Conservative Correction of Severe Skeletal Class III Open Bite
Drs. Shih Yi-Hung, John Jin-Jong Lin & W. Eugene Roberts

Interdisciplinary Treatment for a Mutilated Malocclusion with Excessive Vertical Dimension and Bimaxillary Protrusion
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Taiwan Group had shined at AOSC in Singapore. A glimpse of speakers in front of Marina Sands Hotel.

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2015 熱愛學矯正

張慧男 博士

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

學會開始做矯正需多久?

39小時讓您入門矯正。本課程採高效學習法及高效矯正簡報法 - Keynote，在舒適、輕鬆的環境下，學會簡單有效的矯正方法，教室與診間結合，讓您現學現用，立即熟悉各種習得的技巧，而不需太多課後複習。全程以 In-Office Training 方式，用病例帶動分析、診斷，治療計畫與療程技巧，每一步驟皆以圖片及影片教學，讓您很難錯失任何環節，更沒有聽不清楚或無法理解的可能。為提高課後自我學習及臨床印證之效率，另備有教學電子檔，供學員家中研習。我們的終極目標是：用最短時間、最輕鬆的方式，讓每位學員 - *熱愛矯正學、熱愛學矯正。*

Damon矯正課程

【課程】9:00 - 12:00
【實習】另外安排

使用最新一代矯正器 Damon Q 進行課程，歡迎舊生報名參加。

	台中 (二)	高雄 (四)	台北 (二)	LECTURE	LAB
1	4/28	5/7	10/13	理想入門病例+Damon Q黏著	Bonding (Damon Q) + BT
2	5/12	5/14	10/20	快速矯正療程四部曲	Ceph + Photo
3	5/26	5/21	11/3	簡捷有效的錨定系統	Damon + OrthoBoneScrew I
4	6/23	6/25	11/24	不拔牙與拔牙分析	Damon +OrthoBoneScrew II
5	6/30	7/16	12/15	Damon 診斷流程及微調	Finish Bending
6	7/14	7/30	12/22	完工檢測及報告示範	Fixed Retainer (FR)
7	7/21	8/13	12/29	維持及復發；病例示範	Presentation Demo
8	8/4	8/27	1/5/16'	矯正力學及診斷分析 (1)	DDX + Case Reports I
9	8/18	9/17	1/12	軟硬組織及診斷分析 (2)	DDX + Case Reports II
10	8/25	9/24	1/19	兒童矯正及診斷分析 (3)	DDX + Case Reports III
11	9/1	10/8	2/2	成人矯正及診斷分析 (4)	DDX + Case Reports IV

矯正植體課程

【課程】 9:00 - 12:00
【實習】13:30 - 20:00

矯正植體的操作時機、植法與實習、個案討論、臨床跟診及實作示範。

新竹(五) 11/6 (含午、晚餐)

International workshop

Keynote & managment
OrthoBoneScrew & Damon

馬來西亞B班	4/9 -11
英文A班	6/16 -19
亞洲A班	7/2 -4
領袖高峰班	7/9 -12
亞洲B班	10/29 -30
英文B班	12/1 -3

矯正進階課程

【新竹】 9:00 - 12:00

以病例討論為主軸，培養學員如何正確診斷及快速排除臨床疑點，課程中亦訓練每位學員善用 Keynote。

	新竹 (二)	Paper Reviews	Topics & Case Demo
1	9/15	Bracket Placement	Crowding: Ext. vs. Non-ext.
2	9/22	Impacted Canines	Upper Impacted Teeth
3	12/1	Canine Substitution	Lower Impacted Teeth
4	2/16/16'	Missing 2nd Premolar	Missing: Ant. vs. Post.
5	3/1	DI Workshop	Crossbite: Ant. vs. Post.
6	3/22	CRE Workshop	Open Bite High Angle
7	3/29	Excellence in Finishing (occlusion)	Deep Bite Low Angle
8	4/5	Excellence in Finishing (esthetics & perio)	Gummy Smile & Canting
9	4/19	Ortho-Perio-Restore Connection	Esthetic Finishing (Transposition)
10	4/26	Adjunct to Perio	Implant-Ortho
11	5/3	Unhappy Patient	IDT - Adult Complex

助理訓練課程

【課程】10:00 - 14:30
【實習】15:00 - 20:00

每梯次共兩堂課程與技術操作，內含照相技術、Morph 與公關衛教之電腦資料處理；另安排一次診所見習。

新竹(五) 10/2、16 (含午、晚餐)

矯正精修課程

【課程】9:00 - 12:00

協助每位學員了解由古典到現代之文獻，進而應用於實際病例；並藉由DI及CRE讓精緻完工（Excellent Finishing）變成易達到的目標。

新竹 (二) 精修VII

2015/6/16 7/7 8/11 9/8 10/27 11/17 12/8
2016/3/15 4/12 5/10 6/14

課 程 資 訊

上課地點

【台北】
犇亞會議中心
/ 台北市復興北路99號15樓
(捷運文湖線 南京復興站旁)

【新竹】
金牛頓藝術科技公司
/ 新竹市建中一路25號2樓

【台中】
中國文化大學台中教育中心
/ 台中市西屯區臺灣大道三段658號3樓（Rich 19 大樓）

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＊每次上課請依最新一期IJOI 公告為主

Good speakers are not born so, but trained. How to become the next best speaker.

Having recently returned from 3 presentations in America, I have been pondering on my own performances and those of my peers and what I could learn from them. I was invited to speak in St. Louis by Dr. Rolf Behrents, the recently appointed Chief Editor of AJODO, who was tasked by the Orthodontic Education and Research Foundation of finding the "*best*" speaker in America. (*That he chose me was, of course, very flattering, as I would not consider myself as the "best" nor do I come from America!*)

Upon reflection, I have come to the conclusion that in order to succeed as a presenter, there are numerous factors: a difficult case, with good content, good visual aids and a good result coupled with a simple explanation so the audience can duplicate the treatment in their own practice. Furthermore, the delivery is probably the most important factor - not only stage presence, good gestures, eye contact, understanding different cultures, keeping the audience's attention etc. - but it must also be entertaining!

It then occurred to me, whilst editing this latest version of IJOI, that our publication is also an excellent way of practising, how would you present the case reports in our journal to an audience? Everything is there for you, the case, with good content, visual aids etc. As each one of us is different, so of course will be our presentation styles, there is no "*best*", but we can all strive for excellence on our path to glory.

Being a good speaker requires practice, not prodigious ability. I hope this edition will help to inspire you to get out and present your cases and I would be honored to share the stage with you in the future and have you introduced as the "*best*" speaker.

Chris Chang DDS, PhD, Publisher of IJOI.


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Dr. W. Eugene Roberts


Examiner
Dr. Tom Pitts


Examiner
Dr. John J. J. Lin


Consultant
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Consultant
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Conservative Correction of Severe Skeletal Class III Open Bite: 3 Force Vectors to Reverse the Dysplasia by Retracting and Rotating the Entire Lower Arch

Abstract

Conservative treatment (without orthognathic surgery or extractions) of severe malocclusions limits cost, morbidity and surgical complications. A twelve year history (12-24yr) for a male with a developing Class III openbite malocclusion involved conventional treatment (12-14yr), relapse (18yr), and conservative treatment (21-24yr). Cephalometric superimpositions (18-21yr) revealed a clockwise rotation of the mandibular arch with molar extrusion was the principal growth aberration contributing to the severe malocclusion (Discrepancy Index 89). Posterior skeletal (miniscrew) anchorage with a passive self-ligating (PSL) appliance reversed the etiology of the malocclusion by retracting, intruding and distally rotating the entire lower arch. Specific bracket torque selections and repositioning as needed delivered an excellent final alignment (Cast-Radiograph score of 12). The moment to force ratio (M:F) for the line of force, relative to the center of resistance (C_R) of the lower arch, determines the amount of molar retraction and intrusion. Miniscrews provide extra-alveolar (E-A) or inter-radicular (I-R) anchorage in both arches. Three miniscrew positions are proposed to retract and rotate the lower arch: 1. mandibular buccal shelf (MBS) (E-A), 2. distal to the lower first molar root (I-R), and 3. infra-zygomatic crest (IZC) (E-A). All three sites effectively retract and rotate the lower arch, but the I-R miniscrews interfere with the path of tooth movement, and the IZC screws fail to intrude the molars. Conclusions are: 1. MBS miniscrews produce an optimal line of E-A force for conservatively treating Class III openbite malocclusions to decrease lower facial height (LFH), and 2. reversing the etiology of a dentofacial dysplasia is an effective strategy for predicable conservative treatment.

Key words:

Class III, anterior open bite, temporary anchorage devices (TADs), mandibular buccal shelf (MBS) miniscrews, infrazygomatic crest (IZC) miniscrews, decreasing lower face height (LFH), forward rotation of the mandible

History

An 18 year-old male presented with a severe Class III openbite malocclusion, and a history of full fixed orthodontic treatment beginning at age 12 (*Figs. 1A and B*) that involved extraction of all four first premolars and recovery of blocked out maxillary canines. By age 18 he had relapsed to a severe Class III open bite malocclusion (*Figs. 2A and B*). Numerous decalcifications and restored carious lesions revealed a history of poor oral hygiene. The medical history was noncontributory. The patient was on recall until age 18-21yr, and then returned with a more severe sagittal and vertical discrepancy (*Figs. 3A, 3B and 3C*). He was treated (*Figs. 4A and 4B*) to a near ideal result (*Figs. 5A, 5B and 5C*). Cephalometric superimpositions document late growth (*Fig. 6*), two force vectors for skeletal traction (*Figs. 7 and 8*), and the overall result (*Fig. 9*).

Dr. Irene Yi-Hung Shih,
Visiting Staff, Beauty Forever Dental Clinic (left)

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MS, Marquette University Chief Consultant of IJOI President of TAO (2000~2002)
Author of Creative Orthodontics (middle)

W. Eugene Roberts,
Chief editor, International Journal of Orthodontics & Implantology (right)

Fig. 1A:
12y/o male presents with a convex profile, retruded chin and mentalis strain.

Fig. 1B:
12y/o intraoral view reveals a modest Class III molar relationship, asymmetric anterior openbite and crowding in both arches.

Diagnosis And Etiology

Skeletal:

- SNA 79.9°, SNB 78°, ANB 1.9°
- High mandibular plane angle: *SN-MP 52.2°, FMA 43.6° tending to mask skeletal Class III*
- Facial asymmetry: *Mandible (chin point) deviated slightly to right*

Dental:

- Bilateral Class III canine and molar relationships
- Overjet 0 mm
- Anterior open bite: *8-10 mm*
- Space deficiency: *7 mm in the upper arch, 3mm in the lower arch*
- Facial, maxillary and mandibular midlines were coincident
- Arch forms: *asymmetrical in the maxilla and symmetrical in the mandible*

Fig. 2A:
18y/o (T0) is six years after the start of the initial orthodontic treatment that involved extraction of all four first premolars. Compared to the pretreatment photographs at age 12, the LFH and mentalis strain are increased.

Fig. 2B:
18y/o intraoral and panoramic radiographic views show improved dental alignment, but extensive decalcifications and caries problems are evident. The Class III malocclusion and anterior openbite have increased.

Fig. 3A:
21y2m (T1) facial photographs and cephalometric film document an overall deterioration of the facial form and the mandible is deviated to the right.

Fig. 3B: 21y2m show a further deterioration of the Class III openbite malocclusion.

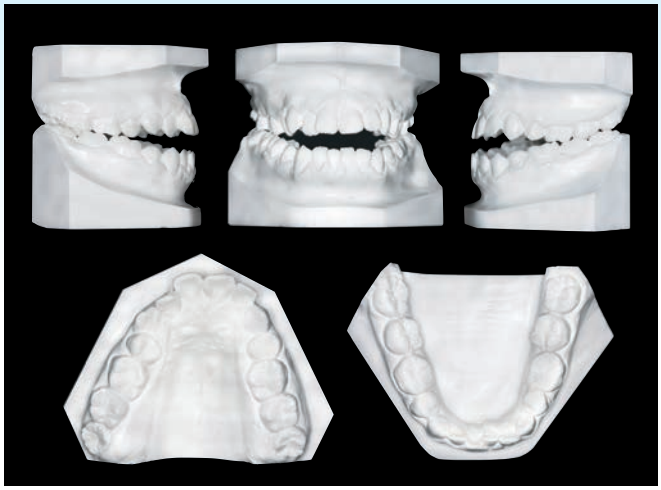

Fig. 3C:
Pre-treatment study models (casts) document a severe Class III openbite malocclusion.

Facial:

- Convex profile with retrusive chin (*mandibular deficiency*)
- Increased LFH with mentalis strain

The ABO Discrepancy Index (*DI*) was 89 as shown in the subsequent worksheet.

Treatment Objectives

Maxilla (*all three planes*):

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

Fig. 4A:
23y9m (T2) progress facial photographs and a cephalometric film show a marked improvement in facial form, but hypermentalis strain is still evident.

Fig. 4B:
23y9m progress intraoral photographs and a panoramic radiograph reveal that the malocclusion is markedly improved.

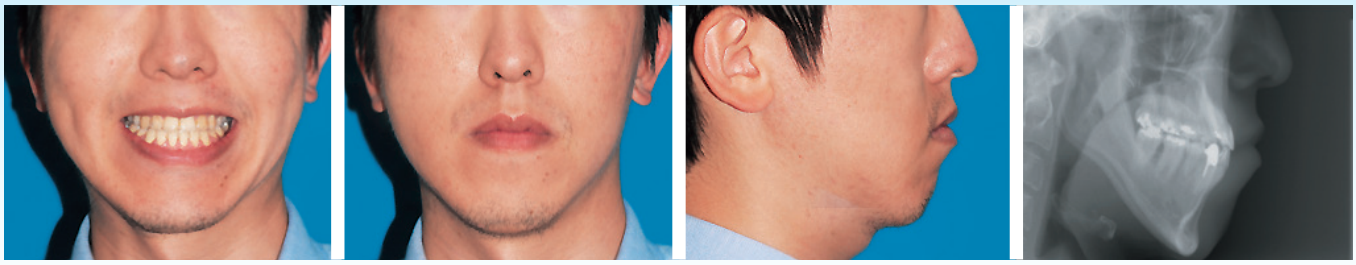

Fig. 5A: 24y11m (T3) facial views show an acceptable facial form and smile line with minimal mentalis strain.

Fig. 5B:
24y11m intraoral documentation reveals a near ideal dental alignment in three dimensions. Facial and dental midlines are coincident.

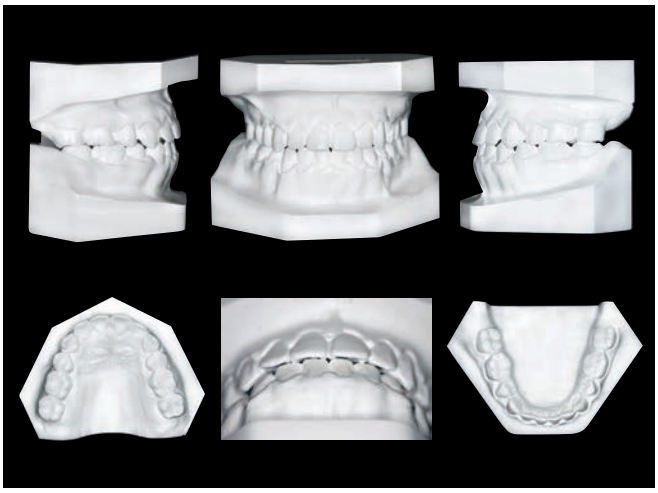

Fig. 5C:
24y11m post-treatment study casts show a near ideal dental alignment which was scored as 12 by the CRE method.

Mandible (*all three planes*):

- A – P: *Maintain*
- Vertical: *Forward rotation to decrease LFH*
- Transverse: *Maintain*

Maxillary Dentition:

- A – P: *Maintain*
- Vertical: *Maintain*
- Transverse: *Expand to correct crossbite*

Mandibular Dentition:

- A – P: *Retr action and counterclockwise rotation of the entire lower arch*

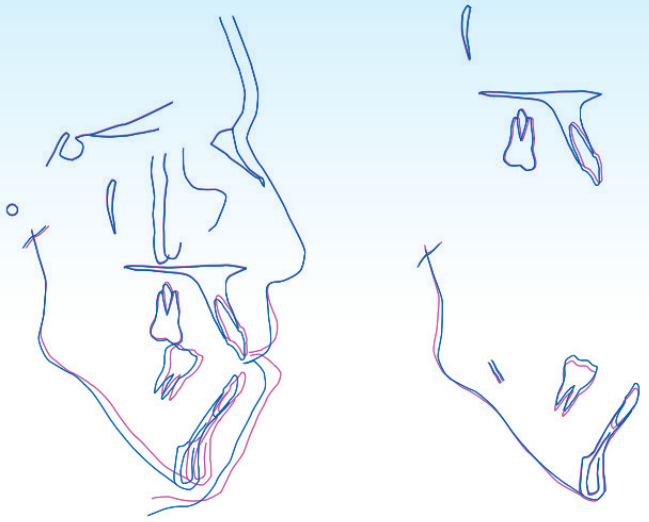

Fig. 6:
T0 (18y, pink) & T1 (21y3m, blue) cephalometric superimpositions on anterior cranial base (ACB), maxilla (Mx) and mandible (Md). Immediately prior to treatment, the principal aberration of growth was a forward rotation of the mandibular arch, resulting in molar extrusion and posterior rotation of the mandible to increase LFH and lip incompetence.

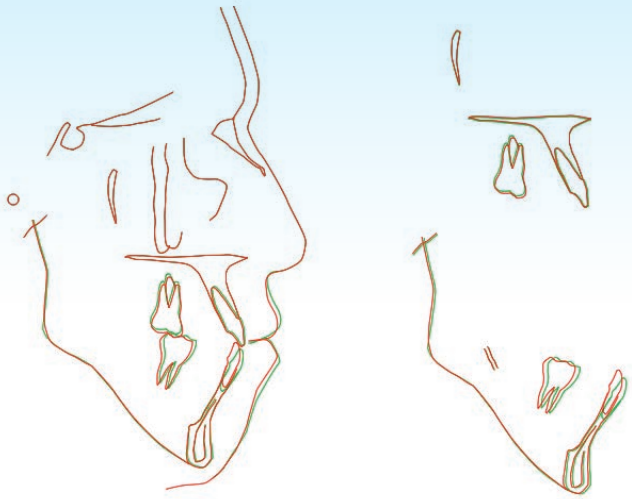

Fig. 8:
T2 (23y9m, green) vs. T3 (24y11m, red) superimpositions on ACB, Mx and Md reveal that the effect of IZC miniscrews is to retract and posteriorly rotate the lower arch. However, the vertical component to the Class III elastics line of force slightly extrudes the lower arch as it is rotating. The net effect is extrusion of the lower incisors, but no intrusion (and maybe slight extrusion) of the lower molars.

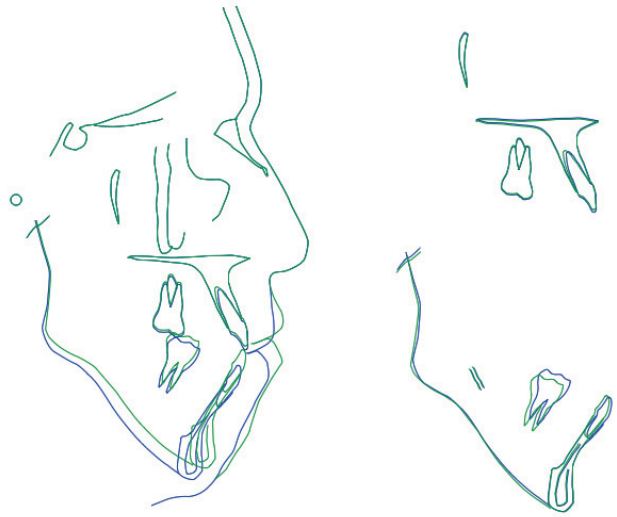

Fig. 7:
T1 (21y3m, blue) vs. T2 (23y9m, green) superimpositions on the ACB, Mx and Md document the effect of posterior mandible miniscrews in retracting and posteriorly rotating the mandibular arch. Note that the treatment effect is a reversal of the aberrant growth pattern shown in Fig. 6.

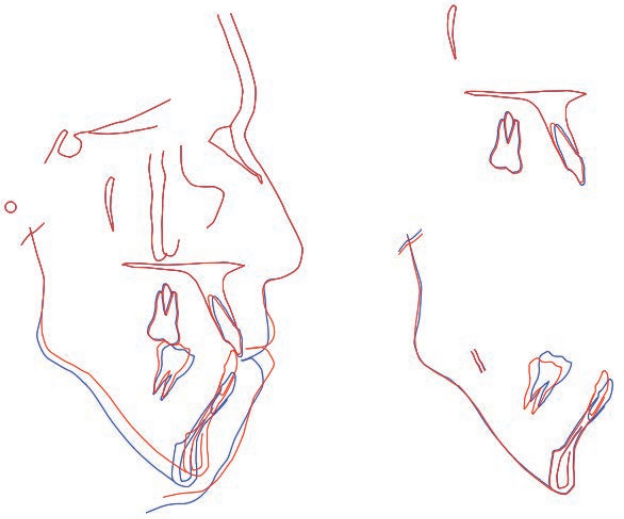

Fig. 9:
T1 (21y3m, blue) vs. T3 (24y1m, red) superimpositions on ACB, Mx and Md show the net effect for both skeletal methods for lower arch retraction. Overall, the lower arch was retracted and rotated posteriorly, resulting in incisor extrusion, molar intrusion and forward rotation of the mandible to decrease both LFH and lip incompetence.

- Vertical: *Extrude incisors, intrude molars*
- Transverse: *Decrease to correct crossbite*

Facial Esthetics:

- Decrease LFH
- Relieve hypermentalis strain

Treatment Plan

The patient rejected orthognathic surgery, but he accepted the extraction of third molars, and the use of a passive self-ligating (*PSL*) appliance with mandibular buccal shelf (*MBS*) miniscrews to provide skeletal traction to reverse his dysplastic orofacial development. The miniscrews were placed as inferiorly as possible to maximize the intrusive component for a line of force from the mandibular canines.

Appliances And Treatment Progress

After removing all four third molars at 21y2m, a full-fixed .022" slot Damon Q PSL appliance (*Ormco, Glendora, CA*) was installed. All brackets had standard torque except the lower left canine, which was bonded with a high torque bracket. The archwire sequence progressed as rapidly as possible to .019x.025" SS for arch stabilization. Beginning 2 months into treatment, posterior cross-elastics were used as needed to correct and maintain the lingual posterior crossbite until the openbite was closed. At 14mo, two 12x14 mm stainless screw miniscrews (*OrthoBoneScrew®, Newton's A, Hsinchu, Taiwan*) were inserted in the MBS as inferiorly as possible with an apically positioned flap to enhance attached gingiva (*Fig. 10*). 3 days later the MBS screws were removed due to soft tissue inflammation, and I-R miniscrews

Fig. 10:
At 22y7m, 2 x14 mm miniscrews were placed bilaterally in buccal shelves in the lower molars region. A periodontist placed the screws as inferiorly as possible with an apically positioned flap. An anterior-posterior radiographic view of the head (right) shows that the screws are in an approximately vertical position and buccal to the roots of the molars.

Fig. 11:
At 22y7m, the buccal shelf 2X14mm miniscrews (Fig. 10) were removed due to soft tissue irritation and replaced with 2X12mm miniscrews inserted in the alveolar process between the roots of the lower first and second molars. The NiTi coil springs and the triangular elastics from the miniscrews to the archwire mesial to the lower canines, was designed to retract and rotate the lower arch distally.

Buccal Shelf Screws	22y7m ~ 23y1m. Retraction of whole lower dentition and intrusion of lower molar on 19x25 SS wire by the buccal shelf screws.
IZC Screw (*Infrazygomatic Screws*)	23y9m ~ 24y11m. Retraction of whole lower dentition and tip back of lower molars on 17x25 TMA wire by the Class III elastics from the IZC screws.

■ Table 1: Major treatment stages.

12 mm in length were installed more occlusally (*Fig. 11*). The lower buccal segments were retracted and intruded with .026x.026" elastic thread and a NiTi coil spring (*Figs. 11 and 12*).

After 6mo of molar intrusion, the open bite closed significantly, but the lower second molars were tipped distally and arch retraction had creased (*Fig. 12*). A CBCT showed that the distal root of the lower right first molar was contacting the miniscrew, so both I-R miniscrews were removed. Two OBSs were installed in the maxillary IZCs (*Fig. 13*), and Class III elastics were utilized to continue the retraction of the lower arch. At 33mo, incisal contact was achieved, and buccal segments were near Class I (*Fig. 14*). At 41mo, detailing was complete so all fixed appliances were removed (*Fig. 15*). The major treatment stages for TADs anchorage are summarized in Table 1.

Results Achieved

The patient was treated to the planned result as documented by a cephalometric radiograph superimpositions showing the effects of growth, and specific types of mechanics (*Figs. 6-9*). A summary of the cephalometric measurements is provided in Table 2.

CEPHALOMETRIC			
SKELETAL ANALYSIS			
	PRE-Tx	POST-Tx	DIFF.
SNA°	79.9°	80.4°	0.5°
SNB°	78.0°	79.7°	1.7°
ANB°	1.9°	0.7°	-1.2°
SN-MP°	52.2°	49.3°	-2.9°
FMA°	43.6°	42.5°	-1.1°
DENTAL ANALYSIS			
U1 TO NA mm	9.8 mm	8.6mm	-1.2 mm
U1 TO SN°	107.1°	111.7°	4.6°
L1 TO NB mm	11.1 mm	7.5 mm	-3.6 mm
L1 TO MP°	78.1°	66.7°	-11.4°
U1 TO PP mm	35.4 mm	35.1 mm	-0.3 mm
U6 TO PP mm	30.2 mm	29.8 mm	-0.4 mm
L1 TO MP mm	45.2 mm	47.7 mm	2.5 mm
L6 TO MP mm	34.8 mm	32.7 mm	-2.1 mm
FACIAL ANALYSIS			
E-LINE UL	-0.1 mm	-1.3 mm	-1.2 mm
E-LINE LL	3.5 mm	3.8 mm	0.3 mm

■ Table 2: Cephalometric summary

Maxilla (*all three planes*):

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

Mandible (*all three planes*):

- A – P: *Maintained*
- Vertical: *Closed ~5mm with froward mandible rotation*
- Transverse: *Maintained*

Maxillary Dentition:

- A – P: *Maintained*
- Vertical: *Maintained*
- Transverse: *Expanded to correct posterior crossbite*

Mandibular Dentition:

- A – P: *Retraction of the entire arch*
- Vertical: *Extrusion of incisors and intrusion of molars*
- Transverse: *Constricted to correct crossbite*

Facial Esthetics:

- Decreased LFH and convexity
- Relieved hypermentalis strain

Retention

Upper and lower Hawley retainers were delivered and the patient was instructed to wear them full time for the first 6 months and nights only thereafter. In addition, instructions were provided for proper home hygiene and maintenance of the retainers.

Final Evaluation Of Treatment

This severe skeletal malocclusion was treated to a near ideal result, as documented by cephalometric superimpositions (*Fig. 9*) and an excellent cast-radiograph evaluation (*CRE*) score of 12. Precise bracket selection and repositioning was effective for detailing and finishing with the PSL appliance despite the extensive movement of the mandibular arch. The pink and white (*P&W*) dental esthetic score of 5 is acceptable, considering this was a retreatment of a patient with previous decalcifications and caries (*Fig. 2B*). The patient had good oral hygiene during the latest course of treatment.

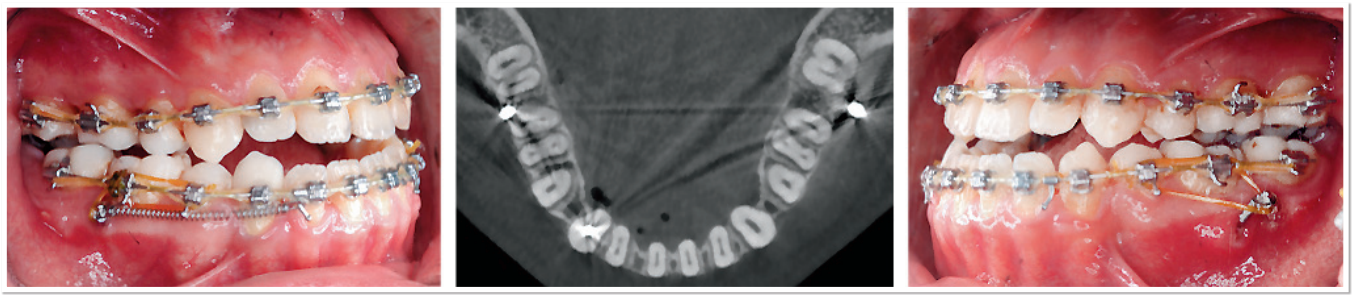

Fig. 12:
At 23y1m, evaluation of the first 6 months of lower arch retraction shows that the openbite closed ~5mm and lower molars were tipped distally. A CBCT image revealed that the distal root of the first molar was contacting the miniscrew on the right side.

Fig. 13:
At 24y2m, the lower posterior miniscrews were removed and two IZC miniscrews were inserted. Class III elastics were extended from the miniscrews to hooks on lower archwire, mesial to the canines.

Fig. 14: At 24y6m, the incisors were contacting and the buccal segments were close to Class I.

Discussion

Orthognathic surgery is usually the preferred treatment for severe Class III anterior open bite malocclusions with a deficient chin.[1,2,3] Camouflage treatment with premolar extractions is a common alternative, but it was not an option because all four first premolars had previously been extracted (*Fig. 3B*). Multiloop edgewise archwire (*MEAW*) is capable of extruding incisors,[4] but it was not selected because it is not effective for decreasing LFH and lip incompetence. In general, the patient was opposed to surgery, so he accepted the limitation that his chin deficiency would not be corrected.

The last three years of growth (*18-21yr*) was characterized by an a clockwise rotation of the lower arch that increased the Class III relationship, anterior open bite, and LFH (*Fig. 6*).

Intrusion of mandibular molars to decrease the LFH is challenging.[5,6] Microscrews, miniscrews, miniplates and osseointegrated dental implants are effective for skeletal anchorage,[7,8,9,10] but the biomechanics of each approach must be carefully analyzed. Lower posterior miniscrews (*Fig. 11*) provide a line of force superior to the center of resistance (C_R) which intrudes the molars by counterclockwise rotation of the entire lower arch (*Fig. 7*). This approach effectively reversed the etiology of the dysplasia (*Fig. 6*) and produced a near ideal result (*Figs. 5A-C and 9*).

The most significant problem encountered was the failure of the initial MBS miniscrews (*Fig. 10*). Biomechanics favor placing an E-A miniscrew deep in the buccal fold to retract, intrude and rotate the lower arch. Soft tissue irritation can be a problem in the buccal fold, so an apically positioned flap was utilized to provide attached gingiva around the miniscrew (*Fig. 10*). Unfortunately, the procedure was unsuccessful and the miniscrews were removed because of soft tissue hyperplasia. After failure of the MBS miniscrews, the second best site for the TADs was I-R site in the posterior lower arch, so the miniscrews were placed distal to the roots of first molars (*Fig. 11*). This I-R site was adequate initially, but after 6 mo of traction, the right molar root contacted the screw (*Fig. 12*) and it was necessary to remove the I-R miniscrews. The third best site for pursuing the clinical objectives was the IZC (*Fig. 13*). Although all three TADs sites were adequate for retracting the lower arch, the MBS is the preferred location for delivering a line of force with a substantial intrusive component for intruding the lower molars, without interfering with the path of tooth movement.

Fig. 15:
At 24y10m, four months of detailing and finishing achieved the final result immediately prior to removing all fixed appliances.

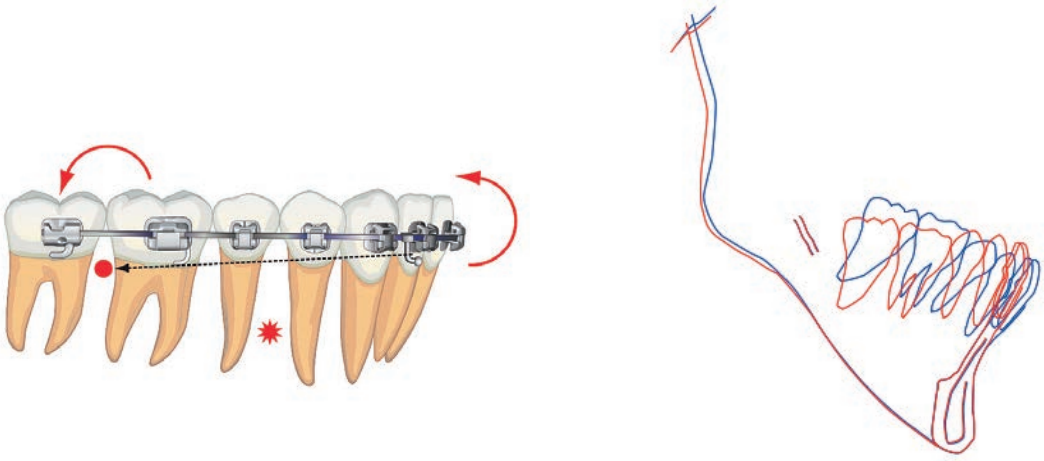

Fig. 16:
(a) Retraction of the lower arch with a buccal shelf miniscrew typically results in posterior rotation of the entire mandibular dentition. This effect is due to the line of force (black dotted line) being occlusal to the center of resistance of the arch (red star). This moment to force ratio retracts and intrudes the arch producing incisor extrusion and molar intrusion.
(b) A cephalometric superimposition on the mandible reveals that buccal shelf retraction retracts the entire lower arch and rotates it distally, thereby intruding the molars.

The soft tissue irritation problem for MBS miniscrews was investigated by Chang and Roberts.[11,12] They found that miniscrews placed in unattached mucosa were well tolerated if the head of the screw and the attached mechanics was several millimeters occlusal to the soft tissue margin. This approach produces a line of force similar to I-R miniscrews (*Fig. 16*), but since the TADs is located buccal to the roots of the molars, there is no problem with root impingement. The initial (*4 mo*) failure rate for MBS miniscrews placed in attached and unattached mucosa is currently being investigated. A reliable method for utilizing MBS miniscrews to retract, intrude and rotate the lower arch would be advantageous for the routine conservative treatment of skeletal malocclusions.[13,14]

Conclusion

MBS and IZC miniscrews are effective E-A mechanics for conservative correction of skeletal malocclusions. Although both mechanisms retract the entire mandibular arch, the MBS mechanism is more effective for intruding lower molars, decreasing the MPA and closing the VDO. The PSL appliance was effective for maintaining arch integrity and symmetry, while the lower arch was retracted and rotated to correct the Class III openbite malocclusion.

Acknowledgements

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- Dr. I-Ling Hong for providing the initial photos before orthodontic treatment.
- Thanks to Dr. Nancy Nie-Shieh Chang and Dr. Yel-Lung Wu for placing the buccal shelf screws and reducing the thick palatal gingiva of the upper posterior teeth.

References

1. Epker BN, Fish LC. Surgical-orthodontic correction of open-bite deformity. Am J Orthod 1977;71:278-99.
2. Proffit WR, Bailey LJ, Philips C, Turvey TA. Long-term stability of surgical open -bite correction by LeFort I osteotomy. Angle Orthod 2000;70:112-7.
3. Hoppenreijs TJ, Freihofer HP, Stoelinga PJ, Tuinzing DB, et al. Skeletal and dento-alveolar stability of LeFort I intrusion osteotomies and bimaxillary osteotomies in anterior open bite deformities. A retrospective three-centre study. Int J Oral Maxillofac Surg 1997;26:161-75.
4. Kim YH. Anterior open bit and its treatment with multiloop edgewise archwire. Angle Orthod 1987;57:290-231.
5. Park YC, Lee SY, Kim DH, Lee SH. Intrusion of posterior teeth using mini-screw implants. Am J Orthod Dentofacial Orthop 2003;123:690-4.
6. Sherwood KH, Burch JG, Thompson WJ. Closing anterior open bite by intruding molars with titanium miniplate anchorage. Am J Orthod Dentofacial Orthop 2002;122:593-600.
7. Umemori M, Sugawara J, Mitani H, Nagasaka H, Kawamura H. Skeletal anchorage system for open bite correction. Am J Orthod Dentofacial Orthop 1999;115:166-74.
8. Sugawara J, Baik UB, Umemori M, Takahashi I, Nagasaka H, Kawamura H, et al. Treatment and posttreatment dentoalveolar changes following intrusion of mandibular molars with application of a skeletal anchorage system (SAS) for open bite correction. Int J Adult Orthod Orthognath Surg 2002;17:243-53.
9. Park HS, Kwon OW, Sung JH. Nonextraction treatment of an open bite with microscrew implant anchorage. Am J Orthod Dentofacial Orthop 2006;130:391-402.
10. Costa A, Raffani M, Melsen B. Miniscrews as orthodontic anchorage. Int J Adult Orthod Orthognath Surg 1998;13:201-9.
11. Chang CH, Roberts WE. Stability of miniscrews on buccal shelves: a retrospective study of 1680 miniscrew insertions by the same orthodontist. Int J Orthod Implantol 2013;30:76-78.
12. Chang CH, Roberts WE. A retrospective study of the extra-alveolar screw placement on buccal shelves. Int J Orthod Implantol 2013;32:80-89.
13. Lin JJ. treatment of severe Class III with buccal shelf miniscrews. News & Trends in Orthodontics 2010;18: 4-15.
14. Lee MC, Lin JJ-J, Roberts WE. Hyperdivergent class III openbite malocclusion treated conservatively. Int J Orthod Implantol 2012;28:4-18.

Discrepancy Index Worksheet

TOTAL D.I. SCORE 89

OVERJET

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

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

Total = 0

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 = 34

LATERAL OPEN BITE

2 pts. per mm. per tooth

Total = 9

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

Total = 8

LINGUAL POSTERIOR X-BITE

1 pt. per tooth Total = 4

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° 14 x 2 pts. = 28

≤ 26° = 1 pt.

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

1 to MP ≥ 99° = 1 pt.

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

Total = 28

OTHER (See Instructions)

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

Identify: Conservative treatment of skeletal malocclusion without extractions or orthognathic surgery.

Total = 4

IMPLANT SITE

Lip line : Low (0 pt), Medium (1 pt), High (2 pts) =_____

Gingival biotype : Low-scalloped, thick (0 pt), Medium-scalloped, medium-thick (1 pt), High-scalloped, thin (2 pts) =_____

Shape of tooth crowns : Rectangular (0 pt), Triangular (2 pts) =_____

Bone level at adjacent teeth : ≤ 5 mm to contact point (0 pt), 5.5 to 6.5 mm to contact point (1 pt), ≥ 7mm to contact point (2 pts) =_____

Bone anatomy of alveolar crest : H&V sufficient (0 pt), Deficient H, allow simultaneous augment (1 pt), Deficient H, require prior grafting (2 pts), Deficient V or Both H&V (3 pts) =_____

Soft tissue anatomy : Intact (0 pt), Defective (2 pts) =_____

Infection at implant site : None (0 pt), Chronic (1 pt), Acute(2 pts) =_____

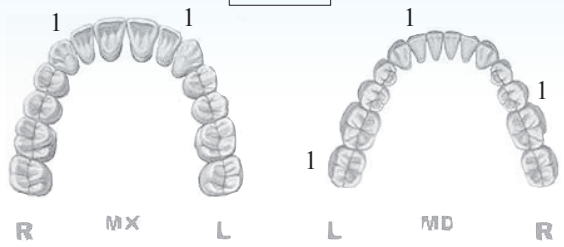
Total = 0

Cast-Radiograph Evaluation

Total Score: 12

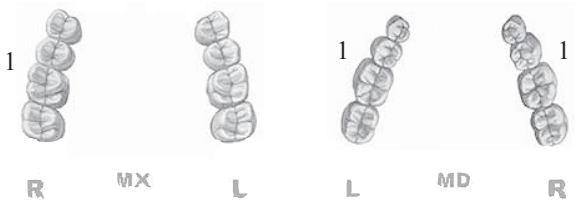
Alignment/Rotations

5



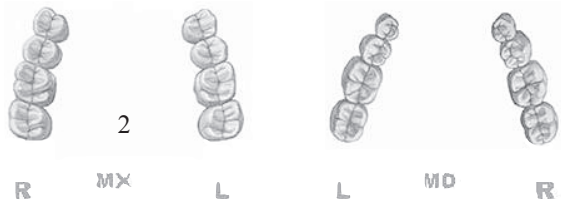
Marginal Ridges

3



Buccolingual Inclination

2

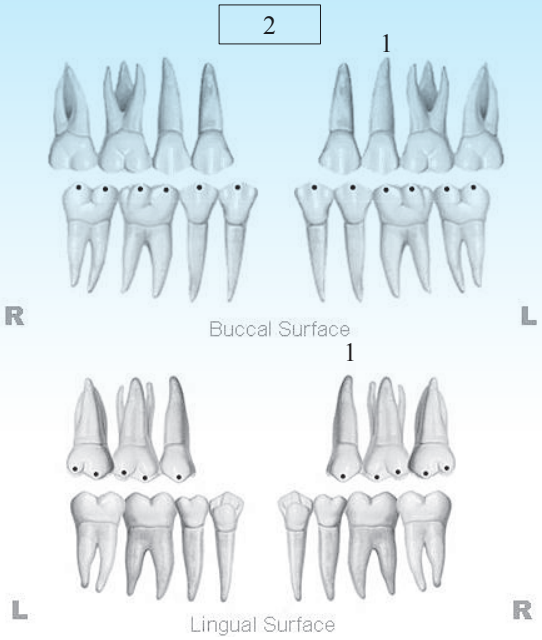


Overjet

0

Occlusal Contacts

2

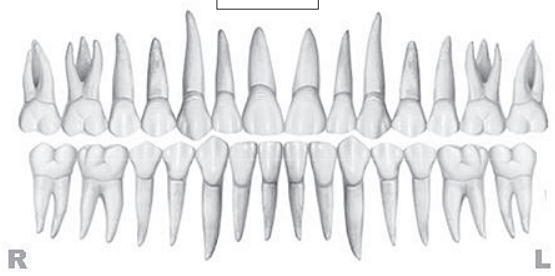


Occlusal Relationships

0

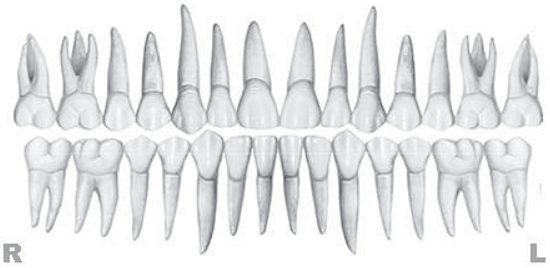
Interproximal Contacts

0



Root Angulation

0



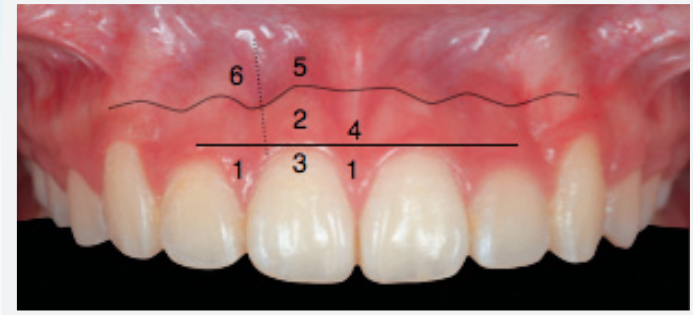
***INSTRUCTIONS:** Place score beside each deficient tooth and enter total score for each parameter in the white box. Mark extracted teeth with "X". Second molars should be in occlusion.*

IBOI Pink & White Esthetic Score

Total Score: = 5

1. Pink Esthetic Score

Total = 1

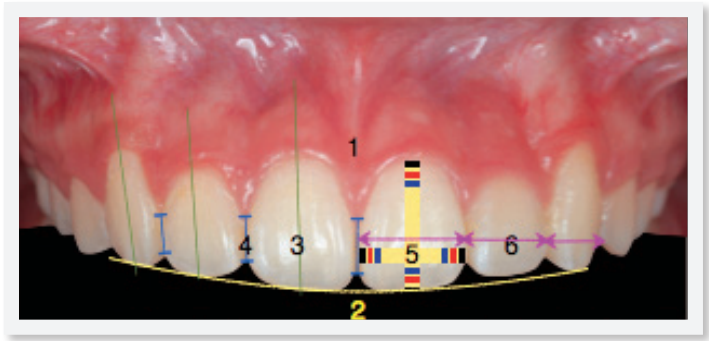


1. Mesial Papilla	0	1	2
2. Distal Papilla	0	1	2
3. Curvature of Gingival Margin	0	1	2
4. Level of Gingival Margin	0	1	2
5. Root Convexity (Torque)	0	1	2
6. Scar Formation	0	1	2

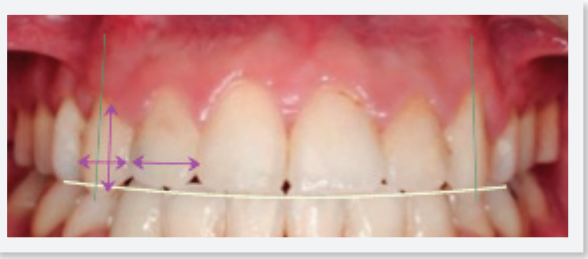
1. M & D Papillae	(0)	1	2
2. Keratinized Gingiva	(0)	1	2
3. Curvature of Gingival Margin	(0)	1	2
4. Level of Gingival Margin	0	(1)	2
5. Root Convexity (Torque)	(0)	1	2
6. Scar Formation	(0)	1	2

2. White Esthetic Score (for Micro-esthetics)

Total = 4



1. Tooth Form	0	1	2
2. Mesial & Distal Outline	0	1	2
3. Crown Margin	0	1	2
4. Translucency (Incisal thrid)	0	1	2
5. Hue & Value (Middle third)	0	1	2
6. Tooth Proportion	0	1	2



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

躍升一流牙科講師的成功跳板

How to Give a TED Style Speech on Dentistry

11/29 (日) 台灣金融研訓院
台北市中正區羅斯福路三段62號

活動簡介

本會去年以「牙科簡報也可像 TED talk一樣？」為題，邀請國際級講師林錦榮、廖炯琳、張慧男，及英國知名寫作和演講教練 Dr. Paul Head，暢談牙科報告的關鍵技巧及表現手法。會後，學員們反應熱烈，訝異於成功演講背後的細緻準備與扎實功夫，並對自身牙科案例寫作、演講訓練產生高於預期的成效。

今年為滿足廣大學員的要求，再度以目前公認最跨領域、切合時代脈動的TED系列演講為標竿，講者必須挑戰在短時間內倡導「值得散播的概念」。由於精簡、實務的案例報告一直是我們非常重視的知識分享形式，TED這種演講形式對有志從事演講的實務工作者和教育者來說，就是非常重要的訓練模式。今年學會再度邀請張慧男博士、Paul Head 老師與其他國際級專家，為大家提供更進階的演講技巧，並帶來最新的矯正植牙案例分析。此外，院士候選人也將發表報告，您可以與專家們共同參與評論，現學現用、迅速累積實力，躍升一流講師絕對不是夢！

學習目標

1. 提昇牙科演講技巧及表現手法。
2. 運用習得技巧來參與評判院士報告。
3. 化繁為簡為的矯正植牙合併案例分析。

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國際矯正植牙學會

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如何加入 iAOI？

欲取得國際矯正植牙學會會員資格，需完成下列階段：

1. Member

醫師可以在網站 http://iaoi.pro/ 直接申請加入會員資格，申請完成的醫師將具有資格索取線上考題題庫或是考題題庫紙本，得用以準備入會考試。

2. Board eligible

所有申請加入會員資格的醫師始可參加入會考試，參加考試的醫師將從四百題題庫選出的一百道題目作答，以 70 分（含）為通過標準，通過的醫師即可獲得 Board eligible 資格。考試的時間為一個小時。下次考試的時間為2014/11/30（日）於台灣台北金融研訓院。

3. Diplomate

已獲得會員資格者，需要提出三篇案例報告，其中一篇案例需要再做口頭報告，通過審查後，始可獲得 iAOI 的 Diplomate 資格。三篇案例中，至少須有一篇案例，同時涵蓋 矯正與植牙領域。此為單一案例的個案報告。報告人和評論人需在規定的時間內完成報告及講評。每個報告人需在 12 分鐘內報告單一個案。大會會在第十分鐘時響第一次鈴，第十二分鐘到時會直接將麥克風關閉。每個個案報告結束後，全體評論人共有八分鐘可以講評。 大會會在第六分鐘時響第一次鈴，第十分鐘到時會直接將麥克風關閉。評論人如果有額外的意見可以以書面方式提供給報告人。

4. Ambassador

獲得院士資格的醫師，將有機會受邀在 iAOI 年度大會中提出六篇矯正與植牙結合的案例報告。完成報告的醫師，始取得 iAOI Ambassador 的資格，並且獲頒紀念獎牌，以表揚醫師對學會的特別貢獻。

＊國際矯正植牙期刊 (IJOI) 是國際矯正植牙學會 (iAOI) 發行的官方刊物。

Interdisciplinary Treatment for a Mutilated Malocclusion with Excessive Vertical Dimension and Bimaxillary Protrusion

Abstract

This case report describes the diagnosis and interdisciplinary treatment for an adult female with a mutilated (4 missing teeth), acquired malocclusion with a protrusive profile. The Discrepancy Index (DI) was 26. There were multiple residual root tips in the edentulous spaces of the upper arch, and a compromised lower 3-unit fixed prosthesis. The lower dental midline was deviated to the right side ~3mm but there was no functional shift. The bimaxillary protrusion was corrected by closing space in both arches utilizing OrthoBoneScrew® anchorage. An edentulous site was prepared to restore the upper left 2nd premolar (#13) with an implant-supported prosthesis. Following orthodontics treatment, periodontal surgery was performed to correct soft tissue relationships in the maxillary anterior segment. Tooth #13 (UL 2nd premolar) was restored with an implant-supported prosthesis. The final outcome for the malocclusion was very good as documented by a Cast-Radiograph Evaluation (CRE) score of 26, and an excellent Pink & White dental esthetic score of 1. (Int J Othod Implantol 2015;38:22-48)

Key words:

bimaxillary protrusion, passive self-ligating appliance, periodontal surgery, osteoplasty, ostectomy, flapless implant surgery, implant-supported prosthesis, IZC&buccal shelf screws

History and Etiology

A 29-year 11 month female presented with chief complaints of a protruded profile, missing teeth and multiple residual roots and root tips (*Figs. 1-3*). The dental history revealed four missing teeth (*#3, 13, 14 and 19*). A missing lower left 1st molar (*#19*) was restored with an ill-fitting 3-unit fixed prosthesis (*#18-20*). Tooth #1 was extruded, tooth #2 was in lingual crossbite, and tooth #23 was in anterior crossbite. There was no contributing medical history. Pre-treatment photographs showed a generalized pattern of exostoses along the facial surface of the maxillary arch, a bimaxillary protrusive profile, an excessive lower facial height, a chin point deviated to the left, and a 3mm midline discrepancy with the mandible to the left (*Figs. 1-3*). Also noted were multiple interdental spaces in the upper arch, including a midline diastema, and unbalanced crown proportions for maxillary incisors.

The patient was treated to a pleasing result as shown in Figs. 4-6. Lateral cephalometric and panoramic radiographs document the pre-treatment condition (*Fig. 7*) and the post-treatment outcome (*Fig. 8*). Dentofacial management is documented with superimposed cephalometric tracings (*Fig. 9*).

Dr. Hsing-Wan Chang,
Instructor, Beethoven Orthodontic Course (Left)

Dr. Chris Chang,
Founder, Beethoven Orthodontic Center
Publisher, International Journal of Orthodontics& Implantology (middle)

W. Eugene Roberts,
Chief editor, International Journal of Orthodontics & Implantology (right)

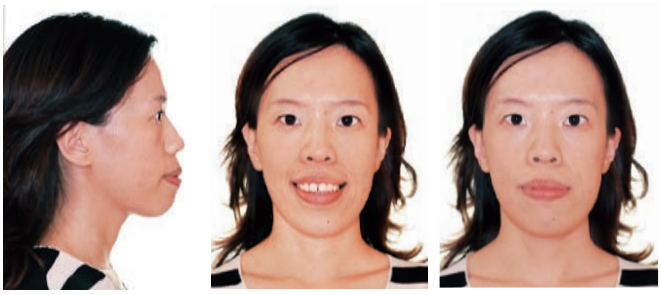


Fig. 1: Pre-treatment facial photographs

Fig. 4: Post-treatment facial photographs

Fig. 2: Pre-treatment intraoral photographs

Fig. 5: Post-treatment intraoral photographs

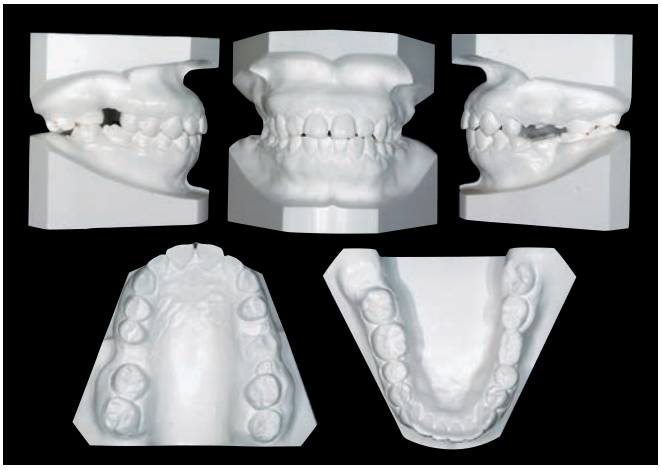


Fig. 3: Pre-treatment study models (casts)

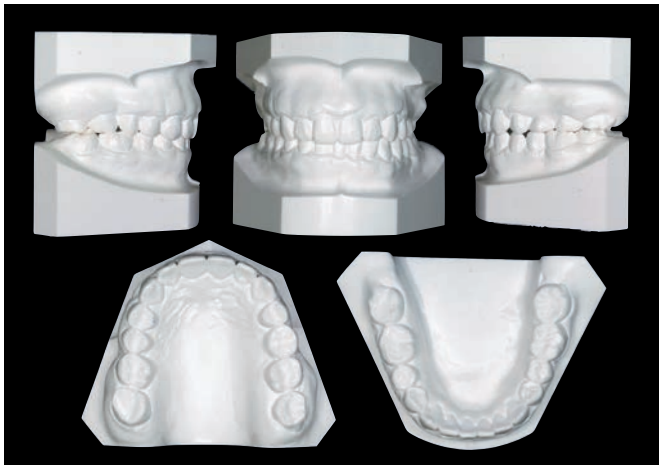


Fig. 6: Post-treatment study models (casts)

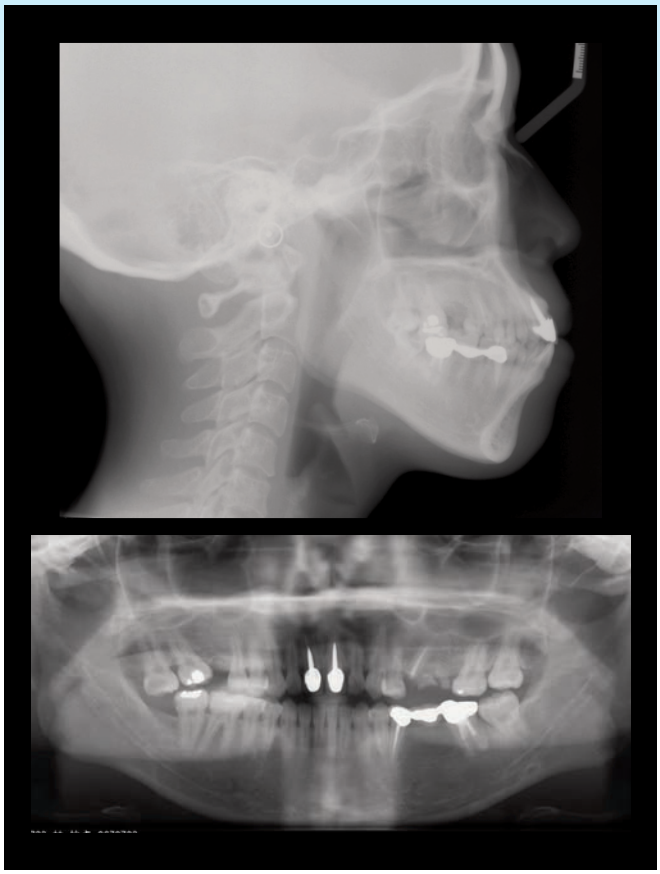


Fig. 7:
Pre-treatment cephalometric and panoramic radiographs

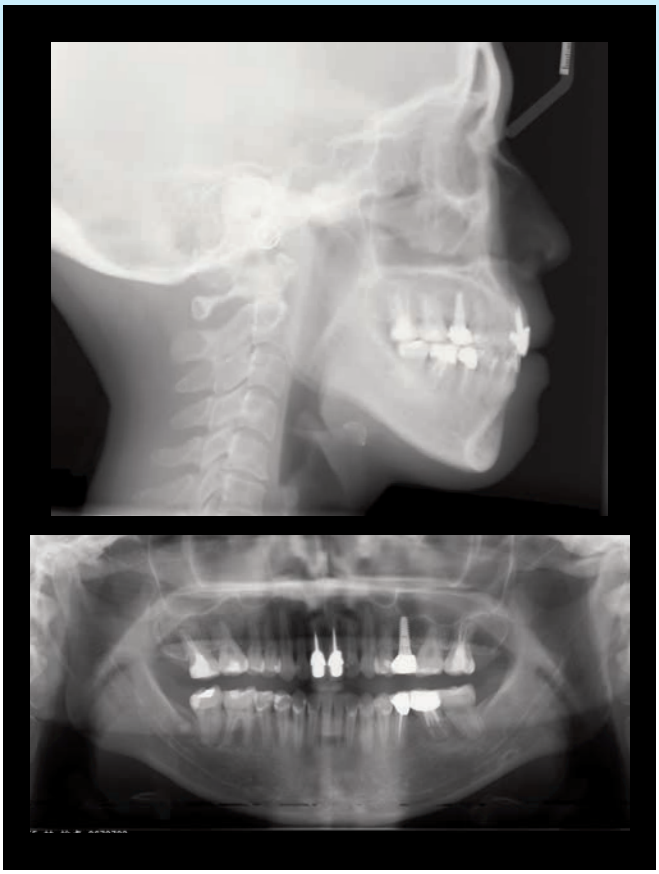


Fig. 8:
Post-treatment cephalometric and panoramic radiographs

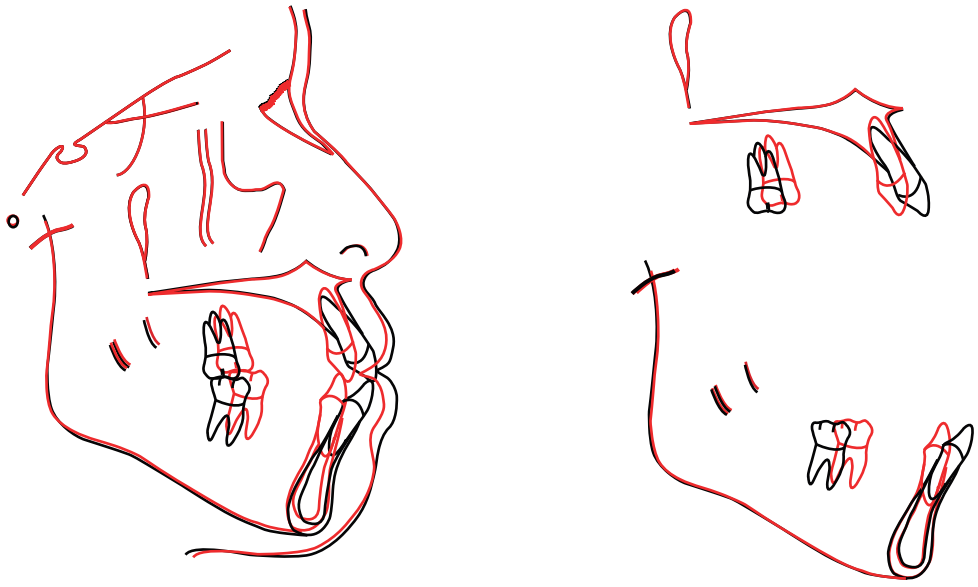


Fig. 9:
Pre-treatment (black) and post-treatment (red) cephalometric tracings were superimposed on the anterior cranial base (left), maxilla (upper right) and mandible (lower right).

CEPHALOMETRIC			
SKELETAL ANALYSIS			
	PRE-Tx	POST-Tx	DIFF.
SNA°	87°	86°	1°
SNB°	80°	79°	1°
ANB°	7°	7°	0°
SN-MP°	40°	39°	1°
FMA°	31°	30°	1°
DENTAL ANALYSIS			
U1 TO NA mm	5 mm	0 mm	5 mm
U1 TO SN°	105°	89°	16°
L1 TO NB mm	11 mm	5 mm	6 mm
L1 TO MP°	95°	78°	17°
FACIAL ANALYSIS			
E-LINE UL	1.5 mm	-1 mm	2.5 mm
E-LINE LL	3.5 mm	0 mm	3.5 mm

■ Table 1: Cephalometric summary

Diagnosis

Skeletal:

- Skeletal Class II (*SNA 87°, SNB 80°, ANB 7°*)
- High mandibular plane angle (*SN-MP 40°, FMA 31°*)
- Generalized maxillary exostoses on the facial surface

Dental:

- Molar classification: *There were no first molars in occlusion, but overall the interdigitation was consistent with a Class I relationship, except for Class II right 2nd and 3rd molars (Fig. 3)*
- Canine relationship: *Bilateral Class I*
- Anterior crossbite: *Lower left lateral incisor*
- Posterior crossbite: *Upper right second molar in lingual crossbite*
- Lower dental midline: *Deviated to left 3mm, but no functional shift was evident*
- Residual roots and root tips: *upper right first molar, left second premolar and first molar (#3, 13, and 14)*
- Lack of symmetrical tooth proportion: *All maxillary incisors (#7-10)*
- Diastema: *Between the prosthetic crowns on the upper central incisors (Fig. 1).*

Facial:

- Skeletal bimaxillary protrusion with excess vertical dimension of occlusion (*VDO*)
- Protrusive upper and lower lips.
- Facial asymmetry: *The chin point was deviated to the left side.*

The ABO Discrepancy Index (*DI*) was 26 as shown in the subsequent worksheet. The major discrepancies (*11 points*) were relative to cephalometrics (*Table 1*): excessive ANB angle and high mandibular plane (*SN-MP angle*).

Treatment Objectives

After carefully reviewing the patient's facial profile, dental, and occlusal problems, the treatment objectives were as follows:

- Remove the residual roots and the pontic from the lower three-unit fixed prosthesis.
- Align the dentition, close spaces in both arches, and prepare an 8mm site for an implant to replace missing #13.
- Perform periodontal surgery to correct maxillary anterior soft tissue esthetic problems: *Crown lengthening of the incisors and reduction of the hypertrophic bony contours.*

- Restore area #13 with an implant-supported prosthesis (*ISP*).
- Establish normal overjet and overbite.
- Create a balanced occlusal relationship.

The overall clinical objectives were to restore occlusal function and improve smile esthetics with interdisciplinary treatment, involving orthodontics, periodontics, and an ISP.

Treatment Alternatives

Two-jaw orthognathic surgery was considered because of multiple dental and skeletal problems: bimaxillary protrusive profile, excessive VDO, and deviated chin point. However, once the surgery was completed, it would still be necessary to restore the edentulous spaces. Although this approach may be the most predictable option for optimal facial esthetics, the patient rejected it because of the surgical morbidity, and increased cost for the surgery, plus the need for additional ISPs and/or other prostheses.

Treatment Plan and Sequence

1. Full fixed orthodontic appliance
2. Bite turbos with a cross elastic to correct the upper right posterior crossbite
3. Insert OrthoBoneScrews® (*OBSs*)(*Newton's A Ltd., Hsinchu City, Taiwan*) as extra-alveolar temporary anchor devices, buccal to all first molar areas.
4. Use elastomeric chains or closed coil springs to close space and reduce the profile.
5. Develop an implant site in the #13 area, and use a flapless surgical approach to place the implant.
6. Perform periodontal surgery in the maxillary anterior region to correct clinical crown proportions and reduce the osseous excess on the labial aspect of the maxilla.
7. Fabricate a final prosthesis six months after periodontal surgery and implant placement.
8. Retention of both arches with clear overlay retainers.

Appliances and Treatment Progress

Damon MX3® 0.22" brackets (*Ormco, Glendora, CA*) were selected, utilizing high torque in the maxillary anterior and low torque in the mandibular anterior regions. The upper arch was bonded initially, and one month later the lower arch was bonded at the same appointment when anterior bite turbos were placed (*Fig. 10*) to facilitate correction of the anterior crossbite tendency. The upper and lower archwires were 0.016 CuNiTi.

Fig. 10:
Bite turbos were bonded on the lingual surfaces of the lower left lateral incisor and cuspid.

In the 6th month of treatment, the upper and lower archwires were changed to 0.014x0.025" CuNiTi. A bite turbo was bonded on the occlusal surface of upper left posterior second molar and a lingual button was bonded on the upper right second molar (#2). A crossbite elastic was attached from tooth #2 to the buccal surface of tooth #31. Three months later (*9th month of treatment*) the posterior lingual crossbite was corrected (*Fig. 11*).

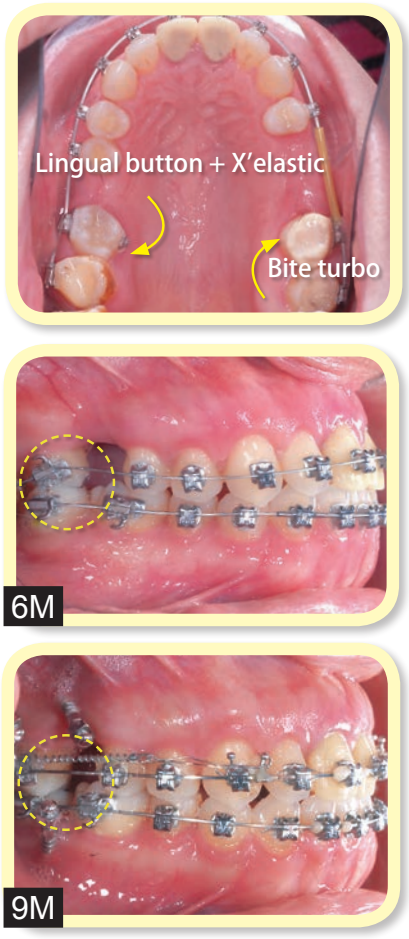


Fig. 11:
In the upper occlusal view, the mechanics are shown for correcting a posterior lingual crossbite: lingual button with a cross elastic on the affected side and bite turbo on the opposite molar. Buccal views show the posterior crossbite before starting the correction, six months (6M) into treatment, and following 3 months of cross-elastic therapy to achieve a desired result, in the ninth month of treatment (9M) overall.

In the 10th month of treatment, a panoramic radiograph was used to evaluate all bracket positions relative to the axial inclinations of the teeth. The upper archwire was changed to 0.019x0.025" SS, and 2 crimped hooks were positioned bilaterally on the upper archwire between the lateral incisors and canines. The latter were used to connect closed coil springs and/or elastics to retract the anterior segment to close space (*Figs. 12-14*). The lower archwire was changed to 0.017x0.025" TMA.

Fig. 12:
Two crimped hooks (circled) between upper lateral incisors and canines were used as the anterior attachments bilaterally for elastometric chains from the OBSs to retract the anterior segment.

Fig. 13:
Extra-alveolar bone screws were inserted buccal to the molars in all four quadrants.

Fig. 14:
Both bone screws and posterior teeth served as the anchorage to retract the anterior teeth.

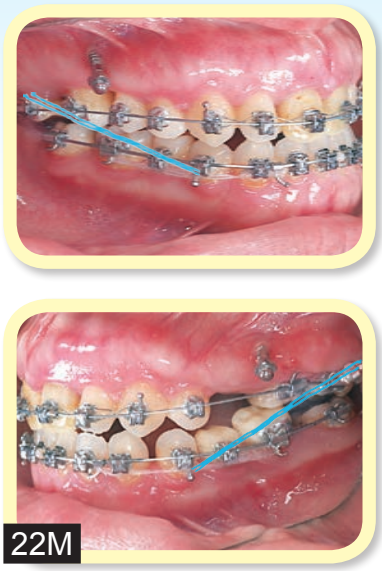


Fig. 15:
The overjet was nearly edge to edge in the 22nd month of treatment (22M), so the lower bone screws were removed and Class III elastics were applied.

In the 12th month of treatment, 2x12 mm OBSs were inserted into the upper infrazygomatic crests and the lower buccal shelves, bilaterally (*Fig. 13*). Elastomeric chains were activated from the canines to the maxillary posterior bone screws to assist in retracting the upper anterior teeth to close space (*Fig. 14*). The lower bone screws were used to retract the lower dentition, and the bone screw on the lower left side was also used to protract the second and third molars.

In the 22nd month of treatment, the overjet was nearly edge to edge (*Fig. 15*). The lower bone screws were removed and Class III elastics were used from the lower first premolars to the upper second molars to correct the Class III occlusal relationship(s). To resist side effects on the lower arch, due to the Class III elastics and the elastomeric chains, the lower archwire was changed to 0.019x0.025" pre-torqued CuNiTi. The upper archwire was expanded to correct the right posterior crossbite tendency.

In the 25th month of treatment, the lower arch space was almost closed and the overbite was satisfactory (*Fig. 16*).

Fig. 16:
In the 25th month of treatment, the overjet was normal and the lower arch space had been closed.

In the 29th month of treatment, the upper archwire was changed to 0.019x0.025" SS and it was expanded in the posterior. Class III elastics were used from the upper OBSs to the hooks on the lower archwire.

In the 35th month of treatment, finishing (*vertical*) elastics were used in the molar areas bilaterally, to achieve an optimal occlusal interdigitation.

After 40 months of orthodontic treatment, all residual space was closed, except for an 8mm wide site for an implant in the upper left posterior area.

Fig. 17:
The presurgical cast was used to fabricate the surgical stent.

Implant Placement

At the 43rd month of orthodontics treatment, preprosthetic records were collected, and the casts were used to fabricate the surgical stents to place an implant in the area of tooth #13 (*Fig. 17*). A preoperative Cone-Beam Computed Tomography (*CBCT*) scan was used to evaluate the alveolar bone volume in the implant site (*Fig. 18*). The bone

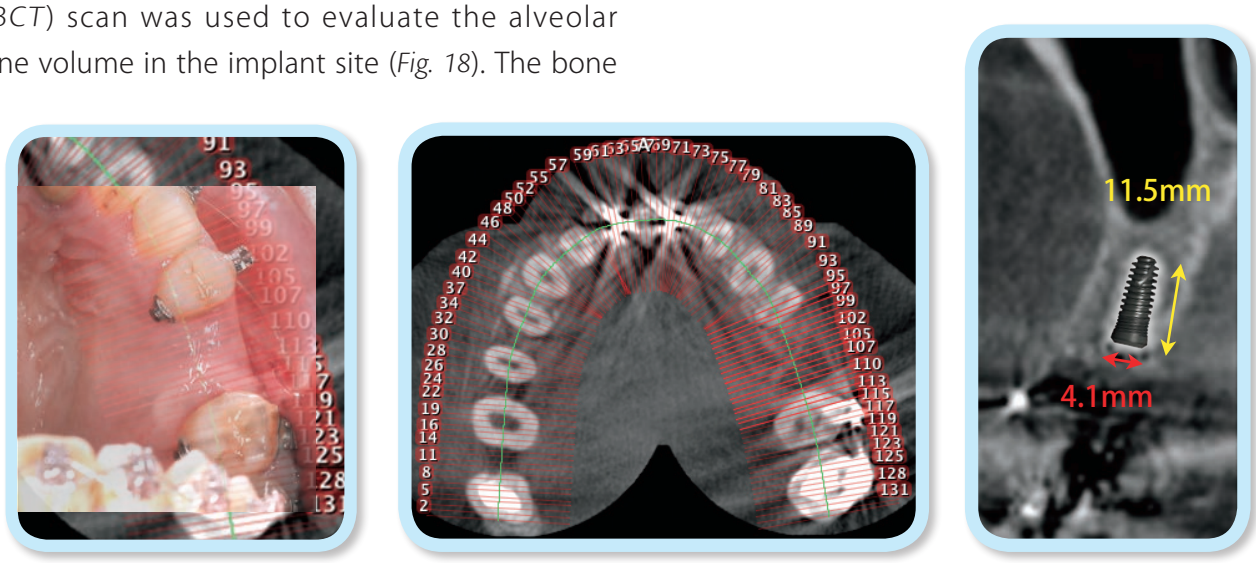


Fig. 18:
CBCT imaging demonstrated that the bone width and height were adequate for a 4.1x11.5mm implant fixture.

width and height were adequate for a 4.1x11.5 mm implant fixture. A flapless surgical approach was performed. After cutting the planned soft tissue emergence with a tissue punch, a circular incision was made and the soft tissue core was removed with a surgical curette to expose the crestal bone. A probe was used to check if there was 3 mm of distance between the crestal bone level and the surface of the soft tissue. Confirming this dimension is important for estimating the projected crown margin (*Fig. 19*). The 2B-3D rule[1] for dental implant planning, placement and restoration was followed.

After drilling to the proper depth with a lancer drill (*Fig. 20*), a surgical guide was inserted, and a periapical radiograph demonstrated that the osteotomy conformed to the planned position and orientation (*Fig. 21*). The osteotomy was enlarged with twist drills to receive an Ø4.1X11.5mm, TwStar® (*MegaGen® Taiwan*) implant fixture, and a healing abutment were installed according to the manufacturer's recommendations (*Fig. 22*). A post-operative periapical radiograph confirmed the desired position and angulation of the implant. In addition, it was clear that the maxillary sinus membrane was not disrupted (*Fig. 23*).

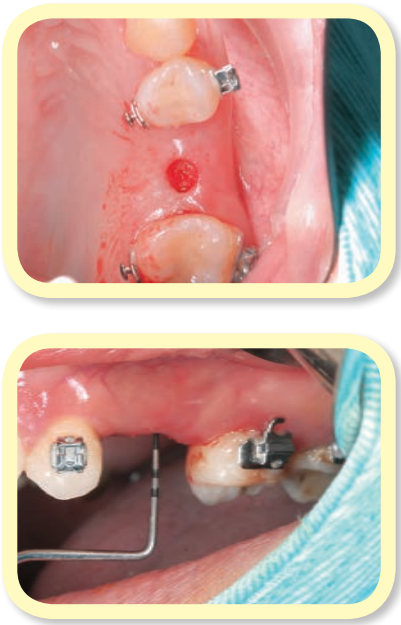


Fig. 19:
The soft tissue thickness was measured to be 3mm before implant placement.

Fig. 20:
The lancer drill prepared the initial osteotomy.

Fig. 21:
A surgical guide pin was placed in the osteotomy and a periapical X-ray demonstrated the orientation of the implant site.

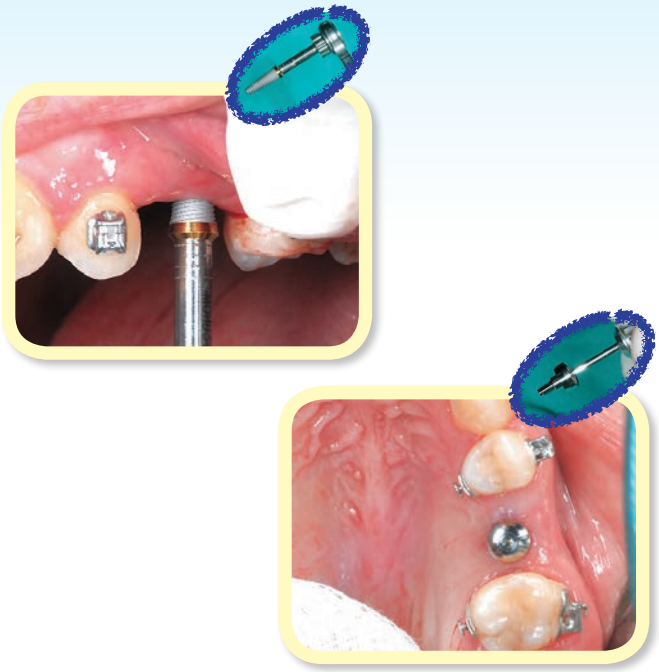


Fig. 22:
After the implant fixture was inserted, the healing abutment was connected.

Fig. 23:
A post-operative periapical X-ray was exposed to check the final position and angulation of the fixture.

Orthodontic Finishing Stage

After the implant was placed, orthodontics finishing was accomplished in the upper left quadrant by extending an elastomeric chain from the OBS to the canine. A coil spring was used to maintain space for the #13 implant as the molars were retracted (*Fig. 24*). At 50 months the finishing was complete (*Fig. 25*) so the patient was scheduled to have the fixed appliances removed. After debonding at 51 months, bone sounding was performed on the labial surfaces of the maxillary incisors (*Fig. 26*). The patient was scheduled for periodontal surgery and the implant prosthesis fabrication.

Periodontic Surgery and Prosthesis Stage

Following orthodontics treatment, all maxillary anterior teeth were retracted and intruded, resulting in adequate clinical crown exposures. Crown lengthening surgery was performed from teeth #7-10 to improve the esthetic proportions (*width and length*) of the incisor clinical crowns. Bone sounding was performed and the distances from the crestal bone to the gingival margin were 3.8mm, 3mm, 3.5mm, 3.5mm, respectively. The initial surgery was a gingivectomy, performed from teeth #7-#10 to reduce pocket depth (*Fig. 26*).[2] After 1 month of healing, new temporary crowns were placed on the maxillary central incisors (*Fig. 27*).

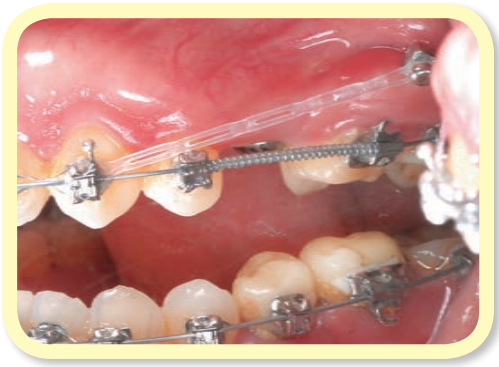


Fig. 24:
The bone screw serves as anchorage to adjust the midline while the open coil spring moves the molar distally.

Fig. 25:
Intraoral photos were taken 1 month before the end of active orthodontic treatment.

Fig. 26:
The bone sounding, performed on all maxillary incisors, demonstrated excessive gingival height, so a gingivectomy was needed.

Fig. 27:
One month after the gingivectomy, new temporary crowns were fabricated and adjusted for the central incisors.

Five months after the gingivectomy, the patient was unhappy with the bony prominence and gingival contours (*scalloping*) of the anterior maxillary region (*Fig. 28*), so a second periodontal surgical procedure was performed. The labial gingiva was reflected for an ostectomy and osteoplasty procedure[3] to reduce the excessive contours of the alveolar process and lengthen the clinical crowns of the incisors. The goal of this approach was to modify the bone

and gingival architecture (*Fig. 29*) to reduce the apparent gingival bulk and provide a more pleasing scolloping of the gingiva margins. The ostectomy was performed on the facial (*labial*) surface, to achieve a uniform 2mm distance between the cementoenamel junction (*CEJ*) and the alveolar bone crest to produce a more ideal scalloping of the gingival margins. Osteoplasty was performed to reduce the thickness of the alveolar bone under the soft tissue on the labial surface of the anterior segment.

■ *Fig. 28:*
Following the gingivectomy and new temporary crowns, anterior esthetics were still inadequate.

■ *Fig. 29:*
Ostectomy and osteoplasty were performed to correct the bony architecture.

Following 6 months of healing, the final prosthesis for the maxillary incisors was delivered (*Fig. 30*).

■ *Fig. 30:*
The final prosthesis was finished, following 6 months of postoperative follow-up, which was 62 months (62M) from the start of interdisciplinary treatment.

Implant Prosthesis Fabrication

The implant, placed in the area of #13 during the course of orthodontics treatment (*Figs. 17-23*), was restored after the appliances were removed. The implant healing abutment was removed and a multi-post abutment was selected for the prosthesis fabrication. The abutment was then modified with a diamond bur, mounted on a high speed handpiece, to accommodate occlusal function, while maintaining a desirable soft tissue contour. The post height of the abutment was reduced to provide 2mm of occlusal clearance for the fabrication of the porcelain fused to metal crown (*Fig. 31*).

Fig. 31:
After removing the healing abutment, the prosthetic abutment was connected to the fixture and adjusted to provide 2mm of clearance for fabrication of a porcelain fused to metal crown. In the right view, the black mark on the abutment will be removed to establish the appropriate clearance (2mm).

Before making the impression, abutment screws were torqued to 35N-cm with a screw driver and a torque ratchet (*Fig. 32*). A gingival retraction cord was positioned in the peri-implant sulcus with a packing-placement instrument (*Fig. 33*). A direct impression was obtained with polyvinyl siloxane (*Fig. 34*), and poured with type IV dental stone. The casts were subsequently articulated using appropriate check-bite records. A metal coping was fabricated by a commercial laboratory, and the marginal integrity of the casting was verified with a dental explorer.

Fig. 32:
Before making the impression, the abutment screws were torqued to 35-N-cm with a torque ratchet.

Fig. 33:
Gingival retraction cord was positioned in the peri-implant sulcus with a packing-placement instrument.

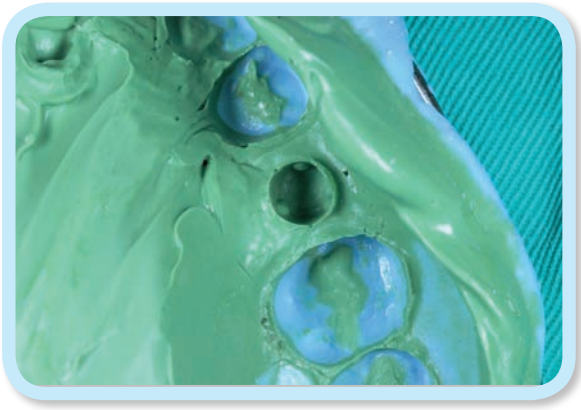


Fig. 34:
A direct impression was obtained with polyvinyl siloxane.

After completion of the crown the contact area was tested with dental floss (*Fig. 35*). After verification of the fit and clinical adjustment of the occlusion, the permanent crown was luted with temporary cement (*Fig. 36*).

■ *Fig. 35:*
The completed final prosthesis is checked for occlusion and interproximal contact.

In the final stages of treatment (*~62 mo*), new crowns were delivered for teeth #18 and 20. These teeth were the previous abutments for the original lower 3-unit fixed prosthesis (*Figs. 2, 3, 7 and 37*). As previously mentioned, the pontic was removed and the space was closed orthodontically (*Fig. 9*).

■ *Fig. 36:*
Left: the final prosthesis for the upper second premolar was luted into place.
Right: the lower occluding restorations were still temporary crowns.

■ *Fig. 37:*
The lower left prostheses were also finished in the 62th month of treatment.

Results Achieved

Maxilla (*all three planes*):

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

Mandible (*all three planes*):

- A - P: *Retracted*
- Vertical: *Decreased by rotating the mandible counter-clockwise 1^0*
- Transverse: *Maintained*

Maxillary Dentition

- A - P: *Incisors retracted, molars protracted*
- Vertical: *Intrusion of the entire arch*
- Inter-molar / Inter-canine Width: *Maintained*

Mandibular Dentition

- A - P: *Incisors retracted, molars protracted*
- Vertical: *Intruded*
- Inter-molar / Inter-canine Width: *Maintained*

Facial Esthetics: Lip protrusion reduced

Final Evaluation of the Treatment

The ABO Cast-Radiograph Evaluation (*CRE*) score was 26 points. The major discrepancies were 5 points each: posterior overjet (*Fig. 38*), occlusal relationships (*Fig. 39*) and occlusal contacts. The midline deviation was maintained because it was considered to be of skeletal origin, and orthodontic correction would probably be unstable. Note that the CRE scoring method does not deduct points for a midline discrepancy, because it is not a problem unless there is a compromise in the posterior occlusion. Details of the CRE scoring are presented in the scoring worksheet at the end of this report.

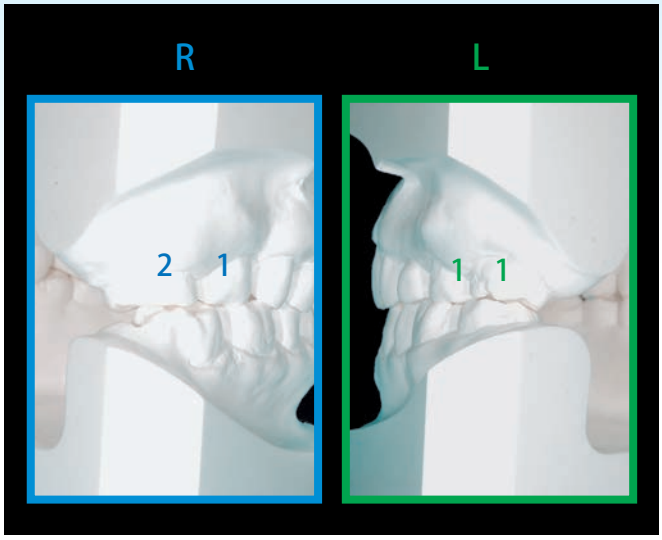


Fig. 38:
A major CRE discrepancy was posterior overjet (5 points). The score for each of the affected upper molars is shown.

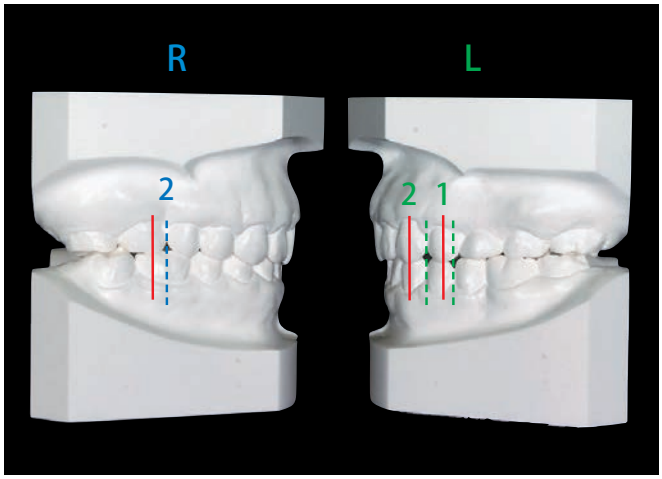


Fig. 39:
Occlusal relationships were scored at 5 points as shown, during the CRE assessment.

Overall, dental and facial esthetics were well managed. The Pink & White dental esthetics

score was 1, which is an excellent outcome. Facial esthetics were improved by decreasing the VDO and correcting the protrusive profile (*Fig. 9*). The latter was substantially reduced by using OBSs to retract the upper and the lower anterior segments. The smile esthetics were enhanced by periodontal surgery and custom fabrication of the final prostheses.

Occlusal function was considerably improved by removing residual roots, performing orthodontics to close space or redistribute it, and fixed prosthetics. Implant-Abutment Transition & Position Analysis achieved a very good score of 2, as documented by the worksheet at the end of this case report.

Discussion

The diagnosis and treatment for the current patient was segmented into two distinct problems, relating to discrepancies in the vertical and sagittal planes.

1. Vertical:

With a natural smile, the patient had an excessive gingival display,[4-6] although it was not evident on the initial smiling view photo (*Fig. 1*). Skeletally, there was an excessive vertical dimension of occlusion (*VDO*). The lower third of her face, distance from subnasale to the lower border of the chin, exceeded the dimension of the middle third of the face, from glabella to subnasale (*Figs. 1 and 40*). Excessive gingival display is a descriptive term rather than a specific diagnosis.[4] Numerous anatomical and physiologic factors may interact for the visual perception of "*excessive gingival display.*" A few examples are vertical maxillary excess,[7] delayed

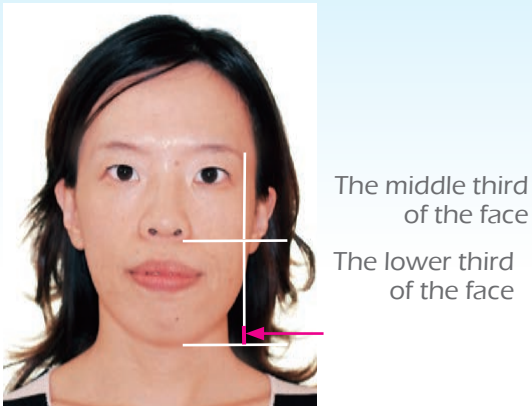
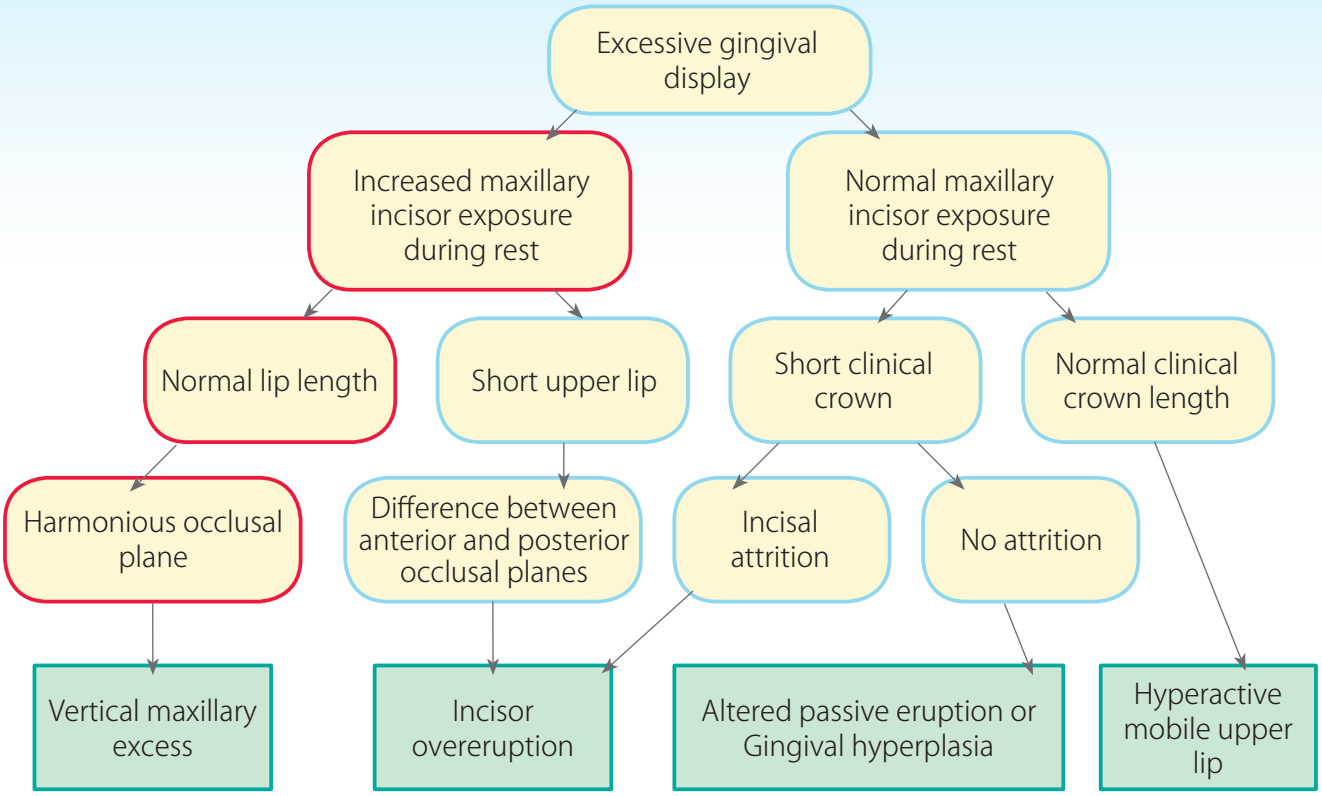


Fig. 40:
Pretreatment, the lower third of the face is longer than the middle third. The red arrow and line show the lower facial excess.

passive eruption,[8,9] abrasion of the anterior dentition with compensatory over eruption, short upper lip, hyperactive maxillary lip contraction and/or short anatomic crown. A flow chart (*Fig. 41*) was used for a systematic assessment[7] to arrive at the diagnosis for the current patient which was vertical maxillary excess with short anatomic crowns.

Gummy smile was not the patient's chief complaint, so she was not motivated for orthognathic surgery,[6] but she did desire a less invasive, interdisciplinary correction with orthodontics, periodontal surgery and prosthetics. Orthodontics treatment was needed to correct or at least improve the excessive VDO and lip protrusion. Thus, the appropriate treatment plan involved a specific sequence of interdisciplinary procedures.

Following the initial phase of orthodontic treatment, the length of the temporary crowns was adjusted (*Fig. 42*). Superimposed cephalometric tracings of the maxilla reveal that the maxillary incisors and molars were intruded (*Fig. 43*). Periodontal surgery was performed to correct the crown-to-



- Normal maxillary incisor exposure during rest: *~3-4 mm in young women, 2 mm in young men*
- Normal lip length: *20~24 mm*
- Normal crown length of maxillary central incisor: 10.5 mm

■ *Fig. 41:*
Using this flow chart, the etiology of the gingival display was determined to be vertical maxillary excess.[7] The path leading to this conclusion is marked in red.

root ratio, gingival display, and bony contour of the anterior maxilla.[10] To improve predictability, a gingivectomy[2] was performed as the initial surgery, but the results failed to meet the patient's esthetic needs, so osteoplasty and ostectomy procedures were performed.[3] The osteoplasty reshaped the anterior maxillary without removing any tooth-supporting bone. In contrast, the ostectomy removed tooth supporting bone, to denude the upper roots of the incisors (*Fig. 29*). The goals for this combined procedure was to improve the gingival scalloping architecture and decrease the protrusive appearance of the anterior maxilla. The ostectomy was performed on the labial surface of the incisors, to reduce the distance to 2mm from the CEJ to crest of the supporting alveolar bone. This relationship is consistent with biologic width for a healthy periodontium (*Fig. 44*). The osteoplasty reduced the thickness and improved the contour of the labial bone under the soft tissue. Finally, the crown root ratio was adjusted further by prosthodontic treatment.

Fig. 42:
The maxillary incisor relationship is shown at the start of treatment (top) and after the temporary crowns were adjusted (bottom) following the termination of active orthodontic treatment.

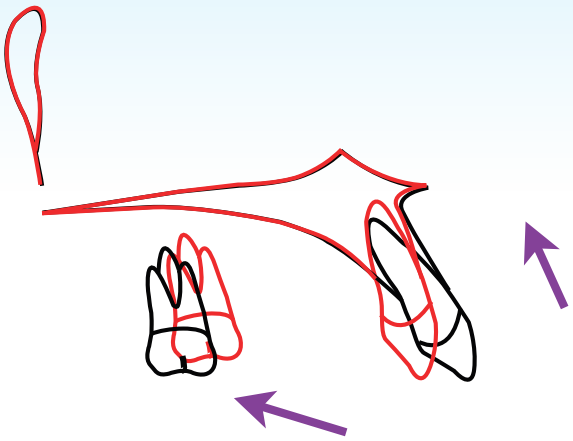


Fig. 43:
The maxillary incisors and molars molars were intruded by orthodontic treatment as demonstrated by the purple arrows.

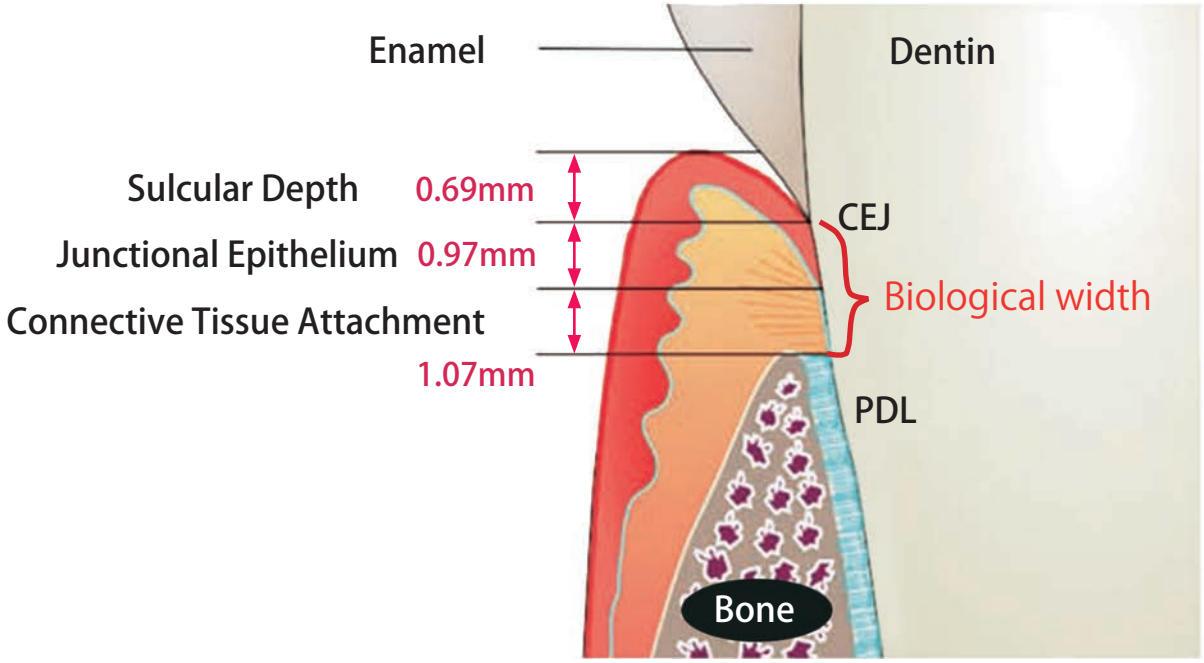
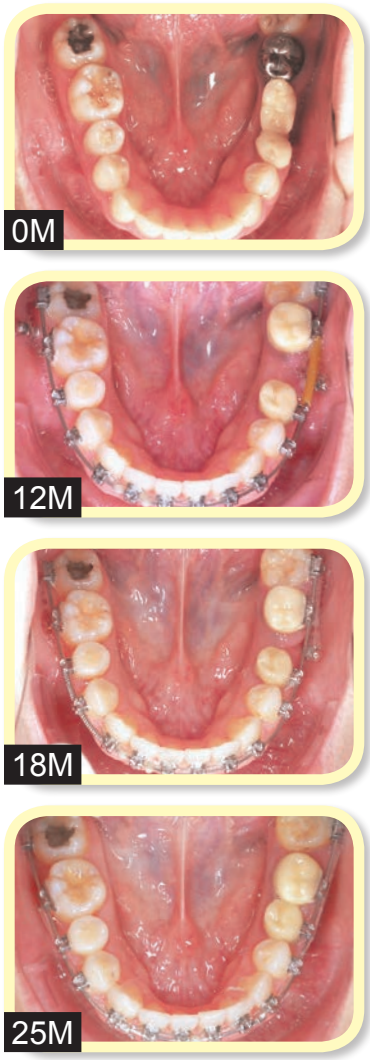


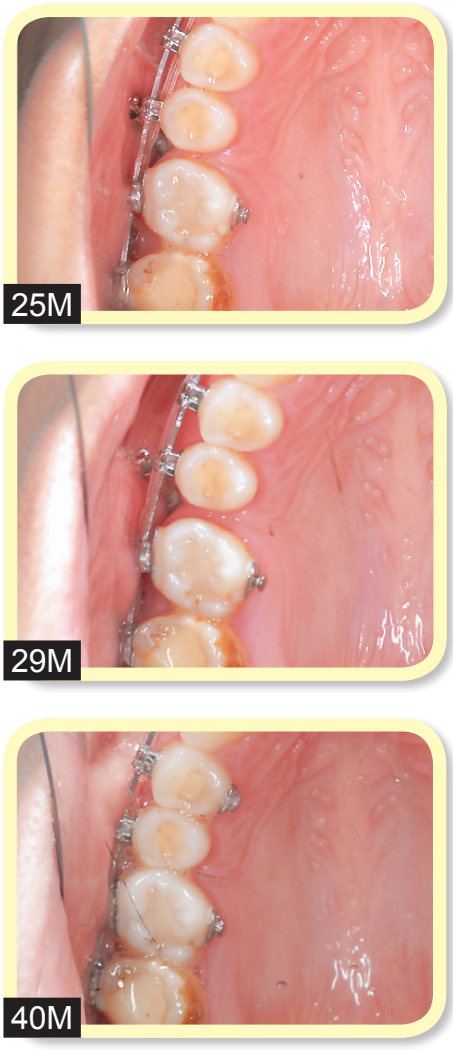
Fig. 44:
This diagram shows the morphology of an ideal biologic width when the alveolar crest is 2mm apical to the CEJ.[7]

2. Sagittal:

Surprisingly, the space in the lower arch was closed in ~25 months (*Fig. 45*) while the upper arch required 40 months (*Fig. 46*). The conservative rate of space closure in the maxillary right quadrant may have been related to the bone atrophy in the edentulous implant site that was noted prior to treatment (*Fig. 47*).[11] Another sagittal issue was the retraction of the lower right dentition, so in the 12th month of treatment a bone screw was inserted in the mandibular right buccal shelf. In the 18th month of treatment, the bone screw was removed and the patient was instructed to use Class III elastics from the lower right canine to the upper right first molar. After 7 months of elastics therapy, the Class



■ *Fig. 45:*
Compared to the pretreatment lower occlusal view (0M), the progress of lower left space closure is shown after twelve (12M), eighteen (18M), and twenty-five (25M) months of treatment.

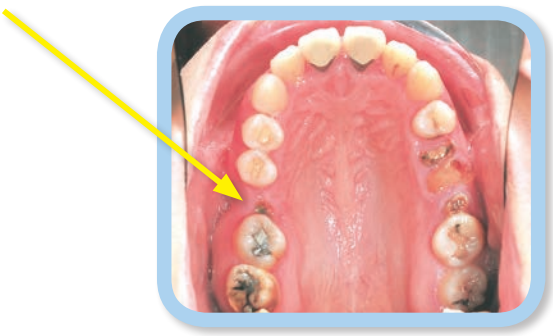


■ *Fig. 46:*
The progress of upper right space closure is shown at twenty-five (25M), twenty-nine (29M), and forty (40M) months of treatment.

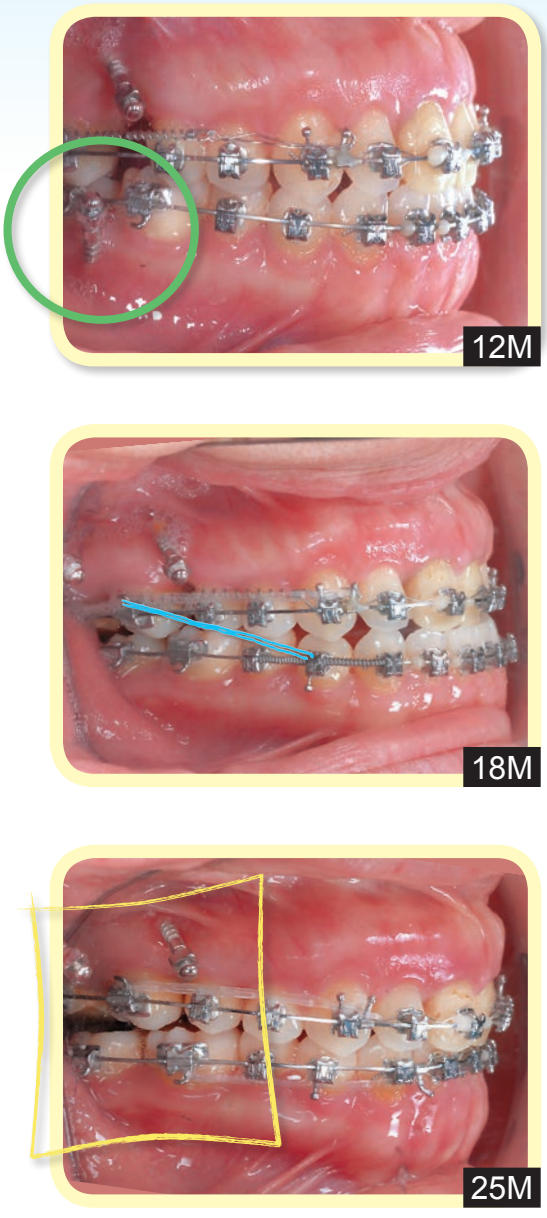
III occlusal relationship was corrected due to the Multiloop Edgewise Arch Wire (*MEAW*) effect[12,13] of the passive self ligating appliance (*Fig. 48*).

The third sagittal problem involved the need to extract a lower right premolar. This procedure helped resolve the midline discrepancy, retract the lips and reduce lower arch width to improve posterior overjet. However, a careful assessment of the dentition and face indicated the midline discrepancy was probably skeletal, and the incisors were sufficiently retracted (*Fig. 49*), so the decision was made to not extract the premolar. The patient was happy with this decision. Furthermore she was willing to accept the decreased posterior overjet, and wanted no further orthodontic treatment.

Bone atrophy



■ *Fig. 47:*
At the start of treatment there was an area of bony atrophy was noted (arrow) that was associated with a retained root tip mesial to the second molar.



■ *Fig. 48:*
Retraction of the lower right dentition at 12 months (12M) was achieved by an OBS (green circle) as anchorage. At 18 months (18M) a Class III elastic (blue line) was used to correct the sagittal discrepancy on the right side. At 25 months (25M) of treatment the buccal occlusion has been corrected (yellow lines).

Pre-Tx

Post-Tx

	Pre-Tx	Post-Tx	DIFF.
U1 TO NA	5 mm	0 mm	5 mm
U1 TO SN°	105°	89°	16°
L1 TO NB	11 mm	5 mm	6 mm
L1 TO MP°	95°	78°	17°
E-LINE UL	1.5 mm	-1 mm	2.5 mm
E-LINE LL	3.5 mm	0 mm	3.5 mm

Fig. 49:
Before and after treatment, the axial inclinations are decreased for both the maxillary and mandibular incisors, as demonstrated by the differentials (Diff.) between the pre-treatement (Pre-Tx) and post-treatment (Post-Tx) cephalometric measurements.

Conclusion

Overall, the treatment time was 62 months for the entire sequence of interdisciplinary procedures: orthodontics, implant placement, periodontal surgery, and prosthesis. The treatment sequence was complex involving the asymmetric closure of large spaces, differential tooth movement to create an optimal implant site, implant placement surgery, two periodontal surgeries, and three temporary prosthesis procedures. The final result was excellent (*CRE 26*) for the comprehensive management of a challenging mutilated dentition (*DI 26*). The patient and the clinicians were well satisfied with the result.

References

1. Chang CH. The 2B-3D rule for implant planning, placement and restoration. Int J Ortho Implantol 2012;27:96-101.
2. Newname MG, Takei HH, Carranza FA. Carranza's Clincal periodontology. 9th ed. W.B. Saunder company. P. 749, 945.
3. Newname MG, Takei HH,Carranza FA. Carranza's Clincal periodontology. 9th ed. W.B. Saunder company. P. 788.
4. Robbins JW. Differential diagnosis and treatment of excess gingival display. Pract Periodont Aesthet Dent 1999;11(2):265-272.
5. Allen EP: Use of mucogingival surgical procedures to enhance esthetics. Dent Clin North Am 1988;32:307-330.
6. Ezquerra F, Berrazueta MJ, Ruiz-Capillas A, et al. New approach to the gummy smile. Plast Reconstr surg 1999;104:1143-1150.
7. Yeh HY, Chang CH, Roberts WE. Implant-orthodontic combined treatment for gummy smile with multiple missing teeth. Int J Orthod Implantol 2013;32:16-32.
8. Weinberg MA, Eskow RN. An overview of delayed passive eruption. Compend Contin Educ Dent 2000;21(6):511-4.

9. Coslet JG, Vanarsdall R. Diagnosis and classification of delayed passive eruption of the dentogingival junction in the adult. Alpha Omegan 1977;70(3):24-28.

10. Hempton TJ, Esrason F. Crown lengthening to facilitate restorative treatment in the presence of incomplete passive eruption. CDA Journal 2000;28(4):290-298.

11. Roberts WE, Marshall KJ, Mozsary PG. Rigid endosseous implant utilized as anchorage to protract molars and close an atrophic extraction site. Angle Orthod 1990;60(2):135-152.

12. Lin JJ. Creative Orthodontics Blending the Damon System & TADs to manage difficult malocclusions. 2nd ed. Taipei: Yong-Chieh;2010. p. 171-186.

13. Kim YH, Han UK. The versatility and effectiveness of the Multiloop Edgewise Archwire (MEAW) in treatment of various malocclusions. World J Orthod 2001;2:208-218.

Discrepancy Index Worksheet

TOTAL D.I. SCORE 26

OVERJET

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

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

Total = 2

OVERBITE

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

Total = 0

ANTERIOR OPEN BITE

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

Total = 1

LATERAL OPEN BITE

2 pts. per mm. per tooth

Total = 0

CROWDING (only one arch)

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

Total = 0

OCCLUSION

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

Total = 0

LINGUAL POSTERIOR X-BITE

1 pt. per tooth Total = 1

BUCCAL POSTERIOR X-BITE

2 pts. per tooth Total = 0

CEPHALOMETRICS (See Instructions)

ANB ≥ 6° or ≤ -2° = 4 pts.

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

Each degree > 6° 1 x 1 pt. = 1

SN-MP

≥ 38° = 2 pts.

Each degree > 38° 2 x 2 pts. = 4

≤ 26° = 1 pt.

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

1 to MP ≥ 99° = 1 pt.

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

Total = 11

OTHER (See Instructions)

Supernumerary teeth	_____ x 1 pt. =	_____
Ankylosis of perm. teeth	_____ x 2 pts. =	_____
Anomalous morphology	_____ x 2 pts. =	_____
Impaction (except 3rd molars)	_____ x 2 pts. =	_____
Midline discrepancy (≥3mm)	@ 2 pts. =	2
Missing teeth (except 3rd molars)	4 x 1 pts. =	4
Missing teeth, congenital	_____ x 2 pts. =	_____
Spacing (4 or more, per arch)	_____ x 2 pts. =	2
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 = 11

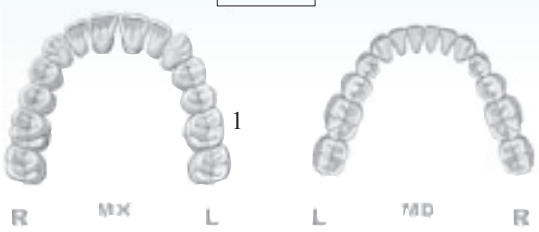
Cast-Radiograph Evaluation

Case # **Patient**

Total Score: 26

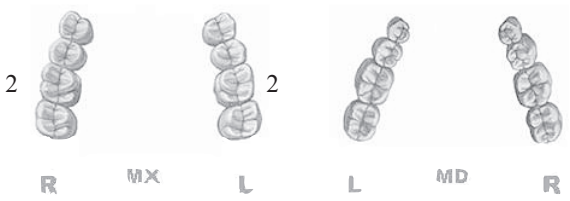
Alignment/Rotations

1



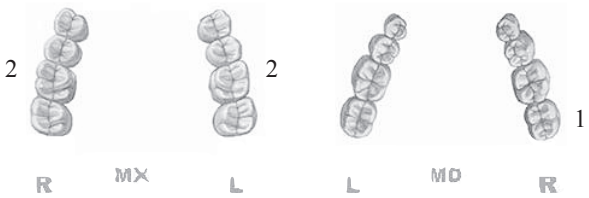
Marginal Ridges

4



Buccolingual Inclination

4

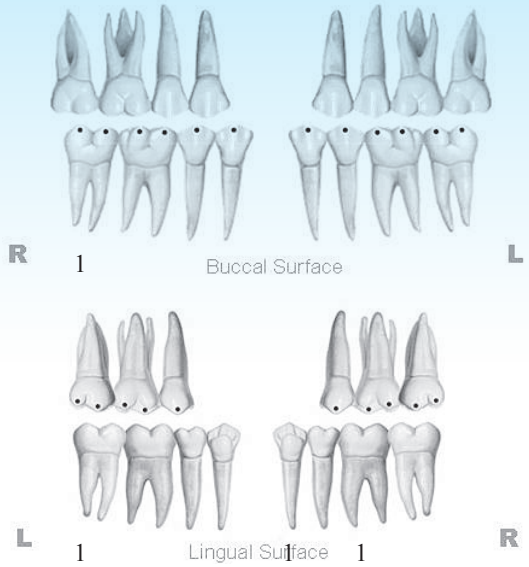


Overjet

5

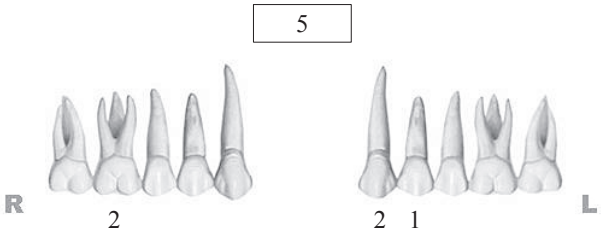
Occlusal Contacts

5



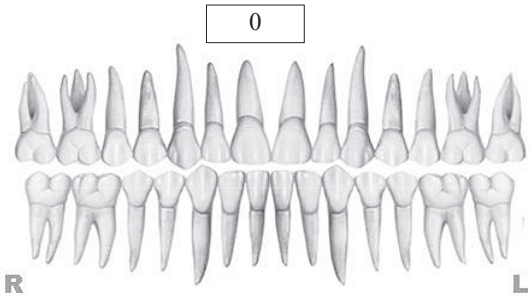
Occlusal Relationships

5



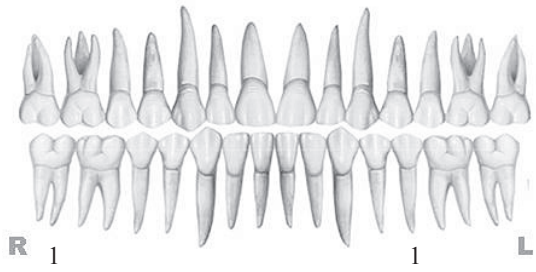
Interproximal Contacts

0



Root Angulation

2



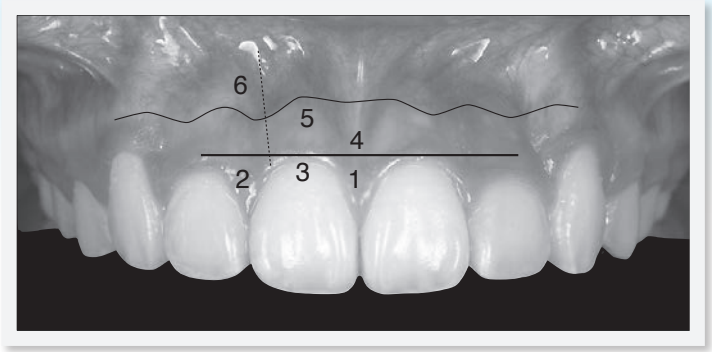
INSTRUCTIONS: Place score beside each deficient tooth and enter total score for each parameter in the white box. Mark extracted teeth with "X". Second molars should be in occlusion.

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

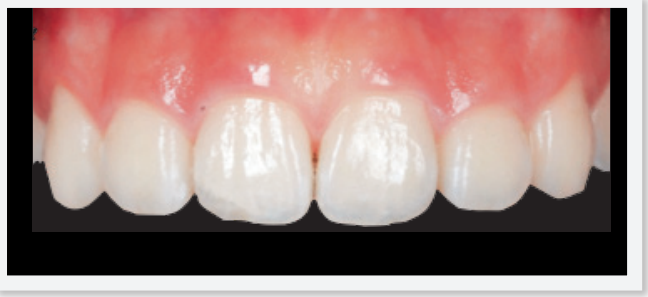
Total Score: = 1

1. Pink Esthetic Score

Total = 1



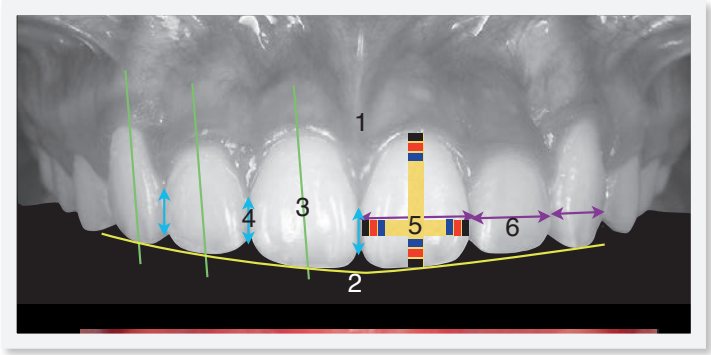
1. Mesial Papilla	0	1	2
2. Distal Papilla	0	1	2
3. Curvature of Gingival Margin	0	1	2
4. Level of Gingival Margin	0	1	2
5. Root Convexity (Torque)	0	1	2
6. Scar Formation	0	1	2



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

2. White Esthetic Score (for Micro-esthetics)

Total = 0



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

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

IBOI Pink & White Esthetic Score

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

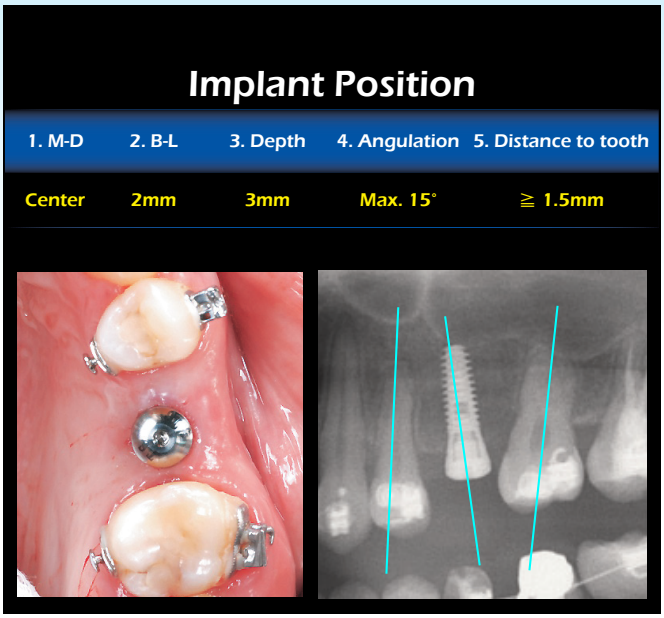
2. White Esthetic Score (for Single-implant)

Total = 1

1. Tooth Form	(0)	1	2
2. Mesial & Distal Outline	(0)	1	2
3. Crown Margin	(0)	1	2
4. Translucency (Incisal third)	(0)	1	2
5. Hue & Value (Middle Third)	(0)	1	2
6. Tooth Proportion	0	(1)	2

Implant-Abutment Transition & Position Analysis

1. Implant Position

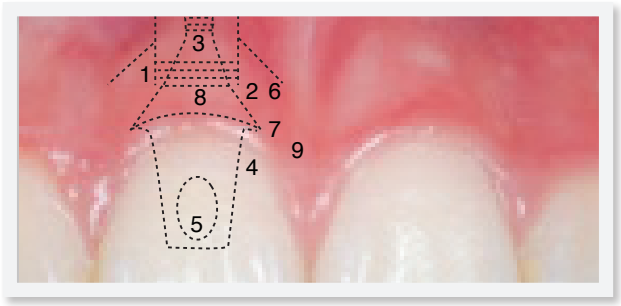


Total = 2

1. M & D (Center)	0	1	2
2. B & L (Buccal 2 mm)	0	1	2
3. Depth (3 mm)	0	1	2
4. Angulation (Max. 15°)	0	1	2
5. Distance to Adjacent Anatomy	0	1	2

1. M & D (Center)	0	(1)	2
2. B & L (Buccal 2 mm)	(0)	1	2
3. Depth (3 mm)	(0)	1	2
4. Angulation (Max. 15°)	0	(1)	2
5. Distance to Adjacent Anatomy	(0)	1	2

2. Abutment transition Contour



E : external connection,
I : internal connection,
S : screw type,
C : cement type,
P : palatal/central,
B : buccal

Total = 0

1. Fixture Cervical Design	N	Y			
2. Platform Switch	N	Y			
3. I-A Connection Type	E	I			
4. Abutment Selection	S	C			
5. Screw Hole Position	P	B			
6. Marginal Bone Loss	N	Y	0	1	2
7. Modified Gingival Contour	N	Y	0	1	2
8. Gingival Height	N	Y	0	1	2
9. Crown margin fitness	N	Y	0	1	2

1. Fixture Cervical Design	(N)	Y			
2. Platform Switch	N	(Y)			
3. I-A Connection Type	E	(I)			
4. Abutment Selection	S	(C)			
5. Screw Hole Position	(P)	B			
6. Marginal Bone Loss	N	Y	(0)	1	2
7. Modified Gingival Contour	N	Y	(0)	1	2
8. Gingival Height	N	Y	(0)	1	2
9. Crown margin fitness	N	Y	(0)	1	2

Herman Ostrow School of Dentistry of USC

Continuing Professional Education

USC University of Southern California

南加大植牙專科進修課程

2015

時間：7/19~20, 2015 (日，一 - 演講與實作 workshop)
9/20~21, 2015 (日，一 - 演講與實作 workshop)
11/22~23, 2015 (日，一 - 演講與實作 workshop)
1/25, 2016 (一 - 美國演講)
1/27, 2016 (三 - 美國可選修的 cadaver workshop)
1/29~30, 2016 (五，六 - 美國演講，畢業典禮)
8/30, 2015 (日 - 視訊教學)
10/18, 2015 (日 - 視訊教學)
12/13, 2015 (日 - 視訊教學)
1/26, 2016 (二 - 美國演講)
1/28, 2016 (四 - 美國可選修的 cadaver workshop)
1/31, 2016 (日 - 美國可選修的 cadaver workshop)

地點：集思交通部國際會議中心　台北市中正區杭州南路一段 24 號 (2015 年 7 月到 12 月)
USC Campus and Millennium Biltmore Hotel Los Angeles. 506 South Grand Avenue. Los Angeles, CA 90071-2607

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Yang Chai

南加大牙醫學院顱面分子生物研究學院副院長，南加大顱面分子生物博士，北京大學牙科學士及口腔顎面外科培訓。

Parish Sedghizadeh

南加大牙醫學院臨床牙科，牙周病科，診斷學和牙齒衛生終身副教授，美國口腔委員會口腔顎面委員。

Ramin Mahallati

南加大牙醫學院臨床講師，畢業於南加大牙醫學院，口腔修復專業培訓。

演講嘉賓：Niklaus P. Lang、Fernando Rojas-Vizcaya、Stephen Wallace、Lyndon Cooper

USC	金牛頓藝術科技
聯絡人：Julie E-mail：julie.chen@usc.edu 電話：+1-213-821-5281	聯絡人：朱央如 E-mail：bellabala@newtonsa.com.tw 電話：(03) 573-5676

第6期 2015 Newton's Implant 金牛頓植牙論壇

時間：2015年03月20日起，上午 9:00～12:00　**地點**：金牛頓教育中心（新竹市建中一路25號2樓）

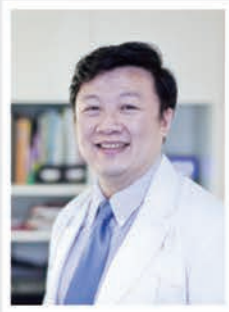
現在的牙科治療已經是各科統合彙整的時代，協同矯正、植體、牙周、補綴讓治療成果臻於完美是我們追求的目標。2015年的課程規劃再突破，精選四年來在台舉辦 USC 南加大植牙進修課程精華，由在臨床及演講領域裡經驗豐富的張慧男、蘇筌瑋和邱上珍醫師共同主講，並導讀經典期刊、深入分析 iAOI 精緻完工案例，化繁為簡。植牙入門者可以輕鬆、有效率地學習，專科醫師也可獲得全新的植牙概念及技術，持續精進！

關於植牙論壇的定位與期許：

1. 將目前眾多植牙演講精華，重新整理過在自己的場合報告。
2. 提供訓練平台供學員報告自己的case，從中相互學習。
3. 提升助教的演講技巧，培養新講師群。
4. 作為未來IAOI矯正植牙專科醫師考試的考前訓練班。

報名專線：03-5735676 黃登鍵先生

	日期	USC 學程精選（主講：張慧男、蘇筌瑋、邱上珍醫師）	經典期刊導讀	iAOI 經典案例
1	3/20	Dr. Homa: Biomechanical considerations, ridge preservation	Introduction of implant system, ridge preservation	Case 01
2	4/24	Dr. Homa: Decision tree for reduced bone volume	Short implant vs immediate implant	Case 02
3	5/22	Dr. Homa: Vertical Incision Subperiosteal Tunnel Access(VISTA)	VISTA: cross link etween ortho & implant	Case 03
4	6/26	Dr. Fernando: Prosthetic consideration in implant therapy	2B3D rule - single implant	Case 04
5	7/31	Dr. Fernando: Implant site planning	2B3D rule - multiple implants	Case 05
6	8/21	Dr. Fernando: Material selection, loading protocol	Smile design	Case 06
7	9/18	Dr. Chiu: Case presentation - Full mouth rehabilitation	GBR	Case 07
8	10/23	Dr. Wallace: Sinus lifting	Sinus lifting	Case 08
9	11/20	Dr. Baldwin: Abutment selection	Abutment selection	Case 09
10	12/18	Dr. Baldwin: Implant occlusion	Implant occlusion	Case 10



學歷：
高雄醫學大學牙醫學系畢業
台灣大學臨床牙醫科學研究所碩、博士
美國俄亥俄州立大學牙博士研究員

經歷：
台北醫學大學牙醫學系兼任助理教授
中華民國牙髓病學會專審委員及理事
中華牙醫學會永久會員
美國牙髓病專科醫師學會專科會員
中華民國家庭牙醫學會專科醫師
台大醫院牙髓病科兼任主治醫師
台北市立萬芳醫院根管治療科兼任主治醫師
財團法人天主教耕莘醫院牙髓病科主任
白石牙醫診所暨教育中心院長

報名資訊

主辦單位
臺灣楓城牙醫學會

協辦單位
湧傑企業股份有限公司

報名方式
名額有限，欲報從速。
請先電話報名並於3日內
劃撥費用至
戶名：湧傑企業股份有限公司
帳號：17471807

報名費用
NT$ 2000元，參加即贈送
TF Adaptive Small Procedure Pack 一盒
*人數到達10人才開班

*報名未出席者，恕不退回既收款項費用

報名專線
台中：04-2305-8915 張's
高雄：07-226-0030 王's

上課時間＆地點
台中 - 2015年 07/26 (日) 早上9:00-12:00
中國文化大學推廣教育部-台中教育中心(307教室)
台中市西屯區臺灣大道三段658號3F(Rich19大樓)

高雄 - 2015年 10/18 (日) 早上9:00-12:00
國立科學工藝博物館南館 107 教室
高雄市三民區九如一路797號

課程介紹

近二十年對醫師作根管治療影響最大的就是鎳鈦旋轉器械的出現，它讓牙醫師們既期待又怕受傷害；期待的是藉由它的高彈性及高效率應付彎曲根管的修形，但又不會無預警地在根管中斷裂。而影響器械臨床表現的主要因素，例如器械的斷面與溝槽設計、冶金製造技術、原始材料特性、運轉模式、錐度與尖端大小的搭配方式、與根管壁接觸面積等，常取決於它們的顯微結構以及相關機械熱處理的製程。

而改變製程的最大目標就是要提升器械的抗疲勞斷裂強度，例如最近發展由 R-Phase Wire所製造之鎳鈦旋轉器械、以往覆式運動取代360度的運轉模式等，這意味鎳鈦金屬合金已經進展到下一個世代。對臨床醫師來說，在操作這些器械之前一定要更清楚新式器械的特性。所以本次演講的目的，就是希望藉由 李偉明 醫師專業又幽默風趣的表達，協助醫師在挑選及運用鎳鈦旋轉器械的時候，能具備更有立論基礎的必要知識，讓根管治療能進行得更順暢，達到更高品質的醫療服務。

2015.5.17(Sun.)Taipei

根管治療・鞭辟入裡

Problem Solving Essentials in Endodontics

Dr. Bernice Ko

INTRODUCTION OF LECTURE

Problem Solving Essentials in Endodontics

This presentation will focus on endodontic troubleshooting modalities relevant for the general dentists in their day to day practice. Each case will review the diagnostic thinking involved, the systematic approach to clinical treatment, retreatment, repair and the clinical recall outcomes. A simplified approach to the diagnostic dilemmas on an emergency visit will be addressed specifically Dr. Dudley Glick' s Referred Pain Pathways, pain to cold/hot temperature from an endodontically-treated tooth and the Endodontic-Periodontal Controversy. Case presentations will include: Differential diagnosis of a Myofascial Pain or Sinus Pain from a toothache, Differential diagnosis of a Large Radiographic Lesion involving multiple teeth, Prevention of Endodontic Mishaps and Repair, Reading the Dentinal Map to efficiently locate calcified MB2 canal/secondary canals, Prevention of hand and rotary files from breaking, Precautions to minimize underfills/overfills, Extra-canal Invasive Root Resorption Treatment, Endodontic applications of Cone-beam CT, Combined Surgical Endodontic-Periodontal Treatment, and a simplified approach to Apexogenesis, Apexification and Regenerative Endodontics.

SPEAKER

Dr. Bernice Ko D.D.S.

Diplomate of the American Board of Endodontics

Dr. Bernice Ko is the Course Director of the University of California, Los Angeles(UCLA) Endodontic Continuum Lecture and Hands-on Workshop.

This course has successfully served both local and foreign general dentists since 1997 in their day to day endodontic clinical procedures. She received her dental degree and completed her postgraduate training in Hospital Dentistry and Endodontics at UCLA. Dr. Ko is a Diplomate with the American Board of Endodontics and is a Lecture with the Section of Endodontics at UCLA. Dr. Ko was the former Director of the UCLA Postdoctoral Endodontics Program providing advanced training to residents in their endodontic didactic, laboratory, clinical and research curriculum. She was also the former President of the Southern California Academy of Endodontics and the Omicron Kappa Upsilon National Dental Honor Society, UCLA School of Dentistry Chapter. Presently, she maintains an Endodontic-Periodontic private practice in West Los Angeles, California with Dr.Thien Nguyen, Dr. Todd Yamada and Dr. Daraporm Tanpattana.

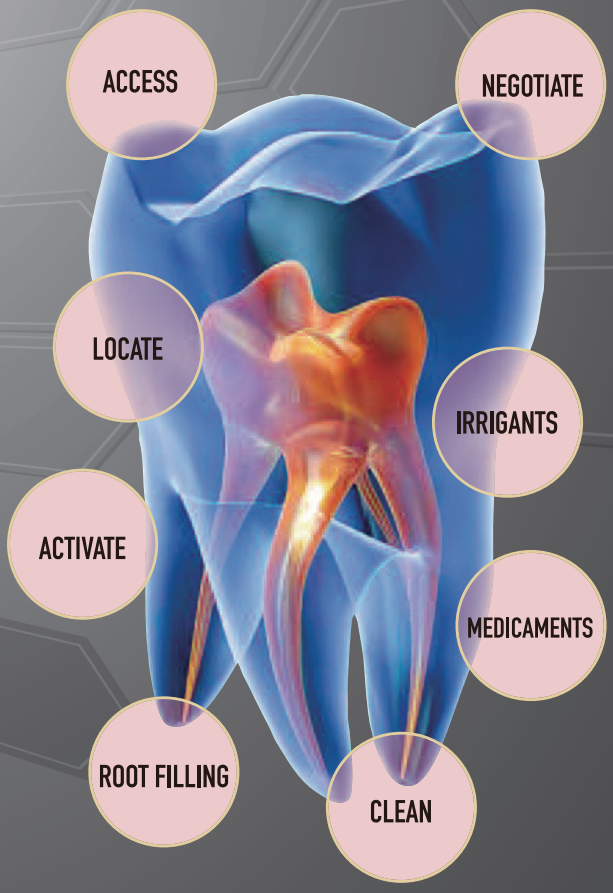
RECOMMEND

謝松志醫師

波士頓大學牙髓病學博士暨專科訓練
臺北醫學大學牙髓病學科主任暨副教授
中華民國牙髓病科專科醫師

Dr.Bernice Ko 在UCLA牙醫學系接受牙醫教育和完整的牙髓病專科訓練並取得美國牙髓病專科醫師。學成後並在UCLA擔任指導和訓練牙髓病專科醫師的重任 。很榮幸有機會邀請 Dr.Bernice Ko 來本校演講，本次內容將牙醫師常遇到的問題，從病例系統性的分析，診斷至臨床處理與追蹤完整的介紹。內容涵蓋牙周與牙髓病 / 顏面肌與齒源性鼻竇的鑑別診斷與治療，如何有效率地找到鈣化的MB2，討論避免根管治療錯誤和解決失誤的方法。

另外Dr.Bernice Ko 在實作課程中將剖析使用新式鎳鈦旋轉器械的要領，如何安全有效的修形狹窄彎曲的根管，提高根管治療的品質與成功率。本次演講與實作內容豐富精彩，相信與會者將有滿滿的收穫！



SCHEDULE

08:30~09:00	Registration Time
09:00~10:15	Lecture
10:15~10:30	Coffee Break
10:30~12:30	Lecture
12:30~13:30	Lunch Time
13:30~15:00	Hands-on
15:00~15:15	Coffee Break
15:15~16:30	Hands-on
16:30~17:00	Q & A

INFORMATION OF LECTURE

Organizer 臺北醫學大學口腔醫學院牙醫學系/牙髓病學科
臺北醫學大學萬芳醫院牙髓病科
中華民國牙髓病學會

Co-Organizer 湧傑企業股份有限公司

Speaker Dr. Bernice Ko

Time 2015/5/17 (Sun.) 9:00am~5:00pm

Venue 臺北醫學大學醫學綜合大樓後棟1F - 8101教室
臺北市信義區吳興街250號

Fee 2015/5/5前
上午Lecture : 會員2000元 / 非會員3000元 / 學生1000元
下午Hands-on : 會員2000元 / 非會員3000元 (限額30名)
Lecture+Hands-on : 會員3000元 / 非會員5000元
2015/5/5後
上午Lecture : 會員3000元 / 非會員4000元 / 學生2000元
下午Hands-on : 會員3000元 / 非會員4000元 (限額30名)
Lecture+Hands-on : 會員4000元 / 非會員6000元

Registration 1. 電話報名 2. 並於三日內劃撥，始完成報名
名額有限，請先電洽，滿額即不再接受報名
02-27788315 分機#131林小姐 / #124王小姐
戶名：湧傑企業股份有限公司
郵政劃撥帳號：17471807（於通訊欄註明報名場次）

Certification 參加者發給繼續教育學分
（紙本學分證明 100 元）

Remark 活動備茶點及午餐，素食請先告知
報名未出席者恕不退還既收款項

Correction of a Full Cusp Class II Malocclusion and Palatal Impingement with Intermaxillary Elastics

Abstract

A 13yr 5mo old female presented with a bilateral full cusp, Class II malocclusion, large overjet, deep curve of Spee and palatal impingement. A passive self-ligating appliance, with maxillary anterior bite turbos, was used as a platform for the application of an array of intermaxillary elastics. The severe Class II malocclusion, Discrepancy Index (DI) of 25, was conservatively corrected in 18 months to an excellent result, as documented with a Cast Radiograph Evaluation (CRE) of 21 and a Pink & White (P&W) dental esthetics score of 3. (Int J Othod Implantol 2015;38:54-72)

Key words:

large overjet, palatal impingement, bite turbos, early light short elastics, Class II orthodontic mechanics, finishing elastics, residual Class II relationship

History and Etiology

A 13-year-5-month-old female was referred by her dentist for orthodontic consultation (*Fig. 1*) because of difficulty incising food. There was no contributory medical or dental history. A clinical examination revealed protrusive lips, large overjet, deep lower curve of Spee, and palatal impingement (*Figs. 2 and 3*). Intraoral photographs and study casts confirmed a bilateral, full-cusp Class II molar relationship. Careful evaluation of the patient's age, facial profile, and occlusal problems suggested the etiology of the malocclusion was due to a lip trap (*lower incisors posture between the incisors*) and forward (*counterclockwise*) rotation of the mandibular arch.

The patient was treated to a pleasing result as shown in Figs. 4-9. Pre-treatment (*Fig. 7*) and post-treatment (*Fig. 8*) cephalometric and panoramic radiographs document the dental and skeletal relationships. Superimposed cephalometric tracings reveal the treatment achieved (*Fig. 9*). The details for diagnosis and treatment are discussed below.

Diagnosis

Skeletal:

- Skeletal Class II (*SNA 81°, SNB 78°, ANB 3°*)
- Mandibular plane angle (*SN-MP 26°, FMA 21°*)

Dental:

- Bilateral full cusp Class II molar relationship
- Overjet was 7mm (*Fig. 10*)
- Overbite 3.5 mm and the with palatal impingement.
- Curve of Spee was ~5mm.

Facial:

- Moderate convex profile with protrusive lips

Dr. Linda Tseng,
Instructor, Beethoven Orthodontic Course (Left)

Dr. Chris Chang,
Founder, Beethoven Orthodontic Center
Publisher, International Journal of Orthodontics& Implantology (middle)

W. Eugene Roberts,
Chief editor, International Journal of Orthodontics & Implantology (right)

Fig. 1: Pre-treatment facial photographs

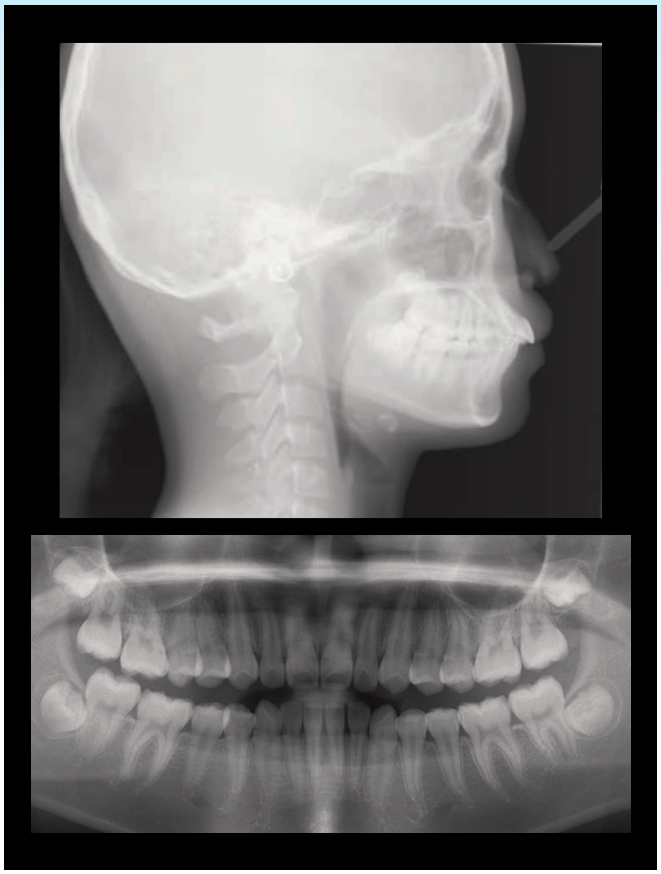
Fig. 4: Post-treatment facial photographs

Fig. 2: Pre-treatment intraoral photographs

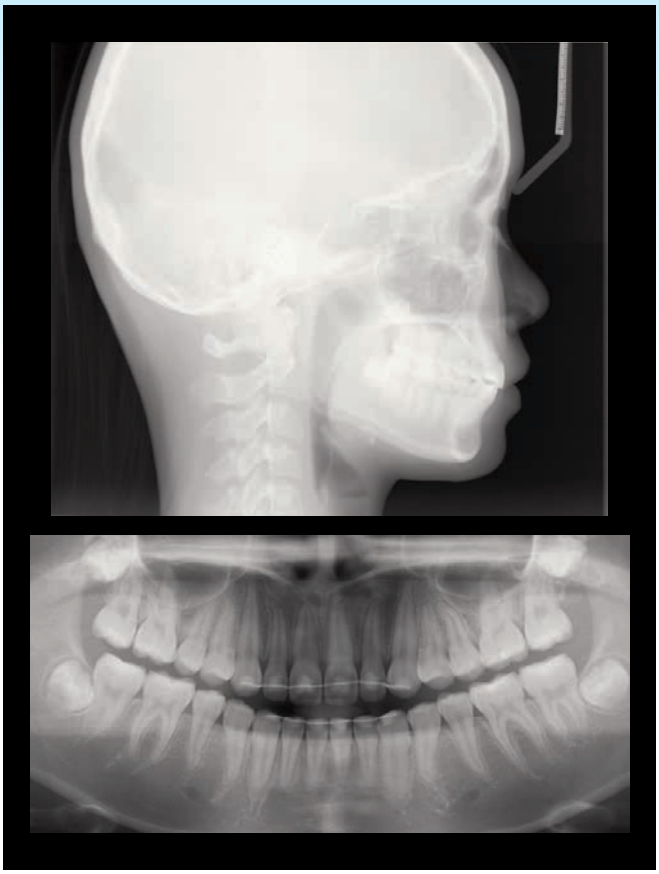
Fig. 5: Post-treatment intraoral photographs

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

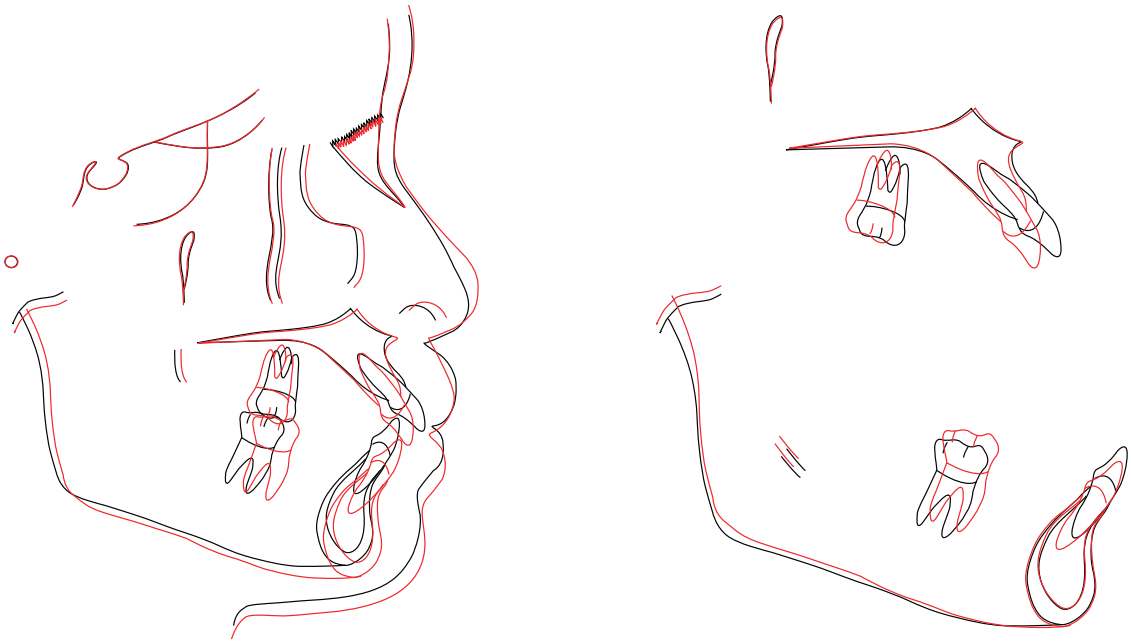
Fig. 6: Post-treatment study models (casts)



■ *Fig. 7:*
Pre-treatment cephalometric and panoramic radiographs



■ *Fig. 8:*
Post-treatment cephalometric and panoramic radiographs



■ *Fig. 9:*
Pre-treatment (black) and post-treatment (red) cephalometric tracings superimposed on the anterior cranial base (left) show normal growth, clockwise rotation of the mandible, and an improved facial profile. Maxillary superimposition (upper right) documents the retraction of the entire upper dentition. Mandibular superimposition (lower right) reveals that the flattening of the curve of Spee was accomplished by extruding the molars and intruding the incisors.

Fig. 10:
Pre-treatment there was palatal impingement with 7mm overjet.

The ABO Discrepancy Index (*DI*) was 25 as shown in the subsequent worksheet.

Specific Objectives of Treatment

Maxilla (*all three planes*):

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

Mandible (*all three planes*):

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

Maxillary Dentition

- A - P: *Retract*
- Vertical: *Maintain*
- Inter-molar Width: *Maintain*

Mandibular Dentition

- A - P: *Maintain*
- Vertical: *Extrude molars, intrude incisors*
- Inter-molar / Inter-canine Width: *Maintain*

Facial Esthetics: *Retract the upper lip*

Treatment Plan

Place a full fixed orthodontic appliance to align and level the dentition with a non-extraction approach. Expedite leveling of the curve of Spee with a series of bite turbos (*BTs*), placed first on the lower molars and next on the upper incisors, along with light short Class II elastics. Subsequently, use conventional Class II elastics to protract the mandible and rotate the occlusal plane, clockwise to correct the sagittal discrepancy. Intermaxillary elastics and detailing bends are planned to produce the final occlusion. After debonding, place upper and lower fixed anterior retainers, and fabricate clear overlay retainers for both arches.

CEPHALOMETRIC			
SKELETAL ANALYSIS			
	PRE-Tx	POST-Tx	DIFF.
SNA°	81°	82°	1°
SNB°	78°	80°	2°
ANB°	3°	2°	1°
SN-MP°	26°	26°	0°
FMA°	21°	21°	0°
DENTAL ANALYSIS			
U1 TO NA mm	9 mm	5 mm	4 mm
U1 TO SN°	120°	107°	13°
L1 TO NB mm	7 mm	6 mm	1 mm
L1 TO MP°	106°	110°	4°
FACIAL ANALYSIS			
E-LINE UL	2.5 mm	-0.5 mm	3 mm
E-LINE LL	2mm	1 mm	1 mm

Table 1: Cephalometric summary

Appliances and Treatment Progress

A .022" slot standard torque Damon D3MX® bracket system (*Ormco, Glendora, CA*) was used. All elastics and archwires used were supplied by the same manufacturer. The maxillary arch was bonded for initial alignment to facilitate the bonding of the mandibular arch the next month. When the lower arch was bonded, bracket interference required installation of two bite turbos (*BTs*), constructed with FUJI II glass ionomer cement (*GIC*) on the lower first molars (*#19 and 30*) (*Figs. 11, 12*). In the 2nd month, the upper arch wire was changed to .014x.025" CuNiTi. In the 4th month, two metal bite turbos were bonded on the palatal surface of the maxillary central incisors (*#8 and 9*). Early light short class II elastics (*Quail 3/16" 2oz*) were applied from lower first molars to upper first premolars to protract the mandible and extrude the lower molars (*Figs. 13, 14*). Once the buccal

Fig. 11:
Bite-turbos made of type II glass ionomer cement were attached to the occlusal surfaces of the lower first molars to prevent bracket interference during the initial alignment phase.

Fig. 12:
The bite was opened slightly with the BTs, just enough to control bracket interference.

Fig. 13:
Anterior BTs provided an incisal stop that allowed the posterior segments to extrude and level to correct the lower curve of Spee. In addition, the mandible was free to move anteriorly for a more comfortable occlusion with the maxilla.

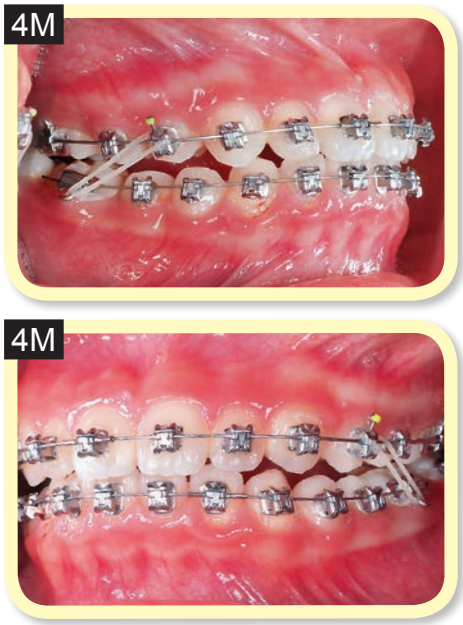


Fig. 14:
Early light short class II elastics were applied from lower first molars to upper first premolars to move the mandible forward and extrude the lower molars.

segments reached the occlusal plane, the posterior BTs were removed (*Fig. 15*). In the 6th month, the upper arch wire was changed to .017x.025" TMA. The anteriors were consolidated with a figure-8 steel ligature tie. The lower arch wire was changed to .014x.025" CuNiTi. In the 8th month, the bracket on tooth #29 was repositioned mesially (*Fig. 16*). The light short elastics were replaced with conventional Class II elastics (*Fox 1/4" 3.5oz*), stretched from the lower first molars to the upper canines. In the 10th month, a panoramic radiograph was exposed to evaluate bracket positions relative to the axial inclinations of all teeth (*Fig. 17*). The lower arch wire was changed to .017x.025" TMA. At 11 months, some occlusal irregularities were noted (*Fig. 18*) and records collection was scheduled for two months later. In the 13th month of active treatment, progress records were collected. The dental casts were assessed using the Cast Radiograph Evaluation (*CRE*) method established by the American Board of Orthodontics (*ABO*), and an open bite in the cuspid area was noticed. To help seat the canines, Monkey® (*3/8" 3.5oz*) elastics were applied in an L-configuration: from the lower first molar, over the upper canine bracket, and

Fig. 15:
BTs were removed as soon as the lower arch was aligned.

Fig. 16: Bracket on #29 was repositioned mesially.

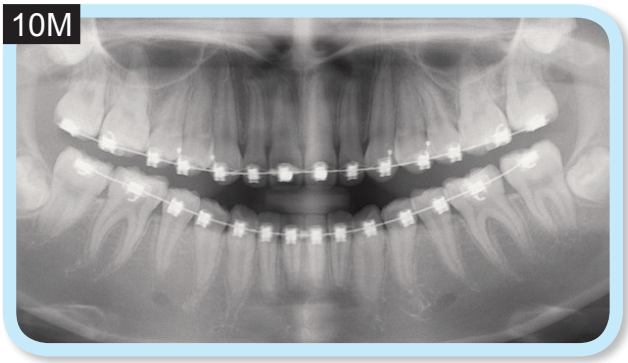


Fig. 17:
A panoramic radiograph was exposed to evaluate bracket positions relative to the axial inclinations of the teeth.

Fig. 18:
Open occlusal contacts (embrasures) were noted in the cuspid regions.

then attached to the lower canine, bilaterally (*Fig. 19*). In the 14th month, alignment finishing was achieved with first order bends on teeth #5, 6, and 13. Elastic configurations were changed to seat the buccal occlusion (*Fig. 20*). For the intermaxillary finishing stage, the appointments were scheduled every other week. Detailing bends and setting elastics produced the desired alignment (*Figs. 20-23*). Six weeks prior to the completion of active treatment, the upper arch wire was sectioned distal to the cuspids. Closing elastics (*Bear® 1/4" 4.5 oz*) were used to improve occlusal contacts (*Fig. 23*). Following 18 months of active treatment, all appliances were removed and retainers were delivered: fixed anterior retainers and clear overlays were for both arches (*Fig. 24*).

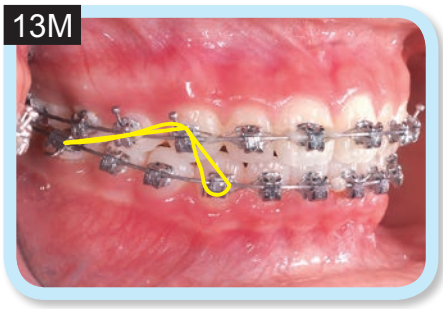


Fig. 19:
Use reverse L-shape elastics (yellow) help improve occlusal contact and embrasure relationships.

Fig. 20:
M-shape configuration of larger diameter elastics (Moose 5/16" 6oz) help seat the occlusion

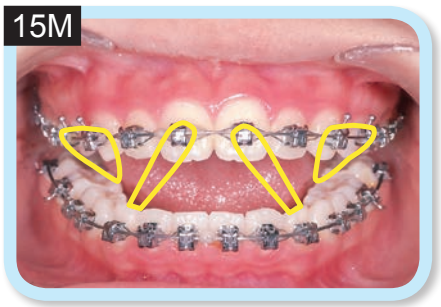


Fig. 21:
Criss-Cross elastics from buccal side of upper teeth to lingual side of lower teeth were used to rectify the buccal overjet. (Monkey 3/8" 3.5oz)

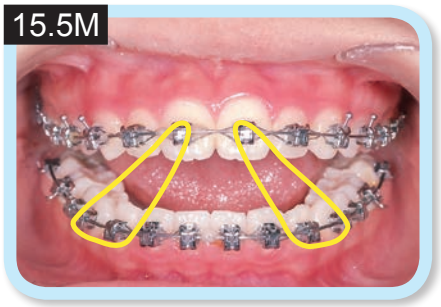


Fig. 22: Triangular elastics with class II pull (Bear 1/4" 4.5oz)

Fig. 23:
Multiple box and triangular configurations (Bear ¼" 4.5oz) were used from 16-18 months to refine intercuspation. The upper arch wire was sectioned distally to the cuspids, and closing elastics were used to improve occlusal contacts.

Fig. 24:
Fixed retainers were bonded from canine to canine for both arches.

Results Achieved

Maxilla (*all three planes*):

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

Mandible (*all three planes*):

- A - P: *Favorable growth expressed*
- Vertical: *Favorable growth expressed*
- Transverse: *Maintained*

Maxillary Dentition

- A - P: *Retracted*
- Vertical: *Maintained for the molars and extruded in the incisal region*
- Inter-molar / Inter-canine Width: *Maintained*

Mandibular Dentition

- A - P: *Maintained*
- Vertical: *Molars extruded, incisors intruded*
- Inter-molar / Inter-canine Width: *Maintained*

Facial Esthetics: Straight profile

Retention

Fixed retainers were bonded on the lingual surface, from canine to canine, in both arches. Full time wear was prescribed for the clear overlay retainers for the first 6 months and then nights only. The patient was instructed in home hygiene, and for the proper maintenance of the retainers.

Final Evaluation of Treatment

The ABO CRE score was 21 points, which is an excellent clinical result for this difficult malocclusion (*DI 25*).[1] The large overjet and deep, impinging overbite were treated to an ideal outcome. Post treatment photographs (*Fig. 5*) and study casts (*Fig. 6*) reveal a class I molar relationship but some class II tendency in the buccal segments. The patient's facial appearance was very good. Superimposed cephalometric tracings documented the clockwise rotation of the mandible due to normal growth, as well as extrusion of the lower molars and intrusion of the lower incisors. The entire maxillary arch was retracted. The major CRE discrepancy was in the occlusal relationship (*8 points*) for the residual Class II tendency of the buccal segments. In retrospect, these problems could have been corrected by stripping the interproximal enamel of the lower incisors, retracting them to produce overjet, and then using Class II elastics to complete the correction. OrthoBoneScrews (*OBS*) at the infrazygomatic crest area would have been effective for retracting the entire maxilla, without tipping the

plane of occlusion, but a transient increase in overjet was still necessary to allow correction of the Class II tendency in the buccal segments.

Discussion

Class II Orthodontic Mechanics[1]

Assessment of orthodontic mechanics explains how applied loads move teeth and change the relationships of the jaws (*Fig. 25*). Class II elastics have predicable effects on the maxillary teeth: 1. retract the entire arch, 2. extrude the upper anterior segment, and 3. rotate the plane of occlusion clockwise because the line of force is occlusal to the center of resistance of the maxilla. The reciprocal elastic force has the opposite effect on the mandibular arch: 1. protracts buccal segments, 2. extrudes lower molars, and 3. intrudes lower incisors, to correct the curve of Spee and conform to the clockwise rotation of the occlusal plane. For Class II malocclusions, it is usually preferable to use high torque brackets on upper anteriors and low torque brackets on lower anteriors to resist the effects of intermaxillary elastics. However, for the present patient standard torque brackets were used on both arches because all incisors were labially inclined. This approach worked well for the upper arch: U1 to SN° improved from 120 to 107°, but the lower incisors flared excessively (*L1 to MP° from 106 to 110°*). This problem with the lower incisors was preventable with low torque brackets and/or the use of labial root torque in the archwire.

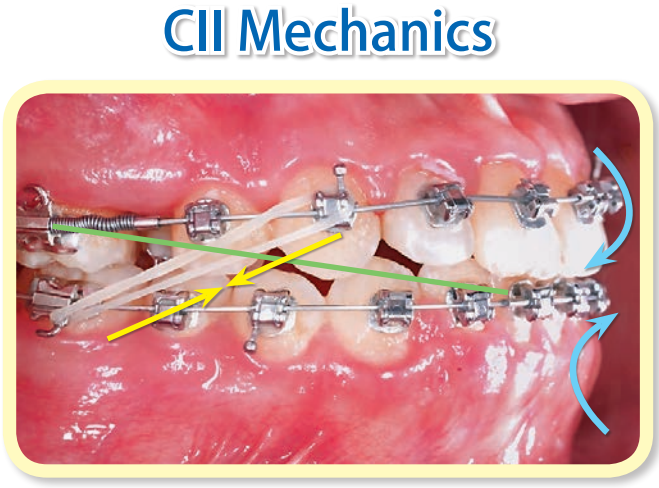


Fig. 25:
The class II elastic delivers reciprocal force (yellow arrows), which results in reciprocal moments in each arch (orange arrows), and steepening of the plane of occlusion (green arrow). Consistent with the rotation of the occlusal plane, the elastics generate components that extrude the upper anteriors and lower molars. The extrusion of the lower molars, and the intrusion of the lower incisors due to the BTs, levels the curve of Spee. The anterior component of elastics force protracts the mandibular dentition resulting in flaring of the lower incisors.

Petrovic et al.[2] revealed that Class II elastics not only move teeth, but are capable of enhancing the amount, and rate of condylar cartilage proliferation. Morphologically, this effect is manifest as lengthening and posterior rotation of the mandible in a growing patient (*Fig. 9*).

	Anterior BT	Posterior BT
Location	Anterior teeth	Molars
Material	Resin or metal	GIC or resin
Application	Low angle or deep bite cases	High angle or cross bite cases
Special Consideration	Proper inclination	Combine with squeeze exercise

Bite Turbos

Bite turbos (*BTs*) have come to mean any occlusal stops on teeth that unlock the malocclusion for greater freedom of tooth movement[3] (*Figs. 11, 13, 26*). According to where they are positioned, BTs are classified as anterior and/or posterior. Anterior BTs for deep bite cases are bonded more gingivally for big overjet cases. Weak teeth, such as endodontically treated maxillary incisors, are a contraindication for BTs because they are prone to fracture. The axial inclination of the maxillary incisors must be considered. If they are upright or retroclined, it may be necessary to correct the inclination prior to installing BTs[4,5,6] (*Fig. 27*). Anterior bite turbos on maxillary incisors tend to intrude lower incisors, and furthermore serve as effective vertical stops for the overbite.[3,7] For open bites, posterior BTs can be combined with squeeze exercises to intrude molars [8,9] (*Fig. 28*). For cross bites, unlocking the inter-digitation with contralateral BTs is effective for facilitating transalveolar correction.

	Latex Natural Rubber	Synthetic Rubber
Origin	Juice of a tree	Developed from petrochemicals
Main ingredient	Pure rubber and water	Polyurethane
Function	Intermaxillary traction	Elastic ligatures; move the tooth along the arch wire
Renew	Changed by the patient every day	Replaced by the orthodontist at the next visit of the patient
Form	Ring	Chain

Fig. 26:
Anterior BTs can be quite versatile. In addition to the present application on the lingual surfaces of maxillary incisors (Fig. 13), they can be bonded on the lingual surface of lower incisors to assist in anterior cross bite correction.

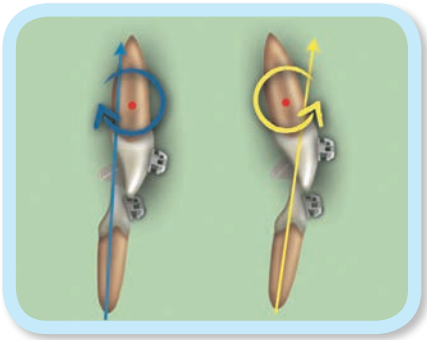
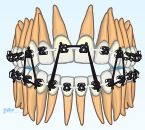


Fig. 27:
It is important to check the axial inclination of the maxillary incisors before bonding BTs. Occlusal force from lower incisors can produce an undesirable moment, so partial correction of maxillary incisor inclination is necessary before bonding lingual BTs on maxillary incisors.

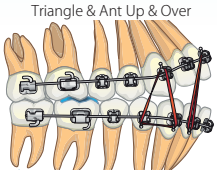
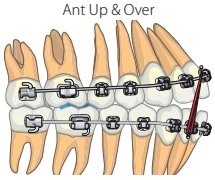
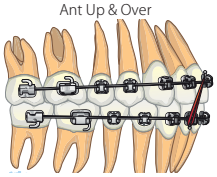
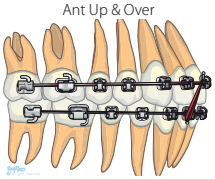
Elastics Within and Between Arches

Baker (*1846*) as well as both Case and Angle (*1902*) were early advocates for natural latex elastics in orthodontic treatment.[10] Elastomeric (*synthetic rubber*) chains were introduced to dental profession in 1960s and have largely replaced latex for intra-arch tooth movement (*Fig. 29*). Elastics have been handy orthodontics mechanics for many years, they are a routine measure throughout the whole treatment process. These materials fit two

Dr. Tom Pitts' Protocol of Elastics and Bite Turbos



Class I Open Bite Non-extraction

Class I Open Bite, Non-Extraction				
Wire	**Elastics**	**Direction**	**Duration**	**Bite Turbo**
.014 NiTi * (*.013 PRN*)	Quail 3/16, 2 oz. or Parrot 5/16, 2.5 oz.	Triangle & Ant Up & Over 	Full Time	L Molar
.018 NiTi	Parrot 5/16, 2.5 oz.	Ant Up & Over 	Full Time	L Molar
.014 x .025 NiTi or .018 x .025 NiTi	Parrot 5/16, 2.5 oz. or Dolphin 5/16, 3 oz.	Ant Up & Over 	Full Time	--
U : .019 x .025 SS / TMA L : .016 x .025 SS	Dolphin 5/16, 3 oz. or Zebra 5/16, 4.5 oz.	Ant Up & Over 	Full Time	--

* *Begin squeeze exercise at the first day. Put fingers on post. fiber of temporalis muscle area to feel the muscle contraction whenever bites on. 50 times as a cycle, do 6 cycles a day to accelerate molar intrusion.*

Fig. 28: Dr. Tom Pitts protocol for elastics and bite turbos.

Fig. 29:
There are two fundamental types of elastics: latex for inter-arch, and synthetic rubber (elastomers) for intra-arch applications.

fundamental categories: latex and synthetic rubber (*elastomer*). According to their location and mode of action, elastics are classified as follows:

1. **Class I Elastics** (*horizontal, intra-maxillary, or intra-arch elastics*) (*Fig. 30*)

Fig. 30:
Synthetic rubber (elastomers) move the teeth along an arch wire to close the space.

Example: A unilateral latex or elastomer elastic, extended from the molar tube to the a hook on the canine in the same arch

Application: These are typical mechanics for intra-arch space closure. When closing large spaces, efficiency can be increased by using lingual elastics to control the axial rotation moments, and placing gable bends in the archwire to prevent the tipping of teeth into the space.

Side effects: Mesial-in axial rotation and arch expansion are common problems for the terminal teeth in the arch. Using lingual elastics, or stopping the labial elastic one tooth anterior of the terminal tooth, can help avoid this undesirable side effect.

2. **Class II Elastics** (*inter-maxillary or inter-arch elastics*) (*Fig. 31*)

Fig. 31:
Latex, class II elastics are for intermaxillary correction.

Example: A typical configuration is a latex elastic extended from a lower molar to a hook on, or mesial to, the upper canine on the same side.

Application: Corrects a Class II buccal relationship and steepens the occlusal plane by two reciprocal actions: 1. maxillary retraction and clockwise rotation of the upper arch, and 2. mandibular arch protraction and clockwise rotation of the lower arch. This combination of A-P and vertical effects corrects Class II buccal segments to Class I.

Side effects: Extrusion of lower molars produces posterior rotation of the mandibular plane and an increase in the vertical dimension of occlusion (*VDO*). Retraction and distal tipping of maxillary incisors, in conjunction with the increase in VDO, may produce unesthetic maxillary anterior gingival exposure (*"gummy smile"*). The lingual tipping of the maxillary incisors and labial tipping of the lower incisors can be controlled with archwire torque and/or bracket selection: high torque for upper incisors and low torque for the lower incisors.

3. **Class III Elastics** (*Fig. 32*)

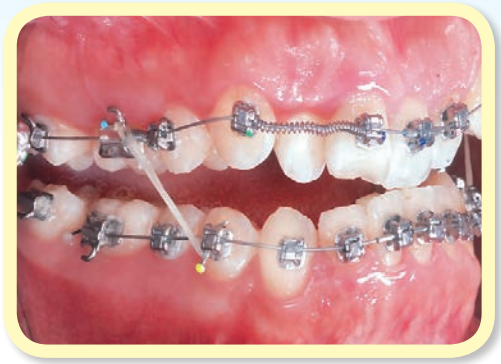


Fig. 32:
Latex, class III elastics are effective for anterior cross-bite correction when combined with lower incisor BTs (Fig. 26).

Example: A typical configuration is a latex elastic extended from an upper molar to a hook on, or mesial to, the lower canine on the same side.

Application: Corrects a Class III buccal relationship and flattens the occlusal plane by two reciprocal actions: 1. maxillary protraction and counterclockwise rotation of the upper arch, and 2. mandibular arch retraction and counterclockwise rotation of the lower arch. This combination of A-P and vertical effects corrects Class III buccal segments to Class I.

Side effects: Common problems are extrusion of the upper molars, flaring of the maxillary incisors and lingual tipping of the lower incisors. The incisal axial inclination problems can be controlled with high torque brackets on lower incisors and low torque brackets in the upper anterior segment.

4. **Anterior Vertical Elastics** (*Fig. 28*)

Example: Intermaxillary elastics can be applied in a vertical, box or triangle configuration, depending on the desired components of force.

Application: They are used to close open bites and/or improve occlusal contacts.

Side effects: They may produce a gummy smile and are often associated with root resorption. When using vertical elastics, it is important to diagnose and treat the etiology of the openbite, which is usually due to abnormal soft tissue posture of the lips and/or tongue.[11]

5. **Finishing Elastics** (*up and down, and continuous intermaxillary elastics*) (*Fig. 33*)

Fig. 33: Finishing elastics improve occlusal contacts.

Example: Single or continuous intermaxillary elastics applied to achieve maximum intercuspation.

Application: This approach is used to seat or settle the occlusion in the final stage of fixed appliance therapy. They are most effective when one or both opposing archwires are removed. A typical approach is to cut the archwires distal to the cuspids before using finishing elastics.

Side effects: They may create marginal ridge discrepancies and occlusal prematurities, so it is best to limit their use to no more than three weeks.

6. **Cross bite elastics** (*Fig. 34*)

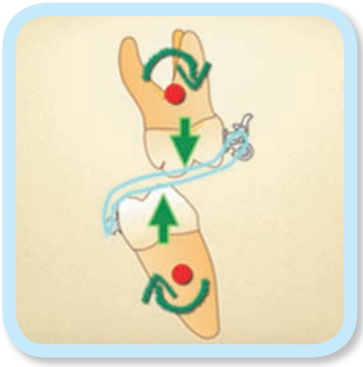


Fig. 34:
Cross bite (transalveolar) elastics from buccal or lingual surfaces of affected teeth are most effective if the malocclusion is discluded with a contralateral BT.

Example: These transalveolar elastics are effective for correcting all maxillary teeth to occlude in a buccal relationship to the mandibular teeth. For posterior teeth mandibular buccal cusps should occlude in the respective fossa of their maxillary antagonist(*s*).

Application: They are used to correct lingual or buccal cross bites. Constructing BTs on the contralateral side of the arch is often essential for disarticulating the malocclusion and allowing the malposed teeth to move to the correct relationship with minimum trauma.

Side effects: produce a cant in the occlusal plane

Fig. 35:
Diagonal elastics were used to a correct midline deviations, but with longterm use can cant the occlusal plane, and alter the axial inclinations of the incisors.

7. **Diagonal elastics** (*midline and/or asymmetric elastics*) (*Fig. 35*)

Example: A typical configuration for midline correction is to extend a latex elastic from a lower canine to the upper canine of the other side.

Application: They are used to correct dental midline deviations and improve intercuspation.

Side effects: Extensive use of midline elastics can produce a cant in the occlusal plane and abnormal axial inclinations of the incisors.

Clinical Tips

The force extension value of latex elastics should be provided by the manufacturers for different sizes. The standard force index is to stretch the elastic to 3 times the original internal diameter to achieve the force stated on the package.[11]

To achieve a more consistent force, routine pre-stretching of elastic chains is recommended.[12]

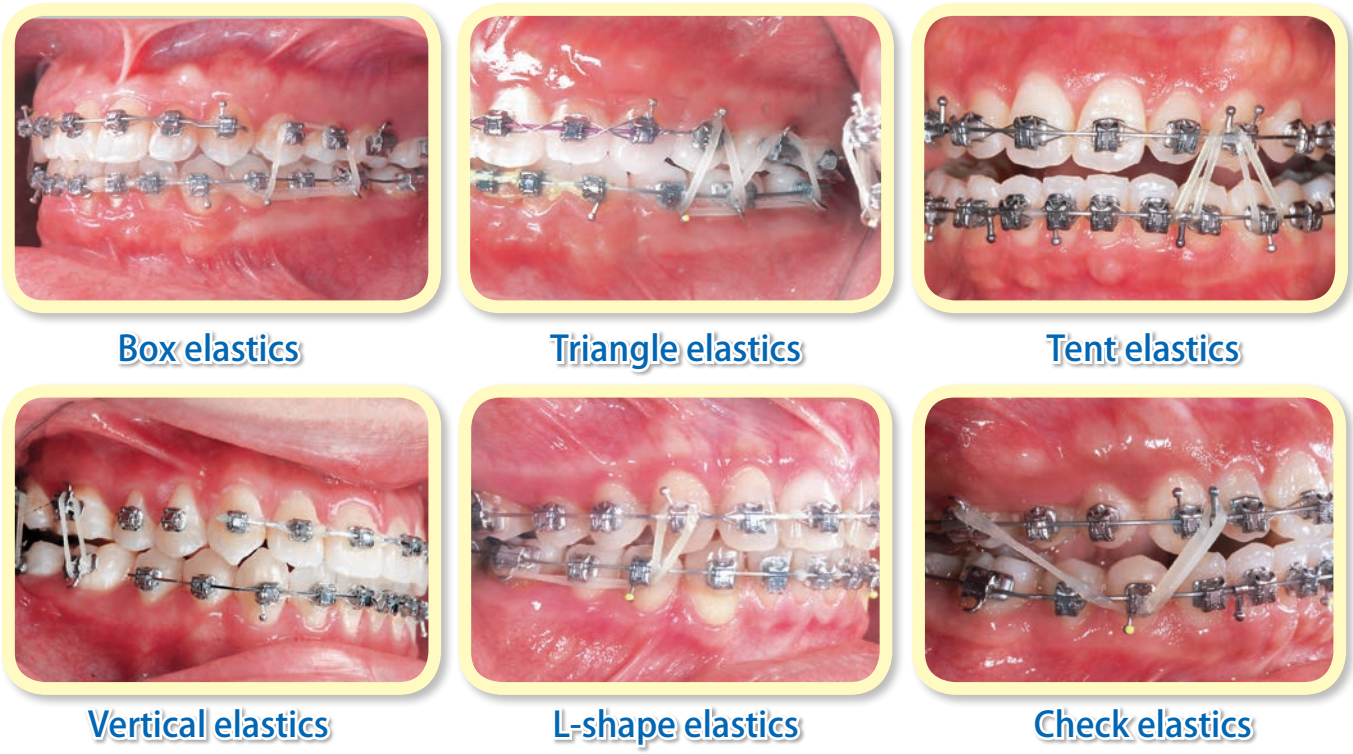


Fig. 36:
Elastics to correct open bites can have many configurations as shown. However, it is also important to correct the etiology of the open bite which is usually soft tissue or digit posture between the teeth. Applying vertical elastics on the lingual surfaces may be more effective for tongue posture problems.

Wong[13] suggests pre-stretching 1/3rd the length of the elastomeric chain to achieve a more uniform strain in the material. Young and Sandrik[14] demonstrated that pre-stretching elastomeric chains decreases the loss of force after they are applied. The latter is an important problem with elastomeric chains because the force can decrease ~30% after two hours in the oral cavity.[15] Most of the elastomeric chains on the market lose 50~70% of their initial force during the first day of application.[16,17] Pre-stretching does not prevent the loss of force but it does decrease it.[12-14]

Instruct the patient to change latex elastics at least once per day. In Beethoven Orthodontic Center, patients are asked to replace elastics four times a day. It is essential for the patient to demonstrate their ability to properly change elastics before leaving the clinic.

The ABO CRE score of 21 documents an excellent final alignment of the dentition. As mentioned previously, the major residual problem was occlusal relationships (*8 points*) due to the Class II tendency in buccal relationships, bilaterally (*Fig. 37*). In retrospect, extra-alveolar miniscrew anchorage[18,19] would facilitate a more complete correction of the Class II relationship without excessive tipping the occlusal plane.

Conclusion

A severe full cusp Class II malocclusion with a large overjet and palatal impingment was effectively treated with passive self-ligating brackets, bite turbos and class II elastics. Elastics are among the most versatile and widely applied materials in orthodontics. It is important to change elastics regularly because their force level decreases rapidly.

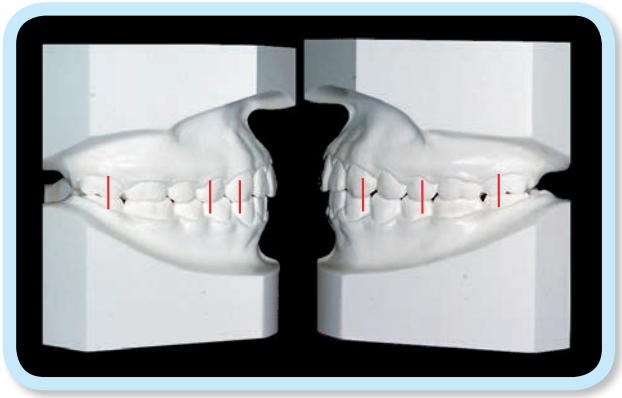


Fig. 37:
The occlusal relationship were under-corrected resulting in a residual Class II tendency. Since there is no overjet (Fig. 38), correction of the Class II buccal segments before debonding would have required stripping of interproximal enamel and retracting the lower incisors to create overjet. Then Class II could then completed with Class II elastics.

Fig. 38:
Four and a half years after treatment, the overjet remains closed and the prospective doctor's smile is very attractive!

Effective use of elastics to resolve challenging malocclusions requires excellent patient cooperation. After four and a half years of follow up for the present patient, the occlusion remained stable, and the patient was well satisfied with the result.

Acknowledgment

Thanks to Mr. Hughes for proofreading this article.

References

1. Chang CH, Roberts WE. Objective assessment of orthodontics clinical outcomes. Chapters 1-3, 3D i-Ortho encyclopedia. Orthodontics Vol I [E-reader version]. Hsinchu: Newton's A Ltd; 2012. Available from: https://itunes.apple.com/book/orthodontics-vol.-i/id520098562?mt=11.
2. Petrovic AG, Stutzmann JJ, Oudet CL. Control processes in the post-natal growth of the condylar cartilage of the mandible. In: Craniofacial Growth and Development. 2nd ed. McNamara JA (Ed.) Monograph No. 4. Ann Arbor: The University of Michigan Press, 1975, pp 101–153.
3. Kozlowski J. Honing Damon system mechanics for the ultimate in efficiency and excellence. Clin Impressions 2008;16:23-28.
4. Thavarungkul R. Correcting deep-bite with fixed bite ramps. News & Trends in Orthodontics 2009;16:68-71.
5. Lin SL, Chang CH, Roberts WE. Mutilated class II division 2 malocclusion: implant-orthodontic treatment utilizing flapless implant surgery and platelet-rich fibrin. Int J Orthod Implantol 2014;33:22-45.
6. Liu CW, Chang CH, Roberts WE. Class II deep bite malocclusion with posteriorly-inclined incisors. Int J Orthod Implantol 2012;25:32-42.
7. Pitts T. Begin with the end in mind: bracket placement and early elastics protocols for smile arc protection. Clin Impressions 2009;17:4-13.
8. Huang S. Dr. Tom Pitts's secrets of excellent finishing (I) News & Trends in Orthodontics 2009;13:14-22.
9. Huang S. Dr. Tom Pitts's secrets of excellent finishing (II) News & Trends in Orthodontics 2009;14:6-23.
10. Bales TR, Chaconas SJ. Force extension characteristics of orthodontic elastics. Am J Orthod 1977 Sept;72(3):296-302.
11. Proffit WR, Fields Jr HW, Sarver DM. Contemporary orthodontics, 4th ed. St. Louis: Mosby Elsevier; 2007.
12. Brantley WA. Effects of pre-stretching on force degradation characteristics of plastic modules. Angle Orthod 1979;49:37-43.
13. Wong AK. Orthodontic elastic materials. Angle Orthod 1976;46(2):196-205.
14. Young J, Sandrik JL. The influence of preloading on stress relaxation of orthodontic elastic polymers. Angle Orthod 1979;49(2):104-9.
15. Langlade M. Optimization of orthodontic elastics. New York: GAC International; 2000.
16. Kanchana P, Godfrey K. Calibration of force extension and force degradation characteristics of orthodontic latex elastics. Am J Orthod 2000 Oct;118(3):280-7.
17. Wang T, Zhou G, Tan X, Dong Y. Evaluation of force Degradation characteristics of orthodontic latex elastics in vitro and in vivo. Angle Orthod 2007;77(4):688-93.
18. Chang CH, Roberts WE. Stability of mini-screws on buccal shelves: a retrospective study of 1680 Mini-screw insertions by the same orthodontist. Int J Orthod Implantol 2013;30:76-78.
19. Chang CH, Roberts WE. A retrospective study of the extra-alveolar screw placement on buccal shelves. Int J Orthod Implantol 2013;32:80-89.

Discrepancy Index Worksheet

TOTAL D.I. SCORE 25

OVERJET

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

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

Total = 3

OVERBITE

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

Total = 5

ANTERIOR OPEN BITE

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

Total = 0

LATERAL OPEN BITE

2 pts. per mm. per tooth

Total = 0

CROWDING (only one arch)

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

Total = 0

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

Total = 8

LINGUAL POSTERIOR X-BITE

1 pt. per tooth Total = 0

BUCCAL POSTERIOR X-BITE

2 pts. per tooth Total = 0

CEPHALOMETRICS (See Instructions)

ANB ≥ 6° or ≤ -2° = 4 pts.

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

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

SN-MP

≥ 38° = 2 pts.

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

≤ 26° = 1 pt.

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

1 to MP ≥ 99° = 1 pt.

Each degree > 99° 7 x 1 pt. = 7

Total = 9

OTHER (See Instructions)

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

Identify:

Total = 0

IMPLANT SITE

Lip line : Low (0 pt), Medium (1 pt), High (2 pts) =_____

Gingival biotype : Low-scalloped, thick (0 pt), Medium-scalloped, medium-thick (1 pt), High-scalloped, thin (2 pts) =_____

Shape of tooth crowns : Rectangular (0 pt), Triangular (2 pts) =_____

Bone level at adjacent teeth : ≤ 5 mm to contact point (0 pt), 5.5 to 6.5 mm to contact point (1 pt), ≥ 7mm to contact point (2 pts) =_____

Bone anatomy of alveolar crest : H&V sufficient (0 pt), Deficient H, allow simultaneous augment (1 pt), Deficient H, require prior grafting (2 pts), Deficient V or Both H&V (3 pts) =_____

Soft tissue anatomy : Intact (0 pt), Defective (2 pts) =_____

Infection at implant site : None (0 pt), Chronic (1 pt), Acute(2 pts) =_____

Total = 0

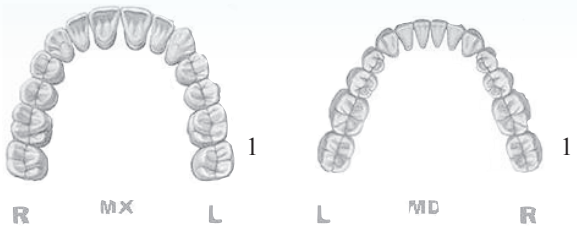
Cast-Radiograph Evaluation

Case # 1 **Patient**

Total Score: 21

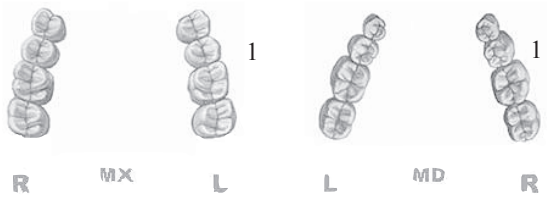
Alignment/Rotations

2



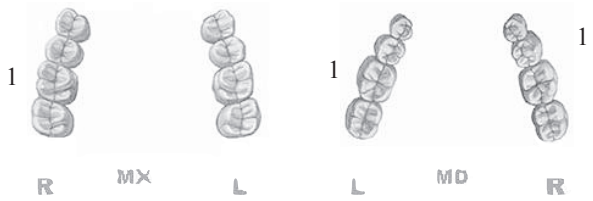
Marginal Ridges

2



Buccolingual Inclination

3

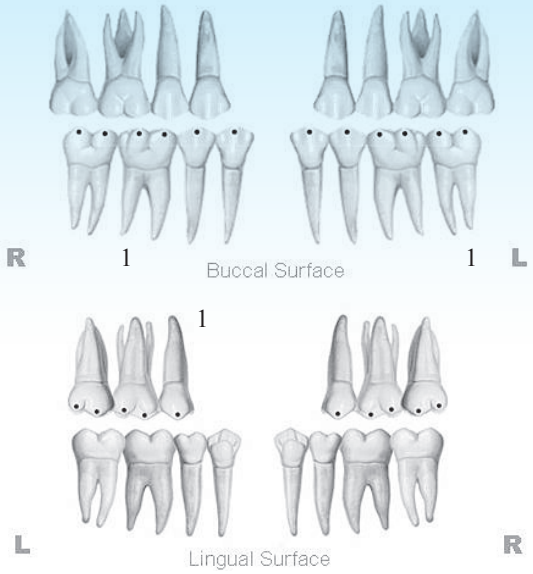


Overjet

1

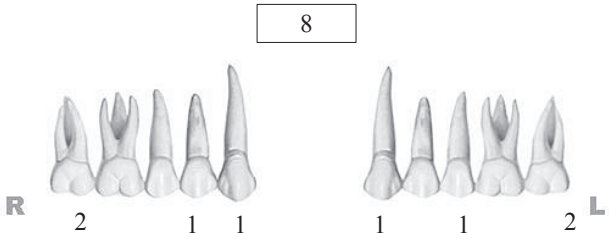
Occlusal Contacts

3



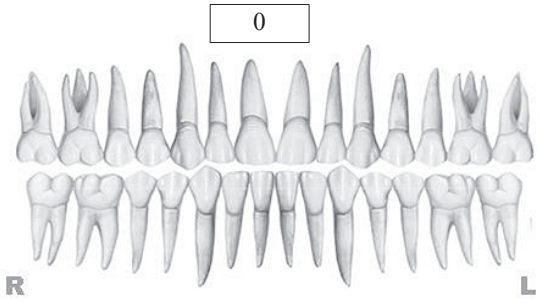
Occlusal Relationships

8



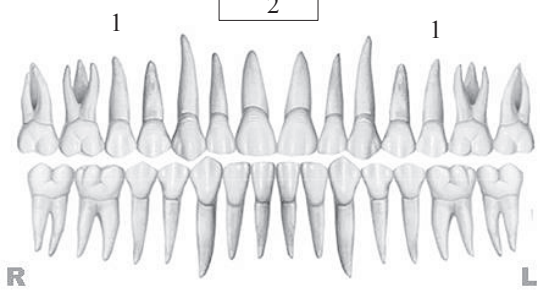
Interproximal Contacts

0



Root Angulation

2



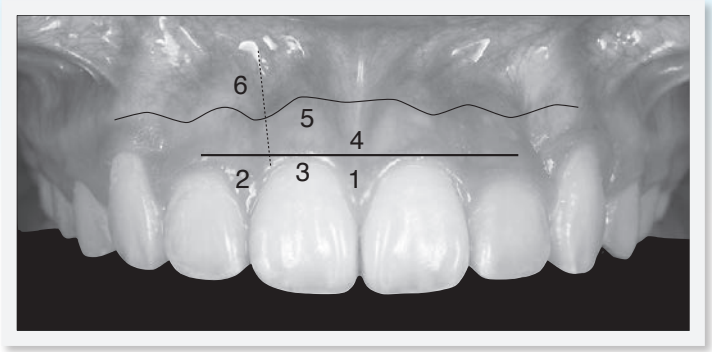
INSTRUCTIONS: Place score beside each deficient tooth and enter total score for each parameter in the white box. Mark extracted teeth with "X". Second molars should be in occlusion.

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

Total Score: = 3

1. Pink Esthetic Score

Total = 2

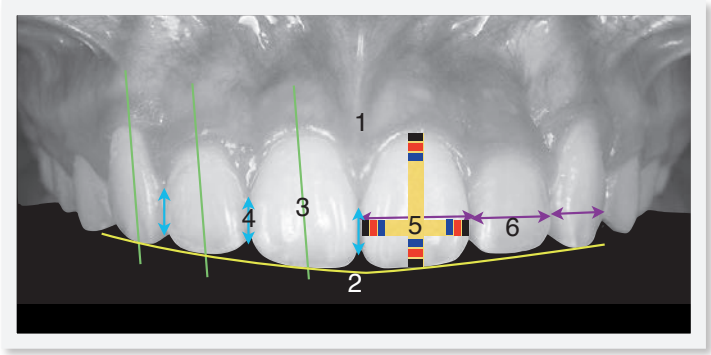


1. M-D Papilla	0	1	2
2. Keratinized Gingiva	0	1	2
3. Curvature of Gingival Margin	0	1	2
4. Level of Gingival Margin	0	1	2
5. Root Convexity (Torque)	0	1	2
6. Scar Formation	0	1	2

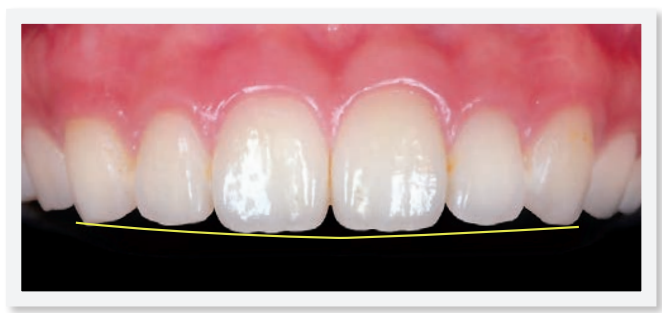
1. M & D Papillae	(0)	1	2
2. Keratinized Gingiva	(0)	1	2
3. Curvature of Gingival Margin	0	(1)	2
4. Level of Gingival Margin	0	(1)	2
5. Root Convexity (Torque)	(0)	1	2
6. Scar Formation	(0)	1	2

2. White Esthetic Score (for Micro-esthetics)

Total = 1



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



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

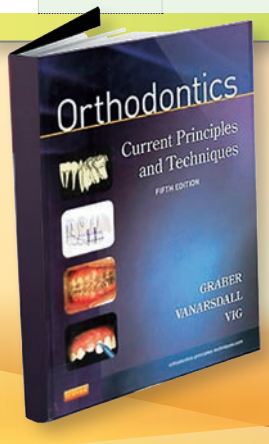
第7年度

2015-2016

貝多芬矯正精修班

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

No.	日期 (W2)	精選文獻分析 09:00 ～ 10:50	精緻完工案例 11:00 ～ 11:50
67	06/16	CH. 18 Lingual orthodontics with completely customized appliance p.615~638	IAOI Finishing case 01
68	07/07	CH. 18 Lingual orthodontics with completely customized appliance p.615~638	IAOI Finishing case 02
69	08/11	CH. 21 Bonding in orthodontics p.727~784	IAOI Finishing case 03
70	09/08	CH. 21 Bonding in orthodontics p.727~784	IAOI Finishing case 04
71	10/27	CH. 21 Bonding in orthodontics p.727~784	IAOI Finishing case 05
72	11/17	CH. 15 Standard edgewise: Tweed-merrifield philosophy, diagnosis, treatment planning, and force systems p.517~560	IAOI Finishing case 06
73	12/08	CH. 15 Standard edgewise: Tweed-merrifield philosophy, diagnosis, treatment planning, and force systems p.517~560	IAOI Finishing case 07
74	03/15	CH. 15 Standard edgewise: Tweed-merrifield philosophy, diagnosis, treatment planning, and force systems p.517~560	IAOI Finishing case 08
75	04/12	CH. 19 Clear Aligner treatment p.639~688	IAOI Finishing case 09
76	05/10	CH. 19 Clear Aligner treatment p.639~688	IAOI Finishing case 10
77	06/14	CH. 19 Clear Aligner treatment p.639~688	IAOI Finishing case 11



課程目標：

藉由“Orthodontics Current Principles & Techniques-5th edition”協助學員將文獻精隨應用於實際病例，並藉由 DI 及 CRE 達成精緻完工 (Excellent Finishing) 之目標。請學員自備教科書。

精修班報名專線 02-2778-8315＃120　湧傑 邵美珍小姐

Beethoven International Damon, OBS & VISTA Workshop

2015 6/16~6/19, 12/1~4

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

LECTURER: Dr. John Lin

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

Dear Chris:

[...] My development as lecturer and orthodontist has evolved greatly. Thanks to this great experience, I came back from Taiwan with the best and latest technique, knowledge, valuable and practical tools, including how to make successful presentations using the resources of MAC technology-rightly led by you in your country. I have also received invaluable and unparalleled academic material on the proper use, benefits and applications of mini-implants.

I will always be thankful not only to you but also to your friendly and dedicated wife, your clinic team in which I found a model for organization, care and functionality. I will never forget all the attentions received and all the time spent on my professional development regardless of the multiple occupations andother responsibilities you all have[...].

Dr. Patricia Vergara Villarreal (right)
Orthodontist, the Military University.CIEO. of Bogota

Dear Chris:

[...]I can only say that the Workshop exceeded my expectation and it was truly amazing. Lectures by the world class orthodontists (*Dr. Chris Chang and Dr. John Lin*), and wealth of knowledge from your many years of dedication, wisdom, and clinical experiences were evident through the cases you presented. I am also very much appreciative of the opportunity to observe you actively and effortlessly practicing what you teach through the chair-side observation session held in your very busy practice.

First, as an innovative educator, you encouraged us to be innovative. Second, you taught us your system and showed us tools in Damon and OBS for us to succeed and duplicate it in each of our own practices. Third, you motivated us to continue to continually improve the system. Personally, I am very grateful and thankful for these three pieces of advice you gave to us[...].

John K.S. Tong, DDS, MAGD
Cupertino, California USA

For more information and registration, visit

http://iworkshop.beethoven.tw

YouTube Newtonsa0301

Like *Chris Chang* On Facebook

VISTA for Impacted Cuspids In-house Workshop (Pig Jaw)

VISTA for Impacted Cuspids in-office workshop includes one half-day hands-on practice:

1. VISTA with Screw Placement
2. VISTA with Connective Tissue Graft
3. Suture Technique

VISTA:
Vertical **I**ncision **S**ubperiosteal **T**unnel **A**ccess

Damon, OBS & VISTA

Day 1

13:00—14:00	Welcome Lunch
14:00—14:40	Orientation
14:40—15:00	Introduction of Beethoven Dental Group
15:00—18:30	Chair-side observation

Day 2

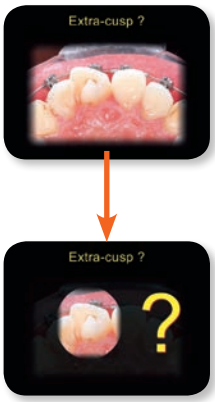
9:00—10:30	Optimized Orthodontic Treatment I *Dr. Chris Chang*
10:30—11:00	Break
11:00—12:30	Optimized Orthodontic Treatment II *Dr. Chris Chang*
12:30—13:50	Lunch
14:00—15:00	Screw Model Practice
15:00—18:30	Chair-side observation

Day 3

09:00—10:00	VISTA for Impacted Cuspids
10:00—10:10	Break
10:10—12:30	Damon + Screw *Dr. John Lin*
12:30—13:30	Lunch
14:00—17:00	VISTA for Impacted Cuspids In-office Workshop (*Pig Jaw*)

Keynote Workshop

Make your presentation great



"I've been a Keynote user and lecturer for 9 years. In June I had the opportunity to attend Newton's A's Introductory Keynote course. To my surprise, I still learn a lot from this supposed to be basic course.

If you think this is a computer course that will show you step-by-step how to use the application, please reconsider. This course is to teach you hands-on, clinical presentation tips. After this course I'm sure that any of you can go back and give a better presentation in your daily dental practice.

If you want to improve communication in your practice, and with patients, this 8-hour course is definitely worth it."

~ Dr. Rungsi Thavarungkul, Thailand
Lecturer, Advanced Keynote Animation and Illustration Workshop

Day 4 - Keynote

09:00—10:00	Introduction of Keynote: Organize your patient files for presentation
10:00—10:10	Break
10:10—11:30	Key Presentation Principles I
11:30—13:30	Lunch
14:00—15:30	Key Presentation Principles II
15:30—15:45	Break
15:45—17:00	Make it Visual

Damon & OBS Workshop

includes two half-day lectures, two half-day chair-side observation sessions, one model practice and one surgical hands-on session.

Registration fees cover local transportation, meals and two nights of shared accommodation (double occupancy). Airport pick up is available upon request with additional charges.

Fees: USD 2,600
Early bird rate:
USD 200 off by 2015 4/16, 9/24

Keynote Presentation workshop

includes one day of lecture and hands-on practice, focusing on improving your professional digital communication skills. The workshop adopts the Macintosh (Apple) system and its native presentation software, Keynote '09.

Registration fees cover local transportation, meals and one nights of shared accommodation (double occupancy).

Fees: USD 500
Early bird rate:
USD 100 off by 2015 4/16, 9/24

Registration:

A 50% deposit is required to complete registration.

To make a payment by wire, please contact us at course@newtonsa.com.tw or call +886-3-5735676 for more information.

Animation & Illustration Workshop

New!

Advanced Keynote Workshop

2015
12/ 05–07
Fri-Sun

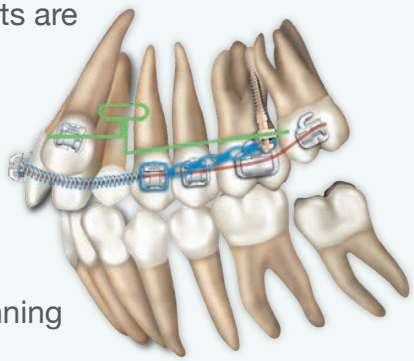
9am-5pm
Limited to 25 particiants

Fees: USD 1900

Early Bird rate:
USD200 off by 10/5

The fees include three full-day workshops, three nights of shared accommodation, local transportation and meals during the workshop period. Airport pick-up is not included.

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



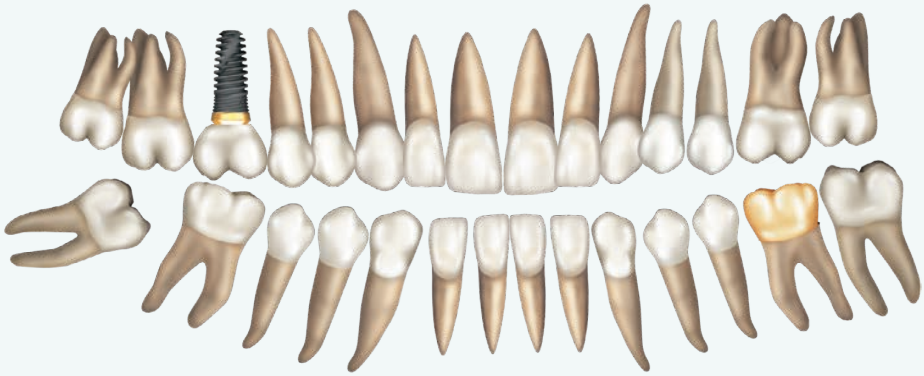
TOPICS:

Learning objectives

- Design illustration in Keynote.
- Showcase your own drawing with stunning animation in Keynote.
- Animation composition.

Requirements:

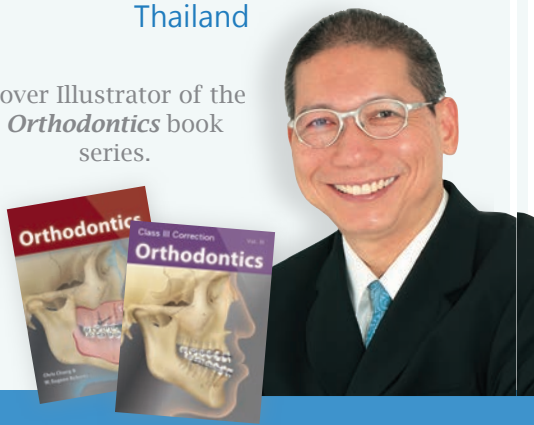
- Mac computer with OSX 10.9
- Keynote 6.X (the latest)



Lecturer

Dr. Rungsi Thavarungkul
Thailand

Cover Illustrator of the ***Orthodontics*** book series.



Newton's A TEL: +886-3-573-5676 course@newtonsa.com.tw

6 天变大师！

Keynote 动画简报实作

从基础到进阶 6 天完整教学

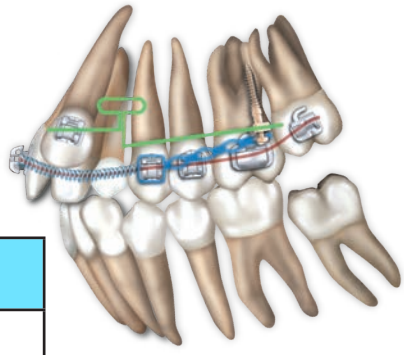
时间：2015/12/2～12/7

地点：金牛顿艺术科技（台湾新竹市建中一路25号2楼）

想要精进您的 **报告技巧** 吗？

绝对 **不可错过** Keynote 1-6 深度教学课程！

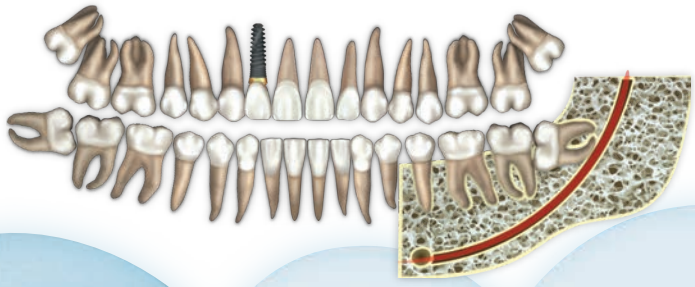
课程内容由基础操作到深入探讨，
一窥张医师＆其他国外大师的演讲成功秘诀，
保证物超所值，让您满载而归！



时间	09:00-12:00	14:00-17:00
12/2 K1	Keynote 基础操作技巧	综合演练 1
12/3 K2	不可不知的简报制作概念	综合演练 2
12/4 K3	令人目眩神迷的演讲秘诀	综合演练 3
12/5 K4	如何让物件动起来	利用简报来制作治疗计画
12/6 K5	来画画吧！	遮罩的艺术
12/7 K6	用Keynote来说故事	制作高阶牙科动画简报！

注意事项：

一、合报K1-6，享有更多优惠（如黄色填充处）。
二、早鸟优惠价，须于2015.08.31前报名。
三、座位有限，额满为止！请提早报名并汇款，以保留席位！（以完成汇款顺序为依据。）
四、若取消报名，
　　30天前退款将扣除10%行政手续费，
　　30天内退款将扣除30%行政手续费。
五、12/4 基础Keynote 将以英语授课。



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Missing Maxillary Central Incisor Treated with Mesial Substitution of the Lateral Incisor, Canine and First Premolar

Abstract

A 24 yr female presented with convex profile, everted lower lip, severe lip protrusion, bimaxillary skeletal protrusion, flared maxillary incisors and two missing teeth: maxillary left central incisor and mandibular right first molar. The missing upper central incisor was corrected with progressive mesial substitution of the lateral incisor, canine, and first premolar. On the contralateral side, the left maxillary first premolar was extracted, and the space was closed to achieve a balanced retraction of the maxillary anterior segment to correct the dental and soft tissue protrusion. The mandibular right molar space was closed, the patient's facial profile was significantly improved, and dental esthetics in the esthetic zone were detailed with restorative procedures. This very difficult malocclusion, with a Discrepancy Index (DI) of 38, was treated to a satisfactory Cast Radiograph Evaluation (CRE) of 27, and a Pink and White (P&W) dental esthetics score of 6. The total interdisciplinary treatment time was 35 months.(Int J Othod Implantol 2015;38:78-93)

Key words:
Bimaxillary protrusion, missing maxillary central incisor, missing mandibular first molar, dental substitution, asymmetry, restorative compensation

History and Etiology

A 24 year-old woman presented two chief complaints: flared maxillary anterior teeth and protrusive lips (*Figs. 1-3*). The patient's medical history was noncontributory, but there was evidence of maxillary anterior dental trauma: missing left maxillary incisor (#*9*) and multiple endodontically treated teeth (#*7, 8, 10 and 11*). The maxillary anterior segment from #7-11 was restored with a porcelain-fused-to-metal (*PFM*) fixed partial denture. No history of adverse habits nor temporomandibular dysfunction was reported.

Clinical examination revealed a bilateral Class II molar relationship, 8 mm overjet, 5 mm over-bite, full buccal cross-bite of tooth #15, and maxillary incisal impingement, that resulted in pronounced protrusion and eversion of the lower lip. In addition, tooth #30 were missing.

The patient was treated to an acceptable result as documented in Figs. 4-6. The cephalometric and panoramic radiographs documented the pre-treatment condition (*Fig. 7*) and the post-treatment result (*Fig. 8*). The cephalometric tracings (*pre-and post-treatment*) are superimposed on the anterior cranial base, maxilla and mandible in Fig. 9.

Dr. Teng-Kai Huang,
Instructor, Beethoven Orthodontic Course (Left)

Dr. Chris Chang,
Founder, Beethoven Orthodontic Center
Publisher, International Journal of Orthodontics& Implantology (middle)

W. Eugene Roberts,
Chief editor, International Journal of Orthodontics & Implantology (right)

Fig. 1: Pre-treatment facial photographs

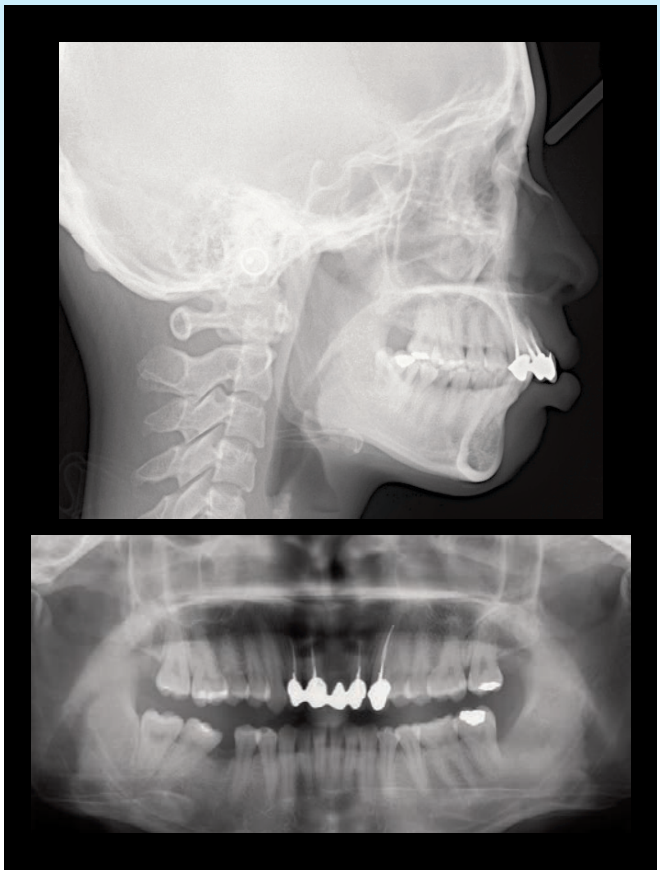
Fig. 4:
The post-treatment facial photographs show dramatic facial correction.

Fig. 2: Pre-treatment intraoral photographs

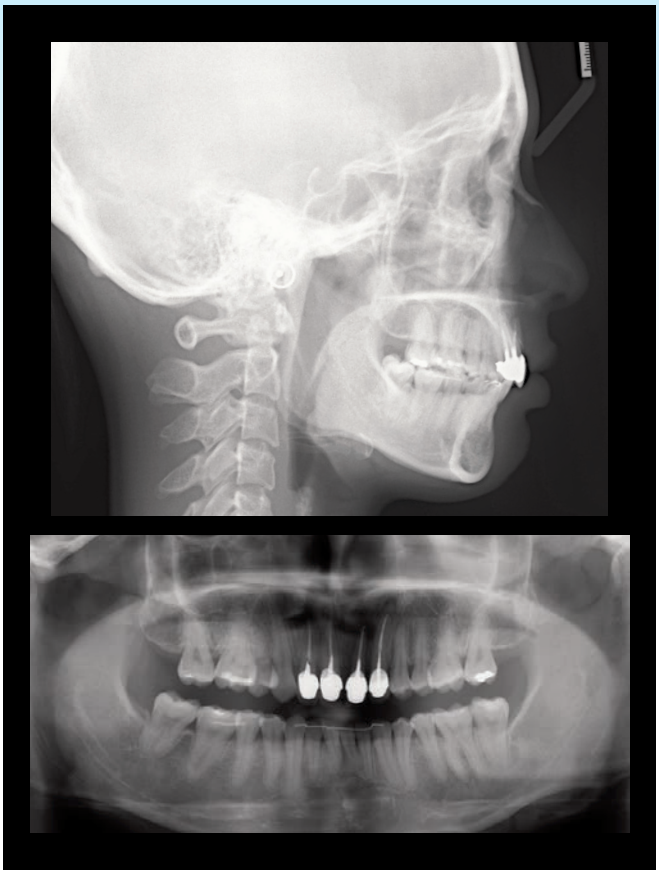
Fig. 5: Post-treatment intraoral photographs

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

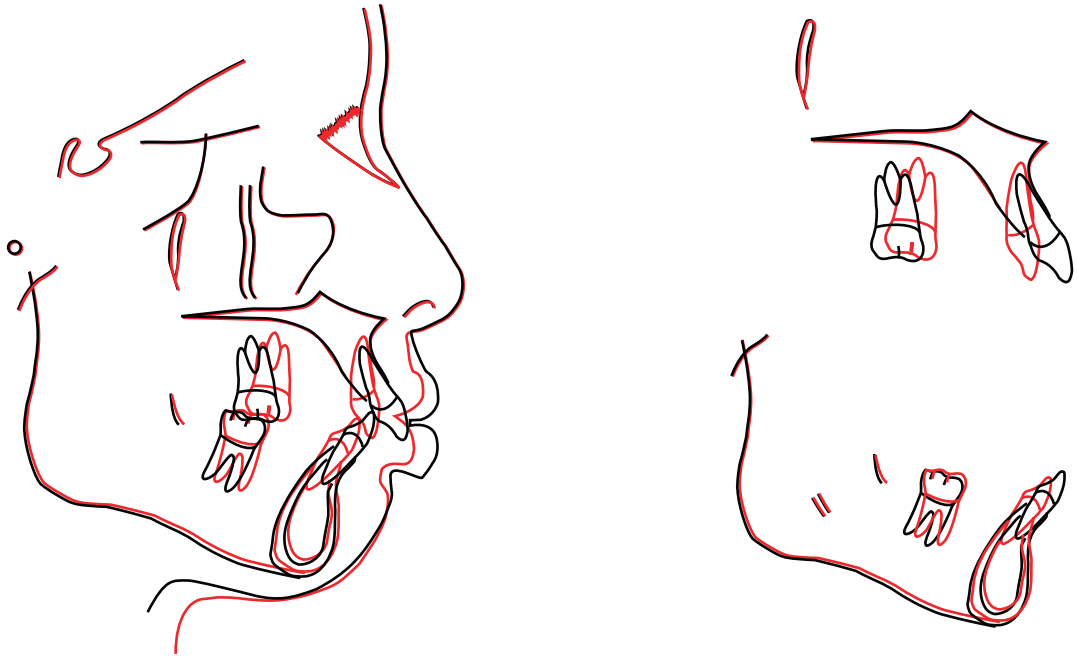
Fig. 6: Post-treatment study models (casts)



■ *Fig. 7:*
Pre-treatment cephalometric and panoramic radiographs



■ *Fig. 8:*
Post-treatment cephalometric and panoramic radiographs



■ *Fig. 9:*
Pre-treatment (black) and post-treatment (red) cephalometric tracings superimposed on the anterior cranial base (left) show an improved facial profile. Maxillary superimposition (upper right) documents the retraction of the incisors and protraction of the molars. Mandibular superimposition (lower right) documents flattening of the curve of Spee.

Diagnosis

Skeletal:

- Skeletal Class II (*SNA 82°, SNB 76°, ANB 6°*)
- Mandibular plane angle (*SN-MP 28.5°*)

Dental:

- Class II molar relationship
- Fixed partial denture: *#7-10*
- Single crown: *#11*
- Missing Teeth: *#9 and 30*
- Endodontically treated teeth: *#7, 8, 10, and 11*
- Buccal posterior cross-bite: *#15 (Fig. 10)*

Facial:

- Convex profile
- Bimaxillary protrusion
- Lip incompetence and everted lower lip (*lip curl*)

CEPHALOMETRIC			
SKELETAL ANALYSIS			
	PRE-Tx	POST-Tx	DIFF.
SNA°	82°	81.5°	0.5°
SNB°	76°	76°	0°
ANB°	6°	5.5°	0.5°
SN-MP°	28.5°	28°	0.5°
FMA°	21.5°	21°	0.5°
DENTAL ANALYSIS			
U1 TO NA mm	6 mm	-0.5 mm	6.5 mm
U1 TO SN°	103.5°	85°	18.5°
L1 TO NB mm	8 mm	4 mm	4 mm
L1 TO MP°	110°	110°	0°
FACIAL ANALYSIS			
E-LINE UL	3 mm	-1 mm	4 mm
E-LINE LL	7 mm	1 mm	6 mm

■ Table 1: Cephalometric summary

The ABO Discrepancy Index (*DI*) was 38 as shown in the subsequent worksheet.[1]

Treatment Objectives

The principal objectives of this treatment were to retract the maxillary dentition and achieve an ideal overjet and overbite as well as to solve the lip incompetence and lip eversion. The treatment options were:

Option A

- Extract teeth #5 and 12, and close the extraction spaces to reduce the overjet.
- Extract tooth #21 and close both lower spaces by protraction of the mandibular molars.

Option B

- Extract tooth #5.
- Close the extraction spaces (*teeth #5 and 9*) to reduce the overjet.
- Close the space of tooth #30 by protraction of the mandibular right molars.

Option B is an unusual orthodontic treatment approach because closing the missing incisor space presents multiple esthetic problems related to tooth substitution and specialized restorative treatment. After a thorough discussion of the pros and cons for both options, the patient elected option B.

Treatment Progress and Appliances

After the maxillary right first premolar was extracted, the three-unit fixed prostheses was removed. A temporary fixed cantilever partial denture was constructed, with tooth #8 serving as an abutment for a #9 pontic. Temporary single crowns were placed on teeth #7, 10, and 11 (*Fig. 11*).

The brackets selected were 0.022" Damon D3MX® (*Ormco, Glendora, CA*) with high torque in the maxillary incisors and standard torque in the mandibular anterior segments. All of the archwires and elastics were produced by the same supplier (*Ormco*). The initial archwires were 0.014" CuNiTi.

Bite turbos were bonded on the occlusal surfaces of the the right maxillary and left mandibular first molars. To simultaneously correct the Class II relationship, and the full buccal posterior cross-bite of tooth #15 (*Fig. 10*), a lingual button was bonded on the mandibular second molar. The patient was instructed to wear Class II elastics (*Quail® 3/16", 2oz.*) and cross-bite elastics full time.

After 10 months of treatment, the buccal posterior cross-bite was corrected, and the posterior bite turbos were removed. The wires were upgraded to .014"x.025" NiTi. The pontic width of tooth #9 was reduced and anterior segment of the maxillary arch was consolidated with an elastic power tube (*Fig. 12*).

Fig. 10:
The upper left second molar (#15) was in full buccal cross bite.

Fig. 11:
The fixed prostheses were removed and replaced with a temporary fixed partial denture and single crowns. The brackets bonded and posterior bite turbos were installed. The patient was instructed to wear Class II elastics.

Fig. 12:
After 10 months of treatment, the buccal posterior cross-bite was corrected, and the bite turbos were removed. The pontic width of #9 was reduced and the anterior segment of the maxillary arch was consolidated with an elastic power tube.

In the 13th month of treatment, a 0.017x0.025" TMA wire was inserted in the maxillary arch and the pontic width of #9 was reduced ~50%. An 0.016 x 0.022" SS wire was inserted in the mandibular arch and #31 was protracted with a power chain.

In the 14th month, the maxillary arch wire was upgraded to 0.019x0.025" SS wire. The tooth #9 space was progressively closed with power chain tension. In the 23rd month, the #9 pontic was removed to complete space closure. In the 26th month, the profile of the temporary crowns of #10 and 11 were reshaped into central and lateral incisors. The maxillary anterior segment was consolidated as space was closed (*Fig. 13*).

The brackets of the mandibular central incisors were rebonded to correct axial angulations (*Fig. 14*). Inter-proximal enamel thickness of the mandibular incisors was reduced and spaces were closed with power chains to correct the black triangles. All fixed

Fig. 13:
In the 26th month, the profile of the temporary crowns (#10 and #11) were reshaped to simulate central and lateral incisors.

Fig. 14:
Inter-proximal reduction was applied to the mandibular incisors to provide space for reducing the black triangles. The brackets of the mandibular central incisors were rebonded in the correct angulation.

appliances were removed after 35 months of active interdisciplinary treatment.

Retention

Upper and lower clear overlay retainers were delivered. The patient was instructed to wear them full time for the first 6 months and nights only thereafter. Instructions for home care and maintenance of the retainers were provided.

Prostheses Fabrication

One month after the completion of orthodontic treatment, temporary restorations were removed a direct polyvinyl siloxane impression was made for teeth #7, 8, 10, and 11. The impression was poured in die stone, and the four full ceramic maxillary anterior crowns were constructed with as natural morphology as possible. The major objective was achieving acceptable esthetic form and shade for the three mesially substituted teeth (#*10-12*) (*Fig. 15*). One week later, the four crowns were luted in place with resin cement and tooth #12 was restored in the form of a canine with restorative resin. A new upper clear overlay retainer was fabricated to fit the upper dentition.

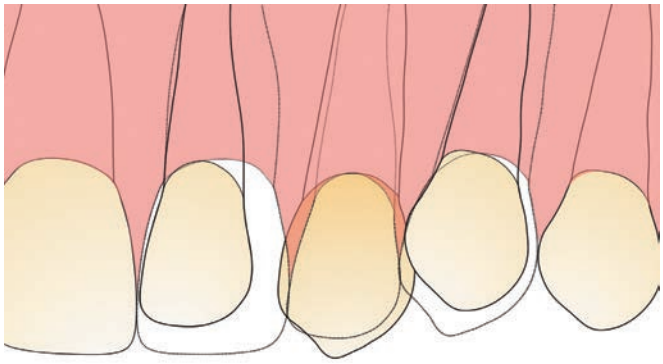


Fig. 15:
The mesially substituted teeth were altered restoratively to simulate upper left incisors and canine. Note that the primary consideration is aligning the gingiva and papillae. Once there axial inclinations were corrected, restorative procedures were performed.

Final Evaluation of Treatment

Cephalometric analysis (*Table 1*) and superimpositions (*Fig. 9*) showed no skeletal change in the maxilla or the mandible. The upper incisor to SN angle decreased from 103.5 to 85°. Because of the conservative treatment plan, the lower incisor to Md plane angle remained at 110°. The protrusive lips and lower lip eversion was improved, due to more ideal incisal relationships. All spaces were closed and the upper dental midline was corrected relative to

the facial and mandibular midline. The ABO Cast-Radiograph Evaluation (*CRE*) score was 27 points,[1] as documented later in this report.

There were multiple minor alignment discrepancies in the ABO CRE (*27*) that were primarily attributable to positional errors in bonding the brackets, but the overall result was pleasing. The protrusive lips were corrected and facial harmony was improved. The patient was particularly pleased with the improvement in her facial profile.

Although it is an esthetically challenging approach, multiple substitutions in the maxillary anterior esthetic zone are a viable conservative option for a missing central incisor.

Discussion

Missing permanent maxillary anterior teeth (*esthetic zone*) is a substantial challenge in dentistry. From an orthodontic perspective, there are usually two treatment options:

1. Maintain the space and restore the missing teeth, prosthetically.

2. Close the space orthodontically and restoratively modify the teeth that are substituted.

There is no consensus as to which approach has the strongest evidence base, particularly with respect to long-term follow-up. A good immediate solution may be a long-term liability. The most common objections to orthodontic space closure are an "*unnatural*" esthetic outcome that is difficult to retain and may compromise functional occlusion. However, patients often prefer the space closure option because they deem it a more conservative and desirable treatment plan compared to implants and prostheses.[2,3] An additional appeal is the belief that conservation of gingival tissue and papillae will provide a more predictable esthetic result.

The specific criteria for canine substitution are well discussed by Kokich and Kinser[4]. In addition to periodontal health, there are a number of important considerations when considering dental substitution: facial profile, type of malocclusion, space conditions, morphology and shades of the crowns, length of roots, and gingival contours.[5,6,7]

For the present patient (*Figs. 1-3*), the convex profile, Angle Class II malocclusion, and large overjet favor dental substitution. Another advantage was that most of the maxillary anterior teeth were already prepared for full coverage. This expands the conservative prosthetic options for restoring adjacent teeth with appropriate morphology, shades and functional contacts, in the maxillary anterior esthetic zone.

Gingival Margin

When aligning natural teeth and abutments, the gingival margins should be the guide for optimal correction. Maxillary central incisors and the canines should be symmetric and in a more apical position compared to those of the lateral incisors (*high-low-high principle*). In addition, the esthetics should be reasonable symmetric between sides.

Orthodontic intrusion or extrusion is often the best option for raising or lowering gingival margins if teeth have a healthy periodontal attachment. However, adjustments of the gingival margins usually requires adjustment in crown morphology to provide optimal esthetics and function. Crown lengthening procedures may be required in addition to orthodontics, but this can considerably complicate treatment due to a loss of periodontal attachment (*mobility*), exposure of the cementoenamel junction, and denuded root surfaces (*sensitivity*).

It is usually necessary to intrude mesially substituted lateral incisors and first premolars[8,9,10,11] to align the gingiva and provide prosthetic space for optimizing crown morphology and shade. On the other hand, a substituted canine may require extrusion and crown reduction to achieve a gingival margin characteristic of a lateral incisor.

Canine Shape / Shade

The mesiodistal dimension of the canine (*Table 2*) is wider than a lateral incisor, so a significant amount of crown reduction, reshaping and tinting is required for a mesially substituted canine (*Fig. 15*), to achieve the appropriate esthetics and function of a lateral incisor. Moreover, the canine is thicker than the lateral incisor and it has less lingual curvature (*Fig. 16a*), so extensive crown or prosthetic adjustment is required. The shade of the canine is usually darker than the adjacent lateral incisor. Optimal correction may require crowns or porcelain veneers.

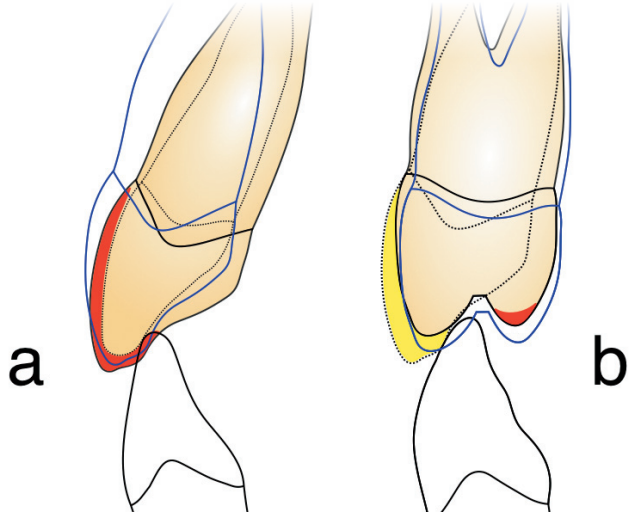
Maxillary	Central Incisor	Lateral Incisor	Canine	1st Premolar	2nd Premolar	1st Molar	2nd Molar
Angulation (mesiodistal)	2°	7°	17°	9°	5°	10°	8°
Inclination (faciolingual)	28°	26°	16°	5°	6°	8°	10°
Crown Size (Mesiodistal)	8.5	6.5	7.5	7.0	7.0	10	9

Adapted from Andrews and Wheeler

■ Table 2: Angulation/ Inclination/ Crown Size

Inclination and Root Eminence

When a maxillary canine is extruded with a labial fixed appliance, the crown usually tips lingually, resulting in a prominent, unesthetic canine eminence. Correcting this problem requires a great deal of lingual root torque[12] which may accentuate the crown morphology problems (*Fig. 16a*). It is usually best to correct the root torque before adjusting crown morphology.



■ *Fig. 16:*

a. Lingual root torque reduces the canine prominence, but it requires reshaping of the tooth to look like lateral incisor. Compare with the superimposed positions: beginning canine prominence (blue), large canine root compared to normal lateral incisor root, and crown reduction required (red).

b. Buccal root torque is needed to increase the first premolar root prominence. A resin buildup or a veneer (yellow) is needed along with reduction of the lingual cusp (red) to simulate canine form. The usual premolar position (blue) is shown prior to the orthodontic and restorative measures to simulate a canine.

In contrast, a substituted first premolar usually requires intrusion, followed by restoration with composite resin or a porcelain veneer to achieve optimal esthetics and occlusal function. As illustrated in Fig. 16b, intrusion of a maxillary premolar usually results in inadequate root eminence and an unesthetic exposure of the lingual cusp when smiling. Again, it is best to correct the axial inclination of the root prior to undertaking crown morphology modifications.

Angulation and Mesiodistal Position

The emergence profile of a maxillary central incisor is generally flat on the mesial surface, but the adjacent lateral incisor is more angulated (*Table 2*). When substituting a lateral for a central incisor, it is necessary to move it close to the midline to provide a more natural midline papillae[13,14] (*Fig. 17*). Because of the size difference between the incisors (*Table 2*), the lateral incisor must be extensively recontoured on the distal surface (*Fig. 15*) which may or may not be consistent with periodontal health. Again the recontouring procedures must be carefully planned for the entire maxillary esthetic zone. It may be advisable to reduce the width of contralateral teeth and then redistribute the space to achieve the most esthetic and healthy gingival solution.

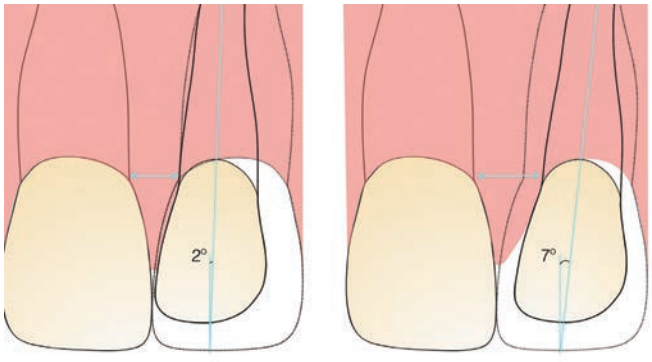


Fig. 17:
Compared to normal tooth form (right), angulation (2^0) and mesiodistal positioning of the substituted lateral incisor is essential for simulating the midline papilla and central incisor crown form (left).

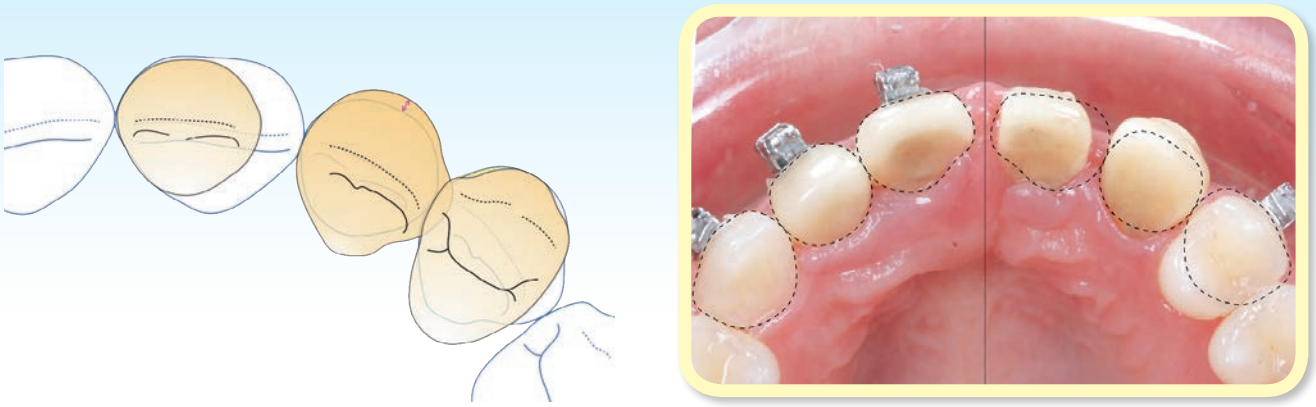
Labio-Palatal Position and Rotation

The lateral incisor should be placed somewhat labially in an atraumatic overjet relationship to reduce the functional load and to avoid traumatic occlusion (*jiggling*).[14] Since the canine is thicker labiopalatally than a lateral incisor, an outset in the main archwire may be necessary to obtain a proper alignment and occlusal contact points, between substituted maxillary incisors and their antagonists.

The mesial line angle of the first premolar is more prominent than for the canine. To present a more canine-like appearance, the first premolar is rotated slightly to the mesial, by distally positioning the bracket (*Fig. 18*).

Bracket Selection

A central incisor bracket should be placed on a mesially substituted lateral incisor to achieve an appropriate angulation for the labial surface of the incisor, as well as to better control its rotation, and correct the second order axial inclination. This concept is supported by a 10 year follow-up study investigating outcomes for substituted canines to close spaces due to congenital absence of maxillary lateral incisors. The most common esthetic deficit was inadequate crown torque of the mesially relocated canine, so it was recommended that the bracket be specific to the final location of the tooth. Therefore, an incisor bracket should be used on the



■ *Fig. 18:*
The substituted lateral incisor should be placed near the midline and slightly labial to reduce the functional loading during protrusion. A main archwire outset corrects the position the substituted canine (red arrows) to obtain a proper contact point. The substituted first premolar should be mesially rotated slightly to simulate the appearance of a canine.

flattened facial surface of the substitutive canine.[15]

For both esthetic and functional reasons, the buccal crown torque for a mesially substituted first premolar should be relatively perpendicular. As previously mentioned, intrusion of the premolar increases the buccal crown torque, so the first premolar bracket is still used because it has more negative torque (-7º) than the canine bracket (0º). In effect, the usual torque in the premolar brackets compensates for the positive torque that is a side effect of intrusion.

These maxillary anterior torque problems are best managed by a combination of bracket selection and differential archwire torque. The important consideration is to carefully monitor the third order effects though out the segment, then adjust the brackets and archwires accordingly.

Occlusion

The root length of the lateral incisor is less than for the central incisor, so it should be protected during the incisive guidance of protrusion. The mesially substituted canine is best able to tolerate incisal guidance, but it may no longer be in an adequate position to provide canine guidance. It is important to carefully consider the optimal position of a tooth and its root structure in planning a mutually protected occlusion. Compromises may be required.

Also because of inadequate root structure, the medially substituted first premolar is usually a poor candidate for providing canine protected occlusion. Group function is the appropriate functional occlusion to avoid excessive stress on an intruded mesially substituted first premolar.

Esthetic Evaluation of Treatment Results

Figs. 1, 2, 4, 5 and 20 document a pleasing improvement in both dental and facial esthetics, but careful analysis shows there is still room for improvement.

First, the left lateral incisor could have been moved

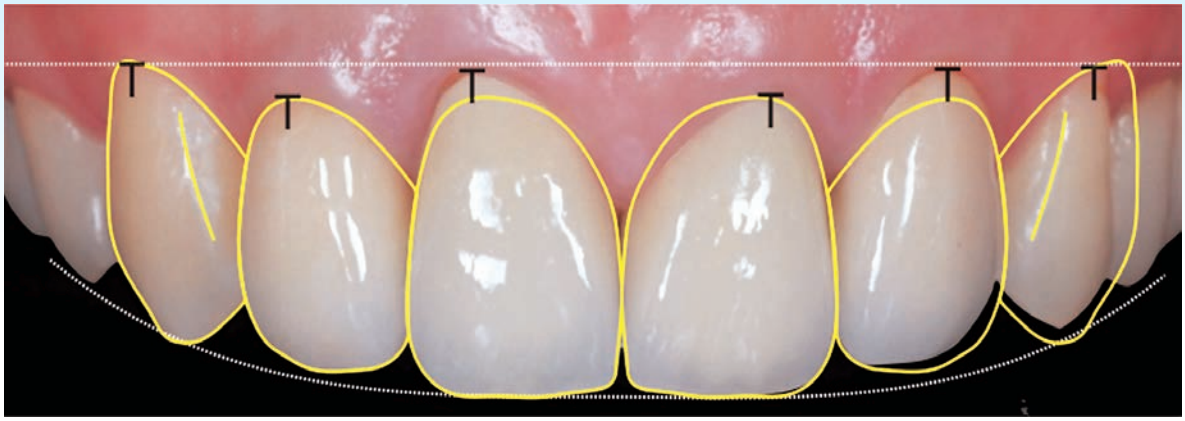


Fig. 19:
The yellow lines indicates the ideal esthetic outline of the maxillary anterior crowns. Corrections required are:
a. the gingival margin of the right central incisor and the left substitutive canine should be positioned more apically
b. the gingival margin of the left substituted first premolar should be intruded
c. the left substituted lateral incisor should be positioned closer to the midline
d. the buccal surface and the cusp tip of the substituted left first premolar should be built-up restoratively.

closer to the midline to narrow the base of the midline papillae (*Fig. 17*).

Second, the left canine could have been extruded to lower the gingival margin and provide more gingival display, which would provide a more youthful appearance.[16] Also the translucence of the crown is a bit opaque, suggesting that a little more reduction on the facial surface of the abutment preparation was needed.

Fig. 20:
The treatment was very successful, but retrospective analysis suggests there is room for improvement.

Third, the left first premolar should have been intruded more to raise the gingival margin and then the restorative build-up could lengthen the cusp tip and thicken the facial surface, creating a more canine-like appearance.

Conclusion

The initial consideration in managing missing maxillary teeth in the esthetic zone is the overall direction of treatment plan, which should based on the facial profile, skeletal classification, dental occlusion, and patient preferences. It is important for the patient to understand the pros and cons of each approach, then agree to the cooperation necessary to achieve an optimal result. In monitoring treatment progress, it is essential to navigate the teeth into the arrangement that best meets the esthetic and functional requirements. Finally, the patient should be committed to the final restorative and prosthetic procedures to achieve an optimal long-term result with respect to both esthetics and function.

Reference

1. Chang CH. Advanced Damon Course No.4,5: DI & CRE Workshop (1)(2). Beethoven Podcast Encyclopedia in Orthodontics [podcast]. Hsinchu: Newton's A Ltd; 2011.
2. Armbruster PC, Gardiner DM, Whitley Jr JB, Flerra J. The congenitally missing upper lateral incisor. Part 1: esthetic judgment of treatment options. World J Orthod 2005;6:369–75.
3. Armbruster PC, Gardiner DM, Whitley Jr JB, Flerra J. The congenitally missing upper lateral incisor. Part 2: assessing dentists' preferences for treatment. World J Orthod 2005;6:376–81.
4. Zachrisson BU. Improving orthodontic results in cases with maxillary incisors missing. Am J Orthod Dentofacial Orthop 1978;73:274-89.
5. Kokich VO Jr, Kinzer GA. Managing congenitally missing lateral incisors. Part I: canine substitution. J Esthet Restor Dent 2005;17:5-10.
6. Zachrisson BU. Improving orthodontic results in cases with maxillary incisors missing. Am J Orthod Dentofacial Orthop 1978;73:274-89.
7. McNeill RW, Joondeph DR. Congenitally absent maxillary lateral incisors:treatment planning considerations. Angle Orthod 1973;43:24-9.
8. Kokich V, Nappen D, Shapiro P. Gingival contour and clinical crown length: their effects on the esthetic appearance of maxillary anterior teeth. Am J Orthod Dentofacial Orthop 1984;86:89-94.
9. Kokich V, Nappen D, Shapiro P. Gingival contour and clinical crown length: their effects on the esthetic appearance of maxillary anterior teeth. Am J Orthod Dentofacial Orthop 1984;86:89-94.
10. Kokich V. Anterior dental esthetics: an orthodontic perspective I Crown length. J Esthet Dent 1993;5:19-23.
11. Kokich VG, Spear F. Guidelines for managing the orthodontic-restorative patient. Semin Orthod 1997;3:3-20.
12. Kokich VG. Esthetics and vertical tooth position: the orthodontic possibilities. Compendium Cont Ed Dent 1997;18:1225-31.
13. Kokich VG, Crabill KE. Managing the patient with missing or malformed maxillary central incisors. Am J Orthod Dentofacial Orthop 2006;129(4):S55–63.
14. Schwaninger B, Shaye R. Management of cases with upper incisor missing. Am J Orthod Dentofacial Orthop 1977;71:396-405.
15. Schwaninger B, Shaye R. Management of cases with upper incisor missing. Am J Orthod Dentofacial Orthop 1977;71:396-405.
16. Thordarson A, Zachrisson BU and Mjör, IA. Remodeling of canines to the shape of lateral incisors by grinding: A long term clinical and radiographic evaluation, Am J Orthod Dentofacial Orthop 1991;100:123-132.
17. Vig RG, Brundo GC. The kinetics of anterior tooth display. J Prosthet Dent 1975;39:502–4.

Discrepancy Index Worksheet

TOTAL D.I. SCORE 38

OVERJET

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

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

Total = 4

OVERBITE

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

Total = 3

ANTERIOR OPEN BITE

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

Total = 0

LATERAL OPEN BITE

2 pts. per mm. per tooth

Total = 0

CROWDING (only one arch)

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

Total = 1

OCCLUSION

Class I to end on	=	0 pts.	
End on Class II or III	=	2 pts. per side	pts.
Full Class II or III	=	4 pts. per side	8 pts.
Beyond Class II or III	=	1 pt. per mm. additional	3 pts.

Total = 11

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° 11 x 1 pt. = 11

Total = 15

OTHER (See Instructions)

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

Identify:

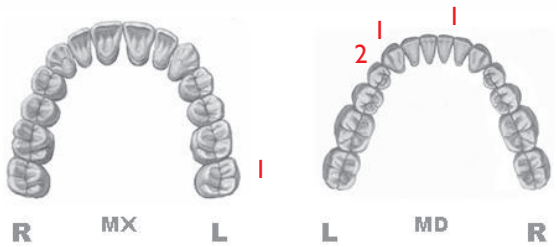
Total = 2

Cast-Radiograph Evaluation

Total CRE Score 27

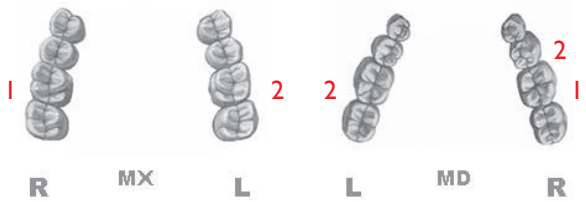
Alignment/Rotations

5



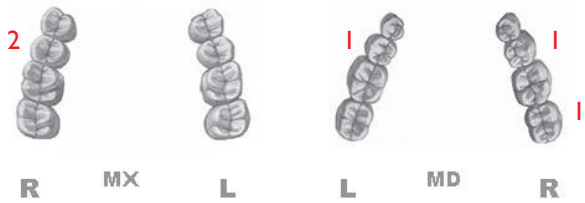
Marginal Ridges

8



Buccolingual Inclination

5

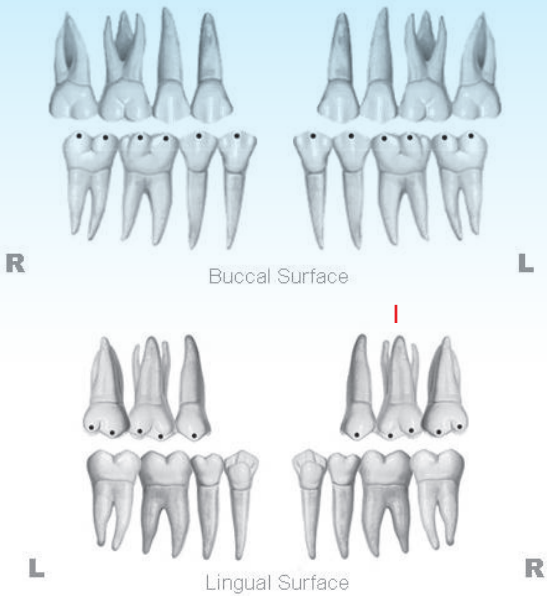


Overjet

0

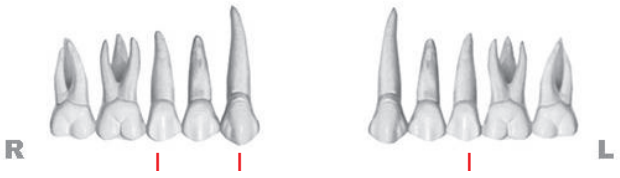
Occlusal Contacts

1



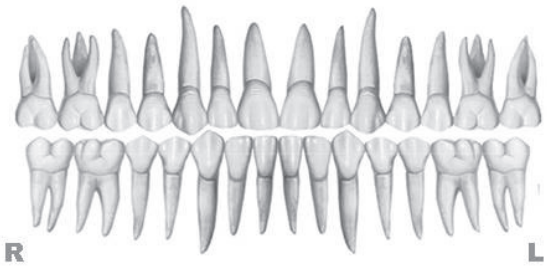
Occlusal Relationships

3



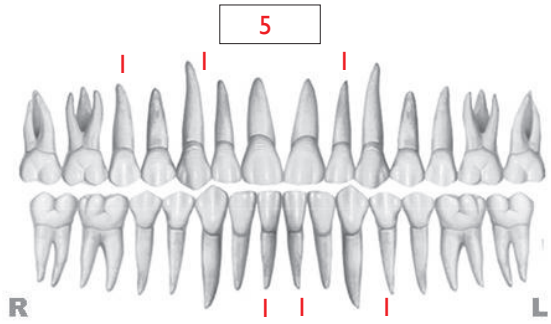
Interproximal Contacts

0



Root Angulation

5



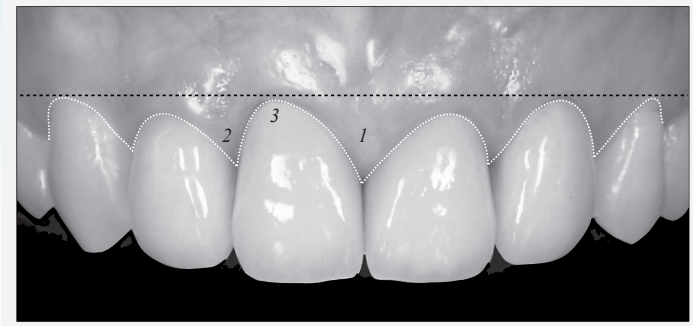
INSTRUCTIONS: Place score beside each deficient tooth and enter total score for each parameter in the white box. Mark extracted teeth with "X". Second molars should be in occlusion.

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

Total Score: = 6

1. Pink Esthetic Score

Total = 2

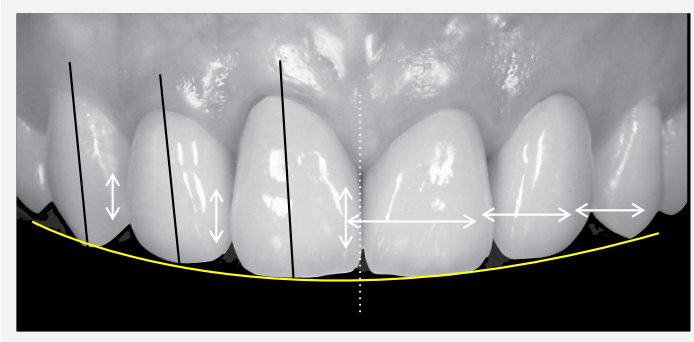


1. M-D Papillae	0	1	2
2. Keratinized Gingiva	0	1	2
3. Curvature of Gingival Margin	0	1	2
4. Level of Gingival Margin	0	1	2
5. Root Convexity (Torque)	0	1	2
6. Scar Formation	0	1	2

1. M & D 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-esthetics)

Total = 4



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

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

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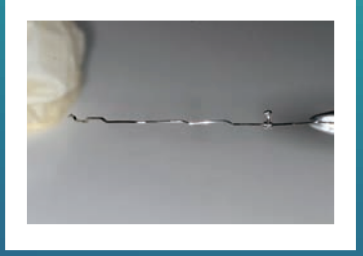
定價：$2900/盒（每盒5條）

採高科技離子植入技術(非一般表面塗層)，在不影響線徑厚度下，同時增加強度並降低摩擦力，創造完美滑行機制與摩擦係數最小化之目的。

低摩擦力TMA的特色

1. 縮短療程：降低摩擦力，牙齒移動速度增加。
2. 經濟效益：換線次數的減少，看診次數降低，得以省去伴隨而來的花費。
3. 治療品質：病人感到更舒適
4. 搭配透明矯正器，美觀性更佳。

JCO Volume 29 : Number 7 Pages 453-461, 1995
Production of Low-Friction and Colored TMA by Ion Implantation



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Indications：

1. Arch coordination
2. Prescription arch
3. Uprighting archwire
4. Sliding archwire

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VPS Impression Material

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Take1 Advanced 提供以下不同包裝與流動性可供選擇

* Cartridge （槍型）50ml
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  - Regular body Wash
  - Medium / Monophase
  - Tray
  - Rigid Tray
  - Bite Registration

* Volume （機器型）380ml
  - Tray
  - Medium / Monophase
  - Rigid Tray

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K2 Dr. Kokich令人屏息的十大演講秘訣 2015.08.06
學習重點：1. Dr. Kokich 十大演講秘訣 2. 準備演講九步驟 3. 多媒體剪輯

K3 賈伯斯令人目眩神迷的五項演講技巧 2015.09.03
學習重點：1. 賈伯斯五項演講技巧 2. 幻燈片設計概念 3. 幻燈片修改應用

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本寶典包含：
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(2) K4~K6
(3) 2014, 2015 課程視訊

備註：
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(2)舊生報名K1~K3須繳訂金，課程日退還。
(3)若取消報名，適用下述K4~6退款說明。

繪圖簡報達人

K4 K5 K6 精修繪圖及動畫技巧 2015.12.05-07

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講師
Dr. Rungsi Thavarungkul

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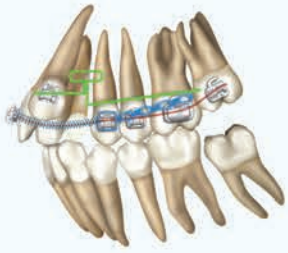

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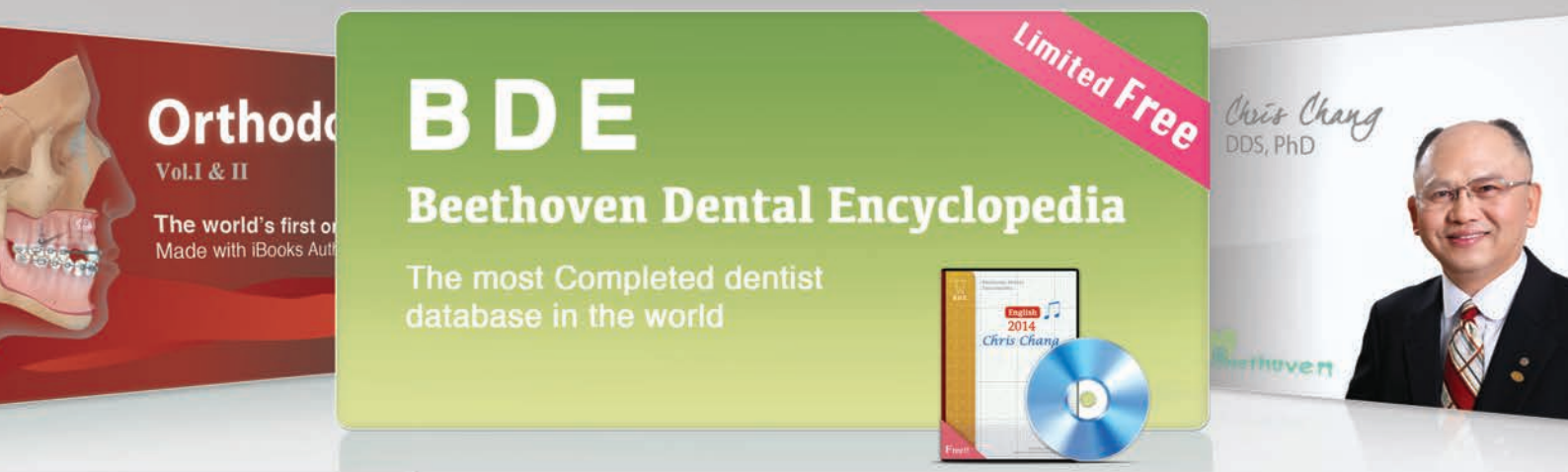

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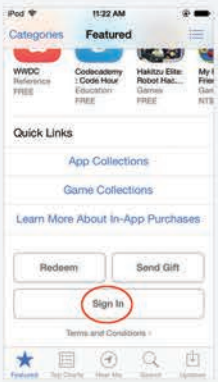

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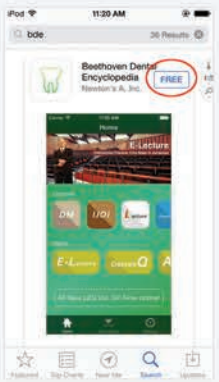
3. "Create Apple ID" if you don't have one.

4. Search for "BDE."



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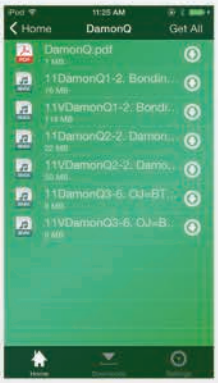

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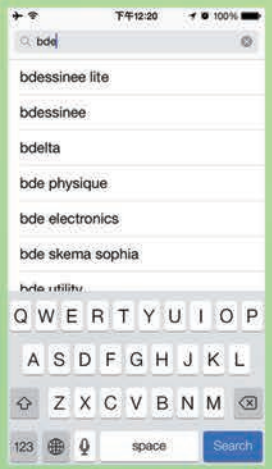

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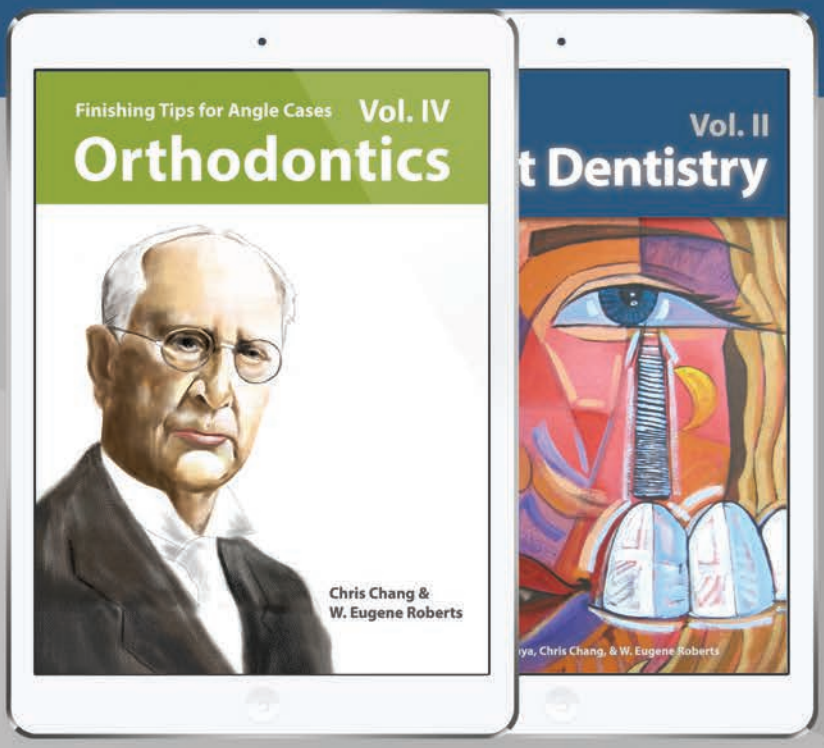

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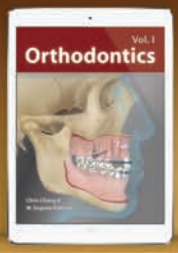

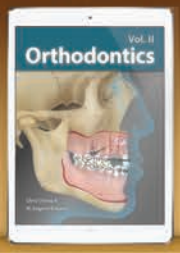

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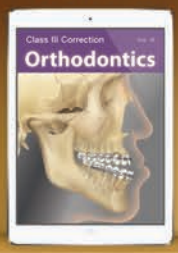

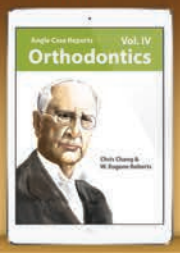

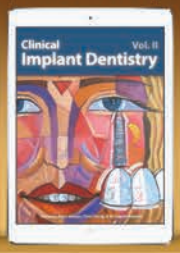

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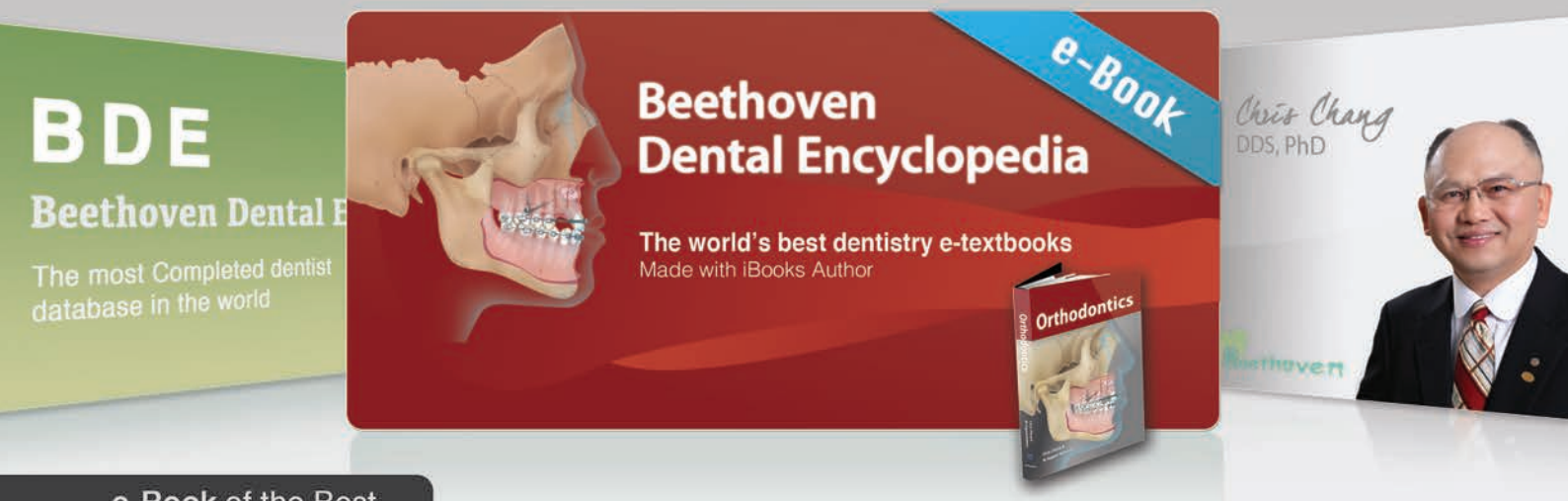

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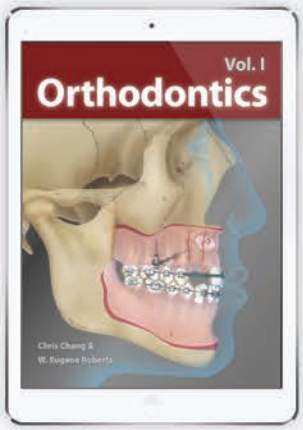

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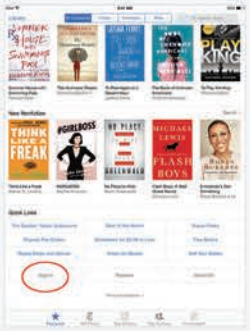

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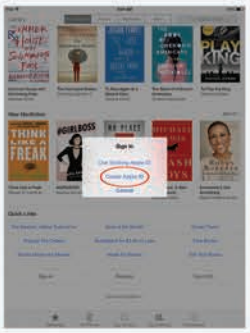

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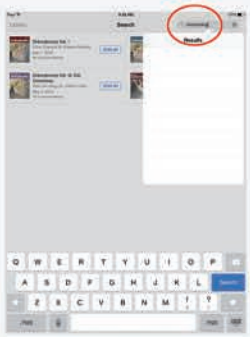

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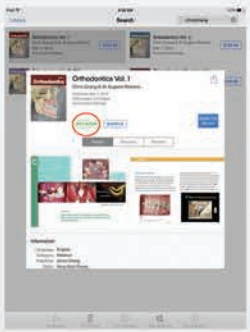

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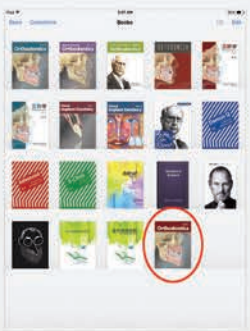

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Feedback from Australia

An amazing experience from such a very smart orthodontist. Dr. Rungsi was able to teach us in a very simple, easy & quick way how to be able to use Keynote in a very professional way. Amazing presentations, skills & knowledge. A must do for anyone who's practicing orthodontics. Looking forward to come again. Stay hungry, stay foolish! :)

Also a very big thanks to Dr. Chris Chang & all the team at Beethoven Dental Group for the excellent organisation & help before, during & after the course.

Amr ElDaly
Australia

A lot of people have asked me about this course, and I should really have done this a long time ago. It was one of the best course (***cost and material involved***) and holiday trip for me. Chris is very generous with his teaching. I asked him pretty much anything, and he can demonstrate right in front of you because he sees so many patients in a day.

Jack Yang
Infinity Dental Care, Australia

貝多芬矯正中心

2015見習獎學金辦法

目的：

為促進國內牙科學術教育與牙科實務工作間的學習交流，並鼓勵國內牙醫系所學生在學期間能認識牙科實務操作環境，貝多芬齒顎矯正中心、安徒生兒童牙科、金牛頓植牙中心與金牛頓藝術科技特聯合提供本獎學金以及三天觀摩見習的機會。

實習目標：

1. 提昇對牙醫實務操作環境與診所管理的認識與了解。
2. 學習如何應用資訊科技來提昇實務工作效率。
3. 觀摩矯正、兒童專科診所與植牙中心的經營模式。

★ 甄選對象：全台灣牙醫系四升五年級學生

★ 名額：每校3-5名

★ 獎助內容：三天二夜五星級飯店住宿以及見習期間餐飲費補助。

★ 遴選方式：學期成績在全班前30%或成績平均在75分以上，且對牙科實務展現積極學習的態度。

★ 見習時間：104年7月30日(四)-8月1日(六)

★ 申請截止日期：104年6月30日，以郵戳為憑。

★ 檢覆文件：

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2. 自傳：基本資料（姓名、性別、手機、市話、email、住址）、學習經歷、申請目的
3. 其他有利申請之文件

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聯絡方式：03-573-5676

電子郵件：course@newtonsa.com.tw

我在這次的貝多芬獎學金活動中獲益良多。張醫師點出演講的成功要訣，其中第一項就是「Always be prepared.」。在見習貝多芬矯正診所過後，對於這句話得到更深的印證。張醫師對於醫療的每一個環節都一絲不苟。用最簡潔有效的方式記錄病例，而且對於細節非常注重。他跟我們說：「矯正沒有大技巧，只有小技巧。如果每一個小技巧都做不好，那矯正就不用做了！」

真的非常幸運能入取這次的貝多芬獎學金見習。如果學弟妹問我貝多芬講學金課程如何。我一定會大大推薦，然後比個讚！因為讀萬卷書不如行百里路。實際來外面看看別人怎麼做，想法可以更加開闊。而且張慧男醫師又是矯正的一代宗師，能在張醫師的診所見習絕對收獲豐富！

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結合科技與醫療，在縝密的規劃、精密的流程中增進效益。在張醫師對美的極致要求下，不只是在治療過程，連對於病例的整理、資料的收集都是一種美與科技的結合。讓對於執業環境感到陌生的我們體會到張醫師的深厚經驗，也讓我們了解到輔助科技以及助理訓練的魔力。

在這幾天行程中，最令我印象深刻的便是張醫師的演講。我感到非常榮幸能從張醫師以及其他醫師的演講中化繁為簡地了解到矯正植牙的互相搭配，牙齦的修補技術以及上顎竇的補骨技巧。這些相當複雜的知識竟然能化為簡潔且重點明確的keynote，讓我深感佩服且覺得獲益良多。

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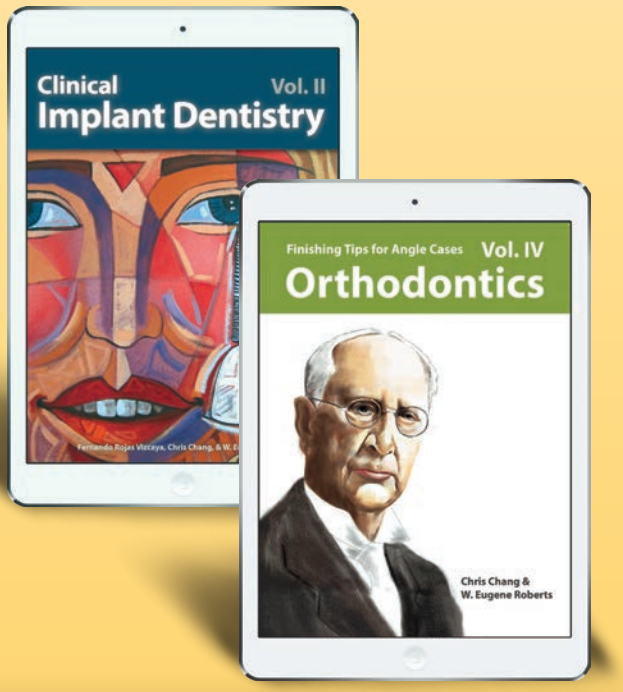

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From left to right: Drs. Hsin-Yin Yeh, Dwight Damon, Chris Chang and Mr. Patrick Eriksson at 2015 Ormco Forum, Orlando, Florida, USA.

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