

CBCT Imaging to Diagnose and Correct the Failure of
Maxillary Arch Retraction with IZC Screw Anchorage

Dr. John Jin-Jong Lin

Bimaxillary Protrusion and Gummy Smile Corrected
with Extractions, Bone Screws and Crown Lengthening

Drs. Chris Lin, Yvonne Wu, Chris Chang & W. Eugene Roberts

Crowded Class II Division 2 Malocclusion with Class I
Molars Due to Blocked In Lower Second Premolars

Drs. Pei-Wen Shu, Hsin Yin Yeh, Chris Chang & W. Eugene Roberts

IJOI

International Journal of
Orthodontics & Implantology

Vol. 35 July, 1, 2014



The 2014 Beethoven International Damon, OBS & VISTA Workshop. Participants took photo with Dr. Chris Chang (center) and instructors after VISTA workshop in Beethoven Orthodontic Center.

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

《僅供牙科專業人士參閱》

2014

熱愛學矯正

張慧男 博士



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

學會開始做矯正需多久?

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



Damon矯正課程

【課程】9:00 - 12:00
 【實習】另外安排

使用最新一代矯正器 Damon Q 進行課程。
 歡迎醫生報名參加。

全新開課

	高雄 (四)	台中 (二)	台北 (二)	LECTURE	LAB
1	5/8	5/6	9/30	理想入門病例+Damon Q黏著	Bonding (Damon Q) + BT
2	5/15	5/27	10/7	快速矯正療程四部曲	Ceph + Photo
3	5/29	6/3	10/14	簡捷有效的錨定系統	Damon + OrthoBoneScrew I
4	6/5	6/24	10/28	不拔牙與拔牙分析	Damon + OrthoBoneScrew II
5	6/12	7/8	11/4	Damon 診斷流程及微調	Finish Bending
6	6/26	7/15	11/18	完工檢測及報告示範	Fixed Retainer (FR)
7	7/17	7/29	11/25	維持及復發; 病例示範	Presentation Demo
8	7/31	8/5	12/9	矯正力學及診斷分析 (1)	DDX + Case Reports I
9	8/7	8/12	12/23	軟硬組織及診斷分析 (2)	DDX + Case Reports II
10	8/21	9/2	12/30	兒童矯正及診斷分析 (3)	DDX + Case Reports III
11	9/4	9/9	1/6/15	成人矯正及診斷分析 (4)	DDX + Case Reports IV

矯正植體課程

【課程】9:00 - 12:00
 【實習】13:30 - 20:00

矯正植體的操作時機、植法與實習、個案討論、臨床跟診及實作示範。



新竹(三) 9/10 (含午、晚餐)

International workshop

Keynote & management OrthoBoneScrew & Damon

中文A班 3/10 - 13
 西班牙語班 5/20 - 24
 英文A班 6/17 - 20
 中文B班 11/26 - 28
 英文B班 12/1 - 4



矯正進階課程

【新竹】9:00 - 12:00

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

	新竹 (四)	Paper Reviews	Topics & Case Demo
1	10/2	Bracket Placement	Crowding: Ext. vs. Non-ext.
2	10/9	Impacted Canines	Upper Impacted Teeth
3	10/23	Canine Substitution	Lower Impacted Teeth
4	10/30	Missing 2nd Premolar	Missing: Ant. vs. Post.
5	11/13	DI Workshop	Crossbite: Ant. vs. Post.
6	11/27	CRE Workshop	Open Bite High Angle
7	12/18	Excellence in Finishing (occlusion)	Deep Bite Low Angle
8	1/8/15	Excellence in Finishing (esthetics & perio)	Gummy Smile & Canting
9	2/12	Ortho-Perio-Restore Connection	Esthetic Finishing (Transposition)
10	3/5	Adjunct to Perio	Implant-Ortho
11	3/19	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) 10/3、24 (含午、晚餐)

課程資訊

上課地點

【台北】
 恆逸資訊中心 畢卡索廳
 / 台北市復興北路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
 / 台中市西屯區臺灣大道三段
 658號3樓 (Rich 19 大樓)

【高雄】
 國立科學工藝博物館-南館
 / 高雄市三民區九如一路797號
 (107研討室)

報名專線

湧傑 Yong Chieh

北區
 (02) 27788315
 楊文君 分機#122

中區
 (04) 23058915 張馨云

南區
 (07) 2260030 王慧靜

* 每次上課請依最新一期
 IJOI 公告為主

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VI	2014/6/10	7/22	8/19	9/16	10/21	11/11	12/16
	2015/1/13	2/10	3/17	4/21			

Ortho My Way: Don't be too proud to take lessons.

Most people wish to become a pro, but only a few achieve that level. That was the problem that bothered me in my first 30 years of my life. 23 years ago, I was lucky enough to receive a gift from my golf coach "Golf My Way" a video from Jack Nicklaus, the 20th century golfing king. I was a beginner at that time and didn't have the slightest idea about golf. Soon, I became addicted to this video and began to follow his method religiously. Three years later, I became a near scratch player and started to collect many trophies.

According to the famous book: Old Man and Golf, it is rare for anyone over 30 years old to pick up golf and achieve a single digit handicap. Some people may have a gift for something, but what I truly believe is that it has to do with the way people are taught and learn. Good teaching material, 100% trust in that material and quality practice are all paramount. I have also applied the same approach to my orthodontic learning. It took me 20 years to realise that this simple method could also be applied to many disciplines, especially those requiring high level skills as well as knowledge.

After last week's Damon Forum in Porto, Portugal, many orthodontists asked me the same question "How can one effectively learn orthodontics?" This question has been asked over and over again for the past 100 years. Since orthodontics is a discipline that contains not only rich knowledge, but also requires skill development, good judgement and the courage to admit that mistakes have been made, and furthermore, the wisdom to recover from adversity. It sounds very similar to golf, which reminded me maybe about my gift from 23 years ago "Golf My Way" that can provide new inspirations.

As Warren Buffett once said life can be viewed as a three-act-play "The dream, the execution, and the passing of the baton". At the start of my next 30 years of professional life, making an analog of this "Golf My Way" in orthodontics might be a worthy trial to pass on the baton. Since the beginning of this year, we have begun a world tour, with the simultaneous launch of the 3D Orthodontics iBooks series. We hope this project will pass on the valuable experience that we have gained over the years to the next generation of orthodontists. We are proud to name it, "Ortho My Way", an extremely effective way to learn orthodontics. My dear friends, please don't be too proud to take lessons. Please march with us on the road to glory and become an orthodontic virtuoso.

Chris Chang DDS, PhD, Publisher of IJOI.

3 Editorial

LIVE FROM THE MASTER

- 4 CBCT Imaging to Diagnose and Correct the Failure of Maxillary Arch Retraction with IZC Screw Anchorage

IAOI CASE REPORT

- 22 Class III with Multiple Gingival Recession: Vestibular Incision Subperiosteal Tunnel Access (VISTA) and Platelet-Derived Growth Factor BB
- 40 Bimaxillary Protrusion and Gummy Smile Corrected with Extractions, Bone Screws and Crown Lengthening
- 64 Crowded Class II Division 2 Malocclusion with Class I Molars Due to Blocked In Lower Second Premolars
- 80 Non-extraction Treatment of Impinging Overbite with Severe Crowding and a Straight Profile

FEEDBACK FROM THE WORLD

- 106 Feedback from 2014 Damon Forum in Shanghai, China
- 107 Feedback from the International Damon, OBS & VISTA Workshop



Examiner
Dr. W. Eugene
Roberts



Examiner
Dr. Tom Pitts



Examiner
Dr. John J. J. Lin



Consultant
Dr. Frederick J.
Regennitter



Consultant
Dr. Tucker Haltom



Consultant
Dr. J. Michael
Steffen



Consultant
Dr. Larry White



Examiner
Dr. Thomas Han



Examiner
Dr. Kwang Bum Park



Examiner
Dr. Homa Zadeh



Examiner
Dr. Fernando
Rojas-Vizcaya



Consultant
Dr. Baldwin W.
Marchack



Consultant
Dr. Stephen
Wallace



Consultant
Dr. Mark Y. K. Ou



Guest Editor
Dr. Rungsi
Thavarungkul



Editors (from left to right) :
Yu Lin Hsu, Associate Editor
Tzu Han Huang, Associate Editor
Billy Su, Chief Editor
Sabrina Huang, Associate Editor
Steven Lee, Associate Editor
Dennis Hsiao, Associate Editor
Chester Yu, Associate Editor
Grace Chiu, Associate Editor
Bella Chu, Chief Editor



Contributors (left to right) :
Dr. Hong Po Chang, Consultant
Dr. Ming Guey Tseng, Consultant
Dr. John Lin, Consultant
Dr. Frank Chang, Consultant
Dr. Johnny Liaw, Consultant
Dr. Chris Chang, Publisher

CBCT Imaging to Diagnose and Correct the Failure of Maxillary Arch Retraction with IZC Screw Anchorage

Glossary of Terms

CBCT	Cone Beam Computed Tomography
U6	Upper 1 st molar
U7	Upper 2 nd molar
MB	Mesiobuccal
DB	Distobuccal
IZC	Infra-zygomatic crest
IZC 6	Screw placement buccal U6 (Fig. 1)
IZC 7	Screw placement buccal U7 (Fig. 2)

ABSTRACT

All IZC mini-screws described in this report are made of stainless steel (SS) and are 2mm in diameter. The original preference was for 2mm x 12mm SS screws for both IZC 6 & IZC 7 applications. CBCT imaging has shown that the tip of the 12mm screws may contact the molar roots prevent retraction of the entire maxillary arch. An 8mm screw in the IZC is usually adequate for osseous anchorage, and the shorter screw is less likely to impinge on molar roots. Evaluating bone screw contact with molar roots via CBCT presents special problems for interpreting images. Scattering, distortion and beam hardening prevent clear, realistic images in 3D. Creating a 3D reconstruction of the molar(s) and screw, from a CBCT (0.25mm voxel) using the ITK-SNAP® (<http://www.itksnap.org/pmwiki/pmwiki.php>) software, produces images that are much easier to interpret.¹ The IZC 7 site is a more suitable and safe location for screw placement because the buccal bone plate is thicker, compared to the IZC 6 site. When using IZC screws for anchorage to retract the maxillary arch, regular monitoring of progress is essential. If maxillary arch retraction is slow or arrested, CBCT imaging is indicated. If there is root interference, remove the IZC screw and replace it with a shorter screw in another location, as indicated. (*Int J Ortho Implantol* 2014;35:4-17)

Introduction

Temporary Anchorage Devices (TADs) were introduced in Taiwan from 2001-2002 via invited presentations: 1. Dr. Park Hyao-Sung (South Korea) Microimplant Anchorage (MIA) system; 2. Dr. Junji Sugawara (Japan) Skeletal Anchorage System (SAS); and 3. Dr. Ryuzo Kanomi (Japan) K1 Mini-Implant System. TADs enjoyed a rapid acceptance in Taiwan, but there were concerns about the limitations of all three methods.

Subsequently, Dr. Eric Liou² (Taiwan) developed a method for infrazygomatic crest (IZC) screw placement adjacent to buccal surfaces of the maxillary first molars.^{2,3} This method is deemed the IZC 6 procedure (Fig. 1). This extra-alveolar (E-A) approach is widely utilized, because there are no interradicular miniscrews to prevent enough full arch retraction, but it is not always successful in retracting maxillary buccal segments. In this report,

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



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

Lin^{4,5} uses CBCT imaging to propose a more distal site that is buccal to the maxillary second molars (IZC 7)(Fig. 2).

There is considerable interest in developing a more predictable IZC temporary anchorage device (TAD), because E-A miniscrews have many important advantages compared to inter-radicular miniscrews: 1. less risk of tooth root damage, 2. more abundant bone allows for a larger screw diameter (2mm), 3. commonly made of stainless steel (SS) which is much

stronger than titanium alloy, 4. 2mm SS screws can be configured with a sharp, cutting tip that is resistant to fracture, 5. less risk of fracture when placed in dense cortical bone, 6. do not interfere with tooth movement, and 7. adequate anchorage for retracting the entire arch to relief crowding and reduce protrusion.

Despite many clinical advantages, the fact remains that IZC miniscrews are not always successful for retraction of maxillary buccal segments. Three case

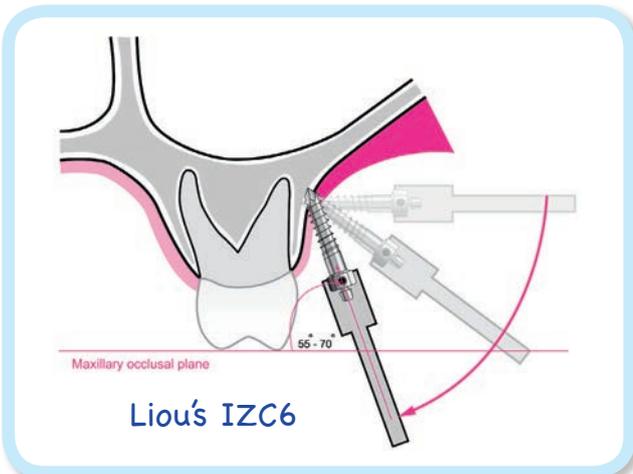


Fig. 1:
 The Liou^{2,3} method is illustrated for placing IZC screws lateral to the U6 MB root. The screw is inserted perpendicular to the buccal plate, but once the cortex is penetrated the screw is progressively angled from 55-70° to the occlusal plane as the TAD is screwed into its final position. (Courtesy of Dr. Rungsi Thavarungkul)

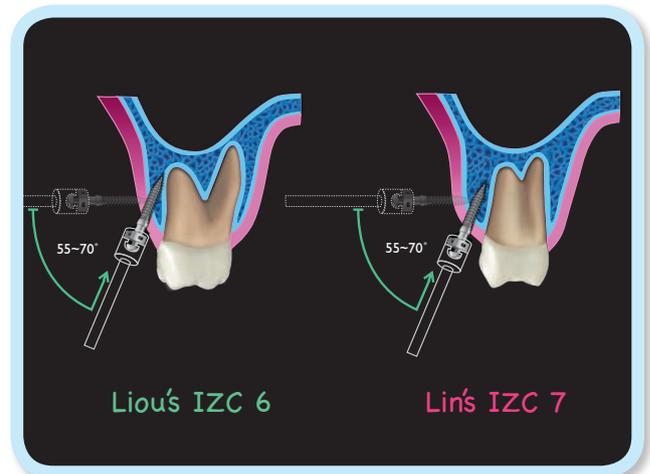
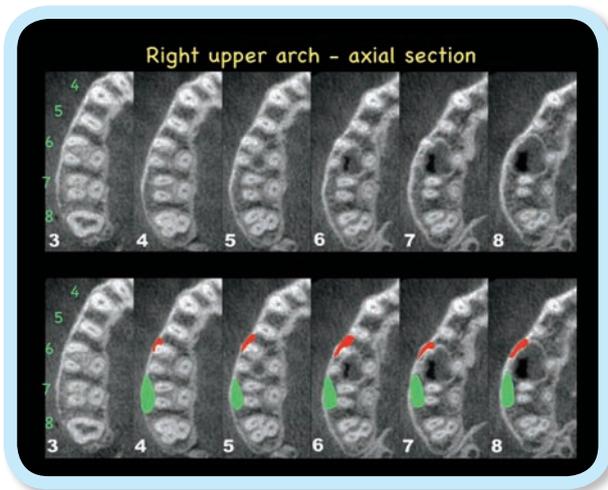


Fig. 2:
 The Lin^{4,5} method (IZC 7) is similar to the Liou^{2,3} approach (IZC 6) except the screw is placed buccal to the second molar because there is a thicker buccal plate bone and less divergence of the molar roots. (Courtesy of Dr. Rungsi Thavarungkul)

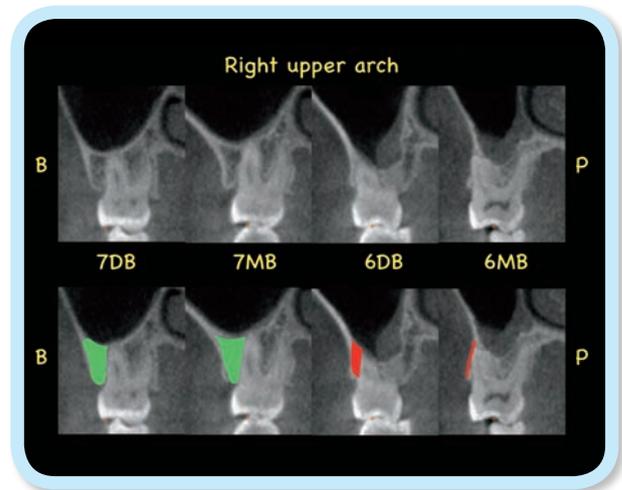
reports are presented to document IZC anchorage problems. The current report has three clinical objectives: 1. utilize CBCT to define the position of IZC screws relative to the upper molars, 2. determine screw positions that are detrimental for full arch retraction, and 3. develop new techniques to improve the success rate for retracting buccal segments.

IZC Anatomy

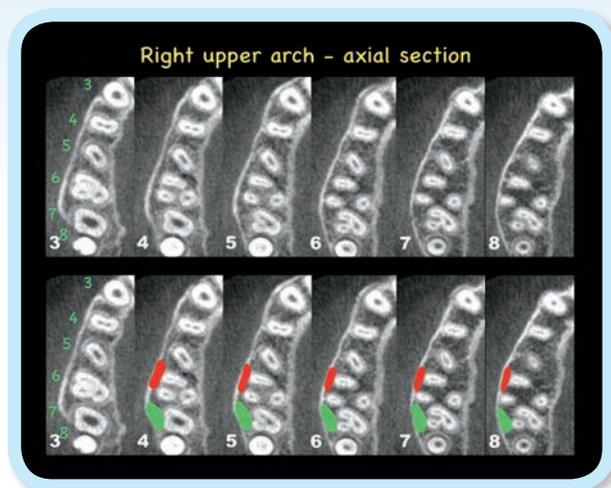
Figs. 3 and 4 are CBCT images of two patients evaluated for IZC TADs. The upper portion of Figs. 3a and 4a are a series of 1mm horizontal cuts through the roots of the maxillary dentition on the right side. The lower portion of both illustrations marks the available bone for the IZC 6 site (*red*) compared to the IZC 7 site (*green*). Figs. 3b and 4b are corresponding coronal views of the first and second molars cut through both the mesial and distal cusps. Again the IZC 6 sites are marked in red and the IZC 7 sites are shaded in green. For both patients, it is apparent that there is considerably more available bone at the IZC 7 site. Not only is the alveolar process thicker, there is less divergence of the second molar roots, compared to the first molar. Thus, it is less likely that a IZC 7 screw placement will contact and interfere with the molar roots.^{4,5} This is a major advantage for the IZC site because interradicular miniscrews commonly contact and injure the roots of teeth.⁶



■ **Fig. 3a:** The upper half of this illustration is a CBCT axial view of the right side of the maxillary shown in 1mm cuts (3-8) through the midroot area of the molars. The lower half of the figure is a duplicate of the upper illustration, with the available bone for the IZC 6 and 7 sites shaded in red and green, respectively. Note that the buccal bone is much thicker on the lateral surface of the second molars compared to the first.

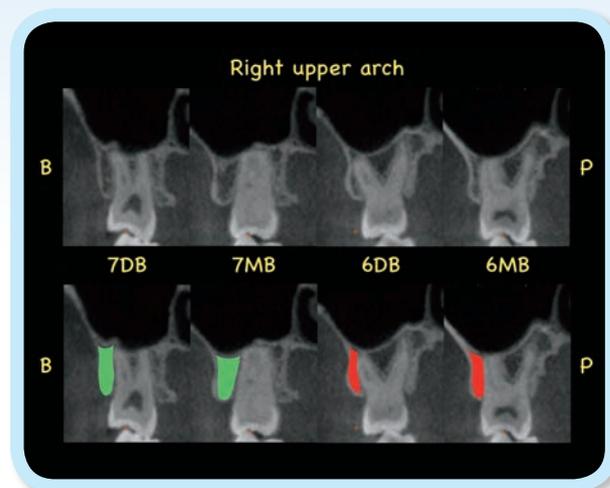


■ **Fig. 3b:** The upper half of the illustration is a CBCT in the coronal view of the right upper maxilla, cut through the first (6) and second (7) molar distobuccal (DB) and mesiobuccal (MB) cusps. The buccal (B) and palatal (P) surfaces are marked for orientation. The lower four cuts are a duplicate of the upper images that are shaded in red and green to document the buccal plate of bone for the first and second molars, respectively. Note that the buccal bone is much thicker on the lateral surface of the second molars compared to the first.



■ Fig. 4a:

Similar illustration to Fig. 3a but for a different patient. Again, the buccal plate of bone is much thicker on the lateral surface of the second molars compared to the first.



■ Fig. 4b:

Similar illustration to Fig. 3b but for a different patient. Again, the buccal plate of bone is much thicker on the lateral surface of the second molars compared to the first.

Cases Reports

Case 1 (Figs 5a-i)

An asymmetric Class II malocclusion (*more pronounced on the left side*) had a large overjet and a midline discrepancy $>3\text{mm}$. IZC 6 screws ($2 \times 12\text{mm}$ SS) were placed bilaterally for differential retraction of the buccal segments to correct the molar relationships and midline discrepancy. Intra-oral photographs indicated that the right screw was positioned on the buccal surface of the right upper first molar distobuccal root (RU6 DB), and the left screw was distal to the left first molar mesiobuccal root (LU6 MB). The corresponding panoramic radiograph suggested that both screws were more distally positioned than they appeared in the intraoral photographs.

After 9 months of maxillary arch retraction with elastomeric chains, it appeared that the upper left dentition failed to retract because the molar relationship was still Class II, and there was no improvement in the midline discrepancy. CBCT imaging (Fig. 5f) showed that IZC screw on the left side was contacting the mesiobuccal root (MB) of the first molar, blocking its further movement to the distal (*retraction*). The roots of the right first molar were not in contact with the IZC screw, indicating that further retraction was possible. The left IZC 6 screw was removed, and a new IZC 7 screw ($2 \times 8\text{mm}$ SS) was placed, to continue the retraction of the left buccal segment. In 8 months the buccal occlusion on the left side was corrected to Class I and the midline was overcorrected $\sim 1\text{mm}$ (Fig. 5).

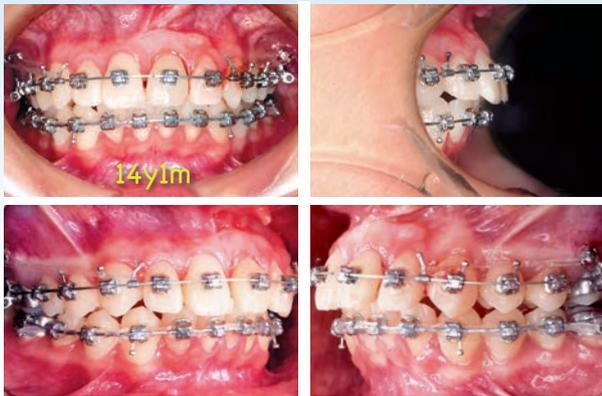


Fig. 5a:
Case 1. Asymmetric Class II malocclusion with large overjet and a midline deviation.



Fig. 5b:
Case 1. After 9 months of upper arch retraction, the right side has corrected to Class I, but the left side has not moved relative to the mandibular arch, and it is still Class II.

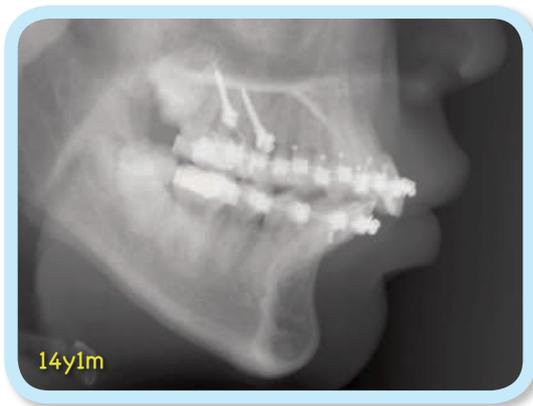


Fig. 5c:
Case 1. At the start of treatment, a lateral cephalometric radiograph shows a large overjet, protruded upper incisors and competent lips.



Fig. 5d:
Case 1. A frontal cephalometric view shows the orientation of the IZC 6 screws placed lateral to the upper first molar.



Fig. 5e:
Case 1. A panoramic radiograph indicates that the right IZC 6 screw is tilted toward the U6 DB root, and the left IZC 6 screw is tipped distally toward U6 MB root.

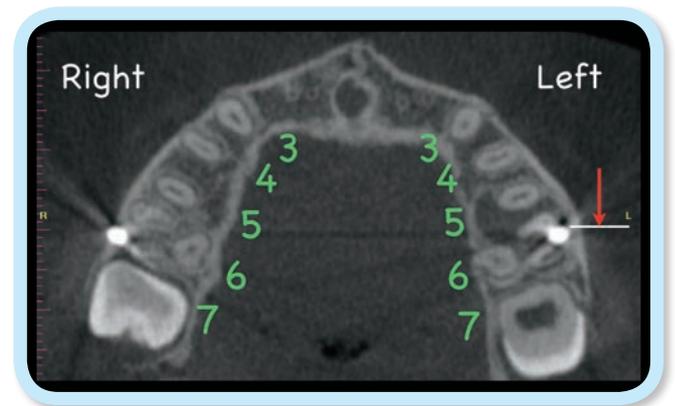
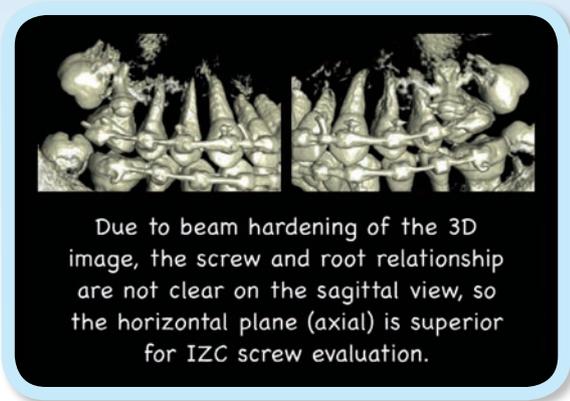
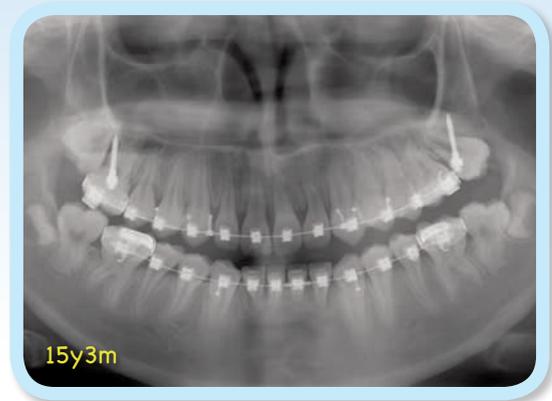


Fig. 5f:
Case 1. The axial CBCT view of the left IZC 6 shows that the tip of the screw is engaging the MB root preventing further retraction of the maxillary dentition on the left side.



■ **Fig. 5g:**
Case 1. The 3D image is consistent with Fig. 5f but the view is not as clear due to beam hardening.



■ **Fig. 5h:**
Case 1. A postoperative panoramic radiograph shows the position of the new left IZC 7 screw.



■ **Fig. 5i:**
Case 1. After 8 months of additional maxillary retraction using the left IZC 7 as anchorage, the upper midline was overcorrected ~1mm.



■ **Fig. 5j:**
Case 1. With 8 months of additional maxillary retraction using the new IZC 7 screw as anchorage, the left buccal segment was corrected to Class I.

What has been learned from this case?

Because of minimal bone at the TAD placement site, an IZC 6 may be placed distal to one of the first molar buccal roots, thereby preventing retraction of the entire buccal segment. When retraction with an active fixed appliance is not achieved in 4-6 months, CBCT imaging is indicated. The objective is to determine if root contact with the screw, has prevented retraction (“distalization”). If root interference with the 12mm IZC 6 screw is detected, remove and place an 8mm IZC 7 screw to continue the retraction of the entire arch.

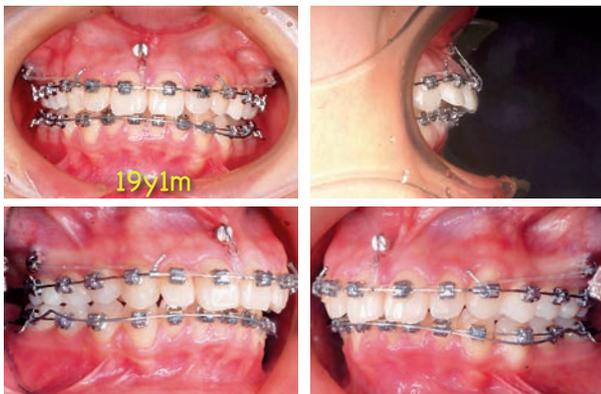
Case 2 (Figs 6a-l)

A 19 year old patient presented with a Class II malocclusion (~5mm bilaterally) with a large overjet (~8mm) and moderate overbite (4-5mm). IZC 6 screws (2x12mm SS) were placed bilaterally to retract the entire upper dentition, to treat the Class II discrepancy without extractions. In addition, a 2x8mm SS bone screw was placed apically between the maxillary central incisors to prevent extrusion of the anterior segment as the arch was retracted. The latter is a very important treatment planning consideration, because the line of retracting force from the IZC screws to the canines is occlusal to the center of resistance of the maxilla. The maxilla is expected to rotate posteriorly as the arch is retracted, so an intrusive force on the anterior segment is essential to prevent producing a gummy smile.

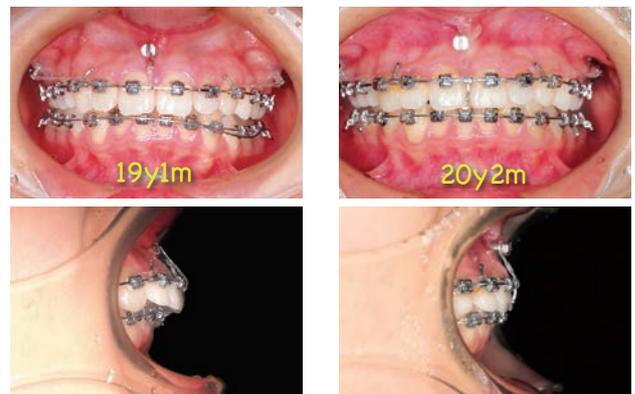
Following 13 months of upper arch retraction (19y1m to 20y2m) the right buccal relationship was corrected to Class I, but the left side was still Class II and the upper midline was deviated ~4 mm to the right. CBCT imaging was indicated to investigate the problem. The 3D views revealed that the right IZC 6 was not in contact with the roots of any teeth and further retraction of the maxillary arch was possible. However, on the left side, the tip of the IZC 6 was in contact with the distal surface of the U6 MB root, preventing the retraction of the buccal segment.

The left IZC 6 was removed and an IZC 7 screw (2x12mm SS) was placed.

Following 5 months of additional retraction (from 20y3m to 20y8m), the upper midline was still deviated to the right and the left buccal occlusion remained Class II. Another CBCT was used to investigate the continuing problem. There was adequate root clearance for the left IZC 7, but there was a concavity on the U6 MB root, and obliteration of the periodontal ligament (PDL), which was consistent with ankylosis.⁷



■ Fig. 6a: Case 2 is a patient with a bilateral Class II malocclusion and a large overjet.



■ Fig. 6b: Case 2. After 13 months of maxillary retraction with IZC 6 anchorage, the upper midline is off to right because the right side is being retracted, but the left side is not moving.



Fig. 6c:
Case 2. After 13 months of retraction, the right side is corrected, but the left side has failed to move.

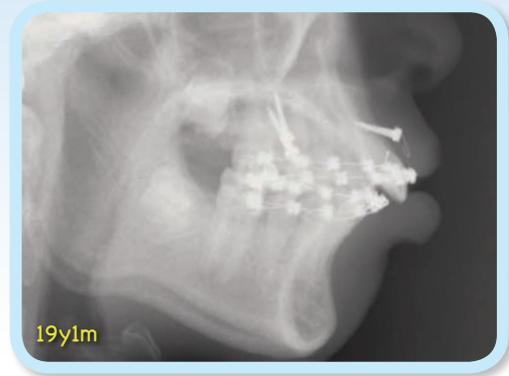


Fig. 6d:
Case 2. A lateral cephalometric radiograph shows a large overjet at the start of treatment.



Fig. 6e:
Case 2. A frontal (PA) cephalometric view shows the orientation of the IZC 6 screws at the start of treatment.

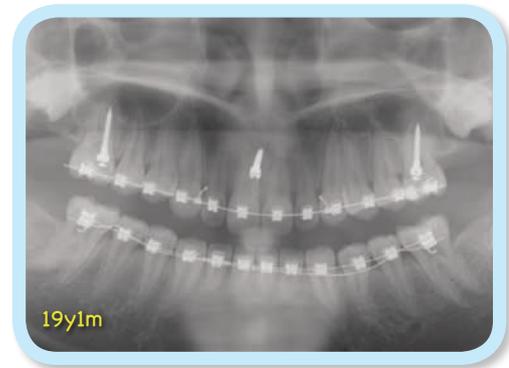


Fig. 6f:
Case 2. The panoramic view at the start of treatment suggests that the right IZC 6 screw is on the buccal side of U6 MB root, while the left IZC 6 screw is on the distal side of U6 MB root.

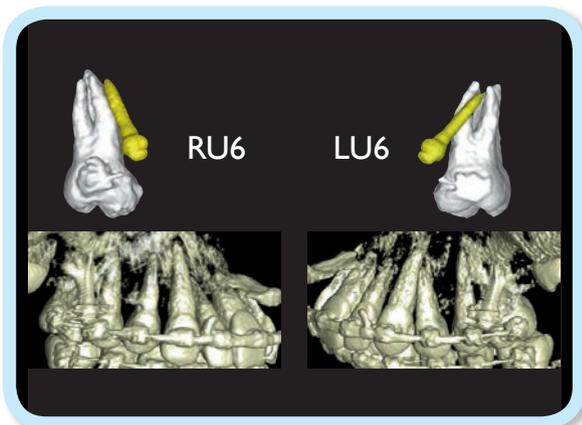


Fig. 6g:
Case 2. CBCT imaging shows that the right IZC 6 screw is on the buccal side of right U6 MB root. The left IZC 6 is on the distal side of U6 MB root. The upper 3D renderings are courtesy of Dr. Bryan PJ Kuo.

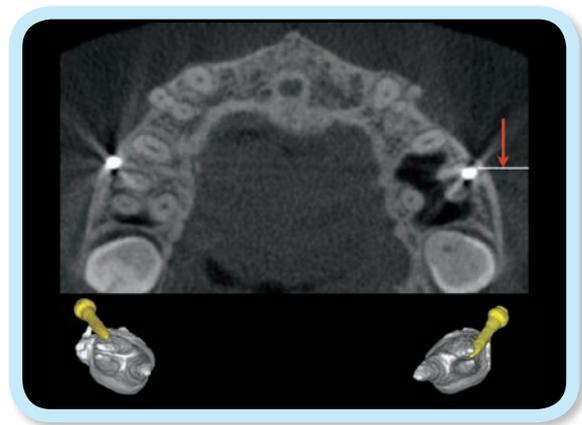


Fig. 6h:
Case 2. The CBCT axial view and 3D rendering shows that the right IZC 6 is in front of U6 MB root, which allowed maxillary retraction on the right side. However, the left IZC 6 is impinging on the U6 MB root preventing maxillary retraction on the left side.



Fig. 6i:
Case 2. A postoperative panoramic radiograph shows the position of the new left IZC 7.



Fig. 6j:
Case 2. After 6 months of additional maxillary retraction, the upper midline was improved but still slightly off to right.

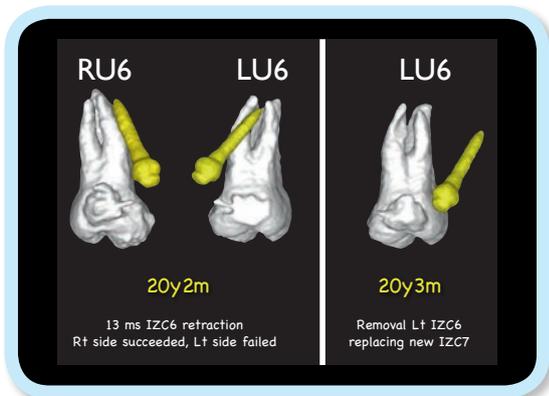


Fig. 6k:
Case 2. On the left, a 3D rendering at 20y2m shows the right IZC 6 was in front of U6 MB root, so retraction occurred as planned, but the left IZC 6 impinged on the left U6 MB root and prevented retraction. On the right, a 3D rendering at 20y3m shows that the IZC 6 screw was removed and a new IZC 7 screw was in place. Note that there is a depression on the MB root, which may be where the LU6 became ankylosed. (Courtesy of Dr. Bryan PJ Kuo)



Fig. 6l:
Case 2. Five additional months of traction with the new IZC 7 screw failed to result in retraction of the maxillary arch on the left side. It is hypothesized that the traumatized UL6 had become ankylosed.

It was concluded that the initial attempt to retract the maxilla on the left side damaged the left U6 MB root, leading to PDL damage and ankylosis. In general, complications and failures with IZC screws are more common on the left side for right-handed clinicians.⁸ All three problem cases in the current report are consistent with this trend: *Case 1 & 2* an IZC 6 screw contacted the distal surface of an U6 MB root, precluding retraction of the maxillary segment. *Case 3* an IZC 7 screw contacted the distal surface of an U7 MB root, precluding retraction of the maxillary segment.

What has been learned from this case?

When placing IZC 6 screws it is important to avoid contacting the distal root surfaces of any teeth in the buccal segment. Right handed clinicians must be particularly careful with screw placement on the left side, and vice versa. Contacting the distal surface of U6 MB root prevented the dentition from further retraction. Furthermore, ankylosis of the damaged U6 MB root continued to prevent left segment retraction, even after a suitable IZC 7 screw was installed.

Case 3 (Figs 7a-k)

A 19 year old patient had a modest asymmetric Class II malocclusion with an impacted right central incisor (UR1). An acquired malocclusion had developed in the maxillary anterior segment. The adjacent incisors drifted into the edentulous UR1 space, and tipped lingually creating an anterior crossbite and severe space deficiency. To open the UR1 space without flaring the maxillary anterior dentition, two IZC 7 screws were placed to provide a distal force on the maxillary canines to prevent anterior protrusion as the UR1 space was opened.

After 4 months of bimaxillary canine retraction (19y4m to 19y8m), the right buccal segment was overcorrected to super Class I, but the left side was still in the original Class II relationship. A CBCT was indicated to evaluate the positions of the IZC screws. The 3D image of the left buccal segment showed that the tip of 12mm IZC 7 was distal to the U7 MB root, preventing buccal segment retraction. Since SS screws are not expected to osseointegrate,⁵ their mechanical retention is primarily related to cortical bone engagement. Cortical bone thickness in the posterior maxilla is ~1.2-1.3mm⁹ and the attached gingiva is about 1.25 mm thick,¹⁰ so an



■ Fig. 7a:

Case 3 shows the start of treatment for a patient with an impacted right maxillary central incisor (UR1). Bimaxillary retraction of the maxillary buccal segments was planned using IZC 7 screws.

■ Fig. 7b:

Case 3. After 4 months of retraction, the upper midline was still ~5 mm off to right.



Fig. 7c:
Case 3. Right side had been overcorrected to super Class I, but the left side has failed to move.

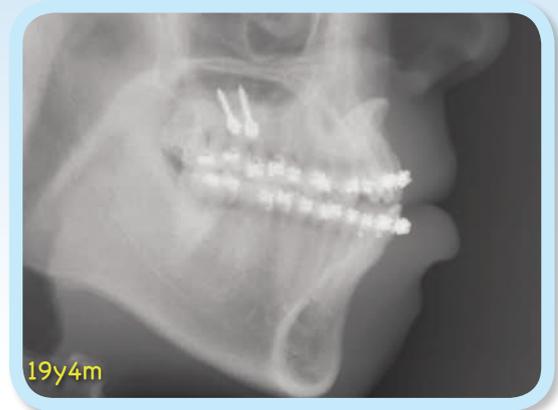


Fig. 7d
Case 3. A lateral cephalometric radiograph reveals that the UR1 is impacted and has a dilacerated root.

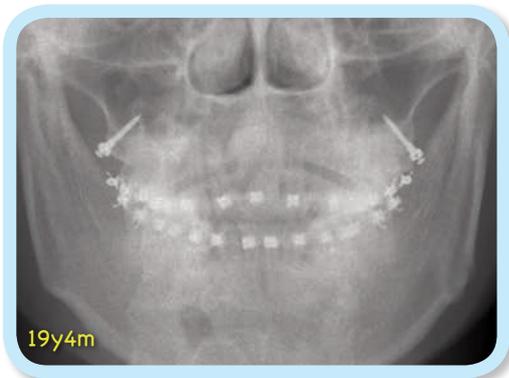


Fig. 7e:
Case 3. A frontal (PA) cephalometric radiograph shows the orientation of the IZC screws.



Fig. 7f:
Case 3. Bilateral IZC 7s were placed. The right IZC 7 was over the buccal surface of right U7 MB root. The left IZC 7 was over the distal surface of U7 MB root.

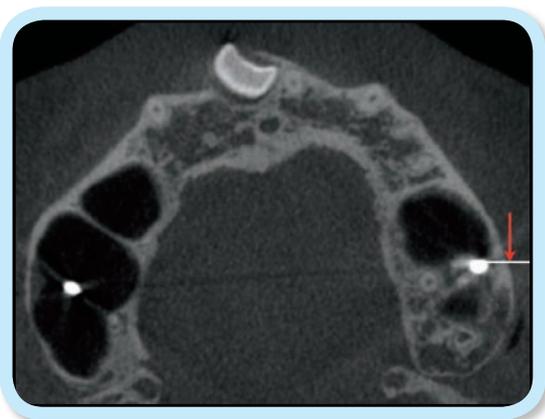


Fig. 7g:
Case 3. A CBCT axial view reveals that the tip of the left IZC 7 screw impinged on the root of the left U7 MB root preventing maxillary retraction on the left side.

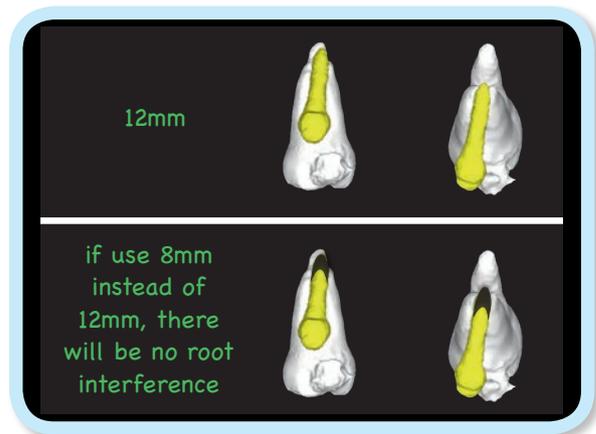


Fig. 7h:
Case 3. 3D CBCT renderings show that the left 12mm IZC 7 screw impinged on the left U7 MB root. If an 8mm screw had been used instead, there would have been no root interference. (Courtesy of Dr. Bryan PJ Kuo)



Fig. 7i:
Case 3. A panoramic radiograph shows an original 12mm IZC 7 screw on right side with a new 8 mm IZC 7 screw on the left side.



Fig. 7j:
Case 3. After 4 months of traction with the new left IZC 7, the upper midline was corrected.

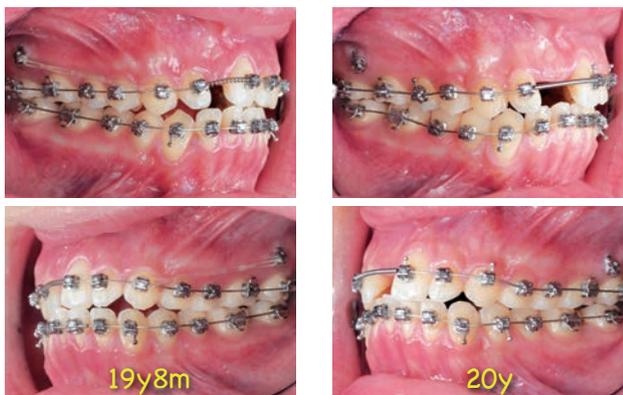


Fig. 7k:
Case 3. After 4 months of traction with the new left IZC 7, the Class II left buccal segment has been corrected to Class I.

8 mm screw would provide adequate osseous anchorage for mechanical retraction of the buccal segments.

To correct the problem for *Case 3*, the 12mm IZC 7 screw was removed and a 2mm x 8mm IZC 7 screw was placed in an adjacent site. Following 4 more months of retraction, a Class I occlusion was achieved on the left side and the maxillary midline was corrected.

What has been learned from this case?

Although there is thicker buccal bone at the IZC 7 site, a 12mm screw is of sufficient length to strike the roots of the molar and prevent buccal segment retraction. If the screw length is reduced to 8 mm, the chance of root interference is substantially reduced.

Discussion

The timely diagnosis of arrested maxillary posterior segment retraction is an important consideration when using IZC anchorage. The root interference problem for *Case 1* was diagnosed after 9 months. The screw was replaced and the continued retraction of the upper dentition was successful, but the overall treatment time was unnecessarily lengthened. For *Case 2*, retraction was attempted for 13 months before the root interference problem was suspected, and unfortunately iatrogenic ankylosis occurred which prevented further tooth movement. On the other hand, the retraction problem for patient 3 was diagnosed after only 4 months, and immediately corrected. The first two patients would have benefitted from a more timely diagnosis of the root interference problem. Based on this clinical experience, it is recommended that retraction

of buccal segments with IZC anchorage be carefully evaluated. If there is no clinical movement of the maxillary relative to the mandibular arch after ~5 months, a CBCT is indicated to determine if the IZC screw is interfering with the molar roots.

To avoid root interference, the IZC 7 site is superior to the IZC 6 site because the buccal plate of bone is thicker. Furthermore, decreasing the screw length from 12 to 8 mm screw further diminishes the risk of screw interference with tooth roots. The 8mm screw is now routinely recommended for the IZC 7 application if the head of the TAD (*platform*) is screwed into contact with the gingiva. However, if a 2-3mm gap is desirable, between the soft tissue and the platform of the screw, a 10mm TAD may be preferable.

Overall IZC 7 site is superior to the original IZC 6 location, and the following procedure is recommended. Under local infiltration anesthesia, the 2x8mm SS self-drilling screws are inserted perpendicularly into the bone about the level of muco-gingival junction buccal to the second molar roots and then rotated ~55-70 degrees and the TAD is screwed in (*Fig. 2*). If a screw contacts a tooth root, even an anesthetized patient will feel some pain. In that event, the screw is removed and inserted in a new position that is not painful. Follow-up CBCT images of IZC 7 screws have failed to demonstrate any root injuries, but occasionally a close contact of the screw with the root has been noted. However, less IZC 7 screws have been placed between the roots of teeth, so that they interfere with retraction of the entire maxillary arch. Since the goal for full arch retraction is to place the screw outside the inter-radicular area, decreased screw length and the thicker plate of buccal bone at the IZC 7 site are major advantages.

Conclusion

- The IZC 7 site is an easier and safer location for screw placement because the buccal bone plate is thicker, compared to the IZC 6 site.
- A 2x8 mm SS screw in the IZC 7 site, with the platform in close contact with the gingiva, is adequate anchorage for retracting the entire maxillary arch. The shorter screw rarely interferes with the molar roots.
- Inserting an IZC screw under local anesthesia provides safe and effective osseous anchorage.
- When placing either IZC 6 or IZC 7 screws, try to position the tip of the screw anteriorly to the MB root of the respective molars to facilitate retraction of the maxillary dentition.
- Even when screw to root contact prevented whole arch retraction, the screws were still firm could still be used as anchorage for extraction cases.

- When using IZC 6 or IZC 7 screws for anchorage to retract the maxillary arch, regularly monitor progress. If maxillary arch retraction is slow or arrested, investigate the problem with CBCT 3D imaging. If there is root interference, remove the screw and replace it with a shorter screw in another location, as indicated.

References

1. Yushkevich PA, Piven J, Hazlett HC, Smith RG, Ho S, Gee JC, Gerig G. User-guided 3D active contour segmentation of anatomical structures: Significantly improved efficiency and reliability. *Neuroimage*. 2006 Jul 1;31(3):1116-28.
2. Chen PH, Liou EJ, et al. CT analysis in infra-zygomatic crest. *JTAO*. 2005;17(2).
3. Liou EJ, Chen PH, Wang YC, Lin JC. A computed tomographic image study on the thickness of the infrazygomatic crest of the maxilla and its clinical implications for mini-screw insertion. *Am J Orthod Dentofacial Orthop* 2007;131:352-6.
4. Lin JJ. A New method of placing orthodontic bone screws in IZC. *News & Trends in Orthodontics* 2009;13:4-7.
5. Lin JJ. *Creative Orthodontics: Blending the Damon system & TADs to manage difficult malocclusions*. 2nd ed. 2010, Yong Chieh Enterprise Co, Ltd., Taiwan.
6. Poggio PM, Incorvati C, Velo S, Carano A. "Safe Zones": A Guide for Miniscrew Positioning in the Maxillary and Mandibular Arch. *Angle Orthod* 2006;76:191-7.
7. Andreasen JO, Kristerson L. The effect of limited drying or removal of the periodontal ligament. periodontal healing after replantation of mature incisors in monkeys. *Acta Odontol Scand* 1981;39:1-13.
8. Chang CH, Roberts WE. A Retrospective Study of the Extra-alveolar Screw Placement on Buccal Shelves. *Int J Ortho Implantol* 2013; 32:80-89.
9. Chen MY, Chen HL, Lin YC, Yen JY, Lai YL. Eastern and western studies of interdental cortical bone thickness for temporary anchorage devices. *J Taiwan Periodontol* 2013;18(1):33-43
10. Goaslind GD, Robertson PB, Mahan CJ, Morrison WW, Olson JV. Thickness of facial gingiva. *J Periodontol*. 1977 Dec;48(12):768-71.

Acknowledgments

1. Thanks to Dr. Rungsi Thavarungkul for his excellent diagrams to illustrate IZC screw position relative to anatomical structures.
2. Thanks to Dr. Bryan Po Jan Kuo for his expertise in interpreting the complicated CBCT data and providing 3D renderings of the IZC screws relative to the adjacent molars.



Beethoven International Damon, OBS & VISTA Workshop

2014 12/1~12/4, 2015 6/16~6/19, 11/24~27



LECTURER: Dr. Chris Chang

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



LECTURER: Dr. John Lin

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

Dear Chris:

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

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



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

For more information and registration, visit

<http://iworkshop.beethoven.tw>



Like

Chris Chang



On Facebook



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



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

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



VISTA:
Vertical Incision Subperiosteal Tunnel Access

Keynote Workshop

Make your presentation great

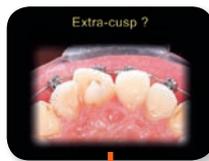
"I've been a Keynote user and lecturer for 9 years. In June I had the opportunity to attend Newton's A's Introductory Keynote course. To my surprise, I still learn a lot from this supposed to be basic course.

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



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)



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 2014 10/01, 2015 4/16, 9/24

Keynote Presentation workshop

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

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

Fees: USD 500

Early bird rate:

USD 100 off by 2014 10/01, 2015 4/16, 9/24

Registration:

A 50% deposit is required to complete registration.

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



湧傑20周年

FUN 暑假價

summer SALE 2014
6.26-9.25止

(限量好禮：瓦斯噴槍PK1000，限量70台，定價\$2,400元)



48折起

Ormco / Kerr / SybronEndo FUN暑假價

好康再加碼，不限廠牌單筆累計消費滿5萬贈限量好禮

(非本促銷專案，若低於定價85折者，恕不列入累計)

超值搶購**48折**

買

矯正專用彈力鏈 (透明/灰色13.1ft)

Power Chain x 5 卷

定價\$1,800元/卷

送

矯正彈力結紮圈 (透明1000's)

Power O-ring x 5 包

定價\$1,900元/包



Ormco
Your Practice. Our Priority.

Elastics
矯正彈力系列

限時回饋**63折**

買

矯正動物圈 (50小包/盒)

Zoo Elastics x 5 盒

定價\$2,500元/盒

送

矯正動物圈 (50小包/盒)

Zoo Elastics x 3 盒



- 本文宣品僅供牙科診所及牙醫師參考，禁止張貼或擺置於公眾可瀏覽及取閱之處
- 本優惠專案僅適用於牙醫診所，本公司保留贈品更換之權利，本公司保留更改及終止活動辦法與條款之權利
- 衛署醫器輸壹字第010513 / 000808 / 010432 號

Kerr

Demi Plus

新一代輕巧無線式高功率LED光聚機

Surprise

FUN價 Surprise A

購買 Demi Plus 1台 **送** 10000元，可任選Kerr全系列商品(定價)

FUN價 Surprise B

購買 Demi Plus 2台 **送** 30000元，可任選Kerr全系列商品(定價)

FUN價 Surprise C

購買 Demi Plus 3台 **送** 60000元，可任選Kerr全系列商品(定價)

· 達任選產品門檻，產品須以定價累進且以同一筆訂單計算 · 衛署醫器輸字第023384號



超值搶購
69折起

Axis | SybronEndo



· 衛部醫器輸壹字第014069號
· 衛部醫器輸壹字第013963號
· 衛署醫器輸壹字第009148號

Endo FUN 價好康一

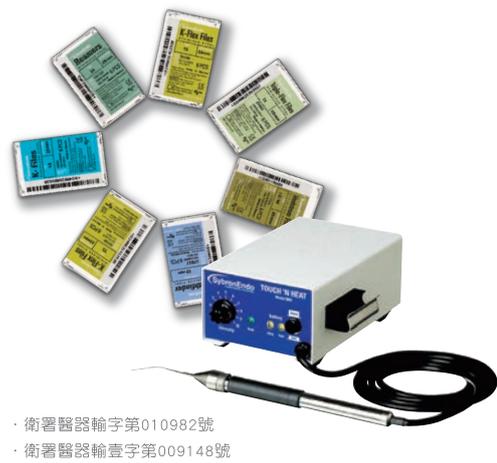
超值搶購
48折起

任搭選購 **40**盒 TF Adaptive File Procedure pack <定價3,200/盒>

→ TF Adaptive Small Procedure pack 23mm/27mm
TF Adaptive Med/Lrg Procedure pack 23mm/27mm

送 Elements Moter 輕量型多功能旋轉馬達 + 8:1手機 1組 <定價136,000>

Endo FUN 價好康二



· 衛署醫器輸字第010982號
· 衛署醫器輸壹字第009148號

買 **100**盒 Hand file

→ K-Files #06-#40	定價\$340/盒
Triple-Flex #08-#40	定價\$340/盒
Reamers #06-#40	定價\$340/盒
K-Flex #06-#40	定價\$400/盒
Hedstrom #15-#40	定價\$480/盒
Pathfinder 21mm/25mm	定價\$550/盒

超值搶購
53折起

送 Touch'n Heat 馬來膠熱融機 1台 <定價30,000>

Class III with Multiple Gingival Recession: Vestibular Incision Subperiosteal Tunnel Access (VISTA) and Platelet-Derived Growth Factor BB

Abstract

Gingival recession can result in pain, hypersensitivity, root caries and esthetic concerns. There are many therapeutic options available for treatment of gingival recession defects. This case report presents a novel treatment strategy of an acquired class III malocclusion in an adult male that was associated with upper anterior multiple gingival recessions. Access to the surgical site is obtained by means of an approach referred to as vestibular incision subperiosteal tunnel access (VISTA). VISTA is introduced by recombinant human platelet-derived growth factor BB saturated onto a matrix of beta-tricalcium phosphate with connective tissue grafts and a resorbable collagen membrane for root dehiscences. Such novel method lead to better wound healing by promoting primary wound coverage, better blood supply, easier clot stability and space maintenance with less scar formation. Connective tissue procedures and guided tissue regeneration-based root coverage are developed in an attempt to overcome clinical limitations while providing comparable result. In this case report, VISTA is a reliable method for use in root coverage procedures with long-term follow-up. (Int J Ortho Implantol 2014;35:22-36)

Key word:

VISTA, gingival recession, root coverage, connective tissue graft, gingival surgery.

History and Etiology

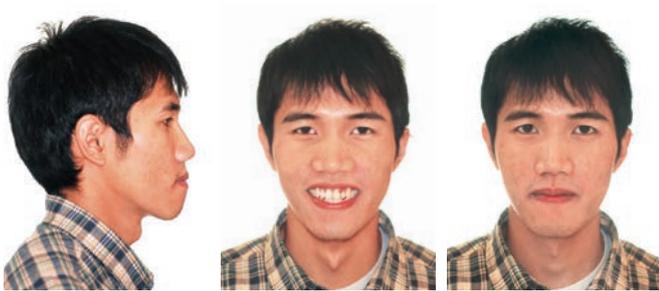
A young man aged 24 years 7 months was referred to us by his family dentist for a second opinion. His main complaints were upper left lateral incisor lock-in and mentalis strain (Figs. 1-3). The patient hoped to resolve his complications. No contributing medical, dental, or family history was reported. The etiology of the malocclusion was unknown, but the nature of the skeletal malocclusion suggested that it was genetic.

The patient was treated to an optimal result as documented in Figs. 4-6. The cephalometric and panoramic radiographs document the pre-treatment condition and the post-treatment results (Figs. 7 and 8). The cephalometric tracings before and after treatment are shown to be superimposed in Fig. 9. The details for diagnosis and treatment will be discussed below.

Dr. Chen Chang-Kai,
 Zouying Branch of Kaohsiung Armed Forces General Hospital (Left)

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

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



■ Fig. 1: Pre-treatment facial photographs



■ Fig. 4: Post-treatment facial photographs



■ Fig. 2: Pre-treatment intraoral photographs



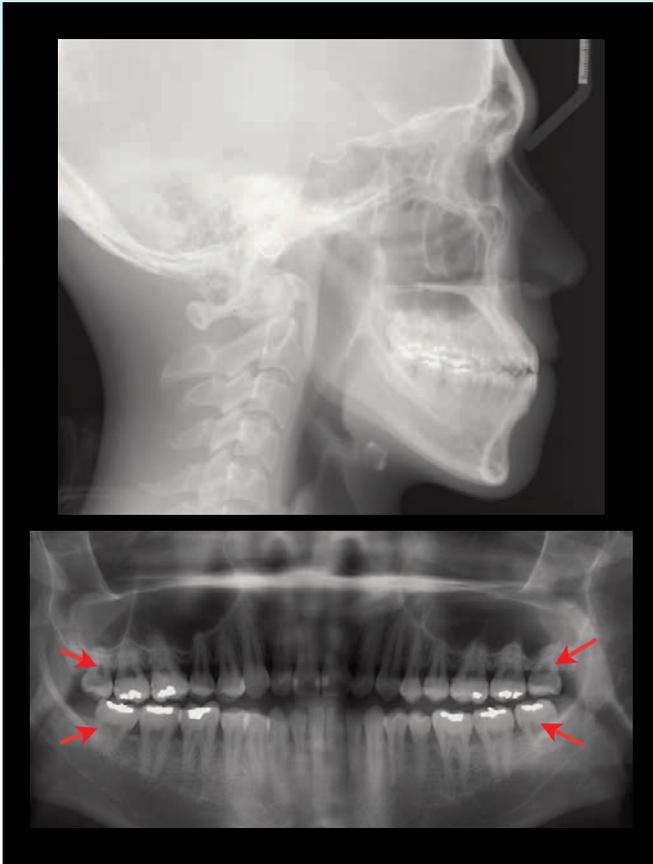
■ Fig. 5: Post-treatment intraoral photographs



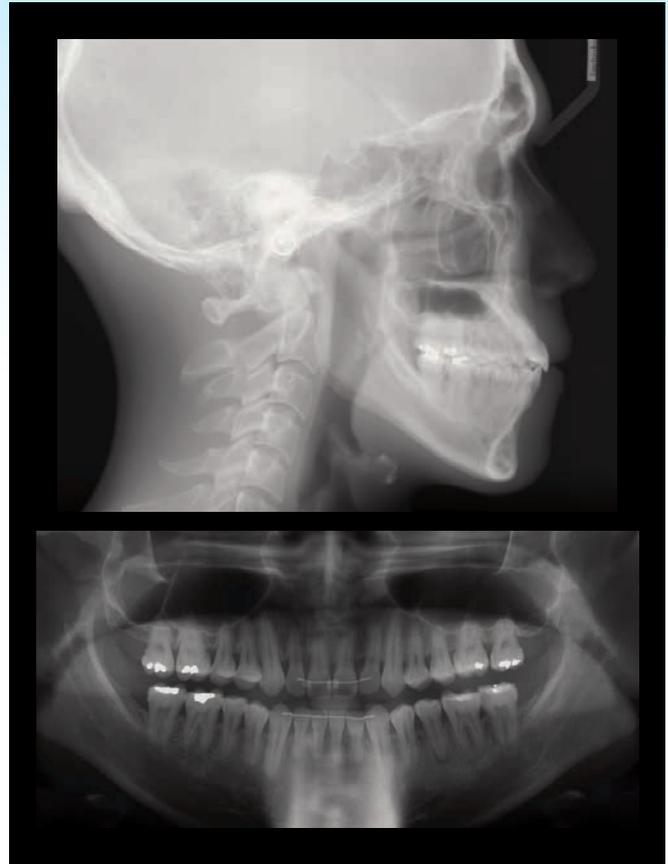
■ Fig. 3: Pre-treatment study models



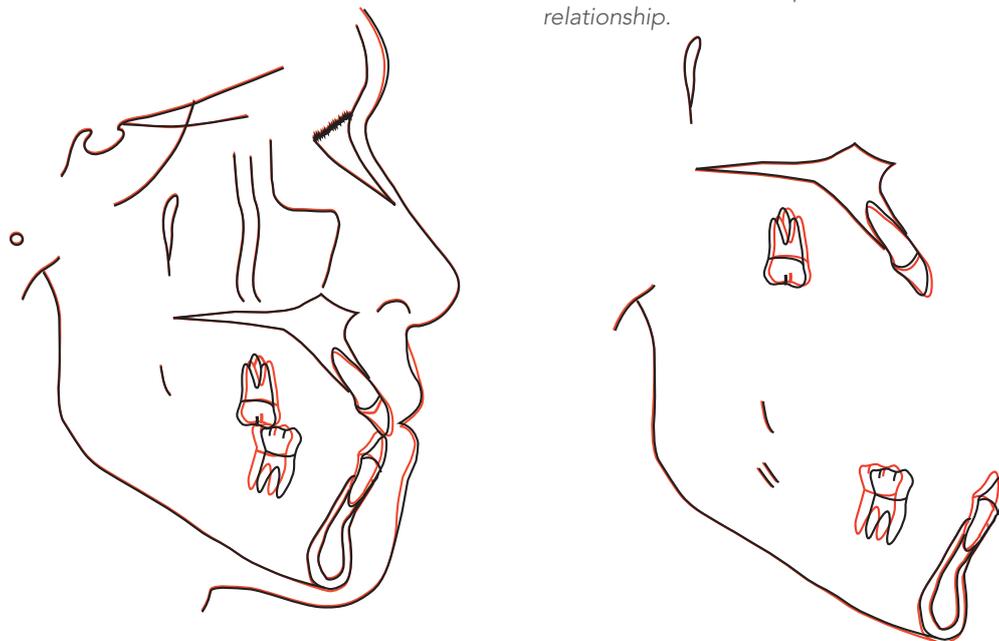
■ Fig. 6: Post-treatment study models



■ Fig. 7: Pre-treatment pano and ceph radiographs. Note the upper and lower both sides 3rd molar.



■ Fig. 8: Post-treatment pano and ceph radiographs. The upper and lower both sides 3rd molars were extracted and lower both sides 2nd molars were pulled back into an ideal occlusal relationship.



■ Fig. 9: Superimposed tracings. The upper anterior teeth were slightly flare-out and lower anterior teeth were slightly retroclined with no affect on the patient's vertical dimension but mild alteration of facial profile after the treatment.

CEPHALOMETRIC			
SKELETAL ANALYSIS			
	PRE-Tx	POST-Tx	DIFF.
SNA°	82°	82°	0°
SNB°	83°	83°	0°
ANB°	-1°	-1°	0°
SN-MP°	37°	38°	1°
FMA°	34°	35°	1°
DENTAL ANALYSIS			
U1 TO NA mm	9 mm	11 mm	2 mm
U1 TO SN°	116°	118°	2°
L1 TO NB mm	8 mm	7 mm	1 mm
L1 TO MP°	90°	86°	4°
FACIAL ANALYSIS			
E-LINE UL	-3 mm	-2 mm	1 mm
E-LINE LL	0 mm	-1 mm	1 mm

■ Table 1: Cephalometric summary

Diagnosis

Skeletal:

- Skeletal Class III (SNA 82°, SNB 83°, ANB -1°)
- Mandibular plane angle (SN-MP 37°, FMA 34°)
- Bimaxillary protrusion with lip strain

Dental:

- Right side cusp Class III molar relationship
- Right side class III canine relationship
- Anterior teeth edge to edge
- About 2 mm space deficiency in upper arch and 2 mm in the lower arch.
- The maxillary dental midline was 2 mm shift to right side.
- The upper left lateral incisor was lock in.

ABO Discrepancy Index (DI) was 18 as shown in the subsequent worksheet.

Facial:

- Straight profile (Fig. 1)
- Protrusive lower lip

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: Slight flaring of incisors
- Vertical: Maintain
- Inter-molar/Inter-canine Width: Expansion to relieve crowding and upper lateral incisor lock in

Mandibular Dentition

- A - P: Anterior teeth retraction and posterior teeth tip-back
- Vertical: Maintain
- Inter-molar/Inter-canine Width: Expansion

Facial Esthetics:

- Protrude upper lip
- Retract lower lip

Treatment Plan

Non-extraction treatment with a passive self-ligating bracket system (Damon Q) was indicated. Class III

elastics were used to correct the A-P discrepancy by flattening the plane of occlusion, and to enhance the camouflage effect. Treatment with Class III elastics was initiated early in treatment (*at the .014 NiTi stage*), and final alignment of the dentition was achieved shortly before the end of active treatment.

Appliances and Treatment Progress

We selected .022" slot Damon Q low torque brackets ($U1=+2$, $U2=-5$, and $U3=-9$). For the lower incisors, brackets were bonded by 022" slot Damon Q standard torque brackets.

The initial archwires were .014" NiTi, and the Class III elastics were upgraded gradually by 2 oz. In the fourth month of treatment, the wires were replaced with rectangular .014X.025" NiTi and we continued using Class III elastics (2 oz) to correct the A-P discrepancy. One month after the .014X.025" NiTi replacement, we performed vestibular incision subperiosteal tunnel access (VISTA) surgery from the upper right canine to the left canine for gingival

recession (*Miller Class I*) (Fig. 10). The sequence of operation was as follows: The recipient teeth were initially prepared through scaling and root planing (Figs. 11 and 12).

The VISTA approach began with a midline frenum incision made through the periosteum to elevate a subperiosteal tunnel (Fig. 13). The tunnel was created to extend through the gingival sulcus of the central incisors and beyond the mucogingival junction, to allow for tension-free coronal repositioning of gingival margins. We used 2 methods of surgery. On the right side we performed guided tissue regeneration (GTR), and on the left side we performed the connective tissue grafts (CTG) were pulled through the tunnel. On the right side, a resorbable collagen membrane (*Lyoplant*) was then trimmed to fit the dimension of the surgical area (Fig. 14). The width of the membrane was adjusted to extend 3 to 5 mm (*or more*) beyond the bony dehiscences overlying the root surfaces. Prior to its insertion, the membrane was saturated with 0.3 mg/ml rhPDGF-BB (*GEM21S, Osteohealth*) for at least



■ Fig. 10: Moderate-wide recession defect on the right area left maxillary central incisor and canine (Miller Class I).



■ Fig. 11: Scaling and root planing over upper left side.



■ Fig. 14:
 a resorbable collagen membrane in the right subperiosteal area



■ Fig. 12: Scaling and root planing over upper right side.

10 min. A suture was passed through the gingival margin and PDGF-saturated collagen membrane to advance the gingiva coronally. Coronally anchored suturing uses a modified horizontal mattress suture with the knot tied to the braces; thereafter, beta-tricalcium phosphate (β -TCP) hydrated with thPDGF-BB was placed between the collagen membrane and the maxillary facial osseous cortex using a microsurgical elevator (Fig. 15). We carefully ensured that all bony dehiscences overlying each tooth root were covered. On the left side, connective



■ Fig. 13:
 The midline frenum incision and elevation through the subperiosteum tunnel



■ Fig. 15:
 GEM -21S is placed between the collagen membrane and the bone.

tissue grafts were obtained from both palatal side (Fig. 16). The grafts were placed within the subperiosteal tunnel and fixed to the braces using modified horizontal mattress sutures. Finally, the midline incision was approximated and sutured (Fig. 17).¹ After one month, clinical follow up showed uneventful healing (Figs. 18 and 19).

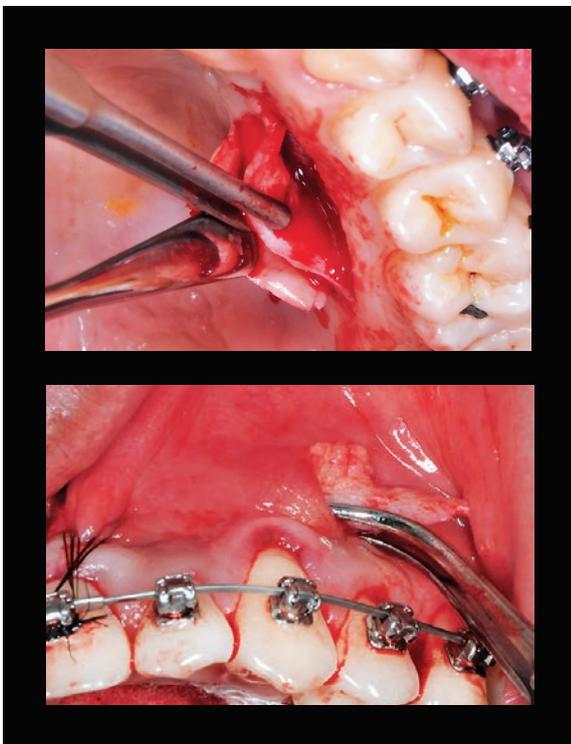
In the ninth month of the patient's treatment, we used .017X.025" TMA wires and Class III elastics (4.5 oz). After 17 months of treatment, the .019x.025" wires were applied. After 23 months of active treatment, the treatment was complete and all appliances were removed.



■ Fig. 17: Suture knot on the braces due to help coronal position.



■ Fig. 18: Frontal view showed uneventful healing after one month post-operation.



■ Fig. 16: connective tissue grafts were embedded between membrane and subperiosteal area from the donate side on the both palatal area.



■ Fig. 19: Palatal view showed uneventful healing after one month post-operation.

Results Achieved

Maxilla (all three planes):

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

Mandible (all three planes):

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

Maxillary Dentition

- A - P: *incisors slightly flaring*
- Vertical: *Extrusion of the posterior teeth*
- Inter-molar/Inter-canine Width: *Crowding corrected with arch expansion*

Mandibular Dentition

- A - P: *incisor retracted and molars were tipped distally*
- Vertical: *Incisors extruded*
- Inter-molar/Inter-canine Width: *Crowding released corrected*

Facial Esthetics

- Upper lip slightly more protruded
- Lower lip was retruded slightly

Retention

The upper fixed retainer 2-2 and the lower fixed retainer 3-3 were bonded on every tooth. An upper clear overlay retainer was delivered. The patient was instructed to wear the retainer fulltime for the first 6 months, and thereafter, only at night. The patient

was instructed in home care and maintenance of the retainer.

Final Evaluation of Treatment

The patient's CRE score was 27 points. The major discrepancies were as follows: Alignment/Rotations (4 points); marginal ridges (4 points); buccolingual inclination (2 points); overjet (4 points), with loss of some contact (7 points); left occlusal relationship (4 points); and unparallel root (2 points). The root coverage from upper right and left canine was 100% (Fig. 20).

Discussion

True gingival recession is a static condition in which the marginal gingiva is positioned apically relative to the cemento-enamel junction. Recession may be localized to a single tooth but in other cases it more broadly involves multiple-tooth segments or the dental arches.² The etiology is multifactorial; possible causes include a response to bacterial plaque, the position of the teeth in the arch, toothbrush trauma, traumatic occlusion, high insertion of the oral frenula, narrow gingival areas, and anatomic defects such as dehiscences and fenestrations.³ Patient age and smoking habits may be secondary factors related to gingival recession.⁴ These various factors can exert significant individual influences but may also act in association.

Planned dental movement does not inevitably constitute an etiological factor if teeth are not

dislocated out of their alveolar process limits. However, if a tooth is shifted without adequate biomechanical control, a bone dehiscence may develop and gingival recession would then be a consequence of the dental movement.⁵ Buccal-lingual dental shifting may also lead to bone dehiscence and subsequent gingival recession.⁶

A relatively high incidence of gingival recession occurs during orthodontic treatment of the mandibular central incisors because the labial bone covering the roots of these teeth is thin.⁷

However, Allais and Melsen⁸ contended that orthodontic treatment involving the mandibular incisors (*labial movement*) is unassociated with an increased incidence of recession. Thus, the effects of

orthodontic proclination of the mandibular incisors on the periodontium remain controversial. Outward dental movement from the alveolar bone caused by excessive inclination of the incisors predisposes teeth to the loss of the labial gingival insertion, which can lead to gingival recession.⁹⁻¹² Yet, several authors have stated that no evidence supports this association between orthodontic treatment (*movement*) and gingival recession.^{7,8,13} Dorfman¹⁴ reported that among 1,162 patients receiving complete orthodontic treatment, 2% showed insufficient amounts of keratinized gingiva in the mandibular central incisors.

The use of gingival grafts as a preventive measure in orthodontic patients at risk of gingival recession is also controversial.¹⁶ Several studies have addressed



■ Fig. 20:

Top: moderate-wide recession defect (Miller Class I).

Bottom: 23 months post-treatment following VISTA.

Both sides are satisfied with the results. Aesthetic criteria of success are fulfilled.

this issue, but differences in their methodology and the heterogeneity in patient ages have rendered extensive analysis challenging. One study reported that younger patients tend to be lost more frequently to follow-up than older patients.¹⁵ Other factors that limit meta-analyses include variations in the amount of movement obtained and the orthodontic treatments performed, absence of a reference point in determining final inferior incisor inclination, differences in the orthodontic post-treatment evaluation period, and differences in the methods employed to analyze the periodontal variables.^{11,12}

In certain situations it is necessary to perform orthodontic treatment prior to mucogingival treatment. These situations include the following: (1) the recession area is associated with shearing movements; (2) gingival recession is located adjacent to one of the mandibular incisors, and the orthodontic treatment plan affects a mandibular incisor extraction because of the Bolton discrepancy (*in this case, the affected tooth should be extracted*); and (3) cases of teeth in labioversion with gingival recession, where the teeth must be moved lingually prior to evaluating the need for mucogingival correction.¹⁷

Comparative clinical study of a guided tissue graft (GTR) versus a connective tissue graft (CTG) showed no significant difference in the results obtained using each method. For changes in keratinized tissue, the results showed a statistically significant gain in the width of keratinized tissue for CTG, compared with GTR.¹⁸

The minimally invasive VISTA approach presented in this case report, combined with a broad wound-healing growth factor, affords unique advantages for the successful treatment of multiple recession defects. The VISTA approach overcomes several of the shortcomings of the intrasulcular tunneling techniques used for periodontal root coverage. The VISTA technique provides broader access to the vestibule; a single vestibular incision can provide access to the entire region. In addition, VISTA allows visual access to the underlying alveolar bone and root dehiscences. The remoteness of the incision reduces the possibility of traumatizing the gingiva of the teeth being treated. Critical to the success of VISTA is a careful subperiosteal dissection that reduces the tension of the gingival margin during coronal advancement, and simultaneously maintains the anatomical integrity of the interdental papillae by avoiding papillary reflection.

In this particular case, considerations of optimizing both the blood supply and the patients' esthetics required a vertically placed vestibular incision. In the maxillary esthetic zone, superior alveolar arteries (*branches of the internal maxillary artery*) run in a superior-inferior orientation. Therefore, a vertically oriented initial incision is less likely to disrupt the blood supply than a horizontally positioned incision. Placement of the initial incision and a tunnel entrance within the maxillary frenum result in little to no visible scarring. This approach maximizes the esthetic outcome in this critical restorative area. An important technical difference between the VISTA and other tunneling approaches versus more classical techniques of gingival augmentation is



■ Fig. 21.:

Left: Pre-treatment intraoral photographs with moderate-wide recession defect.

Right: 44 months post-treatment long term following VISTA with aesthetic criteria of success

the degree of coronal advancement of the gingival margin advocated for the procedure. The gingival margin, with its attached collagen membrane, is advanced to the most coronal level of the adjacent interproximal papillae rather than to the cemento-enamel junction. The sutures are secured to the facial aspect of each tooth, effectively preventing apical relapse of the gingival margin during the initial stages of healing, and compensating for apical migration during the healing period. Apical migration of the gingival margin over relatively long follow-up periods appears either minimal or nonexistent with the VISTA tunnel procedure (Fig. 21).¹

Conclusion

We treated gingival recession successfully in our patient by using the VISTA procedure prior to orthodontic movement of the tooth. The VISTA method offers several advantages, including

minimally invasive treatment, effective prevention of apical relapse of the gingival margin during the initial stages of healing, and improved esthetic outcomes.

Acknowledgment

Thanks to Ms. Tsai Yun-Ju, Sheau-Ling Lin, Wei-Li Yin, Wen-Hsin Lee and Yin-Teng Hsieh for proofreading this article.

References

1. Zedeh H. Minimally Invasive Treatment of Maillary Anterior Gingival Recession Defects by Vestibular Incision Subperiosteal Tunnel access and Platelet-derived Growth Factor BB. *Int J Periodontics Restorative Dent* 2011;31(6):653-60.
2. Newman GV, Goldman MJ, Newman RA. Mucogingival orthodontic and periodontal problems. *Am J Orthod Dentofacial Orthop* 1994;105(4):321-7.
3. Wennström J, Zuchelli G, Pini Prato GP. Mucogingival therapy periodontal plastic surgery. In: Lindhe J, Lang NP, Karring T. *Clinical periodontology and implant dentistry*. 5th ed. Copenhagen: Blackwell Munksgaard; 2008. p. 955-1011.
4. Slutzkey S, Levin L. Gingival recession in young adults: occurrence, severity, and relationship to past orthodontic treatment and oral piercing. *Am J Orthod Dentofacial Orthop* 2008;134(5):652-6.
5. Borghetti A, Monnet-Corti V. *Chirurgie plastique parodontale*. 2nd ed. Paris: Wolters Kluwer France; 2008. p. 447.
6. Kassab MM, Cohen RE. The etiology and prevalence of gingival recession. *J Am Dent Assoc* 2003;134(2):220-5.
7. Ruf S, Hansen K, Pancherz H. Does orthodontic proclination of lower incisors in children and adolescents cause gingival recession? *Am J Orthod Dentofacial Orthop* 1998;114(1):100-6.
8. Allais D, Melsen B. Does labial movement of lower incisors influence the level of the gingival margin? A case-control study of adult orthodontic patients. *Eur J Orthod* 2003;25(4):343-52.
9. Artun J, Krogstad O. Periodontal status of mandibular incisors following excessive proclination. A study in adults with surgically treated mandibular prognathism. *Am J Orthod Dentofacial Orthop* 1987;91(3):225-32.
10. Hollender L, Rönnerman A, Thilander B. Root resorption, marginal bone support and clinical crown length in orthodontically treated patients. *Eur J Orthod* 1980;2(4):197-205.
11. Yared KE, Zenobio EG, Pacheco W. Periodontal status of mandibular central incisors after orthodontic proclination in adults. *Am J Orthod Dentofacial Orthop* 2006;130(1):6.e1-8.
12. Yared KFG, Zenobio EG, Pacheco W. Orthodontic proclination of mandibular incisors: risk to gingival recession? *Rev Dent Press Ortodon Ortop Facial* 2006;11(5):35-41.
13. Artun J, Grobéty D. Periodontal status of mandibular incisors after pronounced orthodontic advancement during adolescence: a follow-up evaluation. *Am J Orthod Dentofacial Orthop* 2001;119(2):2-10.
14. Dorfman HS, Kennedy JE, Bird WC. Longitudinal evaluation of free gingival grafts. A four year report. *J Periodontol* 1982;53(6):349-52.
15. Kakudate N, Morita M, Yamazaki S, Fukuhara S, Sugai M, Nagayama M, Kawanami M, Chiba I. Association between self-efficacy and loss to follow-up in long-term periodontal treatment. *J Clin Periodontol* 2010;37(3):276-82.
16. Maynard JG. The rationale for mucogingival therapy in the child and adolescent. *Int J Periodontics Restorative Dent* 1987;7(2):36-51.
17. Boyd RL. Mucogingival considerations and their relationship to orthodontics. *J Periodontol* 1978;49(2):67-76.
18. Chambrone L, Chambrone D, Pustiglioni FE, Chambrone LA, Lima LA. Can subepithelial connective tissue grafts be considered the gold standard procedure in the treatment of Miller Class I and II recession-type defects? *J Dent* 2008;36(9):659-71.

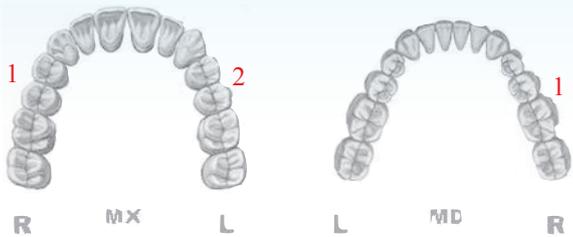


Cast-Radiograph Evaluation

Total Score: 27

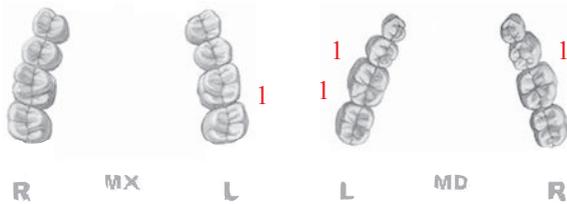
Alignment/Rotations

4



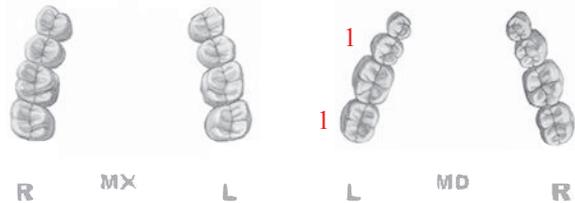
Marginal Ridges

4



Buccolingual Inclination

2



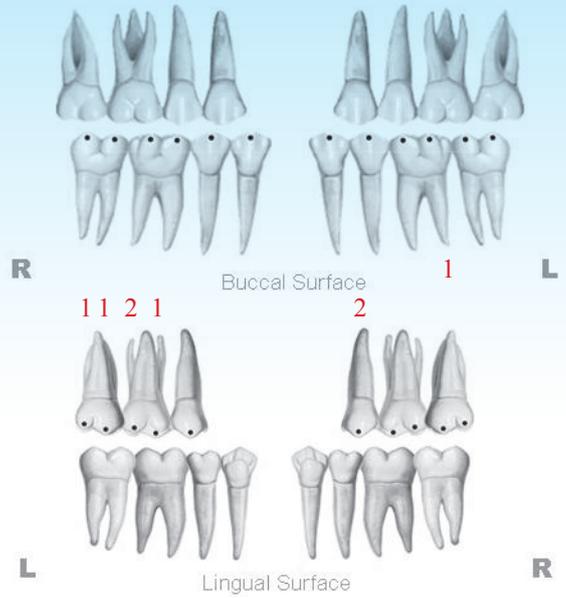
Overjet

4



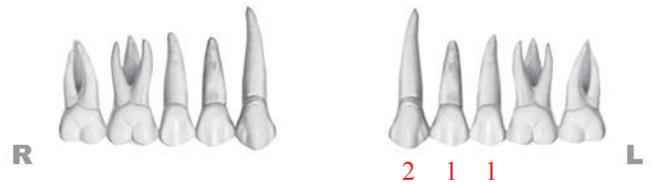
Occlusal Contacts

7



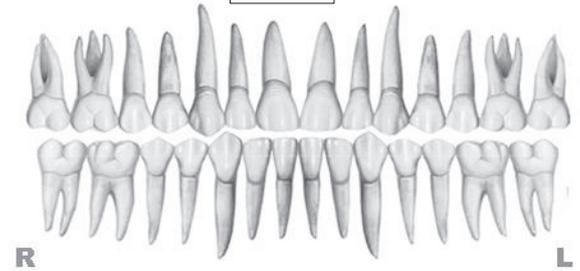
Occlusal Relationships

4



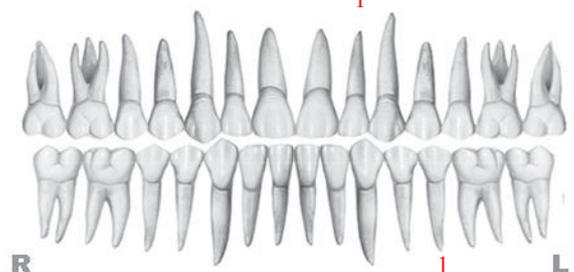
Interproximal Contacts

0



Root Angulation

2

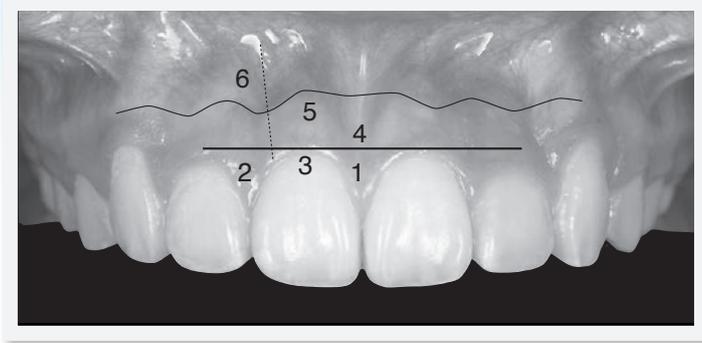


INSTRUCTIONS: Place score beside each deficient tooth and enter total score for each parameter in the white box. Mark extracted teeth with "X". Second molars should be in occlusion.

IBOI Pink & White Esthetic Score

Total Score: = 3

1. Pink Esthetic Score

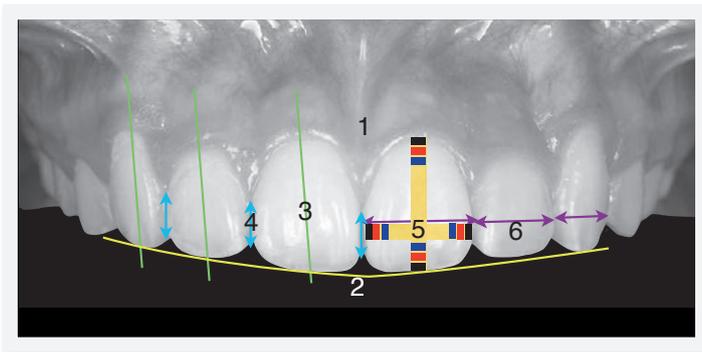


Total = 1

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

1. 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

Dr. Scott Parker
2014 7/6 Kaohsiung



Minimally Invasive Dentistry and Stress-Free Composites

微創牙體復形技術與低收縮樹脂之臨床應用

Easier & More Predictable Procedures
Using Today's Technology

微創牙科治療 (Minimal invasive dentistry) 被稱為牙科治療中“無聲的革命”，微創牙科治療已成為近十年來牙醫界的熱門話題之一，然而微創牙科治療的治療範圍，並非僅是追求表象的工具與材料而已，其主要策略是針對患者進行齲齒風險因素評估，並使用化學方法處理早期齲齒，促進病灶區再礦化；此外亦可藉助一些探測儀器診斷早期齲齒，以期讓患者得到最好的照顧與長期良好的癒後。

我很榮幸能介紹Scott Parker 醫師給台灣的朋友，Scott Parker博士演講的內容十分豐富，深入淺出，內容包括：(1) 微創牙科治療的原理（重要的生理學概念、用於預防、診斷和處理早期齲齒的現代科學理論和技術）；(2) 新的重要的檢測方式；(3) 新型檢測儀器的使用；(4) 新舊復形材料與技術之介紹與比較。從基礎的蛀牙成因，口腔環境中PH扮演的角色至新型材料與技術之發展介紹，通過病例展示，體驗了保存牙科治療和微創牙科治療的獨特優勢，同時證明為何早期齲齒的預防和診斷是牙科治療中的重中之重，最後導入了審美牙科治療技術。我很高興各位能參與此次獨一無二的課程，從中學習Scott Parker 博士治療的經驗，相信各位一定能如同我一樣，從中獲益良多。

杜哲光 醫師 推薦

高雄醫學大學牙醫學系 助理教授

高雄醫學大學附設中和紀念醫院牙科部 主治醫師

Lecture Information

- 主辦單位：**高雄醫學大學附設中和紀念醫院牙科部
協辦單位：湧傑企業股份有限公司
時間：2014/7/6 (Sun.) 9:00am~5:00pm
地點：高雄醫學大學附設中和紀念醫院 啟川大樓6樓 第一講堂
(高雄市三民區自由一路100號)
費用：
- 2014/6/15前
高醫校友會會員 1000 元 非會員 1500 元
 - 2014/6/15後
高醫校友會會員 1500 元 非會員 2000 元
報名繳費另贈送 OptiDisc General Kit 一組
 - 學生憑學生證報名 200元 (無贈品)
(名額有限，請先電話報名)



報名專線：07-2260030 王小姐、02-27788315 分機 #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

學分：參加者發給繼續教育學分（紙本學分證明 100 元）

備註：報名未出席者，恕不退回既收款項

Topics to be discussed:

- Are dental caries on the rise
- What is the role of pH
- Are we really diagnosing what's in our patients best interest
- Review of current diagnostic tools
- Where is dentistry heading
- Applications of lasers in dentistry
- Review of different restorative materials and adhesive systems
- Glass ionomer review
- Using ultrasound to image the teeth, bone, and soft tissues
- New and classic definitions of esthetic dentistry
- Bulk fill versus layering
- How to achieve esthetic restorations quickly
- How to obtain a lustrous polish using less time and effort



• 本文宣品僅供牙科診所及牙醫師參考，禁止張貼或擺置於公眾可瀏覽及取閱之處
• 因應個人資料保護法，當您或由湧傑業務幫您填寫此訂購單或（報名資料表）時，即視為同意您的個人資料由本公司在蒐集目的之範圍內予以處理及利用
• 本公司保留贈品更換之權利
• 衛署醫器輸壹字第002835號

2014 贝多芬正畸精英班

第20届

Beethoven Damon, OBS & Excellent Finishing Workshop

2014, 11/26~11/28



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颌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

线上报名：

<http://iworkshop.beethoven.tw>



<http://weibo.com/changchris>



newtonsa0301



精致的正畸完工 实际操作课程

Excellent Finishing Workshop

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 11/26 (三)

09:00—10:30 贝多芬Damon系统运用

10:30—11:00 休息

11:00—12:30 Optimized Orthodontic Treatment I
优化正畸治疗 *Dr. Chris Chang*

12:30—13:30 午餐

13:30—14:00 课程简介

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 11/27 (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

第三天 11/28 (五)

09:00—10:30 精致的正畸完工 案例示范

10:30—11:00 休息

11:00—12:00 正畸与种植的完美结合

12:30—13:30 午餐

14:00—15:00 OBS 模型实作

15:00—18:30 正畸门诊见习

台北无限精采 自由行, 11/29(六)

iAOI 2014 年度大会, 11/30(日)

09:00—10:30 张慧男博士演讲

10:30—12:00 正畸种植结合的案例报告 I

13:00—15:00 特别来宾演讲

15:00—17:00 正畸种植结合的案例报告 I

* 以上大会内容为暂定，仅供参考

台北无限精采 自由行



搭乘便利的捷运，自由来去全台最现代化的东区，古色古香的迪化街，一日穿梭百年台北。您可以品尝鼎泰丰小笼包、逛士林夜市贴近台湾常民生活，

也可以登 101 大楼远眺台北盆地，甚至到北边的淡水，体验海天一线的美好风光。

- ➡ 一日畅游古今台北
- ➡ 品尝台湾地道美食
- ➡ 体验台湾山海风光
- ➡ 活动费不含在学费内 (费用另计)

贝多芬正畸精英班

包含三场半天的演讲，两场半天的门诊见习，两场模型实作课程。

学费包含当地交通费、餐费及两天的住宿费 (两人同住一间房)；机场接送需额外收费。

学费：RMB 15,000 (USD 2,500)

2014 09/25 前报名优惠 RMB 12,500
USD 2,000

* 不含台北自由行、iAOI 年度大会活动费，需另计。



iAOI 2014 年度大会

国际正畸种植学会 (iAOI) 将邀请张慧男博士及正畸种植界的权威进行演讲，分享最火的临床治疗与诊间谘询技巧，并由多位准院士报告正畸与种植合并治疗的精采案例，期盼透过分享这些实务经验，提升医师自我医疗技术与品质。

- 张慧男博士精采演讲
- 大幅提升医疗技术与品质
- 正畸与种植案例报告
- 活动费不含在学费内 (费用另计)

Bimaxillary Protrusion and Gummy Smile Corrected with Extractions, Bone Screws and Crown Lengthening

Abstract

This case report describes the interdisciplinary treatment of a 25-year-old woman presenting with chief complaints of bimaxillary protrusion and excessive gingival display ("gummy smile"). She was dissatisfied with her previous non-extraction orthodontic treatment, rendered at age 10. The Discrepancy index (DI) for this severe malocclusion was 21. Orthodontic treatment involved extraction of four premolars to correct protrusion, and skeletal anchorage via four miniscrews (2 anterior and 2 posterior) to intrude the entire maxillary arch. Space closure utilizing maxillary extra-alveolar (E-A) bone screws reduced lip protrusion and the anterior miniscrews were used to intrude the maxillary incisors. Following orthodontics, surgical crown lengthening was performed in the maxillary anterior segment. 32 months of interdisciplinary treatment resulted in a near ideal result as evidenced by a Cast-Radiograph Score (CRE) of 15 and Pink & White (dental esthetic) score of 3. (Int J Ortho Implantol 2014;35:40-60)

Key words:

Class I malocclusion, bimaxillary protrusion, surgical crown lengthening, self-ligating appliance, gummy smile

History and Etiology

A 25-year-old woman presented with a history of non-extraction orthodontic treatment, and a labial frenectomy to close the diastema between the upper central incisors, at age 10. The current concerns were bimaxillary protrusion and a gummy smile (Fig. 1). A functional exam documented lip incompetence with a hyperactive mentalis muscle to achieve lip closure. Clinical examination revealed a severe bimaxillary protrusion, gummy smile, lip incompetence and short clinical crowns. Mild crowding was noted in the lower dentition (Figs. 2 and 3). Comprehensive orthodontics treatment and surgical crown lengthening resulted in a pleasing outcome as documented in Figs. 4-9.

Diagnosis

Skeletal:

1. Slightly retrusive mandible ($SNA\ 78^\circ$, $SNB\ 75^\circ$, $ANB\ 3^\circ$)
2. High mandibular plane angle ($SN-MP\ 41^\circ$, $FMA\ 32^\circ$)

Dental:

1. Class I molar relationship, midlines were coincident
2. Short clinical crowns due to altered passive eruption, type I, B
3. Overjet (5 mm)

Dr. Chris Lin,
 Director, Morita dental clinic,
 Board eligible, International Association for Orthodontists & Implantologists (Left)
Dr. Yvonne Wu,
 Board eligible, International Association for Orthodontists & Implantologists (middle)
Dr. Chris Chang,
 Founder, Beethoven Orthodontic Center
 Publisher, International Journal of Orthodontics & Implantology (middle)
W. Eugene Roberts,
 Consultant, International Journal of Orthodontics & Implantology (right)



■ Fig. 1: Pre-treatment facial photographs



■ Fig. 4: Post-treatment facial photographs



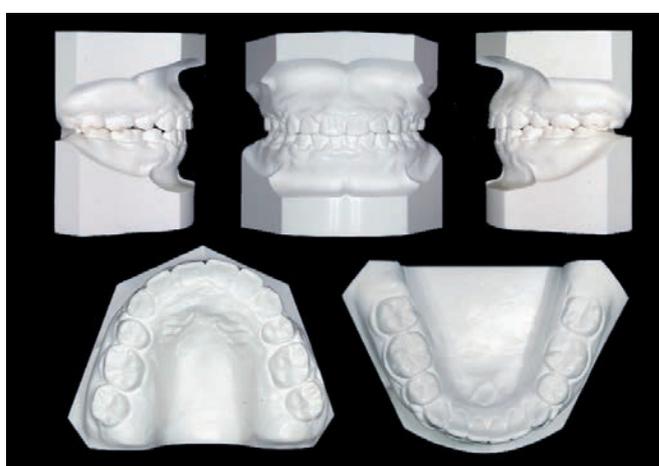
■ Fig. 2: Pre-treatment intraoral photographs



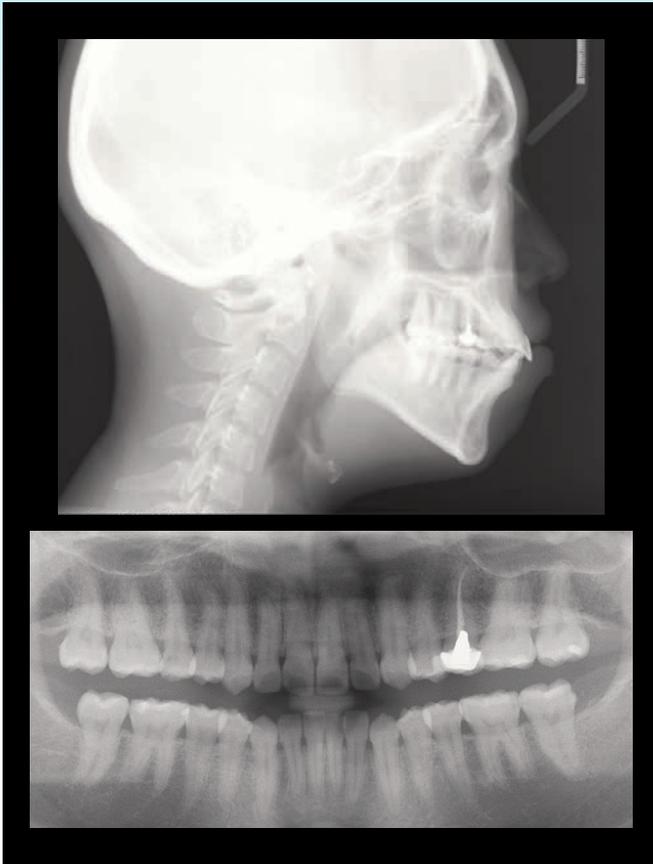
■ Fig. 5: Post-treatment intraoral photographs



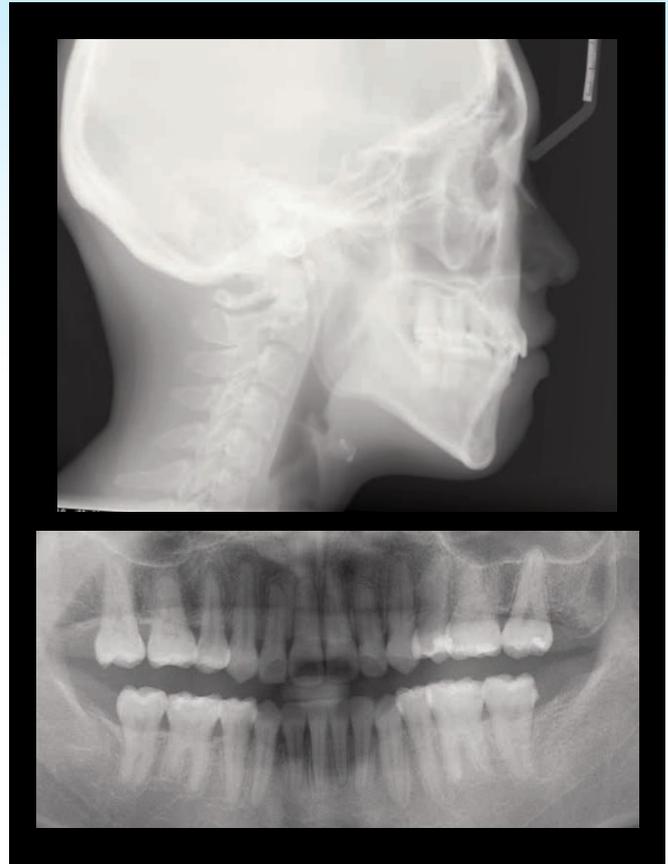
■ Fig. 3: Pre-treatment study models (casts)



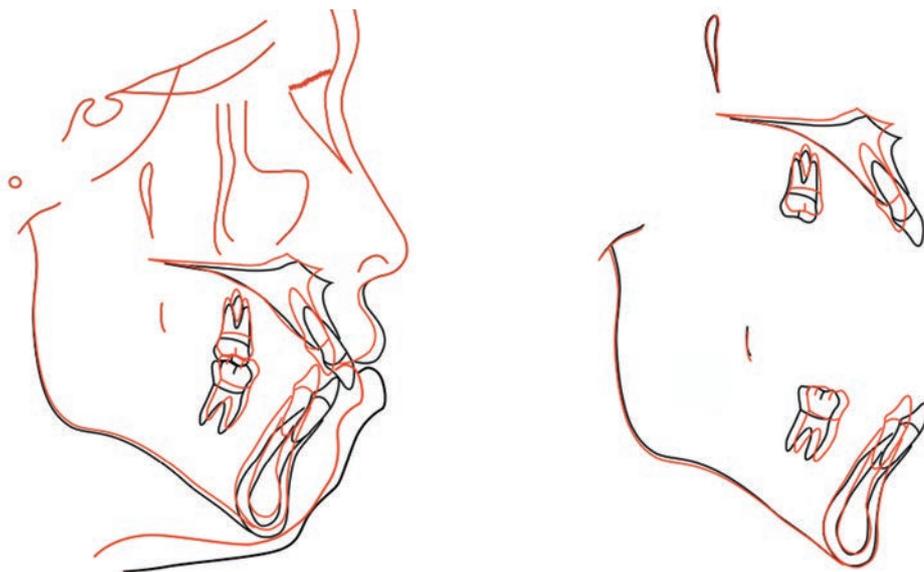
■ Fig. 6: Post-treatment study models (casts)



■ **Fig. 7:**
Pre-treatment lateral cephalometric and panoramic radiographs reveal root canal treatment in tooth #13. Bimaxillary protrusion and lip strain on closure is noted in the cephalometric view.



■ **Fig. 8:**
Post-treatment lateral cephalometric and panoramic radiographs document the orthodontic result.



■ **Fig. 9:** Cephalometric tracings were superimposed on the anterior cranial base, maxilla and mandible.

CEPHALOMETRIC			
SKELETAL ANALYSIS			
	PRE-Tx	POST-Tx	DIFF.
SNA°	78°	74°	4°
SNB°	75°	74°	1°
ANB°	3°	0°	3
SN-MP°	41°	40°	1°
FMA°	32°	31°	1°
DENTAL ANALYSIS			
U1 TO NA mm	10 mm	8 mm	2 mm
U1 TO SN°	110°	103°	7°
L1 TO NB mm	8mm	4mm	4mm
L1 TO MP°	95°	87°	8°
FACIAL ANALYSIS			
E-LINE UL	2 mm	-1 mm	3 mm
E-LINE LL	6mm	1mm	5mm

■ Table 1: Cephalometric summary

Facial:

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

As shown in the subsequent worksheet, the American Board of Orthodontics (ABO) Discrepancy Index (DI) was 21. Cephalometric values are summarized in Table 1.

Specific Objectives of Treatment

Maxilla (all three planes):

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

Mandible (all three planes):

- A - P: *Maintain*

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

Maxillary Dentition:

- A - P: *Retract incisors*
- Vertical: *Intrude the entire maxillary dentition, particularly the incisors*
- Inter-molar / Inter-canine Width: *Modest increase to articulate with the lower arch*

Mandibular Dentition:

- A - P: *Retract the mandibular incisors*
- Vertical: *Maintain*
- Inter-molar / Inter-canine Width: *Modest increase as buccal segments are uprighted*

Facial Esthetics:

Retract lips and achieve lip competence

Treatment Plan

Extract one premolar in each quadrant (*teeth #5, 13, 21 and 28*). Bond all permanent teeth with the .022" Damon Q® (*Ormco, Glendora, CA*) self-ligating bracket system. Use the stainless steel OrthoBoneScrew® (*OBS*) (*Newton's A, Ltd., Hsinchu, Taiwan*) anchorage system as follows: 1. 2mm x 12mm screws in each infrazygomatic crest (*IZC*) to serve as E-A anchorage to retract and intrude the maxillary arch, and 2. 1.5mm x 8mm interradicular screws bilaterally between the roots of the maxillary central and lateral incisors to intrude the maxillary anterior segment. When optimal alignment is achieved, remove all fixed appliances and fabricate clear overlay retainers. Correct maxillary anterior dental and soft tissue proportions with a surgical crown lengthening procedure.

Appliances and Treatment Progress

Following premolar extractions, the .022" Damon Q® system was bonded on all maxillary teeth, using high torque brackets in the anterior segment (Fig. 10). The following month, standard torque brackets were bonded on all mandibular teeth (Fig. 11). The wire sequence in the upper arch was: .014" CuNiTi, .014x.025" CuNiTi, .017x.025" TMA, .019x.025" SS. The wire sequence in the lower arch was similar except that the final wire was .016x.025" SS. After the .019x.025" SS arch wires were inserted into the maxillary arch, power chains and Class II elastics (*Ormco 1/4" 3.5oz "Fox"*) were applied to close all spaces. Twelve months into active treatment, a 2x12 mm OBS was placed in each IZC for posterior maxillary anchorage, and two 1.5x 8 mm miniscrews were inserted between the upper central and lateral incisors (Fig. 12). Retracting the entire maxillary dentition with bony anchorage rotates the arch and extrudes the maxillary incisors, but OBS anchorage between the maxillary central and lateral incisors counteracts the anterior extruding force, resulting in intrusion of the entire maxilla¹ (Figs. 13-15). Thus, the four OBS fixtures are a temporary anchorage device (TAD) to intrude the entire maxilla to help correct gummy smile. In the 23th month of treatment, two anterior bite turbos were bonded on the palatal surface of the maxillary central incisors and Class II elastics (3.5 oz) were used. The short anterior crowns appeared even shorter during the intrusion phase because of gingivitis (Fig. 16).

In the 24th month of treatment, the anterior OBSs were removed and the upper arch wire (.019x.025" SS) was expanded to improve the posterior occlusion (Fig. 14). Class II elastic and anterior U shape vertical elastics were used from the 24th month until the 31th month.

In the 31th month of treatment, the arch wire was sectioned distal to the maxillary canines and bilateral



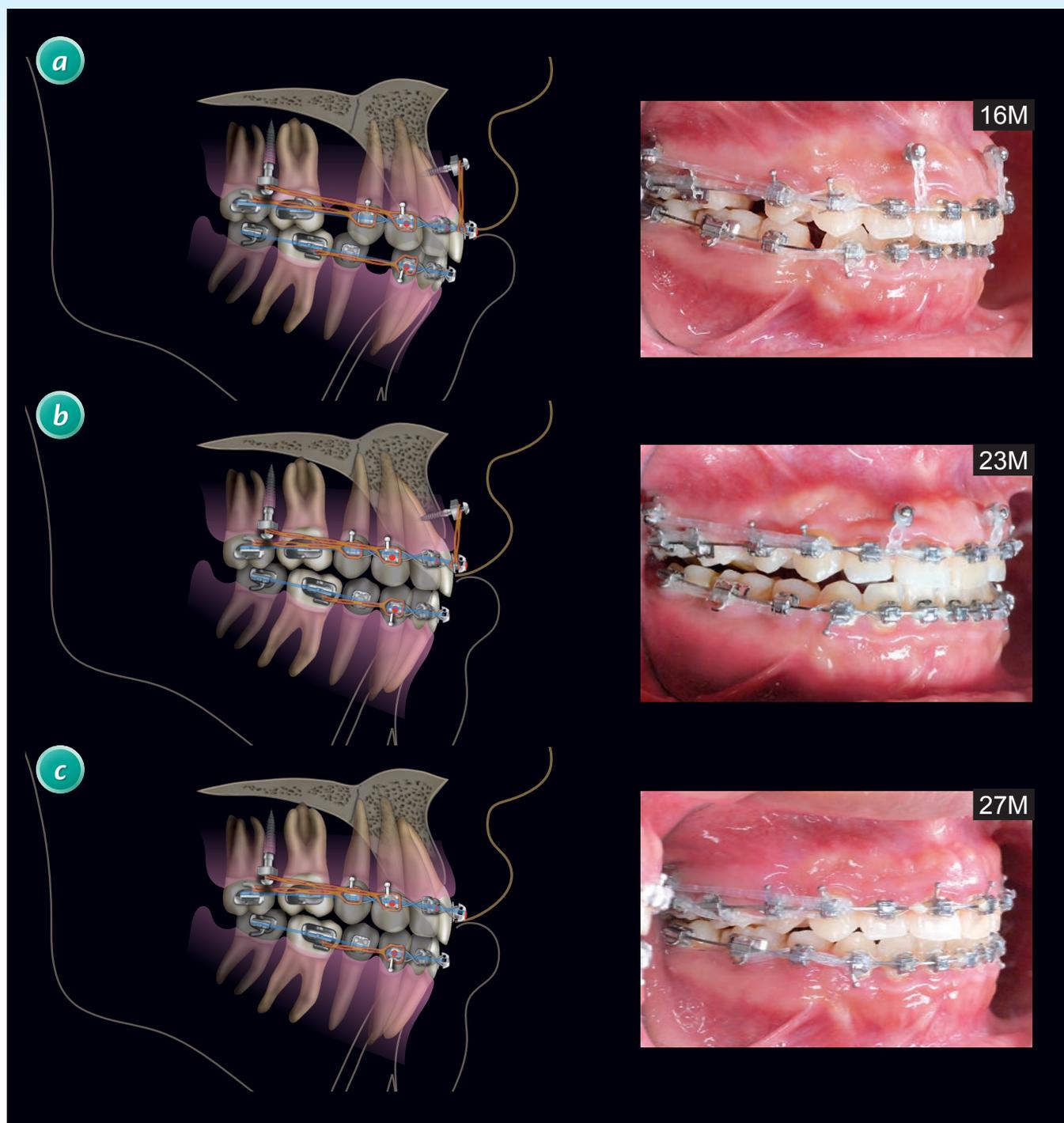
■ **Fig. 10:**
The maxillary right first (#5) and left second (#13) premolars were extracted and high torque brackets were bonded on the incisors.



■ **Fig. 11:**
The lower arch was bonded one month after the upper arch. Standard torque brackets were used on all teeth. Note that both first premolars were extracted.



■ **Fig. 12:**
Inter-radicular OBSs were inserted between the central and lateral incisors, and E-A OBSs were inserted in the zygomatic crests. Incisor intrusion was accomplished with elastomer chains.



■ Fig. 13:

Diagrams and corresponding photographs illustrate the mechanics employed at progressive stages of treatment:

- a. At 16 months the occlusal plane was gradually steepening.
- b. At 23 months anterior bite turbos were bonded on the palatal surfaces of the maxillary central incisors.
- c. In the 27th month, retraction force from the IZC miniscrews closes upper space but also provide lingual crown torque to the upper incisors.



Fig. 14:
As extraction space closed, the right buccal segment tend toward crossbite, so the archwire was expanded.

rectangular shaped Fox (1/4" 3.5 oz) elastics were utilized to settle the posterior occlusion.

After orthodontic appliances was complete, surgical crown lengthening (Figs. 17-19) was performed to establish proper crown heights and proportions. The total active treatment time 32 months.

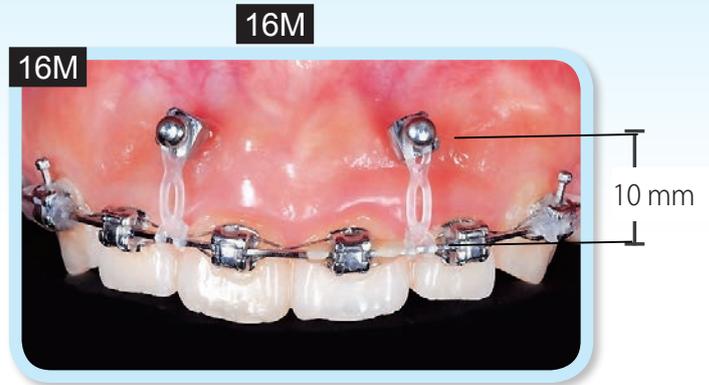


Fig. 16:
The distance of 3 mm between the screws and main arch wire from 16th to 23rd month have been reduced.



Fig. 15:
The force systems provided by the four OBSs and their overall effect on the maxillary arch are complex. The yellow arrow on the left indicates the intrusive force applied to the incisors. The large red arrow is the retraction force anchored by the IZC OBS. The small red arrow is the intrusive component on the posterior maxillary segment. The large blue arrow is the net resultant force on the maxilla, and the blue circular arrow represents the moment of the retraction force around the center of resistance of the maxilla (red dot with a cross).

Retention

Prior to debonding, all finishing discrepancies were assessed such as axial inclination of maxillary molars (Fig. 20). Many of these residual problems were corrected with posterior vertical elastics after the archwire was cut distal to the canines. After all labial appliances were removed, fixed retainers were bonded from 2-2 in the maxillary arch. Upper and lower clear overlay retainers were delivered. The patient was instructed to wear them full time for the first 6 months and nights only thereafter. Instructions were provided for home dental care, as well as for maintenance of the retainers.

Surgical crown lengthening process

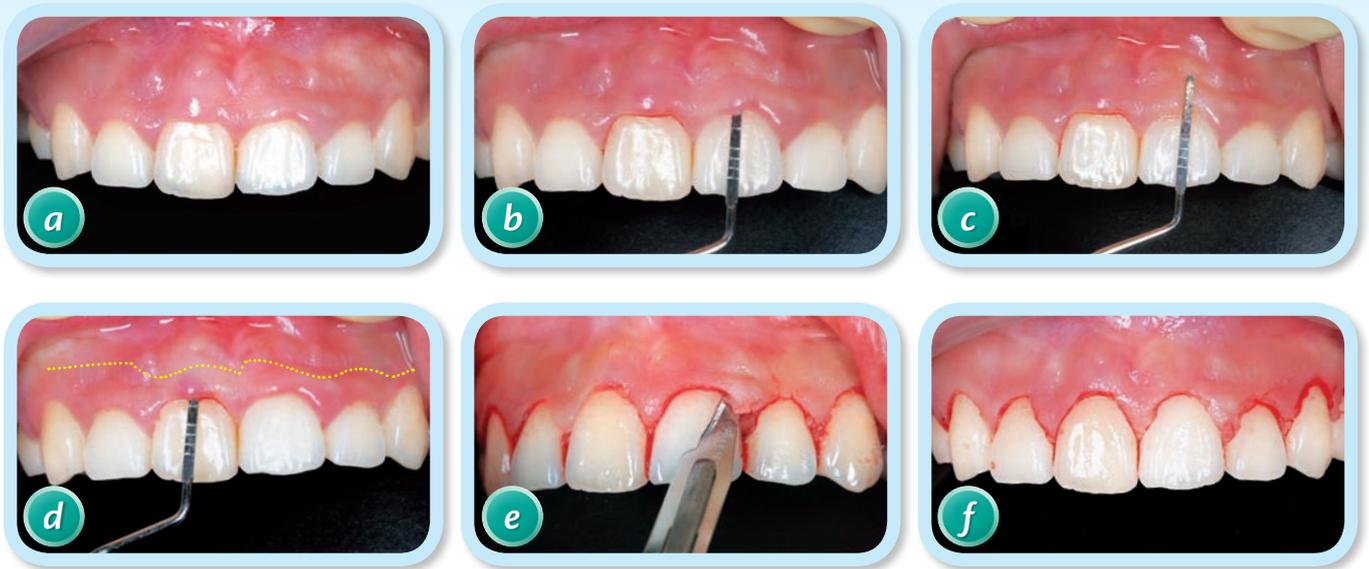
Classification of vertical maxillary excess is shown in Table 2. The procedure indicated is illustrated in Figs.17-19. Under local anesthetic, the width of the dentinogingival complex was measured by sounding to bone with a periodontal probe (Figs. 17b,c and 19). Then the relationship of the cemento-enamel junction (CEJ) to the osseous crest was mapped, and the width of the keratinized gingiva was determined (Fig. 17d). Although not necessarily

essential for periodontal health, 2 mm or more of keratinized gingiva certainly improves esthetics and is helpful for maintaining effective hygiene.² If there is not enough keratinized gingiva following the osteoplasty phase of the surgical crown lengthening procedure, an apically positioned flap is indicated.

Excess gingiva was resected using an intrasulcular incision to establish the desired crown length. In the absence of severe dental attrition, the CEJ was the best anatomical reference for the gingivectomy (Fig. 17) and the osteotomy (Fig. 18) to provide for an adequate biologic width. Once the desired crown exposure was achieved, the gingival flap was raised and bone removal was performed with a #5 round carbide bur to establish a uniform biologic width (CEJ to alveolar crest) of at least 2.5 mm for the anterior teeth. For example, there was only 1 mm of biologic width along some aspects of the facial surface of tooth #9 (Fig 18a). So trimming bone to establish a uniform biologic width of 2.5 mm was essential for long-term gingival health. Finally the flap was repositioned to the crowns and sutured about 0.5 mm coronal to the CEJ (Fig 18c).

	Gingival & mucosal display	Treatment modalities		
	I 2~4 mm	Orthodontics Intrusion only	Orthodontics & Periodontics	Periodontics & Restorative therapy
	II 4~8 mm			Periodontics & Restorative therapy <i>The remaining amount of root encased in bone and crown-to-root ratio</i>
	III ≥ 8 mm			Orthognathic surgery <i>With or without adjustive periodontal & restorative therapy</i>

■ Table 2: Classification of vertical maxillary excess for treatment planning purposes.¹⁰



■ Fig. 17:

The surgical crown lengthening procedure for short clinical crowns (a) begins with bone sounding (b) relative to the attached gingiva (c). The width of the attached gingiva is mapped with a dotted line (d). The gingivectomy is performed with a No. 15 blade (e) and the increased crown exposure (f) is assessed relative to the width of the remaining attached gingiva.

Final Evaluation of Treatment

Alignment: the ABO Cast-Radiograph Evaluation (CRE) score was 15 points, which is an excellent result for a malocclusion presenting with a DI = 21. Most of the residual alignment problems were due to bracket positioning errors. The importance of precise bracket placement cannot be overemphasized.

Esthetics: the Pink and White Dental Esthetics score was assessed before and after crown lengthening surgery. The Pink Esthetics score (*gingival aspects*) significantly improved from 4 to 2 points because of the surgical crown lengthening. Residual discrepancies post-operatively were the curvature and level of the gingival margins. Selective gingivectomy with a dioxide laser is indicated to resolve these problems. The White Esthetics score (*dental aspects*) also improved from 3 points to 1

after crown lengthening surgery. The incisal curve remained uneven due to the attrition of tooth #9. Direct bonding with composite resin and/or selective grinding is indicated.

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). The patient was well satisfied with the result.

Discussion

From an esthetic perspective, the ideal is 1-2 mm of gingival display when smiling.⁴ Excessive gingival exposure when smiling may be localized or involve all of the maxillary teeth. A "gummy smile," may have both an extra-oral and intra-oral etiology.⁵

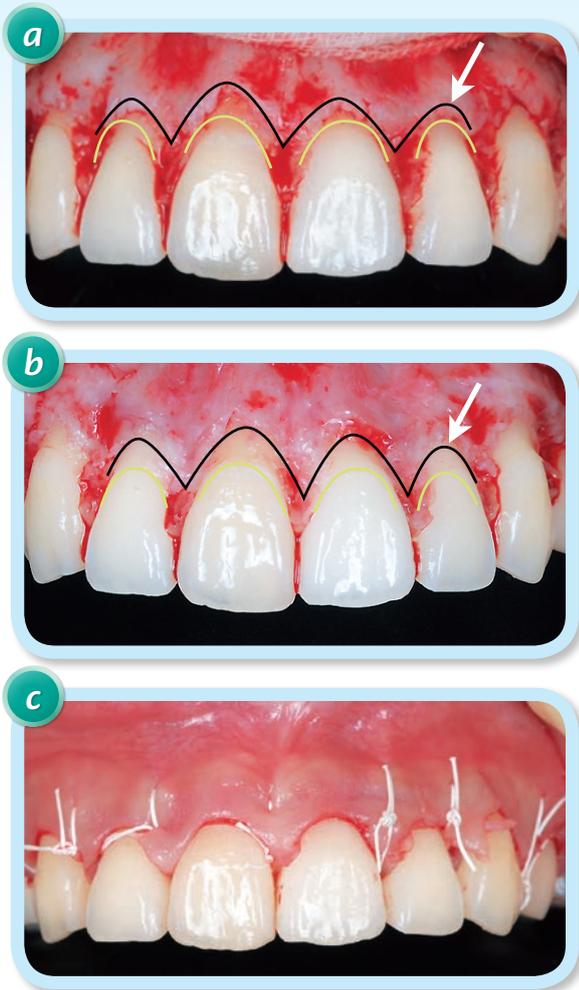


Fig. 18: Yellow lines represent the CEJs and black lines are the alveolar bone level before osteoplasty (a). The white arrow (a) shows that the biologic width of #10 was only ~1 mm (b). After osteoplasty (b) the biologic width was corrected to 2.5 mm, and the gingiva was sutured with #4 Gore-Tex® (Gore Medical Products, Flagstaff, AZ).

Extra-oral causes:

- Short Upper Lip:** Lip length is normally about one third of lower facial height. Clinically, lip length is measured from subnasale to the inferior border of the upper lip (Fig. 21). Individuals with less than 20 mm of lip length are usually classified as having a short lip.⁶

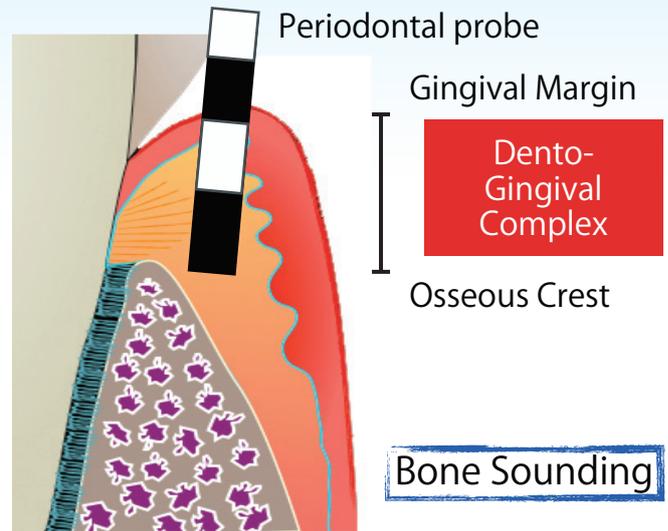
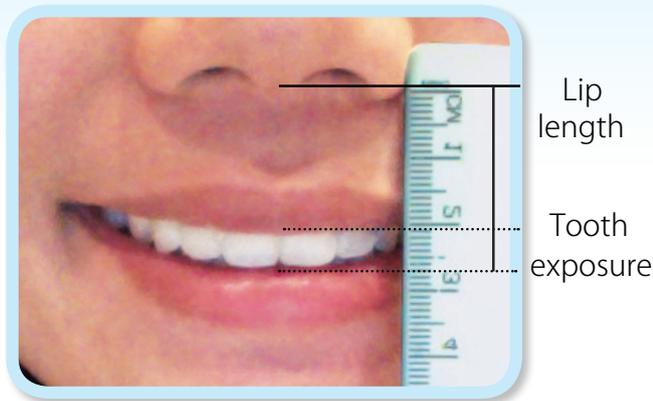


Fig. 19: The dentogingival complex can be measured by bone sounding with a periodontal probe. The dimensions of the normal dento-gingival complex are approximately 3.0 mm buccally and lingually, with a mean of 4.5 to 5.0 mm interproximally.³



Fig. 20: Photos taken at 14th months of treatment show the maxillary molars are tilted mesially because of inaccurate brackets positioning.



■ Fig. 21:

Ideal lip length in young adult females is from 20 to 22 mm, whereas it is from 22 to 24 mm in young adult males.⁶

2. **Hypermobile Upper Lip (HUL):** The average lip mobility from repose and a full smile is ~6-9 mm. The distance the upper lip travels when smiling is determined by measuring from a baseline, which is the lip position at rest; measure the distance from the maxillary incisor edge to the lower border of the lip on the lateral cephalometric film or the facial photograph if the incisor is visible. Then measure the distance from the incisor edge to the inferior border of the lower lip on the facial photograph when smiling. If the total distance that the lip travels when smiling is greater than ~ 6-9 mm, the diagnosis is hypermobile lip. The underlying etiology is usually hyperactivity of the upper lip elevator muscles.
3. **Anterior Dentoalveolar Extrusion (ADE):** This condition may be associated with incisor attrition and/or a deep bite (Fig. 22a). As the maxillary incisors extrude to make contact (*passive eruption*),

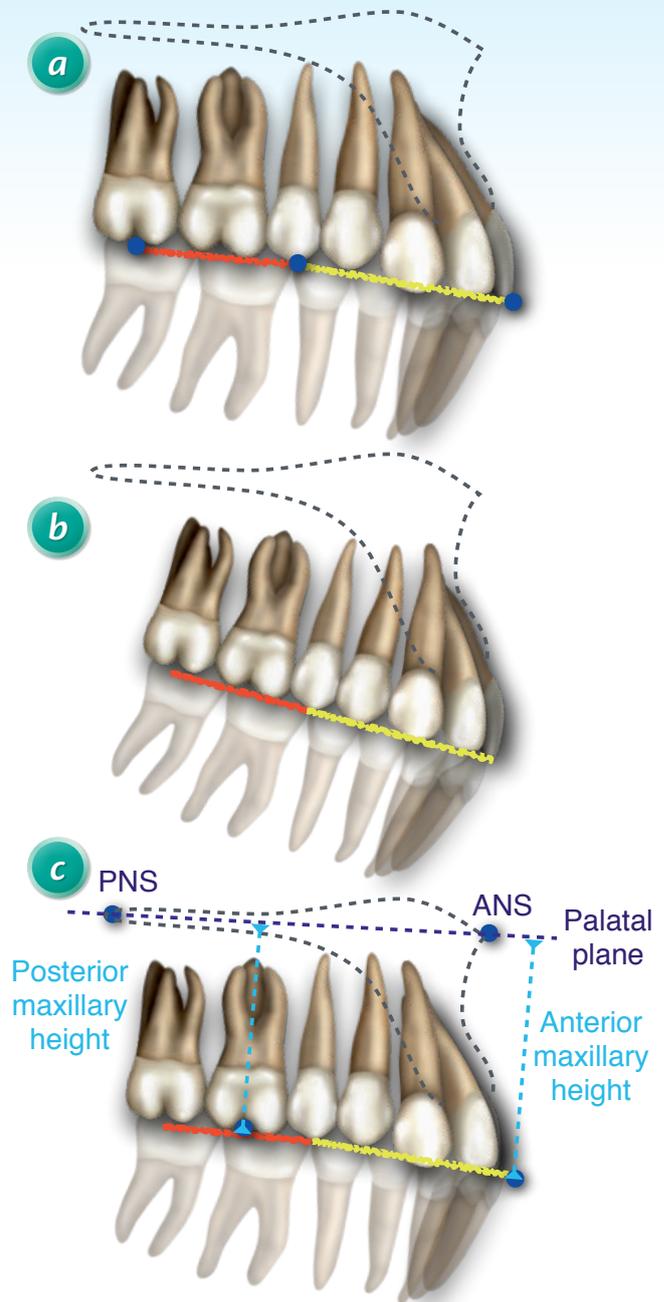
there is excessive gingival display and a curvature of the occlusal plane, which is associated with a disharmony between the anterior and posterior segments.² This condition can be corrected by intruding the upper anterior teeth with miniscrew anchorage.⁶

4. **Vertical Maxillary Excess (VME):** The maxilla is more inferiorly positioned due to increased lower facial height and there may be a cant in the occlusal plane. The average anterior maxillary height is 29.7 mm,⁶ whereas the average posterior maxillary height is 20.6 mm.⁹ The current patient's anterior and posterior maxillary heights were 29 and 25 mm respectively, which is not consistent with either ADE or VME. However, these cephalometric measurements are only averages. A thorough diagnosis for an individual patient must be more comprehensive. Gummy smile is a clinical impression, not a cephalometric value.

Garber and Salama (2000)¹⁰ classified the degree of VME and corresponding treatment modalities. The option to orthognathic surgery was the use of bilateral anterior and posterior miniscrews to achieve intrusion of the anterior teeth and retraction of the entire arch. Once anterior teeth were intruded to the desired level, trimming the upper incisors to the desired height and a crown lengthening procedure were indicated to provide an optimal esthetic result. Furthermore, for the patients with more than 5 mm gingival display, lip reposition surgery and Botox® (Allergan Inc. Irvine, CA) injection are viable alternatives to orthognathic surgery.^{11,12}

Intra-oral causes:

1. **Gingival Enlargement:** Enlarged gingival tissues may be due to infection or sensitivity to medication (e.g. *phenytoin, cyclosporine, calcium channel blockers etc*). The treatment for this condition should focus on oral hygiene, but a gingivectomy may be necessary in some cases.¹
2. **Altered Passive Eruption:** Tooth eruption is divided into two phases: active and passive eruption. Active eruption is the movement of the teeth in the direction of the occlusal plane, whereas passive eruption is the exposure of the teeth by apical migration of the gingiva.¹³ Tooth eruption continues throughout life and the level of free gingival margin varies accordingly. Goldman and Cohen (1968)¹⁴ coined the term "altered passive eruption" for failure of the gingival margin to recede to a level apical to the cervical convexity of the crown. Volcansky and Cleaton- Jones (1976)¹⁴ reported that 12.1% of 1,025 patients with a mean age of 24.2 years \pm 6.2 years displayed altered passive eruption.¹⁴ It is more prevalent in women than in men. Depending on the level of mucogingival junction (MGJ) and alveolar bone crest, there are four types of altered passive eruption: Type IA, type IB, type IIA and type IIB (Fig. 22).¹⁵ The difference between Class I and II is the width of keratinized gingiva (*soft tissue*). The difference between subtype A and B is the level of alveolar bone crest. For the current patient, bone sounding favored a diagnosis of type IB, which can be reliably treated



■ Fig. 22: Occlusal plane canting in the sagittal plane:

- a. In anterior dentoalveolar extrusion (ADE), only the anterior portion of the occlusal plane is canted inferiorly.
- b. Vertical maxillary excess (VME) involves inferior positioning of both the anterior and posterior segments with a flat but often steep occlusal plane.
- c. Anterior and posterior maxillary height are measured cephalometrically as shown.^{7,8}

with gingivectomy and osteoplasty (Figs. 23 and 24).

Decision tree⁵:

The occlusal plane favors ADE (Fig. 22a) because only the anterior segment was tilted inferiorly (Fig. 3). For VME (Fig. 22b) both the the anterior and posterior occlusal planes are inferiorly positioned, and the occlusal plane is flat. ADE can often be treated with orthodontic intrusion but VME may require orthognathic surgery, usually a Lefort 1 osteotomy.

Clinical crown length measurement using a gauge or periodontal probe is the second determinant of an effective decision making process. When compared to normal crown length of a central incisor (~11 mm) a patients's incisors can be classified as short, average or long.

Incisal wear is the third determinant. If there is excessive dental attrition, it is important to intrude the affected teeth to correct the level of the gingiva, and then restore the incisors to normal length. Since a history of excessive incisal wear is usually associated with nocturnal parafunction, it is essential to retain the patient with a Hawley bite plate that slightly opens the posterior bite. The bite plate should be worn at night indefinitely to protect the restorations.

Incisor exposure when resting is the fourth determinant. If the patient cannot completely close the lips in repose, and incisor exposure at rest is

more than 2 mm, VME is the probable diagnosis, and orthognathic surgery may be necessary. If the patient can close the lips at rest, but the gingival display is over 4 mm when smiling, the diagnosis is hypermobile lip. Botox® injections and/or surgical lip repositioning is suggested.^{11,12}

The crown to root ratio is the fifth determinant. If the alveolar bone supporting tooth roots is adequate, the overall treatment time can be reduced by surgical crown lengthening without orthodontic intrusion.

A comprehensive diagnosis and effective treatment plan for gummy smile requires a careful analysis of the five determinants of the decision tree.⁵ For the present patient, the findings were VME, short clinical crown length, and no incisal wear. So the diagnosis was altered passive passive eruption (Fig. 24). Measuring the width of keratinized gingiva and bone sounding determined that the present case was type I B, and the corresponding treatment following completion of orthodontics was gingivectomy and osteoplasty (Figs. 23 and 24). Using the decision tree (Fig. 24), the dental practitioner may approach this type of patient with confidence.

Philips¹⁶ established a plastic surgery classification based on three smiling patterns: commissure, cupid or complex smile. The variation among these smile types is due to the differential function of facial muscle groups. The esthetic appearance of gingival tissue varies widely and must be specifically evaluated for each individual.

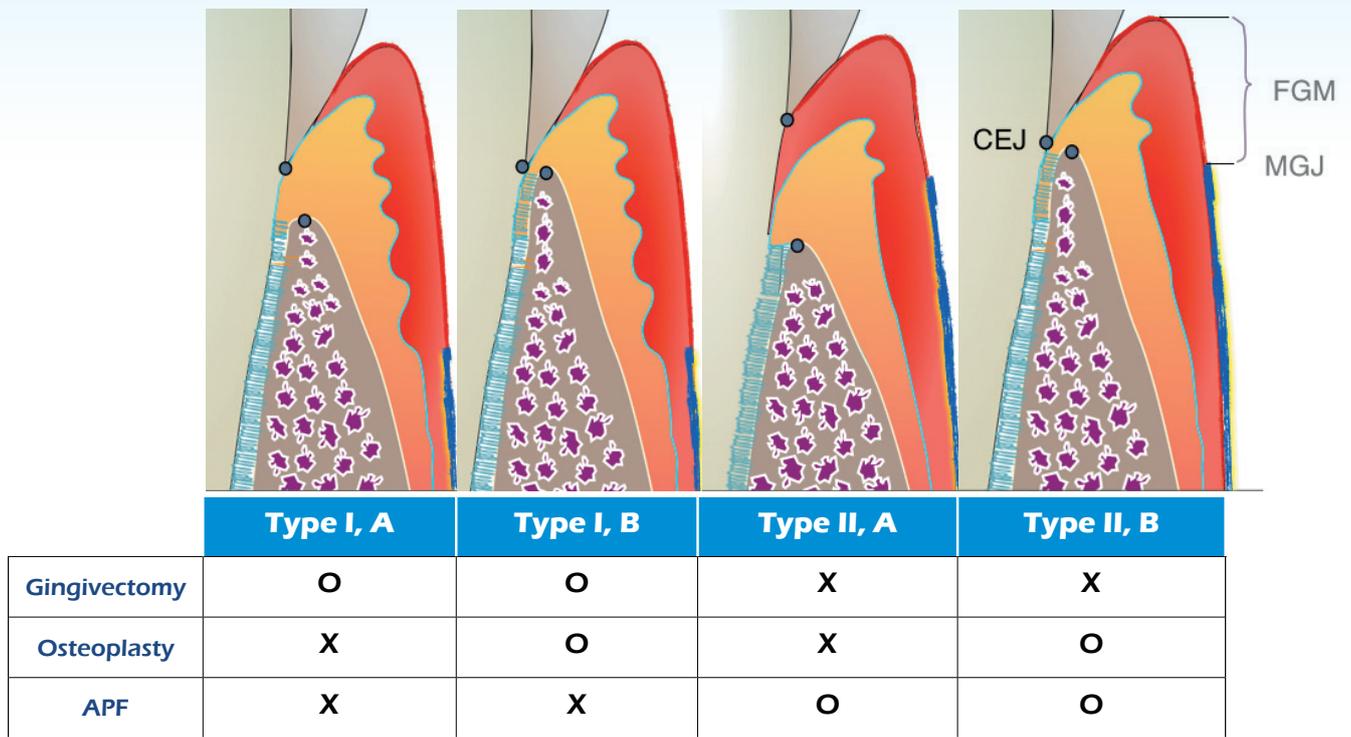


Fig. 23: Classification of altered passive eruption is important for determining the most appropriate surgical procedure(s) to correct it.¹⁵

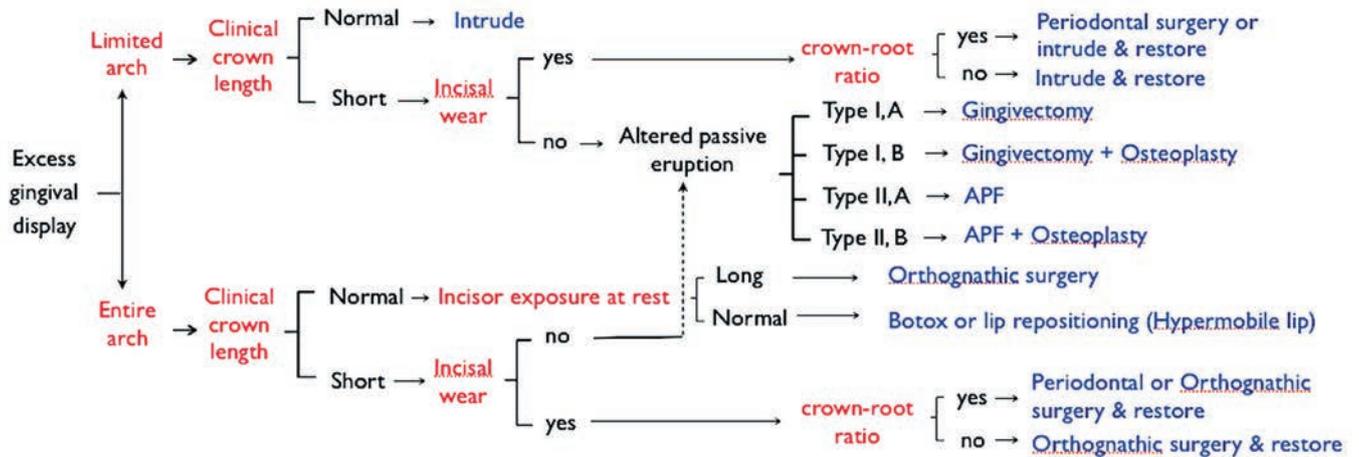
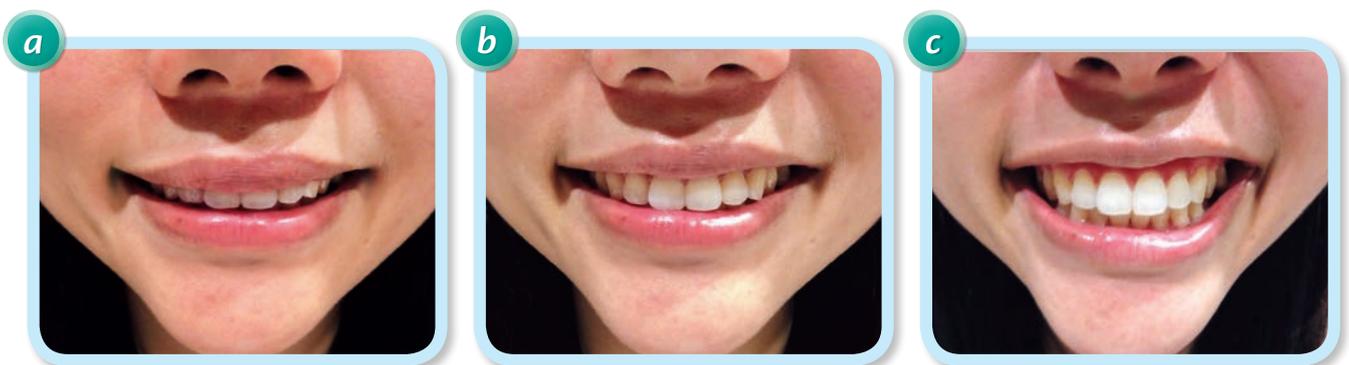


Fig. 24: The decision tree is a flow chart for assessing excessive gingival display to determine the most appropriate clinical management for a specific problem. The five determinants for decision making are: extent of the excessive gingival display, clinical crown length, incisal wear, incisor exposure at rest, and the crown-root ratio.⁵



■ Fig. 25: Smile type is classified as follows:¹⁶

- a. Commissure smile is a Cupid's Bow configuration that is seen in ~67% of the population. The corners of the mouth are elevated and projected anteriorly by the levator muscles of the upper lip. The teeth are exposed in a smile arc with a base at the incisal edge of the maxillary central incisor.
- b. Cuspid smile is seen in ~31% of the population. The shape of the lips is commonly visualized as a diamond. The levator labii superior muscles contract first, exposing the maxillary cuspids, then the corners of the mouth contract projecting the lips upward and outward.
- c. Complex smile is seen in ~2 % of the population. The shape of the lips are typically illustrated as two approximating chevrons. The levators of the upper lip and corners of the mouth contract simultaneously with the depressors of the lower lip, to expose all the upper and lower teeth.



■ Fig. 26: Smile line is classified as follows:¹⁷

- a. Low smile line, exposing less than 75% of the maxillary incisors and no gingiva, is seen in 20.48% of the population.
- b. Average smile line, exposing 75-100% of the maxillary anterior teeth along with interproximal gingiva, is seen in 68.94% of the population.
- c. High smile line, exposing 100% of the anterior segment along with a contiguous band of gingiva., is seen in 10.57% of the population.

Rest



Smile



■ Fig. 27:

Pre- and post-treatment images of the current patient's smile. The gummy smile has been improved remarkably by orthodontics and surgical crown lengthening.

Tjan and Miller¹⁷ published a dental smile classification system that distinguished individuals with a low, average and high smile line, based on the amount of dental and gingival exposure during a natural full smile (Fig. 26). The high smile line, also known as a gummy smile, is generally an esthetic concern which is twice as common in women compared to men. The authors¹⁷ proposed that women have a shorter upper lip than men, but this hypothesis was not confirmed in subsequent studies.¹⁸

Kaya and Uyar¹⁹ found that the dominant factors affecting the perception of smile attractiveness are smile arc and gingival display. Furthermore, flat smile

arcs are preferred when there is insufficient gingival display, but the vaulted smile arc is preferred with excessive gingival display. In an aging study, Vig and Brundo²⁰ reported that the maxillary central incisor exposure gradually decreases over time and is accompanied by a corresponding increase in mandibular tooth exposure.

With respect to the current patient, a high smile line was changed to average by intruding the entire maxillary arch with anterior and posterior OBS anchorage (Fig. 27). The treatment effect is similar to a Le Fort I osteotomy, thereby offering patients a viable alternative. Combining intrusion and surgical crown lengthening produced an attractive

smile without the cost, morbidity and potential complications of orthognathic surgery.

Conclusion

Darwin²¹ stated that we all smile in the same language. The smile is the most recognized human expression. However, excessive gingival display is a major concern for many patients who subsequently seek esthetic dental treatment. By measuring a set of pretreatment parameters, an accurate diagnosis is achieved for guiding conservative treatment that is effective for alleviating gummy smiles.

Acknowledgement

Thanks to Mr. Paul Head and Dr. Bill Su for proofreading this article and Dr. Rungsi and Dr. Chen CK for sharing their ideas and material.

References

- Lang NP, Loe H. The relationship between the width of keratinized gingiva and gingival health. *Journal of Periodontology* 1972;43:623-627.
- Yeh HY, Chang CH, Robert WE. Implant-orthodontic combined treatment for gummy smile with multiple missing teeth. *Int J Ortho Implantol* 2013;32:16-32.
- Kois J. Altering gingival levels. The restorative connection. 1. Biologic variables. *J Esthet Dent* 1994; 6:3-9.
- Hulsey CM. An esthetic evaluation of lip-teeth relationships present in the smile. *Am J Orthod Dentofac Orthop* 1970; 57:132-144.
- Chen CK. Diagnosis and therapy of gummy smile. *Beethoven Podcast Encyclopedia in Implant Forum No.38*. Hsinchu: Newton's A Ltd; 2013.6.28.
- Peck S, Peck L, Kataja M. The gingival smile line. *Angle Orthod* 1992; 62: discussion 1-2, 91-100.
- Wu H, Lin J, Zhou L, Bai D. Classification and craniofacial features of gummy smile in adolescents. *J Craniofac Surg* 2010;21:1474-1479.
- Fushima K, Kitamura Y, Mita H, Sato S, Suzuki Y, Kim YH. Significance of the cant of the posterior occlusal plane in class II division 1 malocclusions. *Eur J Orthod* 1996;18:27-40.
- Janson GR, Metaxas A, Woodside DG. Variation in maxillary and mandibular molar and incisor vertical dimension in 12-year-old subjects with excess, normal, and short lower anterior face height. *Am J Orthod Dentofac Orthop* 1994;106:409-18.
- Garber DA, Salama MA. The aesthetic smile: diagnosis and treatment. *Periodontol* 2000 1996;11:18-28.
- Simon Z, Rosenblatt A, Dorfman W. Eliminating a gummy smile with surgical lip repositioning. *Journal of Cosmetic Dentistry* 2007;23:100-108.
- Polo M. Botulinum toxin type A (Botox®) for the neuromuscular correction of excessive gingival display on smiling (gummy smile). *Am J Orthod Dentofac Orthop* 2008; 133:195-203.6
- Newman MG, Takei HH, Carranza FA. *Carranza's Clinical Periodontology*. 9th ed. Saunders 2002, p. 31.
- Cohen E. *Atlas of cosmetic and reconstructive periodontal surgery*. 3rd ed. Decker BC 2007, p. 259.
- Ezquerria F, Berrazueta MJ, Ruiz-Capillas A, Arregui JS. New approach to the gummy smile. *Plast Reconstr Surg* 1999; 104: discussion 51-2, 1143-1150.
- Philips E. The classification of smile patterns. *J Can Dent Assoc* 1999; 65:252-254.
- Tjan A, Miller G. Tjan AHL, Miller GD. Some esthetic factors in a smile. *J Prosthet Dent* 1984; 51: 24-28.
- Peck S, Peck L, Kataja M. Some vertical lineaments of lip position. *Am J Orthod Dentofac Orthop* 1992;101:516-524.
- Kaya B, Vyar R. Influence on smile attractiveness of the smile arc in conjunction with gingival display. *Am J Orthod Dentofac Orthop* 2013;144(4):541-547.
- Vig RG, Brundo GC. The kinetics of anterior tooth display. *J Prosthet Dent* 1978;39:502-504.
- Darwin C. *The expression of the emotions in man and animal*. London, John Murray, 1872, Chapter 14, p. 347-366.

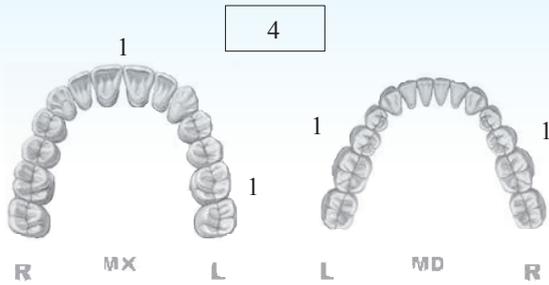


Cast-Radiograph Evaluation

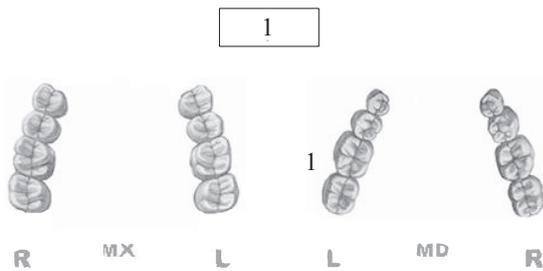
Interim-Treatment Progress

Total Score: **15**

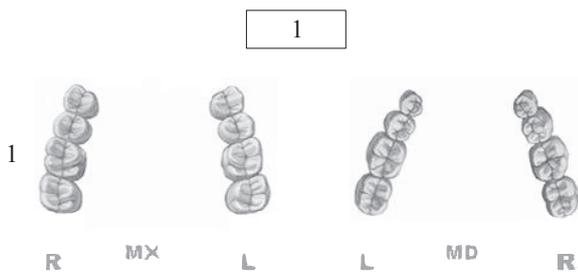
Alignment/Rotations



Marginal Ridges



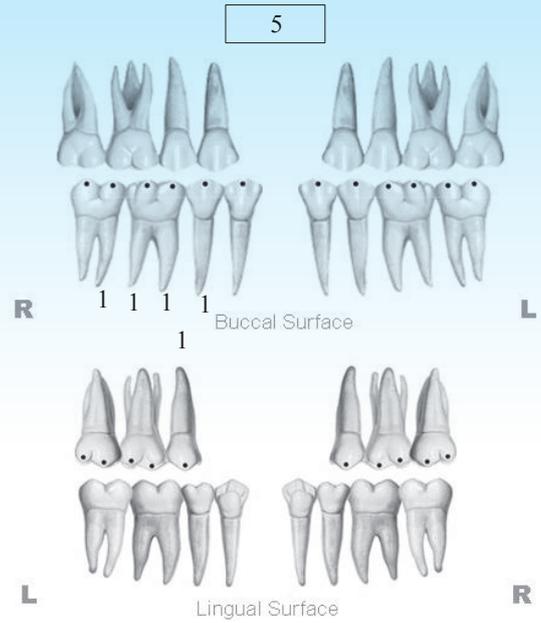
Buccolingual Inclination



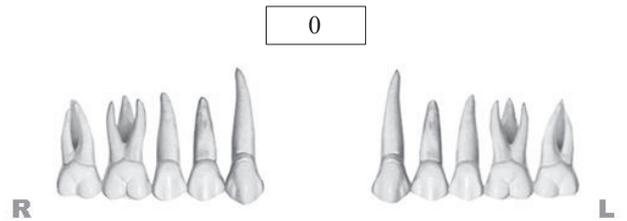
Overjet



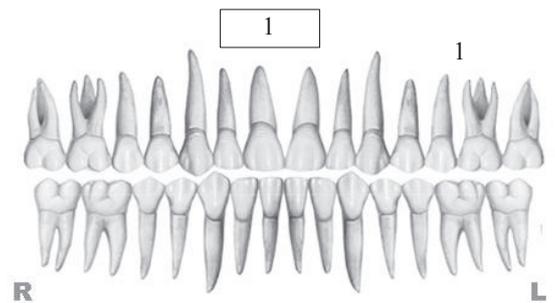
Occlusal Contacts



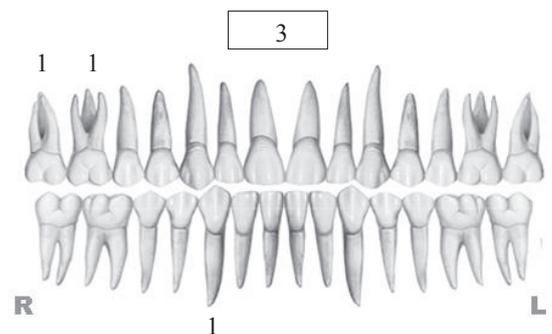
Occlusal Relationships



Interproximal Contacts



Root Angulation

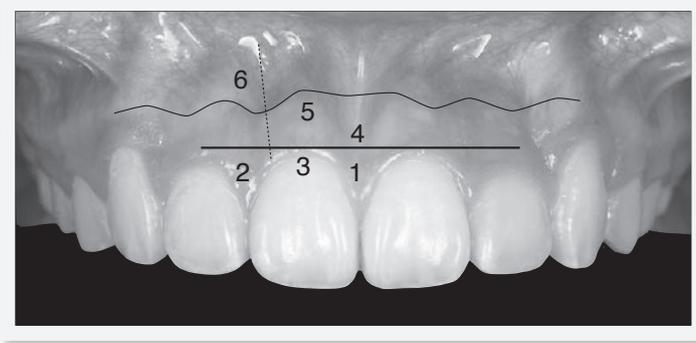


INSTRUCTIONS: Place score beside each deficient tooth and enter total score for each parameter in the white box. Mark extracted teeth with "X". Second molars should be in occlusion.

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

Total Score: = 7

1. Pink Esthetic Score

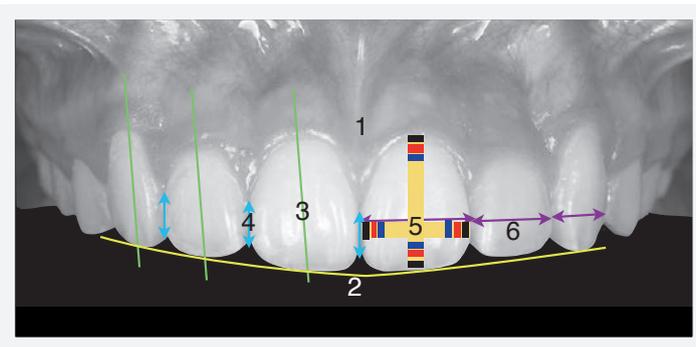


1. Mesial Papilla	0	1	2
2. Distal Papilla	0	1	2
3. Curvature of Gingival Margin	0	1	2
4. Level of Gingival Margin	0	1	2
5. Root Convexity (Torque)	0	1	2
6. Scar Formation	0	1	2

Total = 4

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)



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

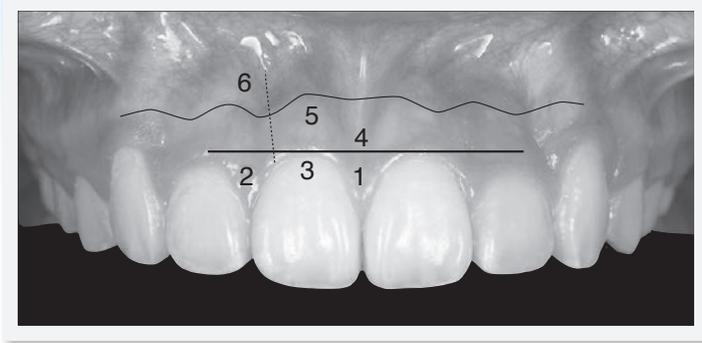
Total = 3

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

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

Total Score: = 3

1. Pink Esthetic Score

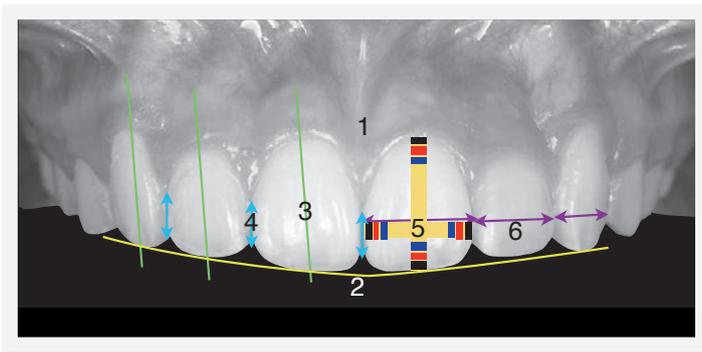


1. Mesial Papilla	0	1	2
2. Distal Papilla	0	1	2
3. Curvature of Gingival Margin	0	1	2
4. Level of Gingival Margin	0	1	2
5. Root Convexity (Torque)	0	1	2
6. Scar Formation	0	1	2

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

2. White Esthetic Score (for Micro-esthetics)



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

Total = 1

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

南加大植牙專科進修課程 2014

時間：

7/13~14, 2014 (日, 一 - 演講與實作 workshop)
9/14~15, 2014 (日, 一 - 演講與實作 workshop)
11/9~10, 2014 (日, 一 - 演講與實作 workshop)
1/19, 2015 (一 - 美國演講)
1/21, 2015 (三 - 美國可選修的 cadaver workshop)
1/23~24, 2015 (五, 六 - 美國演講, 畢業典禮)

8/10, 2014 (日 - 視訊教學)
10/5, 2014 (日 - 視訊教學)
12/14, 2014 (日 - 視訊教學)
1/20, 2015 (二 - 美國演講)
1/22, 2015 (四 - 美國可選修的 cadaver workshop)
1/25, 2015 (日 - 美國可選修的 cadaver workshop)

地點：

集思交通部國際會議中心 台北市中正區杭州南路一段 24 號 (2014 年 7 月到 12 月)
Millennium Biltmore Hotel Los Angeles. 506 South Grand Avenue. Los Angeles, CA 90071-2607 (2015年1月)

南加大講員陣容



Homa Zadeh

南加大牙醫學院畢業牙周病專科醫師及副教授終身職，康乃迪克大學牙周病專科醫師訓練，免疫博士。



Avishai Sadan

南加大牙醫學院院長，LSU牙醫學院補綴專科，Quintessence of Dental Technology (QDT) 前主編。



Baldwin Marchack

畢業於南加大牙醫學院，並且於UCLA獲得MBA學位。美國廣復協會前任主席。



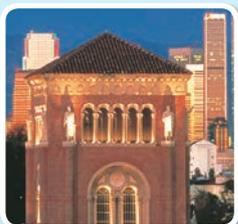
Casey Chen

南加大牙醫學院牙周病專科主任，台大牙醫學士，羅馬林達大學牙醫學位，匹茲堡大學牙周病專科訓練。



Domenico Cascione

南加大牙科技術中心研究專員，義大利牙科技術師專科訓練，伊利諾伊大學牙科技術學士。



Ilan Rotstein

南加大牙醫學院牙髓科教授，手術，治療，和生物科學專科主任，也是本繼續教育中心的負責人。



Yang Chai

南加大牙醫學院顯面分子生物研究學院副院長，南加大顯面分子生物博士，北京大學牙科學士及口腔頰面外科培訓。



Parish Sedghizadeh

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



Ramin Mahallati

南加大牙醫學院臨床講師，畢業於南加大牙醫學院，口腔修復專業培訓。



演講嘉賓：Mauricio Araujo ★ Fernando Rojas-Vizcaya ★ Clark Stanford ★ Stephen Wallace ★ Lyndon Cooper

USC

聯絡人: Julie
E-mail: julie.chen@usc.edu
電話: +1-213-821-5281

金牛頓藝術科技

聯絡人: 黃思涵
E-mail: thuang@newtonsa.com.tw
電話: (03)573-5676



· 衛部醫器輸字第014069號
· 衛部醫器輸字第013963號
· 衛署醫器輸字第009148號

2014 / 9 / 14 Kaohsiung

New Technology & Techniques in Endodontics

預見根管治療的未來

> A Hands-On Course

> Introduction Of Lecture

New Technology and Techniques in Endodontics

您的技術無法突破？缺少更好的儀器協助您嗎？在這個實作課程中，特別設計給每天從事根管治療工作的醫師們，幫助你們提升臨床治療技術。演講主要針對根管診斷評估，病例分析，新型的根管儀器操作，如何提升清潔及修型效率的重點；以及在複雜的3D根管環境中採用熱封填技術。

實作課程中，我們採用最先進最新型的鍍鈦旋轉銼針”系統“—TF Adaptive 進行根管修型，並利用最理想的熱根管封填法—垂直擠壓封填技術，進行緻密的根管封填。

新款的 TF Adaptive System-它會計算您在使用File時施力的壓力值，自動調整旋轉銼針在根管內的扭力。File會依據根管內的狀態旋轉或自動回轉。因此可以達到極佳的清除根管殘屑，不過度修型，並減少銼針吸入及減少銼針分離的狀況。

是什麼樣智慧型的系統？一定要來試試這最新的 TF Adaptive System，它會使您的工作更聰明有效率，使您每天的工作不再陷入看不見的黑洞。

您去年錯過陳維國醫師的演講嗎？他幽默風趣的上課方式，運用他獨特魅力傳授臨床小技巧，讓您輕鬆解決臨床治療的問題。

> Lecture Information

主辦單位：高雄醫學大學-保存科

協辦單位：湧傑企業股份有限公司

時間：2014 / 9 / 14 (Sun.) 9:00-17:00

地點：國立科學工藝博物館(南館)-高雄市三民區九如一路797號

*上午Lecture：103 教室 (1F)

*下午Hands-on：203 教室 (2F)

費用：Lecture：

· 即日起報名費1500元 / 學生500元

· 8/30 後報名費2500元 / 學生1000元

Lecture + Hands-on：

· 即日起報名費3000元

· 8/30 後報名費4000元

(Hands-on限額30名 / 一人一機，獨立操作)

凡報名Lecture + Hands-on並完成繳費

贈 TF Adaptive Small Procedure Pack 23mm(-盒)



· 衛署醫器輸字第009148號

報名專線：07-2260030 王's

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

學分：參加者發給繼續教育學分(紙本學分證明100元)

備註：報名未出席者，恕不退回既收款項

> Speaker Profile:

Dr. Alex W. K. Chan

Specialist in Endodontics, Hong Kong



Clinical Assistant Professor, Faculty of Dentistry, The University of Hong Kong BDS, MDS, MSc, FRACDS, MRACDS (Endodontics), FCDSHK (Endodontics), FHKAM (Dental Surgery), FICOI

陳維國醫師於1990年獲得香港大學牙醫學士學位，再於1993年以全優成績取得香港大學牙體牙髓病科碩士學位。在1995和1996年分別考獲澳紐皇家牙科醫學院院士和國際口腔植體協會會員資格；其後再取得香港醫學專科學院院士、香港牙科醫學院院士(牙髓治療專科)和牙髓治療科專科醫生資格，並以優異成績完成醫療服務專業管理學碩士課程。

陳醫師現為香港大學牙醫學院臨床助理教授、香港牙科醫學院委員會委員、香港牙髓治療專業委員會和香港牙髓病學會的常委，亦是香港特別行政區牙髓治療科專科醫生，曾應邀在香港、中國和亞洲各地講課和主辦學習班。

> Schedule

- 08:00 am - REGISTRATION
- 09:00~10:30 am - The biologic objectives of root canal therapy. The endodontic diagnostic decision making, case selection and organization of armamentarium.
- 10:30~11:00 am - TEA BREAK
- 11:00~12:30 pm - The importance and methods of effective biomechanical cleansing of the root canal system.
- 12:30~13:30 pm - LUNCH BREAK
- 13:30~15:00 pm - The effective rotary nickel titanium file utilization and prevention of iatrogenic events.
- 15:00~15:30 pm - TEA BREAK
- 15:30~17:00 pm - The optimal obturation of root canal systems with warm filling techniques.

- 本文宣品僅供牙科診所及醫師參考，禁止張貼或擺置於公眾可瀏覽及取閱之處
- 因應個人資料保護法，當您或由湧傑業務幫您填寫此訂購單(or報名資料表)時，即視為同意您的個人資料由本公司在蒐集目的之範圍內予以處理及利用
- 本公司保留贈品更換之權利



Axis | SybronEndo



新技術

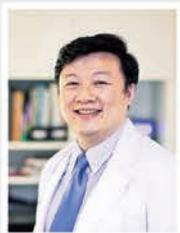
新觀念 新選擇

高效率 根管治療

您也做得到！

台南
台中

2014



李偉明 醫師

學歷：

高雄醫學大學牙醫學系畢業
台灣大學臨床牙醫科學研究所碩、博士

經歷：

台北醫學大學牙醫學系部定兼任助理教授
美國俄亥俄州立大學牙博士研究員
中華民國牙髓病學會專審委員及理事
中華牙醫學會永久會員
美國牙髓病專科醫師學會專科會員
中華民國家庭牙醫學會專科醫師
台大醫院牙髓病科兼任主治醫師
台北市立萬芳醫院兼任主治醫師
財團法人天主教耕莘醫院牙髓病科主任
白石牙醫診所暨教育中心院長

課程介紹

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

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

報名資訊

主辦單位

台南市中山校友會
臺灣楓城牙醫學會

協辦單位

湧傑企業股份有限公司

上課時間

2014年
7/13 (日) 台南 9:00-12:00
8/10 (日) 台中 9:00-12:00

上課地點

台南 - 07/13
國立成功大學
醫學院2樓83-0201
台南市小東路一號

台中 - 08/10

中國文化大學推廣教育部-台中教育中心(307教室)
台中市西屯區臺灣大道三段658號3F(Rich19大樓)

報名方式

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

報名費用

NT\$ 2000元，參加即贈送
TF Adaptive Small Procedure Pack 一組
*人數到達10人才開班
*報名未出席者，恕不退回既收款項費用

報名專線

高雄：07-226-0030王's
台中：04-2305-8915 張's

Crowded Class II Division 2 Malocclusion with Class I Molars Due to Blocked In Lower Second Premolars

Abstract

An 18y2mo female presented a Class II Division 2 malocclusion associated with typical dental alignment problems: retroclined upper central incisors, labially flared maxillary lateral incisors, deep overbite, and severe crowding. Skeletally the malocclusion was complicated by a retrognathic mandible (ANB of 9°) steep mandibular plane angle (MPA 34°) and severe facial convexity (24°). Despite the Class II/2 pattern, the molars were Class I due to ectopic eruption and mesial migration of the mandibular first molars, which resulted in the second premolars being blocked out. The Discrepancy Index (DI) was 37. Treatment mechanics were passive self-ligating brackets, early light short elastics (ELSE), anterior bite turbos, and extra-alveolar (E-A) miniscrews in the infrazygomatic crests to retract the entire maxillary arch. Nonextraction treatment for 32 months resulted in an acceptable skeletal compromises (4° increase in the MPA and lower incisor to mandibular plane angle of 109°), but dental alignment was excellent, as documented with Cast-Radiograph (CRE) score of 22 and a Pink and White (P&W) dental esthetics score of 3. (*Int J Ortho Implantol* 2014;35:64-78)

Key words: Class II division 2 malocclusion, self-ligating appliance, bite turbo, bone screw anchorage

History and Etiology

It is more difficult to finish severe malocclusions well.¹ Of the common malocclusions, Class II Division 2 (Class II/2) malocclusions are the most challenging,² and extended treatment times (>36 months) contribute to an inferior result.³ The traditional treatment approaches involves headgear, functional appliances and/or orthognathic surgery. However, these methods are all problematic with respect to compliance, extended treatment time and/or postoperative complications.¹⁻³

The present patient is a 18-year-and-2-month-old female who presented with her mother for orthodontics evaluation (Figs. 1-3). Chief complaints were crooked teeth and flared upper lateral incisors. Despite a distinct Class II/2 skeletal and dental pattern with bimaxillary crowding, the molars were Class I and both lower second premolars were blocked in to the lingual. The etiology of this complex malocclusion is multifactorial.³

Developmentally the patient had a severely retrusive mandible which is a growth deficit that usually involves both polygenetic genetic traits and environmental factors.⁴ The subsequent development of the dental aspects of the malocclusion appears to be environmental based on the following scenario. Maintaining lip competence in the present of a Class II skeletal pattern results in lingual tipping of the maxillary central incisors, which blocks out the lateral incisors to the labial. The Class I molar relationship is probably due to the ectopic eruption in the mandibular arch: 1st molars erupted mesially into a Class I relationship, causing premature loss of the 2nd deciduous molars, which in turn resulted in blocked in 2nd premolars. Thus, the Class I molar relationship is actually a complicating factor for a Class II/2 skeletal malocclusion.

The patient was treated to a pleasing result in 23 months as documented in Figs. 4-6. Radiographs

Dr. Sophia Pei-Wen Shu, *Instructor*
Beethoven Orthodontic Course (left)

Dr. Hsin Yin Yeh, *Diplomate*
International Association for Orthodontists & Implantologists (middle)

Dr. Chris Chang, *Publisher*
International Journal of Orthodontics & Implantology (middle)

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



■ Fig. 1: Pre-treatment facial photographs



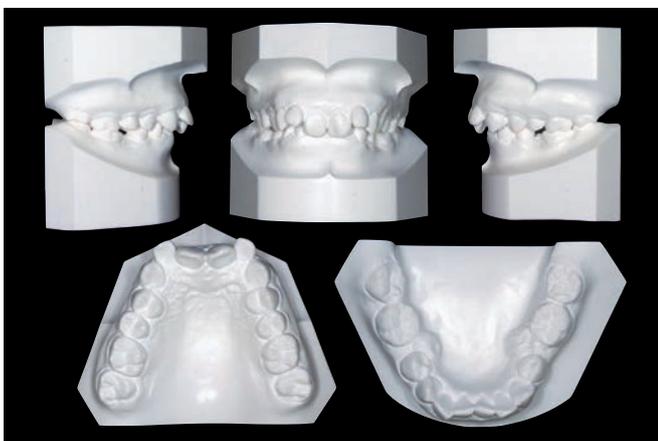
■ Fig. 4: Post-treatment facial photographs



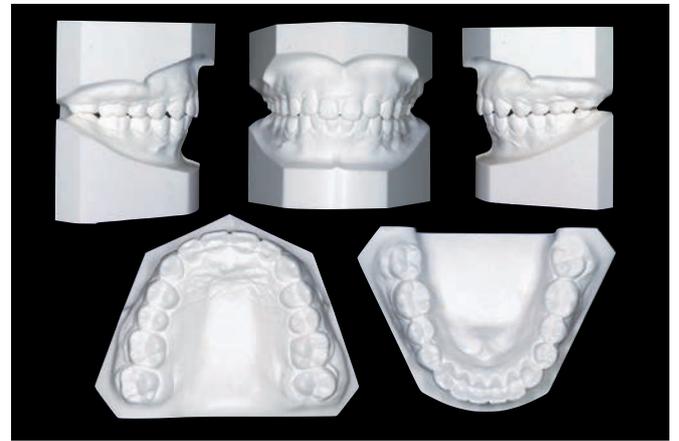
■ Fig. 2: Pre-treatment intraoral photographs



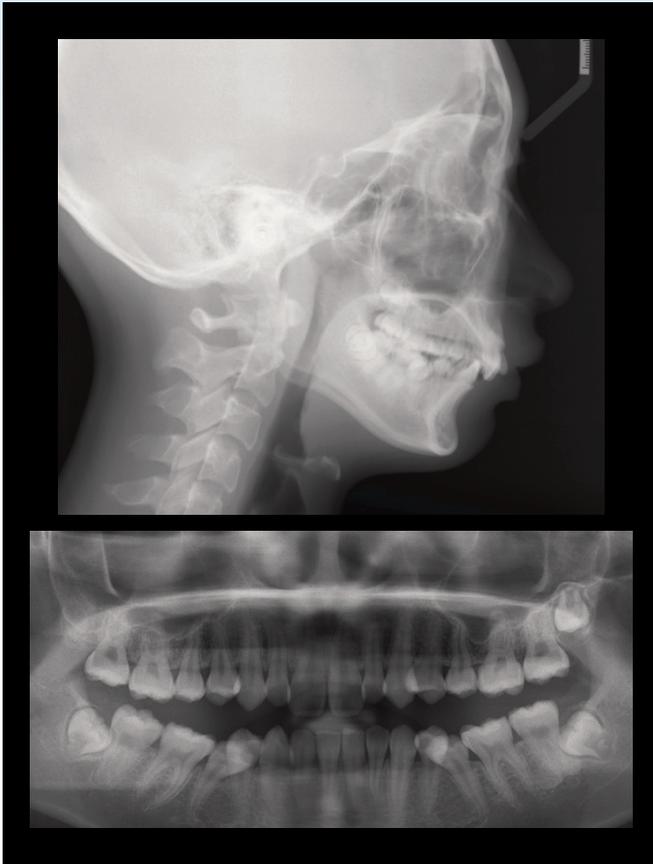
■ Fig. 5: Post-treatment intraoral photographs



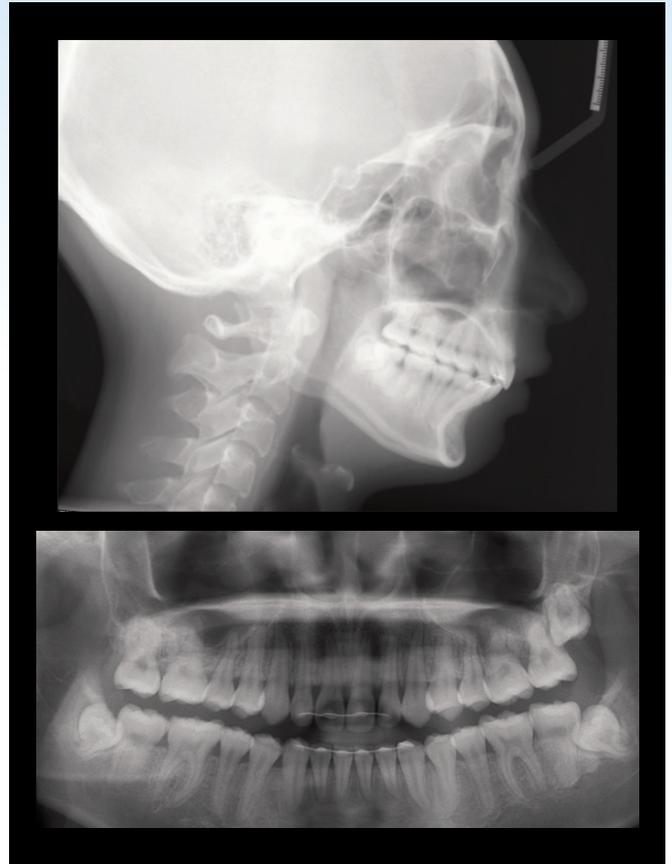
■ Fig. 3: Pre-treatment study models (casts)



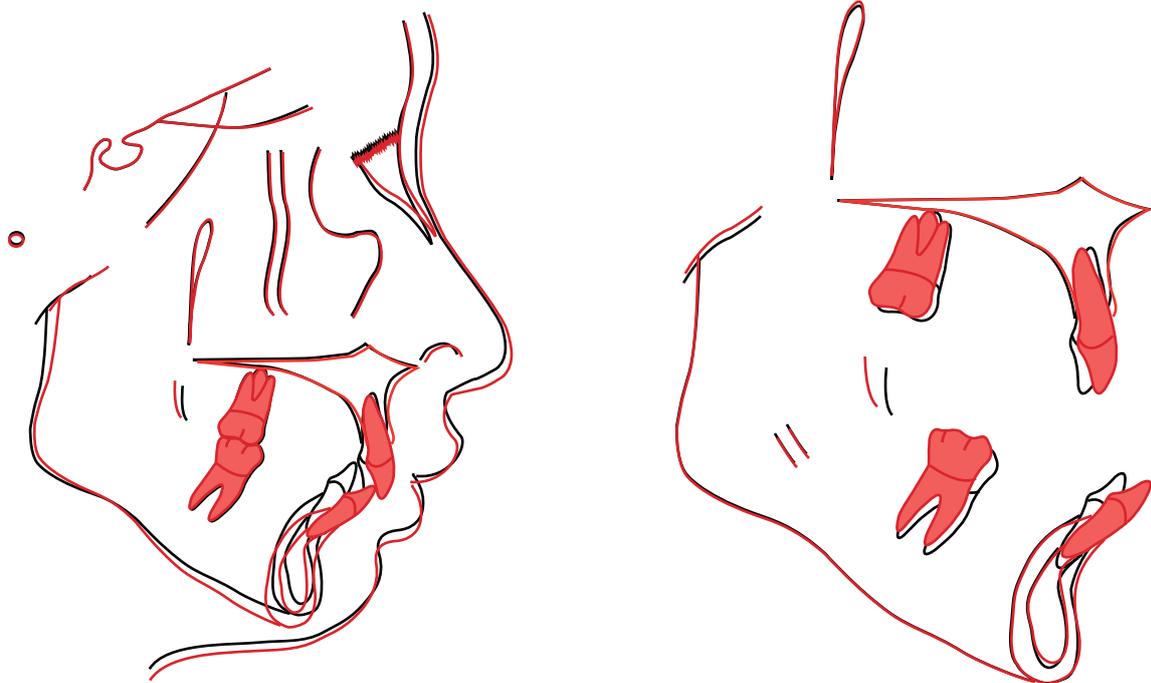
■ Fig. 6: Post-treatment study models (casts)



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



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



■ Fig. 9: Cephalometric tracings are superimposed on the anterior cranial base, maxilla and mandible.

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

Diagnosis

1. Angle Classification:

Class I molar relationship
(due to lingually blocked-in of 2nd premolars)

2. Tooth Size Arch Length Discrepancy:

Maxillary: 6 mm,

Mandibular: 10 mm

3. Crossbite:

Bilateral lingual crossbite of mandibular second premolars

4. Facial:

Gummy smile, convex profile, and mandibular retrusion

5. Radiographic\Cephalometric:

a. Skeletal: Class II (SNA 84°, SNB 75°, ANB 9°);
increased mandibular plane angle (SN-MP 34°)

b. Dental: 100% overbite; lingually tipped upper central incisors

6. Radiographic\Panoramic:

Three impacted 3rd molars (UL, LL, LR)

As shown in the subsequent worksheet, the American Board of Discrepancy Index (DI) was 37.

Specific Objectives of Treatment

Maxilla (all three planes):

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

Mandible (all three planes):

- A - P: *Maintain*
- Vertical: *Maintain if possible, but posterior rotation is likely with efficient mechanics for treatment in < 36 mo.*
- Transverse: *Maintain*

Maxillary Dentition

- A - P:
 - a. Molars: *Retract*
 - b. Incisors: *Tip labially*
- Vertical: *Maintain*
 - a. Molars: *Maintain*
 - b. Incisors: *Intrude*
- Inter-molar Width: *Increase*
- Inter-canine Width: *Maintain*
- Buccolingual Inclination: *Maintain*

Mandibular Dentition

- A - P:
 - a. Molars: *Retract*
 - b. Incisors: *Maintain*
- Vertical:
 - a. Molars: *Extrude*
 - b. Incisors: *Intrude*
- Inter-molar Width: *Increase*
- Inter-canine Width: *Maintain*
- Buccolingual Inclination: *Maintain*

Facial Esthetics:

- Correct relatively protrusive upper lip, maintain lip competence

Other:

- Correct the gummy smile by improving upper incisor alignment; consider follow-up gingivectomy if needed

Treatment Plan

Smooth the facial surface of upper left central incisor before bonding. Bond both arches with a full fixed appliance. Place upper anterior bite turbos on the lingual surface of both central incisors and correct the deepbite with extrusion of the other teeth in the arch. Place early light short elastics (2 oz) to correct Class II buccal segments. Treat the lingual crossbite of the lower 2nd premolars with cross elastics (3.5 oz). Place miniscrews in the infrazygomatic crests bilaterally, to retract the upper posterior segments to attain Class I buccal segments. Apply Class II and posterior vertical elastics as needed. Detail the final occlusion and remove all fixed appliances. Retain the corrected dentition with upper 2-2 and lower 3-3 fixed retainers plus a clear overlay retainer for the maxillary arch. Extraction of all 3rd molars is recommended.

Appliances and Treatment Progress

A .022" slot Damon Clear bracket system (Ormco, Glendora, CA) was selected. The maxillary arch was bonded with standard torque brackets except for high torque brackets on the canines. The upper arch was fitted with a .014" CuNiTi archwire (Fig.



■ **Fig. 10:**

The maxillary arch was bonded with Damon Q Clear with standard torque brackets on the incisors and high torque brackets on the canines. A .013" CuNiTi archwire was inserted.

10), followed by the sequence for .018" CuNiTi, rectangular .014x.025" CuNiTi, .017x.025" TMA, and .019x.025" pre-torqued CuNiTi.

One month later, the lower arch was bonded with low torque brackets and an .014" CuNiTi archwire was placed. The subsequent archwire sequence was .018" CuNiTi, rectangular .014x.025" CuNiTi, and .017x.025" TMA for detailing. In order to open space for the lower 2nd premolars, open coil springs were applied bilaterally between the 1st premolars and 1st molars (Fig. 11). Drop in hooks were inserted into the brackets of the upper 1st premolars. The patient was instructed to wear Class II early light short elastics (Parrot 5/16, 2 oz) bilaterally full time. The elastics extended from the upper 1st premolar to the lower 1st molar bilaterally to retract the upper anterior teeth and reduce the overjet (Fig. 12). Anterior bite turbos were bonded on both upper central incisors to help correct the deep bite (Fig. 13).

After 8th months of initial alignment and leveling in



Fig. 11:
Open coil springs were applied bilaterally between the 1st premolars and 1st molars to open the space for the 2nd premolars.



Fig. 12:
Class II elastics (Parrot 5/16, 2 oz) were used to reduce the overjet.



Fig. 13:
After the initial alignment of the maxillary arc, anterior bite turbos were bonded on both upper central incisors to correct the deep bite.

both arches, 2x12 mm stainless steel mini-screws (OrthoBoneScrew®, Newton's A Ltd., Hsinchu, Taiwan) were inserted in the infrazygomatic crests bilaterally. Elastometric chains from the bone screws to the upper canines were used to retract the maxillary anterior segment (Fig. 14).

One year after the initiation of treatment, spaces between the 1st premolars and 1st molars was created with open coil springs, and brackets were bonded on the lower 2nd premolars (Fig. 15). Since



Fig. 14:
OrthoBoneScrew® mini-screws were implanted bilaterally in the infrazygomatic crests as anchorage to retract the maxillary dentition.



Fig. 15:
The 2nd premolar brackets were bonded once adequate space was obtained. A lingual button was bonded on the lower right 2nd premolar.

the lower right 2nd premolar was still tilted lingually, a lingual button was bonded on it. A cross elastic (*Chipmunk 1/8, 3.5 oz*) was applied from upper 2nd premolar to lower 2nd premolar to correct the buccal crossbite (*Fig. 16*).

In the 22nd month, a maxillary .019x.025" pre-torqued archwire was inserted to apply lingual root torque to the anterior segment (*Fig. 17*). A progress panoramic radiograph was taken to evaluate axial inclinations

(*Fig. 18*). Brackets were repositioned to achieve the desired outcome.

One month before removing all fixed appliances, the upper archwire was sectioned distal to the canines, and continuous vertical elastics (*Ostrich 3/4, 2 oz*) were utilized to settle the occlusion (*Fig. 19*).⁵ Once an optimal finished occlusion was achieved, all fixed appliances were removed. The total active treatment time was 32 months.

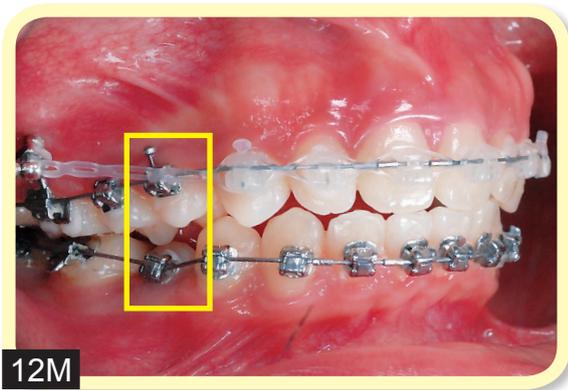


Fig. 16:
A cross elastic (*Chipmunk 1/8, 3.5 oz*) was applied from the upper 2nd premolar to the lower 2nd premolar to correct the buccal crossbite.

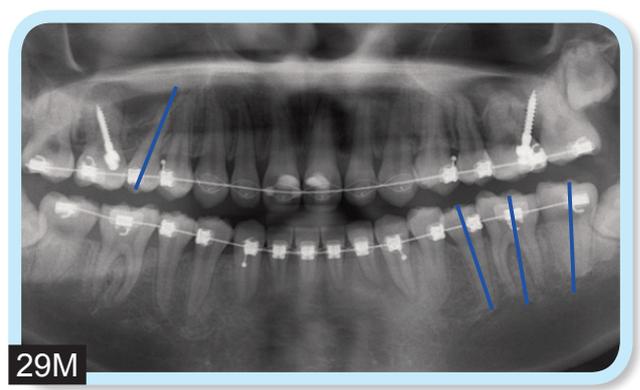


Fig. 18:
A progress panoramic radiography was taken to evaluate axial inclinations: brackets were repositioned on teeth marked with blue lines.



Fig. 17:
An .019x.025" maxillary pre-torqued archwire was used to apply lingual root torque in the anterior segment.



Fig. 19:
To settle the posterior occlusion, the upper archwire was sectioned distal to the canine, continuous intermaxillary elastics (*Ostrich 3/4, 2 oz*) were prescribed.

Results Achieved

Maxilla (all three planes):

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

Mandible (all three planes):

- A - P: *Retracted*
- Vertical: *Increased with a clockwise rotation of the mandible*
- Transverse: *Maintained*

Maxillary Dentition

- A - P:
 - a. Molars: *Retracted*
 - b. Incisors: *Tipped labially*
- Vertical:
 - a. Molars: *Maintained*
 - b. Incisors: *Maintained*
- Inter-molar Width: *Expanded*
- Inter-canine Width: *Maintained*
- Buccolingual Inclination: *Maintained*

Mandibular Dentition

- A - P:
 - a. Molars: *Retracted*
 - b. Incisors: *Tipped labially (109° to mandibular plane)*
- Vertical:
 - a. Molars: *Maintained*

b. Incisors: *Maintained*

- Inter-molar Width: *Expanded*
- Inter-canine Width: *Maintained*
- Buccolingual Inclination: *Uprighted*

Facial Esthetics:

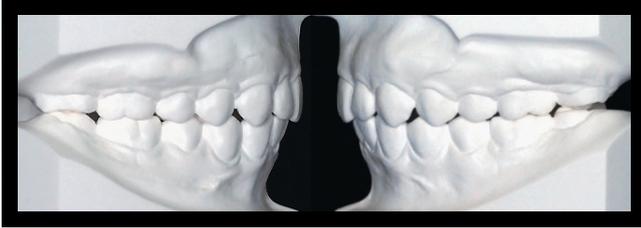
- Lip profile retracted, despite posterior mandibular rotation, facial convexity was unchanged

Retention

Fixed retainers were bonded to each tooth in the upper 2-2 and lower 3-3 areas. Upper and lower clear overlay retainers were delivered with instructions to wear them full time for the first 6 months and nights only thereafter. Home hygiene and retainer care instructions were provided.

Final Evaluation of Treatment

The ABO Cast-Radiograph Evaluation (CRE) score was 22 points, which indicated an optimal dental alignment for this challenging malocclusion. The large overjet and deep bite were corrected, but significant discrepancies were noted for occlusal relationships (Fig. 20) and alignment of second molars (Fig. 21). The dental esthetics were good as documented by the IBOI Pink & White Esthetic score of 3. However, there were minor deficiencies in maxillary midline papilla, incisal curvature (*smile arc*) axial inclination of incisors. Overall, the lingually tipped upper central incisors and the flared lateral incisors were well aligned, considering the skeletal



■ **Fig. 20:**
The occlusal relationships for canines and premolars were still slightly Class II on the finish casts.



■ **Fig. 21:** The second molars were not well aligned.

limitations (ANB 9°). Improved axial inclination of the maxillary incisors resulted in less gingival exposure when smiling: gingivectomy was not necessary (Fig. 22).

The 4° posterior rotation of the mandible did not compromise the facial profile, but it did require excessive inclination of the lower incisor to correct the overjet. However, the treatment was considered optimal for this difficult malocclusion (DI 37) because the excellent dental result (CRE 22), treatment was completed in 32 months, and an acceptable facial result was achieved. Attempting to avoid



■ **Fig. 22:**
The excessive gingival display when smiling was improved and the patient is satisfied with her smile.

the increase in the vertical dimension of occlusion would probably increase the treatment time and result in an inferior overall outcome.¹⁻³

Discussion

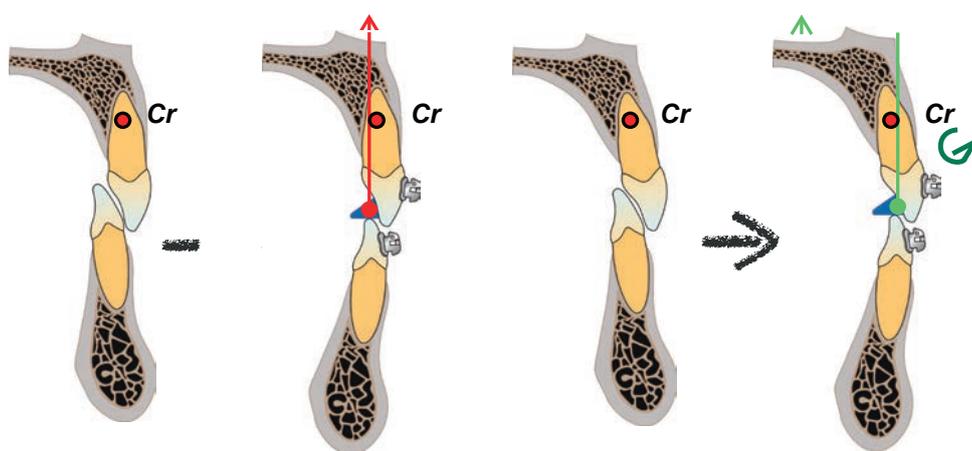
The Class II/2 pattern of malocclusion exhibits complex characteristics such as severe anterior crowding, with retroclined maxillary central incisors/lateral incisors and flared maxillary lateral incisors/canines, deep overbite, and retrusive mandibular or short lower anterior face height.⁶ Class II/2 malocclusion is relatively rare in the Chinese population, with an incidence of 0.5%-5%,⁷ but it is a very challenging to treat and has a high risk of relapse.⁸ Treatment for Class II/2 requires careful diagnosis and a treatment plan involving esthetics, occlusion, and function. It is critical to analyze patient's facial profile, skeletal pattern, and severity of dental malocclusion carefully in the treatment plan as well.⁹ The objective of treatment for Class II/2 usually involves correcting the intrusion of the

upper incisors and deep overbite and achieving a satisfactory skeletal, dental, and soft tissue relationship.¹⁰ Depending on the patient's age and growth potential, there are several options for treating this Class II/2 malocclusion, e.g., fixed and functional appliances, headgears, and orthognathic surgery. However, it is important to choose an efficient option to complete the correction in <36 months to avoid compromises associated with extended treatment times.¹⁻³

The present patient preferred nonsurgical orthodontic treatment to minimize the risk of facial compromise. Extraction treatment for Class II/2 has a tendency to flatten the facial profile and deepen the bite.¹¹ Pitts¹² suggests: "Only extract for the face, not for the space!" The patient's pre-treatment cephalometric radiograph (Fig. 7) showed a slightly protruded profile for both lips due to the flaring of the upper lateral incisors and fairly narrow arches. A non-extraction treatment plan was indicated and the Damon self-ligating system was selected.

Using Damon self-ligating brackets and NiTi archwires, the variable torque control brackets allow the roots of the teeth to begin to upright during the leveling phase. With variable torque brackets, the upper anterior teeth are readily leveled and aligned.¹³ This preliminary alignment provided space for the lower segment to be bonded (Fig. 12). At the same appointment, anterior bite turbos were placed on the upper central incisors (Fig. 13).

Anterior bite turbos are excellent tools for the correction of deep bite if opening the bite and posterior mandibular rotation are acceptable mechanics. They are easy to use and decrease the treatment time for many patients. However, for lingually tipped upper central incisors, the line of occlusal force may be lingual to the center of resistance (CR) which can result in more lingual tipping. Thavarungkul¹⁴ suggests bonding the anterior bite turbos after both central incisors have been proclined slightly. This allows the force vector to pass in anterior of CR in order to correct the deep bite (Fig. 23).



■ Fig. 23:

Left: If anterior bite turbos are applied before the initial alignment of the incisors, the line of occlusal force may be distal to the center of resistance (CR) resulting in more lingual tipping.

Right: After some labial movement of the maxillary central incisor crowns, the line of force (green) is labial to CR which is a preferable force system. (Diagram Courtesy of Dr. Rungsi Thavarungkul)¹⁴

In addition, early light elastics also play an important role in correcting deep bite and aligning the anterior teeth. Using early light short elastics has the advantage of controlling the vertical dimension without decreasing the smile arch and sagittal correction in the early stage of treatment for deep bite. The light force reduces the side effects of the horizontal component of force which can produce unnecessary tipping of the teeth. Pitts¹⁵ also suggests, “keeping the elastics distal” to facilitate posterior extrusion for the deep bite case. For the present patient, anterior bite turbos and Class II elastics resolved the overjet problem, but extruded the mandibular molars, which increased the mandibular plane angle due to posterior rotation of the mandible. However, this skeletal compromise was indicated to meet the patient’s objectives and control the duration of treatment. Extended treatment times for difficult malocclusions often result in inferior results.¹⁻³

For Class II/2 malocclusion, anchorage control is one of the most difficult problems. En masse movement of the anterior segment and improvement in the facial profile can be accomplished with E-A miniscrew anchorage.¹⁶ Miniscrew anchorage is an effective tool for improving maxillary incisor inclination consistent with a proper molar relationship.¹⁷⁻¹⁹ It is also a minimally intrusive method that reduces treatment time and simplifies mechanics for managing dentoalveolar protrusion.²⁰ Studies have shown miniscrew anchorage or headgear can achieve acceptable results for the retraction of incisors. However, with miniscrew anchorage, it does not require patient cooperation

CEPHALOMETRIC			
SKELETAL ANALYSIS			
	PRE-Tx	POST-Tx	DIFF.
SNA°	84°	84°	0°
SNB°	75°	75°	0°
ANB°	9°	9°	0°
SN-MP°	34°	38°	4°
FMA°	30°	34°	4°
DENTAL ANALYSIS			
U1 TO NA mm	-3 mm	-1 mm	2 mm
U1 TO SN°	84°	103°	19°
L1 TO NB mm	4 mm	7 mm	3 mm
L1 TO MP°	95°	109°	14°
FACIAL ANALYSIS			
E-LINE UL	2 mm	0 mm	2 mm
E-LINE LL	1 mm	1 mm	0 mm

■ Table 1: Cephalometric summary

and minimal pain is associated.²¹⁻²² E-A miniscrew can improve the facial profile of Class II/2 patients without wearing an inconvenient and embarrassing headgear device.

Conclusion

Skeletal Class II/2 with a deep bite and severe crowding is a challenging malocclusion that may require facial compromise to attain an optimal result in minimal treatment time. Infrazygomatic crest miniscrew anchorage is effective for retracting the maxillary arch. Moreover, anterior bite turbos are effective appliances for resolving deep bite, but they increase the vertical dimension of occlusion, which increases overjet and the mandibular plane.

Combined miniscrew anchorage and anterior bite turbos are an efficient option for treating Class II/2, but judicious application of the mechanics and management of side effects are required.

References

- Campbell CL, Roberts WE, Hartsfield JK Jr, Qi R. Treatment outcomes in a graduate orthodontics clinic for cases defined by the American Board of Orthodontics malocclusion categories. *Am J Orthod Dentofacial Orthop* 2007;132:822-829.
- Knierim K, Roberts WE, Hartsfield JK Jr. Assessing treatment outcomes for a graduate orthodontics program: Follow-up study for the classes of 2001-2003. *Am J Orthod Dentofacial Orthop* 2006;130:648-655.
- Pinskaya YB, Hsieh T-J, Roberts WE, Hartsfield JK Jr. Comprehensive clinical evaluation as an outcome assessment for a graduate orthodontics program. *Am J Orthod Dentofacial Orthop* 2004;126:533-543.
- Hartsfield JK. Genetics and orthodontics. Chapter 3 in *Orthodontics: Current principles & techniques*, Graber TM, Vanarsdall RL Jr, Vig KWL, Elsevier Mosby, St. Louis, 2005, pp 105-115.
- Steffen JM, Haltom FT. The five-cent tooth positioner. *J Clin Ortho* 1987 Aug;21(8):528-9.
- Garlapati Y, Jadav CL, Kolasani SR, Mummidi B. Management of severe class II division II malocclusion using simplified MPA – A case report. *APOS Trends Orthod* 2013;3:89-93.
- Lin JJ. Prevalence of malocclusion in Chinese children age 9-15. *Taiwan Clin Dent* 1985;5:57-65.
- Canut JA, Arias S. A long-term evaluation of treated Class II division 2 malocclusions: a retrospective study model analysis. *European Journal of Orthodontics* 1999;21:377-386.
- Flavio U, Ravindra N. Treatment of Class II, Division 2 Malocclusion in Adults: Biomechanical Considerations. *Journal of Clinic Orthodontics* 2003;37(11):599-606.
- Chen YJ, Yao CC, Chang JF. Nonsurgical correction of skeletal deep overbite and class II division 2 malocclusion in an adult patient. *Am J Orthod & Dentofacial Orthop* 2004 Sep;126(3):371-8.
- Lee TH. Cephalometric predictor variables for treatment of Class II Division 2 malocclusions. *J Dent Sci* 2006;1(1):16-22.
- Pitts T. The Secrets of Excellent Finishing. *News & Trends in Orthod* 2009 Apr.1;14:6-23.
- Kozlowski J. Honing Damon System Mechanics for the Ultimate in Efficiency and Excellence. *Clinical Impression* 2013;19(1):23-8
- Thavarungkul R. Correcting Deep-bite with Fixed Bite Ramps. *News & Trends in Orthod* 2009 Oct. 1;16:68-71.
- Chang CH. Advanced Damon Course No. 7: Deep bite correction. *Beethoven Podcast Encyclopedia in Orthodontics*. Hsinchu: Newton's A Ltd; 2011.
- Chang CH. Damon Q Course No. 3-2: Class II Mechanics. *Beethoven Podcast Encyclopedia in Orthodontics*. Hsinchu: Newton's A Ltd; 2011.
- Chang CH, Roberts WE. Stability of Mini-screws on Buccal Shelves: A Retrospective Study of 1680 Mini-screw Insertions by the Same Orthodontist. *Int J Orthod Implantol* 2013;30:76-78.
- Chang CH, Roberts WE. A Retrospective Study of the Extra-alveolar Screw Placement on Buccal Shelves. *Int J Orthod Implantol* 2013;32:80-89.
- Park HS, Kwon OW, Sung JH. Microscrew implant anchorage sliding mechanics. *World Journal of Orthodontics* 2005;6(3):265-274.
- Kuroda S, Yamada K, Deguchi T, Kyung HM, Yamamoto TT. Class II malocclusion treated with miniscrew anchorage: Comparison with traditional orthodontic mechanics outcomes. *Am J Orthod & Dentofacial Orthopedics* 2009 Mar;135(3):302-309.
- Chang CH. Advanced Damon Course No. 4,5 : DI & CRE Workshop (1)(2). *BeethovenPodcast Encyclopedia in Orthodontics*. Hsinchu: Newton's A Ltd; 2011.
- Chang CH, Roberts WE. *Orthodontics, 3D i-Ortho encyclopedia*. Hsinchu: Newton's A Ltd; 2012.



Discrepancy Index Worksheet

TOTAL D.I. SCORE 37

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 = 5

ANTERIOR OPEN BITE

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

Total = 0

LATERAL OPEN BITE

2 pts. per mm. per tooth

Total = 0

CROWDING (only one arch)

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

Total = 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. _____ pts.
additional

Total = 0

LINGUAL POSTERIOR X-BITE

1 pt. per tooth Total = 0

BUCCAL POSTERIOR X-BITE

2 pts. per tooth Total = 4

CEPHALOMETRICS (See Instructions)

ANB $\geq 6^\circ$ or $\leq -2^\circ$ = 4 pts.

Each degree $< -2^\circ$ _____ x 1 pt. = _____

Each degree $> 6^\circ$ 3 x 1 pt. = 3

SN-MP

$\geq 38^\circ$ = 2 pts.

Each degree $> 38^\circ$ _____ x 2 pts. = _____

$\leq 26^\circ$ = 1 pt.

Each degree $< 26^\circ$ _____ x 1 pt. = _____

1 to MP $\geq 99^\circ$ = 1 pt.

Each degree $> 99^\circ$ _____ x 1 pt. = _____

Total = 7

OTHER (See Instructions)

- Supernumerary teeth _____ x 1 pt. = _____
- Ankylosis of perm. teeth _____ x 2 pts. = _____
- Anomalous morphology 1 x 2 pts. = 2
- Impaction (except 3rd molars) _____ x 2 pts. = _____
- Midline discrepancy (≥ 3 mm) @ 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 ≥ 2 mm) @ 2 pts. = _____
- Tooth transposition _____ x 2 pts. = _____
- Skeletal asymmetry (nonsurgical tx) @ 3 pts. = _____
- Addl. treatment complexities 4 x 2 pts. = 8

- Identify:
1. Irregular facial surface was found on the upper left central incisor.
 2. Molar relationship was supposed to be full Class II on both side but the mandibular 1st molars mesially shifted due to the mandibular 2nd premolars were lingual blocked-in.

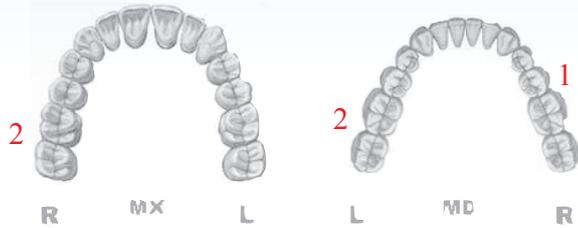
Total = 10

Cast-Radiograph Evaluation

Total Score: **22**

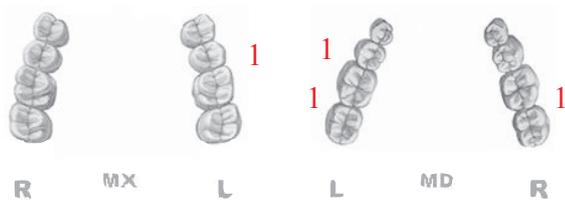
Alignment/Rotations

5



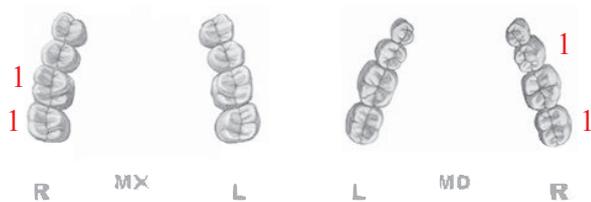
Marginal Ridges

4



Buccolingual Inclination

4



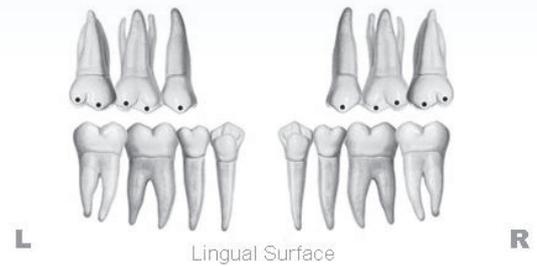
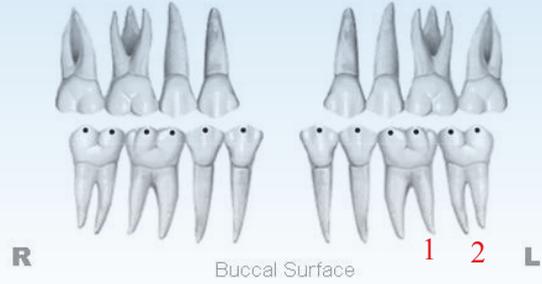
Overjet

0



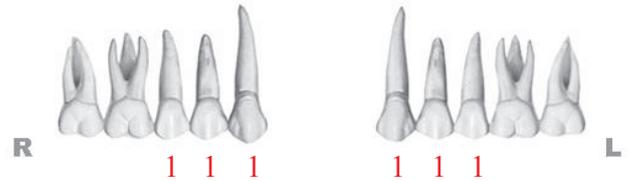
Occlusal Contacts

3



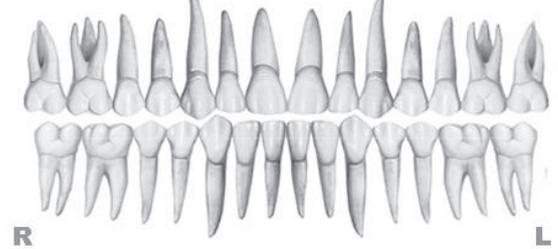
Occlusal Relationships

6



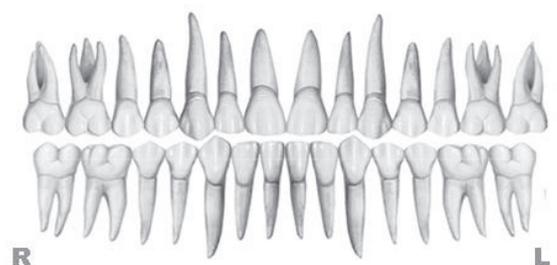
Interproximal Contacts

0



Root Angulation

0

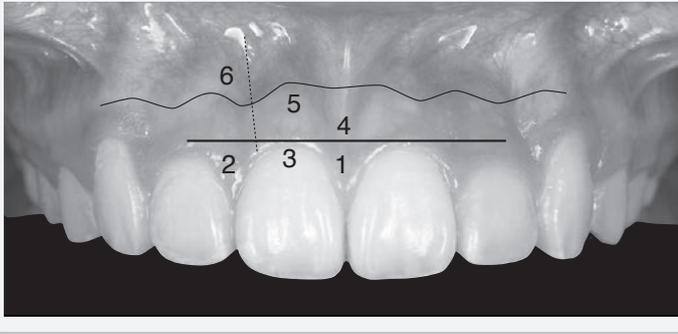


INSTRUCTIONS: Place score beside each deficient tooth and enter total score for each parameter in the white box. Mark extracted teeth with "X". Second molars should be in occlusion.

IBOI Pink & White Esthetic Score

Total Score: = 3

1. Pink Esthetic Score

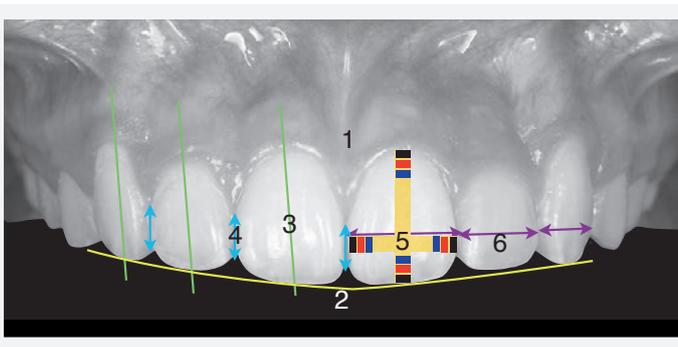


Total = 1

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

1. M & D 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

貝多芬矯正中心 2014 見習獎學金辦法

目的：

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

實習目標：

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

聯絡人：朱央如

聯絡地址：新竹市建中一路25號2樓

聯絡方式：03-573-5676

電子郵件：course@newtonsa.com.tw

- ★ 甄選對象：全台灣牙醫系四升五年級學生
- ★ 名額：每校3-5名
- ★ 獎助內容：三天二夜五星級飯店住宿以及見習期間餐飲費補助。
- ★ 遴選方式：學期成績在全班前30%或成績平均在75分以上，且對牙科實務展現積極學習的態度。
- ★ 見習時間：103年7月24日(四)-7月26日(六)
- ★ 申請截止日期：103年6月30日，以郵戳為憑。
- ★ 檢覆文件：
 1. 該學年成績單影本一份
 2. 自傳：基本資料（姓名、性別、手機、市話、email、住址）、學習經歷、申請目的
 3. 其他有利申請之文件

郵寄到：新竹市建中一路25號2樓朱小姐收。

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。

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。」



高雄醫學大學 許丹音



台北醫學大學 葉家宇

參觀完貝多芬三天兩夜的見習獎學金行程後，收穫甚豐。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。

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。讓我印象最深刻的就是吳寶春師傅的那一股毅力和耐心，正好和當天下午的演講內容有著最適切不過的呼應，3P Passion、Practice and Persistence，「Practice makes perfect」。熟能生巧，精益求精；在張醫師身上，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，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。

Non-extraction Treatment of Impinging Overbite with Severe Crowding and a Straight Profile

Abstract

Non-extraction treatment is a challenging option for adults with severe crowding and a straight profile, particularly when complicated with an impinging deep overbite, and lingually inclined incisors in both arches. This multifactorial malocclusion with a Discrepancy Index (DI) of 14, was initiated treated with relatively simple mechanics: anterior and posterior bite turbos with early light and short Class II elastics (2 oz). Subsequently, lip protrusion was controlled with extra-alveolar (E-A) anchorage by retracting both arches with miniscrews placed in the infrazygomatic crests and mandibular buccal shelves. Progress records were assessed at 19 months to plan the final stage of active treatment. Bite turbos, intermaxillary elastics, and E-A skeletal anchorage resulted in an excellent correction in 23 months, as documented by a Cast Radiograph Evaluation (CRE) of 19 as well as a Pink & White (P&W) dental esthetic score of 3. (Int J Ortho Implantol 2014;35:80-100)

Key words:

Deep bite, palatal impingement, crowding, extra-alveolar miniscrews, osseous anchorage, whole arch distalization, infrazygomatic crests, buccal shelves

History and Etiology

A 32-year-and-8-month-old female was referred by her dentist for orthodontic consultation. The chief concerns were impinging overbite and crooked teeth. The patient was eager to have the problem corrected. Pre-treatment facial photographs (Fig. 1) showed a relatively straight profile with a retrusive lower lip. Intraoral photographs (Fig. 2) and study models (Fig. 3) revealed bilateral Class I molar relationship, 100% impinging deep overbite with retro-inclined upper and lower incisors, severe crowding, and a square arch form. Mild periodontitis was noted in the maxillary anterior region.

The etiology of the malocclusion was inadequate development of arch width to accommodate the adult dentition. This is a common problem in developed countries because children tend to eat

a refined diet that does not require sufficient biting strength to fully develop the jaws in width.¹ Since the patient maintained lip competence during the mixed dentition phase, the incisors were tipped lingually creating an impinging deep overbite. Furthermore the canines were blocked out because they are the last permanent teeth to erupt.

The cephalometric and panoramic radiographs document the pre-treatment condition (Fig. 7) and the post-treatment results (Fig. 8). The superimposed cephalometric tracings before and after treatment are shown in Fig. 9. The correction of this difficult malocclusion was facilitated by assessing progress records, which were collected about 4 months prior to the anticipated finish.

Dr. Shuang-An Lee,
Lecturer, Beethoven Orthodontic Course (Left)

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

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



Fig. 1: Pre-treatment facial photographs
A relatively straight profile with a retrusive lower lip



Fig. 4: Post-treatment facial photographs
Lower lip profile was slightly more protrusive, resulting in a more balanced profile



Fig. 2: Pre-treatment intraoral photographs



Fig. 5: Post-treatment intraoral photographs



Fig. 3: Pre-treatment study models (casts)
Intraoral photographs (Fig. 2) and study models (Fig. 3) revealed bilateral Class I molar relationship, 100% impinging deep overbite with retro-inclined upper and lower incisors, severe crowding, and a square arch form.

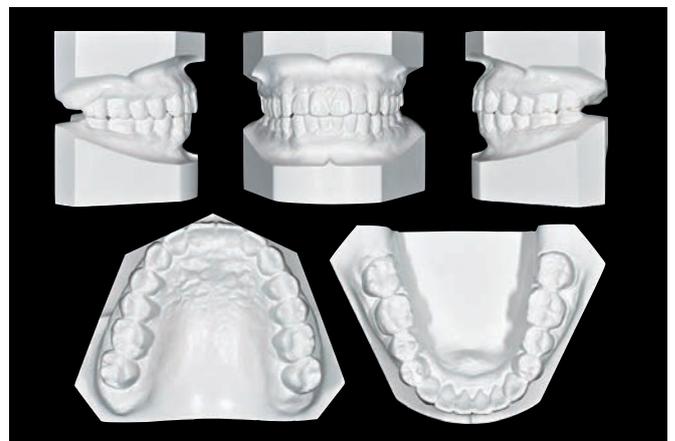
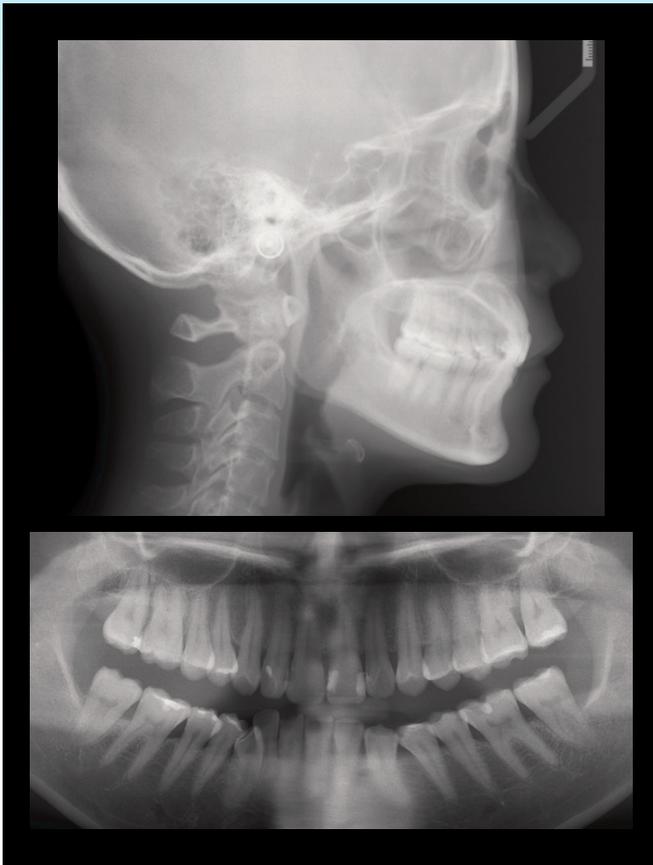
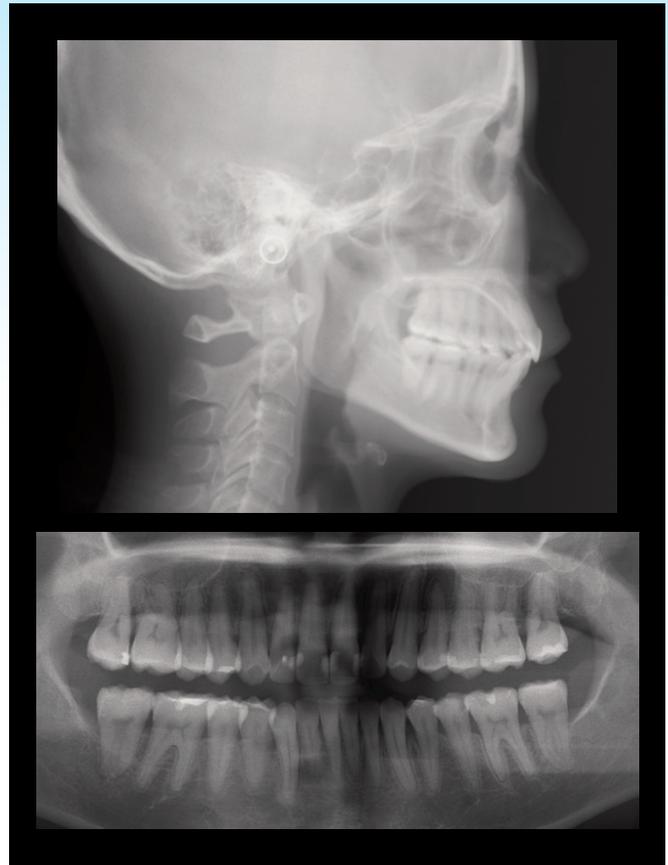


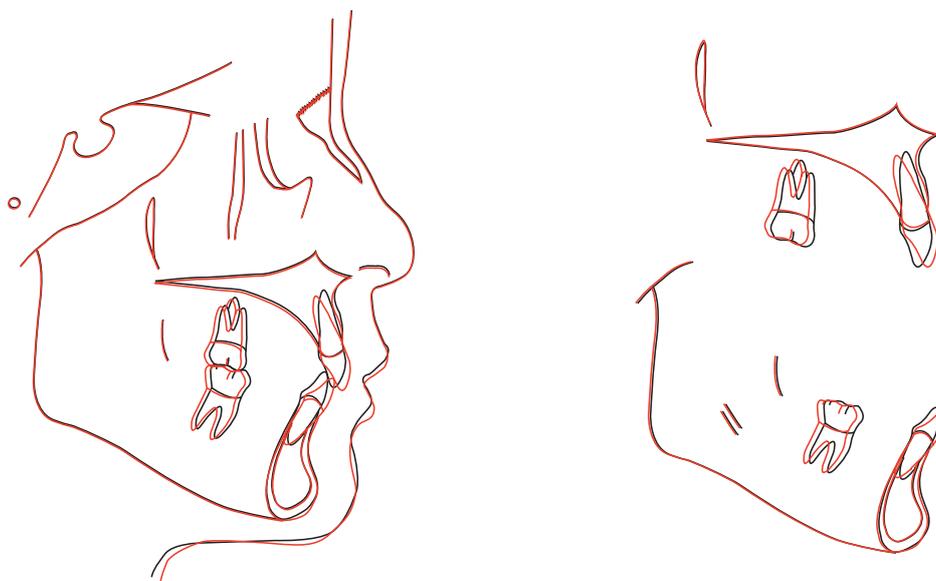
Fig. 6: Post-treatment study models (casts)
Post-treatment intraoral photograph (Fig. 5) and study model (Fig. 6) document the final alignment.



■ **Fig. 7:**
 Pre-treatment lateral cephalometric and panoramic radiographs. The panoramic film showed missing four third molars, mild alveolar bone loss. The lateral cephalometric radiograph showed skeletal Class II, normal mandibular plane angle, 100% deep impinging overbite, as well as retro-inclined upper and lower incisors.



■ **Fig. 8:**
 Post-treatment lateral cephalometric and panoramic radiographs. Both of them showed a harmonic arrangement of the teeth.



■ **Fig. 9:**
 Cephalometric tracings are superimposed on the anterior cranial base, maxilla and mandible: start is black and finish is red. Both upper and lower incisors had increased axial inclination of 9°. Both upper and lower molars were retracted. No skeletal change was found. Lower lip profile was slightly protrusive, resulting in a more balanced facial profile.

Diagnosis

1. Angle Classification: Bilateral Class I molar relationship
2. Tooth Size Arch Length Discrepancy:
 - Maxillary: 6 mm
 - Mandibular: 9 mm
3. Facial: Straight profile with a retrusive lower lip
4. Radiographic\Cephalometric
 - Skeletal: Class II pattern ($SNA\ 78^\circ$, $SNB\ 74^\circ$, $ANB\ 4^\circ$), normal mandibular plane angle ($SN-MP\ 33^\circ$)
 - Dental: 100% deep impinging overbite; retro-inclined upper and lower incisors (Fig. 10)
5. Radiographic\Panoramic: Mild alveolar bone loss
6. Radiographic\Other: Square arch form

The American Board of Orthodontics (ABO) Discrepancy Index (DI) was 14 as shown in the subsequent worksheet.²



■ Fig. 10:
Deep overbite: lingually tipped upper and lower incisors

Specific Objectives of Treatment

1. Maxilla (all three planes):
 - A - P: *Maintain*
 - Vertical: *Maintain*
 - Transverse: *Maintain*
2. Mandible (all three planes):
 - A - P: *Maintain*
 - Vertical: *Maintain*
 - Transverse: *Maintain*
3. Maxillary Dentition:
 - A - P
 - a. Molars: *Retract*
 - b. Incisors: *Increase axial inclination*
 - Vertical:
 - a. Molars: *Maintain*
 - b. Incisors: *Maintain*
 - Intermolar Width: *Increase*
 - Inter canine Width: *Decrease*
 - Buccolingual Inclination: *Maintain*
4. Mandibular Dentition:
 - A - P
 - a. Molars: *Maintain*
 - b. Incisors: *Slightly increase axial inclination*
 - Vertical:
 - a. Molars: *Retract*
 - b. Incisors: *Intrude*
 - Intermolar Width: *Slightly increase*
 - Inter canine Width: *Decrease*
 - Buccolingual Inclination: *Maintain*

5. Facial Esthetics: Maintain

6. Other: Periodontal maintenance every 3 months

Treatment Plan

Non-extraction treatment is recommended. Place posterior bite turbos to allow bonding of all teeth in both arches, and use light short Class II elastics (2 oz) during the initial alignment phase. Anterior bite turbos on both upper central incisors. Interproximal reduction of upper and lower dentition as needed. Extra-alveolar (E-A) miniscrew anchorage in all posterior segments to retract both arches. Pre-finish records about 6 months before the anticipated completion of active treatment to plan finishing details. Continue Class II elastics as needed and detail the final occlusion. Because the patient's high caries rate, use clear overlay retainers in both arches.

Appliances and Treatment Progress

An .022" slot Damon Q bracket system (Ormco Corporation, Glendora, CA) was used. The maxillary arch was bonded first and high torque brackets



■ Fig. 11: Abnormal wear pattern of the lower incisors.



■ Fig. 12:

At the start of treatment (0 months), high torque brackets were bonded on the maxillary anterior teeth and the initial archwire was .014" CuNiTi.

were utilized on the anterior teeth; the initial archwire was .014" CuNiTi (Fig. 12). After one month of initial leveling and alignment in the maxillary arch, posterior bite turbos on the lower first molars (teeth #19 and #30) were used to facilitate the bonding of the lower anterior teeth and to prevent extrusion of the posterior segments. Anterior bite turbos were bonded to the lingual surfaces of the upper central incisors. The lower arch was bonded and low torque brackets were used on the mandibular anterior teeth. The initial lower archwire was an .014" CuNiTi. Drop-in hooks were fitted in the vertical slots of the upper first premolars (teeth #5 and #12) to secure early light short elastics (2 oz shorty Class II elastics) from the teeth #5 to #30 and #12 to #19. (Fig. 13)

In the 3rd month, both posterior bite turbos were decreased in height to accommodate alignment of the arches (Fig. 14). After 5 months of active treatment, the upper archwire was changed to .014x.025" CuNiTi, and the anterior segment was ligated with a figure-eight tie with an 0.012" stainless steel (SS) ligature to maintain the firm contacts between the anterior teeth.



■ Fig. 13:

At 1 month, posterior bite turbos were placed on the mandibular first molars (teeth #19 and #30) to facilitate the bonding of the lower anterior teeth and to prevent extrusion of the posterior segments. The mandibular arch was bonded and low torque brackets were used on the mandibular anterior teeth. The initial lower arch was an .014"CuNiTi. Anterior bite turbos were bonded to the lingual surfaces of the upper central incisors. Drop-in hooks were fitted in the vertical slots of the upper first premolars (teeth #5 and #12) to secure early light short elastics (shorty Class II, 2 oz) used from teeth #5 to 30 and 12 to 19.



■ Fig. 14:

At 3 months, the height of the posterior bite turbos were decreased to accommodate alignment of the arches.



■ Fig. 15:

At 11 months, five months of progress is shown retracting both arches with E-A bone screws that were placed 6 months into treatment. The retraction force (2oz/side) was delivered with an elastomeric chain.

In the 6th month, the Class II elastics were stopped. Two power chains were used under the upper and lower archwires to consolidate anterior space (*teeth #6 to #11 and #22 to #27*). Four E-A bone screws (2x12 mm OrthoBoneScrew, Newton's A Ltd.) were inserted bilaterally into the upper infrazygomatic crests (IZC) and lower buccal shelves. Drop-in hooks were fitted in the vertical slot of the upper canines (*teeth #6 & #11*) to secure light power chains (2 oz) from the canines to the IZC miniscrews to retract the entire maxillary dentition. Additional light power chains (2 oz) were extended from the lower first premolars (*teeth #28 and #21*) to the head of the mandibular

shelf miniscrews to retract the entire mandibular dentition.

The lower archwire was changed to .016" CuNiTi in the 9th month and then to .018" CuNiTi in the 10th month. In the 11th month, the upper archwire was changed to .017x.025" low friction TMA, and an .014x.025" CuNiTi archwire was fitted for the lower arch (*Fig. 15*). Black triangles were noted between the anterior teeth, and interproximal stripping was performed in both the upper and lower arches (*Fig. 16*).



■ Fig. 16:

At 11 months, black triangles were reduced with interproximal stripping in both arches. The bracket on tooth #9 (circled) should be repositioned clockwise to fit root parallelism (green line).



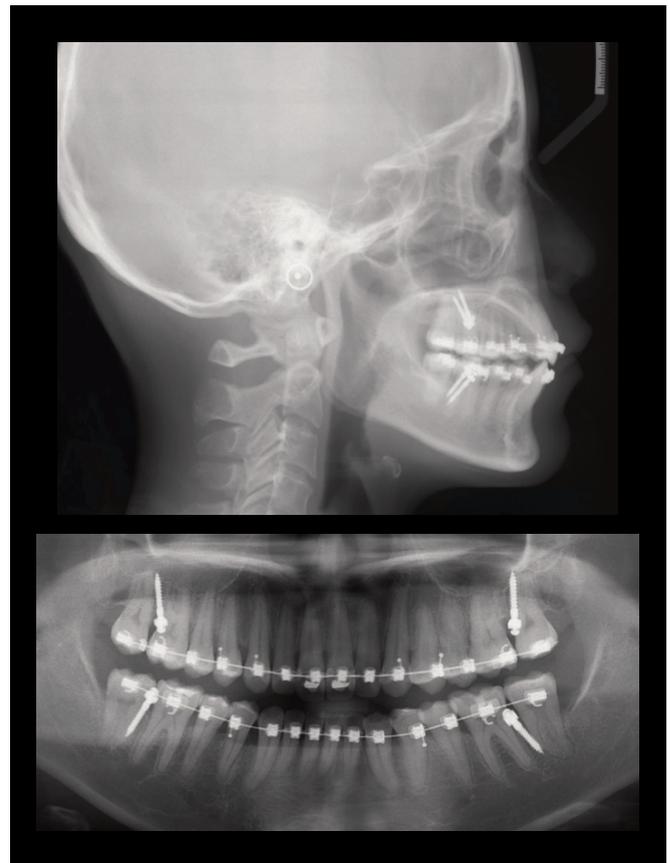
■ Fig. 17:
19 months:
interim-treatment facial and intraoral photographs.



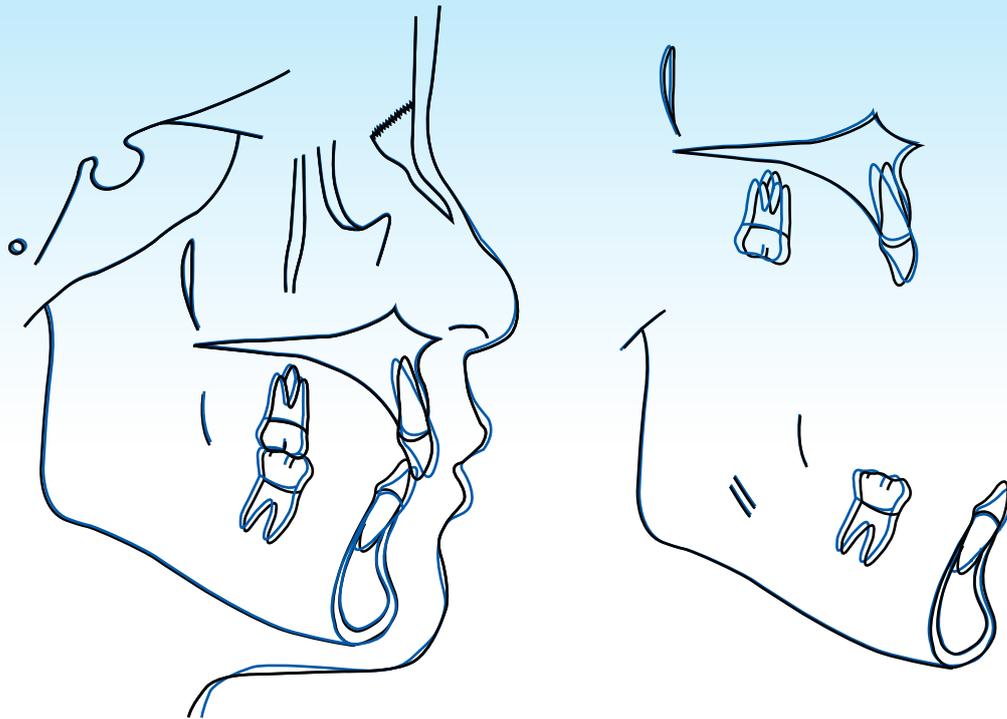
■ Fig. 18:
19 months: interim-treatment study models (casts). After 19 months of active treatment, interim-treatment progress records were collected. The problems detected were the basis for the detailing plan to achieve an optimal result.

In the 13th month, the lower archwire was changed to .017x.025" low friction TMA, with progression to .016x.025" SS in the 16th month. In the 17th month, the upper archwire was changed to .019x.025" SS.

After 19 months of active treatment, interim-treatment progress records were collected. The dental casts and radiographs were assessed with the ABO Cast-Radiograph Evaluation (CRE) which yielded a score of 37. The problems detected were the basis for the detailing plan to achieve an optimal result (Figs. 17-20).



■ Fig. 19:
19 months: interim-treatment cephalometric and panoramic radiographs



■ Fig. 20:

19 months: superimposed cephalometric tracings

Axial inclination of upper and lower incisors was increased from 85° to 95° and from 92° to 107° respectively. Both upper and lower molars were retracted. The upper and lower lip relationship to the facial esthetic plane increased from -1 to 1 mm and from -1.5 to 0.5 mm, which formed a more protrusive lip profile. No skeletal change was found.

Interim-Treatment Progress

1. Maxilla (all three planes):

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

2. Mandible (all three planes):

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

3. Maxillary Dentition:

- A-P
 - a. Molars: *Retracted*
 - b. Incisors: *Increased axial inclination*

- Vertical:
 - a. Molars: *Maintain*
 - b. Incisors: *Maintain*
- Intermolar Width: *Increase*
- Intercanine Width: *Decrease*
- Buccolingual Inclination: *Increased*

4. Mandibular Dentition:

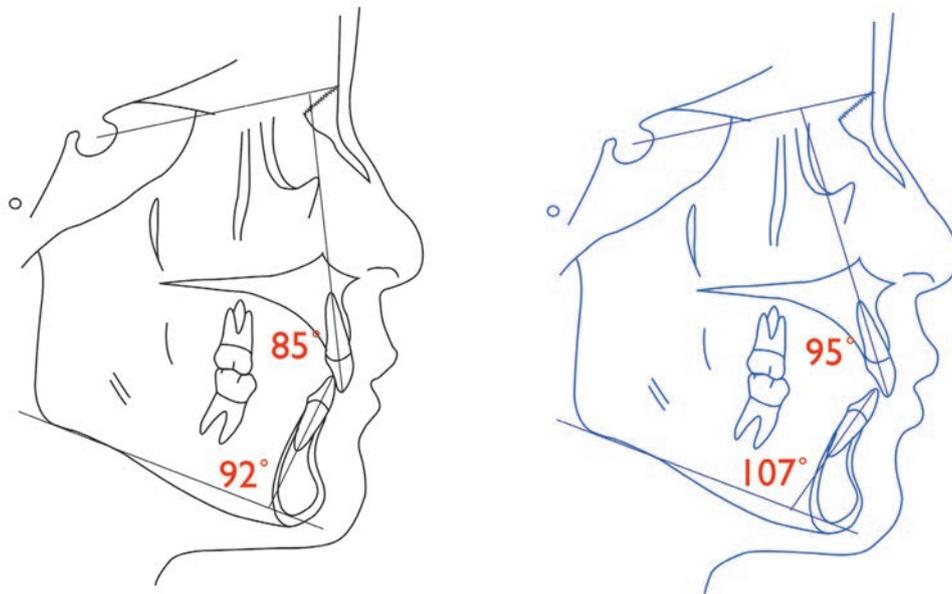
- A-P
 - a. Molars: *Retracted*
 - b. Incisors: *Increased axial inclination*
- Vertical:
 - a. Molars: *Maintain*
 - b. Incisors: *Intruded*
- Intermolar Width: *Increase*
- Intercanine Width: *Decrease*
- Buccolingual Inclination: *Maintain*

Finishing Treatment Plan

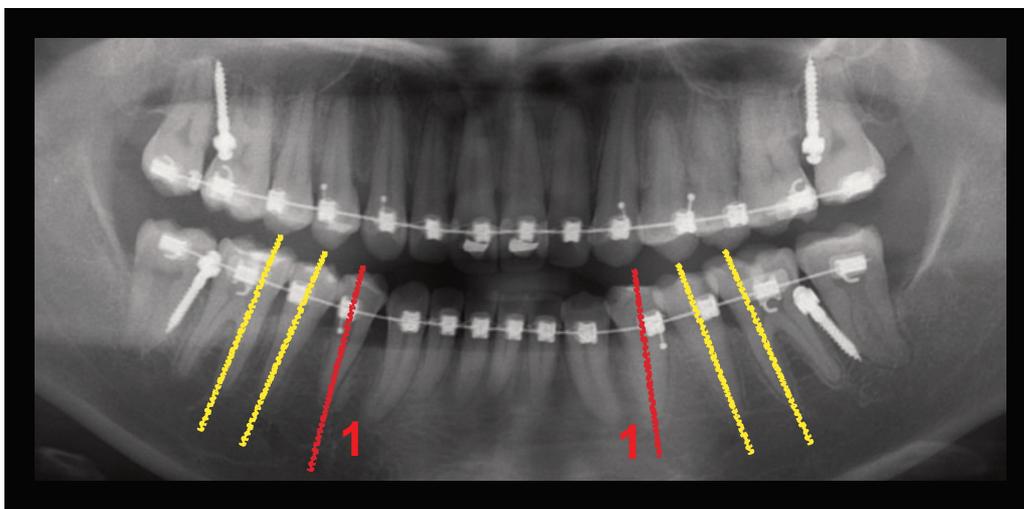
Axial inclination of the upper and lower incisors was increased from 85° to 95° and from 92° to 107° respectively (Fig. 21). The upper and lower lip relationship to the facial esthetic plane increased from -1 to 1 mm and from -1.5 to 0.5 mm. Additional retraction of both arches with E-A miniscrew anchorage was indicated to control incisor flaring and lip protrusion. Panoramic radiography was used to evaluate dental angulation in order to reposition

brackets (Fig. 22). Interproximal stripping in both arches was indicated to reduce black interdental spaces, consistent with optimal tooth proportion.

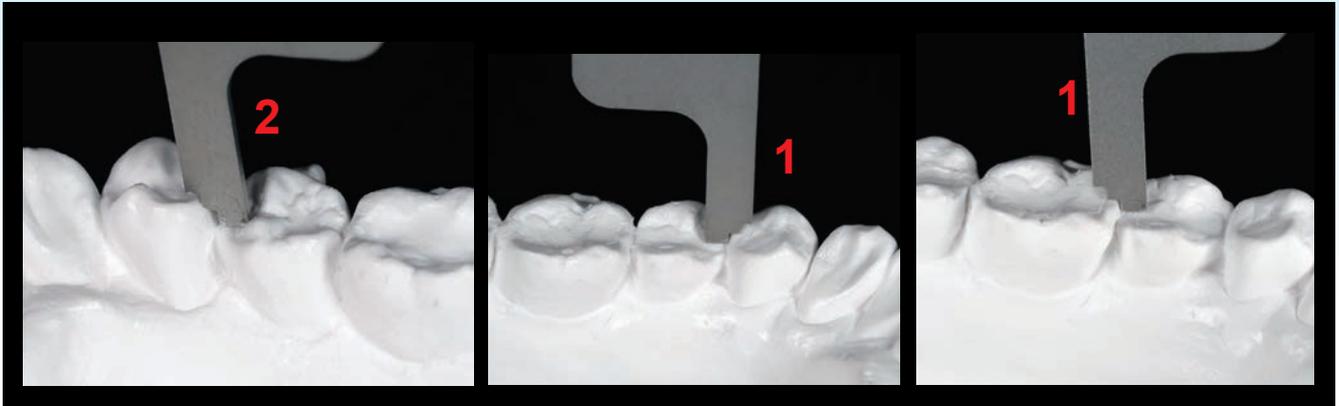
A progress CRE about six months before the anticipated debonding is a proven method for improving treatment quality.³ (Figs. 23-26). A detailed correction plan was generated based on the progress CRE score of 37:



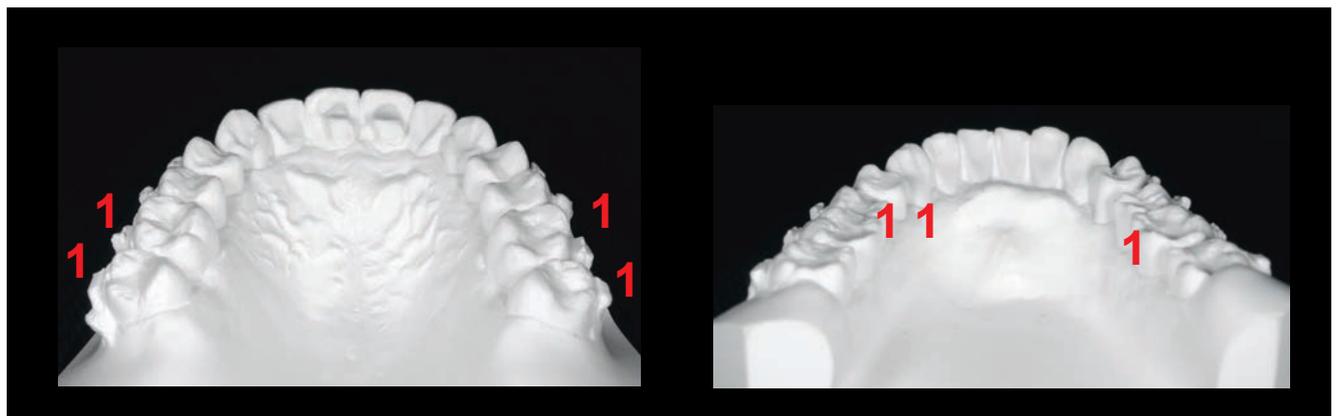
■ Fig. 21: At 19 months, incisal inclination was increased 10° in the upper arch and 15° in the lower arch.



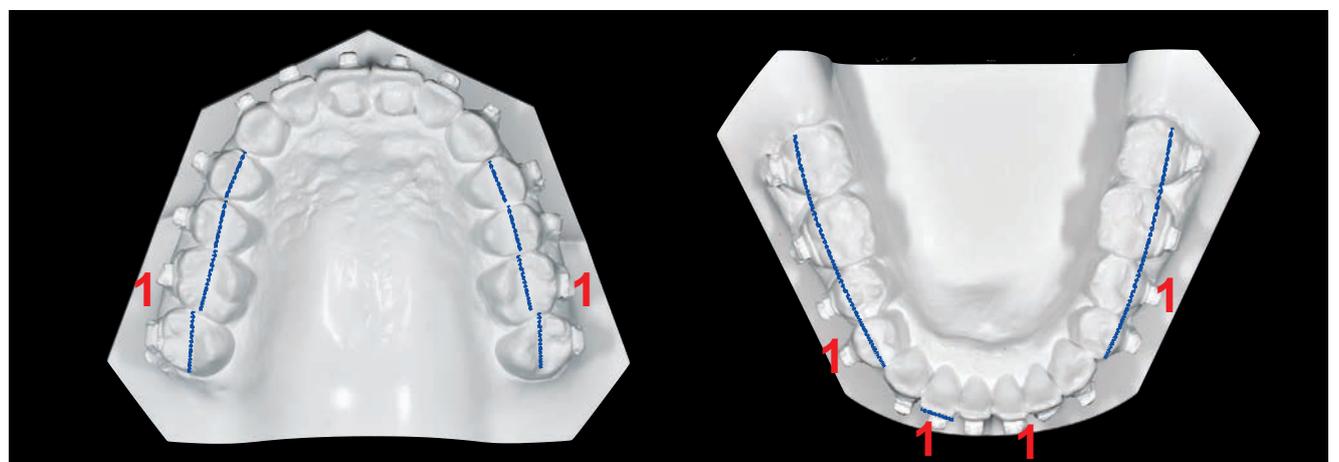
■ Fig. 22: At 19 months, the interim-treatment CRE for root angulation was 2 points deduction (marked in red).



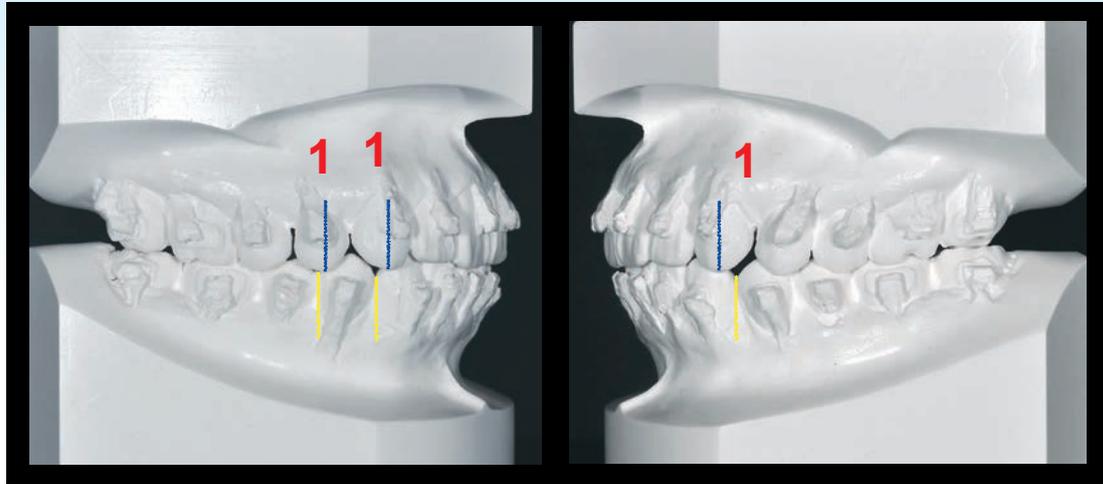
■ **Fig. 23:** At 19 months, the interim-treatment CRE for marginal ridge discrepancies was 4 points deduction as shown in red. One point is scored for a discrepancy of 0.5-1.0 mm; two points are scored for >1mm.



■ **Fig. 24:** At 19 months, the interim-treatment CRE for buccolingual inclination was 7 points deduction (red).



■ **Fig. 25:** At 19 months, the interim-treatment CRE for alignment & rotations was 6 points deduction (red marks). The normal alignment of centric stops in both arches is shown in blue.



■ Fig. 26:

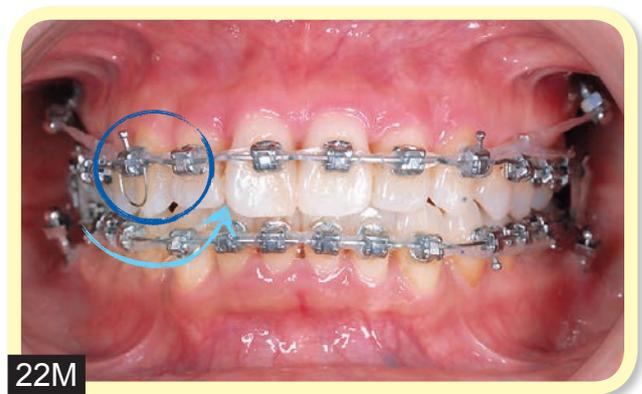
At 19 months, the interim-treatment CRE for occlusal relationships was 3 points deduction (red marks). Maxillary cusp tips (blue) should interdigitate with the mandibular embrasures (yellow).

1. Reposition brackets on teeth #21, 28 & 29 to correct marginal ridge discrepancies (Fig. 23).
2. Apply progressive upper posterior, buccal root torque to reduce buccolingual inclinations (Fig. 24).
3. Detailed bending to correct rotations (Fig. 25).
4. Arch coordination to improve occlusal relationships, interdigitation and contacts (Fig. 26).
5. Continue bilateral retraction of both arches with E-A miniscrews to reduce incisor flaring and lip protrusion (Fig. 21).

to .014x.025 CuNiTi. In the 22nd month, a torquing spring was placed on the right canine (tooth #6) to move crown palatally and correct 1mm of overjet (Fig. 27). At the same appointment, it was noted that distal tipping of the second molars resulted in open occlusal contacts. The upper archwire was sectioned distal to the first molars and vertical elastics (Chipmunk 1/8", 3.5 oz) were used on second molars to improve intermaxillary contacts (Fig. 29).

Appliances and Treatment Progress Part II

In the 19th month, brackets on teeth #21, 28 & 29 were repositioned and both archwires were changed



■ Fig. 27:

At 22 months, a torquing spring (circled) was installed on right upper canine (tooth #6) for palatal crown torque to correct 1mm of excessive overjet.



Fig. 28: Retraction of the entire maxillary dentition with infrazygomatic crest anchorage causes second molars to tip distally, and produces a clockwise rotation of the functional occlusal plane. Open occlusal contacts and a posterior open bite may occur.



Fig. 29: At 23 months, one month of the progress is shown the upper archwire was sectioned distal to the first molars, and vertical elastics (Chipmunk 1/8", 3.5 oz) were used to seat the second molar occlusion.

After 23 months of active treatment, all fixed appliances were removed and clear overlay retainers were delivered.

Results Achieved

1. Maxilla (all three planes):

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

2. Mandible (all three planes):

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

3. Maxillary Dentition:

- Alignment: *Mesial out rotation #2*
- Anchorage: *Retraction of upper posterior segments*
- Incisor Control: *Increased axial inclination*
- A-P: *Retracted*
- Vertical: *Maintain*
- Intermolar Width: *Increase*
- Intercanine Width: *Decrease*
- Marginal Ridges: *Discrepancy on #2*
- Buccolingual Inclination: *Excess axial inclination of #3 and 14*
- Rotation: *within normal limits*

4. Mandibular Dentition:

- Alignment: *4 teeth with minor rotations*
- Anchorage: *Buccal segments retracted*
- Incisor Control: *Flaring*
- A-P: *Retraction of the entire arch*
- Vertical: *Maintain*
- Intermolar Width: *Increase*
- Intercanine Width: *Decrease*
- Marginal Ridges: *Discrepancy on #20 and 29*
- Buccolingual Inclination: *Maintain*
- Rotation: *Mesial-in tooth #30*

5. Facial Esthetics:

- Lower lip profile was slightly more protrusive, resulting in a more balanced profile

6. Superimpositions:

- Axial inclination increased 9° for the upper and lower incisors, resulting in an interincisal angle improvement of 18°
- Both upper and lower posterior segments were retracted
- No skeletal changes were noted
- Lower lip profusion was improved, resulting in a relatively straight facial profile that was well balanced

Retention

Fixed retainers were contraindicated due to the patient's high caries rate. Upper and lower clear overlay retainers were provided with instructions to wear them full time for the first 6 months and nights only thereafter. The patient was instructed in home care and maintenance to prevent recurrence of the periodontal problems. Longterm periodontal follow-up is recommended.

Final Evaluation of Treatment

The finish ABO CRE score was 19 points which was considered excellent for this challenging malocclusion. Major discrepancies were noted in two categories: alignment/ rotations (5 points) and buccolingual inclination (5 points). Both could be improved with more precise bracket positioning and additional progressive root torque in the buccal segments.

Routine periodontal care and periodic maintenance were adequate for arresting the periodontitis and preserving the periodontium. Although longterm stability may be challenging, the treatment approach was appropriate for meeting the functional and esthetic needs of the patient. She was quite pleased with the results.

Discussion

It is challenging to achieve optimal function and esthetics in patients with severe crowding, a relatively straight profile, and retrusive lower lip. The patient preferred a non-extraction approach. There are three important biomechanics issues for avoiding unesthetic bimaxillary protrusion and incisor flaring:

1. Torque selection:

Mandibular anterior low torque brackets helped control anterior tipping (*flaring*) during alignment.

2. E-A miniscrew anchorage:

In the 6th month of treatment a miniscrew was placed in each posterior quadrant and 2 oz of traction was applied to each fixture to retract all four buccal segments to provide space to resolve anterior crowding.

3. Interproximal stripping.

In the 11th month interproximal reduction (*IPR*) was performed to provide space to resolve crowding and reduce black triangles in the incisal regions, consistent with maintaining good tooth proportions.

When retracting both arches with E-A miniscrew anchorage, it is important to carefully monitor the posterior occlusion and lower facial height because the plane of occlusion may rotate (*Fig. 28*).^{4,5,6} The patient's habitual lip competence was a negative factor for severely tipping the incisors lingually, but it was a favorable factor for controlling rotation of the occlusal planes. The latter may be associated with

posterior openbite, anterior deepbite,⁷ and posterior mandibular rotation.

Overbite and overjet are dependent on the vertical overlap of the incisors. The term "overbite" applies to gap between the lingual surface of the maxillary teeth and the labial surface of their occluding antagonist. Normally the lower incisal edges contact the lingual surface of the upper incisors, at or slightly gingival to the cingulum. The vertical overlap is either described in millimeters or as the percentage of lower incisor crown length overlapped by upper central incisors. When the teeth are brought into habitual or centric occlusion, the normal overbite is usually 2-3 mm or 30% percent of the clinical crown height of the mandibular incisors.⁸

Deepbite or deep overbite is defined as an excess overlap of the lower incisors by the upper incisors. This is a common form of malocclusion that may jeopardize periodontal support, intermaxillary occlusion or the TMJ. It is customary to diagnose deepbite when the incisors' overlap exceeds one third of the crown height of the lower incisors.⁷

For deep overbite correction, there are four common approaches:

1. Intrude anteriors
2. Flare anteriors
3. Extrude posteriors
4. Combine all of the above (1-3)

Molar extrusion is often an unstable approach for correcting deepbite because muscles tend to maintain their original length which tends to intrude the molars, thus contributing to a relapse of the deep overbite.^{8,9} Intrusion of anterior incisors is usually a better treatment option for adults. There are several mechanisms to intrude anterior teeth.^{10,11}

1. A basearch from molars to incisors delivers an intrusive force at the bracket
2. Utility arches can deliver an intrusive force but the mechanics may be complicated by applying torque at the bracket.
3. Bite turbos combined with early light short elastics.
4. Lever arms combined with orthodontic bone screws.
5. Interradicular orthodontic bone screws in the anterior region.

Different approaches are chosen based on the individual situation. In addition to the mechanics, it is important to be alert to root resorption. According to Burstone,¹² 20gm of force is recommended for intrusion of maxillary anterior teeth to decrease the incidence of root resorption.

For the present patient, the best alternative was to flare and intrude the anterior segments, because the incisors were tipped lingually and there was a good facial profile. Posterior bite turbos on the lower first molars facilitated the bonding of lower

anterior brackets and prevented extrusion of the posteriors. Anterior bite turbos were bonded to the lingual surfaces of the upper central incisors to provide intrusive forces on the incisors. The impinging overbite was corrected with anterior bite turbos, early light short elastics and pre-torqued brackets. This relatively simple and efficient approach resulted in correction of the problem in about 23 months without adverse skeletal side effects.

Severe deepbite malocclusions may be associated with periodontal problems due to shearing of the gingival tissues and food impaction. This scenario is associated with marked gingival recession, dentin hypersensitivity, loss of attachment and tooth mobility. The traumatic occlusion of an

impinging overbite can accelerate the progression of periodontal disease.¹³ The problem is associated with maligned roots in both the sagittal and frontal planes. If the roots in the anterior segments have acceptable axial inclination to the occlusal plane (*third order*), and are parallel to each other in the second order, the anatomical relationship is favorable for sufficient bone between the roots of teeth. Thus, correction of impinging overbite controls the existing traumatic etiology of periodontitis and is expected to render greater resistance to periodontal bone loss in the future.¹⁴⁻¹⁷ However, careful and routine periodontal maintenance is required.

Overall, the result was an excellent outcome for a challenging problem. The patient was well satisfied with the final results. Although esthetics and periodontal health were improved, long-term retention is necessary to insure stability.

CEPHALOMETRIC				
SKELETAL ANALYSIS				
	PRE-Tx	Progress	POST-Tx	DIFF.
SNA°	78°	78°	78°	0°
SNB°	74°	74°	74°	0°
ANB°	4°	4°	4°	0°
SN-MP°	33°	33°	33°	0°
FMA°	24°	24°	24°	0°
DENTAL ANALYSIS				
U1 TO NA mm	2 mm	4 mm	2 mm	0 mm
U1 TO SN°	85°	95°	94°	9°
L1 TO NB mm	4 mm	7 mm	5.5 mm	1.5 mm
L1 TO MP°	92°	107°	101°	9°
FACIAL ANALYSIS				
E-LINE UL	-1 mm	1 mm	0 mm	1 mm
E-LINE LL	-1.5 mm	0.5 mm	-0.5 mm	1 mm

■ Table 1: Cephalometric summary

Conclusion

This case report documents the periodontal and esthetic compromises of an impinging deepbite malocclusion. The dental problem was corrected with relatively simple mechanics, but E-A miniscrew anchorage was required to retract buccal segments in both arches to prevent excessive expansion of the arches and flaring of the incisors.

Acknowledgment

Thanks to Mr. Paul Head for proofreading this article.

References

1. Kiliaridis S, Georgiakaki I, Katsaros C. Masseter muscle thickness and dental arch width. *Eur J Orthod* 2003;25:259-263.
2. Chang CH. Advanced Damon Course No. 4 and 5: DI & CRE Workshop (1)(2). Beethoven Podcast Encyclopedia in Orthodontics[podcast]. Hsinchu: Newton's A Ltd; 2011.
3. Knierim K, Roberts WE, Hartsfield Jr JK. Assessing treatment outcomes for a graduate orthodontics program: follow-up study for classes of 2001-2003. *Am J Orthod Dentofac Orthop* 2006;130(5):648-655.
4. Jung MH, Kim TW. Biomechanical considerations in treatment with miniscrew anchorage. Part 1 The sagittal plane. *J Clin Orthod* 2008 Feb;42(2):79-83.
5. Nakamura A, Teratani T, Itoh H, Sugawara J, Ishikawa H. Photoelastic stress analysis of mandibular molars moved distally with the skeletal anchorage system. *Am J Orthod Dentofacial Orthop* 2007;132:624-9.
6. Lin JJ. Creative Orthodontics: blending the Damon system & TADs to manage difficult malocclusions. 2nd edition. 2010, Yong Chieh Enterprise Co., Ltd., Taiwan.
7. Sreedhar CVVR, Baratam S. Deep overbite—A review (deep bite, deep overbite, excessive overbite). *Annals and Essences of Dentistry* 2009 Jul-Sep;1(1):8-25.
8. Chen YJ, Jane Yao CC, Chang HF. Nonsurgical correction of skeletal deep overbite and Class II division 2 malocclusion in an adult patient. *Am J Orthod Dentofacial Orthop* 2004;126:371-8.
9. Paik CH, Ahn SJ, Nahm DS. Correction of Class II deep overbite and dental and skeletal asymmetry with 2 types of palatal miniscrews. *Am J Orthod Dentofacial Orthop* 2007;131:00.
10. Chang CH, Roberts WE. Impinging overbite and large overjet. Orthodontics chapter 23. [E-reader version]. Hsinchu: Newton's A Ltd; 2011.
11. Chang CH. Advanced Damon Course No. 7: Deep bite low angle. Beethoven Podcast Encyclopedia in Orthodontics [podcast]. Hsinchu: Newton's A Ltd; 2011.
12. Chang CH, Roberts WE. Stability of Mini-screws on Buccal Shelves: A Retrospective Study of 1680 Mini-screw Insertions by the same Orthodontists. *Int J Orthod Implantol* 2013;30:76-78
13. Chang CH, Roberts WE. A Retrospective Study of the Extra-alveolar Screw Placement on Buccal Shelves. *Int J Orthod Implantol* 2013;32:80-89.
14. Burstone CR: Deep overbite correction by intrusion. *Am J Orthod* 1977;72:1-22.
15. Gupta ND, Sandhya M, Prabhat KC, Lata G. A critical review of the management of deep overbite complicated by periodontal diseases. *Eur J Gen Dent* 2012;1:2-5.
16. Kokich VG: Excellence in finishing: modifications for the perio-restorative patient. *Semin Orthod* 2003;9:184-203.
17. Chang CH. Advanced Damon Course No. 8: excellence in finishing, Beethoven Podcast Encyclopedia in Orthodontics [podcast]. Hsinchu: Newton's A Ltd; 2011.

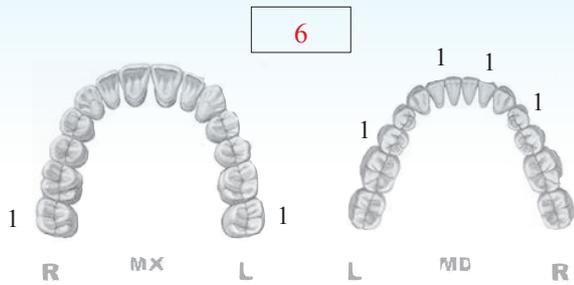


Cast-Radiograph Evaluation

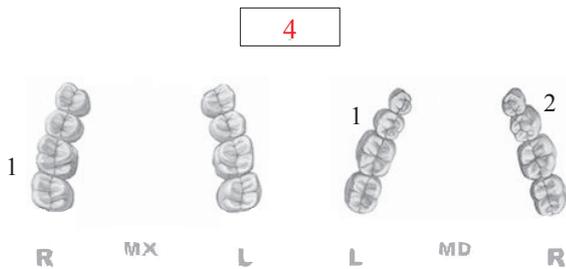
Interim-Treatment Progress

Total Score: **37**

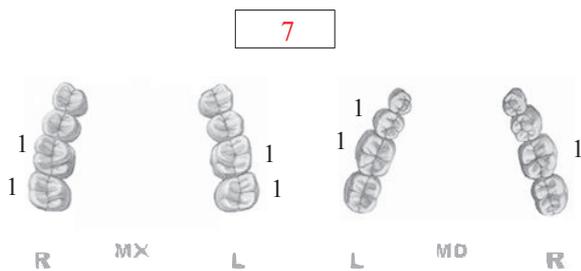
Alignment/Rotations



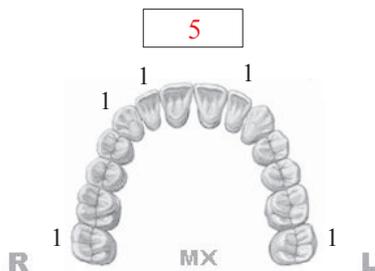
Marginal Ridges



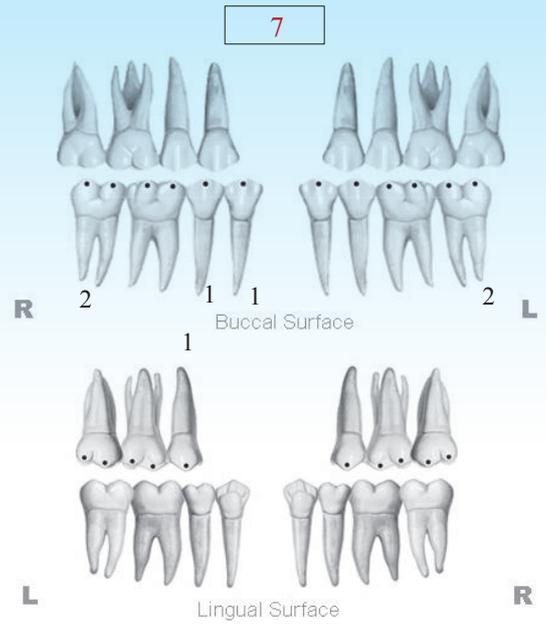
Buccolingual Inclination



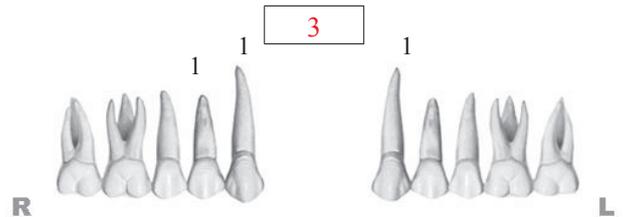
Overjet



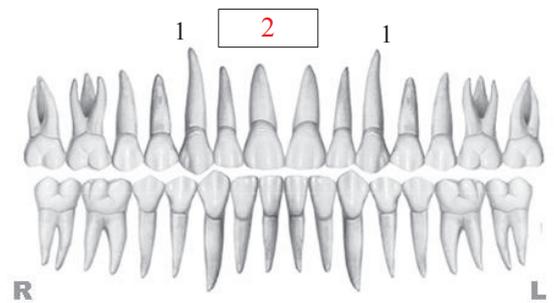
Occlusal Contacts



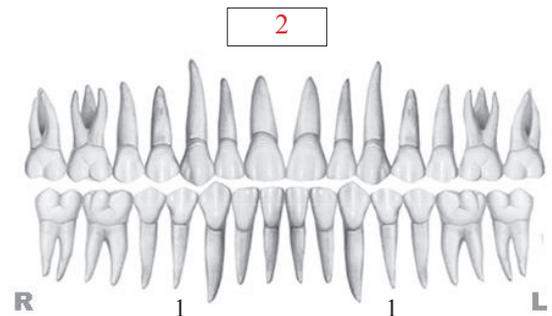
Occlusal Relationships



Interproximal Contacts



Root Angulation



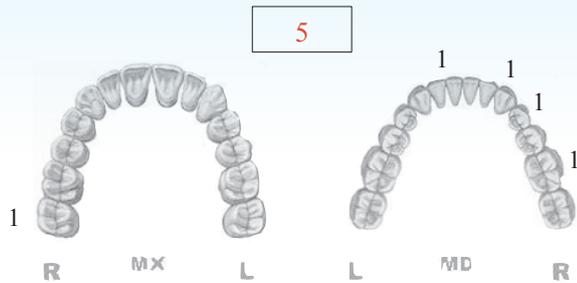
INSTRUCTIONS: Place score beside each deficient tooth and enter total score for each parameter in the white box. Mark extracted teeth with "X". Second molars should be in occlusion.

Cast-Radiograph Evaluation

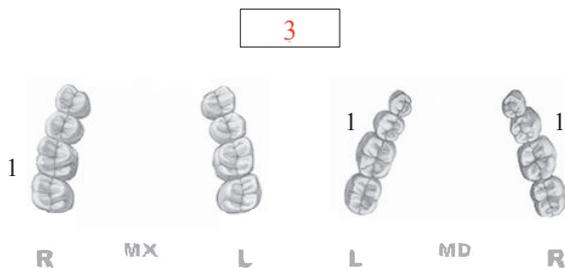
Final Results

Total Score: **19**

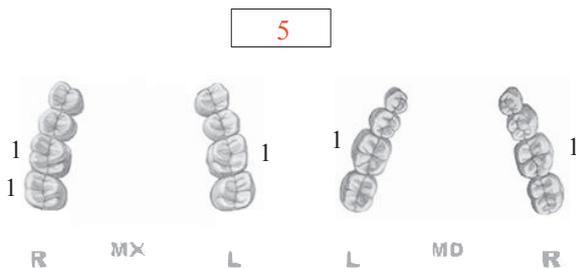
Alignment/Rotations



Marginal Ridges



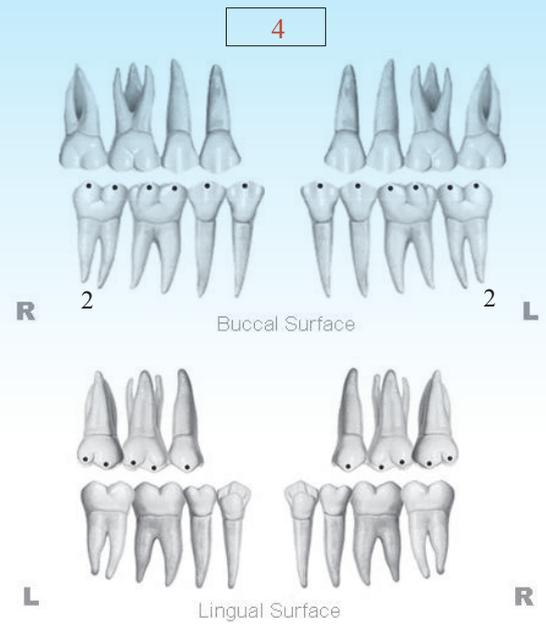
Buccolingual Inclination



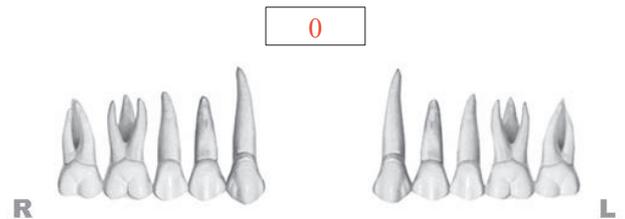
Overjet



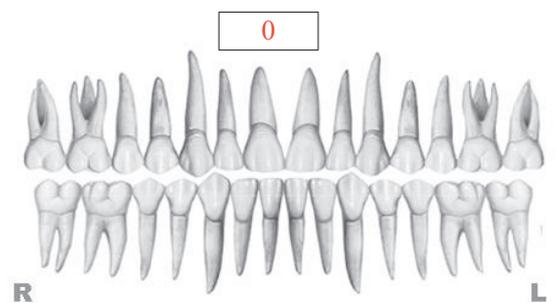
Occlusal Contacts



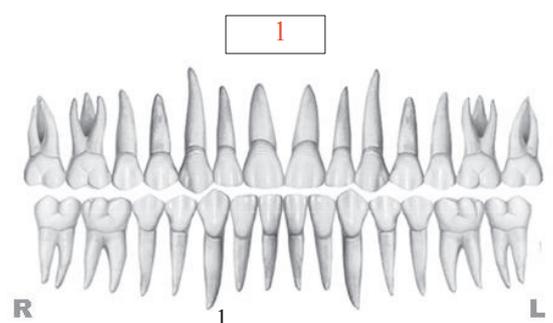
Occlusal Relationships



Interproximal Contacts



Root Angulation

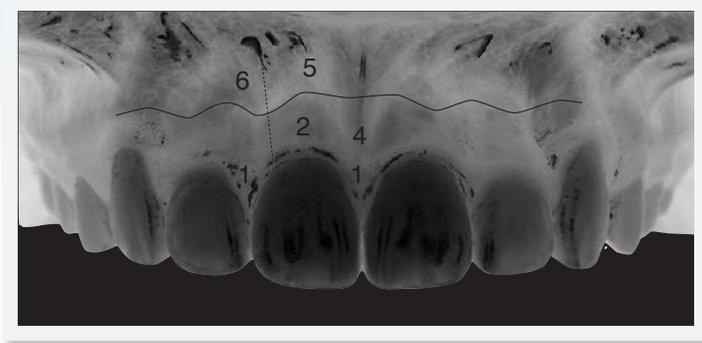


INSTRUCTIONS: Place score beside each deficient tooth and enter total score for each parameter in the white box. Mark extracted teeth with "X". Second molars should be in occlusion.

IBOI Pink & White Esthetic Score

Total Score: = 3

1. Pink Esthetic Score

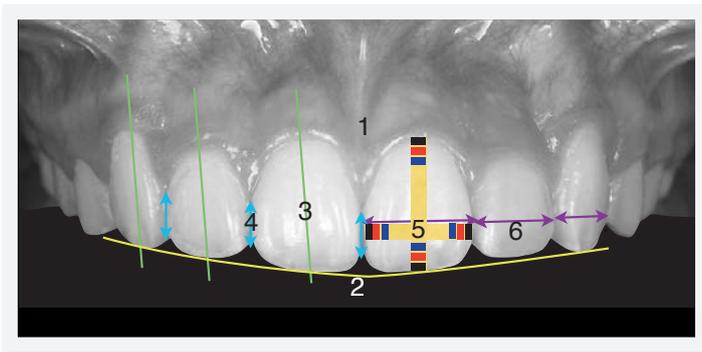


Total = 1

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

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

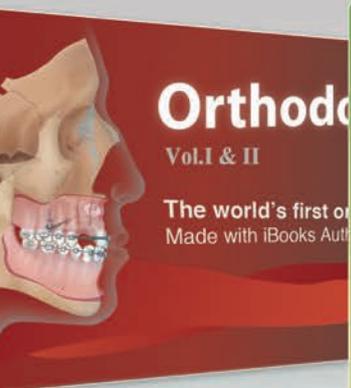
2. White Esthetic Score (for Micro-esthetics)



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



BDE

Beethoven Dental Encyclopedia

世界上最完整的牙醫百科資料庫

限時免費!



App of the Best



免費下載

本程式相容於 iPad、iPhone 和 iPod touch

BDE – 貝多芬牙醫視訊百科

限時免費

貝多芬牙醫視訊百科提供專業的牙醫線上課程，可隨時隨地觀看最新矯正及植牙的診療案例，開創行動學習新紀元。所有課程皆由國際知名講師－張慧男醫師主講，藉由循序漸進的課程安排與豐富內容，讓您獲得深度、有趣的學習經驗。您也可以透過本程式閱讀「國際矯正植牙期刊」(International Journal of Orthodontics and Implantology) 各期完整內容，一覽矯正與植牙結合的精闢案例剖析。

Available on the App Store



下載說明 – Step by Step



1. 點選 App Store。



2. 「登入」您的 Apple ID。



3. 或是「建立一個新的 Apple ID」。



4. 搜尋關鍵字「BDE」。



5. 點選「免費」並「安裝」。



6. 下載完成！



7. 開始享受精采課程吧，按右方箭頭即可下載！

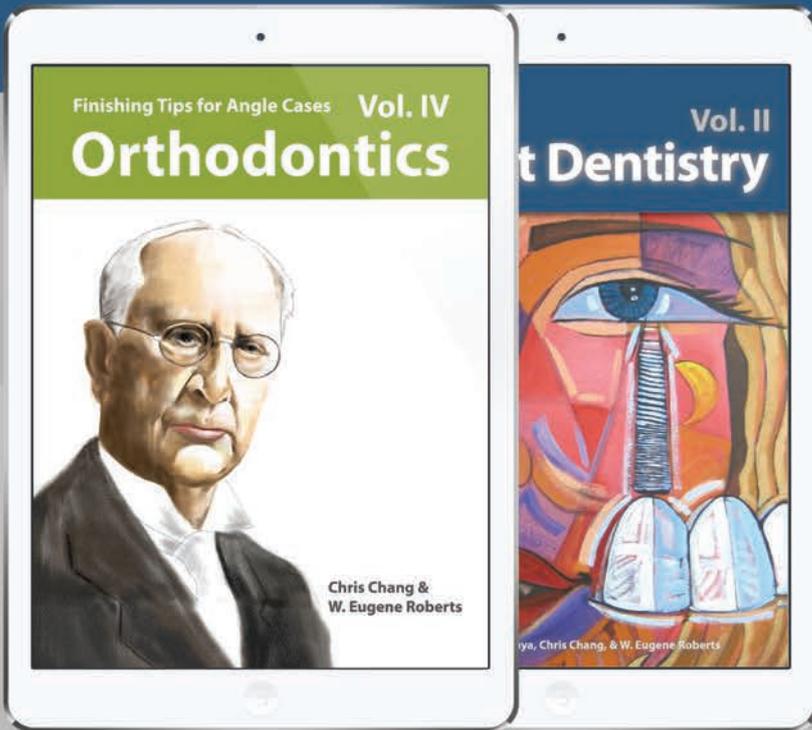


如果您對我們的付費視訊內容、醫療產品有興趣，或對這個應用程式有任何建議，都歡迎寄信到 app@newtonsa.com.tw。

<http://www.orthobonescrew.com>
E-mail: app@newtonsa.com.tw TEL: 03-5735676



Beethoven Dental Encyclopedia e-Book



Beethoven Dental Group regularly publishes world-class journal, *International Journal of Orthodontics and Implantology* (IJOI). Over the years many excellently finished cases are published. By popular demands a special selection of these cases, Orthodontics, is now available in iBooks edition. Once opening this book, your understanding of orthodontics will never be the same!

Amazing Discount
for a **LIMITED TIME**

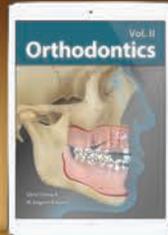
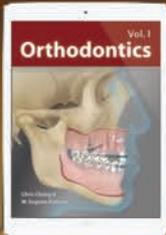
eBooks List



Orthodontics Vol.I Orthodontics Vol.II

Orthodontics Vol.I and Vol.II are now

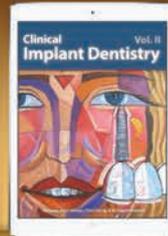
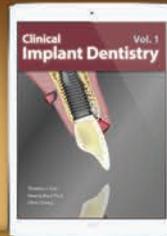
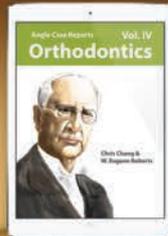
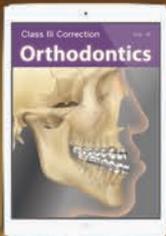
available on **iBooks Store** in total **51 countries**:



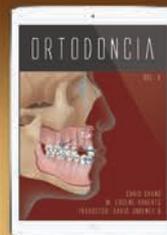
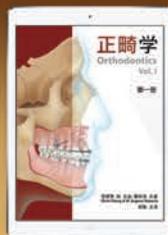
Argentina, Australia, Austria, Belgium, Bolivia, Brazil, Bulgaria, Canada, Chile, Colombia, Costa Rica, Cyprus, Czech Republic, Denmark, Dominican Republic, Ecuador, El Salvador, Estonia, Finland, France, Germany, Greece, Guatemala, Honduras, Hungary, Ireland, Italy, Japan, Latvia, Lithuania, Luxembourg,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

Orthodontics Vol.III Orthodontics Vol.IV

Implant Dentistry Vol.I Implant Dentistry Vol.II



Orthodontics
in Chinese & Spanish



Limited Free

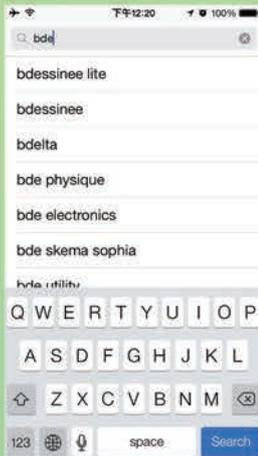


BDE

Beethoven Dental Encyclopedia

The most completed dentist database in the world

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



With your personal account, you can watch the courses (streaming video) online on your iPad and iPhone without occupying your storage.

You can also download the video to your iPad and iPhone. This allows you to watch your saved files anywhere anytime.

Q BDE

1. Go to App Store, search for "BDE" and install the app.
2. Launch the app and enjoy the videos!

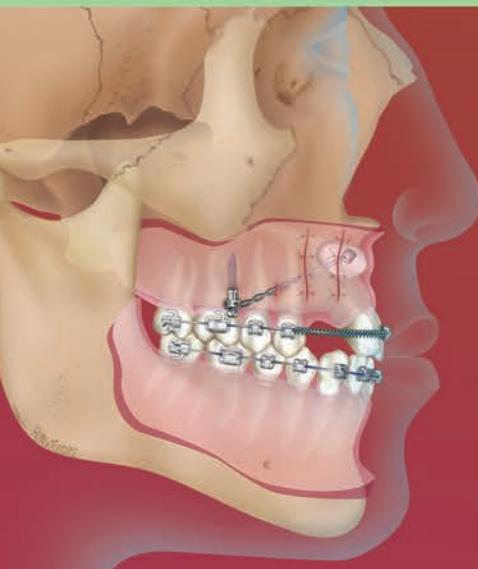
Available on the iPhone
App Store

Go to <http://iaoi.pro> for more latest videos.

E-mail: app@newtonsa.com.tw

TEL : +886-3-5735676

Newton's A



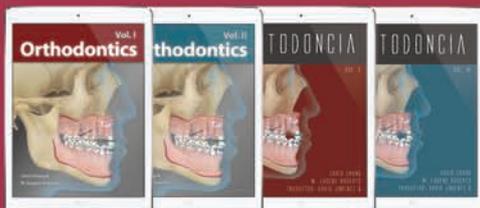
The world's best

Dental e-Textbook

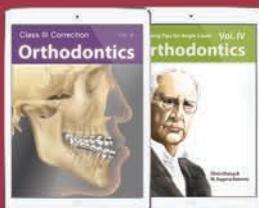
Made by iBooks Author

e-Book

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



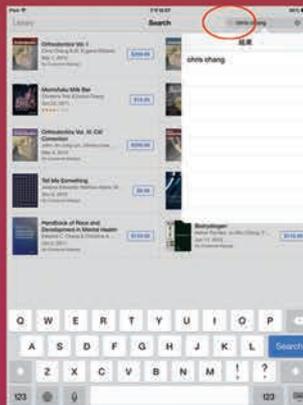
Orthodontics Series



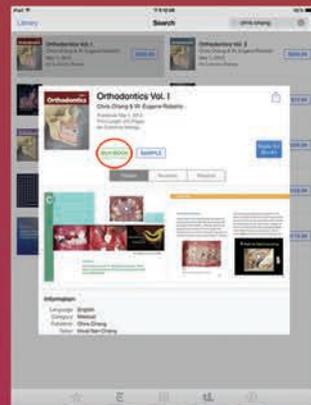
Implant Dentistry Series

Available on the
iBookstore

Q chris chang



1. Search for "chris chang" in iBookstore.



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

International
Association for
Orthodontists &
Implantologists

國際矯正植牙學會

歡迎至 <http://iaoi.pro> 獲得更多 iAOI 會員權益
與專科認證等最新消息。



加入 iAOI， 共創牙科的未來！

如何加入 iAOI？

欲取得國際矯正植牙學會會員資格，需完成下列階段：

1. Member

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

2. Board eligible

所有申請加入會員資格的

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

3. Diplomate

已獲得會員資格者，需要提出三篇案例報告，其中一篇案例需要再做口頭報告，通

過審查後，始可獲得 iAOI 的 Diplomate 資格。三篇案例中，至少須有一篇案例，同時涵蓋矯正與植牙領域。此為單一案例的個案報告。報告人和評論人需在規定的時間內完成報告及講評。每個報告人需在 12 分鐘內報告單一個案。大會會在第十分鐘時響第一次鈴，第十二分鐘到時會直接將麥克風關閉。每個個案報告結束後，全體評論人共有八分鐘可以講評。大會會在第六分鐘時響第一次鈴，第十分鐘到時會直接將麥克風關閉。評論人如果

有額外的意見可以以書面方式提供給報告人。

4. Ambassador

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

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



2014 iAOI 年度大會 矯正與植牙的 DNA 解密

11/30 (日) 09:00 ~ 17:00

台灣金融研訓院
台北市中正區羅斯福路三段62號

活動簡介

牙醫的跨科協同治療已成為當今趨勢，矯正與植牙的合併治療更是當中顯學，如何從最初的擬定治療計畫，到精緻矯正、完美植牙，並與患者維繫順暢的溝通，乃是當今最重要的課題。

本年度大會由張慧男博士領軍，並邀請國外貴賓分享最新的矯正植牙案例，並逐步剖析治療過程，以解出核心治療關鍵及諮詢技巧，讓您現學現用！iAOI 的準院士也將輪番報告經典的矯正植牙案例，並由牙醫界翹楚逐一講評，讓您從中獲得大師級臨床技巧。歡迎至官網 iaoi.pro 瀏覽大會最新資訊！

學習目標

1. 學習矯正與植牙的最新技巧。
2. 簡易治療艱難的矯正與植牙的合併案例。
3. 掌握諮詢技巧，促進醫病雙贏。

報名方式

報名專線：03-5711377
線上報名：iaoi.pro

報名費用

	10/31 前報名	11/01 後報名
會員價	3,600元	5,000元
非會員價	5,000元	7,000元

1. 「會員」為已註冊並繳交入會費、2013年費之醫師，其餘皆適用「非會員」價（未註冊者請至 <http://iaoi.pro> 註冊）。
2. 報名本活動後，恕不退費！

入會費	年費	第一階段資格考 Board Eligibility Exam
NT\$1,000	NT\$3,000	NT\$9,000 - NT\$13,000 (含入會費、年費、考試及證書費)

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

* 匯款後，請務必來電03-5711377核帳

成為iAOI網路會員

- 1 請上 iAOI 官網 <http://iaoi.pro>
Go to <http://iaoi.pro>
- 2 點選右上角「註冊」，輸入您的電子信箱，確認送出。
Select "Sign Up" on this website homepage and enter your e-mail. Click "Send."
- 3 檢查您的電子郵件信箱並點擊驗證連結。
Check your e-mail and click the Confirm link.
- 4 輸入並確認您的密碼，填妥您的個人資訊。
Enter and confirm your password, and fill in your personal information.
- 5 註冊完成，歡迎使用各項線上服務。
Congratulations for successfully becoming an iAOI web member.



Feedback from 2014 Damon Forum in Shanghai, China



I am Dr. Brian Lee, who was the only person trying to put Newton's A's dental mirrors into his own mouth at 2014 Asian Damon Forum.

After the forum, when I showed the mirrors to my staff members for the first time, and the responses weren't very good because of the material-stainless steel. They complained in the past how the surface was easily scratched and left marks. I had to force my staff to try in their own mouth for the first few times. However, 3 weeks later, I noticed that now they'd only use the new mirror from Newton's A.

I just wanted to say "Thank you very much for providing me such useful products."

Dr. Brian Lee!

U-Smile Dental Clinic in Daegu, South Korea



親愛的張醫師與高老師：

您們兩位真是很好的 mentor，您們無私的分享，帶領大家在 Ortho 的領域天天進步 Strive for excellence。四年前，我第一次認識貝多芬和金牛頓，就深深被您們的那種熱誠、專業和力求進步的心吸引和感動。

我一直在思考，您出版的 NTO、IJOI 期刊，讓這麼多的醫師和病人受益，我是否也可以出版一份小小的「小書」，讓病人（尤其是我的小鎮的病人），了解更多的牙醫保健的資料，這本 My Little Red Book of Teeth Protection 我的牙醫保健書終於在 2013 年出版。因您給了我這份勇氣和靈感，去為病人做這些，所以我以敬畏的心把書送給您。也因為一直跟著您和貝多芬的腳步前進，診所也由當年的我一位醫師，發展到今天兩位全職醫師，三位兼職醫師，新的另一間診所也會在今年 6 月開始投入服務。

很高興，也很感恩，在台灣，尤其是 USC 課程，認識了很棒的醫師，如張銘珍、李晃銘、賴宜姍和蘇荃瑋醫師。他們都給了我很大的鼓勵和幫助。這幾年因為您們，我受益良多，真的很感恩。

深深的祝福您們！

陳依虹

President, Family Care Dental in Malaysia



Feedback from the International Damon, OBS & VISTA Workshop

Dear Chris and John:

I want to take this opportunity to thank you both for sharing many clinical experiences and teaching skills in an easy and friendly way with us. You have an impressive organisation and a really great course. I have been teaching and giving lectures for 20 years, and yet was still very much impressed by your professional, easy way to transfer knowledge and clinical procedures, supported by the most high-quality and technological standards. Thank you for the trust, friendship, and the way that you influence all of the people who have the opportunity to take your courses, including me. For these reasons I highly recommend the course.

I also want to congratulate each one of your successful team, including clinical Assistants, doctors, designers, Apple engineers, personal assistants, and of course your lovely wife who is always caring for all the details and willing to help all the doctors. I wish to say a big "Thank You very much" from me and all of the South American doctors in my group,

Finally, I would thank you also for opening up your personal space, ie your library and sharing with us some of your personal philosophies, just another example of the greatness you are as a person.



Sincerely yours,

Dr. Richardo Medellín F.

*Professor Universidad Nacional
Autónoma de México, Universidad Tecnológica de México.*



Dear Dr. Chang,

Thank you for sharing your knowledge with us, and enabling us to perform better as professionals in every little corner of the world by using simple, but effective techniques. As you once said, "It's easy."

I highly recommend this workshop to my colleagues all over the world. If it is within your reach, do not miss out on this rewarding opportunity. I went back home with satisfaction, showered with such good experiences for the people we have met and the knowledge we have received.



Alexia Patiño Lugo

*Orthodontist Universidad latinoamericana - México
Director OrtoCioa, Isla de Margarita-Venezuela*

最新版 Keynote Workshop 高效簡報學習法 系列課程

New!



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。

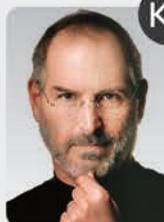
學習重點：1. 操作入門 2. 演講常見十大謬誤 3. 資料視覺化技巧



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，更知其所以然！

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 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



K4 精修繪圖及動畫技巧 2014.12.05-07

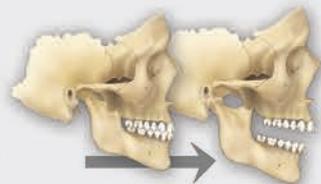
- 世界第一堂最完整的最新版 Keynote 6 課程。
- 在 Keynote 內繪製插圖，並運用動畫效果完美呈現。
- 利用 Keynote 創造複雜的構件。
- 完美整合 Keynote 實用技巧及牙科診間運用。

講師
Dr. Rungsi Thavarungkul

報名 2013 K456 課程即 贈送 2013 及 2014 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。

~~35,000~~
30,000 元 優惠至 2014.08.31 止



Keynote
高效學習寶典

~~93,000~~
46,000 元

本寶典包含：

- (1) K1~K3 (18,000 元)
- (2) K4~K6 (35,000 元)
- (3) 2013, 2014 課程視訊 (40,000 元)

備註：

- (1) 課程當日之前結清款項才能享有本優惠。
- (2) 舊生報名 K1~K3 須繳 500 元訂金/堂，課程日退還。
- (3) 若取消報名，適用下述 K4~6 退款說明。

繪圖簡報達人

報名專線：03-5735676

上課地點：金牛頓藝術科技
新竹市建中一路25號2樓

匯款帳號：

- 銀行代碼：815 日盛銀行 光復分行
- 匯款帳號：109-25203060-000
- 戶名：金牛頓藝術科技股份有限公司

Newton's A
金牛頓藝術科技



2014 Newton's Implant

日期	USC 學程精選 (主講：張慧男、蘇筌璋、邱上珍醫師)	Book review (Plastic-Esthetic Periodontal And Implant Surgery: A Microsurgical Approach)
1 2/21	Dr. Fernando: 2B3D ideal implant position 植體的理想位置分析	CH. 1,2 牙周與植體周邊構造 / 顯微手術介紹與應用
2 3/28	Dr. Fernando: Material selection 植體組件的構成與選擇	CH. 3,4 成功的關鍵 / 癒合、切線、翻瓣設計與縫合
3 4/25	Dr. Homa: Immediate implant placement timing 立即植體的放置時機	CH. 5,6 前牙美學準則：指引、診斷、策略
4 5/16 (新日期)	Dr. Homa: VISTA technique 前庭垂直切線骨膜下隧道術	CH. 7 自體移植體移取
5 6/27	Dr. Baldwin: Abutment selection 補綴支台齒的選擇	CH. 8 牙齦增進術
6 7/25	Dr. Wallace: Sinus augmentation 上顎竇增高術	CH. 9 牙齦萎縮
7 8/22	Dr. Chiu: Hard tissue management 硬組織重建的操作技巧與注意事項	CH. 10 美觀牙冠增長術
8 9/12	Dr. Stanford: Implant prosthesis 植牙膺復學	CH. 11 牙齦乳突重建
9 10/31	Dr. Baldwin: Implant occlusion 植體咬合力量分析	CH. 12 拔牙窩洞處置
10 11/28	特別演講 張燕清主任	
11 12/26	Dr. Chris: IAOL ortho-implant case report 植牙矯正完整示範案例	CH. 13 缺牙修復

*課程時間異動：原 5/30 (五) 改期 至 5/16 (五)



邱丕霞醫師

南下高雄開業，迄今已逾十五年時間，邱醫師最感受用的，是她在三十五歲開業之初學會矯正，在四十六歲還沒得老花眼時學會了植牙。邱醫師坦言，在職進修必然造成壓力，它可能來自於時間、金錢與家庭，畢竟一天只有二十四小時，但終身學習所創造的成就感與報酬，卻讓她覺得當牙醫「真是好玩」，而且將持續下去，謹此與讀者分享。

～本文摘錄自2010最新一期《台大牙友》



矯正植體課程

2014/09/10 (三)
09:00~20:00

OBS In-office Workshop

講解矯正植體操作的時機、方法
診所臨床跟診及實例示範

牙醫師不敢或是不知如何植入 miniscrews，大抵有兩個原因：一是無法突破心理障礙；另一則是認為操作困難。然而，張醫師透過高效率的課程講授，直接切入重點，使您輕鬆掌握；簡潔的步驟，讓您不再求助牙周或口外醫師。百聞不如一「做」，相信短短一天的課程，您將親身見證！

- 購買OBS超值組贈 2000元課程折價券，可折抵本課程費用。



全方位牙醫診所
王肖龍醫師



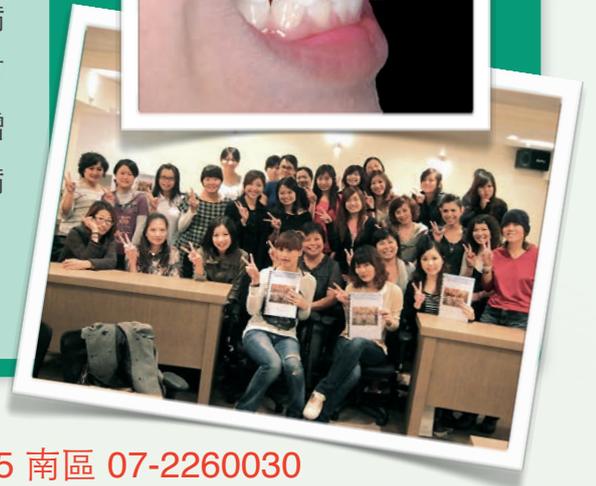
助理訓練課程

2014/10/03 (五)
2014/10/24 (五)

- | | |
|-------------|---------------|
| 1. 高效矯正助理訓練 | 4. Keynote 製作 |
| 2. 新病人流程 | 5. 矯正期間衛教 |
| 3. 照相技巧 | 6. Morph 製作 |

針對矯正助理的臨床技巧、電腦操作，包含照相、X光拍攝、Damon 系統相關知識介紹，以及牙科電腦應用，例如衛教檔案製作、Morph 病例以及 Keynote 病例製作教學。結合課堂講解與診間實習雙重方式，幫助您快速培養出得力矯正助理。此外，本期課程新增 iPad 在診間的應用，讓您的助理可以善用科技，為病人創造理想就診經驗。

- 三人以上團報享9折優惠。



報名專線：湧傑 北區02-27788315 中區 04-23058915 南區 07-2260030

Newton's A 金牛頓藝術科技

地址：新竹市建中一路25號2樓 電話：03-573-5676

OrthoBoneScrew



Designed and recommended
by **Dr. Chris Chang**

Chris Chang, DDS, PhD



Smooth Mushroom Head

For comfort & retention of
elastic chain

4-way Rectangular Holes

For lever arm to solve
impacted tooth

Double Neck Design

Easy hygiene control
& extra attachment

Order information

info@newtonsa.com.tw

www.orthobonescrew.com +886-3-5735676

貝多芬 齒顎矯正中心
Beethoven

Newton's A

B-201204 0000-0000

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

Dr. John Jin-Jong Lin, Taipei, Taiwan

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

Dr. Tom Pitts, Reno, Nevada, 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."

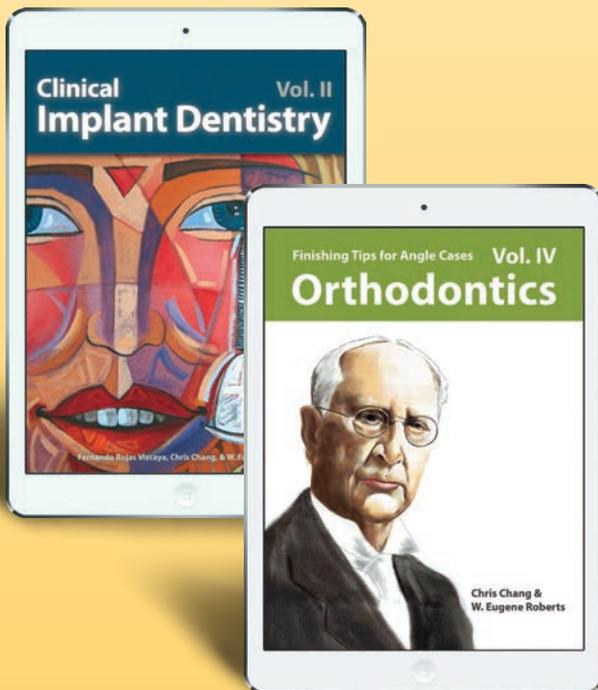
Dr. Ron Bellohusen, New York, USA

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



The Keynote workshop by Dr. Rungsi (first on the right) in 2014 iAOI semi-annual seminar. The attendants were enthusiastic about learning, and very proud of making amazing animations of the "teeth" by themselves.

ISSN 2079-6862



9 772079 686201