芬高效 Damon 矯正大師系列課程是由國際知名講師張慧男醫師親自規劃及授課，課程特色強調由臨床病例帶動診斷、分析、治療計畫擬定與執行技巧。此外，透過數位影片反覆觀看，課堂助教協助操作，以及診間臨床見習，讓學員在短時間能快速上手，感染「熱愛矯正學，熱愛學矯正」的熱情。

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新竹貝多芬齒顎矯正中心負責人
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美國 Angle 學會會員

Damon Master

(Thu) 9:00-5:00 中文授課

The Beethoven Damon Master Program, created by Dr. Chris Chang, is a two-year clinical program. Its hands-on orientation features case study-based diagnosis, analysis, treatment planning andresult evaluation. Combining in-class teaching assistants, after-class video review and chair-side observation, participants will learn to master the essential tips of the Damon System.

Year 1 2018

Module 1 - **5/17**/18' Module 4 - **8/2**
Module 2 - **6/21** Module 5 - **9/27**
Module 3 - **7/5** Module 6 - **6/27.29.30**（擇一）

Year 2 2018-19

Module 1 - **10/18** Module 4 - **1/17**
Module 2 - **12/20** Module 5 - **2/14**
Module 3 - **1/3**/19'

Damon + .014 Cu NiTi

Excellent Finishing

(Tue) 9:00-12:00 中文授課

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Finishing X

Module 1 - **8/14**/18' Module 6 - **1/8**/19'
Module 2 - **9/4** Module 7 - **3/19**
Module 3 - **10/16** Module 8 - **4/16**
Module 4 - **11/13** Module 9 - **5/14**
Module 5 - **12/11** Module 10 - **6/25**
Module 11 - **7/23**

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The workshop provides a 2.5 day, advanced hands-on program to experienced Damon users. The program includes world-class lectures, model and surgical hands-on workshops and clinical observation on patient care and clinic management.

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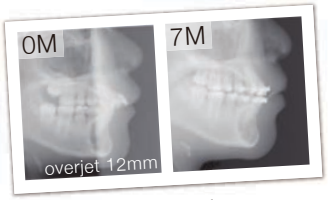
2018

Class 1 - **5/22-25** Class 2 - **12/04-07**
Insignia workshop - **9/9-10**

2019

Class 1 - **5/21-24** Class 2 - **12/03-06**



Damon + Bite Turbo +
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每次上課請依最新一期 JDO 公告為主

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Why Angle Society? (*Part 1.*)

I am often asked many questions about my techniques and opinions about treatments, but recently I was asked to share my thoughts about the Angle Society.

I am a member of the Angle Midwest Component and it took me five grueling years of preparation before being accepted into this prestigious society. In retrospect, I feel the process of qualifying is the **real magic**, as one learns so much during the process and I appreciate this process just as much as I do rubbing shoulders with the world's best Orthodontists at the Angle Society's meetings.

Ever since I became interested in Orthodontics I have been obsessed with Dr. Angle's life, technologies and ideas, which have proven to be a great way of learning our profession. This started 30 years ago and when asked recently why there should continue to be an Angle Society I came up with a threefold answer.

Firstly, to be a **beacon** to all the young doctors so that they can also aspire to become members.

Secondly, to act as an **anchor**, to prevent us from drifting aimlessly through this ocean full of fascination, mystery and challenges.

Thirdly, to function as a **port** in which members can dock, mingle and return laden with information to their practices.

I sincerely hope that these three aids, beacon, anchor and port can also help facilitate your professional life as we march together on the path to glory.

Chris Chang DDS, PhD, Publisher of JDO.

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LIVE FROM THE MASTER

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FEEDBACK

92 Feedback from the Beethoven International Workshop, May, 2018

Comprehensive Retreatment of a 60yr Female: Skeletal Class II Division 2 Malocclusion, Severe Deepbite and Extraction Spaces

Abstract

History: *A 60yr female presented with the chief compliant—unacceptable dentofacial esthetics. As an adolescent she had received full fixed orthodontic treatment including extraction of four premolars.*

Diagnosis: *A relatively straight facial profile was associated with an excessive ANB angle (5.2˚), protrusive maxilla (83.3˚) and retrusive mandible (78.1˚). The occlusion was Class II Division 2 with an impinging deep bite (>9mm) and overjet of ~7mm in centric occlusion. First premolar extraction sites were open (2-3mm bilaterally) in the maxillary arch. The ABO discrepancy index (DI) was 15.*

Etiology: *The unfavorable longterm outcome was probably due to extraction of premolars in the lower arch, inadequate root alignment, and steepening of the plane of occlusion with extensive Class II elastics.*

Objective: *Optimize dentofacial esthetics consistent with an acceptable dental alignment.*

Treatment: *Open the vertical dimension of occlusion (VDO) ~8mm with bite turbos placed on the maxillary canines. Use a full fixed, passive self-ligating (PSL) appliance to align both arches, close space, and maintain an ~5mm increase in the VDO. Correct black triangles in the maxillary anterior segment with enamel interproximal reduction (IPR) and space closure. Resolve the overjet and intermaxillary discrepancy with Class II elastics applied to the buccal or lingual of the U3s and L6s according to their relative axial inclinations. Utilize torquing auxiliaries to increase the axial inclination of the maxillary incisors. Retain with upper and lower Hawley to be worn full time for 6 mo, and nights only thereafter.*

Outcomes: *The mandibular plane rotated posteriorly (2.5˚), facial convexity increased, and lip protrusion decreased, but the Class II intermaxillary discrepancy increased. Residual Class II buccal segments resulted in an ABO cast-radiograph evaluation (CRE) of 30 points.*

Conclusions: *A pleasing dentofacial result was achieved by increasing the VDO and correcting the incisal relationships, but longterm retention with Hawley retainers is indicated. (J Digital Orthod 2018;51:4-17)*

Key words:
Class II, deepbite, Retreatment, Bite turbos, Torquing spring, IPR (interproximal reduction)

History

This 60-year-old female received full fixed orthodontic treatment as an adolescent, that included extraction of upper first (*4s*) and lower second (*5s*) premolars. In the absence of longterm retention, the malocclusion relapsed and extraction spaces were evident in the upper arch. Overall, the chief complaint was poor dentofacial esthetics, but she also had a number of specific oral concerns: 1. relatively protrusive lips, 2. deep overbite, 3. food impaction in the upper extraction sites, and 4. difficulty with oral hygiene (*Figs. 1-3*). After 2 years and 7 months (*31mo*) of active treatment, a desirable dentofacial result (*Figs. 4-6*) was achieved with a passive self-ligation (*PSL*) fixed appliance. Radiographic documentation before and after treatment is

Dr. Irene Yi-Hung Shih,
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Examiner, Journal of Digital Orthodontics,
Director, Jing-Jong Lin Orthodontic Clinic (Center)

Dr. W. Eugene Roberts,
Editor-in-chief, Journal of Digital Orthodontics (Right)

Fig. 1: Pre-treatment facial photographs

Fig. 4: Post-treatment facial photographs

Fig. 2: Pre-treatment intraoral photographs

Fig. 5: Post-treatment intraoral photographs

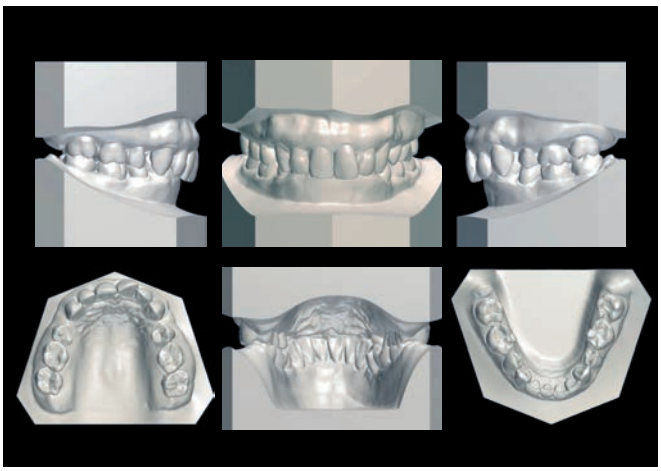


Fig. 3: Pre-treatment study models (casts)

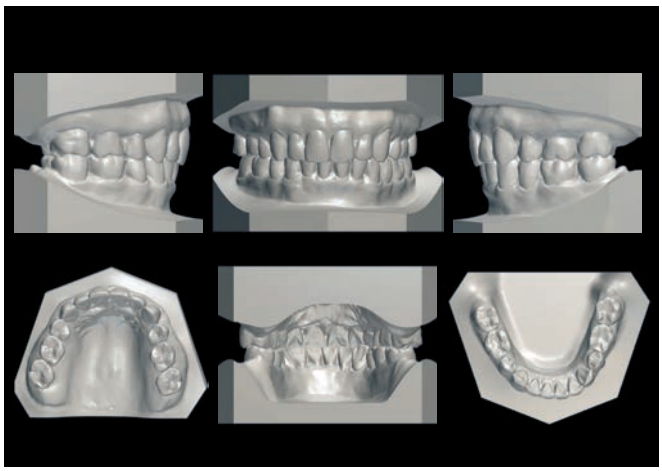


Fig. 6: Post-treatment study models (casts)

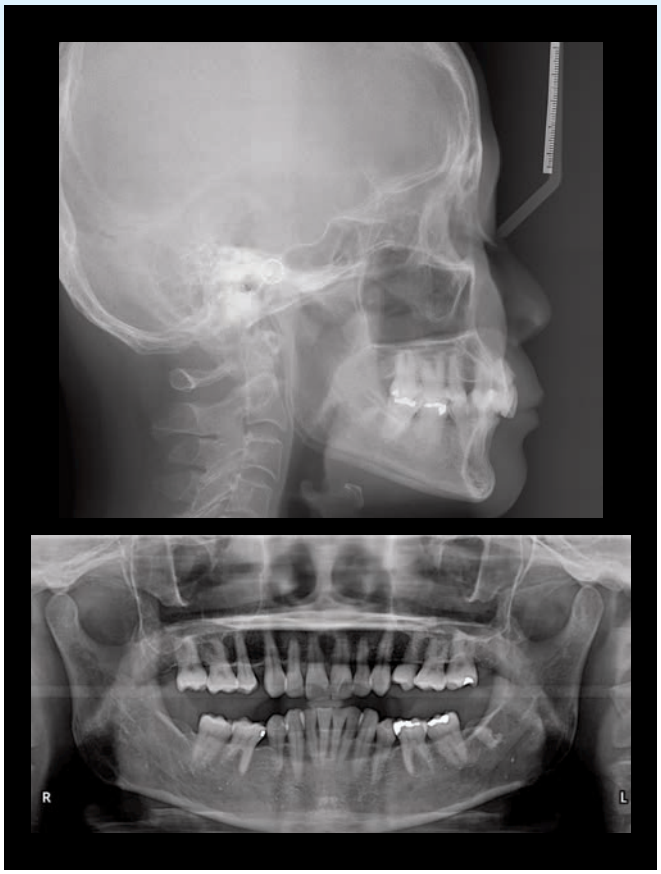


Fig. 7:
Pre-treatment cephalometric and panoramic radiographs

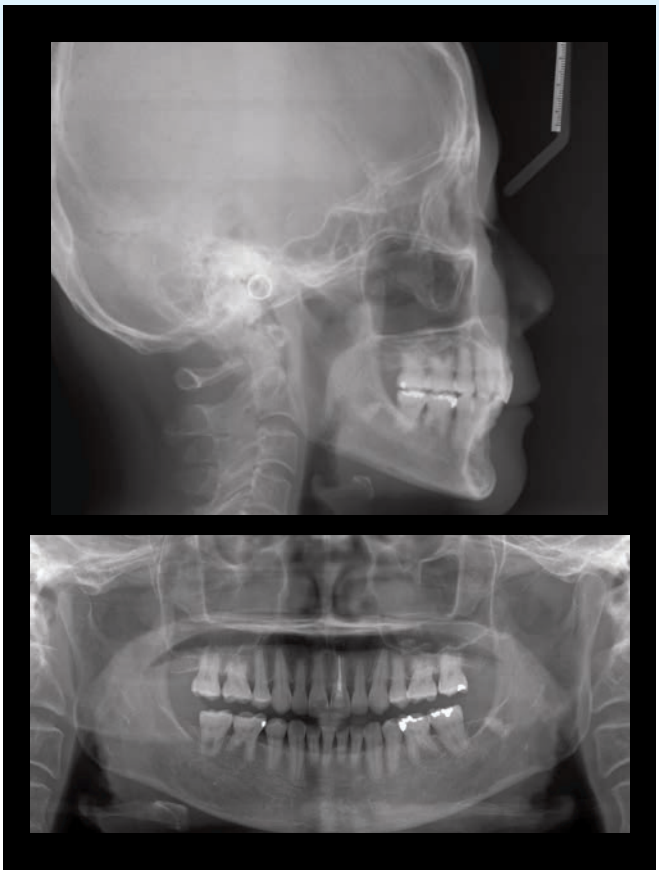


Fig. 8:
Post-treatment cephalometric and panoramic radiographs

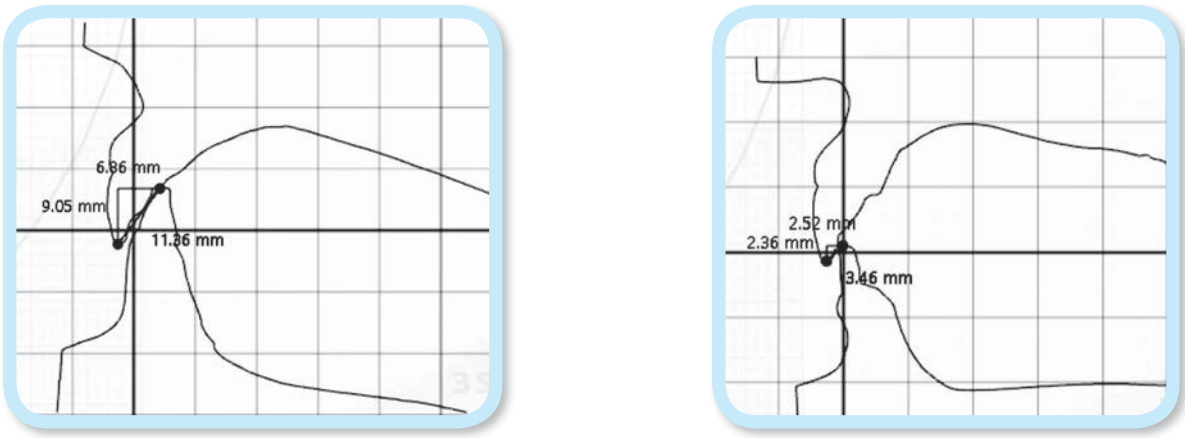


Fig. 9:
A profile projection of the overjet and overbite correction is plotted the mid-sagittal plane. Initial is on the left and final is on the right.

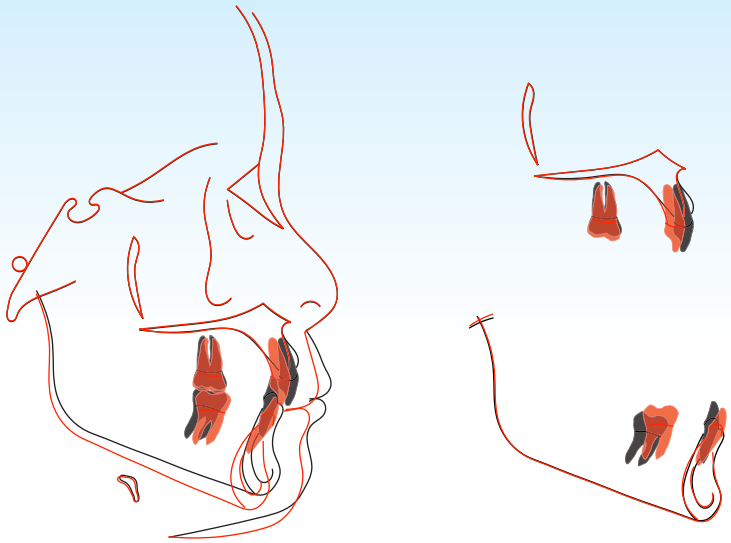


Fig. 10: Cephalometric superimpositions (Black: initial, Red: final).

provided in Figs. 7 and 8, respectively. Overjet and overbite data are shown in Fig. 9, and cephalometric superimpositions document the skeletal and dentofacial results (*Fig. 10*).

Diagnosis

Pre-treatment facial photographs (*Fig. 1*) show a straight profile with slight lip protrusion. Although the patient was concerned about her lips, that relative protrusion was within normal limits (*WNL*) based on cephalometric standards (*Table 1*). The upper dental midline was coincident with the facial midline, but the axial inclination of upper incisors was tilted to the left, and the chin point was deviated to the right. Pre-treatment intraoral photographs and study casts (*Figs. 2 and 3*) revealed Class II canine and molar relationships bilaterally. There was minor crowding, 1.5mm of space deficiency, in the lower arch, and 4.5mm of residual extraction space in the upper arch. An impinging deep overbite of 9.05mm (*>100%*) was associated with an excessive overjet of 6.86mm in centric occlusion (*Fig. 9*). Cephalometric analysis (*Table 1*) shows ANB angle of 5.2˚ with a mandibular plane that is WNL (*SN-MP of 37.1˚, FMA of 26.8˚*). Dental compensation of the incisors resulted in decreased axial inclinations, U1-SN is 79.7˚ and L1-MP is 79.5˚.

CEPHALOMETRIC SUMMARY			
SKELETAL ANALYSIS			
	PRE-Tx	POST-Tx	DIFF.
SNA˚ (82°)	83.3°	83.4°	0.1°
SNB˚ (80°)	78.1°	76.6°	-1.5°
ANB˚ (2°)	5.2°	6.8°	1.6°
SN-MP˚ (32°)	37.1°	39.7°	2.6°
FMA˚ (25°)	26.8°	29.3°	2.5°
DENTAL ANALYSIS			
U1 To NA mm (4 mm)	-3.6 mm	-3.1 mm	0.5 mm
U1 To SN˚ (104°)	79.7°	84.7°	5.0°
L1 To NB mm (4 mm)	1.9 mm	5.2 mm	3.3 mm
L1 To MP˚ (90°)	79.5°	94.5°	15.0°
FACIAL ANALYSIS			
E-LINE UL (2-3 mm)	1.5 mm	-0.4 mm	-1.9 mm
E-LINE LL (1-2 mm)	1.7 mm	-1.5mm	-3.2 mm

Table 1: Cephalometric summary

Skeletal:

- Skeletal Class II (*SNA 83.3˚, SNB 78.1˚, ANB 5.2˚*)
- Mandibular plane angle (*SN-MP 37.1˚, FMA 26.8˚*) is WNL
- Facial asymmetry: *Chin point deviated to the right*

Dental:

- Bilateral Class II canine relationship
- Overjet: *6.86mm*
- Overbite: *9.05mm (exceeding 100% and impinging in the palate)*
- Upper arch space: *4.5mm excess*
- Lower arch space: *-1.5mm deficiency*
- Lower Curve of Spee: *6mm*
- Midlines: *Upper coincident with the facial midline, lower deviated 0.5mm right*
- Arch forms: *Asymmetric tapered arch forms in the maxilla and mandible*

Facial:

- Convex profile
- Acute nasolabial angle
- Relatively protrusive upper lip

The ABO Discrepancy Index (*DI*) was 15 as shown in the first worksheet at the end of this report.

Etiology

About 45 years after treatment as an adolescent, follow-up radiographs (*Fig. 7*) suggest incomplete correction of a Class II division 2 malocclusion: 1. poor root alignment in the lower arch, 2. open extraction sites in the upper arch, and 3. palatally tipped maxillary incisors. The unfavorable long-term outcome was probably due to extraction of premolars in the lower arch, inadequate root alignment, and steepening of the plane of occlusion, due to extensive use of Class II elastics.

Treatment Objectives

The patient's principal objective was improved dentofacial esthetics. After a thorough examination and discussion of the options, a comprehensive retreatment plan was formulated utilizing a PSL bracket system to: 1. open the vertical dimension of occlusion (*VDO*), 2. flatten the deep curve of Spee, 3. correct maxillary anterior black triangles, 4. correct axial inclination of the incisors, 5. align both arches, 6. close spaces in the upper arch, 7. relieve slight crowding in the lower arch, and 8. correct as much of the Class II buccal discrepancy as possible.

Maxilla (*all three planes*):

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

Mandible (*all three planes*):

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

Maxillary Dentition:

- A – P: *Retract*
- Vertical: *Increase*
- Transverse: *Expand*

Mandibular Dentition:

- A – P: *Advance*
- Vertical: *Increase*
- Transverse: *Expand*

Facial Esthetics:

- Convexity: *Increase*
- Lip Protrusion: *Decrease*

Treatment Plans

Open the VDO ~8mm with glass ionomer bite turbos (*GIBTs*) placed on the upper canines. Close upper spaces, and flatten the lower curve of Spee. Utilize high torque brackets on the upper anterior teeth to improve axial inclinations as they are retracted. Complete the correction of upper incisor inclinations with torquing auxiliaries, and resolve as much of the sagittal intermaxillary discrepancy as possible with Class II elastics applied to the buccal or lingual of the U3s and L6s according to their relative axial inclinations.

Appliances and Treatment Progress

The full fixed PSL appliance (*Damon Q®, Ormco, Glendora CA*) was bonded on the upper arch and high torque brackets were utilized on the upper incisors. The initial archwire was 0.014-in CuNiTi (*Fig. 11*). GIBTs were cemented on the lingual surface of upper canines to increase the VDO to establish clearance for placing brackets in the lower arch. Two segments of open coil spring were used between lower first premolars (*L4s*) and first molars (*L6s*) bilaterally to correct axial inclinations and provide space to flatten the excessive curve of Spee. After arch alignment, the GIBTs were removed and relatively light force (*4-oz, 112g, ~1N*) Class II elastics were applied bilaterally from the lingual of the L6s to the upper canines (*U3s*) to retract the maxillary anterior segment and protract the lower posterior segments (*Fig. 12*).

In the 6th month of treatment, an expanded 0.016x0.025-in SS archwire was used to increase upper arch width (*Fig. 13*). After 7 months of initial alignment, ~4mm of space was opened bilaterally in the lower arch, and the curve of Spee was flattened (*Figs. 14 and 15*). Interproximal reduction (*IPR*) of enamel was performed with abrasive strips and an

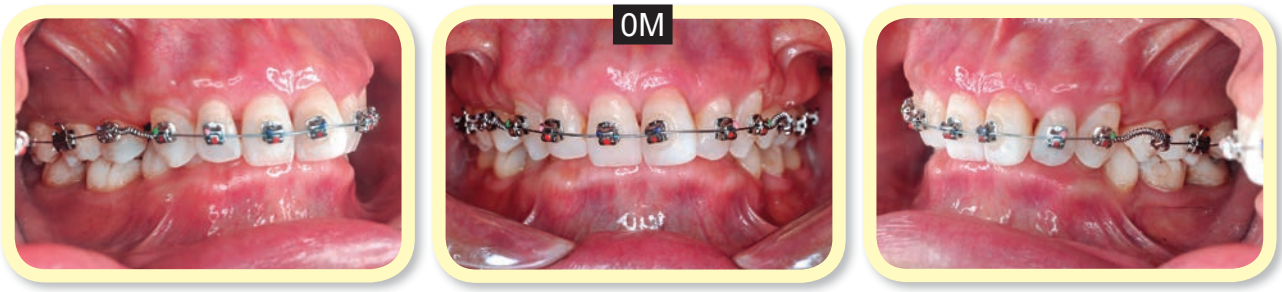


Fig. 11:
At the start of treatment (0M), high torque Damon Q brackets were bonded on the maxillary anterior segment to increase palatal root torque. The initial archwire was 0.014-in CuNiTi. See text for details.

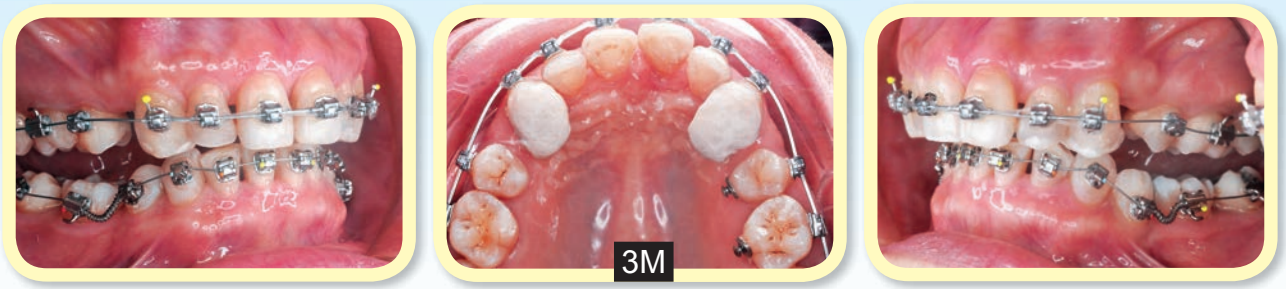


Fig. 12:
At three months (3M) into treatment, bite turbos were bonded on the lingual surface of upper canines to provide clearance for brackets in the lower arch. Two segments of open coil spring were used between lower first premolars and first molars bilaterally to help level the mandibular arch and correct the deep curve of Spee. The initial archwire was 0.013-in CuNiTi. See text for details.

Fig. 13: At six months (6M) into treatment, an expanded 0.016x0.025-in SS archwire was used to expand the upper arch.

Fig. 14: Seven months (7M) into treatment, reopening of the extraction spaces was noted as the arches were aligned.

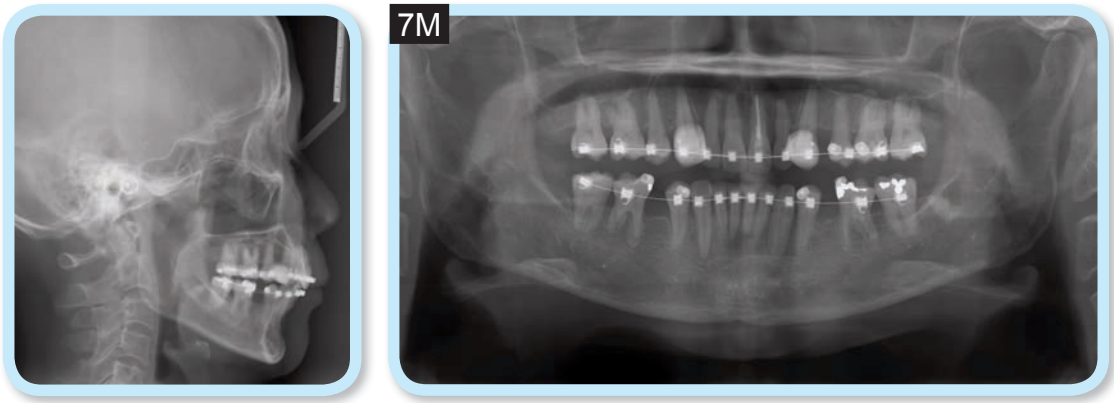


Fig. 15: Cephalometric and panoramic radiographs document progress at seven months (7M).

air-rotor on the upper incisors. The interproximal space was closed to reduce the black triangles and enhance dental esthetics (*Fig. 16*).

Long-term Class II elastics wear retracted the upper dentition and protracted the lower dentition to reduce the excessive overjet. The increase in VDO and flattening of the curve of Spee corrected the deep overbite (*Fig. 17*). Retracting the upper anterior segment resulted in palatal tipping of the incisors despite the high torque brackets, so torquing springs were used on upper incisors beginning 22 months into treatment (*Fig. 18*). A progressive series of intraoral profile views of the incisors documents management of incisal coupling from the start (*0M*) to the end (*2Y7M*) of active treatment (*Fig. 19*).

Fig. 16:
At thirteen months (13M), IPR was done with high speed burs and abrasive stripes on the upper incisors. The space was closed with elastomeric chains to reduce black triangles.

Fig. 17: Long-term use of Class II elastics helped reduce the large overjet, but the maxillary incisors were tipped palatally.

Fig. 18:
At twenty-two months (22M), auxiliary torquing springs were used to move the roots of the upper incisors palatally.

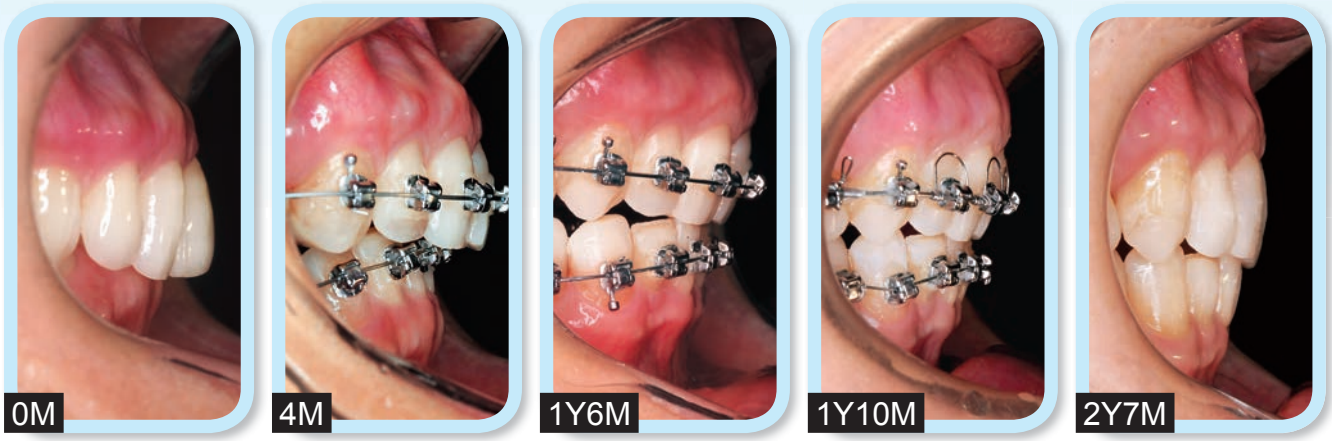


Fig. 19:
***Incisal Coupling**: a progressive series of intraoral radiographs, labeled in years (Y) and months (M) of age, show the overjet and overbite relationships before (0M), during (1Y6M, 1Y10M), and after (2Y7M) treatment. Compare these photographs to the two dimensional analysis of incisal coupling illustrated in Fig. 9. See text for details.*

Repositioning of brackets and wire adjustments were used to detail the occlusion throughout treatment. All fixed appliances were removed after 2yr and 7mo for a total treatment time of 31 months. Retention was with upper and lower Hawley retainers to be worn full time for 6 mo, and nights only thereafter. In addition, instructions were provided in proper home hygiene and retainer maintenance.

Results Achieved

The patient was treated to an acceptable but compromised result as documented in Figs. 4-6. Cephalometric and panoramic radiographs document the pre-treatment condition compared to the post-treatment results (*Figs. 7 and 8*). Correction of the overbite and overjet is revealed in Fig. 9. Superimposed before and after treatment cephalometric tracings (*Fig. 10*) show the skeletal and dentofacial changes, and a summery of cephalometric measurements is provided in Table 1.

The ABO Cast-Radiograph Evaluation (*CRE*) is 30 as shown in the subsequent worksheet.

Maxilla (*all three planes*):

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

Mandible (*all three planes*):

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

Maxillary Dentition:

- A – P: *Retract*
- Vertical: *Maintain*
- Transverse: *Expand*

Mandibular Dentition:

- A – P: *Protraction*
- Vertical: *Increase*
- Transverse: *Expand*

Facial Esthetics:

- Improved with increased facial height, convexity and lip retraction.

Final Evaluation of Treatment

Overall, the patient was satisfied with the treatment outcome. The upper and lower arches were well-aligned, space was closed, and optimal occlusal contacts were achieved. The deep overbite was reduced from 9.05mm to 2.36mm (*Fig. 9*). Facial esthetics were improved with increased facial height and lip retraction. However, the intermaxillary buccal relationships remained Class II. The ABO cast radiograph evaluation (*CRE*) score was 30, and more than half of the discrepancies (*16 points*) were due to the residual Class II buccal relationships. See the second worksheet at the end of this report for details.

Discussion

The demand for retreatment has increased for patients who have experienced unfavorable long-term outcomes. It may be difficult to determine whether a "*relapse*" is due to incomplete correction and/or an unstable result. The initial treatment plan must be carefully considered to achieve an adequate prognosis for stability with additional orthodontics. The retreatment of adults is particularly challenging because of periodontal disease, tooth mobility, multiple missing teeth, atrophic ridges, existing prostheses/implants, severe tooth attrition etc.[1] The interdisciplinary perspective of orthodontics, periodontal and restorative treatment are important considerations.[1]

Resolving a Class II malocclusion, with a severe deepbite and maxillary anterior black triangles (*interproximal spaces*), requires careful management of the VDO, as well as maxillary incisor form, angulation, overjet and overbite. Increasing the VDO may improve dentofacial esthetics (*Figs. 4 and 5*), but results in a more severe Class II sagittal discrepancy (*Table 1*). Deficiencies in incisal coupling compromise intermaxillary alignment[2] and invite instability.[1,3] Correcting black triangles with IPR and space closure reduces the circumference of the anterior segment, requiring excessive palatal torquing of the incisors to correct the Class II buccal segments.[3] Class II treatment with extraction of a premolar in each quadrant requires substantial palatal root torque for upper incisors to achieve a Class I buccal interdigitation. Upright upper incisors, as a side effect of Class II elastics and/or IPR to correct black triangles, may result in an edge-to-edge incisor relationship and/or Class II buccal segments.[3,4]

High torque brackets were used for upper incisors because increased axial inclination was required (*Figs. 11 and 12*). Despite this prospective consideration, the angulation of the upper incisors decreased during treatment (*Fig. 19*). A rectangular archwire (*0.018x0.025-in CuNiTi*), inserted 4mo into treatment, expressed the desired labial crown torque, but also

increased the overjet and extraction site spaces. As the upper anterior segment was retracted, incisal torque was lost as the overbite and overjet decreased. To correct the upper incisal inclination, torquing springs were placed at 22 months into treatment. Because the VDO was increased, it was not possible to adequately torque the maxillary incisors without risking root resorption by contacting the palatal cortical plate.[5] The axial inclination of the incisors was improved late in treatment (*U1-SN: 79.7˚→ 84.7˚; L1-MP: 79.5˚→ 94.5˚*). However, the increase in skeletal discrepancy (*ANB 5.2 to 6.5˚*) was excessive, so maxillary incisor torque at the end of treatment was under-corrected ~20˚. Earlier use of torquing springs or a larger diameter upper archwire (*0.019x0.025-in SS/TMA or 0.215x0.215-in TMA*) may have further moderated the final interdigitation, but opening the VDO in addition to IPR to correct maxillary anterior black triangles precluded ideal correction of the Class II relationship.

When dentofacial esthetics is the principal priority for treatment, appraisal of the position of upper central incisors relative to the upper lip is a critical diagnostic consideration.[4] An aging face is usually characterized by a longer upper lip and reduced maxillary incisor exposure.[6] To preserve the smile arc and desirable incisal exposure, deepbite correction may require opening the VDO rather than intruding the upper incisors. Correcting the curve of Spee and leveling the arches at the desired occlusal plane results in a pleasing dentofacial outcome for an aging face with a long upper lip (*Fig. 4*). However, opening the VDO increases the mandibular plane angle (*SN-MP: 37.1˚→ 39.7˚; FMA: 26.8˚→ 29.3˚*), which lengthens the face and further compromises the Class II relationship. Long-term use of Class II elastics decreased the overjet from 6.86mm to 2.52mm and overbite from 9.05mm to 2.36mm (*Fig. 9*). Inadequate upper incisor inclination and decreased anterior circumferential arch length prevented ideal correction of the Class II relationship (*Figs. 5 and 6*).

An option to control posterior rotation of the mandible is to intrude the mandibular anterior segment with miniscrew anchorage, rather than extruding the posterior buccal segments to level the arch. However, this approach was inappropriate because the patient's lips were redundant and her lower incisors were slightly abraded. The preference was to lengthen her face and retract the lips (*Figs. 4, 8 and 10*). An additional option to restore the abraded edges of the lower incisors was also declined because that may have resulted in an excessive increase in the VDO, due to the restorative space required.[6]

As documented in Fig. 16, IPR was performed on the upper central and lateral incisors to reduce the black triangles and improve the dental esthetics.[6-8] Open gingival embrasures (*black triangles*) are related to interproximal alveolar bone height to the base of the contact area (*>5.5mm*), crown shape and root angulations.[6] If the Bolton[9] ratio for interarch dental widths is WNL, IPR and space closure to correct incisal black triangles decreases arch length of the maxillary anterior segment, thereby preventing complete correction of Class II buccal segments.

When evaluating lip protrusion, it is important to respect ethnic preferences. The most commonly

used cephalometric standards are based on American and Northern European caucasians who typically prefer more full lips (*Table 1, E-Line*). Asian patients are more concerned about relative lip protrusion. In general, the preference is for flatter lips compared to caucasians, and extraction therapy is well accepted for reducing protrusive lips, by the Chinese ethnic group.[10]

Conclusions

Opening the bite to improve facial esthetics for an aging patient aggravated a skeletal Class II discrepancy. IPR and space closure to correct black triangles in the maxillary anterior region contributes to palatal tipping which precludes achieving an ideal Class I correction of the buccal segments. The patient was pleased with the dentofacial esthetics achieved, but longterm retention with Hawley retainers is indicated. Based on the current experience, it is concluded that meeting esthetic goals for aging patients can be challenging.

References

1. Kokich VG. Esthetics: the orthodontic-periodontic restorative connection. Sem Orthod 1996 Mar;2(1):21-30.
2. Sangcharearn Y, Ho C. Effect of incisor angulation on overjet and overbite in Class II camouflage treatment, a typodont study. Angle Orthod 2007 Nov;77(6):1011-8.
3. Kim SJ, Kim JW, Choi TH, Lee KJ, Sangcharearn Y, Ho C. Combined use of miniscrews and continuous arch for intrusive tooth movement of incisors in Class II division 2 with gummy smile. Angle Orthod 2014 Sep;84(5):910-8.
4. Kokich VG. Altering vertical dimension in the perio-restorative patient: The orthodontic possibilities. In: Interdisciplinary treatment planning: principles, design, implementation. Cohen M. Ed. Coal Stream, Illinois, IN: Quintessence Publishing; 2008.
5. Horiuchi A, Hotokezaka H, Kobayashi K, Drummond S, Capelli J Jr. Correlation between cortical plate proximity and apical root resorption. Am J Orthod Dentofacial Orthop 1998 Sep;114(3):311-8.
6. Kurth JR, Kokich VG. Open gingival embrasures after orthodontic treatment in adults: Prevalence and etiology. Am J Orthod Dentofacial Orthop 2001 Aug;120(2):116-123.
7. Christos L, Albert CJ, Yinji R. Enamel reduction techniques in orthodontics: A literature review. Open Dent J 2013;7:146-151.
8. Sheridan JJ. Guidelines for contemporary air-rotor stripping. J Clin Orthod 2007;41:315-20.
9. Bolton WA. Disharmony in tooth size and its relation to the analysis and treatment of malocclusion. Angle Orthod 1958 Jul;28(2):113–130.
10. Huang C, Chang CH, Roberts WE, Shern L. Extraction vs. non-extraction therapy: statistics and retrospective study. Int J Orthod Implantol 2016;44:76-86.

Discrepancy Index Worksheet

TOTAL D.I. SCORE 15

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 = 3

OVERBITE

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

Total = 5

ANTERIOR OPEN BITE

0 mm. (edge-to-edge), 1 pt. per tooth
then 1 pt. per additional full mm. per tooth

Total = 0

LATERAL OPEN BITE

2 pts. per mm. per tooth

Total = 0

CROWDING (only one arch)

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

Total = 1

OCCLUSION

Class I to end on	=	0 pts.	
End on Class II or III	=	2 pts. per side	4 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 = 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° = 1 pt.

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

Total = 0

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 pts. =	_____
Missing teeth, congenital	_____ x 2 pts. =	_____
Spacing (4 or more, per arch)	_____ x 2 pts. =	_____
Spacing (Mx cent. diastema ≥ 2mm)	@ 2 pts. =	2
Tooth transposition	_____ x 2 pts. =	_____
Skeletal asymmetry (nonsurgical tx)	@ 3 pts. =	_____
Addl. treatment complexities	_____ x 2 pts. =	_____

Identify:

Total = 2

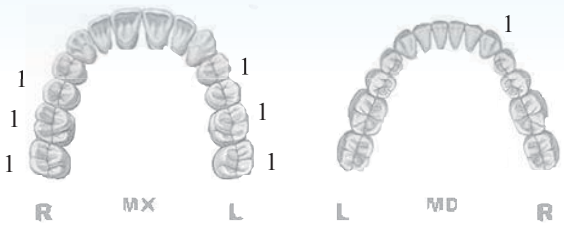
Cast-Radiograph Evaluation

Case # **Patient**

Total Score: 30

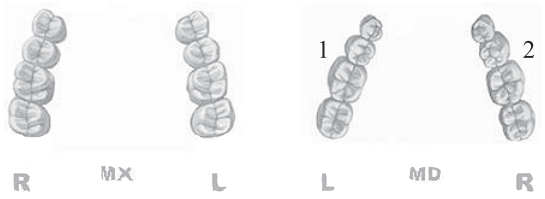
Alignment/Rotations

7



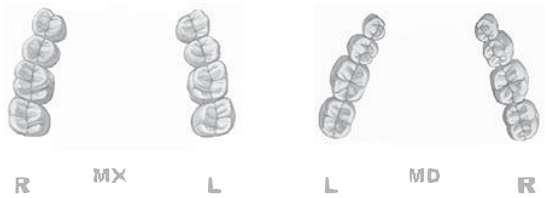
Marginal Ridges

3



Buccolingual Inclination

0

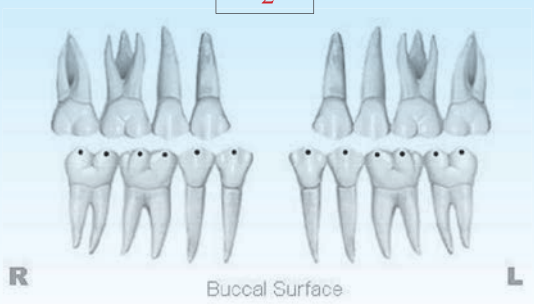


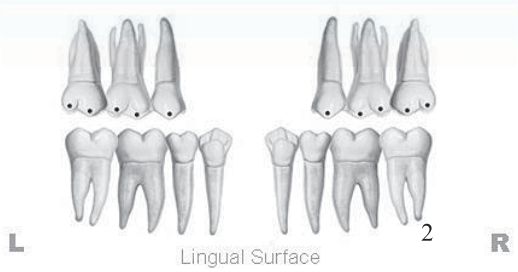
Overjet

2

Occlusal Contacts

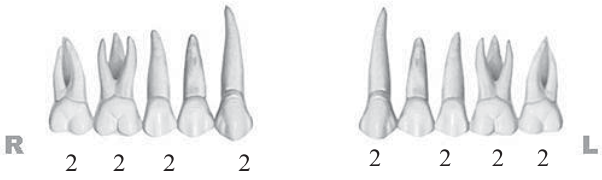
2





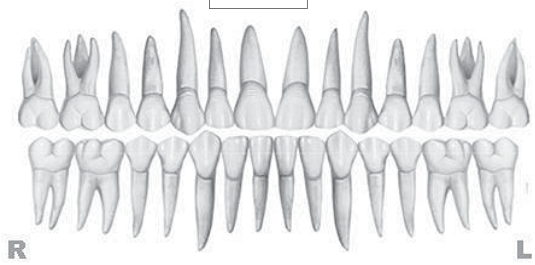
Occlusal Relationships

16



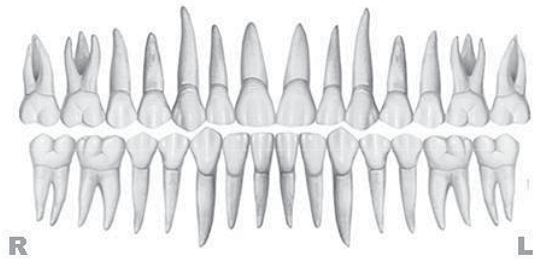
Interproximal Contacts

0



Root Angulation

0



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

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Keynote optional	05/24	12/06

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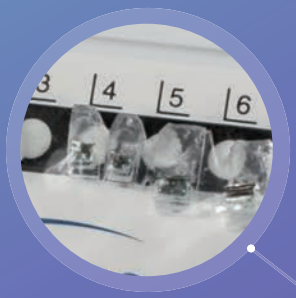

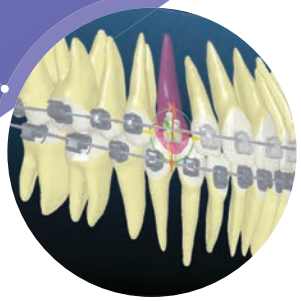

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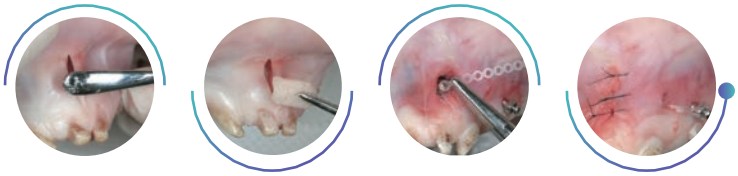

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Day 2

Insignia Lecture, Insignia Chair-side observation

Chris' Lecture:
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Day 3

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KEYNOTE

THE LECTURERS

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.

Dr. John Lin

President of the Jin-Jong Lin Orthodontic Clinic. Dr. Lin received his MS. from Marquette University and is an internationally renowned lecturer. He's also the author of Creative Orthodontics and consultant to Journal of Digital Orthodontics-*A journal for Interdisciplinary dental treatment*.

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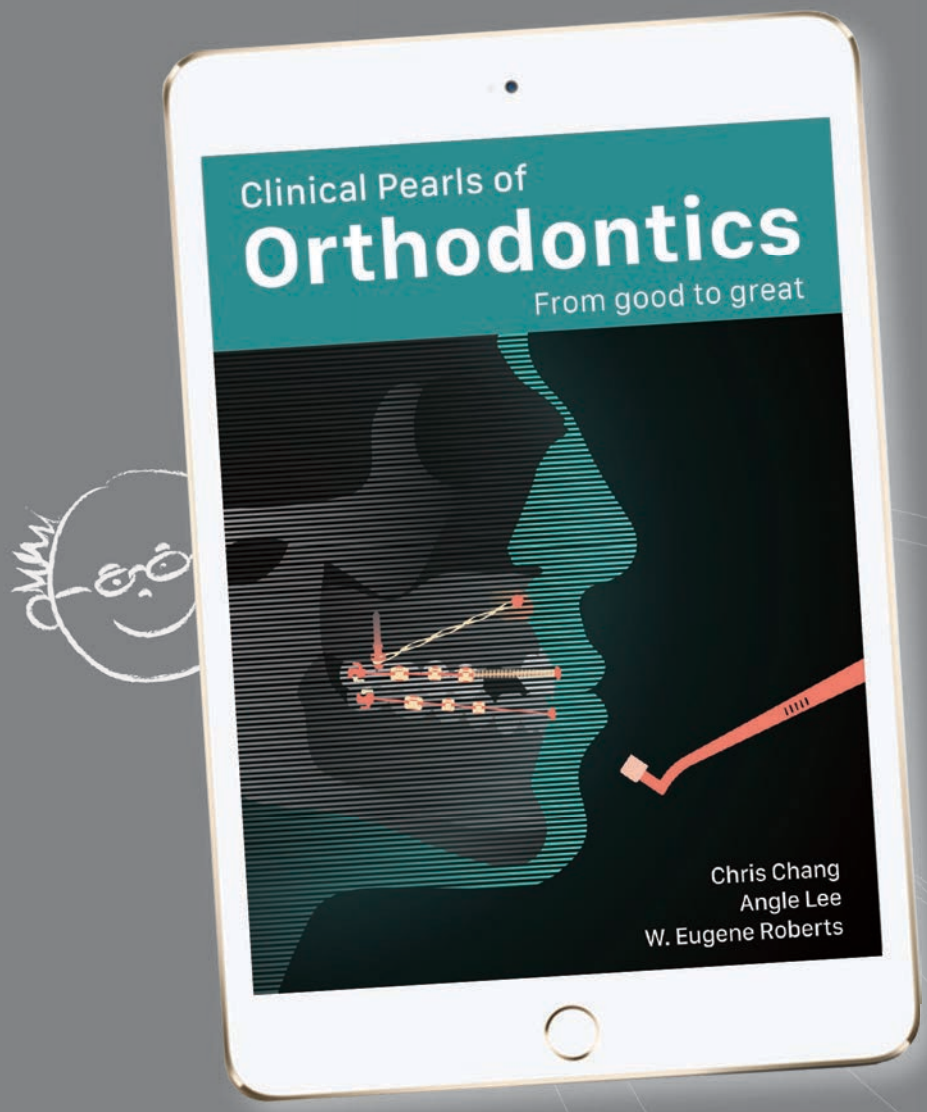

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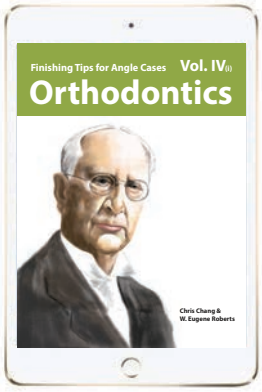

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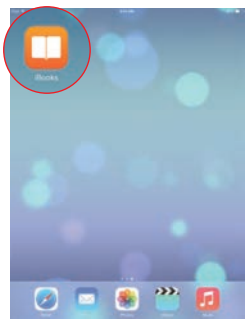

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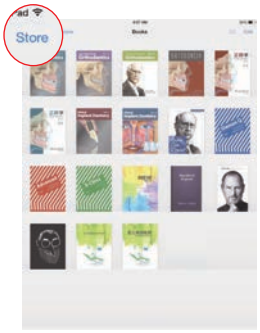

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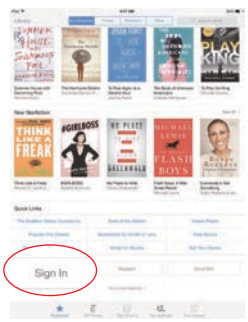

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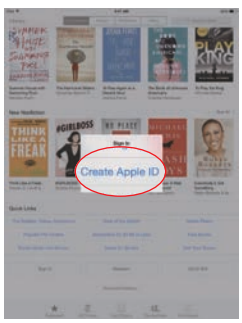

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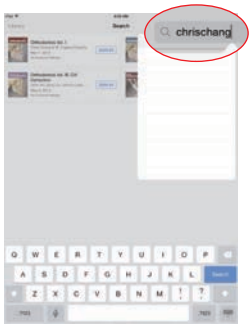

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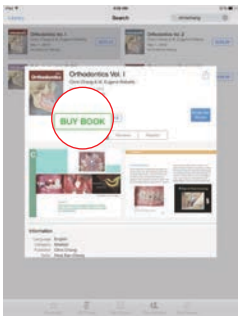

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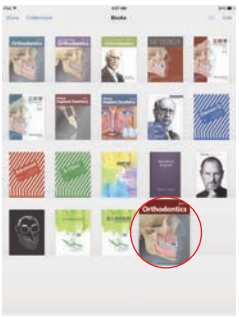

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Newton's A

Insignia® System with Bone Screw Anchorage: Class I Crowded Malocclusion with Severe Maxillary Protrusion

Abstract

***History**: A 16-year-old female presented with a chief complaint (CC) of crowded and protruded anterior teeth.*

***Diagnosis**: Excessive lower facial height (LFH) was 59% of the total facial height (FH). A convex facial pattern (16˚) was associated with protrusion of the maxilla (SNA 89˚). Both lips were protrusive to the E-Line (3mm/5mm). Facial anomalies included an ANB discrepancy (8.5˚), lip incompetence (~5mm), and an occlusal plane canted inferiorly ~3˚ on the patient's left side. Asymmetric Class III/I molar relationships were complicated by constricted arches, severe crowding in the anterior segments, and a 1.5mm midline discrepancy (mandible to the left). The Discrepancy index (DI) was 30.*

***Etiology**: Constricted arches and excessive vertical dimension of occlusion (VDO) are usually associated with childhood developmental problems: 1. inadequate loading of the jaws due to a relatively soft, refined diet, and 2. nocturnal airway deficiency. The latter is secondary to hypertrophic lymphatic tissue in the pharynx, that atrophies in late adolescence.*

***Treatment**: An Insignia® system appliance with passive self-ligating brackets was designed for a treatment plan that included extraction of all four first premolars to achieve specific objectives. 1. Retract anterior segments to relieve crowding, reduce maxillary protrusion, and correct (prevent) excessive gingival exposure (gummy smile). 2. Enhance skeletal anchorage with bilateral infrazygomatic crest (IZC) extra-alveolar (E-A) bone screws (BSs). 3. Use bilateral maxillary incisor BSs to intrude and retract the upper anterior segment.*

***Outcomes**: 24 months of active treatment resulted in the desired outcome, as evidenced by a Cast-Radiograph Evaluation (CRE) of 24, and excellent dental esthetics (Pink & White) score of 0.*

***Conclusion**: Complex malocclusions require a detailed mechanics plan involving supplemental anchorage, e.g. intermaxillary elastics and/or temporary anchorage devices (TADs). Prospective compensation for incisor retraction is an important prerequisite for producing an efficient fixed appliance to optimize outcomes and minimize treatment time. (J Digital Orthod 2018;51:22-39)*

Key words:
Insignia® system, passive self-ligating bracket, archwire sequence, custom bracket, IZC bone screws, miniscrew, bimaxillary protrusion, digital set-up, iatrogenic gummy smile, deepbite, Class II elastics, bite turbos, temporary anchorage devices, infrazygomatic crest, extra-alveolar, bone screws

Introduction

Excessive lip prominence due to dentoalveolar protrusion is a common Asian trait that compromises facial esthetics.[1] Extraction of premolars is well accepted by the affected patients.[2] In the absence of significant dental crowding, closing extraction space to reduce lip protrusion may distally tip and extrude the upper incisors, resulting in iatrogenic gummy smile with a deep bite. This case report presents a patient with lip protrusion who was managed with a self-ligating appliance that is aligned with the Insignia® system (*Ormco, Glendora, CA*). Anchorage for retraction of the anterior segments, as well as for prevention of gummy smile and deepbite, was provided with endosseous bone screws (*BSs*).

Dr. Wen Hsin Lee,
Lecturer, Beethoven Orthodontic Center (Left)
Dr. Angle Lee,
Director, Beethoven Orthodontic Center,
Editor, Journal of Digital Orthodontics (Center left)
Dr. Chris Chang,
Founder, Beethoven Orthodontic Center,
Publisher, Journal of Digital Orthodontics (Center right)
Dr. W. Eugene Roberts,
Editor-in-chief, Journal of Digital Orthodontics (Right)

Diagnosis and etiology

A 16-year-old female was concerned about protrusive lips and crowding in both dental arches (*Figs. 1-4*). The patient had a long lower face, convex profile, and increased vertical dimension of occlusion (*VDO*) (*Fig. 5*). Molar relationships were bilateral end-on Class III with asymmetric canine interdigitation that was Class I on the right and Class II on the left (*Fig. 3*). Overjet was ~3mm and overbite was ~1.5mm. Severe crowding >7mm was noted in the lower anterior region and both arches were narrow (*Fig. 3*).

Fig. 1: Pre-treatment facial and intraoral photographs

Fig. 2:
Frontal view of an asymmetric smile that was associated with malaligned anterior segments.

Fig. 3:
Pre-treatment dental models (casts)

The lateral cephalometric radiograph (*Fig. 5*) was consistent with a skeletal Class II pattern (*SNA 89˚, SNB 80.5˚, and ANB 8.5˚*). There was a steep mandibular plane angle (*SN-MP 39˚*), flared incisors (*U1 to SN 112.5˚; L1 to MP 104˚*) and protrusive lips (*E-line to UL 3mm; E-line to LL 5mm*) (*Table 1*).

The panoramic radiograph was within normal limits (*WNL*) except for an unerupted upper right second molar (*UR7*) (*Fig. 6*). Temporomandibular joint (*TMJ*) transcranial radiographs revealed slight asymmetry WNL in the open and closed positions (*Fig. 7*).

Fig. 4:
Inferior (left) and lateral (right) intraoral views show anterior protrusion and dental crowding (7mm).

Fig. 5: Pre-treatment lateral cephalometric radiograph

Fig. 6: Pre-treatment panoramic radiograph

The ABO Discrepancy Index (*DI*) was 30 as shown in the subsequent worksheet.

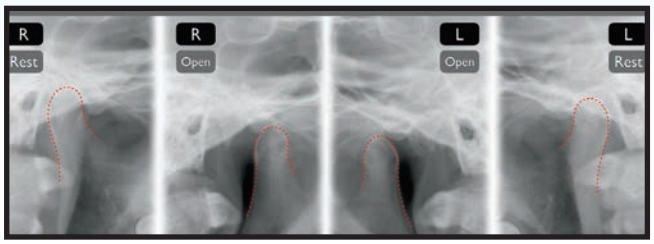

Fig. 7:
Pre-treatment TMJ transcranial radiographs show the right (R) and left (L) sides in the rest and open positions. The mandibular condyles are outlined in red. The slight asymmetry between the right to left TMJs is WNL.

CEPHALOMETRIC SUMMARY			
SKELETAL ANALYSIS			
	PRE-Tx	POST-Tx	DIFF.
SNA° (82°)	89°	88°	1°
SNB° (80°)	80.5°	80°	0.5°
ANB° (2°)	8.5°	8°	0.5°
SN-MP° (32°)	39°	39.5°	0.5°
FMA° (25°)	31.5°	32.5°	1°
DENTAL ANALYSIS			
U1 To NA mm (4 mm)	2.5 mm	2 mm	0.5 mm
U1 To SN° (104°)	112.5°	98.5°	14°
L1 To NB mm (4 mm)	12.5 mm	8 mm	4.5 mm
L1 To MP° (90°)	104°	94.5°	9.5°
FACIAL ANALYSIS			
E-LINE UL (-1 mm)	3 mm	-0.5 mm	3.5 mm
E-LINE LL (0 mm)	5 mm	0 mm	5 mm
%FH: Na-ANS-Gn (53%)	59%	58%	1%
Convexity: G-Sn-Pg' (13°)	16°	16.5°	0.5°

Table 1: Cephalometric summary

Treatment Objectives

After discussing multiple options with the patient, the following treatment was accepted:

(1) Maintain facial convexity and the VDO.

(2) Extract all four first premolars to relieve crowding and retract the anterior segments.

(3) Correct lip protrusion by retracting the incisors and decreasing their axial inclination.

(4) Establish ideal overjet and overbite.

(5) Correct iatrogenic gummy smile with maxillary anterior TAD anchorage.

(6) Align dental midlines.

(7) Establish Class I molar and canine relationships bilaterally.

Treatment Plan

Extract all first premolars and install the digitally designed fixed appliance (*Insignia®*) with passive self-ligating (*PSL*) brackets as specified in Figures 8 and 9. Utilize the archwires, auxiliaries and elastics prescribed by the same manufacturer (*Ormco Corporation, Glendora CA*). Correct crowding and install bilateral infrazygomatic crest (*IZC*) bone screws to anchor retraction of the anterior segments to resolve dental protrusion and optimize the axial inclination of the incisors. Install bilateral bone screws in the apical area of the maxillary anterior region to control the tendency for developing a gummy smile and deep bite.

Maximally retract the anterior segments to resolve dental protrusion as well as the axial inclination of the incisors. Install bilateral IZC bone screws to serve as anchorage to further retract the upper arch. Prevent iatrogenic gummy smile and deep bite with upper incisal bone screws. Specify digital set-up as shown in Figs. 8 and 9.

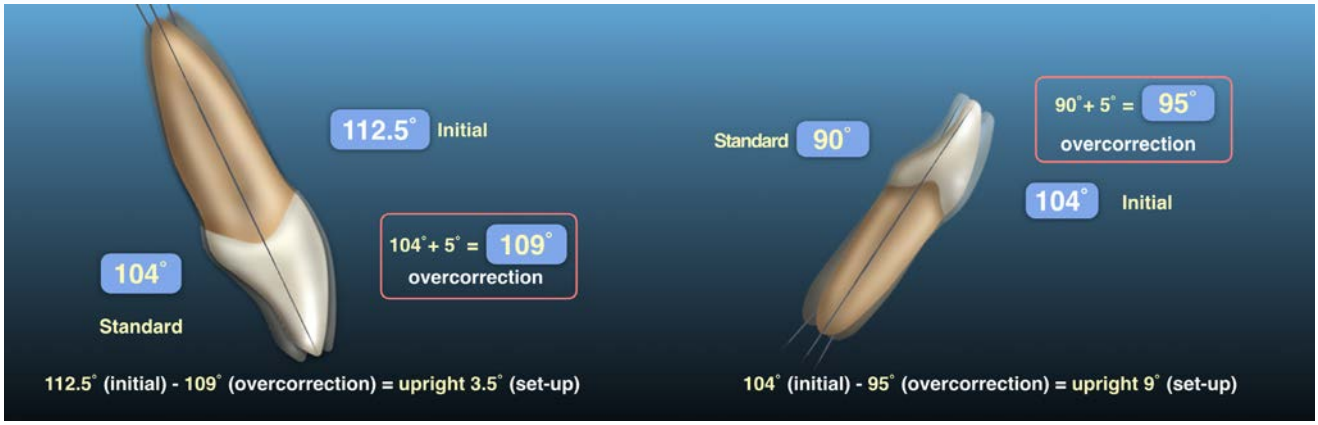

Fig. 8:
As illustrated, torque compensations of 5° in the digital appliance are required for incisors that will be retracted to close space. If both IZC bone screws and Class II elastics are required, upper incisors should be increased 10°. See text for details.

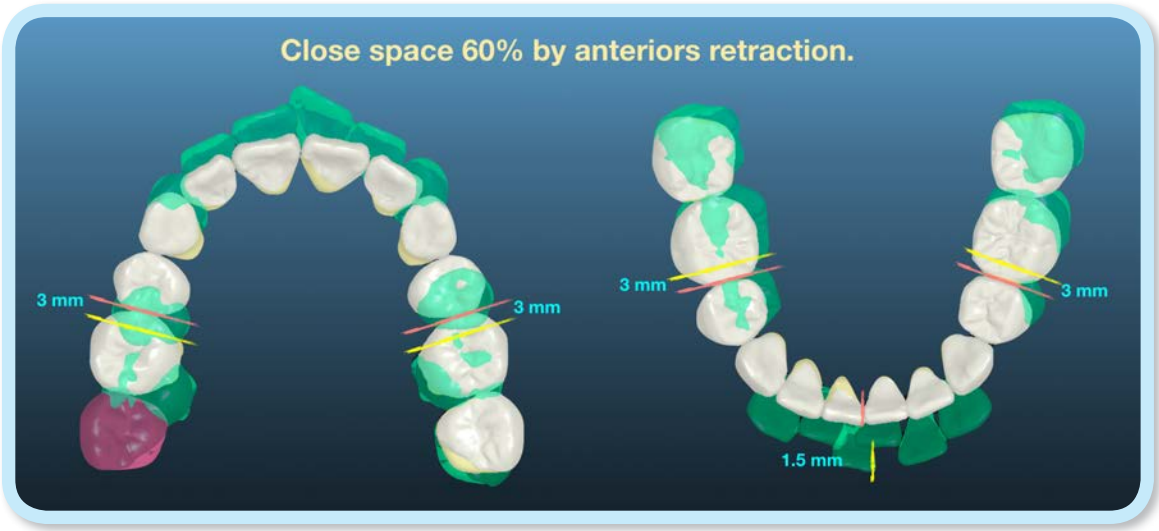

Fig. 9:
The unerupted UR7 is purple, green teeth show the pre-treatment positions of the erupted dentition, and yellow lines mark the pre-treatment mesial surfaces of the first molars, as well as lower midline. The prescribed space closure in both arches is 60% anterior retraction and 40% mesial movement of buccal segments. Pink lines are the projected post-treatment mesial surfaces of the first molars and the lower midline, which is shifted 1.5mm to the right. The digital set-up of the final result (white teeth) prescribes the fixed appliance and bracket position on each tooth that is reverse engineered to the original malocclusion. See text for details.

Digital Set-Up

(1) Vertical:

- Upper: *Maintain*
- Lower: *Maintain*
- Anterior overbite: *Set to 1.5mm*

(2) Extract upper and lower 1st premolars.

(3) A/P movement and space closure: Close space 60% by anterior retraction *(Fig. 9)*.

(4) Incisor Crown Torque:

- Upper: *Upright 3.5 degrees*
- Lower: *Upright 9 degrees*

Note: Closing extraction spaces decreases the axial inclination of the anterior teeth, so both upper and lower incisors required ~5° more positive torque. Upper incisor crown torque was reduced from 112.5° (*pre-treatment*) to 109° (*standard 104˚ + over-correction 5˚*). The lower incisor torque was decreased from 104° (*pre-treatment*) to 95° (*standard 90˚ + over-correction 5˚*) (*Fig. 8*).

(5) Midline correction:

- Maintain the upper midline and move lower midline to the right 1.5mm to coincide with the upper midline.

(6) Archwire Plane:

- Set brackets at the center of the upper and lower central incisors.

Treatment Progress

Two months following extraction of all four 1st premolars, all teeth were bonded with an Insignia® digitally-designed 0.022-in custom appliance as specified on all permanent teeth. All treatment and sequencing details are shown in Table 2 and illustrated in Figs. 10 and 11. The archwire sequence (*Table 2*) was documented at 0, 4, 8, 11, 18 and 22 months (*0-22M*) with upper (*Fig. 10*) and lower (*Fig. 11*) occlusal photographs, arranged in clockwise order. Fixed appliances were removed after 24 months of active treatment.

Treatment Results

The patient was satisfied with the balanced facial profile and harmonious relationship of the lips (*Fig. 12*). Overjet was corrected to 0mm and the overbite was reduced to 1mm. The canine and molar relationships were corrected to Class I bilaterally (*Fig. 13*). A functional occlusion with stable posterior support and optimal anterior guidance was established (*Fig. 14*).

Cephalometric superimposition before and after treatment (*Fig. 15*) showed that the maxillary first molars were translated mesially about 3mm. The maxillary central incisors were extruded 1.5mm and translated distally about 5mm. The mandibular first molars were translated mesially about 3mm. Lower incisors were uprighted about 10 degrees and intruded about 1mm. The post-treatment panoramic radiograph documented adequate root parallelism (*Fig. 16*), and TMJ imaging was WNL (*Fig. 17*). The ABO Cast-Radiograph Evaluation (*CRE*) score was 24

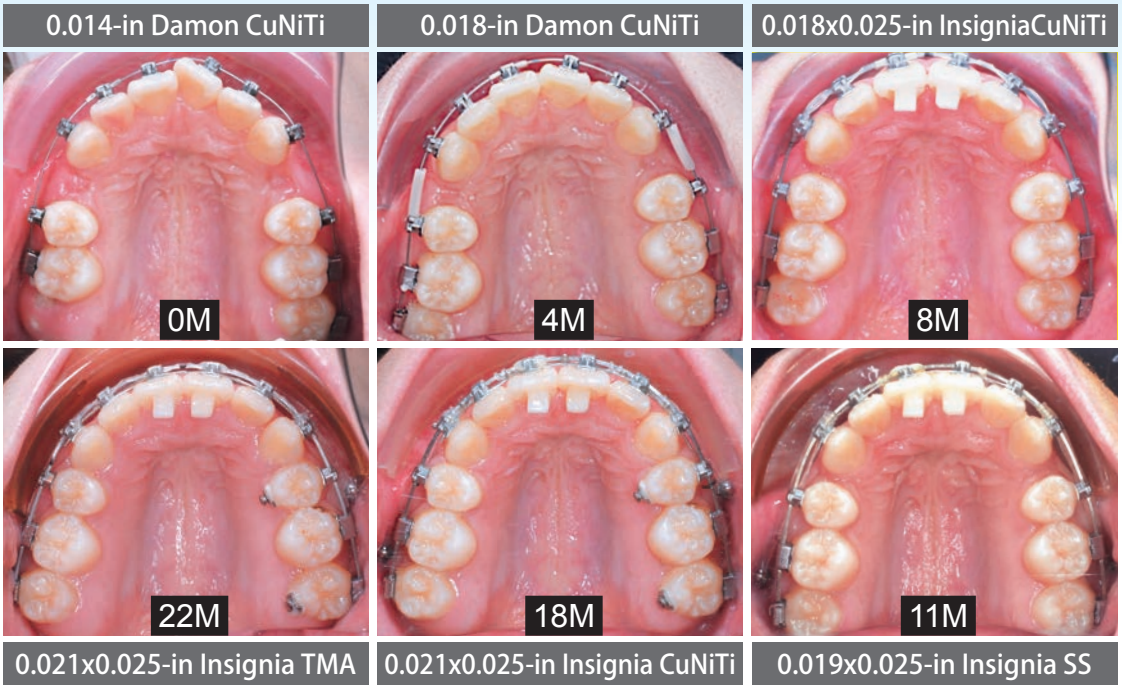

Fig. 10:
Treatment progress in months (M) and the archwire progression from the start of treatment (0M) to twenty-two months (22M) is shown in a clockwise array of maxillary occlusal photographs. See text for details.

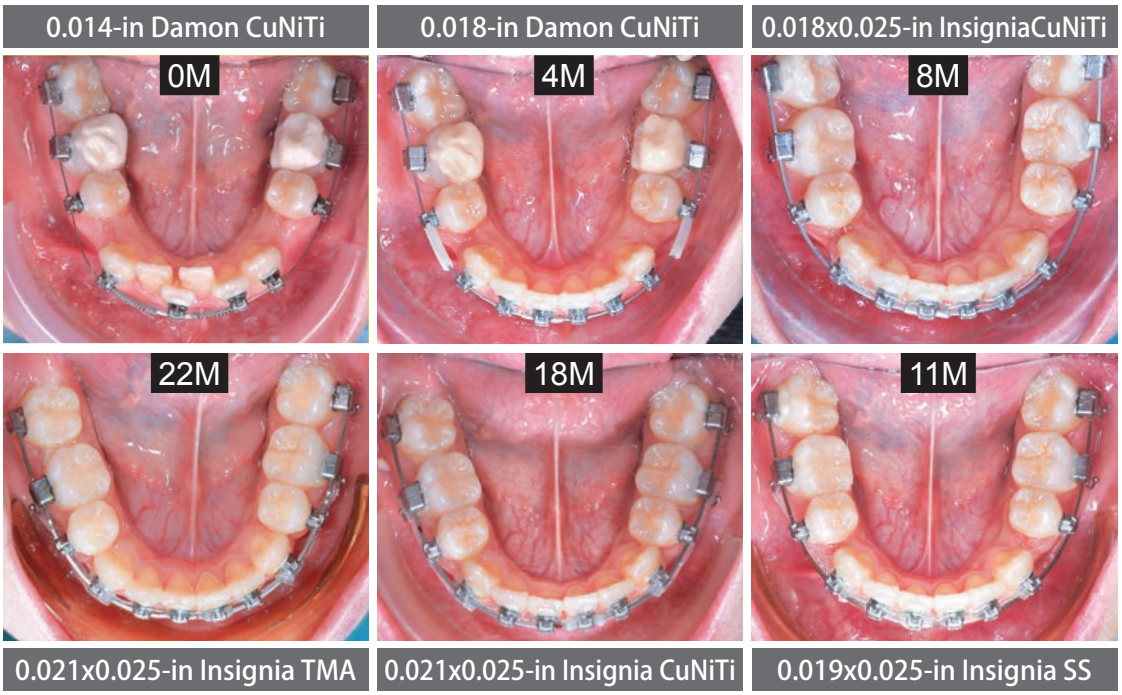

Fig. 11:
Treatment progress in months (M) and the archwire progression from the start of treatment (0M) to twenty-two months (22M) is shown in a clockwise array of mandibular occlusal photographs. See text for details.

points (*Worksheet 2*). The major CRE discrepancy was the buccolingual inclination. The Pink and White dental esthetic score was 0 points, as shown in the supplementary worksheet 3. The patient was well satisfied with the esthetic and functional correction (*Fig. 18*).

Appointment	Archwire	Notes
1 (0 months)	U/L: 0.014-in Damon CuNiTi	Disarticulation with posterior bite-turbos constructed with Fuji II Type II Glass Ionomer cement (GC America, Alsip IL) on the occlusal surfaces of the L6s. Open coil springs for space opening in the lower anterior segment.
2 (2 months)		Re-activation open coil springs.
3 (4 months)	U/L: 0.018-in Damon CuNiTi	
4 (6 months)	U/L: 0.014x0.025-in Insignia CuNiTi	Started using early light Class II elastics (Quail, 3/16-in, 2-oz) from U3s to L6s to retract maxillary anteriors.
5 (8 months)	U/L: 0.018x0.025-in Insignia CuNiTi	Maxillary anterior teeth were tied together with stainless steel ligature wire. Remove lower posterior bite turbos. Bond anterior bite turbos near the cingulum of the upper central incisors and use Class II elastics (Fox, 1/4-in, 3.5-oz) from U3s to L6s.
6 (10 months)	U/L: 0.021x0.025-in Insignia CuNiTi	
7 (11 months)	U/L: 0.019x0.025-in Insignia SS	Close all extraction spaces with power chains. Iatrogenic gummy smile was noted due to space closure and Class II elastics. Pause elastics and install IZC and incisor bone screws to control incisors dumping and iatrogenic gummy smile.
8-13 (12-17 months)		New power chains were used to re-activate space closure mechanics.
14 (18 months)	U/L: 0.021x0.025-in Insignia CuNiTi	
15 (19 months)	U/L: 0.021x0.025-in Insignia TMA	
16-20 (20-24 months)		Detail and adjust incisal edges of the LL2 and LL3.

■ Table 2: Treatment sequence

Fig. 12: Post-treatment facial and intraoral photographs.

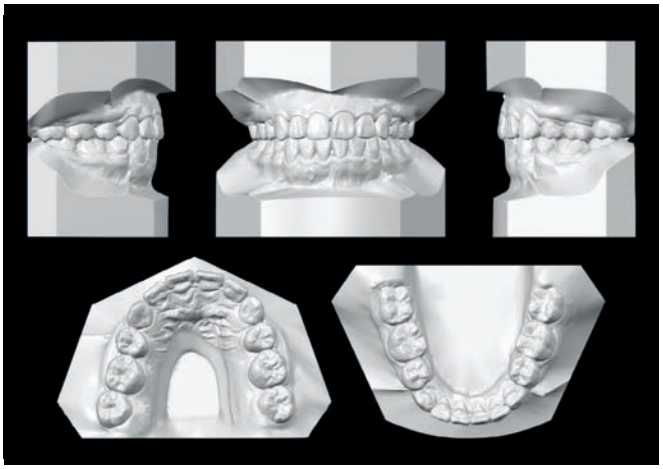

Fig. 13: Post-treatment dental models (casts)

Fig. 14: Post-treatment lateral cephalometric radiograph

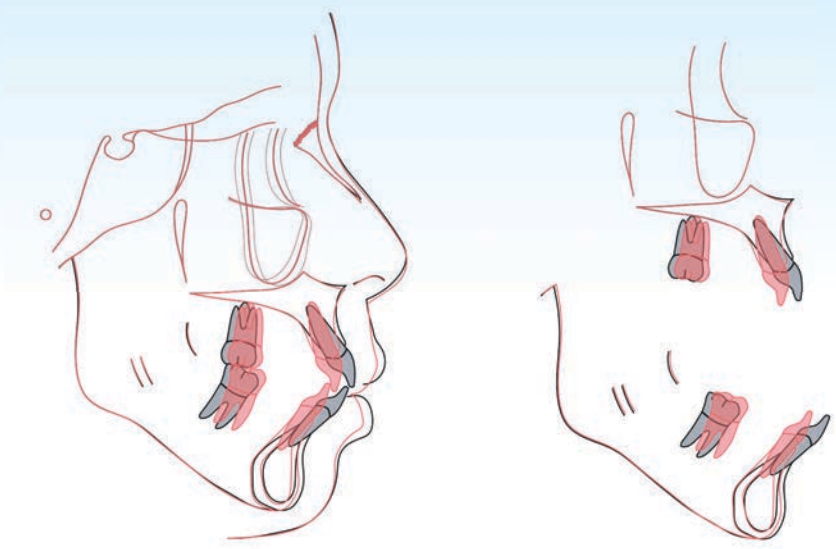

Fig. 15:
Superimposed cephalometric tracings show dentofacial changes resulting from 24 months of active treatment (red) are compared to the pre-treatment (black). See text for details.

Fig. 16:
Post-treatment panoramic radiograph

Fig. 18:
After orthodontic treatment, the patient displayed a pleasing smile.

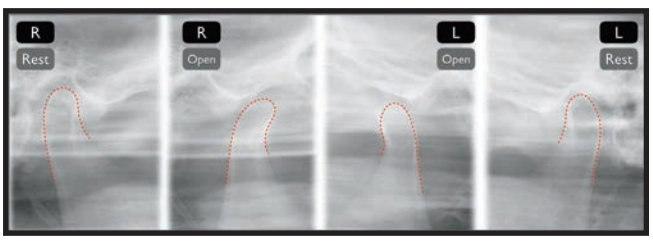

Fig. 17:
Post-treatment TMJ transcranial radiographs are shown of the right (R) and left (L) sides in the rest and open positions. The contours and articular relationships are WNL for both sides.

Discussion

The Insignia® system supplies a virtual set-up to plan treatment mechanics with "*the end in sight.*"[3] Customized brackets, reverse engineered from a digital set-up, are a powerful technology that is very accurate and efficient.[1,4,5] The first order and second order prescription are usually expressed as specified in the digital set-up. The third order perspective, also

called the root torque prescription, is dynamically expressed and has a multi-factorial effect.[1] The clinician must monitor the treatment process to anticipate specific compensations for optimizing efficiency of the correction. Multiple factors affecting torque expression are:

(1) Crowding: The lower was more crowded (*7mm*) than the upper arch (*4mm*) (*Fig. 1*). The lower extraction spaces relieve more crowding so there is less incisor retraction, which results in less loss of torque in the lower arch. More torque compensation is required for the upper arch.

(2) Tooth Shape and Size: Root length and surface area are greater for upper compared to lower incisors (*Fig. 19*). The same bracket torque and archwire expresses better torque control in the lower incisors, so distal translation is more easily achieved.

(3) Anchorage Compensation: Compared to the maxilla, the posterior mandible is more dense cortical bone, which provides better anchorage for retraction of lower compared to upper anteriors.[6] In addition, the periodontal ligament (*PDL*) of lower molars forms more dense cortical bone[7] that further enhances lower posterior anchorage.[8] Posterior maxillary anchorage is further compromised by the larger PDL surface area of upper incisors (*Fig. 19*). Extracting all four 4s and closing spaces without supplemental anchorage may result in excessive overjet and a Class II relationship.[1,6,9,10] IZC bone screws and Class II elastics both tend to increase distal tipping of the maxillary incisors. To achieve a more ideal final alignment, incisal torque compensation is required for maxillary incisors in the digital treatment plan (*Fig. 8*).

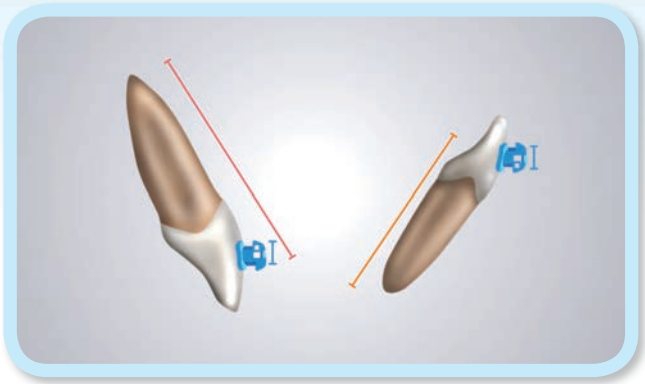

Fig. 19:
Root length from bracket to apex and PDL surface area are greater for the upper compared to the lower incisors. Thus more torque compensation is required for upper incisor retraction.

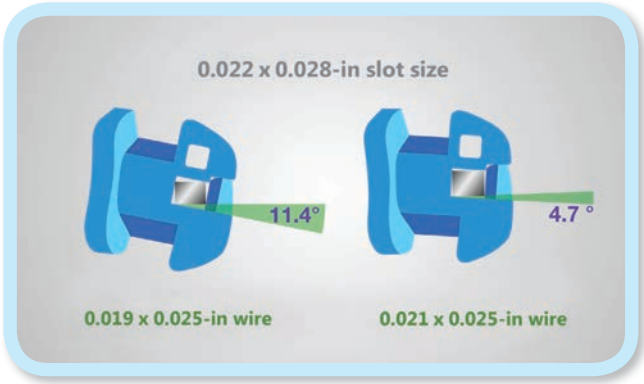

Fig. 20:
For 0.022-in brackets (0.019x0.025-in slot size), the play with a 0.019x0.025-in wire is 11.4° compared to 4.7° for an 0.021x0.025-in wire The play must be considered in the torque compensation for incisal retraction with a specific archwire. See text for details.

(4) Axial Inclination of Incisors: The initial axial inclinations of the incisors is an important factor in planning torque compensation(s).

If torque compensation results in excessive axial inclination of the incisors, differential interproximal reduction (*IPR*) is a good solution. Considering all the variables for the present patient, that tend to decrease upper incisor axial inclination, the digital set-up (*Fig. 8*) was revised to over-correct the upper incisors 10°.

(5) Archwire Size and Bracket Play: The resilience of a rectangular wire produces a moment to resist lingual tipping of anterior teeth. Using a full-size archwire reduces the wire-to-lumen "*play*" effect (*Fig. 20*) that reduces the axial inclination of the incisors as posterior space is closed.[1,3] Following the recommended wire sequence, either an 0.019x0.025-in stainless steel or TMA wire can be used for optimal space closure. Compared to 0.019x0.025-in, a larger dimension 0.021x0.025-in archwire has less "*play*" effect in an 0.022-in slot bracket. A large rectangular archwire is effective for controlling axial inclinations, but more friction is produced when closing posterior spaces. A stepwise approach may be indicated: close space on a smaller dimension archwire and then correct of the incisal inclination with an 0.021x0.025-in TMA archwire.

(6) Bracket Position: The distance of the bracket slot to the center of resistance (*C.R.*) of the root supported by alveolar bone plays an important role in the magnitude of the moment generated by a horizontal force. Maxillary incisor brackets can be bonded in the three positions relative to the labial surface: near the incisal edge, middle third, and close to gingiva (*Fig. 21*). The same linear force applied near the incisal edge creates the largest moment tipping the incisor palatally. Despite the mechanical advantage of locating a bracket nearer the C.R., gingival positioning may result in soft tissue irritation, a compromise in hygiene, and interfere with the application of torquing auxiliaries, if needed. All considered the most ideal position of the bracket is in the center of the labial surface of the incisors after they are ideally positioned in the pretreatment digital set-up.

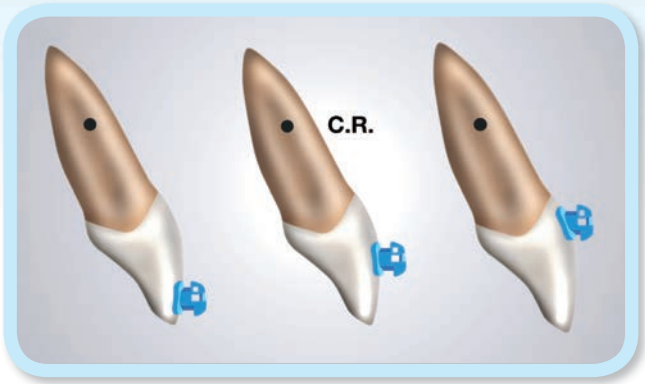

Fig. 21:
Relative to the center of resistance of the root (C.R.) the bracket can be bonded on the labial surface in a gingival, middle or apical position, as shown from left to right.

(7) Deepening of the Overbite and Distal Tipping of the Incisors: Eight months into treatment, space closure in the upper arch resulted in distal tipping and extrusion of the maxillary incisors (*Fig. 10*). Anterior bite turbos were bonded on the lingual surfaces of upper central incisors to open the bite and apply intrusive force to the incisors (*Fig. 22*). Anterior bite turbos (*planes*) utilize the functional force of occlusion to control anterior overbite and overjet.[11,12]

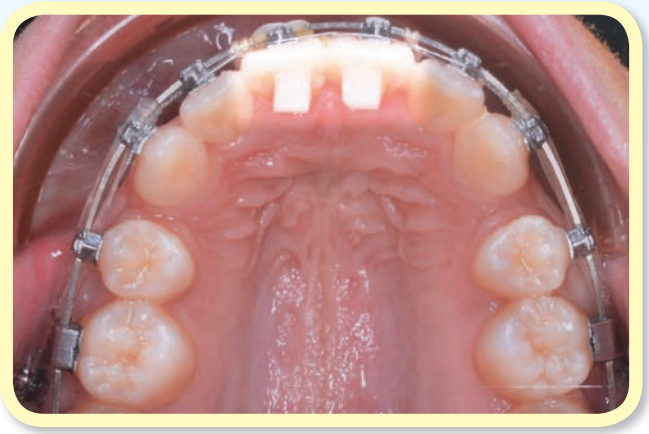

Fig. 22:
Two bite turbos were bonded on the palatal surface of the maxillary central incisors at the 8th month and Class II elastics (Fox, 3.5-oz) were applied.

(8) Iatrogenic Gummy Smile: Class II elastics and upper space closure result in deepening of the anterior overbite and distal tipping of the maxillary incisors. Cephalometric analysis at 11 months into treatment documented this problem, which is commonly referred to as incisal "*dumping*" (*Fig. 23*). Two labial bone screws were placed between the roots of the central and lateral incisors to provide apical traction to correct the iatrogenic gummy smile by intruding the maxillary incisors. Superimposition of cephalometric radiographic between 11mo progress and the end of active treatment revealed 3mm of upper incisor intrusion and decreased over-bite.

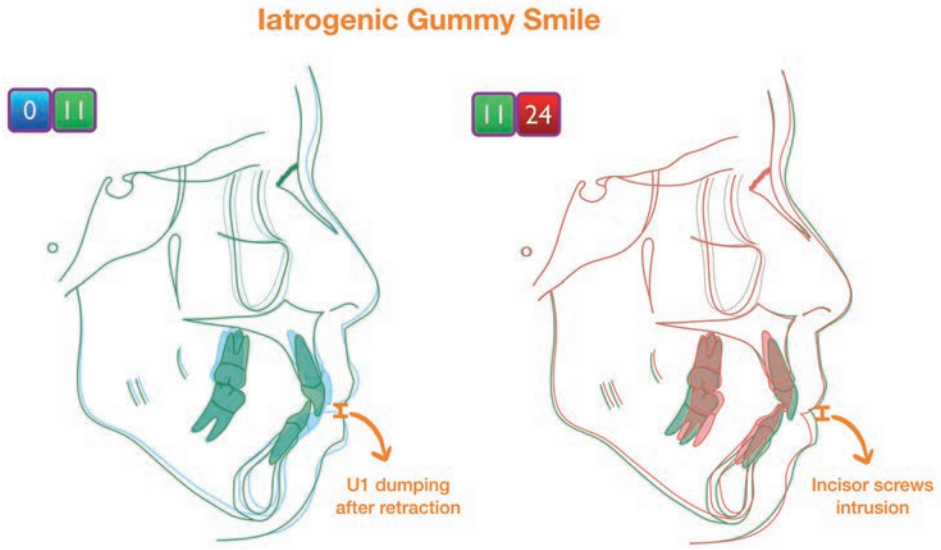

Fig. 23:
***Left**- Superimposed cephalometric tracings show dentofacial changes resulting after 11 months of active treatment (green) compared to the pre-treatment position (blue). An iatrogenic gummy smile was associated with upper incisors that were tipped lingually and extruded. This loss of upper incisor axial inclination ("torque") is commonly referred to as "dumping."*

***Right**- A cephalometric tracing at 11 months into treatment (green) is superimposed on the post-treatment tracing (red), revealing 3mm of upper incisor intrusion. The caption "Incisor screw intrusion" refers to the intrusion of the maxillary anterior segment. See text for details.*

(9) Biomechanics: Combining maxillary posterior space closure with the use of IZC and incisal bone screws results in complex mechanics that are difficult to visualize clinically (*Fig. 24*). Multiple lines of force bilaterally decrease the length of the arch and produce two moments around axes in the frontal plane, one in the anterior segment (*yellow*) and the other in the posterior aspect of the maxilla (*blue*). These mechanics avoid the adverse effects of distal tipping (*loss of torque*) and extrusion of the upper incisors which are normally produced by prolonged use of Class II elastics.[13-16]

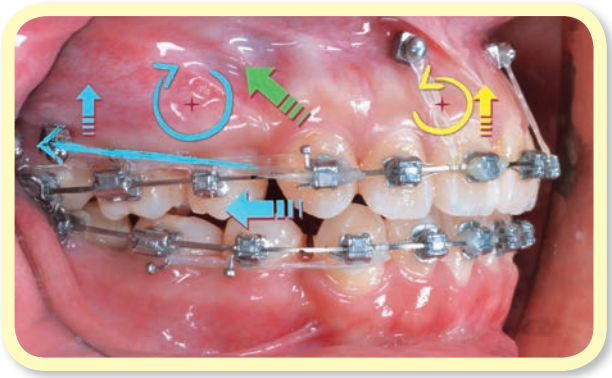

Fig. 24:
A unilateral view of the maxillary arch illustrates the bilateral IZC anchored mechanics that retract and distally rotate the maxillary arch. The sketched blue arrow, along the chain of elastics from the maxillary canine to IZC bone screw, shows the line of force that is divided into distal (horizontal blue arrow) and vertical components (smaller blue arrow). Since the lines of force are occlusal to the center of resistance of the maxilla bilaterally, the center of rotation is a frontal axis through the maxilla (red star) that produces a moment (blue curved arrow) that rotates the maxilla distally. The maxillary anterior miniscrews anchor intrusive force (yellow arrow) that create a counterclockwise moment (yellow curved arrow) tending to flare the maxillary incisors. When properly executed, these composite mechanics produce a resultant load on the upper archwire (green arrow) that retracts and intrudes the maxillary dentition.

A customized digital appliance focuses on loads applied to the teeth, but additional anchorage from intermaxillary elastics and bone screws must be carefully considered. The Insignia® system produces an ideal fixed appliance for optimal alignment based on a pretreatment digital set-up of the final result. This approach substantially enhances outcomes with minimal treatment time if supplemental anchorage is integrated into the overall treatment plan.[3,4]

Conclusions

1. Closing four first premolar extraction sites in a Class I non-growing patient often results in an iatrogenic Class II malocclusion.

2. Mandibular posterior segments have more anchorage value compared to the maxilla.

3. Intermaxillary elastics correct an iatrogenic Class II malocclusion by steepening the plane of occlusion, which is associated with retraction and extrusion of the maxillary incisors.

4. IZC and maxillary incisor bone screws can be used to correct the iatrogenic problem, but this stepwise approach lengthens treatment time and exposes the teeth to excessive root movement.

5. It is best to utilize a digital set-up of the desired final alignment to produce a precise fixed appliance that includes maxillary incisal torque compensations up to 10° for the specific mechanics planned.

6. The Insignia® system combined with maxillary bone screw anchorage is ideal for prospectively planning the efficient correction of complex malocclusions with minimum treatment time and root movement.

Acknowledgment

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References

1. Chang C, Lee A, Chang CH, Roberts WE. Bimaxillary protrusion treated with Insignia® system customized brackets and archwires. Int J Orthod Implant 2017;48:50-70.
2. Huang C, Shern L, Chang CH, Roberts WE. Extraction vs. non-extraction therapy: statistics and retrospective study. Int J Orthod Implant 2016;44:76-86.
3. Lee A, Chang CH, Roberts WE. Archwire sequence for Insignia® : a custom bracket system with a bright future. Int J Orthod Implant 2017;46:60-9.
4. Lee A, Chang CH, Roberts WE. Skeletal Class III crowded malocclusion treated with the Insignia® custom bracket system. Int J Orthod Implant 2017;47:52-69.
5. Huang A, Lee A, Chang CH, Roberts WE. Insignia® system and IZC bone screws for asymmetric Class II malocclusion with root transposition of maxillary canine and premolar. J Digital Orthod 2018;49:76-95.
6. Sandusky Jr. WC. Orthodontic anchorage. Am J Orthod 1951;37(11):858-866.
7. Roberts WE, Arbuckle GR, Analoui M. Rate of mesial translation of mandibular molars using implant-anchored mechanics. Angle Orthod 1996;66(5):331-338.
8. Roberts WE, Nelson CL, Goodacre CJ. Rigid implant anchorage to close a mandibular first molar extraction site. J Clin Orthod 1994;28(12):693-704
9. Bills DA, Handelman CS, BeGole EA. Bimaxillary dentoalveolar protrusion: traits and orthodontic correction. Angle Orthod 2005;75:333-9.
10. Roberts WE. Bone physiology, metabolism and biomechanics in orthodontic practice. In: Orthodontics: Current Principles and Techniques. Chap 10. 5th ed. Graber LW, Vanarsdall RL Jr., Vig KWL (Eds). St. Louis: Elsevier Mosby; 2012. pp. 287-343.
11. Wong A, Chang CH, Roberts WE. Conservative management of skeletal Class II malocclusion with gummy smile, deep bite, and a palatally impacted maxillary canine. Int J Orthod Implant 2017;48:24-46.
12. Jackson S, Sandler PJ. Fixed biteplanes for treatment of deep bite. J Clin Orthod 1996;30:283-7.
13. Lin C, Wu Y, Chang CH, Roberts WE. Simplified mechanics for gummy smile correction. Int J Orthod Implant 2017;47:72-91.
14. Yeh J, Chang CH, Roberts WE. Implant-orthodontic combined treatment for gummy smile with multiple missing teeth. Int J Orthod Implant 2013;32:16-32.
15. Nanda R. Correction of deep overbite in adults. Dent Clin North Am 1997;41(1):67–87.
16. Burstone CR. Deep overbite correction by intrusion. Am J Orthod 1977;72(1):1-22.

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 =

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 = 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 _____ 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 = 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° 1 x 2 pts. = 2

≤ 26° = 1 pt.

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

1 to MP ≥ 99° = 1 pt.

Each degree > 99° 5 x 1 pt. = 5

Total = 14

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 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. =	_____
Addl. treatment complexities	_____ x 2 pts. =	_____

Identify:

Total = 0

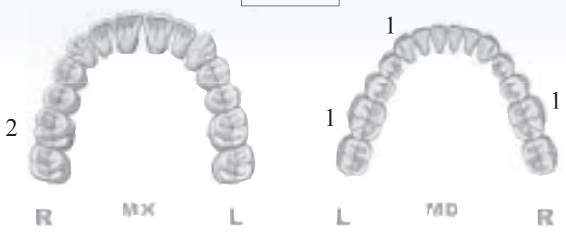
Cast-Radiograph Evaluation

Case # **Patient**

Total Score: 24

Alignment/Rotations

5



Marginal Ridges

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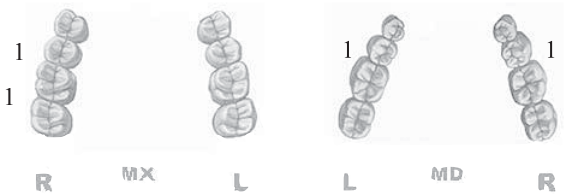

Buccolingual Inclination

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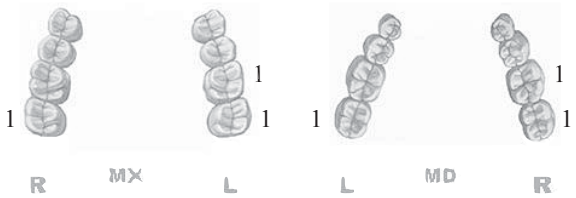
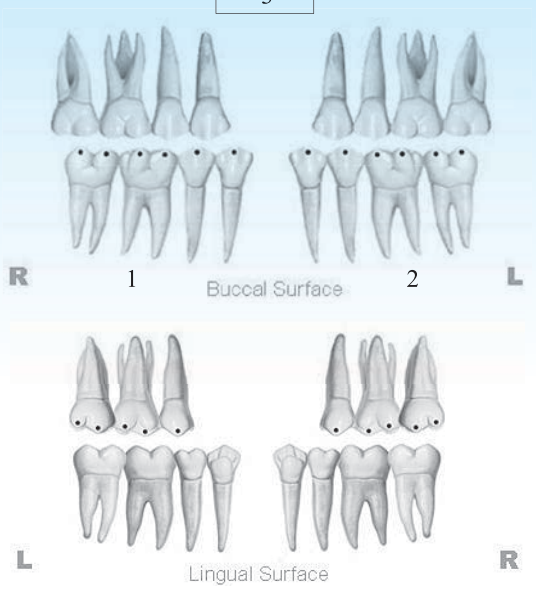


Overjet

0

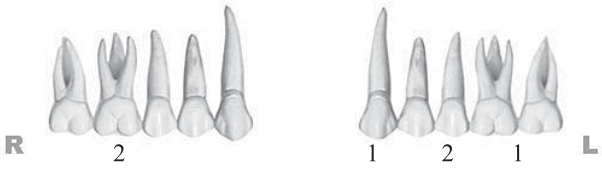
Occlusal Contacts

3



Occlusal Relationships

6



Interproximal Contacts

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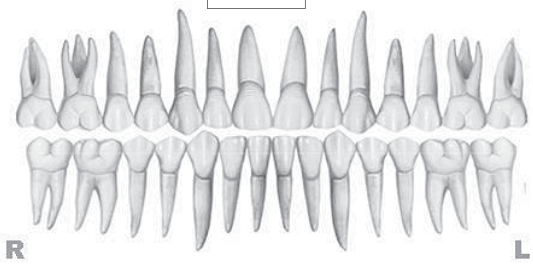

Root Angulation

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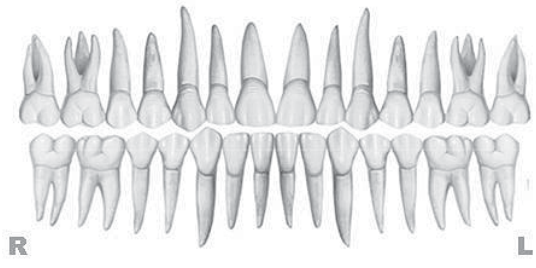


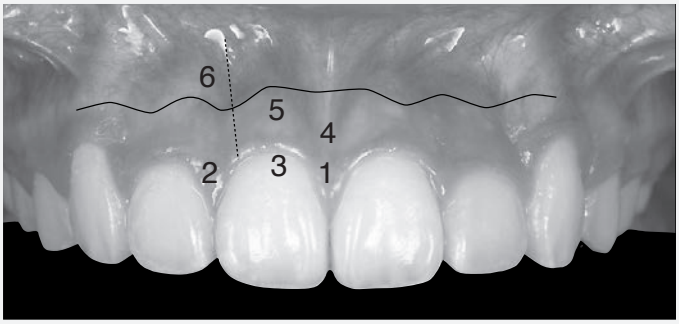
INSTRUCTIONS: Place score beside each deficient tooth and enter total score for each parameter in the white box. Mark extracted teeth with "X". Second molars should be in occlusion.

IBOI Pink & White Esthetic Score

Total Score: = 0

1. Pink Esthetic Score

Total = 0

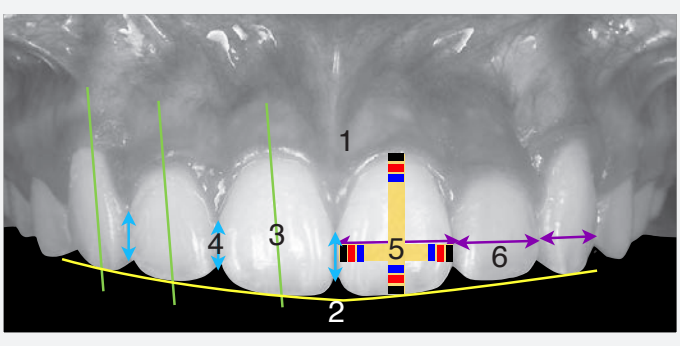


1. M & D Papillae	0	1	2
2. Keratinized Gingiva	0	1	2
3. Curvature of Gingival Margin	0	1	2
4. Level of Gingival Margin	0	1	2
5. Root Convexity (Torque)	0	1	2
6. Scar Formation	0	1	2

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 = 0



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

Dental Clinic Established 1996
Beethoven

International Insignia™ Workshop

2018
Sept. 9-10
@Taiwan

Dr. Chris Chang
Founder, Beethoven Orthodontic Center

Dr. Judy Yeh
Vice Director
Beethoven Orthodontic Center

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Course Features:

1 Systematic and practical
Led by the world-renowned Dr. Chris Chang, this course offers an efficient SOP that guides you in your painless journey of Insignia custom orthodontics.

2 Hands-on workshop
The course covers practices on indirect bonding and computer-based Insignia Approver application. You learn best when you can have real hands-on experiences.

3 Chairside learning
Participants will have a chance to conduct chairside learning and observing Insignia's clinical treatment process.

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Post-course follow up will include free consultation by senior doctors on two trial cases.

Location: Newton's A (2F, 25, Jianzhong 1st Rd., Hsinchu City, Taiwan)

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Registration fees cover meals and two nights of shared accommodation (double occupancy).

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http://iworkshop.beethoven.tw

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2018

Insignia Workshop Schedule

Michael Bay
Senior Manager – Global Digital Solutions | Insignia

Dr. Eric Hsu

Dr. Joshua Lin

Instructor, Beethoven Orthodontic Course

Sept. 9 (SUN)

		Speaker
09:00	Inside the Insignia: Diagnosis, Tx planning, Digital set-up and Clinical Execution.	Chris Chang
12:00	Lunch	
13:00	Insignia Approver software hands-on workshop I	Joshua Lin & Chris Chang
15:30	6 keys to write an effective Approver plan for Insignia	Eric Hsu & Chris Chang
17:30	Gala Dinner	

Sept. 10 (MON)

09:00	Indirect bonding hands-on workshop	Judy Yeh & Chris Chang
10:00	Indirect bonding & wire progression for Insignia –How to fix 10 common mistakes?	Judy Yeh & Chris Chang
12:00	Lunch	
13:00	Insignia Approver software hands-on workshop II	Michael Bay & Chris Chang
15:30	**Chair-side Observation** including bonding and case demos Location: In Beethoven Orthodontic Center	

- Pre-requisite: participants must have at least two years of orthodontic experiences.
- A course certificate will be provided upon completion of the workshop.

Max. number of participants: **30** doctors

Animation & Illustration

Advanced Keynote Workshop

2018 12/1-3 (Sat-Mon) 09:00-17:00

Effective dental presentation in today's digital world requires not only clear clinical photos but also diagrams and animation to engage the audience. Moreover, these visual tools are excellent aids to make your presentation unique and memorable. In this workshop Dr. Rungsi will share his dental illustration experiences and demonstrate step by step how to create an illustration from an initial sketch to a finished piece. Active participation and completion of workshop assignments are required for workshop participants.

Topics:

1. Design illustration in Keynote.
2. Showcase your own drawing with stunning animation in Keynote.
3. Animation composition.

Lecturer:
Dr. Rungsi Thavarungkul,
Thailand

Early Bird

by 2018/10/01

Newton's A course@newtonsa.com.tw

Requirements: MacBook with the lastest system and Keynote version

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自6/26－12/25止

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感溫性鎳鈦合金線 - Begin Torque Control

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模型（隨機出貨）
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Early Treatment of a Class III Malocclusion with Severe Crowding and Deep Bite

Abstract

This report describes a conservative (non-extraction) early treatment for Class III malocclusion with anterior crossbite that began in the mixed dentition (9yr 6mo) and was finished in the early permanent dentition (12yr 8mo). Crowding was 6mm in the lower and 16mm in the upper arch, and there was no space for the unerupted maxillary canines. The probable etiology of the malocclusion was inadequate development of the maxillary arch, associated with ectopic eruption of the maxillary central incisors into an anterior crossbite that developed into a 100% deepbite. The ABO Discrepancy Index (DI) was 29. Early treatment for development of the maxillary arch was achieved with a 2x2 appliance, engaging the first molars and central incisors, supplemented with bite turbos on the lower incisors to open the bite, and open coil springs to tip the central incisors labially. After 23 months of treatment, the buccal segments were erupted and all maxillary teeth except the lateral incisors were bonded with a passive self-ligating (PSL) appliance. Space was opened with open coil springs for the blocked-out lateral incisors. At 28 months, buttons were bonded on the lateral incisors to apply archwire traction, and the lower arch was bonded from first molar to first molar (6-6) with PSL brackets. At 30 months, PSL brackets were also bonded on the lateral incisors and the maxillary arch was aligned. After 38 months of active treatment, 23 mo in mixed dentition and 15 mo in permanent dentition, an acceptable orthodontic alignment was achieved, as evidenced by a cast-radiograph evaluation (CRE) score of 25 points, but the second molars were not scored because they were not fully erupted. The superimposition of cephalometric tracings shows that the upper and lower incisors were tipped anteriorly, molars were extruded, and the mandibular plane angle was open about 3˚. Follow-up records 2 years after treatment revealed the correction was stable and late facial growth was within normal limits (WNL). Additional monitoring is indicated until the full permanent dentition (7-7) is achieved. (J Digital Orthod 2018;51:44-61)

Key words:

Early treatment, mixed dentition, Class III, severe crowding, deep bite, arch development

History and Etiology

A 9-year-6-month-old girl presented with an anterior cross bite and severely crowded mixed dentition (*Figs. 1-3*). A clinical evaluation revealed a Class III molar relationship, deep anterior over-bite and an excessive Curve of Spee in the lower arch. Maxillary canine eruption was blocked out, and potentially impacted. The facial profile was straight with a slightly protrusive lower lip. Both medical and dental histories were noncontributory, and there was no evidence of contributing oral habits or temporomandibular dysfunction. The patient was treated to an acceptable result, as shown in Figs. 4-9.

Dr. Sheau Ling Lin,
Lecturer, Beethoven Orthodontic Center (Left)
Dr. Chris Chang,
Founder, Beethoven Orthodontic Center,
Publisher, International Journal of Orthodontics & Implantology (Center)
Dr. W. Eugene Roberts,
Editor-in-chief, International Journal of Orthodontics & Implantology (Right)

Fig. 1: Pre-treatment facial photographs

Fig. 4: Post-treatment facial photographs

Fig. 2:
Pre-treatment intraoral photographs reveal severe crowding of both arches and anterior crossbite.

Fig. 5:
Post-treatment intraoral photographs show the anterior crossbite has been corrected.

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

Fig. 6:
Post-treatment study models (casts) reveal modest expansion in both arches.

Fig. 7:
Pre-treatment cephalometric and panoramic radiographs

Fig. 8:
Post-treatment cephalometric and panoramic radiographs

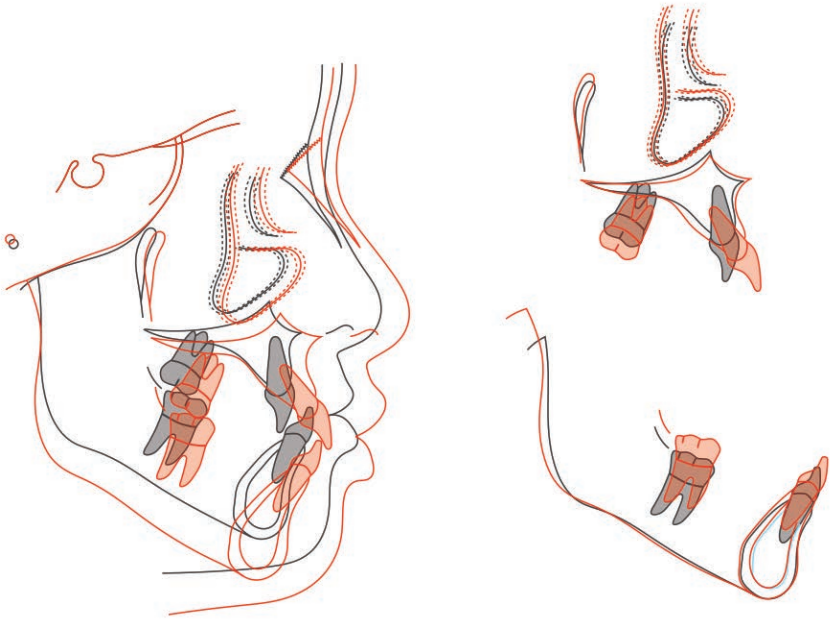


Fig. 9:
Pre-treatment (black) and post-treatment (red) cephalometric tracings are superimposed to show the dental, skeletal and soft tissue changes during treatment. See text for details.

Diagnosis

Skeletal:

- Class III (*SNA 77°, SNB 79°, ANB -2°*)
- Normal mandibular plane angle (*SN-MP 36°, FMA 32°*)

Dental:

- Midline: *The lower midline was shifted 1mm to the left of the facial midline*
- Molar Relationships: *Bilateral Class III*
- Arch-length Discrepancy: *-16mm in the upper and -6mm in the lower*
- Crossbite: *Anterior segment plus the lower first premolars were in buccal crossbite*
- Curve of Spee: *Excessive in the mandibular arch*
- American Board of Orthodontics (*ABO*) Discrepancy Index (*DI*): *29, as shown in the subsequent worksheet*

Facial:

- Profile: *Straight with a slightly protrusive lower lip*
- Functional Shift: *Anteriorly on closing, centric relation to centric occlusion (C_R —> C_o)*
- Symmetry: *Within normal limits (WNL)*

Specific Treatment Objectives

The principle objectives were to: 1. correct the anterior cross bite, 2. relieve the maxillary and mandibular crowding, 3. establish a normal overjet and overbite relationship, 4. improve the facial profile, and 5. achieve an excellent finish (*alignment*) with an ABO cast radiograph score (*CRE*) of no more than 30 points.

Maxilla (*all three planes*):

- A - P: *Allow for normal expression of growth*
- Vertical: *Allow for normal expression of growth*
- Transverse: *Allow for normal expression of growth*

Mandible (*all three planes*):

- A - P: *Decrease consistent with opening the bite to correct the anterior crossbite*
- Vertical: *Increase consistent with opening the bite to correct the anterior deepbite*
- Transverse: *Allow for normal expression of growth*

CEPHALOMETRIC			
SKELETAL ANALYSIS			
	PRE-Tx	POST-Tx	DIFF.
SNA° (82°)	77°	80°	3°
SNB° (80°)	79°	78°	1°
ANB° (2°)	-2°	2°	4°
SN-MP° (32°)	36°	39°	3°
FMA° (25°)	32°	35°	3°
DENTAL ANALYSIS			
U1 TO NA mm *(4 mm)*	-1 mm	6 mm	7 mm
U1 TO SN° (104°)	87°	113°	26°
L1 TO NB mm *(4 mm)*	4 mm	5 mm	1 mm
L1 TO MP° (90°)	88°	91°	3°
FACIAL ANALYSIS			
E-LINE UL *(2-3 mm)*	-1.5 mm	1 mm	2.5 mm
E-LINE LL *(1-2 mm)*	1.5 mm	2 mm	0.5 mm
Convexity: G-Sn-Pg' *(13°)*	2°	10°	8°
%FH: Na-ANS-Gn (53%)	53%	56%	3%

Table 1: Cephalometric summary

Maxillary Dentition:

- A - P: *Tip incisors anteriorly*
- Vertical: *Extrude molars to open the bite for deepbite correction*
- Inter-molar / Inter-canine Width: *Expand as needed to correct the crossbite and crowding*

Mandibular Dentition:

- A - P: *Tip incisors anteriorly*
- Vertical: *Intrude incisors and extrude molars to correct the deepbite*
- Inter-molar / Inter-canine Width: *Expand as needed to relieve crowding*

Facial Esthetics:

- Improve the upper lip support and correct the mandibular lip protrusion in centric occlusion.

Treatment Plan

Conservative, non-extraction treatment in the mixed dentition was indicated in preparation for alignment and finishing in the early permanent dentition. Develop the maxillary arch with a 2x2 appliance, engaging the first molars and central incisors, supplemented with bite turbos on the lower incisors to open the bite, and open coil springs in the buccal segments to tip the central incisors labially. As space is opened for the blocked out canines and lateral incisors, progressively bond all permanent teeth in both arches with a passive self-ligating (*PSL*) appliance. Apply intermaxillary elastics to correct the occlusal relationships. Detail with bracket rebonding and archwire adjustments. Deliver clear overlay retainers for both arches.

Appliances and Treatment Progress

An 0.022-in slot Damon MX® fixed appliance (*Ormco, Glendora, CA*) was utilized along with the archwires, coil springs and elastics specified by the manufacturer. Mixed dentition treatment was initiated with a 2x2 maxillary fixed appliance (*Fig. 10*). Low torque brackets were bonded on the maxillary

Fig.10
At the start of treatment (0M), a 2x2 fixed appliance fitted with open coil springs was used to expand the maxillary arch (above). Composite resin bite turbos were bonded near the incisal edge on the lingual surface of all four mandibular incisors (below).

central incisors to resist the flaring tendency, as spaces were opened with open coil springs for the blocked-out canines and lateral incisors. Molar tubes were bonded on the maxillary 1st molars, and a 0.014x0.025-in CuNiTi wire, supplemented with two open coil springs, was used to tip the central incisors labially. Composite resin bite turbos were bonded on the lingual surfaces of the mandibular incisors to open the bite, and to relieve the restriction on maxillary arch expansion due to the anterior cross bite. The patient was instructed to put a tongue depressor between the maxillary central and mandibular incisors; then bite and hold the position with a moderate force for 5-10 minutes. The exercise was repeated 4 times in succession to complete a cycle, and there were at least 4 cycles per day (*Fig. 11*). In the 7th month of treatment, the archwire was changed to 0.017x0.025-in TMA, and then to 0.019x0.025-in SS in the 13th month of treatment.

In the 23rd month, a positive overjet was noted and the buccal segments had erupted. All maxillary teeth

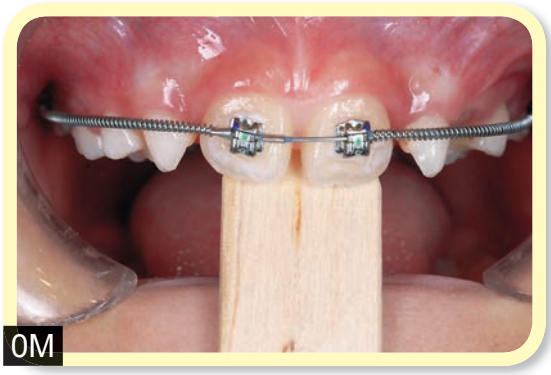


Fig. 11:
A tongue depressor was used to apply force to the lingual surface of the maxillary central incisors to move them anteriorly.

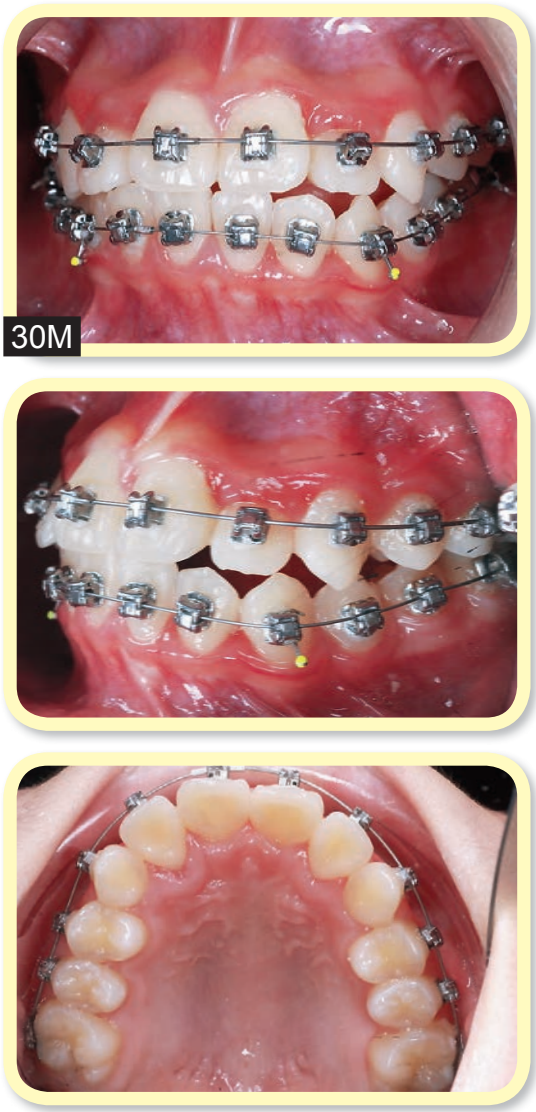
Fig. 12:
At the 23rd month (23M) of treatment, all maxillary teeth were bonded, except for the lingually positioned lateral incisors, and bilateral open coil springs were used to create space (above). A left lateral intraoral view (below) is the first documentation of a positive overjet during treatment.

from 1st molar to 1st molar (*6-6*), except for the two palatally positioned lateral incisors, were bonded with PSL brackets (*Fig. 12*). Open coil springs were applied between the central incisors and canines to gain spaces for the lateral incisors. Bonding of the mandibular arch was completed at 28 months of treatment (*Fig. 13*). Low torque brackets were selected for the mandibular incisors to control the flaring effect when leveling. Two buttons were bonded on the labial surfaces of the maxillary lateral incisors, and archwire traction was applied; flowable resin was bonded on the steel ligature ties to prevent lip irritation. The maxillary lateral

incisor brackets were bonded at the 30th month of treatment (*Fig. 14*), and the following arch wire sequence was applied in the maxillary arch: 0.016-in CuNiTi followed by 0.017x0.025-in TMA. The mandibular archwire sequence was 0.013-in CuNiTi, 0.016-in CuNiTi, and 0.014x0.025-in CuNiTi (*Fig. 18*). Class III elastics (*3/16-in 2-oz*) were used as needed to correct the sagittal relationships.

In the 35th month of treatment, two torque springs were applied to the maxillary lateral incisors for labial root movement (*Fig. 15*). After 38 months of active treatment (*23 months in the mixed dentition and 15 months in the early permanent dentition*), all the appliances were removed. Following probing and measuring the width of the attached gingiva (*Fig. 16*), maxillary labial frenectomy as well as gingivoplasty

■ *Fig. 13:*
The lower arch was bonded at 28 months (above). Buttons with ligature wires attached were bonded on the labial surface of the maxillary lateral incisors, and the ligatures were tied to the archwire to produce traction to move the lateral incisors anteriorly (below).



■ *Fig. 14:*
The maxillary lateral incisors were bonded with PSL brackets in the 30th month (30M) of treatment, as shown in a series of three intraoral photographs: frontal (above), lateral (middle) and occlusal (below).

was performed on the maxillary lateral incisors and right central incisor with a diode laser (*Fig. 17*). Upper and lower clear overlay retainers were delivered for both arches.

■ *Fig. 15:*
A root labial torquing spring was applied to each maxillary lateral incisor (above). Occlusal (middle) and left buccal (below) intraoral photographs document the position of the lateral incisors when the labial root torque was applied.

■ *Fig. 16:*
At 38 months (38M) probing depth (above) and the width of attached gingiva (below) were assessed with a periodontal probe in preparation for the gingivectomy.

■ *Fig. 17:*
Frontal view of the anterior maxillary segment is shown before (above) and after (below) the gingivoplasty and frenectomy procedures.

Results Achieved

Maxilla (*all three planes*):

- A - P: *A point moved anteriorly*
- Vertical: *Inferiorly positioned consistent with growth*
- Transverse: *Expanded*

Mandible (*all three planes*):

- A - P: *Posteriorly positioned consistent with clockwise rotation*
- Vertical: *Increased (posterior rotation)*
- Transverse: *Maintained*

Maxillary Dentition

- A - P: *Incisors extruded and tipped anteriorly*
- Vertical: *Incisors and molars extruded*
- Inter-molar / Inter-canine Width: *Crowding corrected with arch expansion*

Mandibular Dentition

- A - P: *Anterior incisors tipped labially*
- Vertical: *Molars and incisors extruded*
- Inter-molar / Inter-canine Width: *Crowding was corrected with arch expansion*

Facial Esthetics: Lip protrusion WNL, competent lips

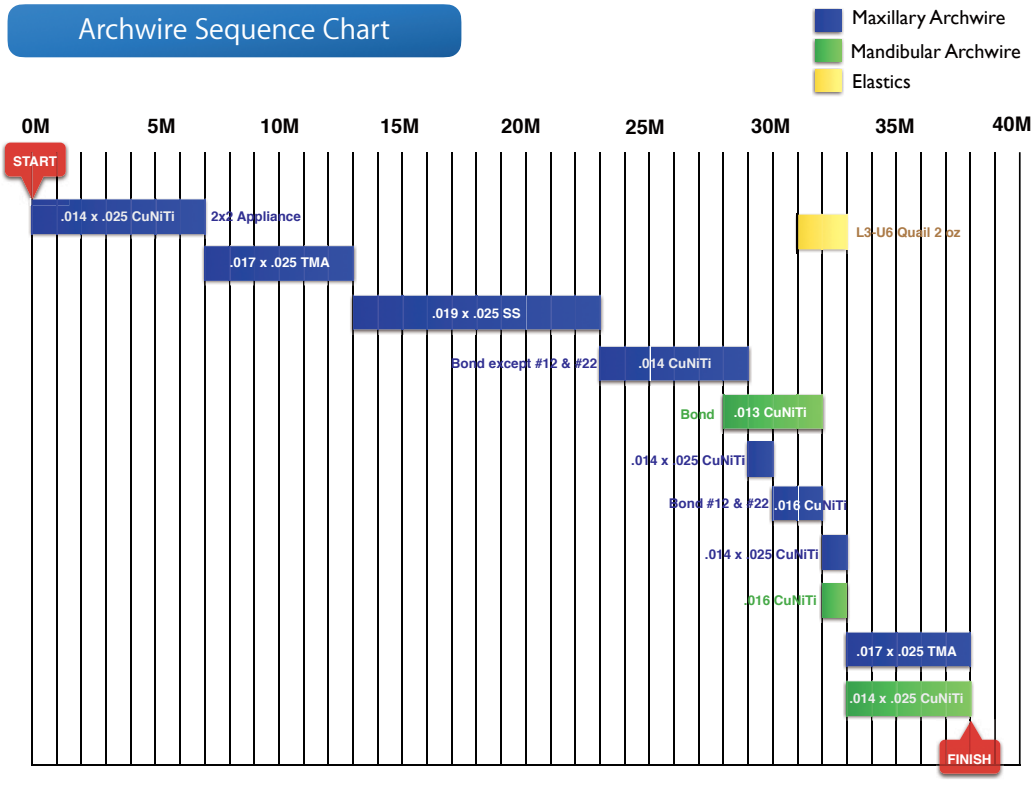


Fig. 18: Archwire Sequence Chart.

Retention

Clear overlays were delivered for both arches. The patient was instructed to wear them full time for the first 6 months and nights only thereafter. Instructions were provided for home hygiene as well as for maintenance of the retainers.

Final Evaluation of the Treatment

Cephalometric analysis (*Table 1*) and superimpositions (*Fig. 9*) demonstrate that the upper and lower incisors in both arches were tipped labially and extruded. The lower molars were also extruded as the bite was opened. The mandible rotated posteriorly, resulting in a 3° increase in the mandibular plane angle, and a 1° reduction in the SNB angle. The upper incisor to SN angle increased from 87° to 113°. The angle of the lower incisor to the mandibular plane increased from 88° to 91°. Despite the substantial increase in lower facial height, the patient's lips remained competent.

The ABO Cast-Radiograph Evaluation score was 25 points. The major discrepancies were marginal ridge discrepancy (*8 points*), occlusal relationships (*6 points*), and overjet (*5 points*). Overall, the dentition was well aligned, and both the anterior cross bite and deep overbite were corrected. Upper lip support was improved primarily by the increase in the axial inclination of the maxillary incisors (*Figs. 4 and 9*), but there were multiple soft tissue and tooth contour problems in the maxillary anterior region, as reflected in the Pink & White Esthetic score of 6 (*see score sheet at the end of this report*). The patient and her parents were satisfied with the result, but the substantial increase in the lower facial height and the unerupted second molars were long-term concerns. It was recommended that the patient have follow-up records in about 2 years to evaluate the stability of the correction, the late adolescent growth response, and the eruption of the second molars.

Discussion

Successful early treatment outcomes are strongly related to an accurate diagnosis for each patient. Unpredictable growth and development patterns complicate the diagnostic procedures. Early treatment continues to be controversial because the prolonged treatment time is often associated poor patient compliance with oral hygiene and patient applied mechanics.[1]

Lin[2] has defined a Three-Ring Diagnosis system, which predicts a good prognosis with a conservative treatment for 90% of anterior crossbite patients who have a functional shift, orthognathic profile and canine/molar Class I relationship in the centric relation position. The latter is classified as Pseudo Class III. The present patient matched all three criteria, so a favorable result could be expected. Skeletal Class III (*True Class III*) treatment is usually postponed until the end of puberty, preferably after the late mandibular growth is complete, for a stable treatment outcome.[1] For the current patient, severe space deficiency was related to the anterior crossbite, which also led to the lack of maxillary alveolar bone development and upper lip support. Without intervention to make space

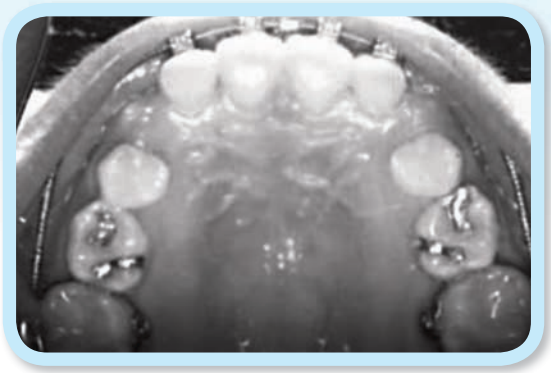


Fig. 19:
The traditional D-gainer is a 2x4 or 4x2 fixed appliance with brackets on first molars and all four incisors. There are coil springs in each buccal segment to create space with light force. (Photo from Alan Bagden, A Conversation - The Damon System: Questions and Answers. Clin Impressions. 2005;14(1):4-13)

during the mixed dentition, it is likely that the maxillary canines would become impacted.[2]

Many articles documented successful outcomes and post-treatment stability for the early treatment of anterior crossbites.[3-5] For slight to mild crowding dentitions with single to multiple anterior crossbite teeth, inclined plates or other removable appliances are usually effective. However, when moderate to severe space deficiency is apparent, appliances designed to regain space should be considered. A rapid palatal expander (*RPE*) is commonly used in growing children. RPE generates a heavy force to separate the mid-palatal suture, and angiogenesis and osteogenesis subsequently promote bone formation to achieve the goal of maxillary arch expansion.[6] The greatest change of arch expansion by RPE is in the transverse dimension, and if used in conjunction with a face mask, more improvements can be achieved in sagittal relation.[7] However, pain[8] and foreign body sensations during treatment with RPE, coupled with the need of patient compliance with a face mask, are still significant problems.

Correction of Class III malocclusion with anterior crossbite in the mixed dentition may be indicated depending on the severity of the problem and motivation of the patient.[9] For the present patient a modified (*2x2*) Damon System D-gainer® was used in the maxillary arch to correct the anterior crossbite and deficient development in width (*Figs. 10-14*). The 2x2 design was necessary because the lateral incisors had erupted in the palate behind the central incisors. The traditional D-gainer is a 2x4 or 4x2 fixed appliance, with brackets bonded on the first molars and all four incisors in each arch, and open coil springs in the buccal segments to increase arch length (*Fig. 19*).[10] The mechanics of the D-gainer expand the arch with a light continuous force delivered with passive self-ligating brackets, CuNiTi arch wires, and NiTi open coil springs.[11] The Ni-Ti coil spring expands the arch and tends to displace the cheeks laterally ("*Frankel effect*"), but the amount of activation is critical. If the coil spring is excessively activated, the wire will bow into the cheeks, they will counter with a force causing the anterior teeth to flare. A coil spring that is longer than the interbracket space by 1 to 1.5 times the width of a bracket was adequate. The expansion effect continued after bonding the whole arch with PSL brackets. Comparison of the pre- and post-treatment dental casts revealed 12mm of canine expansion in the upper arch and 8mm of canine expansion in the lower arch. The combination of the D-gainer and bite turbos was very effective for correcting

the crossbite and developing the maxillary arch in both length and width. Mikulencak[12] compared rapid maxillary expansion and Damon system for development of the maxillary arch, and found no difference in the amount of molar tipping between the two methods, indicating that the maxillary arch can be expanded with light continuous force. The results for the present patient are consistent with Mikulencak:[12] no significant molar tipping (*Figs. 5, 6 and 10-14*).

Although early treatment (*phase I*) for routine malocclusions may lengthen treatment time,[9] this approach may be effective for decreasing overall treatment time for patients with Class III malocclusion and anterior crossbite. Sugawara[13] concluded that phase 1 treatment considerably simplified phase 2 correction for mild to moderate Class III patients, who can be managed conservatively.

The following are four key points for the clinical procedure:

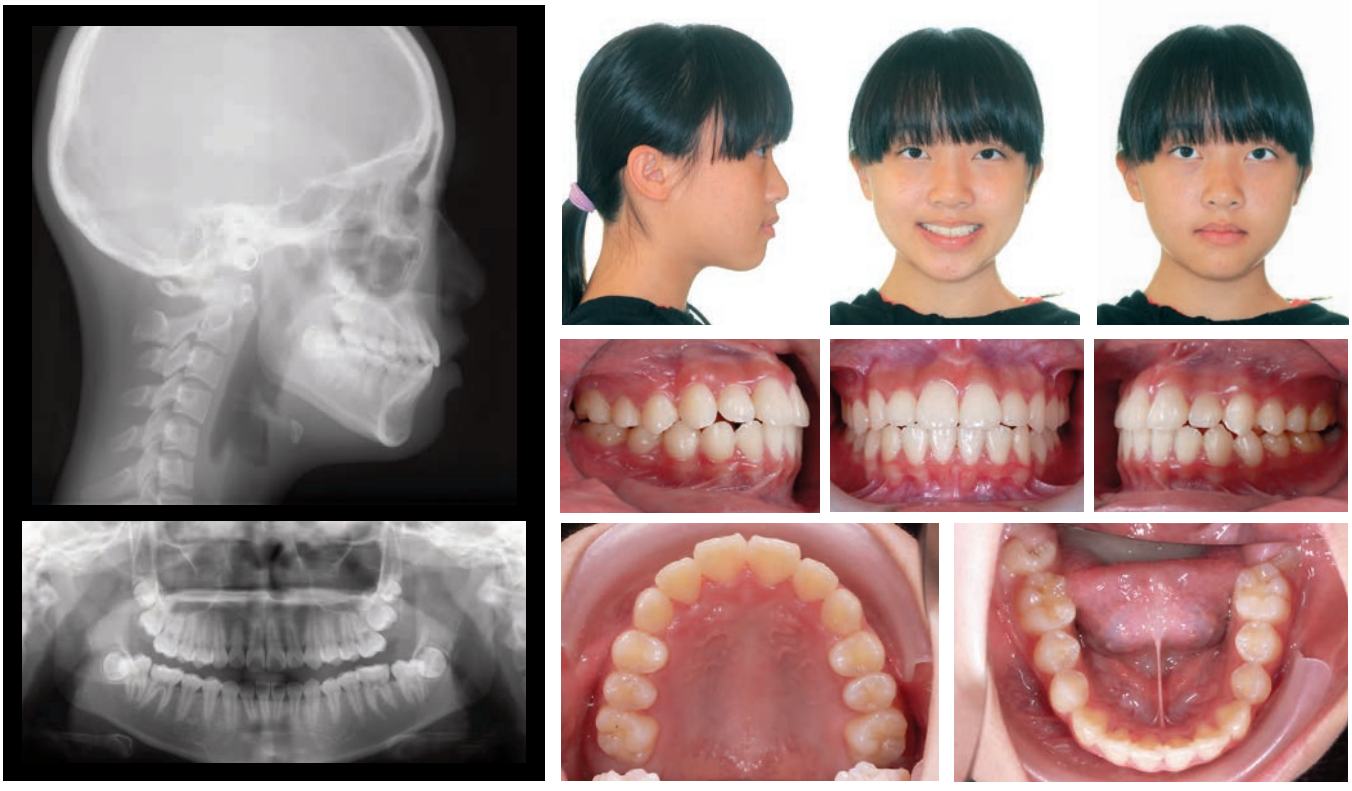


Fig. 20:
Two years after treatment a full set of records was obtained. Note the good facial esthetics and stability of the nonextraction correction of a severely crowded Class III malocclusion with anterior crossbite malocclusion (DI 29). Note the persistence of posterior crowding in both arches, which is associated with a lack of eruption of the upper second molars despite complete root development.

1. **Bracket Selection:** Select low torque brackets for the anterior teeth in both arches to decrease the tendency for incisal flaring when expanding and aligning the arch.

2. **Bite Turbos:** Use composite resin on the lingual surface of the mandibular incisors to create balanced occlusal stops that allow the maxillary incisors to move anteriorly for correction of the crossbite in the absence of functional interference. Well constructed bite turbos are critical for enhancing arch

Fig. 21: The facial profile is compared before treatment (0M), after treatment (38M), and at 2 year follow-up (2Y F/U).

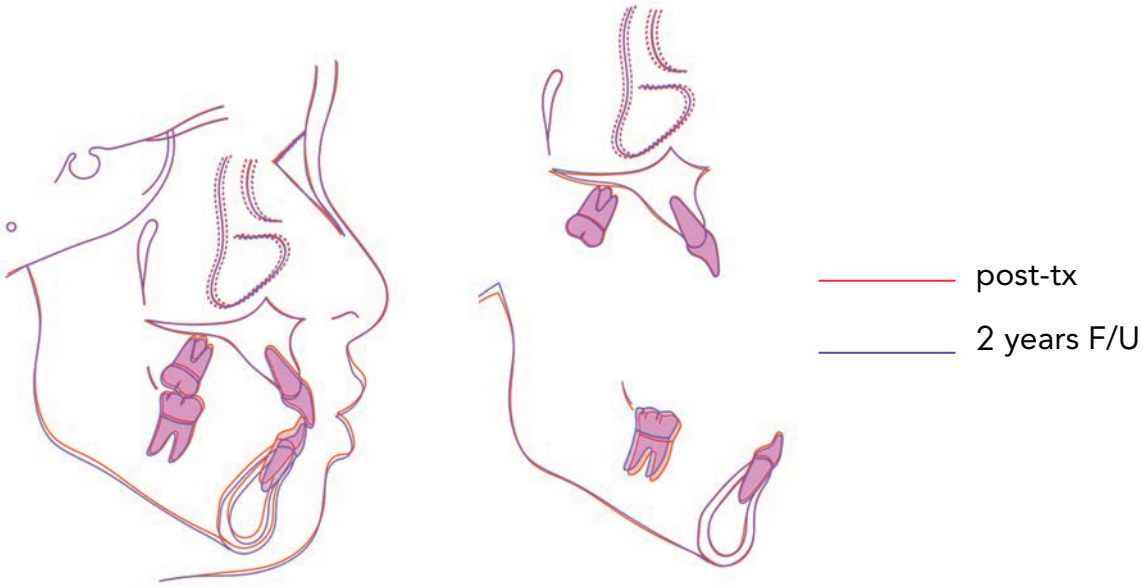


Fig. 22:
Cephalometric tracings are superimposed post-treatment (red) and at 2-year follow up (purple) to show the dental and skeletal changes associated with late adolescent growth.

development, increasing the VDO, intruding the incisors and opening the bite for correction of the excessive Curve of Spee. The posterior rotation of the mandible associated with bite turbos that open the VDO >5mm must be carefully managed to avoid producing incompetent lips. Most Class III deepbite patients benefit esthetically and functionally by a clockwise rotation of the mandible to correct the A/P and vertical relationships of the upper and lower jaws.[14]

3. **Tongue Depressors**: This is a simple yet effective technique for tipping maxillary incisors anteriorly to correct an anterior crossbite. However, patient compliance with multiple periods of daily exercise is essential.

4. **Torque Springs**: Although low torque brackets were chosen for anterior teeth, the play of the rectangular arch wire in the PSL bracket resulted in compromised torque after aligning and leveling. Correcting torque with differential bends in a full-sized archwire often produces undesirable side effects on adjacent teeth. Torquing auxiliaries (springs) are very efficient mechanics for individual teeth, but they must be closely supervised to produce the desired effect without iatrogenic damage like root resorption, overcorrection or fenestrations.

A recent randomized clinical trial with a two year follow-up demonstrated that mixed dentition treatment of anterior crossbite affecting one or more incisors can be successfully corrected by either fixed or removable appliances with similar long-term stability.[15] Two year follow-up of the present patient documented the stability of both the arch alignment and expansion. A particularly pleasing and significant finding was that the normal late growth response (*Figs. 20-22*) resulted in near ideal facial form. Although the correction of the Class III deepbite malocclusion resulted in a two centimeter increase in the VDO and posterior rotation of the mandible (*Fig. 9*), the lips remained competent resulting in a desirable late growth response. However, there is a lack of space in the posterior arches.

Conclusion

Anterior crossbite in mixed dentition results in esthetic, developmental and functional deficits. With a careful diagnosis, early treatment of anterior crossbite and mid-face deficiency can be effectively and efficiently treated. Arch expansion with light forces is stable, but conservative development of the arches may result in a posterior arch length deficiency, that should be monitored until the permanent dentition is complete.

Acknowledgment

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References

1. Hsieh TJ, Pinskaya Y, Roberts WE. Assessment of orthodontic treatment outcomes: early vs. late treatment. Angle Orthod 75:158-166, 2005.
2. Lin JJ. Mandibular growth and class III treatment. Int J Orthod Implantol 2013;32:4-13.
3. Borrie F, Bearn D. Early correction of anterior crossbites: a systematic review. J Orthod 2011;38(3):175-184.
4. Wiedel AP, Bondemark L. Fixed versus removable orthodontic appliances to correct anterior crossbite in the mixed dentition-a randomized controlled trial. Eur J Orthod 2015;37(2):123-127.
5. Wiedel AP, Bondemark L. Stability of anterior crossbite correction-a randomized controlled trial with a 2-year follow-up. Angle Orthod 2015;85(2):189-195.
6. Chang CH, Garetto LP, Katona TR, Potter RH, Roberts WE. Angiogenic induction and cell migration in an orthopaedically expanded maxillary suture in the rat. Arch Oral Biol 1996;41(10):985-994.
7. Godt A, Zeyher C, Schatz-Maier D, Göz G. Early treatment to correct class III relations with or without face mask. Angle Orthod 2008;78(1):44-49.
8. Needleman HL, Hoang CD, Allred E, Hertzberg J, Berde C. Reports of pain by children undergoing rapid palatal expansion. Pediatr Dent 2000;22(3):221-216.
9. Hsu YL, Chang CH, Roberts WE. Early intervention of class III malocclusion and impacted cuspids in late mixed dentition. Int J Orthod Implantol 2012;28:66-79.
10. Alan B. A conversation-the damon system: questions and answers. Clin Impressions 2005;14(1):4-13.
11. Lin JJ. Why damon system. New & Trends in Orthodontists 2010;17:10-23.
12. Mikulencak DM. A comparison of maxillary arch width and molar tipping changes between RME and fixed appliance vs. damon system. Thesis Abstract, St Louis University. Am J Orthod Dentofacial Orthop 2007;132:562.
13. Sugawara J, Aymach Z, Hin 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):11-22.
14. Kozlowski J. Honing damon system mechanics for the ultimate in efficiency and excellence. Clin Impressions 2008;16:23-28.
15. Wiedel AP, Bondemark L. Stability of anterior crossbite correction: a randomized controlled trial with a 2-year follow-up. Angle Orthod 2015;85(2):189-195.

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 = 8

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 4 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 = 2

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° = 1 pt.

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

Total = 4

OTHER (See Instructions)

Supernumerary teeth	_____ x 1 pt. =	_____
Ankylosis of perm. teeth	_____ x 2 pts. =	_____
Anomalous morphology	_____ x 2 pts. =	_____
Impaction (except 3rd molars)	2 x 2 pts. =	4
Midline discrepancy (≥3mm)	@ 2 pts. =	_____
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. =	_____
Addl. treatment complexities	_____ x 2 pts. =	_____

Identify:

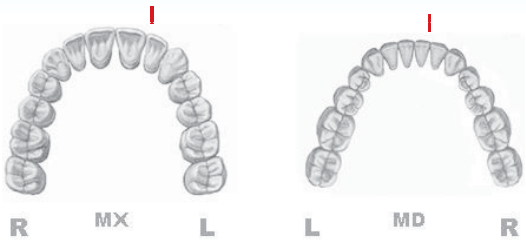
Total = 4

Cast-Radiograph Evaluation

Total CRE Score 25

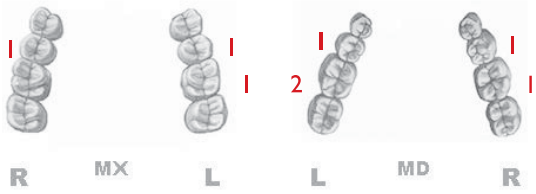
Alignment/Rotations

2



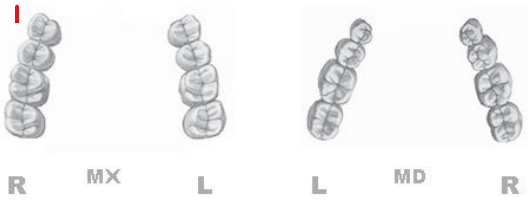
Marginal Ridges

8



Buccolingual Inclination

1

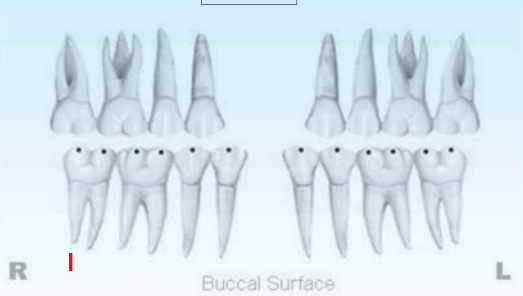


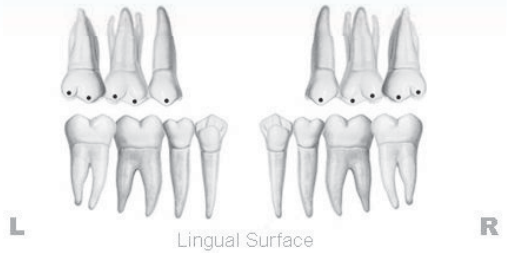
Overjet

5

Occlusal Contacts

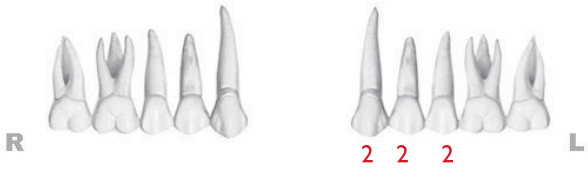
1





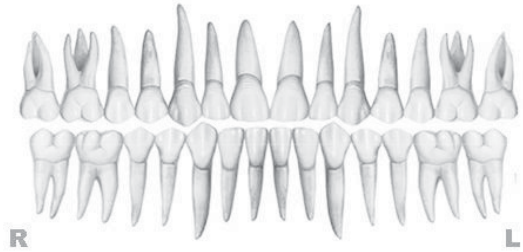
Occlusal Relationships

6



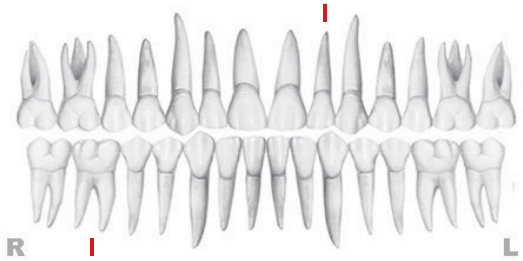
Interproximal Contacts

0



Root Angulation

2



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.

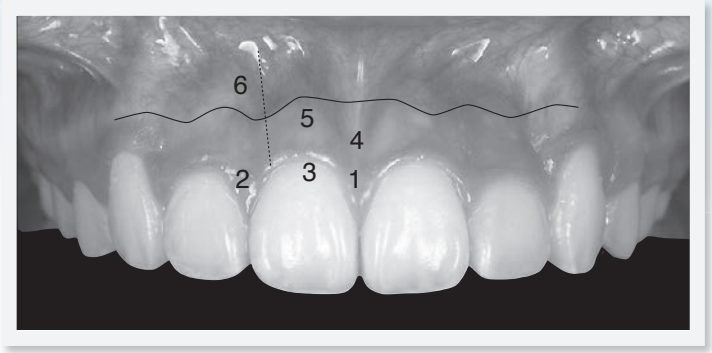
Note that this CRE score is incomplete because the second molars are not yet in occlusion.

IBOI Pink & White Esthetic Score (Before Surgical Crown Lengthening)

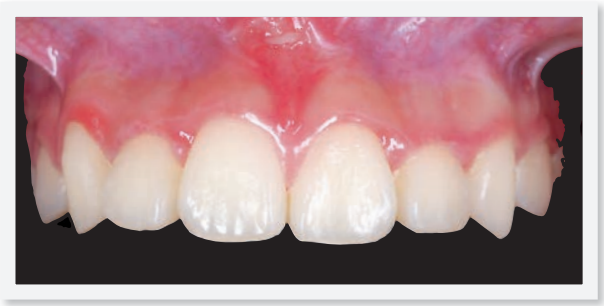
Total Score: = 6

1. Pink Esthetic Score

Total = 2



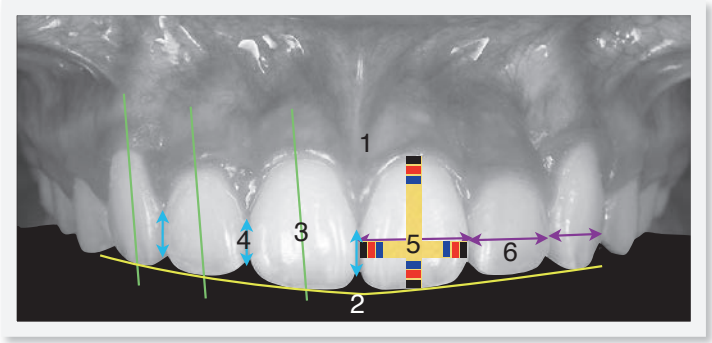
1. M & D Papillae	0	1	2
2. Keratinized Gingiva	0	1	2
3. Curvature of Gingival Margin	0	1	2
4. Level of Gingival Margin	0	1	2
5. Root Convexity (Torque)	0	1	2
6. Scar Formation	0	1	2



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

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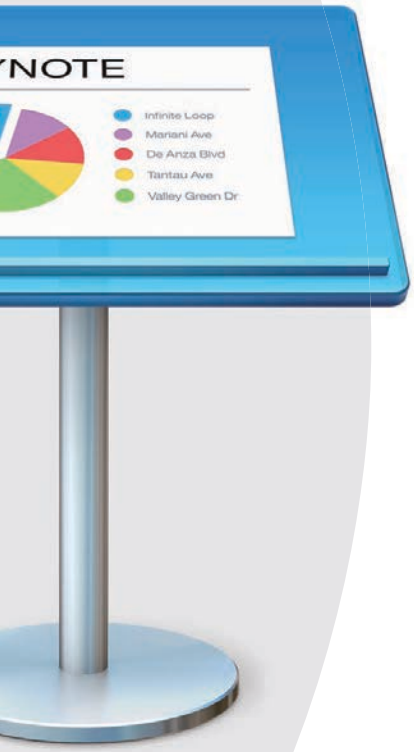

技巧班 強化你的 Keynote 簡報力

(四) 7/26

無論是 Keynote 新手或是略有經驗的使用者，在一天的簡報課程中，將精選介紹 Keynote 的重要工具，幫助你設計合適的動畫，分享設計資料視覺化的秘訣，並搭配 Mac 內建常用的影音工具來編修圖片和影像剪輯，金牛頓的教學團隊將教你如何使用 Keynote 創造出動人的專業簡報。

講師：金牛頓工程師

大師班 賈伯斯的簡報秘訣與設計要素

(四) 8/9

由國際知名的牙科講師張慧男醫師主講的一天課程，將以他幽默風趣的演講風格來剖析賈柏斯的美學概念以及演講秘訣，利用實例來說明如何設計出視覺優美且知識性豐富的專業演講。

講師：張慧男醫師

動畫班 精修繪圖及動畫技巧

(六~一) 12/1-3

數位化潮流下的牙科簡報，不僅需要清晰的臨床照片，也需要精確的圖表和流暢的動畫來吸引觀眾，而優秀的視覺化工具更使您的演講獨樹一格且令人難忘。

Keynote 456 課程中，Dr. Rungsi 將分享他利用 Keynote 軟體繪製精美牙科插圖的經驗，並一步步教會您如何從構想和草圖創建出令人驚艷的成果。跟隨簡報美學大師的腳步，您也可以秀出創意、站上世界舞台！

講師：Dr. Rungsi Thavarungkul

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● *AJODO/Research paper - 3 points*
ABO case report - 2 points
Clinical tip - 1 point

Dr. 張銘珍* Ming-Jen Chang

18 pts

Dr. 曾令怡*▲ Linda Tseng

14 pts

Dr. 葉信吟 Hsin-Yin Yeh

18 pts

Dr. 李雙安▲ Angle Lee

17 pts

Dr. 徐玉玲▲ Lynn Hsu

16 pts

Dr. 林詩詠 Joshua Lin

16 pts

Dr. 蘇筌瑋 Bill Su

14 pts

Dr. 曾淑萍 Shu-Ping Tseng

12 pts

Dr. 黃祈 Richie Huang

12 pts

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Early Interceptive Treatment for Maxillary Lateral Incisor and Canine Transposition

Abstract

History: *An 8yr-6mo girl was referred for orthodontic evaluation of bilateral blocked-out permanent canines that were labial to the roots of the lateral incisors. The patient and her family preferred an optimal correction without extracting permanent teeth.*

Diagnosis: *Facial convexity and the intermaxillary skeletal relationship were within normal limits (WNL), but the lower lip was retrusive. The crowns of the maxillary incisors were relatively well aligned, but roots of the laterals were displaced distally due to ectopic eruption of the canines on the labial surface. Molar relationships were end-on Class II bilaterally. Caries was noted on the mesial surface of the LL 2nd deciduous molar. The ABO Discrepancy Index (DI) was 29.*

Etiology: *Relatively small deciduous canines (Cs) were associated with deviated paths of eruption for the permanent canines (3s) resulting in ectopic eruption labial to the lateral incisor roots. Interceptive treatment was indicated to avoid transposition and periodontal problems.*

Treatment Plan: *Open space bilaterally in the maxillary canine areas. Extract the upper Cs and retract the ectopically erupted upper 3s into the expanded canine spaces. When the U3s are correctly positioned for eruption, bond a full fixed appliance in both arches, and install bite turbos on the palatal surface of the upper central incisors. Correct interdigitation and overjet with intermaxillary elastics, then detail and finish. Remove appliances and retain with upper 2-2 and lower 3-3 fixed lingual retainers.*

Outcomes: *Following 42 months of continuous mixed and permanent dentition treatment, this severe malocclusion (DI 29) was treated to an initial satisfactory result, as evidenced by an ABO Cast-Radiograph Evaluation (CRE) of 29. Three years later, eruption and settling of the 7s improved the outcome to excellent: CRE 19 points and the Pink & White dental esthetic score was 4.*

Conclusion: *A small upper C and lack of a canine eminence are indications to carefully monitor permanent canine development. If the path of eruption deviates to the mesial, extract the Cs and open space for the 3s. Expand the arch as needed and retract the erupting 3s to prevent transposition, periodontal problems, and the need to extract permanent teeth. (J Digital Orthod 2018;51:66-86)*

Key words:
Lateral incisor-canine transposition, ectopic canine eruption, interceptive treatment, Class II correction, non-extraction

Ectopic eruption of permanent canines may result in impaction, crowding, transposition, and/or periodontal compromise.[1,2] Canine transposition is most common with the first premolar or lateral incisor, but it may also involve the central incisor and second premolar. Compared to other teeth, the permanent maxillary canine (*U3*) has the longest developmental pathway, from the bud stage to full eruption into the oral cavity. Interceptive orthodontic treatment[3] to control genetic and environmental factors is often effective for redirecting an ectopically erupting canine to its normal position.[4,5] The disadvantages of early treatment for canine transposition are a prolonged treatment time of up to 50 months, that may result in a compromised outcome if treatment is terminated prematurely. However, early-treatment routinely decreases the extraction rate compared to late-treatment in the permanent dentition.[6]

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When interceptive therapy begins in the early mixed dentition, continuing mechanics into the permanent dentition involves an extended treatment, so it may be desirable to terminate prior to achieving ideal alignment of the second molars. It is hypothesized that the second molars will erupt and occlude normally if the dentition is ideally aligned from 6-6.

Diagnosis and Etiology

An 8-year-6-month-old girl was referred by her dentist for orthodontic consultation. Her chief concern was the crowded dentition with two blocked-out U3s labial to the lateral incisors (*Figs. 1-3*). Her upper dentition

Fig. 1: Pre-treatment facial and intraoral photographs

appeared to be well-aligned, but two blocked-out canines resulted in palatal movement of the roots of the upper lateral incisors. The retained upper deciduous canines (*UCs*) were relatively small (*Fig. 2*) and no root resorption was noted radiographically (*Fig. 4*). Both U3s were buccally superimposed over the adjacent lateral incisors in the early mixed dentition (*partial transposition*). The molar relationship was a bilateral end-on Class II (*Fig. 3*). The underlying skeletal pattern was WNL (*SNA 83.5°, SNB 79°, ANB 4.5°*), but there was a low mandibular plane angle (*SN-MP=30°*) (*Table 1*). The ABO Discrepancy Index (*DI*) was 29 as shown in the subsequent worksheet (*Fig. 3*).[7]

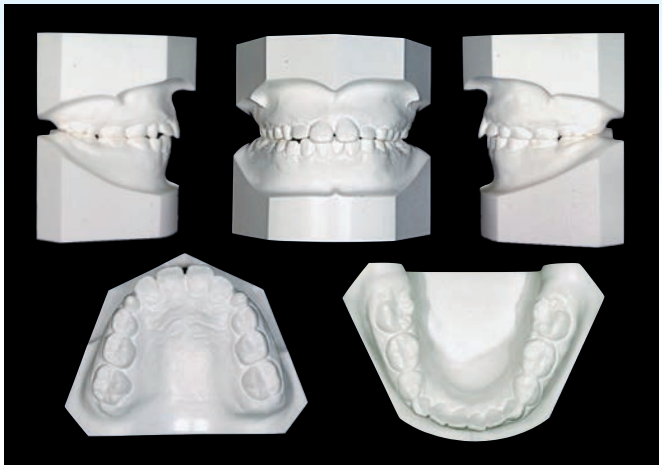


Fig. 2: Pre-treatment dental models (casts)

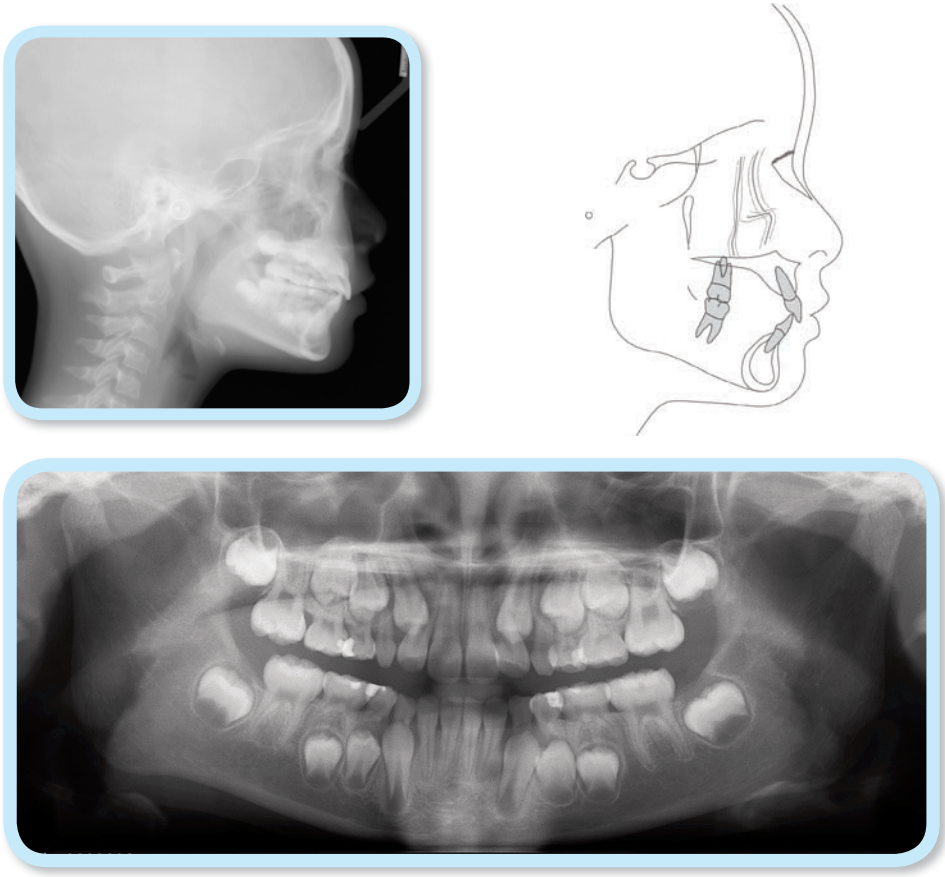
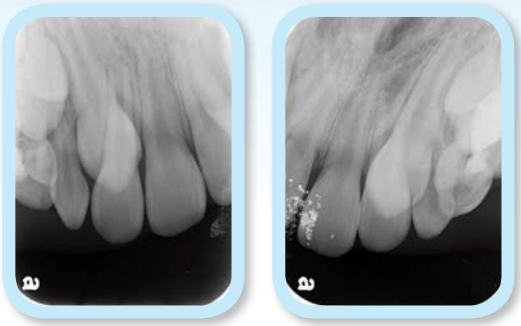


Fig. 3: Pre-treatment lateral cephalometric radiograph with tracing, and the initial panoramic radiograph



■ *Fig. 4:*
Periapical radiographs shows the canines overlapping the laterals.

CEPHALOMETRIC SUMMARY				
SKELETAL ANALYSIS				
	PRE-Tx	POST-Tx	DIFF.	F/U 3y
SNA° (82°)	83.5°	83.5°	0°	83.5°
SNB° (80°)	79°	81°	2°	81.5°
ANB° (2°)	4.5°	2.5°	2°	2°
SN-MP° (32°)	30°	29°	1°	27°
FMA° (25°)	23°	22°	1°	20°
DENTAL ANALYSIS				
U1 To NA mm (4 mm)	2 mm	7 mm	5 mm	7 mm
U1 To SN° (104°)	105°	121°	16°	121°
L1 To NB mm (4 mm)	5 mm	6.5 mm	1.5 mm	6 mm
L1 To MP° (90°)	102°	102°	0°	101°
FACIAL ANALYSIS				
E-LINE UL (2-3 mm)	1 mm	-2 mm	3 mm	-2.5 mm
E-LINE LL (1-2 mm)	1 mm	0 mm	1 mm	-2 mm
%FH: Na-ANS-Gn (53%)	54.6%	54.2%	0.4%	54.1%
Convexity: G-Sn-Pg' (13°)	11°	8°	3°	6°

■ Table 1: Cephalometric summary

Treatment Objectives

Achieve normal expression of facial growth in the anteroposterior, vertical, and transverse directions. Maintain normal buccolingual inclination of the dentition, especially the upper incisors after the protruded lower lip is corrected. Expand the inter-canine and inter-molar distances consistent with the apical base of bone.

Treatment Alternatives

There were three treatment options: 1. Extract upper lateral incisors (*U2s*) or ectopic U3s, retain the UCs, and align the compromised dentition. 2. Extract the UCs, allow the ectopic canines to erupt, and correct the subsequent malocclusion with fixed appliances. 3. In addition to extracting the UCs, open space in the mixed dentition, retract the U3s to their correct sagittal positions, and align the entire dentition as the buccal segments erupt. Option 1 would result in poor esthetics, compromised occlusal function, and the longterm prognosis for the UCs is uncertain. Option 2 involves a longer period with a compromised dentition, requires more steps to reverse the transposed teeth, and may result in a tooth-transposition outcome.[8] Extracting UCs may improve the position of palatally displaced U3s, but has little effect on reversing a transposition.[9] Option 3 focuses on correcting the relative positions of the U3s and the U2s in the early mixed dentition period. The latter requires three integrated procedures: extract the UCs, open space for the U3s, and retract them into the correct position. The normal dental sequence in the anterior segments is retained,

Fig. 5: In the mixed dentition, open coil springs between the U1s and UDs expand the upper arch sagittally and transversely.

until the permanent buccal segments erupt. Intermaxillary finishing is achieved with a full fixed appliance. If Class II mechanics are anticipated, it is wise to consult the patient and parents about the use of bone screws to control the anteroposterior positions of both dental arches.[10] The final result in the early permanent dentition should be monitored for at least three years after treatment to check the eruption of the 7s and evaluate stability of arch expansion during late adolescent growth.

Treatment Progress

For mixed dentition treatment, brackets were bonded on permanent upper central incisors (*U1s*) and first molars (*U6s*), in addition to the deciduous molars, bilaterally. No brackets were bonded on the U2s because their roots were in close proximity to the ectopic U3s. The UCs were retained until the midline diastema was closed between the U1s. U3s were sufficiently erupted to bond labial attachments for elastics to retract them. To correct the overjet, a high torque 0.022-in slot passive self-ligating (*PSL*) appliance Damon Q® bracket system (*Ormco Corp., Glendora CA*) was selected,[11] with an archwire sequence as described in Table 2. The initial archwire of 0.014-in CuNiTi was placed with open coil springs between the U1s and primary first molars (*UDs*) (*Figs. 5 and 6*). A month later, a 0.014x0.025-in CuNiTi wire was inserted for torque control of the upper central incisors. Lip seal exercises were prescribed to restrain the upper anterior segment. Seven months into treatment, a 0.017x0.025-in TMA archwire was placed and adjusted as needed (*Figs. 7 and 8*). Open coil springs continued to increase arch length for

Fig. 6:
***Hypothetical Example:** if the lateral incisor is bonded with a bracket, and engaged on the arch wire, it would move labially into the ectopic U3, blocking its distal retraction (blue arrow) as well as risking root resorption.*

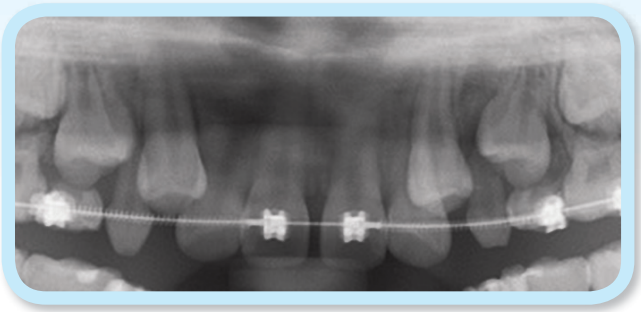


Fig. 7:
In the 6th month, the transposed U3s drifted distally as the arch was expanded.

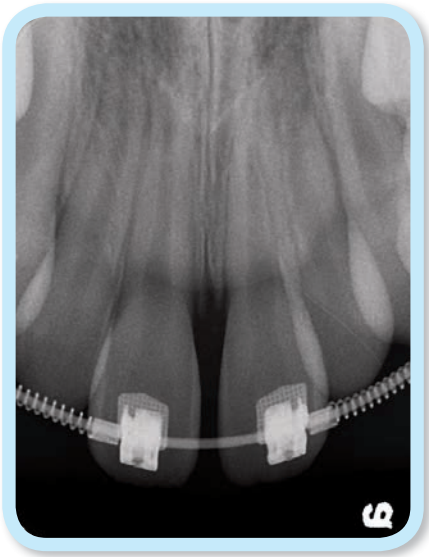


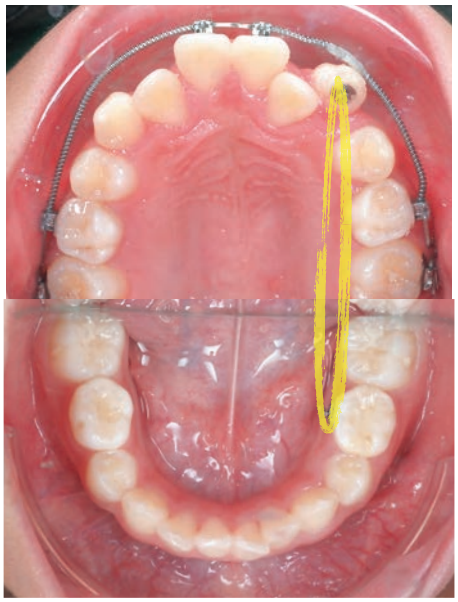
Fig. 8:
After 7 months of treatment, the partial transposition of the U3s was corrected.

the permanent canines and they were allowed to erupt spontaneously. Due to the space opening required for the U3s, the overjet increased to 7mm (*Fig. 9*). Lip seal exercise instructions were provided to increase labial pressure on the flared teeth. In the tenth month, the UCs were extracted, because they were almost in contact with the U3s. The latter were guided into position with the archwire (*Fig. 10*). In the 19th month, lingual buttons were bonded on

Fig. 9:
Expansion of the upper arch to open space to align the U3s and U2s produced an iatrogenic increase in overjet.

the upper left canine and lower left second primary molar, to receive an intermaxillary elastic to guide the left flared canine into the dental arch (*Figs. 11 and 12*). Two months later, after the upper right primary second molar had exfoliated, a light-cured resin stop for the open coil spring was bonded on the archwire. Five months later, bracket bonding was completed for the entire upper permanent dentition and a 0.014-in CuNiTi archwire was placed (*Fig. 13*). In the 30th month, Damon Q PSL brackets were bonded on the lower dentition, and a 0.014-in CuNiTi archwire was inserted (*Fig. 14*). Bite turbos were bonded on the upper central incisors for deep bite correction

■ *Fig. 10:*
A progressive series of maxillary occlusal photographs document the alignment of the upper arch from 1-31 months (M), and the installation of bite turbos on the palatal surfaces of the U1s. See text for details.



■ *Fig. 11:*
Nineteen months into treatment, light-cured flowable resin on the coil spring engaged the UL3, as it was retracted with an elastic attached to the lingual surface of the LL deciduous molar. See text for details.

(*Fig. 10*). Two months later, a 0.018-in CuNiTi archwire was engaged on the upper dentition for continued leveling. In the 35th month, a 0.014x0.025-in CuNiTi was placed and Class II elastics (*Parrot 5/16-in 2-oz*) were used to retract the UL3 and LLD utilizing drop-in hooks on the canine brackets. The upper and lower anterior segments were tied together with a figure-of-eight ligature. The posterior residual spaces were closed with power chains. Two months later, a new upper 0.017x0.025-in TMA arch wire was placed. The force level of the Class II mechanics was increased from the U3s to lower first molars (*L6s*) with Fox 1/4-in 3.5-oz elastics.

After 37 months of treatment, the 0.019x0.025-in CuNiTi lower arch wire with additional lingual crown torque was used to upright the anterior dentition,

Fig. 12:
A progressive series of left buccal photographs from 1-31 months (M) shows the alignment sequence for the UL3. See text for details.

Fig. 13:
Low torque brackets were bonded on the upper incisors to reduce flaring as the ectopic canines were aligned. See text for details.

Fig. 14:
After 30 months of mixed dentition treatment, a full fixed appliance from 6-6 was bonded on both arches.

and space was closed with power chains. One month later, a lower TMA wire with minor adjustments for occlusal detailing was placed. In the 42nd month, all fixed appliances were removed. Fixed lingual retainers were delivered in both arches. The upper second molars were still erupting.

Facial Result

Lip protrusion was decreased ~2mm to the E-Line, and facial convexity was reduced to 8˚ with good facial balance. The lower face grew downward and froward ~15mm, and ANB angle decreased from 4.5 to 2.5. Maxillary and mandibular dimensions were enhanced in the anteroposterior, vertical, and transverse planes. Inclination of the upper incisors was increased from 105˚ to 121˚ (*Figs. 15-17, and Table 1*).

Dental Result

A Class I occlusion with coincident dental midlines was achieved (*Figs. 15 and 16*). Favorable expression of lower facial growth facilitated the correction of the molar relationship, and iatrogenic overjet (*Figs. 16 and 17*). Increased axial inclination of the upper incisors was noted despite the extensive use of Class II elastics (*Fig. 18*).

Fig. 15: Post-treatment facial and intraoral photographs after 42 months of active treatment

The Cast Radiograph Evaluation score was 29 points, as shown in the Supplementary Worksheet 2. Points deducted were for marginal ridge discrepancies (6), buccolingual inclination (13), overjet (2) and occlusal contacts (3). Many of the alignment problems were secondary to incomplete eruption of the 7s. No permanent teeth were extracted, all teeth were well aligned in the normal sequence, and dental esthetics were excellent, as evidenced by a Pink and White Esthetic Index of 4 (*Supplementary Worksheet 3*).

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

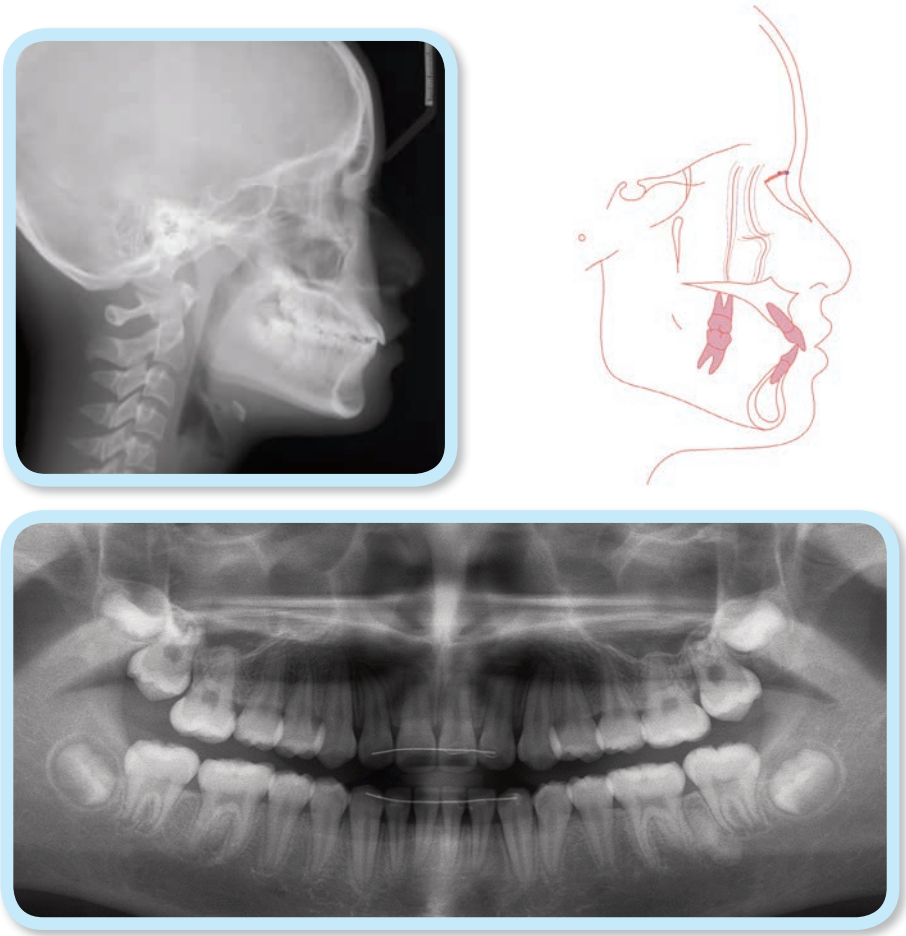


Fig. 17:
***Upper**: Post-treatment lateral cephalometric radiograph and tracing*
***Lower**: Post-treatment panoramic radiograph*

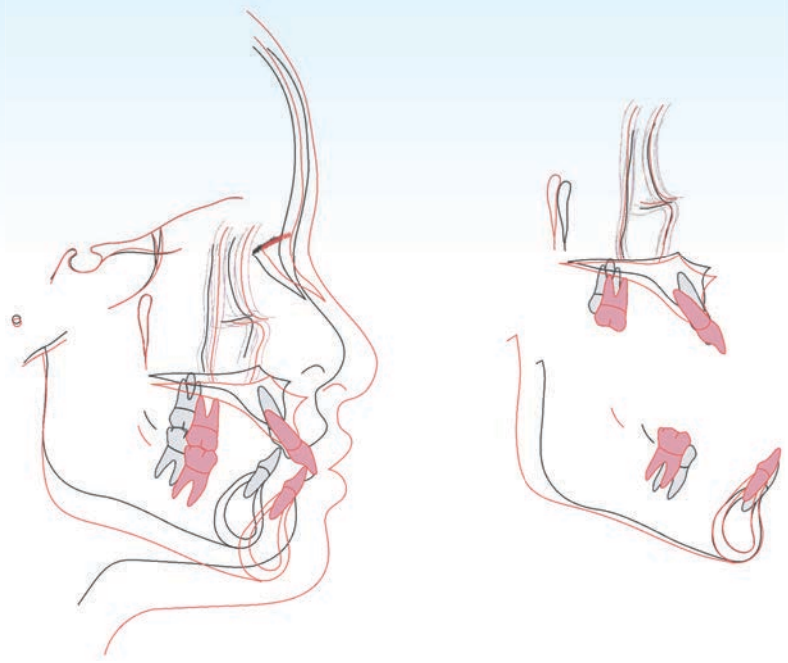


Fig. 18:
The anterior cranial base grew 4mm anteriorly during 42 months of active treatment. As usual the mandible grew further anteriorly than the maxilla, which improved the facial profile. See text and Table 1 for details.

Retention

Fixed retainers were bonded on the lingual surfaces of four upper incisors (2-2) and all lower anterior teeth (3-3). Upper and lower clear overlay retainers were provided and full time wear was prescribed for the first 6 months and nights only thereafter. The patient was instructed in home hygiene as well as care and maintenance of the retainers.

Discussion

Tooth transposition is presently defined as an interchange in the position of two adjacent teeth. Transposition of tooth crowns may be partial or complete depending on the respective positions of the roots. The problem is more common in the upper arch with the U3s as the most frequently involved teeth. Prevalence is <1% in most studies with a mean prevalence of 0.33% that was established with a meta-analysis.[12] In 1995, Peck and Peck[13] classified maxillary tooth transposition, according to the teeth involved. The 5 types described were primarily related to position of the U3s.[14] Etiology of maxillary permanent canine (*U3*) transposition is related to the complex development of the late mixed dentition period. The U3s have the longest developmental period, and path of eruption from germination, from just below the orbit in the fetal period, through calcification beginning 4-5 months after birth, to culminating with eruption into full occlusion at ~12 years age. The latter marks the beginning of the permanent dentition period.

As the tooth buds grow in the underdeveloped fetal jaw, the developing maxillary cuspid is superior and palatal to the first premolar initially, but then

migrates mesially and labially as tooth roots develop and jaw dimensions increase. Adjacent teeth develop and erupt leaving the canines to wedge between the growing roots and the U3s are usually displaced to the labial. The canine crown typically moves trough the labial plate of bone producing a canine bulge (*eminence*) on the alveolar surface that can be palpated and observed facially by the age of 8-10 years. Bony obstructions, dental crowding and resistance from adjacent structures, such as the unabsorbed root of a deciduous canine, may deflect the path of the growing canine resulting in transposition or impaction. Spontaneous eruption of an ectopic canine may jeopardize the roots of adjacent teeth particularly the lateral incisor.[15] The resorbed root of the lateral incisor is significantly correlated to encroachment of an ectopic canine. Resorbed incisor roots usually have good long-term healing potential and can be treated orthodontically.[16] The best strategy for efficiently reversing U3 transposition is early diagnosis and interceptive treatment.[17,18]

An important objective for interceptive orthodontic treatment is to correct transposition of U3(*s*) to achieve an optimal outcome with little or no root resorption (*Fig. 19*). This goal is best achieved with two phases of treatment for most patients. Mixed dentition treatment focuses on reversing the transposition and aligning the dentition prior to the late transition phase of occlusal development (*age 10-12yr*). Permanent dentition treatment is best accomplished after the second molars erupt. Avoiding incisal root resorption depends on effective management of a U3 transposition before the pubertal growth spurt.[18] Clinical palpation of the

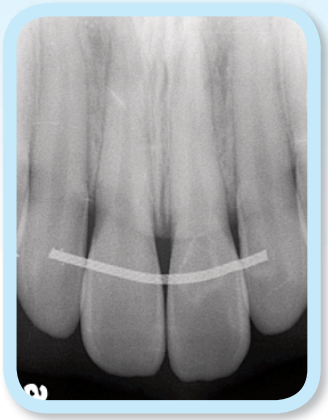


Fig. 19:
The root integrity of the maxillary incisors was preserved by interceptive orthodontic treatment.

canine eminence of the U3s high on the alveolar process and above the deciduous cuspid is an effective diagnosis tool beginning about the age of eight.[19] If the bulge (*canine eminence*) is not evident by age 10, radiographic imaging is indicated to determine if there is a developmental problem.

A NiTi open coil spring is useful for expanding the arch and creating space to accommodate the U3 which is considerably larger than the UC (*Fig. 20*).[20] If upper arch expansion is indicated in the mixed dentition, the D-gainer Damon system appliance is more gentle and effective with minimal risk of periodonal loss.[21,22] Teeth with roots near the crown of the unerupted U3 (*e.g. the U2*) should not be bonded so that they are free to move out the way of the path of eruption. For the present patient, the Damon D-gainer provided more than 5mm of space, which is comparable to traditional rapid or slow palatal expansion (*Fig. 21*). For optimal expansion, the length of the open coil spring should be 1-1.5 times the mesio-distal width of the bracket to

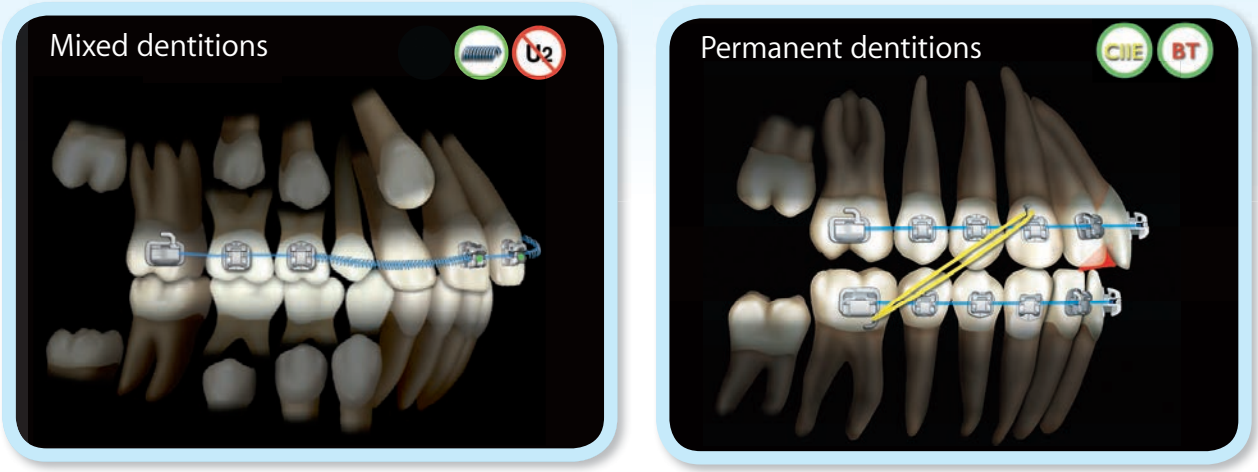


Fig. 20:

***Mixed Dentition**: Interceptive orthodontic treatment reversed the lateral incisor-canine transposition without bonding the upper lateral incisor (U2). See text for details.*

***Permanent Dentition**: A full fixed appliance (6-6), Class II elastics (CIIE) and bite turbos (BT) were used to correct the protrusive maxillary arch and overjet. See text for details.*

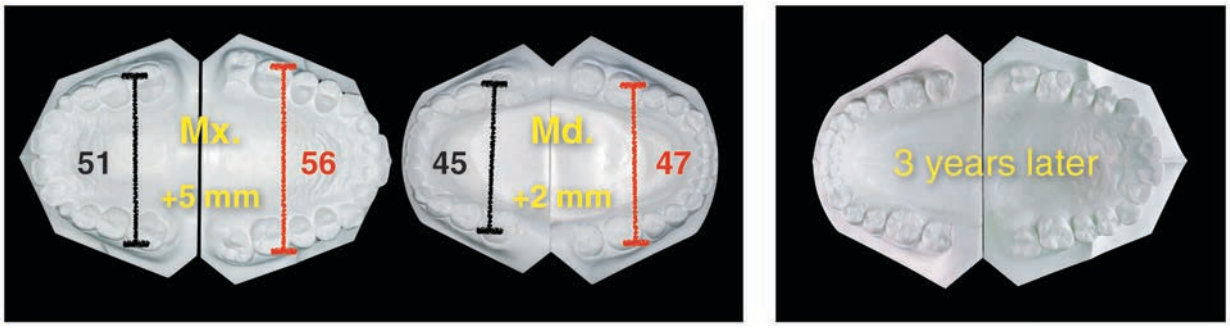


Fig. 21:

***Left**: Intermolar distance was expanded 5mm in the upper arch and 2mm in the lower arche during active treatment.*

***Right**: The post-treatment expansion was stable in both arches 3 years later.*

provide a light expanding force when threaded on a 0.014-in CuNiTi wire. In the absence of competent lips, progressive expansion of the maxillary arch to accommodate the U3 resulted in excessive maxillary incisor flaring (*Fig. 22*). Bonding low-torque brackets on the upper anteriors would have reduced this side effect.

Nine months into treatment, an iatrogenic increase in overjet was noted (*Fig. 22*), which was related to the 14 months of arch expansion and space opening that was required to achieve adequate arch length. As the space was opened, the U3s drifted distally but the overjet increased to 7mm (*Fig. 23*). It was necessary to consider upper premolar extractions because the patient was <10 years old and the second molars were

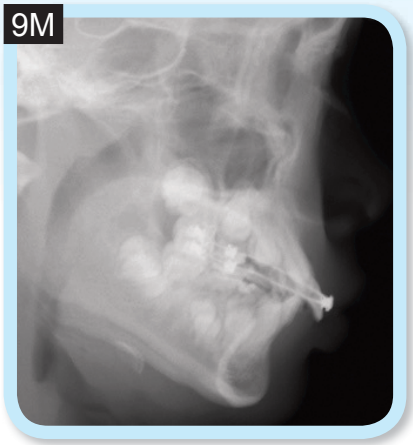


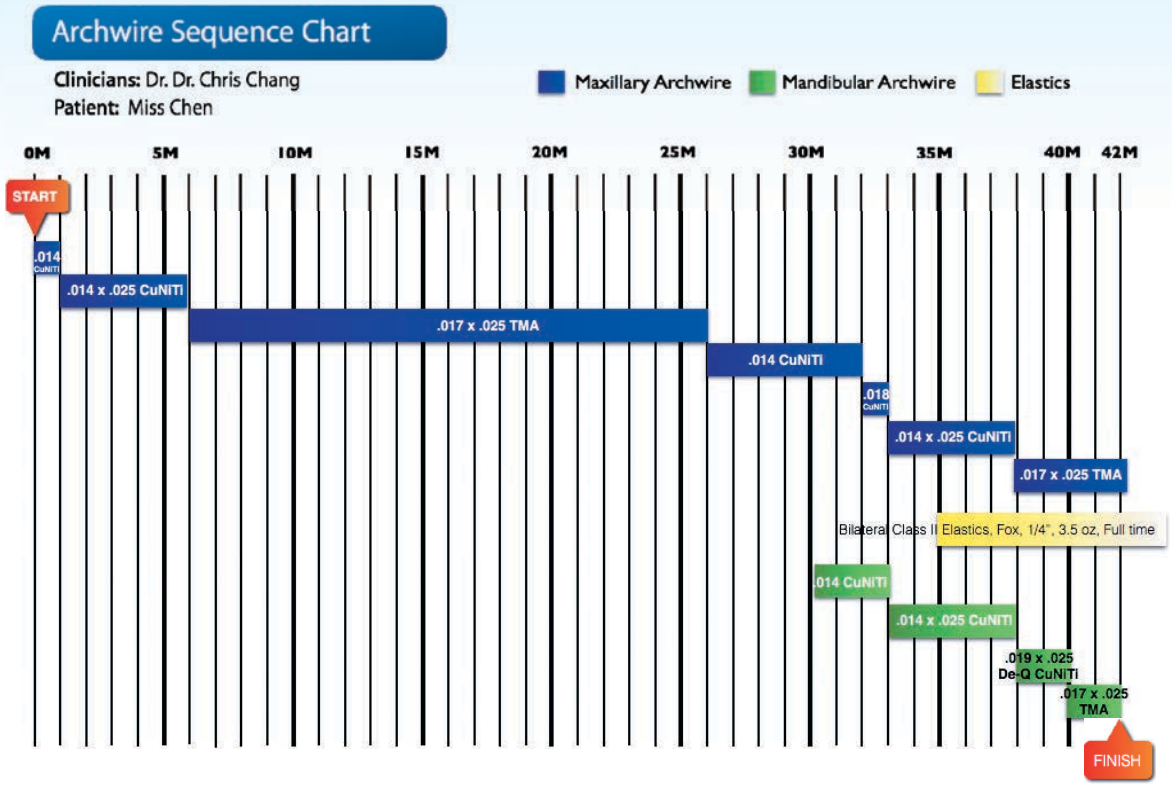
Fig. 22:
In the ninth month of treatment the overjet increased as the maxillary arch was expanded. See text for details.

Fig. 23:
At 14 months of active treatment, the upper right canine had drifted distally to almost its normal position in the arch.

not erupted. An option to extraction is headgear or retraction of the upper arch with a temporary anchorage device (*TAD*), but either approach can block eruption of the U7s. Overjet can also be reduced with a fixed functional appliance that promotes mandible growth,[23,24] but the current prepubertal patient was growing slowly, and excessive flaring of the lower incisors was likely. All considered, the best option was deemed: 1. align the upper arch, 2. bond brackets on the remaining dentition from 6-6 in both arches when the buccal segments erupt, 3. bond bite turbos on the palatal surfaces of the central incisors, and 4. correct the overjet with Class II elastics (*Fig. 20*).

During active treatment, the first molars were expanded 5mm in the maxilla and 2mm in the mandible. Three years later, the inter-molar distance in the maxilla was stable at 56mm (*Fig. 21*), compared to the contraction (*relapse*) that is typical of patients expanded with a rapid palatal expander (*RPE*).[25] The iatrogenic increase in overjet first noted at nine months (*Fig. 22*), was corrected to an ideal Class I occlusion with no overjet that was stable (*Fig. 24*).

Fig. 24: Three years after treatment, there is an ideal Class I occlusion with second molars fully erupted into full occlusion.



■ Table 2: Archwire sequence chart documents the mechanics of active treatment. See text for details.

Forty-two months of merged mixed and permanent dentition treatment resulted in a compromised outcome (*CRE 29*) with the most prominent deficiency being 13 points deducted for buccal-lingual inclinations. Because of the extended treatment time, only the permanent dentition from 6-6 was bonded and aligned with the fixed appliance. The erupting second molars were not bonded or aligned. It was hypothesized that the second molars would settle into acceptable relationships because the dentition from 6-6 was well aligned. That hypothesis was accepted because the alignment score improved 10 points to a CRE of 19 three years after treatment (*Worksheet 3 at the end of this report*). Lip protrusion and facial convexity decreased to achieve the desired facial result three years later (*Fig. 25*).

There are two keys to optimal resolution of the canine-lateral incisor transposition. One is to avoid bonding a bracket on the lateral incisor and the other is to keep the transposed canine as high as possible until it is clear of the roots of adjacent teeth.[16] In general, canine transpositions are most effectively managed in the early mixed dentition so diagnosis of the problem by about age 8 years is critical. If the transposed maxillary canine fully erupts, it is almost impossible to correct the problem without significant root resorption[26] and periodontal damage.[27] When transposed canines are fully erupted, it is often best to accept the transposition. If there is significant crowding, extraction of lateral incisors is usually preferable to removing premolars.

Fig. 25:
The facial profile continued to improve from pre-treatment (left), through post-treatment (center) to 3 years after treatment.

Conclusion

Early diagnosis and interceptive orthodontic treatment can correct an ectopically erupted tooth. This approach is designed to avoid transposition in the permanent dentition, as well as root resorption and/or periodontal defects. When the transposed canine is still high in the alveolar process, the path of tooth eruption can be redirected with a specific strategy: 3D radiographic imaging, arch expansion, removing dental or bony obstacles, and applying orthodontic traction. Careful clinical and radiographic evaluation of treatment progress is essential. Orthodontic treatment of the canine transposition often requires a long treatment time (*~4 years*) from the early mixed dentition (*~age 8*) until the initial permanent dentition (*~age 12*). However, interceptive treatment is the most effective approach for achieving harmonious esthetics and an optimal occlusion.

Acknowledgement

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Reference

1. Kokich VG. Surgical and orthodontic management of impacted maxillary canines. Am J Orthod Dentofacial Orthop 2004;126(3):278-83.
2. Sachan A, Chaturvedi TP. Orthodontic management of buccally erupted ectopic canine with two case reports. Contemp Clin Dent 2012;3(1):123-128.
3. King GJ, Brudvik P. Effectiveness of interceptive orthodontic treatment in reducing malocclusions. Am J Orthod Dentofacial Orthop 2010;137(1):18-25.
4. Ely NJ, Sherriff M, Cobourne MT. Dental transposition as a disorder of genetic origin. Eur J Orthod 2006;28(2):145-51.
5. Papadopoulos MA, Chatzoudi M, Karagiannis V. Assessment of characteristic features and dental anomalies accompanying tooth transposition: a meta-analysis. Am J Orthod Dentofacial Orthop 2009;136(3):308. e. 1-10.
6. Hsieh TJ, Pinskaya Y, Roberts WE. Assessment of orthodontic treatment outcomes: early treatment versus late treatment. Angle Orthod 2005;75(2):162-70.
7. Chang CH, Roberts WE. Orthodontics [E-reader version]. Hsinchu: Newton'A Ltd; 2012. Available from: https://itunes.apple.com/book/orthodontics-vol.-i/id520098562?mt=11.
8. Kokich VG, Nappen DL, Shapiro PA. Gingival contour and clinical crown length: their effect on the esthetic appearance of maxillary anterior teeth. Am J Orthod 1984;86(2):89-94.
9. Baccetti T, Leonardi M, Armi P. A randomized clinical study of two interceptive approaches to palatally displaced canines. Eur J Orthod 2008;30:381–85.
10. Lin JJ. Creative orthodontics blending the Damon system and TADs to manage difficult malpositions 2nd ed. Taipei: Yong Chieh Co; 2010. p. 187-208.
11. Pitts T. Begin with the end in the mind: bracket placement and early elastics protocol for the smile protection. Clin Impressions 2009;17:4-13.
12. Papadopoulos MA, Chatzoudi M, Kaklamanos EG. Prevalence of tooth transposition. A meta-analysis. Angle Orthod 2010;80(2):275-85.
13. Peck S, Peck L. Classification of maxillary tooth transpositions. Am J Orthod Dentofacial Orthop 1995;10:505–517.
14. Shapira Y, Kuftinec MM. Maxillary tooth transpositions: characteristic features and accompanying dental anomalies. Am J Orthod Dentofacial Orthop 2001;119(2):127-34.

15. Ericson S, Kurol PJ. Resorption of incisors after ectopic eruption of maxillary canines: a CT study. Angle Orthod 2000;70(6):415-23.
16. Hsu YL, Chang CH, Roberts WE. Canine-lateral incisor transposition: controlling root resorption with a bone-anchored t-loop retraction. Am J Orthod Dentofacial Orthop 2016;150:1039-50.
17. Falahat B, Ericson S, Mak D'Amico R, Bjerklin K. Incisor root resorption due to ectopic maxillary canines: a long-term radiographic follow-up. Angle Orthod 2008;78(5):778-85.
18. Parker WS. Transposed premolars, canines, and lateral incisors. Am J Orthod Dentofacial Orthop 1990;97:43–48.
19. Williams BH. Diagnosis and prevention of maxillary cuspid impaction. Angle Orthod 1981;51(1):30-40.
20. Hsu YL, Chang CH, Roberts WE. Early intervention of class III malocclusion and impacted cuspids in late mixed dentition. Int J Orthod Implantol 2012;28:66-79.
21. Brunetto M, Andriani Jda S, Ribeiro GL, Locks A, Correa M, Correa LR. Three-dimensional assessment of buccal alveolar bone after rapid and slow maxillary expansion: a clinical trial study. Am J Orthod Dentofacial Orthop 2013;143(5):633-44.
22. Podesser B, Williams S, Crismani AG, Bantleon HP. Evaluation of the effects of rapid maxillary expansion in growing children using computer tomography scanning: a pilot study. Eur J Orthod 2007;29(1):37-44.
23. Nelson C, Harkness M, Herbison P. Mandibular changes during functional appliance treatment. Am J Orthod Dentofacial Orthop 1993;104(2):153-61.
24. Cozza P, Baccetti T, Franchi L, De Toffol L, McNamara JA Jr. Mandibular changes produced by functional appliances in Class II malocclusion: a systematic review. Am J Orthod Dentofacial Orthop 2006;129(5):599. e. 1-12.
25. Huynh T, Kennedy DB, Joondeph DR, Bollen AM. Treatment response and stability of slow maxillary expansion using Haas, hyrax, and quad-helix appliances: a retrospective study. Am J Orthod Dentofacial Orthop 2009;136(3):331-9.
26. Cernochova P, Krupa P, Izakovocova-Holla L. Root resorption associated with ectopically-erupting maxillary permanent canines: a computed tomography study. Our J Orthod 2011;33(5):483-491.
27. Nabbout F, Skaf Z, Hlayhel J. Maxillary tooth transposition: a report of two cases. Int Orthod 2017;15(3):467-482.

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 = 2

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 = 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	4 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 = 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° 102° = 1 pt.

Each degree > 99° _____ x 1 pt. = 3

Total = 4

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 pts. =	_____
Missing teeth, congenital	_____	x 2 pts. =	_____
Spacing (4 or more, per arch)	_____	x 2 pts. =	_____
Spacing (Mx cent. diastema ≥ 2mm)		@ 2 pts. =	2
Tooth transposition	2	x 2 pts. =	4
Skeletal asymmetry (nonsurgical tx)		@ 3 pts. =	_____
Addl. treatment complexities	2	x 2 pts. =	4

Identify: Treatment since early mixed dentition, unacertained mandible growth

Total = 10

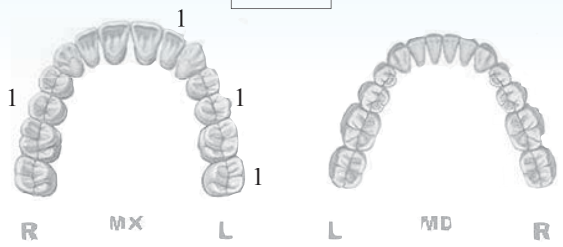
Cast-Radiograph Evaluation

Case # **Patient**

Total Score: 29

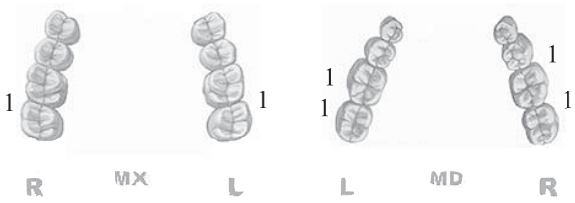
Alignment/Rotations

4



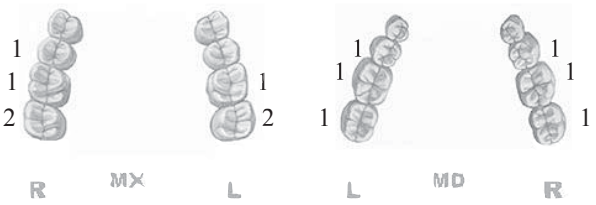
Marginal Ridges

6



Buccolingual Inclination

13

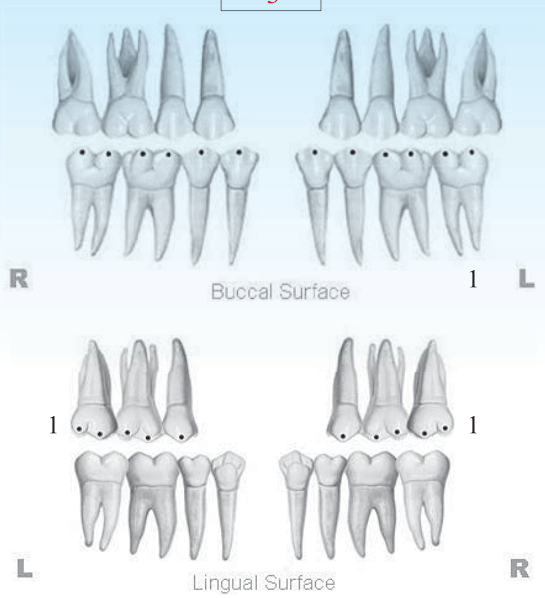


Overjet

2

Occlusal Contacts

3

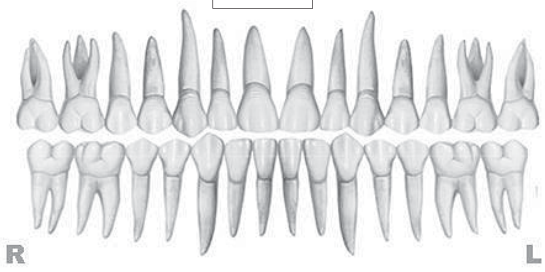


Occlusal Relationships

0

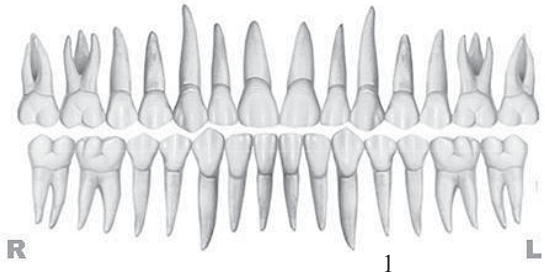
Interproximal Contacts

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.

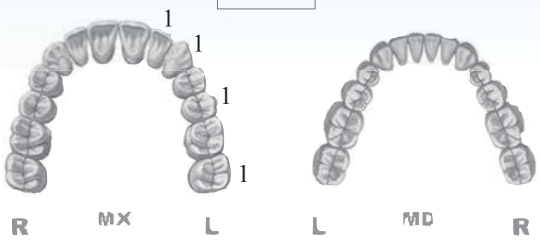
Cast-Radiograph Evaluation
3yrs F/U

Case # **Patient**

Total Score: 19

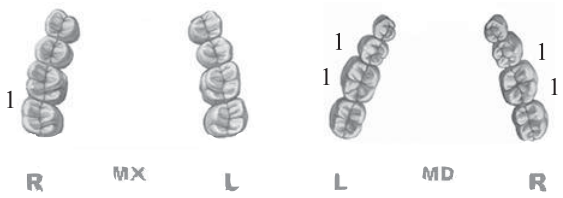
Alignment/Rotations

4



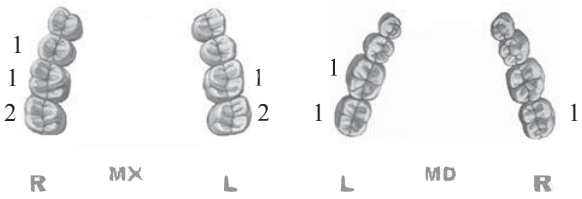
Marginal Ridges

5



Buccolingual Inclination

10

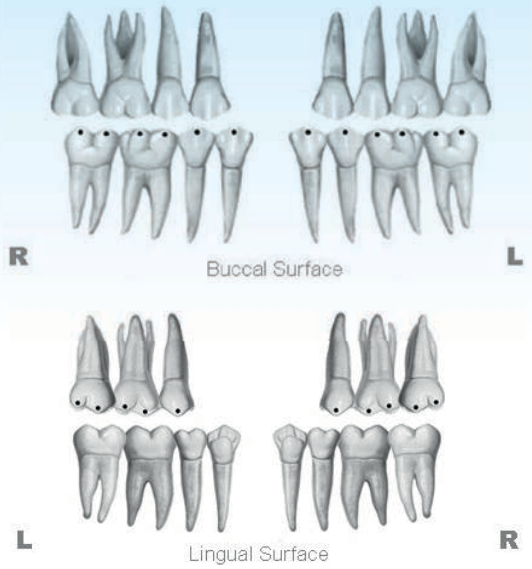


Overjet

0

Occlusal Contacts

0

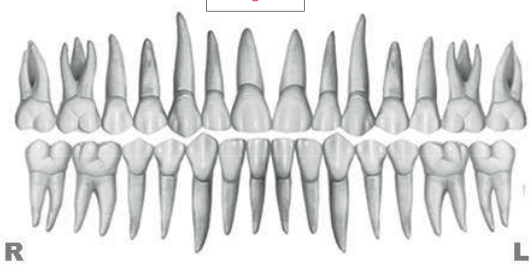


Occlusal Relationships

0

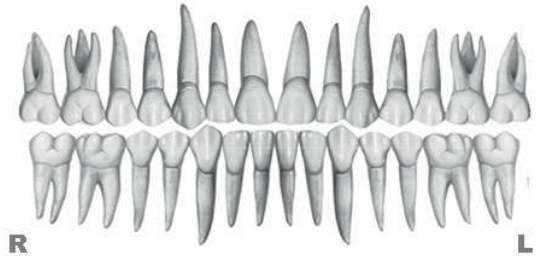
Interproximal Contacts

0



Root Angulation

0



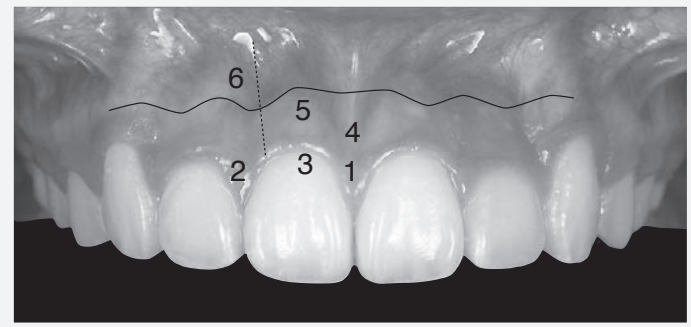
INSTRUCTIONS: Place score beside each deficient tooth and enter total score for each parameter in the white box. Mark extracted teeth with "X". Second molars should be in occlusion.

IBOI Pink & White Esthetic Score (Before Surgical Crown Lengthening)

Total Score: = 4

1. Pink Esthetic Score

Total = 1

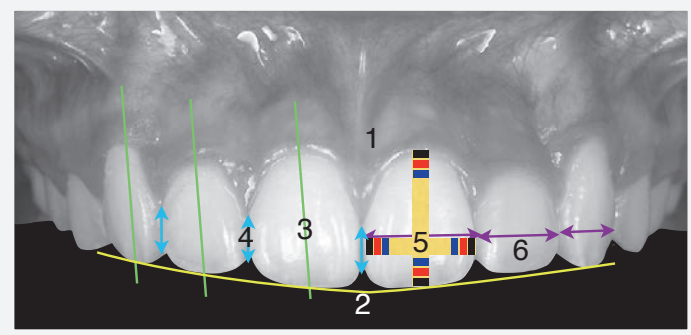


1. M & D Papillae	0	1	2
2. Keratinized Gingiva	0	1	2
3. Curvature of Gingival Margin	0	1	2
4. Level of Gingival Margin	0	1	2
5. Root Convexity (Torque)	0	1	2
6. Scar Formation	0	1	2

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 = 3



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

2018~2019 第十年度

貝多芬 矯正精修班

時間：每月中週二上午 9:00-12:00
地點：金牛頓教育中心（新竹市建中一路25號2樓）

上課日期：

2019

8/14、9/4、10/16、11/13、12/11、
1/8、3/19、4/16、5/14、6/25、7/23

- 09:00 ~ 10:00 精選文獻分析
- 10:00 ~ 10:30 精緻完工案例
- 10:50 ~ 12:00 臨床技巧及常犯錯誤分享

全新的第十年度 2018-19 貝多芬精修班， 是由國際知名講師張慧男醫師主持，並偕同貝多芬牙醫團隊住院醫師群共同主講。

每月一次的課程之中，包含了：

1. 精選矯正權威期刊 AJODO 的文章做文獻分析與評讀。
2. 精緻完工 ABO 案例報告，其中因應數位矯正的世界趨勢，Insignia 與 Invisalign 病例為課程探討的主要內容之一。
3. 分享臨床上常犯的錯誤以及解決方法。

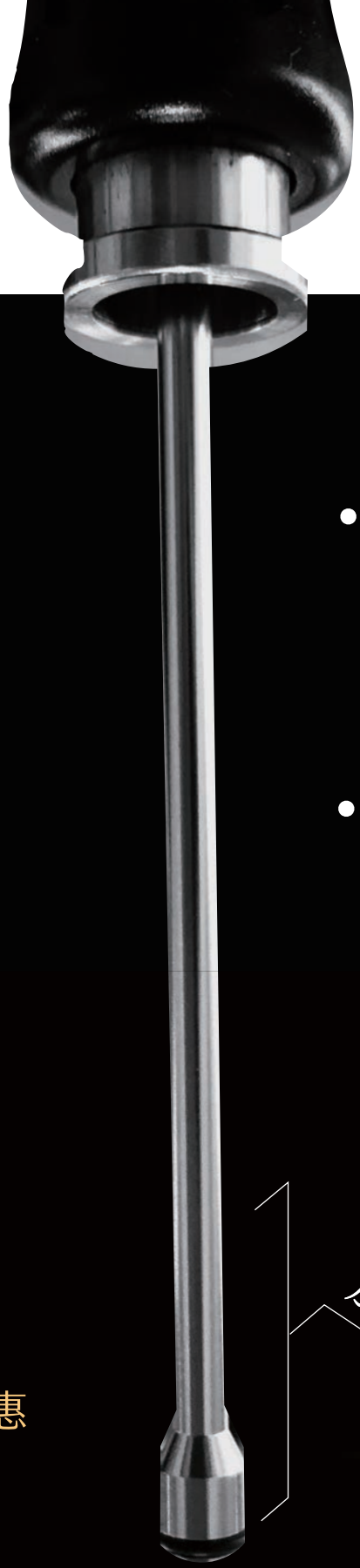
2018-19 貝多芬精修班內容豐富精彩，讓您經由每個月一次的課程，在面對各式的臨床案例時，更能游刃有餘、得心應手。

學習目的：

研讀最新趨勢文章可以窺知世界文獻公認的治療方式，而藉由評論文章的優缺點不僅能夠訓練判斷與思考能力，更可以清楚比較作法上的不同，達到完整理解治療方向、內容與穩定性的目標。

報名專線：03-5735676＃219，詹雅婷

全面加長，全新進化



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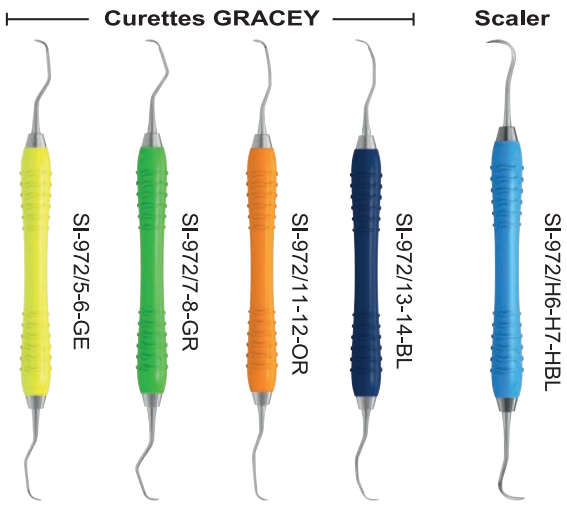

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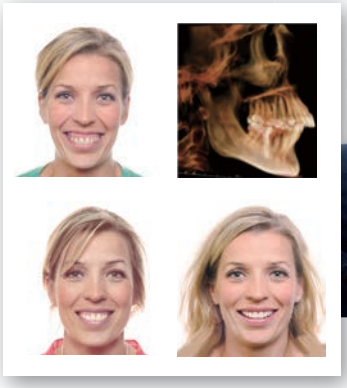
Stuart L. Frost, DDS
Mesa, Arizona

Dr. Frost 從 University of the Pacific School of Dentistry 取得牙醫學位，並有5 年一般牙科的臨床經驗。以研究獎學金專攻於顳顎關節疾病(TMD)一年後，他在 University of Rochester 完成了兩年的矯正與牙顏面矯正住院醫師。現在兼任 University of the Pacific 矯正課程的臨床副教授，並於全世界各地演講 Damon System。

此為期一天的演講，適合給剛開始接觸被動自鎖式 (PSL; Passive self-ligation) 矯正器，或是臨床上已使用 PSL 但想要提升其操作技巧與臨床應用的醫師。透過強調 PSL 的核心概念，以及互動式討論不同類型的臨床病例，這場演講將會注重在合併評估牙周問題之 Class II、ClassIII、拔牙等病例的治療力學與治療計劃。

CASE 1



CASE 2

KEY OBJECTIVE COVERED

A Proven approaches to varied Class II and Class III Cases
- Indication
- Bracket position
- Bite turbo
- Early light short elastics
- Clinical tips

B Extraction vs. Non-Extraction treatment

主辦單位：臺灣大學牙醫校友總會　　協辦單位：湧傑企業股份有限公司
演講日期：2018/ 08 /19 / (Sun.) 9:00 ~17:00
地　　點：[台灣金融研訓院]-菁業堂　台北市羅斯福路三段62號2樓
報名費用：8/3前 主協辦單位 會員2000 / 非會員2500 , 學生 1500元
　　8/3後 主協辦單位 會員3000 / 非會員3500 , 學生 2000元
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　　請於報名後三日內，至郵局劃撥費用（於通訊欄註明報名場次）
　　戶名：湧傑企業股份有限公司　帳號：17471807
學　　分：依衛福部醫事人員繼續教育辦法登錄學分
備　　註：活動備茶點及午餐，素食請先告知。報名未出席者恕不退還既收款項。

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Fig. 1. Bond strength of various self-adhesive cements to dentin (MPa)[5]

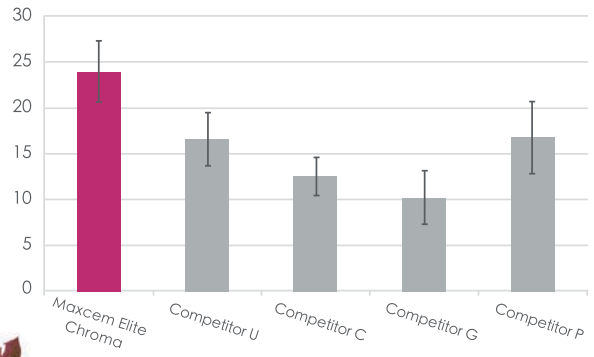
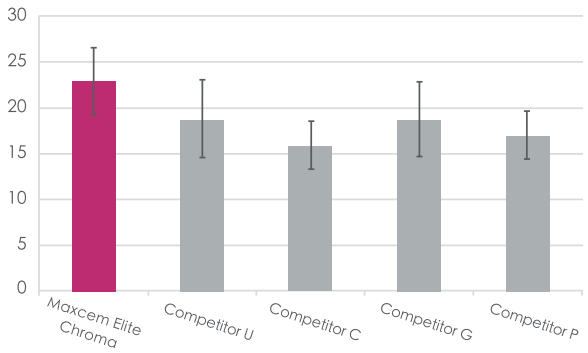
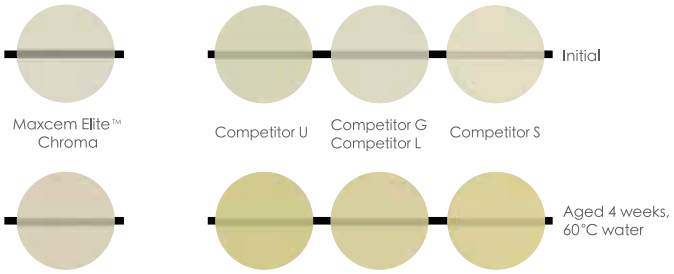


Fig. 2. Bond strength of various self-adhesive cements to enamel (MPa)[5]



LONG-TERM COLOR STABILITY



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Feedback from the Beethoven International Workshop, May, 2018

Dr. Chris is very talented as a speaker, really simplifies the way to learn. Very professional slides and photographs, the Keynote is amazing. It was very good. Some students are very avid to see interfering with others, but it was plenty of opportunity to see. Great hands on component with the TADs, wire bending and pigs.

Rita Rockliff
AUSTRALIA

Dear Chris,

Hands-on surgery was great and procedures were well taught and practiced, organisation of the course was spot on, Keynote was more than I expected! We all got a chance to look and learn and great idea to divide us into two groups. Easier to learn. Loved to see the clinic in real life process, Chris was impressively patient and generous to listen to our endless questions. Thanks for a great time, the Newton's A team are superb! Very knowledgeable, friendly and supportive. Keynote presenters were amazing. You are a wonderful team, keep up the good work. Chris, you not only made this course educational, you really made it lots of fun and great memories were easily created. Thanks for everything looking forward for more.

Sandy Ghattas,
AUSTRALIA

The results of the shown cases impressed me the most. The treatment plans with the miniscrews open a new range of possibilities and make the treatments more predictable. Thanks a lot for this wonderful course and perfect organisation! I will recommend it to everybody! Chris, you and your whole Team were really impressive! You are always invited to visit me in Innsbruck/Austria.

Andreas Buchner
GERMANY/AUSTRIA

Dear Chris,

The lectures were very informative! The chair-side observation was great to watch! I learned a lot! Staff were all extremely helpful and lovely, thank you. Chris is such an inspiration, great host, thank you! I'm very grateful for the opportunity.

Amanda Ho,
AUSTRALIA

International Beethoven Workshop

Dental Clinic Established 1996

2018 Session A: 05/22-25 (Full) Session B:12/04-07 (Full)
Additional session: 03/13-16 (Full)

@Taiwan

Since 2009, Beethoven International Damon, OBS & VISTA Workshop has received over 350 participants from more than 30 countries. This three-day advanced hands-on course combines practical lectures and in-office clinical learning and has attracted orthodontic practitioners worldwide to strengthen their skills and knowledge in the Damon System, TADs and minimally invasive surgeries. In addition to clinical development, participants will be exposed to clinic management and staff training of a world-class orthodontic centre. The optional Keynote workshop will help improve your ability to master professional digital communication. Come join us and be part of a community of excellence.

Course Schedule

VISTA

This 4-hour hands-on surgical workshop features minimally invasive procedures for impactions and soft tissue enhancement.

Topics include:

1. VISTA for Screw Placement
2. VISTA for Connective Tissue Graft
3. Suture Techniques

Day 1	Chair-side observation
Day 2	Lecture, Model workshop, Chair-side observation
Day 3	VISTA Lecture, Lecture by Dr. John Lin, VISTA workshop
Day 4	Keynote workshop by Newton's A team

KEYNOTE

Dr. Rungsi Thavarungkul, Thailand
Lecturer, Advanced Keynote Workshop

"If you think this is a computer course that will show you step-by-step how to use the application, please reconsider. If you want to improve communication in your practice, and with patients, this 8-hour course is definitely worth it."

THE LECTURERS

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 ***International Journal of Orthodontics & Implantology,*** he has been actively involved in the design and application of orthodontic bone screws.

Dr. John Lin

President of the Jin-Jong Lin Orthodontic Clinic. Dr. Lin received his MS. from Marquette University and is an internationally renowned lecturer. He's also the author of Creative Orthodontics and consultant to ***International Journal of Orthodontics & Implantology.***

FEES

Day 123 USD 2,700 Early bird rate: USD 200 off (advanced registration 2 months prior to the course date)
Day 4 USD 600 Early bird rate: $100 off (advanced registration 2 months prior to the course date)

For more information and registration, visit
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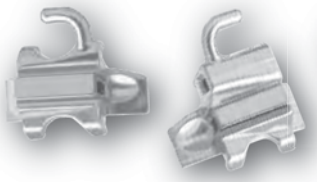

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2. Customers who purchase one set of courses will have access to both the narrated and non-narrated version.
3. Some courses, including Damon Q and Advanced, are renewed annually and each renewal is to be purchased separately with a 50% discount.

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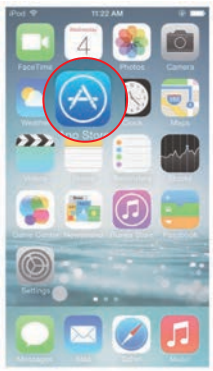
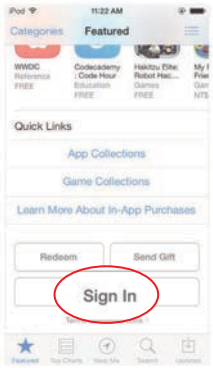
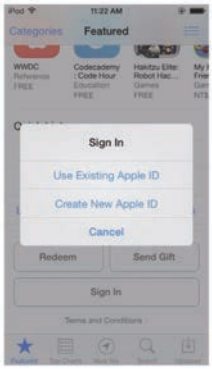


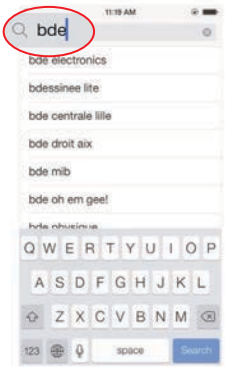
1. Go to App Store on your device.



2. "Sign in" with your Apple ID.



3. "Create Apple ID" if you don't have one.



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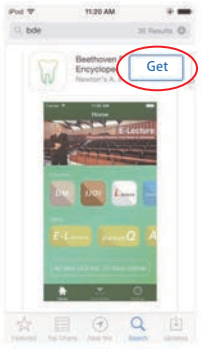

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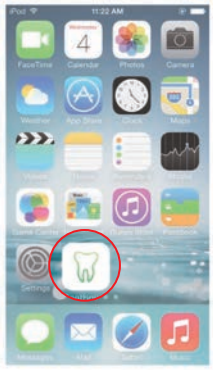

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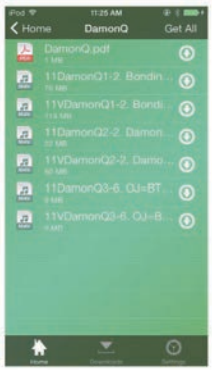

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The 2018 Beethoven International Workshop participants together with Drs. John Lin (first row, center right) and Chris Chang (first row, center left) in Newton's A Library, Hsinchu, Taiwan. May 22-24, 2018.