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Using infrazygomatic crest (IZC) OrthoBoneScrews® as definite anchorage, a skeletal Class II malocclusion with severe overjet and deep overbite was corrected with clear aligners. Elastics were hooked bilaterally from the precision cuts on the aligners to the IZC screws, as well as from the cuts to the buttons on the lower first molars. Class I molar and canine relationships were achieved after 18 months of active treatment.

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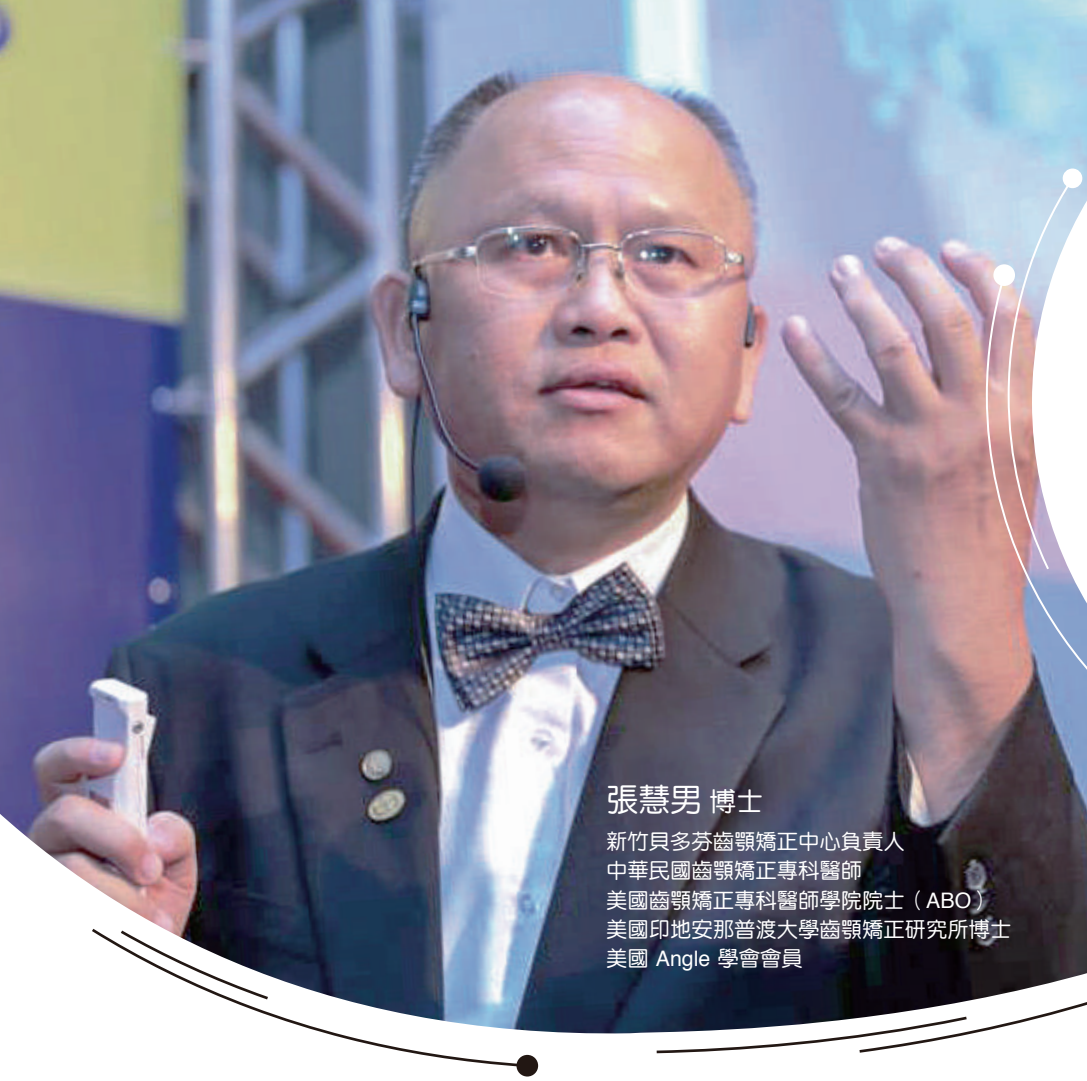

2023
熱愛學矯正

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

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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.

2023

Module 1 - 4/13
Module 2 - 5/11
Module 3 - 5/25
Module 4 - 6/8
Module 5 - 6/29
Module 6 - 7/13
Module 7 - 7/27
Module 8 - 8/10
Module 9 - 8/24
Module 10 - 9/7
Module 11 - 9/21

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 XIV

Module 1 - 5/10
Module 2 - 6/7
Module 3 - 7/12
Module 4 - 8/16
Module 5 - 9/6
Module 6 - 10/4
Module 7 - 11/15
Module 8 - 12/6
Module 9 - 1/10/23'
Module 10 - 2/7
Module 11 - 3/7

International Workshop

(Digital Orthodontics, OBS & VISTA)

English Class

The workshop provides a 3 day, advanced hands-on program to experienced Damon users. The program includes world-class lectures, model and surgical hands-on workshops and clinical observation on patient care and clinic management.

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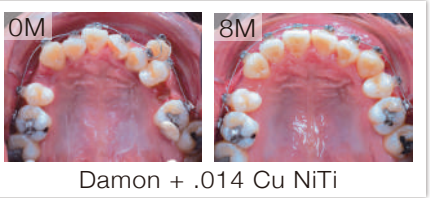
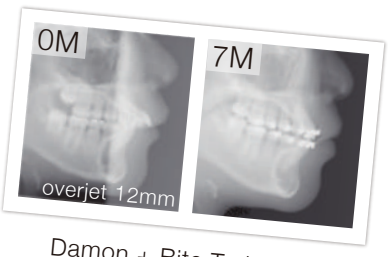


Damon + .014 Cu NiTi

Damon Clear



Damon + Bite Turbo +
Early Light Short Elastic

每次上課請依最新一期 JDO 公告為主

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Orthodontic Advanced Education after COVID-19

COVID-19 has impacted many industries in the world, including ours, and this has led me to reconsider the methods for orthodontic education. During this period, even if you had gone to the United States to learn orthodontics, most courses would have been taught primarily with online videos. Therefore, is there actually any real educational difference between studying online lessons in the United States and doing exactly the same thing in Taiwan? If there is no discernable difference between the two, then I personally would prefer being trained in the comfort of my home in Taiwan. Why spend so much time and money going to the United States to receive the same education?

Now, a perfect solution has presented itself. The International Medical College (IMC) of the University of Duisburg-Essen (UDE), Germany, contacted us in the hope that we could provide them with a prerequisite orthodontic program. In addition to learning comprehensive orthodontics in this program, every participant is required to complete two case reports, in order to attain a thorough understanding and perception of the whole treatment process. This solid training helps to greatly strengthen your foundations in orthodontics. After completion of this program, doctors will be instantly eligible for admission to the Specialized Orthodontics Master's program in UDE. The curriculum of the Master's program combines online distance learning from home and internships in Germany. After finishing the course and your Master's thesis, which is either a systematic review or original scientific research, you will receive a fully accredited Master's degree in Orthodontics. I believe that the concept design of the curriculum in UDE is very consistent with post-COVID orthodontic education. Instead of wasting so much time and money traveling to a specific location in the world to study, this is the method that will be more frequently applied in the future.

The three cases in this issue are all written by doctors who are joining the UDE Master's program this year. The report that I am most moved by has been written by Dr. Nawal J. Al Mutawa, a female dentist from Bahrain, who originally qualified as a prosthodontic specialist. In her practice, however, she found that many cases needed orthodontic treatment, but she was unable to receive an orthodontic education in Bahrain since she is a prosthodontist. Pre-COVID, I gave a speech in Bahrain, and having listened to my speech, she finally found the best way to learn orthodontics - she flew to Taiwan to learn from me. During my course, she asked me a question: how could she become certified as an orthodontist and be able to officially practice orthodontics in Bahrain? The Master's degree in UDE is the best answer that I could find.

She has now completed two case reports and this month is joining the UDE Master's course. As you will yourselves discover from her case report in this issue, her work is amazing. A huge 14mm overjet was improved so dramatically in only 18 months. There is no doubt in my mind whatsoever that she is more than capable of becoming a most proficient orthodontist. The only thing that she is lacking is an official certification. Now, the UDE Master's degree program has solved the puzzle. I am very grateful to be able to teach such a student.

Finally, in this issue's Taiwanese lifestyle, we introduce how to raise chickens in an unconventional manner. I believe you are smart enough to agree with my new approach…..and if not, I'll be starting an online international chicken rearing path to glory course very soon!

Chris Chang PhD, ABO Certified, Publisher of JDO

Clear Aligners and TSADs for the Treatment of a Skeletal Class II Malocclusion with Severe Overjet and Deep Overbite

Abstract

History: *A 42-year-old male presented for orthodontic consultation with a severe Class II malocclusion, overjet of 14mm, and a deep bite with flared anterior teeth. His chief complaints were poor esthetics and masticatory function.*

Diagnosis and Etiology: *Flared, gapped, and over-erupted upper anterior teeth resulted in a severe overjet of 14mm. Lower anterior teeth were also over-erupted, impinging on the upper anterior palate and resulting in an overbite of 8mm. Gingival recession was found along the palatal surfaces of the upper incisors. No significant mobility of anterior teeth was observed. Long, narrow upper dental arch with mesially rotated UR5 was noted, as well as Class II molar relationship on the left side, Class II canine relationships on both sides, and a skeletal Class II malocclusion (ANB, 6°). The probable etiology for the increased overjet included external factors such as thumb-sucking in childhood and existing habits like mouth-breathing, which led to over-eruption of upper anterior teeth (internal factors). Loss of proper overjet led to overeruption of lower anterior teeth, which developed into deep bite.*

Treatment: *A non-surgical, non-extraction orthodontic treatment protocol with aligners and temporary skeletal anchorage devices (TSADs) was generated. Intraoral scanning for digital impressions, full records, and prescription form were submitted for Invisalign comprehensive clear aligners. A set of 34 aligners for the first phase was designed. The attachments were bonded on the second visit, TSADs were inserted in the infrazygomatic crest (IZC) bilaterally, and early Class II elastics were used. On completion of the first set of aligners, a significant improvement on overjet and overbite, de-rotation of UR5, and Class I molar and canine relationships on both sides were achieved.*

Outcomes: *Treatment goals were achieved after 18 months of treatment with clear aligners. (J Digital Orthod 2022;68:4-18)*

Key words:
Skeletal Class II malocclusion, Class II molar relationship, curve of Spee, vertical dimension of occlusion (VDO), TSADs, Class II elastics, overjet, overbite

Introduction

The dental nomenclature for this report is a modified Palmer notation with four oral quadrants: upper right (UR), upper left (UL), lower right (LR), and lower left (LL). Teeth are numbered 1-8 from the midline in each quadrant.

A 42-year-old male presented with chief complaints of incompetent lips, flared and gapped anterior teeth, reduced lower facial height, severe deep bite and overjet, and a retrognathic mandible. He was previously seen by other orthodontists and dentists. Different treatment plans were suggested, such as extraction of flared teeth with restoration by fixed bridges or implant supported prosthesis and even orthognathic surgery. Oral soft tissues, periodontium, frenum, and gingival health were all within normal limits (WNL). No significant mobility of flared teeth was noticed. Oral hygiene was very good. No significant medical or dental histories were noted.

Diagnosis and Etiology

Pre-treatment facial and intraoral photographs (Fig. 1) showed a convex profile with incompetent lips and

Nawal J. Al Mutawa,
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Joshua S. Lin,
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Chris H. Chang,
Founder, Beethoven Orthodontic Center
Publisher, Journal of Digital Orthodontics (Center right)
W. Eugene Roberts,
Editor-in-Chief, Journal of Digital Orthodontics (Right)

protrusive upper incisors. Additional pre-treatment intraoral photographs (Fig. 2) showed an overjet of 14mm, overbite of 8mm, long and narrow upper arch with flared, over erupted, and gapped upper incisors with gum recession at the palatal surfaces, a mesially rotated UR5, as well as over-erupted lower anteriors and impingement in the upper arch. In centric occlusion, molar relationship on the left side

Fig. 1: *Pre-treatment facial and intraoral photographs*

Fig. 2: Photographs show the increased overbite and overjet as well as a deep curve of Spee.

and canine relationships on both sides were Class II (Fig. 1). A severely deep curve of Spee was shown when patient was asked to bite in an edge-to-edge occlusion (Fig. 2). Upper and lower midlines were in coincidence.

The patient complained about occasional pain and discomfort in the temporo-mandibular joints (TMJs). He also reported a mouth-breathing habit since childhood because of chronic nasal congestion and recurrent pharyngitis. Pre-treatment panoramic and cephalometric radiographs are shown in Figs. 3 and 4 respectively. Cephalometric analysis (Table 1) showed a hypodivergent skeletal Class II pattern with a retrognathic mandible that was manifested as a large overjet of 14mm. The ANB angle was 6˚, the FMA angle was 25˚, upper incisors were proclined 123˚, and the lower incisors were proclined 97˚ to the mandibular plane. The cephalometric analysis is summarized in Table 1. The American Board of Orthodontics (ABO) Discrepancy Index (DI) was 33, as documented in Worksheet 1 at the end of this report.

Fig. 3: Pre-treatment panoramic radiograph

Treatment Objectives

In order to improve esthetics for the patient's smile, treatment objectives were set to correct the vertical

Fig. 4: Pre-treatment cephalometric radiograph

CEPHALOMETRIC SUMMARY			
	PRE-TX	POST-TX	DIFF.
SKELETAL ANALYSIS			
SNA° (82°)	80°	80°	0°
SNB° (80°)	74°	76°	2°
ANB° (2°)	6°	4°	2°
SN-MP° (32°)	32°	34°	2°
FMA° (25°)	25°	27°	2°
DENTAL ANALYSIS			
U1 TO NA mm (4mm)	10	2	8
U1 TO SN° (104°)	123°	97°	26°
L1 TO NB mm (4mm)	5	5.5	0.5
L1 TO MP° (90°)	97°	98°	1°
FACIAL ANALYSIS			
E-LINE UL (-1mm)	1	-3	4
E-LINE LL (0mm)	0	-1.5	1.5
%FH: Na-ANS-Gn (53%)	55%	56%	1%
Convexity:G-Sn-Pg' (13°)	24°	17°	7°

Table 1: *Cephalometric summary*

dimension of occlusion (VDO) in the anterior segment, by improving the overjet and overbite via intrusion of the over-erupted upper and lower anteriors, retraction of the proclined upper anteriors, and correction of the Class II molar and canine relationships to Class I. In addition to the difficulty in closing the lips and incising food, the patient's chief concerns included esthetics (Figs. 1 and 2). Orthognathic surgery was previously suggested by three other orthodontists, but the patient declined that option because it was too aggressive. He also refused extraction of the proclined teeth because of good periodontal condition and the absence of teeth mobility. Thus, a light-forced orthodontic treatment using clear aligners (Invisalign®, Align Technology Inc., Santa Clara, Calif) was proposed to meet the patient's needs.

Treatment Goals :

1. Improve overjet and overbite.
2. De-rotate UR5.
3. Achieve Class I molar and canine relationships on both sides.
4. Close spaces in the upper anteriors.

Treatment Strategies :

1. Intrude and retract the upper anteriors.
2. Intrude lower anteriors.
3. Early Class II elastics
4. IZC screws for intra-arch anchorage with Class II elastics

Treatment Progress

A dental scan with iTero Element II (Align Technology Inc., San Jose, Calif) was taken, and full records were submitted to start the analysis and planning of the case. Instructions to the CAD (computer aided design) designer were given as follows: de-rotate UR5, expand the upper arch, intrude and retract upper anterior teeth, intrude lower anterior teeth, and achieve Class I molar and canine relationships. Class II correction was simulated with precision cuts. The third Clincheck

Fig. 5: *Posttreatment facial and intraoral photographs*

Fig. 6: *Posttreatment overjet and curve of Spee*

Fig. 7: *Posttreatment panoramic radiograph*

Fig. 8: *Posttreatment cephalometric radiograph*

Fig. 9: *Posttreatment smile of the patient*

(Align Tech Inc., San Jose, Calif) confirmed the desired biomechanics design, and the outcome was approved.

A total of 53 aligners were used: 34 in the first phase and 19 in the second phase for refinement. A one-week aligner change protocol was used. The treatment began with the delivery of first aligners without placing any attachments for one week to allow the patient to adapt to speech articulation and assure comfort. The patient was instructed to wear the aligners for 22 hours per day, and was advised to remove them for eating and brushing teeth only.

One week later, attachments were bonded with SDR bulk-fill flowable composite (SDR flow+, Dentsply Sirona, Konstanz, Germany) as follows (Fig. 10):

Upper arch:

1. Optimized multiplane attachment on UR6, UR7, UL6, and UL7
2. Optimized root control attachment on UR4 and UL3
3. Precision cut mesial hook on UR3 and UL3
4. Optimized attachment on UL1 and UL5
5. Optimized deep bite attachment on UL4

Lower Arch:

1. Optimized multiplane attachment on LL6 and LL7
2. Precision button cutout on LL6 and LR6
3. Optimized rotation attachment on LL4, LL5, and LR5
4. Optimized twin root control attachment on LL3
5. Power ridge for lingual root torque control on LL2
6. Optimized root control attachment on LR4

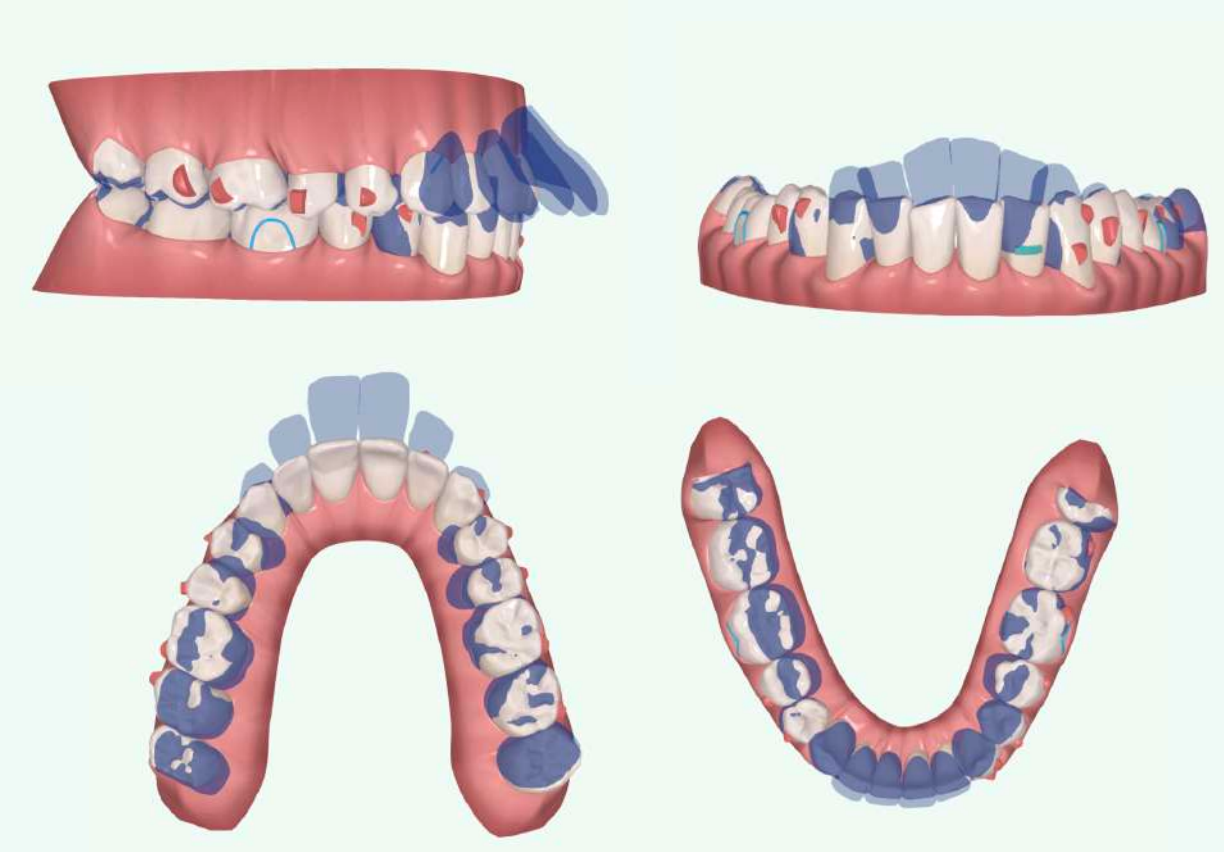

Fig. 10: *The initial Clincheck views show the pre-treatment teeth position (blue) and simulated final position (white)*

On the same visit, two IZC screws (2x12-mm, OrthoBoneScrew®, iNewton, Inc., Hsinchu City, Taiwan) were installed. Elastics (Moose, 5/16-in, 6 oz, Ormco, CA) were hooked from upper canine to the IZC screw bilaterally (Fig. 11). The patient was given instructions on how to hook elastics, and was requested to keep them hooked at all times and to change them every 8 hours after they were taken off to eat or brush teeth. At week 8, a button was attached on the buccal surface of UR5, and an elastic (Chipmunk, 1/8-in, 3.5 oz) was hooked from UR5 to the IZC screw on the right side to help rotate UR5. A cutout in the aligner at the corresponding site of the button was created. Class II elastics from lower first molars to upper canines were also initiated. Periosteal perforation was performed between the roots of lower anteriors and around the root of UR5, with the use of an 1.5x8-mm bone screw (Smart Anchor, GNI Co. Ltd., South Korea) after application of local anesthesia (Fig. 12). The patient was asked to do clenching exercise using an aligner seater for ten times on each anterior tooth to accelerate intrusion. At week 12, lingual buttons were attached on the lingual surfaces of UR5 and UR3, and elastic closing chain was placed to create a moment of force together with the elastic on buccal surface to accelerate rotation. Another two Chipmunk elastics were introduced from buttons on lower 1st molars to

Fig. 11: *TSADs in the IZC and Class II elastics*

Fig. 12: *Periosteal perforation between the roots of lower anteriors*

upper canines. Composite buttons were placed on the upper canines, and cutouts were made at the corresponding position of the hooks on the aligners to transform the hooks to buttons. At week 20, the buttons on the lingual surfaces were removed, and the use of Class II elastics continued until the end of the first phase at aligners #34.

A careful assessment of the results were carried out. The overjet and overbite were substantially improved, Class I molar and canine relationships were achieved on both sides. However, posterior open bite on the buccal side of the molar area were observed on both sides. New digital scans and photos were taken and submitted for additional aligners for the second phase of treatment plan. The patient was instructed to wear the last aligners of the first phase and keep Class II elastics hooked at night only until the arrival of the new aligners. A new ClinCheck® was generated and modified to meet the following requirements:

1. Further intrusion of upper and lower anteriors
2. Extrusion of posterior upper and lower teeth
3. Lingual root torque on upper incisors
4. Buccal root torque on upper and lower molars

Modifications in the aligner features were as follows :

1. Existing attachment were left on UR7, UR6, UR4, UL2-5, UL7, LL7, LL3, LR4, and LR5
2. New optimized rotation attachment on UR5
3. New horizontal rectangular attachment on UR3, LR6, and LL6
4. Button cutout on UR3 and UL3
5. New optimized root control attachment on UR2 and LR3
6. Power ridge for lingual root torque control on UR1 and UL1
7. New optimized deep bite attachment on UL6 and LL5
8. New optimized multiplane attachment on LR7

The additional set of 19 refinement aligners arrived after four weeks, and the new attachments were placed according to the new template. Class II elastics (Fox, 1/4-in, 3.5 oz, Ormco, CA) were advised to be used full time while wearing the aligners. At week 8 of the additional aligners, two bone screws sized 1.5x8-mm (Smart Anchor, GNI Co. Ltd., South Korea) were inserted labially between the roots of upper central and lateral incisors on both side, cuts were made on the lingual surfaces of the aligners, and two Fox elastics were advised to be used from these screws to the cuts to support intrusion of upper anteriors (Fig. 13). In the bilateral posterior segments, Moose elastics were used in V shape from the IZC screw to the lower molars and then to upper canines to support extrusion of lower molars, together with the elastic from IZC screw to upper canines. This pattern was used for four weeks only. At aligners #12 of the second phase, the patient was advised to continue with Class II elastic pattern only in the posterior segment. At aligners #16 all bone screws were removed, and the patient was advised to wear the remaining aligners with a two-week changing frequency. After aligners #19, all the planned goals were achieved with excellent results. All attachments and buttons were removed, and final records of photos, X-ray, and digital scans for clear retainers were taken. The patient was advised to wear aligners #19 of the second phase full time to hold the teeth in place while waiting for the retainers.

Retention

Digital scans for clear removable retainers were taken with iTero scanner. Clear overlay retainers (Vivera, Align Technology, San Jose, Calif) were delivered after two weeks for full time wear for one month. After one month the patient was seen, and cuts were made manually for Class II elastics to be used at night only with Fox elastics (Fig. 14)

Fig. 13: *TSADs and elastics in the upper labial*

Treatment Results

Posttreatment documentation of photographs (Figs. 5 and 6), radiographs (Figs. 7 and 8), cephalometric measurements (Table 1), and superimposed cephalometric tracings (Fig. 15) indicated that both the overbite and overjet were within normal ranges. Class I molar and canine relationships on both sides were achieved. Retraction of upper anteriors was successful, and spaces were eliminated. Lower anteriors was intruded, and the curve of Spee were flattened. Two sets, a total of 53 aligners for both arches over 18 months produced a final result as planned in treatment goals and close to the original 3D ClinCheck projection.

Discussion

The biomechanics of clear aligners could be described as a sequence of crown tipping and root

Fig. 14: *Clear retainers (Vivera) with bite ramps and Elastics*

uprighting.[1] Aligner therapy is a good approach for resolving vertical discrepancies such as deep bite and open bite. Successful treatment results using clear aligners to correct these discrepancies have been reported in the literature.[2] For the current case, intrusion of upper and lower anterior teeth was initiated from the beginning of the treatment, which was accelerated by micro perforation (Fig. 12)[3] and clenching exercises.[4] The biomechanics of the assisted flapless corticotomy, or micro-osteoperforation, is developed based on the understanding of the regional acceleratory phenomenon (RAP). The RAP is a collection of a physiological healing process that is characterized by tissue remodeling and manifested as transient bursts of osteoclastic and osteoblastic activities, increased levels of local and systemic inflammatory markers, which then causes an accelerated bone turnover and decreased bone density.[5]

When dealing with Class II malocclusion, the treatment with clear aligners offers different possible mechanisms: 1. distalization, 2. molar de-rotation, 3. elastic intermaxillary correction (jump), 4. extractions, 5. mandibular advancement, and 6. orthognathic surgery.[6] In this case, Class II correction was induced by elastic jump effect from early Class II elastic with IZC screws which produced intra-arch anchorage to retract upper anteriors together with Class II elastic from lower molars (Fig. 11). The elastic effect is simulated on virtual setups by a jump-like shift of occlusion from Class II to Class I to allow easier visualization. Elastic wear is recommended from the start of the treatment. Despite the extensive use of Class II elastics, little evidence is known about their effects in enhancing the sagittal bite jump in adults. Retraction of upper anteriors induced relative extrusion. After the first set of aligners, overjet and overbite were improved, which improved the esthetics of the patient's smile significantly (Fig. 10), but posterior open bite on both sides was observed. Three probable reasons were suggested: 1. inadequate intrusion of lower anteriors, which induced premature occlusal contact in the anterior and absence of contact in the posterior segments; 2. loss of torque of upper anterior teeth during their retraction and long-term use of Class II elastics; and 3. buccal tipping of upper molars during expansion, which produced relative intrusion of buccal cusps of the molars.[7]

Additional aligners were requested, and a new ClinCheck was generated to overcome these side effects with the objectives to: 1. further intrude upper and lower anteriors; 2. add lingual root torque and power ridges in the upper anteriors, and 3. add buccal root torque and extrude molars. To achieve the desired treatment goals, there should be a prescribed overcorrection in leveling the mandibular curve of Spee within the ClinCheck treatment plan, and the extrusion of the mandibular first molars should be considered.[8] The clinician should also consider using auxiliary appliances to improve mandibular curve of Spee leveling.[9] For the current case, the correction was done by additional aligners, and at the end of the second phase, very good results were achieved with normal values of overbite and overjet, as well as flattened curve of Spee, closed buccal spaces, and favorable occlusion with Class I canine and molar relationships on both sides.

Two mechanisms were used to succeed in this case. The first objective was intrusion of anterior teeth to flatten the curve of Spee, and the second was the use of IZC screws for intra-arch anchorage. Early Class II elastics and later on retraction of upper anteriors contributed to the correction. They were also used in the second phase for closing the buccal space. The Class II elastics induced mandibular auto-rotation, which contributed to the improvement of sagittal relation and the final Class I occlusion. The DI score of this case was 33, which is not considered to be an easy case, and yet satisfactory esthetic results were achieved. The cephalometric superimpositions (Fig. 15) show the improvement of the upper incisal

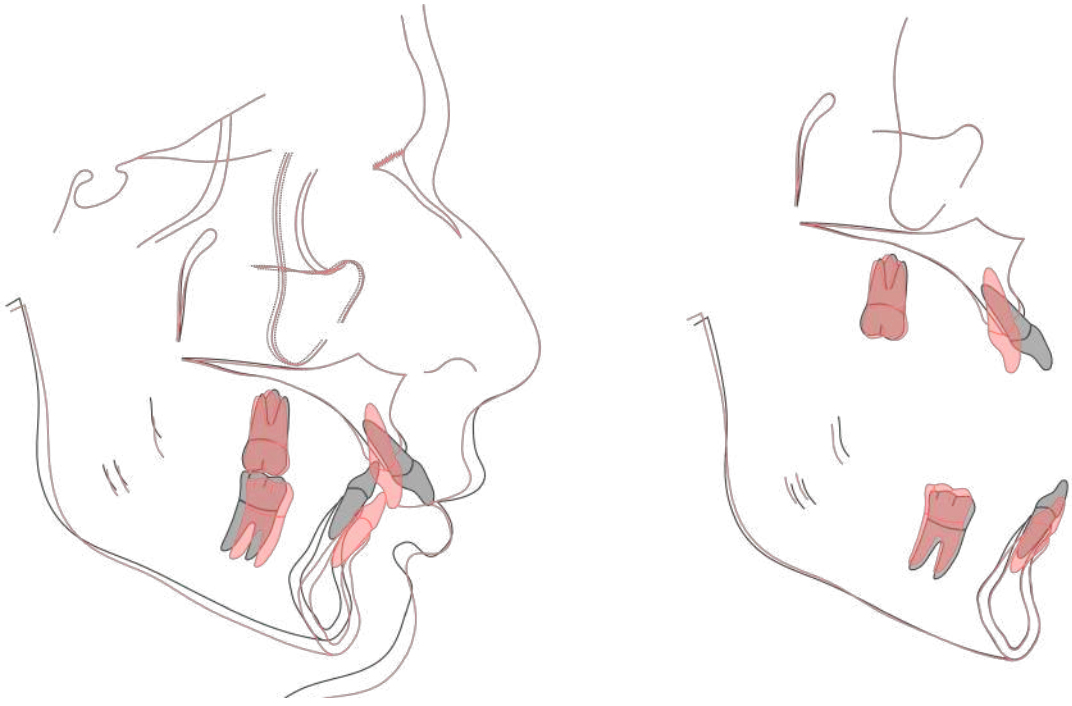

Fig. 15:
Superimposed cephalometric tracings show the dentofacial changes after 18 months of treatment (red) compared to the pre-treatment position (black). See text for details.

inclination, angulation, and the vertical relation, which was enhanced by intrusion of both upper and lower incisors. All these factors contributed to the correction of the overjet and overbite.

Conclusions

Clear aligners are a therapeutic modality that can be effectively employed for non-extraction treatment of Class II with severe overjet and overbite. Flattening curve of Spee[10] is the key objective for deep bite treatment, which was mainly corrected by intrusion of upper and lower anterior teeth. For proclined upper anterior teeth with severe overjet, retraction and intrusion can be achieved simultaneously as long as lingual root torque is controlled. With careful evaluation of anterior teeth during retraction, relative extrusion and additional intrusion of teeth was accomplished to achieve the desired overbite. Class II correction with elastics by virtual bite jump can be achieved in adults with excellent patient compliance and early introduction in the treatment.

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Discrepancy Index Worksheet

TOTAL D.I. SCORE 33

OVREJET

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

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

Total = 5

OVERBITE

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

Total = 5

ANTERIOR OPEN BITE

0 mm. (Edge-to-edge), 1 pt. per tooth
Then 1 pt. per additional full mm. Per tooth

Total = 0

LATERAL OPEN BITE

2 pts. per mm. Per tooth

Total = 0

CROWDING (only one arch)

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

Total = 1

OCCLUSION

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

CEPHALOMETRICS (See Instructions)

ANB ≥ 6° or ≤ -2° = 4 pts.

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

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

SN-MP

≥ 38° = 2 pts.

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

≤ 26° = 1 pt.

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

1 to MP ≥ 99° = 1 pt.

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

Total = 4

OTHER (See Instructions)

Supernumerary teeth	_____ x 1 pt.	=
Ankylosis of perm. Teeth	_____ x 2 pts.	=
Anomalous morphology	_____ x 2 pts.	=
Impaction (except 3rd molars)	_____ x 2 pts.	=
Midline discrepancy (≥ 3mm)	@ 2 pts.	=
Missing teeth (except 3rd molars)	_____ x 1 pt.	=
Missing teeth, congenital	_____ x 2 pts.	=
Spacing (4 or more, per arch)	_____ x 2 pts.	= 8
Spacing (Mx cent. diastema ≥2mm)	@ 2 pts.	= 2
Tooth transposition	_____ x 2 pts.	=
Skeletal asymmetry (nonsurgical tx)	@ 3 pts.	=
Addl. treatment complexities 2	x 2 pts.	= 4

Identify: Skeletal Class II with 14mm overjet is an indication of orthognathic surgery.

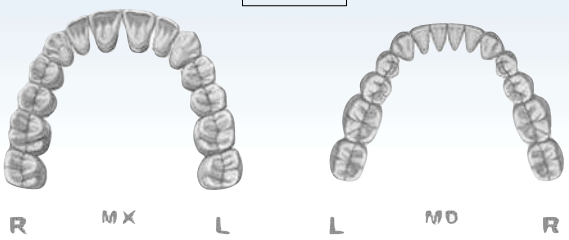
Total = 14

Cast-Radiograph Evaluation

Total Score: 12

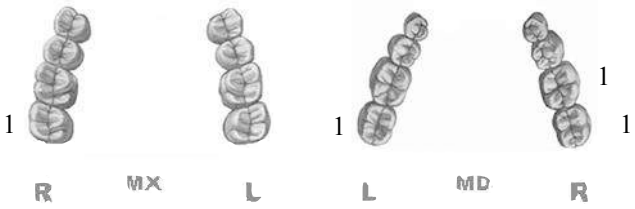
Alignment/Rotations

0



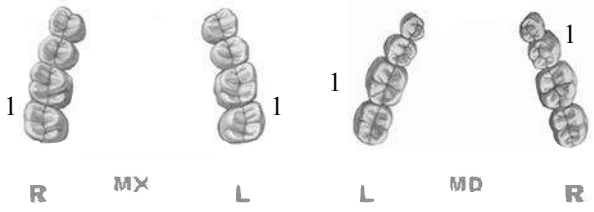
Marginal Ridges

4



Buccolingual Inclination

4

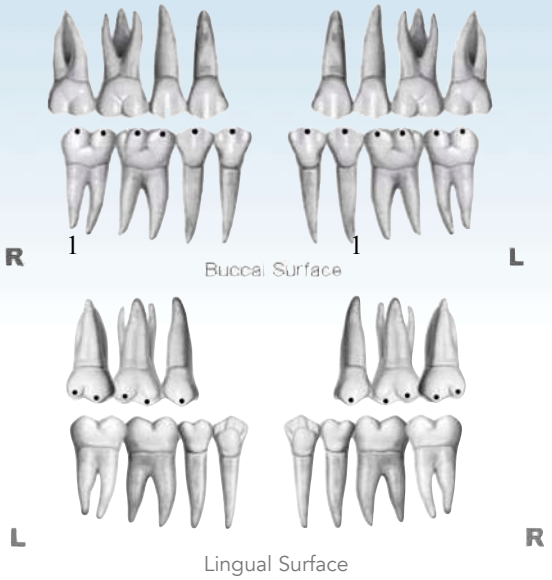


Overjet

0

Occlusal Contacts

2

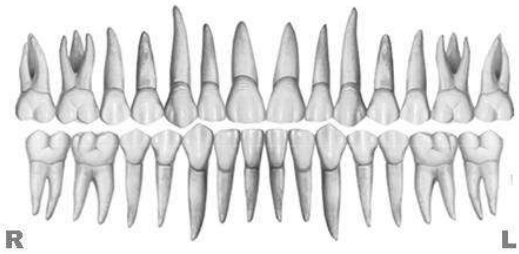


Occlusal Relationships

0

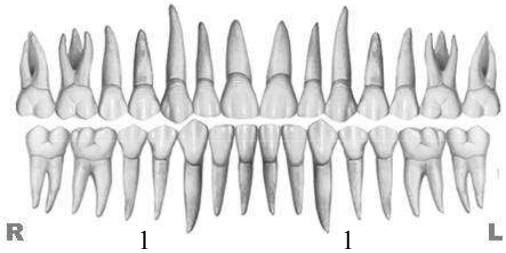
Interproximal Contacts

0



Root Angulation

2



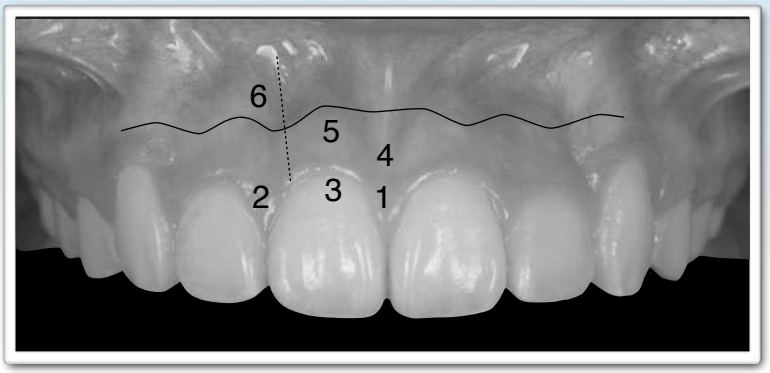
INSTRUCTIONS: Place score beside each deficient tooth and enter total score for each parameter in the white box. Mark extracted teeth with "X". Second molars should be in occlusion.

IBOI Pink & White Esthetic Score

Total Score = 3

1. Pink Esthetic Score

Total = 1

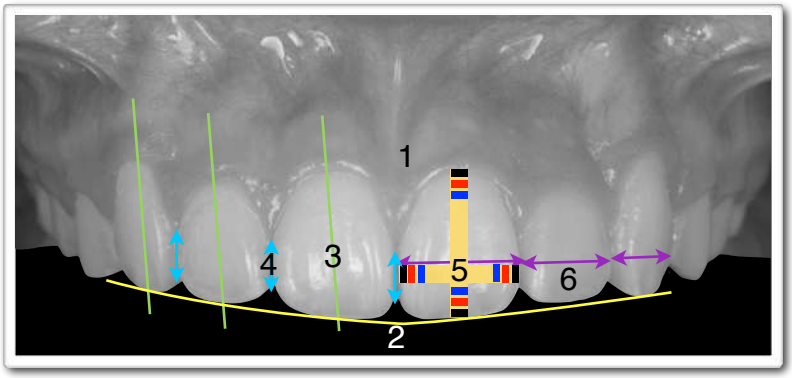


1. M & D Papillae	0	1	2
2. Keratinized Gingiva	0	1	2
3. Curvature of Gingival Margin	0	1	2
4. Level of Gingival Margin	0	1	2
5. Root Convexity (Torque)	0	1	2
6. Scar Formation	0	1	2

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

2. White Esthetic Score (for Micro-esthetic)

Total = 2



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

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

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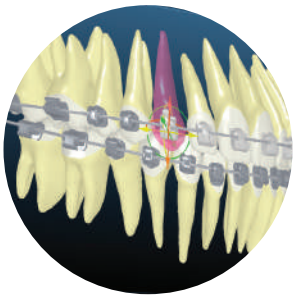

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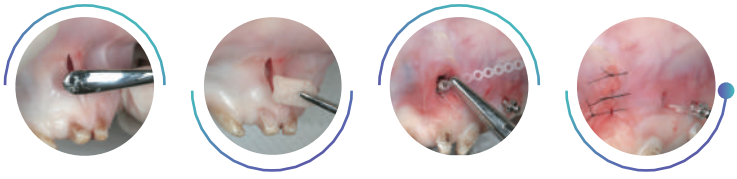

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Course Schedule

Day 1 **Chair–side observation**

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

Chris' Lecture:
Digital Orthodontics with TAD

Day 3 **VISTA Lecture & workshop**

Chris' Lecture:
VISTA for Impacted Cuspids

* The topics for VISTA workshop:

1. VISTA with screw placement
2. VISTA with connective tissue graft
3. Suture technique

Prof. Dr. Paulo Fernandes Retto, Portugal

"Dr. Angle would be glad to know that contemporary orthodontics has a professional as Chris Chang!"

Digital Orthodontics, OBS & VISTA

Day 4 **Keynote workshop** (Optional)

by Newton's A team

1. Patient clinical records management
2. Patient communication presentation
3. Basic animations and visual aids

Dr. Rungsi Thavarungkul, Thailand

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

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.

Products

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2022-2023 第十四年度

貝多芬 矯正精修班

時間：週二上午 09:00-12:00

地點：金牛頓教育中心（新竹市建中一路 25 號 2 樓）

上課日期：

2022　5/10、6/7、7/12、8/16、9/6、10/4、11/15、12/6

2023　1/10、2/7、3/7

- **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**

全新的第十四年度 2022-23 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。

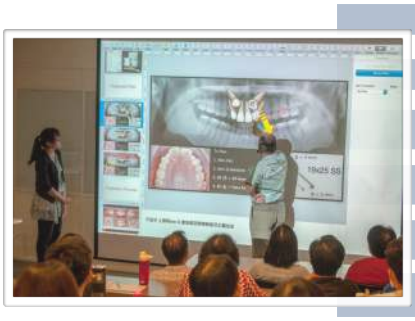
每月一次的課程之中，包含了：

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。

2022-23 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 #218 陳小姐

光聚機挑選指南

Part 1 -能量

Q：能量越強越好 ?!

高強度能量優缺點

優　點　短時間快速聚合樹脂

缺　點
- 機身容易發燙
- 高熱導致牙髓損傷
- 過熱當機

理想的光聚機

能　量　每秒光能量1100-1130mW/cm2變換

散　熱　良好散熱系統，持續輸出不發燙

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

Part 2 -波長

Q：全波長 vs 純藍光 LED光聚機差別

全波長光聚機優缺點

優　點

適用包含非CQ-based 的 Resin Composite

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

理想的光聚機

能　量　460-480nm的波長配合超過1200mW/cm2的能量

C/P 值　具有良好的品質以及性價比

您知道嗎？

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

Part 3 -電池

Q：續電力越久越好？？

高續電力光聚機

優　點　可連續使用3-5天不用充電

缺　點　搭配高電容量的光聚機會使整體重量上升，操作不方便

理想的光聚機

電　池　至少1個工作天使用不充電的蓄電量

重　量　良好散熱系統，持續輸出不發燙越輕巧＋方便使用

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Treatment of a Class I Bimaxillary Protrusion, Crowding, and Black Triangles

Abstract

Introduction: *A 24-year-old female presented with chief complaints of flared upper central incisors and blocked-in right upper lateral incisors with protrusive lips.*

Diagnosis: *The cephalometric analysis revealed a skeletal Class I relationship (SNA, 89˚; SNB, 83˚; ANB, 6˚) and proclined upper and lower incisors. An intraoral assessment revealed partial crossbite of the upper right lateral incisor as well as blocked-out eruption of the upper left second premolar, and the midline was deviated 1mm to the right. There was crowding in both the upper and lower anterior dentitions. The Discrepancy Index (DI) was 38.*

Treatment: *A Damon® system appliance with passive self-ligating brackets was applied to correct the dental malocclusion after extracting four premolars (UR4, UL5, LR4, and LL4). Asymmetric extraction was carried out due to the upper left second premolar being intruded with a curved root. Space closure and midline correction were accomplished with elastics. The active treatment time was 31 months.*

Results: *Improved dentofacial esthetics and occlusal function were achieved after treatment. The Cast-Radiograph Evaluation (CRE) score was 24, and the Pink and White esthetic score was 3. Neither significant root resorption nor periodontal problems were noted.*

Conclusions: *This case report demonstrates the use of passive self-ligating appliances to resolve severe anteriorly proclined teeth without using an orthodontic bone screw. (J Digital Orthod 2022;68:26-41)*

Key words:
Skeletal Class I, proclined anterior teeth, anterior crossbite, midline deviation, passive self-ligating brackets, asymmetrical mechanics

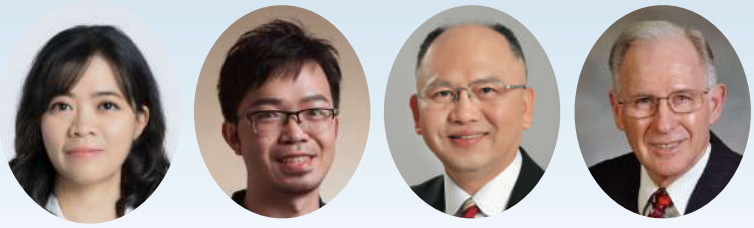
The dental nomenclature for this case report is a modified Palmer notation with four oral quadrants: upper right (UR), upper left (UL), lower right (LR), and lower left (LL). Teeth are numbered 1-8 from the midline in each quadrant, e.g., an upper right lateral incisor is UR2.

Introduction

Bimaxillary protrusion is commonly seen in Asian populations.[1-3] It is characterized by protrusive and proclined anterior teeth, which results in lip protrusion and increased facial convexity.[4] Facial esthetics is the main reason that patients seek orthodontic treatment. The etiology of a bimaxillary protrusion is multifactorial and consists of both genetic and environmental factors such as mouth breathing, tongue and lip habits, and tongue volume.[5] Conventional treatment includes extraction of four first premolars, followed by retraction and retroclination of the anterior teeth to reduce facial convexity and to maintain or achieve Class I canine and molar relationships.[6,7]

This case report demonstrates the treatment of a patient with bimaxillary protrusion in a Class I molar relationship by extracting four premolars. Reducing the dental and soft tissue convexity resulted in a satisfying outcome.

Yi-Hsuan Lin,
Training Resident, Beethoven Orthodontic Center (Left)
Joshua S. Lin,
Associate Director, Beethoven Orthodontic Center (Center left)
Chris H. Chang,
Founder, Beethoven Orthodontic Center
Publisher, Journal of Digital Orthodontics (Center right)
W. Eugene Roberts,
Editor-in-Chief, Journal of Digital Orthodontics (Right)



Diagnosis and Etiology

A 24-year-old female presented for orthodontic evaluation for misaligned teeth with a large overjet and protrusive, incompetent lips (Figs. 1-3). Medical and dental histories were non-contributory. From the cephalometric analysis, a convex profile with protrusive upper and lower lips to the E-line were

Fig. 1: *Pre-treatment facial and intraoral photographs*

noted (Fig. 4; Table 1). Compared to the facial midline, the upper and lower dental midlines were coincident but were shifted 1mm to the right. The panoramic radiograph revealed an impacted LR8 and a super-erupted UL8. The blocked-out UL5 was a mesio-angular partial impaction with a curved root (Fig. 5). Temporomamdibular joint (TMJ) morphology was normal in the open and closed positions (Fig. 6). There were no signs nor symptoms of temporomandibular dysfunction (TMD). The American Board of Orthodontics (ABO) Discrepancy Index (DI) was 38 points, as shown in Worksheet 1 at the end of this report.[8]

Treatment Objectives

1. Improve esthetics by correcting facial convexity, and retracting the lips relative to the E-line (Table 1).
2. Correct the anterior blocked-in UR2 to achieve an ideal overjet.
3. Maintain Class I canine and molar relationships.
4. Correct the midline discrepancy.

Fig. 2: *A close-up shot of the proclined upper anterior teeth and the large overjet*

Treatment Plan

According to Chang's extraction decision chart (Table 2), extraction is the first choice for a case with flared central incisors and protruded lips.

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

Fig. 4: *Pre-treatment cephalometric radiograph*

Since the patient was open to extraction, UR4, UL5, LR4, and LL4 were extracted in order to relieve the anterior crowding and flaring. An asymmetric extraction pattern - UL5 instead of UL4 - was carried out because UL5 was compromised with a curved root and partial impaction. Space closure by retracting the upper and lower arches would also retract the lips. Class II elastics were indicated to resolve the anterior-posterior relation between the upper and lower dentitions. Bilateral infrazygomatic crest (IZC) bone screws are an option to achieve further overjet correction. Both fixed and clear retainers were prescribed for retention of the arches after active treatment. Extraction of UL8 and LR8 was also suggested.

CEPHALOMETRIC SUMMARY			
	PRE-TX	POST-TX	DIFF.
SKELETAL ANALYSIS			
SNA° (82°)	89°	87°	2°
SNB° (80°)	83°	82°	1°
ANB° (2°)	6°	5°	1°
SN-MP° (32°)	35°	35°	0°
FMA° (25°)	28°	28°	0°
DENTAL ANALYSIS			
U1 TO NA mm (4mm)	7.5	0	7.5
U1 TO SN° (104°)	121°	94°	27°
L1 TO NB mm (4mm)	10	6	4
L1 TO MP° (90°)	103°	93°	10°
FACIAL ANALYSIS			
E-LINE UL (-1mm)	5	1	4
E-LINE LL (0mm)	8	2	6
%FH: Na-ANS-Gn (53%)	57%	57%	0%
Convexity:G-Sn-Pg' (13°)	7°	6°	1°

Table 1: *Cephalometric summary*

Treatment Progress

A 0.022-in slot Damon Q® fixed appliance (Ormco, Glendora, California) with passive self-ligating (PSL) brackets was selected along with all specified archwires and orthodontic auxiliaries. Before active orthodontic treatment, the patient was referred to extract the UR4, UL5, LR4, and LL4. 2 weeks later, Damon Q® 0.022-in PSL brackets (Ormco, Glendora, CA) were bonded on the upper and lower teeth, and a 0.014-in CuNiTi archwire was engaged. Standard-torque brackets were chosen for both upper and lower anterior teeth. In preparation for restorative treatment of LR6 mesial surface, an open coil spring was placed between LR5 and LR6 to create space.

Fig. 5: *Pre-treatment panoramic radiograph*

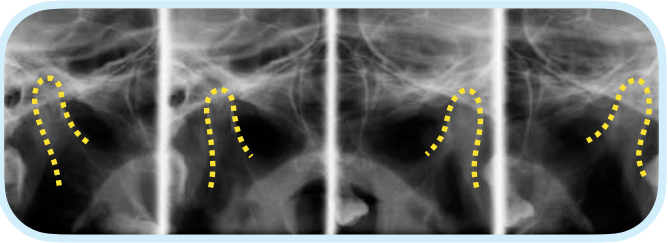


Fig. 6 :
Transcranial radiographs of the temporomandibular joints (TMJs) prior to treatment are shown from the left: right TMJ closed, right TMJ open, left TMJ open, and left TMJ closed. The mandibular condyles are outlined in yellow.

After two months of space opening, the lower archwire was removed, and resin filling to restore LR6 mesial caries was carried out.

Early alignment of the upper and lower arches was achieved with progressive 0.014x0.025-in CuNiTi and 0.017x0.025-in TMA archwires. A four-ring power chain was placed bilaterally from the maxillary canines to the maxillary 1st molars to close the extraction spaces in the 10th month of treatment. Class II elastics (Fox, 1/4-in, 3.5-oz; Ormco) were applied on both sides to accelerate the correction of the excessive overjet. They were bilaterally attached from U3 drop-in hooks to L6 hooks.

In the 14th month of treatment, brackets on UR3 to UL3 were repositioned to correct the axial angulations. In the 15th month, black triangles were noted interproximally between the four upper incisors and between the four lower incisors. After interproximal enamel reduction (IPR) was performed, an elastomeric chain was applied to close the space (Fig. 7). In the 17th month, a more rigid 0.016x0.025-in SS archwire was used for final space closure. Figure-eight ties were applied on both arches from canine to canine in order to fix the anterior teeth as segments. An additional 14 months were required to detail the occlusion.

	Ext	Non
1. Profile	Protrusive	Straight
2. Md. angle	High	Low
3. Bite	Open	Deep
4. Ant. inclination	Flaring	Flat
5. Crowding	> 7 mm	None
6. Decay/ missing	Present	?
7. P't perception	Ok	No
8. Etc...		

Table 2: *Chang's Extraction Decision Table*

Fig. 7:
Black triangles were noted between upper and lower incisors (left column). IPR was performed to reshape tooth morphology (center column). Anterior teeth were tied with elastomeric thread for space closure. Final results show that black interdental spaces were eliminated and contact areas were increased (right column).

***Fig. 8**: Treatment sequence from the frontal view is shown in months (M): 0M, 4M, 7M, 10M, 14M, 17M, 19M, and 27M.*

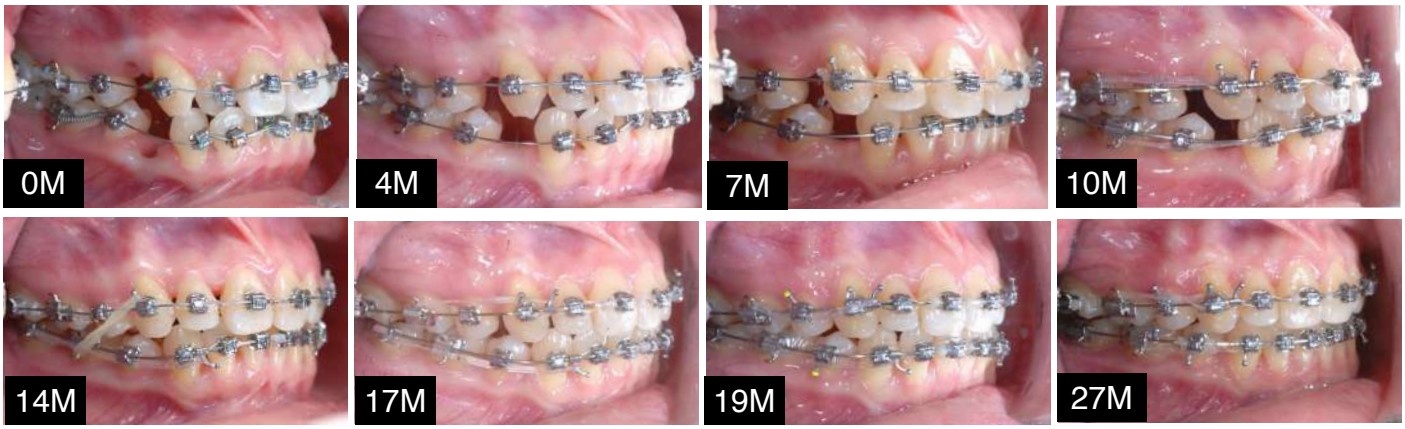


***Fig. 9**: Treatment sequence from the right buccal view is shown in months (M): 0M, 4M, 7M, 10M, 14M, 17M, 19M, and 27M.*

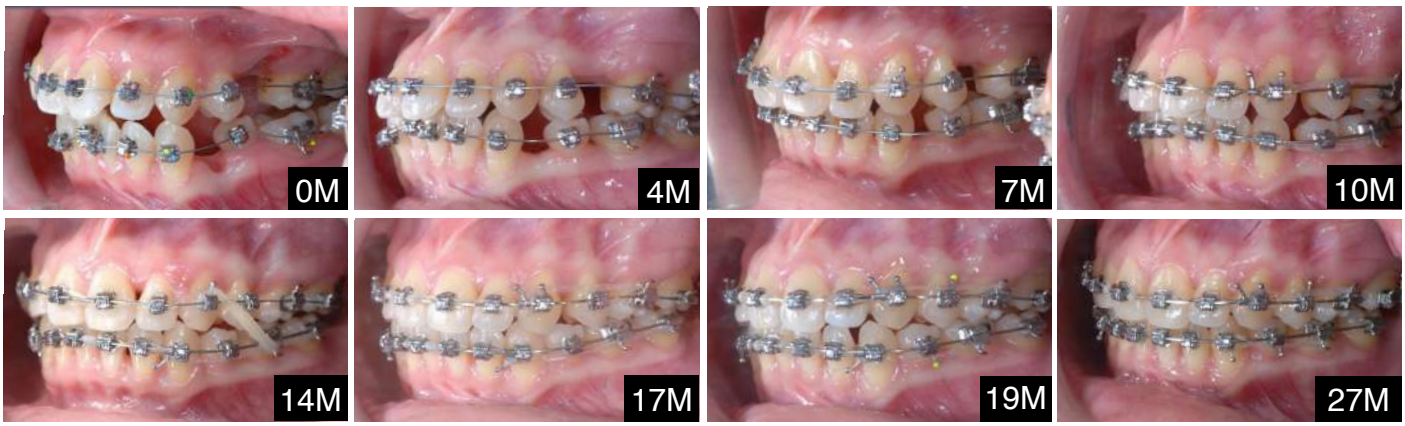


***Fig. 10**: Treatment sequence from the left buccal view is shown in months (M): 0M, 4M, 7M, 10M, 14M, 17M, 19M, and 27M.*

***Fig. 11**: Treatment progress from the maxillary occlusal view is shown in months (M): 0M, 4M, 7M, 10M, 14M, 17M, 19M, and 27M.*

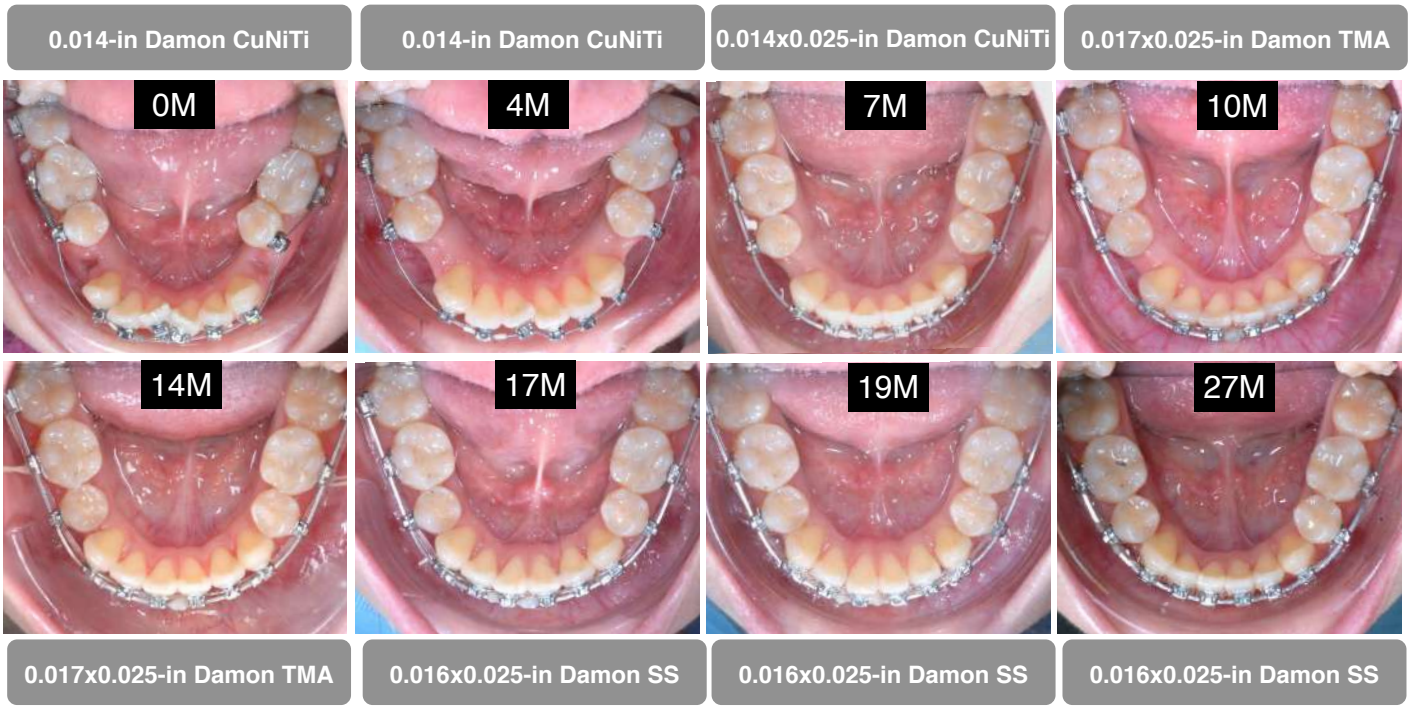


***Fig. 12**: Treatment progress from the mandibular occlusal view is shown in months (M): 0M, 4M, 7M, 10M, 14M, 17M, 19M, and 27M.*

The treatment progress is documented in a progressive series of intraoral photographs in frontal (Fig. 8), right buccal (Fig. 9), left buccal (Fig. 10), maxillary occlusal (Fig. 11), and mandibular occlusal (Fig. 12) views. After 31 months of active treatment, all fixed appliances were removed, and fixed retainers were delivered on the maxillary anterior 2-2 and the lingual mandibular 3-3, respectively. Removable clear overlay retainers were provided to maintain both arches. Posttreatment records were collected: casts, photographs, as well as panoramic and lateral cephalometric radiographs (Figs. 13-17).

Results Achieved

Facial esthetics and intermaxillary occlusion were both significantly improved after 31 months of active treatment (Fig. 13). The canine and molar relationships were maintained in Class I. The posttreatment panoramic radiograph documented acceptable root parallelism (Fig. 16). The superimposed

Fig. 13: *Posttreatment facial and intraoral photographs*

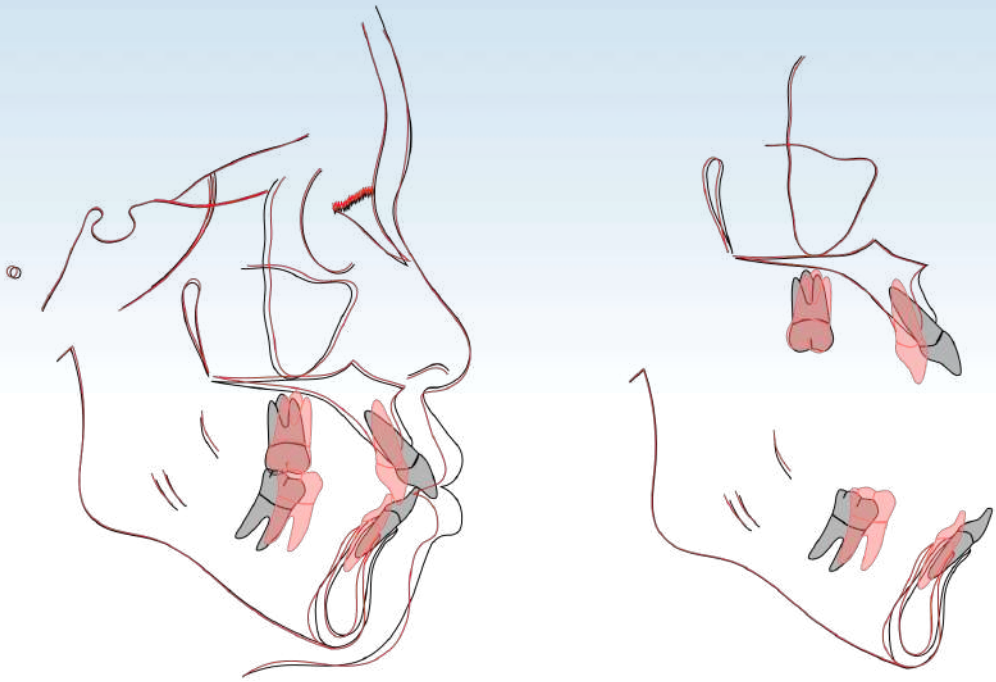


Fig. 14:
Pre-treatment (black) and posttreatment (red) cephalometric tracings are superimposed on the anterior cranial base (left), the maxilla (upper right), and the mandible (lower right). The incisors were retracted, and the protrusion was reduced.

Fig. 15: *Posttreatment cephalometric radiograph*

Fig. 16: *Posttreatment panoramic radiograph*

cephalometric tracings illustrated that the LR6 and LL6 were protracted 5mm due to the closing of the extraction spaces using elastic force (Fig. 14). The axial inclination of the upper incisor (U1-SN) decreased 27˚ after treatment (121˚ to 94˚), and the axial inclination of the lower incisors (L1-MP) was tipped lingually (103˚ to 93˚). The upper and lower lips were both retruded following the retraction of the anterior segments. The mandibular plane angle (SN-MP) was well-maintained (Table 1).

***Fig. 17**: Posttreatment dental models (casts)*

The Cast-Radiograph Evaluation (CRE) score was 24 points, as shown in the supplementary Worksheet 2.[9] The Pink and White dental esthetic score was 3 points (Worksheet 3).[10] The patient was pleased with the final result.

Discussion

In Taiwan, many young females are averse to having a convex profile with protrusive lips and seek orthodontic treatment to solve the problem and acquire a more esthetically pleasing straight profile. The major problem for this present patient was crowded anterior teeth, which were extremely proclined with a large overjet. According to Chang's extraction decision table (Table 2), extraction of 4 premolars for crowding relief and anterior teeth retraction was planned to achieve optimal esthetic and functional result. During the course of treatment, Class II elastics were applied to help to retract the upper anterior teeth and improve the inter-arch relationship. The final outcome shows that although mild anchorage loss was noted in the lower dentition, the originally protrusive anterior teeth were successfully retracted. The patient was very pleased with the improvement in her facial profile. It was not necessary to use extra alveolar bone screws, which was the patient's preference. In retrospect, two bone screws in bilateral infra-zygomatic crests would have expedited the treatment, enhanced the anterior teeth reaction, and could have maintained better torque for the anterior teeth. It would have been wise to prospectively propose the use of bone screws; patients tend to be less receptive to this option if they were neither informed nor expecting it.

Consideration About Treating Black Triangles

In the finishing stage of treatment, black triangles were noted both in the upper and lower anterior dentition. Although a study showed the threshold for patient awareness and adversity to black triangles is 3mm,[11] the majority of space closure treatments averages between 1 to 1.5mm.[12,13]

A black triangle is the open gingival embrasure area lacking interdental papillae. It can be seen when papilla deficiency is significant enough that saliva can no longer mask the dark contrast against the white tooth. The space may make the patient feel odd and unattractive, and furthermore may cause loss of periodontal health due to chronic retention of food debris and subsequent gingival inflammation.[14]

Burke[15] reported a 41% prevalence of black triangles in adolescent orthodontic patients with previously crowded maxillary central incisors. The occurrence is greater in adult patients, and may be as high as 67%, which is attributed to the resorption of the alveolar crest. Since the adult population is now up to 40% of all orthodontic patients, the predisposition for posttreatment black triangles should not be ignored.[16]

Black triangles have many etiologies: age, thin gingival biotype, decreased bone height from

periodontal diseases, excessive embrasure space with deficient papilla affected by root angulation, crown form, and distance from alveolar bone to interproximal contact.[13]

Conventional solutions for black triangles include periodontal regenerative surgery, prosthetic reconstruction, and tooth morphology reshaping combined with orthodontic alignment.[17,18]

Periodontal regenerative surgery

Regenerative periodontal surgery focuses on the pink esthetic portion that includes interproximal bone grafts and soft-tissue grafts for papilla reconstruction. Surgical treatments are more invasive and the outcome is less predictable.

Prosthetic reconstruction

Many patients may prefer non-invasive dental re-contouring to reduce or obliterate black triangles with tooth-colored restorations. Prosthetic restorations include porcelain crowns, veneers, or composite bonding to fill the spaces and improve the white esthetic portion. However, some patients are unwilling to sacrifice sound tooth structure for porcelain restoration and are also reluctant to pay the extra prosthesis fee. Moreover, even with highly polished procedures, discoloration may appear on the composite surfaces several years after treatment. If restorative procedures are carried out, care must be taken not to "overcontour" the teeth, create harboring places for plaque, strangulate the papilla, and create an environment conducive to inflammation.[15]

Morphology reshaping combined with orthodontic alignment

During orthodontic treatment, black triangles can be reduced by reshaping the tooth outline form, polishing the enamel surface, and using elastomeric chains to move adjacent teeth to close the space. The open embrasure area becomes smaller and the papilla fill the narrowed embrasure to eliminate the black triangles. Factors including root angulation, crown form, and interproximal contact location relative to its length should all be taken into consideration when planning the treatment.

(I) Root angulation

Root angulation is strongly associated with open gingival embrasure in adult orthodontic patients. Mean root angulation in normal gingival embrasures converges at 3.65°. An 1° increase in root divergence increases the odds of an open gingival embrasure by 14 to 21%. When adjacent roots come too close together, a lack of embrasure space can jeopardize the proximal bone and displace the papilla. Orthodontic brackets should be placed according to root angulation and soft tissue margin, but not to existing incisal edge to avoid aberrant root position.[16]

(2) Tooth crown form

Taylor[19] classified tooth form into 3 types: square, tapered, and ovoid. Turverson[20] reported that tapered teeth with divergent crowns exhibit contact points rather than contact areas, which increases the embrasure area and contributes to open gingival embrasure. For each millimeter increase from the mesial contact to the long axis, the odds of an open gingival embrasure increases six times.[16]

Fig. 18:
Posttreatment photo (left) shows a smaller black triangle between LL1 and LL2. Photos from the 6-month (6M; center) and 5-year (5Y; right) follow-up show that the black triangle was diminished.

(3) Bone-contact distance and contact length

Tarnow et al.[21] showed that an increased distance from the alveolar bone crest to the interproximal contact significantly increases the possibility of open gingival embrasures from only 2% for 5mm distance, 44% for 6mm, up to 73% for 7mm. The papilla has limited ability to creep from the alveolar bone crest to the interproximal contact. The contact position could be changed from the contact point to the contact area by tooth morphology reshaping. Increased contact length and shortened bone-contact distance could reduce the possibility of black triangles. Sarver[22] explained the appropriate ratio for a contact between the central incisors is 50% of the tooth height.

(4) Tooth dimensions

Appropriate crown width-to-height ratio (80±5%) for individual teeth and Bolton's ratio for interarch relationships should be considered before enamel striping.[13]

Integrating this Knowledge into the Present Case

Black triangles are very common after crowding relief. The tapered upper and lower incisors were stripped to attain a straight proximal outline form. The new contacts changed from short contact points to long contact areas. This reduced the embrasure area space and shortened the distance between the contact and the alveolar bone crest. For the present patient, although there was still a small black triangle noted between LR1 and LR2 when all active treatment was completed, it appeared smaller at the 6-month follow-up, and was further diminished at the 5-year follow-up (Fig. 18). This might be the result of gingival creeping, owing to tooth morphology reshaping for a better contact position and length, hence decreasing the bone-contact distance to an optimal range.

Conclusions

This bimaxillary protrusion with proclined anterior teeth, large orverjet and protrusive lips was treated to an acceptable result. With Chang's extraction decision table (Table 2), a feasible treatment plan was completed with a pleasant outcome. In retrospect, the treatment time may have been decreased by using buccal shelf miniscrews. In addition, the long-term follow-up showed the black triangles were diminished and the occlusion was stable.

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Discrepancy Index Worksheet

TOTAL D.I. SCORE 38

OVREJET

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

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

Total = 3

OVERBITE

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

Total = 2

ANTERIOR OPEN BITE

0 mm. (Edge-to-edge), 1 pt. per tooth
Then 1 pt. per additional full mm. Per tooth

Total = 0

LATERAL OPEN BITE

2 pts. per mm. Per tooth

Total = 0

CROWDING (only one arch)

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

Total = 7

OCCLUSION

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

Total = 0

LINGUAL POSTERIOR X-BITE

1 pt. per tooth Total = 0

BUCCAL POSTERIOR X-BITE

2 pts. Per tooth Total = 2

CEPHALOMETRICS (See Instructions)

ANB ≥ 6° or ≤ -2° = 4 pts.

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

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

SN-MP

≥ 38° = 2 pts.

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

≤ 26° = 1 pt.

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

1 to MP ≥ 99° = 1 pt.

Each degree > 99° 14 x 1 pt. = 14

Total = 19

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

Identify:

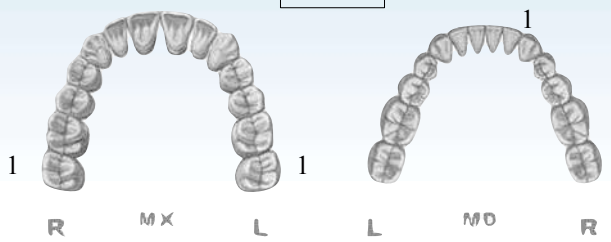
Total = 5

Cast-Radiograph Evaluation

Total Score: 24

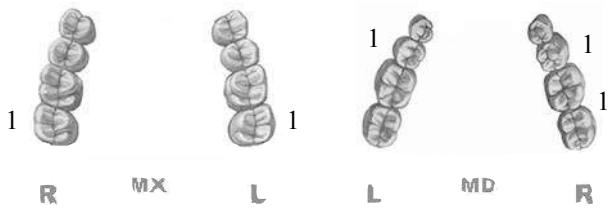
Alignment/Rotations

3



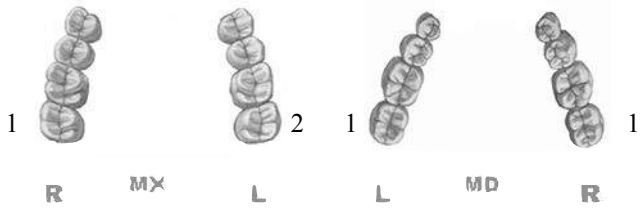
Marginal Ridges

5



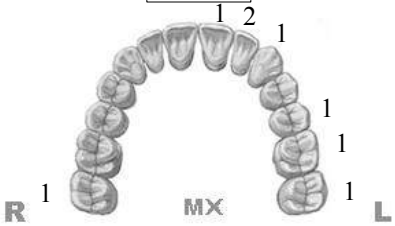
Buccolingual Inclination

5



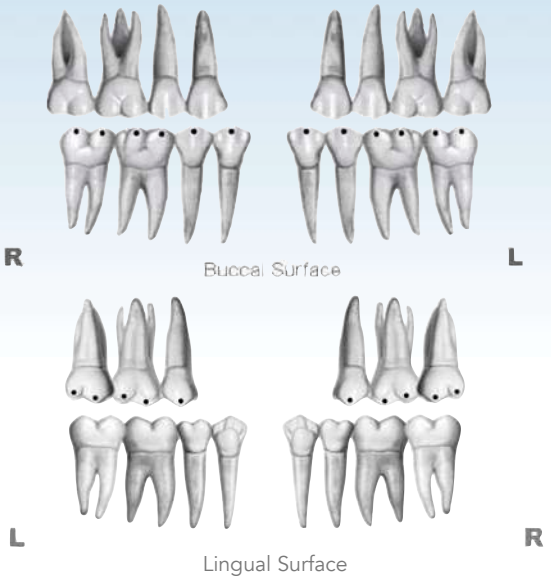
Overjet

8



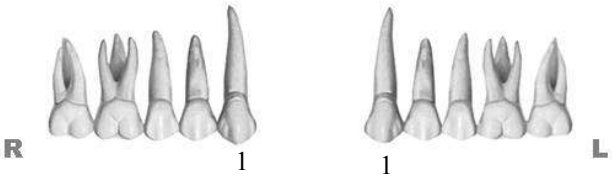
Occlusal Contacts

0



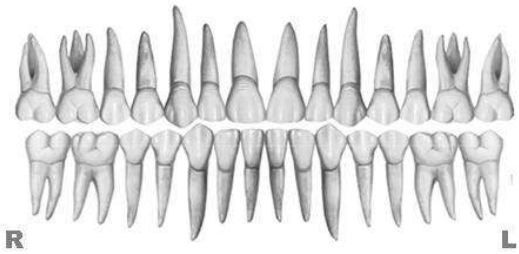
Occlusal Relationships

2



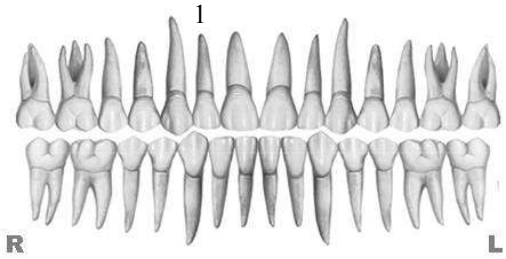
Interproximal Contacts

0



Root Angulation

1



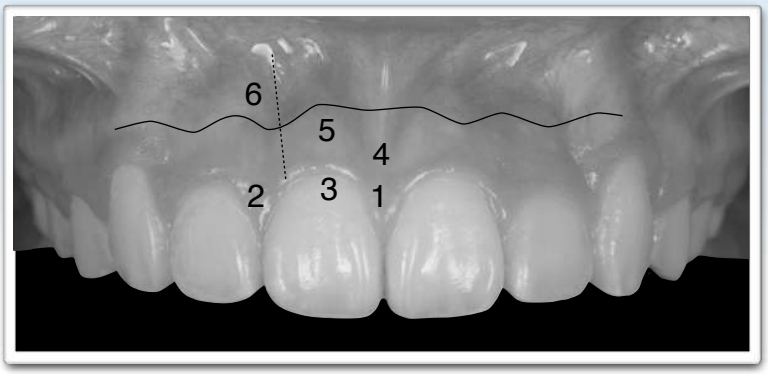
INSTRUCTIONS: Place score beside each deficient tooth and enter total score for each parameter in the white box. Mark extracted teeth with "X". Second molars should be in occlusion.

IBOI Pink & White Esthetic Score

Total Score = 3

1. Pink Esthetic Score

Total = 0

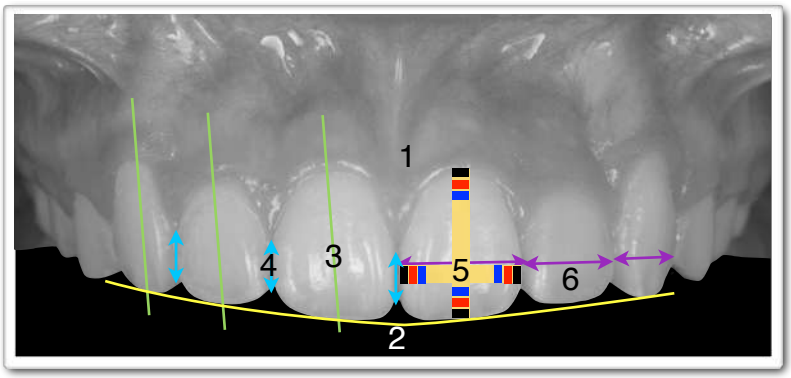


1. M & D Papillae	0	1	2
2. Keratinized Gingiva	0	1	2
3. Curvature of Gingival Margin	0	1	2
4. Level of Gingival Margin	0	1	2
5. Root Convexity (Torque)	0	1	2
6. Scar Formation	0	1	2

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

2. White Esthetic Score (for Micro-esthetic)

Total = 3



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

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

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全新改版的 2023 年貝多芬高效 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，本年度亦特別加入最新的**數位矯正與隱形牙套**的內容，並邀請了貝多芬牙科集團各院院長演講**特別矯正專題**。

此外，透過數位影片反覆觀看，結合矯正與電腦教學，課堂助教協助操作，讓學員在短時間能快速上手，感染**「熱愛矯正學，熱愛學矯正」**的熱情。

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1. Selecting your ideal first case
2. Bonding position
3. Bonding + BT + Ceph tracing
4. TADs + space closing + hook + spring
5. Finishing bending & fixed retainer

Practice: Clinical photography

Module 2 - 5/11

1. Four stages of efficient orthodontic treatment
2. Simple and effective anchorage system
3. Extraction vs. Non-extraction analysis

Practice: Patient photo management

Module 3 - 5/25

1. Soft & hard tissue diagnostic analysis
2. Big overjet correction
3. Damon diagnosis & fine-tuning

Practice: Ceph tracing

Module 4 - 6/8

1. Excellent finishing
2. Retention & relapse

Practice: Ceph superimposition & measurement

Module 5 - 6/29

1. Simplify your system
2. Extraction vs. non-extraction

Practice: Case report demo

▲ **Computer training (Mac): 1:30-3:00 pm**

Module 6 - 7/13

1. Class III correction
2. Class II correction

Special lecture

Module 7 - 7/27

1. Upper impaction
2. Lower impaction
3. Gummy smile correction

Special lecture

Module 8 - 8/10

1. ABO DI, CRE workshop
2. Open bite

Special lecture

Module 9 - 8/24

1. Implant-ortho combined treatment
2. Asymmetry

Special lecture

Module 10 - 9/7

1. Minor surgeries in orthodontics
2. Digital orthodontics

Special lecture

Module 11 - 9/21

1. Aligner & TADs
2. Keys to aligner learning

Special lecture

▲ **Special lecture: 1:30-2:30 pm**

時間：週四全天（9 am - 5 pm）

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Impacted Maxillary Canines: Auto-Eruption in Moderately Crowded Mixed Dentition

Abstract

Introduction: *A 10y-9m-old female presented with chief complaints of bilateral maxillary impacted canines in the late mixed dentition stage. The premolars had begun to erupt.*

Diagnosis: *There was moderate anterior crowding in the maxillary arch, and the maxillary canines were impacted. Crossbite of both maxillary lateral incisors was noted. The total Discrepancy Index (DI) for this malocclusion was 57, including an Impaction Specific Assessment System (iSAS) score of 19 points.*

Treatment: *The anterior crossbite was corrected using a passive self-ligating appliance, supplemented with a bite turbo on the lower left lateral incisor. Open coil springs were placed to gain spaces for eruption of the impacted canines.*

Results*: After 25 months of active treatment, the Cast-Radiograph Evaluation (CRE) score was 13. Superimposition of the cephalometric tracings showed that the SNA, SNB, and ANB angles increased 8°, 3°, and 5° respectively, which resulted in a more harmonious facial pattern. Besides, U1-SN and L1-MP both increased from retroclined to more ideal angles. The 1-year follow-up photographs revealed that both facial esthetics and occlusion were stable.*

Conclusions*: In mixed dentition, clinical signs of delayed or ectopic eruption should be confirmed by panoramic and cephalometric films first. For upper canine impactions to erupt spontaneously, angle of inclination and initial height of the impaction are critical. Preserving Leeway space can help relieve crowding. Lastly, different bracket selections depending on factors such as displaced position of impacted canines, non-/extraction of the adjacent teeth, and initial inclination of anterior segment are efficient for achieving desirable outcomes. (J Digital Orthod 2022;68:46-63)*

Key words:
Impacted maxillary canine, mixed dentition, Leeway space, open coil spring

Introduction

The dental nomenclature for this report is a modified Palmer notation. Upper (U) and lower (L) arches, as well as the right (R) and left (L) sides, define four oral quadrants: UR, UL, LR, and LL. Deciduous teeth are marked A-E from the midline in each quadrant, e.g., an upper right primary canine is URC. Permanent teeth are numbered 1-8 from the midline in each quadrant, e.g., a lower left canine is LL3.

The prevalence of impacted maxillary canines (I-U3s) by most studies are two-thirds palatal.[1] In 1995, an international sample of I-U3s reported by Peck and Peck[2] showed that 73.4% of I-U3s encroached on first premolar. Corresponding data for other teeth was 20.5% lateral incisor, 4.1% first molar, and 2% central incisor. Furthermore, there is a 3% prevalence of transposition with the adjacent lateral incisor. The dental esthetics and functions in patients with an impacted canine(s) could be negatively influenced by its long and complex treatment.[3-6] Therefore, the ameliorated treatment

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Joshua S. Lin,
Associate Director, Beethoven Orthodontic Center (Center left)
Chris H. Chang,
Founder, Beethoven Orthodontic Center
Publisher, Journal of Digital Orthodontics (Center right)
W. Eugene Roberts,
Editor-in-Chief, Journal of Digital Orthodontics (Right)

for a transposed canine cannot be overemphasized. In this case, bilateral impacted maxillary canines were present in a 10-year-9-month-old female, which was the chief complaint.

History and Etiology

A 10-year-9-month-old female presented with a moderately crowded dentition (Figs. 1 and 2). An

Fig. 1: *Pre-treatment facial and intraoral photographs*

Fig. 2: *Pre-treatment study models*

Fig. 3: *Posttreatment facial and intraoral photographs*

Fig. 4: *Posttreatment study models*

intraoral examination revealed recently erupted right and left maxillary first premolars, but the maxillary right second primary molar was retained. The anterior dentition was moderately crowded, both maxillary lateral incisors were in crossbite, and the maxillary canines were unerupted. Since there were no obvious anomalies and pathology which could be observed in the panoramic and peri-apical films of the maxillary arch, the assumed etiology for the impactions was crowding and abnormal paths of eruption.

There was no evidence of contributing oral habits or temporomandibular dysfunction. Good alignment was achieved after 27 months of active treatment, as shown in Figs. 3, 4, 6, and 7.

Diagnosis

Facial:

- Facial Height: *Normal (54%) with tapered facial form*
- Protrusion: *Relatively protrusive lips (upper: 1.5mm to the E-line; lower: 2mm to the E-line)*
- Incisal Exposure: *Within normal limits (WNL) when smiling*

Skeletal:

- Intermaxillary Relationship: *Retrusive maxilla (SNA, 74°) and mandible (SNB, 73°), as well as skeletal Class I (ANB, 1°)*
- Mandibular Plane: *High mandibular plane angle (SN-MP, 49.5°; FMA, 42.5°)*

Dental:

- Incisal Inclination: *Retrusive upper incisor (U1-SN, 97°) and lower incisor (L1-MP, 78.5°)*
- Classification: *End-on Class II molar relationship on both sides*
- Unerupted: UR3, UR5, UR7, UL3, UL7, LR7, and LL7

The total Discrepancy Index (DI) for this malocclusion was 57, including an Impaction Specific Assessment System (iSAS) score of 19 points, as shown in the subsequent Worksheets 1 and 2.

Treatment Objectives

The treatment objectives were to:

1. Induce bilateral impacted maxillary canines to erupt.
2. Correct the retroclined upper and lower incisors and asymmetrical dental arches.
3. Resolve the crowded dentition.
4. Reduce high mandibular plane angle.

Maxilla (all three planes):

- Incisal Exposure: *WNL when smiling*
- A-P: *Allow for normal expression of growth.*
- Vertical: *Allow for normal expression of growth.*
- Transverse: *Maintain.*

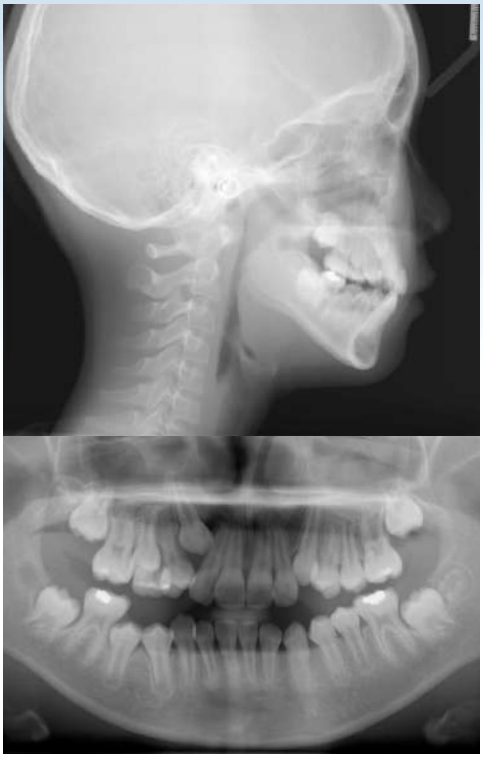

Fig. 5:
Pre-treatment cephalometric and panoramic radiographs document the original dentofacial morphology.

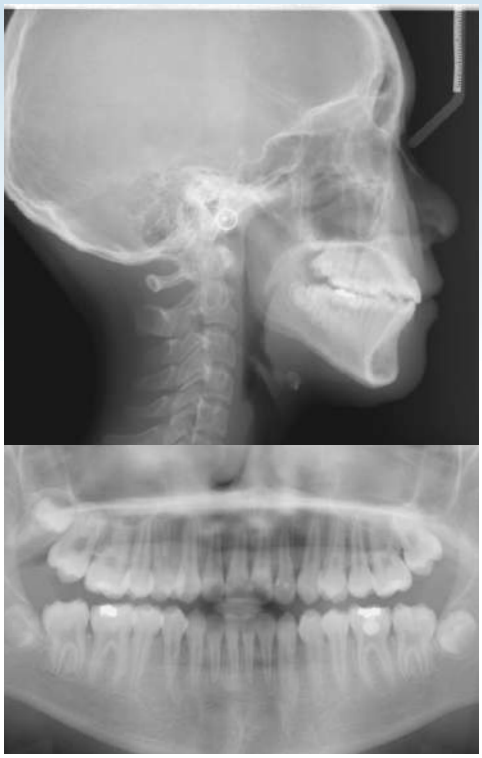

Fig. 6:
Posttreatment cephalometric and panoramic radiographs reveal the dentofacial morphology immediately after fixed appliances were removed.

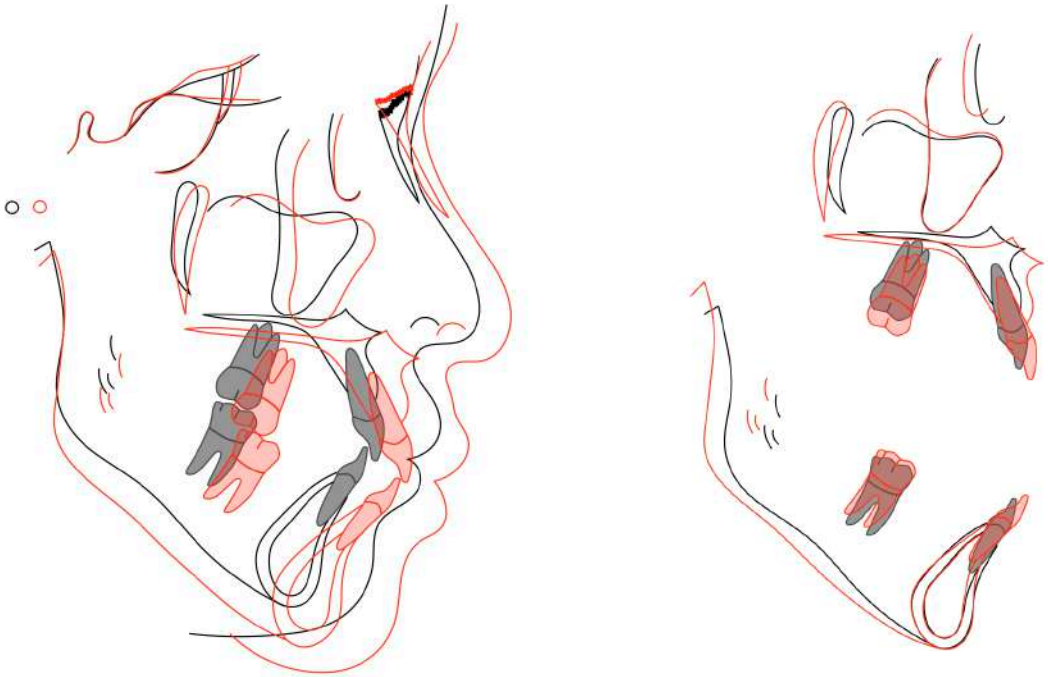

Fig. 7:
Pre- (black) and posttreatment (red) cephalometric tracings are superimposed on the anterior cranial base (left), the maxilla (upper right), and the stable internal structures of the mandible (lower right). See text for details.

CEPHALOMETRIC SUMMARY			
	PRE-TX	POST-TX	DIFF.
SKELETAL ANALYSIS			
SNA° (82°)	74°	82°	8°
SNB° (80°)	73°	76°	3°
ANB° (2°)	1°	6°	5°
SN-MP° (32°)	49.5°	48.5°	1°
FMA° (27°)	42.5°	41.5°	1°
DENTAL ANALYSIS			
U1 TO NA mm (4mm)	6	1.5	4.5
U1 TO SN° (104°)	97°	101°	4°
L1 TO NB mm (4mm)	5	8.5	3.5
L1 TO MP° (90°)	78.5°	89°	10.5°
FACIAL ANALYSIS			
E-LINE UL (-1mm)	1.5	1	0.5
E-LINE LL (0mm)	2	2	0
%FH: Na-ANS-Gn (56%)	54%	53.5%	0.5%
Convexity: G-Sn-Pg (13°)	6.1°	9.2°	3.1°

Table 1: *Cephalometric Summary*

Mandible (all three planes):

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

Maxillary Dentition:

- A-P: *Protrude incisors to correct U1-SN.*
- Vertical: *Maintain.*
- Inter-Molar/Inter-Canine Width: *Expand as needed to relieve crowding.*

Mandibular Dentition:

- A-P: *Protrude incisors to correct L1-MP angle.*
- Vertical: *Maintain.*
- Inter-Molar/Inter-Canine Width: *Expand as needed to relieve crowding.*

Facial Esthetics:

- Maintain.

Treatment Alternatives

The ideal objectives for a full fixed-appliance treatment would be to resolve the malocclusion and align the impacted cuspids. Judging from the profile, bilateral impacted maxillary canines, retroclined upper and lower incisors (U1-SN, 97°; L1-MP, 78.5°), crowded anterior dentition, and high mandibular plane angle (SN-MP, 49.5°; FMA, 42.5°) are all essential points to note when considering alternative treatments. Possible treatment options are listed below (Fig. 8):

Option 1: U4s Extraction

Relieve the crowding by extracting UR4 and UL4. For this treatment option, instead of extracting only the UR4, removing both maxillary first premolars could prevent the midline from deviating. However, since this was a case with only moderate crowding, bilateral first premolar extractions would provide too much space, which could aggravate the retrusive upper incisors, causing excessive retraction of the anterior teeth and a dished-in profile.

Option 2: Rapid Maxillary Expansion (RME) Device (Non-extraction)

Relieve crowding by expanding the arches with a rapid maxillary expansion (RME) device. The main objective would be to enhance forward displacement of the maxilla by sutural growth. Based on previous studies,[7] in the "infantile" stage (8 to 10 years of age), the midpalatal suture is broad and smooth; in the "juvenile" stage (10 to 13 years), the suture becomes more squamous and overlapping; in adolescence, the suture becomes more heavily interdigitated. Since the patient was between the infantile and juvenile stages, the effect on the advancing maxilla was uncertain.

Option3: Open Coil Springs (Non-extraction)

Relieve the crowding by expanding the arches using passive self-ligating appliances supplemented with open coil springs.

The objective for this non-extraction option is to use passive self-ligating appliances combined with open coil springs to preserve teeth and enhance facial profile. For this moderately crowded dentition, Option 3 is the best choice. Furthermore, maxillary expansion induces incisal flaring to correct the retrusive anterior teeth.

Since the UR3 was a high-position, labially impacted canine, surgical intervention was also considered. The UR3 could be exposed by a VISTA procedure. Then a button could be bonded on the labial surface, and a chain of elastics could apply distal and occlusal traction to the UR3, via a 3D lever arm inserted into the hole on an infrazygomatic crest (IZC) bone screw. However, the patient's parents preferred non-surgical

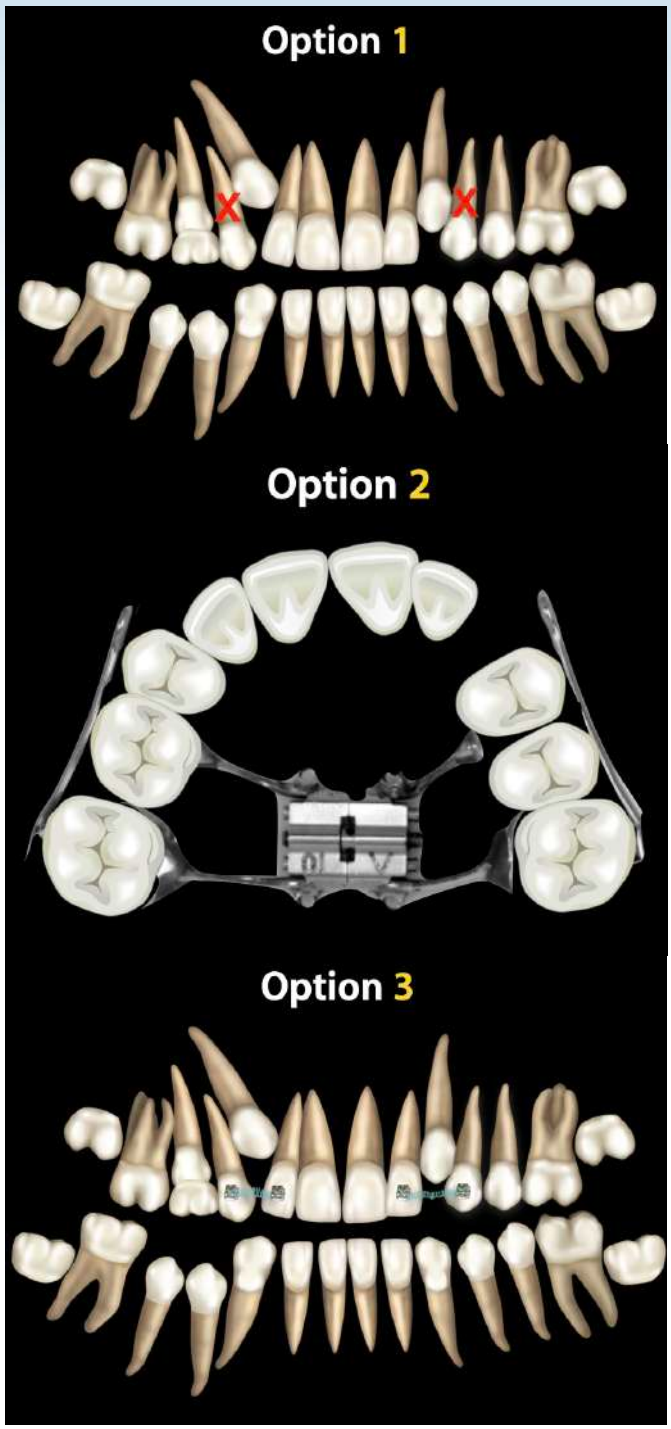

Fig. 8:
Diagram showing the configuration of different treatment plans of tooth extraction, RME (rapid maxillary expansion), and open coil springs respectively

treatment. Thus, after discussing the advantages and disadvantages of each option with the patient's parents, a non-extraction treatment with open coil springs (Option 3) was chosen.

Treatment Progress

The treatment can be roughly divided into two phases: the first is to induce eruption of the impacted canines as well as to correct the UR2 and UL2 crossbite, and the second is to complete the final alignment. The progress of intraoral photographs is documented in Figs. 9-13.

A self-ligating fixed appliance (Damon Q®, Ormco Corporation, Brea, CA) was bonded on all maxillary permanent teeth except for UL3, which was left unbonded to erupt naturally (Fig. 11). A 0.014-in CuNiTi archwire was engaged. Two open coil springs were inserted between UR2 and UR4, as well as between UL2 and UL4, respectively to create space for the impacted maxillary canines (Figs. 10 and 11). On the same visit, a lingual bite turbo was placed on LL2 in order to correct the UL2 crossbite (Fig. 13).

One month later, a self-ligating fixed appliance (Damon Q®, Ormco Corporation, Brea, CA) was bonded on all mandibular permanent teeth except for LR5, and a 0.014-in CuNiTi archwire was engaged. An open coil spring was inserted between LR4 and LR6 (Fig.10).

By the 3rd month, crowding around both UR3 and UL3 was relieved, so the upper archwire was changed to 0.018 CuNiTi. By the 4th month, the LR5 had erupted enough so a bracket was bonded and the archwire was engaged. In the 7th month, the lower archwire was changed to 0.014x0.025 CuNiTi. In the 11th month, the upper archwire was changed to 0.014x0.025 CuNiTi. In the 13th month, an elastic (Parrot 5/16-in, 2oz, Ormco) was applied from UR2 through LR4 to LR6 in order to close the space between UR2 and UR3. In the 15th month, inter-proximal reduction (IPR) was performed on the mesial sides of UR1 and UL1 in order to correct the black triangle, and a 4-loop power chain was applied from UR2 to UL2 to close the space. In the 19th month, the upper archwire was changed to 0.017x0.025 TMA, and a 5-loop power chain was applied between UR2 and UR6 in order to close the space between UR2 and UR3. The lower archwire was changed to 0.016 CuNiTi at the same appointment.

In the 20th month, the lower archwire was changed to 0.014x0.025 CuNiTi, and then to 0.017x0.025 TMA in the 22nd month. Class III elastics (Fox 1/4-in, 3.5oz, Ormco) were applied bilaterally from U6s to L3s to close the open contacts. In the 23rd month, an elastic (Kangaroo 3/16-in, 4.5oz) was applied from UR4 to the lingual button of LR5, and another one was applied from UR3 to the lingual button of LR4. In the 24th month, all elastics (Kangaroo 3/16-in, 4.5oz) were removed, and IPR was performed on UR1, UL1, LR1, and LL1 to correct the midline. In the 25th month, an elastic (Squirrel 1/8-in, 3.5oz) was applied from UR4 to the LR5 lingual button, and another from UR3 to the LR4 lingual button. After 25 months of active treatment, all appliances were removed.

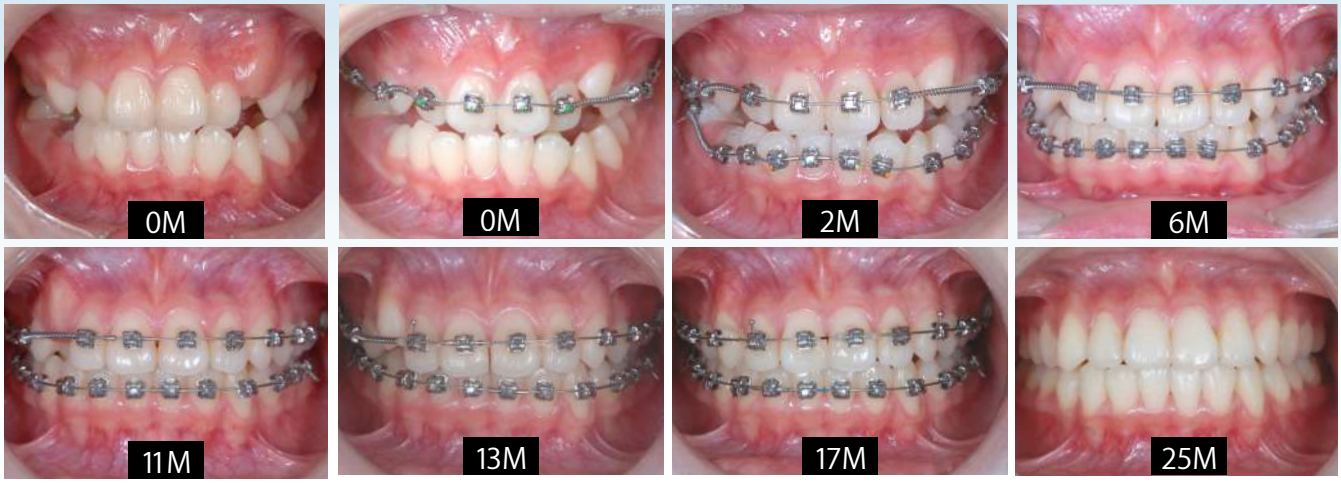

Fig. 9: *Frontal view of treatment sequence shown in months (M): 0M, 2M, 6M, 11M, 13M, 17M and 25M.*

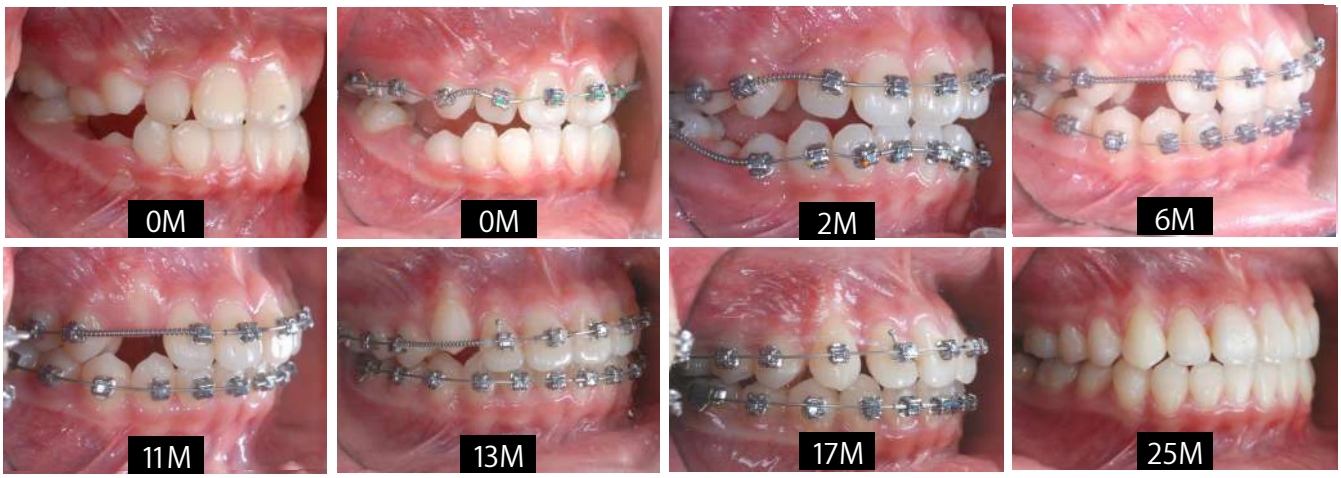

Fig. 10: *Right view of treatment sequence shown in months (M). Note: the eruption procedure of the impacted maxillary right canine.*

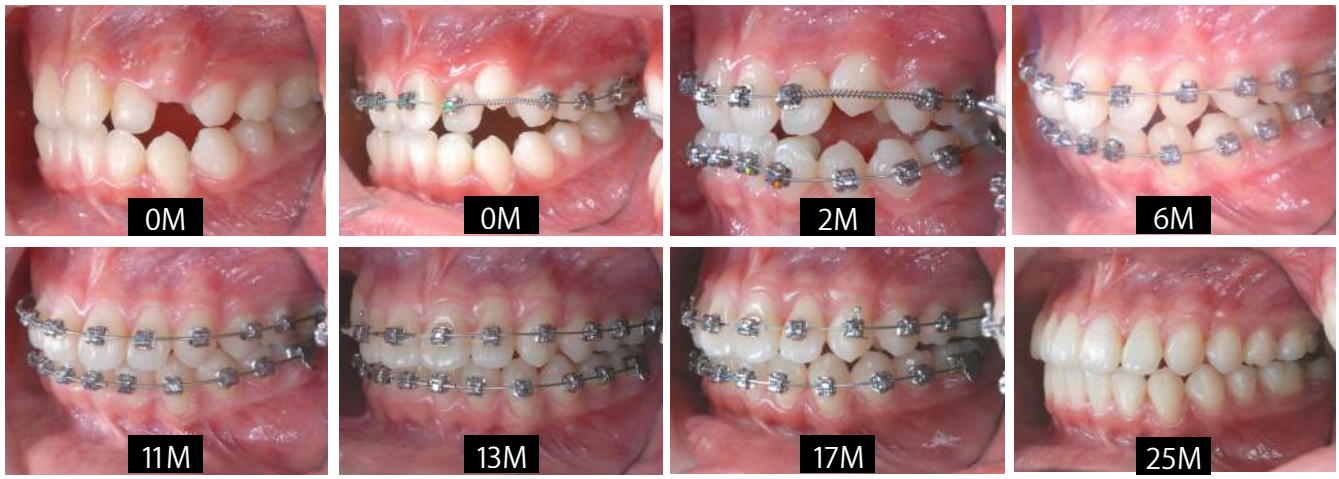

Fig. 11: *Left view of treatment sequence. Note: the eruption procedure of the impacted maxillary left canine.*

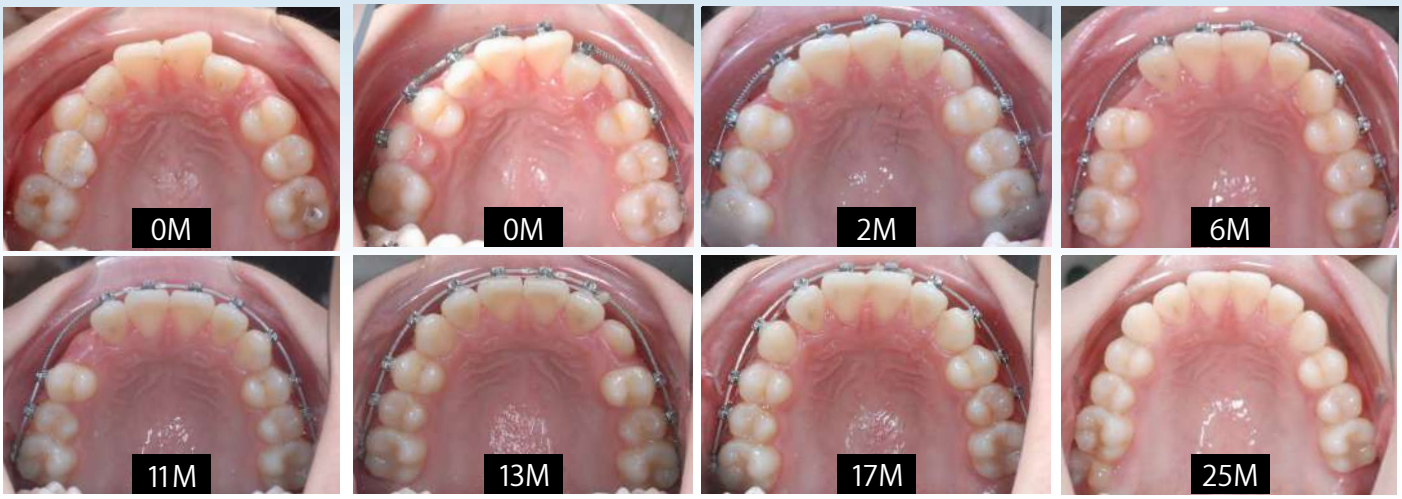

Fig. 12: *Upper arch progress. Note: Two open coil springs were applied between UR2 and UR4, and between UL2 and UL4, to create space for the impacted maxillary canines.*

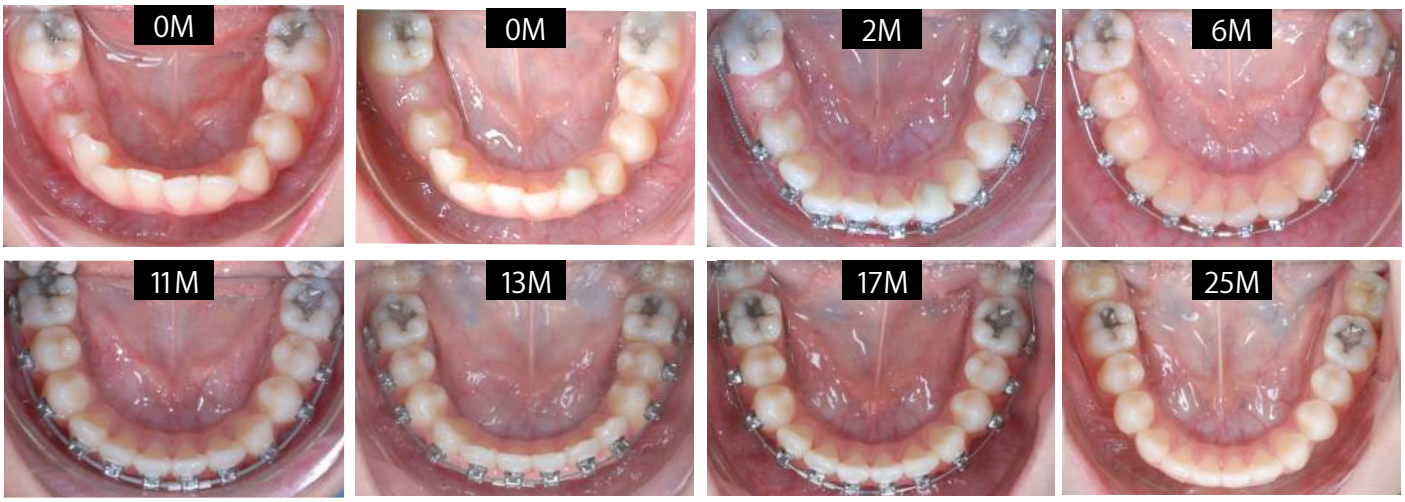

Fig. 13: *Lower arch progress. Note: A bite turbo was bonded on the lingual surface of LL2 to correct the crossbite of UL2.*

Treatment Results

Cephalometric superimpositions (Fig. 7) and analysis (Table 1) document improved intermaxillary relationship as well as inclinations of the upper and lower incisors.

The treatment results for this patient were excellent. Facial esthetics, dental alignment, and intermaxillary occlusion were significantly improved (Figs. 3 and 4). The posttreatment panoramic radiograph (Fig. 6) documented acceptable root parallelism, except for UR4 and LR5, which is reflected in the Cast-Radiograph Evaluation (CRE) score (Worksheet 3). Bilateral canines erupted spontaneously without

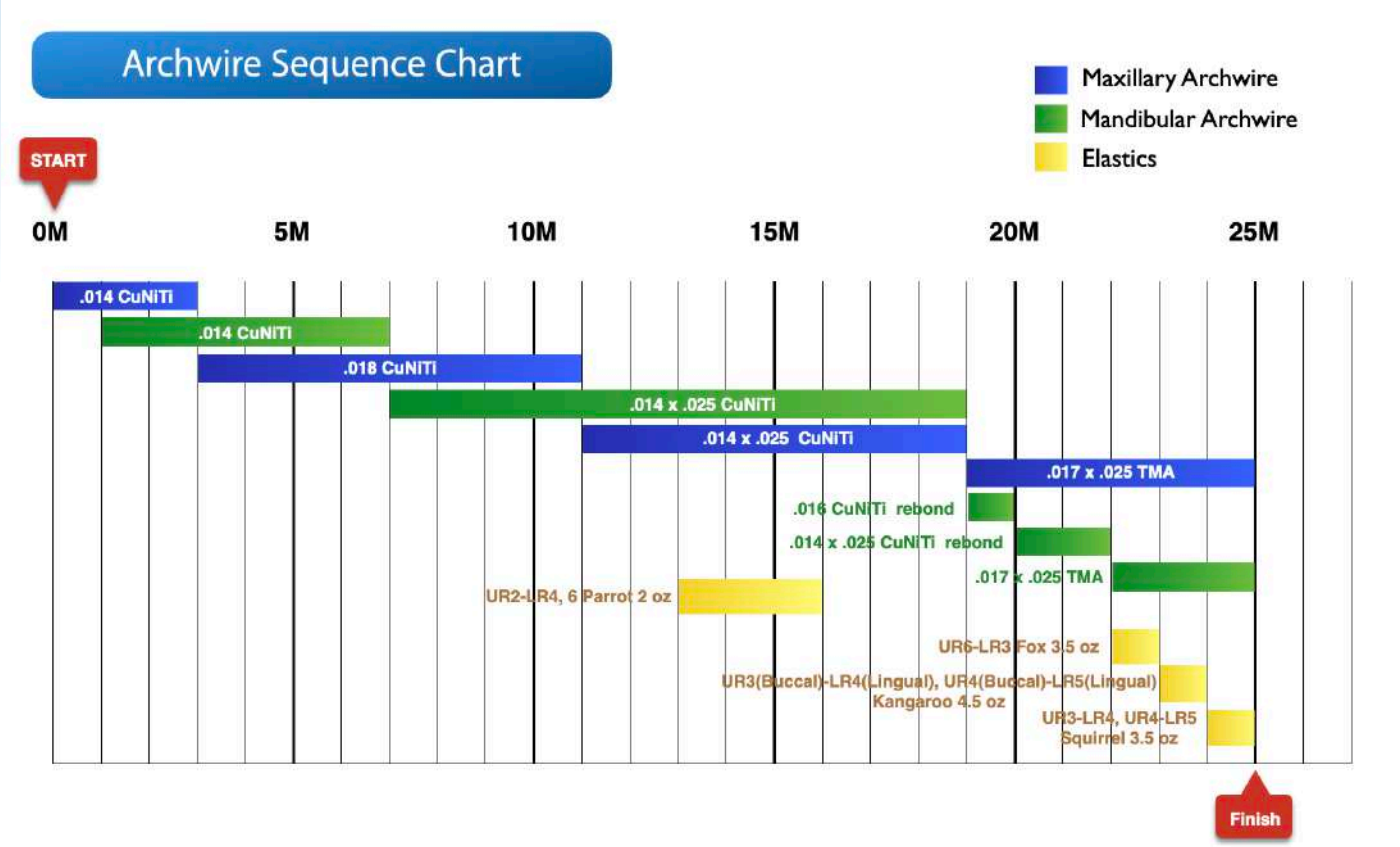

Table 2:
The Archwire Sequence Chart shows all the mechanics of treatment. Principal archwires are shown for the maxillary and mandibular arches in blue and green respectively.

any surgical exposure. Superimposed cephalometric tracings (Fig. 7) document that the axial inclination of the upper incisors (U1-SN) increased 4° after treatment (97° to 101°), and the axial inclination of the lower incisors (L1-MP) increased 10.5° (78.5° to 89°). The American Board of Orthodonticts (ABO) CRE score was 13 points, as shown in the supplementary Worksheet 3. The major discrepancies in the final alignment were rotation, marginal ridge discrepancies, and buccal lingual inclination of the posterior teeth. The Pink and White esthetic score was 3 points, as shown in the supplementary Worksheet 4. The patient was very satisfied with the results.

Discussion

1. Labially Impacted Maxillary Canine

Maxillary canines are commonly impacted teeth with an incidence of 2%, second only to the third molars.[7] It is twice as common in females as it is in males, and the prevalence of a labial or palatal impaction is one-third and two-thirds respectively. A useful tool to evaluate the severity and path of eruption of impacted canines is radiography; however, its reliability differs among different age groups. In children aged 10 years or younger, attempting to determine the path of eruption radiographically generally has little effect due to the

large variations in the position of and changes in tooth germ in the path. However, in children aged 11 years or older, clinical signs of delayed or ectopic eruption can be confirmed by the radiographs.[8,9] In this case, since the patient was 10y-09m, the labial impacted inclination of UR3 could be diagnosed by the panoramic film and the cephalometric radiograph.[9-12]

Labially impacted maxillary canines result either from ectopic migration of the canine crown over the root of the lateral incisor or from shifting of the maxillary dental midline, causing insufficient space for the canine to erupt.[13] Olive[14] suggested that spontaneous eruption of an impacted canine may be feasible by creating space for the canine crown with routine orthodontic mechanics. Bishara[15] claimed that without surgical intervention, labially impacted canines still have a chance to erupt spontaneously. In this case, bilateral labially impacted canines erupted without surgical intervention.

Warford et al.[16] suggested that compared to patients without canine impactions, those with canine impactions generally need longer treatment time because of increased tooth displacement relative to the occlusal plane. Smith's[17] study showed that the mean value of the maxillary canine eruption rates from alveolar bone to oral cavity was 0.08mm per week. Generally, a permanent tooth may take 2-4 years to move through the alveolar bone into the occlusion, at which point the root would be two-thirds complete. Nonetheless, the rate of movement can be rapid once permanent teeth erupt.

It has been reported that labial impaction of maxillary permanent canine is most frequently associated with crowding, which is consistent with a lack of space diagnosed in 60-90% of patients with maxillary impacted canines.[18] After removal of the primary canine and expansion of the dental arch, about 42% of maxillary impacted canines erupted spontaneously within a one-year period, which shows that space is critical to tooth eruption. Besides, two factors which affect self-eruption are the critical angle (20°) of inclination (Fig. 14) and the initial height of the impacted tooth. If the angle is less than 20°, spontaneous eruption is more possible. Meanwhile, if the initial vertical position is higher, a favorable inclination can be anticipated.

2. Leeway Space vs. E Space

The Leeway space is the difference between the combined mesiodistal (m-d) diameter of the primary canine plus the first and second molars and the combined m-d diameter of their corresponding permanent successors.[19] Another approach is E space, which only subtracts m-d diameter of the second premolar from that of the deciduous second molar. However, many orthodontists use E space instead of the Leeway space, because it is easier to measure and because they believe that the two measurements are similar. Fernandes et al.[20] found that the E space predicts a larger space than the Leeway space, and the difference is about 1mm. Thus, clinicians should be careful not to overestimate the space available.

For the UR3 in this case, the pre-treatment panoramic and the cephalometric radiographs

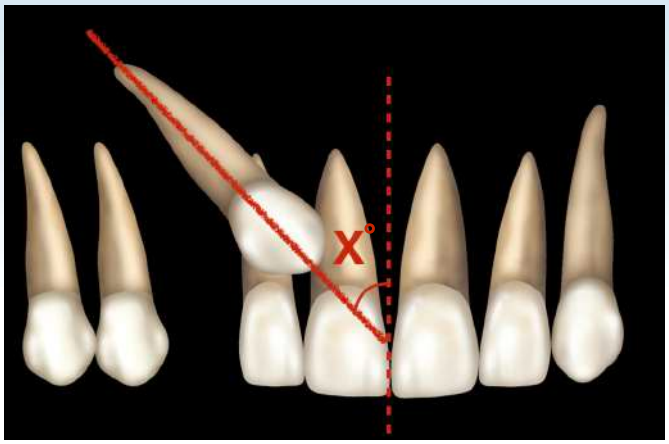

Fig. 14:
If the inclination of the impacted canine (X˚) is less than the critical angle (20°), spontaneous eruption is more likely to happen.

show that the angle of inclination was 21°, and the crown was superior to the cementoenamel junction (CEJ). Therefore, the inclination of the high-position, impacted UR3 was confirmed. However, since the upper right primary second molar was retained, it provided the E space for the impacted UR3. Therefore, the impacted UR3 could be corrected merely by means of self-ligating fixed appliances with open coil springs.

3. Bracket Selection

There are two kinds of maxillary canine displacements: palatal or labial impactions. If a maxillary canine is palatally displaced, it can be moved into the arch by a lateral force, and the crown becomes labially tipped. Thus, a low-torque bracket is needed to upright the canine as it is moving into the arch. On the contrary, if a maxillary canine is labially displaced, moving it into the arch causes its crown to tip palatally. In this case, a high-torque bracket should be considered.[21] Leveling and aligning of a crowded dentition without extraction usually leads to incisal flaring, and the use of open coil springs in the maxilla to regain space for impacted canines may worsen the situation.[14] Fortunately, the upper incisors were retroclined and could benefit from the flaring side effects of the non-extraction protocol with open coil springs.

As discussed above, low torque brackets were chosen for the anterior segment of the upper arch.

Conclusions

Clinical signs of delayed or ectopic eruption should be confirmed by panoramic films and cephalometric radiographs. The critical angle of inclination and the initial height of the impacted canines are both crucial for spontaneous eruption. Preserving the Leeway space or E space can help relieve crowding. In addition, bracket selection depends on the displaced position of impacted canines, extraction of an adjacent tooth, and the initial inclination of the anterior segment.

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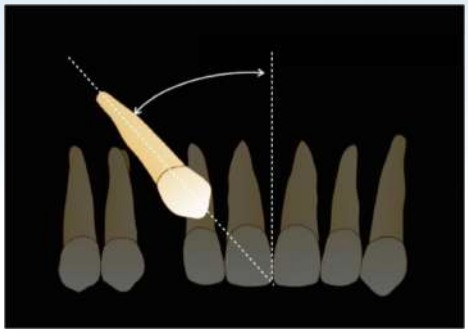
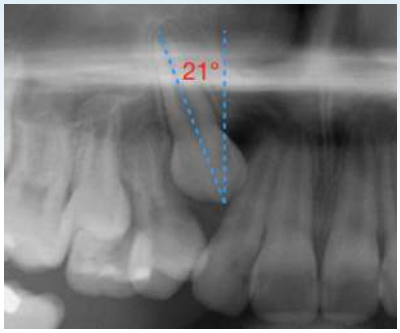
impaction Discrepancy Index (iDI) Worksheet

Total iDI Score 19

1. Angulation of the impaction to the midline in degrees

Total = 2+1=3

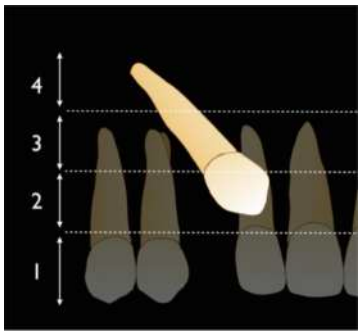


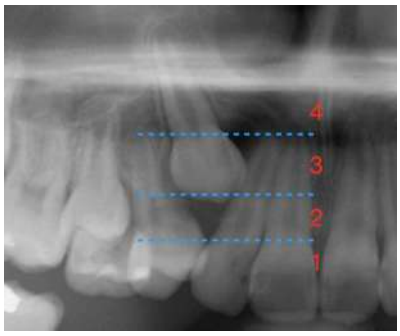


Grade 1: 0° ~ 15° = 1 pt.
Grade 2: 16° ~ 29° = 2 pts.
Grade 3: ≥30° = 3 pts.

2. Vertical distance from the occlusal plane

Total = 3+2=5

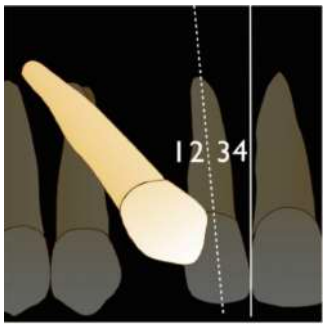


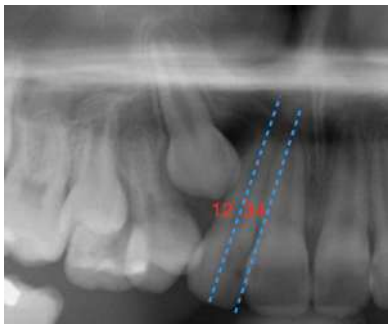


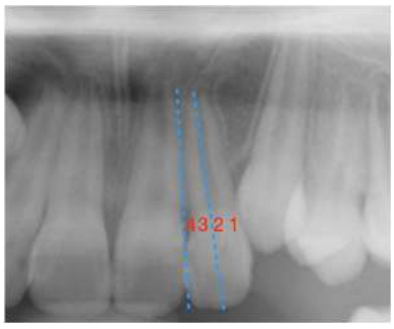
Grade 1: Below the level of the CEJ = 1 pt.
Grade 2: Above the CEJ, but less than halfway up the root = 2 pts.
Grade 3: More than halfway up the root, but less than the full root length = 3 pts.
Grade 4: Above the full length of the root = 4 pts.

3. Mesiodistal position of the impaction tip

Total = 2+1=3



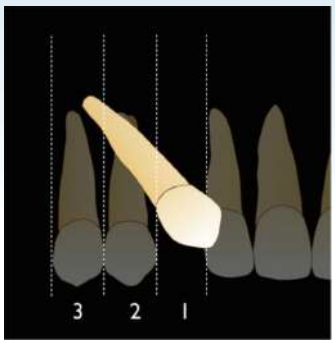


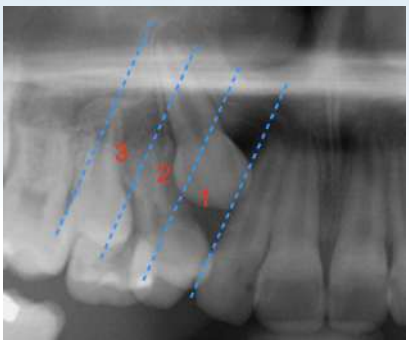


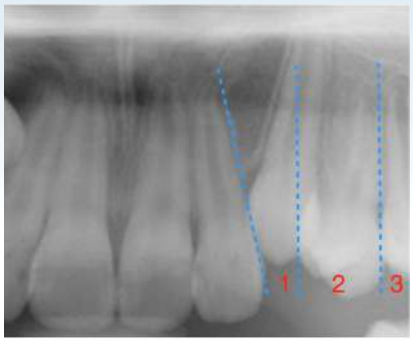
Grade 1: No horizontal overlap = 1 pt.
Grade 2: Less than half the root width = 2 pts.
Grade 3: More than half, but less than the whole root width = 3 pts.
Grade 4: Complete overlap of root width or more = 4 pts.

4. Anterior-posterior position of the impaction root apex

Total = 1+1=2



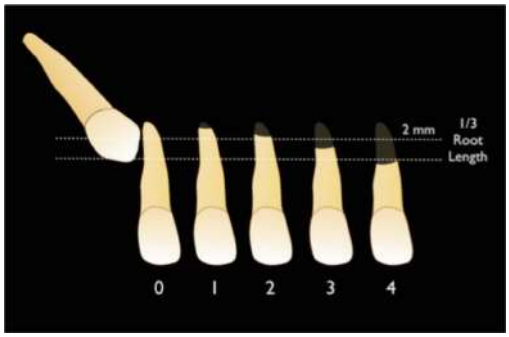


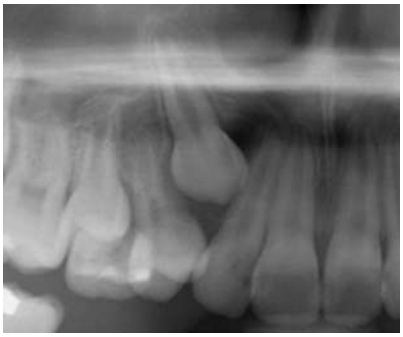


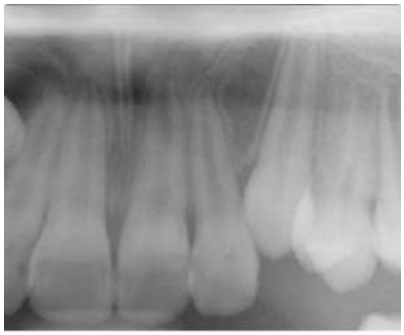
Grade 1: Above the canine position region = 1 pt.
Grade 2: Above the upper first premolar region = 2 pts.
Grade 3: Above the upper second premolar region = 3 pts.

5. Root resorption of the adjacent tooth apex

Total = 0+0=0







Normal apical contour = 0 pt.
Apical irregularity, same length as pre-treatment = 1 pt.
Apical root resorption of less than 2mm = 2 pts.
Apical root resorption more than 2mm, less than one third original root length = 3 pts. Apical root resorption more than one third original root length = 4 pts.

6. Age relative to the completion of root formation apex

Total = 1+1=2

< 9 y/o (Before central incisor root completed) = 0 pt.
9~11 y/o (Before lateral incisor root completed) = 1 pt.
12~13 y/o (Before 1st premolar root completed) = 2 pts.
> 13 y/o (canine root completed) = 3 pts.

7. Labial or palatal position of the impaction apex

Total = 2+2=4

Palatal impaction = 1 pt.
Labial impaction = 2 pts.

Discrepancy Index Worksheet

TOTAL D.I. SCORE: 57

OVREJET

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

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

Total = 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 = 2

OCCLUSION

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

Total = 4

LINGUAL POSTERIOR X-BITE

1 pt. per tooth Total = 0

BUCCAL POSTERIOR X-BITE

2 pts. per tooth Total = 0

CEPHALOMETRICS (See Instructions)

ANB ≥ 6° or ≤ -2° = 4 pts.

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

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

SN-MP

≥ 38° = 2 pts.

Each degree > 38° 12 x 2 pts. = 24

≤ 26° = 1 pt.

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

L1 to MP ≥ 99° = 1 pt.

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

Total = 26

OTHER (See Instructions)

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

Identify: iDI = 19

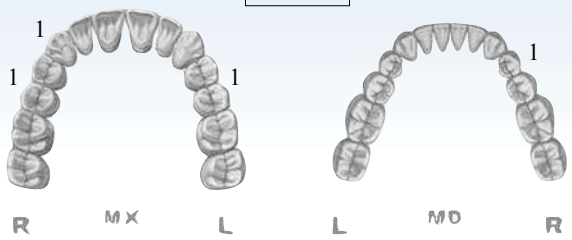
Total = 23

Cast-Radiograph Evaluation

Total Score: 13

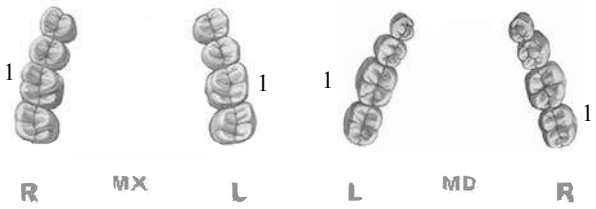
Alignment/Rotations

4



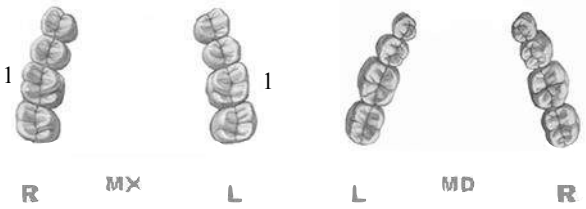
Marginal Ridges

4



Buccolingual Inclination

2

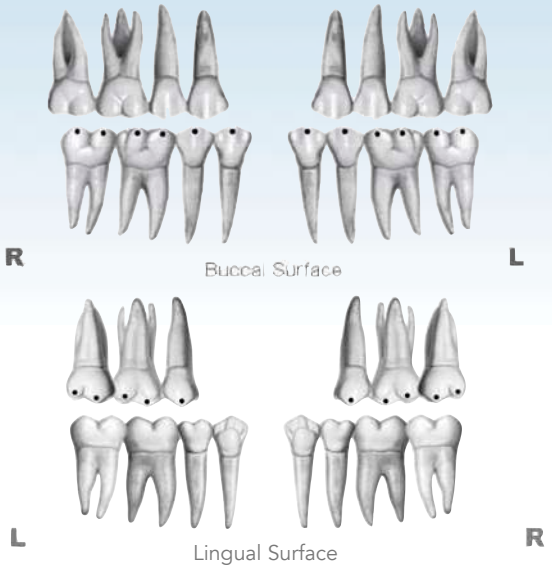


Overjet

0

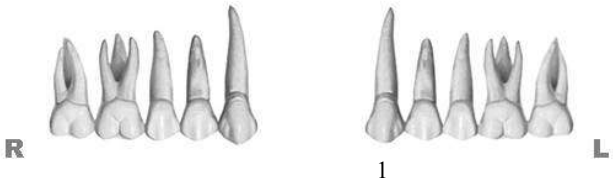
Occlusal Contacts

0



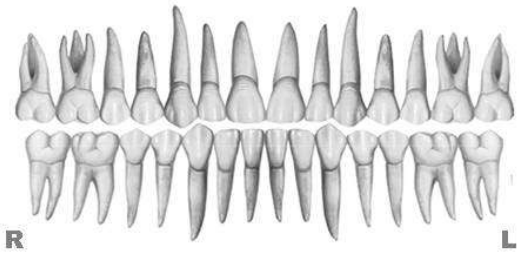
Occlusal Relationships

1



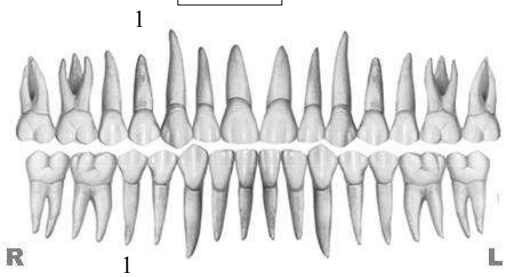
Interproximal Contacts

0



Root Angulation

2



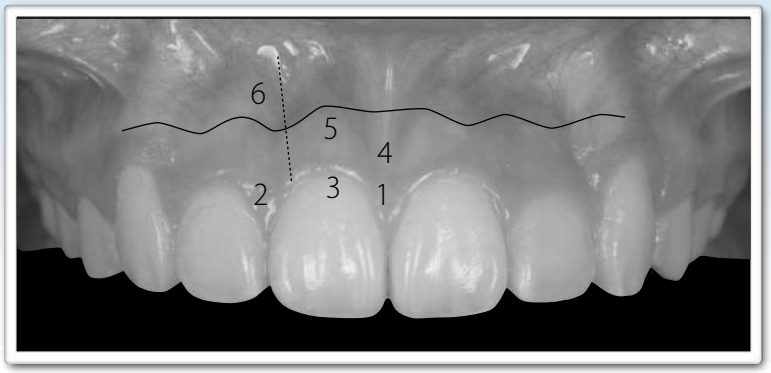
INSTRUCTIONS: Place score beside each deficient tooth and enter total score for each parameter in the white box. Mark extracted teeth with "X". Second molars should be in occlusion.

IBOI Pink & White Esthetic Score

Total Score = 3

1. Pink Esthetic Score

Total = 1

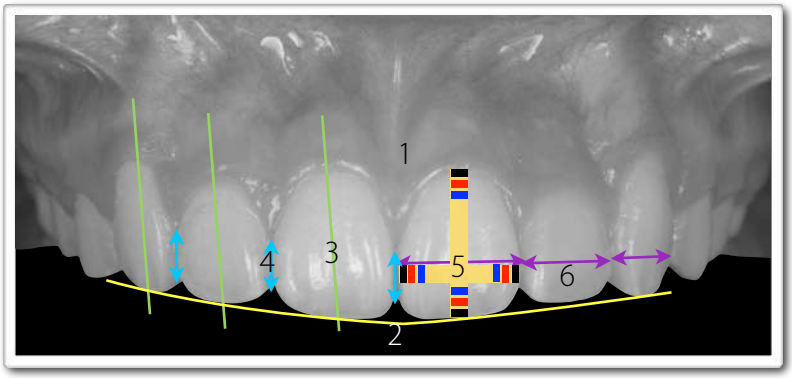


1. M & D Papillae	0	1	2
2. Keratinized Gingiva	0	1	2
3. Curvature of Gingival Margin	0	1	2
4. Level of Gingival Margin	0	1	2
5. Root Convexity (Torque)	0	1	2
6. Scar Formation	0	1	2

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

2. White Esthetic Score (for Micro-esthetic)

Total = 2



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

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

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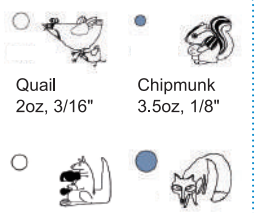

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將尾端彎折至矯正器凹槽內

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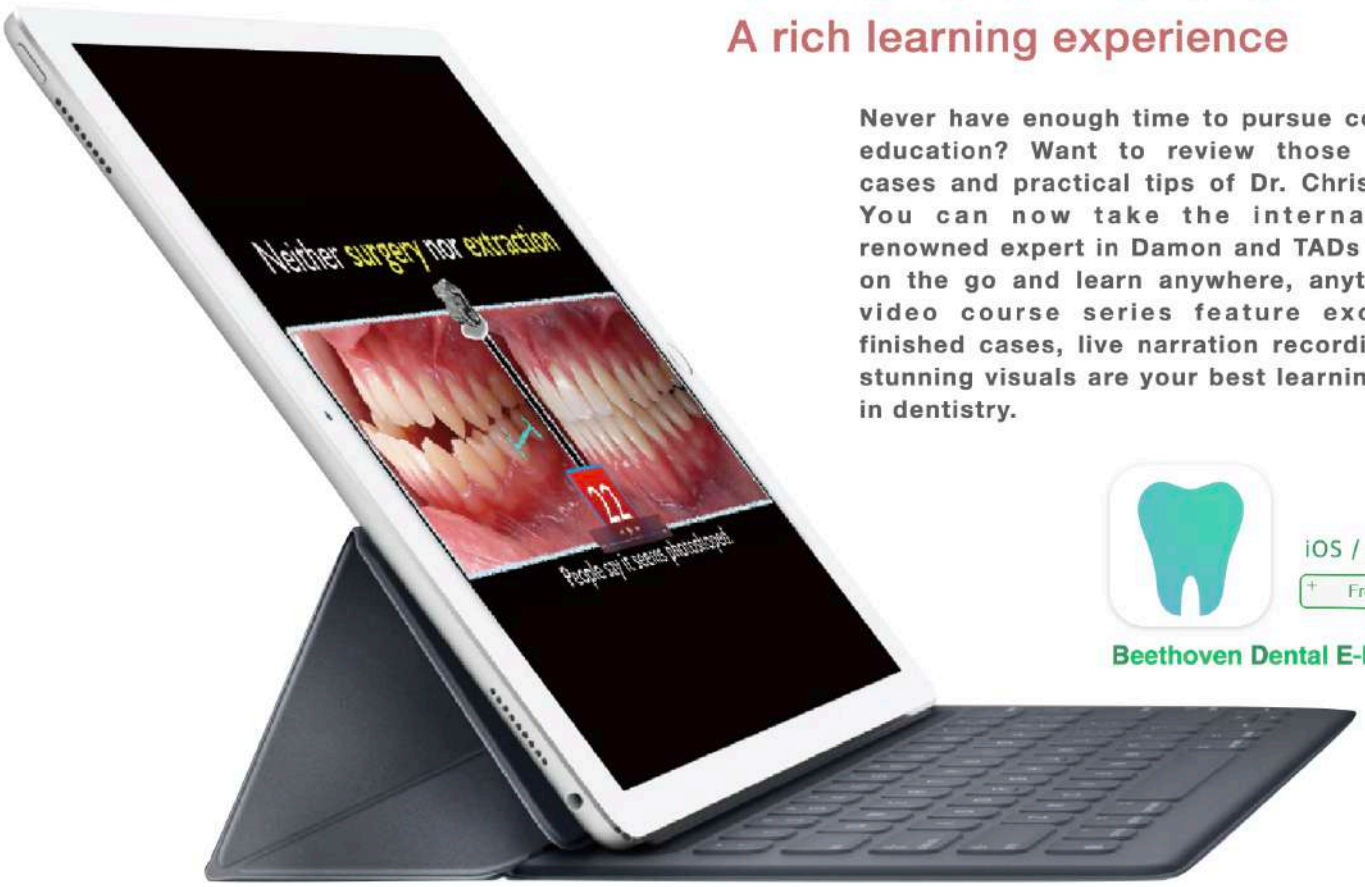

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narrated

Lecture

E-Lecture

narrated

OBS TAD

OBS (TAD)

non-narrated

Finishing

Finishing
(12 seasons)

non-narrated

Implant Forum

Implant Forum
(9 seasons)

non-narrated

Assistant

Assistant

non-narrated

Ortho

E-Ortho

non-narrated

Implant

E-Implant

non-narrated

Pedo

E-Pedo

Note:

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2023 第二十三屆
貝多芬高爾夫邀請賽
Beethoven Golf Invitational

本年度邀請賽已正式登錄 R&A 賽事行程

宗旨

秉持貝多芬齒顎矯正堅持完美與感動之創院精神，藉由高爾夫運動參與，養成健康運動的習慣，活絡人際間的互動，致力推動高爾夫運動人口倍增回饋於社會並鼓勵具潛力之青少年選手參與，開拓選手的國際視野。

日期

54 洞比桿賽
預　賽：2022 年 12 月 30-31 日
決　賽：2023 年 1 月 1 日

地點

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資格

2009 年（含）以前出生具業餘身份選手參加。

報名

11/28 日前向新竹市高爾夫球委員會報名。
電話：0922-986546 楊小姐；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　FLY GOLF 曾秀鳳高爾夫教學中心

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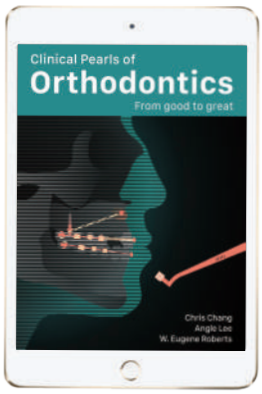

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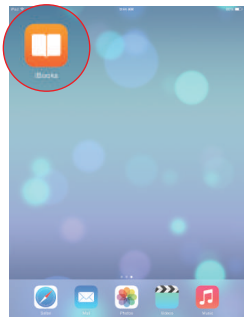

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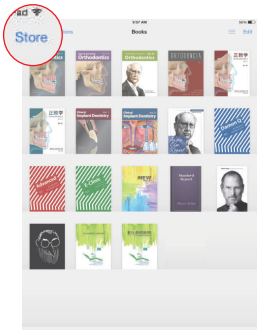

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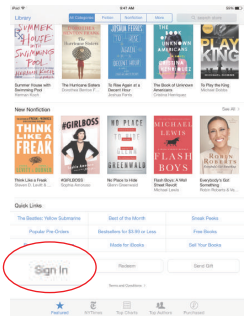

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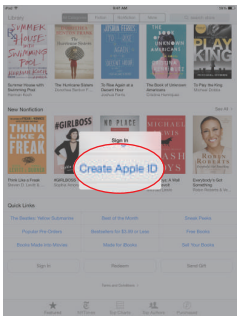

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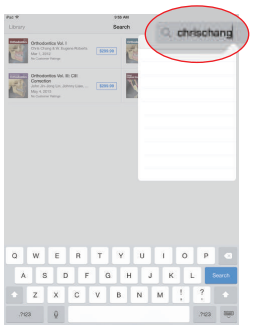

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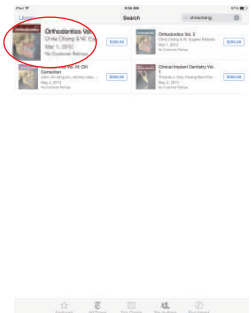

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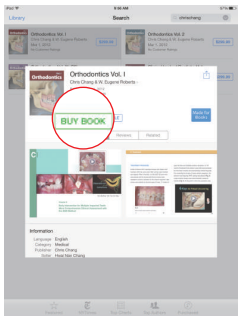

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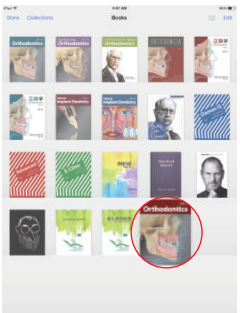

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2023 Beethoven

Clinical Education

Beethoven Clinical Education 主要針對修習過 Damon Master Program、並想要繼續獲取更進階臨床與學術訓練的醫師所專門設計的課程。此訓練課程除了新增**學術文章寫作與演講的訓練**，也加入了**骨釘與 VISTA 術式**等操作課程，醫師不僅可以就近學習張慧男醫師的技術與經驗，亦同時培養醫師**期刊寫作**的能力與**高效簡報**的技巧。

修習完 Damon Master Program 與本課程，並完成**兩篇案例報告文章**後，即可取得赴**德國碩士班進修資格證書**。此系列課程能讓醫師在進入德國碩士班之前，做好最充分的準備。


Dr. Chris Chang


Dr. Joshua Lin


Dr. Eric Hsu

ABO Writing Training

Medical Writing Training-1 5/18

Medical Writing Training-2 6/1

Medical writing skills are crucial for clinicians, educators and researchers. This training contains academic medical writing on case reports. Participants will have a chance to publish articles for journals like Journal of Digital Orthodontics (JDO).

Presentation Workshop 6/15

The presentation workshop designed to help participants utilize the most frequently used presentation tools in Keynote to manage patient clinical records and create simple but effective patient communication presentation.

VISTA & 4 other Minor Surgeries for Orthodontic Practice

VISTA Hands-on Workshop 7/6

The VISTA (vertical incision subperiosteal tunnel access) surgical techniques for impacted cuspids will discuss the following topics:

1. VISTA with screw placement
2. VISTA with connective tissue graft
3. Suture technique

TADs & Surgeries Hands-on Workshop

The workshop covers bonding on a typodont, TAD placement, and 4 minor surgeries for orthodontic practice.

時間：週四全天 (9 am - 5 pm)

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Univ. Prof. Dr. Dr. Dr. h. c. mult. Ulrich Joos, FRCS, FDSRCS

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德國明斯特大學口腔顎面外科醫院及門診部榮譽教授
英國皇家外科學會榮譽院士 (FRCS, FDSRCS)
德國外科基金會 DCS 創辦人
德國杜易斯堡 MVZ 醫療中心創辦人
歐洲顱顎面外科協會 EACMFS 主席

1972年至1979年為其學術養成重要階段，先後完成牙醫、醫學學士，隨後認證為口腔顎面專科醫師。1983年於佛萊堡大學任教期間 (C3-Professor)，取得德國特許任教資格，後續擔任歐洲及歐盟各國口腔顎面外科相關學會的領導者，智利顎面外科協會榮譽會員及匈牙利學術榮譽博士 (1990-1994)，法國口腔顎面等外科協會副主席 (1995)，1998至2002年兩度擔任歐洲顱顎面外科協會主席，德國杜易斯堡-埃森大學IMC口腔醫學碩士學位委員會主席(2003)，同年獲頒西班牙口腔顎面外科協會榮譽會員，海德拉巴裂(口蓋唇裂)協會國際顧問委員會榮譽會員(2005)，匈牙利塞格德大學榮譽博士及教授(2012)，英國皇家外科學會榮譽院士(2018)，30年職涯內培育超過300名口腔顎面專科醫師。

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VISTA surgical techniques	Early orthodontic treatment	Early orthodontic treatment	Treatment for impacted teeth	Research design	ABO DI & CRE	ABO case report	Academic writing

Beethoven International Orthodontic Specialty Course, 是德國國立杜易斯堡-埃森大學 IMC 齒顎矯正專科碩士學位所特別增設的先修課程，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、治療計劃擬定與執行技巧，亦加入最新的數位矯正與隱形牙套的內容，並邀請了貝多芬牙科集團各院院長演講特別矯正專題。

除包含原貝多芬矯正大師班的課程內容外，另外加入了骨釘與 VISTA 術式的操作課程，並新增了學術文章寫作與演講的訓練，讓醫師在進入德國碩士班之前，做好更充分的準備。

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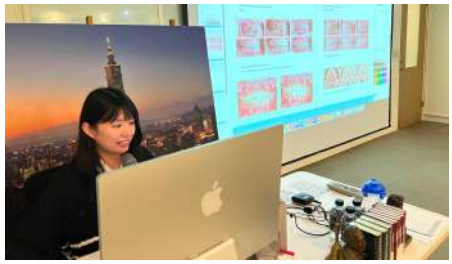
全新規劃的術式實作

本課程全新規劃的術式實作特別採用了由國際知名的西班牙臨床大師 Dr. Fernando Rojas-Vizcaya 所設計含阻生牙的新式牙齒模型，與歐洲課程接軌，臨床操作更易上手。



學術文章寫作訓練

本課程除了課堂演講與模型操作課程外，亦加入了學術文章寫作訓練。醫師可以學習如何有技巧並且有效率的撰寫學術文章，讓之後的碩士論文與文章發表更游刃有餘。

Beethoven Dental Clinic Established 1996

03-5735676#217 Chester Yu

yuebucy@newtonsa.com.tw

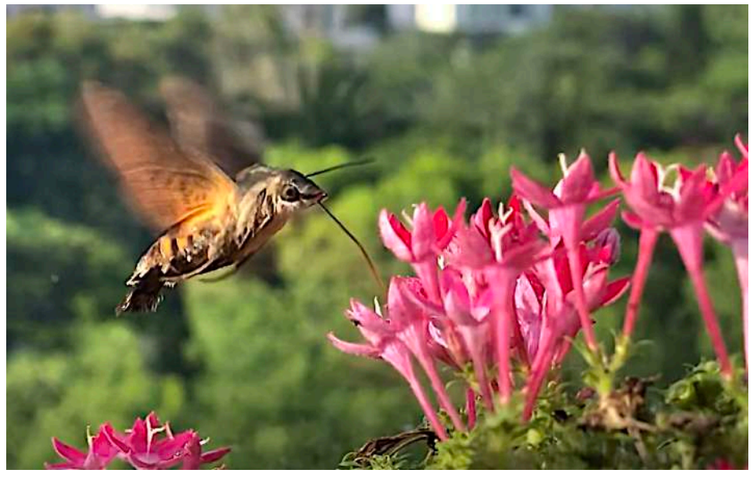
Taiwanese Lifestyle Through the Eyes of CC
Chapter 7.
Wild Garden for Chickens

"Love your life. Perfect your life.
Beautify all things in your life.
Seek to make your life long and its purpose in the service of your people."

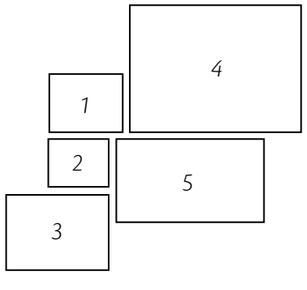
– Chief Tecumseh (1768-1813)

As life expectancy increases, how we live our later years becomes an important issue that we all need to give some thoughts to, if we hope to pursue a life that is meaningful and of quality. One of Dr. Chris Chang's neighbor, Dr. Sheng, who is in his mid-90's, takes a stroll every morning in the neighborhood, and stops at the pond near Dr. Chris's house to feed the fish. This scene inspired Dr. Chris to examine his daily routine and habits as he realized that good habits give us guidelines for life. Having awareness of our routine and habits, both good and bad, helps us to identify the things that we want or need to change. Improvements, then, are no longer abstract concepts, but become feasible plans and procedures.

Over the past couple of years, one particular habit that Dr. Chris has cultivated is spending some time immersed in the "wilderness" that he has developed around his home - having breakfast on his rooftop garden (see Chapter 2), playing music in the natural habitat aviary (see Chapters 3 and 6), enjoying a bath amidst the surrounding mountain views, and so on and so forth. From the beginning of this lifestyle series, Dr. Chris has been seeking to reserve spaces in and around his house for sentient beings other than humans, as well as to replicate their natural habitat as closely as possible, not because it seems to be a good thing to do (which it is!) but mainly because this brings him joy.



A while after the Chang family had moved into their current location, a patient gave Dr. Chris 5 young chickens as a housewarming present. Knowing where to keep them and how to make sure the pleasure does not wear off, as tending to them slowly turns into a chore, becomes a problem. It is impractical to keep the chickens



Figs. 1-3: An undisturbed wild garden naturally attracts new settlers. The Chang family has seen a variety of wild creatures from chafer battles (Fig. 1) and moths (Fig. 2), to the extraordinary hummingbird moths (Fig. 3).

Fig. 4: Compared to a neatly trimmed garden design, the lives in a wild garden thrive and bloom in their most natural beauty.

Fig. 5: As the chickens settled, baby chicks started to appear, indicating the comfort and reassurance they found in the new home.

Fig. 6: While a garden like this might seem unruly, it provides the concealment and privacy that prey animals, just like chickens, need in order to identify somewhere to be their home. Lower your voice and keep your movement contained upon entering so that you do not startle the timid residents there.

Fig. 7: It is crucial to reserve bare soil for the chickens to scratch and dig to their heart's content, without causing too much damage to the garden.

Fig. 8: On top of the chicken coops, several compact discs (top right corner) are attached. They reflect the sunlight, each in a slightly different direction, and function as modern-version scarecrows that keep eagles away from the chickens.

on the ground-floor patio despite its spaciousness and that it is surrounded by flourishing plants. For one, the patio is paved with ceramic tiles, and having chickens running about would entail serious demand for scrubbing, to remain clean from chicken faeces. Furthermore, the house is located in a mountainous area, and is itself amidst wildlife, which includes natural enemies of chicken - from rats to snakes and eagles – all of which are common visitors.

Recall the rooftop wild garden and the concept "the messier, the merrier" introduced in Chapter 2? As the garden excelled in its untamedness, it had become perfect to host these newcomers. To create a habitat to accommodate undomesticated creatures, the main principle is to leave them alone! A photo-ready, perfectly trimmed garden might be more to the liking of most onlookers, but it is far from safe, nor concealed enough, to be a home for prey animals. Upon entering a wild garden, make sure to keep your footsteps and movements light, so as not to startle any of its settlers. With such caution implemented into their gardening routine, Dr. Chris's rooftop has seen such a variety of true wild lives from chafer beetles to butterflies and moths, including the most special of all, the hummingbird moth (Figs. 1-3). In addition, the plants that have been

Fig. 9: Keep the chickens in the coop for around 3 week to get them accustomed to the enclosure. Once the chickens recognize the coop as a safe place, they would return to the coop when needed - for resting, laying and hatching eggs, and even to hide from danger.

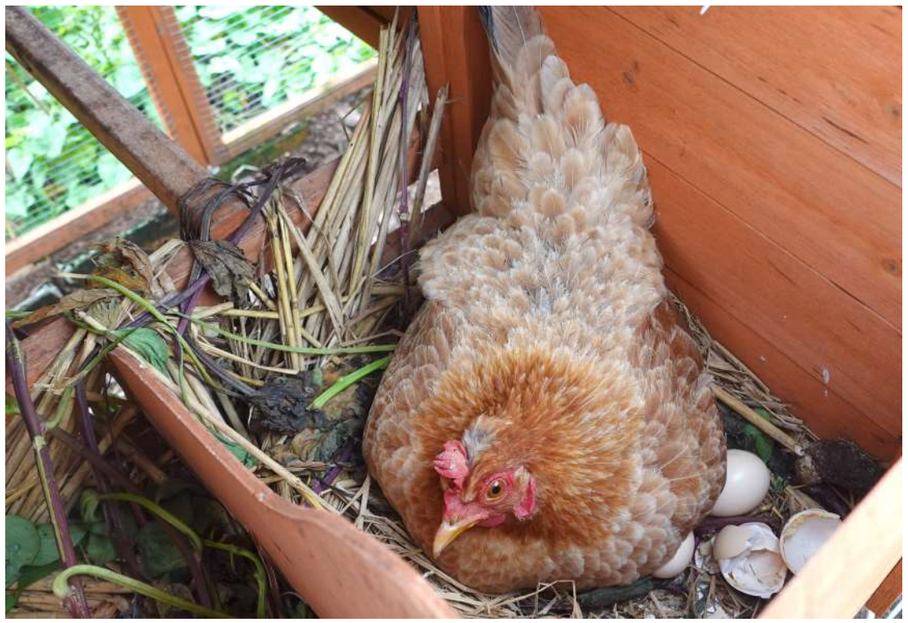


Fig. 10: Hens and their eggs enjoy privacy and tranquility in the coop during the hatching period. Coops also prevent hens from laying their eggs somewhere difficult to reach, minimizing potential trouble for cleaning.

manually grown thrive and bloom in the hands of the greatest artist - mother nature - with her energy and tenderness (Fig. 4). As the first 5 chickens have gradually matured and offspring start to make their appearance (Figs. 5 and 7), it is evident that they have settled and see the garden as a safe haven.

Much like quail (also see Chapter 2), chickens are ground-dwellers who enjoy scratching and digging on bare soil ground and snacking on the worms and insects underneath (Fig. 7). Unlike quail however, chickens are so much more forceful that chances are scarce for young, delicate sprouts to survive, unless they can outgrow the chicken's foraging speed. A garden with plants that are already fully-grown, just like Dr. Chris's, is suitable for these baddies as it has the capacity to tolerate the harm caused by the chicken's vandalism.

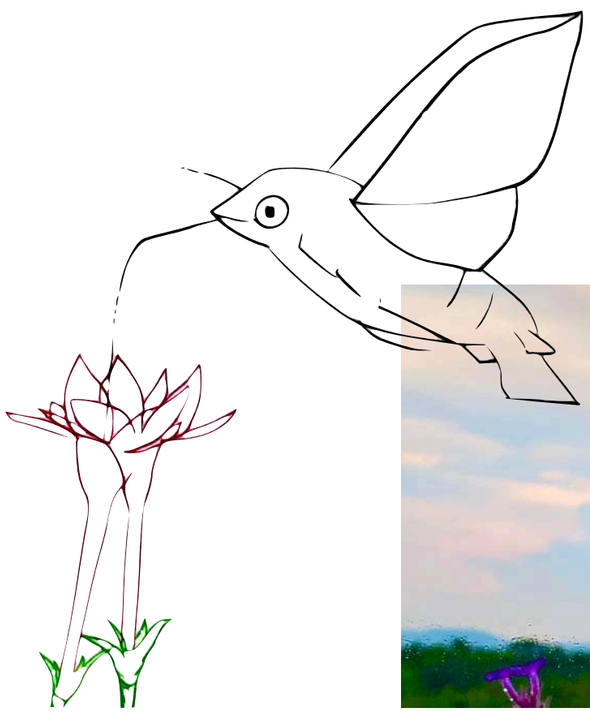
Coops are necessary for ensuring outdoor safety of the chickens, protecting them from winged predators like eagles, as well as from natural disasters (Figs. 8 and 9). During the hatching period, the coop provides a tranquil hiding place for the hens and their eggs (Fig. 10), which further facilitates easier management as eggs and faeces are less likely to be hidden somewhere difficult to reach. To make sure the chickens recognize the coop as a safe shelter to return to, Dr. Chris's trick is to keep them inside for the first 3 weeks or so, accustoming the chickens to the enclosure before setting them off to explore the wider, more exciting parts of the garden.

Now, a work-day routine for Dr. Chris is comprised mainly of gardening and practicing violin and golf in the morning, clinic hours from the afternoon to evening, and another round of violin and golf practice before bed. There are also intervals when he enjoys some refreshments amongst the various kinds of fairy-like, feathered creatures, which guide Dr. Chris deeper and deeper into their world. The quote by Chief Tecumseh at the beginning of this article is an inspiration to many. To Dr. Chris, however, in addition to making our life's purpose in the service of our people (for him, this lies in treating patients with dental concerns), we should also do our best to serve our wildlife.

Desk editor of JDO & a wildlife enthusiast*

Annie Chen

*Title bestowed by Dr. Chris Chang
Special thanks to Mr. Paul Head for refining this article
Special thanks to Jenny Chang for the delicate sketch of a hummingbird moth drinking nectar from a flower.



Beethoven
Damon Master Program

Course Schedule

66hrs

Module 1

1. Selecting your ideal first case
2. Bonding position
3. Bonding + BT + Ceph tracing
4. TADs + space closing + hook + spring
5. Finishing bending & fixed retainer

Practice: Clinical photography

Module 2

1. Four stages of efficient orthodontic treatment
2. Simple and effective anchorage system
3. Extraction vs. Non-extraction analysis

Practice: Patient photo management

Module 3

1. Soft & hard tissue diagnostic analysis
2. Big overjet correction
3. Damon diagnosis & fine-tuning

Practice: Ceph tracing

Module 4

1. Excellent finishing
2. Retention & relapse

Practice: Ceph superimposition & measurement

Module 5

1. Simplify your system
2. Extraction vs. non-extraction

Practice: Case report demo

Module 6

1. Class III correction
2. Class II correction

Topic: Early orthodontic treatment

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

時間：週四全天 (9 am - 5 pm)

地點：金牛頓藝術科技 (新竹市建中一路 25 號 2 樓)

Module 7

1. Upper impaction
2. Lower impaction
3. Gummy smile correction

Topic: Modfied VISTA

Module 8

1. ABO DI, CRE workshop
2. Open bite

Topic: Modified 2X4 appliance in ortho treatment

Module 9

1. Implant-ortho combined treatment
2. Asymmetry

Topic: Impacted cuspid treatment

Module 10

1. Minor surgeries in orthodontics
2. Digital orthodontics

Topic: Ortho-viewed interdisciplinary treatment

Module 11

1. Aligner & TADs
2. Keys to aligner learning

Topic: Pre-aligner treatment

Special lecture: 1:30-2:30 pm

費用含課程視訊*、iPad、課程電子書與材料。

*贈送之課程視訊提供兩年時間串流觀看。

+

透過數位影片反覆觀看，結合矯正與電腦教學，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。

Beethoven
Clinical Education

此訓練課程除了新增學術文章寫作與演講的訓練，也加入了骨釘與VISTA術式等操作課程，醫師不僅可以就近學習張慧男醫師的技術與經驗，亦同時培養醫師期刊寫作的能力與高效簡報的技巧。

34hrs

ABO Writing Training

Medical Writing Training

Medical writing skills are crucial for clinicians, educators and researchers. This training contains academic medical writing on case reports. Participants will have a chance to publish articles for journals like Journal of Digital Orthodontics (JDO).

Presentation Workshop

The presentation workshop designed to help participants utilize the most frequently used presentation tools in Keynote to manage patient clinical records and create simple but effective patient communication presentation.

VISTA & 4 other Minor Surgeries for Orthodontic Practice

VISTA Hands-on Workshop

The VISTA (vertical incision subperiosteal tunnel access) surgical techniques for impacted cuspids will discuss the following topics:

1. VISTA with screw placement
2. VISTA with connective tissue graft
3. Suture technique

TADs & Surgeries Hands-on Workshop

The workshop covers bonding on a typodont, TAD placement, and 4 minor surgeries for orthodontic practice.

*全系列課程修畢，完成兩篇案例報告文章後，即可取得赴德國碩士班進修資格證書。

"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

"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

New Release!

At the end of September, 2022, Damon Master, class 2022, finished their 9th module with a hands-on DI & CRE workshop.