Congenital Absence and Microdontia of Second Premolars: Orthodontics, Implants and Prosthetic Dentistry
Drs. Linda Tseng, Chris Chang & W. Eugene Roberts

Space Closure for Congenitally Missing Upper Second Premolars with Molar Protraction Through the Floor of the Maxillary Sinus
Drs. Chia Wei Liu, Chris Chang & W. Eugene Roberts

Severe Gummy Smile, Class II with 8mm Crowding Treated with Invisalign and Miniscrews
Dr. Diego Peydro Herrero

Conservative Restoration of Interproximal Caries During Active Orthodontic Treatment
Drs. Sheau Ling Lin, Chris Chang & W. Eugene Roberts

IJOI
International Journal of Orthodontics & Implantology
Vol. 43 July 1, 2016

The 25th Beethoven international workshop, April 26-28, 2016. Participants took photos with Drs. John Lin (center) and Chris Chang (first row, left).

International Journal of Orthodontics & Implantology is an experience sharing magazine for worldwide orthodontists and Implantologists. Download it at *http://iaoi.pro.*

《僅供牙科專業人士參閱》

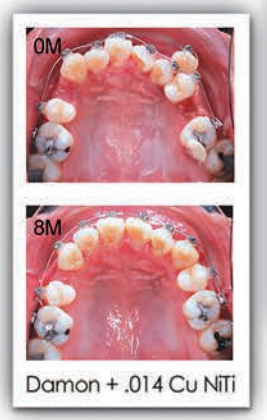
2016 熱愛學矯正

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 + .014 Cu NiTi

Damon Clear

Damon Master Class

使用最新一代矯正器 Damon Q 進行課程，歡迎舊生報名參加。

【課程】9:00 - 12:00
【實習】另外安排

	台中 (四)	台北 (二)	LECTURE	LAB
1	5/5	5/17	理想入門病例+Damon Q黏著	Bonding (Damon Q) + BT
2	5/19	5/24	快速矯正療程四部曲	Ceph + Photo
3	5/26	6/21	簡捷有效的錨定系統	Damon + OrthoBoneScrew
4	6/16	6/28	不拔牙與拔牙分析	Space Closing + Hook + Spring
5	6/23	7/5	Damon 診斷流程及微調	Finish Bending
6	6/30	7/19	完工檢測及報告示範	Fixed Retainer (FR)
7	7/7	7/26	維持及復發；病例示範	Presentation Demo
8	7/21	8/16	矯正力學及診斷分析 (1)	DDX + Case Reports I
9	7/28	8/23	軟硬組織及診斷分析 (2)	DDX + Case Reports II
10	8/11	8/30	兒童矯正及診斷分析 (3)	DDX + Case Reports III
11	8/25	9/6	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(三) 9/21（含午、晚餐）

International workshop

Keynote & managment
OrthoBoneScrew & Damon

2016

英文A班	4/26 -29
英文B班	10/18 -21
馬國A班	9/22 -24
馬國B班	12/8 -10

2017

英文A班	5/16 -19
英文B班	11/28 -12/1

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	9/27	Bracket Placement	Crowding: Ext. vs. Non-ext.
2	10/4	Impacted Canines	Upper Impacted Teeth
3	10/25	Canine Substitution	Lower Impacted Teeth
4	11/1	Missing 2nd Premolar	Missing: Ant. vs. Post.
5	11/29	DI Workshop	Crossbite: Ant. vs. Post.
6	12/6	CRE Workshop	Open Bite High Angle
7	12/20	Excellence in Finishing (occlusion)	Deep Bite Low Angle
8	12/27	Excellence in Finishing (esthetics & perio)	Gummy Smile & Canting
9	1/3/17'	Ortho-Perio-Restore Connection	Esthetic Finishing (Transposition)
10	1/10	Adjunct to Perio	Implant-Ortho
11	1/17	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) 10/7、11/4（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VIII 8/9/16' 9/20 10/18 11/22 12/13 2/14/17' 3/14 4/11 5/9 6/13 7/11

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）

報名專線

湧傑 Yong Chieh

北區
(02) 27788315
楊文君 分機#122

中區
(04) 23058915 張馨云

南區
(07) 2260030 蔡淑玲

＊每次上課請依最新一期 IJOI 公告為主

Number One Profession

I recently read in an AJO-DO editorial, that Orthodontics is now ranked as the No. 1 job in America. This was deduced from the following seven criteria: median salary, employment rate, 10 year growth volume, 10 year growth percentage, future job prospects, stress levels and work-life balance. Orthodontists are usually able to plan and work at their own pace and also enjoy great satisfaction from their craftsmanship and great feedback from their customers.

From my humble "*country boy*" background to be a member of the elite No. 1 profession, how lucky I am!!

As many of you know, my career has also taken on an extra dimension, speaking and teaching about Orthodontics, which I now feel even more honoured to do, as it is the No. 1 profession!

Earlier this year I was delighted to have been one of the key speakers at the AAO in front of a 3,000+ full house in the biggest auditorium, which, according to a young doctor, was the only time that the auditorium was full during this 4 day event. The feedback has been great; Dr. Lee Graber publicly commented that in the past his highest mark for excellent speakers was A+, however this year he'd give Chris Chang A+++. Dr. Larry White wrote an email to me saying that "in the 50 years of presentations at the AAO, I've never seen such adoration (*by the audience*)". Dr. Tom Mulligan wrote: "The crowd was so large there was simply no way I could make my way through in order to say "*hello*" and "*thank you*" for your great presentation".

I look forward to being a regular key speaker at this event for many years to come and hope that I can inspire the younger generation of Orthodontists to also join me in advancing the No. 1 profession.

Of course, all this would have not been possible without the great support of my family, my mentor Dr. Eugene Roberts, as well as countless professionals who have helped and inspired me. I cannot mention them all here, but you know who you are - Thank you.

Let us keep marching along the path to glory and make the most of our opportunity to be involved in, improve and further our great No. 1 profession.

Chris Chang DDS, PhD, Publisher of IJOI.

3 Editorial

iAOI CASE REPORT

4 Congenital Absence and Microdontia of Second Premolars: Orthodontics, Implants and Prosthetic Dentistry

32 Space Closure for Congenitally Missing Upper Second Premolars with Molar Protraction Through the Floor of the Maxillary Sinus

52 Severe Gummy Smile, Class II with 8mm Crowding Treated with Invisalign and Miniscrews

CLINICAL TIPS

70 Conservative Restoration of Interproximal Caries During Active Orthodontic Treatment

76 The "ANG (Anghileri) Technique": Making Derotation Easy

iAOI OTHERS

82 In Memoriam: My Story with Charles J Burstone

FEEDBACK FROM THE WORLD

90 Feedback from the Beethoven International Workshop in April, 2016

Congenital Absence and Microdontia of Second Premolars: Orthodontics, Implants and Prosthetic Dentistry

Abstract

A 31-year-5-month old male presented for orthodontic consultation to evaluate interdental spacing and an anterior deepbite. There were three congenital missing second premolars: lower left (LL), lower right (LR) and upper right (UR) quadrants. The upper left (UL) second premolar was affected by microdontia and positioned in lingual crossbite. Multiple teeth were tipped and extruded in both arches, so preprosthetic alignment was required to prepare sites to restore the missing and anomalous premolars. Orthodontic alignment and prosthetic site preparation was achieved with a full fixed passive self ligating appliance, open coil springs, and early light short Class II elastics (ELSE). Bite turbos were employed to increase the vertical dimension of occlusion (VDO). Flapless and open-flap surgical procedures were selected according to the soft tissue and bone conditions at each implant site. The implant replacing the LR second premolar was inadvertently oriented to the buccal, so a 15° angled abutment was required to correct the orientation of the preparation prior to restoration with a crown. This severe mutilated malocclusion with an American Board of Orthodontics (ABO) Discrepancy Index (DI) of 26 was treated to a pleasing functional and esthetic result in 26 months. The ABO Cast-Radiograph Evaluation (CRE) score was 27, and the Pink and White dental esthetic index was 3. (Int J Orthod Implantol 2016;43:4-27)

Key words:

Interdental spacing, congenitally missing premolars, microdontia, preprosthetic alignment, implant size selection, flap and flapless surgical techniques

History and Etiology

A 31-year-5-month male presented for interdisciplinary consultation (*Fig. 1*) with a chief complaint: unaesthetic dentition due to irregular spaces (*Figs. 2 and 3*). Clinical examination revealed an anomalous, small second premolar (*microdontia*) in the UL quadrant, that was in lingual crossbite. The other three second premolars were congenitally missing. Masticatory efficiency was compromised in the canine and premolar areas of both arches due to multiple spaces and extruded teeth (*Fig. 2*). There was no cost-effective prosthetic option for managing this severe malocclusion (*DI 26*), without preprosthetic orthodontics. An interdisciplinary treatment plan was initiated to align the dentition and consolidate space for restoration of the missing second premolars with implant-supported prostheses (*ISP*). A crown was placed on the undersized UL maxillary premolar. The patient was treated to the planned result in 26 months as documented in Figs. 4-6. Radiographic images before and after treatment are presented in Figs. 7 and 8,

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

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

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

Fig. 1: Pre-treatment facial photographs

Fig. 4: Post-treatment facial photographs

Fig. 2: Pre-treatment intraoral photographs

Fig. 5: Post-treatment intraoral photographs

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

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

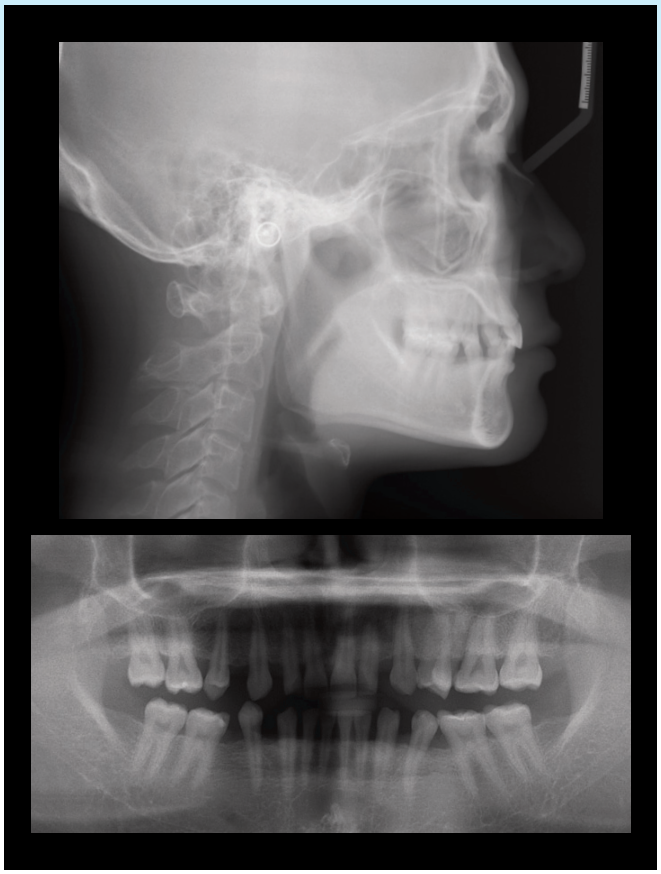


Fig. 7:
Pre-treatment lateral cephalometric and panoramic radiographs show a relatively straight profile (above) and an irregular partially edentulous dentition (below).

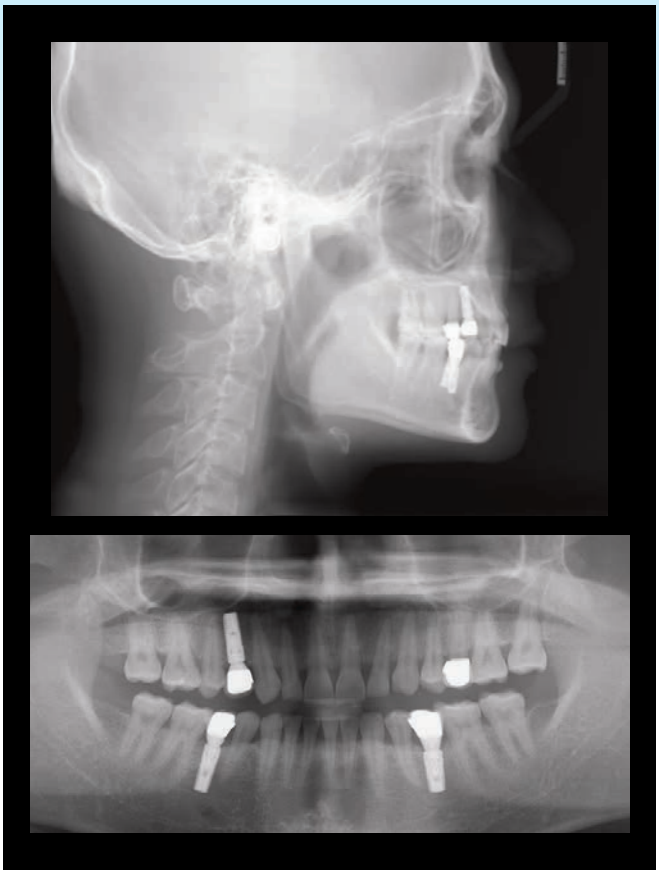


Fig. 8:
Post-treatment lateral cephalometric and panoramic radiographs document an adequate facial profile, a well aligned dentition, and three implants optimally positioned for restoration of the congenitally missing second premolars.

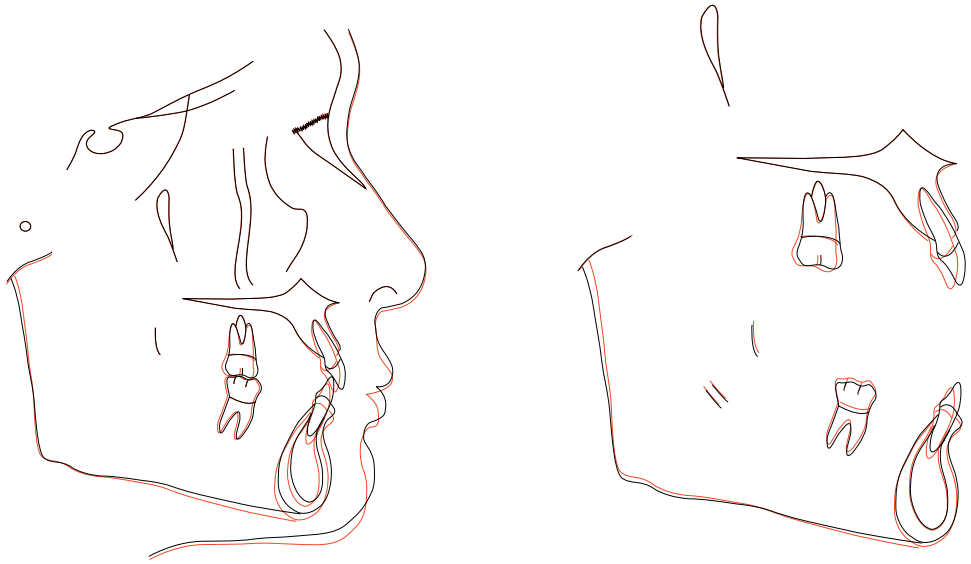


Fig. 9:
Initial (black) and finish (red) cephalometric tracings are superimposed on the anterior cranial base (left), as well as on the stable skeletal structures of the maxilla (upper right), and mandible (lower right). Note that the most significant changes were clockwise mandibular rotation to open the vertical dimension of occlusion, and slight retraction of the anterior segments to optimally align the dentition.

respectively. Cephalometric documentation is provided in Fig. 9.

Diagnosis

Skeletal:

- Skeletal Class I (*SNA 83°, SNB 83°, ANB 0°*)
- Low mandibular plane angle (*SN-MP 19°, FMA 15°*)

Dental:

- Slight Class II molar tendency bilaterally
- Three congenitally missing second premolars #5 (*UR*), 20 (*LL*), and 29 (*LR*)
- Microdontia and lingual crossbite of the upper left (*UL*) second premolar, tooth #13
- Irregular marginal ridges in both arches due to tipping and lack of antagonists (*Fig. 10*)

Fig. 10:
Multiple teeth were extruded due to a lack of appropriate occlusal antagonists. Dental alignment was inadequate for cost-effective prosthetic reconstruction.

Fig. 11:
Severe attrition of the incisal edges of lower anterior teeth was attributed to abnormal function associated with the deep bite occlusion.

- Severe attrition of the incisal edges in the lower anterior segment (*Fig. 11*)
- Overbite 4mm
- Excessive curve of Spee in the lower arch

Facial:

- Relatively straight facial profile with a retruded lower lip

The American Board of Orthodontics (*ABO*) Discrepancy Index (*DI*) was 26 as shown in the subsequent worksheet.

Specific Objectives of Treatment

The principal objectives were to: 1. maintain the facial profile, 2. align marginal ridges to restore occlusal function, 3. prepare implant sites by consolidating space, and 4. achieve ideal overbite and overjet relationships.

CEPHALOMETRIC			
SKELETAL ANALYSIS			
	PRE-Tx	POST-Tx	DIFF.
SNA°	83°	83°	0°
SNB°	83°	83°	0°
ANB°	0°	0°	0°
SN-MP°	19°	21°	2°
FMA°	15°	17°	2°
DENTAL ANALYSIS			
U1 TO NA mm	5.5 mm	3.5 mm	2 mm
U1 TO SN°	106°	100°	6°
L1 TO NB mm	3 mm	1.5 mm	1.5 mm
L1 TO MP°	99°	94.5°	4.5°
FACIAL ANALYSIS			
E-LINE UL	-2.5 mm	-2 mm	0.5 mm
E-LINE LL	-2 mm	-2.5 mm	0.5 mm

Table 1: Cephalometric summary

Maxilla (*all three planes*):

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

Mandible (*all three planes*):

- A - P: *Slight distal movement consistent with bite opening*
- Vertical: *Increase by rotating the mandible clockwise*
- Transverse: *Maintain*

Maxillary Dentition

- A - P: *Retract maxillary incisors and molars*
- Vertical: *Extrude to increase the vertical dimension*
- Preprosthetic preparation of second premolar areas

Mandibular Dentition

- A - P: *Retract lower incisors*
- Vertical: *Extrude molars and intrude incisors to correct excessive curve of Spee*
- Prepare implant sites for both missing second premolars

Facial Esthetics: Maintain

Treatment Plan

The interdisciplinary sequence begins with full fixed orthodontic alignment, with an increase the vertical dimension of occlusion (*VDO*) via anterior bite turbos (*occlusal stops*), and Class II elastics. During alignment open coil springs consolidate space in the second premolar areas. About 6 months before the end of active orthodontics treatment, place implants to replace the missing three premolars, and after orthodontics treatment is completed construct four prosthetic restorations (*single crowns*) to restore all second premolars. Retain with clear overlay retainers.

Appliances and Treatment Progress

An .022" slot self-ligating appliance Damon Q® bracket system (*Ormco, Glendora, CA*) was used for both arches along with the elastics and archwires prescribed by the same manufacturer. Standard torque brackets were bonded on upper and lower incisors. The initial arch wire was .014" CuNiTi. Bite turbos were bonded on the palatal surface of maxillary central incisors (*teeth #8 & 9*). Early light short elastics (*ELSE*) (*Quail 2oz*) were applied from the buccal surface of the lower first molars to the upper canines bilaterally (*Fig. 12*). In the 8th month of treatment, the upper arch wire was changed to .016x.025" stainless steel (*SS*) and a .017x.025" titanium molybdenum alloy (*TMA*) archwire was placed in the lower arch. In the mandible, open coil springs were compressed between the first molars and premolars to increase space for the planned protheses. In the maxilla, the open coil springs were placed between the canine and premolar on the right side to prepare the implant site and provide adequate space for the PFM

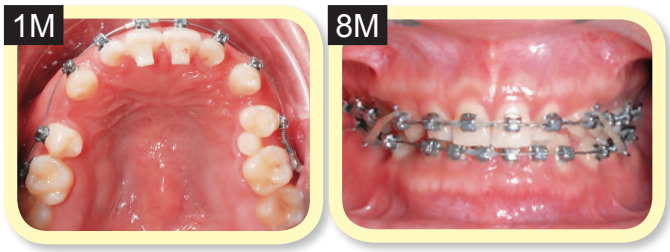


Fig. 12:
Bite turbos (premature occlusal stops) were bonded on the palatal surfaces of teeth #8 & 9. ELSE (Quail 2oz) were applied from the lower first molar to upper canine bilaterally to correct the Class II irregularity in the buccal segments.

crown on the anomalous tooth at the left side (*Fig. 13*). Thirteen months into active treatment, a cone-beam computed tomography (*CBCT*) scan was exposed to evaluate the bone volume in the implant sites (*Fig. 14*). Surgical stents were designed on the casts to guide the osteotomy for implant placement (*Fig. 15*). In the 15th month of treatment, presurgical preparation was completed (*Fig. 16*)[1], and the mucogingival junction was evaluated for each implant site to determine if there was at least 3mm of keratinized gingiva (*Fig. 17*).[2-4]

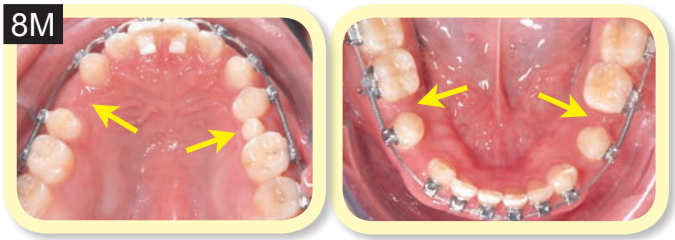


Fig. 13:
Open coil springs were placed between the first molar and first premolar in all four quadrants (black arrows) to produce adequate space for prosthetic restoration. In the 8th month, the lower arch wire was .017x.025" TMA and the upper arch wire was .016x.025" SS.

Implant Placement

A flapless surgical technique was indicated for the upper right (*UR*) implant. After injecting local anesthesia, the surgical stent was fitted into position and a surgical explorer penetrated the soft tissue to mark the central axis of the osteotomy. A soft tissue punch was used to excise a cylinder from the 3mm thick gingiva (*Fig. 18*), and a surgical guide pin was placed in the

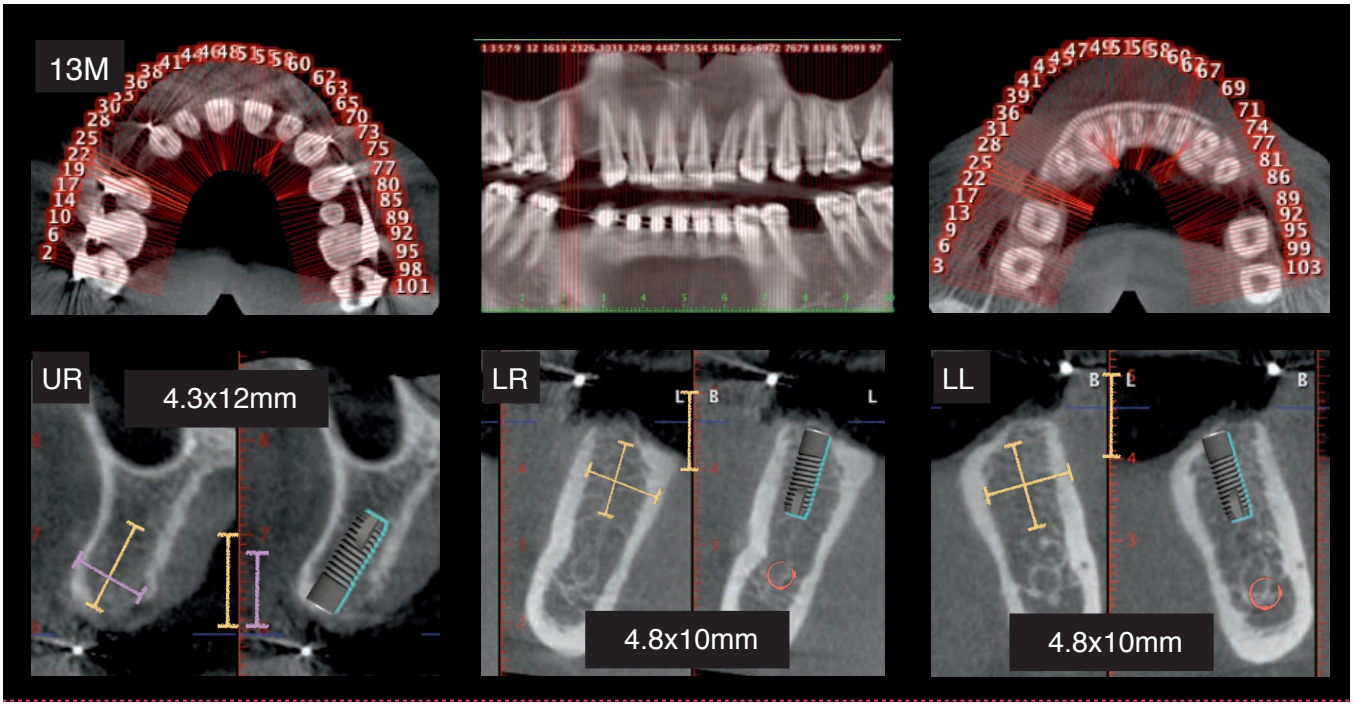


Fig. 14:
A preoperative CBCT scan assessed bone volume for the selection of appropriate implants for the three missing premolars.

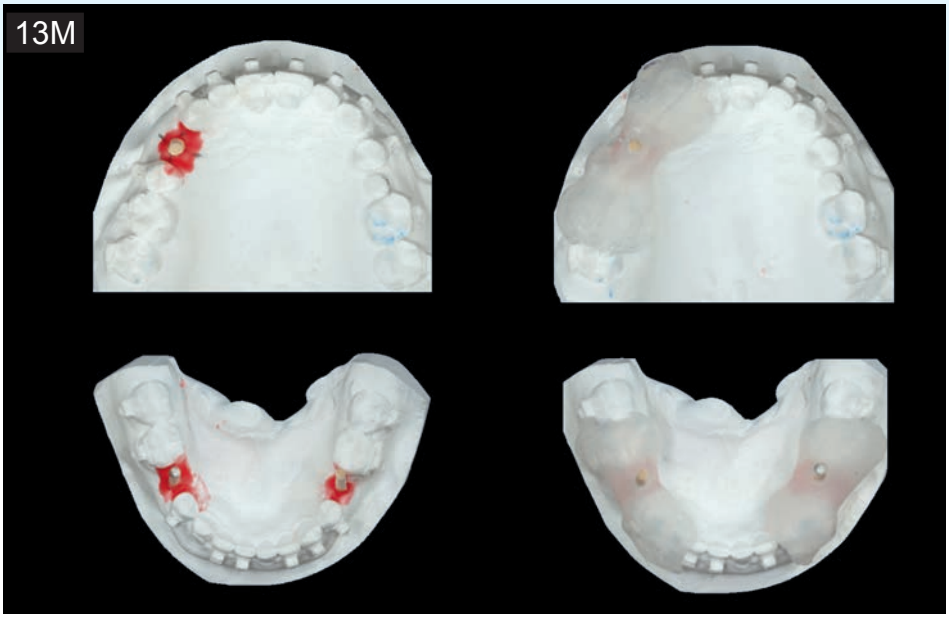


Fig. 15: At 13 months (13M) into treatment casts were obtained for construction of the surgical stents.

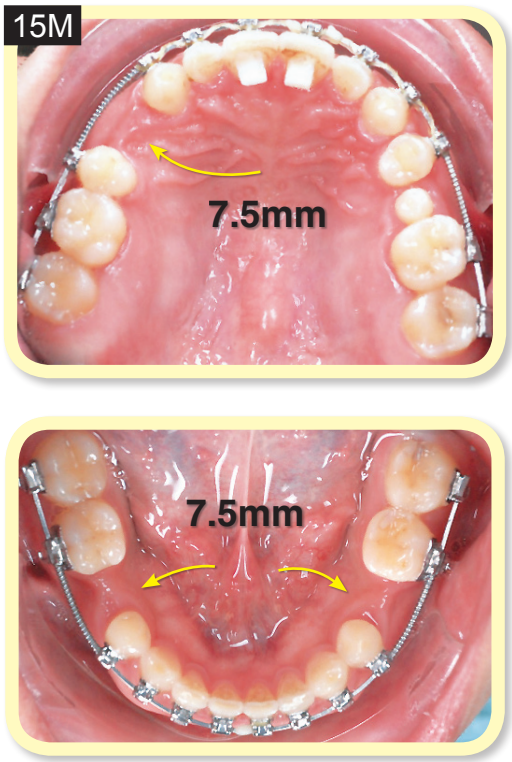


Fig. 16:
After 15 months (15M) of treatment, preprosthetic preparation was completed.

preparation and a periapical x-ray was exposed to check the mesiodistal angulation of the osteotomy (*Fig. 19*). For the mandibular implant sites, flap surgery followed the 2B-3D rule (*Fig. 20*).[4,5] All three implants (*A+ system, MegaGen, Taiwan*) were installed according to the manufacturer's instructions (*Fig. 21*). Both implants on the right side were 4.3x12mm fixtures and the one in the lower left was a 4.3x10mm fixture. After each implant was placed, a 5mm healing abutment was installed. Periapical radiographs documented the final position of the implants (*Fig. 21*).[6]

Orthodontic Finishing

A panoramic radiograph was taken to evaluate the axial inclination of all teeth relative to the implants in both arches. Brackets on maligned teeth were rebonded in a position designed to achieve the

Fig. 17:
Before surgery, the location of the mucogingival junction (red line) was located to determine if there was at least a 3mm width of keratinized gingiva. The upper site (left) had adequate attached gingiva (left) but the mandibular sites were deficient on both the right and left sides, as shown in the center and right photographs, respectively.

Fig. 18:
A flapless technique was used to place an implant in the upper right second premolar area. A surgical probe was employed for soft tissue penetration to mark the central position of the future implant (left). A soft tissue punch was used to excise the gingiva (right) as indicated by the bleeding point (center).

Fig. 19:
The initial osteotomy was cut to a depth of 15mm and the drill was released from the handpiece (left). The lancer drill was removed and a surgical guide pin was inserted (center). A periapical radiograph (right) was exposed to check the mesiodistal angulation of the osteotomy.

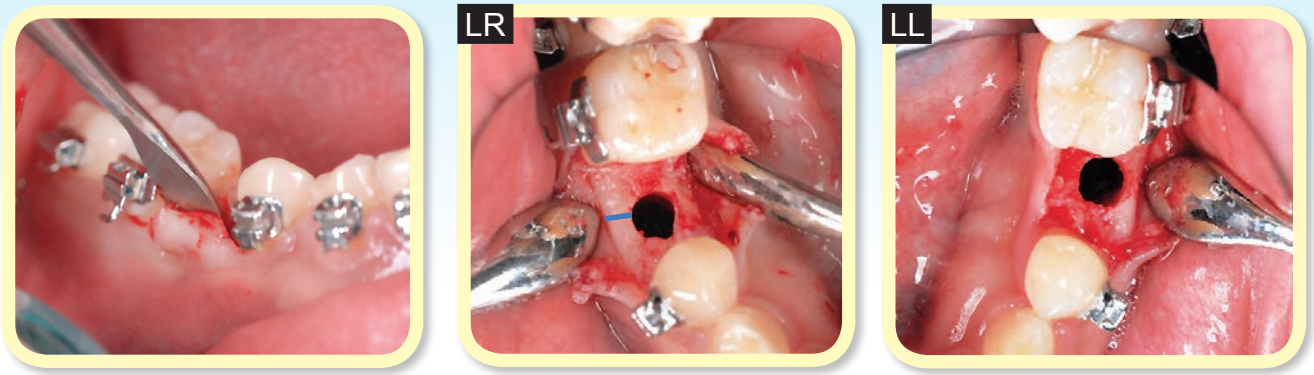


Fig. 20:
Flap surgery was performed for both of the mandibular implant sites. Soft tissue is reflected (right) and >2mm of buccal bone width (blue line) is confirmed lateral to the osteotomy (center). The contralateral osteotomy has the minimum bone width of 2mm (right).

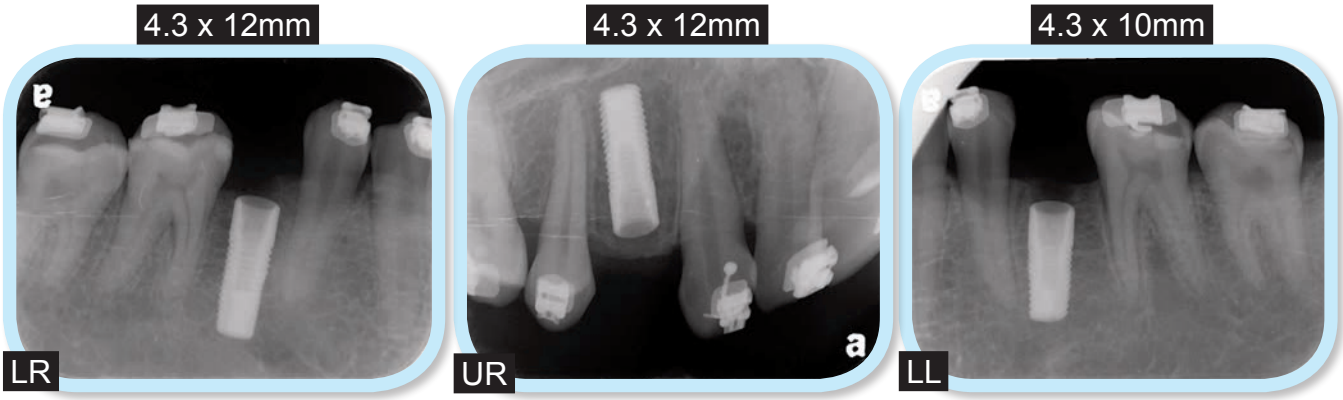


Fig. 21:
Periapical radiographs confirm adequate implant size and position for all three second premolar areas (LR, UR and LL).

desired inclinations with a straight CuNiTi archwire (*Fig. 22*). After 6 months of final finishing and implant healing, the prostheses were constructed (*Fig. 23*).

Implant Prosthesis Fabrication

Preprosthetic evaluation revealed that the LR implant was excessively oriented to the buccal. Despite the incorrect buccal-lingual angulation of the implant (*Fig. 24*), the overall position was satisfactory, so an angled abutment was indicated. Accordingly a 15˚ angled abutment with a 2mm cuff

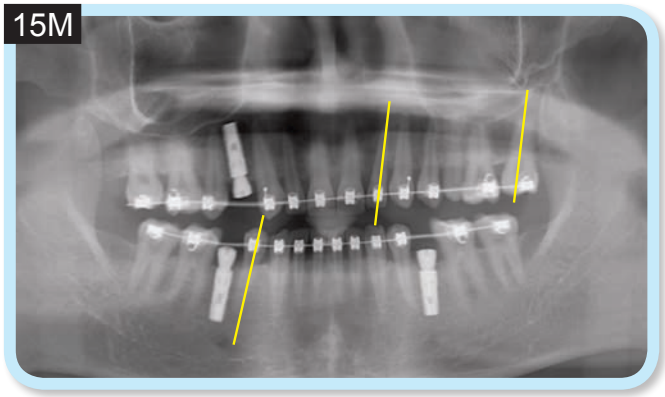


Fig. 22:
A panoramic radiograph was exposed to evaluate dental axial inclinations relative to the implants. Brackets were repositioned for the three teeth with a significant deviation from ideal inclination (yellow lines).

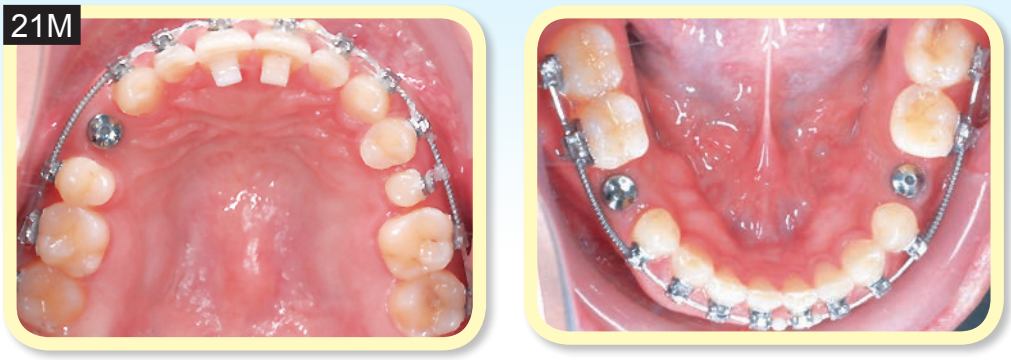


Fig. 23: Following 6 months of orthodontics finishing, the implants were sufficiently healed for prostheses fabrication.

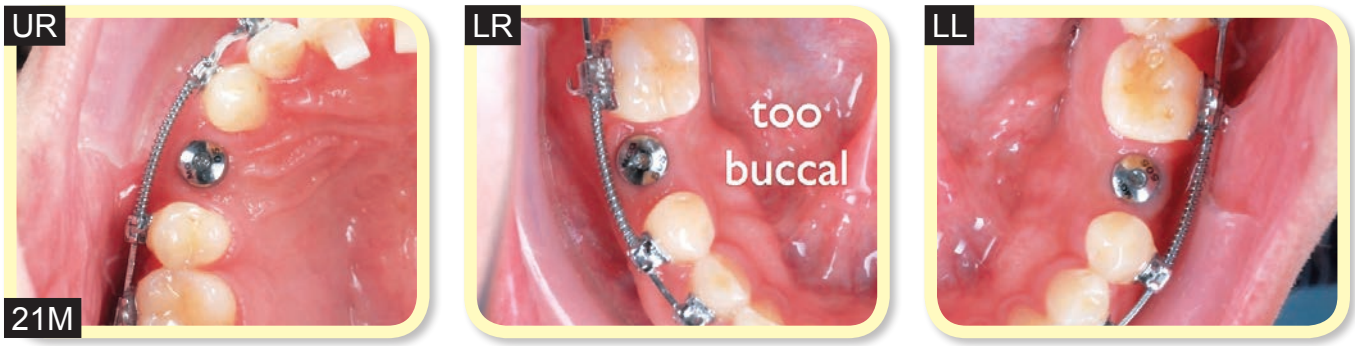


Fig. 24:
At 21 months (21M) into treatment, the UR and LL implants have an appropriate buccolingual inclination, but the LR implant (center) was excessively tipped to the buccal.

height was selected and screwed into the fixture. The post height of the abutment was reduced to provide 2mm of occlusal clearance for prosthesis fabrication (*Fig. 25*). A double cord gingival retraction technique was used to expose each abutment for a direct impression with polyvinyl siloxane (*Fig. 26*). The impressions were poured with type IV dental stone to prepare the working cast. To prevent tissue overgrowth, a "*Tony cap*" was used as a substitute for a provisional crown as shown (*Fig. 27*). Straight post abutments with 3mm cuff height were chosen for the lower left and upper right implants (*Fig. 28*). For all of the implant abutments, a direct impression utilizing the pick-up technique was made, then fitted with an abutment analog (*Fig. 29*), and poured with type IV dental stone. A laser crown lengthening procedure was performed adjacent to the undersized upper left second premolar, which was then prepared to receive a PFM crown (*Fig. 30*). All four crowns were delivered (*Fig. 31*), and the marginal fit was checked with periapical radiographs (*Fig. 32*).

Fig. 25:
Occlusal clearance for the LR abutment was inadequate (left). The post height of the abutment was reduced to provide 2mm of occlusal clearance for fabrication of the prosthesis (center) and then repositioned into the implant to confirm adequate occlusal clearance (right).

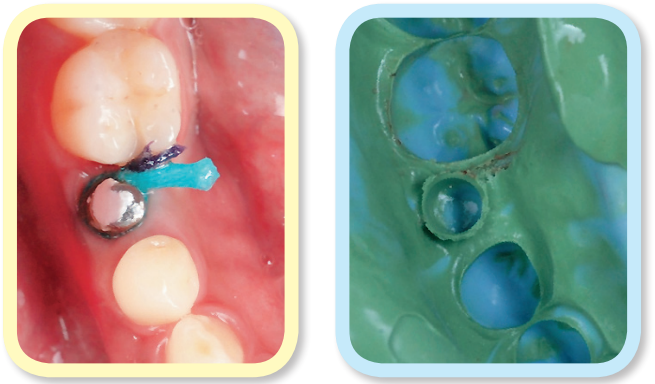


Fig. 26:
Following soft tissue retraction with the double cord technique (left), a polyvinyl siloxane impression was made (right).

Fig. 27:
To prevent soft tissue overgrowth, Tony caps were fitted on the prepared abutments.

Fig. 28:
Straight post abutments with a 3mm cuff height were used for the UR and LL implants, as shown in the left and right views, respectively.

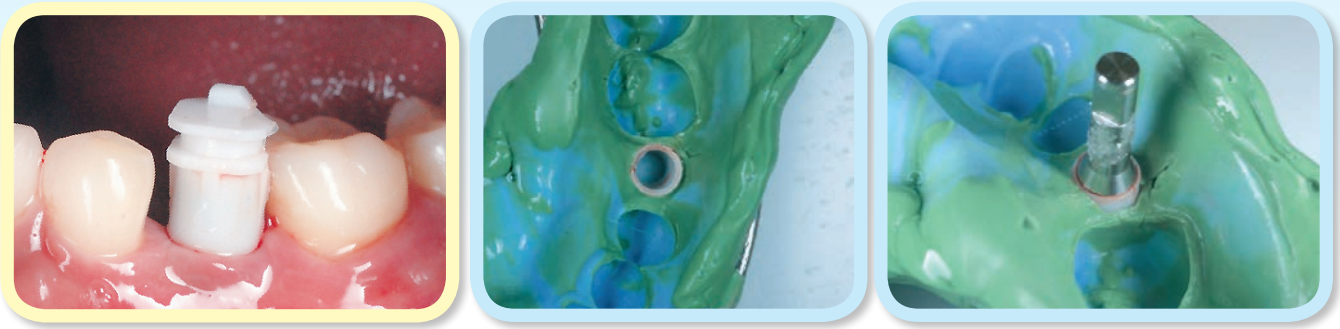


Fig. 29:
A female abutment index was fitted on the lower LL preparation (left), and a direct impression was made utilizing the pick-up technique (center). An abutment analogue was inserted into the index device (right) and the impression was poured up in stone to prepare a working cast.

Fig. 30:
For the under-sized upper left second premolar, a laser crown lengthening procedure was performed as shown and allowed to heal, prior to making the final impression to construct the crown.

Fig. 31: All four crowns were delivered as marked by the arrows.

Fig. 32:
Periapical films were exposed to check the marginal fit of each restoration. The LR, UR and LL prostheses are shown in the left, center and right views, respectively.

Results Achieved

Maxilla (*all three planes*):

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

Mandible (*all three planes*):

- A - P: *Decreased slightly*
- Vertical: *Rotated 2° clockwise*
- Transverse: *Maintained*

Maxillary Dentition

- A - P: *Incisors retracted, molars tipped distally*
- Vertical: *Slightly increased*
- Inter-molar / Inter-canine Width: *Maintained*

Mandibular Dentition

- A - P: *Maintained*
- Vertical: *Mandibular incisors intruded and retracted, molars extruded*
- Inter-molar / Inter-canine Width: *Maintained*

Facial Esthetics: Maintained

Retention

Upper and lower clear overlay retainers were delivered, but no fixed retainers were deemed necessary. The patient was instructed to wear the overlays full time for the first month and nights only thereafter. Instructions were provided for dental hygiene as well as for the maintenance of the retainers.

Final Evaluation of Treatment

The ABO Cast-Radiograph Evaluation (*CRE*) score was 27. The CRE method is actually a negative score, summing the deviations from ideal alignment. The major discrepancies shown in Figs. 33-35 were as follows: marginal ridge discrepancies -6 points (*Fig. 33*), occlusal contacts -5 points (*Fig. 34*), significant rotations -6 points (*Fig. 35*), as well as an additional -3 points for overjet. The Pink & White Esthetic Score was 3 as detailed in the worksheet at the end of this case report. Discrepancies were 1 point for an incomplete gingival papilla, in addition to 2 points for an irregular incisal curve and abnormal tooth proportions for the right upper central incisor. The patient's facial profile was improved by increasing the VDO (*Figs. 4 and 9*) with clockwise rotation of the mandible, which increased the SN-MP angle 2°. In the upper arch, there was a slight distal tipping of the molars and about a 2mm retraction of the incisors. For the lower arch, extrusion of the molars and intrusion of the incisors was consistent with deep bite correction (*Fig. 9*).

Discussion

Diagnosis

Partially edentulous patients with substantial irregularity preclude routine prosthetic restoration. Orthodontic alignment and space consolidation is indicated to achieve an optimal, cost effective result. For the current patient, orthodontic space closure was an undesirable option because of his relatively flat facial profile. Preprosthetic alignment and space

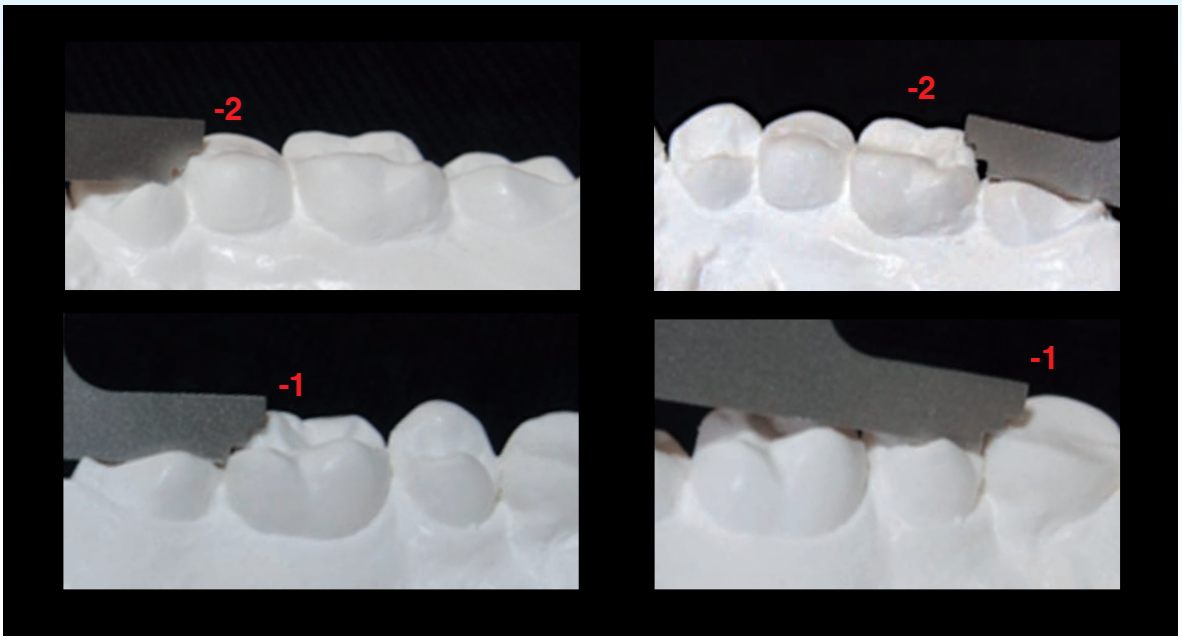


Fig. 33:
There were four marginal ridge discrepancies as marked in red that scored a total of -6 points when the American Board of Orthodontics (ABO) cast analysis was performed after treatment.

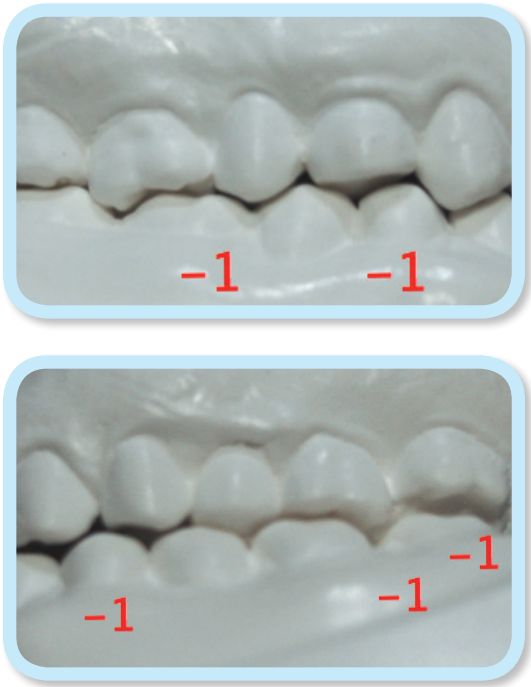


Fig. 34:
Five points were deducted as shown for lack of occlusal contacts according to the ABO scoring method.

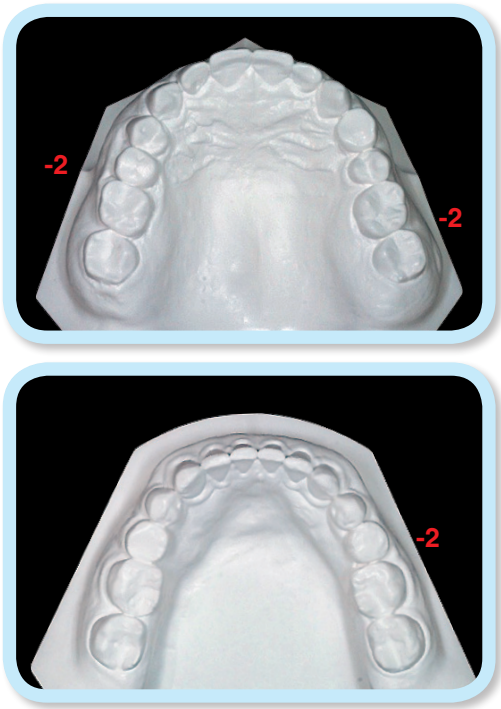


Fig. 35:
Three teeth were rotated more than 0.5mm and scored -2 point each for a total of -6 points on the ABO analysis.

management was indicated to achieve a desirable prosthetic result.

Deep bite correction

For anterior deep bite correction, anterior bite turbos were placed on the lingual surface of the upper incisors to open the bite.[7] These occlusal stops provided bite opening for increasing the clearance to place lower incisor brackets, and also served as occlusal stops to allow posterior teeth to extrude to open the bite and rotate the mandible clockwise to increase the VDO. Class II elastics assisted in steepening the plane of occlusion and supported the increase in VDO. According to Parker,[8] deep bite correction often results in not only intrusion of the incisors, but extrusion of the buccal segments, and an increased axial inclination of the incisors. This tirade was noted except for the excessive flaring of the incisors, which was prevented by orthodontic retraction of the anterior segments (*Fig. 9*).

Implant size selection

A CBCT scan provides the 3D anatomy which is critical information for selecting the size of an implant and choosing the appropriate surgical procedure. The length and diameter of a fixture has important mechanical implications, as reported by Himmlova et al.[9] From a theoretical perspective, they demonstrated that mechanical stress was focused in the crestal bone area of implants when they were loaded laterally. It has recently been demonstrated that elevated stress is directly associated with orthodontically-induced bone resorption in the path of tooth movement.[10] These dentofacial orthopedic data are consistent with the concept that elevated cervical stress[9] is associated with crestal bone loss and gingival recession (*Figs. 36-38*).

Crestal bone stress is inversely related to the length of the implant, but the curve flattens at about 10mm (*Fig. 37*), so 10-12mm implants are deemed optimal for most patients. Implant diameter is inversely related to the surface stress delivered by axial forces, because an applied axial load is distributed over a larger surface area (*Fig. 38*). Within the restraints of jaw anatomy, the theoretical stress curve suggests the optimal diameter for optimizing surface stress is ~4.0-5.0mm (*Fig. 38*). This principle is also supported at the clinical level by dentofacial orthopedics data. When an entire dental arch is moved as a segment (*determinate mechanics*), the force levels in the PDL are decreased by the large surface area of the roots to less than the level associated with pressure necrosis (*8-10kPa*).[10] Controlling PDL necrosis allowed

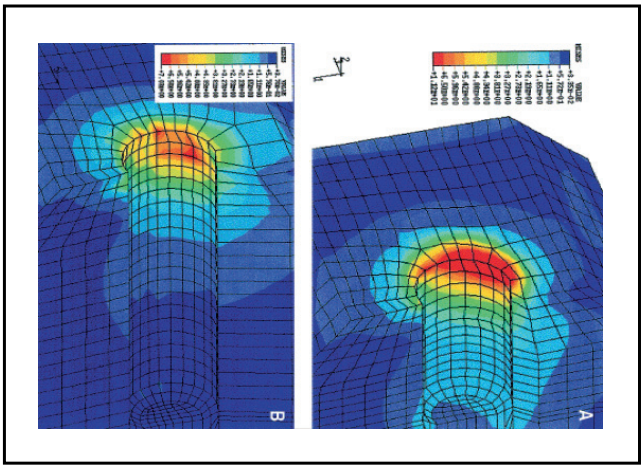


Fig. 36:
As illustrated by this finite element analysis, Himmlova et al.[9] reported that the vast majority of stress is focused on the crestal portion of implants, as documented by the red and yellow color.

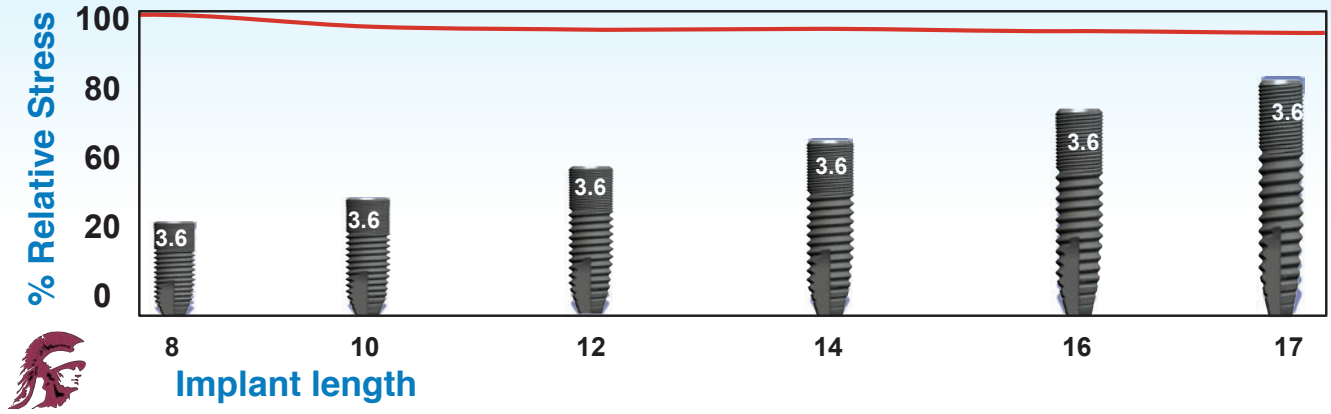


Fig. 37:
For implants of the same diameter, cervical stress (plotted as a red line) is inversely related to the length of the implant. The difference in relative stress for implants from 8 to 17mm implants is about 7.3%. Note there is little difference in the relative stress for implants 10mm or longer. For most applications, 10-12mm implants are indicated.[9]

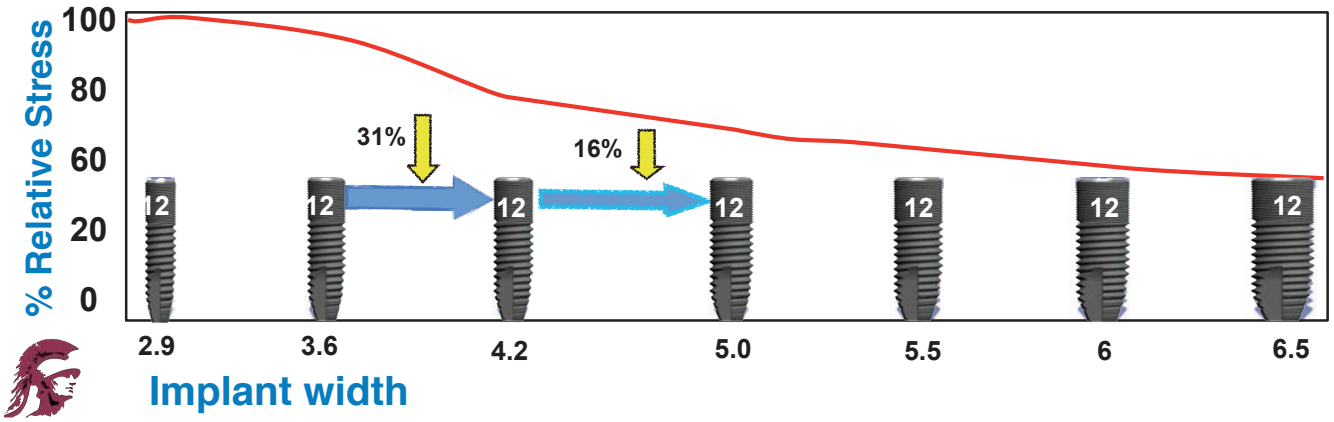


Fig. 38:
For implants 12mm in length, the relative stress at the bone margin of the fixture is inversely related to its diameter. The range of stress for implant diameters of 2.9 to 6.5mm is about 60%. The decrease in stress is about 31 and 16% as the diameter of the implant progresses from 3.6 to 4.2 and to 5.0mm, respectively. These data indicate that implant diameters of 4-5mm are indicated for most applications. See text for supporting dentofacial orthopedic data.[9]

these advanced mechanics to correct severe skeletal malocclusions conservatively, i.e. without extractions or orthognathic surgery. These data provide physiologic evidence for the prosthetic concept that stress levels are inversely related to implant surface area.

Considerations for Flapless Surgery

Implants can be placed with an open flap or flapless procedure. CBCT imaging and 3D treatment planning software are helpful for flapped procedures, but they are essential for the flapless approach, because the surgeon is operating without direct visualization of the site. Advanced

imaging and treatment planning technology have contributed to the popularization of flapless surgery among experienced implant surgeons, which is an interesting development because the method was initially designed for novice doctors.[11,12]

For implant sites with adequate soft and hard tissue, flapless surgery has numerous advantages, including: (*1*) conservation of soft tissue architecture and bone volume, (*2*) maintenance of the blood supply, (*3*) decreased operative time because of no fear reflection or sutures, (*4*) enhanced patient comfort because of less swelling and pain, and (*5*) resumption of daily oral hygiene procedures immediately.[11,12] However, the flapless approach does have some drawbacks, including: (*1*) the surgeon cannot directly visualize anatomic landmarks and vital structures, (*2*) potential for thermal damage to bone because of compromised access for external irrigation throughout the osteotomy procedure, (*3*) increased probability of an undesirable axial inclination, (*4*) inability to contour bone (*alveoloplasty*), and (*5*) difficulty in manipulating circumferential soft tissue to ensure adequate dimensions of keratinized gingiva around the implant.[11,14] Although the importance of a broad width of keratinized mucosa around implants is controversial, the preponderance of evidence suggests that 3mm of keratinized gingiva is important for long-term success.[13,14]

For the implant in the UR second premolar area, the quality and quantity of both bone and soft tissue were adequate, so the flapless technique was indicated (*Fig. 39*). The mandibular implant sites had adequate quality and quantity of bone as assessed with the CBCT scan, but the width of keratinized gingiva was inadequate, so flap surgery was selected (*Fig. 40*).

Implant position

There are 5 keys for implant placement : (*1*)

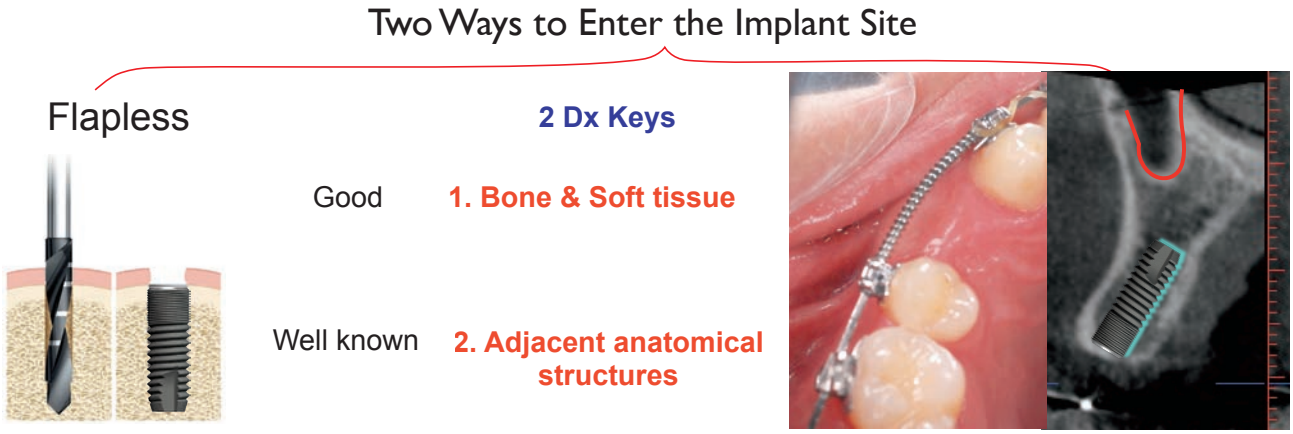


Fig. 39:
For the upper right implant, there was adequate quality and quantity of both bone and soft tissue. Since there were no anatomic restrictions, such as the floor of the sinus, the flapless technique was indicated.

mesiodistal (*M-D*) direction is optimized by placing the implant in the center of the space, (2) buccolingual (*B-L*) position requires 2mm of bone on the buccal surface of the implant to preserve an adequate blood supply, (3) depth of the fixture should be 3mm apical to the future crown margin (*2B-3D rule*),[4,5] (*4*) The axial inclination of the implant should be parallel to the adjacent teeth, and (5) the distance from the implant to adjacent teeth should be at least 1.5mm to avoid compromising the blood supply of interproximal bone. If the buccal plate of bone adjacent to the implant is less than 2mm, spontaneous bone resorption is likely, so the following remedies are proposed for marginal sites: (*a*) place the implant more lingually, (*b*) use a smaller diameter implant, and/or (*c*) increase buccal bone thickness with a cortical bone graft or guided bone regeneration (*GBR*).[15] To support the proximal bone level, the fixture should be at least 1.5mm away from the adjacent natural teeth (*as previously mentioned*), but also at least 3mm away from adjacent implants. The inter-implant bone distance is a particularly important consideration because there is no collateral circulation with the PDL and attached gingiva.[16]

Placing implants during active orthodontics treatment has distinct advantages for optimizing the implant position: 1. implant site development, 2. a temporary increase in the width of the surgical site, 3. alignment of adjacent teeth can be corrected as the implant heals, and 4. dental axial inclinations can be corrected as needed to optimize loads on implant-supported prostheses.

After 6 months of implant healing and orthodontic finishing, the current patient was evaluated for prosthesis fabrication. It is difficult to precisely evaluate the axial inclination of an implant prior to the placement of an abutment. A straight abutment revealed that the lower right implant was well positioned in the supporting tissue, but it was

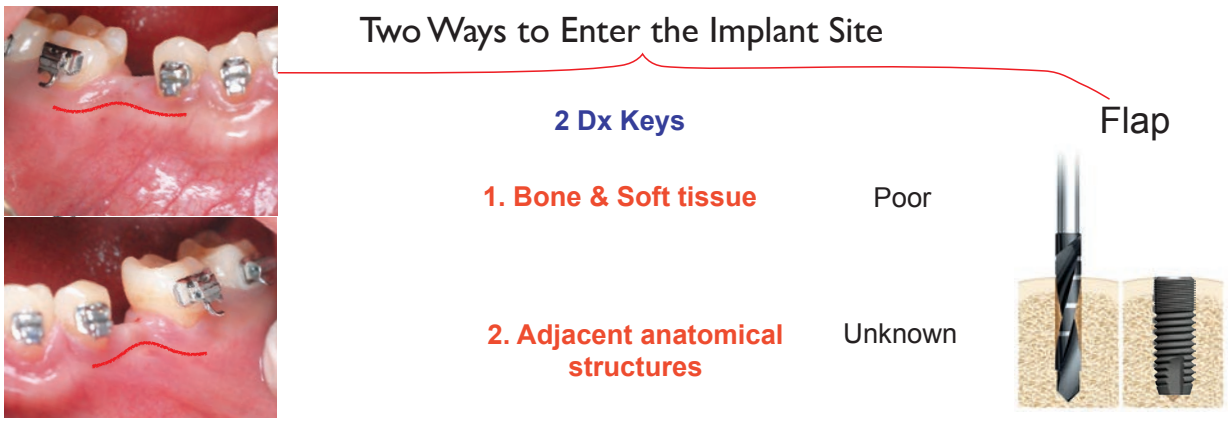


Fig. 40:
The width of keratinized gingiva at the mandibular implant sites was marginal and the precise position of the mental nerve was unknown, so a flap surgical procedure was preferable.

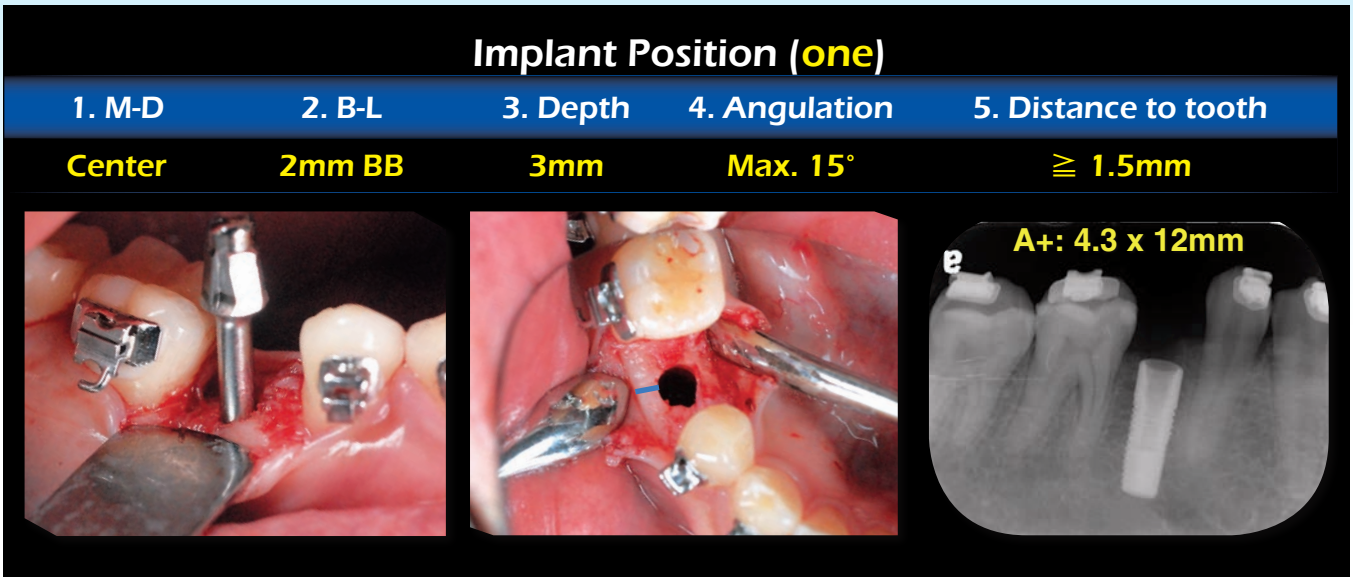


Fig. 41:
The implant placement in the lower right second premolar area (left) demonstrates that the fixture was installed in the center of M-D plane, preserving at least a 2mm thickness of bone (blue line) on the buccal surface (center). The fixture platform was 3mm apical to the expected inferior margin of the crown, and it was more than 1.5mm from adjacent teeth (right). The implant appears to be in an ideal position on the periapical film (right), but it was excessively angled to the buccal. See text for details.

Fig. 42:
An unesthetic display of the metal margin of the crown was noted at the gingival margin of the angled metal abutment on the lower right implant-supported prosthesis (arrow in the left view) compared to the contralateral area (right view). This problem was due to a lack of soft tissue thickness and height ("running room") to optimally accommodate an angled abutment.

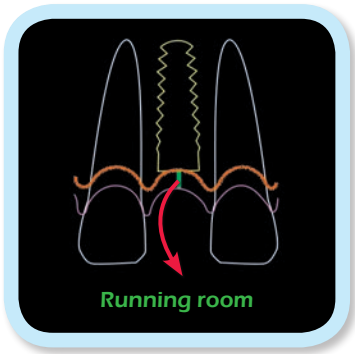


Fig. 43:
Running room is the vertical distance from the implant's prosthetic platform to the free gingival margin.

excessively oriented to the buccal (*Fig. 41*)[5,17,18] After a careful assessment, the problem was deemed manageable with an angled abutment.

Angled abutment

Ideally, implants should be placed parallel to other fixtures or adjacent teeth, and be aligned in the axial plane of the arch. However, this objective is not always achieved, so angled abutments may be necessary to facilitate prosthesis fabrication. A 15˚ angled abutment shifts the occlusal surface of a restoration about 1-1.5mm and a 25˚ abutment moves it about 2-2.5mm.[19-21] In addition, use of angled abutments can reduce treatment time, fee

for service, and the need to perform additional surgery by installing another implant or guided bone regeneration.[19] The major disadvantage is that occlusal loading on angled abutments can significantly increase bone stress and strain at the alveolar crest.[20,21] Regional overload is more significant with the decreased bone density that occurs during the healing process, and this is an important factor when considering an immediate loading protocol.[22] Despite the 3-4 fold increase in marginal bone stresses for 15-25° angled abutments, the resulting bone strain usually remains within physiological limits.[19-21] Eger et al.[23] demonstrated that the long-term success of angled abutments was equivalent to straight abutments. The implant and prosthesis survival rates associated with angled abutments was more than 95% after 3 years' of follow-up. There are no significant differences in probing depths, gingival inflammation and attachment levels between straight and angled abutments at 1 year follow-up.[23] Additional "*running room*" (*width and height of marginal gingiva*) is necessary to avoid an unesthetic gingival display of the metal angled abutment (*Figs. 42 and 43*). Increased marginal gingiva mass helps mask the abrupt change of fixture contour as the angled abutment penetrates the soft tissue. Fig. 43 is a drawing demonstrating that the current concept of "*running room*" refers to the vertical width of gingiva from the prosthetic platform of the implant to the free gingival margin. To control excessive longterm stress, the clinician should attain the best fit of all components and minimize the occlusal contact on lingual or palatal cusp inclines. It is important to carefully adjust the occlusion to avoid traumatic lateral excursions on teeth that have angulated abutments.[18-20]

Conclusion

Dentofacial orthopedic correction of a partially edentulous malocclusion can greatly simplify the prosthetic requirements. Implant size selection is a critical factor related to anatomical features of the surgical site. Additional considerations are the tooth to be restored, and the opposing occlusion. From a biomechanics perspective, the optimal implant dimensions for most edentulous sites are about 10-12mm in length and 4-5mm in width. If the M-D position of an implant is acceptable, the B-L inclination can vary up to 25° and be adequately restored with an angled abutment. Angled

Fig. 44:
Two year follow-up records demonstrate the stability of the treatment rendered.

abutments result in increased stress at the margin of alveolar bone, but this compromise is usually within physiological limits if there is adequate bone healing prior to loading. The longterm clinical course for prostheses supported by angled and straight abutments is similar.

Acknowledgement

Thanks to teacher Paul Head for proofreading this article.

References

1. Small PN, Tarnow DP, Cho SC. Gingiva recession around wide-diameter versus standard-diameter implants: a 3- to 5-year longitudinal prospective study. Pract Proced Aesthet Dent 2001;13:143-6.
2. Gargulo AW, Wentz FM, Orban B. Dimensions and relations of the dentogingival junction in humans. J Periodontal 1961;32:261-7.
3. Grunder U, Gracia S, Capellu M. Influence of the 3-D bone-to-implant relationship on esthetics. Int Periodont Rest Dent 2005;25(2):113-9.
4. Chang CH. The 2B-3D rule for implant planning, placement and restoration. Int J Orthod Implantol 2012;27:96-101.
5. Chang MJ, Chang CH, Roberts WE. Implant-supported crowns to replace congenitally missing lateral incisors: 2B-3D rule for ideal implant position. Int J Orthod Implantol 2015;37:22-57.
6. Su B, Chang CH, Roberts WE. Implant-Orthodontic combined treatment. Over-erupted molar and scissors-bite correction. Int J Orthod Implantol 2012;26:36-51.
7. Mayes JH. Bite Turbos. New levels of bite-opening acceleration. Clinical Impression 1997;6:15-17.
8. Parker CD, Nanda RS, Currier GF. Skeletal and dental changes associated with the treatment of deep malocclusion. Am J Orthod Dentofacial Orthop 1995;107:382-93.
9. Himmlová L, Dostálová T, Kácovský A, Konvicková S. Influence of implant length and diameter on stress distribution: A finite element analysis. J Prosthet Dent 2004;91:20-5.
10. Roberts WE, Viecilli RF, Chang CH, Katona TR, Paydar NH. Biology of biomechanics: finite element analysis of a statically determinate system to rotate the occlusal plane for correction of skeletal Class III malocclusion. Am J Orthod Dentofacial Orthop 2015;148:943-955.
11. Brodala N. Flapless surgery and its effect on dental implant outcomes. Int J Oral Maxillofac Implants 2009;24:118-125.
12. Flanaga D. Flapless dental implant placement. J Oral Implantology 2007;33:75-83.
13. Wennstrom JL, Bengazi F, Lekholm U. The influence of the masticatory mucosa on the peri-implant soft tissue condition. Clin Oral Implants Res 1994;5:1-8.
14. Warrer K, Buser D, Lang NP, Karring T. Plaque-induced peri-implantitis in presence or absence of keratinized mucosa. An experimental study in monkeys. Clin Oral Implants Res 1995;6:131-8.
15. Chiu G, Chang CH, Roberts WE. Bimaxillary protrusion with an atrophic alveolar defect: Orthodontics, autogeneous chin-block graft, soft tissue augmentation, and an implant. Am J Orthod Dentofacial Orthop 2015;147:97-113.
16. Berglundh T, Lindhe J, Jonsson K, Ericsson I. The topography of the vascular systems in the periodontal and peri-implant tissues in the dog. J Clin Periodontal 1994;32(3):189-93.
17. Kois JC, Kan JY. Predictable peri-implant gingival esthetics: surgical and prosthodontic rationales. Pract Proced Aesthet Dent 2001;13(9):691-8.
18. Kois JC. Predictable single-tooth peri-implant esthetics: five diagnostic keys. Compend Contin Educ Dent 2004;25(11):895-6, 898, 900 passim.
19. Cavallaro J, Greenstein Jr. and G. Angled implant abutments: A practical application of available knowledge. J Am Dent Assoc 2011;142:150-8.
20. Brosh T, Pilo R, Sudai D. The influence of abutment angulation on strains and stresses along the implant/bone interface: comparison between two experimental techniques. J Prosthet Dent 1998;79(3):328-334.
21. Kao HC, Gung YW, Chung TF, Hsu ML. The influence of abutment angulation on micromotion level for immediatelly loaded dental implants: a 3-D finite element analysis. Int J Oral Maxillofac Implants 2008;23(4):623-630.
22. Roberts, WE, Garetto, LP, DeCastro RA. Remodeling of Devitalized Bone Threatens Periosteal Margin Integrity of Endosseous Titanium Implants with Threaded or Smooth Surfaces: Indications for Provisional Loading and Axially Directed Occlusion. J Ind Dent Assoc 1989;68(4):19-24.
23. Eger DE, Gunsolley JC, Feldman S. Comparison of angled and standard abutments and their effect on clinical outcomes: a preliminary report. Int J Oral Maxillofac Implants 2000;15(6):819-823.

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 = 0

OVERBITE

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

Total = 2

ANTERIOR OPEN BITE

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

Total = 0

LATERAL OPEN BITE

2 pts. per mm. per tooth

Total = 0

CROWDING (only one arch)

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

Total = 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 _____ x 1 pt. = _____

SN-MP

≥ 38° = 2 pts.

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

≤ 26° = (1 pt.)

Each degree < 26° 7 x 1 pt. = _____

1 to MP ≥ 99° = (1 pt.)

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

Total = 9

OTHER (See Instructions)

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

Identify: Teeth extrusion

Total = 14

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) =_____

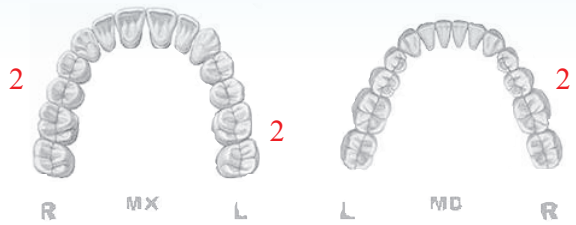
Total = 0

Cast-Radiograph Evaluation

Total Score: 27

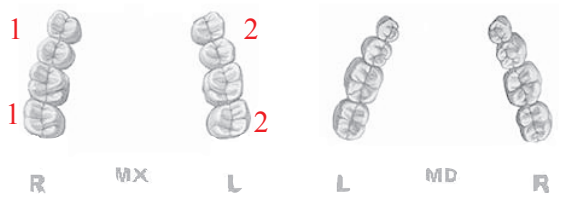
Alignment/Rotations

6



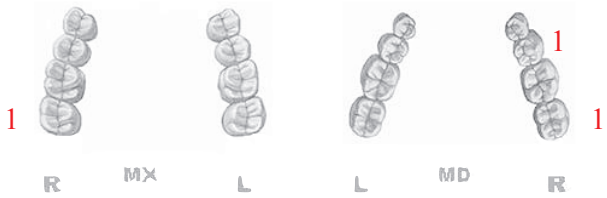
Marginal Ridges

6



Buccolingual Inclination

3

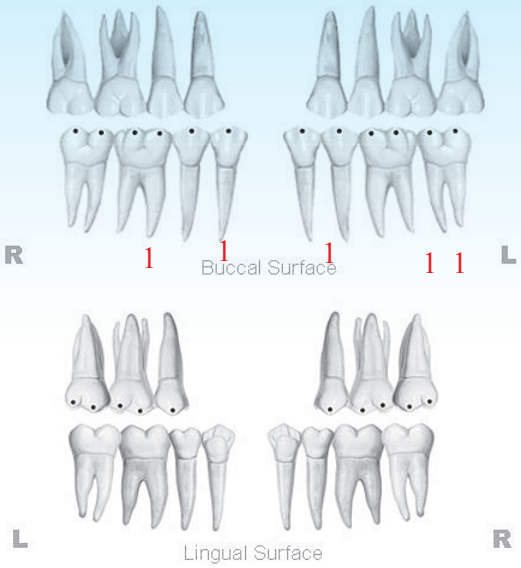


Overjet

3

Occlusal Contacts

5

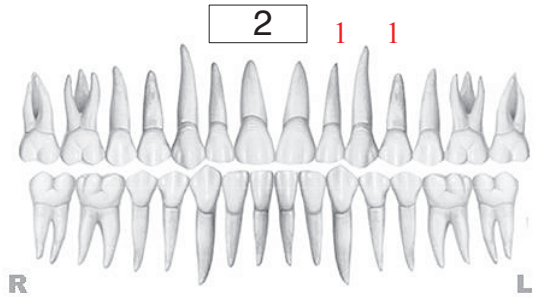


Occlusal Relationships

1

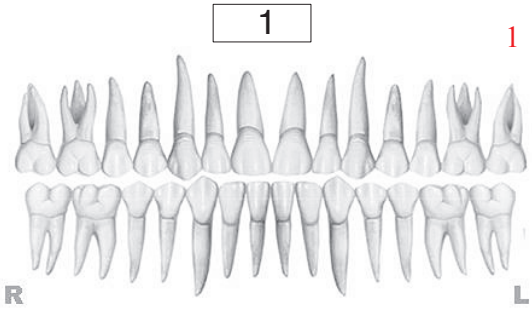
Interproximal Contacts

2



Root Angulation

1



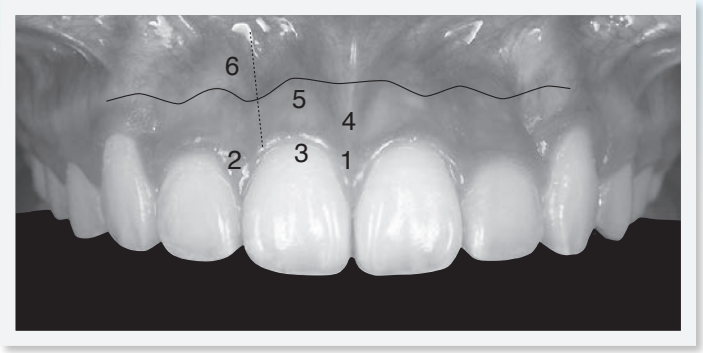
INSTRUCTIONS: Place score beside each deficient tooth and enter total score for each parameter in the white box. Mark extracted teeth with "X". Second molars should be in occlusion.

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

Total Score: = 3

1. Pink Esthetic Score

Total = 1

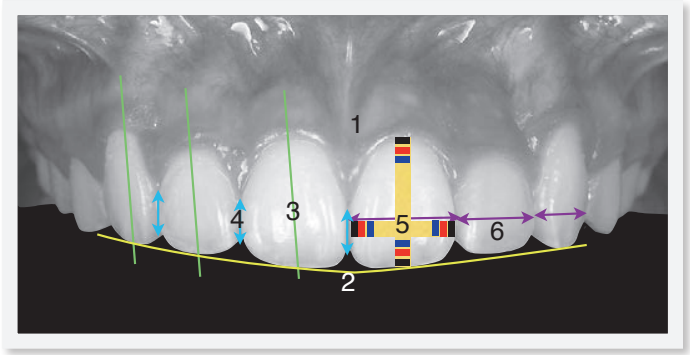


1. M & D Papilla	0	1	2
2. Keratinized Gingiva	0	1	2
3. Curvature of Gingival Margin	0	1	2
4. Level of Gingival Margin	0	1	2
5. Root Convexity (Torque)	0	1	2
6. Scar Formation	0	1	2

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

2. White Esthetic Score (for Micro-esthetics)

Total = 2



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

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

I nternational
Association for
Orthodontists &
I mplantologists

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

Join the *iAOI*, the future of dentistry!

How to join iAOI?

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

1. Member

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

2. Board eligible

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

3. Diplomate

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

4. Ambassador

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

*International Journal of Orthodontics & Implantology (IJOI) is the official publication of International Association for Orthodontists & Implantologists (iAOI).

iAOI

2016 iAOI Symposium 年度大會

認證課程首次來台！

- **ALIAS-LSW系統官方認證證書：**
  完成大會演講與Hands-on課程，可獲得ALIAS-LSW系統官方認證證書。
- **ALIAS＋TAD案例示範：**
  張慧男醫師親自示範ALIAS與TAD結合案例治療。
- **Indirect Bonding現場操作：**
  現場Indirect Bonding示範操作。

7/31 日 9:00－17:00
大會演講
金融研訓院二樓菁業堂
台北市中正區羅斯福路三段62號

8/1 or 2 一or二 9:00－17:00
Hands-on
金牛頓藝術科技
新竹市建中一路25號2樓

新舌側矯正系統-新思維！

Think Outside the Box: ALIAS-LSW

舌側矯正專家 Dr. Giuseppe Scuzzo

在義大利、瑞士、西班牙的大學皆有開設相關課程，並發表超過七十篇相關論文和出版三本專書。除此之外，他與日本的舌側矯正專家 Dr. Takemoto 一起發明了數種主流的舌側系統－STb, ALIAS, LSW, Square slot bracket 等。

	6/30前		6/30後	
	會員	非會員	會員	非會員
7/31 大會演講	NTD 6,000	NTD 8,000	NTD 8,000	NTD 10,000
7/31 大會演講 & 8/1 or 2 Hands-on	NTD 26,000	NTD 28,000	NTD 28,000	NTD 30,000

6/30前報名7/31大會演講，加贈2017/5/21年中大會 Dr. Menzel 課程折價券 **2,000** 元！

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

主辦單位：iAOI 國際矯正植牙學會　協辦單位：中華民國齒顎矯正學會　台灣口腔矯正學會　中華民國舌側矯正學會　湧傑企業股份有限公司

International Beethoven Dental Clinic Established 1996 Workshop

2016
Session A: 04/26-29 (Full)
Session B: 10/18-21

2017
Session A: 05/16-19
Session B: 11/28-12/1

@Taiwan

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

VISTA
Vertical Incision Subperiosteal Tunnel Access

THE LECTURERS

Dr. Chris Chang

CEO, Beethoven Orthodontic and Implant Group. He received his PhD in bone physiology and Certificate in Orthodontics from Indiana University in 1996. As publisher of ***International Journal of Orthodontics & Implantology***, he has been actively involved in the design and application of orthodontic bone screws.

Dr. John Lin

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

FEES

Day 123 USD 2,600 Early bird rate: $200 off by 2016/8/18; 2017/3/16, 9/28

Day 4 USD 500 Early bird rate: $100 off by 2016/8/18; 2017/3/16, 9/28

For more information and registration, visit

http://iworkshop.beethoven.tw

course@newtonsa.com.tw
+886-3-5735676 #218 Bella

International Beethoven Workshop

Dental Clinic Established 1996

Dr. David Nissan
Mexico

"More than I expected"

Dr. Lee Hye Jin Serena
Argentina

"Dr. Chris shared his knowledge in details and made the difficult cases look simple."

Dr. Sunish T Daniel
Dubai

"The workshop, all and all was an wholesome experience and I would definitely recommend this course to my friends."

Dr. Joanna Lim
Singapore

"Truly inspirational"

Prof. Dr. Paulo Fernandes Retto
Portugal

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

Dr. Amr ElDaly
Australia

"Amazing experience"

Dr. Chen Yehong
Malaysia

"The best & smartest choice ever"

Dr. Alejandro Ramírez
Spain

"The best workshop in the world"

Course Schedule

Day 1 Chair-side observation

Day 2 Lecture, Model workshop, Chair-side observation

Day 3 VISTA Lecture, Lecture by Dr. John Lin, VISTA workshop

Day 4 Keynote workshop

VISTA

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

Topics include:

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

Keynote

Dr. Rungsi Thavarungkul, Thailand
Lecturer, Advanced Keynote Workshop

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

Space Closure for Congenitally Missing Upper Second Premolars with Molar Protraction Through the Floor of the Maxillary Sinus

Abstract

A 21-year-old male presented with a chief complaint of missing maxillary second premolars. The edentulous spaces were retained as implant sites with band-and-loop fixed space maintainers. Presurgical evaluation, after the space maintainers were removed, revealed caries on the mesial of both first molars, and inadequate implant sites. The patient opted for orthodontic space closure, which required protracting the upper molar roots through the floor of the maxillary sinus. Routine orthodontic space closure, supplemented with Class III elastics and mandibular buccal shelf bone screws, produced a pleasing result. There was no clinical evidence of root resorption or other complications. This partially edentulous malocclusion, with an American Board of Orthodontics (ABO) Discrepancy Index (DI) of 13 points, was treated to an ABO Cast-Radiograph Evaluation (CRE) score of 19 points in 26 months. (Int J Orthod Implantol 2016;43:32-48)

Key words:
Congenital missing premolars, buccal shelf bone screws, maxillary sinus floor, overbite anchorage

History and Etiology

A 21-year-old male with a partially edentulous malocclusion was referred for orthodontic consultation (*Fig. 1*). The chief complaint was bilateral edentulous spaces due to congenitally missing maxillary second premolars. The spaces were retained as potential implant sites with band-and-loop space maintainers (*Figs. 2-3*). After the retainers were removed, presurgical evaluation of the implant sites revealed caries on the mesial of both first molars (*Figs. 4 and 5*). Bone width and depth were inadequate for conventional implant placement. Orthodontic space closure was deemed a more predictable and cost-effective option compared to placing implant-supported prostheses, with bone grafting and soft tissue augmentation procedures. The patient concurred, and a pleasing result (*Figs. 6-8*) was achieved for this partially edentulous malocclusion (*DI 13*)[1] with 26-months of active treatment. Both premolar spaces were closed, the profile was preserved, and lip protrusion was corrected (*Figs. 9 and 10*). Superimposed tracings of cephalometric radiographs before and after treatment (*Fig. 11*) revealed that the maxillary molars were translated anteriorly, but as expected the anterior segment was retracted slightly, resulting in an end-to-end incisal relationship. As an adjunctive measure, it was necessary to retract the entire lower arch with anchorage provided via buccal shelf bone screws.[2] The maxillary first molars were finished in a Class II molar relationship with a final CRE score[3] of 19 (*Fig. 8*). The detailed diagnosis, treatment plan, mechanics and outcomes assessment are presented in this report.

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

Fig. 1: Pre-treatment facial photographs

Fig. 2: Pre-treatment intraoral photographs

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

Fig. 4:
The upper right edentulous space is atrophic on the buccal and palatal surfaces. Note caries on the mesial surface of the first molar. The latter is a significant risk for long-term use of band and loop space maintainers.

Fig. 5:
The upper left edentulous space has similar deficiencies including molar caries when compared to the left side.

Fig. 6: Post-treatment facial photographs

Fig. 7: Post-treatment intraoral photographs

Fig. 8: Post-treatment study models

Diagnosis

Skeletal:

- Class II skeletal relationship (*SNA 82.4˚, SNB 75.7˚, ANB 6.7˚*)
- Increased mandibular plane angle (*SN-MP 37.4˚, FMA 30.2˚*)

Dental:

- Bilateral Class I molar relationship
- Mild crowding of about 2mm in the lower arch
- Overjet 2mm
- Overbite 2mm
- Missing upper second premolars (*congenital absence*)

Facial:

- Acceptable profile with slightly protrusive lips

The ABO Discrepancy Index (*DI*) was 13[1] as shown in the subsequent worksheet.

Specific Objectives of Treatment

Maxilla (*all three planes*):

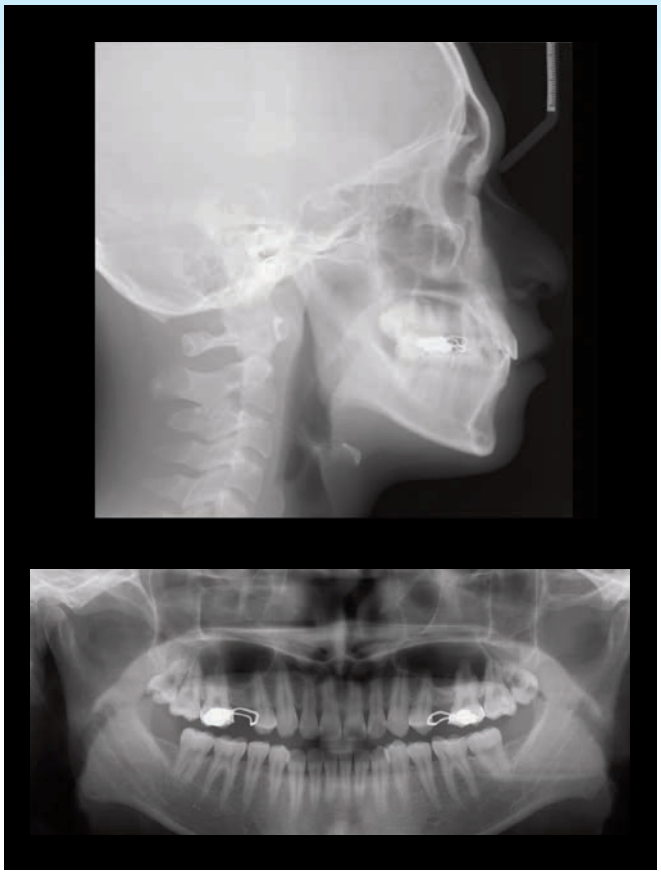
- A - P: *Maintain*
- Vertical: *Maintain*
- Transverse: *Maintain*

Mandible (*all three planes*):

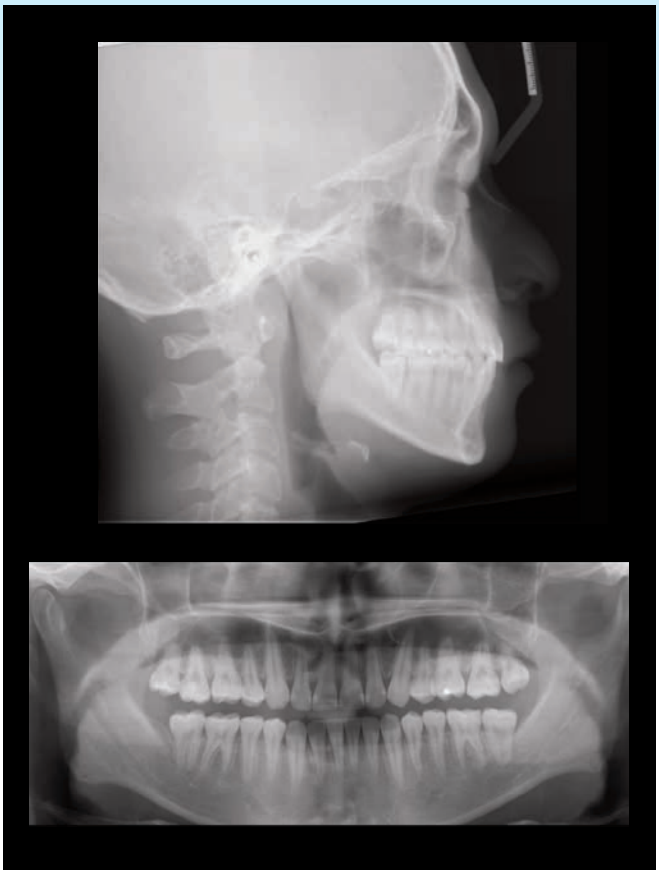
- A - P: *Maintain*
- Vertical: *Maintain*
- Transverse: *Maintain*

Maxillary Dentition

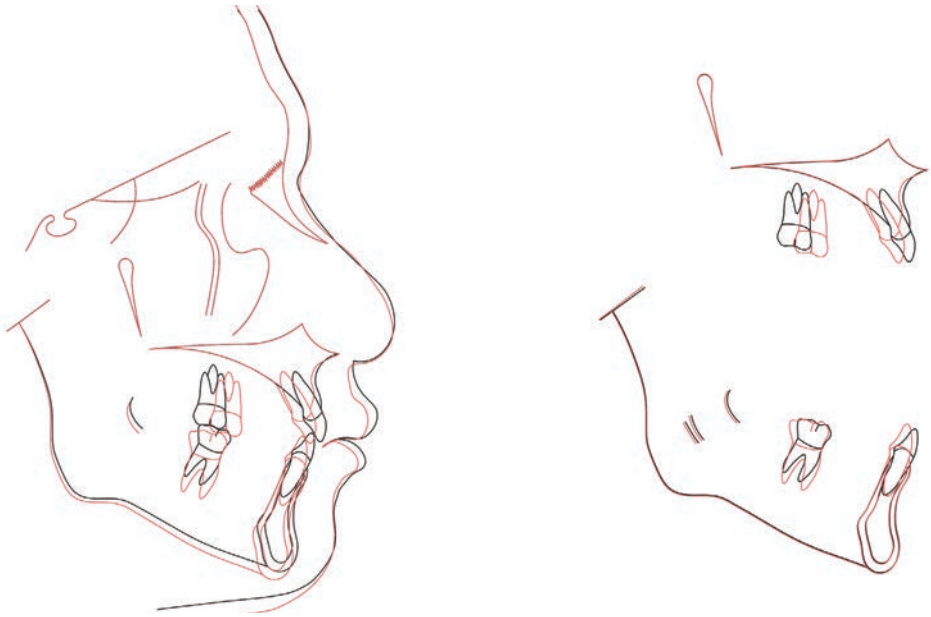
- A - P: *Retract*
- Vertical: *Maintain*
- Inter-molar / Inter-canine Width: *Maintain*



■ *Fig. 9:*
Pre-treatment cephalometric and panoramic radiographs show missing maxillary second premolars with band and loop space maintainers in each edentulous site.



■ *Fig. 10:*
Post-treatment cephalometric and panoramic radiographs document dentofacial morphology.



■ *Fig. 11:*
Superimposed cephalometric before (black) and after (red) treatment show slight extrusion of upper and lower molars, consistent with moderate posterior rotation of the mandible. The lower arch was retracted with buccal shelf bone screws.

Mandibular Dentition

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

Facial esthetics: Maintain

Treatment Plan

The treatment plan focused on posterior maxillary space closure. A non-extraction approach was indicated because of the acceptable facial profile with moderate lip protrusion. The mechanics plan was to align the upper arch up to a .017x.025" TMA archwire, and then close space with a chain of elastics, supplemented with Class III elastics. Use mandibular shelf bone screw anchorage[2] to retract the lower arch as needed to produce an acceptable incisal relationship. Finish the interdigitation in a Class I cuspid and Class II molar occlusion. Immediately after removing the fixed appliances, deliver clear overlay retainers for each arch.

Appliances and Treatment Progress

Damon Q® .022" slot self-ligating appliance (*Ormco, Glendora, CA*) was bonded on both arches. The Zoo-Series elastics® and archwires utilized in the treatment were produced by the same manufacturer. High torque brackets were used for the upper incisors and standard torque brackets were used for the lower anteriors. The archwire sequence for both arches was .014" CuNiTi, .014x.025" CuNiTi, .017x.025" TMA, and .016x.025" stainless steel (*SS*). Six

CEPHALOMETRIC			
SKELETAL ANALYSIS			
	PRE-Tx	POST-Tx	DIFF.
SNA°	82.4°	81.5°	0.9°
SNB°	78.7°	78°	0.7°
ANB°	3.7°	3.5°	0.2°
SN-MP°	37.4°	38.5°	1.1°
FMA°	30.2°	31.3°	1.1°
DENTAL ANALYSIS			
U1 TO NA mm	1 mm	2 mm	1 mm
U1 TO SN°	104.6°	104.6°	0°
L1 TO NB mm	6.5 mm	5 mm	1.5 mm
L1 TO MP°	94.9°	86°	8.9°
FACIAL ANALYSIS			
E-LINE UL	2 mm	0 mm	2 mm
E-LINE LL	2 mm	0 mm	2 mm

■ Table 1: Cephalometric summary

months into treatment bilateral Class III elastics (*Fox, 3.5oz*) were applied to facilitate protraction of the maxillary molars and retraction of the entire lower dentition (*Fig. 12*). In the 7th month of treatment, buttons were bonded to the palatal surface of the upper second premolars and first molars, and an elastic chain was applied to assist space closure (*Fig. 13*). At 11 months, the Class III elastic on the right side was stopped to allow correction of the midline discrepancy with continued intermaxillary traction on the left side. Bilateral space closure was achieved using power chains on the facial surface (*Fig. 13*). In the 19th month of treatment, bilateral mandibular buccal shelf bone screws (*2x12mm OrthoBoneScrew®, Newton's A Ltd, Hsinchu, Taiwan*) were placed to

Fig. 12:
Class III elastics were used bilaterally to facilitate protraction of the maxillary first molars, retract the lower dentition, and open the vertical dimension of occlusion.

Fig. 13:
Palatal buttons were bonded on the maxillary first premolars and molars to facilitate space closure.

Fig. 14:
At 19 months the bilateral buccal shelf bone screws are providing anchorage to retract the entire lower arch.

retract the lower dentition (*Fig. 14*). In the 24th month, crimpable hooks were installed between the maxillary central and lateral incisors bilaterally. Cross arch elastics (*Fox, 1/4", 3.5oz*) were used to correct the lower midline (*Fig. 15*), which had shifted to the right ~1mm. In the 25th month of treatment, the bone screws were removed, and the upper archwire was cut distal to the first premolar on the right side, and distal to the upper first molar on the left side. The distal segments of the cut archwires were removed and buccal occlusal contacts were finished with intermaxillary elastics (*Chipmunk, 1/8", 3.5oz*). After 26 months of active treatment, all appliances were removed. A diode laser was used to adjust gingival contours as needed for optimal anterior aesthetics (*Fig. 16*).

Fig. 15:
At 24 months, cross arch elastics were used to correct the lower midline discrepancy.

Fig. 16: A diode laser was used to adjust the gingival contour to improve the soft tissue esthetics.

Results achieved

Maxilla (*all three planes*):

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

Mandible (*all three planes*):

- A - P: *Slightly retracted as the bite opened*
- Vertical: *Increased by posterior rotation of the mandible*
- Transverse: *Maintained*

Maxillary Dentition

- A - P: *Retracted*
- Vertical: *Molars slightly extruded*
- Inter-molar / Inter-canine Width: *Maintained*

Mandibular Dentition

- A - P: *Retracted*
- Vertical: *Incisors extruded*
- Inter-molar / Inter-canine Width: *Maintained*

Facial esthetics: Protrusive upper and lower lips were retracted

Retention

Upper and lower clear overlay retainers were delivered with instructions for full time wear the first 6 months, and nights only thereafter. Instructions were provided for home care and maintenance of the retainers.

Final Evaluation of Treatment

The ABO CRE score[3] was 19 points. The major discrepancies were in the occlusal contacts (*3 points*), marginal ridges (*4 points*) and alignment (*3 points*). The occlusion was finished in a Class II molar relationship because of the missing maxillary premolars. This is an optimal occlusion for the present patient, so no points were deducted for occlusal relationships. The maxillary and mandibular anterior segments were retracted to correct the protrusive lips. The maxillary buccal spaces were closed with molar protraction through the floor of the maxillary sinuses. No root resorption or other adverse outcomes were noted. Both the patient and the clinician were satisfied with this result.

Discussion

Management of Congenital Missing Premolars

Second premolars have a high prevalence of congenital absence, exceeded only by third molars. The problem is more common in the mandibular (*2.91-3.22%*) than the maxillary (*1.39-1.61%*) arch.[4] Kokich[5] and numerous other authors[6-11] have presented scenarios for managing congenitally missing teeth that were complied into a flow chart to help practitioners make clinical decisions for individual patients (*Fig. 17*). When congenitally missing second premolars are diagnosed, the first priority is to inform the patient and parent, and then carefully consider the orthodontic options. Space closure is usually the most desirable longterm outcome, but if the deciduous second molar(s) are healthy and the dentition is well aligned, a retained primary molar may be retained for several decades.[6,7] However, prudent oral hygiene measures should be reviewed with routine follow-up as indicated.

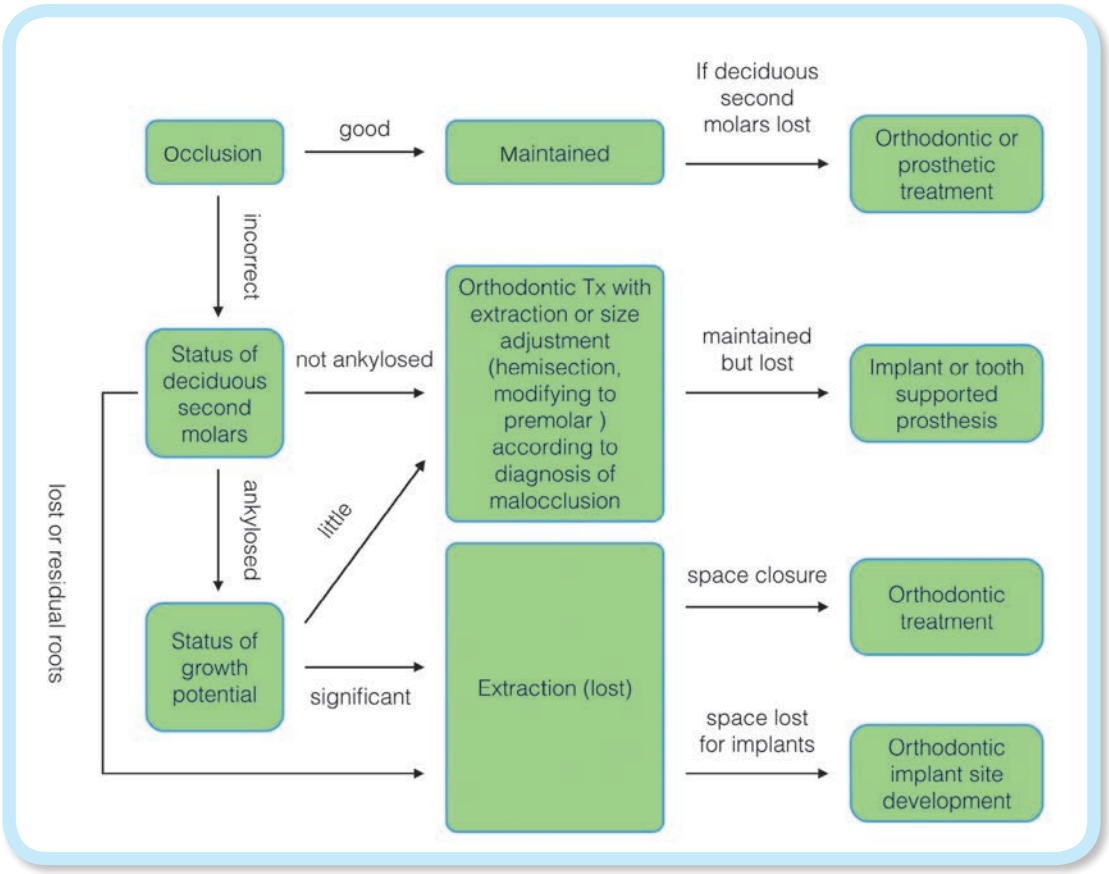


Fig. 17:
A schematic flow chart is designed to guide the diagnostic and treatment planning process for managing congenitally missing premolars.

Ankylosis of the deciduous second molars is an important consideration because the future implant site may be compromised. If a deciduous molar is out of occlusion and the interproximal bone levels are sloped in an apical direction, the tooth is probably ankylosed. The diagnosis is confirmed by percussion with a hand instrument. An ankylosed tooth has a sharp "*bone ring*" compared to a "*muted thump*" for teeth with an intact PDL. If an affected patient has significant growth potential, the ankylosed primary molar should be extracted to avoid a progressive vertical bony defect. The most common treatment options are to close the space or maintain an edentulous site for an implant-supported prosthesis.

When the edentulous premolar space is a future implant site, Ostler and Kokich[8] suggest avoiding a space maintainer, in favor of allowing the adjacent teeth to drift and tip naturally, followed by orthodontics for site development as needed. The data supporting this approach is the pattern of atrophic resorption of edentulous areas. The ridge width decrease 25% within 4 years, and after another 3 years, the ridge narrows another 5%, for a total reduction of 30% over 7 years. The ridge may still be wide enough for a dental implant but the fixture usually must be placed in a less esthetic lingual position because of bone resorption along the facial surface of the edentulous space.[8] Site development with orthodontics is usually required to separate the adjacent teeth and close interproximal contacts, thereby creating a wider ridge with more buccal bone support.[5] As shown in Fig. 17, the alternative is orthodontic space closure.

Reducing the Width of a Retained Primary Molar

In the absence of ankylosis, a viable option is reduction of the width of the deciduous molar to achieve optimal orthodontic alignment.[5] For younger patients with substantial growth potential, the first option is hemisecting the deciduous second molar. Removing the distal half of the deciduous molar allows the permanent molar to drift mesially and erupt.[9,10] Hemisection permits the occlusion to be more optimally corrected in the sagittal plane, but it is usually a commitment to an implant-supported prosthesis after growth is completed. The second option is moderate reduction of both the mesial and distal surfaces of the primary second molar. To avoid sensitivity and resist caries it is important to leave a layer of interproximal enamel on each surface. This method improves buccal interdigitation after orthodontics, and the retained primary molar can be retained well into adulthood.[7]

Managing the Current Malocclusion

The patient reviewed for this care report was diagnosed with bilateral congenitally missing maxillary second premolars, and his dentist decided to restore the missing premolar sites with dental implants. Band-and-loop space maintainers were placed to maintain space for the implants until adolescent growth was complete,[11] but they

entailed the risk of caries to the permanent molars (*Figs. 4 and 5*). It is important to delay dental implants until growth is complete because osseointegrated fixtures are unable to adapt to changes in the intermaxillary dimension,[12] but, delaying implant placement exposes the edentulous sites to atrophic bone resorption. Furthermore, the sagittal width of the retained spaces for the current patient were inadequate for implants, which indicated that the space maintainer were not fabricated until substantial space was already lost. In retrospect, it appears the space maintainers were contraindicated because the implant site was already compromised and the appliances resulted in mesial caries on both first molars (*Figs. 4 and 5*).

As advocated by Kokich and colleagues,[5,8] it may have been wise to allow the maxillary molars to drift into the edentulous spaces, and then consider the orthodontics and prosthetic options when growth was complete. That scenario benefits orthodontic space closure, and if implants are the desired option, the edentulous sites benefit from orthodontic site preparation. Another prosthetic preparation option is to move the first premolar into the edentulous space to create a more optimal implant site, in the space vacated by the first premolar. It is also possible to move the premolar into the site to create new bone and then back out again to hopefully create a better implant site in the second premolar area. Extensive translation of a tooth to create an implant site requires considerable treatment time, and may result in undesirable side effects. Furthermore, the procedure poses a risk of root resorption, and atrophic bone modeling tends to occur immediately after the alveolar process is no longer adequately loaded,[12] so most prepared implant sites may be compromised by the time the procedure is completed.

Long-Term Solution

Proper orthodontics management of congenitally missing teeth results in a long-term resolution for the problem. An optimally aligned normal dentition is superior to any prosthesis. The latter are mechanical devices with a typical lifespan that is far less than the expected longevity of the patient. The most effective treatment strategy for congenitally missing teeth is to diagnose the problem early and focus on an orthodontics solution.

All children should receive an orthodontics evaluation early in the mixed dentition stage. If second premolar agenesis is diagnosed, and there is also a significant malocclusion, the preferred option is early extraction of the second deciduous molars to allow the space(*s*) to close naturally, and then finish the space closure with full fixed orthodontics in adolescence. In the absence of malocclusion and particularly for patients with a relatively flat face, there are two orthodontic options, and both usually require extra-alveolar bone screw anchorage[2] to protract molars. The space can be closed in adolescence or later in life after the retained deciduous molars are lost. For a longterm solution to

the problem, space closure by protracting posterior segments with extra-alveolar bone screw anchorage[2] is an increasingly preferred option because there is less risk, greater longterm predictability, and it is usually more cost effective than implant-supported or conventional prostheses.

Moving teeth through the floor of the maxillary sinus

Moving teeth through the floor of the sinus has long been a viable clinical option based on physiologic principles[12] and is further supported by experimental studies.[13,14] However, Wehrbein et al.[15,16] reported that orthodontic tooth movement through the maxillary sinus was limited, but Park et al.[13] reported that teeth can be moved through the anatomic limitations, such as thin cortical bone, a suture or maxillary sinus. Kuroda et al.[14] evaluated bone surface modeling by moving maxillary first molars of mice in a palatal direction for up to 14 days, with a nickel-titanium super elastic load. They found bone resorption along the periodontal ligament (*PDL*) surfaces in the direction of tooth movement, but a layer of bone separating the PDL from the sinus membrane was always maintained due to apposition on the corresponding bone surface of the sinus. It was concluded that this physiologic phenomenon was due to the mechanical stress of tooth movement. In a case report, Park et al.[13] showed that teeth readily moved through the sinus by both translation and tipping without regard to the anatomy of the sinus. In contrast, Wehrbein et al.[15] stated that bodily or tipping movement through the maxillary sinus depends on the morphology of the antrum. They demonstrated that if there is a more vertical extension of the basal maxillary sinus in front of the tooth to be moved, greater tipping was accomplished than with teeth moved through a more horizontal maxillary sinus base. For the present patient, superimposed tracings of panoramic radiographs demonstrated that the teeth in the buccal segments were translated through the sinus (*Fig. 18*), so the experience is consistent with both previous studies.[14,15]

Root resorption is a concern when teeth are moved through cortical plates of bone, such as the floor of the sinus. In that regard, Wehrbein et al.[16] detected root resorption histologically in tissue specimens, but not in routine clinical radiographs. Kuroda et al.[14] failed to note any significant root resorption on teeth that had been moved through the maxillary sinuses. These data suggest there is little significant risk of root resorption when teeth are moved through the sinus with routine orthodontic mechanics. This conclusion is consistent with the physiologic principles of bone modeling.[12]

Orthodontic outcomes

The patient reported here presented with a relatively good facial profile that should be preserved.[17] It was desirable to protract the molars rather than retracting the anterior segment, but the problem is adequate anchorage for mesial translation. A relatively deep bite with no overjet in a patient with decreased vertical dimension of occlusion can provide adequate anchorage

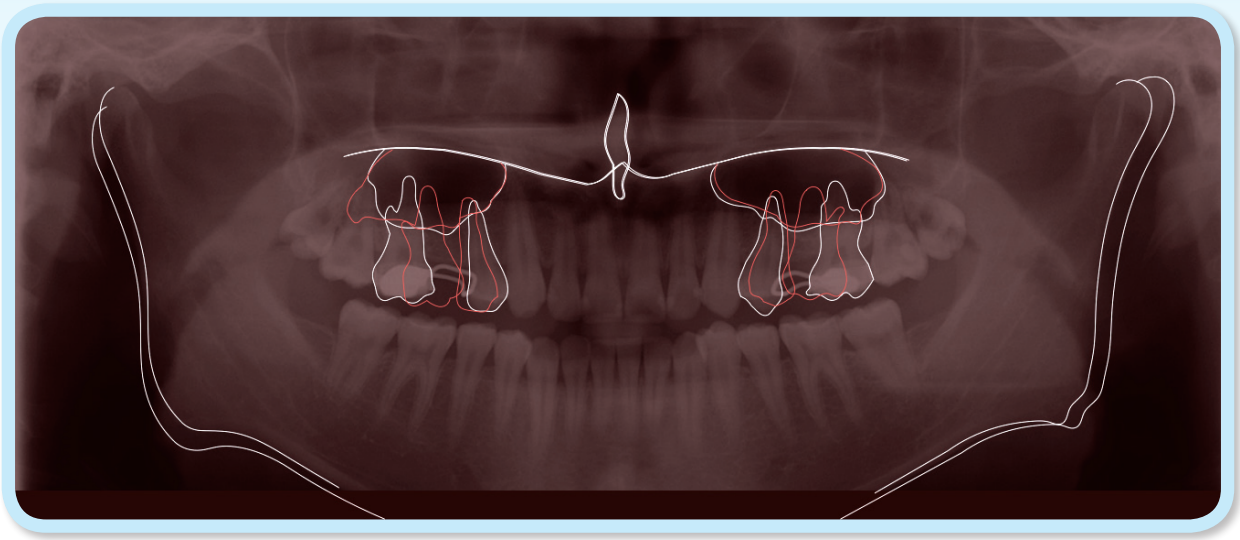


Fig. 18:
Superimposition of pre- and post-treatment tracings of panoramic radiographs show that the path of tooth movement was through the floor of the maxillary sinus, bilaterally.

for molar protraction with a chain of elastics on a round stainless steel archwire.[18] This relatively efficient method is particularly effective when supplemented with intermaxillary elastics. To prepare the current patient for space closure, the maxillary anterior segment was aligned with sequential archwires. When the .017x.025" TMA archwire was inserted, the anterior segment was secured with a figure-eight steel ligature tie from canine to canine. Power chains were used from the maxillary canines to the first molars to close the buccal spaces. Buttons were bonded on the lingual surface of the maxillary first premolars and first molars, and lingual power chains were stretched between the attachments bilaterally. The lingual force was applied to control rotations by balancing the space closure force on the buccal and the lingual.[19] Class III elastics were applied from the upper first molars to the lower canines. With these efficient mechanics, spaces were closed completely within 4 months, but there was retraction of the incisors resulting in an end-to-end relationship (*Fig. 19*).

Fig. 19:
The anterior overjet was reduced to an end-to-end incisal relationship. Mandibular buccal shelf bone screws were required as anchorage to retract the entire lower arch.

Fig. 20:
2-yr follow-up profile and intraoral photographs. The dentofacial result was stable.

It should be noted that rectangular TMA is more resistant to sliding mechanics for molar protraction than a round SS archwire,[18] and that problem may have contributed to more maxillary incisor retraction than was desired.[20] At 11 months, the end-to-end incisal relationship required mandibular buccal shelf bone screws for anchorage to retract the lower arch. After 22 months of treatment, proper overjet was achieved and the final finishing stage was initiated to detail the occlusion. The appliances were removed after 26 months of active treatment. In retrospect the treatment time may have been decreased if the buccal segments had been protracted on a smooth round wire. Archwires that bind during sliding mechanics may increase the anchorage of the posterior segments, resulting in more retraction of the incisors.[20]

Conclusion

Congenitally missing premolars are frequently encountered in orthodontics, and their management has life-long consequence. Appropriate diagnosis, treatment and interdisciplinary care requires a careful analysis relative to the growth and development of the patient. Based on a review of literature, a schematic flow chart was constructed to guide clinicians in a step by step procedure for defining the optimal management of a specific patient. An important consideration in managing upper buccal spaces is the floor of the maxillary sinus. No significant restrictions or side effects are currently associated with moving the roots of healthy teeth through the floor of the maxillary sinus. On the other hand, implants are problematic. Ridge atrophy may decrease the width of an implant site, and an inferiorly positioned sinus restricts the depth of bone available for placing an implant. In general, orthodontic space closure is the preferred option for managing congenitally missing teeth. Extra-alveolar bone screw anchorage in the buccal shelf of the mandible and/or the infrazygomatic crest provides direct or indirect anchorage for retraction of anterior segments and protraction of buccal segments to close spaces due to congenitally missing teeth. Space closure entails less risk, is a more predictable

restoration of esthetics and function long term, and is more cost effective.

References

1. Cangialosi TJ, Riolo ML, Owens SE, Dykhouse VJ, Moffitt AH, Grubb JE, Greco PM, JD English, RD James. The ABO discrepancy index: a measure of case complexity. Am J Orthod Dentofacial Orthop 2004;125(3):270–278.
2. Chang CH, Liu SSY, Roberts WE. Primary failure rate for 1680 extra-alveolar mandibular buccal shelf mini-screws placed in movable mucous or attached gingiva. Angle Orthod 2015;85:905-910.
3. Casko JS, Vaden JL, Kokich VG, Joseph Damone, James RD, Cangialosi TJ, Riolo ML, Owens SE, Bills ED. Objective grading system for dental casts and panoramic radiographs. Am J Orthod Dentofacial Orthop 1998;114(5):589–599.
4. Polder BJ, Van't Hof MA, Van der Linden FPGM, Kuijpers-Jagtman AM. A meta-analysis of the prevalence of dental agenesis of permanent teeth. Community Dent Oral Epidemiol 2004;32(3):217–226.
5. Kokich VO. Congenitally missing mandibular second premolars: Clinical options. Am J Orthod Dentofacial Orthop 2006;130(4):437–444.
6. Sletten DW, Smith BM, Southard KA, Casko JS, Southard TE. Retained deciduous mandibular molars in adults: a radiographic study of long-term changes. Am J Orthod Dentofacial Orthop 2003;124(6):625–630.
7. Bjerklin K, Bennett J. The long-term survival of lower second primary molars in subjects with agenesis of the premolars. Eur J Orthod 2000;22(3):245–255.
8. Ostler MS, Kokich VO. Alveolar ridge changes in patients with congenitally missing mandibular second premolars. J Prosthet Dent 1994;71(2):144–149.
9. Northway WM. Hemisection: one large step toward management of congenitally missing lower second premolars. Angle Orthod 2004;74(6):792–799.
10. Northway WM. The nuts and bolts of hemisection treatment: managing congenitally missing mandibular second premolars. Am J Orthod Dentofacial Orthop 2005;127(5):606–610.
11. Fudalej P, Kokich VO, Leroux B. Determining the cessation of vertical growth of the craniofacial structures to facilitate placement of single-tooth implants. Am J Orthod Dentofacial Orthop 2007;131(4):S59–S67.
12. Roberts WE, Graber LW, Vanarsdall RL Jr, Vig KWL. Bone physiology, metabolism and biomechanics in orthodontic practice. In: Orthodontics: Current Principles and Techniques, Chapt 10. 5th ed. St. Louis: Elsevier Mosby; 2012. pp. 287-343.
13. Park JH, Tai K, Kanao A, Takagi M. Space closure in the maxillary posterior area through the maxillary sinus. Am J Orthod Dentofac Orthop 2014;145(1):95-102.
14. Kuroda S, Wazen R, Moffatt P, Tanaka E, Nanci A. Mechanical stress induces bone formation in the maxillary sinus in a short-term mouse model. Clin Oral Investig 2013;17(1):131–137.
15. Wehrbein H, Bauer W, Wessing G, Diedrich P. The effect of the maxillary sinus floor on orthodontic tooth movement. Fortschr Kieferorthop 1990;51(6):345–351.
16. Wehrbein H, Fuhrmann RA, Diedrich PR. Human histologic tissue response after long-term orthodontic tooth movement. Am J Orthod Dentofacial Orthop 1995;107(4):360–371.
17. Sarver DM. Interactions of hard tissues, soft tissues, and growth over time, and their impact on orthodontic diagnosis and treatment planning. Am J Orthod Dentofac Orthop 2015;148(3):380-386.
18. Roberts WE, Nelson CL, Goodacre CJ. Rigid implant anchorage to close a mandibular first molar extraction site. J Clin Orthod 1994;28(12):693-704.
19. Lin SL, Chang CH, Roberts WE. Uprighting and protracting a horizontally impacted lower third molar in an adult. Int J Ortho Implantol 2015;34:58–77.
20. Taylor NG, Ison K. Frictional resistance between orthodontic brackets and archwires in rather buccal segments. Angle Orthod 1996;66(3):215-22.

Discrepancy Index Worksheet

TOTAL D.I. SCORE 13

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 = 0

LATERAL OPEN BITE

2 pts. per mm. per tooth

Total = 0

CROWDING (only one arch)

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

Total = 1

OCCLUSION

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

Total = 2

LINGUAL POSTERIOR X-BITE

1 pt. per tooth Total = 0

BUCCAL POSTERIOR X-BITE

2 pts. per tooth Total = 0

CEPHALOMETRICS (See Instructions)

ANB ≥ 6° or ≤ -2° = (4 pts.)

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

Each degree > 6 _____ x 1 pt. = _____

SN-MP

≥ 38° = 2 pts.

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

≤ 26° = 1 pt.

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

1 to MP ≥ 99° = 1 pt.

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

Total = 4

OTHER (See Instructions)

Supernumerary teeth	_____	x 1 pt. =	_____
Ankylosis of perm. teeth	_____	x 2 pts. =	_____
Anomalous morphology	_____	x 2 pts. =	_____
Impaction (except 3rd molars)	_____	x 2 pts. =	_____
Midline discrepancy (≥3mm)		@ 2 pts. =	_____
Missing teeth (except 3rd molars)	_____	x 1 pts. =	_____
Missing teeth, congenital	_____	x 2 pts. =	2
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:

Total = 6

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) =_____

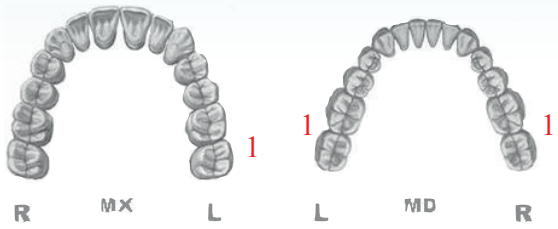
Total = 0

Cast-Radiograph Evaluation

Total Score: 19

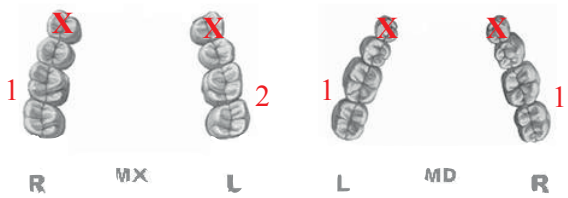
Alignment/Rotations

3



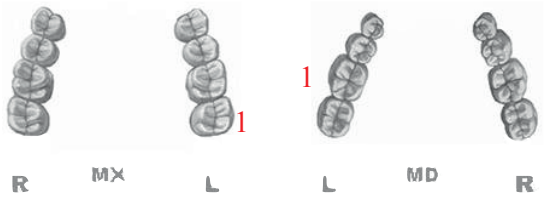
Marginal Ridges

5



Buccolingual Inclination

2

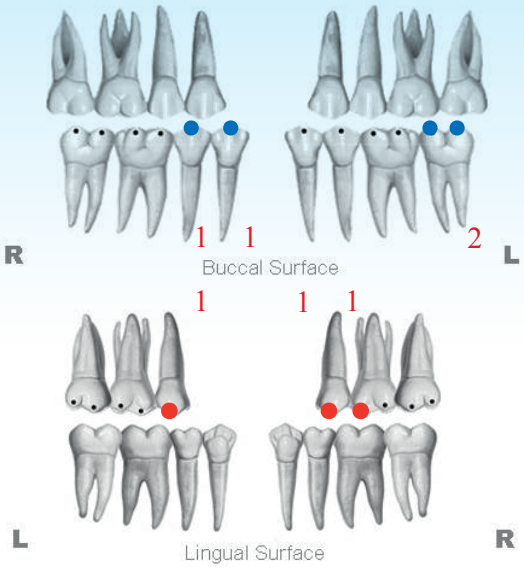


Overjet

0

Occlusal Contacts

7

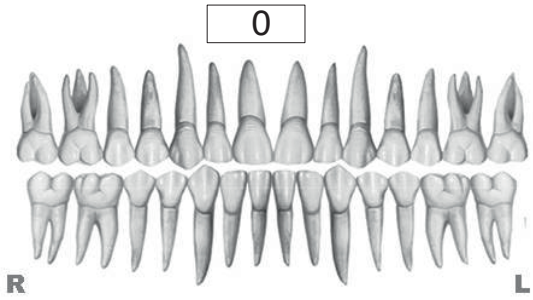


Occlusal Relationships

0

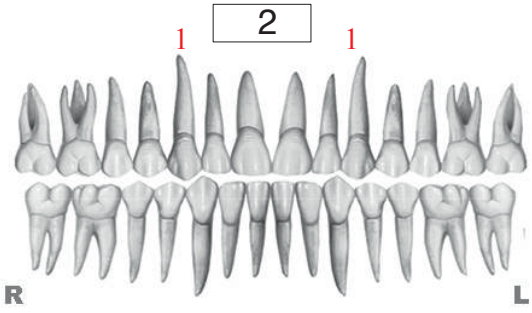
Interproximal Contacts

0



Root Angulation

2



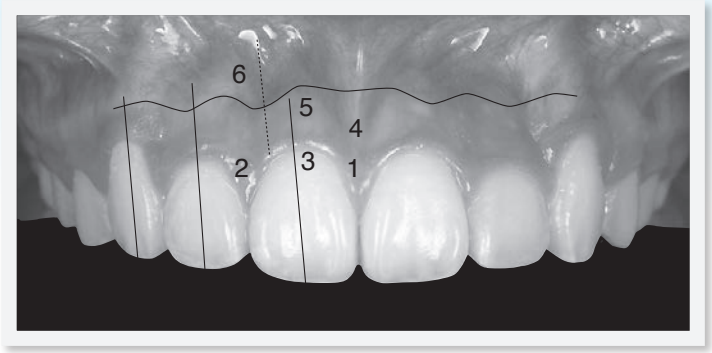
INSTRUCTIONS: Place score beside each deficient tooth and enter total score for each parameter in the white box. Mark extracted teeth with "X". Second molars should be in occlusion.

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

Total Score: = 3

1. Pink Esthetic Score

Total = 0

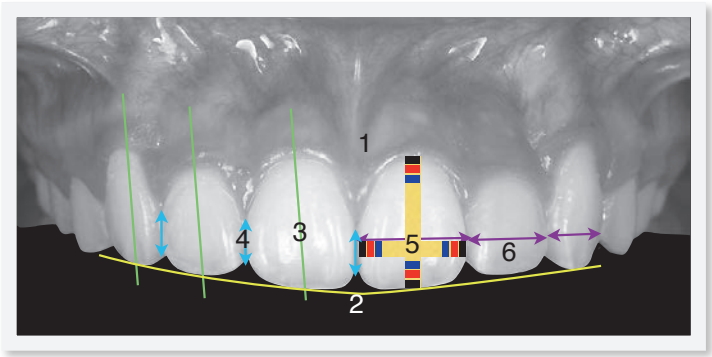


1. M & D Papilla	0	1	2
2. Keratinized Gingiva	0	1	2
3. Curvature of Gingival Margin	0	1	2
4. Level of Gingival Margin	0	1	2
5. Root Convexity (Torque)	0	1	2
6. Scar Formation	0	1	2

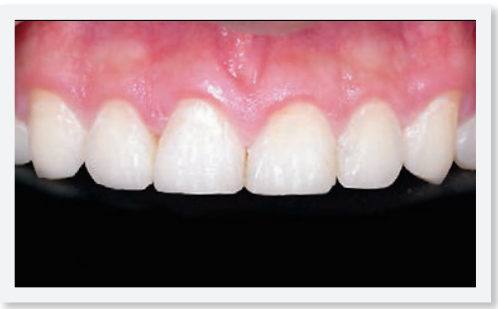
1. M & D Papilla	(0)	1	2
2. Keratinized Gingiva	(0)	1	2
3. Curvature of Gingival Margin	(0)	1	2
4. Level of Gingival Margin	(0)	1	2
5. Root Convexity (Torque)	(0)	1	2
6. Scar Formation	(0)	1	2

2. White Esthetic Score (for Micro-esthetics)

Total = 3



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



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

Herman Ostrow School of Dentistry of USC

Continuing Professional Education

USC University of Southern California

USC Comprehensive Surgical and Restorative Implant Training Program in Taiwan

南加大植牙專科進修課程

2016

7/16~18, 2016 (六，一 - 演講與實作 workshop)
11/19~21, 2016 (六，一 - 演講與實作 workshop)
2/8, 2017 (三 - 美國可選修的 cadaver workshop)
2/10~11, 2017 (五，六 - 美國演講，畢業典禮)

9/17~19, 2016 (六，一 - 演講與實作 workshop)
2/6~7, 2017 (一 ，二 - 美國演講)
2/9, 2017 (四 - 美國可選修的 cadaver workshop)
2/12, 2017 (日 - 美國可選修的 cadaver workshop)

地點：
金牛頓藝術科技中心：新竹市建中一路 25 號 2 樓 (2016 年 7 月到 11 月)
Millennium Biltmore Hotel Los Angeles. 506 South Grand Avenue. Los Angeles, CA 90071-2607 (2017年2月)

講員陣容

Alexandre-Amir Aalam

Neema Bakhshalian

Lyndon Cooper

Fereidoun Daftary

Thomas Han

Bach Le

Pascal Magne

Baldwin Marchack

Seiko Min

Alireza Moshaverinia

Ilan Rotstein

Tomaso Vercellotti

Homayoun Zadeh

3D 根管治療新觀點

Clinical Management of curved canals :
a novel 3D approach to the endodontic therapy

2016.7.24 (SUN) Taipei

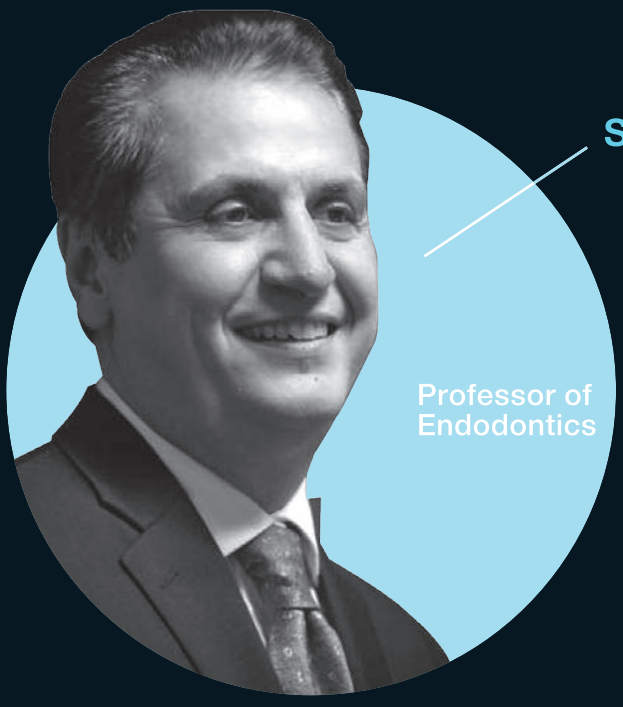
Dr. Gianluca Gambarini

・主辦單位：台大醫院牙科部牙髓病科 / 中華民國牙髓病學會・協辦單位：湧傑企業股份有限公司

COURSE OUTLINE

3D ENDODONTICS: MANAGEMENT OF COMPLEX CANALS

1. Role of Magnification and CBCT in endo: diagnosis and treatment planning!
2. Problems in locating canals and understanding anatomy in 3D!
3. Minimally invasive endodontics? Reality or myth? Dynamic access!
4. Role and influence of curvatures. 3D vs 2D. Defining a complex curvature!
5. Management of complex curvatures. The risk of canal transportation!
6. Working in and out (reaming vs hedstroem-like action). 3D shaping!
7. Working length determination. Basic principles and clinical hints about EALs!
8. Canal negotiation. Calcified canals and management of iatrogenic errors!
9. Why and how to perform a glide path!
10. Niti instrumentation techniques. Rotary vs reciprocation. Apical finishing!
11. The cleaning and shaping concept. Irrigation protocals and materials.
12. Improving cleaning in non-instrumented areas (isthmus, irregularities,etc)
13. Disinfection and Debridement. Vital vs Necrotic teeth. Single / Multiple Visit
14. Cold vs warm obturation techniques. Three-dimensional filling!
15. Post-endodontic restoration. Choice between techniques.



SPEAKER

Dr. Gianluca Gambarini, MD, DDS

- Full-time Professor and Head of Endodontics, Director of Master of Endodontics, University of Rome , La Sapienza, Dental School.
- Former scientific editor of the Italian Journal of Endodontics, the official Journal of the Italian Society of Endodontists.
- Official member of the ANSI/ADA and ISO committees for endodontic materials.
- Chairman of the Clinical Practice Committee of the ESE

RECOMMEND

李苑玲 醫師

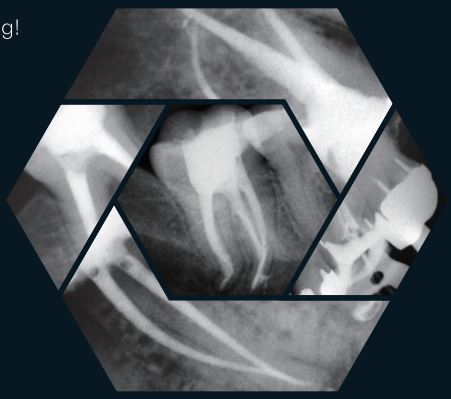
台大醫院牙科部牙髓病科主治醫師
中華民國牙髓病專科醫師

Professor Gianluca Gambarini 任教於義大利La Sapienza羅馬大學牙醫學院，除了擔任該校牙醫學院牙髓病科主任，同時也是研究所牙髓病訓練課程的負責人，無論在牙髓病相關的基礎研究或是臨床治療方面都有豐富的研究成果與臨床經驗，發表超過450篇的學術論文，並撰寫過多本牙髓病學教科書。此外，Professor Gianluca Gambarini 也是國際知名活躍的講師，曾多次受邀在American Association of Endodontists (AAE)、International Federation of Endodontic Associations (IFEA)、European Society of Endodontology (ESE)等國際牙髓病學會，以及歐洲、美加、南美洲、亞洲、中東以及澳洲等地的牙髓病學會或大學組織進行專題課程演講，授課足跡遍佈全世界，往往都引起與會者的廣大迴響。

近年來Professor Gianluca Gambarini 致力於發展3D Endodontics - 應用CBCT影像與判讀來協助牙髓疾病診斷、瞭解患齒根管3D解剖形態、改進與擬訂根管修形與治療的策略。此次的學術研討會，Professor Gianluca Gambarini 將以CBCT影像做為工具並搭配多年的臨床經驗做為主軸，帶領大家從3D的角度重新領略根管治療的奧秘，從基本的髓腔開擴作為開端，帶入複雜性根管修形清創與根管緻密充填治療的操作技巧，使您在臨床根管治療步驟執行策略的考量與擬定能有全新的視野。

SCHEDULE

08:30-09:00	Registration
09:00-10:30	Lecture: Minimally invasive endodontics? Reality or myth? Dynamic access!
10:30-11:00	Break
11:00-12:00	Lecture: Management of complex curvatures. The risk of canal transportation!
12:00-13:00	Lunch
13:00-14:00	Demonstration (TFA with plastic block or 3D tooth)
14:00-15:00	Lecture: The cleaning and shaping concept. Irrigation protocals and materials.
15:00-15:30	Break
15:30-17:00	Lecture: Cold vs warm obturation techniques. Three-dimensional filling!



INFORMATION OF LECTURE

Organizer	台大醫院牙科部牙髓病科 / 中華民國牙髓病學會
Co-Organizer	湧傑企業股份有限公司
Speaker	Dr. Gianluca Gambarini
Time	2016 / 7 / 24 (SUN) 8:30am~5:00pm
Venue	台大第八講堂 - 西址一樓（台北市常德街1號） * 請由公園路15-2號或青島西路大門進入台大醫院，行中央走廊至「萊爾富」左轉到底
Fee	2016/7/1前　主協辦單位　會員2000元 / 非會員2500元 / 學生1000元 2016/7/1後　主協辦單位　會員2500元 / 非會員3000元 / 學生1000元 * 現屆研究生及住院醫師優待價1000元，需於7月1日前向秘書處集體報名，課程當天請攜帶學生證或住院醫師證件入場
Registration	牙髓病學會報名電話：02-2382-1212　秘書處 顧小姐 湧傑公司報名電話：02-27788315　分機 #125劉小姐 / #131林小姐 牙髓病學會Email : endo999@gmail.com 報名請至郵局劃撥費用 戶名：余佳玲 帳號：50110921 劃撥報名截止日期：即日起至 2016 / 7 / 8 止
Certification	參加者發給繼續教育學分（共 7.8 學分 / 紙本學分證明 100 元）
	活動備茶點及午餐，素食請先告知
Remark	報名未出席者恕不退還既收款項

Severe Gummy Smile, Class II with 8mm Crowding Treated with Invisalign and Miniscrews

Abstract

A 27-year-old woman presented with a Class II malocclusion, 8mm of crowding and severe gummy smile. Her motive for the consultation was that she wished to improve her smile aesthetics and to achieve the desired final result without braces. The case was treated by dental arch transversal expansion, creating enough space for the mandible anterorotation and correcting the Class II. Temporary Anchorage Devices (TADs) were used for the Class II elastics, avoiding undesirable upper incisor retroclination. The anchorage also prevented the upper incisors from extruding and the gummy smile from worsening. After 16 months of treatment, satisfactory aesthetical and occlusal results were achieved. (Int J Orthod Implantol 2016;43:52-66)

Key words:

Invisalign, aligner treatment, gummy smile, Class II division II, severe crowding, TADs (miniscrews)

Introduction

Invisible orthodontic treatment is a common request nowadays. Severe gummy smile treated with aligners has been viewed as difficult. However, with the correct diagnosis and proper biomechanical alignment design, in conjunction with miniscrews, satisfactory results are achievable as documented in this case report.

Diagnosis

A 27-year-old woman presented with a gummy smile and crowding in both dental arches; her motive for the consultation was that she wished to improve her smile with aligner treatment.

Pre-treatment photographs indicated a convex profile (*Fig. 1*). The intra-oral examination showed the molar relationships were bilateral Class II. The overbite was +5mm (*75%*) with retroclined upper and lower incisors, diagnosed as a Class II division II malocclusion. The upper canines were completely outside the ideal dental arch (*Fig. 1*).

The smile evaluation showed a severe gummy smile in both the anterior and posterior regions (*Fig. 1*). The lack of dental arch transversal development was due in part to premaxillary area compression and crowding (*-7mm upper, -8mm lower*).

Dr. Diego Peydro Herrero
Director, Clínica Dental Peydro, Valencia, Spain
Director, Master Class of Beethoven Invisalign International Course

Fig. 1:
Pre-treatment intraoral and facial photographs. A severe gummy smile and severe crowding with Class II division II malocclusion was noted.

The panoramic x-ray (*Fig. 2*) revealed no abnormalities in the root or alveolar bone levels. The analysis of the temporomandibular joint (*TMJ*) was within the normal limits. The lateral cephalometric radiograph and tracing (*Fig. 2*) indicated a skeletal Class II pattern (*SNA 75°, SNB 70°, and ANB 5°*) with a steep mandibular plane angle (*SN-MP 41°*). Both upper and lower incisors were retroclined (*U1-SN 87°, L1-MP 85°*), with retrusive lips (*E-line UL -5mm; E-line LL -2mm*)

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

Treatment Plan

After discussing options with the patient, the following treatment goals were decided upon:

1. Non-extraction, aligner treatment in conjunction with TADs.
2. Align, level and expand the dentition in both dental arches, reducing buccal corridors.
3. Prevent worsening of anterior and posterior gummy smile by TADs.
4. Correct the Class II dental malocclusion assisted by TADs.
5. Reduce the overbite by light intrusion and proclination of the lower incisors.
6. Correct the upper and lower incisor retroclination by increasing lingual root torque.

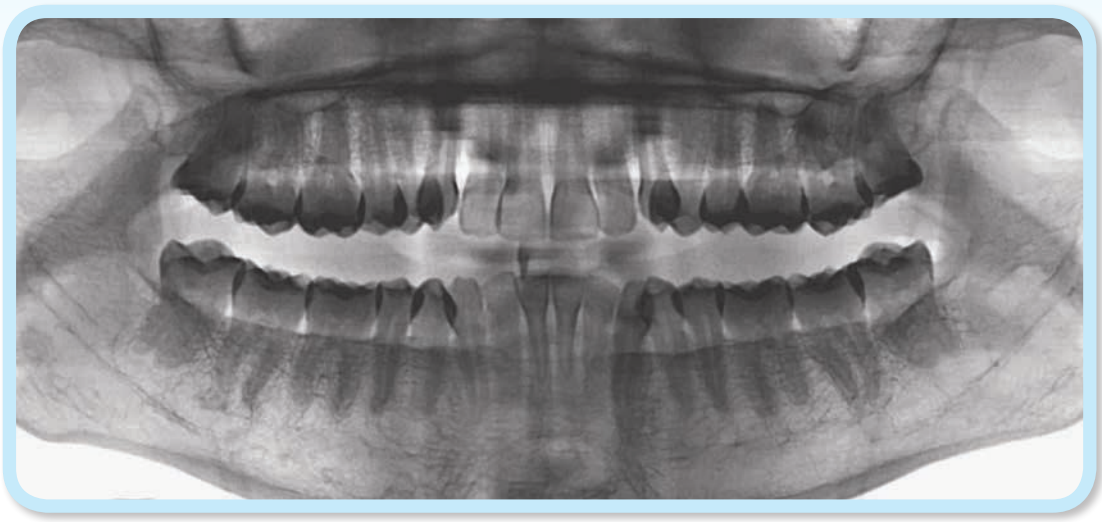
CEPHALOMETRIC			
SKELETAL ANALYSIS			
	PRE-Tx	POST-Tx	DIFF.
SNA°	75˚	75˚	0˚
SNB°	70˚	70˚	0˚
ANB°	5˚	5˚	0˚
SN-MP°	41˚	41˚	0˚
FMA°	34˚	34˚	0˚
DENTAL ANALYSIS			
U1 TO NA mm	0 mm	0 mm	0 mm
U1 TO SN°	86˚	91˚	5˚
L1 TO NB mm	5 mm	6.5 mm	1.5 mm
L1 TO MP°	91˚	95.5˚	4.5
FACIAL ANALYSIS			
E-LINE UL	-5 mm	-6 mm	1 mm
E-LINE LL	-2 mm	-3 mm	1 mm

■ Table 1: Cephalometric summary

Treatment Progress

A dental scan with iTero Element (*Align Tech Inc., San Jose, CA*) was taken to start the analysis and planning of the case. After several further Clinchecks (*Invisalign System Align Tech Inc., San Jose, CA*), modifications for the proper biomechanical design were confirmed.

A total of 48 aligners were used: 31 aligners in the first phase and 17 aligners in the second phase (*additional aligners*). The duration of use was mainly 10 days, although some were changed every 14 days. The treatment began with the delivery of the first 2 aligners. The patient was instructed to use the aligners between 20 to 22 hours a day, and was advised to remove them only while eating or brushing her teeth.



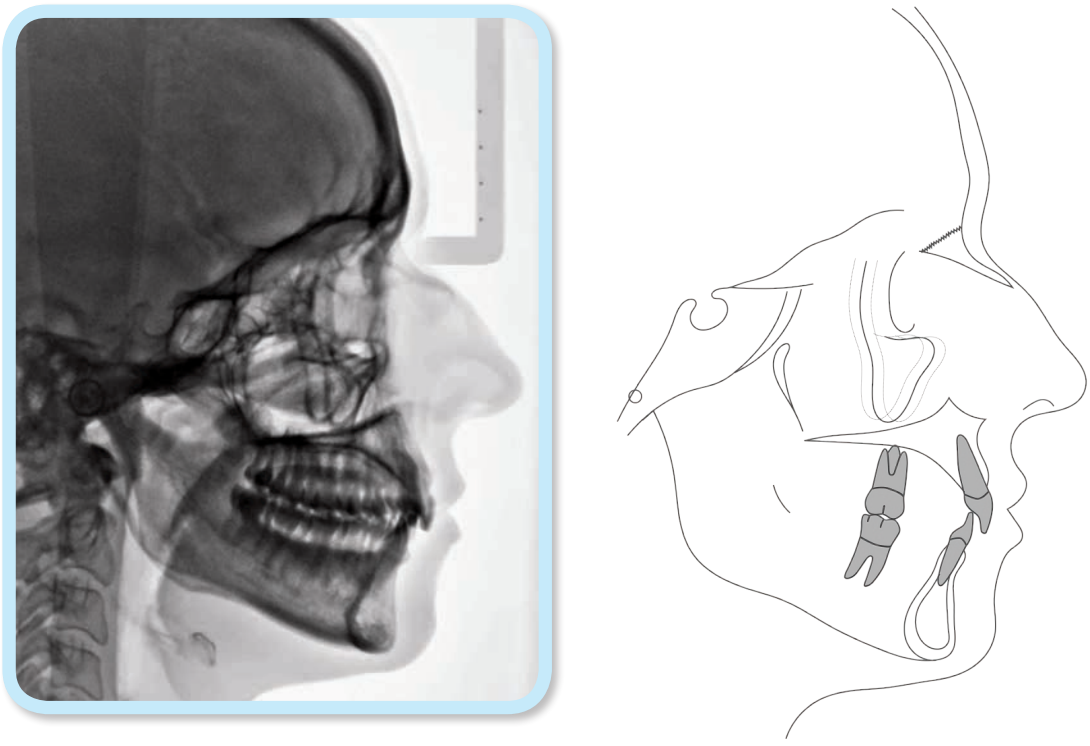


Fig. 2:
The cephalometric tracing indicated a skeletal class II pattern with a steep mandibular plane angle. Upper incisors were retroclined.

The selected attachments were:

UPPER MAXILLA (*per tooth*) (*Fig. 3A*):

- 1.6 Horizontal 4mm
- 1.5 Optimized
- 1.4 Horizontal 3mm
- 1.3 Optimized
- 2.6 Horizontal 4mm
- 2.5 Optimized
- 2.4 Horizontal 4mm
- 2.3 Optimized

MANDIBLE (*per tooth*) (*Fig. 3B*):

- 3.6 Horizontal 3mm
- 3.5 Optimized
- 3.4 Horizontal beveled to occlusal 4mm
- 3.3 Optimized
- 4.6 Horizontal 3mm
- 4.5 Optimized
- 4.4 Horizontal beveled to occlusal 4mm
- 4.3 Optimized
- 4.2 Horizontal beveled to gingival 3mm

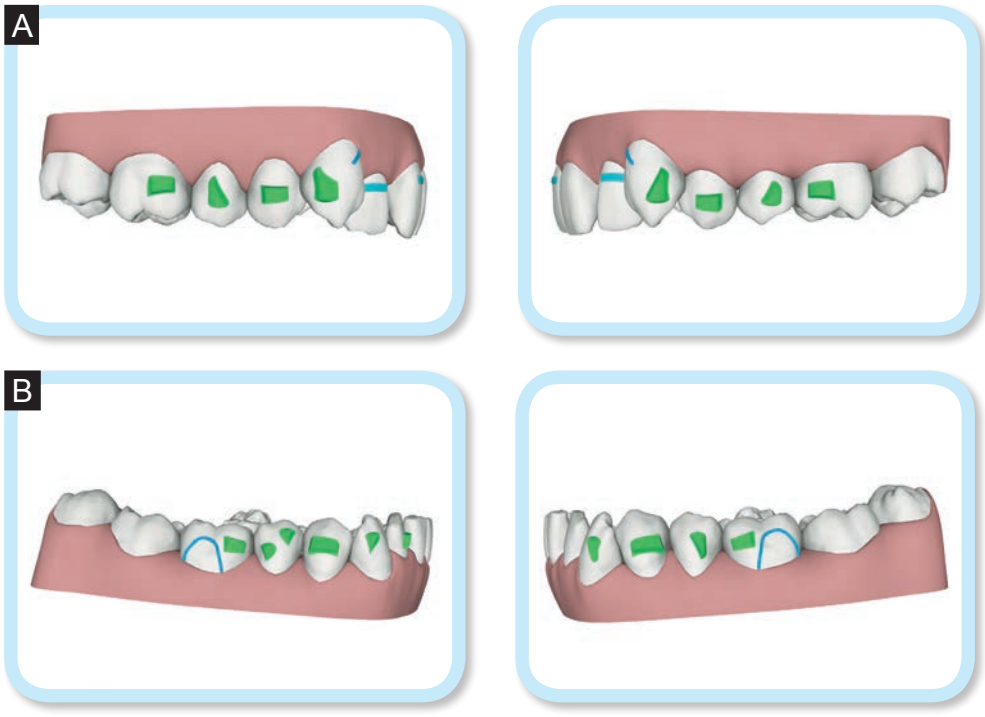


Fig. 3: The attachments selected for the case were shown as above.

The attachments were placed in the second visit. The composite used as attachments was Tetric Evoceram (*IVOCLAR VIVADENT Inc., NY, USA*).

After placing the attachments, aligners 3 to 8 were delivered to the patient. The aligner shift frequency was every 10 days. During the use of these 8 aligners, the programmed movements were mainly expansion, proclination, and derotation of the molars, canines, and premolars.

2 months later, aligners 9 to 16 were delivered and an appointment was scheduled to perform IPR and to insert the miniscrews.

Interproximal reduction (*IPR*) was performed at the 17th aligner. In the upper arch IPR from distal 13 to distal 23 and in the lower arch IPR from distal 33 to distal 43 (*0.4mm in each contact point*) was carried out to solve crowding, help to the intrusion movement of the incisors, and to reduce the existing black triangles between the incisors, which would then improve the smile aesthetics and enhance the shape and dental anatomy (*Fig. 4*). A symmetrical IPR was conducted in order to maintain centered dental midlines at the end of the treatment.

In this case the IPR performed was:

Maxilla: 0.4mm per contact point, from distal 13 to distal 33. (*Fig. 4A*)

Mandibular: 0.4mm per contact point, from distal 33 to distal 43. (*Fig. 4B*)

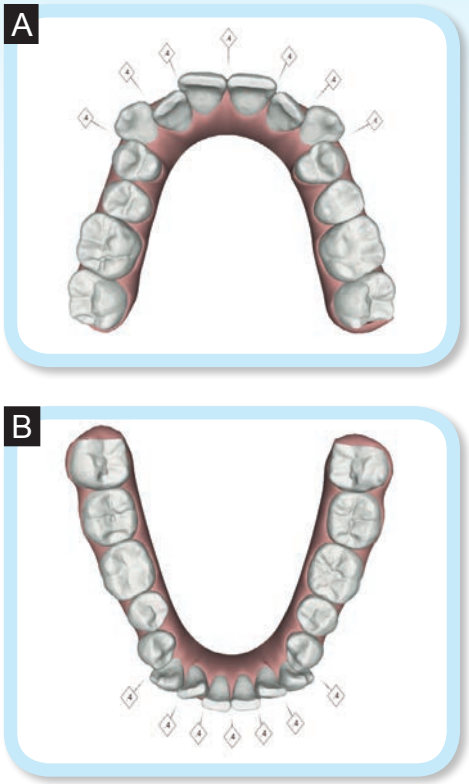


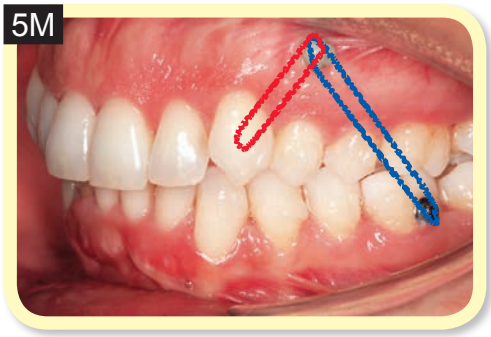
Fig. 4: IPR planning.

After 4 months of treatment of the 17th aligner, the transversal development of the upper arch had already been partially achieved, as well as a significant increase in torque on the upper incisors (*Fig. 5*). For aligner 17, a 1.6x9mm miniscrew (*MIAS1609 Microdent system, Barcelona*) was placed between the roots of the canines and the upper first premolars (*Fig. 5*). Class II elastics (*3/16" 8oz*) were used from the miniscrew to the tubes bonded on the lower first molars.

On aligner 20, having completed the proclination of the upper incisors, the upper incisor intrusion began

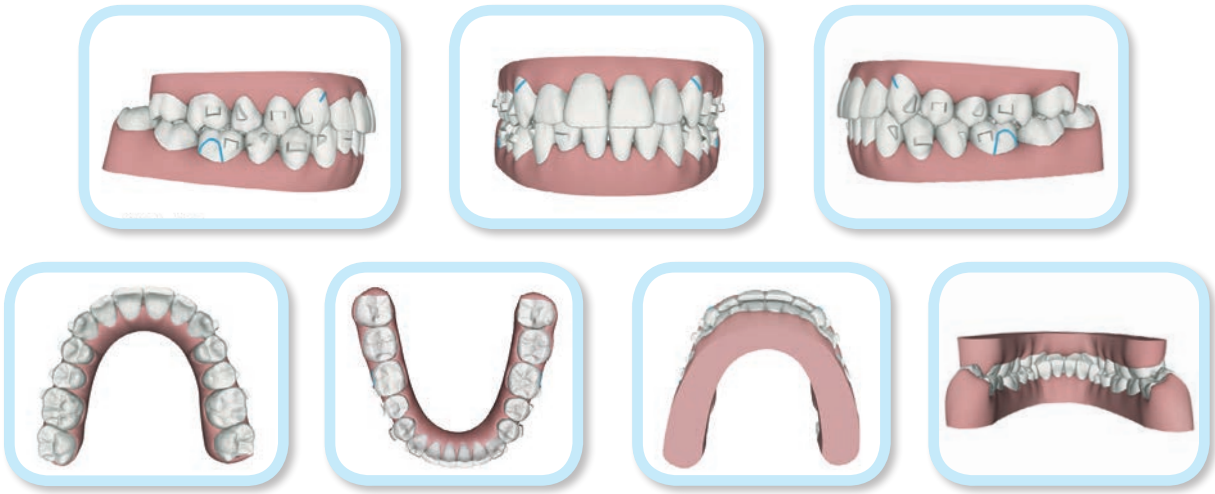
and the patient was instructed to simultaneously use a short elastic from the miniscrew to the cut located on 13 and 23, along with the Class II elastics she had been using. The size and strength of that second elastic was 1/8" 6½oz (*Fig. 6*). Namely, the miniscrew also provided anchorage to intrude the upper incisors, using elastics (*1/8" 6 ½oz*) from the miniscrew to a cut in the aligner located on the upper canines.

The first phase of treatment was completed on aligner 31, after 11 months of treatment. At that time a new scan was performed to plan the second phase of treatment for detailing and finishing this clinical case. The final result was planned (*Fig. 7*). In this second phase of treatment, 17 aligners were used and the patient continued to use both elastics.



■ *Fig. 5:*
On the 17th aligner, Class II elastics 3⁄16" 18oz and miniscrew/ button were used.

■ *Fig. 6:*
On the 20th aligner, Class I elastics (⅛" 6½oz) were added (red) in addition to the Class II elastics (blue).



■ *Fig. 7: Final result planned in 2nd phase (additional aligners).*

After 15 months of treatment, an occlusal adjustment was performed to improve the stability of the case, removing occlusal interferences. An aesthetic detailing of the cuspids of the upper canines was performed at the request of the patient, so that they would have a more rounded appearance. On this visit, all attachments were removed and the patient kept the last aligner passively for 1 month in order to stabilize the immense change that had been achieved.

The malocclusion was resolved in 16 months using Invisalign (*Align Tech, Inc. San Jose, CA*) assisted by TADS.

Retention

2 ESSIX retainers were given to the patient to maintain the correct alignment and leveling of the dentition in both arches. The patient was instructed to use these retainers throughout the day during the first month post-treatment and afterwards only while sleeping.

Treatment Results

Satisfactory results for smile aesthetics, occlusion and alignment can be observed in the post-treatment extra-oral and intra-oral photographs (*Fig. 8*). Bilateral molar and canine Class I relationships have been achieved. Further documentation with radiographs, cephalometric measurements and tracings indicate the maxillary incisors have increased lingual root torque. The mandibular incisors have been proclined (*Fig. 9*). The final result achieved is close to the planned and designed 3D Clincheck.

Discussion

Class II cases with a deep overbite, severe gummy smile and maxillary compression to be treated with aligners has previously been viewed as difficult.[1,2] However, a proper biomechanical design, incorporating miniscrews, helps to expand the aligners' indication range.[3-5]

Careful planning when using aligner systems is of the utmost importance.[6] The appropriate sequence of movements have satisfactorily resolved clinical case problems.[6] Most errors that occur with this type of orthodontic technique result from sequences of movements which are not planned according to the 3 phases of orthodontic treatment (*Transversal, Vertical, Sagittal*) and therefore an attempt to resolve phases without first completing the previous phase translates into movements that are not expressed clinically, giving rise to multiple errors. Knowing and understanding the biomechanics of dental movements with aligners rather than with braces is key to achieving good clinical outcomes.[3]

Maxillary compression, resolved with arch expansion, simultaneously created space for the anterior crowding and solved part of the vertical problems. Mesial-out rotation of the upper first molar during expansion helped to decrease the Class II molar relationship. The arch development in posterior teeth is proved effectively.[7]

Fig. 8:
Post-treatment intraoral and facial photographs. Satisfactory smile aesthetics, occlusion and alignment have been achieved. Bilateral Class I relationships have been achieved. Treatment time: 16 months.

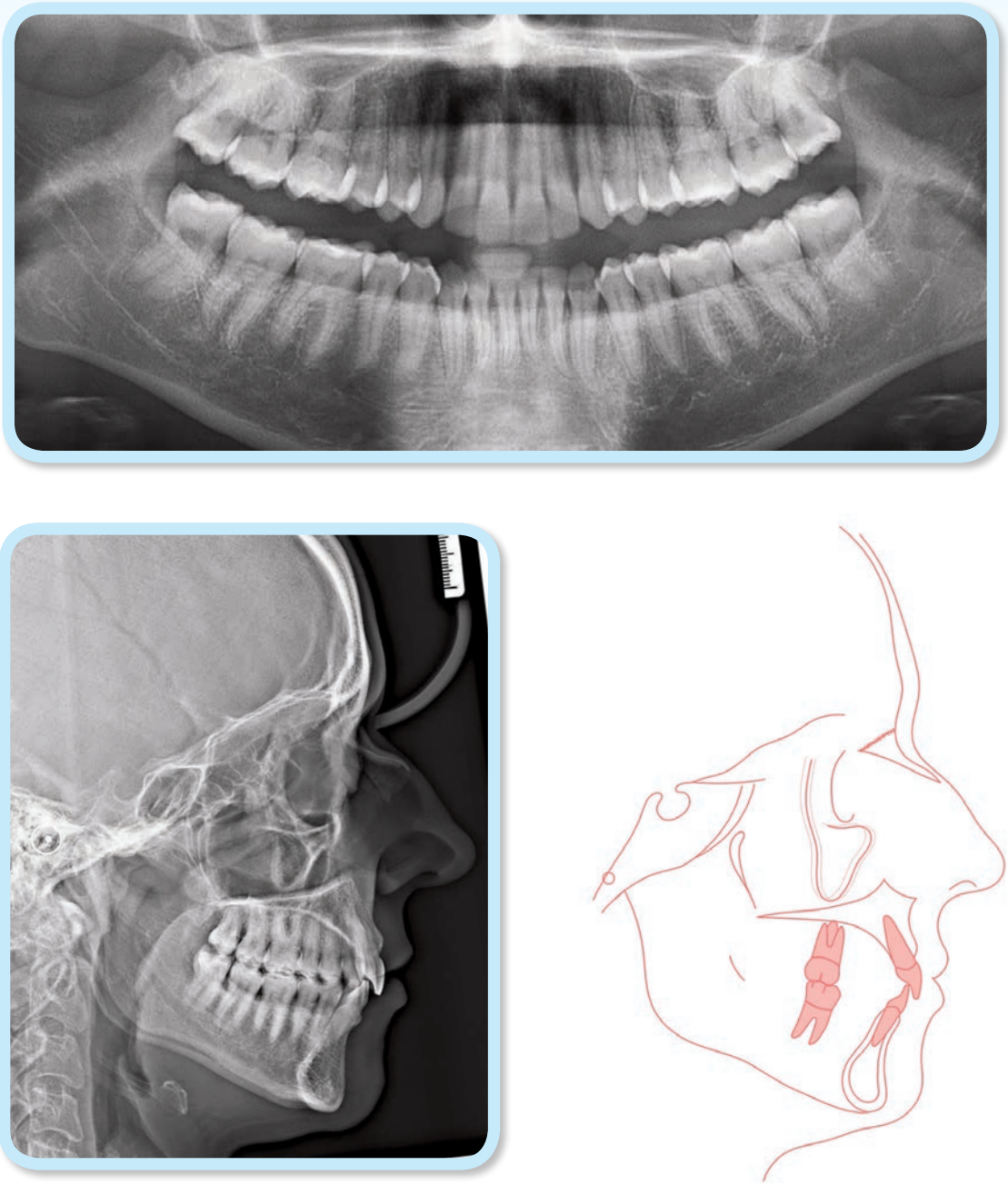


Fig. 9: Post-treatment cephalometric and panoramic radiographs.

Class II elastics can be effective and work efficiently[2] after overjet creation by expanding and increasing upper incisor root torque. However, the biomechanics treating any case with Class II division II and severe gummy smile must be designed properly.

Miniscrews as anchorage for Class II correction proved to be very effective when seeking the effect of mandibular advancement. Producing the anchorage with the miniscrew rather than in the upper aligner, the upper anchorage is completely skeletal and the entire effect occurs at the mandibular level, thus avoiding such adverse effects as retroclination and the loss of torque on the upper incisors; also preventing deepening of the overbite or worsening the gummy smile. Deep overbite can also be resolved with this kind of Class II elastics, due to mandible anterorotation and lower incisor proclination.[8] The aligners practiced a light intrusion force[9,10] over the upper anterior teeth which helped with gummy smile correction.

The Class I elastics from the miniscrews located between the upper premolars to upper aligner canine cut-out helped to simultaneously solve the Class II malocclusion. Due to these two miniscrews being located close to the maxillary center of resistance, the Class I elastics produced more body movement effect for the upper arch and lingual root torque effect on the upper incisors; thus, distalization with minimal side effects was achieved.

The case was finalized in a Class I molar and canine occlusion, with proper torque at the upper and lower incisors, and the correct transversal development

Fig. 10:
Cephalometric tracings before (black) and after (red) treatment showed slight intrusion and retraction of upper dentition and flaring of lower incisors. The maxillary incisors have increased lingual root torque. The mandibular incisors have been proclined.

of both dental arches. Furthermore, biomechanics assisted by miniscrews worked properly, achieving changes at the dental, gingival, and bone level that resulted in a great improvement in smile aesthetics.

Conclusions

It has been proven that the Invisalign System (*Align Technology, San Jose, CA*) works properly with miniscrews, to assist dental movements that may initially have seemed complex.

The use of miniscrews in this case favors the biomechanical design, by avoiding the adverse effects of retroclination and loss of torque on the upper incisors, which are normally produced by the continued use of elastics when they are anchored on to the aligners at the upper canine level.

Miniscrews in combination with elastics and aligners are useful in assisting movements as planned. Even severe gummy smiles can be treated with the proper design (*Fig. 11*).

Fig. 11:
Gummy smile has been corrected with miniscrews in 16 months.

Acknowledgement

Thanks to Dr. Huang, Chi for ceph tracings and editing; Teacher Paul Head for profreading this article.

References

1. Giancotti A, Mampieri G, Greco M. Correction of deep bite in adults using the Invisalign system. J Clin Orthod 2008;42(12):719–26.
2. Schupp W, Haubrich J, Neumann I. Class II correction with the Invisalign system. J Clin Orthod 2010;44(1):28–35.
3. Kravitz ND, Kusnoto B, BeGole E, Obrez A, Agran B. How well does Invisalign work? A prospective clinical study evaluating the efficacy of tooth movement with Invisalign. Am J Orthod Dentofacial Orthop 2009;135(1):27–35.
4. Fudalej P, Antoszewska J. Are orthodontic distalizers reinforced with the temporary skeletal anchorage devices effective? Am J Orthod Dentofacial Orthop 2011;139(6):722–9.
5. Lin JCY, Tsai SJ, Liou EJW, Bowman SJ. Treatment of challenging malocclusions with Invisalign and miniscrew anchorage. J Clin Orthod 2014;48(1):23–36.
6. Samoto H, Vlaskalic V. A customized staging procedure to improve the predictability of space closure with sequential aligners. J Clin Orthod 2014;48(6):359–67.
7. Rossini G, Parrini S, Castroflorio T, Deregibus A, Debernardi CL. Efficacy of clear aligners in controlling orthodontic tooth movement: A systematic review. Angle Orthod 2015;85(5):881–9.
8. Duncan LO, Piedade L, Lekic M, Cunha RS, Wiltshire WA. Changes in mandibular incisor position and arch form resulting from Invisalign correction of the crowded dentition treated nonextraction. Angle Orthod [In press] 2015.
9. Turatti G, Womack R, Bracco P. Incisor intrusion with Invisalign treatment of an adult periodontal patient. J Clin Orthod 2006;40(3):171–4.
10. Simon M, Keilig L, Schwarze J, Jung BA, Bourauel C. Forces and moments generated by removable thermoplastic aligners: incisor torque, premolar derotation, and molar distalization. Am J Orthod Dentofacial Orthop 2014;145(6):728–36.

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 = 0

OVERBITE

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

Total = 2

ANTERIOR OPEN BITE

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

Total = 0

LATERAL OPEN BITE

2 pts. per mm. per tooth

Total = 0

CROWDING (only one arch)

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

Total = 7

OCCLUSION

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

Total = 4

LINGUAL POSTERIOR X-BITE

1 pt. per tooth Total = 0

BUCCAL POSTERIOR X-BITE

2 pts. per tooth Total = 0

CEPHALOMETRICS (See Instructions)

ANB ≥ 6° or ≤ -2° = 4 pts.

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

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

SN-MP

≥ 38° = 2 pts.

Each degree > 38° 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 = 6

OTHER (See Instructions)

Supernumerary teeth	_____ x 1 pt. =	_____
Ankylosis of perm. teeth	_____ x 2 pts. =	_____
Anomalous morphology	_____ x 2 pts. =	_____
Impaction (except 3rd molars)	_____ x 2 pts. =	_____
Midline discrepancy (≥3mm)	@ 2 pts. =	_____
Missing teeth (except 3rd molars)	_____ x 1 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: Gummy Smile

Total = 6

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 =

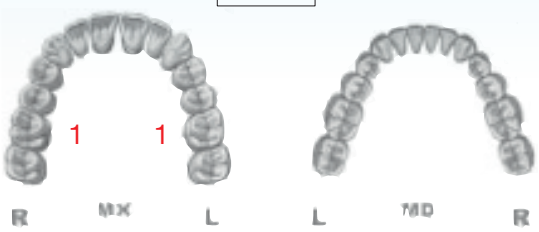
Cast-Radiograph Evaluation

Case # **Patient**

Total Score: 10

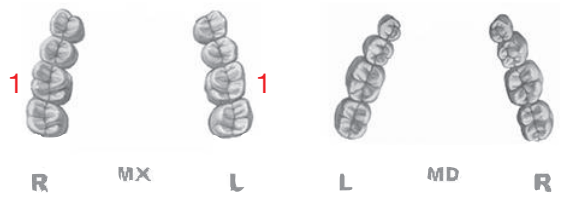
Alignment/Rotations

2



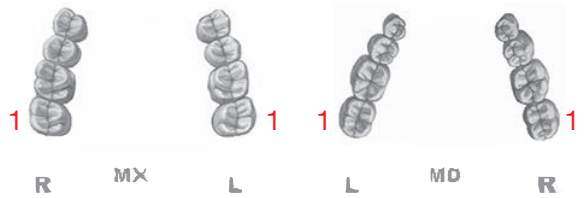
Marginal Ridges

2



Buccolingual Inclination

4

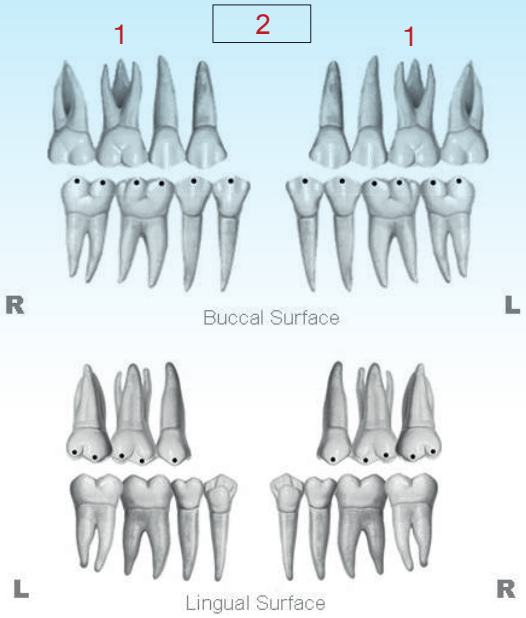


Overjet

0

Occlusal Contacts

2

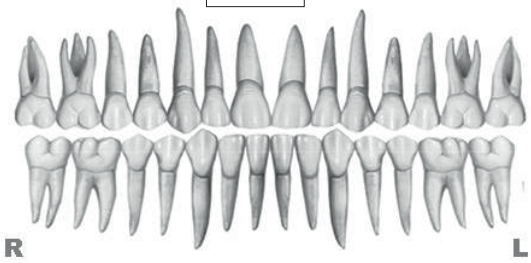


Occlusal Relationships

0

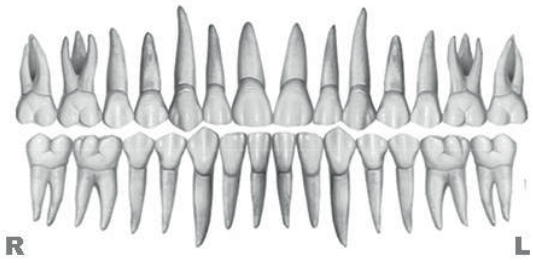
Interproximal Contacts

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 (Before Surgical Crown Lengthening)

Total Score: = 3

1. Pink Esthetic Score

Total = 2

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 = 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

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

2016 Keynote Workshop

高效簡報學習法

K123

看過太多充滿複雜文字和圖表的幻燈片，聽過就忘了的演講嗎？Keynote系列課程教你如何利用Mac內建軟體Keynote，製作出令人目眩神迷、印象深刻的電腦簡報。透過小班教學，貼身指導，務必讓你在課程中輕鬆掌握Keynote的簡報技巧。

K1 簡報聖經 Keynote 101

2016.07.14

K2 DR. KOKICH 10大演講秘訣

2016.08.04

K3 STEVE JOBS 令人目眩神迷的演講技巧

2016.09.15

K456 ADVANCED KEYNOTE

Speaker: Dr. Rungsi

2016.10.22 - 24

K456

講師：
Dr. Rungsi Thavarungkul

數位化潮流下的牙科簡報，不僅需要清晰的臨床照片，也需要精確的圖表和流暢的動畫來吸引觀眾，而優秀的視覺化工具更使您的演講獨樹一格且令人難忘。Keynote 456課程中，Dr. Rungsi將分享他利用Keynote軟體繪製精美牙科插圖的經驗，並一步步教會您如何從構想和草圖創建出令人驚艷的成果。跟隨簡報美學大師的腳步，您也可以秀出創意、站上世界舞台！

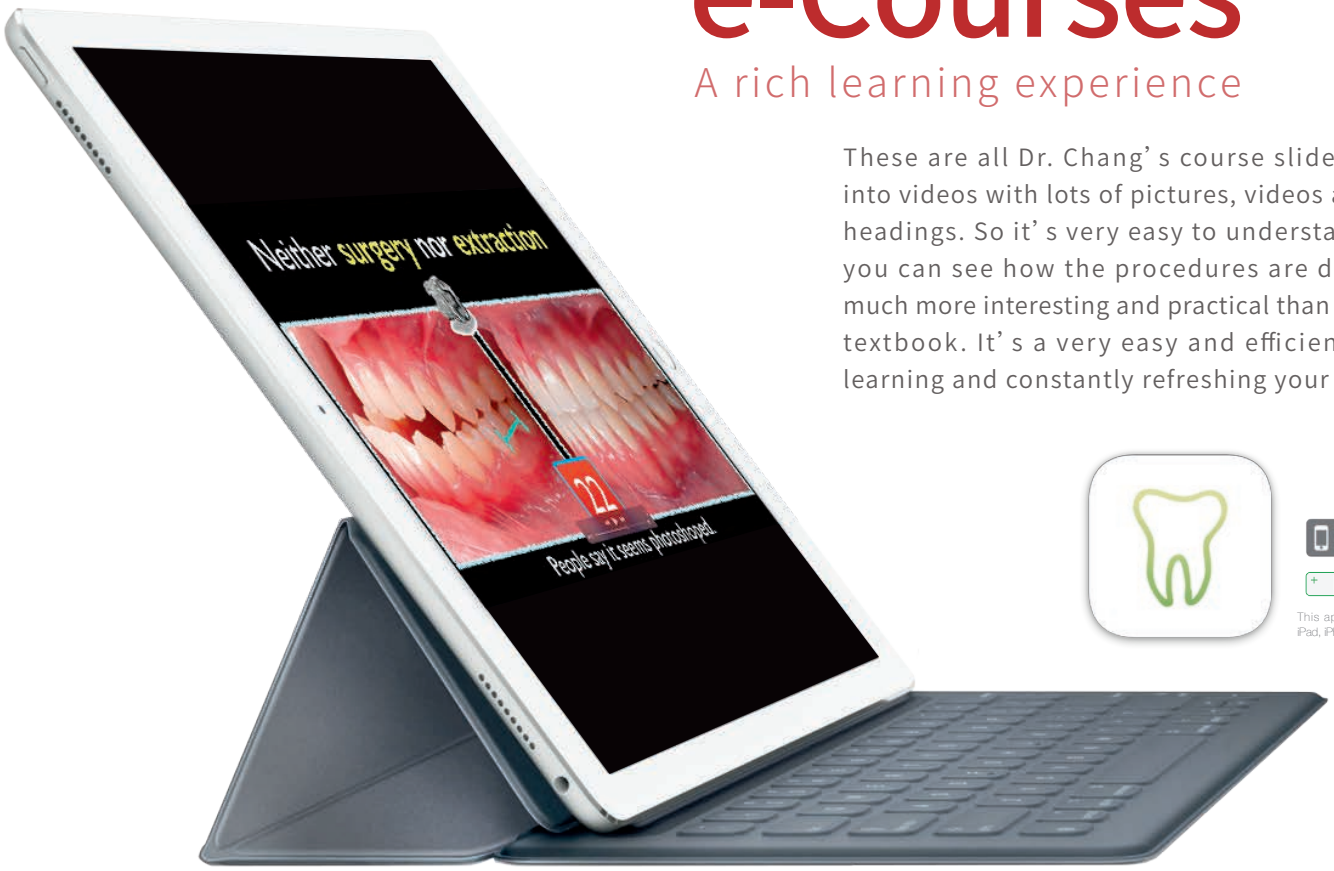
報名2016課程即贈送2015及2016課程視訊。

- 名額有限，以繳費順序為依據。
- 舊生享特惠優惠價，限額6名。
- 若取消報名，7/22前退款將扣除10%行政手續費，7/23後扣除30%行政手續費。

Newton's A 金牛頓藝術科技　新竹市建中一路25號2樓　報名專線：03-5735676

e-Courses

A rich learning experience



These are all Dr. Chang' s course slides turned into videos with lots of pictures, videos and clear headings. So it' s very easy to understand when you can see how the procedures are done. It' s much more interesting and practical than reading a textbook. It' s a very easy and efficient way of learning and constantly refreshing your memory.

Available on the App Store
Get
This app is designed for iPad, iPhone and iPad touch

Series

Voiced — Damon Q

Voiced — Advanced

Voiced — OrthoBoneScrew

Voiced — E-Lecture

Finishing (7 Sessions)

E-Ortho

E-Implant

E-Pedo

Assistant

Note:

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

BDE

Knowledge in your pocket

Your personal takeaway mobile learning device

Beethoven Dental Encyclopedia

Damon Q Voiced in English is now available!!

BDE offers professional orthodontic and implant video courses. Members can watch the latest dentistry treatment from the comfort of their home. All courses are instructed by Dr. Chris Chang. This step-by-step practical course will make your learning an informative and fun experience. You can also have access to International Journal of Orthodontics and Implantology from the App.

✔ Online access ✔ Offline download and unlimited viewing

+ Free App

Available on the App Store

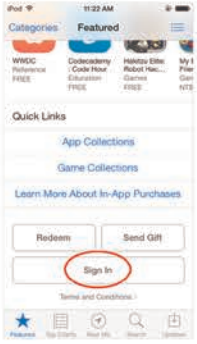
This app is designed for iPad, iPhone and iPad touch

Note:

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

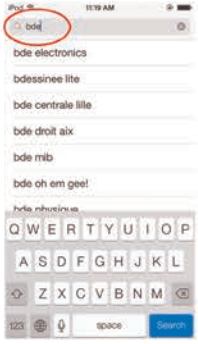
Manual– Step by Step

1. Go to App Store on your device.



2. "Sign in" with your Apple ID.

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

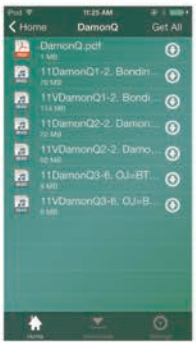


4. Search for "BDE."

5. Click "FREE."

6. Click "INSTALL APP."

7. Once downloaded, click "BDE" to launch the app.



If you are interested in our paid video ormedical products, contact **app@newtonsa.com.tw** for more information.

+886-3-573-5676

http://orthobonescrew.com

Newton's A

Conservative Restoration of Interproximal Caries During Active Orthodontic Treatment

Introduction

Oral health maintenance during orthodontics is essential for achieving desirable clinical outcomes. Common problems, such as caries, pulpitis, periapical pathology and periodontal disease, require correction or at least stabilization prior to commencing active orthodontic treatment. However, it may be difficult to access small carious lesions in a crowded dentition. On the other hand, large carious lesions with pulp involvement and periapical pathology often require endodontic treatment and temporary restorations before the start of orthodontic treatment. Tooth fractures or pathology detected during active treatment may require adjunctive care during the course of orthodontic therapy.

Class II, III and IV restorations may involve important functional areas on occlusal or incisal surfaces. It is important to monitor restored teeth in centric occlusion and functional excursions, both before treatment and as it progresses. Bracket repositioning, detailing and/or occlusal adjustment may be necessary to control occlusal trauma.

Conservative management of caries is frequently encountered during active orthodontic treatment. Interproximal space is created to facilitate conventional restoration of small to moderate carious lesions.[1] Attempting to restore interproximal lesions without opening space invites operative errors that may inadvertently weaken a marginal ridge or incisal angle. Once the integrity of a functional structure is compromised, it may collapse, risking serious damage to a tooth. This report describes a relatively simple, yet conservative approach to restore interproximal caries during active orthodontic treatment (*Fig. 1*).

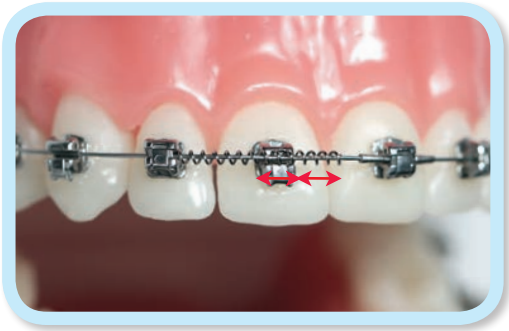


Fig. 1:
As shown, the length of the open coil spring is the distance between the brackets plus 2-2.5 times the bracket width.

Clinical technique

Indication: Orthodontic patients with caries on anterior or posterior proximal surfaces

Application: Poor access to interproximal lesions is improved by orthodontically opening interdental spaces (*Fig. 2*), but simultaneous opening of multiple spaces is unpredictable (*Fig. 3*). Restoring inaccessible

Dr. Sheau Ling Lin,
Lecturer, Beethoven Orthodontic Course (Left)

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

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

Fig. 2:
To reactivate the spring, a ball of flowable resin is polymerized on the archwire to increase the range of activation.

Fig. 3:
Three consecutive open-coil springs on an archwire is not recommended, because the space opening is unpredictable and may result in periodontal compromise.

interproximal lesions should be the first priority at the start of orthodontic treatment. Selective space opening during active treatment facilitates the predictable restoration of lesions noted later (*Fig. 4*).

Procedure: An open coil spring is used to separate the affected teeth. The length of the open coil

Fig. 4:
An open coil spring was inserted between the central incisors to open space for restoration of interproximal caries.

should be the distance between the brackets, plus 2-2.5 times the bracket width (*Fig. 1*). After 1-2 months, the teeth usually separate about 1.5-2mm, which is adequate for most operative procedures (*Fig. 5*). If the interdental space is inadequate at a follow-up visit, activate the open coil spring with a pusher and polymerize a resin ball (*1.5-2mm in diameter*) on the archwire to re-activate the spring (*Fig. 2*). Follow-up at about 1 month interval is recommended until an adequate space is achieved.

Fig. 5:
Two months after the coil spring was placed, the interproximal space was opened about 2mm.

Fig. 6:
Following the restorative procedure, the space is closed with an elastic chain. Alternatively, coil springs can be placed distal to the central incisors, if there are additional restorative needs on those surfaces.

Multiple Lesions: Be patient, do not exceed more than 2 open coil springs in a quadrant, or more than 3 in an entire arch. It is challenging to properly place multiple interdental springs, and the direction of the forces is difficult to control (*Fig. 3*). Furthermore, excessive space opening may distort the arch and damage the periodontium.

Case Illustration

A 21 year old female with mild maxillary crowding was scheduled to commence orthodontic treatment, but there were proximal caries on the mesial surfaces of maxillary incisors. An open coil spring was placed between the brackets of the maxillary central incisors at the initial bonding appointment (*Fig. 4*). In two months, the space was opened about 2mm (*Fig. 5*). The archwire was removed, and the patient was referred to her general dentist to restore the caries. After the restorative procedure (*Fig. 6*), open coil springs were inserted between the maxillary lateral incisors and central incisors bilaterally (*Fig. 7*), to open additional spaces to restore interproximal caries.

The coil springs placed distally to the central incisors helped close the midline diastema, as they opened spaces between the central and lateral incisors (*Fig. 7*).

Discussion

Restoring interproximal carious lesions, from the a labial or lingual with a G.V. Black preparation,[1] requires removal of a large amount of tooth structure to accomplish the proper retention and resistance forms.[2] Space opening provides more direct access for caries removal, resulting in a more conservative restoration. It may be advantageous to restore interproximal caries early in orthodontic treatment, rather than before it starts.

Contemporary caries management can be accomplished with "*box*," "*slot*," or "*tunnel*" preparations.[3] A box preparation results in extensive loss of tooth structure on the lingual or labial surface. The slot procedure reduces the amount of tooth structure removed, but the point of access may weaken the marginal ridge or incisal angle.

Fig. 7:
Coil springs are positioned between the central and lateral incisors bilaterally, to open space for additional restorative procedures.

Furthermore, it is difficult to properly finish the margins of a slot preparation, which may predispose the patient to food impaction, secondary caries and periodontal problems. Tunnel restorations are designed to preserve the functional structures, but it is a very technique-sensitive procedure. There is more risk to the pulp, and it is difficult to fill the preparation with restorative material. In addition, finishing the margins of the restoration is challenging, so the procedure is usually restricted to interproximal caries on the distal surface of posterior teeth. Opening a space considerably facilitates the tunnel procedure because it provides more direct visualization.

Use of open coil springs to separate carious interproximal surfaces is a wise decision, particularly if the teeth are to be aligned anyway. Opening the proximal areas allows the dentist to have direct visual access to the lesions. Small to moderate caries are easily restored in a conservative manner, and functionally sensitive areas are protected. The margins of the restoration are readily finished and the profile is meticulously constructed to produce ideal form and function.

Conclusion

Orthodontically separating teeth with small to moderate proximal caries facilitates restorative procedures, by providing direct visual access. Conservative operative procedures preserve the integrity of marginal ridges and incisal angles. The selective opening of interdental space is a reliable interdisciplinary procedure for facilitating conservative restorative procedures.

Acknowledgment

Thanks to Mr. Paul Head for proofreading this article.

References

1. Theodore MR, Harald OH, Edward JS, Jr. Sturdevant's art & science of operative dentistry. 4th ed. St. Louis: Elsevier Mosby; 2002. p. 281-303.
2. Ji W, Chen Z, Frencken JE. Strength of tunnel-restored teeth with different materals and marginal ridge height. Dent Mater 2009;25:1363-70
3. Chu CH, Mei ML Cheung C, Nalliah RP. Restoring proximal caries lesions conservatively with tunnel restorations. Clin Cosmet Investig Dent 2013;30:43-50.

Animation & Illustration Workshop

Advanced Keynote Workshop

2016 10/22-24 (Sat-Mon) 09:00-17:00

2017 12/2-4 (Sat-Mon) 09:00-17:00

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

Topics:

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

Lecturer:
Dr. Rungsi Thavarungkul,
Thailand

Early Bird

by 2016/08/05

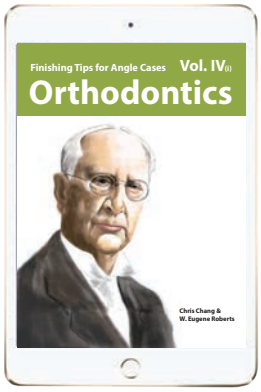
Newton's A course@newtonsa.com.tw

Requirements: Mac computer with OSX 10.11.X; Keynote 6.X (the latest)

e-BooK

Learn it your favorite way

Best of all



BUY BOOK

This book requires iBooks 3.0 or later and iOS 5.0 or later.

The World's Best e-Textbook

Beethoven Dental Encyclopedia

e-Books collection

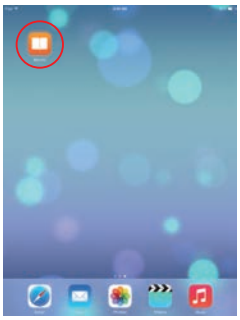
Beethoven Orthodontic and Implant Group has published the International Journal of Orthodontics and Implantology since 2007. This Journal features excellently finished case reports evaluated by objective grading systems. The Orthodontics and Implant Dentistry eBook series is a special selection of exciting cases with interactive functions and multimedia resource. Once opening this book, your understanding of dentistry will never be the same!

Now available in iBooks Store in 51 countries:

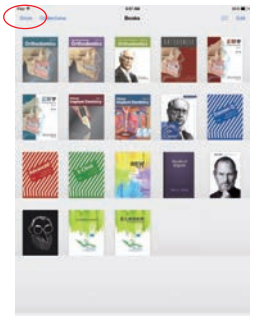
Argentina, Australia, Austria, Belgium, Bolivia, Brazil, Bulgaria, Canada, Chile, Colombia, Costa Rica, Cyprus, Czech Republic, Denmark, Dominican Republic, Ecuador, El Salvador, Estonia, Finland, France, Germany, Greece, Guatemala, Honduras, Hungary, Ireland, Italy, Japan, Latvia, Lithuania, Luxembourg, Malta, Mexico, Netherlands, New Zealand, Nicaragua, Norway, Panama, Paraguay, Peru, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland, United Kingdom, United States, and Venezuela.

Available on the iBookstore

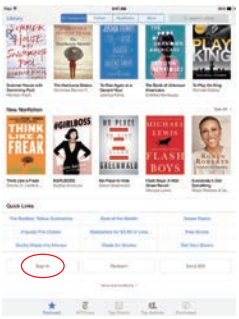
Step-by-step Instruction



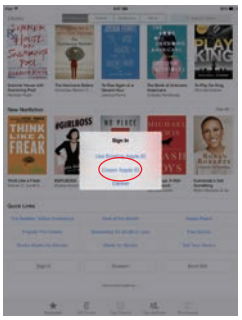
1. Launch "iBooks" app on your iPad.



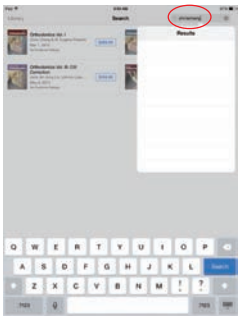
2. Click "Store."



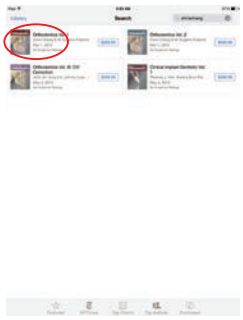
3. "Sign in" with your Apple ID.



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

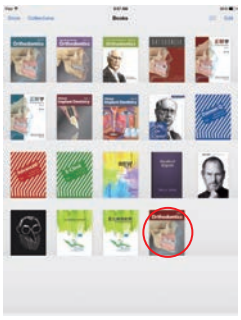


5. Search for "chrischang."



6. Click the book's icon.

7. Check the price and click "BUY BOOK."



8. Once downloaded, click the book's icon to launch the e-book and enjoy the awesome content!

If you are interested in our paid video or medical products, contact **app@newtonsa.com.tw** for more information.

+886-3-573-5676
http://orthobonescrew.com
app@newtonsa.com.tw

Newton's A

The "ANG (Anghileri) Technique": Making Derotation Easy

One of the main goals of the initial phase, when working with passive self-ligating Damon brackets, is to control rotation during alignment. Delays in reaching this goal can slow down the treatment process.

If a tooth is slightly rotated, CuNiTi initial archwires allow doctors to achieve a complete correction in the first few months. (*Fig. 1*)

Fig. 1: Sequence of correcting rotated upper cuspids.

When an archwire can't be engaged due to a large degree of tooth rotation, the Couple Technique, which states that two forces equal in magnitude and opposite in direction can produce a pure rotation, spinning the object around its center of resistance, is effective in solving this problem.

The Couple Technique is applied in this case by bonding two buttons on the buccal and palatal surfaces of the bicuspid and molar (*Fig. 2*). Despite its effectiveness in derotation, this technique can be very uncomfortable for some patients.

The "*ANG Technique*" was invented by Dr. Matías Anghileri from Argentina to provide an effective and comfortable solution to address this problem. First, place the initial archwire and bond a button on the buccal surface of the rotated tooth. Second, insert a passive spring between the two teeth surrounding the rotated tooth. Third, use a ligature from the button to compress the spring approximately a

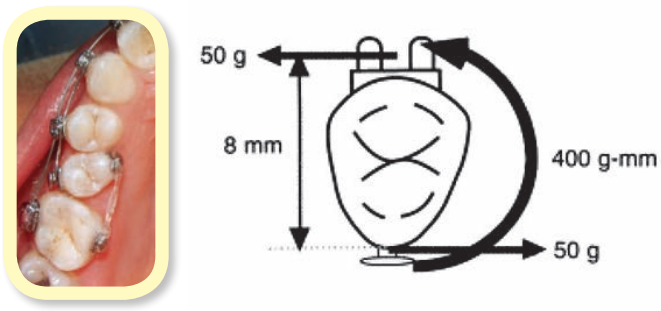


Fig. 2: The application of the Couple Technique

Dr. Anghileri Matías
Specialist in Orthodontics & Dentofacial Orthopedics, Buenos Aires, Argentina

■ *Fig. 3:*
ANG Technique: Compressing a coil spring to ⅓ of its length by inserting a ligature.

third of its original length. An easy way to do this is by placing the ligature through the first or second coil (*Fig. 3*). The spring can then exert its force in the same direction to which the tooth must be rotated.

In this article two cases are presented to illustrate the application of the ANG technique. In this first case (*Fig. 4*), the bicuspid is rotated distally; therefore, the spring should be compressed to provide a constant mesial light force towards the rotated bicuspid (*Fig. 4*). The spring works continuously to derotate the tooth without adjusting the ligature.

Once the tooth is rotated enough to be engaged in the main archwire, it's ready for bonding. It's noted that a space is created as the tooth derotates since a rotated posterior tooth occupies more space than a well-aligned one. Finally, the total correction is achieved after three months (*Fig. 5*).

■ *Fig. 4: ANG Technique: Compressed spring*

Fig. 5: ANG Technique: Creating space and derotating before alignment.

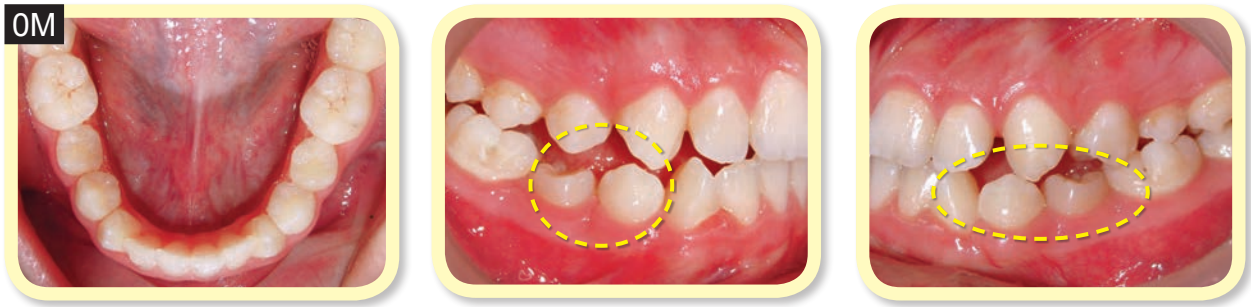


Fig. 6: ANG Technique: Four rotated teeth highlighted by dotted circles.

Fig. 7: ANG Technique: Directions of forces.

In the second case there are four teeth severely rotated. As a result alignment usually takes several months (*Fig. 6*).

The ANG Technique is applied to the lower cuspids and the second lower bicuspids simultaneously. The tooth where the spring is going to be anchored must have a greater anchorage than the rotated one to avoid an unwanted rotation.

Fig. 8: ANG Technique: Bonding the brackets.

Fig. 9: ANG Technique: Alignment.

With the ANG technique the directions of the forces of the compressed springs rotate the bicuspids distally and the cuspids mesially (*Fig 7*).

Two months later, there is enough space to directly engage these four teeth with a .013" CuNiTi wire. The ANG Technique doesn't interfere with the incisors and anterior guidance is undisturbed. (*Fig. 8*). After 3.5 months the teeth are in a good alignment (*Fig. 9*).

Controlling tooth rotation does not have to involve complex mechanics that may prolong treatment time. The "*ANG (Anghileri) technique*" employs simplified and yet effective mechanics to solve tooth rotation without sacrificing patient comfort.

carl martin Solingen

優惠期間：自2016/7/1-12/25止

IMPLAVISION 德國專利 可拆卸式植牙印模TRAY

這是您的煩惱嗎？

Some implant manufacturers offer a closed mold which makes the production of an individual scoop mold necessary. This means a larger expense a lot more time and a new evaluation appointment with the patient.

IMPLAVISION 是您可能的解決方案！

1. Suited for the pick-up technique with 9 removable individual segments
2. Produced with rustfree refined steel, reusable, sterilizes up to 200°C
3. Stable, for high precision impressions protected by international patent

Implant Tray / 一組(六個)

〈附二支Spanner〉

NEW ARRIVAL

新品優惠 **NT$45,500**

~~〈原價NT$81,100/組〉~~

Upper Jaw


430L/2


430M/3


430S/4

Lower Jaw


431L/2


431M/3


431S/4

〈原價NT$13,200/個〉


REP430

〈原價NT$950/個〉

總代理 湧傑 YONG CHIEH 訂購專線：北區 (02)2778-8315・中區 (04)2305-8915・南區 (07)226-0030

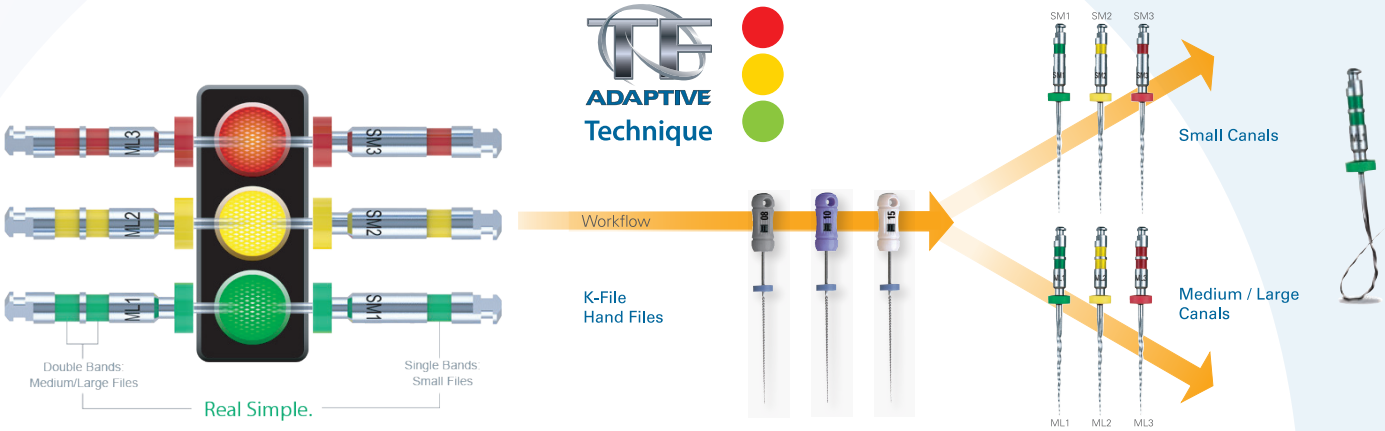
Kerr™
ENDODONTICS

TF Adaptive File

新一代鎳鈦彈性旋轉器械

紅綠燈般的顏色標示，淺顯易懂。綠色開始，遇紅則停。

優惠期間：自2016/7/1-12/25止



買

任選TF Adaptive File 或 TF Twisted File〈號碼任選〉

新一代鎳鈦彈性旋轉器械/鎳鈦彈性旋轉器械

〈定價$3,500/盒〉

買10送10

NT$35,000

再贈

Pulp Canal Sealer EWT / 1盒

長效型氧化鋅根管充填劑〈定價$5,800/盒〉

總代理 湧傑 YONG CHIEH 訂購專線：北區 (02)2778-8315 · 中區 (04)2305-8915 · 南區 (07)226-0030

＊本優惠專案僅適用於牙醫診所＊本公司保留贈品更換之權利＊本公司保留更改及終止活動辦法與條款之權利

＊本文宣品僅供牙科診所及牙醫師參考，禁止張貼或擺置於公眾可瀏覽及取閱之處＊衛署醫器輸壹字第009148號＊衛署醫器輸字第011611號

In Memoriam:
My Story with Charles J Burstone

My struggle with studying Orthodontics with an engineering background, initially in Brazil, where I went to Dental School, was to try to find an appropriate scientific, physical approach. I've only started to find this approach when reading the work of Charles J. Burstone. In 2001, I translated one of his books, "*Modern Edgewise Mechanics and the Segmented Arch Technique*", into Portuguese. Without much hope of a response, I contacted Dr. Burstone with some questions about the book. Dr. Burstone not only replied to all my questions, but that was the beginning of a mutually stimulating intellectual discussion that has lasted until last February of 2015. He started as my mentor, and passed away as one of my best friends. There was no teacher that I admired more.

Fig. 1: Dr. CJ Burstone at Sun Valley in 1990.

Dr. Burstone was the first mentor of my academic life. It started when I once asked him how we could predict tooth movement based on force systems if we didn't have any papers about the relationship between the force we applied on the tooth and how that translated to cellular reaction and bone modeling in the PDL. He said that basically there was no scientific evidence for it, and we just assumed that the tooth would respond linearly to the force system. I was surprised by this, because predictability of tooth movement depends on this hypothesis. Our conversation gave me motivation to pursue research to investigate this. He said I should go to Indiana to study under Dr. Eugene Roberts. I had no motivation to go anywhere else and study anything other than biomechanics, so I followed his advice. Moreover, our discussions and some issues I found with the T-loops in the book led to the publication of my first paper "*Self-corrective T-loop for differential space closure*".

When I finished my PhD, my original idea for research that originated from my conversations with Dr. Burstone, combined with the genetics input from Dr. Eugene Roberts and his collaborators, won

Rodrigo F. Viecilli, DDS, PhD
Associate Professor of Orthodontics, director of the Biomechanics Laboratory Center for Dental Research, Loma Linda University School of Dentistry, Dr. Roberts' #9 graduate student

the Milo Hellman Award, being recognized as the best graduate research in North America. I immediately started my academic career as an Assistant Professor at NYU after graduating from residency.

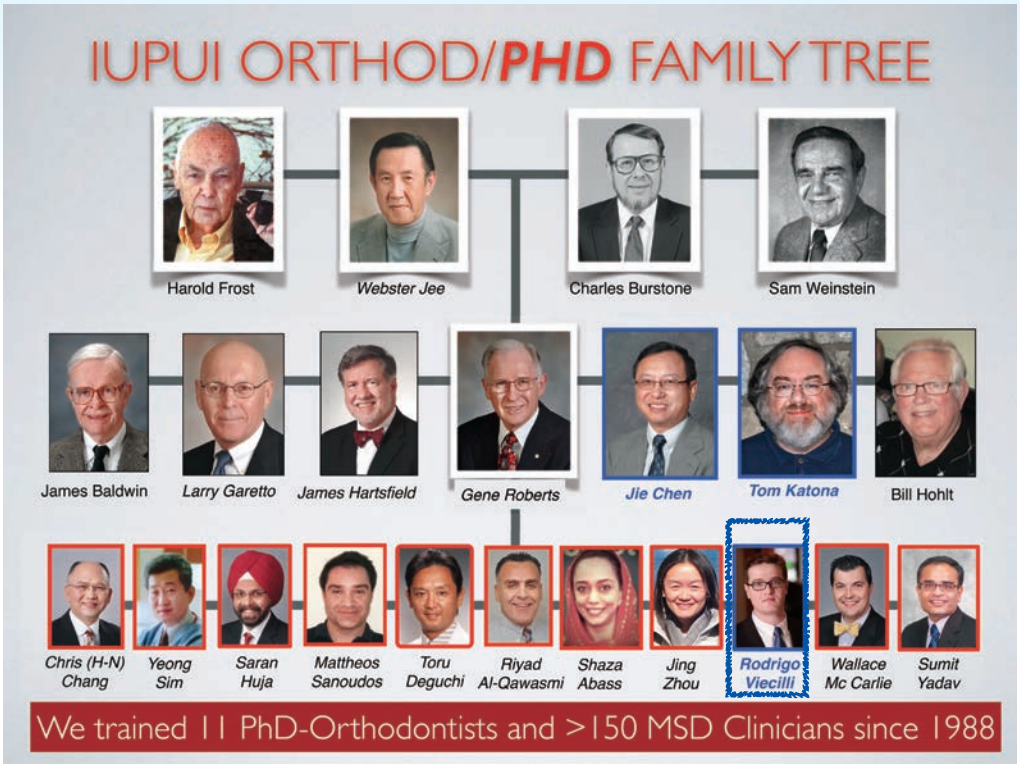
I once took Dr. Burstone to see the Episode III of the Star Wars series, when we were lecturing together at a national meeting in Brazil. He had never seen any of the Star Wars movies, but after watching it, he started to incorporate the theme in his lectures. He liked to say that we, the biomechanical scientists of Orthodontists, should be the Jedi of the profession, and fight against the dark side (*the gurus and technique prophets*). He convinced me that people like us have an ethical mission in the Profession to keep things factual and scientific.

Fig. 2:
Portrait of (from left to right) Drs. Chris Chang, Charles Burstone, Eugene Roberts, James Baldwin (oil painting) and bust of C. Burstone (center left). Permanent collection in the Department of Orthodontics and Oral Facial Genetics at Indiana University School of Dentistry.

In my opinion, there are only two minds that were truly genius in Orthodontics: Calvin Case and Charles Burstone. I will explain why. In the beginning of the 20th century, Calvin Case defended extractions in selected cases to improve the profile, and proposed customized force systems to achieve specific movements. In his book, he described the first scientific attempt to define a primitive center of resistance. Calvin Case defended that specific objectives for positions of teeth should be established and the decision on extractions depended on those. On the other hand, Edward Angle, who ended up being more famous and recognized, designed and helped sell pre-fabricated appliances. Long discussions in ***Dental Cosmos*** depicted Angle using divine images and religious arguments against Case to suggest his thoughts as heretic. Unfortunately, Case was ahead of his time and was ostracized by the Orthodontic community after being continuously attacked by Angle, and killed himself. When I first discussed this story with Dr. Burstone, and the difficulty in making the Orthodontic community study and accept a more scientific approach to mechanics, in lieu of simply focusing on brackets and devices, he surprised me. He said Calvin Case was his greatest inspiration,

Fig. 3:
Bust of Calvin Case. Permanent collection in the Beethoven Orthodontic Center.

Fig. 3:
Two of Dr. Burstone's closest professional colleagues and personal friends (Rodrigo and Michael Marcotte), and Chris Chang at the Burstone Memorial Symposium in Indianapolis in 2015.



and the concepts of goal-oriented treatment and the occlusogram that he invented were basically a sophisticated version of Case's ideas. The genius of Dr. Burstone is that he was able to take Case's ideas to a more practical level. Even though he was a tough scientist somewhat opposing the way things were generally done in orthodontics, his lectures were always packed and he was admired and loved by most, if not all.

The difference between Charles J. Burstone and other great legends of Orthodontics is that he did not teach a technique (*although some labeled it as such*). He was not a guru or a clinician. He was a scientist and the concepts revealed by his research are universal. Anytime he analyzed a mechanical system or appliance, he would look at the data, and rejected even his own original versions of appliances when necessary. His conclusions about mechanical design and tooth movement were based on data, not on what he anedoctally saw in his office, or what worked in his hands. To compare the legacy of Dr. Burstone in Orthodontic mechanics to any others is simply unfair, because nobody can match establishing the scientific foundations of orthodontic mechanics. I feel extremely privileged to have the opportunity to directly work with him in the last few years and ask and learn from him while we worked on projects. It is my responsibility as a scientist to give continuity to his work.

Fig. 4: Drs. Charles Burstone and James Baldwin.

I had the privilege to work together with Dr. Burstone in his last two contributions to orthodontics. The first was the proof that the center of resistance could not be defined in 3D as a point, and the proof that axes of resistance could. This study was published in the AJO-DO and has since been validated by other groups. This study revealed that there can be expected variation of 1-2mm in the location of the projected center of resistance in different planes, and that the Cres is very sensitive to root and bone asymmetries. Hence, continuous clinical feedback and adjustment are necessary as the tooth moves.

The last thing we worked on together is called SmartArch (*Fig. 5*) (*http://www.smartarchortho.com*). It is an alignment wire with stiffness prescriptions for each inter-bracket distance in an arch. It was conceptualized jointly by us while we discussed what would be the best possible alignment archwire. Basically, the SmartArch was developed to be the only necessary alignment archwire for first and second order corrections. Our calculations determined that for optimum sliding during alignment we should not use a wire larger than 0.016 to starts a case. Then, laser was used to process the wire in each interbracket distance so that each tooth would get an optimum force value for its available root support. The SmartArch is the first wire in orthodontics that has data showing that both root support and interbracket distances are taken into account to obtain the optimum force for tooth alignment. Our data shows that alignment with this archwire works best with self-ligating brackets or

Fig. 5:
SmileArch designed by Drs. Charles Burstone and Rodrigo F. Viecilli.

a slightly loose metallic ligature. Dr. Burstone and I spent over a year and worked on this on the phone and weekend-long meetings during that period.

Dr. Burstone, even with his advanced age, was extremely sharp and had a very witty sense of humor. We had just talked on the phone about some challenges regarding the SmartArch right before he travelled to Korea to give his last series of lectures. I was sad and stunned to be woken up with the news that he had passed away. But, in the serenity that I learned to have from him, I was comforted by the fact that he passed away still performing at his best, with honor, and doing what he loved. That's the way of the scientist, and the Jedi.

The picture below was taken in 2003, when I was 26 and was finishing my residency in Orthodontics. Dr. Burstone had visited Brazil to give a course, and met my family (*which is also of orthodontists*) to revise the translation of his book.

Fig. 6: Drs. Charles Burstone, Rodrigo and his family, 2003.

2016 Keynote Workshop

高效简报学习法

6 天变大师！

动画简报实作。从基础到进阶六天完整教学

看过太多充满复杂文字和图表的幻灯片，听过就忘了的演讲吗？Keynote 系列课程教你如何利用 Mac 内建软体 Keynote，制作出令人目眩神迷、印象深刻的电脑简报。透过小班教学，贴身指导，务必让你在课程中轻松掌握 Keynote 的简报技巧。

K1

2016. 10. 19

简报圣经

Keynote 101

K2

2016. 10. 20

DR. KOKICH

10 大演讲秘诀

K3

2016. 10. 21

STEVE JOBS

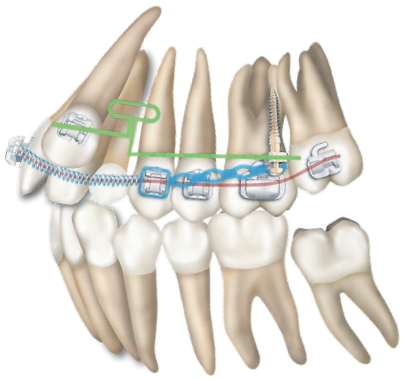
令人目眩神迷的演讲秘诀

K456

2016. 10. 22-24

ADVANCED KEYNOTE

讲师: Dr. Rungsi



讲师： Dr. Rungsi Thavarungkul

数位化潮流下的牙科简报，不仅需要清晰的临床照片，也需要精确的图表和流畅的动画来吸引观众，而优秀的视觉化工具更使您的演讲独树一格且令人难忘。Keynote 456 课程中，Dr. Rungsi 将分享他利用 Keynote 软体绘制精美牙科插图的经验，并一步步教会您如何从构想和草图创建出令人惊艳的成果。跟随简报美学大师的脚步，您也可以秀出创意、站上世界舞台！

报名2016课程即赠送2015及2016课程视讯。

- 名额有限，以缴费顺序为依据。
- 旧生享特惠优惠价，限额6名。
- 若取消报名，30天前退款将扣除10%行政手续费，30天后扣除30%行政手续费。

Ormco

Your Practice. Our Priority

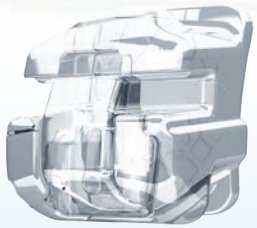
優惠期間：自2016/7/1-12/25止

DAMON™ CLEAR2

- **FOUR SOLID WALLS WITH NEW ULTRA-PRECISION SLOT**
  For 2x the rotational control providing meticulous finishing and faster treatment.
- **100% CLEAR**
  For the superior aesthetics that patients demand
- **ROUNDED CONTOURS**
  For superb patient comfort
- **PATENTED LASER-ETCHED PAD**
  For optimal bond strength and reliability.
- **INNOVATIVE SPINTEK™ SLIDE**
  For quick and easy wire changes.

買 DAMON® CLEAR™ DAMON™ CLEAR2 (滿400顆)

〈CLEAR定價NT$1,200/顆，CLEAR2定價NT$1400/顆〉



特價 NT$280,000

贈 Demi Plus

A Kerr light curing system powered by Demetron Technology

新一代輕巧無線式高功率LED光聚機

〈定價NT$50,000〉

總代理 湧傑 YONG CHIEH 訂購專線：北區 (02)2778-8315 · 中區 (04)2305-8915 · 南區 (07)226-0030

＊本優惠專案僅適用於牙醫診所＊本公司保留贈品更換之權利＊本公司保留更改及終止活動辦法與條款之權利

＊本文宣品僅供牙科診所及牙醫師參考，禁止張貼或擺置於公眾可瀏覽及取閱之處＊衛部醫器輸字第027158號＊衛署醫器輸字第023384號

Feedback from the Beethoven International Workshop in April, 2016

I enjoyed the content of the lectures, the clinical observation, and the hands-on simulation exercises. No one in the world of orthodontics is doing what Drs. Chang and Lin are doing! Excellent. Observing Dr. Chang providing hands-on patient care, and being able to ask questions and discuss treatment options and protocols really tied together everything that I had heard in Dr. Chang's lectures and what I had read in his journals and textbooks.

Mark Lenz (Center right), USA

Dr. Chang's philosophy of common sense!

I really appreciate his humbleness and simple approach to explain technical and complex treatment plans. Returning to basic science helps greatly to solve complicated situations. He has tremendous amount of knowledge not only in Ortho but also Oral surgery and Perio as well. He is such a lucky clinician to have the most talented, hard working team around him. I guess it was not overnight to develop a great environment in all his polyclinics.

I recommend his course to every dentist interested in broadening clinical skills and change of practice style and say you don't know what you don't know!

This course is a gem.

Best regards,

Sherif Ibrahim, Australia

Chris makes everything so simple. He explains very clearly and goes out of his way to show the technique step by step and demystifies the use of TAD mechanics without using a lot of extra bits and pieces. Chris really sticks to the basics, working on building up our fundamental skills.

Howard Yean, Australia

The entire course was great and the topics were really well developed and explained. The portion that talked about the treatment of impacted teeth and treatment of class III patients were the ones I liked the most. It was great, really useful and beneficial in terms of acquiring knowledge. Dr. Chang was clear and explained everything he was doing. The proximity was really good.

Miguel Goncalves, Portugal

Chris' OBS lectures, his treatment of some very difficult cases non-surgically is very inspiring. The clinic patient workflow and Keynote is also very efficient and simple, certainly something to incorporate into our practice.

Guan Go, Australia

OrthoBoneScrew Super Set

Created by Dr. Chris Chang, OrthoBoneScrew(OBS) is made of medical grade, stainless steel and is highly praised by doctors for its simplistic design, low failure rate and excellent quality. Beethoven's OBS super set is your must-have secret weapon to provide a consistent traction force in a minimally invasive approach.

Smooth Mushroom Head
For comfort & retention of elastic chain

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

Double Neck Design
Easy hygiene control & extra attachment

Screw Type	
1.5	1.5x8mm
2.0	2.0x12mm
2.7	2.0x14mm with holes

Chris Chang
Founder and Inventor

Newton's A
E-mail: info@newtonsa.com.tw
http://www.orthobonescrew.com

Products

Dental Products Essential Kit

Double Retractors

Double Retractors x2, Black Board x2

The double-end design creates an extended handle and allows for firm grasp. The new and improved material is more durable and resilient. The light shape provides the most esthetic aid in intra-oral photography.

Stainless Steel Mirror

Size : L (Recommanded), M, S

Strong, durable stainless steel, autoclave-proof, the specially designed size, shape and thickness ensure maximum intra-oral view without sacrificing patient comfort.

Bite Turbo 2.0

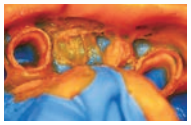
Handle x1, BT molds x6, BT longer molds x6, Button molds x6

A simple but power set of tools to correct severe deep bite and cross efficiently. The bite turbos and lingual button molds, made with silicon and filled with flowable resin, can be reused and adjusted depending on treatment progress. The longer one allows you to solve all kinds of deep bite and large horizontal overjet.

優惠期間：自2016/7/1-12/25止

Take 1 Advanced

Vinylpolysiloxane Impression Material



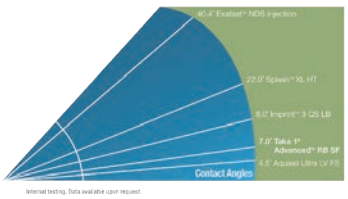
加成型矽膠印模材

專為製作精確的牙冠、牙橋、崁體或植牙所設計的印模材料。操作簡單容易，Wash流動性更附上口內注射用小頭，讓操作更方便。機器型混合材料，更免去調拌準備的時間，讓診間看起來整潔美觀。

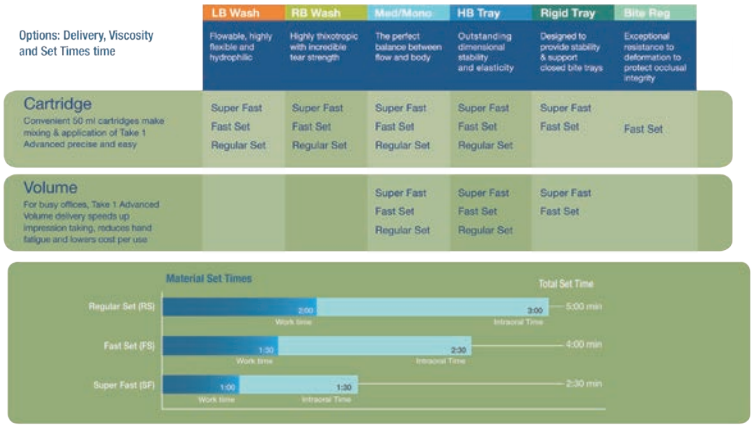
Features

Outstanding tear strength and elongation.

Hydrophilic wash material.



Widest selection of viscosities, set times and delivery methods.



買一送一

Take 1 Advanced Cartridge (50mlx24) 一箱〈定價NT$25,200/箱〉

特價 **NT$25,200**

買

Take 1 Advanced Cartridge Wash (50mlx24) 一箱+
Take 1 Advanced Volume (380mlx2) 五盒 ~~〈定價NT$78,200/組〉~~

特價 **NT$68,000**

贈

Volume Mixer 一台
〈定價NT$62,000/台〉

總代理 湧傑 YONG CHIEH 訂購專線：北區 (02)2778-8315・中區 (04)2305-8915・南區 (07)226-0030

貝多芬牙醫視訊 百科全書

矯正研習

由矯正名師張慧男醫師深入淺出的生動教學，讓您在循序漸進的主題課程裡，完全掌握結合最新的矯正系統Damon以及矯正骨釘OBS的實用治療秘訣。無論是矯正新手或是想要持續進修的專科醫師都不可錯過！

- 矯正基礎 Damon Q
- 矯正進階 Advanced
- 矯正植體 OrthoBoneScrew
- 矯正精修 Finishing（七年度）
- 中文精選 C-Lecture

診所行銷

還不知如何利用科技行銷與提昇專業服務？透過系統化的助理訓練課程，囊括「矯正」、「植牙」、「兒童牙科」結合三領域的案例解說和衛教示範，讓您輕鬆運用iPad科技專業化您的診間服務！

- 矯正 E-Ortho
- 兒牙 E-Pedo
- 植牙 E-Implant
- 助理訓練 Assistant

植牙精進

由矯正名師張慧男醫師主持，邀集國內外植牙講師，整理當前植牙的熱門主題，透過66堂課的專題演講和個案分析，讓您在植牙學習之路上不斷精進！

- 植牙論壇 Implant Forum（六年度）

終身會員 享好康

凡購買任一系列貝多芬視訊課程，皆可享有以下優惠

1. **免費更新** C-Lecture 及 E-Consultation 矯正衛教篇。
2. **無聲升有聲:** 凡單購無聲視訊課程，只需付些微差額，即可升級最新有聲課程。
3. 贈送矯正植牙國際**電子期刊**（IJOI）
4. iOS **系統健檢**

Newton's A (03)-573-5676 http://orthobonescrew.com 新竹市建中一路25號2樓

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

Dr. John JJ Lin, Taipei, Taiwan

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

Dr. Tom Pitts, Reno, Nevadav, USA

"A great idea! The future of textbooks will go this way." *Dr. Javier. Prieto, Segovia, Spain*

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

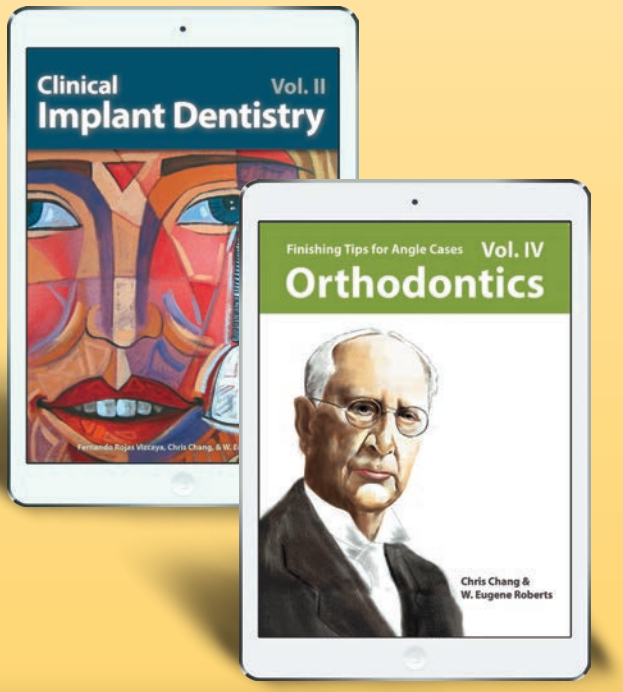
Dr. Don Drake, South Dakota, USA

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

This method of learning is quantum leap forward. My students at Oklahoma University will benefit greatly from Chris Chang's genius. *Dr. Mike Steffen, Oklahoma, USA*

"Dr. Chris Chang's innovation eBook is at the cutting edge of Orthodontic Technology... very exciting! " *Dr. Doraida Abramowitz, Florida, USA*

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



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

Dr. John Freeman, California, USA

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

Dr. Keyes Townsend Jr, Colorado, USA

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

Dr. Jerry Watanabe, California, USA

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

Dr. Errol Yim, Hawaii, USA

"Beyond incredible! A more effective way of learning." *Dr. James Morrish Jr, Florida, USA*

The 2016 iAOI symposium on April 26. Participants took photo with the keynote speaker, Dr. Diego Peydro Herrero (center right), and Dr. Chris Chang (center left) in Newton's A, Hsinchu, Taiwan.

ISSN 2079-6862
9 772079 686201