JDO

Journal of **D**igital **O**rthodontics

International Journal for Orthodontists and Implantologists

Vol. 56 Oct 1, 2019

Dr. Chris Chang speaking in the 2019 Orthodontic Conference in the magnificent Yitzhak Rabin Center hosted by the Tel-Aviv University School of Dentistry, Orthodontic Department.

ISSN 2523-9392

977 2523939 006

This journal is available for free download at iJDO.pro.

2020-21
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。

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 2020
Module 1 - **4/23**
Module 2 - **5/21**
Module 3 - **6/4**
Module 4 - **7/2**
Module 5 - **8/20**
Module 6 - **6/19-20**（擇一）

Year 2 2020-21
Module 1 - **9/24**
Module 2 - **10/15**
Module 3 - **11/19**
Module 4 - **12/17**
Module 5 - **1/7**/21'

Damon + .014 Cu NiTi

Excellent Finishing
(Tue) 9:00-12:00 中文授課

Critically reviewing classical literature and contempoRary papers and applying lessons learned to clinical work; utilising ABO's DI and CRE standards to turning excellent finishing into attainable goals.

Finishing XI
Module 1 - **8/27**
Module 2 - **9/10**
Module 3 - **10/22**
Module 4 - **11/12**
Module 5 - **12/10**
Module 6 - **1/14**/20'
Module 7 - **2/25**
Module 8 - **3/24**
Module 9 - **4/14**
Module 10 - **5/19**
Module 11 - **6/16**

Damon Clear

Damon, OBS & VISTA International Workshop
English Class

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.

course@newtonsa.com.tw
+886-3-573-5676 #218 Annie

2019
Class 1 - **5/21-24**
Class 2 - **12/03-06**

2020
Class 1 - **5/12-15**
Class 2 - **12/08-11**

Damon + Bite Turbo + Early Light Short Elastic

每次上課請依最新一期 JDO 公告為主

報名專線
湧傑 Yong Chieh
北區 楊文君 02-27788315 #122
中區 張馨云 04-23058915
南區 蔡淑玲 07-2260030

上課地點：新竹市建中一路25號2樓（金牛頓藝術科技）
2F, No. 25, Jianzhong 1st Rd., Hsinchu City, Taiwan (Newton's A)

What makes an orthodontic graduate program a great program?

Why do I ask? Well, one of the junior doctors in my clinic, Alex, has been applying for graduate programs in the U.S. and has received a staggering eleven interview requests! In my day I was lucky to have received three and now this young man is spoilt for choice. He asked me which school would be the best and I have to admit I was unable to answer such a simple question. Not bad, when one considers I've been in the profession for 33 years!

The answer came to me in Israel, where I'd been invited to be the keynote speaker at the Israeli Orthodontist Conference, as well as giving a commencement speech to the graduating Orthodontic class at Tel Aviv University. That evening as we ate our dinner, I asked my dining partners which one they would consider to be the best program in the U.S. and no consensus was reached.

The next day, after the commencement speech, the graduating students had to present their work in a top-tier way and comment on their three and half year program. This was when the penny dropped and I realized the answer is actually quite obvious. I saw in Tel Aviv University an intimate bonding between the students and their program coupled with the love of Orthodontics they had inherited from the faculty members. This made a deep and lasting impression on me and answered Alex's question.

Now, if I ever get asked this question again, I have the answer; the school which:

1. Teaches the students the right way to learn, to think, and to practice our profession.
2. Teaches the students the love for this profession, the devotion required, and helps establish a spirit of belonging and identity within the profession.
3. Most importantly, teaches the students to become a close member of this big family/profession.

If all the graduating students from every University could feel this love for our profession and their patients, then all schools would be the best and our profession's future would be able to enjoy unlimited evolution and improvement. I hope that all of us in the orthodontic profession can join in to achieve this goal as we march along our path to glory.

Chris Chang PhD, ABO Certified, Publisher of JDO

Class III Malocclusion with an Atrophic Edentulous Ridge Treated with Autotransplantation, Lower First Molar Extraction and Space Closure

Abstract

Diagnosis: *A 19-year-10-month-old female with chief complaints of crowding and missing teeth presented for a second opinion. Clinical examination revealed a straight profile, 3° G-Sn-Pg' facial convexity, and high mandibular plane angle (SN-MP 35°). The occlusion was Class III, crowded anterior segments, missing left maxillary first and second premolars, and an edentulous atrophic ridge. All third molars were present and the lower right first molar (LR6) was compromised with poor tooth structure and failed endodontics. The ABO Discrepancy Index (DI) was 20.*

Etiology*: Class III dentofacial malocclusion was due to genetics and environmental factors. The absence of both upper left premolars had resulted in the mesial migration of her upper left molars and a residual atrophic edentulous ridge.*

Treatment*: The emphasis was on a conservative treatment plan that preserved healthy teeth. The right upper second premolar (UR5) was endodontically treated and autotransplanted into the edentulous atrophic site (UL4). Both mandibular first molars were extracted and the adjacent second and third molars were protracted to close space and substitute for the first molars.*

Outcome*: The autotransplanted premolar healed successfully, crowding was corrected, and the dentition was well aligned with Class I canine and Class II molar relationships. The ABO Cast Radiograph Evaluation (CRE) was 16. (J Digital Orthod 2019;56:4-20)*

Key words:
Autotransplantation, Class III malocclusion, wisdom teeth replacement

History

A 19-year-10-month-old female presented with the chief complaints of crowding and missing premolars. The pre-treatment facial photographs (*Fig. 1*) showed a straight profile with 3° facial convexity (*G-Sn-Pg'*). Her upper left first and second premolars were missing leaving a severe atrophic ridge (*Figs. 2 and 3*). Brackets were bonded on the upper arch by a previous orthodontist (*Fig. 2*), but her parents wanted a second opinion because they were not satisfied with the treatment plan.

Intra-oral examination revealed missing upper left premolars, severe atrophic ridge (*Fig. 4*), Class III canine relationship, and a compromised lower right first molar. The maxillary dental midline was shifted 1mm to the left of the facial midline. As outlined in Table 1, the previous orthodontist had proposed Plan A: extract both mandibular wisdom teeth and the maxillary right wisdom tooth. Three temporary anchorage devices (*TADs*) were proposed: bilateral in the mandibular buccal shelf regions, and in the right maxillary infrazygomatic crest. A dental implant was planned for the edentulous space which was deemed a viable option because

Dr. Derek Teng-Kai Yang,
Orthodontist, E-Da Hospital (Upper left)

Dr. Po-Jan Kuo,
Periodontist, Jing-Jong Lin Orthodontic Clinic (Upper center)

Dr. Nancy Nie-Shiuh Chang,
Periodontist, Jing-Jong Lin Orthodontic Clinic (Upper right)

Dr. John Jin-Jong Lin,
Examiner, Journal of Digital Orthodontics
Director, Jin-Jong Lin Orthodontic Clinic (Lower left)

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

longterm implant success is reported to be up to 94.6%.[1] However, the patient and her parents wanted to preserve as many healthy teeth as possible. According to the family concerns, Plan B was proposed: autotransplant the UR5 to restore the edentulous space (*UL4*), extract both lower first molars, and close space to produce an intact lower arch (*Table 1*).

Fig. 1: Pre-treatment facial photographs

Fig. 2: Pre-treatment intraoral photographs

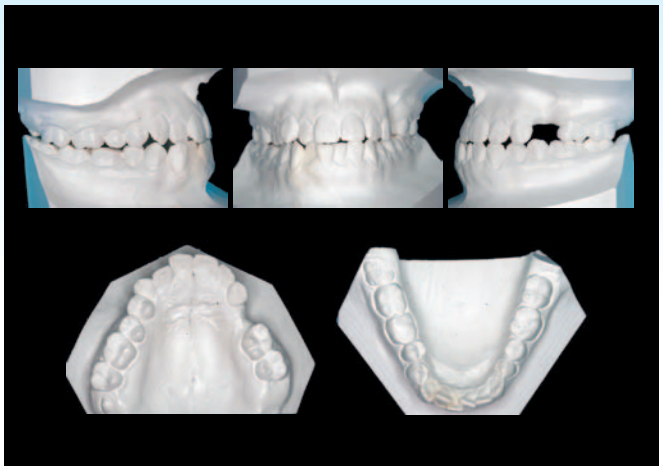

Fig. 3: Pre-treatment dental models (casts)

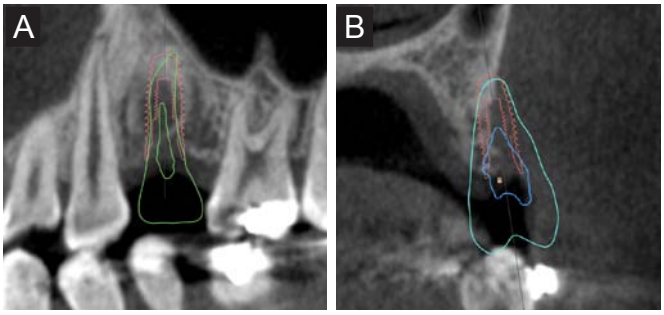

Fig. 4:

A. Sagittal slice showing the similar mesio-distal dimension of the virtual dental implant (red line) and donor tooth (green line) at the alveolar bone crest level.

B. Coronal slice from the radiographic examination showing complete loss of the buccal plate.

	Tx Plan A	Tx Plan B
Dental Implant	1	No
46 Dental Crown	Yes	No
Extraction	18, 38, 48	15 for 24, 36, bad 46
Distalization	17, 37, 47	No
Screws	3	No
Re-endo	46	No
Bone Graft	Yes	Yes
Waste of 18	Yes	No

Table 1: Plan A and Plan B comparison.

CBCT images of the virtual dental implant (*Ø4.3mm x 11.5mm*) with a crown is shown with a red outline. An imported STL file was used to replicate the donor tooth (*green line*) (*Fig. 4*). The buccal-palatal width of the donor tooth (*8.3mm*) was greater than the dental implant (*4.3mm*). A horizontal bone augmentation procedure to produce a ridge >5mm was essential for dental implant placement. However, the bone augmentation volume and the surgical complexity could be reduced using autotransplantation.

The patient and her family accepted Plan B. She was treated to a pleasing result in 35 months without TADs or a dental implant (*Figs. 5-7*). The cephalometric and panoramic radiographs document the dentofacial patterns before and after the treatment (*Figs. 8 and 9*). The superimposed cephalometric tracings show the dentofacial changes associated with the treatment (*Fig. 10*). Table 2 is a summary of the cephalometric measurements. A comparison of the alternate treatment plans is illustrated in Fig. 11.

Diagnosis and Etiology

Facial:

- Length: *Long tapered face in the frontal plane*
- Protrusion: *The facial convexity is relatively straight (3° G-Sn-Pg'), which was within the normal limits (WNL) despite mild retrusion of the maxilla (Table 2)*
- Symmetry: *The maxillary dental midline is shifted to the left 1mm, and the chin point is deviated 2mm to the right*
- Smile Line: *The incisal exposure is WNL, but the smile arc was not consistent with the lower lip*

Fig. 5: Post-treatment facial photographs

Fig. 6: Post-treatment intraoral photographs

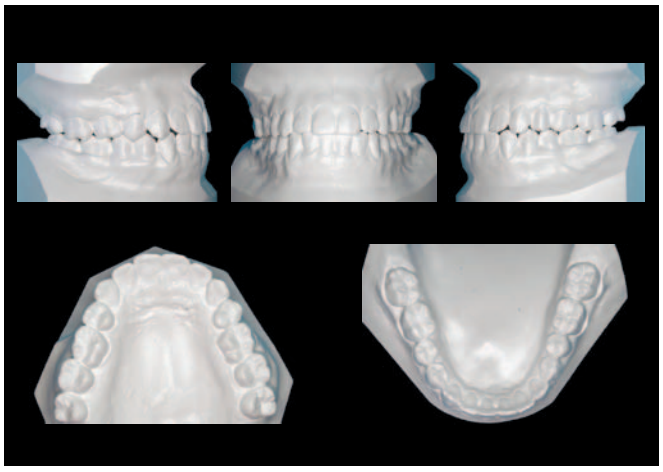

Fig. 7: Post-treatment dental models (casts)

Skeletal:

- Intermaxillary Relationship: *Mild retrusion of the maxilla and mild prognathism of the mandible (SNA 79.5° , SNB 81° , SNA -1.5°) (Table 2)*
- Mandibular Plane: *High mandibular plane (SN-MP 35°, FMA 28°)*
- Vertical Dimension of Occlusion (*VDO*): *Mildly excessive (ANS-Gn is 55% of Na-ANS-Gn dimension), compared to a norm of 53%*
- Symmetry: *Mandible deviation to the right (Fig. 1)*

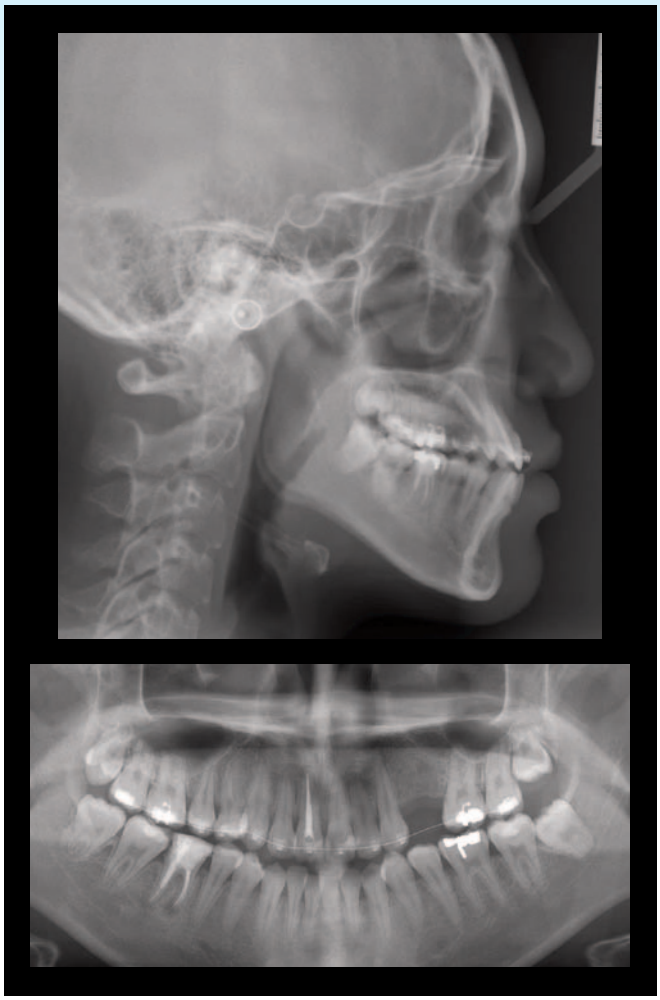

Fig. 8:
Pre-treatment cephalometric (above) and panoramic (below) radiographs.

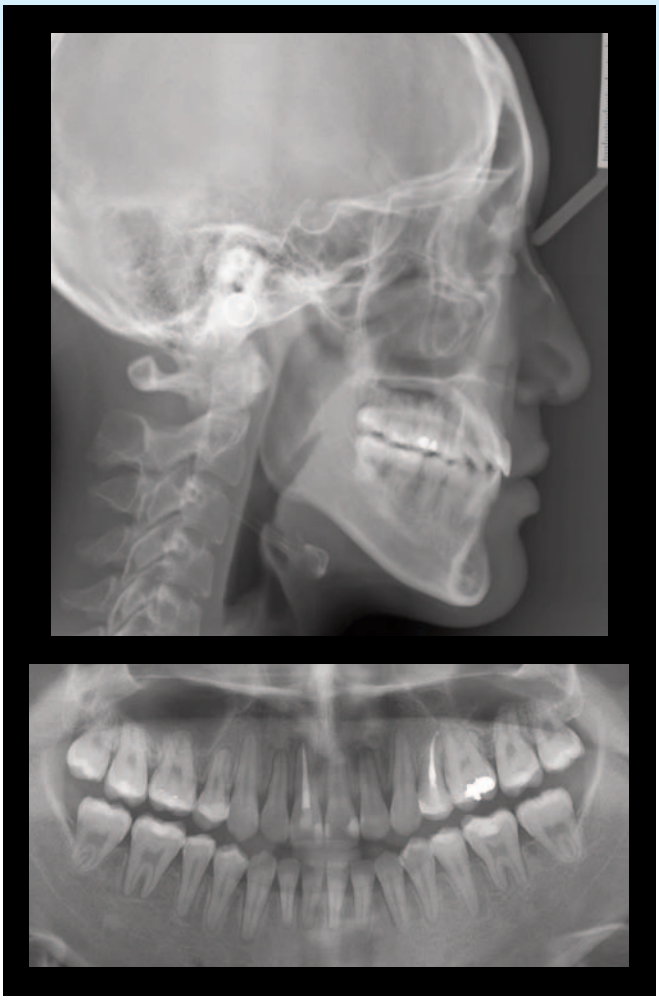

Fig. 9:
Post-treatment cephalometric (above) and panoramic (below) radiographs.

Dental:

- Classification: *Class III molar on the right side, Class I molar on the left side, and bilateral Class III canine relationship (Fig. 3)*
- Overbite: *0mm*
- Overjet: *-1mm (anterior crossbite)*
- Anomalies: *The left maxillary first and second premolars are missing and the left maxillary molars had migrated mesially. The lower right first molar was compromised with failed endodontic treatment.*
- Symmetry: *The maxillary midline had shifted to the left of the facial midline by 1mm, and the lower dental midline was deviated 2mm to the right due to the skeletal problem*
- Crowding: *There was about 5mm of crowding in the lower arch*
- Archforms: *V shaped in the maxilla and ovoid in the mandible*

The American Board of Orthodontics (*ABO*) Discrepancy Index (*DI*) was 20, as documented in the subsequent worksheet.

CEPHALOMETRIC SUMMARY			
SKELETAL ANALYSIS			
	PRE-Tx	POST-Tx	DIFF.
SNA° (82°)	79.5°	79.5°	0°
SNB° (80°)	81°	80°	1°
ANB° (2°)	-1.5°	-0.5°	1°
SN-MP° (32°)	35°	36°	1°
FMA° (25°)	28°	29°	1°
DENTAL ANALYSIS			
U1 To NA mm (4 mm)	7 mm	4.5 mm	2.5 mm
U1 To SN° (104°)	108°	106.5°	1.5°
L1 To NB mm (4 mm)	6 mm	2 mm	4 mm
L1 To MP° (90°)	90°	81°	9°
FACIAL ANALYSIS			
E-LINE UL (-1 mm)	-2 mm	-4 mm	2 mm
E-LINE LL (0 mm)	0 mm	-2.5 mm	2.5 mm
%FH: Na-ANS-Gn (53%)	54%	54.5%	0.5%
Convexity: G-Sn-Pg' (13°)	0°	3°	3°

Table 2: Cephalometric summary

Treatment Objectives

There were two principal treatment objectives: 1. autotransplantation of the UR5 to the UL4 site, 2. extract both lower first molars and protract 2nd and 3rd molars to close the spaces bilaterally and correct the Class III malocclusion.

Maxilla (all three planes):

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

Mandible (all three planes):

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

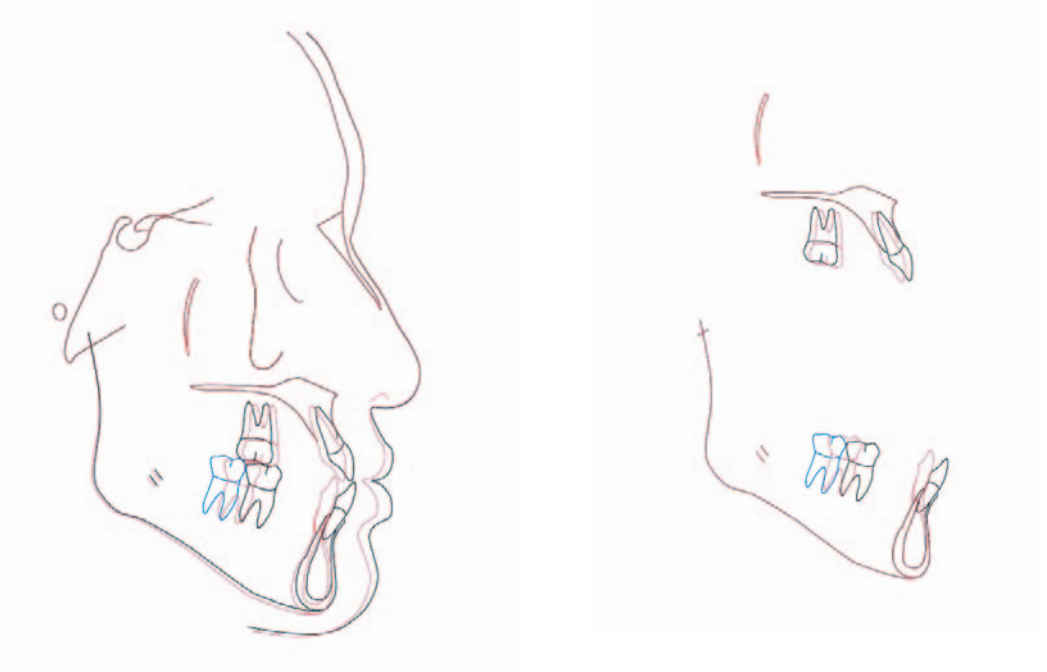

Fig. 10:
Superimpositions of cephalometric tracings show the pre-treatment (black) and post-treatment (red) dentofacial morphology. Mandibular 2nd molars are in blue.

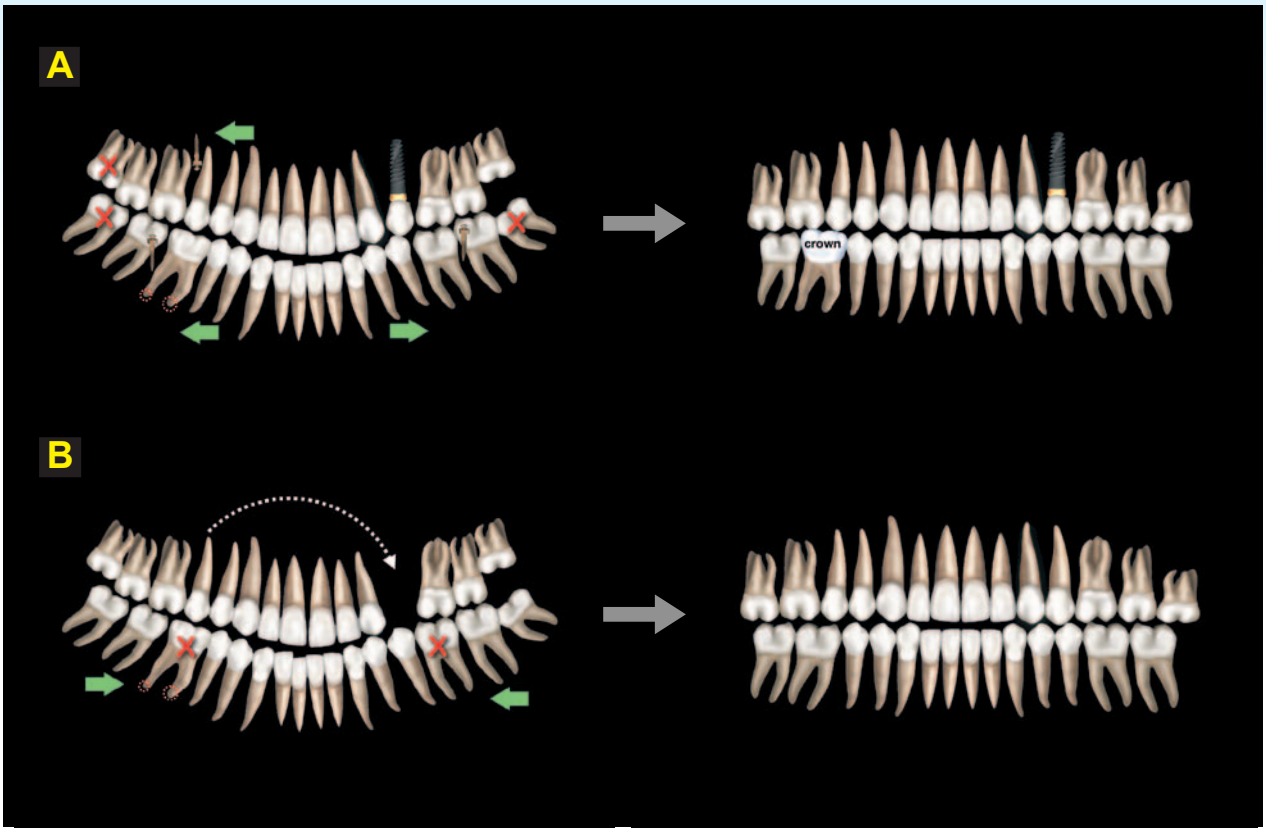

Fig. 11:

A. ***Plan A****: One dental implant is used to restore the UL4, three third molars are extracted, TAD anchorage is used to align the dentitions, and a crown is placed on the compromised lower right first molar.*

B. ***Plan B****: Autotransplantation of the UR5 to replace the missing UL4, extract both lower first molars, and close space to resolve the Class III malocclusion.*

Maxillary Dentition:

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

Mandibular Dentition:

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

Facial Esthetics:

- Convexity: *Increase facial convexity*

Treatment Alternatives

Plan A

First, extract the bilateral mandibular wisdom teeth and the maxillary right wisdom tooth. Second, retract the lower dentition utilizing TAD anchorage bilaterally in both buccal shelves. Third, correct the upper midline by applying one TAD in the right maxillary infrazygomatic crest. Fourth, perform endodontic re-treatment and place a dental crown on the right mandibular first molar. Fifth, leave the space of the missing left maxillary first premolar for future dental implantation. It was clear to the family

that many aspects of Plan A were challenging: TAD anchorage, a dental implant in an inadequate left upper edentulous space, requirements for bone/soft tissue augmentation, and low probability for successful restoration of the compromised lower right first molar. In addition, three healthy teeth would be lost.

Plan B

Bilateral extraction of mandibular first molars, space closure, and autotransplantation of the right maxillary second premolar to left premolar edentulous space. This conservative approach corrects the Class III crowded malocclusion, and is more predictable for restoration of the atrophic edentulous ridge. Plan B was the most cost-effective and conservative approach for a near ideal result.

Appliances and Treatment Progress

0.022-in slot Damon Q® passive self ligating (*PSL*) brackets (*Ormco, Glendale, CA*) with standard torque were bonded on all teeth in the lower arch except for the incisors (*Fig. 12*). The lower right central and left lateral incisors were bonded with low torque brackets positioned upside down in order to reverse root torque from -11 degrees to +11 degrees. The right mandibular lateral incisor (*LR2*) and the left mandibular central incisor (*LL1*) were not bonded at the beginning of the treatment to simplify alignment with the initial 0.013-in CuNiTi archwire.

In the first month of treatment, inter-proximal reduction (*IPR*) was performed on the mesial of the right mandibular first molar (*Fig. 13*) to help initiate alignment. In the fourth month of treatment, all the

Fig. 13:
One month (1M) later, IPR was performed on the mesial side of LR6 to create space to align the LR5.

Fig. 12:
At the beginning of the treatment, the lower dentition was bonded with standard torque Damon Q® brackets except for the lower incisors. LR1 and LL2 were bonded with low torque brackets positioned upside down. LR2 and LL1 were not bonded in the beginning to prevent round tripping.

teeth in the upper arch were bonded with standard torque brackets (*Fig. 14*). However, a Damon Q® high torque (*+11 degrees*) bracket was used instead on the blocked-out upper right canine to improve root movement. An open coil spring was applied to create more space for the right maxillary second premolar. Moreover, a ligature tie holding this tooth firmly to the archwire was made to exert a lateral expansion movement. Inter-maxillary early light short elastics (*ELSE*) (*Quail 3/16, 2-oz*) were applied from the lower first premolars to the upper first molars bilaterally. Following lower first molar extraction, Class I elastics (*Quail 3/16, 2-oz*) were applied bilaterally from the lower first premolars to the lower second molars to close the lower first molar extraction spaces (*Fig. 14*).

In the seventh month of treatment, alignment was improved with a rectangular wire (*Fig. 15*). Brackets were bonded on the LR2 and LL1 when space was adequate. Mandibular second premolars and second molars were bonded with lingual buttons bilaterally. Utilizing buccal and lingual power chains, the space was closed efficiently.

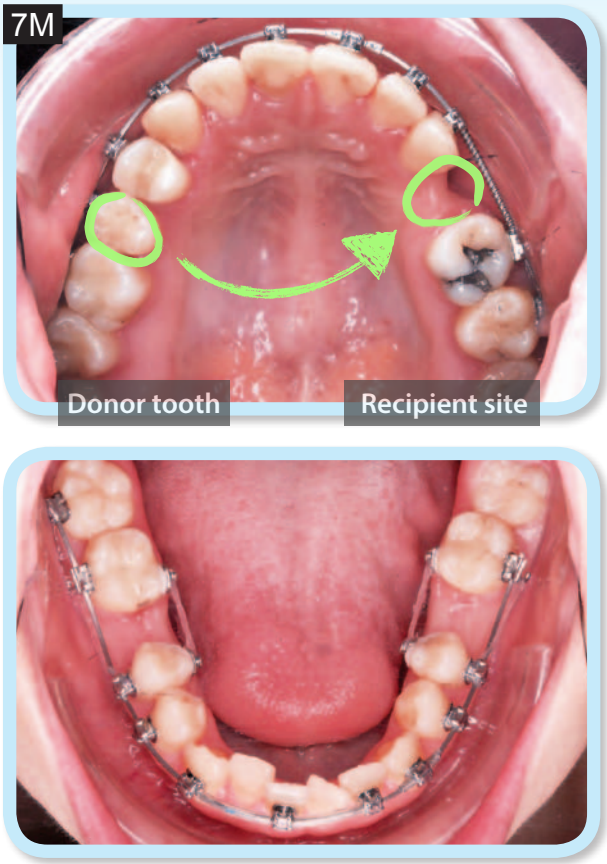

Fig. 15:

***Upper**: After seven months of treatment (7M), the green arrow shows the donor tooth (UR5) was autotransplanted to the recipient site (UL4).*

***Lower**: Power chains were used on the buccal and lingual surfaces to close first molar spaces.*

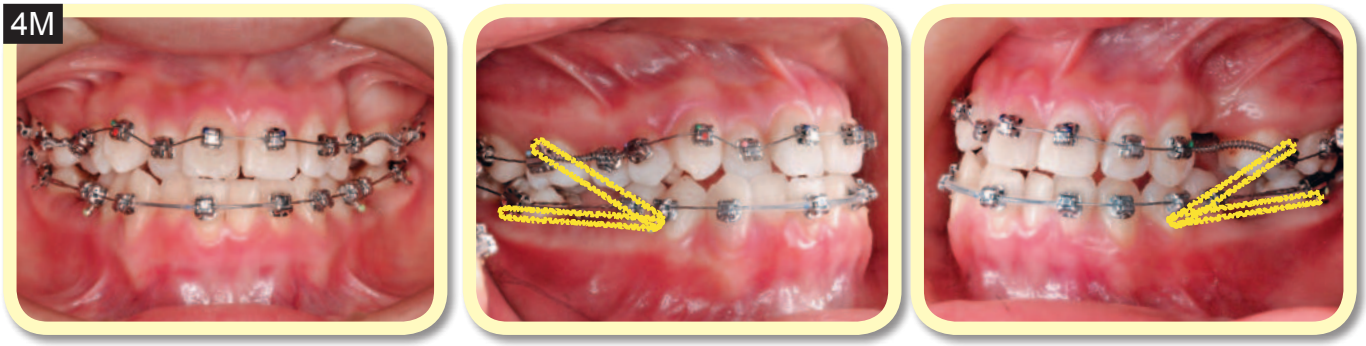

Fig. 14:

After four months of treatment (4M), the upper dentition was bonded with standard torque brackets, except for UR3, which received a high torque bracket. Quail elastics were used from UR6-LR4, LR7-LR4, UL6-LL4, and LL7-LL4.

By the ninth month of treatment, the recipient site was orthodontically prepared (*Fig. 16*). A periodontist conducted the surgery in which the right maxillary second premolar was extracted and transplanted to its contralateral first premolar position. Before the surgery, a CBCT image was obtained. An analog of the donor tooth UR5 was made with 3D printing and used to help prepare the recipient site (*Fig. 17*). This procedure minimizes the duration of the extra-oral time for the donor tooth to help preserve PDL cells attached to the root surface.[2] Moreover, the orthodontic forces applied to the periodontally healthy tooth increased its mobility so that extraction trauma was reduced and intact PDL tissue was maintained.[3] The increased tooth mobility with orthodontics is associated with a gradual widening of the periodontal space, PDL bone resorption, and increased periodontal vascularity.[3] Both procedures increase autotransplantation success. The atrophic recipient site was restored with a freeze-dried bone allograft (*FDBA*), enamel matrix derivatives (*Emdogain®; EMD*),[4] and a connective tissue graft to improve osseous structural quality (*Fig. 18*).

Once space for crowded out incisors was adequate (*Fig. 19*), LR2 and the LL1 were bonded with low torque Damon Q® brackets also positioned upside down. The archwire was switched from 0.014x0.025-in CuNiTi back to 0.013-in CuNiTi rounded wire for leveling and alignment.

With progressive space closure of the mandibular second and third molars, a bowing effect (*deep curve of Spee and posterior open bite*) was observed in the 12th month of treatment. As shown in Fig. 20, intermaxillary elastics (*Fox 1/4 inch 3.5-oz*) were on the buccal and lingual surfaces of teeth in both buccal segments to close the posterior openbite and assist in the intermaxillary correction.

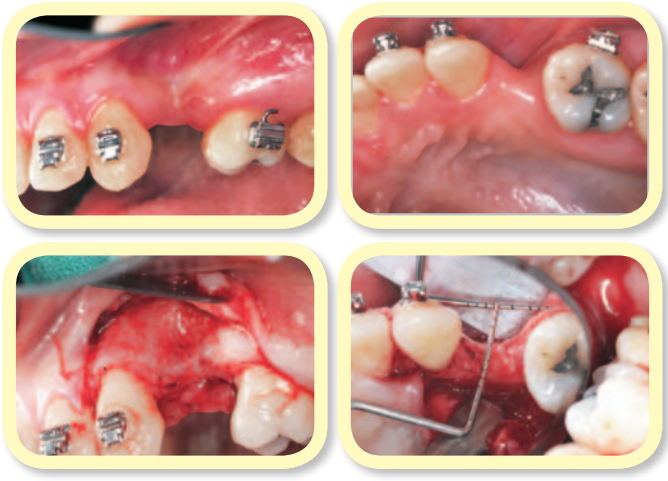

Fig. 16:
An alveolar ridge deficiency was apparent after flap reflection of the recipient site.

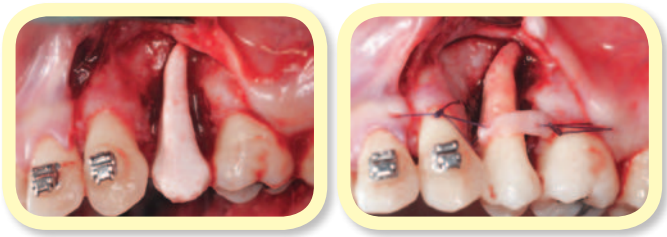

Fig. 17:
A 3D-printed replica of the UR5 was used to prepare recipient site (left). Donor tooth UR5 was transplanted and immobilized by connective tissue graft (right).

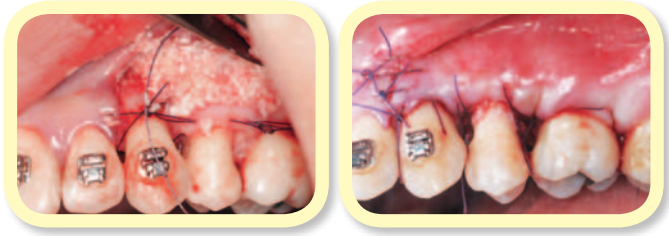

Fig. 18:
The socket around the recipient site was grafted with allograft material (FDBA) and enamel matrix derivative (EMD) after tooth transplantation (left). The closure with sutures is shown (right).

Fig. 19:
Left: After nine months (9M) of treatment the post-operative view of the upper arch is shown.
Center: Spaces are prepared in the lower arch for the LR2 and LL1 were prepared .
Right: The front view is shown after the low torque Damon Q® brackets are positioned upside down on the lower incisors.

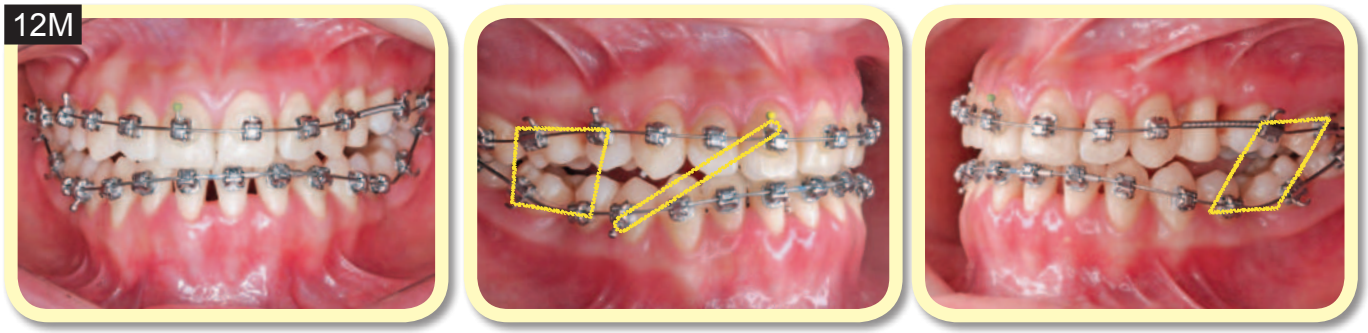

Fig. 20:
After twelve months (12M) of treatment, elastics (Fox 1/4 inch 3.5-oz) were used on the lingual and buccal surfaces to close the posterior openbite and midline. See text for details.

Bracket repositioning was performed repeatedly throughout the treatment as indicated by the sequential panoramic radiographs (*Fig. 21*). Archwires were adjusted to detail the occlusion. Twenty-three months were needed to close the spaces and another 12 months were required for final detailing. The overall treatment time is 35 months (*Fig. 22*).

Results Achieved

All the original objectives of the treatment have been achieved (*Figs. 5-7*). The maxillary and mandibular arches were well aligned in a Class I canine relationship. The overbite and the overjet are optimal (*Fig. 9*), and the lower extraction sites were completely closed by retracting the anterior segment and protracting the lower molars (*Fig. 10*).

Maxilla (all three planes):

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

Mandible (all three planes):

- A – P: *Reduced*
- Vertical: *Increased*
- Transverse: *Maintained*

Fig. 21:
Bracket repositioning was performed as indicated by panoramic radiographs taken form 10-26mo (10M, 20M, 26M).

Fig. 22: After twenty-three months (23M) of treatment, spaces are nearly closed and the arches are well aligned.

Maxillary Dentition

- A – P: *Retracted*
- Vertical: *Maintained*
- Transverse: *Expanded*

Mandibular Dentition

- A – P: *Incisors retracted and molars protracted*
- Vertical: *Maintained*
- Transverse: *Maintained*

Facial Esthetics:

- Increased convexity and reduction of lip protrusion

Retention

The upper and lower arch corrections were retained with Hawley retainers full time for the first six months and nights only thereafter. Guidance for home hygiene as well as maintenance of the retainers was provided.

Final Evaluation of Treatment

Overall, the patient was pleased with the substantial improvement in facial esthetics, dental alignment, and functional occlusion. The right maxillary second premolar was successfully autotransplanted to the position of the contralateral first premolar. Moreover, the spaces in the posterior mandible were closed by protracting the molars. No implants, TADs nor extensive restorative dentistry was required.

The ABO Cast-Radiograph Evaluation (*CRE*) score was 16 points. There were minor discrepancies in two categories: marginal ridges (*3 points*) and alignment rotation (*4 points*). The right mandibular third molar was tipped lingually which resulted in marginal ridge discrepancies and excessive buccolingual inclination of the posterior segments (*Fig. 7*).

Discussion

Orthodontic protraction of mandibular molars to replace missing first molars is challenging because of the dense mandibular cortical bone in the posterior segment. Pre-treatment assessment should include periodontal health, alveolar bone mass, root morphology of the lower molars, and the zone of attached gingiva. Positive factors are adequate bone width and height. A knife-edge atrophic ridge may result in root resorption. Third molars with two defined roots are superior to one with a single conical root. Although space reopening is a concern, neither space recurrence nor increased pocket is reported in follow-up evaluation.[5,6]

Protracting molars with only buccal force can lead to mesial rotation and increased curve of Spee (*posterior openbite*).[7] Crossbite may occur if the maxillary arch is narrow. Intermaxillary cross elastics and power chains on both the buccal and lingual sides of the lower buccal segments may be required. Molar tipping to the mesial is preventable by taking the following few precautions. Longer buccal hooks can help the force pass through the plane of the center of resistance for a molar. Next, a molar uprighting spring can introduce an uprighting force to offset the tendency to tip mesially. In addition, rebonding the molar tube down on the mesial surface can improve the root mesial moment supplied by the archwire. Finally, a tip back bend can also help.[8] Although molar protraction is challenging, the lower molars were presently protracted 6mm. Baik et al.[5] have shown that these methods are effective for closing up to 12mm of space.

Tooth extraction results in alveolar bone resorption,[9] so lower first molar extractions were delayed until immediately prior to initiating space closure. The post-operative regional acceleratory phenomenon (*RAP*) in and around the extraction site helps accelerate the process of space closure.

Tooth autotransplantation is defined as extracting a healthy tooth and transplanting it into an extraction socket or edentulous ridge, so it replaces a tooth which either has been lost or has a poor prognosis.[10] The survival rate for tooth autotransplantation ranges from 81.4% to 90%.[11] According to Tsukiboshi et al.,[12] the survival rate may increase up to 100% for immediate transplantation into a properly prepared fresh extraction site. However, when the recipient site is an edentulous ridge, the survival rate can drop

to 75% because it is necessary to artificially prepare a socket. All things considered, a meta-analysis published in 2014 reported the survival rate was 98% after one year and as high as 90.5% after five years.[13]

In order to increase the success rate for tooth autotransplantation, it is critical to preserve a healthy periodontal ligament (*PDL*) on the donor tooth.[14] This is best accomplished with atraumatic surgery and a short extra-oral period between extraction and implantation. Orthodontic movement of the donor tooth prior to extraction facilitates its removal so there is less damage to the PDL. Before the surgery, a CBCT image is useful to print a 3D analog replica which can be used to shorten the extra-oral duration by preparing the site. FDBA and Emdogain® were used to enhance the repair and regeneration process for PDL cells on the surface of the root.[15]

Autotransplantation and implant-supported prostheses are effective solutions for missing teeth. The pros and cons for each approach are presented in Table 3. The biggest advantage of autotransplantation is the use of a natural tooth with a PDL that promotes periodontal bone formation. Unfortunately, this approach is not often used in clinical practice because of unfamiliarity with the surgical procedures and associated dental physiology. In contrast to dental implants, autotransplantation is less expensive and requires less time. When indicated, autotransplantation is a viable option compared to an implant-supported prosthesis.

	Autotransplanted tooth	Dental implant
Source	Limited	Commercial
Periodontal ligment	Yes	No
Osseointegration	No	Yes
Inducing bone formation	Yes	No
Moved by orthodontic force	Yes	No
Treatment time	Shorter	Longer
Restoration procedure	Straightforward	Delicate
Caries incidence	Yes	No
Periodontal/peri-implant infection	Yes	Yes
Response to infection treatment	Predictable	Unpredictable
Maintenance cost	Low	High
Moved with craniofacial growth	Yes	No

Table 3: Comparison of an autotransplanted tooth and dental implant.

Conclusions

Autotransplantation and substitution of lower second and third molars for first molars were a cost-effective solution for a complex Class III malocclusion with a compromised first molar and an atrophic edentulous space. The success rate for an autotransplant can be improved by the application of CBCT and 3D printing technology. This conservative approach preserved healthy teeth and resulted in an optimal outcome.

Acknowledgment

The authors wish to thank the following important contributors: Dr. Tien-Chun Kuo for the root canal treatment of the transplanted tooth; Dr. Jeng-Feng Hwang for composite restoration and temporary crowns of the autotransplanted teeth; Dr. Rungsi Thavarungkul for the templates that clearly demonstrate the treatment plan and Mr. Paul Head for proofreading.

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Discrepancy Index Worksheet

TOTAL D.I. SCORE 20

OVERJET

0 mm. (edge-to-edge)	=	1 pt.
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 = 2

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 = 2

OCCLUSION

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

Total = 2

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° -1.5° = 4 pts.

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

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

SN-MP 35°

≥ 38° = 2 pts.

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

≤ 26° = 1 pt.

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

1 to MP ≥ 99° 90° = 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)	2	x 1 pts. =	2
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	2	x 2 pts. =	4

Identify: Alveolar ridge atrophy
Need autotransplantation

Total = 6

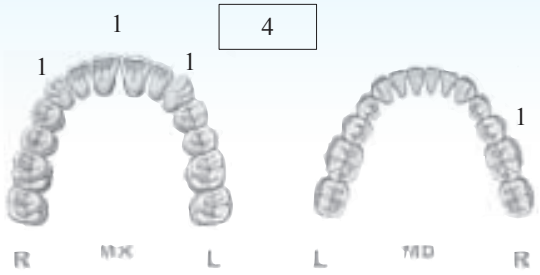
Cast-Radiograph Evaluation

Case # **Patient**

Total Score: 16

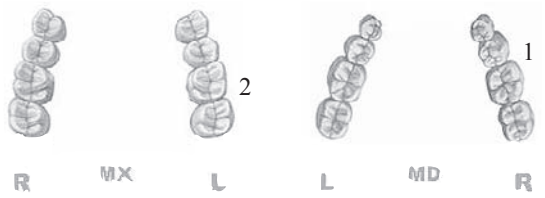
Alignment/Rotations

4



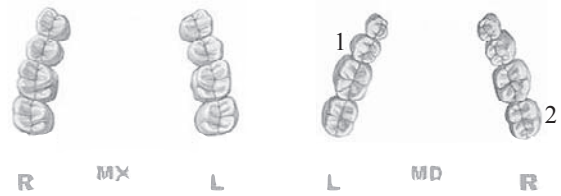
Marginal Ridges

3



Buccolingual Inclination

3

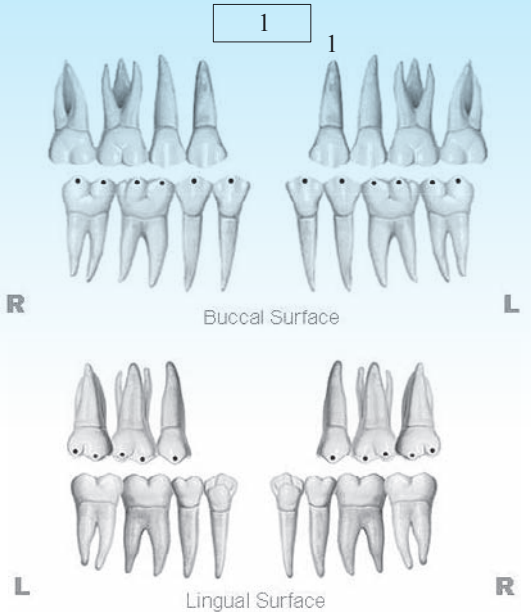


Overjet

2

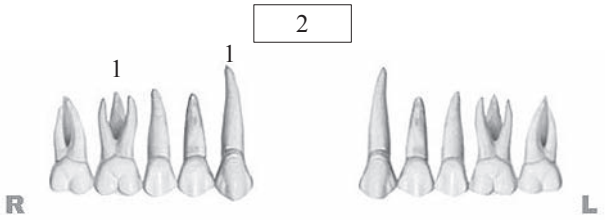
Occlusal Contacts

1



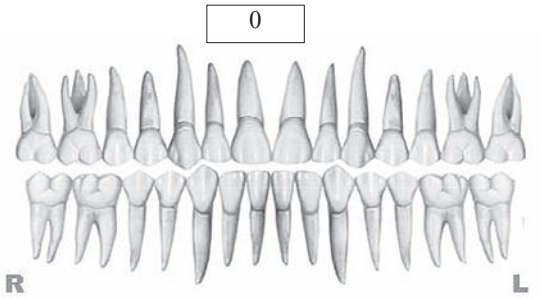
Occlusal Relationships

2



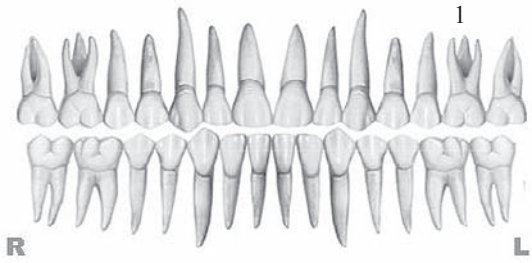
Interproximal Contacts

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.

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AJO-DO
American Journal of Orthodontics & Dentofacial Orthopedics

January 28, 2019

Shuang-An Lee
Chris CH. Chang
W. Eugene Roberts
[redacted]

RE: CDABO Case Report of the Year Award

Dear Drs. Lee, Chang, and Roberts:

It is with great pleasure that I write to inform you that your article, "Severe unilateral scissors-bite with a constricted mandibular arch: Bite turbos and extra-alveolar bone screws in the infrazygomatic crests and mandibular buccal shelf," has been selected to receive the 2019 CDABO Case Report of the Year Award. Congratulations.

The College of Diplomates of the American Board of Orthodontics (CDABO) is composed of orthodontic clinicians who have passed all phases of the American Board of Orthodontics examination. The award was established by the College to recognize excellence in clinical orthodontics. It is given annually to the authors of the best Case Report published during the previous year in the *American Journal of Orthodontics and Dentofacial Orthopedics*.

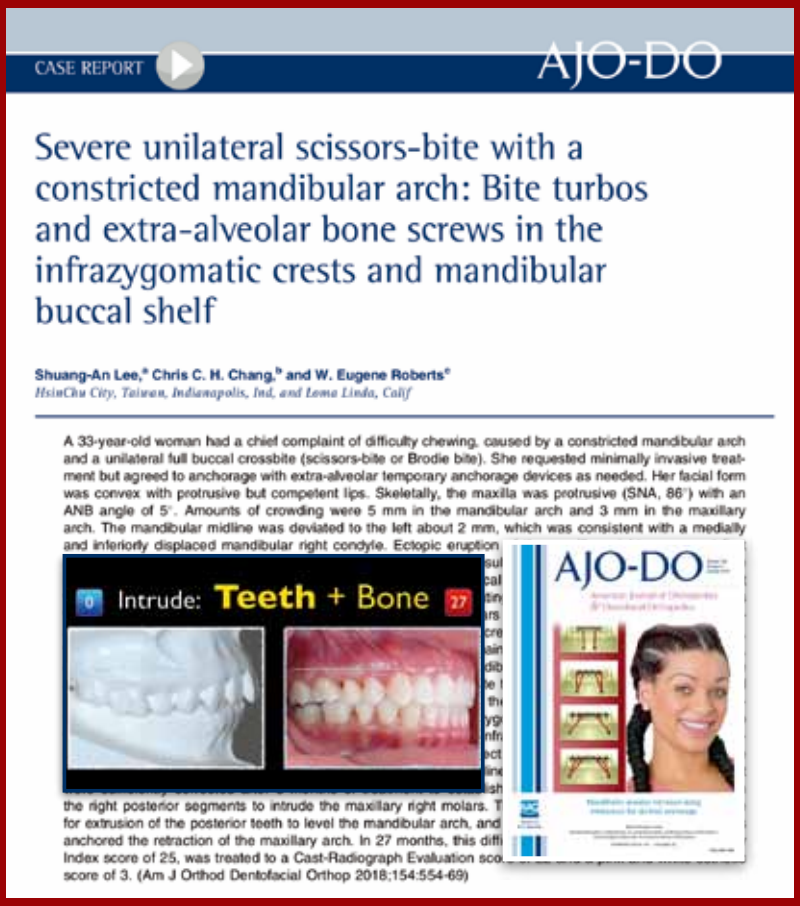
The CDABO award will be presented at the annual meeting of the *AJO-DO* editorial board, which is held in conjunction with the AAO Annual Session. This year, the editorial board will meet Sunday, May 5, from 7:00 to 9:00 am, in Los Angeles, Calif. You and your co-authors are invited to join the board for this breakfast meeting and be recognized by the Journal's editors and associates.

I hope that you plan to attend the AAO Annual Session in Los Angeles and can receive your certificate and recognition in person. Please let me know if you will be able to attend the AJO-DO Editorial Board Meeting on Sunday, May 5.

Again, I offer my congratulations for receiving this prestigious award.

Sincerely,

Rolf G. Behrents, DDS, MS, PhD
Editor-in-Chief, AJO-DO



CASE REPORT AJO-DO

Severe unilateral scissors-bite with a constricted mandibular arch: Bite turbos and extra-alveolar bone screws in the infrazygomatic crests and mandibular buccal shelf

Shuang-An Lee,[a] Chris C. H. Chang,[b] and W. Eugene Roberts[c]
HsinChu City, Taiwan, Indianapolis, Ind, and Loma Linda, Calif

A 33-year-old woman had a chief complaint of difficulty chewing, caused by a constricted mandibular arch and a unilateral full buccal crossbite (scissors-bite or Brodie bite). She requested minimally invasive treatment but agreed to anchorage with extra-alveolar temporary anchorage devices as needed. Her facial form was convex with protrusive but competent lips. Skeletally, the maxilla was protrusive (SNA, 86°) with an ANB angle of 5°. Amounts of crowding were 5 mm in the mandibular arch and 3 mm in the maxillary arch. The mandibular midline was deviated to the left about 2 mm, which was consistent with a medially and inferiorly displaced mandibular right condyle. Ectopic eruption

the right posterior segments to intrude the maxillary right molars. T
for extrusion of the posterior teeth to level the mandibular arch, and
anchored the retraction of the maxillary arch. In 27 months, this diffi
Index score of 25, was treated to a Cast-Radiograph Evaluation sco
score of 3. (Am J Orthod Dentofacial Orthop 2018;154:554-69)

AJO-DO, Volume 154, Issue 4, Pages 554–569

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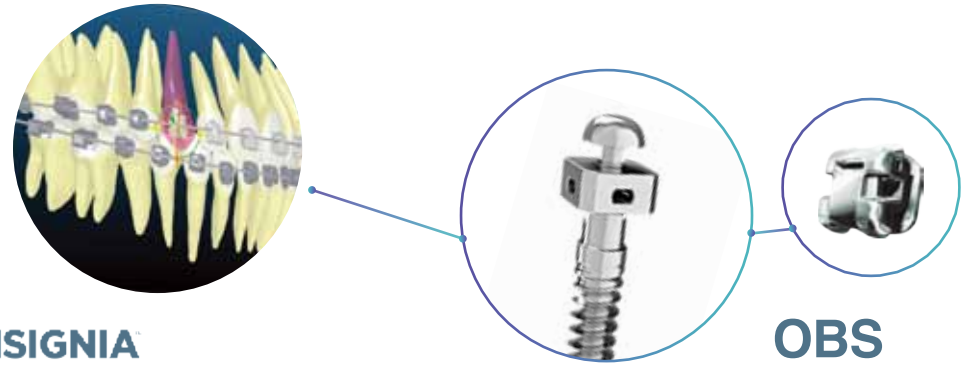

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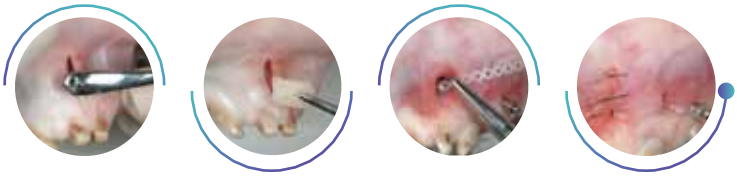

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KEYNOTE

THE LECTURER

Dr. Chris Chang

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

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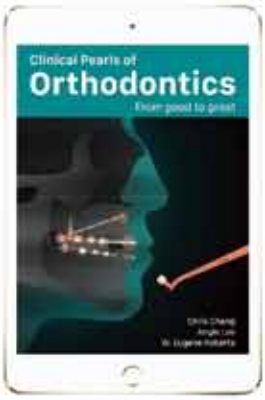

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The Long and Winding Road: How to Regain the Severe Torque Loss in the Insignia™ System

Abstract

***Introduction**: Choosing the correct archwire sequence is essential for achieving optimal outcomes in a timely manner. A digital custom appliance is designed for ideal alignment with the finishing archwire. Translating teeth is problematic when a horizontal force is applied to the arch. Archwires with inadequate stiffness can result in severe loss of incisor torque when anterior segments are retracted. Iatrogenic axial inclination problems increase treatment time and may result in elevated root resorption.*

***Diagnosis**: An 18-year old female presented with a chief complaint (CC) of protrusive lips. Clinical evaluation revealed skeletal protrusion (SNA 88˚, SNB 82˚, ANB 6˚), steep mandibular plane angle (FMA 30˚), bimaxillary lip protrusion (4mm/6mm to the E-line), and a Discrepancy Index (DI) of 26.*

***Treatment**: All four first premolars were extracted, and an Insignia™ system appliance with passive self-ligating brackets was prescribed. Extraction spaces were closed in all four quadrants using titanium molybdenum alloy (TMA) archwires. Bilateral reaction force of ~400cN was anchored with infrazygomatic crest (IZC) bone screws (BSs). The archwire torsional stiffness in the anterior segment was inadequate for the applied load, resulting in decreased axial inclination of maxillary incisors when the anterior segment was retracted. Correction mechanics were: 1. lingual root torque in the anterior segment, 2. anterior nasal spine (ANS) bone screw, and 3. anterior root torquing auxiliary spring.*

***Outcome**: 16mo of space closure resulted in severe distal tipping (31˚) of upper incisors. An additional 12mo of active treatment was required to correct the upper incisal inclination to an optimal 104˚. After 28 months of active treatment, a Cast Radiograph Evaluation (CRE) score of 10 was achieved.*

***Conclusions**: The upper incisal moment to force ratio (M:F) was inadequate for optimal upper incisor retraction. The problem was preventable with: 1. less reaction force (~200cN/side), 2. 20˚ increase in anterior lingual root torque (torsion) on the archwire to increase the moment, and/or 3. a stiffer stainless steel (SS) archwire. The M:F should be carefully evaluated prior to initiating space closure, and incisor axial inclinations should be carefully monitored with progress cephalometrics during space closure. Iatrogenic axial inclination problems (dumping) can usually be corrected with extended treatment time, but prevention is far more efficient and cost effective. (J Digital Orthod 2019;56:26-42)*

Key words:
Insignia™ system, customized passive self-ligating brackets, digital set-up, moment to force ratio, archwire sequence, IZC screw, temporary anchorage devices (TADs), bimaxillary protrusion, extraction of premolars

Introduction

The Insignia™ system allows clinicians to plan with the end in sight.[1-3] A pretreatment digital set-up of the custom fixed appliance optimizes bracket positions and torque levels to achieve an ideal alignment with minimal adjustments. However, achieving the outcome(s) prescribed is more challenging when there are extractions, space closure and retraction of anterior segments. Torque compensations[1,2] are applied to the virtual treatment plan to offset archwire-bracket play and to increase lingual root torque to

Dds. Laurel Shern,
Clerk, Beethoven Orthodontic Center (Upper left)

Dds. Kristine Chang,
Clerk, Beethoven Orthodontic Center (Upper center)

Dds. Jennifer Chang,
Clerk, Beethoven Orthodontic Center (Upper right)

Dr. Chris H. Chang,
Founder, Beethoven Orthodontic Center
Publisher, Journal of Digital Orthodontics (Lower left)

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

achieve translation rather than "*dumping.*" The goal for translation is to balance the moment to force ratio (*M:F*) to achieve the ***equivalent force system***. The latter is the amount of moment (*torque*) relative to the force that is required to simulate the retraction force passing through the center of resistance (C_{RES}) of the root(*s*). The clinician must prescribe the amount of incisor retraction planned, the allied retraction force, and archwire specifications: material, size and configuration (*pretorqued, expanded or constricted*). The custom appliance is then adjusted to accommodate the planned mechanics. The alternative is to accept the treatment plan proposed by

Fig. 1: Pre-treatment facial and intraoral photographs

Insignia™ because it is compatible with the custom appliance. The amount of tooth movement, archwire specifications and applied retraction force are critical to treatment success.[3] For an optimal outcome in a timely manner, it is critical that the applied mechanics is consistent with the design of the custom appliance.

Etiology and Diagnosis

An 18-year-old female presented with a chief complaint of protrusive lips (*4mm/6mm to the E-line*) (*Figs. 1-4; Table 1*). The lateral cephalometric radiograph was consistent with a skeletal Class II pattern (*SNA 88˚, SNB 82˚, ANB 6˚*). There was a steep mandibular plane (*SN-MP 47˚, FMA 40˚*) and a 3 mm overjet (*Table 2*). The mandibular midline was 0.5 mm to the right. Bimaxillary dental protrusion was consistent with lip protrusion. The upper incisors were labially inclined (*U1 to NA 7 mm, U1 to SN 116.5˚*), as were the mandibular incisors (*L1 to NB 11 mm, L1 to MP 104˚*). The American Board of Orthodontics (*ABO*) Discrepancy Index (*DI*) score was 26 as shown in the subsequent worksheet.

CEPHALOMETRIC SUMMARY			
DENTAL ANALYSIS			
	PRE-Tx	INTER-Tx	POST-Tx
U1 To NA mm (4 mm)	7 mm	4 mm	0 mm
U1 To SN˚ (104°)	116.5˚	85.5˚	104˚
L1 To NB mm (4 mm)	12 mm	5 mm	5 mm
L1 To MP˚ (90°)	104˚	86.5˚	87.5˚

Table 1

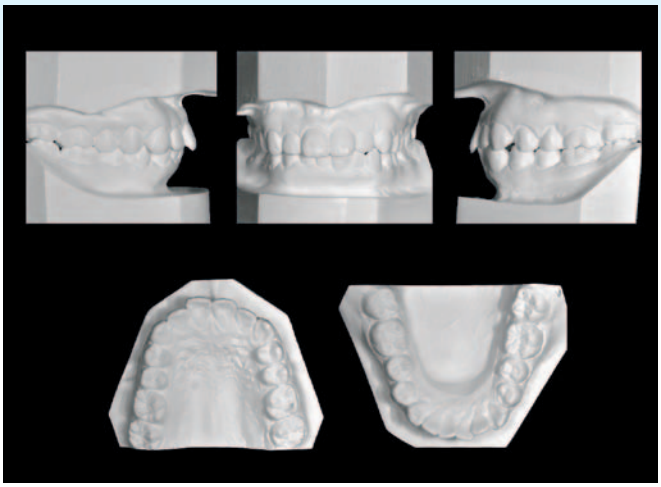

Fig. 2: Pre-treatment dental models (casts)

Fig. 3: Pre-treatment lateral cephalometric radiograph

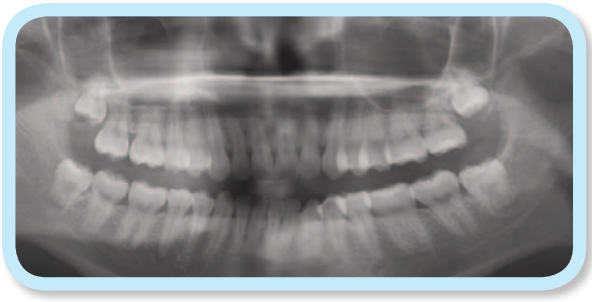

Fig. 4: Pre-treatment panoramic radiograph

Treatment Objectives

1. Retract upper and lower lips.
2. Retract both arches with TAD anchorage and Class II elastics.
3. Establish ideal overjet and overbite.
4. Correct the slight mandibular midline discrepancy.
5. Establish Class I molar and canine relationships.

Treatment Plan

The patient accepted extraction as the optimal approach for reducing lip protrusion. All first four premolars were extracted as indicated by the patient's protrusive profile, steep mandibular plane, and flared incisors.[4] Bilateral infrazygomatic crest (IZC) bone screws were used as anchorage for retraction of both arches.[1]

Digital Set-up

1. Extract upper and lower first premolars.
2. Close extraction spaces with equal and opposite (50-50%) movement of anterior and posterior segments (*Fig. 5*).
3. Incisor Axial Inclination
   - 3.1 Upper: Decrease 12 degrees
   - 3.2 Lower: Decrease 14 degrees

Closing extraction spaces tends to decrease the axial inclination of incisors, so 5 degrees of lingual root torque were added to both the upper and lower incisor set-up to compensate for the mechanics. Upper incisor crown torque was reduced from 116.5˚ to 109˚ (*standard 104˚ + over-correction 5˚*). The lower incisor torque was changed from 104˚ to 95˚ (*standard 90˚ + overcorrection 5˚*).

4. Midline correction: Move the midline 0.5 mm to the right (*Fig. 5*)

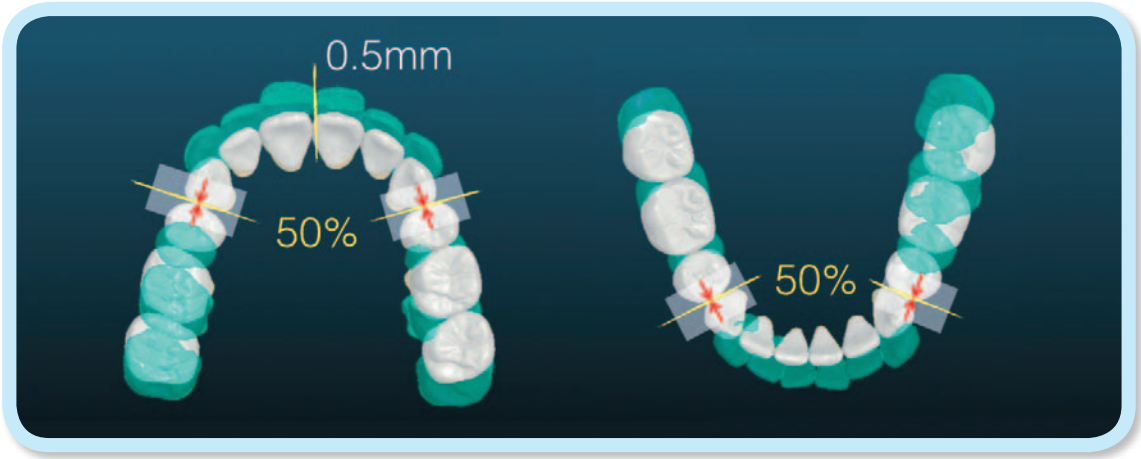

Fig. 5:
Green teeth are the pre-treatment position of the dentition. The planned space closure in both arches is 50% posterior retraction of the anterior segment and 50% mesial protraction of the buccal segments. See text for details.

Treatment Progress

Two months after extraction of the four first premolars, all teeth were bonded with an Insignia™ digitally-designed 0.022-in slot, custom appliance. Extraction spaces were closed with a sequence of two archwires: 0.018x0.025 CuNiTi and 0.019x0.025 TMA. Bilateral infrazygomatic crest (*IZC*) bone screws were installed to serve as anchorage to maximally retract both arches.[5] After five visits over ten months, incisors were retracted (*Fig. 6*) and all spaces were closed using the 0.019x0.025 TMA archwire (*Fig. 7*). However, space closure resulted in the upper incisors being too upright due to a 31˚ torque loss (*U1 to NA 4 mm, U1 to SN*

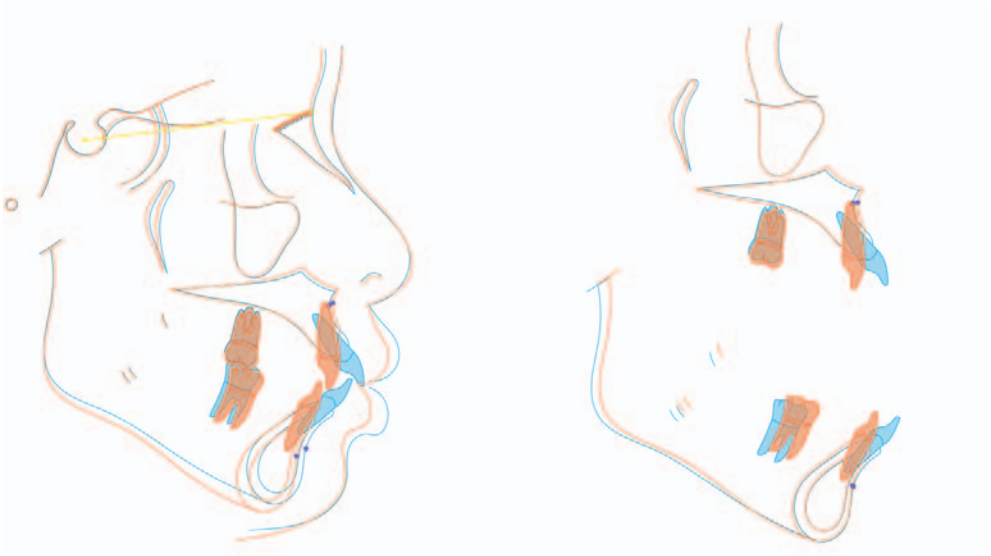

Fig. 6:
Superimposed cephalometric tracings showing dentofacial changes during 14 months of treatment (orange) compared to the pre-treatment position (blue). The upper incisors axial inclination decreased 31˚ to an excessively upright relationship (85.5˚). See text for details.

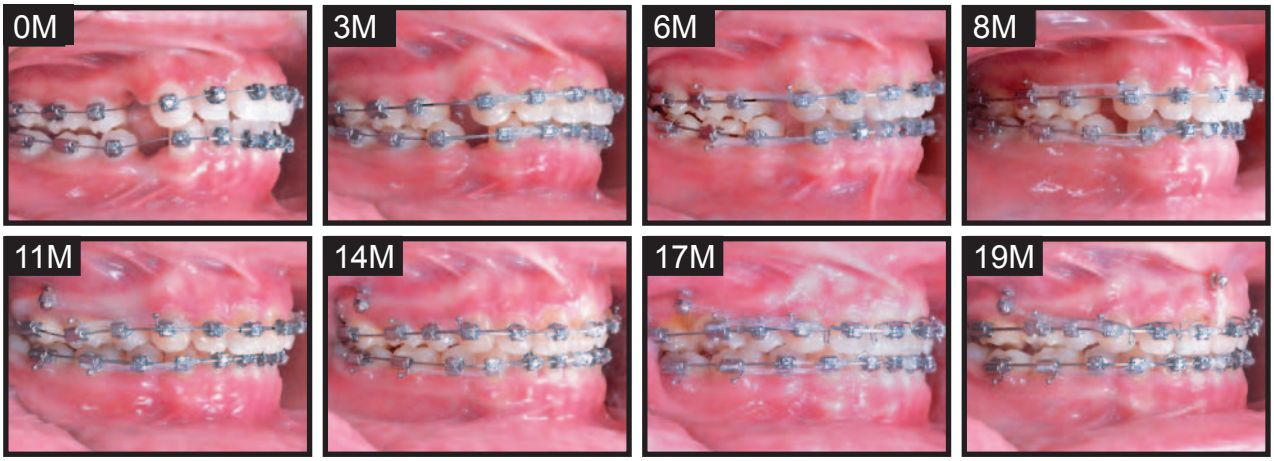

Fig. 7:
A progressive series of right buccal view photographs show treatment progress and the archwire sequence for both arches in months (M) from the beginning of treatment (0M) to nineteen months (19M). The use of TMA wire to close extraction spaces resulted in excessive decrease in the axial inclinations of the upper incisors. At 14M, the upper central incisor crowns are lingually tippied. However, the TMA wire was adjusted in torsion to increase lingual root torque, an anterior nasal spine screw was inserted (19M), and an anterior root torque spring was added (17M) to compensate for the loss of torque.

85.5˚) (*Figs. 6 and 7; Tables 1-3*). Lower incisors were tipped lingually to an acceptable axial inclination (*86.5˚*).

To compensate for the loss of maxillary torque, three adjustments were applied: 1. 15 degrees of lingual root torque, 2. anterior nasal spine (*ANS*) screw to intrude and flare the maxillary incisors, and 3. an anterior torquing auxiliary (*Figs. 7 and 8*). After 12 additional months of treatment, axial inclination of the maxillary incisors was ideal (*U1-SN 104˚*) (*Tables 1, and 4*). The total active treatment time was 28 months. All treatment and sequencing details are shown in Table 3 and Figs. 7-9.

CEPHALOMETRIC SUMMARY			
SKELETAL ANALYSIS			
	PRE-Tx	POST-Tx	DIFF.
SNA˚ (82°)	88˚	90˚	2˚
SNB˚ (80°)	82˚	81˚	1˚
ANB˚ (2°)	6˚	9˚	3˚
SN-MP˚ (32°)	37˚	37˚	0˚
FMA˚ (25°)	30˚	30˚	0˚
DENTAL ANALYSIS			
U1 To NA mm (4 mm)	7 mm	4 mm	3 mm
U1 To SN˚ (104°)	116.5˚	85.5˚	31˚
L1 To NB mm (4 mm)	12 mm	5 mm	7 mm
L1 To MP˚ (90°)	104˚	86.5˚	17.5˚
FACIAL ANALYSIS			
E-LINE UL (-1 mm)	4 mm	1 mm	3 mm
E-LINE LL (0 mm)	6 mm	1 mm	5 mm
%FH: Na-ANS-Gn (53%)	55%	57%	2%
Convexity: G-Sn-Pg' (13°)	16˚	16˚	0˚

■ *Table 2: Cephalometric summary after 14 months of treatment. Note the extreme torque loss, especially in the upper incisors.*

Treatment Results

At the end of active treatment, the patient was treated to the desired result. Overjet was corrected from 3 to 0 mm (*Figs. 10 and 11*), extraction spaces were successfully closed (*Fig. 12*), and axial inclination for incisors was near ideal (*U1-SN 104˚, L1 to MP 86.5˚*) (*Figs. 12 and 13; Tables 1 and 4*). Anchorage loss was minimal because the treatment plan was changed to use IZC BS anchorage to achieve 90% anterior retraction.[5] The lips were retracted 3mm/5mm. The ABO Cast Radiograph Evaluation (*CRE*) score was 10 points (*shown in the subsequent worksheet*), which is an excellent outcome for malocclusion with a DI score of 26. The Pink and White Esthetic Score was 2.

Discussion

1. Archwire Sequence

Although a favorable outcome was achieved in 28 months (*Fig. 14*), treatment duration was extended 12 months to correct iatrogenic problems of decreased axial inclinations of the upper incisors (*dumping*) that was associated with anterior segment retraction. The proximal cause of the incisal dumping (*Fig. 6*) was an inadequate M:F delivered by the 0.018x0.025-in TMA archwire. In analyzing the etiology of the problem, it is important to consider two confounding variables associated with the decision to use of IZC BS anchorage: 1. large maxillary retraction force of ~400cN per side decreased the M:F producing excessive tipping, and 2. anterior segment retraction was 90% of the extraction space rather than the 50% planned (*Fig. 5*), which increased the tendency for incisor tipping. When the decision was made to use

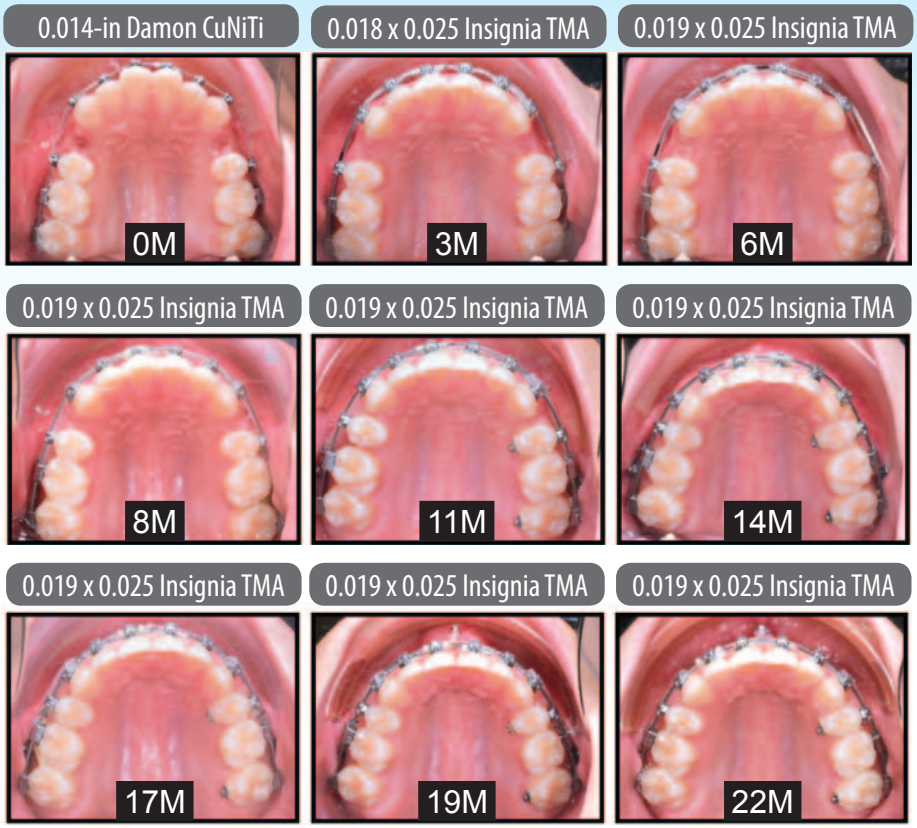

Fig. 8: A series of upper occlusal views show progress from the start of treatment at zero month (0M) to twenty-two months (22M).

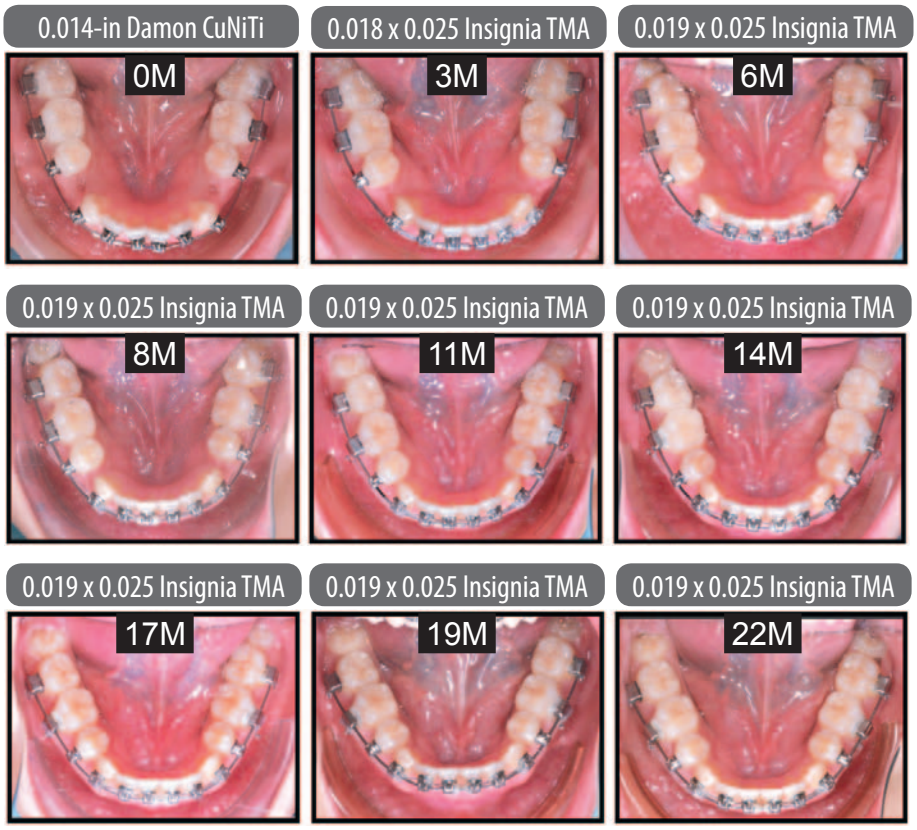

Fig. 9: A series of lower occlusal views show progress from the start of treatment at zero month (0M) to twenty-two months (22M).

TAD anchorage, it was appropriate to reduce the force by 50% to ~200cN/side if the TMA archwire was retrained, or switch to a stiffer archwire such as SS to express a larger moment as the incisors are retracted.

It is challenging to determine the M:F ratio when a space closure appliance is activated. An experienced clinician can estimate the moment applied to the anterior segment by fitting the archwire in the anterior brackets and then sensing or measuring the force required to move the buccal segment of the archwire to the level of the posterior brackets. However, the actual clinical performance of the mechanism is best assessed with a progress cephalometric radiograph during space closure. The tooth movement response is usually apparent within a month or two during space closure. Orthodontists routinely use progress panoramic radiographs to correct bracket positions, but few regularly employ cephalometrics to monitor progress in correcting lip protrusion and axial inclination of incisors. Errors in the sagittal plane (*e.g. lip protrusion, incisor axial inclinations, posterior rotation of the mandible*) are far more serious problems than incorrect bracket orientation in the buccal segments. Second order problems due to incorrect bracket positions can be corrected in a month or two, but a 10˚ error in the

Fig. 10: Post-treatment facial and intraoral photographs

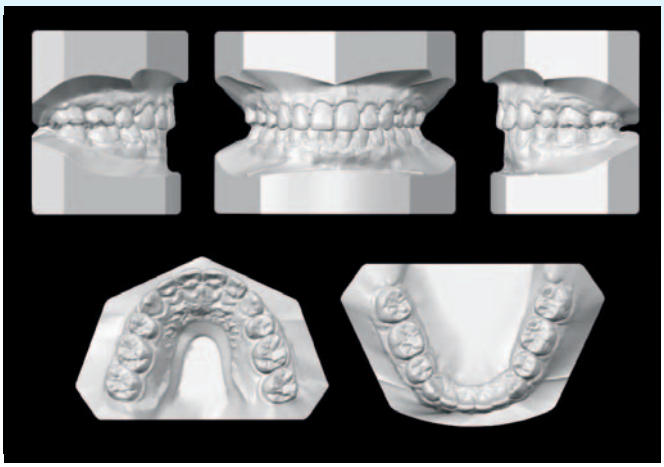

Fig. 11: Post-treatment dental models (casts)

Fig. 12: Post-treatment lateral cephalometric radiograph

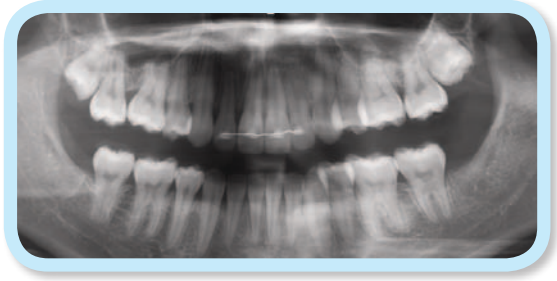

Fig. 13: Post-treatment panoramic radiograph

sagittal axial inclination of incisors required 12mo of additional treatment (*Figs. 6 and 7*). Early correction of space closure biomechanics is much more efficient than correcting severe incisal dumping or bite opening after the spaces are closed.

In addition to inadequate torque, the TMA archwire bowed in a clockwise direction which extruded the maxillary incisors and tip them lingually (*Fig. 7*).[6] TMA was an exceedingly flexible material (*Fig. 15*) for the high retraction force and large distance of retraction.[7] To avoid the 31˚ upper incisor torque loss, it would be wise to use a 0.019x0.025 SS archwire because it is over twice as stiff as a TMA wire of the same size (*Fig. 15*).[8] Although a 0.019x0.025-in SS wire has 11˚ of play, once engaged, the material is more ideal for major mechanics like space closure because of its rigidity.[9] The integrity of the arch can be maintained during space closure with chains of elastics,[10] but the retraction force must be carefully paired with an appropriate root lingual moment (*Fig. 7*). After extraction spaces are closed, torque expression and final detailing can be achieved using a 0.021x0.025 TMA archwire.

In general the wire sequence (*Table 3*) should be as follows: 0.014 CuNiTi, 0.014x0.025 CuNiTi, 0.018x0.025 CuNiTi, and 0.016x0.025 SS.[3,10] If large extraction spaces are closed, the wire sequence should include an additional wire, 0.021x0.025 CuNiTi, before switching to stainless steel, preferably 0.019x0.025 SS (*Table 5*), to begin space closure. The full-sized CuNiTi arch wire is used to prepare for the insertion of the SS wire.[3,10] At the end of treatment, either the 0.021x0.025 CuNiTi or 0.021x0.025 TMA wire can be used to achieve finishing details.[3,10,11]

Appointment	Archwire	Notes
1 (0 months)	U/L: 0.014-in Damon CuNiTi	Bond InsigniaTM digitally-designed 0.022-in custom appliance upper and lower from 7-7
2 (1 months)	U/L: 0.014x0.025-in Insignia CuNiTi	
3 (3 months)	U/L: 0.018x0.025-in Insignia CuNiTi	Power chains
4 (6 months)	U/L: 0.019x0.025-in Insignia TMA	Fox (1/4-in, 3.5-oz) from U3s to L5-6s Close the spaces
5-8 (7-9 months)		Power chains Fox (1/4-in, 3.5-oz) from U6-7s to Button UR7 and UR5
9 (10 months)	U/L: 0.018x0.025-in Insignia CuNiTi	IZC bone screws buccal to UR6 and UL6
10 (10 months)	L: 0.014 x 0.025 Insignia CuNiTi	
11 (11 months)	U: 0.019 x 0.025 Insignia TMA L: 0.018 x 0.025 Insignia CuNiTi	
12 (13 months)	L:0.019x0.025-in Insignia TMA	Power chains
13-15 (14-16 months)		AA UL2 -10, UR2 +10, L2s Power chains
16-18 (18-20 months)	U/L: 0.021x0.025-in Insignia TMA	IZC bone screw between UR1 and UL1 Power chains Anterior root torque added
19-20 (21-23 months)		Remove anterior root torque Twisted wire +15 degrees Power chains, power tubes, expand upper archwire
21 (24 months)	U: 0.021 x 0.025 Insignia TMA	Expand upper archwire Debond IZC bone screws UR6 and UL6
22-23 (25-27 months)		Finish detailing

■ *Table 3: Treatment sequence*

2. Correcting Incisal Torque

Preventing the problem by detecting it early with cephalometrics is preferred, but if the incisal torque loss is not discovered until after space closure, there are several methods for correction: 1. adjust 15˚-20˚ of lingual root torque into the anterior segment of the 0.018x0.025-in TMA archwire, 2. place a 20˚ pretorqued 0.019x0.025-in CuNiTi archwire, 3. insert an anterior nasal spine (*ANS*) screw between the two incisors (*Fig. 16*), and 4. fit an anterior root torquing spring to deliver lingual root torque to the maxillary anterior teeth (*Fig. 17*).[12] All of these methods result in lingual root torque on the maxillary incisors. They can be used in a

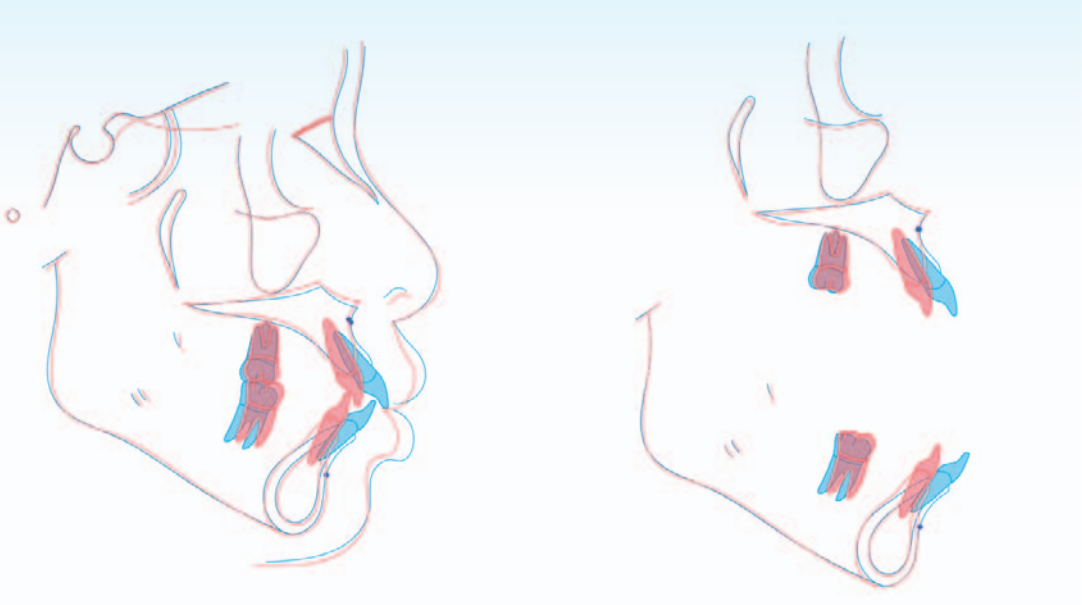

Fig. 14:
Superimposed cephalometric tracings showing dentofacial changes over 28 months of treatment (red) compared to the pre-treatment position (blue). Note that these tracings involve roundtrip movement of the maxillary incisors. See text for details.

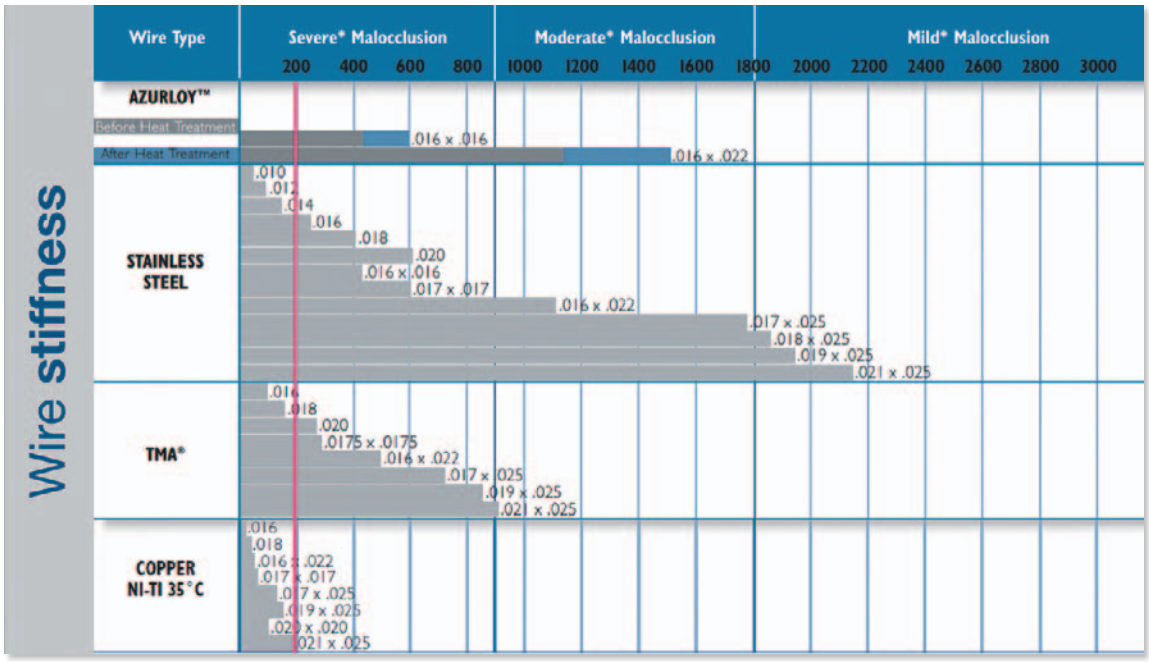

Fig. 15:
Wire stiffness is directly related to the modulus of elasticity (CuNiTi < TMA < SS) and the cross-sectional area of a wire. For a given cross-section TMA is about 5X stiffer than CuNiTi 35 °C, and SS is over twice as stiff as TMA. See text for details.

CEPHALOMETRIC SUMMARY			
SKELETAL ANALYSIS			
	PRE-Tx	POST-Tx	DIFF.
SNA° (82°)	88°	88°	0°
SNB° (80°)	82°	82°	0°
ANB° (2°)	6°	6°	0°
SN-MP° (32°)	37°	37°	0°
FMA° (25°)	30°	30°	0°
DENTAL ANALYSIS			
U1 To NA mm (4 mm)	7 mm	0 mm	7 mm
U1 To SN° (104°)	116.5°	104°	12.5°
L1 To NB mm (4 mm)	12 mm	5 mm	7 mm
L1 To MP° (90°)	104°	87.5°	19.5°
FACIAL ANALYSIS			
E-LINE UL (-1 mm)	4 mm	1 mm	3 mm
E-LINE LL (0 mm)	6 mm	2 mm	4 mm
%FH: Na-ANS-Gn (53%)	55%	57%	2%
Convexity: G-Sn-Pg' (13°)	16°	14°	2°

Table 4: Cephalometric summary

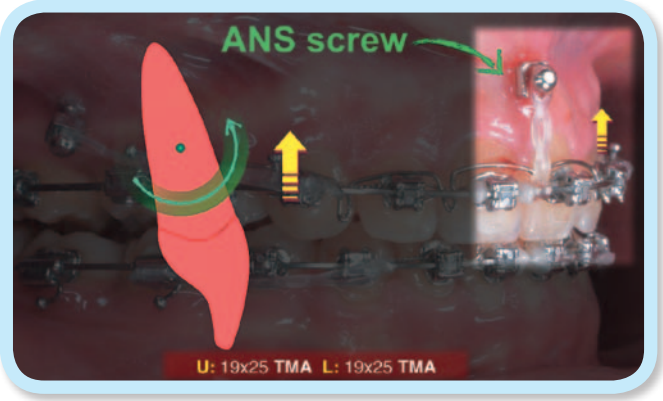

Fig. 16:
An anterior nasal spine (ANS, green arrow) bone screw is inserted between the two maxillary central incisors. The upper and lower archwires are 0.019x0.025-in TMA. Since the power-chain anchored by the ANS screw has a line of force labial to the center of resistance, the force applied to the archwire (yellow arrows) results in a moment of the force (green circular arrow) around the center of rotation (green dot) of the incisor, which produces lingual root torque. See text for details.

sequence or in combination to increase the axial inclination ~15° to return to an ideal angle of 104° for upper central incisors (*Fig. 18*). When using the ANS TAD, the line of force for the power chain is labial to the center of resistance for the incisor roots so it produces lingual root torque and intrudes the incisors simultaneously (*Fig. 16*).

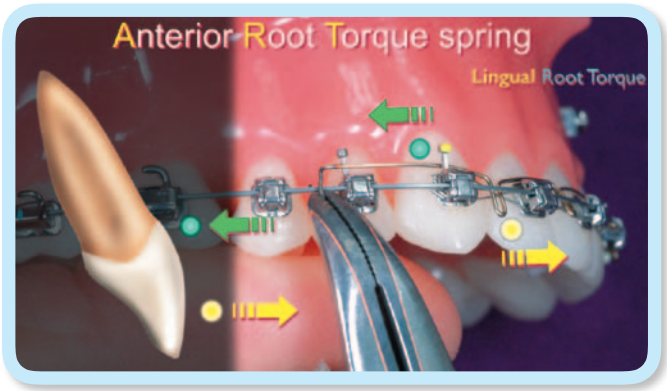

Fig. 17:
When the hooks on the Anterior Root Torque spring are engaged occlusal to the base archwire as shown with Weingart pliers, the spring applies an intrusive force and a couple (opposing green and yellow arrows) to each incisor (left). This mechanism applies lingual root torque to the maxillary incisors. See text for details.

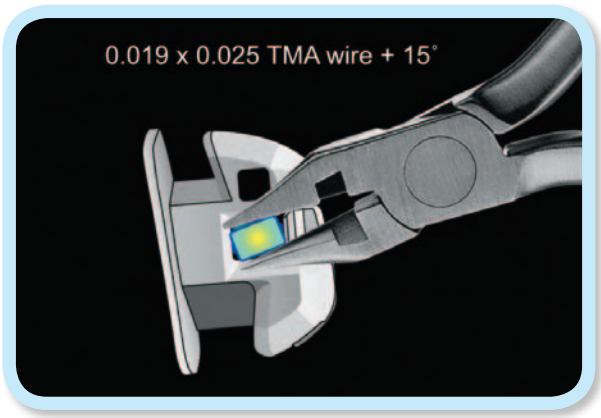

Fig. 18:
A 15° torsional bent in the anterior segment of a TMA wire (green) results in lingual root torque on the tooth when the archwire is twisted and inserted into the bracket with the pliers as shown. See text for details.

Wire Sequence	
Non Extraction	Extraction
1. 0.014 CuNiTi	1. 0.014 CuNiti
2. 0.014 x 0.025 CuNiTi	2. 0.014 x 0.025 CuNiTi
3. 0.018 x 0.025 CuNiTi	3. 0.018 x 0.025 CuNiTi
4. 0.026 x 0.025 SS	4. 0.021 x 0.025 CuNiTi
	5. 0.019 x 0.25 SS

Table 5: Recommended wire sequence for extraction and non extraction cases.

3. Biomechanics

The torque settings for an Insignia™ treatment plan are predicated on the amount of space closure force and the distance the anterior segment will be retracted. To utilize the appropriate retraction force, the clinician must carefully evaluate the M:F when initiating space closure. IZC BSs typically anchor about 14oz (*397g or 389cN*) of elastomer force bilaterally.[7] Assume a curved archwire with a total retraction load of almost 800cN delivers ~400cN of retraction force to each incisor, and the C_{RES} is ~10mm apical to the bracket for each tooth. To translate the incisor roots distally, the archwire must deliver a uniform moment of 4000cN-mm to each to each incisor. This is more than twice the torsional range for a flat (*no activation*) 0.018 x 0.025-in TMA archwire.[13] The moment applied during incisal retraction can be increased by adding torque to the Insignia™ prescription and utilizing a 20° pretorqued TMA archwire. However, that adjustment may be inadequate because the moment required for translation is beyond the torsional range for TMA.[13] A total maxillary retraction force of almost 800cN requires a stiffer material like SS to provide an adequate root lingual moment. Consistent with its higher modulus of elasticity, SS delivers more than twice the moment in torsion compared to a TMA wire of identical dimensions.[13]

Conclusions

1. SS wires are stiff in both bending and torsion, which are the archwire properties required to retract anterior segments during posterior space closure.

2. TMA wire is preferable for finishing bends because it is easy to adjust and applies less force to the teeth.

3. Correcting a severe sagittal torque loss is facilitated by combinations of mechanics to apply lingual root torque to upper incisors.

4. Prevention is the best policy because correction of a severe axial inclination problem requires a much longer treatment time.

5. A clinician must understand the mechanical properties of materials when designing mechanics for all fixed appliances.

Acknowledgments

Thanks to Dr. Rungsi Thavarungkul for the beautiful illustrations. Special thanks to Dr. Bear Chen for his mentorship and assistance with data collection.

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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 = 2

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 = 1

OCCLUSION

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

Total = 0

LINGUAL POSTERIOR X-BITE

1 pt. per tooth Total = 0

BUCCAL POSTERIOR X-BITE

2 pts. per tooth Total = 0

CEPHALOMETRICS (See Instructions)

ANB ≥ 6° or ≤ -2° = 4 pts.

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

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

SN-MP

≥ 38° = 2 pts.

Each degree > 38° 9 x 2 pts. = 18

≤ 26° = 1 pt.

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

1 to MP ≥ 99° = 1 pt.

Each degree > 99° 2 x 1 pt. = 2

Total = 27

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 =

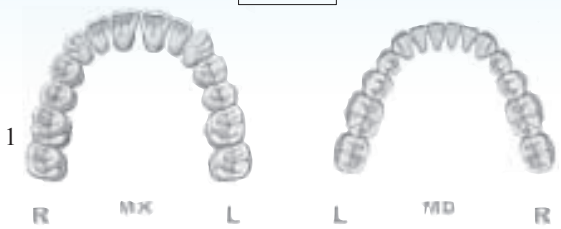
Cast-Radiograph Evaluation

Case # **Patient**

Total Score: 10

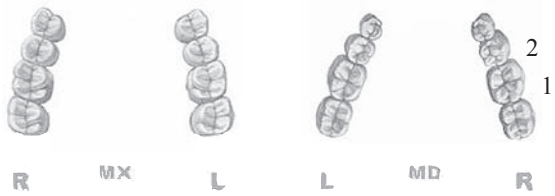
Alignment/Rotations

1



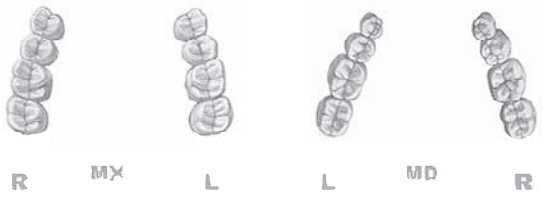
Marginal Ridges

3



Buccolingual Inclination

0

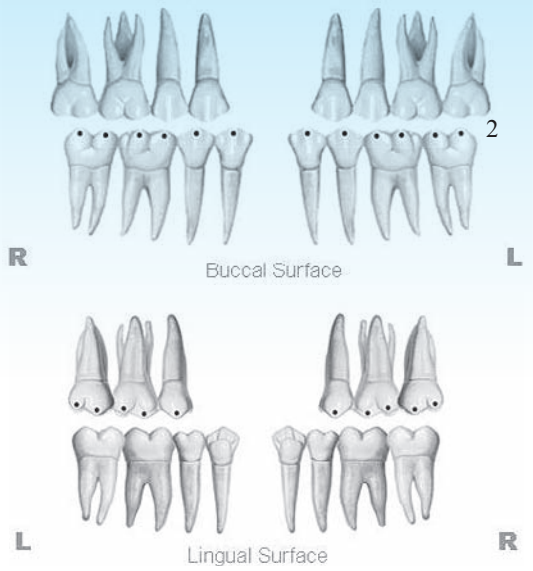


Overjet

0

Occlusal Contacts

2

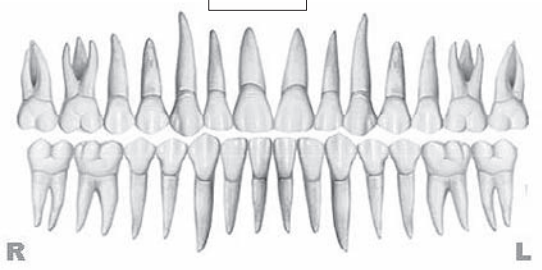


Occlusal Relationships

4

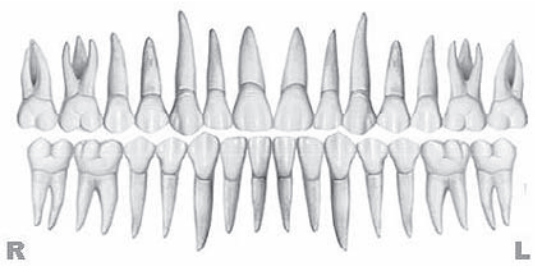
Interproximal Contacts

0



Root Angulation

0



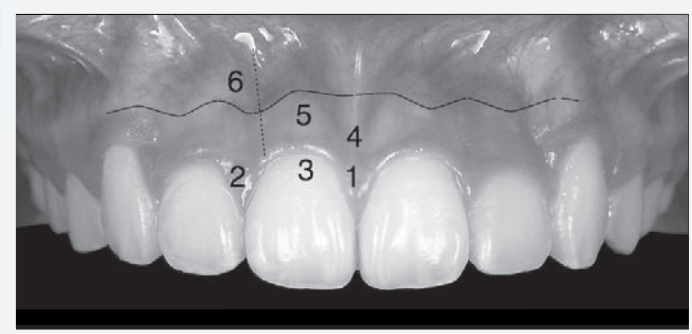
INSTRUCTIONS: Place score beside each deficient tooth and enter total score for each parameter in the white box. Mark extracted teeth with "X". Second molars should be in occlusion.

IBOI Pink & White Esthetic Score

Total Score: = 2

1. Pink Esthetic Score

Total = 1

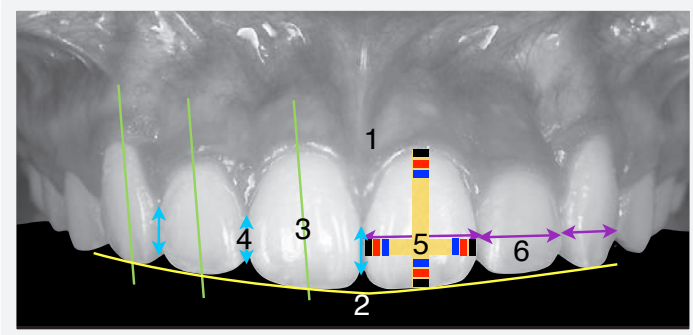


1. M & D Papillae	0	1	2
2. Keratinized Gingiva	0	1	2
3. Curvature of Gingival Margin	0	1	2
4. Level of Gingival Margin	0	1	2
5. Root Convexity (Torque)	0	1	2
6. Scar Formation	0	1	2

1. M & D 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 = 1



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

Implant Forum

- Implant Forum — 1-9 seasons

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Join the *iAOI* the future of dentistry!

About our association-iAOI

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

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1. Member

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2. Board eligible

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Dr. 曾令怡*▲ Linda Tseng

Dr. 林詩詠▲ Joshua Lin

Dr. 徐玉玲▲ Lynn Hsu

Dr. 李雙安▲ Angle Lee

Dr. 蘇筌瑋 Bill Su

Dr. 葉信吟▲ Hsin-Yin Yeh

Dr. 黃祈 Richie Huang

* *Ambassador（大使）: One who has published 9+ case reports in JDO.*

▲ *Case report(s) published at least once in referral journals.*

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

Dr. 黃育新 Yu-Hsin Huang

Dr. 邱上珍▲ Grace Chiu

Dr. 黃瓊嫻 Sabrina Huang

Dr. 曾淑萍 Shu-Ping Tseng

Dr. 林曉鈴 Sheau-Ling Lin

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Dr. 張銘津 Ariel Chang

Dr. 彭緯綸 Wei-Lun Peng

Dr. 呂詩薇 Julie Lu

2019 iAOI Symposium

12/29 Sun

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Hsinchu City, Taiwan

Dr. Kenji Ojima

Advanced Aligner Orthodontics

Dr. Kenji Ojima received his postgraduate degree in Orthodontics from the University of Showa. In addition to being an international speaker and key opinion leader on DSD and aligners, he also maintains a private practice in Tokyo since 2007 together with Dr. Dan and Dr. Kumagai. He is currently the president of Japan Academy of Aligner Orthodontics and the President of the American Academy of Cosmetic Orthodontics-Asian Chapter.

Dr. Ojima will present various types of common cases including expansion, extraction, distalization, openbite, deepbite, interdisciplinary treatment and surgery-first approach with aligner cases. He will detail how to achieve excellent results of these cases over a short period of time.

09:00-10:30 ● **Diagnosis/Treatment Plan**
Dr. Kenji Ojima

11:00-12:30 ● **Class II Approach for Aligner**
Dr. Kenji Ojima

13:30-15:00 ● **Extraction Approach for Aligner**
Dr. Kenji Ojima

15:30-17:00 ● **Screws and Aligners: Pulling and Pushing Mechanics**
Dr. Chris Chang

Dr. Bill Su
Chairman

Dr. Kenji Ojima is an internationally renowned aligner speaker and has accumulated more than 2000 aligner cases in merely 3-4 years. Coupled with his expertise in DSD and the acceleration approach, he has managed to achieve what many patients would called, fast and fabulous results. I have listened to Dr. Ojima's lectures a couple of times in the past and has always been very impressed by his charm and persuasiveness . This advanced aligner course is ideal for clinicians who want to take their treatment to the next level and improve their treatment efficiency and esthetic quality. Don't miss out this IAOI's end-of-the-year event!

Phone: +886-3-5711377 Registration: iaoi.pro Contact: Michelle Tsai contact@iaoi.pro

DSD Digital Smile Design

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Workshop

Integrating DSD & Miniscrews with Aligners

12/30 Mon

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2F, 25, Jianzhong 1st Rd.,
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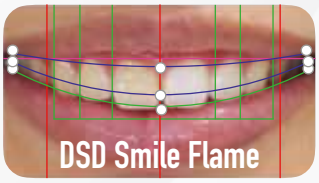
Dr. Kenji Ojima + Dr. Chris Chang

ABO-Certified Orthodontist
Member, Angle Society Midwest Chapter
Founder & President, Newton's A & Beethoven Orthodontic Center
Co-author, Orthodontics Vol I-IV

In this one day workshop, Dr. Ojima will demonstrate how to use Orthocomm and DSD app to perform diagnosis, treatment planning, conduct motivational mockup and ensure patient compliance to achieve ideal clinical results in digital orthodontics.

09:00-10:30 ● **Digital Smile Design App**
Learn how to design motivational mockup in DSD App.
Dr. Kenji Ojima



11:00-12:30 ● **Orthocomm Aligner Management**
Use Orthocomm to execute clinical protocols and ensure patient compliance.
Dr. Kenji Ojima

13:30-15:00 ● **Miniscrew Workshop for Aligners**
Dr. Chris Chang

15:00-16:00 ● **Q&A**
Dr. Kenji Ojima & Dr. Chris Chang

Requirement: An iPad and a PC (Mac/Windows) with Chrome browser.

	By 2019/12/01		After 2019/12/01	
	Member	Non-Member	Member	Non-Member
Lecture	$200	$250	$250	$300
Lecture + Workshop	$1,000	$1,035	$1,250	$1,285

(iAOI Enrollment Fees USD 35 included)

The fee of lecture+workshop includes a hands-on typodont and consumables (software cost is not included).

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iAOI

Class III Malocclusion, Anterior Crossbite and Missing Mandibular First Molars: Bite Turbos and Space Closure to Protract Lower Second Molars

Abstract

***Diagnosis**: A 32-year-old female presented with a long face (55%), maxillary retrusion (SNA 79.5º), mandibular protrusion (SNB 82.5º), retruded lips (-4.0/-3.5mm), relative lower lip protrusion, missing lower first molars (LR6, LL6), atrophic edentulous spaces, Class III buccal segments, and anterior crossbite. The Discrepancy Index (DI) was 25.*

***Etiology**: Early loss of L6s was probably due to molar-incisal hypomineralization (MIH). Anterior crossbite is a common functional compensation after lower second deciduous molars are lost at about age 12yr.*

***Treatment**: A passive self-ligating (PSL) appliance, posterior bite turbos, early light short Class III elastics were used to correct the anterior crossbite. The L6 extraction sites were closed with primarily Class II elastics. Active treatment time was 20 months.*

***Results**: Closure of the atrophic L6 sites was achieved by retracting the anterior segment and protracting lower molars. No significant root resorption nor periodontal problems were noted. The patient was pleased with treatment: excellent occlusal function, improved dentofacial esthetics, and an attractive smile arc. Clinical outcomes were a cast-radiograph evaluation (CRE) of 21 and a Pink & White (P&W) dental esthetic score of 3.*

***Conclusions**: Severe skeletal malocclusion was corrected in 20 months with a full-fixed PSL appliance, posterior bite turbos, intermaxillary elastics, and space closure mechanics. (J Digital Orthod 2019;56:48-63)*

Key words:
Missing first molar, mesially tipped molar, atrophic edentulous ridge, anterior crossbite, passive self-ligating brackets, Class III elastics

Introduction

Many patients with a skeletal Class III malocclusion view surgery as the only viable option. However, that is an over treatment for patients with a good profile, near Class I molar relationship, and/or an anterior functional shift. It is essential to consider the etiology and differentially diagnose the malocclusion before formulating a treatment plan. If a centric relation (C_R) to centric occlusion (C_O) discrepancy exists, the problem is best classified as a pseudo Class III malocclusion.[1] Pseudo Class III patients who have an orthognathic profile in C_R usually have a good prognosis for conservative treatment.

Dr. Ashley Huang,
Lecturer, Beethoven Orthodontic Course (Left)

Dr. Angle Lee,
Editor, Journal of Digital Orthodontics (Center left)

Dr. Chris H. Chang,
President, Beethoven Orthodontic Center
Publisher, Journal of Digital Orthodontics (Center Right)

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

Fig. 1: Pre-treatment facial and intraoral photographs in C_O

Fig. 2 : Functional assessment of mandible movement: intraoral photographs in C_R

Diagnosis and Etiology

A 32-year-old woman sought orthodontic evaluation for missing teeth, poor dentofacial esthetics, and a protrusive lower lip (*Figs. 1-3*). Radiographic examination included a lateral cephalometric film, panoramic radiograph, and a temporomandibular (*TMJ*) joint series (*Figs. 4-6*). Cephalometric analysis revealed a long face, retrusive maxilla, and protrusive mandible (*Table 1*). No contributing medical history was reported, but isolated loss of permanent first molars is usually due to a medically-related dental developmental problem in the toddler years: molar-incisor hypomineralization (*MIH*).[2] In adults, closing edentulous L6 spaces is challenging because of associated malocclusion, atrophic knife-edge ridge, and anchorage requirements.[3-5] An anterior crossbite may be associated with MIH, but it can be a fortunate occurrence that increases anchorage for L7 protraction.[3]

Facial evaluation showed symmetrical structures, a concave profile, retrusive lips to the E-Line, but a relative protrusion of the lower lip. An unattractive reverse smile arc was evident while smiling. The panoramic radiograph (*Fig. 5*) reveled missing L6s and U8s bilaterally, retained root tip in the LR6 area, and mesial tipping of the L7s. Intraoral examination showed missing teeth (UR8, UL8, LR6, and LL6), residual root tip in the area of the LL6, anterior crossbite of all four maxillary incisors, buccal crossbite of the UL7, maxillary dental midline coincident with the facial midline, mandibular dental midline 1mm to the left, and a C_O-C_R discrepancy (*anterior functional shift*) from an initial edge-to-edge position (*Figs. 1-3*). Pre-treatment cephalometric evaluation confirmed the skeletal Class III (*ANB -3˚*) as previously described (*Fig. 4; Table 1*), but the excessive SNB angle was partially due to the C_O-C_R discrepancy. The TMJ radiographs (*Fig. 6*) showed symmetric unremarkable morphology and there were no signs or symptoms of TMJ dysfunction. The American Board of Orthodontics (*ABO*) discrepancy index (*DI*) was 25 points,[5] as shown in the worksheet at the end of this report.

Treatment Objectives

The treatment objectives were: (*1*) extract the hopeless lower left first molar residual root; (*2*)

CEPHALOMETRIC SUMMARY			
SKELETAL ANALYSIS			
	PRE-Tx	POST-Tx	DIFF.
SNA˚ (82º)	79.5˚	79.5˚	0˚
SNB˚ (80º)	82.5˚	83˚	0.5˚
ANB˚ (2º)	-3˚	-2.5˚	0.5˚
SN-MP˚ (32º)	35˚	36˚	1˚
FMA˚ (25º)	27˚	28.5˚	1.5˚
DENTAL ANALYSIS			
U1 To NA mm (4 mm)	2 mm	2.5 mm	0.5 mm
U1 To SN˚ (110º)	103˚	106˚	3˚
L1 To NB mm (4 mm)	0 mm	-1 mm	1 mm
L1 To MP˚ (90º)	77˚	72˚	5˚
FACIAL ANALYSIS			
E-LINE UL (-1 mm)	-4 mm	-4 mm	0 mm
E-LINE LL (0 mm)	-3.5 mm	-1.5 mm	2 mm
%FH: Na-ANS-Gn (53%)	55%	55.2%	0.2%
Convexity: G-Sn-Pg' (13º)	2˚	1.5˚	0.5˚

■ *Table 1: Cephalometric summary*

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

Fig. 4: Pre-treatment lateral cephalometric radiograph

Fig. 5: Pre-treatment panoramic radiograph

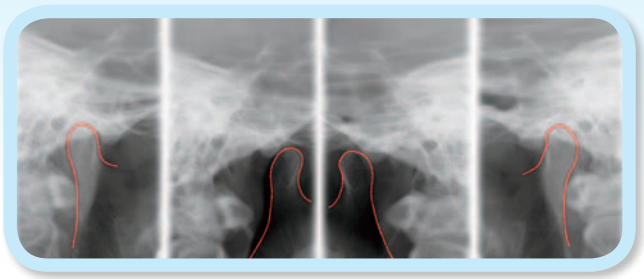

Fig. 6:
Pre-treatment TMJ radiographic series from left to right are: closed right, open right, closed left, and open left.

correct the anterior crossbite by opening the bite and retracting the lower anterior segment, (3) protract the mandibular molars to close space, and (4) correct the maxillary anterior smile arc.

Treatment Alternatives

Uprighting the L7s and leaving the space for implant-supported crowns was considered. That option may decrease treatment time, but it was more expensive and invasive. Also, the buccolingual width of the atrophic edentulous ridges required augmentation bone grafts. After carefully considering the pros and cons for each option, the patient selected orthodontic space closure.

Treatment Progress

The patient was referred for removal of the residual LL6 root, and one month later, Damon Q® passive self-ligating (*PSL*) 0.022-in brackets (*Ormco, Glendora, CA*) were bonded on all permanent teeth. All elastics, archwires and auxiliaries were produced by the same manufacturer. Standard torque brackets were used on all teeth except: 1. low torque brackets on the maxillary incisors, 2. low torque brackets

bonded up-side-down (*to express high torque*) on the mandibular incisors, and 3. high torque brackets on L3s. Archwire materials were copper nickel-titanium (*CuNiTi*), titanium molybdenum alloy (*TMA*), and stainless steel (*SS*). The maxillary archwire sequence was: 0.014-in CuNiTi, 0.014x0.025-in CuNiTi, 0.017x0.025-in TMA, and 0.016x0.025-in SS. The corresponding lower arch sequence was 0.014-in CuNiTi, 0.014x0.025-in CuNiTi, 0.016x0.025-in pre-Q NiTi (*20º of lingual root torque in the anterior segment*), 0.019x0.025-in pre-Q NiTi, and 0.016x0.025-in SS. In the first month of active treatment, posterior bite turbos were constructed with Fuji II type II glass ionomer cement (*GC America, Alsip IL*) on the occlusal surfaces of the mandibular second molars. The patient was instructed to wear the short Class III elastics (*Quail 3/16-in, 2oz*) from the upper first molars to the lower first premolars bilaterally, to correct the anterior crossbite (*Fig. 7*). Bilateral bite turbos were effective for unlocking the interdigitation and facilitating overjet and overbite correction. In the 4th month of treatment, a positive overjet was achieved and the bite turbos were removed (*Fig. 8*). To enhance space closure efficiency and to control iatrogenic rotation, four lingual buttons were bonded on the lower first premolars and the second molars. A sequence of 0.016x0.025-in Pre-Q NiTi and 0.019x0.025-in Pre-Q NiTi wires were installed in the lower arch in the 4th and 6th months respectively, to increase incisors torque. In the 8th month, Class II elastics (*Bear 1/4-in, 4.5-oz*) were applied bilaterally from the maxillary canines to the mandibular 2nd molars for 3 months to complete the A-P correction and promote smile arc development (*Fig. 9*). Fifteen degree root lingual third order bends in 0.016x0.025-in SS archwires were applied to mandibular incisors in the 9th month and to the maxillary incisors in the 15th month (*Figs. 10 and 11*). In the 12th month,

Fig. 7:
In the 1st month of the treatment, the 0.014-in CuNiTi archwires engaged in all dentition of both arches. The anterior crossbite was corrected with bite turbos (blue circles), alignment of the maxillary anterior segment, and 2-oz Class III elastics (blue lines). Class III elastics provide horizontal and vertical forces to facilitate early correction of anterior crossbite.

Fig. 8:
In the 4th month, anterior crossbite was corrected. The maxillary archwire was changed to 0.014x0.025-in CuNiTi, and the mandibular archwire was changed to 0.016x0.025-in Pre-Q NiTi.

Fig. 9:
In the 9th month, maxillary and mandibular archwires were changed to 0.016x0.025-in SS. Class II elastics (blue lines) were applied for A-P correction, and to prevent uprighting of the lower anterior teeth during space closure.

Fig. 10:
Maxillary arch form was corrected from one (1M) to twenty (20M) months with the archwire sequence as shown. In the 9th month of treatment, third order bends applied +15 degrees of lingual root torque on maxillary incisors.

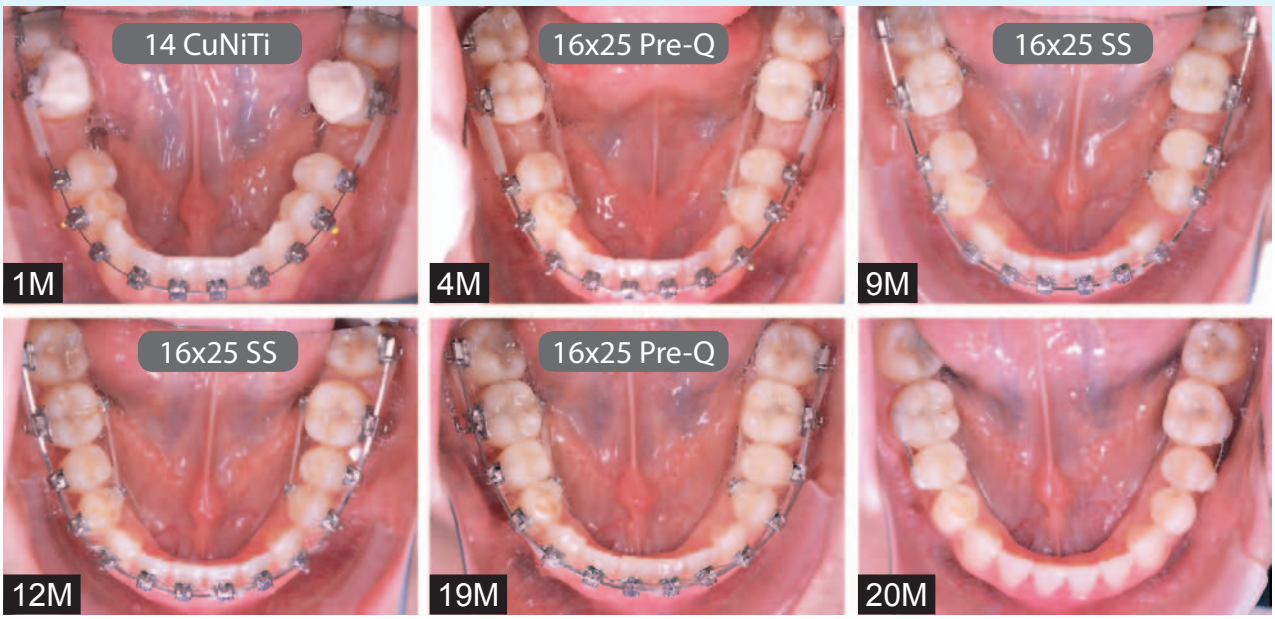

Fig. 11:
In the 1st month of the treatment (1M), posterior bite turbos were bonded on the occlusal surfaces of the mandibular second molars. In the 4th month of treatment (4M), buttons were bonded on the lingual surfaces of the mandibular first premolars and second molars. Power chains were applied on the buccal and lingual surfaces from 9-19mo (9M-19M) to close the lower posterior spaces. In the 12th month, the extraction spaces were closed. Third order bends were placed in the 15th month to deliver +15 degrees of lingual root torque to the mandible incisors. By nineteen months (19M) the correction was complete and the fixed appliances were removed at twenty months (20M).

the extraction spaces were closed. Brackets were repositioned based on a progress panoramic radiograph. Inter-proximal reduction (*IPR*) of the mandibular central incisors was performed to correct the dark interproximal triangles, and to reduce arch-length to permit an ideal overjet correction. Fixed appliances were removed after 19 months of active treatment. Two fixed retainers were bonded buccally between the mandibular second premolars and the second molars to maintain space closure. Retention was provided with maxillary and mandibular clear overlay retainers.

Treatment Results

Facial esthetics with a more harmonious facial profile were achieved by a modest increase in lower facial height and retraction of the lower anterior segment (*Fig. 12*). The maxillary anterior segment has well aligned with a pleasing smile arc.[6] Dental midlines were aligned on the facial midline, and normal overbite and overjet were achieved (*Fig. 13*). The post-treatment panoramic and cephalometric films (*Figs. 14 and 15*) revealed harmonious axial inclinations in the buccal segments with all interproximal spaces closed. An unusual external apical root resorption was noted. The cephalometric analysis revealed that the upper incisor to SN angle was increased 5 degrees, and the SNB angle was decreased from 84 to 81 degrees (*Table 1*). Superimposition of cephalometric tracings from before and after treatment showed that the mandibular anterior segment was retracted about 5mm, and was lingually inclined about 4 degrees. Mandibular

Fig. 12:
Post-treatment facial and intraoral photographs show two fixed retainers (blue arrows) bonded on the buccal surfaces of the mandibular second premolars and the second molars.

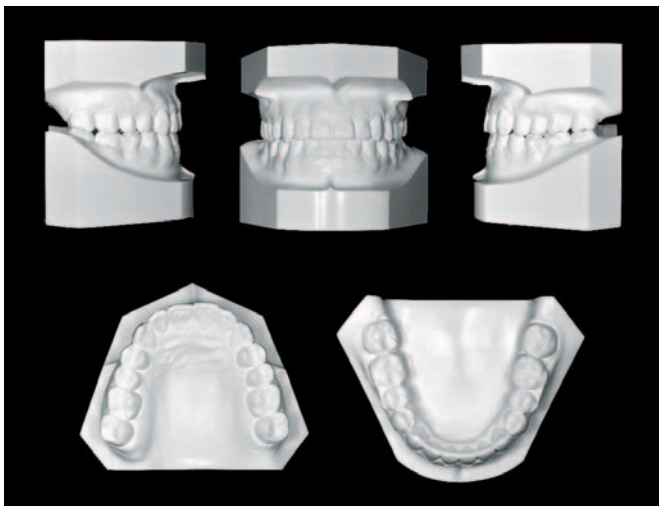

Fig. 13: Post-treatment dental models (casts)

second and third molars were protracted, uprighted, and extruded, which was associated with ~1 degree clockwise rotation of the mandible (*Fig. 16*). The patient was well satisfied with the treatment results. The ABO cast radiograph evaluation (*CRE*) score was 21 points,[7] as shown in the worksheet at the end of this report. The major alignment discrepancies were marginal ridges and buccolingual inclination of the molars. Substituting mandibular third molars for second molars may be challenging because of morphologic variabilities of the crown. The Pink and White (*P&W*) esthetic score was 3 points,[8] which

Fig. 14: Post-treatment lateral cephalometric radiograph

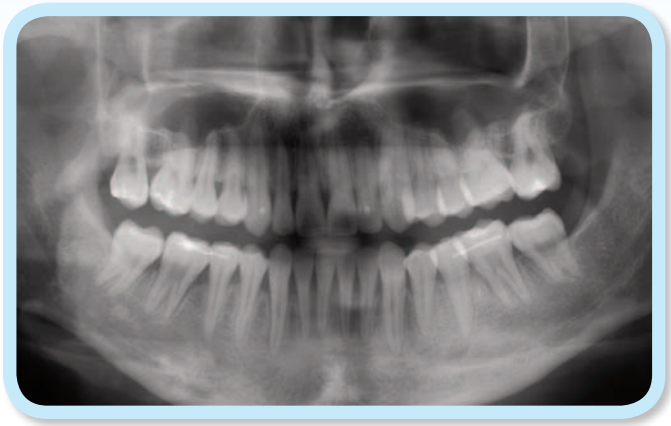

Fig. 15: Post-treatment panoramic radiograph

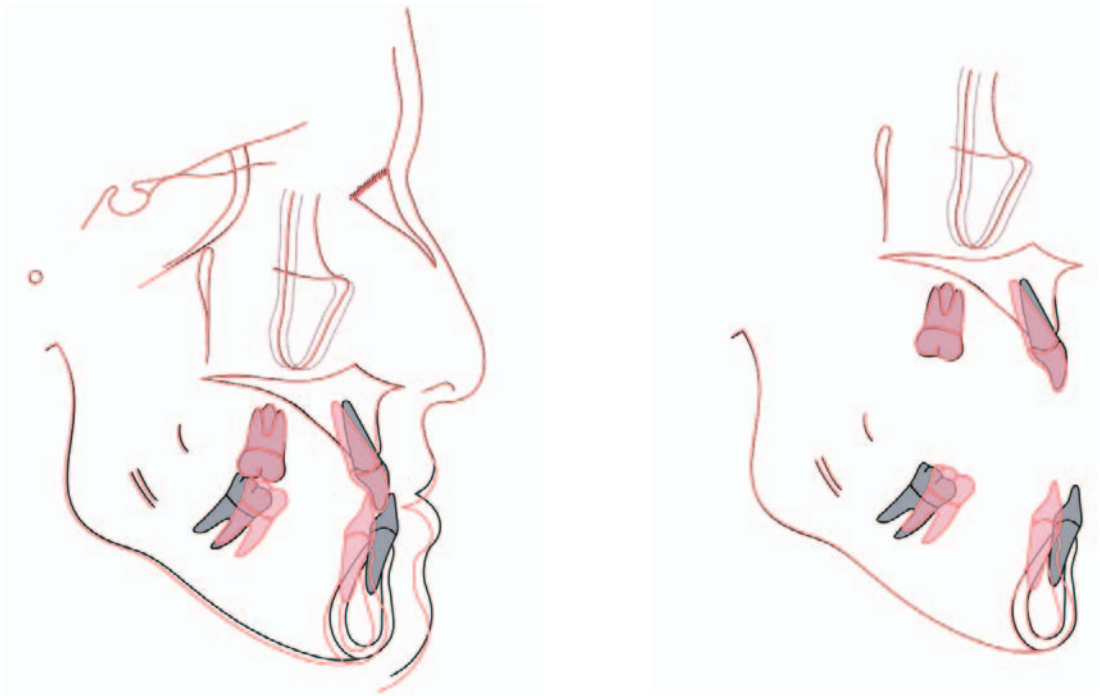

Fig. 16:
Superimposed cephalometric tracings showing dentofacial changes after 19 months of treatment (red) compared to pre-treatment (black). The protrusive lower lip was corrected, resulting in a more balanced facial profile. Maxillary incisor axial inclination was increased 5˚ and mandibular incisors were retracted ~5mm. The mandibular second molar(s) was protracted and substituted for the missing 1st molar(s).

reflected gingival prominence on the UR1. Attrition on the incisal edges of the 4 maxillary incisors was due to occlusal interference before orthodontic treatment. Two-year-follow-up intraoral photographs showed stable occlusion and a harmonious curvature of gingival margins (*Fig. 17*).

Discussion

Differential diagnosis of skeletal Class III malocclusion with an anterior crossbite is essential for formulating an efficient treatment plan. Treatment options are orthodontic treatment with or without orthognathic surgery. Class III patients with an acceptable profile and near Class I molar relationship in C_R are good candidates for conservative orthodontic treatment particularly if there is a pretreatment $C_R \rightarrow C_O$ functional shift. If the latter is present, the diagnosis is pseudo Class III malocclusion.[1] In C_R the present patient had a straight facial profile, Class I molar relationship, and an anterior functional shift to achieve C_O. These

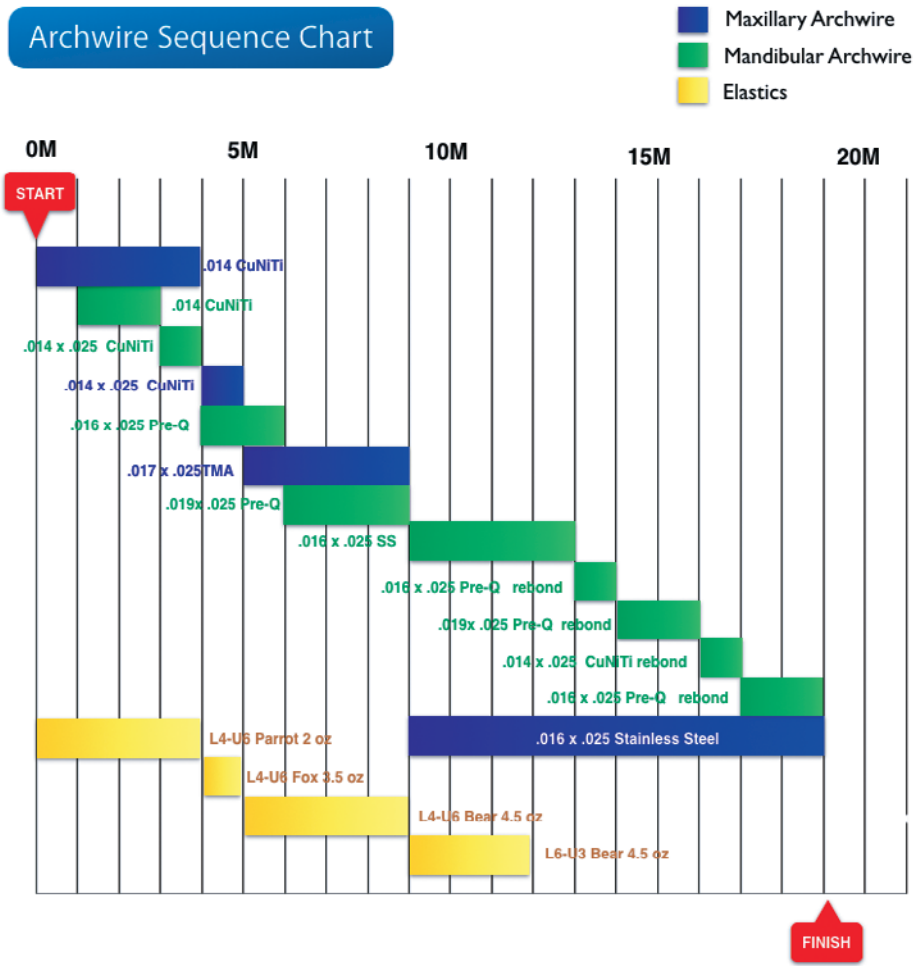

Table 2: Archwire sequence chart

Fig. 17: 2-year-follow-up intraoral photographs

diagnostic features suggested a good response to dentoalveolar treatment. Posterior bite turbos on L7s and light force Class III elastics facilitated the anterior crossbite correction and retracted the lower premolars. After only 3 months of active treatment, a positive overjet was achieved.

Upper incisors flare when crowding is corrected without extraction or interproximal reduction, and the problem is enhanced with Class III elastics. To control maxillary incisal flaring, low torque brackets (*+7 and +3*) are indicated for central and lateral incisors, respectively. Class III elastics tip lower incisors lingually, so high torque brackets are indicated. There are no high torque brackets available for lower incisors, so low torque brackets

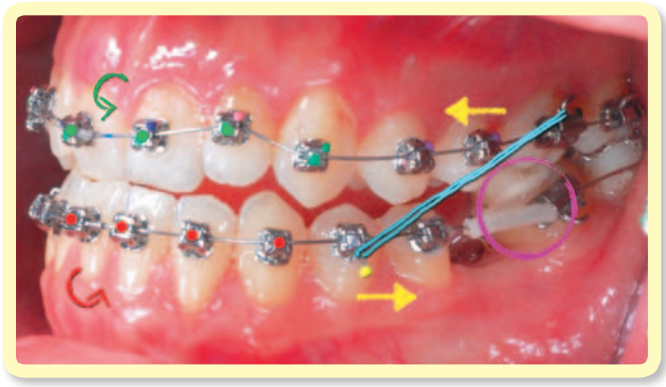

Fig. 18:
Conservative correction of anterior crossbite with Class III elastics (blue line) tends to flare maxillary incisors and tip mandibular incisors lingually (yellow arrows). Decreased torque is required in upper incisor brackets (green arrow) and increased torque in lower incisor brackets (red arrow). The posterior bite turbos (purple circle) unlock the interdigitation to permit retraction of the lower anterior segment.

are bonded up-side-down to achieve the desired torque (*Fig. 18*).

Missing mandibular first molar is common among adult orthodontic patients.[1-3] Since the L6s are lost early due to MIH,[2] the L7s tip mesially into the space, and the edentulous ridge becomes atrophic. Stepovich[9] found that L6 extraction sites can be closed if the edentulous ridge is 6 mm or less in mesiodistal length and ~7mm in buccolingual width. For the present patient, the mesiodistal dimensions were 7mm on the left, 8mm on the right, and the buccolingual alveolar bone widths were >8mm on both sides. After 19 months of treatment, the extraction sites closed and the axial inclination in the buccal segments were WNL (*Fig. 15*).

Extra-oral devices such as a facemask are relatively inefficient, but retromolar endosseous implants are effective indirect anchorage for protracting lower molars.[10] Miniscrews are used for anchorage reinforcement,[11-13] but there may be problems with adequate sites and screw movement during molar protraction.[14,15] Conservative space closure is effective when intermaxillary force is used and retraction of the lower anterior segment is desirable (*Figs. 7-16*). Protraction of lower molars with intra-arch mechanics results in retraction of the lower anterior segment.[16] For the present patient, the extraction space was used to align the teeth and correct the negative overjet, so there was no need for anchorage reinforcement.

Large dimension rectangular wires help control axial inclinations during space closure. Closing spaces

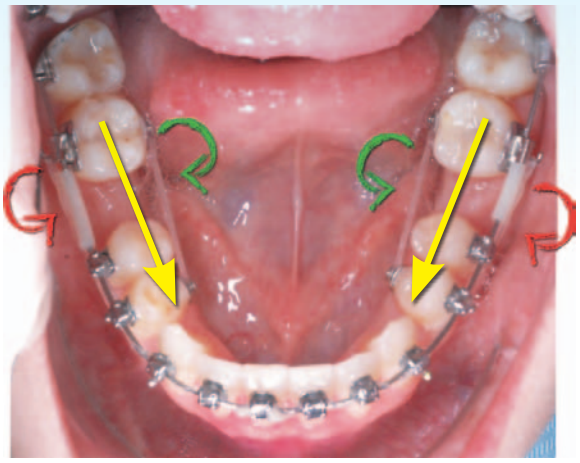

Fig. 19:
Closing space with sliding mechanics (yellow arrows) on a heavy SS rectangular wire is facilitated by balancing lingual (green arrows) and buccal moments (red arrows) to avoid the tendency for mesial and lingual tipping and iatrogenic rotation of the second molars.

with sliding mechanics on a heavy SS rectangular wire is facilitated by balancing lingual and buccal forces to prevent iatrogenic rotation (*Fig. 19*). Space re-opening of the mandibular first molar extraction sites may occur after appliances are removed. Fixed retention for mandibular posterior space closure is indicated.[17]

Conclusions

1. Differential diagnosis of Class III malocclusion with anterior crossbite requires an evaluation of the facial profile, molar classification, and functional shift. Differentiating between the true and the pseudo Class III malocclusions is essential when predicting prognosis and also for preventing over-treatment.

2. Closing mandibular extraction sites controls treatment costs by eliminating the need for

surgical and restorative procedures. However, control of the mechanics for tooth movement is also important. Dividing buccal and lingual force on a heavy archwire prevents rotation as well as mesial and/or lingual tilting of the second molar.

Reference

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Discrepancy Index Worksheet

TOTAL D.I. SCORE 25

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 = 8

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 = 1

OCCLUSION

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

Total = 0

LINGUAL POSTERIOR X-BITE

1 pt. per tooth Total = 1

BUCCAL POSTERIOR X-BITE

2 pts. per tooth Total = 0

CEPHALOMETRICS (See Instructions)

ANB ≥ 6° or ≤ -2° = 4 pts.

Each degree < -2° 1 x 1 pt. = 1

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

SN-MP

≥ 38° = 2 pts.

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

≤ 26° = 1 pt.

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

1 to MP ≥ 99° = 1 pt.

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

Total = 5

OTHER (See Instructions)

Supernumerary teeth	_____	x 1 pt. =	_____
Ankylosis of perm. teeth	_____	x 2 pts. =	_____
Anomalous morphology	_____	x 2 pts. =	_____
Impaction (except 3rd molars)	_____	x 2 pts. =	_____
Midline discrepancy (≥3mm)		@ 2 pts. =	_____
Missing teeth (except 3rd molars)	2	x 1 pts. =	2
Missing teeth, congenital	_____	x 2 pts. =	_____
Spacing (4 or more, per arch)	1	x 2 pts. =	2
Spacing (Mx cent. diastema ≥ 2mm)		@ 2 pts. =	_____
Tooth transposition	_____	x 2 pts. =	_____
Skeletal asymmetry (nonsurgical tx)		@ 3 pts. =	_____
Addl. treatment complexities	3	x 2 pts. =	6

Identify: Molar protraction x2
CO/CR discrepancy

Total = 10

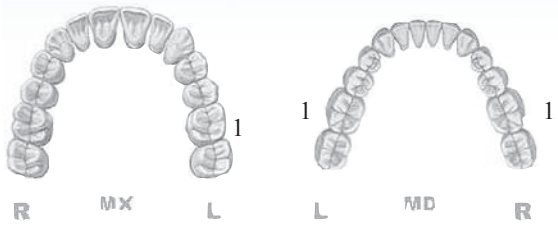
Cast-Radiograph Evaluation

Case # **Patient**

Total Score: 21

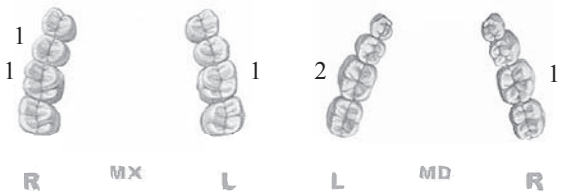
Alignment/Rotations

3



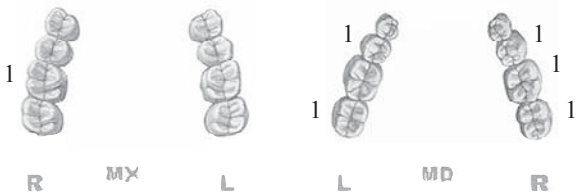
Marginal Ridges

6



Buccolingual Inclination

6

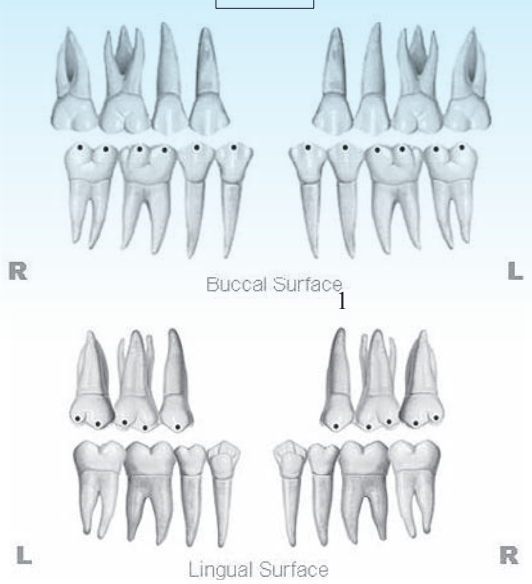


Overjet

3

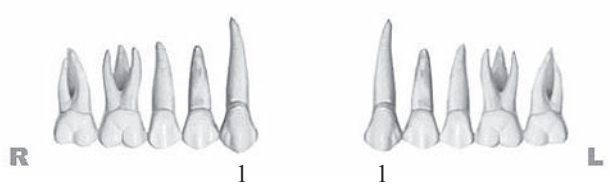
Occlusal Contacts

1



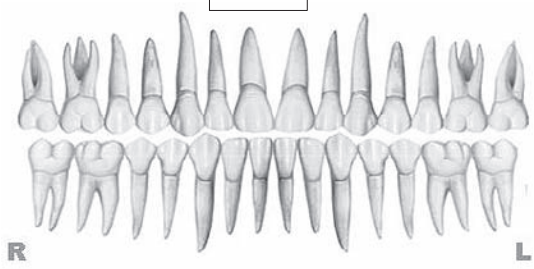
Occlusal Relationships

2



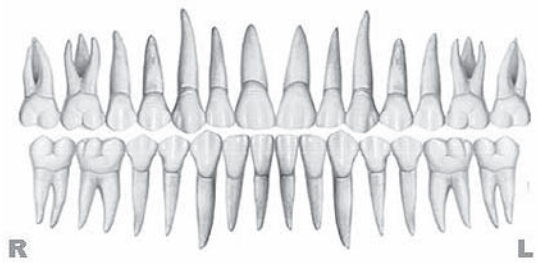
Interproximal Contacts

0



Root Angulation

0



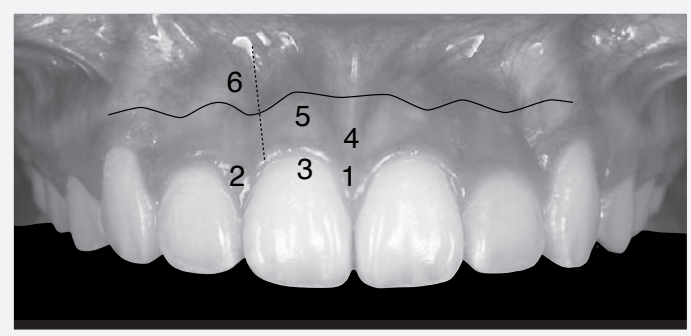
INSTRUCTIONS: Place score beside each deficient tooth and enter total score for each parameter in the white box. Mark extracted teeth with "X". Second molars should be in occlusion.

IBOI Pink & White Esthetic Score

Total Score: = 3

1. Pink Esthetic Score

Total = 1

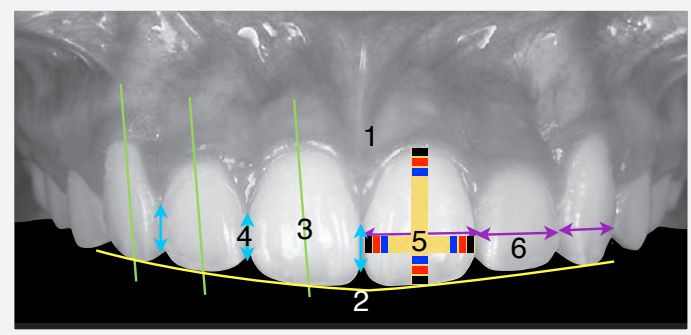


1. M & D Papillae	0	1	2
2. Keratinized Gingiva	0	1	2
3. Curvature of Gingival Margin	0	1	2
4. Level of Gingival Margin	0	1	2
5. Root Convexity (Torque)	0	1	2
6. Scar Formation	0	1	2

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

2. White Esthetic Score (for Micro-esthetics)

Total = 2



1. Midline	0	1	2
2. Incisor Curve	0	1	2
3. Axial Inclination (5°, 8°, 10°)	0	1	2
4. Contact Area (50%, 40%, 30%)	0	1	2
5. Tooth Proportion (1:0.8)	0	1	2
6. Tooth to Tooth Proportion	0	1	2

1. Midline	(0)	1	2
2. Incisor Curve	0	(1)	2
3. Axial Inclination (5°, 8°, 10°)	(0)	1	2
4. Contact Area (50%, 40%, 30%)	(0)	1	2
5. Tooth Proportion (1:0.8)	0	(1)	2
6. Tooth to Tooth Proportion	(0)	1	2

裕見。新美學

BPR課程臨床解析 2019.11.24 (日)

台 北
9:00~17:00

演講實作
東方人文教育中心
萬豪廳 & 實作教室

台 中
9:00~12:00

同步演講視訊
A S Design Center

黃裕新 醫師

- 國立台灣大學牙醫學士
- 2016 Dentsply 牙體復形競賽全球第三
- 2014, 2015 Dentsply牙體復形競賽台灣冠軍
- 2017 中華牙體復形學會大會講師

強力推薦

姜昱至 醫師 推薦

中華民國牙體復形學會前理事長/
中華民國牙髓病學會專科醫師/
國立台灣大學牙醫學系副教授

黃裕新醫師致力於牙科美學復形，曾經獲得Dentsply 牙體復形臨床競賽世界第三，並於中華牙體復形學會年會受邀擔任講師，也是學會健保事務委員會副主委。黃醫師在臨床技術上不斷的精進，更專注於其理論基礎。看診之餘參與國內外大大小小的演講或實作課程，希望能去蕪存菁把最完整的技術運用在治療與教學上。

BPR 是近期在台灣牙科很盛行的主題，也是每位醫師在每日臨床治療上都會遇到的課題，如何達到 Long-term success，不只仰賴醫師的技術也仰賴對於材料的了解與使用，就讓黃醫師為各位帶來最根本的概念以及詳盡的治療處理過程。

課程簡介

Minimally invasive concept 是近期牙科治療大家追求的方向，臨床上我們常常會遇到齲齒缺損很大的Cavity，也常有齒質厚度剩餘量不多的牙齒，如何才能最有效的保留齒質也能達到最佳的修復，重要的是長期的成功率，因此這成為一種趨勢也是我們需要培養的臨床技能。

In/Onlay是近期牙科中當紅的治療方式之一，不外乎就是因為 Minimally Invasive Concept、Material、Bonding 的進步，如何黏？修形為何？是大家最常詢問的問題。本課程將帶領大家了解 Ceramic 材料的基礎觀念，修形的技巧，Temp 的製作以及染色和 Cementation 的步驟，讓大家能夠藉此解決臨床上可能會遇到的問題，在 In/Onlay 的製作上能夠更有信心。

時 程 表

主　題	
08:00-9:00	***Registration***
	Lecture
09:00-10:30	1. What is Ceramic Inlays/Onlays? 2. Ceramic Inlays/Onlays preparation guideline and design 3. Do you know your bonding agent & cement?
10:30-10:45	***Coffee Break***
10:45-12:00	4. All ceramic materials Cementation 5. How to make a beautiful temporary prosthesis (CDT:李浩甫) 6. Impression technique 7. Case discussion
12:00-13:00	***Lunch Break***
	Hands-On 精緻小班
13:00-14:45	Inlay / Onlay Preparation
14:45-15:30	Temporary Prosthesis (Modeling & Coloring) (CDT:李浩甫)
15:30-15:50	***Coffee Break***
15:50-16:25	Cementation
16:25-17:00	Case discussion ／臨床疑難雜症排除

報名資訊

主辦單位

湧傑企業股份有限公司、臨床修復筆記社團

日　　期

2019/11/24 (日) 09:00~17:00

地　　點

台北：東方人文教育中心 萬豪廳＆實作教室
新北市新莊區化成路413號二樓

台中：A S Design Center
台中市南屯區大墩七街327號4樓

報名方式

線上報名：
https://reurl.cc/NapM8Q

電話洽詢：湧傑 02-27788315#122 楊小姐

備　　註

1. 報名Lecture＋精緻小班的醫師將備有午餐，素食者請先告知
2. 報名未出席者恕不退還既收款項
3. 學員可準備臨床實際 Case 於課堂上討論
4. 參加精緻小班課程學員需自備用具
   ＊ 口鏡、探針、鑷子一組、Loupe一副、習慣的OD器械2~3支

費　　用

Lecture	(限額120名)
一般報名	$2,000
臨床修復筆記社團／APACD學員：	$1,500
舊生 (2019/6/15添加新觀念學員)	$1,000
台中 AS 同步視訊課程（座位60-70）	$1,200

Lecture + 精緻小班 Hands-on (限額15名)	
一般報名	$15,000
臨床修復筆記社團／APACD學員：	$12,000
舊生 (2019/6/15添加新觀念學員)	$10,000

凡報名Hands-on課程即贈送

＊Prepare用Meisinger Bur一組 (鑽針＋鑽針盒)
＊NX3永久性樹脂黏著劑(Dual Cure)一支
＊湧傑貓頭鷹帆布提袋一個

・衛部醫器輸壹字第017950、017951號
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OBS

OBS Super Set

Created by Dr. Chris Chang, OBS is made of medical grade, stainless steel and titanium, and is highly praised by doctors for its simplistic design, low failure rate and excellent quality. OBS is your must-have secret weapon for maximum, reliable anchorage.

Smooth Mushroom Head
For comfort & retention of elastic chain

4-way Rectangular Holes
For lever arm to solve impacted tooth

Double Neck Design
Easy hygiene control & extra attachment

FDA

Made in Taiwan

New **Titanium** Higher biocompatibility*

1.5 | 1.5X8mm

Stainless Steel**

2.0 | 2.0x12mm

2.7 | 2.0x14mm (with holes)

Buy a Super Set, get ***OBS Clinical Guide*** **(ebook on iPad)** for free.

* TADs made of Ti alloy have a lower failure rate compared to SS when placed in thin cortical bone. These results are consistent with a biocompatibility-related tendency for less bone resorption at the bone screw interface.
Reference: Failure Rates for SS and Ti-Alloy Incisal Anchorage Screws: Single-Center, Double-Blind, Randomized Clinical Trial (J Digital Orthod 2018;52:70-79)

** The overall success rate of 93.7% indicates that both SS and TiA are clinically acceptable for IZC BSs.
Reference: Failure rates for stainless steel versus titanium alloy infrazygomatic crest bone screws: A single-center, randomized double-blind clinical trial (Angle Orthod 2019;89(1):10-46)

iNewton +886-3-573-5676 orthobonescrew.com inewton.dental@gmail.com

2019~2020 第十一年度

貝多芬 矯正精修班

時間：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：

2020

8/27、9/10、10/22、11/12、12/10
1/14、2/25、3/24、4/14、5/19、6/16

- 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

全新的第十一年度 2019-20 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。

2019-20 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＃201，蔡佳汶

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

Abstract

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

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

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

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

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

Diagnosis and Etiology

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

Dr. Joy Hui-Wen Cheng,
Lecturer, Beethoven Orthodontic Center (Left)

Dr. Sheau Ling Lin,
Lecturer, Beethoven Orthodontic Center (Center left)

Dr. Chris H. Chang,
Founder, Beethoven Orthodontic Center
Publisher, Journal of Digital Orthodontics (Center Right)

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

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

Fig. 1: Pre-treatment facial and intraoral photographs

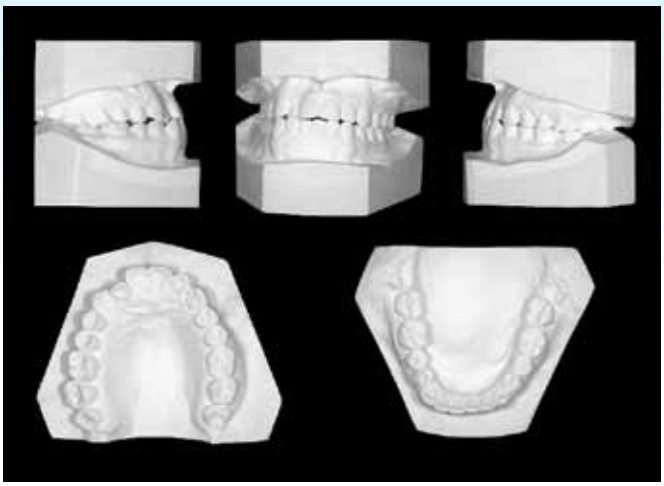

Fig. 2: Pre-treatment dental models (casts)

Fig. 3: Pre-treatment cephalometric radiograph

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

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

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

Treatment Objectives

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

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

Maxilla (all three planes):

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

Mandible (all three planes):

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

Maxillary dentition:

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

Mandibular dentition:

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

Facial Esthetics: Retract lower lip

Treatment Alternatives

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

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

Table 1: Cephalometric summary

Treatment Progress

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

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

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

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

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

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

Results Achieved

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

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

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

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

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

Fig. 9: Post-treatment facial and intraoral photographs

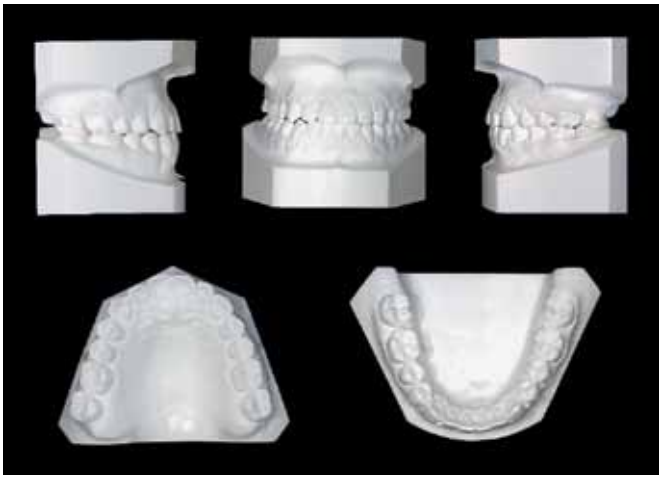

Fig. 10: Post-treatment study models (casts)

Fig. 11: Post-treatment panoramic radiograph

Fig. 12: Post-treatment cephalometric radiograph

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

Discussion

Correction of Class III Malocclusion

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

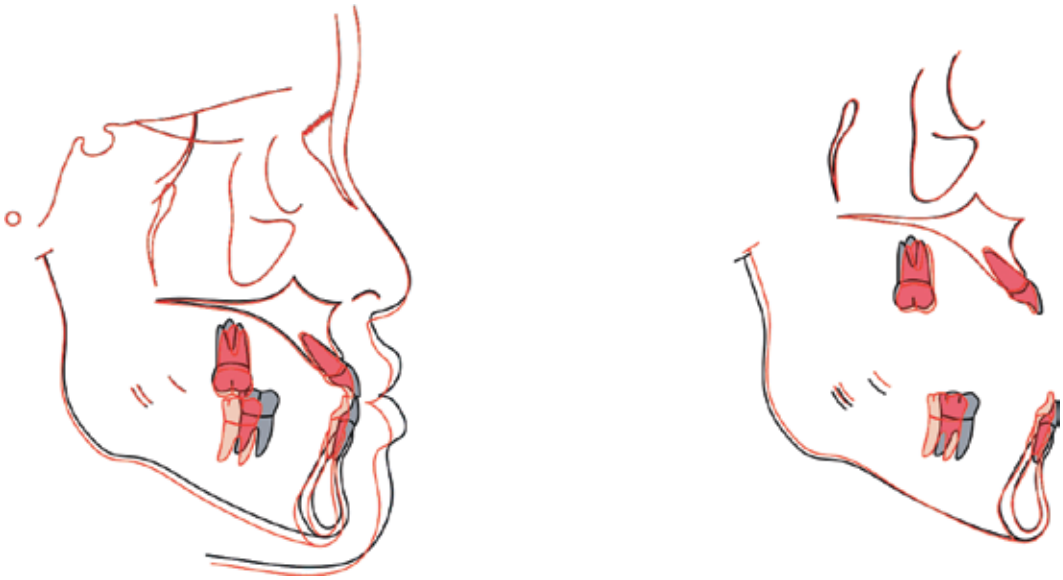

Fig. 13:
Superimposed cephalometric tracings compared changes in dentofacial relationships from before (black) to after (red) treatment. Note that the maxillary incisors were slightly retracted, while mandibular incisors were extruded and retracted. See text for details.

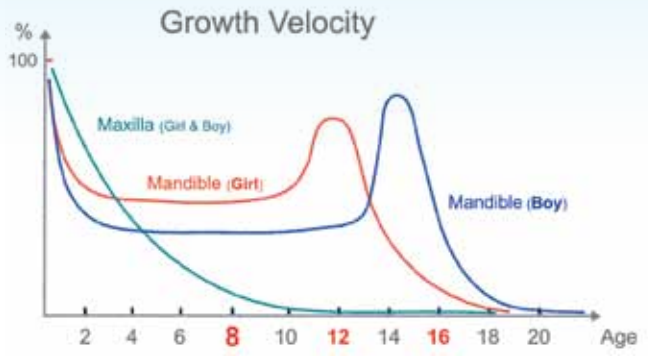

Fig. 14:
Growth curve for the maxilla compared to the mandible (Courtesy Dr. Kazuto Kuroe)

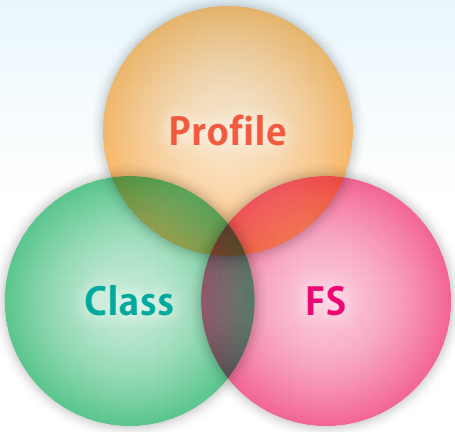

Fig. 15: Lin's 3 ring Class III malocclusion diagnosis system

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

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

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

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

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

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

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

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

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

Facial Asymmetry

Facial asymmetry with dental midline discrepancies

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

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

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

Axial inclination of the lower incisors to the

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

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

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

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

Conclusions

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

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Discrepancy Index Worksheet

TOTAL D.I. SCORE 30

OVERJET

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

Negative OJ (x-bite) 1 pt. per mm. per tooth = 11

Total = 11

OVERBITE

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

Total = 0

ANTERIOR OPEN BITE

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

Total = 1

LATERAL OPEN BITE

2 pts. per mm. per tooth

Total = 0

CROWDING (only one arch)

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

Total = 1

OCCLUSION

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

Total = 4

LINGUAL POSTERIOR X-BITE

1 pt. per tooth Total = 3

BUCCAL POSTERIOR X-BITE

2 pts. per tooth Total = 0

CEPHALOMETRICS (See Instructions)

ANB ≥ 6° or ≤ -2° = 4 pts.

Each degree < -2° 1 x 1 pt. = 1

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

SN-MP

≥ 38° = 2 pts.

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

≤ 26° = 1 pt.

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

1 to MP ≥ 99° = 1 pt.

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

Total = 5

OTHER (See Instructions)

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

Identify:

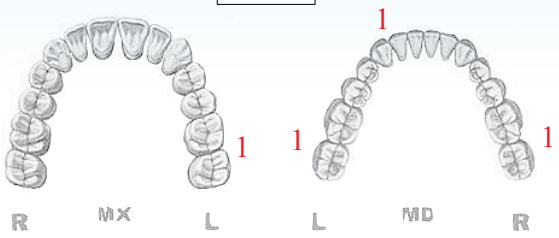
Total = 5

Cast-Radiograph Evaluation

Total Score: 26

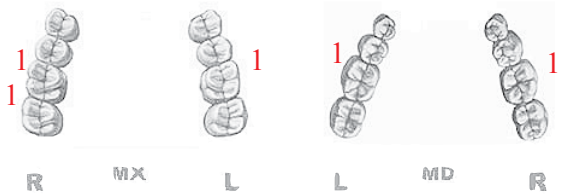
Alignment/Rotations

4



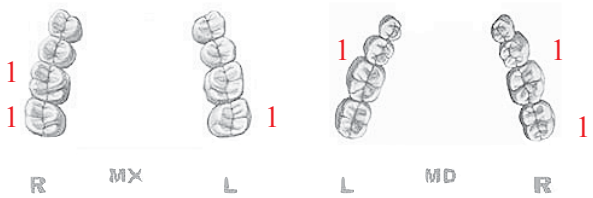
Marginal Ridges

5



Buccolingual Inclination

6

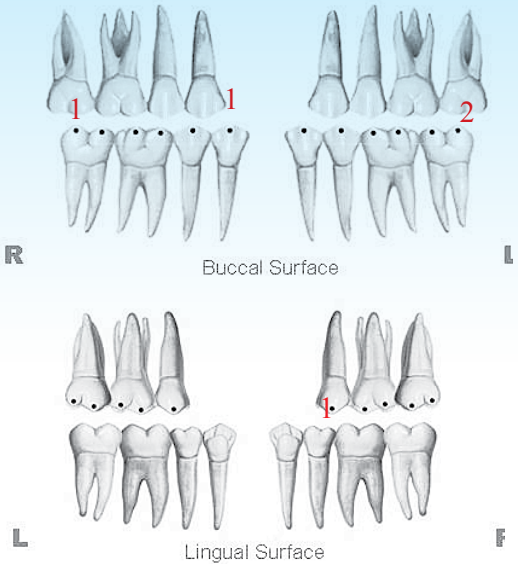


Overjet

5

Occlusal Contacts

5

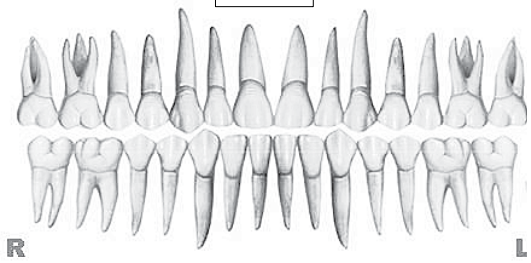


Occlusal Relationships

0

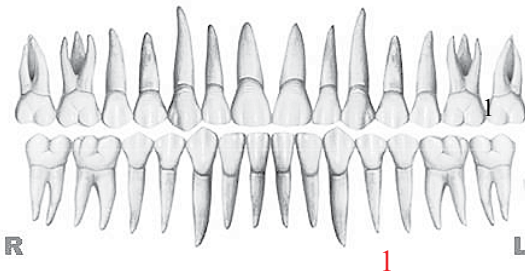
Interproximal Contacts

0



Root Angulation

1



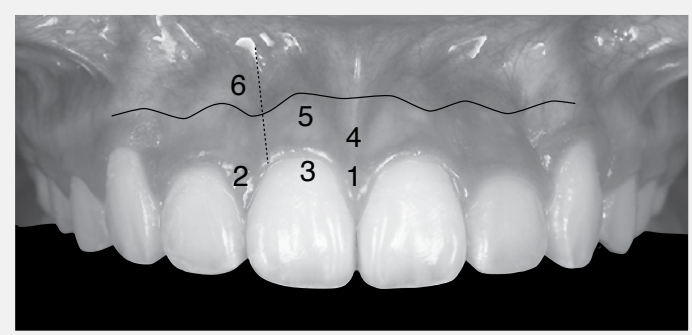
INSTRUCTIONS: Place score beside each deficient tooth and enter total score for each parameter in the white box. Mark extracted teeth with "X". Second molars should be in occlusion.

IBOI Pink & White Esthetic Score

Total Score: = 6

1. Pink Esthetic Score

Total = 2

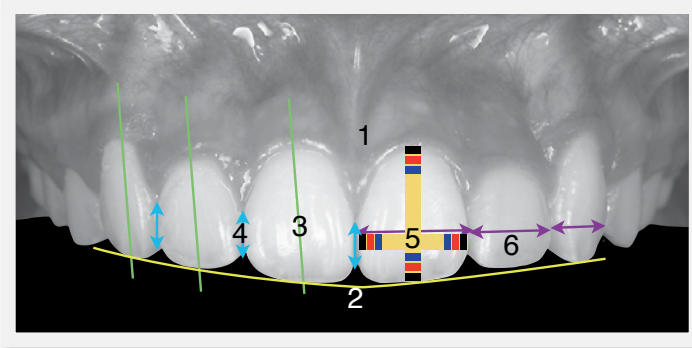


1. M & D Papillae	0	1	2
2. Keratinized Gingiva	0	1	2
3. Curvature of Gingival Margin	0	1	2
4. Level of Gingival Margin	0	1	2
5. Root Convexity (Torque)	0	1	2
6. Scar Formation	0	1	2

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

2. White Esthetic Score (for Micro-esthetics)

Total = 4



1. Midline	0	1	2
2. Incisor Curve	0	1	2
3. Axial Inclination (5°, 8°, 10°)	0	1	2
4. Contact Area (50%, 40%, 30%)	0	1	2
5. Tooth Proportion (1:0.8)	0	1	2
6. Tooth to Tooth Proportion	0	1	2

1. Midline	(0)	1	2
2. Incisor Curve	0	(1)	2
3. Axial Inclination (5°, 8°, 10°)	0	(1)	2
4. Contact Area (50%, 40%, 30%)	(0)	1	2
5. Tooth Proportion (1:0.8)	0	(1)	2
6. Tooth to Tooth Proportion	0	(1)	2

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貝多芬矯正團隊

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首次華人獲此殊榮
2019 Case Report of the Year **Award**

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https://goo.gl/Dnu94Z

Shuang-An Lee

Chris H. Chang

W. Eugene Roberts

AJO-DO
American Journal of Orthodontics & Dentofacial Orthopedics

January 28, 2019

Shuang-An Lee
Chris C.H. Chang
W. Eugene Roberts
[redacted]

RE: CDABO Case Report of the Year Award

Dear Drs. Lee, Chang, and Roberts:

It is with great pleasure that I write to inform you that your article, "Severe unilateral scissors-bite with a constricted mandibular arch: Bite turbos and extra-alveolar bone screws in the infrazygomatic crests and mandibular buccal shelf," has been selected to receive the 2019 CDABO Case Report of the Year Award. Congratulations.

The College of Diplomates of the American Board of Orthodontics (CDABO) is composed of orthodontic clinicians who have passed all phases of the American Board of Orthodontics examination. The award was established by the College to recognize excellence in clinical orthodontics. It is given annually to the authors of the best Case Report published during the previous year in the *American Journal of Orthodontics and Dentofacial Orthopedics*.

The CDABO award will be presented at the annual meeting of the *AJO-DO* editorial board, which is held in conjunction with the AAO Annual Session. This year, the editorial board will meet Sunday, May 5, from 7:00 to 9:00 am, in Los Angeles, Calif. You and your co-authors are invited to join the board for this breakfast meeting and be recognized by the *Journal*'s editors and associates.

I hope that you plan to attend the AAO Annual Session in Los Angeles and can receive your certificate and recognition in person. Please let me know if you will be able to attend the *AJO-DO* Editorial Board Meeting on Sunday, May 5.

Again, I offer my congratulations for receiving this prestigious award.

Sincerely,

R. Behrents

Rolf G. Behrents, DDS, MS, PhD
Editor-in-Chief, *AJO-DO*

CASE REPORT

AJO-DO

Severe unilateral scissors-bite with a constricted mandibular arch: Bite turbos and extra-alveolar bone screws in the infrazygomatic crests and mandibular buccal shelf

Shuang-An Lee,[a] Chris C. H. Chang,[b] and W. Eugene Roberts[c]
HsinChu City, Taiwan, Indianapolis, Ind, and Loma Linda, Calif

A 33-year-old woman had a chief complaint of difficulty chewing, caused by a constricted mandibular ar
and a unilateral full buccal crossbite (scissors-bite or Brodie bite). She requested minimally invasive tre
ment but agreed to anchorage with extra-alveolar temporary anchorage devices as needed. Her facial for
was convex with protrusive but competent lips. Skeletally, the maxilla was protrusive (SNA, 86°) with a
ANB angle of 5°. Amounts of crowding were 5 mm in th

anterior flaring of the incisors. The scissors-bite and lingu
were sufficiently corrected after 3 months of treatment to
the right posterior segments to intrude the maxillary right
for extrusion of the posterior teeth to level the mandibular
anchored the retraction of the maxillary arch. In 27 months, this difficult malocclusion, with a Discrepan
Index score of 25, was treated to a Cast-Radiograph Evaluation score of 22 and a pink and white esthe

AJO-DO, Volume 154, Issue 4, Pages 554–569

2020 第二十屆
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日期

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預　賽：2019 年 12 月 30-31 日
決　賽：2020 年 1 月 1 日

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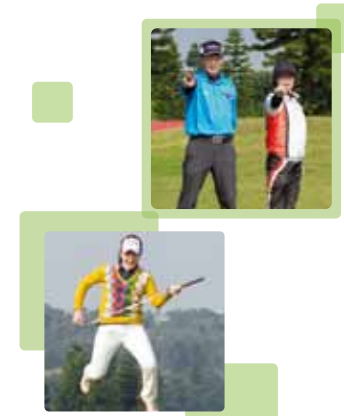
報名

12/5 日前向新竹市高爾夫球委員會報名。
電話：03-5388533；傳真：03-5388112
E-mail：sandy_yang@bangruh.com.tw



主辦單位：貝多芬齒顎矯正中心　承辦單位：新竹市體育會高爾夫委員會

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Feedback from the 2019 Damon Master Program

I would like to thank Dr. Chris Chang for an amazing experience I've had.

It was above all my expectation. Everything from education program and clinic management to delicious dinner food was just extra perfect! Such a great luck and pleasure for me to come to Taiwan for the course attendance. You guys are professionals and indeed Number One!

Dr. Ivan Vengerenko,
UKRAINE

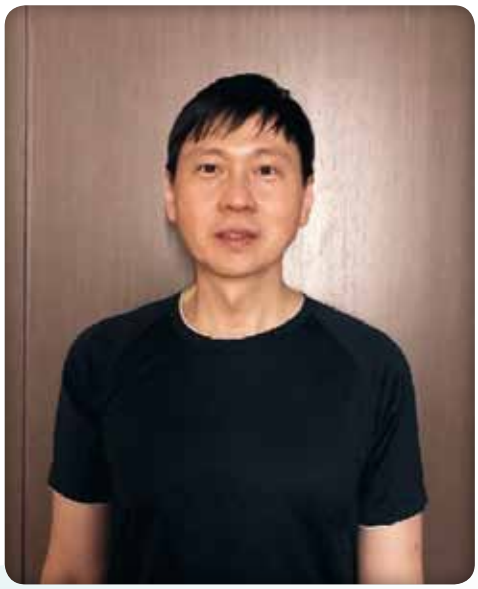
You guys helped us a lot starting from before the trip till after the class. I was the one who asked a lot of questions because I own a business in my country. Therefore, this is my precious chance to learn from teacher Chris Chang not only in Orthodontics but also in the management of clinic and company.

I'm also very appreciative of your workshop on Keynote. I cannot wait to learn more advanced Keynote techniques from you in the next class.

Dr. Tuenjai Pornmahala,
THAILAND

The course has been very interesting, well organized and informative, coupled with the staff's friendliness and helpfulness, which made it even more enjoyable. The workshop was conducted well.

I found the MacBook workshop especially helpful. Being a first-time MacBook user, shockingly there were many others in the class like me. I hope to learn more tips and tricks from you all to make my MacBook more efficient for orthodontics.



Dr. Edwin Chan,
SINGAPORE

Feedback from the 2019 Beethoven Scholarship

張醫師與我們見面僅僅三天，但不難理解張醫師的成功原因，張醫師在他的 Sharing 裡就有提到 his 3Ps: passion, practice, perseverence。五十幾歲的張醫師儘管忙碌奔波，依然精神抖擻且笑口常開，足可證一灘靜止不動的水，永遠納不入新的靈感，一條終止不息的水流，永遠不會安於現狀。

此外，對於 Apple 的品質、形象其實一直都是明白的，但這次藉由 Keynote 兩個動畫教學的課程，以及一次簡報教學的課程，有了更全面的深入了解，甚至是靈感。所謂的 Real artists simplify（真正的藝術家力求簡化），舉凡世上好的演講應皆簡潔易懂、深入人心。

林冠瑤 同學
中山大學牙醫學系

張慧男醫師榮獲美國矯正學會期刊最佳案例獎

獲北美地區最大中文報紙-世界日報 World Journal 報導

記者王全秀子/橙縣報導

貝多芬團隊負責人張慧男醫師的臨床案例，月前獲得美國矯正學會期刊（American Journal of Orthodontics and Dentofacial Orthopedics）年度最佳案例。他和共同作者之一，也是張慧男的指導教授 Eugene. W.Roberts 同台領獎。

華人團隊首獲殊榮

美國矯正學會出版的矯正專刊，為公認的世界級的矯正專業期刊，每年學會在前一年該期刊所出版的案例中，評選出最具原創性和臨床治療結果優異的出版案例，在隔年的矯正年會上頒發最佳臨床案例（Case of the Year）獎，表揚作者對於臨床研究與治療上的卓越貢獻。

張慧男所領導的貝多芬團隊為華人首次獲選的治療團隊，獲得該項殊榮受到肯定。

張慧男在印地安那大學取得矯正博士學位後，一直致力臨床治療和專業教學的工作。他熱愛分享，寫作和演講，不僅將實務案例出版在英文的專業期刊上，也領導貝多芬團隊的醫師們，將案例製作成簡報影片發表在各大社群媒體上，與來自世界各地的專業人士交流。

從 2009 年開始，他徵選台灣牙醫系四升五年級學生，提供獎學金和臨床診所實習的機會，幫助學生在畢業選擇專科前，能有機會到診所環境實地考察。

除了熱愛矯正和教學外，張慧男還擁有專業的高爾夫球教練資格，工作之餘把高球作為休閒娛樂活動，還致力培育台灣青少年高球選手。

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▲ 華裔醫師張慧男（前排左二）與專業人士交流。

B3 | 美西要聞(二)　世界日報　worldjournal.com　2019年6月9日 星期日 SUNDAY, JUNE 9, 2019

張慧男獲美國矯正學會期刊最佳案例獎

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華裔醫師張慧男獲得美國矯正學會期刊年度最佳案例。（Florence提供）

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尾島賢治 醫師

Advanced Aligner Orthodontics

Dr. Kenji Ojima（尾島賢治）於日本東京昭和大學獲得矯正專科學位。他除了是國際知名的 Aligner 及 DSD 的講者之外，他也在東京和 Dr. Dan、Dr. Kumagai 等醫師一起經營矯正診所。他目前同時也擔任日本數位隱形矯正學會理事長（President of JAAO），以及美國審美矯正學會亞洲分會的會長。

本次演講中 Dr. Kenji Ojima 將分享他如何把 DSD 的概念應用在數位隱形矯正的治療方法裡。他將會分享許多不同型態的案例，包含：牙弓擴大、拔牙、整個齒列移動、深咬、開咬，以及跨科和合併手術等複雜案例，並講解要怎麼快速達到優異治療結果的成功秘訣。

09:00-10:30 ● **Diagnosis/Treatment Plan**
Dr. Kenji Ojima

11:00-12:30 ● **Class II Approach for Aligner**
Dr. Kenji Ojima

13:30-15:00 ● **Extraction Approach for Aligner**
Dr. Kenji Ojima

15:30-17:00 ● **Screws and Aligners: Pulling and Pushing Mechanics**
Dr. Chris Chang

蘇筌瑋 理事長

Dr. Kenji Ojima 是近年來非常活躍於國際的隱形矯正講師，在短短的 3-4 年間累積了大量的臨床案例，再結合他在 DSD 方面的專長，以及搭配使用加速器，成功的達成了許多患者夢寐以求的治療效果—又快又美。我多次聆聽過 Dr. Kenji 的演講，他的演講風格非常風趣又有魅力，非常適合已經在開始使用隱形矯正器，希望進一步了解怎麼樣提昇治療效率和設計出更美觀笑容的牙醫師。請大家千萬不要錯過學會今年壓軸的年終盛會！

報名專線：03-5711377　報名網址：iaoi.pro 聯絡方式：蔡小姐 contact@iaoi.pro

DSD Digital Smile Design

Workshop

Integrating DSD & Miniscrews with Aligners

Workshop 已額滿

12/30 (一)

新竹市建中一路25號2樓
金牛頓藝術科技

Dr. Kenji Ojima ＋ Dr. Chris Chang

尾島賢治 醫師　　張慧男 醫師

新竹貝多芬齒顎矯正中心負責人
中華民國齒顎矯正專科醫師
美國齒顎矯正專科醫師學院院士（ABO）
美國印地安那普渡大學齒顎矯正研究所博士
美國 Angle 學會會員

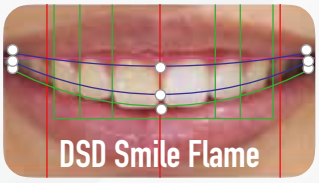
Dr. Kenji Ojima（尾島賢治）醫師將在這一天的臨床實作課程中示範如何利用 Orthocomm 以及 DSD App 兩項軟體來執行隱形數位矯正的診斷分析，執行療程，並且透過軟體模擬的效果，打動患者接受治療，以及在療程中確保患者的高度配合，以達到理想的治療結果。

09:00-10:30 **Digital Smile Design App**
學習利用 DSD 軟體來設計初診的模擬笑容
Dr. Kenji Ojima

11:00-12:30 **Orthocomm Aligner Management**
利用 Orthocomm 來執行治療程序和確保患者配合療程
Dr. Kenji Ojima

13:30-15:00 **Miniscrew Workshop for Aligners**
Dr. Chris Chang

15:00-16:00 **Q&A**
Dr. Kenji Ojima & Dr. Chris Chang



硬體需求：iPad 與含 Chrome 瀏覽器的 Mac 或 Windows 電腦。

	2019/12/01 前		2019/12/01 後	
	會員	非會員	會員	非會員
大會單場報名	$5,000	$6,600	$6,600	$8,000
大會＋Workshop	$28,000	-	$35,000	-

• Workshop 不開放非會員報名　• Workshop 費用內含操作模型與耗材（不含軟體費用）

學分：依衛福部醫事人員繼教育積分管理辦法登錄授與專科醫師認證學分。

匯款資訊：日盛國際商業銀行 815 光復分行 0347　帳號：105-27376210-000　戶名：國際矯正植牙學會
2019/12/01 前因故退費，需扣除 10% 行政費用；12/01 後因故退費，需扣除 30% 行政費用。

iAOI

2020 熱愛學矯正

張慧男 博士

新竹貝多芬齒顎矯正中心負責人
中華民國齒顎矯正專科醫師
美國齒顎矯正專科醫師學院院士（ABO）
美國印地安那普渡大學齒顎矯正研究所博士
美國 Angle 學會會員

Damon + .014 Cu NiTi

全新的 2020 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。名額有限，一年僅有一次機會在台完整體驗 Damon 矯正大師課程，錯過只能等明年囉！

Damon Master Program

全方位矯正訓練課程

Module 1 - **4/23**
理想入門病例 + Damon Q 黏著
高效矯正治療四階段
Hands-on : Bonding + BT + Ceph tracing
Practice: Clinical photography

Module 2 - **5/21**
簡捷有效的錨定系統
不拔牙與拔牙分析
Hands-on: TADs + Space Closing + Hook + Spring
Practice: Ceph tracing;
Filing patient photo records (template)

Module 3 - **6/4**
Damon 診斷流程及微調
醫病溝通及協調
Hands-on: Finish bending & fixed retainer
Practice: Editing patient photo records (use own data);
Morph

Module 4 - **7/2**
完工檢測及報告示範
維持及復發；病例示範
Hands-on: Presentation demo
Practice: Demo case report

Module 5 - **8/20**
矯正力學及診斷分析
軟硬組織及診斷分析
兒童及成人矯正診斷分析
Practice: Case report

臨床見習 - **6/19,20(擇一)**
跟診實習及診間管理
Practice: Clinical photography

Practice Time: 1:00-2:30pm

* 每次上課請依最新一期JDO公告為主

Module 6 - **9/24**
擁擠牙：拔牙與不拔牙討論分析
阻生齒討論分析
Literature review: Bracket placement;
Impacted canines

Module 7 - **10/15**
缺牙、錯咬討論分析
Literature review: Canine substitution;
Missing 2nd premolar

Module 8 - **11/19**
開咬、深咬、臉型討論分析
ABO DI, CRE 實作
Literature review: DI & CRE review

Module 9 - **12/17**
齒齦外露與咬合平面偏斜／錯位
Literature review: Excellence in finishing
(occlusion, esthetics, perio)

Module 10 - **2021/1/7**
植牙及矯正合併治療討論分析
成人複雜病例協同治療
Literature review: IDT

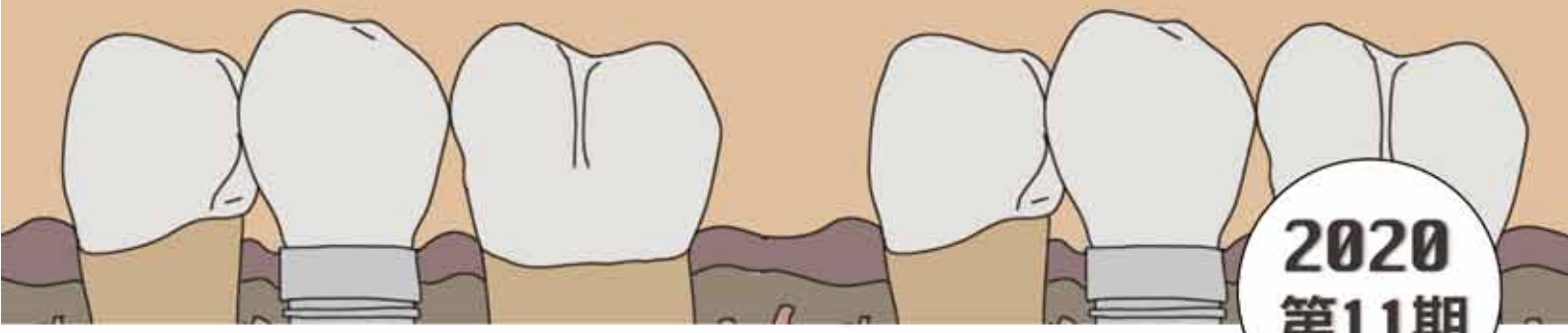
Computer training (Mac): 1:00-2:30pm

費用含課程視訊、iPad、課程電子書、模型及材料、ABO量尺。

時間：週四全天（9 am - 5 pm），每月一次。
上課地點：金牛頓藝術科技（新竹市建中一路25號2樓）

報名專線 湧傑 Yong Chieh
北區：02-27788315 #122 楊文君
中區：04-23058915 張馨云
南區：07-2260030 蔡淑玲

2020 Implant Forum
植牙論壇



2020 第11期

前言

2020 年植牙論壇課程（Implant Forum），全新內容精彩可期。希望藉由每月一次的進修研討，解答您工作的疑惑，並幫助您在面對全口重建的臨床案例時，能胸有成竹，駕輕就熟。

課程主軸

我們邀請各界醫師齊聚新竹，藉由每月一次的進修研討，解答我們在診間常遇到的疑難雜症。課程內容豐富，包含深度主題解析、精彩案例討論、實際操作課程，更加貼近我們每日的臨床醫學。

講師群

今年度特別演講包含陳明時醫師帶來咬合專題、邱上珍醫師的 Osseodensification Concept、蘇筌瑋醫師的 VISTA、林森田醫師的 all-on-4 全口重建與柯秋賢醫師的 X-guide 導航臨床分享等，還有更多的精彩內容，期待您的加入！

課程日期

1	3/13	6	8/28
2	4/24	7	9/25
3	5/22	8	10/16
4	6/12	9	11/27
5	7/24	10	12/18

地點：新竹市建中一路25號2樓 （金牛頓藝術科技）

時間：禮拜五上午 9:00-12:00

報名方式：03-5735676 # 203
clinton@newtonsa.com.tw 陳建名

課表時段僅供參考，植牙論壇保留課程變動之權利。

"From this book we can gain a detailed understanding of how to utilize this ABO system for case review and these challenging clinical cases from start to finish."

Dr. John JJ Lin, Taipei, Taiwan

"I'm very excited about it. I hope I can contribute to this e-book in someway."

Dr. Tom Pitts, Reno, Nevadav, USA

"A great idea! The future of textbooks will go this way."

Dr. Javier. Prieto, Segovia, Spain

No other book has orthodontic information with the latest techniques in treatment that can be seen in 3D format using iBooks Author. It's by far the best ever.

Dr. Don Drake, South Dakota, USA

"Chris Chang's genius and inspiration challenges all of us in the profession to strive for excellence, as we see him routinely achieve the impossible."

Dr. Ron Bellohusen, New York, USA

This method of learning is quantum leap forward. My students at Oklahoma University will benefit greatly from Chris Chang's genius.

Dr. Mike Steffen, Oklahoma, USA

"Dr. Chris Chang's innovation eBook is at the cutting edge of Orthodontic Technology... very exciting! "

Dr. Doraida Abramowitz, Florida, USA

"Dr. Chang's technique is absolutely amazing and cutting-edge. Anybody who wants to be a top-tiered orthodontist MUST incorporate Dr. Chris Chang's technique into his/her practice."

Dr. Robert S Chen, California, USA

New Release!

"Dr. Chris Chang's first interactive digital textbook is ground breaking and truly brilliant! "

Dr. John Freeman, California, USA

"Tremendous educational innovation by a great orthodontist, teacher and friend."

Dr. Keyes Townsend Jr, Colorado, USA

"I am awed by your brilliance in simplifying a complex problem."

Dr. Jerry Watanabe, California, USA

"Just brilliant, amazing! Thank you for the contribution."

Dr. Errol Yim, Hawaii, USA

"Beyond incredible! A more effective way of learning."

Dr. James Morrish Jr, Florida, USA



Class photos from the 2019 Damon Master Program in China, Malaysia and Thailand (from left to right).