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Drs. John Lin, W. Eugene Roberts, Chris Chang and Johnny Liaw together at Dr. Roberts' wine tasting party during the AAO annual meeting in Philadelphia, USA in May, 2013.

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《僅供牙科專業人士參閱》

2013～2014 熱愛學矯正

張慧男 博士

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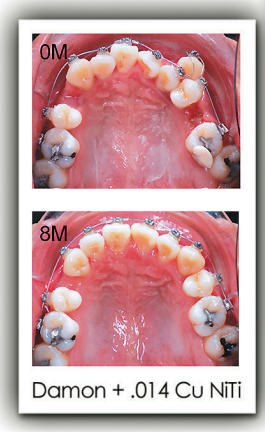
學會開始做矯正需多久?

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矯正課程

【課程】9:00 - 12:00
【實習】另外安排

使用最新一代矯正器 Damon Q 進行課程，歡迎舊生報名參加。

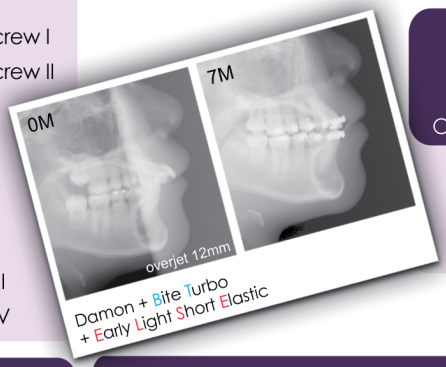
	台中 (四)	台北 2014 (二)	高雄 (四)	LECTURE	LAB
1	6/13	10/15	5/8	理想入門病例+Damon Q黏著	Bonding (Damon Q) + BT
2	6/27	10/22	5/15	快速矯正療程四部曲	Ceph + Photo
3	7/4	10/29	5/29	簡捷有效的錨定系統	Damon + OrthoBoneScrew I
4	7/18	11/26	6/5	不拔牙與拔牙分析	Damon +OrthoBoneScrew II
5	7/25	12/3	6/12	Damon 診斷流程及微調	Finish Bending
6	8/8	12/10	6/26	完工檢測及報告示範	Fixed Retainer (FR)
7	8/15	2/11/14'	7/17	維持及復發；病例示範	Presentation Demo
8	10/3	2/18	7/31	矯正力學及診斷分析 (1)	DDX + Case Reports I
9	10/31	2/25	8/7	軟硬組織及診斷分析 (2)	DDX + Case Reports II
10	11/28	3/4	8/21	兒童矯正及診斷分析 (3)	DDX + Case Reports III
11	12/19	3/18	9/4	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) 10/23 (含午、晚餐)



Damon + Bite Turbo + Early Light Short Elastic

International workshop

Keynote & managment
OrthoBoneScrew & Damon

A班 6/18-20
B 班 11/19-21

矯正進階課程

【新竹】 9:00 - 12:00
【高雄】14:00 - 17:00

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 (四)	Paper Reviews	Topics & Case Demo
1	7/11	Bracket Placement	Crowding: Ext. vs. Non-ext.
2	8/1	Impacted Canines	Upper Impacted Teeth
3	8/29	Canine Substitution	Lower Impacted Teeth
4	9/12	Missing 2nd Premolar	Missing: Ant. vs. Post.
5	12/5	DI Workshop	Crossbite: Ant. vs. Post.
6	12/12	CRE Workshop	Open Bite High Angle
7	1/9/14'	Excellence in Finishing (occlusion)	Deep Bite Low Angle
8	2/27	Excellence in Finishing (esthetics & perio)	Gummy Smile & Canting
9	3/13	Ortho-Perio-Restore Connection	Esthetic Finishing (Transposition)
10	4/10	Adjunct to Perio	Implant-Ortho
11	4/24	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) 10/11、18 (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V

6/11 7/9 8/20 9/10 10/8 11/5 12/17
2014/1/7 3/11 4/15 5/13

課 程 資 訊

上課地點

【台北】
恆毅資訊中心 畢卡索廳
/ 台北市復興北路號99號12樓
(捷運南京東路站旁)

【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
/ 台中市西屯區中港路二段128之2號3樓

【高雄】
國立科學工藝博物館-南館
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＊每次上課請依最新一期IJOI 公告為主

Let's Put a Dent in the Universe!

I recently returned from a four-city lecture tour in China where I met colleagues from various parts of this huge and culturally diverse country. One thing I found in common with them was their burning desire for learning and improving, highlighted by their focus and the waves of questions following my talks. Steve Job's famous quote, "*Stay hungry, stay foolish*" (*my personal motto*) reflects their passion and mine to becoming a better doctor.

As Jobs nicely put it, life is about "*connecting the dots*". I now realize this is personally relevant and this ibook series is an accumulation of my "*dots*" of patient records, case reports, digital technology acquisition and clinical skills spanning 27 years.

I started using Apple's Technology-Keynote eight years ago and have since applied it in my presentation training courses, public lectures and adopted this excellent graphic-rich application for my patient data management. Using Apple's various technologies, I have started a company that specializes in dental education, including podcast videos and printing publications. Last February, when the new iBooks Author application was released, we spent only one month turning our collection of past cases into the world's first 3D, interactive orthodontic ibook to which the responses have been just overwhelming. We currently have several ongoing ibook projects and hope to release a couple more early next year.

I believe many of you out there are hungry for learning and sharing. iBooks provides a premium platform to integrate text with a multi-media source and engages readers through interactive designs.

I sincerely invite you all to collaborate with us in publishing cases and sharing them with the world. Let's together "*put a dent in the universe!*"

Chris Chang DDS, PhD, Publisher

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Dr. Tom Pitts

Examiner
Dr. John J. J. Lin

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Examiner
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Mandibular Growth and Class III Treatment

Questionable Concepts of the Developing Class III

Most orthodontics literature advocates early treatment for anterior crossbite,[1-4] largely based on the hypothesis that a persistent anterior crossbite favors excessive growth of the mandible, and inadequate growth of the maxilla. This concept is predicated on the belief that a proper vertical overlap of the maxillary incisors is necessary to restrict mandibular and enhance maxillary growth. The traditional argument is that patients may have had an orthognathic profile and Pseudo Class III malocclusion when they are young, but they inevitably become a severe skeletal Class III malocclusions, in the absence of early orthodontics treatment to correct the crossbite (*Fig. 1*).

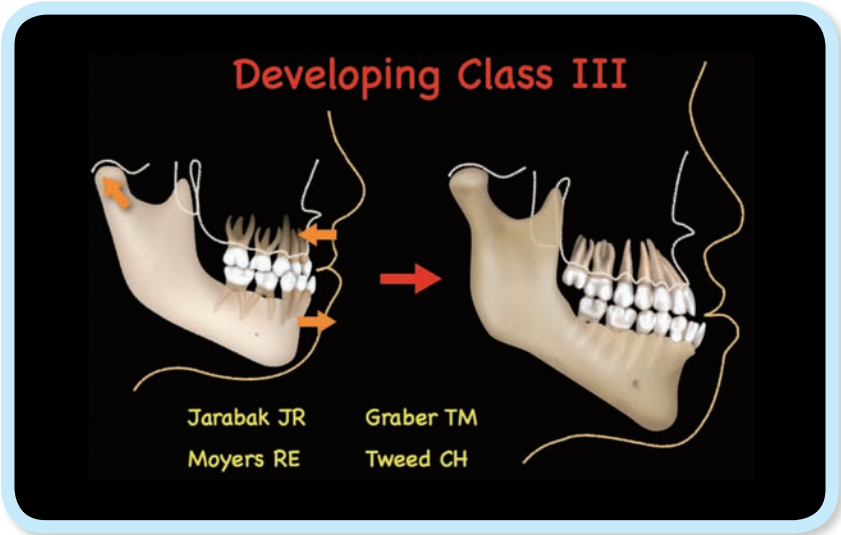

Fig. 1:

Developing Class III: if an anterior crossbite is not treated early, the functional restriction will result in decreased maxillary and excessive mandibular growth, resulting in a severe Class III skeletal malocclusion. (Courtesy Dr. Rungsi Thavarungkul)

Fig. 2A demonstrates the Class III growth process for a patient with a Pseudo Class III, anterior crossbite and orthognathic profile. Abnormal growth expression due to the crossbite results in a severe prognathic malocclusion with a True (*Skeletal*) Class III occlusal relationship. However, Fig. 2A is actually a computer morphing based on the initial facial profile photograph of a 8y9m boy with a Pseudo Class III malocclusion (*Fig. 3*). The boy was not treated, but did return for recall when was 13y9m. Note, that he is still a Pseudo Class III case and did not develop into a severe True Class III case, as was simulated in the photo sequence (*Fig. 2A*). In fact, the right side photograph in the simulation is the profile of the 11y11m lateral profile of the boy shown as *Case 2* in Fig. 4. The latter boy has been a severe prognathic True Class III malocclusion since the age of 6y8m.

Dr. John Jin-Jong Lin
MS, Marquette University
Chief Consultant of IJOI
President of TAO (2000~2002)
Author of *Creative Orthodontics*

Thus, the morphing in Fig. 2A is important for demonstrating the traditional concept of Class III development. All orthodontists have seen patients at each end of the Class III spectrum, so the natural assumption is that there is a progressive sequence for all of them. However, clinical experience has shown that severe, skeletal Class III malocclusions are manifest early. As explained in Section 1 of this chapter, differential diagnosis is critical for distinguishing patients, who are likely to benefit from early correction, from those who are probably destined for orthognathic surgery.

Many orthodontists ascribe to the concept that all Class III patients have an abnormal growth pattern, that will eventually lead to severe problems. Thus, they perform interceptive Class III treatment as early as possible, to correct the crossbite and establish a more normal growth pattern. For patients with a mild to moderate Pseudo Class III, with an orthognathic profile in CR, it is not necessary to perform interceptive treatment, but these patients usually have a good prognosis if early treatment is performed, as the definitive measure. On the contrary, if a patient shows a severe skeletal malocclusion early (*Class III molar and prognathic profile in CR*) early treatment is not an effective interceptive approach, because they will probably relapse, due to the late mandibular growth. This evolving concept will be discussed further after a review of literature later in this section.

Late Mandibular Growth

The long-term growth studies of Bjork[5] and Thailander[6] demonstrate that maxillary growth is essentially complete by the age of 10, but the mandible continues to grow until about age 20. The latter is referred to as late mandibular growth (*Fig. 5*). In this regard, the success of Class III interceptive treatment cannot be assessed until growth is completed.

A good clinical example of late mandibular growth is shown in Fig. 6. After orthodontic treatment was completed at age 19y9m, the patient's mandible continued to grow and deviate to the left side. The harsh reality when treating Class III malocclusions is that the patients may continue to grow forward, and they often deviate to one side or the other. Even after the age of 18-20yrs, some mandibular growth may still occur. Compensating for this potential problem requires overcorrection of the malocclusion, or waiting until later than 20yrs of age to start the orthodontic treatment.

Fig. 2A:

Developing Class III means a growing patient with an anterior crossbite (left) progressively becomes more Class III and prognathic (right). Early treatment of the anterior crossbite intercepts the Class III growth pattern.

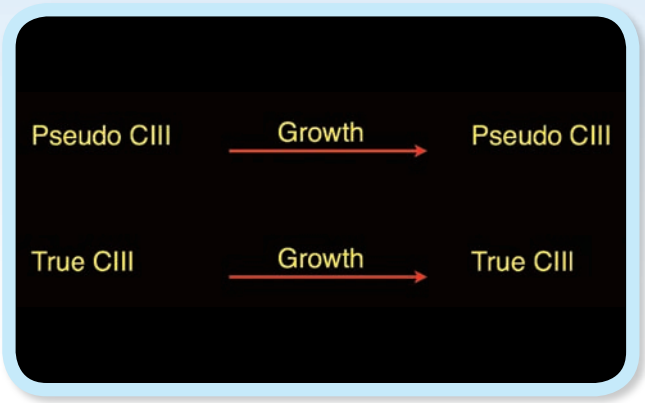

Fig. 2B:

A long-term follow-up study shows that untreated Pseudo or True Class III malocclusions are maintained with growth.

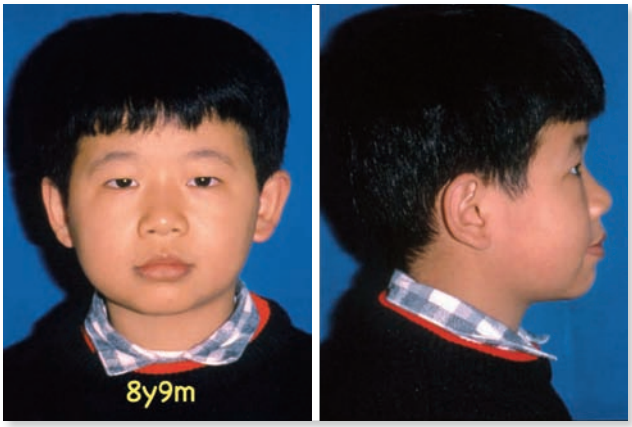

Fig. 3A:

8y9m male with Pseudo Class III malocclusion with an orthognathic profile in CR.

Fig. 3B:

The functional shift and pseudo Class III relationship.

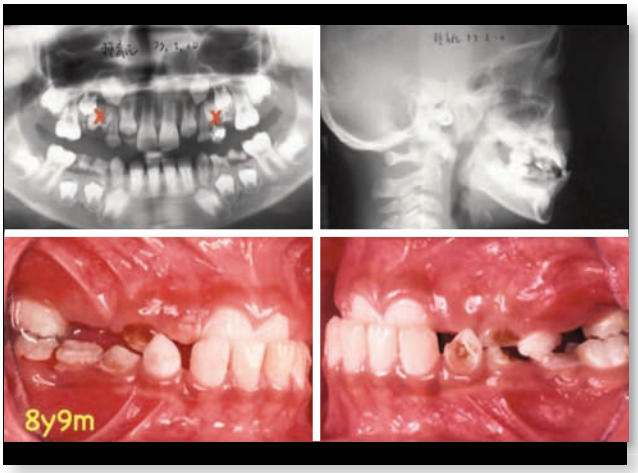

Fig. 3C:

A severe mutilated dentition is due to rampant caries. The treatment plan was to remove four premolars, but after two upper first premolars were removed, the patient disappeared.

Fig. 3D:

About five years later, the patient returned with a better occlusion and a good profile, but he still had an anterior crossbite. This malocclusion is easily managed with fixed appliances.

Fig. 4A: 6y8m

A true CIII malocclusion with a prognathic profile

Fig. 4B (case 2): 11y11m

After 5 years 3 months of additional growth, this is still a severe true CIII case with a prognathic profile

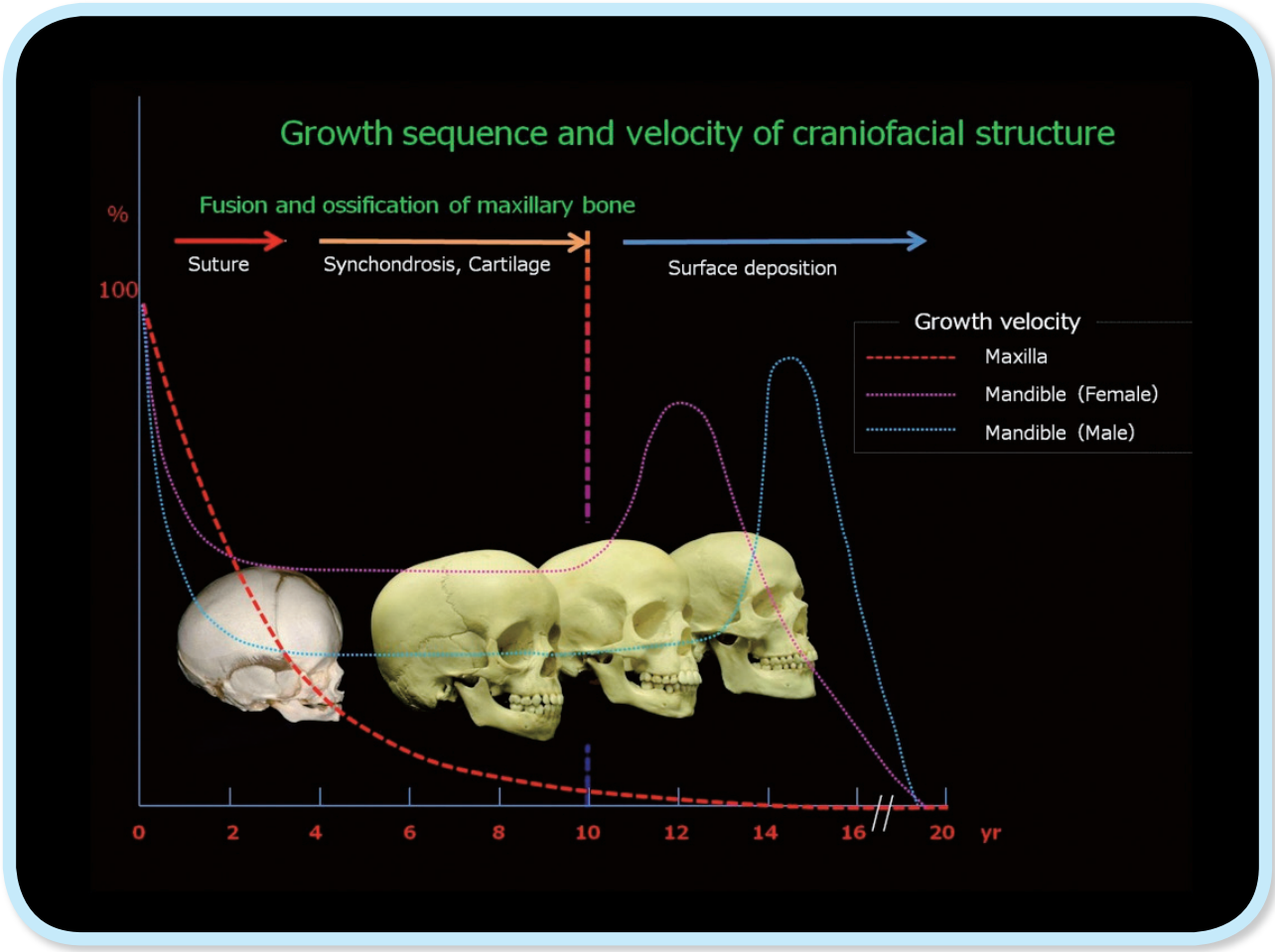

Fig. 5:

Late mandibular growth: most of the maxillary growth is over by age 10, but there is still a lot of mandibular growth left until about age 20. Female lower jaw (F) growth usually finishes earlier than the male lower jaw (M) growth. (Courtesy Dr. Kazuto Kuroe)

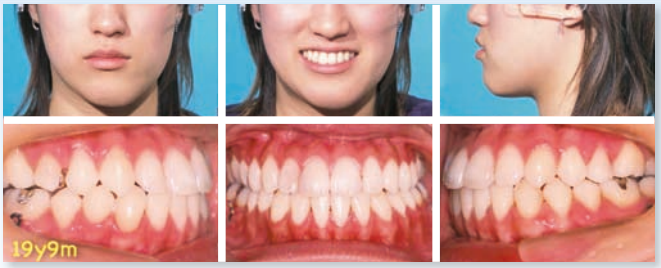

Fig. 6A: 19y9m

A severe Class III, asymmetric open bite patient was successfully treated with the SAS (Skeletal Anchorage System) mini-plate system to a Class I occlusion. (Courtesy Dr. Junji Sugawara)

Fig. 6B: 25y6m

Although the patient was finished in Class I occlusion at age 19y9m, very late mandibular growth has produced a relapse of the Class III malocclusion with a mandibular deviation to the left.

Orthodontics or Orthopedics in Class II Treatment

As an introduction to Class III orthopedic treatment, it is important to review the extensive clinical experience with Class II treatment. Although some orthodontists still prefer removable functional appliances, the trend in recent years is clearly toward fixed functional appliances, because they require less patient cooperation. However, all orthodontic devices require a thorough understanding of its pros and cons to maximize the treatment outcome. According to Cohen[7] and Mill et al.,[8] the success rate with removable functional appliances is only ~30%. Inappropriate growth may be a factor, but Sahm, et al.[9] report that the patient's lack of cooperation is the major reason for failure.

Herbst appliances require minimal patient cooperation. Pancherz et al.[10,11] have published two longitudinal studies on the treatment outcomes with Herbst devices. They demonstrate that functional appliance is an appropriate treatment option for dentoalveolar correction ("*fitting teeth together*"), but there is little skeletal alteration, i.e. true orthopedic effect (*Figs. 7-8*).

An illustration from Proffit's text[12] demonstrates the curve for temporary acceleration of facial growth associated with functional appliance therapy (*Fig. 9*). The appliances are most effective during the early treatment period in the mixed dentition. However, this is only a temporary effect because the total amount of mandibular growth is unchanged. Functional appliances are incapable of stimulating additional mandibular growth, but they can cause it to be expressed earlier.

In dentofacial orthopedics of Class II malocclusions using the Herbst appliance it seems as if the inherent morphogenetic pattern dominates over the treatment procedure. This could also be true for other dentofacial orthopedic approaches as well (e.g. Activator, Frankel, Bionator)

Pancherz H & Fackel U
EJO 12:209-218, 19990

Fig. 7:

Functional appliances can hardly change the inherited mandibular morphogenetic pattern.

On a long term basis, Herbst treatment improved the sagittal jaw base relationship, but did not normalize it. The sagittal dental arch relationship, on the other hand, was almost normalized.

Hansen K & Pancherz H
EJO 14:285-295, 1992

Fig. 8:

Functional appliance: Herbst appliance can only normalize the dentition relationship. However, it cannot normalize the intermaxillary relationship.

Orthopedic Correction: Chin Cap for Class III Treatment?

In a short term, a chin cap can change the direction of the mandibular growth, but the favorable changes are not usually maintained at the end of the growth phase[13] (*Fig. 10*). This scenario is similar to fixed functional appliances. Pancherz[10] reported that in short term the Herbst treated group had a lot more mandibular growth, compared with control group, but in the long term the overall mandibular growth was about the same as the control group. The data show that there is little growth left after Herbst treatment. On the contrary, the control group continued to grow during the post-treatment retention phase. Overall, the mandibular growth was about the same in the treated and control group. Thus, orthopedic appliances for Class II or III correction do not change growth potential.

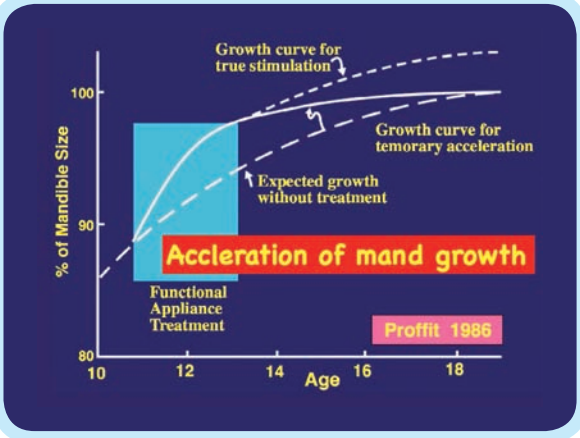

Fig. 9:

Functional appliances induce only temporarily mandibular growth to achieve Class II correction; the induced mandibular growth cannot exceed its inherited growth potential.

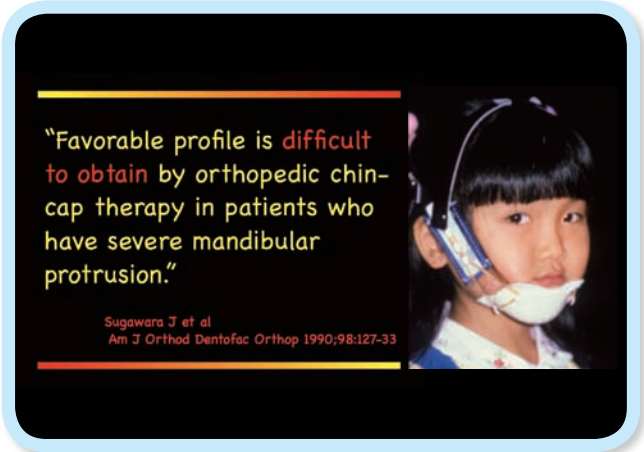

Fig. 10

Orthopedic Effect of Early Face Mask Treatment

Sugawara[14] reported an interesting study on the effect of early treatment of identical twins (*Figs. 11A & B*). One twin was treated early with a face mask and her identical sister was not treated. The treated twin demonstrated more anterior growth of the maxilla than her sister (*Figs. 11C & D*). In the adolescent period,

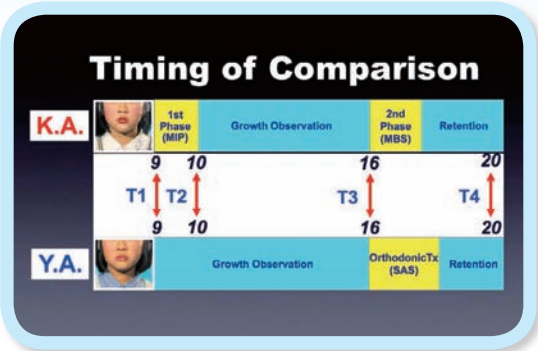

Fig. 11A:

Twin KA has two stage treatment. Twin YA only one stage treatment. (Courtesy Dr. Junji Sugawara)

Fig. 11B:

At stage 9 years old, before treatment, both has severe Class III deep bite.

Fig. 11C:

At age 10 years old, KA already had her crossbite corrected, YA received no treatment.

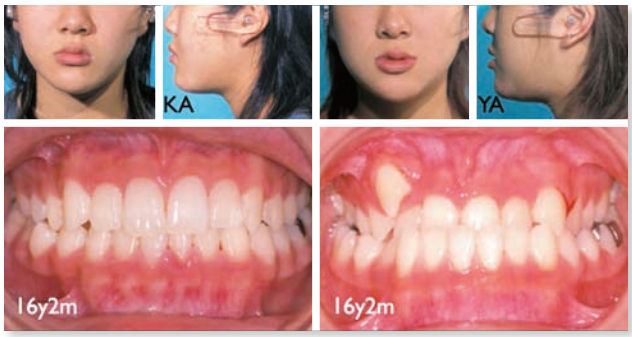

Fig. 11D:

At age 16, KA good overbite and overjet. YA still has anterior crossbite and deep bite overbite.

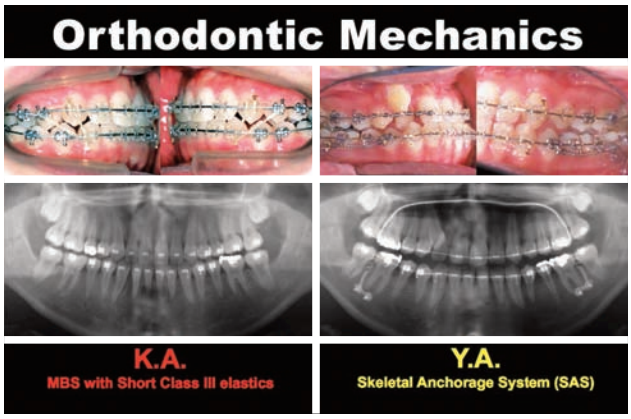

Fig. 11E:

Orthodontic treatment for KA was simply using Class III elastics. YA was finished using the more complicated SAS mini-plate system.

Fig. 11F:

At 20 years old.

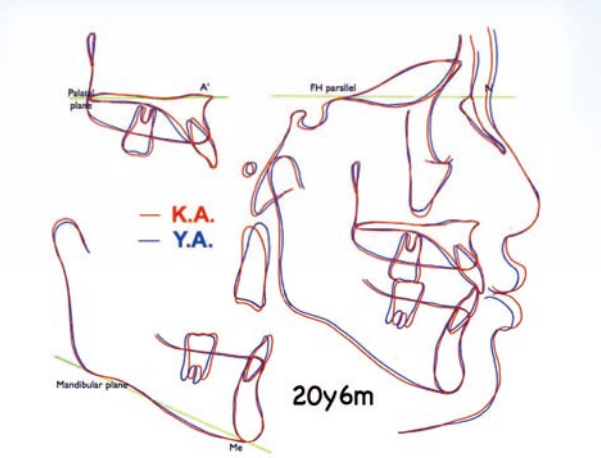

Fig. 11G:

At 20 years old, the cephalometric superimpositions of the twins, show little difference in the skeletal or dental patterns.

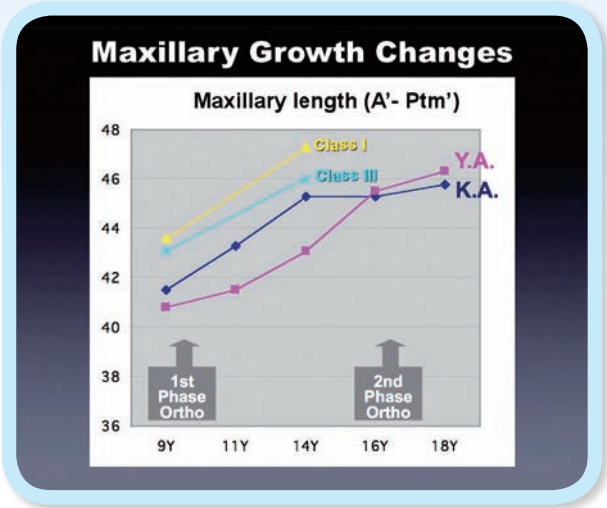

Fig. 11H:

After the first phase treatment, KA has much more maxillary growth, but after follow up at 16 years YA has caught up. By 18 years, there is no net difference in the expression of growth.

both twins were treated with fixed appliances (*Fig. 11E*) to a nearly identical result (*Fig. 11F*). In the late growth period, the control twin demonstrated catch up growth of the maxilla, and at the end of the active growth period, there was no difference between the twin sisters (*Fig. 11G*). A plot of maxillary growth changes in the sagittal plane shows there was no net difference in the total maxillary growth achieved, but the twin who received early treatment did express her growth sooner (*Fig. 11H*).

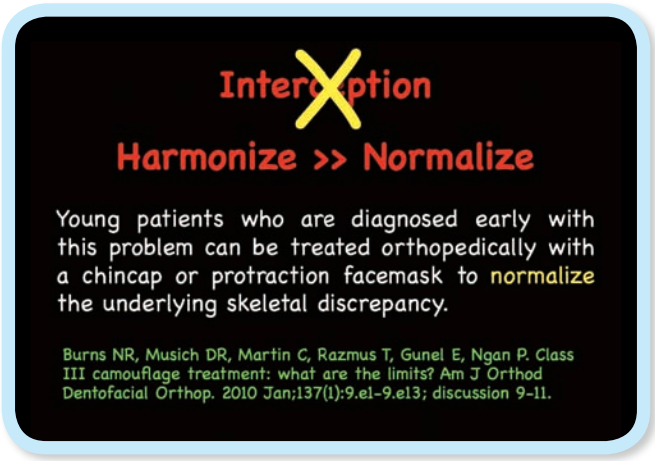

Fig. 12:

Burns et al. thought early diagnosis of a Class III patient could lead to orthopedic treatment to normalize the skeletal discrepancy. In fact we cannot intercept Class III growth or normalize the developmental pattern. What we can do is harmonize the interdental relationship for mild malocclusions.

What We Can Learn From This Twin Study:

(1) Although the anterior crossbite was not corrected early for YA, the original profile was maintained, and there was no deterioration into a severe, skeletal Class III malocclusion, that required surgical correction. These observations do not support the concept that early Class III treatment "*intercepts the developing Class III growth pattern.*" It appears that early treatment to correct the anterior crossbite is an option, that does not change the overall growth pattern (*Fig. 12*).

(2) The original CO profile was somewhat prognathic, due to large functional shift, so the original CR profile is expected to be more orthognathic. Unfortunately no CR facial profile photographs were reported, underlining the importance of these diagnostic records at the first visit. Early correction was not necessary for YA's malocclusion. As for her twin sister KA, early correction of the crossbite was an option, but it is unrealistic to expect a change in the overall growth expression. YA was readily treated with one phase of treatment when she was an adolescent. These data conflict with the traditional "*developing Class III*" concept that suggests that early crossbite correction will "*normalize growth.*"

(3) Fig. 11H demonstrates enhanced maxillary growth, associated with early treatment, but the advantage is lost, compared to one phase of fixed appliance treatment, during the late phase of growth. Thus, from a skeletal perspective, there is no net advantage for early treatment (*Figs. 11F & G*).

(4) Despite the lack of a net skeletal advantage, early treatment of the crossbite has clear esthetic and functional benefits (*Fig. 11C*). This may be the desired option of the patient and her family, but it offers no clear advantage for the final result (*Fig. 11D*).

Normalizing Jaw Growth Is Not Realistic

Burns et al.15 promote early treatment of the Class III malocclusion, with a chin cap or protraction face mask, to normalize the underlying skeletal growth discrepancy. However, the Pancherz Herbst Class II study[11] and the Sugawara[14] face mask Class III report, both show that one phase treatment during the adolescent growth spurt is just as effective as two phases of treatment. Furthermore, Pancherz's[10,11] long term follow up of Class II patients, treated with a Herbst appliance, concluded that the fixed functional appliance improved the sagittal apical base relationship, but the treatment did not normalize the sagittal jaw base relationship.

Sugawara's[13] long term effects of chin cap therapy on Class III patients showed a favorable short term change, that was often not maintained at the end of growth. Long term follow up of rapid maxillary expansion combined with face mask protraction therapy in the mixed dentition revealed that about 25-33% of the growth enhancement relapses.[16-19] This means that the overall expression of growth cannot be changed. These data suggest that normalization of growth, due to an early phase of treatment, is unlikely.

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2014 Beethoven International Damon, OBS & VISTA Workshop

6/17~6/20, 12/1~12/4

LECTURER: Dr. Chris Chang

President of the Beethoven Orthodontic Center. He received his PhD in bone physiology and Certificate in Orthodontics from Indiana University in 1996. As publisher of ***International Journal of Orthodontics & Implantology*** and author of ***3D iBooks Ortho***, he has been actively involved in the design and application of bone screws.

LECTURER: Dr. John Lin

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

Dear Chris:

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

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

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

Dear Chris:

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

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

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

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

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

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

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

Damon, OBS & VISTA

Day 1

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

Day 2

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

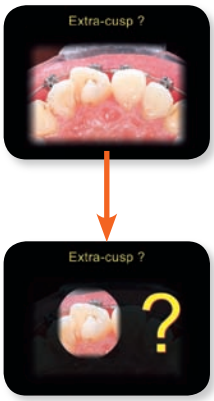
Day 3

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

Keynote Workshop

Make your presentation great

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



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

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

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

Day 4 - Keynote

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

Damon & OBS Workshop

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

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

Fees: USD 2,600
Early bird rate: USD 200 off by 04/17,10/01

Keynote Presentation workshop

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

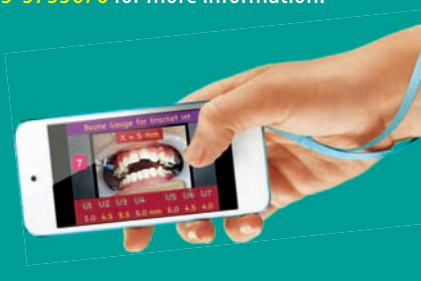
Registration fees cover local transportation, meals and one nights of shared accommodation (double occupancy).

Fees: USD 500
Early bird rate: USD 100 off by 04/17,10/01

Registration:

A 50% deposit is required to complete registration.

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



Implant-Orthodontic Combined Treatment for Gummy Smile with Multiple Missing Teeth

Abstract

This case report describes the interdisciplinary treatment of a 29-year-old woman presenting with a chief complaint of excessive gingival display ("gummy smile"). Her acquired, asymmetric right Class II malocclusion was complicated by three missing posterior teeth in the maxillary arch. Orthodontics was indicated to correct smile esthetics, reduce lip protrusion and align the dentition before utilizing prosthetics to improve the occlusal function. Mandibular second premolars were extracted to retract the lower incisors. The maxillary dentition was also retracted as well as intruded with miniscrews to close the missing molar spaces and correct the gummy smile. The maxillary right first premolar space was prepared for an implant-supported crown. A marked improvement in smile esthetics and occlusal function was achieved. (Int J Ortho Implantol 2013;32:16-32)

History and Etiology

The patient's primary concerns were protrusive lips and a gummy smile. A functional exam documented hypermentalis activity when closing the lips, and excessive gingival display upon smiling (*Fig. 1*). Intraoral examination revealed that the missing maxillary teeth (*#3, 5 and 14*) were restored with two fixed partial dentures (*FPDs*): a three unit acrylic prosthesis on the left side and a five-unit metal prosthesis on the right (*Fig. 2*). The casts (*study models*) showed an asymmetric Class II malocclusion on the right side with a mandibular midline discrepancy that was deviated 2 mm to the right (*Fig. 3*). There was no additional contributing medical or dental history. With combined implant and orthodontics treatment, the patient was treated to a pleasing result as documented in Figs. 4-6.

Fig. 1: Pretreatment facial photographs

Fig. 2: Pretreatment intraoral photographs

Fig. 3: Pretreatment study models

Dr. Hsin Yin Yeh, Diplomate, *International Association for Orthodontists & Implantologists* (left)
Dr. Chris Chang, Director, *Beethoven Orthodontic Center* (middle)
Dr. W. Eugene Roberts, Consultant,
International Journal of Orthodontics & Implantology (right)

Fig. 4: Posttreatment facial photographs

Fig. 5: Posttreatment intraoral photographs

Fig. 6: Posttreatment study models

Radiographs before and after treatment are shown in Figs. 7 and 8, respectively. Fig. 9 documents the treatment with superimposed cephalometric tracings.

Diagnosis

Skeletal:

1. Retrusive mandible (*SNA 82°, SNB 78°, ANB 4°*)
2. Increased mandibular plane angle (*SN-MP 42°, FMA 36°*)

Dental:

1. Class II molar relationship (*right*), 2mm midline discrepancy with the mandible to the right
2. Multiple teeth missing (*#3, #5, #14*)

Facial:

1. Convex profile with protrusive lips
2. Excessive gingival display when smiling

As shown in the subsequent worksheet, the Discrepancy Index (*DI*) was 25, calculated with a modification of the American Board of Orthodontics DI, which assessed additional treatment complexity related to the gummy smile and compromised implant site.

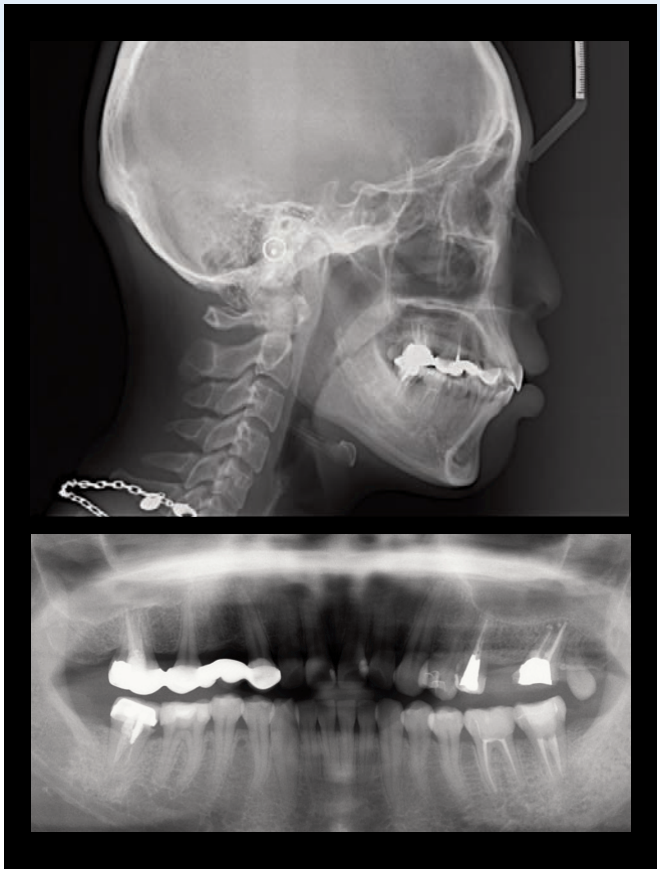


Fig. 7:

Pre-treatment pano and ceph radiographs. The pano film showed that the #3, #5, #14 were missing. The lateral ceph radiograph indicated that there was about 7 mm of upper incisor exposure at rest (from incisor edge of upper central incisor to lower border of upper lip).

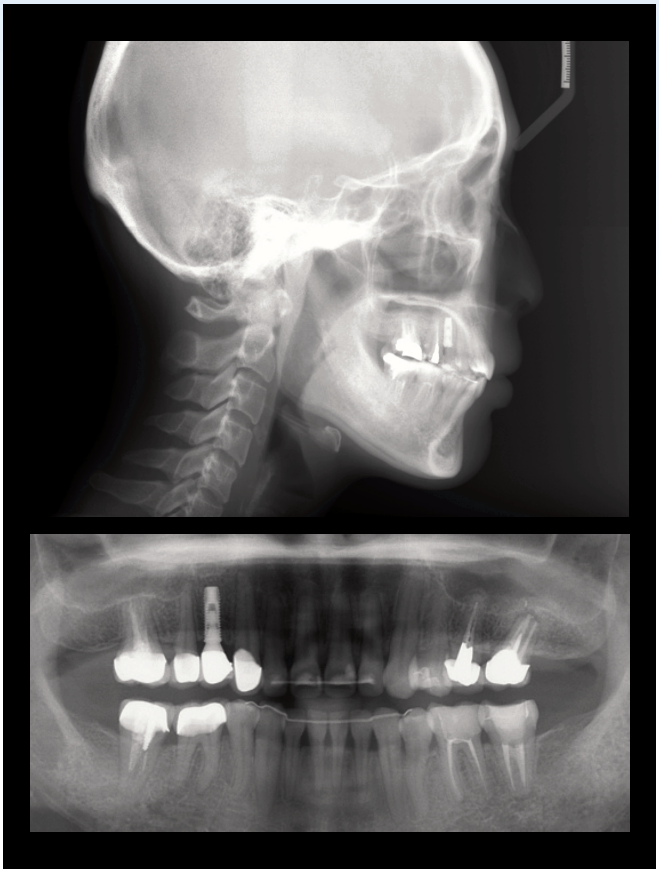


Fig. 8:

Post-treatment pano and ceph radiographs. The pano film showed that the missing maxillary first molar spaces were closed and an implant replaced the missing maxillary right first premolar.

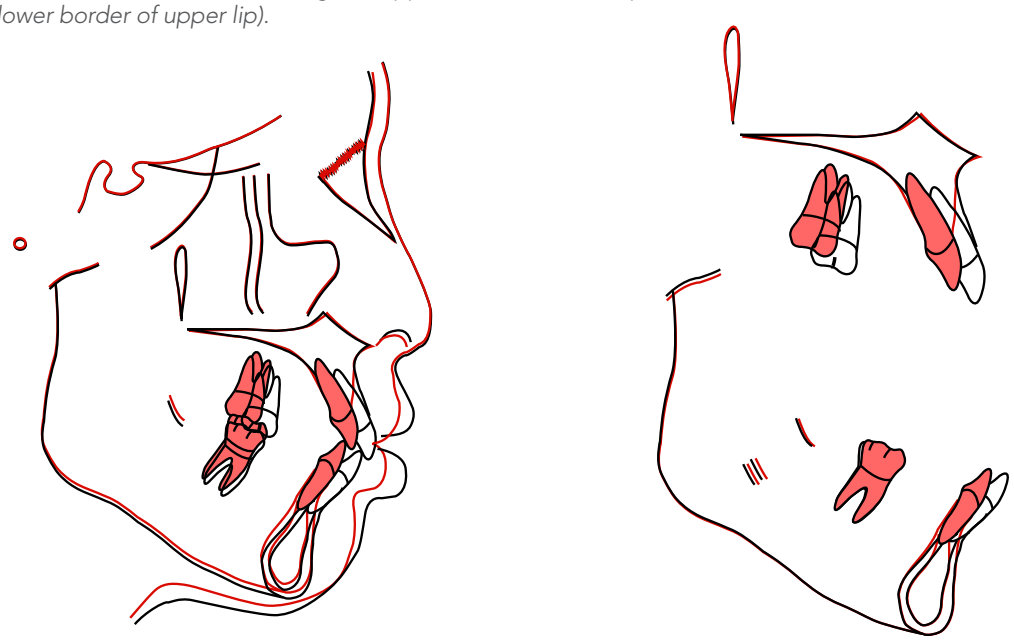


Fig. 9:

Superimposed tracings indicated that the maxillary incisors and molars had been intruded, upper molars had been distalized by miniscrews, both upper and lower central incisors had been retracted, and the profile had been improved.

CEPHALOMETRIC			
SKELETAL ANALYSIS			
	PRE-Tx	POST-Tx	DIFF.
SNA°	82°	81°	1°
SNB°	78°	78°	0°
ANB°	4°	3°	1°
SN-MP°	42°	40°	2°
FMA°	36°	35°	1°
DENTAL ANALYSIS			
U1 TO NA mm	7 mm	2 mm	5 mm
U1 TO SN°	111°	109°	2°
L1 TO NB mm	10 mm	3 mm	7 mm
L1 TO MP°	102°	85°	17°
FACIAL ANALYSIS			
E-LINE UL	2 mm	-1 mm	3 mm
E-LINE LL	5 mm	1 mm	4 mm

Table. 1: Cephalometric summary

Specific Objectives of Treatment

Maxilla (*all three planes*):

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

Mandible (*all three planes*):

- A - P: Maintain
- Vertical: Decrease the vertical dimension of occlusion (*VDO*)
- Transverse: Maintain

Maxillary Dentition

- A - P: Retract the maxillary anterior segment and close molar spaces
- Vertical: Intrude the entire maxillary dentition
- Inter-molar Width: Maintain

Mandibular Dentition

- A - P: Retract the mandibular incisors
- Vertical: Maintain
- Inter-molar / Inter-canine Width: Maintain

Facial Esthetics: Retract protrusive lips

Treatment Plan

Extract the bilateral mandibular second premolars, remove both maxillary FPDs, and fabricate temporary crowns for the abutment teeth. Retain a space of about 7.5 mm between the maxillary right canine and second premolar for an implant supported crown; close all other spaces. Retract and intrude the maxillary anterior segment by utilizing miniscrews in the right and left infrazygomatic crests for anchorage. Lever arms from the miniscrews were used to apply intrusive force to the anterior maxillary dentition to help correct the gummy smile. At the completion of active treatment, remove the fixed appliances, bond fixed retainers on the anterior segments of both arches, and fabricate a clear overlay retainer for the upper arch.

Appliances and Treatment Progress

Before bracket bonding, the mandibular second premolars were extracted. The maxillary FPDs were removed and temporary crowns were constructed for the abutments (*Fig. 10*). Subsequently, .022" Damon D3MX brackets (*Ormco Corporation, Glendora, CA*) were selected. The wire sequence in both arches was: .014 NiTi, .016 NiTi, .014x.025 NiTi, .017x.025 TMA, .019x.025 SS. After the .019x.025 SS archwires were inserted in both arches, closed coil springs were applied to close all space except for the maxillary right first premolar implant site.

Nineteen months into active treatment, a 2x12 mm OrthoBoneScrew (*Newton's A, Inc., Taiwan*) was placed in each infrazygomatic crest for posterior maxillary anchorage. Bilateral intrusion lever arms, fabricated from sections of .017x.025 TMA wire, were inserted into the auxiliary slots of the miniscrews for anchorage, and the active arm was hooked on the main archwire between the maxillary canine and lateral incisor (*Fig. 11*). Two anterior bite turbos were bonded on the palatal surface of the maxillary central incisors and Class II elastics (*3.5oz*) were used (*Figs. 11-12*). Fifteen months after the intrusion lever arms were applied, there was no significant intrusive effect on the maxillary anterior teeth, probably because of the extrusive component of the Class II elastics was negating the intrusive force of the lever arms. To enhance the intrusive force on the incisors, two additional miniscrews 1.5x8 mm OrthoBoneScrews were placed apically between the maxillary central and lateral incisor's roots. Intrusive elastic chains were tied from the miniscrews to the main archwire, which generated 60 gm per side (*Fig. 13*). This latter mechanism provided a direct line of intrusive force to the incisors to supplement the intrusive force on the maxillary anterior segment due to the posterior lever arms (*Fig. 14*).

In the 49th month of treatment, a computed tomography (*CT*) image was taken in preparation for implant placement in the maxillary right first premolar area, and a 4x11.5 mm (*wide diameter*) fixture was chosen. Full thickness flaps were reflected on the labial and lingual surfaces. The buccal flap was sutured to the cheek and the palatal flap was retracted with sutures to obtain a clear

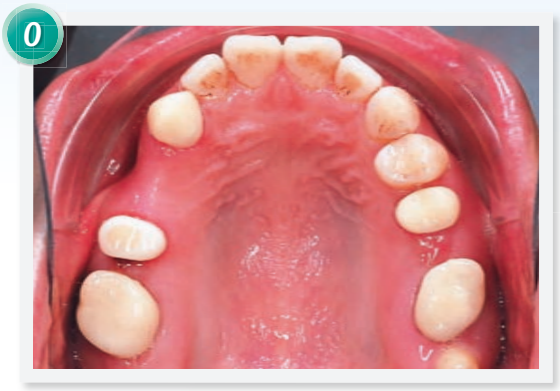


Fig. 10:

Temporary crowns were fabricated for maxillary right canine, second premolar, second molar and maxillary left second premolar and molar.

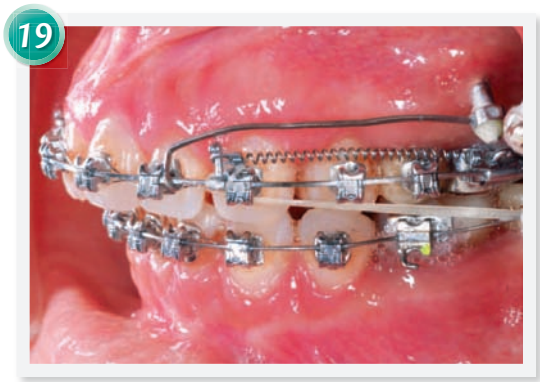


Fig. 11:

Intrusion lever arms made with .017x.025 TMA were inserted into the miniscrew head holes.

Fig. 12:

The anterior bite turbos were bonded on the palatal side of maxillary central incisors. Class II elastics were used (3.5 oz).

Fig. 13:

Two miniscews were placed between maxillary central and lateral incisors as anchorage to intrude anterior teeth.

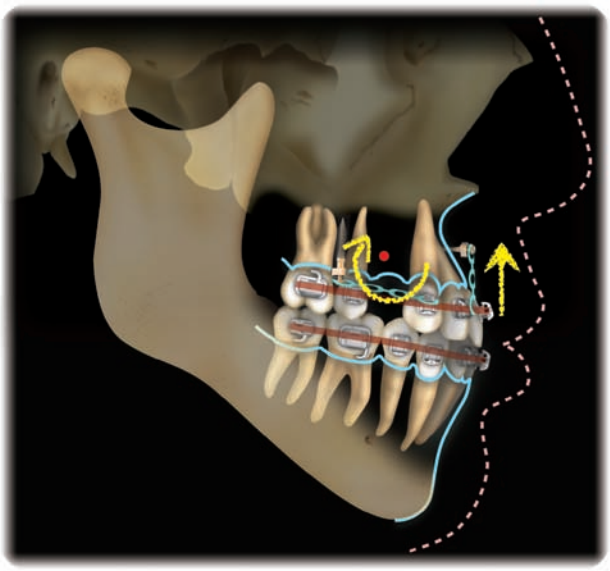


Fig. 14:

Retracting the whole maxillary dentition with bony anchorage in the infrazygomatic crests would extrude the maxillary incisors and tip the molars back. Intruding the maxillary incisors with bony anchorage between the central and lateral incisors will counteract the extruding force. In this way, the whole maxillary dentition can be retracted and intruded by these anterior and posterior miniscrews.

surgical view. A surgical stent was used to achieve optimal positioning of the fixture. After the implant was placed and the cover screw was secured, GEM 21S (*Growth-factor Enhanced Matrix, Osteohealth*) was placed into the defect on the mesial side of the first premolar area, and a surgical membrane was used to cover it (*Fig. 15*). The flap was sutured with direct loop interrupted 5-0 nylon.

Two months after the implant surgery, all orthodontic appliances were removed and retainers were delivered. Seven months after the fixture had been placed, an incision was made to expose the cover screw and a healing abutment was secured to the fixture. One week later, the abutment (*EZ Post, EZ Plus™, Megagen, UK*) was used to replace the healing abutment (*Fig. 16*). A snap impression, with a coping and post level analog, were used to transfer the level of the abutment. In the laboratory, occlusal reduction of the analog for the crown fabrication was performed. A mock-up was made for an index of the abutment. After trimming the abutment, the metal coping was tried-in and the tightness of the contact area and marginal integrity were checked. The permanent crown was luted with temporary cement (*Fig. 17*).

Retention

Fixed retainers were bonded from 2-2 in the maxillary arch and 3-3 in the mandibular arch. An upper clear overlay retainer was delivered. The patient was instructed to wear it full time for the first 6 months and nights only thereafter. Instructions

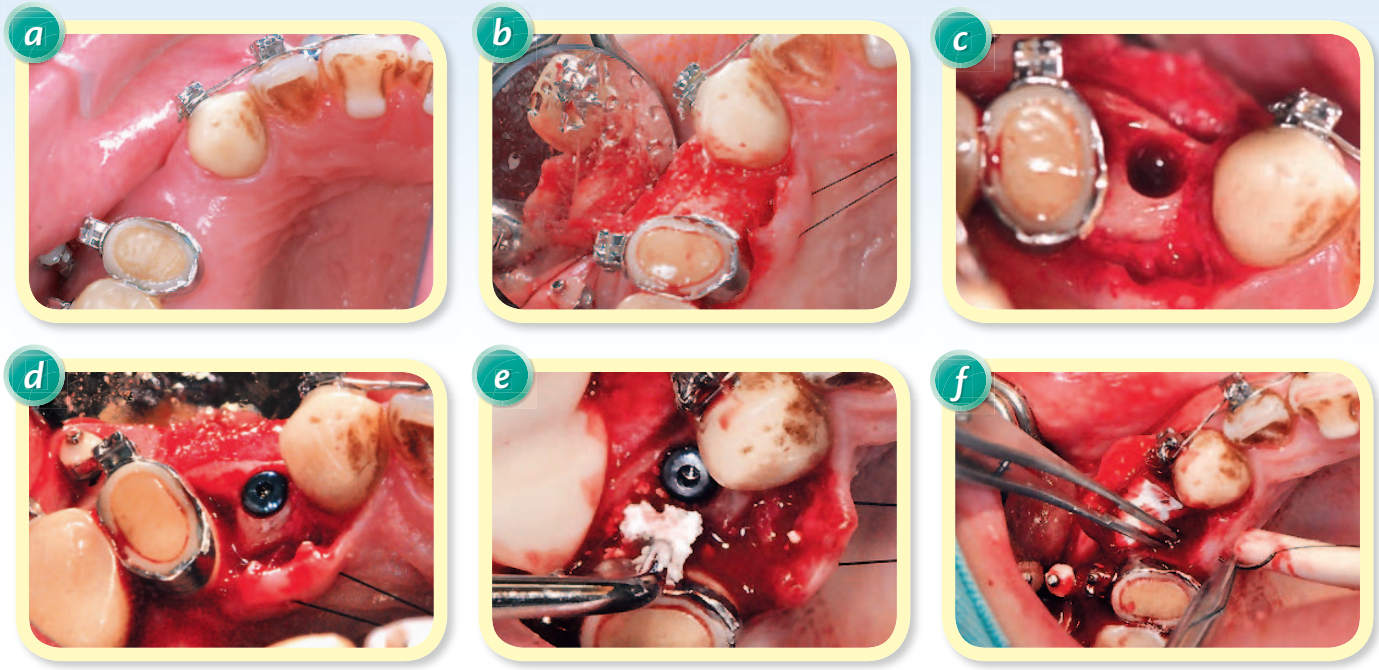


Fig. 15:
Surgical procedure. a,b,Open the flap. c,d, Drill the bone and place the fixture. e,f, Fill the mesial bony defect with GEM 21S and suture with a membrane.

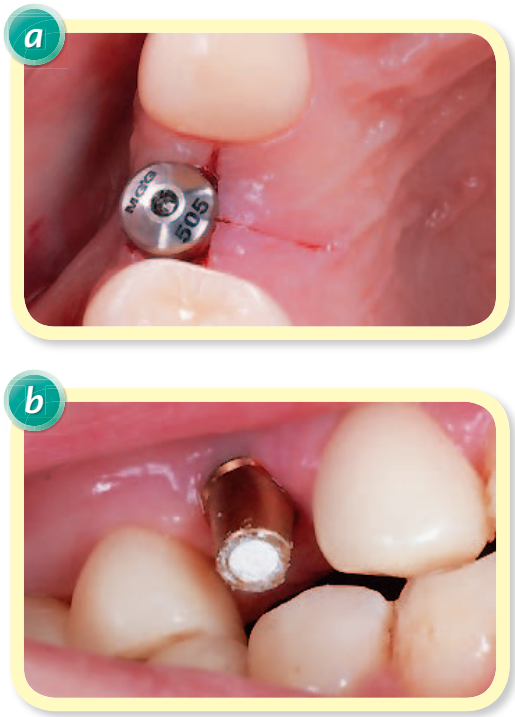


Fig. 16:
a, A healing abutment was screwed into the fixture two months after the surgery.
b, One week later, the abutment replaced the healing abutment.

were provided for home care and maintenance of the retainers.

Final Evaluation of Treatment

First, the ABO Cast-Radiograph Evaluation score was 15 points, which reflected the optimal occlusion of the asymmetric buccal segments. The major discrepancies were overjet and occlusal relationship. Because both maxillary first molars were missing, the optimal treatment plan was deemed to be extraction of the mandibular second premolars. This extraction pattern minimized the prosthetic needs but it resulted in an atypical, although stable, occlusal relationship (*Fig. 18*). The use of the ABO Cast-Radiograph Evaluation is challenging under these circumstances. The occlusal relationships of the canines and the adjacent premolars were scored, but the relative positions of the maxillary second premolars and second molars were considered

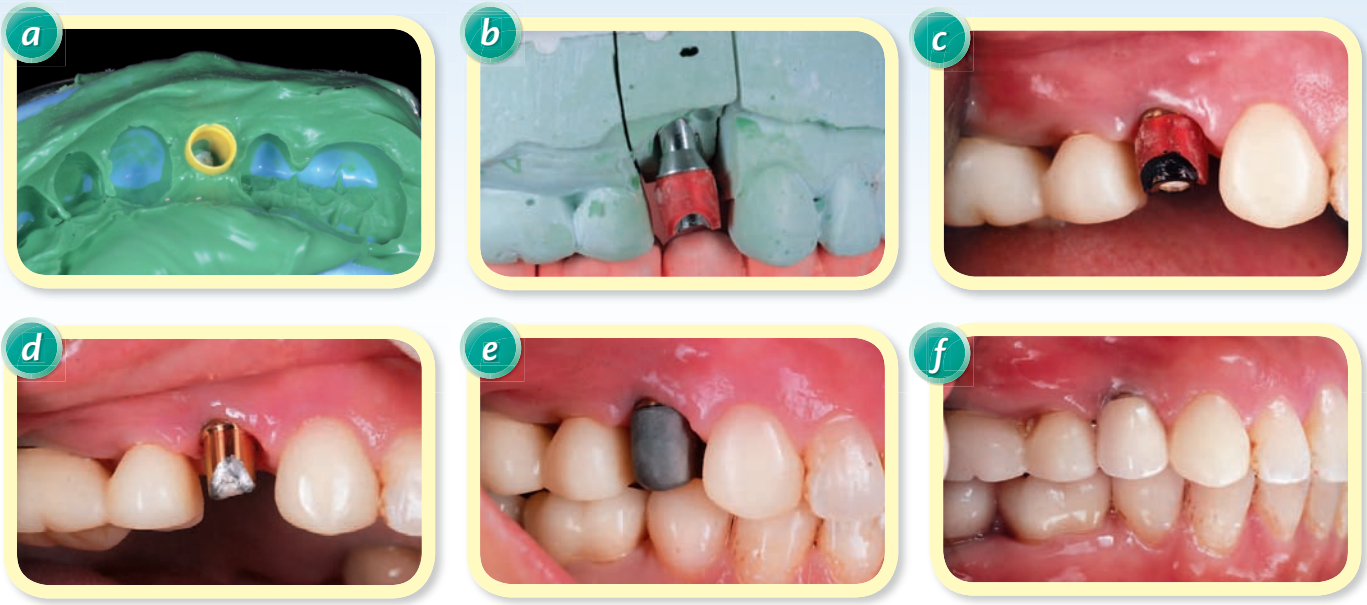


Fig. 17:

Prosthesis fabrication. a, The snap impression coping. b, Occlusal reduction of the post level analog and a mock up. c, d, Use the mock up as an index to trim the analog. e, Metal coping try-in. f, The permanent crown was luted with temporary cement.

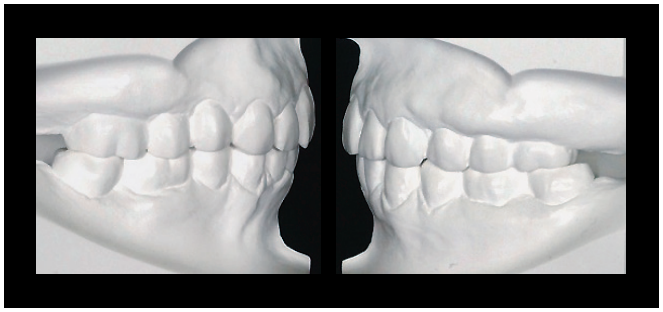


Fig. 18:

The occlusal relationship of both sides were not optimal because of asymmetric extraction.

optimal so they were not scored.

Second, the IBOI Pink & White Esthetic score was 2 points. The interdental papilla between maxillary central incisors did not fully occupy the embrasure. Moreover, the level of gingival margin between the right side and the left side was uneven.

Third, the IBOI Implant-Abutment Transition & Position Analysis score was 7 points. The fixture was placed mesially and buccally about 2 mm below the future crown margin. This resulted in insufficient gingival contour and height of the abutment was insufficient.

Overall, the maxillary dentition was intruded and the anterior teeth were retracted (*Fig. 9*). The gummy smile and the protrusive lips were significantly improved (*Fig. 4*) and the edentulous area was restored with an implant. The patient was quite satisfied with the result.

Discussion

Excessive gingival display when smiling, is commonly refereed to as "*gummy smile, high lip line, or high smile line,*" and it is usually an esthetic deficit.[1] The prevalence of excessive gingival display affects ~10% of population between the age of 20 and 30, but it is more prevalent in women than in men.[2] When gingival exposure while smiling reaches more than 4 mm, most dentists and lay people consider

the smile to be unesthetic.[3] However, orthodontists tend to be most critical; gingival exposure more than 2 mm during a full smile is considered to be unharmonious.

Many etiological factors, alone or in combination, may be involved in a gummy smile: gingival hypertrophy (*overgrowth*), anterior dentoalveolar protrusion, vertical maxillary excess (*inferiorly positioned maxilla*), and hyperactivity of upper lip elevator muscles.[4] To diminish the gingival display when smiling, there are many treatment options depending on the differential diagnosis of the problem. Thus, a thorough examination and careful diagnosis is essential before treatment. Several studies[4-6] have evaluated the etiology of excessive gingival display:

1. Gingival overgrowth: Enlarged gingival tissues may be due to infection or medication (*e.g. phenytoin, cyclosporine, calcium channel blockers*). The treatment for this condition should focus on oral hygiene, but a gingivectomy may be necessary in some cases. Another condition of gingival overgrowth is altered passive eruption, where the gingival margins fail to recede apically to the level of cementoenamel junction (*CEJ*). Before treatment, probing the thickness of the soft tissue to the bone level will determine the amount of excess soft tissue and whether bone resection is needed.

2. Anterior dentoalveolar extrusion: This condition may be associated with anterior tooth wear or a deep bite. The latter is usually associated with an occlusal disharmony between anterior and posterior segments. The treatment of this condition may include orthodontic intrusion of the anterior teeth and/or periodontal surgery, with or without restorative therapy.

3. Vertical maxillary excess: These patients typically have increased lower facial height, and the occlusal plane between the anterior and posterior segments is harmonious, but it is inferiorly positioned. The problem is of skeletal origin rather than an over-eruption of the maxillary anterior teeth. Due to the inferiorly positioned occlusal plane, the lower lip covers the incisal edges of the maxillary canines and premolars. According to Garber and Salama,[1] the treatment of vertical maxillary excess, with an unesthetic soft tissue display, is classified into three degrees with corresponding treatment modalities. Their approach is summarized in Table 2.

4. Hyperactivity of the upper lip elevator muscles: A normal (*non-hyperactive*) upper lip moves approximately 6-8 mm from a resting position to a broad smile position. Hyperactive upper lips move a distance that is 1.5 to 2 times greater. A lip repositioning procedure[7] or an injection of botulinum toxin-A to the lip elevator muscles[8] is advocated. Another etiology related to excessive gingival exposure is a short upper lip (*decreased length*). However, upper lip length for most gummy smile patients is normal even if the lip looks short, clinically. Thus, the underlying etiology is usually hyperactivity of the upper lip elevator muscles.

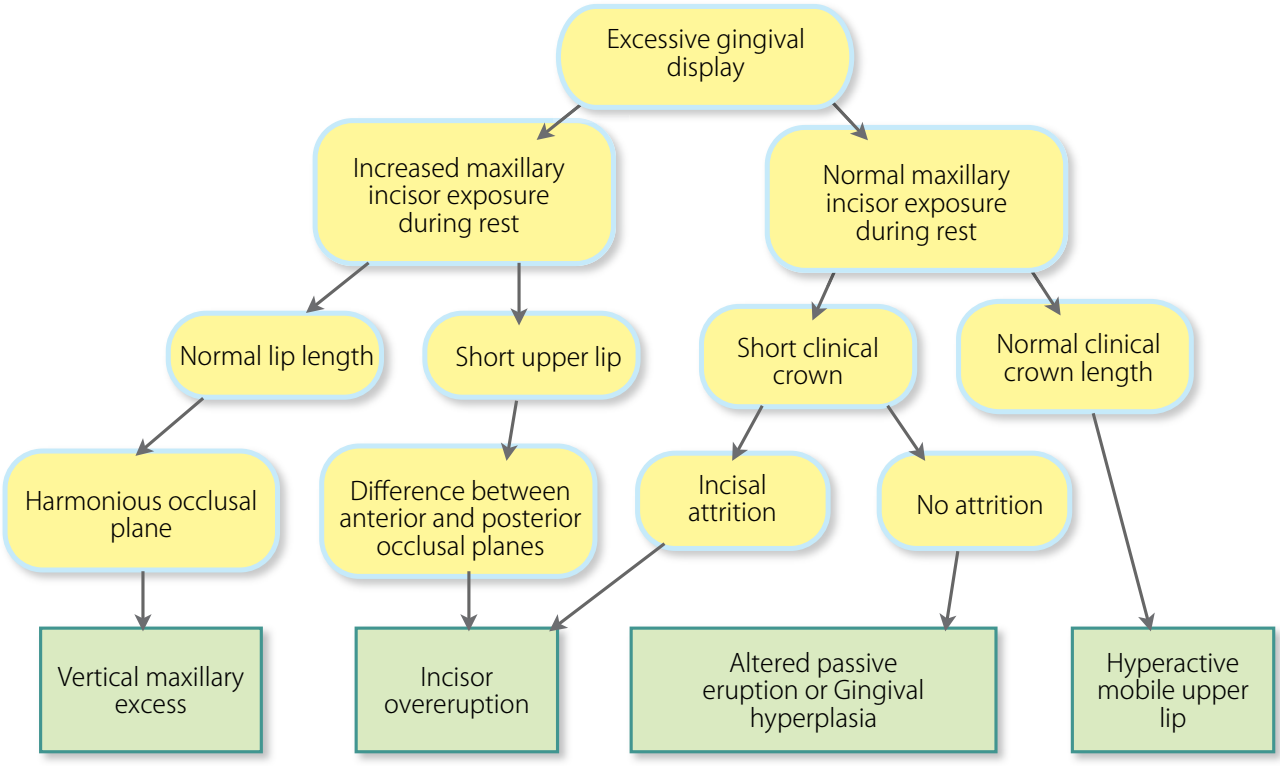
The gummy smile phenotype may have a multifactorial etiology, so it may be difficult to diagnose and treat. A flow chart is helpful for determining the etiology and selecting the appropriate treatment plan (*Fig. 19*).[4-5]

At rest the present patient had a 6 mm maxillary

Degree	Gingival and mucosal display(mm)	Treatment modalities
I	2~4	Orthodontic intrusion Orthodontics and periodontics Periodontal and restorative therapy osteotomy)
II	4~8	Periodontal and restorative therapy Orthognathic surgery(Le Fort I osteotomy)
III	>8	Orthognathic surgery with or without adjunctive periodontal and restorative therapy

* The degree of severity is predicated after treating the altered passive eruption.

■ Table 2. The degree of gingival and mucosal display and the relative treatment modalities.[1]



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

■ Fig. 19: A flow chart can help to determine the etiology of excessive gingival display.[4-5]

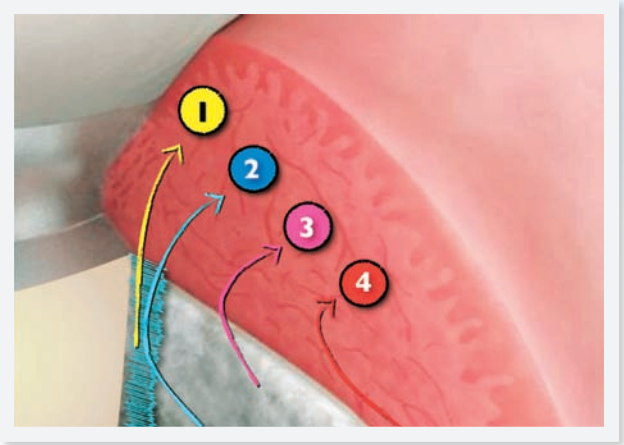


Fig. 20:

Because there is no periodontal ligament over implants, the blood supply routes of the marginal gingiva are only via cortical bone (3) and apical mucosa (4).[12] *Grunder*[11] *found that 2mm of buccal bone thickness could prevent gingiva recession.*

central incisor exposure, i. e. the distance from the incisal edge to the inferior border of the upper lip (*Fig. 7*). Lip length, occlusal plane and overbite were within normal limits (*WNL*). The clinical crowns of the maxillary incisors were short, but no attrition was evident. According to the flow chart (*Fig. 19*), the present morphological pattern fit the vertical maxillary excess group because altered passive eruption was also noted. The treatment plan was orthodontic intrusion of the maxillary anterior teeth followed by gingivectomy to resolve the gummy smile. As previously described, 15 months of intrusive force, delivered by lever arms anchored with posterior miniscrews, failed to achieve adequate intrusion of the anterior segment. Then two additional miniscrews were placed between the maxillary central and lateral incisors to provide supplemental force for incisor intrusion.[9]

Light forces, 60 gm per side (*20 gm per tooth*),[10] were applied. Thus, the primary anchorage units for incisor intrusion were the anterior miniscrews, while the infrazygomatic bone screws were used to retract the anterior segment and intrude the molars.

When multiple teeth are missing, orthodontic alignment and space closure is usually necessary to achieve optimal results. As shown in Fig. 15a, the right maxillary first premolar space was prepared for implant placement. During implant placement, the osteotomy bur was inadvertently shifted to the buccal, resulting in a buccal plate of bone that was only 1 mm thick. Thus, the straight post on the abutment required occlusal reduction before crown fabrication (*Fig.17d*). Another apparent ramification of the thin buccal plate of bone was gingival recession (*Fig. 17f*). This undesirable clinical result is consistent with a report by Grunder, Gracis and Capelli[11] who demonstrated that gingival recession occurs if the buccal bone thickness is less than 2 mm. When there is an insufficient buccal plate after implant placement, bone augmentation is required to produce an adequate bone mass to provide vascular support for the overlying gingiva (*Fig. 20*).[12] For the present patient, the implant position should have been placed more lingual, and positioned 3 mm apical to the future gingival margin of the prosthesis, to provide for an adequate biologic width (*Fig. 21*). Building on these concepts of periodontal biology, Chang[12] proposed the 2B-3D rule as a guide to achieve more consistent esthetics and stability.

GEM 21S (*Growth-factor Enhanced Matrix, Osteohealth, Shirley, NY*) is a synthetic bone graft material, composed of recombinant human platelet-derived growth factor-BB (*rhPDGF-BB*) and beta-tricalcium (*ß-TCP*).[13] PDGF is a natural growth factor that has been synthesized for bone grafting

purposes in periodontics. PDGF promotes the regeneration of bone, ligament, and cementum in animals and humans.[14] ß-TCP is a purified, porous osteoconductive scaffold that provides a framework for bone ingrowth. A multi-center, randomized and blinded clinical trial in humans demonstrated the effectiveness of rhPDGF-BB in combination with a porous ß-TCP for the treatment of periodontal osseous defects.[15] With respect to present case report, GEM 21S was used to successfully fill a mesial bony defect near the maxillary right second premolar (*Fig. 22*).

Conclusion

The smile plays an important role in facial esthetics, particularly for the first impression. Gummy smile was the major esthetic concern for the present patient

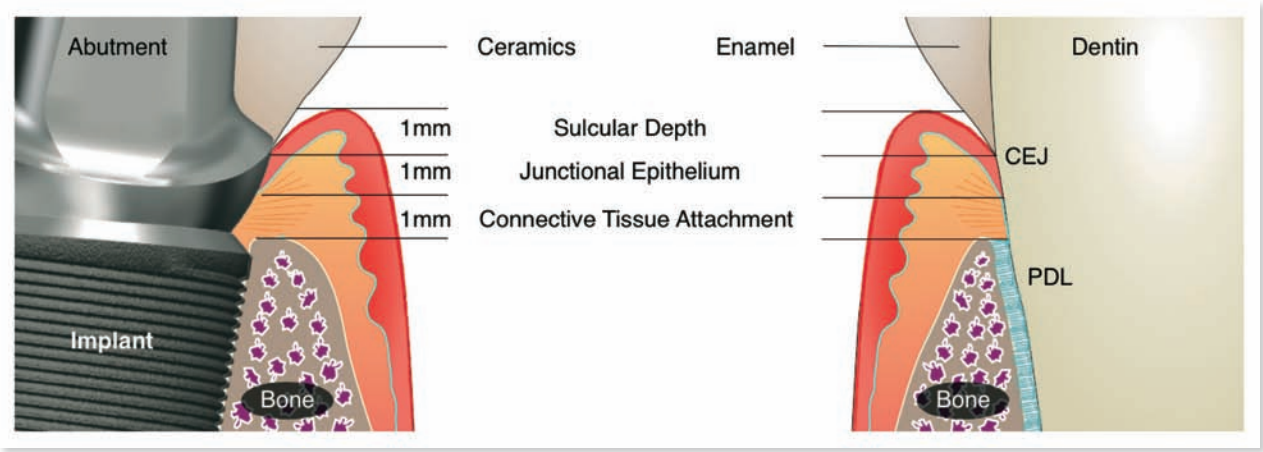


Fig. 21:

A comparison of biologic width between an implant and a nature tooth. Based on the rule, the fixture should be placed 3 mm apical to the gingival margin of the future prosthesis to gain the ideal emergence profile, esthetics, and biologic width.[12]

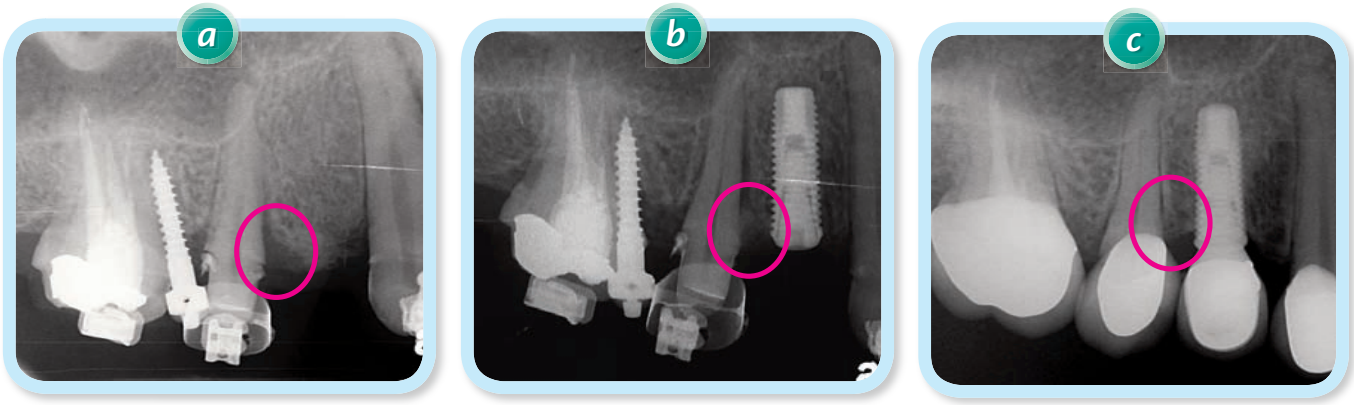


Fig. 22:

a, There was a mesial bony defect over the maxillary right second premolar. b, The GEM 21S completely filling the defect during the surgery. c, Two years after the surgery, a significant increase in bone fill was noted.

Fig. 23: Pre- and post-treatment images of the patient's smile. The gummy smile has been improved remarkably.

to seek dental treatment. Careful examination and an appropriate diagnosis are essential for achieving an optimal result. Miniscrews are useful anchorage devices for intruding maxillary anterior teeth to resolve the problem of excessive gingival exposure when smiling (*Fig. 23*). A malocclusion with multiple missing teeth required orthodontics for optimal alignment before restoration of a missing maxillary premolar with an implant-supported crown. Combined orthodontic and implant therapy is an excellent, cost effective option for comprehensive care of acquired malocclusions.

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Discrepancy Index Worksheet

TOTAL D.I. SCORE 25

OVERJET

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

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

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 = 0

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° 4 x 2 pts. = 8

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

1 to MP ≥ 99° = 1 pt.
Each degree > 99° 3 x 1 pt. = 3

Total = 14

OTHER (See Instructions)

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

Identify: 6 mm of excessive gingival display

Total = 7

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) = 1
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) = 1
Soft tissue anatomy : Intact (0 pt), Defective (2 pts) = _____
Infection at implant site : None (0 pt), Chronic (1 pt), Acute(2 pts) = _____

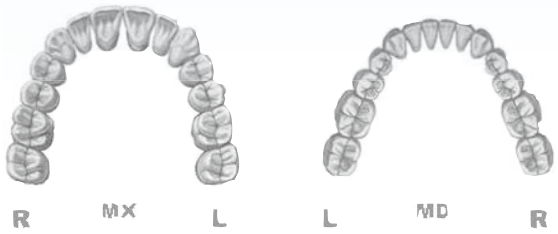
Total = 2

Cast-Radiograph Evaluation

Total Score: 15

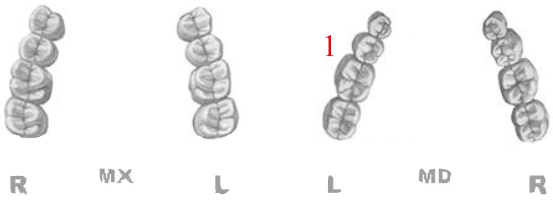
Alignment/Rotations

0



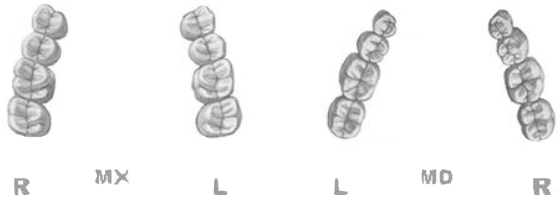
Marginal Ridges

1



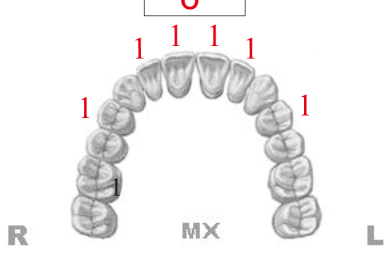
Buccolingual Inclination

0



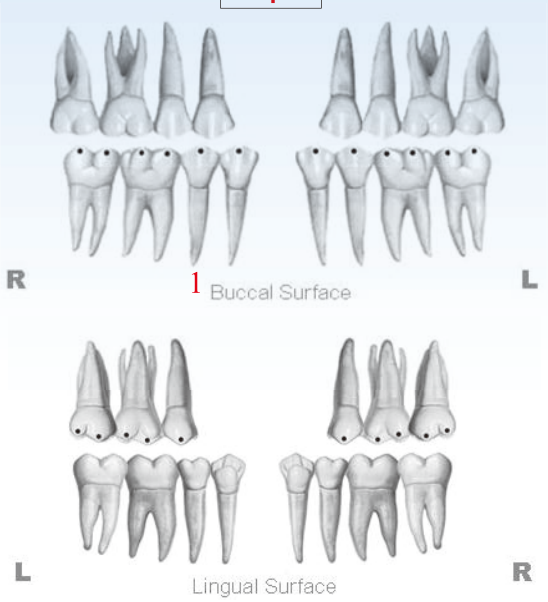
Overjet

6



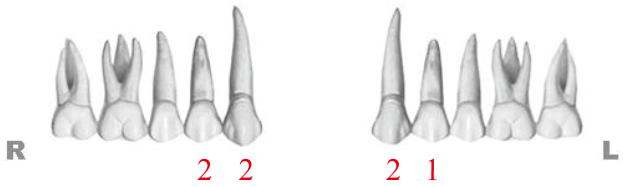
Occlusal Contacts

1



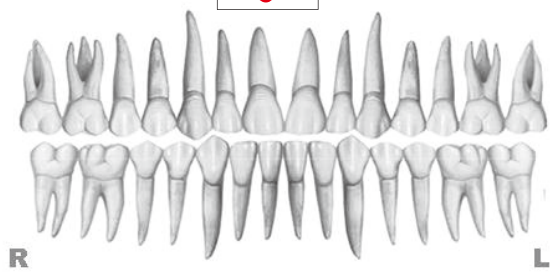
Occlusal Relationships

7



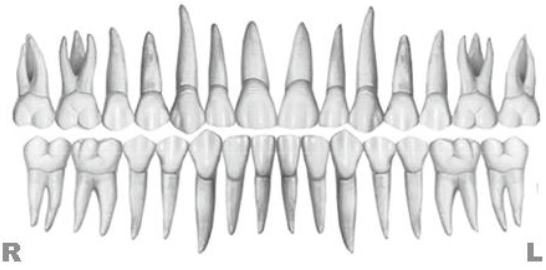
Interproximal Contacts

0



Root Angulation

0



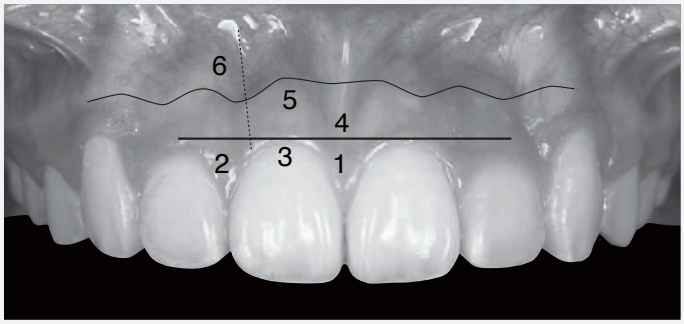
INSTRUCTIONS: Place score beside each deficient tooth and enter total score for each parameter in the white box. Mark extracted teeth with "X". Second molars should be in occlusion.

IBOI Pink & White Esthetic Score

Total Score: = 2

1. Pink Esthetic Score

Total = 2

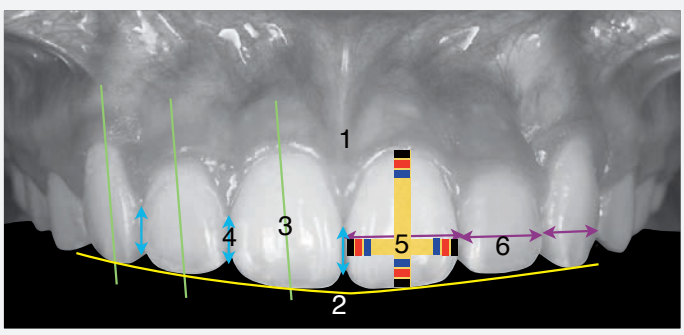


1. M & D Papillae	0	1	2
2. Keratinized Gingiva	0	1	2
3. Curvature of Gingival Margin	0	1	2
4. Level of Gingival Margin	0	1	2
5. Root Convexity (Torque)	0	1	2
6. Scar Formation	0	1	2

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

2. White Esthetic Score (for Micro-esthetics)

Total = 0



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

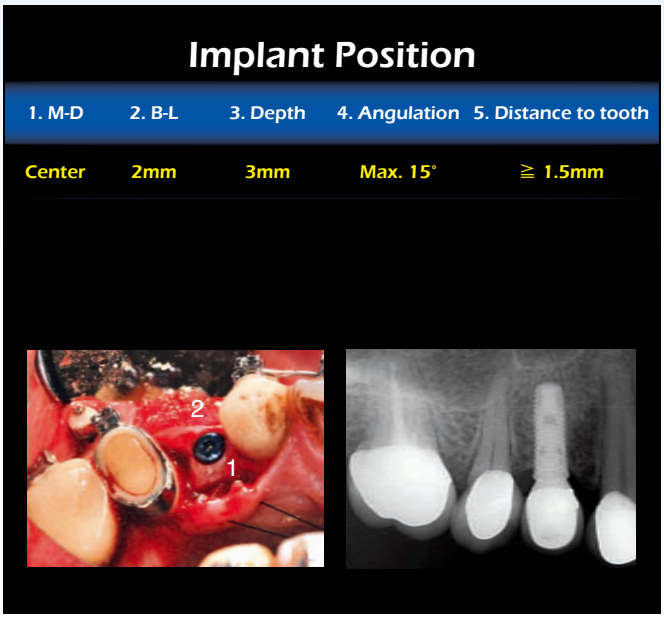
1. Midline	(0)	1	2
2. Incisor Curve	(0)	1	2
3. Axial Inclination (5° , 8° , 10°)	(0)	1	2
4. Contact Area (50%, 40%, 30%)	(0)	1	2
5. Tooth Proportion	(0)	1	2
6. Tooth to Tooth Proportion	(0)	1	2

IBOI Implant-Abutment Transition & Position Analysis

Total Score: = 7

1. Implant Position

Total = 3

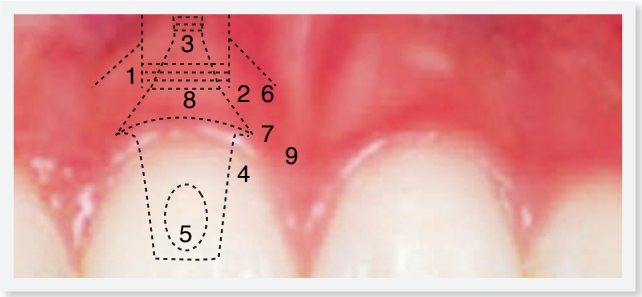


1. M & D (Center)	0	1	2
2. B & L (Buccal 2 mm)	0	1	2
3. Depth (3 mm)	0	1	2
4. Angulation (Max. 15°)	0	1	2
5. Distance to Adjacent Anatomy	0	1	2

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

2. Abutment transition Contour

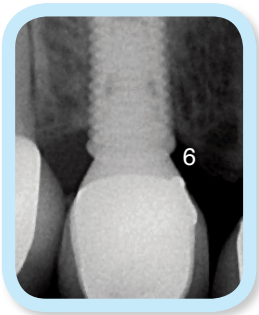
Total = 4



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

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

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



2013

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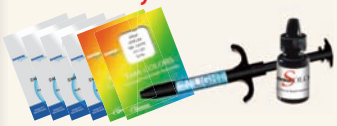
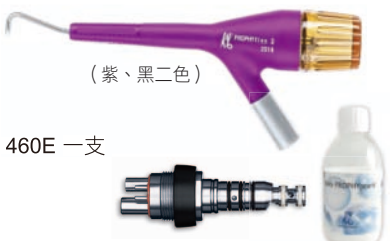
DAMON 3MX	贈品 ❶ .014 Damon Copper Ni-Ti 10條 ❷ .014x.025 Damon Copper Ni-Ti 10條 ❸ .019x.025 Damon SS 10條 特價NT$**90,000** 	贈品 ❶ .014 Damon Copper Ni-Ti 20條 ❷ .014x.025 Damon Copper Ni-Ti 20條 ❸ .019x.025 Damon SS 20條 ❹ D3MX器械 1支 特價NT$**180,000** 	贈品 ❶ Damon Copper Ni-Ti 100條(任選) ❷ Bondable Tube 200顆 (6th四象限各50顆) 特價NT$**450,000** 
DAMON	贈品 ❶ .014 Damon Copper Ni-Ti 10條 ❷ .014x.025 Damon Copper Ni-Ti 10條 ❸ .019x.025 Damon SS 10條 特價NT$**100,000** 	贈品 ❶ .014 Damon Copper Ni-Ti 20條 ❷ .014x.025 Damon Copper Ni-Ti 20條 ❸ .019x.025 Damon SS 20條 ❹ Damon Q 器械 1支 ❺ Enlight(光照含氟矯正專用黏著劑) 1支 ❻ Ortho Solo(多功能光照黏著基底劑) 1瓶 特價NT$**200,000** 	贈品 ❶ Damon Copper Ni-Ti 150條(任選) ❷ Bondable Tube 120顆 (6th四象限各30顆) 特價NT$**500,000** 
DAMON CLEAR 5|5 3|3 + DAMON 54|45	贈品 ❶ .014 Damon Copper Ni-Ti 10條 ❷ .014x.025 Damon Copper Ni-Ti 10條 ❸ .019x.025 Damon Colored TMA-Honeydew 5條 ❹ Enlight(光照含氟矯正專用黏著劑) 1支 特價NT$**132,000** 	贈品 ❶ .014 Damon Copper Ni-Ti 20條 ❷ .014x.025 Damon Copper Ni-Ti 20條 ❸ .019x.025 Damon Colored TMA-Honeydew 10條 ❹ Enlight(光照含氟矯正專用黏著劑) 1支 ❺ Ortho Solo(多功能光照黏著基底劑) 1瓶 特價NT$**264,000** 	贈品 ❶ Damon Copper Ni-Ti 100條(任選) ❷ Clear Debonding Plier 1支 ❸ Bondable Tube 40顆 (6th四象限各10顆) ❹ .019x.025 Damon Colored TMA-Honeydew 30條 ❺ Damon Clear + Q Typodont 1個 特價NT$**660,000** 
swiss dentacare / KaVo. Dental Excellence.	**SDC ProLign Kit**  加購優惠價NT$**39,999** 現貨售完為止	KaVo PROPHYflex 3 氣動潔牙機 **75** 折 （紫、黑二色） **加贈** KaVo MULTIflex COUPLING 460E 一支 PROPHYpearls 一瓶 (10oz) 	

湧傑 YONG CHIEH 服務專線：北區 02-27788315· 中區 04-23058915· 南區 07-2260030

衛署醫器輸字第 022355 號 衛署醫器輸字第 010924 號 衛署醫器輸壹字第 010513 號 衛署醫器輸壹字第 006858 號 衛署醫器輸壹字第 006857 號 衛署醫器輸壹字第 009520 號 衛署醫器輸壹字第 001468 號 衛署醫器輸壹字第 002033 號 衛署醫器輸壹字第 009179 號

Non-extraction Treatment of Severe Anterior Crowding

History and Etiology

A 21-year-10-month old female presented for orthodontic consultation. Her chief complaint was the irregularity of her teeth (*Figs. 1-3*). There was no contributing medical or dental history. Her oral hygiene was good, and temporomandibular function was within normal limits (*WNL*).

Fig. 1: Pretreatment facial photographs

The initial clinical examination revealed severe anterior crowding in both arches. The etiology of the malocclusion was deemed to be a space deficiency due to relatively narrow arches. The patient was treated to a near ideal outcome, as documented in Figs. 4-6. The diagnosis and treatment are documented with pre-treatment (*Fig. 7*) and post-treatment (*Fig. 8*) panoramic and cephalometric radiographs, as well as superimpositions cephalometric tracings (*Fig. 9*).

Fig. 2: Pretreatment intraoral photographs

Diagnosis

Skeletal:

- Class III pattern (*SNA 80°, SNB 81°, ANB -1°*)
- Decreased mandibular plane angle (*SN-MP 28°, FMA 21°*)
- Both dental arches were relatively narrow

Dental:

- Right Occlusion: Class I molar, Class II canine

Fig. 3: Pretreatment study models

Dr. Li-Chu Wu, Lecturer, Beethoven Orthodontic Course (right)
Dr. Chris HN Chang, Director, Beethoven Orthodontic Center (middle)
Dr. W. Eugene Roberts, Consultant,
International Journal of Orthodontics & Implantology (left)

Fig. 4: Posttreatment facial photographs

Fig. 5: Posttreatment intraoral photographs

Fig. 6: Posttreatment study models

- Left Occlusion: End on Class II molar, Class II canine
- OB 4 mm; OJ 6 mm
- Crowding: 10 mm in the upper arch and 8mm in the lower arch
- Upper incisors were tipped labially. (*U1-SN 118°*)
- Lower incisors were tipped lingually. (*L1-MP 86°*)
- Both lower third molars were impacted

Facial:

- Straight profile with decreased but acceptable lip position
- UL-E line: -1.5mm
- LL-E line: -1.5mm

The IBOI discrepancy index (*DI*), which is derived from the American Board of Orthodontics (*ABO*) method (*http://www.americanboardortho.com/professionals/ clinicalexam/*), was 14 as shown in the subsequent work sheet. The most important diagnostic factors were the excessive overjet and anterior crowding (*Fig. 10*).

Specific Objectives of Treatment

Maxilla (*all three planes*):

- A - P: Maintain
- Vertical: Maintain

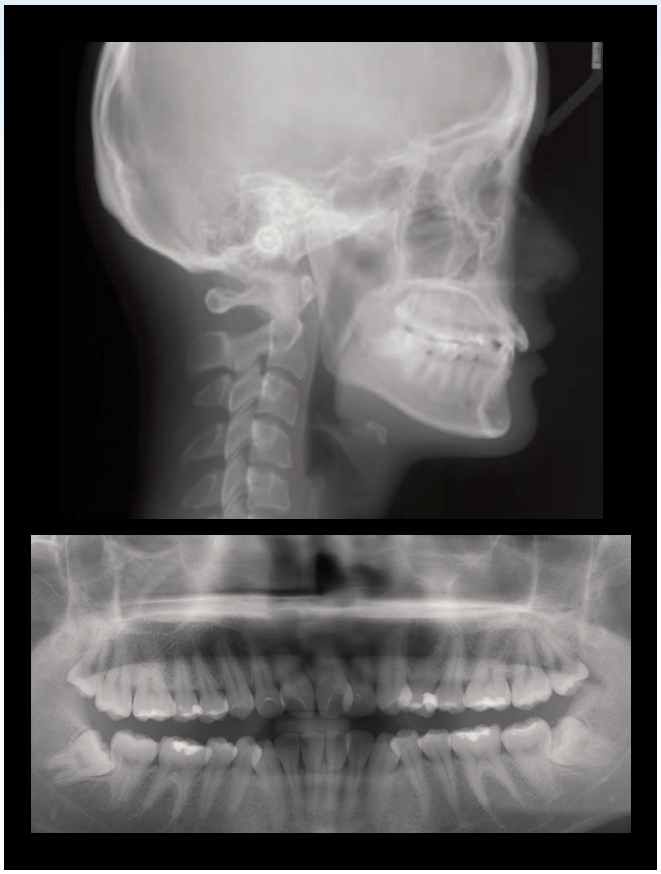


Fig. 7: Pretreatment pano. and ceph. radiographs

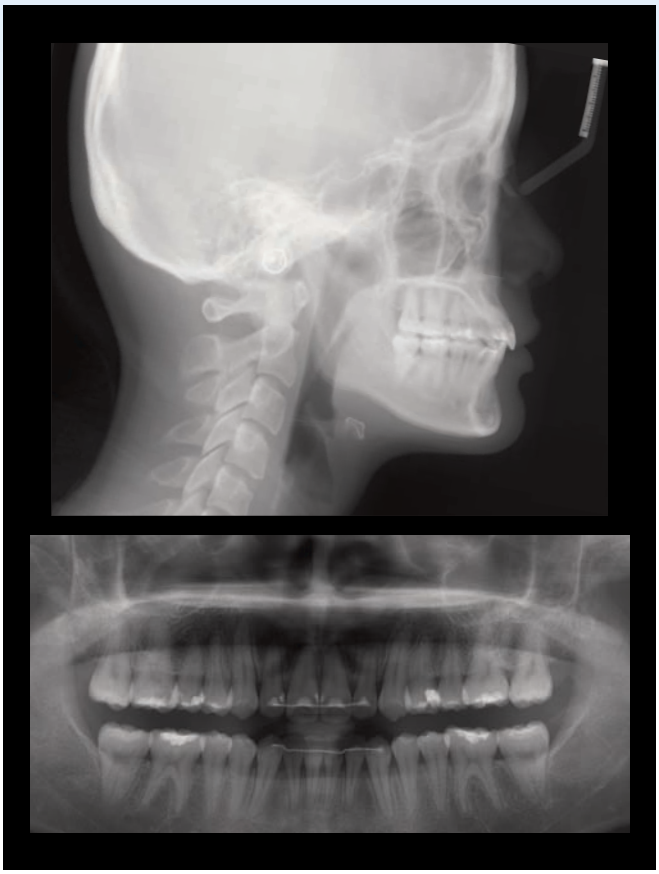


Fig. 8: Posttreatment pano. and ceph. radiographs

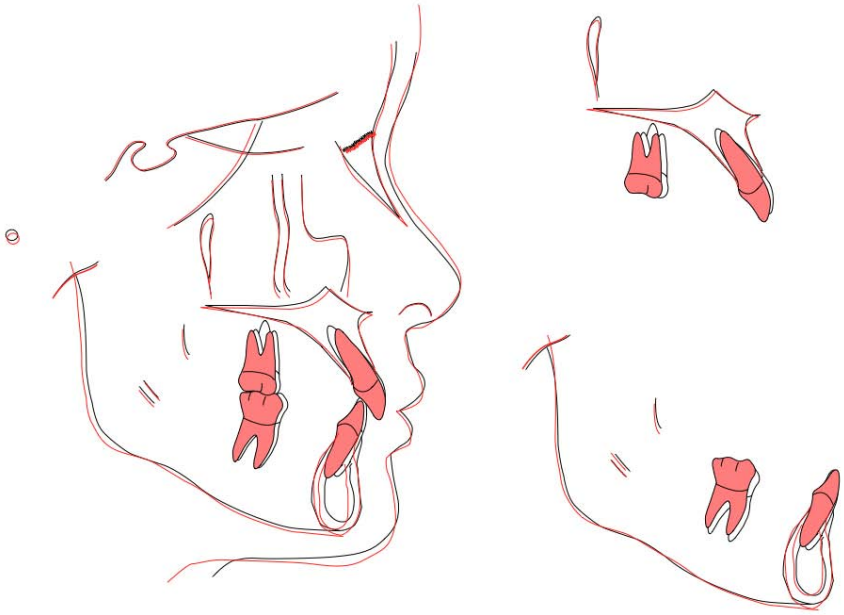


Fig. 9: Superimposed tracings

Fig. 10: The major diagnostic factors were a 6mm overjet and severe crowding in both arches.

- Transverse: Maintain

Mandible (*all three planes*):

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

Dentition:

- Maxillary: Correct incisal inclination, crowding and narrow arch width
- Mandibular: Correct incisal inclination, crowding, and the lingually inclined buccal segments
- Intermaxillary: Correct the left Class II molar relationship

Facial Esthetics: Maintain

Treatment Plan

All four third molars were extracted before initiating orthodontic treatment. Considering the patient's marginally retrusive lip position, a nonextraction (*other than third molars*) treatment plan with fixed appliances was indicated to resolve the crowding. Damon D3MX brackets (*Ormco*), with an .022" slot, were selected because this light force, self-ligation system can increase arch width and create space for correcting the crowding. This method is particularly effective for patients with a narrow arch form. All upper and lower incisors were bonded with low torque brackets. Interproximal reduction (*IPR*) of the enamel on the lower incisors was indicated to avoid flaring of the lower anterior teeth. Class II elastics were used to resolve the sagittal occlusion discrepancy, and detailing bends and settling elastics produced the final occlusion. The fixed appliances were removed and the corrected dentition was retained with anterior fixed retainers on both arches, and a clear overlay retainer on the upper arch.

Appliances and Treatment Progress

After the extraction of all four third molars, a .022" slot Damon D3MX® appliance (*Ormco*) was bonded on all teeth in both arches. Low torque brackets were used for all the incisors. The maxillary arch was bonded first (*Fig. 11*), and one month later the lower arch was initiated (*Fig. 12*). The wire sequences were identical for both arches: .014 CuNiTi, .016 CuNiTi, .014x.025 CuNiTi, and .017x.025 low friction TMA. In the 14th month of treatment, a .019x.025 De-Q (*-20°*) wire was used in the upper arch to enhance the torque control of the incisors (*Fig. 13*), and IPR was performed on the lower incisors to provide crowding relief and to prevent lower anterior flaring (*Fig. 14*).

Fig. 11:

Upper arch was bonded with .022" slot Damon D3MX® brackets. Low torque brackets were chosen for the incisors.

Fig. 12:

Lower arch was bonded with Damon D3MX® brackets. Low torque (-6°) brackets for the incisors played a role in the torque control.

Fig. 13:

The .019x.025 De-Q (-20°) wire was used in the upper arch to enhance the torque control of the anterior teeth.

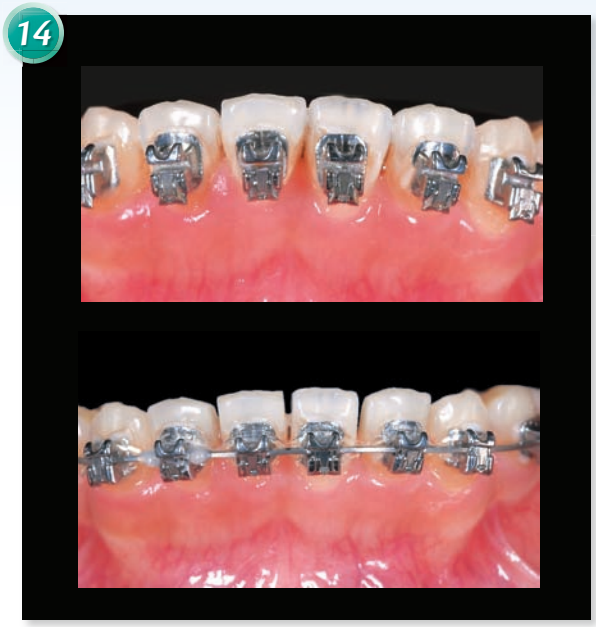


Fig. 14:

The lower incisors were stripped to provide crowding relief and to prevent the anterior flaring out.

In the 19th month, bracket positions were corrected for the upper right central incisor and canine. Torquing springs (*.018X.025*) were placed on both upper canines to apply labial root torque. In the 22nd month, torquing springs for the labial root torque of the upper canines continued, and Class II elastics were included to improve the molar relationship (*Fig. 15*). From the 24th month, up and down triangle elastics (*4.5oz*) were used in the canine regions for final detailing of the anterior segments (*Fig. 16*).

After 26 months of active treatment, the appliances were removed. Before and after treatment casts documented arch expansion in both the maxillary (*Fig. 17*) and mandibular (*Fig. 18*) arches. Anterior fixed retainers were bonded on both arches as follows: 2-2 in the upper and 3-3 in the lower. A clear overlay retainer was delivered for the upper arch, and a

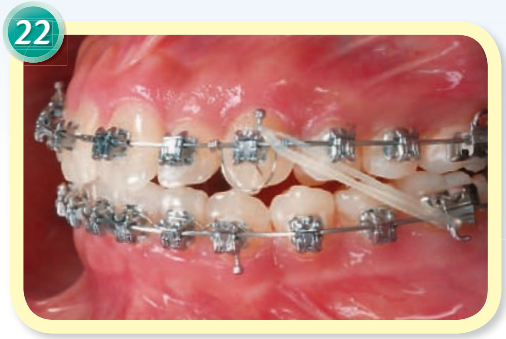


Fig. 15:

Torquing springs (.018X.025) were placed on both upper canines for torque control. Class II elastics were included to improve the molar relationship.

Fig. 16:

The up and down elastics (4.5oz) were used anteriorly for final detailing of the anterior segments.

gingivectomy was performed on the upper lateral incisors with a diode laser to improve the crown length-to-width proportion (*Fig. 19*).

Results Achieved

Maxilla (*all three planes*):

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

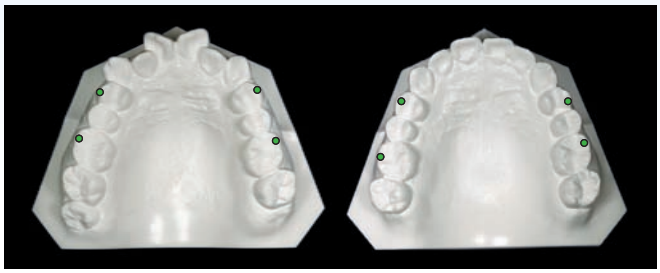


Fig. 17:

In the upper arch : the inter-premolar width was increased 5mm and the inter-molar width was increased 4mm.

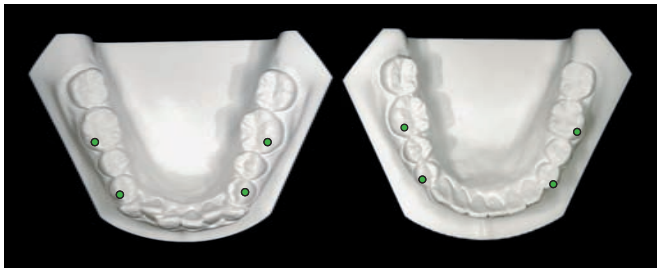


Fig. 18:

In the lower arch, the same amount of width was increased as in the upper arch.

Fig. 19:

The gingival display of the upper lateral incisors was improved by gingivectomy .

Mandible (*all three planes*):

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

Maxillary Dentition:

- A - P: Improved the axial inclination of the upper incisors (*118°to 110°*)
- Vertical: Maintained
- Inter-premolar width: Increased 5mm (*39.5mm to 44.5mm*)
- Inter-molar width: Increased 4mm (*49mm to 53mm*)

Mandibular Dentition:

- A - P: Increased the axial inclination of lower incisors (*86° to 93°*)
- Vertical: Maintained
- Inter-premolar width: Increased 5mm (*30mm to 35mm*)
- Inter-molar width: Increased 4mm (*42mm to 46mm*)

Facial Esthetics: Maintained

Retention

As previously described, fixed retainers were bonded on all maxillary incisors and from canine to canine in the mandibular arch. An upper clear overlay retainer was delivered. The patient was instructed to wear it full time for the first 6 months and nights only indefinitely. Instructions for home care and maintenance of the retainers were also provided.

Gingival Display

Following removal of the fixed appliances and the post-treatment recovery of the gingival contours, the maxillary lateral incisors had excessive gingival display. Adjusting the gingival esthetics, particularly for teeth in the esthetic zone (*maxillary anterior region*) must be approached carefully. The gingival sulcus of the upper lateral incisors was probed and the average depth on the labial surface was 4mm. Deducting 2mm for the biological width of the epithelial attachment and 1mm for the desired sulcus depth, a 1mm gingivectomy with a diode laser was deemed appropriate to improve the tooth proportions and gingival display. Fig. 19 shows the gingival display on the maxillary lateral incisors before and after gingivectomy.

Final Evaluation of Treatment

The Cast-Radiograph Evaluation score (*http://www.americanboardortho.com/professionals/clinicalexam/*) was 21 points as shown in the subsequent work sheet. The major discrepancies were the buccolingual inclination (*6 points*), uneven marginal ridges (*5 points*) and root angulation (*4 points*). The IBOI pink and white esthetic score was 4.

The molar and canine relationship are both Class I. Both overbite and overjet were ideal. Upper incisor to the SN angle decreased from 118° to 110°. The Lower incisor to the Md plane angle increased from 86° to 93°. Lip protrusion increased in both arches: UL-E line increased from -1.5mm to -1mm, LL-E line increased from -1.5mm to -0.5mm. As previously described, arch widths increased 4-5mm in both arches (*Figs. 17-18*).

The patient's chief concern (*crowding*) was resolved. A good intermaxillary alignment was achieved consistent with optimal esthetics. Overall, the treatment results were pleasing to both the patient and the clinician.

Discussion

Deciding on extraction or non-extraction treatment is often perplexing, especially in borderline cases. The principal consideration is how to create space to correct crowding without adversely affecting the facial profile. Proffit, Fields and Sarver[1] concluded that arch expansion, without moving the incisors anteriorly, was the most critical factor in achieving a satisfactory resolution of crowding without extractions.

The diagnosis was performed according to the Chang[2] criteria for "Crowding: Ext. vs. Non-ext." A non-extraction approach was indicated due to the straight profile, relatively retrusive lips, and low mandibular plane angle. However 8-10 mm of crowding in each arch, and the anteriorly inclined upper incisors, were a challenge to manage. The current approach focused on gaining space while controlling the axial inclinations of the anterior teeth.

The Damon passive self-ligation system provides a good mechanism for gaining space via posterior transverse arch adaptation. Dwight Damon proposed: "*With light forces in a passive system, the posterior transverse arch adaptation results from interplay among the tongue, the alignment forces and the resistant lip musculature. Working in conjunction, they encourage the teeth to follow the path of least resistance, which is posterolaterally.*" Bagden[3] pointed out that the additional arch width that is gained by this process produces the space required to resolve most crowded dentitions without extractions, molar retraction or rapid palatal expansion. In the present case, the narrow arch forms were widened in both arches. Arch expansion was 5mm in the premolar and 4mm in the molar regions, respectively. Excellent alignment was achieved and the result was stable 3 years later, at a follow-up examination (*Figs. 20-22*).

To supplement arch expansion, space was also created with interproximal enamel reduction (*IPR*).[4] It was performed on the lower incisors in the 14th month to prevent labial flaring.[5] Despite arch expansion and IPR, the lower incisor to the Md plane angle increased from 86° to 93°. This result was expected because of the severe dental crowding initially; however, a lower anterior fixed retainer was deemed necessary for long-term stability of the lower incisor alignment.

Fig. 20: Posttreatment facial photographs (3 years follow up)

Fig. 21:
Posttreatment intraoral photographs (3 years follow up)

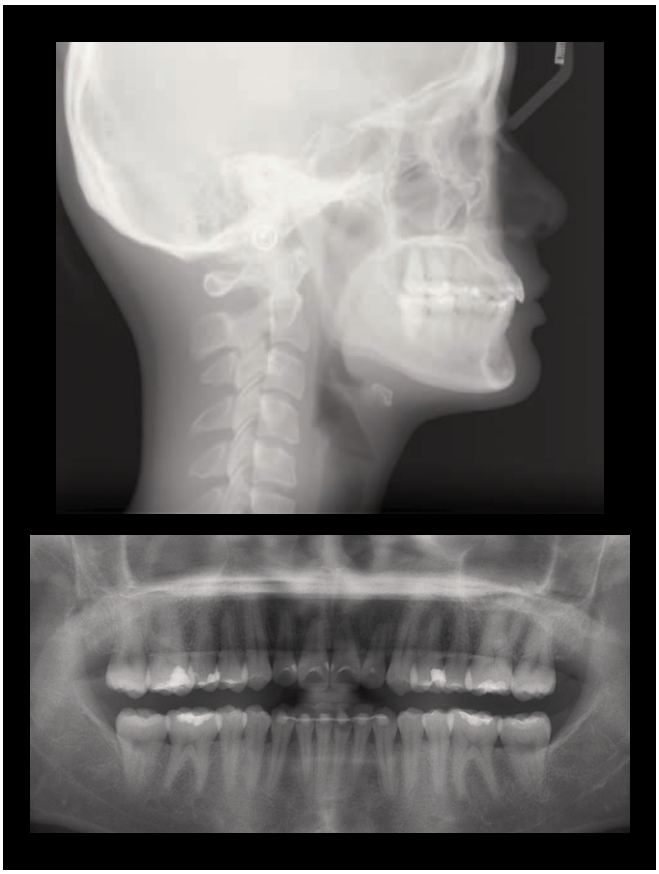


Fig. 22:
Posttreatment pano and ceph radiographs
(3 years follow up)

Kozlowski[6] has emphasized the following important principle: "*Match Torque Selection to Case Goals.*" Utilizing the variable torque options of the Damon System, treatment time can be shortened while enhancing stability. Because of the severe anterior crowding and anteriorly tipped incisors in the maxillary arch, the low torque brackets on the upper incisors were engaged with a .019X.025 De-Q (*-20°*) archwire to provide additional torque control in the 14th month. Combined with the retraction force of the CII elastics, the axial inclination of the maxillary incisors improved from118° to 110°. Bone screws anchorage was not applied. Additional compensations for the maxillary anterior flaring were torquing springs (*.018X.025 SS*) which were applied to the upper canines to enhance labial root torque. The low torque (*-6°*) brackets on lower incisors were effective in helping control axial inclinations.

The IBOI Cast-Radiograph Evaluation, which is based on the ABO method,[7] was 21; most of the points deducted were for discrepancies of the buccolingual inclination, marginal ridge alignments and root angulation. It appears that the majority of

CEPHALOMETRIC			
SKELETAL ANALYSIS			
	PRE-Tx	POST-Tx	DIFF.
SNA°	80°	80°	0°
SNB°	81°	80°	1°
ANB°	-1°	0°	1°
SN-MP°	28°	29°	1°
FMA°	21°	22°	1°
DENTAL ANALYSIS			
U1 TO NA mm	4 mm	3 mm	1 mm
U1 TO SN°	118°	110°	8°
L1 TO NB mm	0.5 mm	1 mm	0.5 mm
L1 TO MP°	86°	93°	7°
FACIAL ANALYSIS			
E-LINE UL	-1.5 mm	-1 mm	0.5 mm
E-LINE LL	-1.5 mm	-0.5 mm	1 mm

■ Table. 1: Cephalometric summary

these residual problems could have been corrected if they had been identified with prefinish records: casts and a panoramic radiograph obtained about 6 months before the anticipated debonding date. When finishing problems are known, most can be systematically eliminated in the last few months of treatment.[8]

Conclusion

When choosing a non-extraction approach for resolving severe anterior crowding, the most critical consideration is to choose a method for gaining space that does not produce excessive flaring of the incisors. The Damon System offers an efficient way to gain space by using light forces that are within the functional adaptation capability of the oral cavity. Furthermore, anterior torque control and interproximal stripping of enamel is also helpful for achieving a pleasant result. Resolving the problem for the patient satisfactorily, without any undesirable side effects, should be the guiding principle.

Acknowledgment

Thanks to Dr. Roberts for proofreading this article.

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Discrepancy Index Worksheet

TOTAL D.I. SCORE 14

OVERJET

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

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

Total = 3

OVERBITE

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

Total = 2

ANTERIOR OPEN BITE

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

Total = 0

LATERAL OPEN BITE

2 pts. per mm. per tooth

Total = 0

CROWDING (only one arch)

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

Total = 7

OCCLUSION

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

OTHER (See Instructions)

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

Identify:

Total = 0

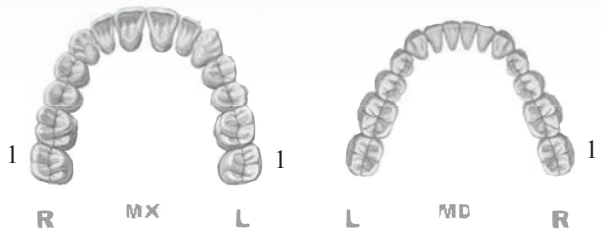
Cast-Radiograph Evaluation

Case # 1 **Patient**

Total Score: 21

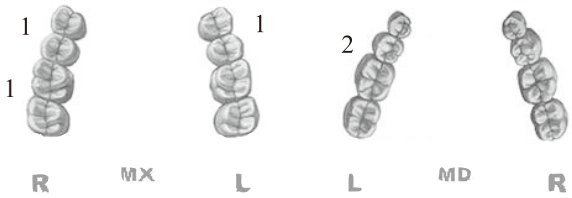
Alignment/Rotations

3



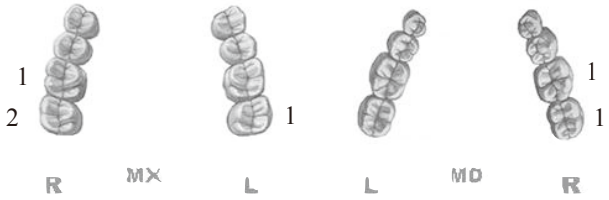
Marginal Ridges

5



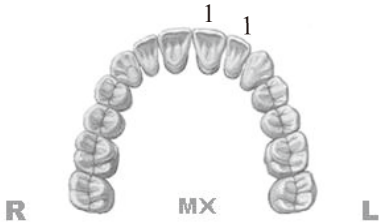
Buccolingual Inclination

6



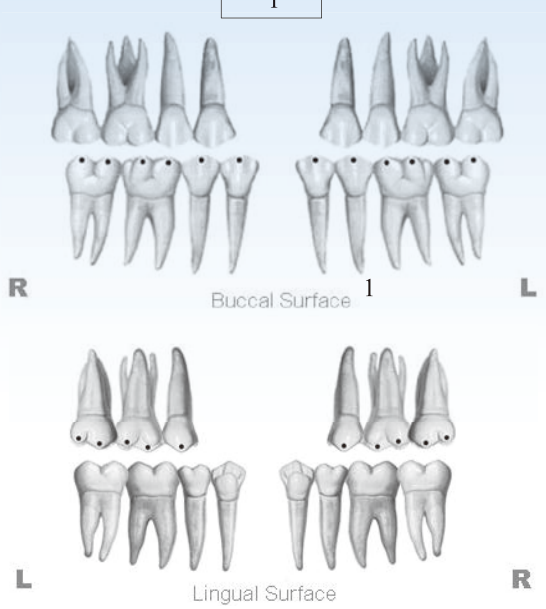
Overjet

2



Occlusal Contacts

1

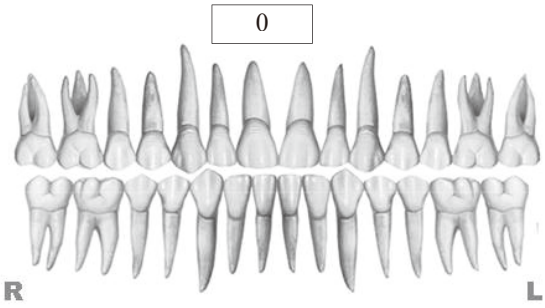


Occlusal Relationships

0

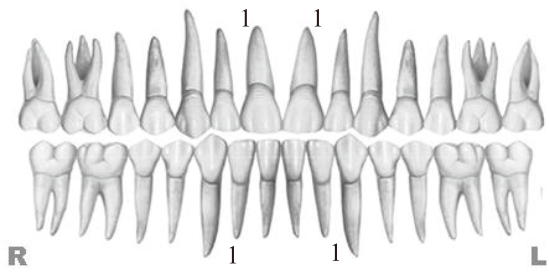
Interproximal Contacts

0



Root Angulation

4



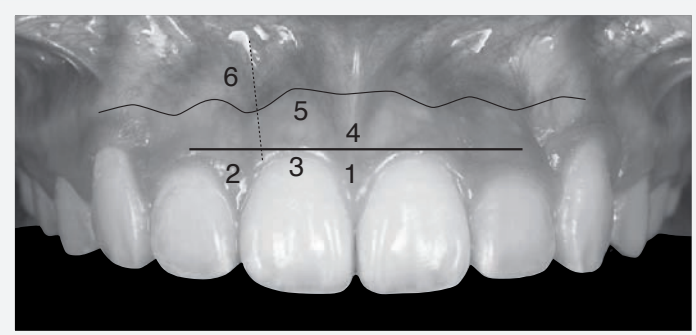
INSTRUCTIONS: Place score beside each deficient tooth and enter total score for each parameter in the white box. Mark extracted teeth with "X". Second molars should be in occlusion.

IBOI Pink & White Esthetic Score

Total Score: = 4

1. Pink Esthetic Score

Total = 2

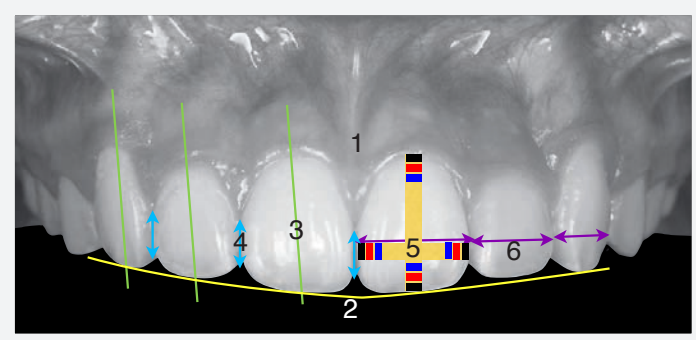


1. Mesial Papilla	0	1	2
2. Distal Papilla	0	1	2
3. Curvature of Gingival Margin	0	1	2
4. Level of Gingival Margin	0	1	2
5. Root Convexity (Torque)	0	1	2
6. Scar Formation	0	1	2

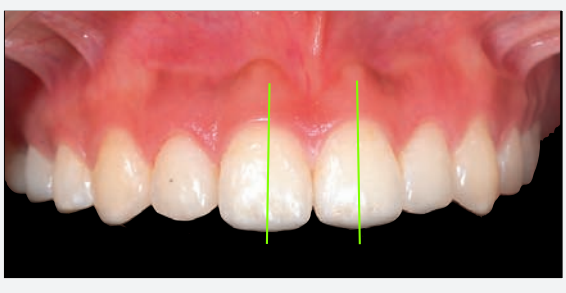
1. M & D Papillae	(0)	1	2
2. Keratinized Gingiva	(0)	1	2
3. Curvature of Gingival Margin	(0)	1	2
4. Level of Gingival Margin	(0)	1	2
5. Root Convexity (Torque)	0	1	(2)
6. Scar Formation	(0)	1	2

2. White Esthetic Score (for Micro-esthetics)

Total = 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

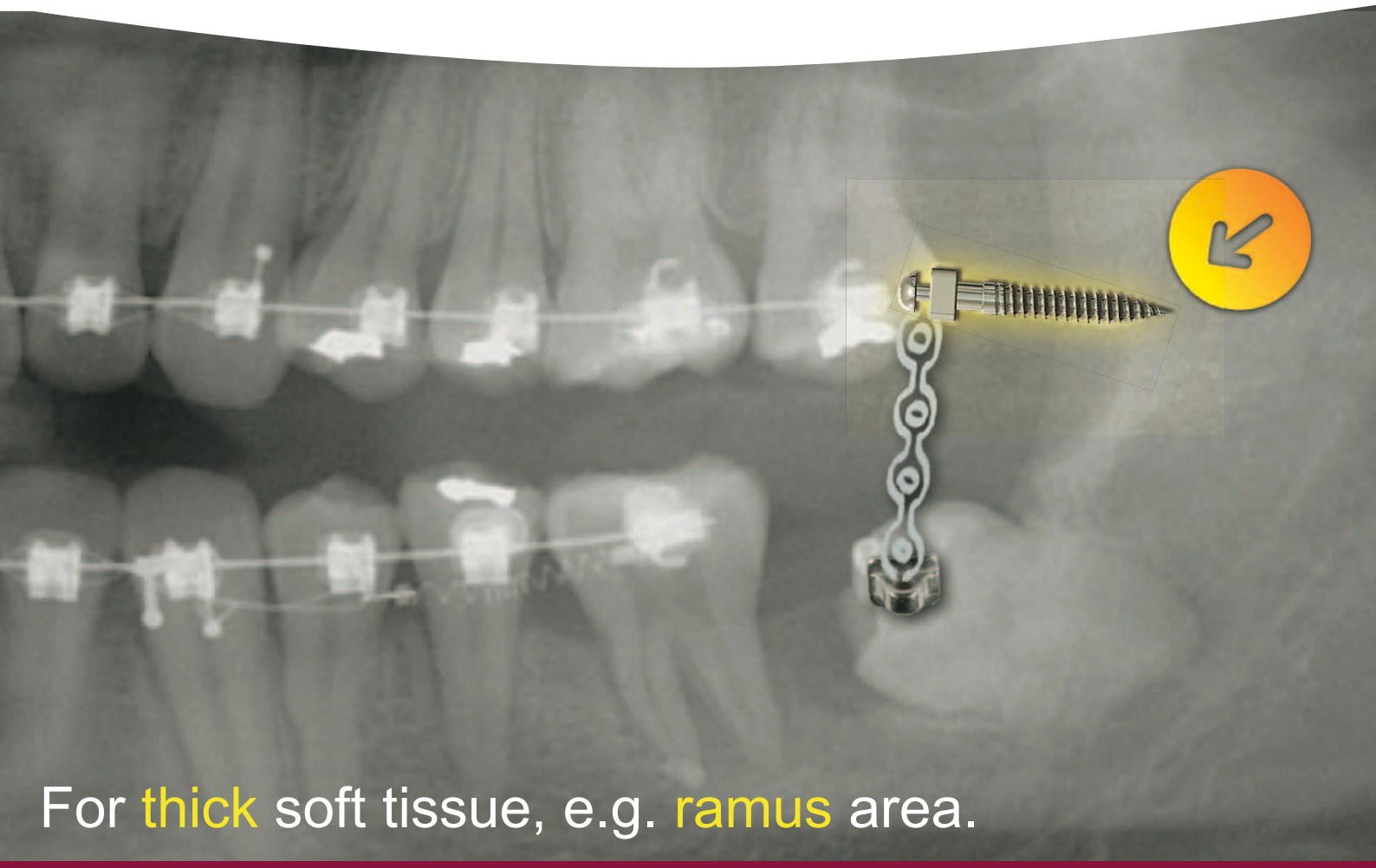


1. Midline	(0)	1	2
2. Incisor Curve	(0)	1	2
3. Axial Inclination (5° , 8° , 10°)	0	1	(2)
4. Contact Area (50%, 40%, 30%)	(0)	1	2
5. Tooth Proportion (1:0.8)	(0)	1	2
6. Tooth to Tooth Proportion	(0)	1	2

Make it easy!

New

Mushroom 2.7 (2.0 x 14mm)



2.7 Mini Set

Mushroom 2.7 x 5
Screw-driver x 2

TEL: +886-3-573-5676 http://orthobonescrew.com Newton's A

Class I Crowding with Canine Transposition and Midline Deviation

History and Etiology

A 18-year-11-month-old male presented with a chief complaint of "*crocked teeth,*" an apparent reference to his asymmetric anterior malocclusion (*Figs. 1-3*). There was no other contributory medical or dental history. Clinical exam revealed transposition of the permanent right maxillary canine and adjacent premolar. In addition, generalized crowding was noted in both arches (*Fig. 2*). Extraction of all four first permanent premolars was indicated, to relieve crowding in both arches and correct the canine-premolar transposition. The patient was treated to an acceptable result as documented in Figs. 4-9. Detailed diagnosis, treatment procedures and recommended follow-up will be discussed below.

Fig. 1: Pretreatment facial photographs

Fig. 2: Pretreatment intraoral photographs

Diagnosis

The patient presented with a convex facial profile and a bilateral class I molar relationship. The maxillary dental midline was shifted 2 mm to the right of the facial midline, and there was a lingual cross-bite of the right maxillary lateral incisor. Cephalometric and panoramic radiographs (*Fig. 7*) document the complexity of the malocclusion (*Fig. 10*).

Skeletal:

- Skeletal Class I (*SNA 75°, SNB 74°, ANB 1°*)

Fig. 3: Pretreatment study models

Dr. Wei Ming-Wei, Lecturer,
Beethoven Orthodontic Center (left)
Dr. Chris HN Chang, Director,
Beethoven Orthodontic Center (middle)
Dr. W. Eugene Roberts, Consultant,
International Journal of Orthodontics & Implantology (Right)

Fig. 4: Posttreatment facial photographs

Fig. 5: Posttreatment intraoral photographs

Fig. 6: Posttreatment study models

- Mandibular plane angle (*SN-MP 35°, FMA 28°*)

Dental:

- Bilateral Class I crowded malocclusion
- overbite: 3.5 mm
- overjet: 3 mm
- Severe crowding of about 10 mm in the upper arch and 9 mm in the lower arch

The ABO Discrepancy Index (*DI*) was scored at 15 points 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: Retraction of incisor
- Vertical: Maintain
- Inter-molar Width: Maintain

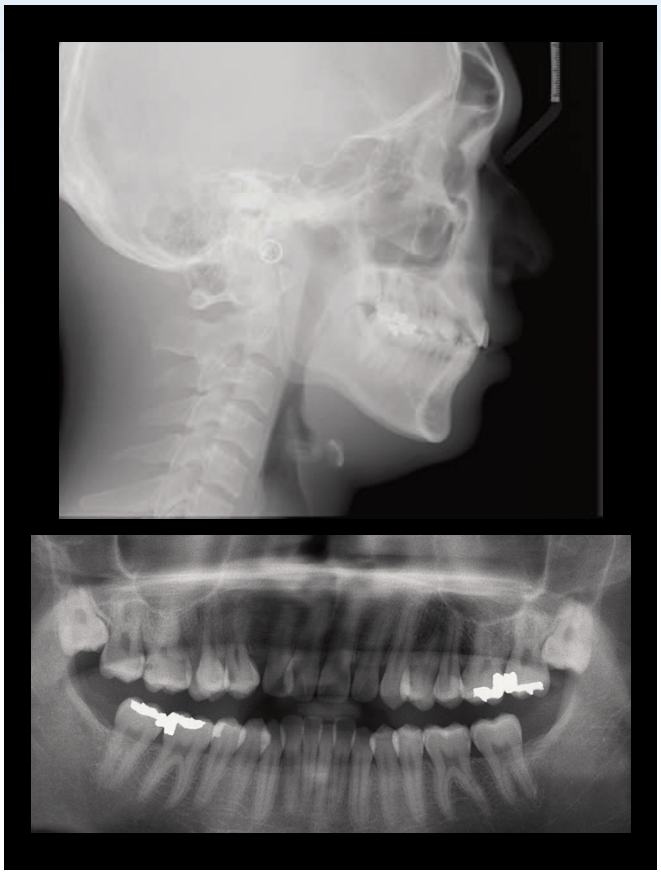


Fig. 7: Pretreatment pano. and ceph. radiographs

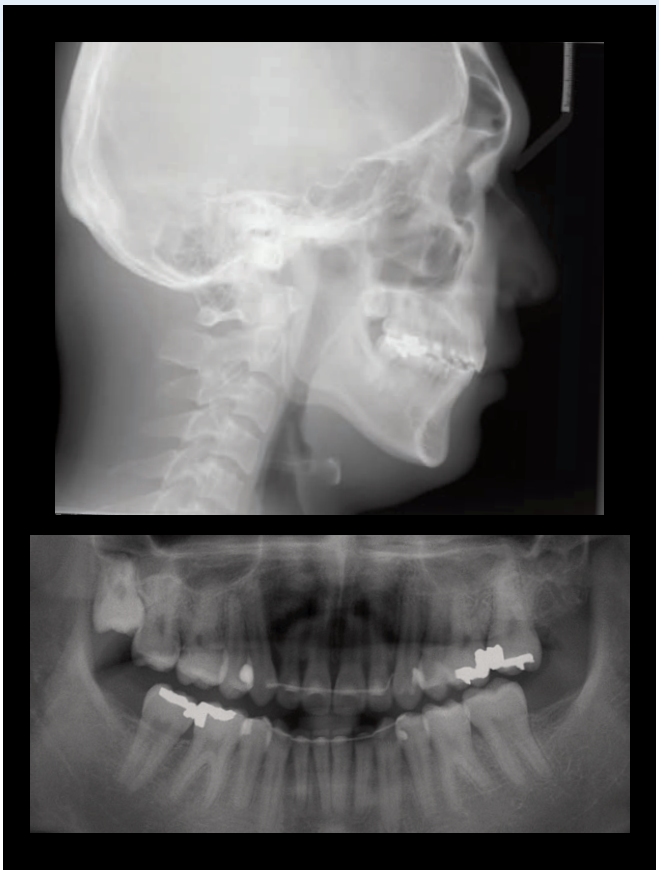


Fig. 8: Posttreatment pano. and ceph. radiographs

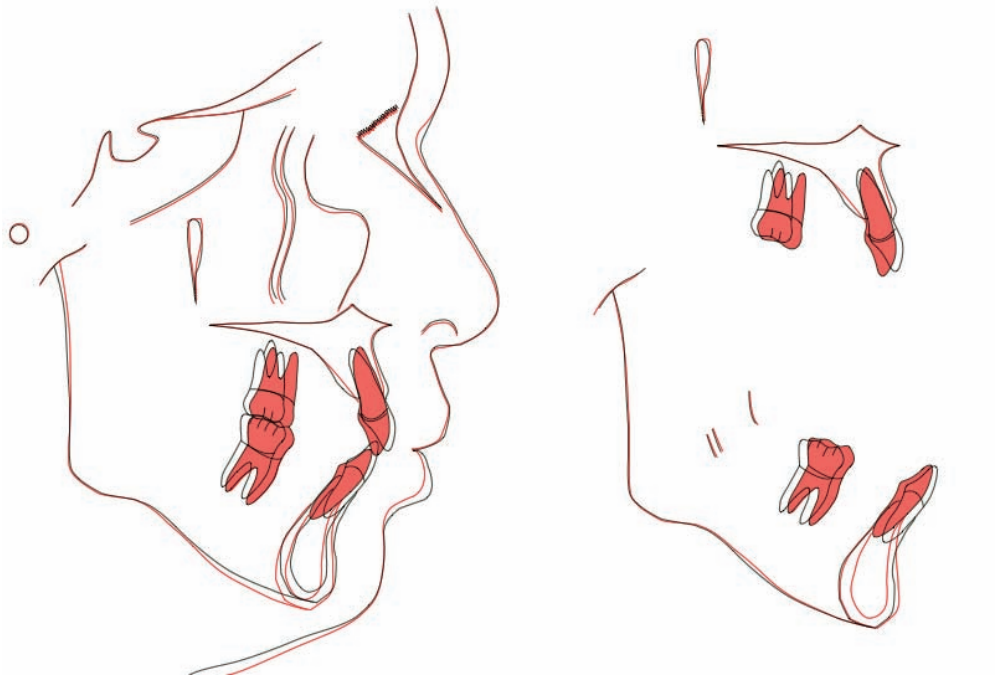


Fig. 9:

Superimposed tracings. Reasonable molars mesial drift and retraction of incisors in extraction orthodontic case. Overjet correction due to maxillary incisors uprighting. Well controlled lower incisors' torque were noticed.

Fig. 10. The magnified view of the right maxillary canine-premolar transposition and general crowding before treatment.

Mandibular Dentition

- A - P: mild retraction of incisors
- Vertical: Maintain
- Inter-molar / Inter-canine Width: Maintain

Facial Esthetics: Retraction of lower lip

Treatment Plan

The 1st premolars in all four quadrants were extracted to create space to correct crowding in both arches, as well as to align the transposed maxillary right canine. Examination of the extracted premolars (*Fig. 11*) demonstrates that the patient is caries susceptible. Bitewing radiographs are indicated to rule out other carious lesions. Posterior bite turbos were applied initially to facilitate bite opening and leveling. After the maxillary lateral incisor cross-bite was corrected, the posterior bite turbos were removed. The extraction space in the maxillary right quarter was used to correct the midline deviation.

In the later stage of the treatment, anterior bite turbos were used to assist in overbite and overjet correction. Following space closure, detailing bends were applied to produce the final occlusion. The

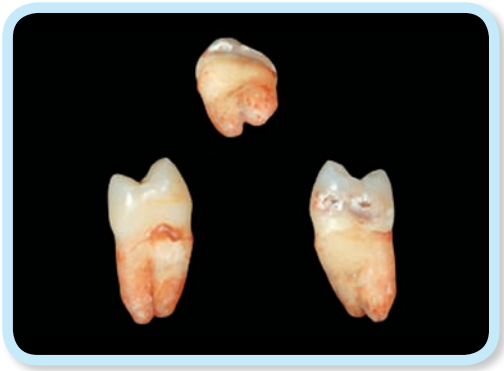


Fig. 11. extracted premolars with proximal caries.

fixed appliances were removed and the corrected dentition was retained with fixed anterior retainers (*Mx 3-3, Md 5-5*) in both arches.

Appliances and Treatment Progress

A .022" Damon D3MX bracket system (*Ormco*) was used. The maxillary arch was bonded with standard torque brackets on the anteriors, which led to problems as will be discussed later (*Fig. 12*) .

After six months of active treatment, the right maxillary canine and adjacent lateral incisor were aligned. Mandibular anterior teeth were aligned, as

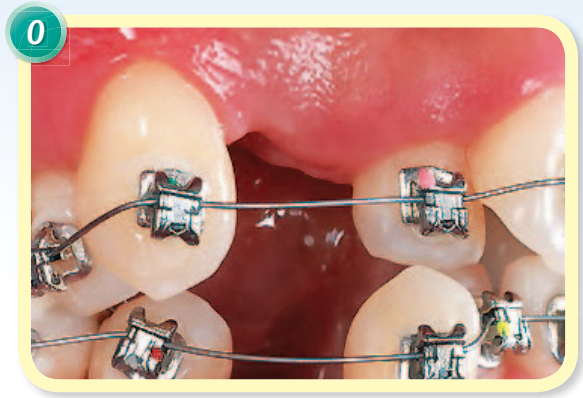


Fig. 12:
faulty torque selection in right maxillary lateral incisor and canine.

the canines were retracted. The distal angulation of mandibular canines and increased Curve of Spee were noted at this stage (*Fig. 13-14*). The problem resulted from space closure with light archwires that failed to deliver adequate distal root torque in the mandibular anterior segment. After nine months of treatment, both arches were aligned to receive .019 x .025" SS arch-wires (*Fig. 15*) to correct the curve of Spee and provide additional distal root torque for space closure. The arch wire was cut distal to the left maxillary 1st molar. Anterior bite turbos and Class II elastics were utilized, from the left maxillary canine to the left mandibular first molar, to facilitate correction of the curve of Spee and retract the canines (*Fig. 14*). Following alignment, dark triangles developed between the central incisors, and the right central and lateral incisors (*Fig. 15*).

It took another eight months to close the left maxillary 1st premolar extraction space. The midline deviation was significantly improved but not fully corrected. In the 19th month of treatment, another panoramic film was taken, followed by re-bonding for detailing and correction of esthetic problems in the anterior region (*Fig. 16*). Triangle elastics were

Fig. 13:
6th month of treatment. Well aligned teeth in both arches and an increasing Curve of Spee in mandibular arch were noticed.

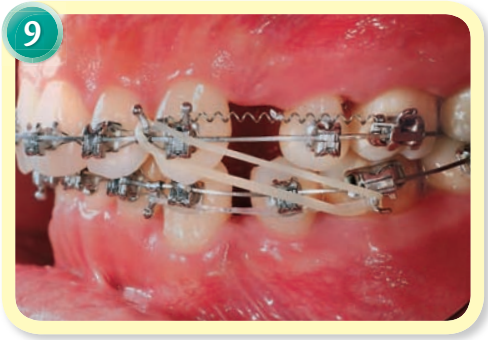


Fig. 14:
Arch wire was cut end in the distal of left maxillary 1st molar with Class II elastic applied in major space closure.

Fig. 15:
In the 9th month of treatment, a dark triangle was noted between the maxillary right central and later incisors.

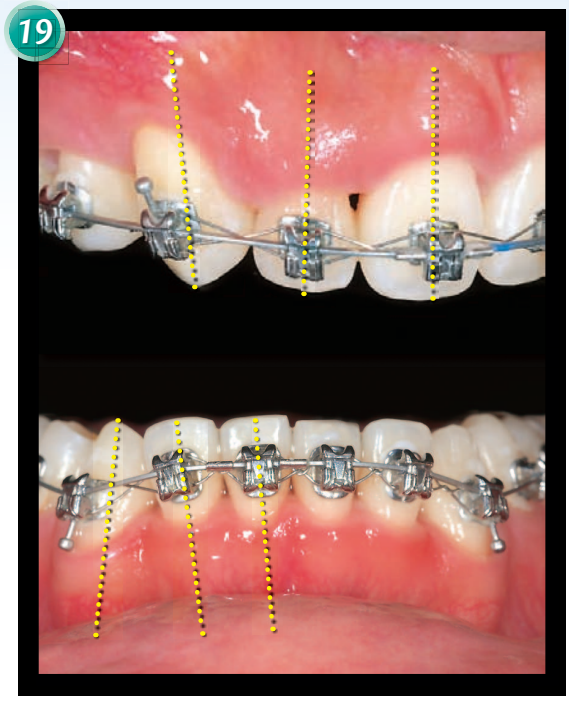


Fig. 16:
Mild angulation deviation causing the anesthetic result in both arches.

used bilaterally in the premolar region to settle the occlusion.

Archwire expansion was used to increase the mandibular inter-canine distance in the 23rd month of treatment. Following final detailing, all appliances were removed after 24 months. Upper clear overlay and fixed anterior (*Mx 3-3, Md 5-5*) retainers were delivered for both arches.

Results Achieved

Maxilla (*all three planes*):

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

Mandible (*all three planes*):

- A - P: Maintained
- Vertical: clockwise rotation
- Transverse: Mild increase

Maxillary Dentition

- A - P: Uprighting incisors 8 degrees
- Vertical: Molar extrusion
- Inter-molar / Inter-canine Width: Maintained

Mandibular Dentition

- A - P: Maintained lower incisor angulation
- Vertical: Molar extrusion
- Inter-molar / Inter-canine Width: Maintained

Facial Esthetics: Moderate retraction of the lower lip

Retention

The fixed retainer was bonded on all maxillary incisors. The mandibular fixed retainer was bonded from second premolar to second premolar. An upper clear overlay was delivered. The patient was instructed to wear it full time for the first 6 months and nights only thereafter. The patient was trained relative to home care and maintenance of the retainers.

Final Evaluation of Treatment

The ABO Cast-Radiograph Evaluation score was 26 points. The major discrepancies were in the right occlusal relationships, alignment/rotation, and marginal ridges. The upper dental midline discrepancy was decreased to 1.5 mm to the left of the facial midline. The transposed canine was well aligned, and the adjacent gingival texture was healthy (*Fig. 20*). However, the posttreatment panoramic radiograph shows an apparent, vertical osseous defect on the mesial of the right maxillary canine. Periodontal follow-up is indicated.

The use of Class II elastics was necessary to anteriorly reposition the mandibular dentition, because there was inadequate torque in the incisor brackets. Overall, this severe crowding case was treated to an acceptable facial and dental result, but the loss of alveolar bone height in the maxillary anterior region and possible vertical osseous defect must be carefully monitored (*Fig. 8*).

Discussion

Tooth transposition is defined as the positional interchange of two adjacent teeth. This problem is more common in the maxillary arch. Although maxillary tooth transposition is an uncommon growth abnormality in the general population, the incident rate rises to approximately one in 300 orthodontic patients.[1] Peck et al. (*Fig. 17*) found that maxillary canine-first premolar transposition is the most frequent type. Typically, the transposed maxillary canine is found to be blocked-out facially between maxillary first and second premolar. The canine is usually rotated mesiofacially, and the first

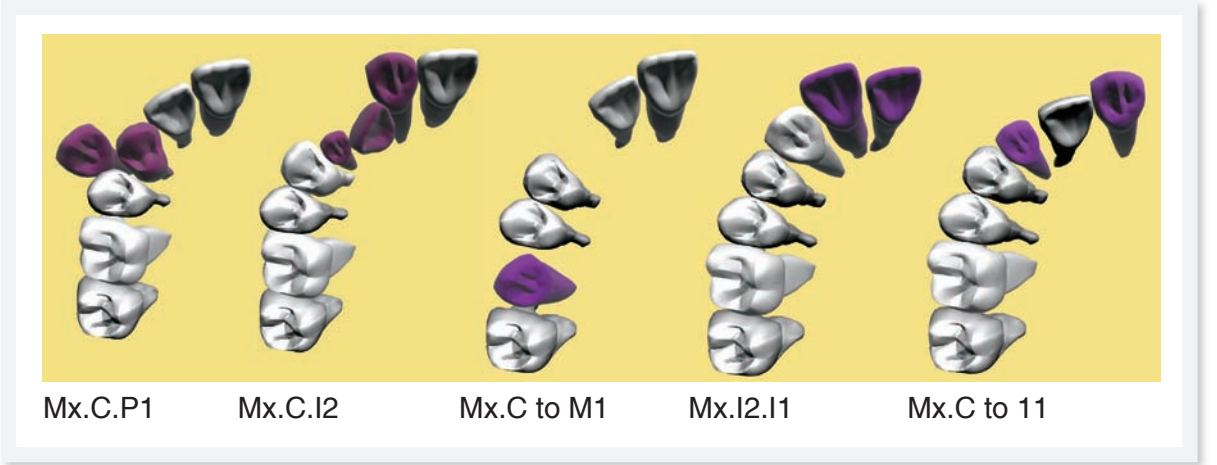


Fig. 17: Five types of maxillary tooth transposition introduced by Peck in 1995.[1]

premolar is distally tipped and rotated mesiopalatally (*Fig. 18*), with or without a primary canine in arch.[2] Genetics is the main etiologic factor for maxillary canine-first premolar transposition. After a thorough diagnosis, three treatment modalities are considered:

1. Non-extraction treatment and keep the transposed tooth order: Different root prominence and gingival margin discrepancy are expected to create a compromised result. Palatal cusp reduction of transposed maxillary first premolar is indicated in the latter stage of treatment, to achieve a better occlusion. With efficient mechanics, a acceptable esthetic and functional result can be achieved with a limited time in treatment.

2. Non-extraction treatment and correction of the transposed tooth order: Prolonged treatment time is expected with this treatment option. Furthermore, moderate root resorption of the canine and premolar is likely.[3] Increased complexity of treatment mechanics, and the possibility of canine gingival recession, may reduce the patient's motivation and compliance. The key to the success with this treatment approach is well controlled first premolar torque, during the canine mesial tipping period. Babacan [4] suggested using a .017x.025 TMA power-arm connection from the maxillary first molar to the first premolar to provide palatal root torque. Although moving the transposed maxillary canine and first premolar back to their anatomically normal positions, it is not suitable for most transpositions in the mandible. Chang[5] suggests a surgical procedure, Vertical Vertibular Incision Subperiosteal Tunnel Access(*VISTA*), as an appropriate choice for the extensive traction of the transposed tooth while producing minimal root damage and better patient comfort.

3. Extraction of transpositional first premolar: This is usually a relatively simple treatment option for crowded cases, with or without a convex profile. For the present case, generalized crowding and a mild lip protrusion indicated an extraction approach.

Fig. 18:
Characteristics of typical maxillary canine-first premolar transposition was found in this case.

The third treatment plan was selected for the present case. Considering the advantage of low friction self-ligation bracket system (*Damon D3MX bracket system, Ormco*), an archwire was fully engaged in the first appointment for the distal tipped right maxillary canine.[6] The arch was aligned within six months, and no significant side effects were noted. One of the advantages of low friction self-ligating brackets is the shortened initial leveling

time in severe crowding cases, such as the present one.[7] However, the initial selection of standard torque for both the right maxillary lateral incisor and the canine compromised treatment progress (*Fig. 12*). Standard torque brackets failed to express adequate torque control during alignment and space closure. Other accessories are available for increased control of root torque, including anterior root torque spring (*ART*), which is compatible with the passive self-ligating system.[8] On the other hand, differential torque selection in the maxillary anterior region may have reduced treatment time and achieved a better root alignment result.[9]

In the 6th month of active treatment, initial leveling and alignment was complete, but more space closure (~*8mm*) was required on the left side of maxilla. Anchorage control in this case was crucial. The post-treatment midline was deviated 1.5 mm to the right of facial midline (*Fig. 19*). Midline correction would have been much more efficient if a miniscrew was placed in the infrazygomatic crest of left maxilla, to enhance anchorage during the space closure stage. Although Kokich[10] asserted that mild midline deviations can be disregarded, better anchorage congtrol would have improved the result for this patient.

Fig. 19: Post treatment midline deviation.

In cases of moderate to severe anterior crowding in adults, dark interproximal triangles are a common problem when the teeth are aligned.[11] Contributing factors include: 1. poor oral hygiene, 2. mal-alignment of the dentition, 3. undiagnosed insipient periodontitis, and 4. under-development of the gingival papillae (*Figs. 15 and 16*). Effective approaches for reducing black triangles are rebonding to correct axial inclinations of the teeth, interproximal enamel reduction, and closure of the residual space.

Anterior bite turbos with Class II elastics were effective for retracting the maxillary canines, as the lower the Curve of Spee was corrected. However, these mechanics resulted in molar extrusion and clockwise rotation of mandible (*Fig. 9*). Increasing lower facial height, as evidenced by the 3 degree increase in the SN-MP angle, was undesirable for a patient with a convex profile. This problem could have been prevented by the use of differential torque brackets in the anterior segments to prevent distal tipping and extrusion of the incisors as they were retracted.

Gingival margins of right maxillary lateral incisor and canine were not satisfactory. Obviously, the axial control of lateral incisor could have been improved.

Fig. 20: Post treatment frontal view

Gingivoplasty after debonding[12] might improve esthetics. Adding more palatal root torque in right maxillary canine is unlikely to improve the gingival height, and it would create an unesthetic overjet, that might compromise canine function. Given this patient's primary concerns, a functionally stable canine relation with moderate gingival recession was the best compromise.

The ABO CRE score was 26, with most of the points deducted in incisor and molar alignment errors. Rebonding brackets, or wire bending for detailing, could have improved the final result.[13]

Conclusion

Treatment options for tooth transposition vary significantly. Correcting transposed teeth into anatomically normal positions may satisfying esthetic demands, but it complicates treatment. With careful diagnosis and adequate torque selection of brackets, acceptable results can be achieved nonextraction. As modern facial standards have evolved over the past twenty years,[14] the common focus continues to be a full smile and reduced buccal corridors. In the presence of substantial crowding, extraction of the transposed premolar considerably simplified treatment. Despite an extraction or nonextraction approach, the use of inter-arch elastics, in patients with a convex profile, should be avoided, if at all possible.

Self-ligating brackets facilitate the efficient initial alignment to correct crowding. However, the importance of differential torque control for malaligned teeth is critical, as demonstrated in the present case. This moderately difficult malocclusion (*DI = 15*) was treated to an acceptable result (*CRE = 26*). The midline deviation could be improved by

CEPHALOMETRIC			
SKELETAL ANALYSIS			
	PRE-Tx	POST-Tx	DIFF.
SNA°	75°	75°	0°
SNB°	74°	73°	0°
ANB°	1°	2°	1°
SN-MP°	35°	37°	2°
FMA°	28°	30°	2°
DENTAL ANALYSIS			
U1 TO NA mm	7 mm	6 mm	1 mm
U1 TO SN°	101°	93°	8°
L1 TO NB mm	5 mm	5 mm	0 mm
L1 TO MP°	98°	97°	1°
FACIAL ANALYSIS			
E-LINE UL	0 mm	-1 mm	-1 mm
E-LINE LL	2 mm	0 mm	-2 mm

Table. 1: Cephalometric summary

placing a miniscrew in the left posterior maxillary region.[15] The periodontal condition of the maxillary anterior region should be carefully evaluated. The posttreatment panoramic radiograph (*Fig. 8*) reveals decreased bone height in the maxillary anterior region, and there may be a vertical osseous defect on the mesial of the maxillary right canine.

Acknowledgment

Thanks to Ms. Tzu Han Huang for proofreading this article.

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Discrepancy Index Worksheet

TOTAL D.I. SCORE 15

OVERJET

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

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

Total = 4

OVERBITE

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

Total = 2

ANTERIOR OPEN BITE

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

Total = 0

LATERAL OPEN BITE

2 pts. per mm. per tooth

Total = 0

CROWDING (only one arch)

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

Total = 7

OCCLUSION

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

Total = 0

LINGUAL POSTERIOR X-BITE

1 pt. per tooth Total = 0

BUCCAL POSTERIOR X-BITE

2 pts. per tooth Total = 0

CEPHALOMETRICS (See Instructions)

ANB ≥ 6° or ≤ -2° = 4 pts.

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

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

SN-MP

≥ 38° = 2 pts.

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

≤ 26° = 1 pt.

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

1 to MP ≥ 99° = 1 pt.

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

Total = 0

OTHER (See Instructions)

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

Identify:

Total = 2

IMPLANT SITE

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

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

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

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

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

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

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

Total = 0

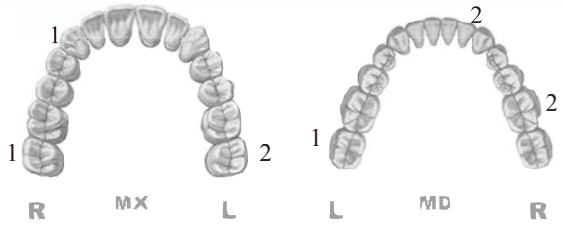
Cast-Radiograph Evaluation

Case # 1 **Patient**

Total Score: 26

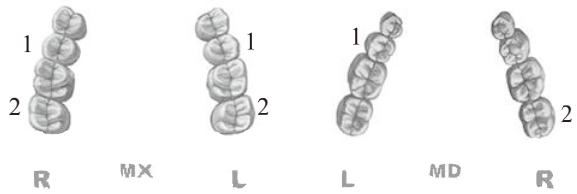
Alignment/Rotations

9



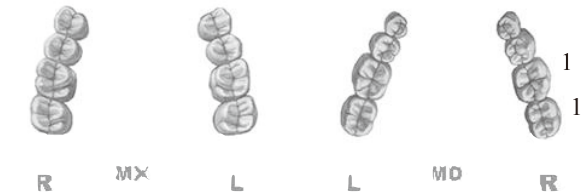
Marginal Ridges

9



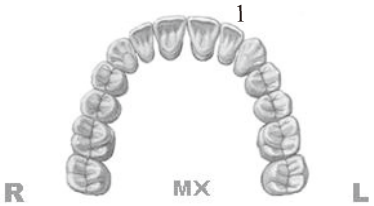
Buccolingual Inclination

2



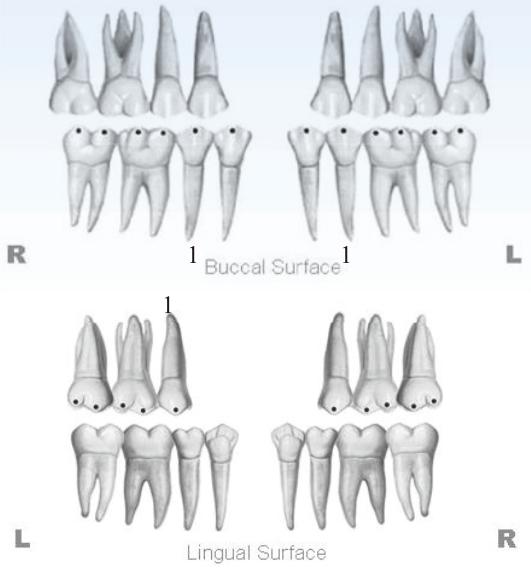
Overjet

1



Occlusal Contacts

3

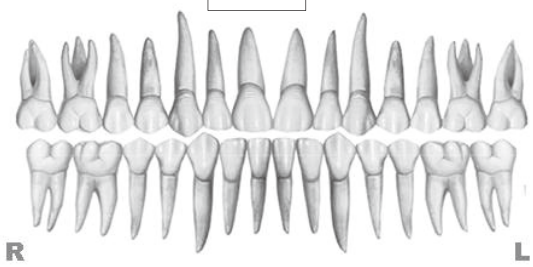


Occlusal Relationships

0

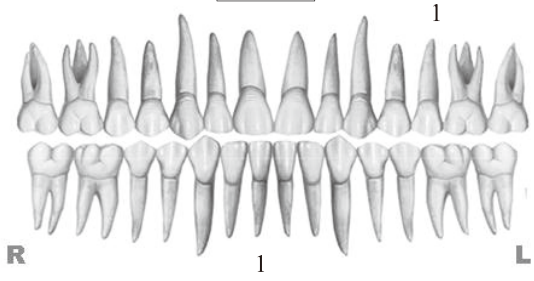
Interproximal Contacts

0



Root Angulation

2



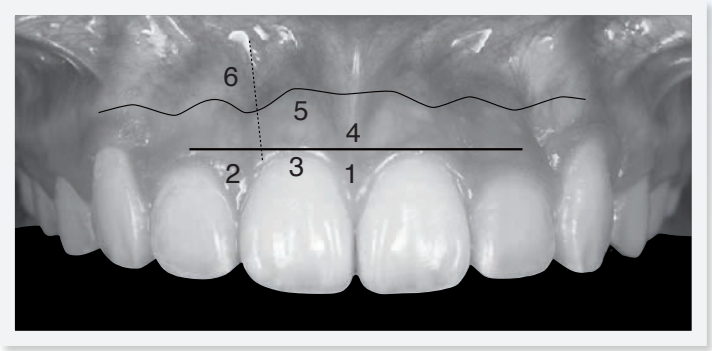
INSTRUCTIONS: Place score beside each deficient tooth and enter total score for each parameter in the white box. Mark extracted teeth with "X". Second molars should be in occlusion.

IBOI Pink & White Esthetic Score

Total Score: = 5

1. Pink Esthetic Score

Total = 2

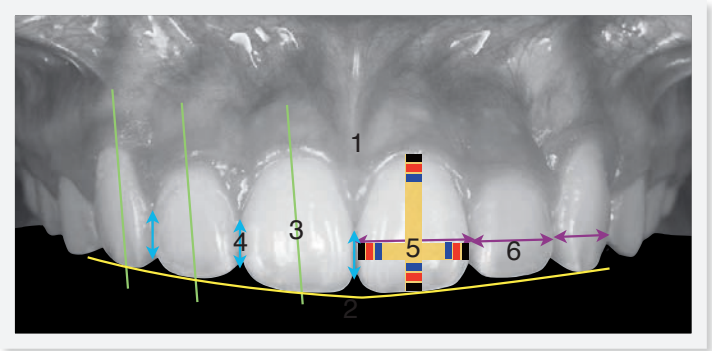


1. Mesial Papilla	0	1	2
2. Distal Papilla	0	1	2
3. Curvature of Gingival Margin	0	1	2
4. Level of Gingival Margin	0	1	2
5. Root Convexity (Torque)	0	1	2
6. Scar Formation	0	1	2

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

2. White Esthetic Score (for Micro-esthetics)

Total = 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

Update 2013

Real World

Dentistry for the Restorative Practice

Dr. Robort Lowe
November 12, 2013
Taipei, Taiwan

SPEAKER INTRODUCTION

Dr. Robert Lowe

Loyola University School of Dentistry: (closed 1993)

- Assistant Clinical Professor - Oral Diagnosis 1983-84
- Assistant Clinical Professor - Operative Dentistry, 1984-88
- Assistant Professor - Operative Dentistry 1988-93
- Sophomore Operative Techniques - Assistant Course Director, 1988-89
- Sophomore Operative Techniques - Course Director, 1989-93
- Senior Honors Operative Program - Director

Consultant in Restorative Dentistry - Edward Hines VA Hospital, Hines, Illinois – appointed June 1987

In 2004, Dr. Lowe received the Gordon Christensen Outstanding Lecturer Award for his contributions in Dental Education. In 2005, he received Diplomate status on the American Board of Aesthetic Dentistry, an honor shared by less than 50 dentists in the entire US. He has authored, published hundreds articles in cosmetic and rehabilitative dentistry in highly respected Dental Publications, some of which he sits on their editorial boards, and has contributed to dental textbooks, over his 31 year career. He's a consultant for the most prominent dental manufacturer's world wide and active as a key opinion the leader in development of new materials and techniques. As a clinical and educational leader in the field, He's consistently named to"Top 100 Clinicians in Dentistry" by Dentistry Today.

INTRODUCTION OF LECTURE

在當今不斷變化的經濟環境中，牙醫師們必須提供病人優質的服務，但仍保有一定的盈利。利用一致並可預期的臨床技術來節省操作時間，並同時創造高品質的補綴。牙科中有效率的新技術，將幫您的治療在市場上與眾不同。 現在就開始利用聰明及有效率的工作方式，來贏得我們最珍貴的資產 - Chair Time (診療時間)吧。

在此次的演講中，Dr. Lowe將教導許多小撇步，讓您的補綴成果維持在一定的水準。課程中將會討論新的牙科材料與使用技術，如何利用這些新技術來提昇醫師的專業，而不止是維持在" bottom line" 。即使遇到最困難及麻煩的治療，也能輕易完成。Dr. Lowe的演講還包含一個新的部份，即如何用創新的方式來面對臨床的狀況，避免時間與金錢的浪費，降低失敗率！

千萬不要錯過這個以技術操作為導向的演講，有用的臨床資訊，將助您的操作技術更上一層樓。

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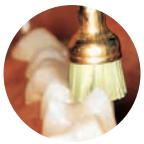
SCHEDULE OF LECTURE



08:30 - 09:00 • Registration Time

09:00 - 10:30 • Advances In Direct Composites

- Bulk fill and sonic delivery are changing the way we clinically fabricate direct composite restorations.
- Simple layering technique for life-like anterior aesthetics.
- Direct composite bridges

• "World Class" Crown and Bridge Techniques

- Tissue management and perfect master impressions
- Predictable cementation Protocols

10:30 - 10:50 • Morning Break

10:50 - 12:20 • "What's New In Aesthetic Dentistry?

- "No Prep" Porcelain Veneers
- "Pearlfect Smile" – Indirect Composite Veneers as a lower cost alternative to porcelain.
- Prefabricated Composite Veneers as an alternative to direct bonding.

12:20 - 13:30 • Lunch Break

13:30 - 15:00 • Prosthetic Tooth Repositioning and Orthodontic Tooth Preparation

- How to correct tooth position for function and aesthetics when the patient elects NOT to have pre prosthetic orthodontics for crowded cases.

• The Perio-Prosthetic Connection to Restorative Dentistry

- Soft tissue recontouring using diode lasers
- Biologic width: A discussion of the position of the alveolar crest relative to the restorative margin
- Biologic width correction for selected cases

15:00 - 15:20 • Break

15:20 - 17:00 • Creative Treatment Planning : When It Doesn't Go By The Book?

-Clinical solutions for "real life" problems
- Restoration of excessive tooth wear: The role of anterior guidance
- Open bite restoration without surgical intervention?
- Step by step clinical protocols for complete rehabilitation
- Dental implant restoration in the restorative practice
- Creative solutions for complex aesthetic and functional problems

• Q & A

INFORMATION OF LECTURE

Organizer : 中華民國牙體復形學會

Co-Organizer : 湧傑企業股份有限公司

Speaker : Dr. Robert Lowe

Time : 2013/11/12 (Tue.) 9:00am~5:00pm

Venue : 中國文化大學推廣教育部-建國本部大夏館
B1國際會議廳
(台北市建國南路二段231號)

Fee : 2013/10/15前
主協辦單位 會員2000元 / 非會員2500元
2013/10/15後
主協辦單位 會員2500元 / 非會員3000 元
(課程結束後贈送精美小禮物)
學生憑學生證報名500元(無贈品)
(名額有限，請先電話報名)

Registration : 02-27788315 分機#124王小姐/ #125劉小姐
請於報名後三日內，至郵局劃撥費用
（於通訊欄註明報名場次）
戶名：湧傑企業股份有限公司
帳號：17471807

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

Remark : 活動備茶點及午餐
報名未出席者恕不退還既收款項

Compromised Treatment for an Asymmetric Class II/III Mutilated Malocclusion with Facial Asymmetry

History and Etiology

A 23-year-6-month-old male presented for orthodontic consultation with chief complaints of irregular dentition, mandible shift and facial asymmetry (*Fig. 1*). There was no contributory medical or dental history. A clinical exam revealed that the permanent maxillary canines were erupted but blocked out labially. In centric occlusion (*Co*) the lower midline was shifted to the right by 6.5mm, which was equivalent to almost the width of a lower incisor. Lingual crossbite was noted on the right side, and the right lower second molar was missing (*Fig. 2*). The traditional treatment approach for a managing this severe malocclusion is orthognathic surgery, but that option was declined by the patient. He preferred only dentoalveolar correction which produced the compromised result, as documented in Figs. 4-6. The cephalometric and panoramic radiographs before treatment are shown in Fig. 7: matched post-treatment results are illustrated in Fig. 8. The before and after treatment cephalometric tracings are superimposed in Fig. 9. The cephalometric measurements summary is provided in Table 1. The details for the diagnosis and treatment approach are discussed below.

Fig. 1: Pretreatment facial photographs

Fig. 2: Pretreatment intraoral photographs

Fig. 3: Pretreatment study models

Diagnosis

Skeletal:

Dr. Hsing-Wen Chang, Lecturer, Beethoven Orthodontic Course (right)
Dr. Chris Chang, Director, Beethoven Orthodontic Center (middle)
Dr. W. Eugene Roberts, Consultant,
International Journal of Orthodontics & Implantology (left)

Fig. 4: Posttreatment facial photographs

Fig. 5: Posttreatment intraoral photographs

Fig. 6: Posttreatment study models

- Skeletal Class III (*SNA 85°, SNB 84°, ANB 1°*)
- Mandibular plane angle (*SN-MP 35°, FMA 28°*)

Dental:

- Right side: full cusp Class II malocclusion Left side: Class III molar relationship
- Overjet: 0 mm
- Overbite was 3mm
- Crowding: ~ 15 mm due to blocked-out canines and blocked-in lateral incisors, bilaterally.
- Midline: mandibular midline was 7 mm right of the facial and upper dental midlines

Facial:

- Convex profile, protrusive lower lip, and the chin was shifted to the right side ABO Discrepancy Index (*DI*) was 38 as shown in the subsequent worksheet.

Specific Objectives of Treatment

Maxilla (*all three planes*):

- A - P: Maintain
- Vertical: Maintain
- Transverse: Expand

Mandible (*all three planes*):

- A - P: Retract
- Vertical: Open the bite slightly

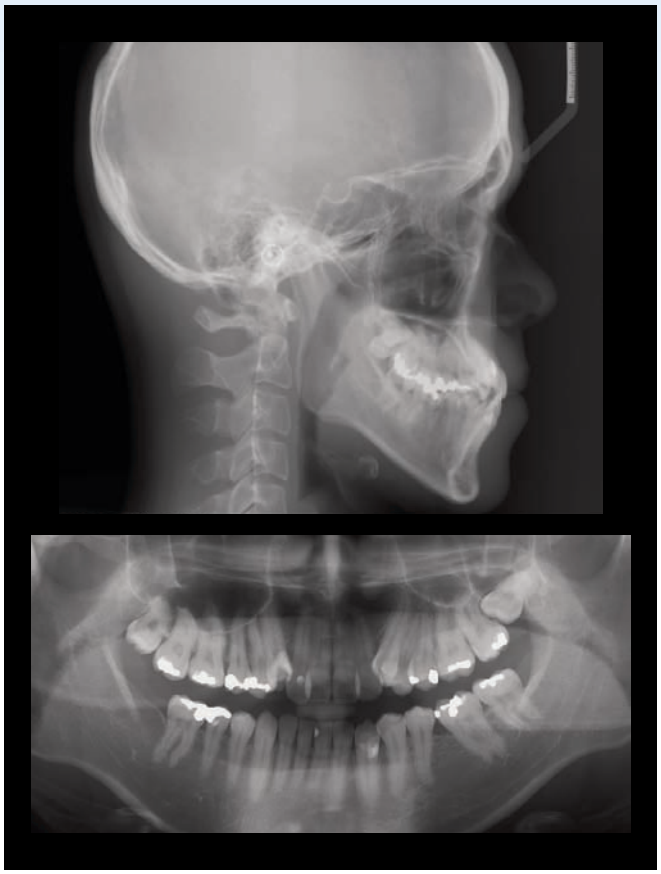


Fig. 7: Pretreatment pano. and ceph. radiographs

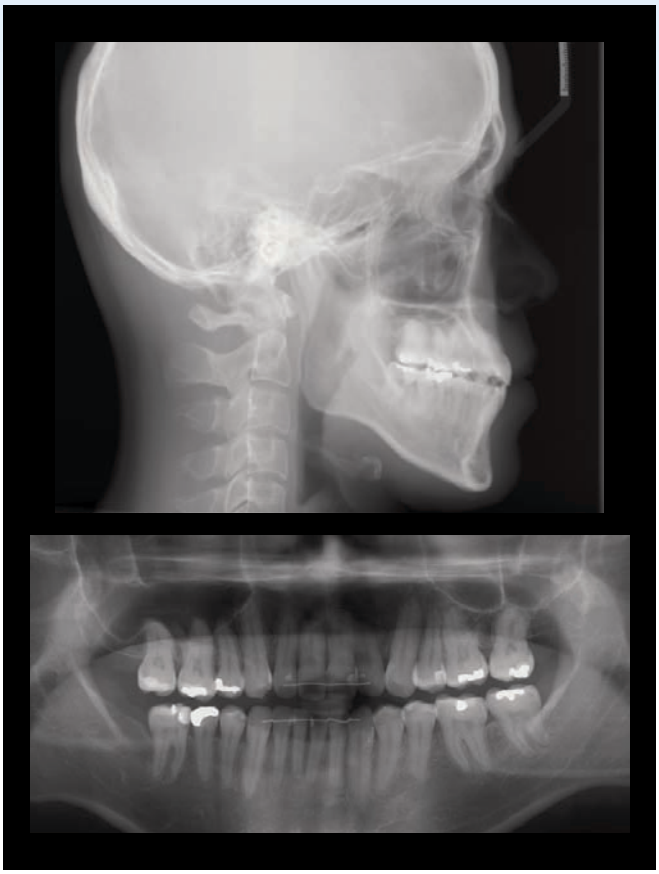


Fig. 8: Posttreatment pano. and ceph. radiographs

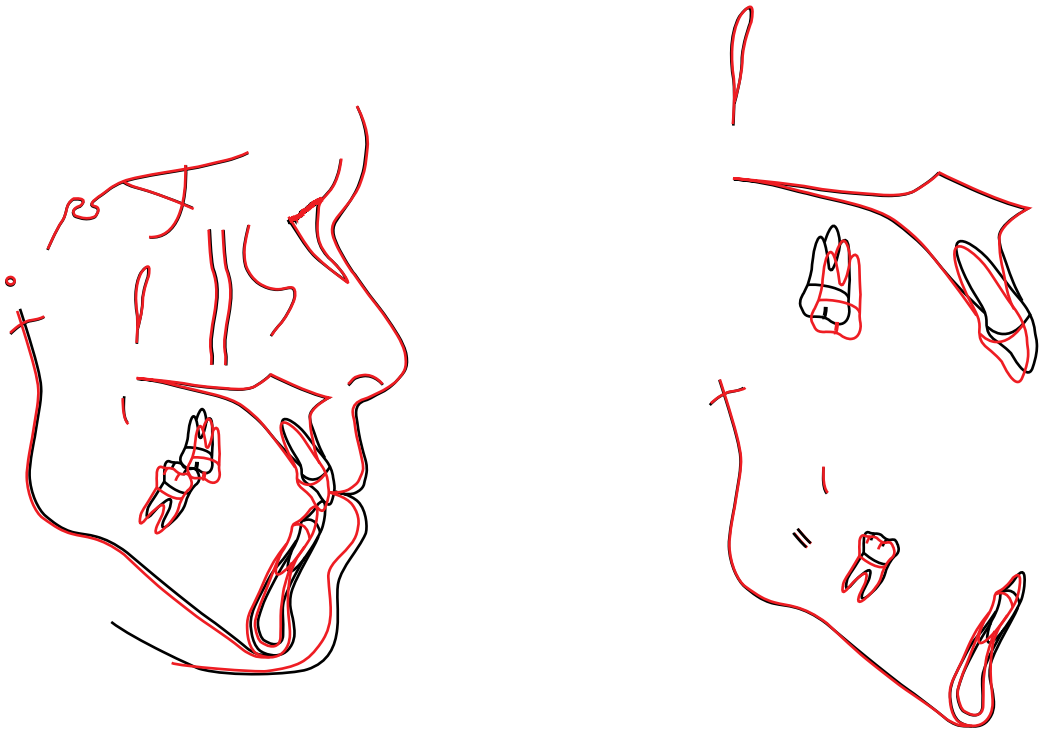


Fig. 9. Superimposed tracings

- Transverse: Maintain

Maxillary Dentition

- A - P: Retract incisors
- Vertical: Extrude incisors and molars
- Inter-molar / Inter-canine Width: Slightly expand

Mandibular Dentition

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

Facial Esthetics: Maintain

Treatment Plan

Since the patient declined the orthognathic surgery option, asymmetric extraction of upper premolars was indicated. A full fixed orthodontic appliance was planned with the supplemental anchorage of bilateral extra-alveolar bone screws[1] (*2x12 mm OrthoBoneScrew, Newton's A inc.*) in the mandibular buccal shelves. The buccal crossbite was addressed with upper archwire expansion and lower archwire constriction. Subsequently, extra-alveolar bone screws were used as supplemental anchorage to help correct the protruded mandibular dentition, dental midline shift and crossbite relationship. Bilateral Class III and crossbite elastics[2] with bite turbos were used respectively to achieve the treatment goal of a better occlusal interdigitation. Following the removal of fixed appliances, the corrected dentition was retained with fixed anterior retainers in both arches: Mx 2-2 and Md 3-3.

Appliances and Treatment Progress

A .022" slot Damon D3MX bracket system (*Ormco Corporation*) was used. After extracting the maxillary second premolars, the mandibular arch was bonded with low torque brackets on the incisors. One month later the maxillary arch was bonded with standard torque brackets on the incisors. The initial arch-wire for both arches was .014" NiTi wire.

In the 3rd month of treatment, bite turbos were installed on both lower first molars as well as the right central and lateral incisors (*Fig. 10*), to open the bite and serve as an inclined plane for the severely blocked-in right lateral incisor (*Fig. 11*). The arch-wires were changed to .016" NiTi in the upper and

Fig. 10:
Bilateral lower first molars and lower right first and second incisors was bonded with bite turbos.

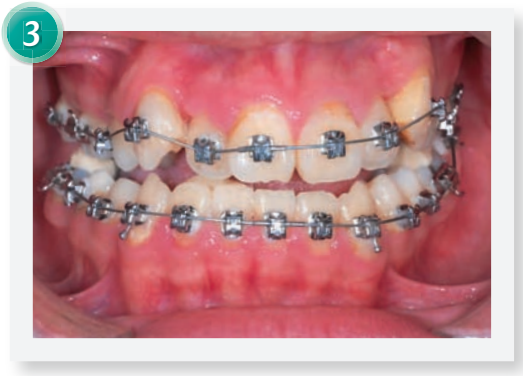


Fig. 11:
Bite turbos can both open the bite and serve as an inclined plane.

.014x.025" NiTi lower arches. From the 4th month to the end of the treatment, Class III elastics from the lower canines to upper first molars were used as needed, to retract the mandibular dentition and correct the dental midline discrepancy.

In the 6th month, the upper arch-wire was changed to .014x.025" NiTi and in the 7th month, the upper arch was changed to a .016x.025" pre-torqued NiTi arch-wire. In the 9th month of treatment, two buttons were bonded to the lingual side of the upper left first and seconded molars (*Fig. 12*) as attachments for cross elastics (*Fig. 13*). The upper and lower arch-wires were changed to .017x.025" TMA in the 10th and 11th months, respectively.

At the 9th month of treatment, buttons were attached on the lingual side of the upper right first and second molars for use of cross elastics (*Fig. 12*). At 16 months, similar lingual buttons were attached on the left side and thereafter cross elastics were used bilaterally (*Fig. 14*). In the 17th month of treatment, the lower arch-wire was changed to .016x.025" SS and the arch-wire was constricted to decrease the lower arch width. A maxillary elastometric chain was attached from first molar to first molar for space closure. In the 18th month, archwires were changed to .019x.025" SS. Arch coordination, expansion in

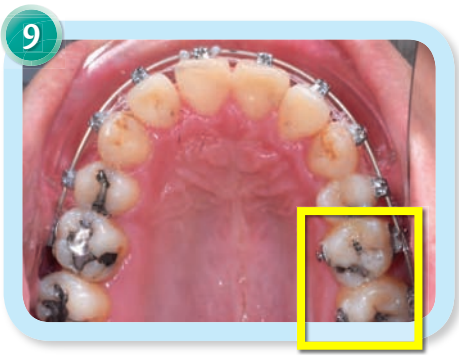


Fig. 12:

Two lingual buttons were bonded to the lingual side of upper left first and seconded molars.

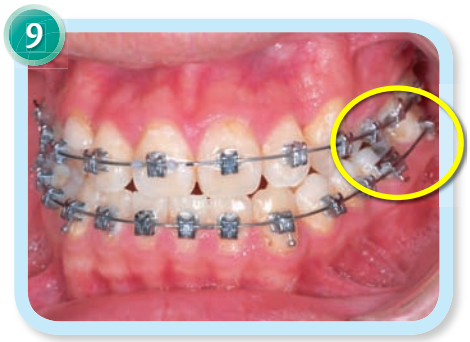


Fig. 13:

After the upper extraction space was almost closed, the overjet was still positive but the left side became a lingual crossbite. The corssbite elastic was used to correct the problem.

Fig. 14:

Upper right side lingual buttons were used to correct the right side lingual crossbite.

the upper and constriction in the lower, was used to control the crossbite tendency (*Fig. 15*).

In the 25th month of treatment, the palatal side of the upper right canine was bonded with a lingual button, and a cross-elastic was used to correct the crossbite. Mandibular buccal shelf miniscrews were inserted to serve as anchorage to retract the mandibular dentition (*Fig. 16*).

From the 27th to the 29th month, the ART (*Anterior Root Torque*) spring[3] was attached to the upper anteriors (*Fig. 17*). At 35 months of treatment, IPR (*InterProximal Reduction*) was performed on the upper anterior teeth and the residual spaces in the maxillary and mandibular dentition were closed using elastometric chains (*Fig. 18*). After appliance removal, upper clear overlay and fixed anterior (*Mx 2-2, Md 3-3*) retainers were delivered.

The maxillary wire sequence was .014" CuNiTi, .014x.025" CuNiTi, .016x.025" pre-torqued NiTi,

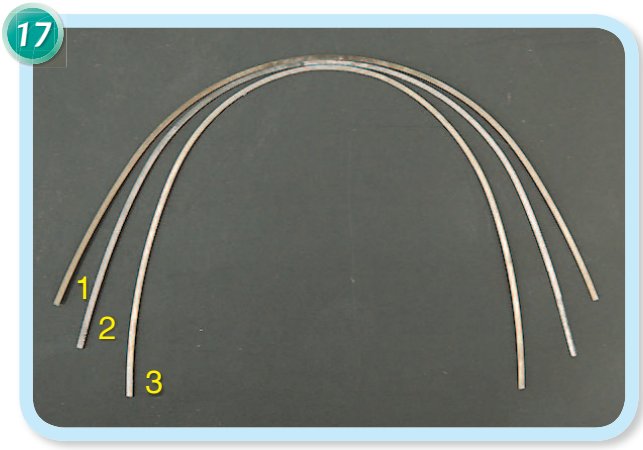


Fig. 15:
Arch wire adjustment: 1: expanded. 2: normal. 3: narrowed

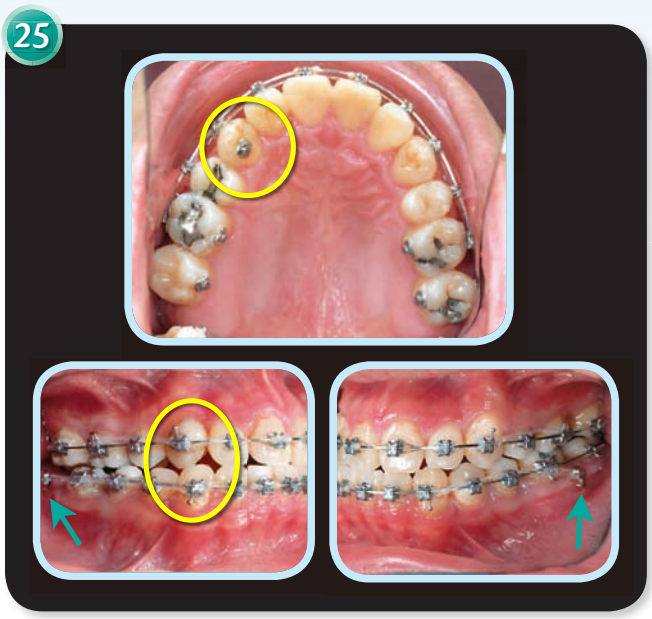


Fig. 16:
The lingual button was bonded to correct upper right canine crossbite (yellow line). Two miniscrews were inserted in lower buccal shelves to retract the lower dentition (the arrows).

CEPHALOMETRIC			
SKELETAL ANALYSIS			
	PRE-Tx	POST-Tx	DIFF.
SNA°	85°	85°	0°
SNB°	84°	84°	0°
ANB°	1°	1°	0°
SN-MP°	35°	36°	1°
FMA°	28°	29°	1°
DENTAL ANALYSIS			
U1 TO NA mm	8 mm	6 mm	2 mm
U1 TO SN°	120°	117°	3°
L1 TO NB mm	8 mm	7 mm	1 mm
L1 TO MP°	85°	88°	3°
FACIAL ANALYSIS			
E-LINE UL	-4 mm	-4 mm	0 mm
E-LINE LL	0.5 mm	0 mm	0.5 mm

Table. 1: Cephalometric summary

Fig. 17:
Use a ART to increase upper anteriors lingual root torque.

Fig. 18:
Upper: Before IPR
Lower: After IPR and close space with elastometric chain.

.017x.025" TMA, and .019x.025" SS. For the mandibular dentition, the sequence was .014" CuNiTi, .014x.025 CuNiTi, .016x.025" CuNiTi .017x.025" TMA, .016x.025" SS, and .019x.025" SS.

Results Achieved

Maxilla (*all three planes*):

- A - P: Maintained
- Vertical: Maintained
- Transverse: Expanded

Mandible (*all three planes*):

- A - P: Mild retracted
- Vertical: 1° clockwise rotation of the mandibular plane angle
- Transverse: Maintained

Maxillary Dentition

- A - P: Incisors retracted
- Vertical: Entire arch extruded
- Inter-molar / Inter-canine Width: Expanded

Mandibular Dentition

- A - P: Incisors slightly retracted
- Vertical: Slight intrusion of the entire arch
- Inter-molar / Inter-canine Width: Constricted

Facial Esthetics:
Slightly retracted upper and lower lip

Retention

Fixed retainers were bonded on all maxillary incisors, and from canine to canine in the mandibular arch. An upper clear overlay was delivered. The patient was instructed to wear it full time for the first 6 months and nights only thereafter. Home care instructions were provided.

Final Evaluation of Treatment

The ABO Cast-Radiograph Evaluation Score (*CRS*)

was 26 points and IBOI Pink & White score was 4 points, as documented on the forms appearing later in this report. The major discrepancies were the occlusal relationships (*8 points*), root angulation (*5 points*), lack of occlusal contacts (*4 points for the right second molars*), marginal ridges (*3 points*), buccolingual inclination (*3 points*), alignment/ rotation (*2 points*) and overjet (*1 point*). Most of these problems resulted from dental compensations for the facial asymmetry, i. e. posterior dental expansion in the maxillary arch and tip-back of the molars in the mandibular arch. The OB and OJ were 2mm, the lower dental midline was shifted 5mm to the right of the facial midline and the chin was still deviated to the right. The facial profile and the interdigitation was acceptable. Root resorption of the maxillary incisors was noticed in the post treatment panoramic film. Overall, the treatment outcome for this challenging case were satisfactory for both the patient and the clinician.

Discussion

This patient will be discussed in four categories:

1. Facial Asymmetry
2. Diagnosis (*Dental Midline and Facial Asymmetry*)
3. Treatment Plan and Result
4. Root resorption

Facial asymmetry

Eiology of facial asymmetry[4] includes genetic as well as congenital malformations, such as hemifacial microsomia or unilateral cleft of the lip and palate. Defining the characteristics of a facial deviation involves a careful assessment of:

a. Environmental factors: habits and trauma

b. Functional deviations: mandibular shifts due to interference or prematurity in occlusion

c. Other factors: temporomandibular joint disorder, degenerative joint disease, neoplasia

Classification of dentofacial asymmetries is as follows:

a. Dental: due to local factors such as early loss of deciduous teeth, a congenitally missing tooth (*teeth*), and/or habits such as thumb sucking.

b. Skeletal: the deviation may involve abnormal morphology of the maxilla and/or mandible.

c. Muscular: hyperplasia and/or hypoplasia of facial or masticatory muscles.

d. Functional: dental interference in centric relation, often associated with a constricted maxillary arch or a malposed tooth, results in a shift to achieve maximal intercuspation.

Diagnosis

Evaluation of the dental midline to facial symmetry

includes assessing the intermaxillary relationship in the following positions: mouth open, centric relation, initial contact, and centric occlusion. The lower dental midline for the current patient was shifted ~7mm to the right in the centric occlusion, compared to only 4mm to the right side with the mouth open (*Fig. 19*). The patient's chin was deviated to the right both at rest and in maximal intercuspation, but the problem was more severe in Co position because of the functional shift.

Cone-beam CT is a valuable tool for evaluation of facial asymmetry,[5-6] but most patients are still diagnosed with frontal (*posterior-anterior view*) cephalograms. Landmarks are identified with the methods recommended by Sassouni and Ricketts (*Fig. 20*).[7-9]

The current patient had a complex multifactorial malocclusion associated with both dentofacial asymmetry and a functional shift. The ramus height was greatest on the left side which contributed to the chin deviation to the right. Maxillary arch symmetry was within normal limits, but the A-P position of the mandibular dentition was asymmetric, which may have been due to the early loss of a deciduous teeth in addition to the early loss of the permanent first molar. As previously specified, the chin asymmetry was more pronounced when the patient was in the occluded position (*Fig. 20*).

Fig. 19:

Left: Lower dental midline shifted 7mm to the right side in CO

Right: Lower dental midline shifted 4mm to the right side with the mouth open

Treatment Plan and Result

The panoramic film (*Fig. 7*), shows that the lower left first molar has been missing for some time, as evidenced by the mesial inclination of the adjacent second and third molars. Thus, uprighting of the tipped molars was expected to produce some lower midline correction. Due to the crowded upper dentition with an acceptable nasolabial angle (*Figs.*

Fig. 20: Diagnosis of facial asymmetry

Lo and Lo': bilateral intersection of the oblique orbital line with the lateral contour of the right and left side orbits.

Nc: the neck of crista galli

ANS: anterior nasal spine

U1(L1): mesial contact point of upper (lower) central incisors.

Me: menton

The facial midline was defined as a line perpendicular to the line connecting Lo and Lo' through Nc

1-2), extraction of the upper second premolars was indicated. The treatment outcome was compromised because: 1. lower left molar uprighting did not produce enough midline correction, and 2. the skeletal Class III pattern required upper dental arch expansion and lower dental arch constriction to avoid posterior crossbite.

Although the mesially tipped lower right molars were uprighted from 400 to 850 degrees (*Fig. 21*), this was insufficient anchorage to correct the midline. Subsequently, in the 25th month of treatment, the decision was made to use lower extra-alveolar miniscrews in the buccal shelves to correct the midline and retract the entire lower dentition. In retrospect, treatment time could have been considerably reduced if the extra-alveolar anchorage had been initiated earlier in treatment.

Another major problem was the coordination of the arches to correct the posterior crossbite. This discrepancy was due to Class III skeletal pattern and the necessity to extract second premolars in the upper arch. The upper arch was expanded and the lower arch was constricted (*Fig. 15*). Cross elastics were used from lingual buttons on the upper molars (*Figs. 12-14,16*). The ART spring (*Fig. 17*) was used for palatal root movement of the maxillary incisors. Overall, the maxillary arch was widened but there was little change in the mandibular arch.

In retrospect, extracting the lower left first premolar would have helped correct the midline, as well as the Class III buccal segment and the posterior crossbite tendency. This approach may have improved the cast-radiograph score and reduced the need for extra-alveolar miniscrew anchorage.

Root Resorption

Root resorption of maxillary incisors, a common problem in orthodontics,[10-11] was noted (*Figs. 8, 22*). The reason may be excessive incisor retraction or tipping of the roots into the palatal plate of bone to obtain overjet correction. In this regard, it is important to note that lingual root torque using an ART auxiliary was performed on the upper anteriors in the 27th month of treatment.

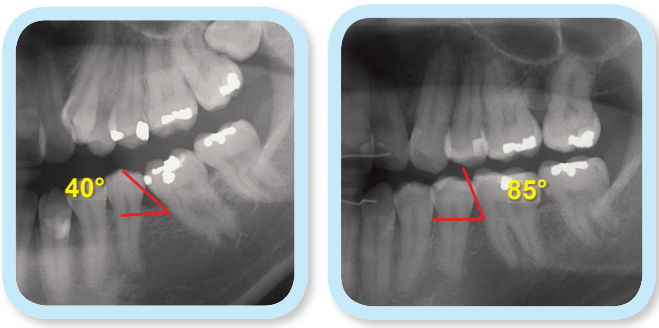


Fig. 21:
Left: Pre-treatment
Right: Post-treatment

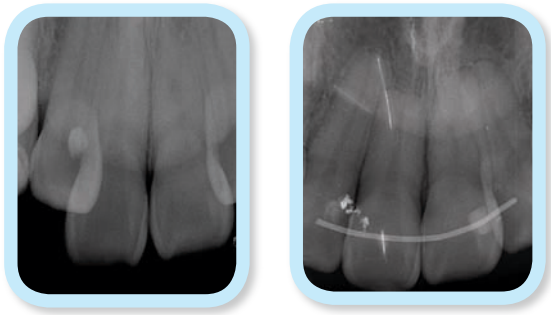


Fig. 22. Left:
Left: Pre-treatment
Right: Post-treatment

Conclusion

This case report presents a Class III patient with dentofacial asymmetry combined with a functional shift in occlusion. Conservative non-surgical treatment with the Damon self-ligating system and buccal shelf bone screws proved to be effective for the correction of this severe Class III malocclusion. This was a treatment compromise (*camouflage approach*) because the underlying skeletal asymmetry was not addressed. For patients with dentofacial discrepancies, the most common reasons for seeking professional help are problems with biting and chewing.[12] Another major reason is dissatisfaction with their facial appearance. With conservative mechanics it is possible to improve the patient's appearance and masticatory function, but corrections of major skeletal discrepancies require orthognathic surgery.

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Discrepancy Index Worksheet

TOTAL D.I. SCORE 38

OVERJET

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

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

Total = 4

OVERBITE

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

Total = 4

ANTERIOR OPEN BITE

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

Total = 0

LATERAL OPEN BITE

2 pts. per mm. per tooth

Total = 0

CROWDING (only one arch)

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

Total = 7

OCCLUSION

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

Total = 8

LINGUAL POSTERIOR X-BITE

1 pt. per tooth Total = 4

BUCCAL POSTERIOR X-BITE

2 pts. per tooth Total = 0

CEPHALOMETRICS (See Instructions)

ANB ≥ 6° or ≤ -2° = (4 pts.)

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

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

SN-MP

≥ 38° = 2 pts.

Each degree > 38° _____ 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. =	2
Missing teeth (except 3rd molars)	_____ x 1 pts. =	2
Missing teeth, congenital	_____ x 2 pts. =	_____
Spacing (4 or more, per arch)	_____ x 2 pts. =	_____
Spacing (Mx cent. diastema ≥ 2mm)	@ 2 pts. =	_____
Tooth transposition	_____ x 2 pts. =	_____
Skeletal asymmetry (nonsurgical tx)	@ 3 pts. =	3
Addl. treatment complexities	_____ x 2 pts. =	_____

Identify: Trans-alveolar impaction

Total = 7

IMPLANT SITE

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

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

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

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

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

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

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

Total = 0

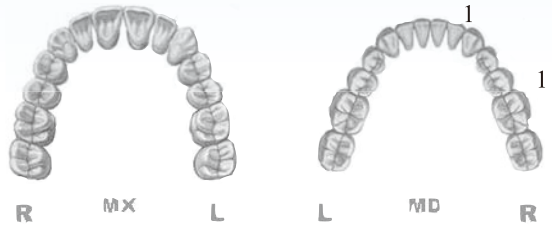
Cast-Radiograph Evaluation

Case # 1 **Patient**

Total Score: 26

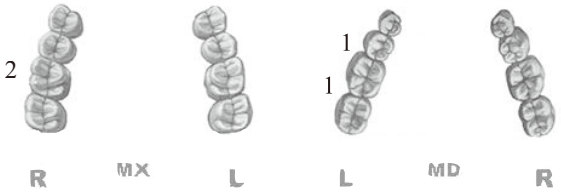
Alignment/Rotations

2



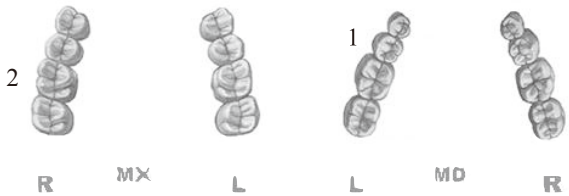
Marginal Ridges

3



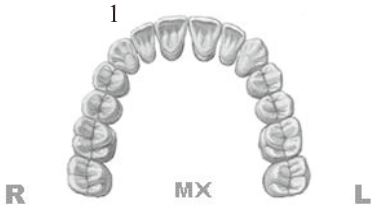
Buccolingual Inclination

3



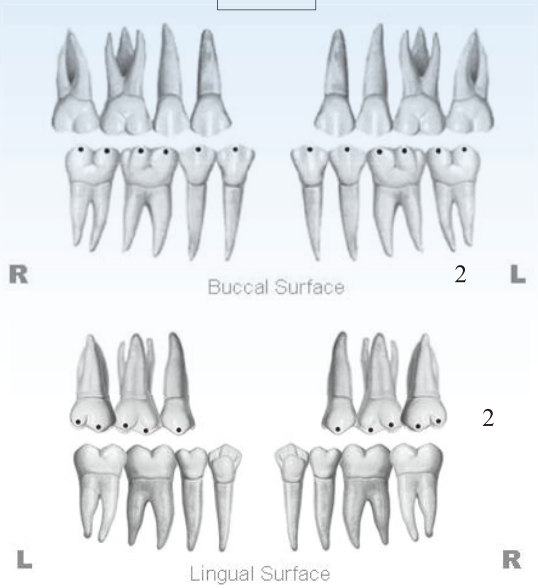
Overjet

1



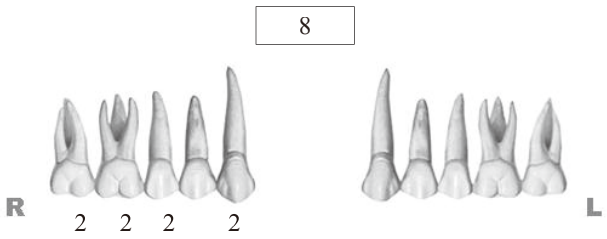
Occlusal Contacts

4



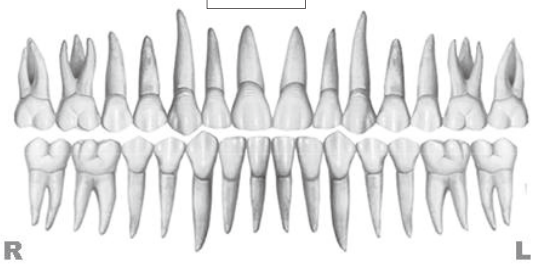
Occlusal Relationships

8



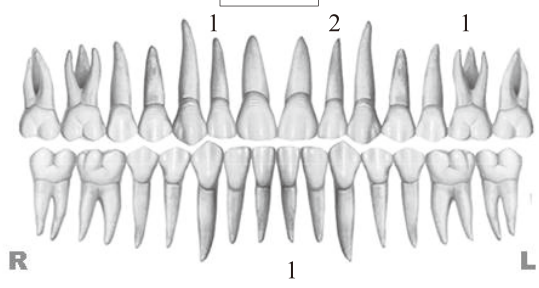
Interproximal Contacts

0



Root Angulation

5



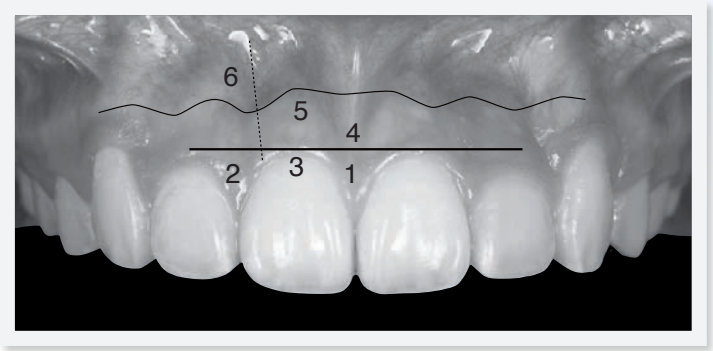
INSTRUCTIONS: Place score beside each deficient tooth and enter total score for each parameter in the white box. Mark extracted teeth with "X". Second molars should be in occlusion.

IBOI Pink & White Esthetic Score

Total Score: = 4

1. Pink Esthetic Score

Total = 1

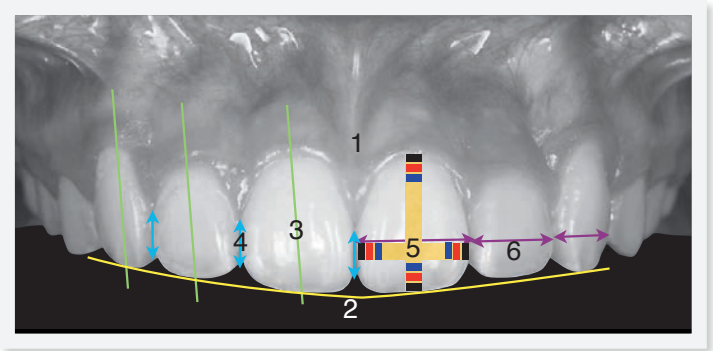


1. Mesial Papilla	0	1	2
2. Distal Papilla	0	1	2
3. Curvature of Gingival Margin	0	1	2
4. Level of Gingival Margin	0	1	2
5. Root Convexity (Torque)	0	1	2
6. Scar Formation	0	1	2

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

2. White Esthetic Score (for Micro-esthetics)

Total = 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

MICROSURGERY

CURETTES

SybronEndo curettes are extremely sharp and able to cut through attaching fibers with the efficiency of a scalpel. This allows the skilled clinician to provide patients with the shortest recovery time possible. All curettes are autoclavable and manufactured from only the highest-grade surgical stainless steel.

Ruddle Curettes are used to make a sharp dissection of the periosteal tissue, thus preventing tissue damage. They allow for undermining elevation of the flap, which along with the micro-surgical incision are the first two steps in automatic flap management.

974-0033 **Ruddle Upper Left/Lower Right Curette**
Round ends used to cut and elevate gingival tissue.

974-0034 **Ruddle Upper Right/Lower Left Curette**
Round ends used to cut and elevate gingival tissue.

974-0035 **Mini Ruddle Upper Left/Lower Right Curette**
Small squared ends used to cut and elevate gingival tissue.

974-0036 **Mini Ruddle Upper Right/Lower Left Curette**
Small squared ends used to cut and elevate gingival tissue.

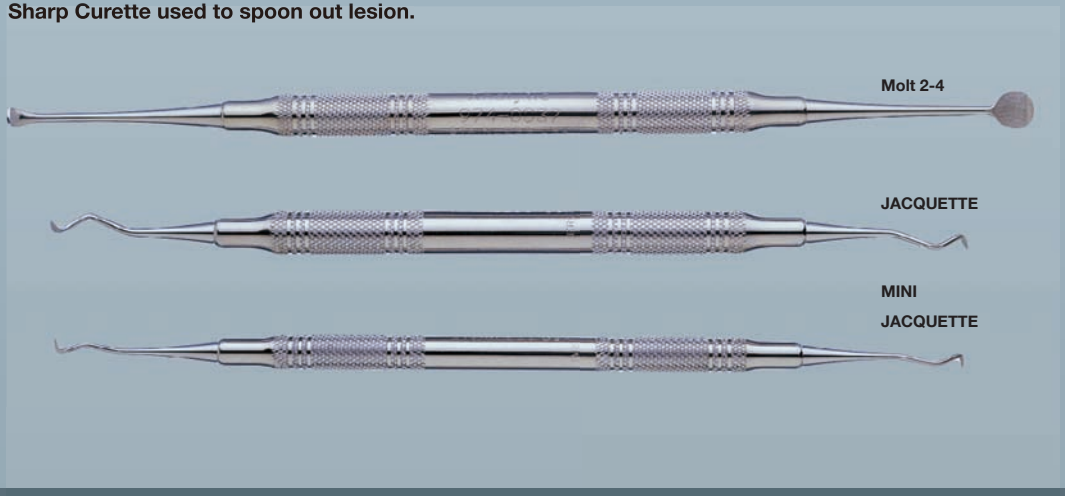
The Molt 2-4 is used for elevation of the tissue once the incision is made.

974-0037 **Molt 2-4 Elevating Curette**
Rounded ends with no angle are used to cut and elevate tissue.

Jaquettes are double-ended and used to curette pathological lesions from the surface of the root. They are especially useful when the bony access is small or when tissue needs to be curetted from lingual recesses.

974-0038 **Jacquette Curette**
Sharp Curette used to spoon out lesion.

974-0039 **Mini Jacquette Curette**
Sharp Curette used to spoon out lesion.



A Retrospective Study of the Extra-alveolar Screw Placement on Buccal Shelves

ABSTRACT

Background: Previous studies on inter-radicular screw insertion have shown that there was a significantly higher failure rate for screws inserted through moveable mucosa compared to attached gingiva. Furthermore, there are no reports about the stability of the extra-alveolar screw insertion into the buccal shelf of the mandible. This is an important area of research because extra-alveolar miniscrews placed in the buccal shelf are effective anchorage, for retracting the entire lower dentition to correct Class III malocclusion. It is important to understand the success rate and stability for buccal shelf miniscrews placed in different locations.

Objective: Compare the failure rates for buccal shelf screws inserted through movable mucosal (*MM*) as opposed to attached gingiva (*AG*).

Design: Retrospective review.

Participants: 840 patients (*405 males; 435 females, with the age of 16 ± 5 years*) received buccal shelf screw placements that were performed by the same orthodontist between 2009 and 2012, using standardized procedures.

Methods: A total of 1680 miniscrews (*2x12mm, stainless steel*) were placed on buccal shelves; 1286 miniscrews were in movable mucosa and 394 miniscrews penetrated attached gingiva. All miniscrews were placed as parallel as possible to the lower 1st and 2nd molars roots (*extra-alveolar approach*). Screw heads, at the insertion point, were at least 5mm above the soft tissue. All mini-screws were immediately loaded with a force ranging from 8oz. to 14oz., according to the patients' age. The stability of the buccal shelf screws was tested up to 4 months after placement.

Result: 121 miniscrews out of 1680 failed during the course of study. Failure was defined as loose screws that were exfoliated or removed by the clinician. The overall failure rate was 7.2% for the entire sample (*n=1680*). In the movable mucosa group, 94 out of 1286 (*7.31%*) failed; 27 out of 394 (*6.85%*) failed in the attached gingiva group. A Chi-square test showed there was no statistical significance of the failure rates between miniscrews inserted through MM compared to AG.

Discussion & Conclusions: Buccal shelf mini-screws can be placed in either the movable mucosa or attached gingiva. In terms of stability, there was a high success rate for both groups (~93%). This is clinically valuable information because bone buccal to the roots of the teeth is more directly accessible by penetrating the movable mucosa apical to the mucogingival

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

W. Eugene Roberts, Consultant,
International Journal of Orthodontics & Implantology (Right)

junction. Also many patients have a minimal width of attached gingiva buccal to the molars. Thus in this retrospective study, the majority of the buccal shelf miniscrews (*1286/1680*) were placed through movable mucosa. Due to the elevated position of the screw head, mucosal insertion does not jeopardize the health of the soft tissue. For extra-alveolar screw placement, insertion through the movable mucosa is often the preferred procedure for buccal shelf miniscrews, because it accesses more bone volume, facilitates the surgical procedure, and is usually more comfortable for the patient. It is important for the clinician to realize that these advantages can be achieved without sacrificing screw stability. (*Int J Ortho Implantol 2013;32:80-89*)

INTRODUCTION

In Asia, skeletal anchorage[1-7] is the key in our daily practice, particularly in the treatment of bimaxillary protrusion[1] and Class III malocclusion.[2] Back in 1997 Kanomi[8] introduced the miniscrew for orthodontic anchorage, and it soon gained wide acceptance in the orthodontic profession. In the following years more refined mini-screws have been brought into the markets;[9,10] miniscrews have now become the main stream in orthodontic anchorage. The diameters of orthodontic miniscrews range from 1 to 2.3mm and the length from 4 to 21mm.[11-25]Although a few well designed studies and some case reports have been published on success rates, research so far has shown promising results and treatment efficiency, but has often lacked evidence-based information.[25,26] Therefore studies on screw design and surgical protocol are vital in order to evaluate their success rates.

In dental literature, success rates of orthodontic mini-screws as temporary anchorage range from 57% to 95.3%, with most studies reporting success rates of around 84%.[26-28] Several studies have attempted to find out the factors responsible for the success of orthodontic miniscrews. Primary stability is generally accepted to be the most important factor and can be measured by evaluation of insertion torque, removal torque, and pull-out strength. Variables that result in higher primary stability include smaller pilot hole diameters,[23] increased cortical bone thickness,[29-32] increased bone density, and use of self-drilling miniscrews.[33,34]

In conclusion, there are three key factors that dramatically affect initial stability: 1. bone quality; 2. screw design; 3. placement technique. These three factors are inter-related. For example, one will have totally different success rates if varying screw designs and placement techniques are used on the same patient. Thus, it is imperative to understand and control these variables.[35]

1. Bone quality:

Given that orthodontic miniscrews are based on mechanical locking, instead of osseointegration,[36] our job as a clinician is to find the bigge st and the best quality bone for the screw engagement. Cortical bone provides us with the answer for that high quality bone. How can we get more cortical bone engagement? The screw design and placement technique could provide the answer.[1,2]

2. Screw design:

Screws with diameters of 1.2mm or greater have universally achieved success rates of above 70% in the current available studies. Another significant factor is length; Chen et al[18] increased the success rate from 72% to 90% by using 8mm instead of 6mm long screws. Three other studies also reported higher success rates using longer screws without increasing the diameter.[17,19,21] However, increasing the screw diameter and length can also add to the possibility of root damage during screw placement. Nevertheless, this issue could be easily resolved by a new placement technique, such as extra-alveolar insertion.[1,2]

3. Placement technique

One major technical part related to the screw success rate is the insertion angle. Park et al[16] evaluated the angle between miniscrews' long axis and cortical bone. They asserted that although no major differences were found in terms of success rates, they contended however, that placing screws not perpendicular to the bone surface, but at an obtuse angle, lowered the risk of root damage and increased the screw's contact with cortical bone. In conclusion, a steeper angle, for example extra-radicular insertion,[1,2] will increase the cortical bone contact which will , in turn, enhance the stability of the screw. Besides, this upright position of the screw will also reduce root damage.

In terms of success rate differences between maxilla and mandible after screw placement with immediate loading, one study compared placement in beagles and found out that the mandibles had greater primary stability than the maxillae.[31]However, in humans, the success rates of miniscrews placed in the maxilla are consistently greater than those placed in the mandible in all[26, 38-40] but one study.[23] Recent studies have significantly supported the maxilla as a more suitable placement for

Fig. 1:

Special design of the orthodontic bone screw (2x12 stainless steel) used in current study illustrates the strength of this skeletal anchorage device that fits into the extra-alveolar approach on buccal shelves.

miniscrews.[12,17,24] All three studies interpreted the lower success rate in the mandible as a consequence [12,17,24] of overheating the bone during drilling. They suggest that sufficient watering must therefore be used while pilot drilling. In addition, mandibular miniscrews might be more exposed to soft tissue interference.[1,2] This suggests that other factors may be important in determining the success of miniscrews in the mandible, such as insertion in various zones of soft tissue.

Previous studies on inter-radicular screw insertion have shown that there was a significantly higher failure rate for screws inserted through movable mucosa compared to attached gingiva. Furthermore, there are no reports about the stability of the extra-alveolar screw insertion into the buccal shelf of the mandible.[41-45] This is an important area of research because extra-alveolar miniscrews placed in the buccal shelf are effective anchorage for retracting the entire lower dentition to correct Class III malocclusion.[2] Therefore, it is vital to understand the success rate and stability for buccal shelf miniscrews placed in different areas of soft tissue. The aim of this research is to compare the failure rates of buccal shelf screws inserted through movable mucosal (*MM*) as opposed to attached gingiva (*AG*).

MATERIAL AND METHODS

840 patients (*405 males; 435 females, age 16 ± 5 years*) received buccal shelf screw placements that were performed by the same orthodontist (*Dr. C.C.*) using standardized procedures between 2009 and 2012 at the Beethoven Orthodontic Center, Taiwan.[1,46]

Patients were informed about the possibilities of inflammation around and loosening of the miniscrews. A total of 1680 miniscrews (*2 x 12mm, stainless steel, Newton's A, Taiwan, Fig.1*) were placed on buccal shelves (*Fig. 2-3*) without flap elevation under

Fig. 2:
Between 1st and 2nd molars a larger buccal shelf bone volume is present.

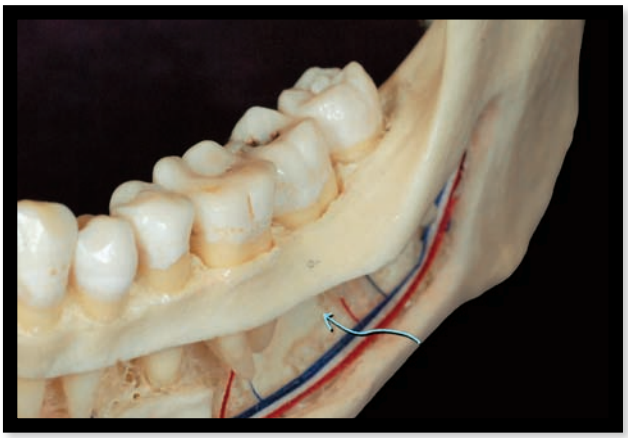


Fig. 3: There is a safe zone between the 1st and 2nd molar roots.

Fig. 4:
The mucogingival junction (MGJ) seperates the attached gingiva (AG) and the movable mucosa (MM).

local anesthesia; 1286 miniscrews were in movable mucosa and 394 mini-screws penetrated attached gingiva (*Fig. 4*). All miniscrews were placed as parallel as possible to the lower 1st and 2nd molar roots (*extra-alveolar approach*). The placement procedures are described as follows. Use a dental explorer to make a dent through the soft tissue, periosteum and on the cortical bone of buccal shelf outside the 1st and 2nd molar roots . Then, an orthodontic bone screw (*2 x 12mm stainless steel, Newton's A, Taiwan*) further penetrates this dent and is screwed in an upright direction parallel to the long axis of the lower 1st and 2nd molar roots (*Fig. 5-6*).

Fig. 5:
Mucosal insertion refers to the position that the buccal shelf screw is inserted in the movable mucosa.

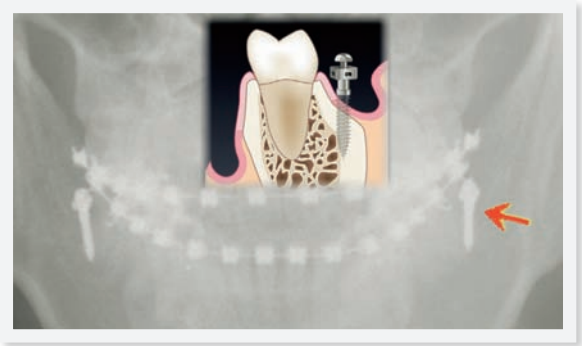


Fig. 6:
The extra-alveolar approach on buccal shelves refers to the position of screws which have been placed parallel to the lower 1st and 2nd molar roots as shown in this X-ray.

Fig. 7:
In the extra-alveolar approach on buccal shelves, all screw heads was at least 5mm above the soft tissue, in order to prevent the soft tissue overgrowth.

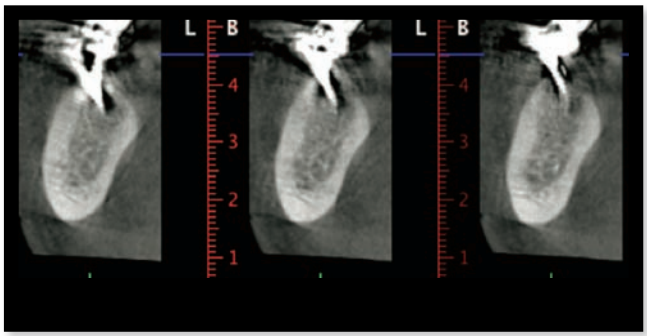


Fig. 8:
In the extra-alveolar approach on buccal shelves, on average, there is 5mm of bone engagement as shown in this CBCT.

No pilot drill is needed. Screw heads, at the insertion point, are at least [46-49] 5mm above the soft tissue (*Fig. 7*). On average, there is 5mm of bone engagement (*Fig. 8*).[50] All miniscrews are immediately loaded by using elastomeric modules (*power chains*), with a force ranging from 8oz. to 14oz based on the patient's age, to connect the canine hook and screw head. Elastomeric chains generally lose 50% to 70 % of their initial force during the first day of load application,[51,52] therefore, in order to maintain the

constant force level, pre-stretching [53]of all power chains should be performed to drain the initial force before attaching to the miniscrews. All screws were placed by the same placement protocol[1,2] and the patients were instructed to keep the screw heads clean at all times to prevent inflammation. The power chains were replaced every four weeks. The stability of the buccal shelf screws was tested up to four months after placement.

RESULTS

121 mini-screws out of the 1680 placements failed during the course of the study. Failure was defined as loose screws that were exfoliated or removed by the clinician within 4 months of screw placement. The average failure time for these 121 failed mini-screws was 3.3 months. The overall failure rate was 7.2% for the entire sample (*n=1680*). In the movable mucosa (*MM*) group, 94 out of 1286 (*7.31%*) failed; 27 out of 394 (*6.85%*) failed in the attached gingiva (*AG*) group (*Fig. 9*). A Chi-square test showed there was no statistical significance of the failure rates between miniscrews inserted through MM compared to AG ($p > .05$).

There was a significant correlation between the failure rate and the following variables: Age, left or right hand site, and individual bone quality.

Notably, the average age for these 121 failed screw patients was 14 ± 3 years (*Fig. 10*) which is considered

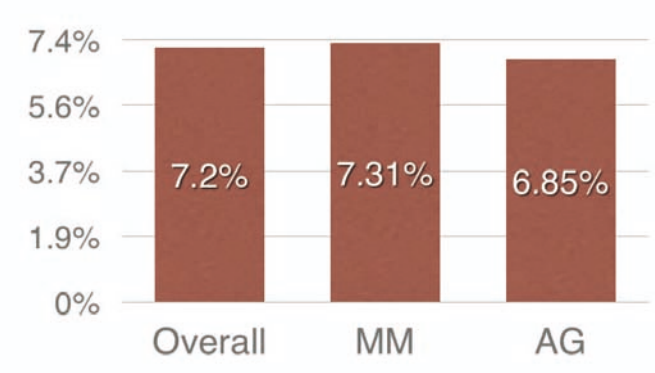


Fig. 9:

The overall failure rate was 7.2% for the entire sample (n=1680). In the movable mucosa (MM) group, 94 out of 1286 (7.31%) failed; 27 out of 394 (6.85%) failed in the attached gingiva (AG) group.

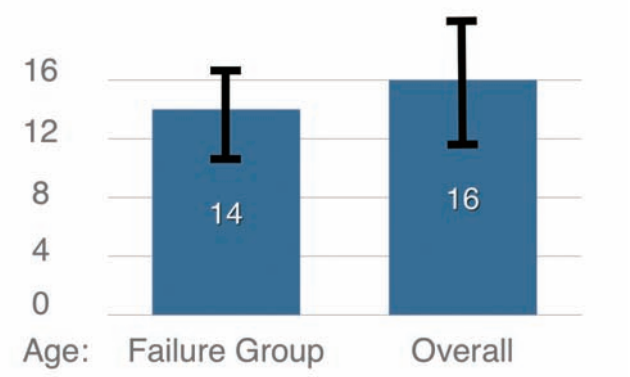


Fig.10:

Notably, the average age for these 121 failed screw patients was 14±3 years which is considered lower than the overall average age (16±5 years).

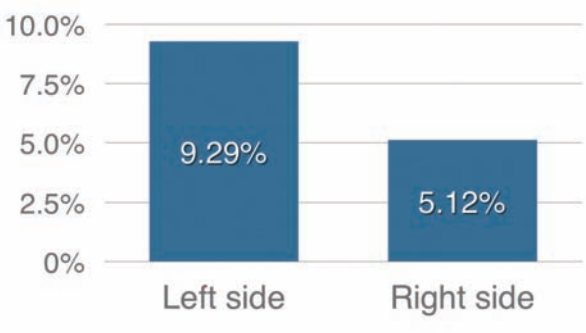


Fig.11 :

A Chi-square test showed statistical significance of the failure rates between left (9.29%) and right (5.12%) hand sites (p<.001) This significant difference indicates the techical sensitivity for placing on the left hand site, as opposed to the right hand site, where it is much easier to insert the screw.

lower than the overall average age (*16 ± 5 years*). This data indicates that younger patients have higher failure rates. This result may be due to the immature cortical bone in younger patients which could not sustain the mechanical locking.

Among these 121 failed screws, 78 screws came from left buccal shelves; 43 screws from right buccal shelves (*Fig. 11*). A Chi-square test showed statistical significance of the failure rates between left (*9.29%*) and right (*5.12%*) hand sites ($p<.001$) This significant difference indicates the techical sensitivity for placing on the left hand site, as opposed to the right hand site, where it is much easier to insert the screw.

When comparing the failure rate from one side vs both sides, an interesting fact was found. The 121 failed screws came from 105 patients of which 89 patients had single screw failure and the other 16 patients lost screws on both sides. This data indicates that when a patient has a loose screw on one side the chance for screw failure on the other side will dramatically increase. This implies that indiviual bone quality might play a significant role in screw retention.

DISCUSSION

Regarding different insertion sites of miniscrew placement, most studies showed higher failure rate in the mandible (*19.3%*) than in the maxilla (*12%*). The overall failures of the mini-screw in the mandible were 1.5 times more than those of the maxilla. The higher mini-screw failure rates observed for those inserted in the mandible can be attributed to (*1*) the greater bone density of the mandible that can lead to higher insertion torque value, possibly harmful to miniscrew success; (*2*) bone overheating during insertion; (*3*) less cortical bone formed around the miniscrew inserted in the mandible; and (*4*) a narrower vestibule compared with the maxilla that prevents the patient from cleaning the area throughly. All studies used the inter-radicular insertion approach which placed the screws between the roots. In addition, mini-screw placed between the mandibular second premolars and first molars had significantly higher failure rates compared with miniscrew placed between the first and second premolars.[24,54,55]

The disadvantage of the inter-radicular insertion approach could be improved by using the extra-alveolar insertion approach. Our group had designed and practiced this extra-alveolar insertion approach for ten years. In previous studies, there has been no evaluation of clinicians' skills as a factor influencing success rates. Therefore, in order to exclude this variable, prior to this study the operator (*Dr. C.C.*) followed this placement protocol[1, 46] for six years and performed over 3000 buccal shelf screw placements. This extensive practice should have reduced the operation errors and the clinical bias in decision-making for the selection of the insertion site. The operator's learning curve, which was determined by evaluation of the success rate of miniscrews placed by the operator (*Dr. C.C.*) over four periods each consisting of 12 months, was investigated prior to this study.

In this extra-alveolar insertion protocol, buccal shelf miniscrews can be placed in either the movable mucosa or attached gingiva. In terms of stability,

there was a high success rate for both groups (~93%). This is clinically valuable information because bone buccal to the roots of the teeth is more accessible by penetrating the movable mucosa apical to the mucogingival junction. Also many patients have a minimal width of attached gingiva buccal to the molars. Thus in this retrospective study, the majority of the buccal shelf miniscrews (*1286/1680*) were placed through movable mucosa. Due to the elevated position of the screw head, mucosal insertion does not jeopardize the health of the soft tissue. For extra-alveolar screw placement, insertion through the movable mucosa is often a preferred procedure for buccal shelf mini-screws, because it can access more bone volume, is an easier surgical procedure, and is usually more comfortable for the patient. It is important for clinicians to realize that these advantages can be achieved without sacrificing screw stability.

Many studies have found no significant differences between failure rate and age.[11,16,17,21] However, in this study, younger patients had a higher failure rate. This might be attributed to a difference in bone density because bone calcification is not fully complete in adolescents. However, immature bone is not necessary to be the contra-indication for screw placement. One could change the insertion angle to increase the solid cortical bone engagement. With this upright position, the screw tip could catch more solid bone and enhance the mechanincal locking.[56] For sure, we normally reduce the amount of loading moment for younger patients.

The significant difference in failure rates between the left side (*9.29%*) and the right side (*5.12%*) indicates the technical sensitivity for placing on the left hand site, as opposed to the right hand site, which is much easier to insert the screw. The maneuver of screw insertion on the left hand side is more difficult for right-hand operator. This 9.29% failure rate on the left side is significant higher than 5.12% on the right side. Nevertheless, it also indicates that there is a big room for improvement on the left hand side.

There were 16 patients who had screw failure on both sides. It implies that individual bone quality might play a significant role in screw retention. The bone density of cortical bone could be identified in the beginning before placing the screw. When encountering this type of soft bone, it would be a good idea to inform the patients right away about the possibility to re-insert the screw. Furthermore, when a screw fails on one side, it is also a good idea to inform patients about the possibilty of failure on the other side.

CONCLUSIONS

The overall failure rate of buccal shelf screw placement was 7.2% under an initial loading of 8 to 14oz per mini-screw based on the patients' age. The buccal shelf area is appropriate for mini-screw placement, and these buccal shelf screws serve as an ideal orthodontic anchorage to move the lower dentition back in an en mass pattern. Factors that influenced the clinical success of mini-screws on buccal shelves were the patient's age, the bone quality, and the operator's skills. Insertion points in various soft tissue zones do not affect the success rate because the screw heads are upright and away from soft tissue in this particular extra-alveolar screw placement.

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2014 贝多芬正畸精英班

Beethoven International Damon, OBS & VISTA Workshop

03/11~03/14, 2014

讲师：张慧男医师

现任贝多芬正畸植牙集团负责人，于 1996 年取得美国印第安那普渡大学齿颚正畸研究所博士学位，也是《国际正畸植牙期刊》(International Journal of Orthodontics & Implantology, IJOI) 发 行人。他长期致力于正畸植体 (orthodontic bone screws) 的研发及运用。

讲师：林锦荣医师

现任林锦荣齿列正畸中心院长，于美国马楷大学取得正畸硕士学位，是一位国际知名的正畸讲师，他同时也是《创意正畸》(Creative Orthodontics) 一书作者，以及《国际正畸植牙期刊》(International Journal of Orthodontics & Implantology, IJOI) 的顾问。

亲爱的张医师：

[...] 我身为一位讲师和正畸医师，透过这次台湾学习的经验，获得很多专业上的成长。我带回了最新、最棒的知识、技术和实用的工具，包含如何利用苹果电脑制作一流的简报，这一切都要归功于您的指导。我也在迷你骨钉的运用和治疗优点上，获得许多宝贵的学术参考资料。

除了对您万分的感谢外，我也要感谢您热心助人的夫人，以及您专业的诊所员工。在他们身上我看到了一种组织、关怀和功能性的模范。我永远不会忘记我在贝多芬集团学习期间所获得的关注和协助，不论每个人所担任的角色和功能 [...]。

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

亲爱的张医师：

[...] 我只能说这个课程远远超乎我的期望，这真是太棒了的学习经验。张医师和林医师世界级的演讲，以及您们多年累积的知识、经验和智慧，都反映在您们所呈现的案例中。我也很珍惜有机会在您忙碌的诊间，观摩着您如何积极、轻松地实践您在课程上所传授的秘诀。

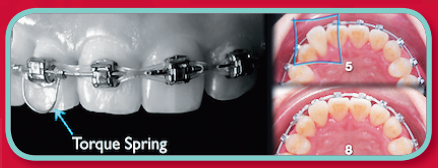
首先，身为极具创意的教育家，您鼓励我们要有创造力来思考治疗方式。其次，您介绍我们您的工作系统，以及 Damon 及 OBS 这些工具来帮助我们在自己的实务工作中也获得成功。最后，您激励我们要持续改进这个系统。我个人由衷感谢您给我们的这三个建议 [...]。

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

精致的正畸完工 实际操作课程

精致的正畸完工为半天的实际操作课程，
学习重点如下：

1. 正畸器位置的黏着
（Bonding Position）
2. 三步弯丝法
（Third Order Bend）
3. 单个牙转矩调整 (Torque Spring)



4. 前牙转矩调整 (Anterior Root Torque)

贝多芬正畸精英班

第一天，3/11（二）

09:00—09:30	课程简介
09:00—10:30	贝多芬Damon系统运用
10:30—11:00	休息
11:00—12:00	精致的正畸完工 案例示范
12:30—13:30	午餐
14:00—15:00	儿童牙科、植牙中心参观
15:00—18:30	正畸门诊见习

第二天，3/12（三）

09:00—10:30	Optimized Orthodontic Treatment I 优化正畸治疗 (1) *Dr. Chris Chang*
10:30—11:00	休息
11:00—12:30	Optimized Orthodontic Treatment II 优化正畸治疗 (2) *Dr. Chris Chang*
12:30—13:50	午餐
14:00—15:00	OBS 模型实作
15:00—18:30	正畸门诊见习

第三天，3/13（四）

09:00—10:00	美学上的修整 Esthetic Finishing
10:00—10:10	休息
10:10—12:30	Damon + OBS *Dr. John Lin*
12:30—13:30	午餐
14:00—17:00	精致的正畸完工实际操作课程 Excellent Finishing Workshop

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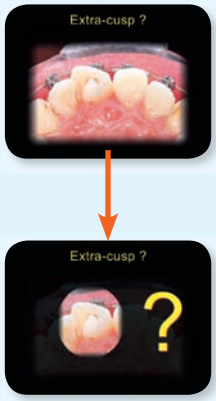
「我使用 Keynote、当 Keynote 的讲师已经九年了。今年六月，我有了参加金牛顿高效简报课程的机会，令我讶异的是，我仍然从这堂理应是基础的课程中学到很多。



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~ Dr. Rungsi Thavarungkul, Thailand Lecturer,
进阶 Keynote 课程－精修绘图简报达人讲习班讲师

第四天，3/14（五）

09:00—10:00	Keynote 简介： 组织简报用的患者档案
10:00—10:10	休息
10:10—11:30	高效简报要点 (1)
11:30—13:30	午餐
14:00—15:30	高效簡報要點 (2)
15:30—15:45	休息
15:45—17:00	信息视觉化

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包含三场半天的演讲，两个半天的门诊见习，两个模型实作课程。

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貝多芬高效矯正器黏著流程

前言

將矯正器黏著到病人牙齒上即象徵矯正治療的正式開始。如何有效率且準確地完成整個療程，是我們從黏著矯正器時就要仔細思考的議題。貝多芬矯正中心自 2005 年開始採用 Damon® (Ormco) 矯正器至今，不斷地從治療個案中思考如何精進矯正器的黏著技術和效率。現在貝多芬矯正中心已建立了一套黏著矯正器的流程，讓這個重要的開始可以更有效率進行，以達到最終理想的治療結果。

黏著前準備

每一位病人第一次黏著矯正器前，貝多芬助理都會先把病人治療前的資料準備齊全，病歷 (包括口內外照片以及 X 光片) (圖 1) 和標準模型會先放置診療台上 (圖 2)。在病人開始接受治療之前，張慧男醫師會先把擬定好的治療計畫註記在病歷上，再由當天看診的住院醫師根據病歷和模型，思考矯正器要黏著的位置，並且先用鉛筆在模型上做標記 (圖 3)。這樣一來，醫師可預先決定黏著的位置，節省臨床操作時的時間，亦確保黏著位置的正確性。

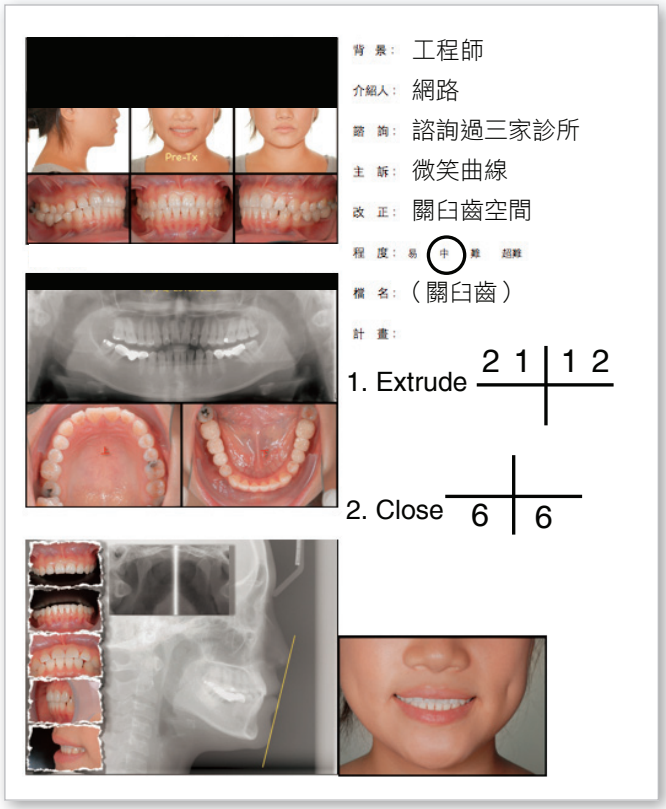
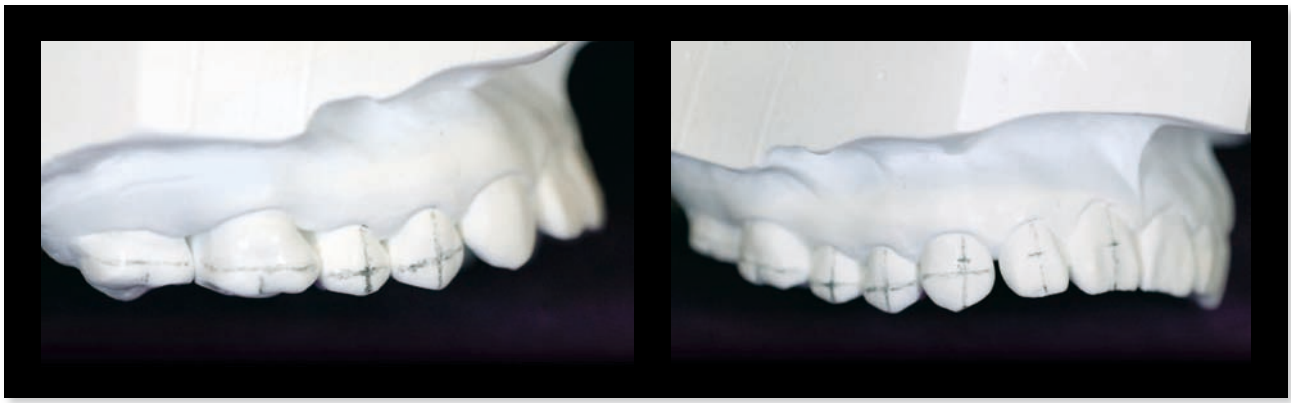


圖 1.
病歷包含治療前的口內外照片、X 光片、治療計畫。利用圖片讓醫師和病人講解治療計畫時，病人較容易理解，同時也讓住院醫師們可以快速了解治療重點。

圖 2. 病歷和標準模型會在黏著矯正器前準備好。

葉信吟醫師 貝多芬矯正課程講師（左）
張慧男醫師 貝多芬齒顎矯正中心負責人（右）



■ 圖 3. 在黏著矯正器之前，先在模型上標記預計黏著矯正器的位置。

• 黏著位置決定

目前貝多芬矯正中心是使用 Damon Q® 和 Damon Clear®（上顎前牙以及小白齒為透明矯正器）兩種矯正器。矯正器黏著的位置是參考 Pitts[1]，Roberts 和 Chang[2-4] 建議的黏法，以及張慧男醫師多年的臨床經驗發展而成。

• 黏著順序：

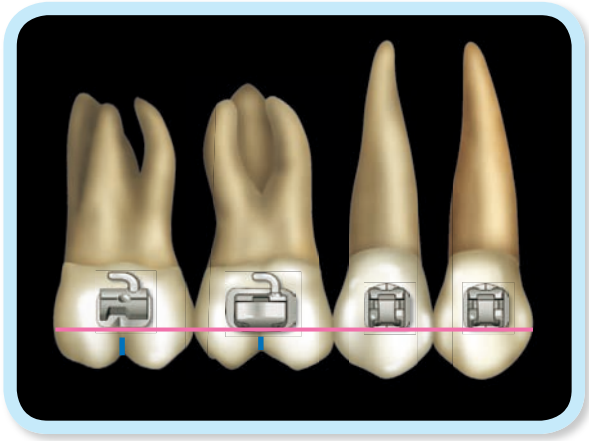
左側第二大臼齒到第一小臼齒；右側第二大臼齒到第一小臼齒；左側犬齒到右側犬齒。

• 黏著原則：

後牙主要提供咬合功能，所以矯正器的黏著是根據和鄰牙接觸點的位置作為參考點。上顎前牙主要以美觀為導向，黏著的位置是希望前牙的排列能呈現微笑曲線。下顎前牙主要是根據水平以及垂直覆蓋決定黏著的位置。

• 黏著位置：

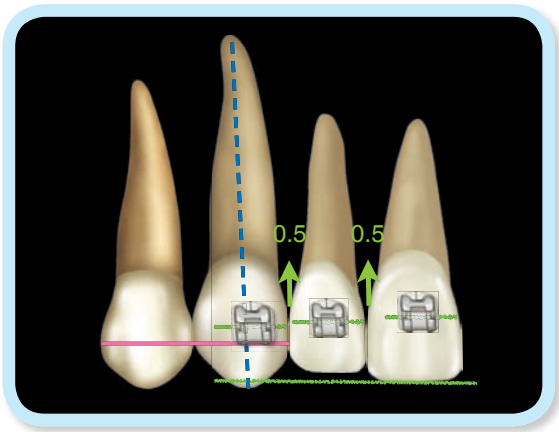
1. 上顎後牙：矯正器的下緣沿著牙齒近遠心接觸點連線。臼齒矯正器的頰側凹痕對準臼齒的頰側溝（圖 4）。



■ 圖 4.
上顎後牙矯正器的底部沿著牙齒近遠心接觸點連線(粉紅線)。臼齒矯正器的頰側凹痕對準臼齒的頰側溝（藍線）。

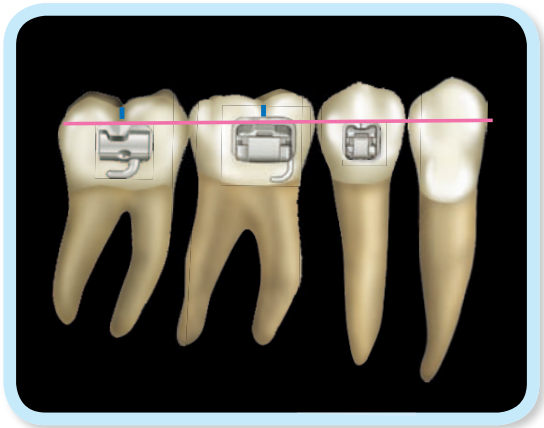
2. 上顎前牙：犬齒矯正器的下緣沿著和小臼齒近遠心的接觸點連線，並且距離牙齒長軸近心 1mm。側門齒和門齒的溝槽依序距離犬齒矯正器溝槽往牙齦方向 0.5mm (圖 5)。

3. 下顎後牙：矯正器的上緣沿著牙齒近遠心接觸點連線。臼齒矯正器的頰側凹痕對準臼齒的頰側溝 (第一大臼齒的矯正器寬度較大，因此黏的位置稍微往咬合端。)(圖 6)。



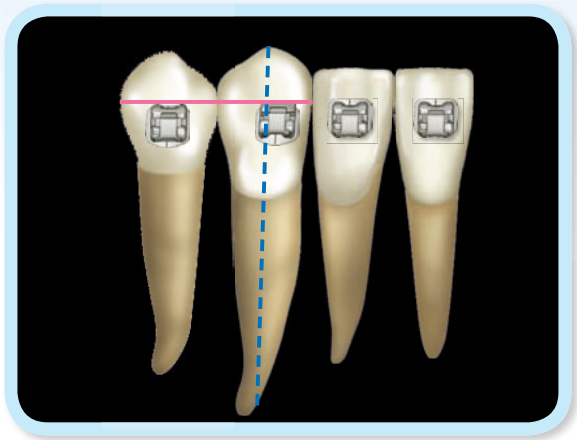
■ 圖 5.

犬齒矯正器的下緣沿著和小臼齒近遠心的接觸點連線 (粉紅線)，並且距離牙齒長軸 (藍色虛線) 近心 1mm。側門齒和門齒的溝槽依序距離犬齒矯正器溝槽往牙齦方向 0.5mm (綠線)。



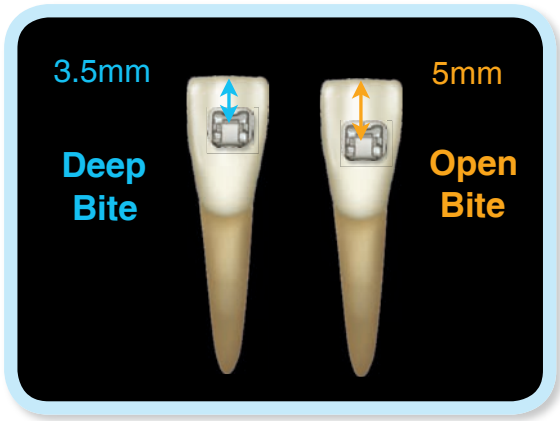
■ 圖 6.

下顎後牙矯正器的底部沿著牙齒近遠心接觸點連線 (粉紅線)。第一大臼齒的矯正器稍微往咬合端。 臼齒矯正器的頰側凹痕對準臼齒的頰側溝 (藍線)。



■ 圖 7.

犬齒矯正器的下緣沿著和小臼齒近遠心的接觸點連線 (粉紅線)，並且距離牙齒長軸 (藍色虛線) 近心 1mm。



■ 圖 8.

下顎正中門齒以及側門齒矯正器黏著的位置根據垂直覆蓋而有所調整。深咬的病例可以將矯正器往切端黏，溝槽上緣距離切緣約 3.5mm；開咬的病例則可以將矯正器往牙齦端黏，溝槽上緣距離切緣 5mm。

4. 下顎前牙：犬齒矯正器的下緣，沿著和小臼齒近遠心的接觸點連線，並且距離牙齒長軸近心 1mm (圖 7)。側門齒和門齒的矯正器基本上是黏在牙齒中間位置，根據垂直覆蓋的深淺可以往切端或是牙齦端做調整，深咬往切端黏，開咬往牙齦端黏 (圖 8)。

黏著過程

• **器械準備**：

1. 醫師診療台：

口鏡、scaler、end cutter、 Weingart plier、needle holder、開蓋器、鑷子、吸水棉、棉卷、三角隔片、流動樹脂、打磨膏、張口器、打火機、0.014 Cu-NiTi wire (圖9)。

2. 助理工作台：矯正器、酸蝕液、黏著液、小棉棒、樹脂、鑷子 (圖 10)。

吸水棉、棉卷、三角隔片、流動樹脂、打磨膏、張口器 (由左到右)

口鏡、scaler、end cutter、Weingart plier、 needle holder、開蓋器、鑷子、0.014Cu-NiTi線、打火機 (由左到右)

■ 圖 9. 醫師診療台

矯正器盤、酸蝕液 (藍色)、黏著液 (黃色)、小棉棒、樹脂、鑷子 (由左到右)

■ 圖 10. 助理工作台

• **臨床步驟**：(圖 11)

(1) 使用打磨膏將牙齒表面清洗乾淨。

(2) 將牙齒表面吹乾後塗上酸蝕液。

■ 圖 11. 臨床步驟。

(3) 沖洗吹乾後塗上黏著液

(4) 光照機來回照光三秒。

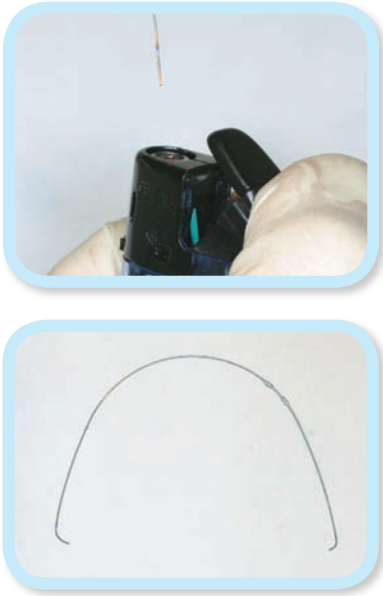
(5) 依照順序黏著。後牙每黏完一顆先照光十秒固定。

(6) 左側前牙三顆定位後一起照光，再黏右側前牙，或者前牙六顆定位後一起照光。

(7) 全部黏完後每一顆矯正器再照光十秒。

(8) 用 needle holder 將 gauge 取下。

(9) 放入0.014 Cu-NiTi 線。線的尾端會多留約4mm，並且用打火機燒最尾端 3mm 後將線彎直角，末端再用流動樹脂將線尾包住，避免線尾刺到病人 (圖 12)。



■ 圖 12. .014Cu-NiTi 線尾用打火機燒約 3mm 處後彎折。

• 臨床小技巧：

I. 0.014 Cu-NiTi 線上附有 stopper，主要用來防止線的滑動。基本上 stopper 應放在正中門齒的位置，若是 Damon Clear® 則會選擇放在犬齒的位置 (圖 11-9)，因為金屬的 stopper 放在透明矯正器旁會比較明顯，基於美觀的考量會盡量避免放在門齒的位置。

II. 若是拔第一大臼齒的病人，因為矯正器間距較大，0.014 Cu-NiTi 線容易滑脫，會選擇先穿到第二小臼齒，等之後換到直徑較粗的線再穿到第二大臼齒 (圖 13)。

■ 圖 13.
將 stopper 放在正中門齒的位置。0.014Cu-NiTi 先穿到第二小臼齒，線尾用打火機燒約 3mm 後彎折，再用流動樹脂把線尾包住 (黃色箭頭)。

口腔衛教

在病人黏著矯正器結束後當天，助理會利用 iPad 播放貝多芬自製的衛教影片 (圖 14)，教導病人如何刷牙，另外還會提供病人一份衛教單和刷牙用具組 (圖 15)，方便病人持續維持口腔清潔。

■ 圖 14. 讓病人用 iPad 觀看刷牙衛教影片。

■ 圖 15. 提供病人刷牙包和注意事項。

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1. Pitts T. Begin with the end in mind: Bracket placement and early elastics protocols for smile arc protection. Clinical impressions, 2009; 17(1):4-13.
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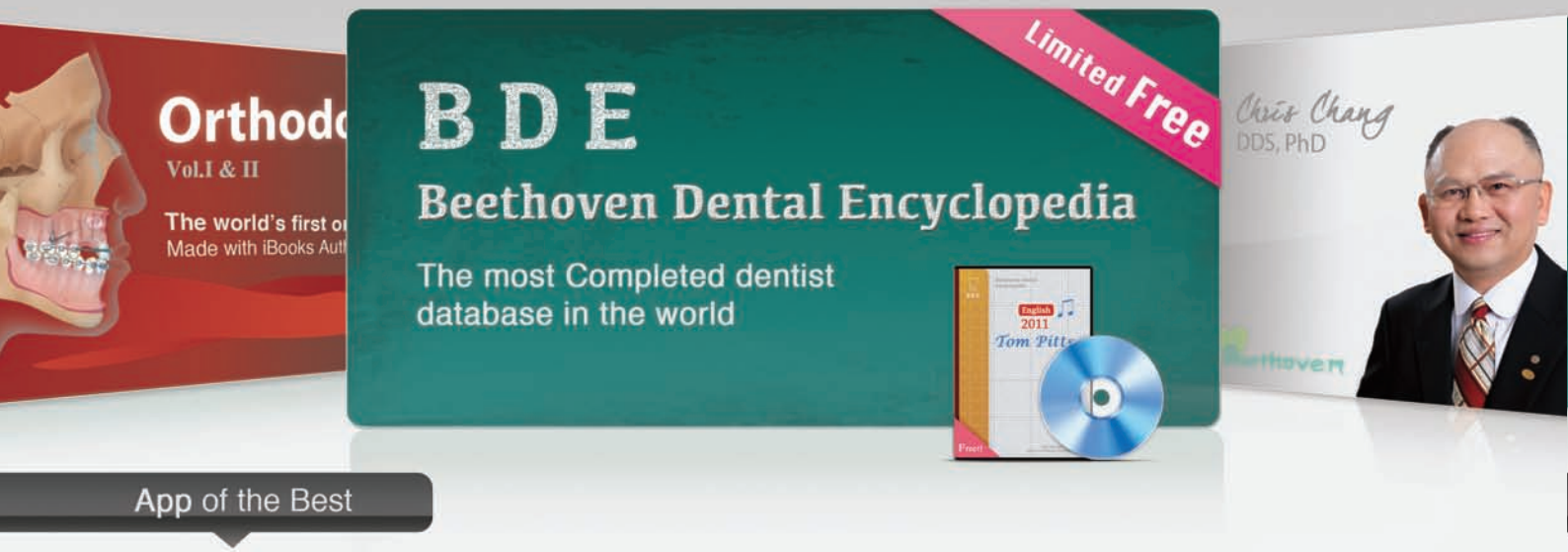
4. Chang CH, Roberts WE. Orthodontics. Vol III. Taipei: Yong Chieh; 2012.



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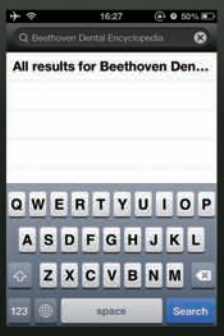

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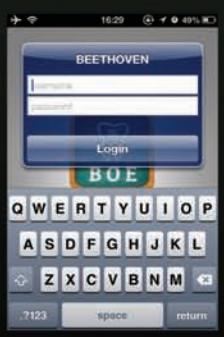

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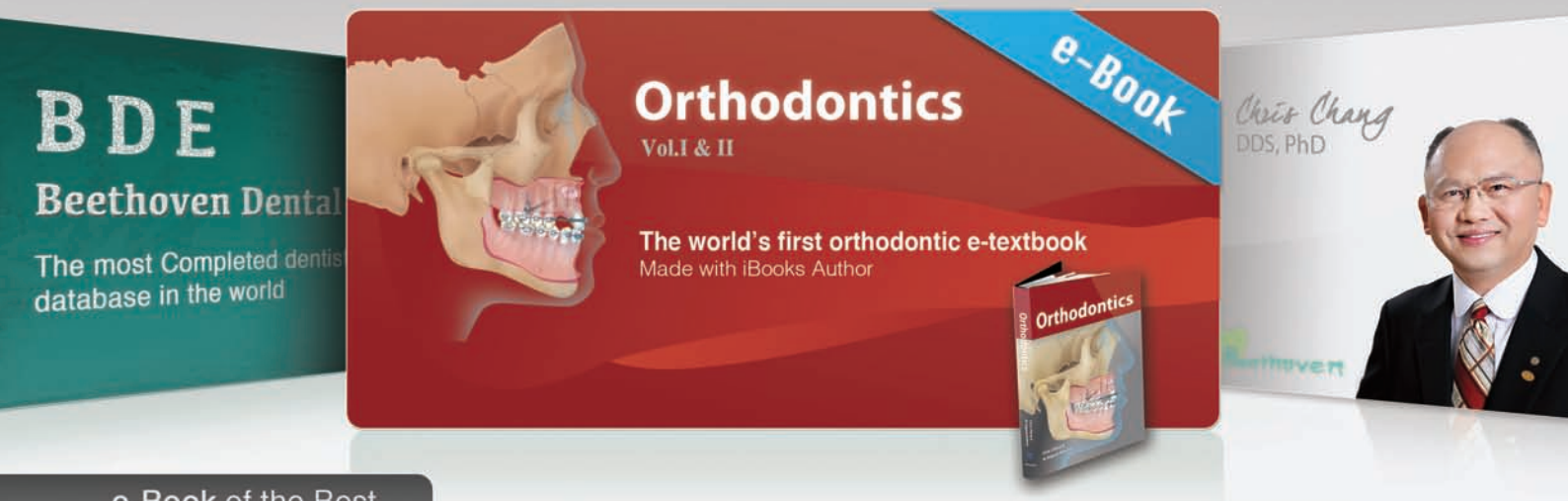

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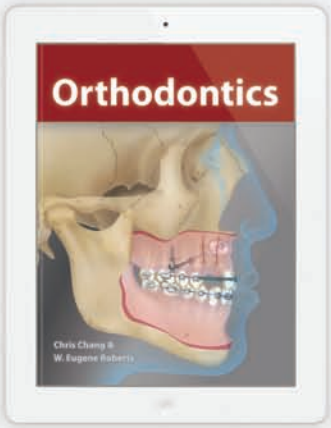

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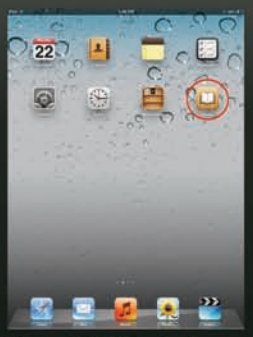

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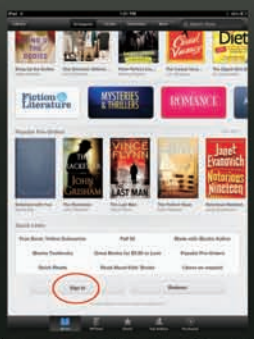

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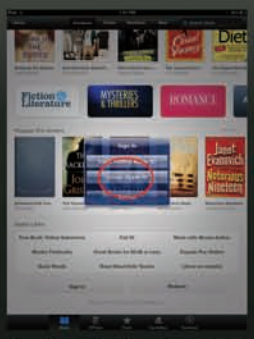

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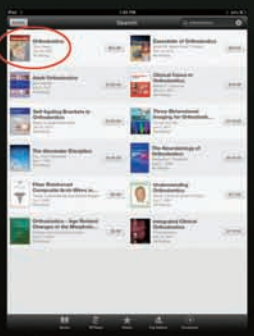

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Newton's A

Case Report: Surgery-First Approach Combining with CDG® for Class II Patients

Abstract

This article presents an interdisciplinary treatment approach for a 20-year-old female patient presenting with: (1) a convex profile, (2) and skeletal Class II malocclusion due to inferior mandibular retrognathism, (3) Retrogenia and (4) Amelogenesis imperfecta. Surgery was applied before orthodontics. A new device, Castellanos Direct Guides (CDG®), was used to ensure correct occlusal fixation during the surgery. The treatment time was significantly reduced to 8 months and the outcome was satisfactory according to the treatment plan. (Int J Ortho Implantol 2013;32:100-106)

Introduction

Orthognatic surgery is considered for cases with different position and size of maxillary bones, when ideal esthetic and functional results are expected. Orthognatic surgery is planned to achieve the best esthetic (*macro, mini and micro esthetically*)[1] and functional results (*occlusion with condyles relocated in centric position and passive fixation of posterior segments*).

The conventional orthognatic surgery protocols require a relatively long period of treatment time, usually between 15 to 17 months[2, 3] and sometimes up to 24 months.[4] These protocols are proceeded by a preliminary orthodontic dental alignment and leveling, using rigid stainless steel arches,

Lateral and postero-anterior x-ray

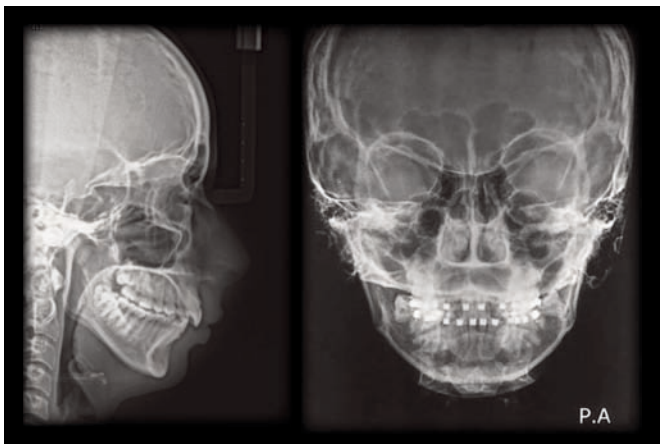

Fig. 1

Iniitial - December 20, 2011: Facial and intraoral pre-surgical pictures. Notice the convex profile, reduced inferior facial third,class II molar and canine bilateral dental relationship.

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Lateral and postero-anterior x-ray

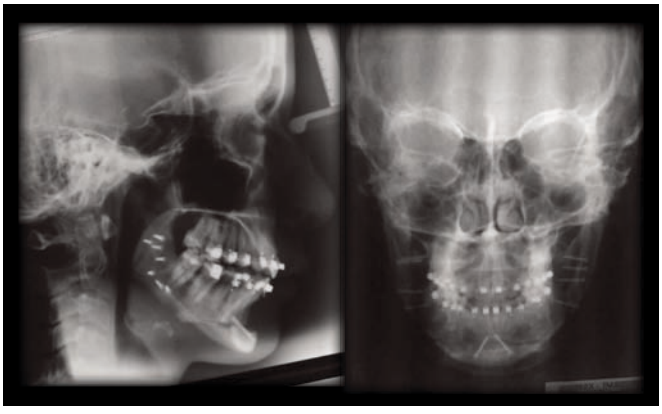

Fig. 2

End of treatment: August 18th 2012 (total time of treatment: 8 months) Facial and intraoral post-surgical photos showing evidence of optimum esthetic and dental changes, providing symmetry, balance and shape of facial thirds, adequate mandibular and chin projection. The better projection of the nasal tip is partly due to the secondary rhinoplasty. Canine and molar relationships are class I bilateral and the dental inferior midline is corrected.

preferentially with welded surgical pins to assist in the fixation and intraoperatory stability. Such orthodontic treatment is slow, offers limited results and often makes the malocclusion more pronounced which is part of the reason for rejection.

The conventional orthodontic method is also challenged as the result of patients' tendency to easily dislodge the inferior brackets. In addition, lifting the curve of Spee is more complex and slow due to the compressive force of masseter and internal pterygoid muscles' resistance. This can be avoided in mild cases by placing bite-turbos or biting blocks. However, in more complex cases it is necessary to initiate the orthodontic treatment only in one dental arch, and to place a bite lifting plate in the antagonist one, which further increases the time required for decompensation .

"*Surgery first*", an alternative described by Brachvogel in 1991[5] and later by Nagasaka in 2009,[6] is considered to eliminate the long decompensation stage and avoid some of the previously mentioned disadvantages. However, the risk of orthognatic surgery without prior orthodontics is the unexpected positional changes of jaws and teeth as a consequence of incorrect model surgery.

To provide stability some protocols are recommended for bonding brackets and placing passive arches .

Some protocols emphasize the problems derived from the Curve of Spee that contraindicate this approach due to the lack of intra and post-operative occlusal stability, related to development of bilateral posterior open bite, directly proportional to the Curve of Spee, that creates anterior edge to edge bites which tends to limit and compromis the final outcome.[7] Other protocols as that cited by Liou in 2011 consider two options for class II patients: First, to perform a segmented mandibular anterior osteotomy to level the Curve of Spee and second, post-surgical dental intrusion of the anterior-inferior section to close posterior open bite, which will facilitate mandibular self-rotation and achieve a better profile of the patient.[8]

This surgery first approach can reduce treatment length in two aspects: First, the elimination of pre-surgical orthodontic phase of decompensation; second, the regional acceleration phenomena (*RAP*) that increases the rate of dental orthodontic movement.[9] RAP is described as an increased metabolic activity linked to bone turnover, used in early post-surgical orthodontic phase, to facilitate a faster dental movement and reduce treatment time.

This case reported a new approach based on the surgery-first approach to treat class II dentofacial anomalies, using an innovative device, Castellanos Direct Guide (*CDG®*). It is easy to obtain, fast, reliable and warrants surgical stability, and provides great patient comfort. This device opens a broad set of diversified approaches to facial surgery. The design of this orthodontic aid serves two main purposes: to assist the orthognatic surgeon to place the bone segments in the desired occlusal position and to obtain better stability while reducing treatment time. It is made possible because of the regional acceleratory window developed by bone osteoinduction generated by the surgery.[8, 9]

This case report aims to explain the fabrication, function and advantages of this new device and its application. this article presents a case, representative of a group of patients that have been successfully treated by this interdisciplinary approach.

Patient: N. F.

Age: 20.

Gender: Female

Chief complaint: small mandible and protrusive upper central incisors.

Summary of Diagnostic Findings:

1. Convex Profile
2. Skeletal Class II associated to inferior mandibular retrognathism
3. Overjet: increased
4. Reduced inferior facial third
5. Short Distance menton-throat
6. Deep mento-labial groove
7. Retrogenia
8. Deep Curve of Spee
9. Multiple rotations and versions
10. Inferior midline deviation to the left 3 mm, associated to levognathism (*Condylar hyperplasia was discarded by bone gammagraphy*)
11. Left canine and molar Class II, 7 mm
12. Right canine and molar Class II, 3 mm
13. Enamel Hypoplasia (*Generalized Amelogenesis imperfecta*)
14. Third molar teeth extraction indicated for lack of space.

Interdisciplinary Team Participants:

- Maxillofacial surgeon

Fig. 3:

Taking into consideration that RAP occurs only in the lower jaw due to the surgical procedure, microperforations can be performed in the upper arch in order to match dental movement. It is important to point out that propel should not be done on the posterior upper teeth for the closing of the residual open bite should occur by the extrusion of lower molars and premolars, thus leveling the Curve of Spee.

- Orthodontist
- Plastic surgeon
- Esthetic dentist

Interdisciplinary Treatment Objectives:

- To obtain facial proportion harmony
- Straight Profile
- Skeletal class I
- Anterior teeth coupling
- Occlusion in centric relation
- Recover vertical dimension of the facial inferior third
- Reduce the curve of Spee
- Bilateral canine and molar Class I
- Dental Alignment and leveling
- Improve dental shape and color

Brackets:

- Passive self-ligation Brackets, Slot 0.022"

Sequence of Treatment:

Once the ortho-surgical aims were established,

Fig. 4:

Models mounted in the articulator (adjustable or semi-adjustable), based on the STO.

Fig. 5:

The CDG®s are independent (right and left) is recommended ideally covering the occlusal area since at least the third mesial occlusal surface of the second molar to the distal aspect of the canine. It is important that the morphology copied in detail in this area.

Fig. 6:

The direct guide should provide the highest possible stability, (in the case shown in this figure the acrylic contacts saliva even in the space of an absent tooth)

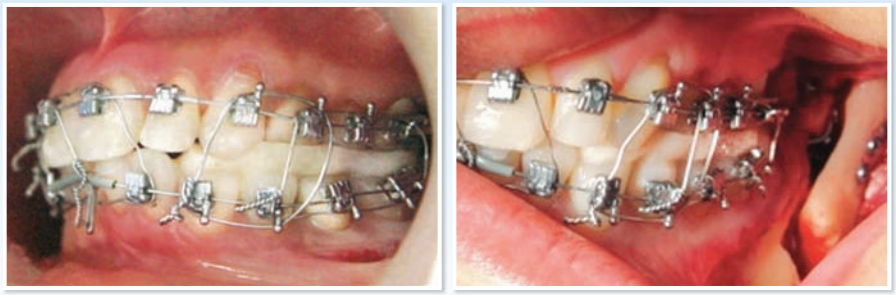

Fig. 7

a: Transoperatory picture. Notice CDG® in position with FIM and wires in the expected position previously planned in the model surgery. Indentation is perfect.

b: It shows the mandibular advancement outcome and occlusion as planned.

Fig. 8:

Postsurgery: January 2012 (2 weeks after surgery) Shows the patient two weeks following the procedure CDG®s preserved stability. the occlusion shows the same position as was predicted in the model surgery "The patient feels confortable, because her bite remains stable reference tracks"

Fig. 9:

Intraoral photos of the post-surgical orthodontic process showing evidence of arch coordination six months after surgery.

treatment based on post operative occlusion and guidelines of surgical treatment objectives (*STO*) began. Special attention was given to the axial inclination of lower incisors and Curve of Spee, both of which would be corrected during the orthodontic phase when the adjacent soft tissue would be altered.

1. Articulator mounting in centric relation .
2. Surgical model sectioning and mandibular advance 7 mm to the right and 3 mm to the left, asymmetricly, according to the treatment plan and STO.
3. Preparation of CDG® guide. The customized CDG® are fabricated as follows:
   a) Isolation of posterior occlusal surfaces in both models with separating solution.
   b) Apply self-curing acrylic in its plastic phase, independently on the occlusal inferior right and left surfaces.
   c) Occlude in the mounting position made as indicated in the STO.
4. Carefully remove the CDG®s.
5. Bonding of superior and inferior brackets with versatile Smile Arc Protection (*SAP*) to protect the arch and smile curve.[11]
6. Initial arch: .014" NiTi archwire
7. Bonding CDG® guides to the inferior occlusal face, using glass ionomer.
8. Surgical sequences: Chin osteotomy, bilateral sagital splint osteotomy with simultaneous extraction of inferior third molars, intermaxillary fixation with 0.5 wires using CDG®'s, rigid internal fixation with bicortical screws for osteotomy of mandibular ramus, remotion of intermaxilary fixation, checking occlusion and adequate condylar position and excursions, rigid internal chin fixation, extraction of superior third molars.
9. The patient kept the CDG® in place for 4 to 5 weeks. During this period, regular checkups were conducted to ensure the occlusion was stable and elastics were delivered.
10. After 4 to 5 weeks, X-ray films were taken and the CDG® was removed, using rotatory high speed instruments to debilitate the bonded interface.
11. After this stage, the orthodontic procedure is managed as a class I skeletal case, with the normal protocols and archwire sequences. Additionally, elastics (*2 oz*) were used, based on Pitts' protocols, to close the open bite at the premolar level caused by the deep Curve of Spee.
12. After completing the orthodontic treatment, the brackets were removed and superior impressions from second to second premolar were taken to apply Luminieres, which improved morphology and solve texture and color problems associated to the condition of amelogenesis imperfecta.
13. Occlusal adjustment by selective stripping.
14. Removable retention with Pitts' MT Splints, for dentomaxillary stabilization, to be used at night.

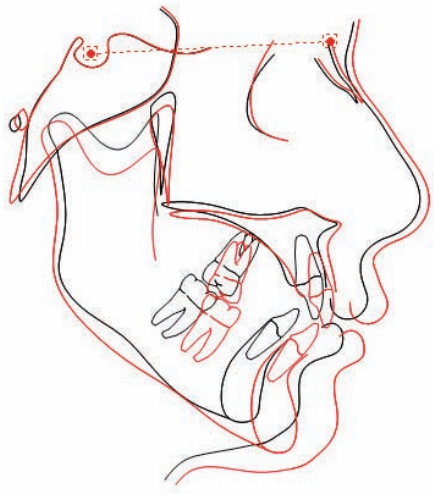

Fig. 10:

Superimpositions: Iniitial - December 20, 2011 (Black line) and final: August 18th 2012. Notice the convex profile, reduced inferior facial third,class II molar and canine bilateral dental relationship. (total time of treatment: 8 months)

Treatment Outcomes:

1. Straight Profile - Class I canine and molar bilateral
2. SAP Smile Arc Protection.
3. Anterior teeth coupling
4. Occlusion in centric relation
5. Recovery of vertical dimension of the facial inferior third
6. Flat Curve of Spee
7. Dental alignment and leveling
8. Improved dental shape and color.

Conclusions:

The Surgery-first protocol eliminates the decompensation orthodontic stage. The modified protocols applied in this case was performed by an interdisciplinary team. The combined use of a customized simple device-CDG® provided the surgeon precise guidance in the expected occlusal relation during the placement of bone segments and improved stability. One of the advantages of these protocols is the significant reduction of time, associated with the surgically induced, regional acceleratory phenomenon (*RAP*), the use of active NiTi archwires and early light elastics (2 Oz.) from the beginning of treatment, all of which allowed the initiation of dental movement during the time window. Other advantages are increased patient acceptance and comfort, better esthetic outcome and greater stability of the treatment . The CDG®s can provide an exact guide to the final occlusal relation and eliminate the post-surgery compensation stage. The CDG®s can be made and function even in absence of some teeth and give reliable stability during the intra and post-surgical procedures.

Acknowledgement

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植牙術前難易度評分系統介紹
The SAC Classification in Implant Dentistry

隨著科技技術與經驗的進步，植牙已經逐漸成為局部或全口缺牙患者的治療標準選擇之一。如何讓醫師在執行或選擇植牙作為治療選擇之前，能有一套系統輔助幫忙醫師謹慎的評估患者的狀況以及判斷治療的複雜容易程度，the International Team for Implantology（ITI）在2007年世界性的大會中與眾多醫師討論訂定出一份準則，從手術的觀點與補綴的觀點出發詳細列出植牙過程中可能遇到的狀況，按照風險區分為高中低，供作醫師下治療計畫前的參考，讓醫師尋著這套工具將病人分類為簡單，進階，複雜性治療難度的分類準則。這套工具稱作 Straightforward, Advanced and Complex classification system 簡稱 SAC 系統。隨著科際整合概念逐漸盛行，成年患者在植牙前利用矯正方式重新排列齒列空間的接受度越來越高，因此矯正的治療難易評估（由美國矯正學會頒佈的評估方法）也被納入植牙術前評估的考量因子之一，讓醫師能夠更全面性的替患者進行完整的諮詢。

本文先從植牙的時機（表一）與假牙的製作時機（表二）作分期，type 1定義為拔牙後立即植牙，此時骨頭與牙肉都尚未癒合，人工牙根植入後要能維持初期的穩定需要相當的技術，通常植牙的同時需要在拔

分類	定義	拔牙後植牙時機	拔牙後硬軟組織狀態
type 1	立即植牙 immediate placement	拔牙後立即植牙	拔牙窩洞內外 硬軟組織尚未癒合
type 2	早期植牙 （軟組織癒合） early placement with soft-tissue healing	拔牙後等待4~8週	拔牙窩洞洞口 牙肉已經癒合覆蓋， 但窩洞內骨頭尚未癒合
type 3	早期植牙 （硬組織部分已癒合） early placement with partial bone healing	拔牙後等待12~16週	拔牙窩洞洞口 牙肉已經癒合覆蓋， 窩洞內部分骨頭開始癒合
type 4	延遲植牙 late placement	拔牙後等待超過6個月	拔牙窩洞完全癒合

■ 表一

Dr. Bill Su, Director,
Newtons Implant Center

牙的窩洞處補骨。typ 2定義為拔牙後等待4~8周至拔牙洞口軟組織癒合後進行早期植牙，此時骨頭尚未癒合，需要在植牙同時補骨，但是牙肉已癒合所以皮瓣能夠作完全縫合。type 3定義為拔牙後等待12~16周至軟組織癒合，且此時部分骨頭已經開始形成的時期作早期植牙，此時植牙比較容易達到理想的位置，但因骨頭仍不足，所以通常也需同時補骨。type 4定義為拔牙後等待超過6個月，此時硬軟組織都完全癒合的時期進行植牙手術。表二定義植牙後，假牙（臨時假牙）的放置時機分期，植牙後48小時內就安裝假牙但是沒有咬合接觸定義為 immediate restoration，承受咬合力定義為 immediate loading。48小時到3個月內稱為 early loading，3~6個月安裝假牙稱為 conventional loading，6個月以後稱為 delayed loading。

缺牙區的骨脊頰舌側厚度理想上為植體牙根植入後，頰舌側最少能保有1mm的安全厚度（前牙區為了保持美觀與避免萎縮，甚至建議頰側能有2mm的骨質），通常植體依照牙根直徑會有窄，標準與寬植體的不同大小。ITI 建議我們將各種不同的案例，依照治療的複雜程度，區分為簡單病例（綠燈），進階病例（黃燈）以及複雜病例（紅燈）（表三）。

假牙放置時機	定義
植牙後立即放置假牙 immediate restoration	植牙牙根置入48小時內立即安裝假牙， 但是沒有任何咬合接觸
植牙後立即放置假牙承載咬合力 immediate loading	植牙牙根置入48小時內立即安裝假牙 並且承受咬合力
植牙後等待癒合後承載咬合力 conventional loading	植牙牙根置入後等待3~6個月 才安裝假牙
植牙後早期放置假牙承載咬合力 early loading	植牙牙根置入後安裝假牙的時間為48小時之後， 但3個月內
植牙後延遲放置假牙承載咬合力 delayed loading	植牙牙根置入超過3~6個月後才安裝假牙

■ 表二

SAC 首先先評估病人的基本狀況 (表四)，依照病人的期望，患者本身的相關性病史了解患者的身體狀況以及對治療本身是否懷抱著過度的期望。牙周病史與口腔清潔能讓醫師評估假牙將來完成後維持的狀況與預後情形。抽煙的量嚴重影響將來植牙的長期成功率以及傷口的癒合速度。開口度大小影響植牙的位置與角度，骨骼 (尤其下顎骨，男生約需 18 歲，女生約需等到 16 歲) 尚未發育完成便種植植體時，隨著後來的頷骨成長，容易會使植牙的假牙下沉低於咬合平面，上顎前牙的植體假牙牙齦邊緣高度也容易高於正常鄰牙。

接下來評估植牙區的美觀風險因子 (表五)，唇線高代表患者講話微笑時，容易看到前牙植牙的整個牙冠輪廓以及牙齦邊緣，每個環節都需要相當的能力掌控表現最自然的美觀，因此對醫師而言難度風險最高。牙齦類型如果厚度厚，曲線低，則完成的植體假牙邊緣較容易看不出來，同時牙齦乳頭比較容易豐滿，因此，牙冠形狀越呈現三角形，牙齦乳頭就必須越高越豐隆才能不會出現三角的情況，要達到美觀的難度也就越高。植牙區如果有發炎的狀況，會影響該區骨質的質地與骨質的量，發炎沒有控制，會感染影響該區植體牙根甚至導致骨粉也受到感染。鄰牙周圍的骨頭水平高度決定了將來植牙牙套兩旁牙齦乳頭的高度，鄰牙如果是不密合的牙套，或是根尖有感染可能會影響旁邊植牙的長期成功率，單顆缺牙區的近遠心徑理想上應該為植體牙根的直徑加上兩邊至少各 1.5mm 的距離，以標準植體尺寸 4mm 而言，我們希望理想上有 7mm 的空間，如果過窄過寬都會影響將來植體假牙的型態。要達成美觀，硬軟組織一定都要達到理想的厚度與高度，不然將來的植體假牙就會過大過長或是角度不佳。

接下來進入手術風險因子評估 (表六)，病人的基本狀況以及美觀風險經過前面的綜合表列後，手術的部份首先我們可以藉由斷層的分析判斷骨量是否足夠，一般而言水平骨厚度應為選用植體牙根直徑多 2mm，植體牙根長度的選擇，10mm 以上比較足以承受咬合的應力。軟組織的狀態區分為厚薄與否，是否萎縮以及是否有足夠的角化牙齦作評估。當植牙區鄰近重要解剖結構 (上顎竇，下齒槽神經，頦神經等) 甚至必須經過在這些解剖構造時，手術的難度以及可

簡單病例	進階病例	複雜病例
手術過程簡單， 風險低較不會侵犯到 重要解剖結構術後後遺症少 美觀容易達成或較不影響	手術難度提高 離重要解剖結構近 術後後遺症機率增加 美觀達成難度增加	手術難度高 鄰近重要解剖結構 術後後遺症容易產生 達成美觀難度高
可直接完成植牙手術	植牙手術過程中 需要局部補骨 / 補肉	可能先進行硬軟組織重建， 待癒合成熟後再進行 植牙手術植牙手術時， 同時安裝假牙

■ 表三

植牙患者基本狀況風險因子評估 General modifiers		風險低	風險中等	風險高
病人的期望	病人對治療過程以及結果的期望	只要有牙齒即可	假牙滿足功能上的需求	過程舒適，假牙需滿足美觀的需求
系統性相關病史	可能會影響骨頭癒合能力的相關骨性疾病，免疫異常相關疾病，服用類固醇類的藥物病史，控制不量的糖尿病，接受過放射線治療。	健康無任何系統性疾病免疫功能健全	控制中的相關系統性或免疫性疾病	影響骨質癒合的疾病或服用相關藥物（例如福善美）免疫功能異常血糖控制不良接受放療中
牙周相關病史	進行中的牙周病會影響植牙或補骨術式的成功率以及增加感染的風險。	健康	控制中的牙周病	進行中的牙周病牙周病再復發遺傳性牙周炎傾向
口腔清潔程度	病人能夠自行維持良好的口腔清潔對於植牙的長期成功率極為重要。	良好	中等	不良
抽煙習慣	抽煙會影響植體骨整合，骨粉癒合與長期植體間的牙周健康，在植牙前應建議病人戒煙。	沒有抽煙習慣	一天少於10隻菸	一天多於10隻菸
顏面骨骼發育	骨骼的發育讓過早種植的植體假牙沉入咬合平面，偏向顎側，牙齦高度不平齊造成功能與美觀上的問題。	發育完成		正在發育中
開口度	顳顎關節或是其他情況造成開口收限，讓植體無法順利的種植正確的角度與位置，至少需要開口30mm。	正常	開口受限	嚴重開口受限，幾乎無法開口
其他	有無其他風險因子補充			

■ 表四

美觀風險因子評估 Esthetic modifiers		風險低	風險中等	風險高
基本狀況風險評估 Genreal modifiers	如上表列之綜合評價			
唇線 Lip line	說話或微笑的時候，植牙假牙的牙齦線是否看得到	牙齦乳突沒有露出	唇線在牙齦乳突的位置	微笑時完全露出牙齦
牙齦類型 Gingival biotype	牙齦類型的差異影響植體假牙邊緣的美觀以及長期追蹤時牙齦萎縮的程度	厚，低曲線 Low-scalloped, Thick	中等厚度，曲線 Medium-scalloped, Medium-thick	厚度薄，高曲線 High-scalloped, Thin
牙冠形狀 Shape of tooth crowns	鄰牙牙冠型態決定將來植牙假牙的美觀程度，三角形狀的牙冠美觀上的挑戰難度較高。	正方形 Rectangular	卵圓形 Ovale	三角形 Triangular
植牙區是否有發炎感染 Infection at implant site	牙周炎，根管病變，創傷（牙根裂，牙根吸收，沾粘）等會造成發炎反應，影響植牙區硬軟組織的完整。	沒有 None	慢性發炎 Chronic	急性發炎 Acute
鄰邊牙齒骨頭的高度 Bone level at adjacent teeth	骨頭垂直距離的喪失讓將來植體假牙完成後，短縮的牙齦乳突與黑三角的出現機會增加。	接觸點到骨頭距離小於等於 5mm	接觸點到骨頭距離 5.5~6.5mm 之間	接觸點到骨頭距離大於等於 7mm
鄰邊牙齒的狀態 Restorative status of neighboring teeth	不良補綴物容易造成植牙區感染的機率。	完整	曾經填補	不良補綴物
無牙區範圍 Width of edentulous span	兩顆以上的牙齒喪失需要考量將來牙齒的寬度以及植體種植的位置。	單顆牙（大於等於 7mm 近遠心寬徑）	單顆牙（小於 7mm 近遠心寬徑）	兩顆以上牙齒喪失
軟組織狀態 Soft tissue anatomy	不足的軟組織會影響植牙假牙的美觀與長期成功，需要做軟組織手術，	軟組織完整	軟組織厚度不足	軟組織缺乏
骨頭狀態 Bone anatomy	骨質喪失的量直接影響植體牙根的維持以及補骨術式的難易度。	骨質完整	水平性骨喪失	垂直性骨喪失
其他	有無其他風險因子補充			

■ 表五

手術風險因子評估 Surgical modifiers		風險低	風險中等	風險高
基本狀況風險評估 Genreal modifiers	如上表列之綜合評價			
美觀風險評估 Esthetic modifiers	如上表列之綜合評價			
骨量 Bone volume				
水平骨厚度		足夠 (厚度至少為選用植體直徑 +2mm)	中等厚度，曲線 Medium-scalloped, Medium-thick	厚度薄，高曲線 High-scalloped, Thin
垂直骨高度		足夠 (植體長度理想上達到 10mm)	卵圓形 Ovale	三角形 Triangular
軟組織狀態 Soft tissue				
軟組織厚度		厚		
軟組織萎縮與否		足夠	萎縮，可植牙同時進行軟組織術式	萎縮，需另外進行軟組織術式增加缺損
角化牙齦量足夠與否		>3mm	1~3mm	<1mm
解剖結構				
植牙區靠近解剖結構		植體牙根不會侵犯解剖結構	植體牙根鄰近解剖結構 (3mm 以內)	重要解剖結構位於植體牙根位置
手術術式複雜度				
手術術式與次數		植體牙根放置不需要其他額外步驟手術導引板輔助	植體牙根放置同時可能補骨或補肉無翻瓣手術	植體牙根放置前需要先進行多次補骨補肉的步驟全口植牙植牙伴隨特殊術式 (上顎竇提昇，下齒槽神經位移等)
後遺症				
手術中產生的風險		幾乎沒有	容易產生 (鄰近神經，上顎竇質地不佳 ...)	必然產生
術後產生的風險		幾乎沒有	發生後能復原 (神經麻痺 ...)	發生後幾乎無法復原
其他附註				

■ 表六

能發生術後後遺症的機率便大福提高。如果硬軟組織有欠缺不足，則就要視缺損的量以及醫師的經驗或技術評估整個植牙過程中所需要的手術次數，例如有些醫師會選擇先將骨量補足等待骨粉成熟後，才進行植牙的手術。手術導引板能讓醫師精確的掌握植牙的位置，無翻瓣手術則相對需要醫師更多的臨床經驗以及硬軟組織條件都相當好的情況下才建議。手術中可能產生的風險包含是否會壓迫到神經，上顎竇提昇時造成上顎竇膜破裂等情況，術後可能會因為這些狀況產生術後腫脹，流血，麻痺，大部分都能逐漸復原，但仍須小心手術時避開這些解剖結構以免發生難以復原的後遺症。

補綴風險因子評估部分（表七），當患者無法保持口腔清潔或進行中牙周炎不願意接受牙周控制，意味著當植牙假牙完成後，患者對維持自己口內補綴物清潔的能力不足。鄰牙牙冠如果與植牙假牙同時置換，醫師與技師比較能夠掌握顏色以及牙齒的形態。建議醫師在諮詢患者時，詢問之前牙齒喪失的原因，牙周炎或咬力的因素失去牙齒往往代表醫師在進行植牙補綴時，感染的控制以及咬力的分佈必須格外的小心。植牙的部位以連續多顆前牙美觀區以及全口重建的困難度最高，依照將來假牙的型態空間是否足夠，我們必須首先考量對咬的距離是否足夠假牙容納支台齒，假牙支架以及假牙燒瓷的空間。近遠心距需要能維持植體距離自然牙至少1.5mm，距離第二顆植體至少3mm的安全距離，如果空間不足，則需考慮修磨鄰牙或是進行矯正空間調整。牙冠高度指將來假牙完成時，是否會因為過長而需要在齒頸部燒上人工牙齦，如果能在植牙前與患者溝通，則能減低將來換成後患者的疑慮。

接下來需要考量患者的咬合導引以及咬合類型，前方/犬齒導引提供後牙的保護，群體功能性咬合或平衡性咬合能讓牙周的患者無論前牙區或是後牙區都期望能提供均勻的咬合受力，深咬的類型必須謹慎的評估甚至建議患者接受矯正的調整，當多顆植體或是全口重建的案例，最終補綴物的咬合設計是否適當提供該補綴物的長期成功率，磨牙的患者尤其是牙齒已經出現磨耗的情況時，補綴物完成後建議應該給予咬合板，甚至遠在治療前，就必須針對顳顎關節進行診斷治療。

植體牙根置入後等待骨整合期間，我們可以選擇活動式或固定式的臨時假牙，如果植牙牙根初期穩定極佳，骨質軟組織條件足夠，為了維持美觀或是縮短治療時間，有時植牙同時就會放置臨時性假牙，需注意齒頸部型態的修型與拋光，讓軟組織癒合。等到骨整合後，植牙支持式的臨時假牙便會開始安裝，通常醫師會利用此時進行牙齦的塑型，讓最終假牙的牙齦牙冠邊緣能夠呈現自然的形態。

最終假牙的製作過程牽涉到印模方式，支台齒，以及牙冠材質等的選擇。越多顆（跨牙弓兩側都有）植體或是角度差異越大的植體需要利用到open tray的方式取模盡量避免誤差，支台齒的選擇原則上各家植體的廠牌都有自己的設計，通常一般支台齒指植牙角度位置高度距離極佳的狀況下，我們可以直接套用而不需要再修磨，美觀性支台齒多用於前牙區因為齒頸線有弧度的設計更能表現前牙牙冠的形態，如果需要維持開展的牙齦型態或應付各種不同的牙齦高度弧度需求，便需要客製化進行支台齒的製作。牙冠的材質選擇上，承接咬力的位置通常醫師會建議為金屬或是

補綴風險因子評估 Restorativemodifiers		風險低	風險中等	風險高
口腔環境				
口腔健康狀況		健康	局部齲齒牙齦炎，治療中可控制	嚴重牙周炎等進行中病症，沒有接受治療
缺牙區鄰牙狀況		不密合假牙，但願意置換	健康牙	不密合假牙，但不考慮置換
植牙區原本牙齒喪失原因		創傷 / 齲齒		牙周炎 / 咬力過大
假牙類型				
假牙數量		單顆	局部多顆前牙單顆	全口前牙多顆
假牙空間評估				
對咬距離 inter-arch distance	植牙區牙齦邊緣到對咬牙的距離	足夠（支台齒高度 + 假牙厚度）	距離不足可調整假牙高度	距離不足需要調整對牙
近遠心距離 Mesio-distal space	植體距離自然牙需 1.5mm，距離植體需 3mm	足夠	空間不足需修磨鄰牙	空間不足或過多需先進行矯正
植牙區牙冠高度	軟組織高度喪失時，牙冠會顯得特別長，假牙可能需要作人工牙齦	正常牙冠高度	牙冠較鄰牙稍長	假牙需要製作人工牙齦
咬合				
咬合導引類性		前方導引 / 犬齒導引	群體功能性咬合 平衡性咬合	導引喪失需重新建立
咬合類型		正常咬合	不良咬合（暴牙，後倒，擁擠..）	深咬
是否會影響患者的咬合類型		不會影響	配合原本咬合	需改變咬合類型
磨牙		無	有 / 牙齒無磨耗	有 / 牙齒磨耗嚴重

補綴風險因子評估 Restorativemodifiers	風險低	風險中等	風險高
臨時假牙類型			
植體牙根等待癒合期間	不需要	活動式臨時假牙	固定式臨時假牙
植體牙根骨整合後， 植牙支持式臨時假牙安裝	不需要	維持牙齦型態	改變牙齦型態
假牙承受咬合力時機	植牙後 延遲放置假牙 承載咬合力	植牙後 早期放置假牙 承載咬合力	植牙後 立即放置假牙 承載咬合力
最終假牙製作過程			
印模方式選擇	直接印模	close tray impression	open tray impression
支台齒選擇	一般支台齒	美觀性 支台齒有角度 支台齒	客製化 支台齒多顆 splinting
假牙材質選擇	牙冠全部為金屬或 氧化鋯樹脂 包覆外側， 內裡為金屬或 氧化鋯	porcelain 包覆頰 側，內裡與承受 咬合處為金屬或 氧化鋯	porcelain 包覆頰側到咬合 面以上， 內裡為金屬或氧 化鋯
假牙黏合方式選擇	黏著式螺絲固定式	半固定式	活動式
清潔維持需求	低	患者需特別方式 作清潔維持	患者無法清潔 需醫療照護
其他附註			

■表七

氧化鋯，但色澤上能夠全部覆蓋瓷的表現最為自然。黏合的方式通常有黏著式或是螺絲固定式依照條件的不同或是醫師的臨床經驗與習慣作選擇，半固定式通常為螺絲固定，需要醫師每半年拆卸作清潔保養並置換零件，活動式則需患者睡前將假牙卸下，仍須至少每半年讓醫師進行活動式假牙的調整，並且觀察患者是否能保持假牙的清潔，在假牙一完成後，如需要特別清潔的器具(超級牙線或牙線穿引器等)，則需教導患者正確的保養方式以及較密集的追蹤間隔，以免假牙容易發生問題。

我們建議初學的醫師利用這些表格依序分析患者屬於哪一種治療的類型，可依照綠燈不計分，黃燈計1分，綠燈2分的原則按照下列標格來總列出植牙案例

■表八

的總分（表八），同時也可以讓我們比較容易看出該區可能隱藏的陷阱所在。有經驗的醫師也可以利用這樣的評估流程快速的瀏覽，以檢視是否有疏忽遺漏之處，全面性的評估以及正確的診斷能幫助完整治療計畫的訂立，也能讓醫師在植牙生涯裡，走得安心踏實。

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Feedback from Dr. Chris Chang's Lectures in China

首先謝謝張慧男博士的精彩演講，也感謝 Ormco 公司周到的組織。

作為一名大學教師和正畸醫生，我參加過很多學術活動，但是，張博士的課程給我帶來更深刻的印像和感觸。張博士不僅在複雜繁瑣的正畸世界裡找到了一條簡明、實用思路和方法，真正做到「化繁為簡」，張博士將簡明的治療方式和清晰的治療過程相結合，幫助正畸專科以及一般牙科醫師輕鬆處理常見的矯正問題，非常有針對性。

同時通過高品質的照片和影片來幫助醫師設計並執行簡單又符合邏輯的治療計劃，這對提高正畸矯治效率，保證矯治效果大有益處。另外，張慧男博士的演講技巧和精美的課件製作給我帶來震撼。同時，張博士將臨床中的經驗和思考以電子資料的形式總結出來，並建立了研究雜誌，有利於正畸同行們的學習和交流，這對口腔教育水平的提高和發展具有非常好的示範作用，非常欽佩張博士在這些方面做出的努力和貢獻。

非常希望再次聽到張博士的講座，希望張博士在正畸新的診斷、設計、目標理念和簡明的治療的完美結合上帶給我們更大的驚喜。

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副教授
山東大學口腔醫院正畸科

9月6日，「化繁為簡，樂享正畸」華人Damon大師中國巡講在山東青島花園大酒店舉行。來自台灣，具有豐富臨床經驗並任美國正畸學會院士的張慧男博士著重就阻生尖牙治療，微骨釘應用等進行了講解；張醫師的演講中涵蓋大量華人的臨床病例資料，他創造並運用簡潔的力量系統，以簡明的治療方式和清晰的治療過程相結合，輕鬆處理複雜的矯正難題。演講中，張慧男博士用風趣詼諧的語言解析了一些較為複雜的臨床病例，透過高品質的照片和影片來幫助醫師設計並執行簡單又符合邏輯的治療計劃，令在座的醫師們受益匪淺，茅塞頓開。

「化繁為簡，樂享正畸」的成功召開，必將為青島乃至山東省口腔正畸事業的快速發展起到積極的推動作用。期待張慧男博士再次蒞臨青島！

袁曉 博士
青島市立醫療集團
口腔醫學中心主任

趙陽 主治醫師 博士
副教授
中國醫科大學
口腔醫學院正畸科

慧男老師、高老師：

您好！收到您的感謝信，受寵若驚，內心很忐忑。瀋陽一站，聆聽您的講座，受益匪淺，回去後深讀您的著作更是醍醐灌頂！本應發信感謝，沒想到您卻先對我致信，內心真的激動不已。

這幾日，您的精彩演講，高水平病例解析，弦猶在耳，真的震撼非常，感慨您對病例的精益求精的態度，您的演講已經激發很多年輕醫生立志向您學習，這幾天大家都在翻看您的電子雜誌，議論您的病例，您的想法理念在我的周圍刮起一陣Chris旋風。

科室裡年輕醫生幾乎全部報名三亞您的課程，大家三亞再見！

您的粉絲
學生 趙陽

剛回到美國，終於可以上facebook了，感謝張醫師高老師讓我參與了這次巡講，見識了張醫師的演講功力！

四場相同的主題，四場都有不一樣的表現方式，而且回應都非常非常的熱烈！雖然台灣和大陸有不同的生活文化，竟也能把現場氣氛帶到最高點。最後一場更把「任何問題都可以在一分鐘內找到檔案show 給你看」的回答方式表現的淋漓盡致，其中root dilaceration 就是很好的例子，十幾個問題，輕輕鬆鬆，迎刃而解，太牛了！

I 服了you。

Johnathon lee
D.D.S.
Cum Laude Art of Dentistry, General Dentistry, LA, USA

Feedback from the International Damon & OBS Workshop

Dear Chris:

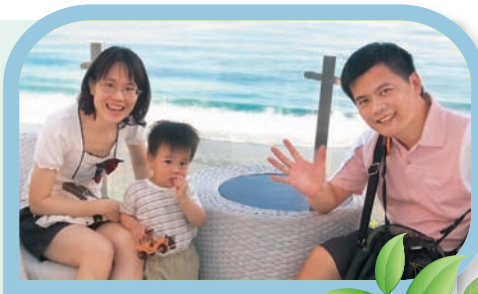
First, I would like to thank you for the incredible opportunity to visit your clinic. Although there were merely five days, it represented a breakthrough for me in my career. Amongst the many things I have learned from you, the technically innovative use of the miniscrews, OBS, will help me achieve excellent clinical results. It was incredible to see complex cases being resolved as simply and efficiently as you did, based on intelligent planning. This experience was all very inspiring and would sure bring about positive changes in my clinical development.

Also, I want to express my admiration for you as a teacher, because the dynamics, organization and technological innovation I saw in your course are truly the work of a genius. I am proud to say that I took a course with Professor Chris! I also want to make a special thanks to your wife Shufen and your entire team, who received me so well!

Sincerely, Rodrigo

Dr. Rodrigo Alexandre Milani
Private Practice in São Paulo, Brasil

張醫師、高老師您好！



• 郭育妏醫師（圖左）

我是台中優盛牙醫診所的郭育妏，躊躇了很久，終於能鼓起勇氣把這件放在心裡很久的事向您開口！一直以來，看到IJOI上完整又精彩的文章，我很佩服下筆的醫師們能夠對一個全然陌生的case有如此詳盡和流暢的說明，對我這樣一個不是科班出生，僅僅是一個開業牙醫，又要管理診所、還要扮演妻子和媽媽的多重角色，研究case寫case對我來說是一個相當大的挑戰啊！張醫師在基礎班結束的最後一次上課，引用一個石油鉅子的話勉勵我們：他說人應該要有目標，每年給自己訂一個目標，然後努力地達成它！這些話深植入我心中，想想自己漫無目標的活了這些年頭，實在非常浪費！因此當時就立下志願以後要來考iAOI的院士。去年度在iAOI年度大會上看到6位考院士的醫師優異的表現，非常驚訝也非常震撼，於是給自己2年的時間來準備院士考試。

最後要很謝謝張醫師、高老師、和金牛頓團隊沒有你們想要學矯正的人是很難學好矯正的。我最喜歡張醫師說的一句話：「矯正是要花一輩子來學習的！」十分十分謙遜的人才會如此說，這句話我會謹記在心。

最後祝張醫師、高老師、和金牛頓團隊的每一位身體康健、事事如意，謝謝你們！

郭育妏 敬上 優盛牙醫診所

敬愛的張醫師與高老師：

昨日新竹一行，實在讓我內心有許多衝擊與感動。

我方才明白為何文堅每次提到張醫師，總是不能停止的感佩，直到我們家孩子抗議為止。

從新竹回來我也有了些改變，文堅離開三軍總醫院已逾半年，從教學醫院到自己開業，我們經驗創業維艱的歷程。然而昨日新竹一行，我深深感到欣喜與振奮，因為雖然您們已臻至臺灣甚至世界翹楚，卻仍然不斷改變與成長，何況是我們呢？現在的不足，都是未來可以成長的機會。非常感動於您們的慷慨接待，尤其高老師在百忙中還親力親為對我們診所助理授課，真是太寶貴、太令人感動了！張醫師忙碌緊湊卻不失幽默從容的態度，讓看診過程中醫師與病患都可以成為一種專業享受，期待未來繼續能向您們更多學習。

再次謝謝您們對我們的提攜與扶持。其實，您們展現的不僅是牙醫大師，也是讓人仰慕的人生導師。誠摯祝福您們闔家安康喜樂福盃滿溢事業昌大全球臺灣以您們為榮

新北市板橋區樂真牙醫診所

文堅 紅鶯 敬上

張醫師、高老師：

謝謝您們！今天收到了送給我們電子書共同作者的紙本及電子檔。其實在 iAOI 院士考試過程中，您們已經給予我超乎想像的協助，今天再收到您送的禮物，更加倍感謝！我想最好表達謝意的方法，是真正學會，並且做好手上的每一個 case。

昨天接受您們的建議，一定要去看吳寶春。所以努力排出時間，帶全家人進電影院。電影一開場，對於Keynote的User來講，真是個奇妙的經驗！吳寶春的手不斷的搓揉著麵糰，那麵包出爐的熱氣忽聚忽散，每一次熱氣慢慢凝聚，就出現文字，每一次熱氣消散，又代表另一次的轉場。片中對於正在不斷學習矯正或植牙的學生，則有另番的感動。矯正醫師是不會輕易將他的絕活教給其他醫師的，就像本堂麵包大師一般。而那一種願意敞開恆溫室，讓你去看、去聞老麵的大師傅，更少；那種願意開放診所任由你去看去照像去錄影的真的沒有！

最後僅將此片獻給，那位勇於追逐夢想，一條路一直一直走，終於成就世界第一的Chris，from Taiwan。

學生 **李名振 敬上**

台中瑞聯牙醫診所

2013 Beethoven Scholarship Reports

台北醫學大學牙醫系
葉家宇 同學

張醫師您好：

參觀完貝多芬三天兩夜的見習獎學金行程後，收穫甚豐，非常感謝您提供一個如此特別又扎實且豐富的計劃給仍然在學的牙科學生們。三天的行程雖然緊湊，但是在充滿巧思的活動設計，以及貴院的工作人員陪同下，無論是兒童牙科診所、植牙診所、植牙論壇或讓我們驚呼連連的矯正中心觀摩，都開拓了我們有別於學校或醫院見習的另一個視野。

而此行收穫最大的部分除了見習以外，也了解到張醫師的用心良苦，除了安排面對面的演講 ， 讓我們了解您的成功歷程求學過程以及人生的心得、體悟， 還送我們一人一本精緻的小書—「賈語錄」 閒暇時間隨手翻閱，彷彿還能看見您的笑容以及曾對我們說過的每句話。

當然也沒有忘記您特地安排我們看電影：吳寶春師傅的故事，我覺得這部電影最特別的是他以一個客觀的敘述性手法，描述吳寶春師傅的成長過程，直到成為世界首屈一指的頂級麵包師傅，因為敘述性的手法很客觀，因此能啟發每個人不一樣的思維。在這過程中，讓我印象最深刻的就是吳寶春師傅的那一股毅力和耐心，從最基本的揉麵團功夫下手，測溫度、調控發酵時間，不斷地改良、精進自己的手藝，正好和您當天下午的演講內容有著最適切不過的呼應， 3PPassion、Practice and Persistance，「Practice makes perfect」。熟能生巧，精益求精；在您身上，我看到了最完美的典範。

張醫師謝謝您，您是一個出色的牙醫師、教育家、出版家、實業家、演說家，其實您還有好多的角色，但您總是能在每個角色間做到最好，誠摯的感謝您帶給我們的每一份感動，還有高老師、思涵、承勳以及這幾天陪伴我們的所有人員。這次的活動啟發的我對牙醫師以及人生不一樣的思考方式。

希望以後還有機會能夠遇見您，聽您分享另一場精采絕倫的演講。

高雄醫學大學牙醫系
許丹音 同學

一開始知道這個見習機會的時候，其實不太清楚內容，後來詢問曾經去過的學長姐們，大家都非常推薦！建議一定要好好準備爭取這個機會，可以大開眼界，且非常有收穫，知道了之後便開始著手準備申請。

很開心能有這個機會被選上，這三天的見習時光真的非常充實，好像劉姥姥進大觀園的感覺，曾經聽過很有名的矯正診所是如何的運作，但親眼看到之後，才知道內部人員的訓練，軟硬體的搭配，團隊間的默契，還有超高水準的效率才有辦法達到這種頂尖的程度。張醫師在看診中即便忙的不可開交，仍然一有機會就細心的為我們解說，是一個很肯提拔後輩又不斷精進的醫師，讓我們知道成功的人有一定的公式在依循著，如果可以延著前人的路繼續走，又有良師的指引，真的很有幫助。

這三天的活動也看到了溫馨的兒牙，兒牙醫師邊看診邊哼著歌安撫著小朋友，彷彿有一種魔力，小朋友都乖乖的配合著。還有有趣的植牙實作課程，能夠自己動手操作現在最夯植牙，並且有專人在一旁指導也是第一次的新鮮體驗。

如果有學弟妹問我說，大四升大五的暑假有什麼值得參加的活動，我一定會毫不猶豫的說：參加貝多芬診所的見習！真的很值得。

Keynote Workshop

高效簡報學習法 系列課程

輕鬆製作簡報

K1 **簡報聖經** 2014.07.24

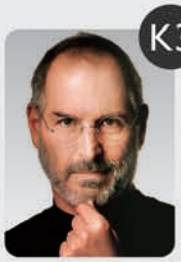
看過太多充滿複雜文字和圖表的幻燈片，聽過就忘了的演講嗎？這堂課將教您如何製作目眩神迷、印象深刻的簡報。透過小班教學，貼身指導，讓您在八小時裡輕鬆掌握簡報技巧。

學習重點：1. 操作入門　2. 演講常見十大謬誤　3. 資料視覺化技巧

K2 **Dr. Kokich 令人屏息的十大演講秘訣** 2014.8.14

這堂課將為各位介紹世界牙醫界的天王講師 Dr. Kokich 的十大演講秘訣，讓您在進階的課程中更加掌握演講設計的關鍵原則，不但讓您知其然，更知其所然！

學習重點：1. Dr. Kokich 十大演講秘訣　2. 準備演講九步驟　3. 多媒體剪輯



K3 **賈伯斯令人目眩神迷的五項演講技巧** 2013.10.24, 2014.09.11

這堂課將為大家逐步解析跨界演講大師賈伯斯是如何說出打動人心、價值數十億美金的關鍵故事。透過逐步的分析拆解，要讓您也可以成為獨具魅力的演講人。

學習重點：1. 賈伯斯五項演講技巧　2. 幻燈片設計概念　3. 幻燈片修改應用

連續報名K1~3
學費9折

備註：
1. 課程當日之前結清款項，才能享有 9 折優惠。
2. 舊生報名須繳交 500 元訂金/堂，課程當日退還。

繪圖簡報達人

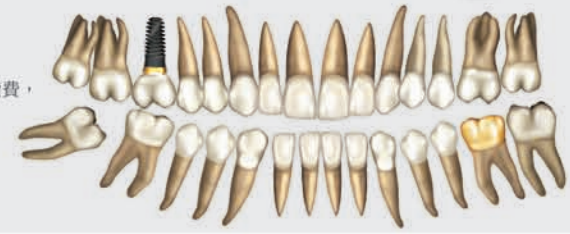
K4 K5 K6 **經修繪圖及動畫技巧** 2013.11.23~25 **僅剩3名！**

講師
Dr. Rungsi Thavarungkul

- 學會使用繪圖板。
- 在 Keynote 內繪製插圖，並運用動畫效果完美呈現。
- 用 Adobe Illustrator 和 Photoshop 創造複雜的構件。
- 完美整合 Adobe 繪圖及 Keynote 實用技巧。

報名 2013 K456 課程即 贈送 2012 及 2013 課程視訊（價值 40,000元）。

備註：
1. 限額 25 名，以繳費順序為依據。
2. 舊生重溫價 9,000 元，限額 6 名。
3. 若取消報名，10/23 前退款將扣除10% 行政手續費，10/24 後扣除30%行政手續費。



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　　新竹市建中一路25號2樓
費用：15,000 元，限10名
報名專線：03-5735676

- 銀行代碼：815 日盛銀行 光復分行
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- 戶名：金牛頓藝術科技股份有限公司

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2014貝多芬青少年高爾夫邀請賽

2014 Beethoven Jounior Golf Invitational

HsinChu GOLF COMMITTEE

十、報名方式

即日起至12月8日前向新竹市體育會高爾夫球委員會報名(03-6102428，Email:tsaikc@mail.ypu.edu.tw，Fax:03-6102374)，免報名費，果嶺、球車、桿弟費(約2000元逕付球場櫃台)等自理。

一、主　　旨

秉持貝多芬齒顎矯正堅持完美與感動之創院精神，藉由高爾夫運動參與，養成健康運動的習慣，活絡人際間的互動，致力推動高爾夫運動人口倍增，回饋於社會並鼓勵具潛力之青少年選手，發展出國家或世界級驕傲。

二、主辦單位

貝多芬齒顎矯正醫院

三、指導單位

新竹市體育會

四、協辦單位

東方日星高爾夫俱樂部
金牛頓藝術科技
安徒生兒童牙醫

五、承辦單位

新竹市體育會
高爾夫球委員會

六、參賽資格

凡愛好高爾夫球之貝多芬、金牛頓及安徒生之業餘球友均可報名，預定參加人數為160名(額滿為止)

七、比賽日期　2014年元旦(星期三)早上0630於**東方日星**高爾夫俱樂部報到

八、比賽方式　採18洞(06：50AM同時開球)方式進行。

(一)社會組：總桿及淨桿前三名頒發獎盃，以新新貝利賽制取淨桿前10名及BB獎另頒發獎品。

(二)學生公開A、B、C組：依據各組18洞總桿門檻限制，男、女成績合併計算，錄取A、B、C組三組成績前六名頒發獎狀及獎學金。

(三)技術獎：遠距獎2名、近洞獎4名、2近洞獎2名、3近洞獎2名。

九、比賽組別　分社會組及男、女青少年A、B及C組如下

組別	年齡限制	男子	女子	冠軍	亞軍	季軍
社會組	業餘球友	白梯	紅梯	總、淨桿前三名頒發獎盃及獎品		

學生組	年齡限制	男子	女子	1	2	3	4	5	6
公開A組	年滿15歲未滿23歲	藍梯	白梯	需79桿(含)以下始列入排名頒獎					
國中B組	年滿12歲未滿15歲	藍梯	白梯	需85桿(含)以下始列入排名頒獎					
國小C組	年滿10歲未滿12歲	白梯	紅梯	需99桿(含)以下始列入排名頒獎					

註：年齡分組以比賽日期103年元月1日0時為基準日

Bite Turbo 2.0版

全新登場

加長版BT

由張慧男醫師親自研發的加長版 BT，
讓您在短時間內，
解決各種深咬及較大的水平差距(OJ)，
是矯正不可或缺的工具之一。

預購特惠

Bite Turbo 2.0 超值組合包

2600元

~~3300元~~

包含：

- 手柄 x1 (900元)
- BT頭 x6 (800元)
- BT頭 加長版 x6 (800元)
- Button x6 (800元)

經典BT使用範例

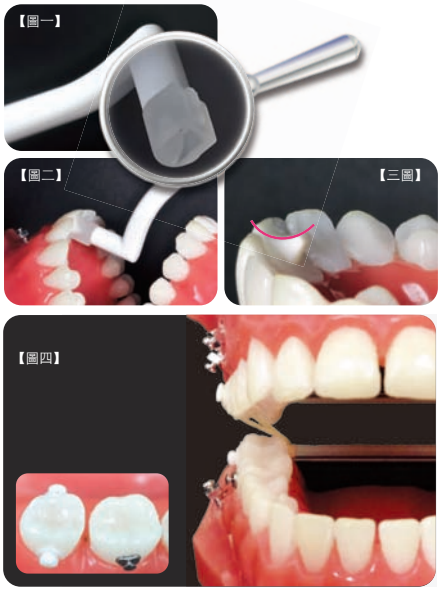
一個輕巧 BT，
輕鬆改善嚴重的深咬，
及水平差距(OJ)問題。

消毒方式：化學藥水浸泡消毒
代理商：金牛頓藝術科技股份有限公司
電話：+886-3-5735676
地址：新竹市建中一路25號2樓

Newton's A
http://orthobonescrew.com

Bite Turbo 使用說明

快速矯正深咬、錯咬，泡消後可重複使用



BT 頭使用方式：

1. 手柄接上 BT 頭，確認 BT 上凸起的線條朝手柄外側。【 圖一 】
2. 在 BT 凹槽內填入樹脂。
3. 定位後，以 Light cure 定型。【 圖二 】 藉由弧狀讓深咬漸進改善。【 圖三 】

Button 頭使用方式：

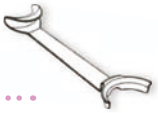
1. 手柄接上 Button 頭 (無方向性)。
2. 在 Button 凹槽內填入樹脂。
3. 定位後，以 Light cure 定型。
   藉由拉橡皮筋漸進改善錯咬。【 圖四 】

備註：

★貝多芬矯正中心使用的化學泡消藥水為 MICRO

★牙科器具比例：水 1000 cc ＋藥水 20 cc

雙頭拉勾 使用說明



牙科照相利器

1. 拉勾使用頻率很高，屬消耗品，為增加拉勾壽命，泡消後請立即擦乾。(正常使用下，使用壽命介於 800~1000 次)
2. 每次泡消約 30~40 分鐘，之後用清水清洗，並立即擦拭，使其乾燥。 沖洗中有泡泡為正常現象。
3. 建議每週更換一次藥水。

備註：

★貝多芬矯正中心使用的化學泡消藥水為 MICRO

★牙科器具比例：水 1000 cc ＋藥水 20 cc

不鏽鋼口鏡 使用說明

牙科設養輔助器

1. 清潔方式 (勿使用粗纖維製品)
   (1) 以清水清洗。
   (2) 消毒：高溫消毒或化學泡消。
   (3) 乾燥：請使用濕潤的酒精紗布，
   特別建議用「 不織布 」材質的紗布。
2. 入口前建議用吹風機吹口鏡入嘴端5~10秒，
   再放入患者口內，可避免口鏡起霧。
   (盡量避免擦拭，以免產生刮痕)

3. 拍照成果示意圖：

國偉牙醫 楊振樺醫師

一般的口鏡一點都不性感：弧線不夠完整、情感不夠深入。口鏡應該是藝術和美結合的產物，我們的生活、我們的夢想，都應該是五彩繽紛的。陳建綱醫師帶著熱情將上述的理念投入口鏡的開發上，我對他有著12萬分的感謝。

使用上，看牙的朋友看到口鏡是消毒過的，大幅增進對醫師的信任；對醫師而言，他們不用擔心口鏡掉在地上而造成碎裂的問題；對護士助理而言，也改善手感拿捏及不順手的問題。甚至在拍攝口內鏡像時，即便是微距離拍攝，影像周邊也不再那麼朦朧美。學長，這一步真是踏得有歷史意義呀！

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. The exam is one hour and the next session will be held on December 9 in the headquarter of Taiwan Academy of Banking and Finance, Taipei, Taiwan.

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

國際矯正植牙學會

International Association of Orthodontics and Implantologists

地點：台北金融研訓院 2F菁業堂
台北市中正區羅斯福路三段62號
報名專線：03-5711377
線上報名：iaoi.pro

會 員 價 10/31 前 3,600元
11/01 後 4,800元
非會員價 10/31 前 4,800元
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Board Eligible 考試費用 5,000元
（含考試及證書費，原價 9,000元）

帳戶資訊
戶名：國際矯正植牙學會
銀行代號：815 日盛銀行 光復分行
帳號：105-273-762-10000
匯款完成請務必來電 03-5711377 核帳

12/15(日) 09:00~17:00

國際矯正植牙學會 關鍵報告2013

The Untold Story

of Ortho-Implant Combined Treatment

今年年會主題為「矯正與植牙結合的關鍵報告」，由國際級大師 Dr. Roberts 領軍，與三位國內資深醫師：林錦榮醫師、吳碧祁醫師、張慧男醫師，一起探討矯正與植牙協同治療的成功關鍵，此外，七位學會院士候選人也各將提出一個結合矯正與植牙治療的案例，與大家分享他們在這個嶄新領域裡的收穫。矯正與植牙的跨領域整合為未來牙科治療趨勢，iAOI 誠摯邀請您一起走在尖端、突破窠臼，在牙科學習的道路更上一層樓！

08:00	**iAOI Exam**
09:10	Registration
09:30	Topic: **Musculoskeletal Biomechanics of the Face and Jaws** 矯正力學的奧祕
10:20	Break
10:40	Topic: **Treatment Planning for Ortho-Implant Combined Treatment** 矯正與植牙合併治療的治療計劃
11:30	Diplomate Oral Presentation 1 & 2 黃登楷、林曉玲
12:10	Lunch
13:00	Topic: **From the End Occlusion to Determine the Implant Site** 由咬合決定植體的位置
13:50	Diplomate Oral Presentation 3 & 4 黃育新、張銘津
14:30	Break
15:00	Diplomate Oral Presentation 5 & 6 & 7 呂詩薇、張馨文、魏明偉
16:00	Topic: **Keys to Ortho-Implant Combined Treatment** 矯正與植牙合併治療的秘訣
16:50	Closing comments and Certificate ceremony

主辦單位：iAOI 國際矯正植牙學會　協辦單位：Newton's A 金牛頓藝術科技股份有限公司　湧傑企業股份有限公司　3a 三業有限公司

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成像清晰
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加倍舒適
多道工序，增加患者口腔舒適感

多種尺寸
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口鏡實際拍攝照片

♥ 嚐鮮體驗組

單組組合 含口鏡 x1 & 單組拉勾 x1

雙組組合 含口鏡 x2 & 單組拉勾 x2

限時特惠中！

買口鏡，抽大獎

凡購買嚐鮮體驗組 單組 = 抽獎機會 x1
雙組 = 抽獎機會 x2

1 首獎：牙醫電子書全集（四冊） 共1名

2 特獎：
iPad mini Wi-Fi 16G
共1名

3 牙醫電子書（四選一）
共3名

4 Keynote 1 課程
共3名

5 不鏽鋼口鏡一支
共6名

6 單組拉勾
共6名

2013.12.15 IAOI 年度大會 熱鬧開獎！

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"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*

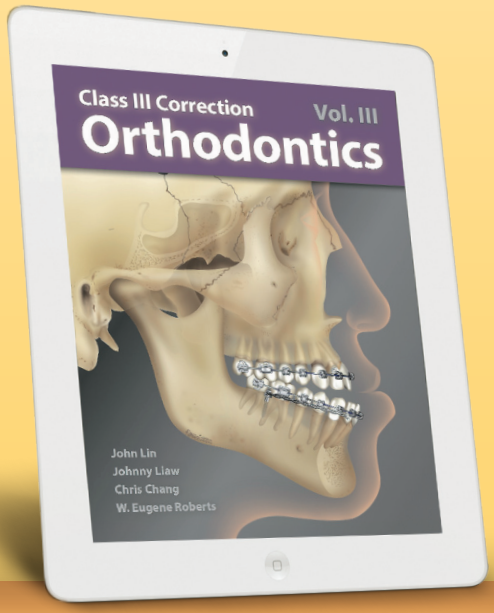
This method of learning is quantum leap forward. My students at Oklahoma University will benefit greatly from Chris Chang's genius. *Dr. Mike Steffens, Oklahoma, USA*

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

Dr. Doraida Abramowitz, Florida, 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*

Dr. Chris Chang was recently invited to a four city lecture tour in China, including Wuhan, Chongqing, Qingdao and Shengyang in September, 2013.

Attendants were encouraged to take photographs of Dr. Chang's slides as learning aides.

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