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About the Beethoven Dental Encyclopedia e-book, please refer to pages 90-91.

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，讓您很難錯失任何環節，更沒有聽不清楚或無法理解的可能。為提高課後自我學習及臨床印證之效率，另備有教學電子檔，供學員家中研習。我們的終極目標是：用最短時間、最輕鬆的方式，讓每位學員 - *熱愛矯正學、熱愛學矯正。*

Damon矯正課程

【課程】9:00 - 12:00
【實習】另外安排

使用最新一代矯正器 Damon Q 進行課程，歡迎舊生報名參加。 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 & managment
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 與公開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）

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

課程資訊

上課地點

【台北】
恒逸資訊中心 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）

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＊每次上課請依最新一期 IJOI 公告為主

Road to Glory: Preface to Angle Case Reports

It all began in the winter of 2007, when Dr. Roberts came to lecture in Taiwan. After visiting my clinics and reviewing some of my cases, he invited me to take the American Board of Orthodontics (*ABO*) Certification exam. For me it was an enormous task to add to my already hectic workload, but it was also an impossible one to decline, as it had been proposed by my mentor. It took me one year of preparation and I was fortunate enough to tackle the beast on the first attempt. However, it didn't take long for me to realize the benefits this certification brought to my practice, a systematic and objective review of my clinical results. I had the opportunity to scrutinize and critique my work effectively and efficiently. The quality control system that I set up for the preparation of ABO has become my standard practice ever since.

So it wasn't a great surprise when Dr. Roberts came back the next year and challenged me to reach for the holy grail of our profession, Angle Society membership, a five-year, multi-phased entrance exam. Once again, the wise Angle Society examiners adopted the same powerful ABO's DI and CRE Indexes to fully assess case quality. After five years of rigorous grooming and coaching, I can now say with full confidence that this assessment method is one of the best ways of improving your caliber. This is also why Dr. Roberts and I decided to publish these specially prepared case reports so anyone interested in taking their work to the next level can master the tools while studying these treatment details. The ultimate goal is to systematically apply these tools to analyze your own cases. According to my own experience nothing can teach you more than your own mistakes. This ABO grading system simply gives you a clear strategic vision and a rock-steady hand on the wheel.

This new book collection of Angle case reports would not have been possible without the help of many: the excellent teams from Beethoven Orthodontic Clinic and Newton's A, whose dedicated staff routinely and diligently document and organize the patient files. The "*Apple geniuses*" at Newton's A, who produce the ebooks' beautiful and creative electronic presentation layouts. My English editors, Tzu Han and Paul Head, who help correct my Taiwanese English. Special thanks also go to my examiners of the Angle Society Midwest, Drs. Gil Schmidtke, Steve Sherman, Kenneth Eberle, Glen Cowan, Michael Frazier, Roberto Hernandez-Orsini and Marissa Keesler. Of course, my biggest supporter and wife, Shufen, who is a constant source of inspiration, and occasionally, forced mini-vacations. My mentor, Dr. Roberts, who meticulously checks every word and number of the manuscripts, and also provides additional literature analysis to enhance case discussions. None of this could have come true without his continuous support and encouragement. His generosity and mentorship are the gifts I wish to share with you all, my friends. I sincerely invite you to open this book and embark on this journey towards excellence. If you wish to put a dent in the orthodontic world, this evaluation system will be your most powerful hammer. So please, join us on this journey and together let's march the road to glory.

Chris Chang DDS, PhD, Publisher


Examiner
Dr. W. Eugene Roberts


Examiner
Dr. Tom Pitts


Examiner
Dr. John J. J. Lin


Consultant
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Dr. Chris Chang, *Publisher*

Introduction for the iBook of Chris Chang's Angle Cases

This iBook is a compilation of case reports that Dr. Chris Chang presented in partial fulfillment of the requirements to become an active member of the Midwest Component of the Edward H. Angle Society of Orthodontists (*EHASO*). Understanding this professional accomplishment, as well as Chris's longtime affinity for the ideals of Dr. Angle, is facilitated by the remarks of Dr. George W. Hahn at the 25th anniversary of the EHASO.[1]

Edward H. Angle was born in 1855 on a farm in Pennsylvania, and grew up showing a range of remarkable abilities, especially the design and construction of mechanical equipment. His mother recognized his talents and arranged an apprenticeship with a dentist that subsequently resulted in graduation from the Pennsylvania College of Dentistry in 1876. Although "*orthodontia*" was a very young discipline, the art and science was a perfect match for Angle, and he began a long career of innovation, beginning with the jack and traction screw appliance, variations of which are still widely used today. Following a series of academic and private practice ventures, Angle formed several private schools of orthodontia across the country which became the nuclei for the initial orthodontics societies: St. Louis (*1900-present, the predecessor of the AAO*), 2. New York & New London (*1913-39*), and 3. Pasadena (*1922-30, the original EHASO*) (*Fig. 1-3*).

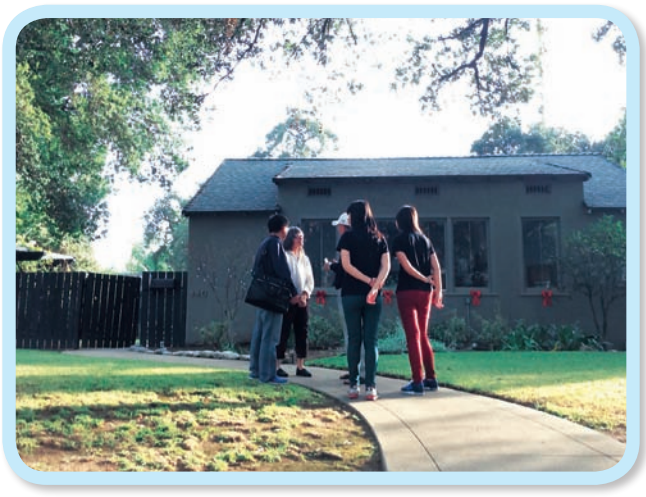

Fig. 1:

Former home of Angle College of Orthodontia (1922-30) at 550 Jackson Street, Pasadena. Now it is a private residence.

Fig. 2:

After the Angle case exam in 2014, Chris Chang's family visited Dr. & Mrs. Angle's former home (1918-1930) at 1025 N. Madison Street, Pasadena (from left to right: Chris Chang, Barbara Lamprecht and Johnathon Lee).

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

Edward H. Angle Society of Orthodontia: the society was reorganized in its present form at the Lake Shore Athletic Club in Chicago on November l7, 1930. At the same location 25 years later, Dr. Hahn [1] recounted that the EHASO believes in the idealism that Angle held, taught and lived. His goal was perfection in everything! To emulate the ideals of its founder, the Angle Society must remain a working society, for Angle had no time for sloths. All candidates and members must have something to offer for what he/she receives. Merely being a good clinician and/or a politically correct practitioner does not merit membership in Angle's inner circle.

Hahn[1] lamented that the personal touch of Angle would decline with the attrition of his students, but the bright shield of idealism will never tarnish. Progress in orthodontics will be due to improvements in thinking rather than in mechanics. Angle sought earnest and honest clinicians with initiative, who were energetic, ambitious, and "*possessed (above all else) with the ability to reason.*"[1] He felt that "*well-trained intelligent minds and well-disciplined fingers*"[1] will produce nothing short of the best. Hahn[1] concluded that an American Board of Orthodontics (*ABO*) diploma should hang on the wall of the every EHASO member. In effect, the ABO should be a prerequisite for the Angle Society.

Enduring Standards of the Angle Society: There is an ideal, well above average, that is worth living and striving to attain. The professional fellowship of the society involves no selfishness, jealousy, nor deceit. The focus

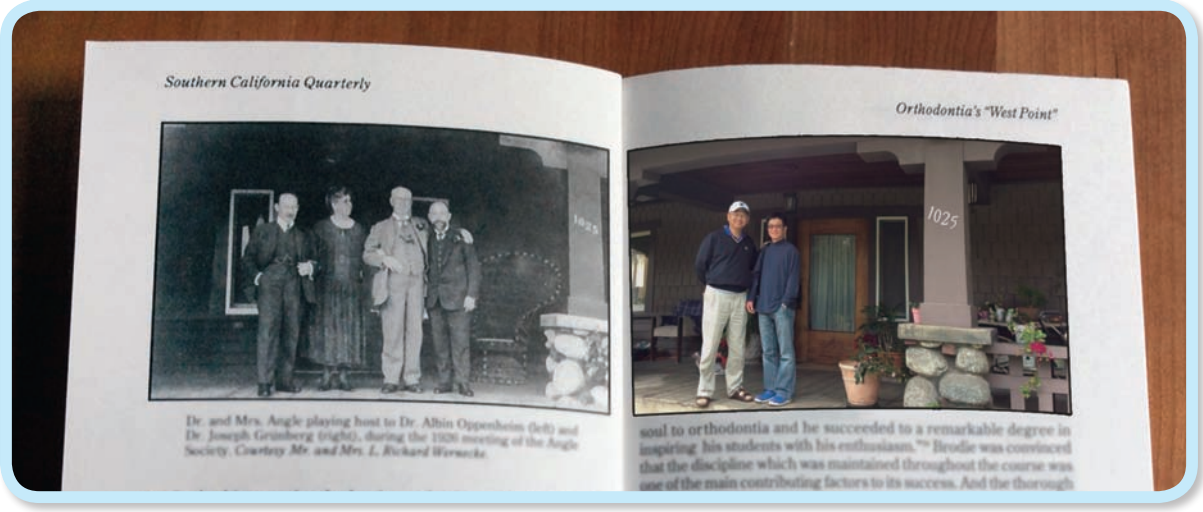

Fig. 3: In front of Dr. Angle's house, a comparison between 100 years ago and today. (note the magic number: 1025)

is on an honesty of purpose in which everyone is "*held in that esteem which gives him a feeling of pride tempered by humility.*" [1] The society offers an opportunity for the full and open exchange of knowledge, with ideas eagerly offered and nothing held back. It is a professional opportunity to escape the realm of mediocrity, and embrace a standard of conduct which makes living and working a pleasure. There is an inspiration that comes from personal contact with others "*whose object is not self-glorification but a willingness to give freely of what they have learned with only the thought of helping others.*" [1] Never forget Angle's ideal of perfection, which was so characteristically expressed in his motto that hung on the wall of the school in Pasadena, "There is but one best way."[1]

Chris Chang in the Angle Tradition: In reflecting on Dr. Chang's career development, I am struck by the parallels to Dr. Angle, and feel Chris is well suited to the rich heritage of the EHASO. After studying oral surgery and orthodontics in Taiwan, Dr. Chang decided that a broad, international perspective was required to reach his career objectives. In retrospect, it is apparent that this intellectual thirst was inspired by his study of Edward Hartley Angle. When Chris arrived at Indiana University to interview as the first PhD/Orthodontics student, he asked to present a lecture to the faculty about Dr. Angle. Chris had studied him intently, visited the sites of the Angle Schools, and presented an outstanding presentation that is well remembered. There are not many applicants presenting for interview who can offer an erudite lecture on the founder of the speciality that they plan to pursue!

Fig. 4: By Chris Chang, Post-impressionism.

Renaissance Man: The fact that Chris would not be an average student was reinforced by his agenda for an appropriate education. Like Angle, Chris is a "*Renaissance Man,*" meaning his talents and interests embraced many disciplines. In addition to pursuing a challenging PhD curriculum, he learned to play golf to a near scratch handicap, developed a remarkable ability as an post-impressionist artist, in the van Gogh tradition (*Fig. 4*), and embarked on violin lessons that culminated in playing formal concerts on campus. It was unclear that he would find time to study basic science and orthodontics! However, according to his own schedule, Chris produced an outstanding PhD thesis on the induced angiogenesis of sutural expansion, resulting in two major referred publications that remain classic references for the perivascular induction of osteogenesis (*Fig. 5*). [2,3]

The Cross-Roads: After graduating from Indiana University, Chris married his soulmate Shufen, a PhD Geriatric Nurse trained at the University of Illinois at Chicago. As the Mother Angle in Chris's life (*Fig. 6*), Shufen plays a strong role in all his accomplishments. Together, the Changs embarked on remarkable series of achievements: a wonderful family, savvy investments, Beethoven Orthodontics Center, Newton's A, the Dental Education Center, and a host

of other enterprises. As previously noted, Chris is a gifted golfer, who has closed many business deals on the golf course! With this level of professional and personal accomplishment, many gifted orthodontists lose site of Angle's vision of excellence. When approached about pursuing the ABO and eventually the Angle Society, his initial response was typical: "*it would take so much time.*" However, he again reflected on Angle's idealism, which applies to all aspects of life, including orthodontics. With Shufen's support, Chris soon accepted the challenge and was well on his way. He passed the ABO with flying colors, and in the process discovered the ABO system of clinical assessments, which he now pursues on every patient and fervently teaches his students. I am sure Chris felt that the reward of ABO certification greatly exceeded the effort.

The next step was the real cross-road: would he pursue membership in the Angle Society after achieving the ABO? This proved no problem for Chris because he had professional momentum in the Angle tradition. Although he could have pursued a component with less rigorous admission requirements, Chris accepted the challenge of the Midwest Component, which still imposes the rigor inspired by Dr. Alan G. Brodie. Immediately after achieving ABO certification, Dr. Chang presented five of his board cases to satisfy the candidate requirement for Angle Midwest. This shortcut was possible because his board cases had been finished in the past five years. Had he waited, the ABO cases would have expired, requiring the work up of new ones.

The Clinical Qualification: The following year Chris brought records for 10 more cases that he had recently started. He was instructed to bring cases of moderate difficulty that could be finished to an ideal result. However, many of the cases he brought were extremely difficult. There was considerable concern among the membership that he had misunderstood that a very good result was expected. Chris's response was "*these are routine cases in my practice.*" Six of the patients were selected for the annual presentation of progress records, that would be carefully examined by expert clinicians on the Admissions Committee. In addition, records were collected for the other four cases because they could be substituted if there were any problems in completing the six cases selected. In the end, Chris completed his clinical requirement, achieving very good results for a challenging series of patients. The case reports are forthcoming in this

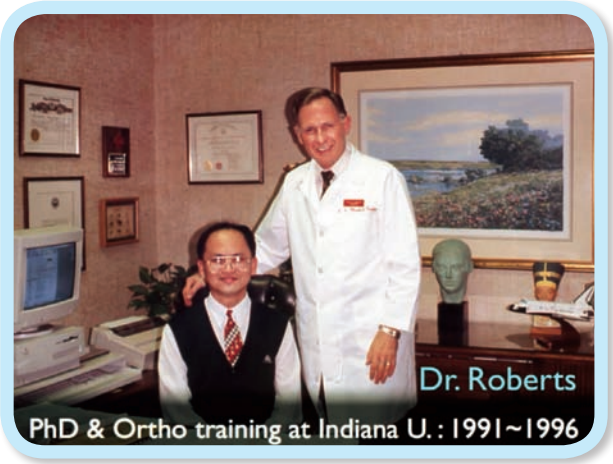

Fig. 5: Chris Chang and Dr. Roberts at Indiana University

Fig. 6: Chris Chang's family

iBook. Note that Chris has a strong preference for nonextraction treatment, which would certainly set well with Dr. Angle!

The Study Requirement: The admissions process for Angle Midwest requires an original research project involving a testable hypothesis with statistical analysis of the data. Chris decided to assess the failure rate of all temporary anchorage devices placed in the buccal shelves of the mandible. The preliminary data is published in the International Journal of Orthodontics and Implantology (*Figs. 7-9*)[4,5], and his formal presentation of the project is scheduled for the 2015 Angle Midwest meeting in Naples, Florida.

The Charge: Please enjoy and learn from this interesting series of Angle cases. Hopefully the case reports will challenge you to greater heights in a pursuit of excellence, worthy of our icon, Dr. Edward Hartley Angle.

Fig. 7:

There is a safe zone between the 1st and 2nd molar roots becasue the the inferior alveolar neurovascular bundle is apical to the roots of the teeth.

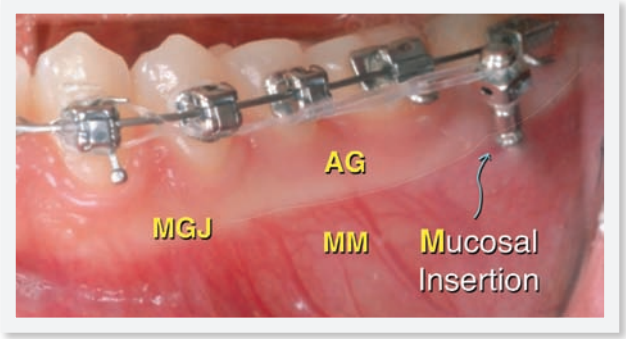

Fig. 8:

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

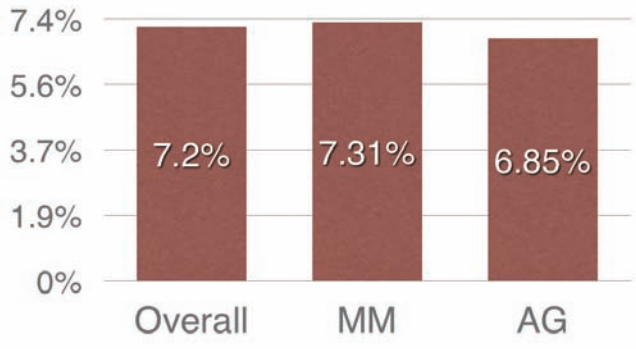

Fig. 9:

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

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1. Hahn GW. A history of the Edward H. Angle society of orthodontics. Presented at the 25th Anniversary of the EHASO in 1955. Copyrighted and published online by E. H. Angle Education and Research Foundation in 2001.
2. Chang H-N, Garetto LP, Katona TR, Potter RH, Roberts WE. Angiogenic induction and cell migration in an orthopedically expanded suture in the rat. Arch Oral Biol (41(10):985-994. 1996.
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4. Chang CH, Roberts WE. Stability of mini-screws on buccal shelves: A retrospective study of 1680 mini-screw insertions by the same orthodontist. IJOI 2013;30:76-78.
5. Chang CH, Roberts WE. A retrospective study of the extra-alveolar screw placement on buccal shelves. IJOI 2013;32:80-89.

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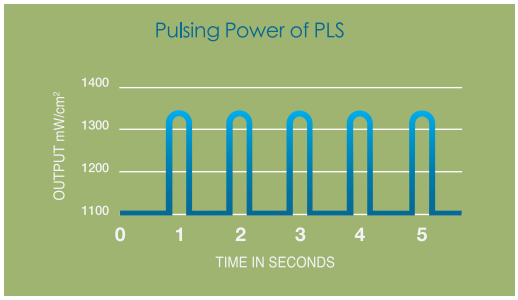

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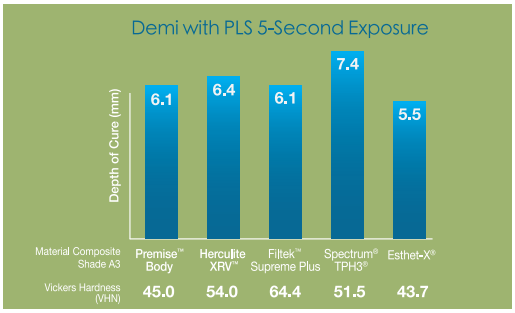

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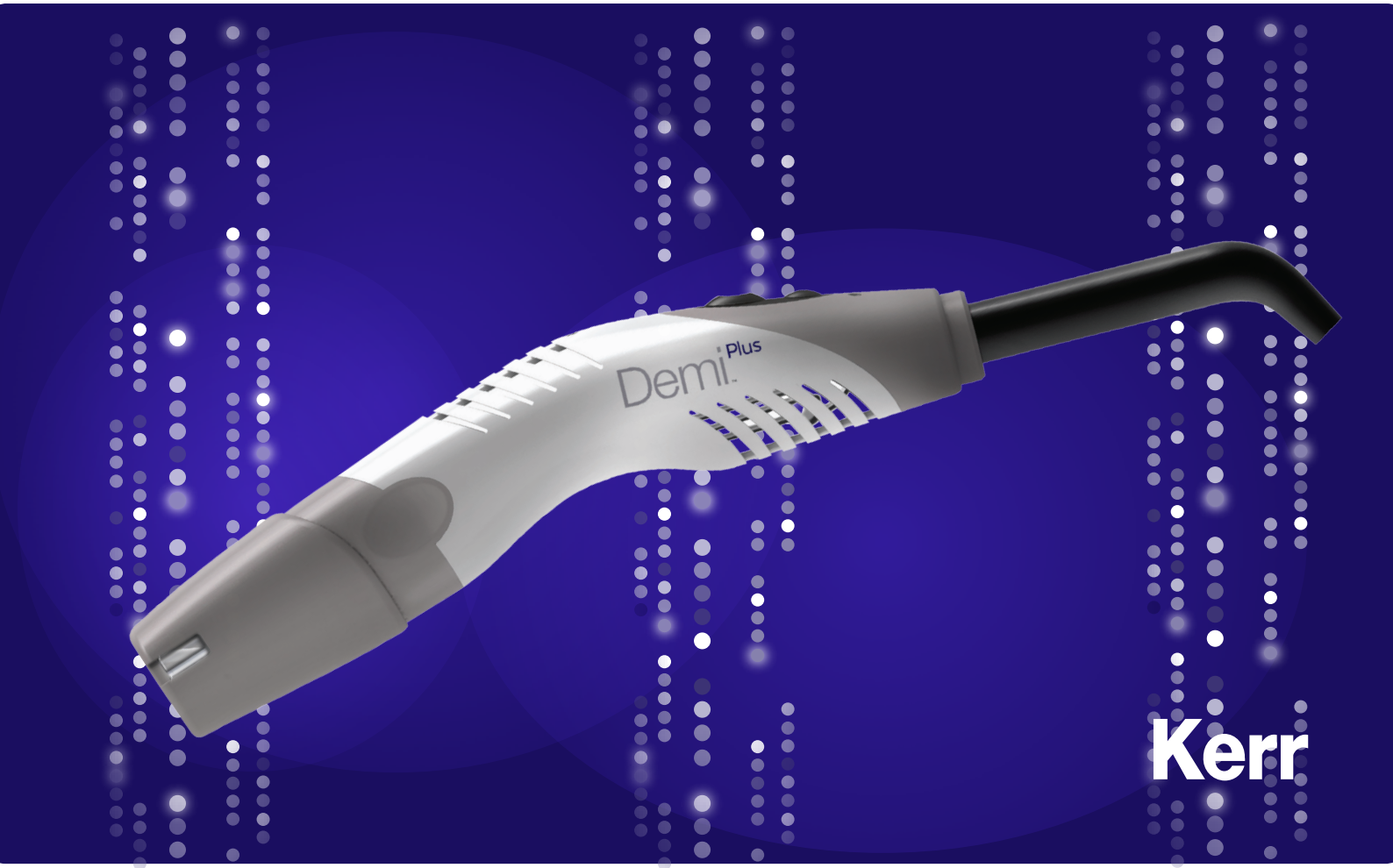

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現任貝多芬正畸植牙集團負責人，於1996年取得美國印第安那普渡大學齒顎正畸研究所博士學位，也是《國際正畸植牙期刊》(International Journal of Orthodontics & Implantology, IJOI) 發行人。他長期致力於正畸植體 (orthodontic bone screws) 的研發及運用。

講師：林錦榮醫師

現任林錦榮齒列正畸中心院長，於美國馬楷大學取得正畸碩士學位，是一位國際知名的正畸講師，他同時也是《創意正畸》(Creat ive Orthodontics) 一書作者，以及《國際正畸植牙期刊》(International Journal of Orthodontics & Implantology, IJOI) 的顧問。

親愛的張醫師：

[...]我身為一位講師和正畸醫師，透過這次台灣學習的經驗，獲得很多專業上的成長。我帶回了最新、最棒的知識、技術和實用的工具，包含如何利用蘋果電腦製作一流的簡報，這一切都要歸功於您的指導。我也在迷你骨釘的運用和治療優點上，獲得許多寶貴的學術參考資料。

除了對您萬分的感謝外，我也要感謝您熱心助人的夫人，以及您專業的診所員工。在他們身上我看到了一種組織、關懷和功能性的模範。我永遠不會忘記我在貝多芬集團學習期間所獲得的關注和協助，不論每個人所擔任的角色和功能[...]。

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

親愛的張醫師：

[...]我只能說這個課程遠遠超乎我的期望，這真是太棒了的學習經驗。張醫師和林醫師世界級的演講，以及您們多年累積的知識、經驗和智慧，都反映在您們所呈現的案例中。我也很珍惜有機會在您忙碌的診間，觀摩著您如何積極、輕鬆地實踐您在課程上所傳授的秘訣。

首先，身為極具創意的教育家，您鼓勵我們要有創造力來思考治療方式。其次，您介紹我們您的工作系統，以及Damon及OBS這些工具來幫助我們在自己的實務工作中也獲得成功。最後，您激勵我們要持續改進這個系統。我個人由衷感謝您給我們的這三個建議[...]。

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

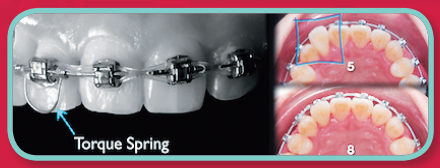
精緻的正畸完工 實際操作課程

Excellent Finishing Workshop

精緻的正畸完工為半天的實際操作課程，學習重點如下：

1. 正畸器位置的黏著（Bonding Position）
2. 三步彎絲法（Third Order Bend）

3. 單個牙轉矩調整 (Torque Spring)



4. 前牙轉矩調整 (Anterior Root Torque)

貝多芬正畸精英班

第一天 11/26 (三)

09:00—10:30	貝多芬Damon系統運用
10:30—11:00	休息
11:00—12:30	Optimized Orthodontic Treatment 優化正畸治療 *Dr. Chris Chang*
12:30—13:30	午餐
13:30—14:00	課程簡介
14:00—15:00	兒童牙科、植牙中心參觀
15:00—18:30	正畸門診見習

第二天 11/27 (四)

09:00—10:00	美學上的修整 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	精緻的正畸完工 實際操作課程 Excellent Finishing Workshop

第三天 11/28 (五)

09:00—10:30	精緻的正畸完工 案例示範
10:30—11:00	休息
11:00—12:00	正畸與種植的完美結合
12:30—13:30	午餐
14:00—15:00	OBS 模型實作
15:00—18:30	正畸門診見習

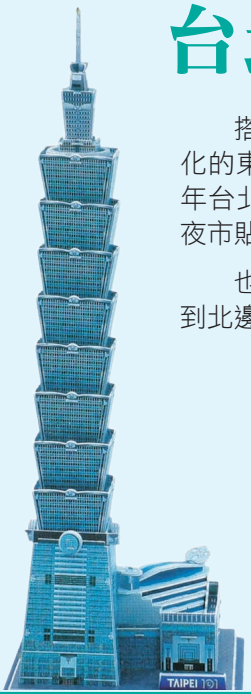
台北無限精采 自由行，11/29(六)

iAOI 2014 年度大會， 11/30(日)

09:00—10:30	張慧男博士演講
10:30—12:00	正畸種植結合的案例報告 I
13:00—15:00	特別來賓演講
15:00—17:00	正畸種植結合的案例報告 I

＊以上大會內容為暫定，僅供參考

台北無限精采 自由行



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iAOI 2014 年度大會

國際正畸種植學會（iAOI）將邀請張慧男博士及正畸種植界的權威進行演講，分享最火的臨床治療與診間諮詢技巧，並由多位準院士報告正畸與種植合併治療的精采案例，期盼透過分享這些實務經驗，提昇醫師自我醫療技術與品質。

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Conservative Adult Treatment for Severe Class III, Openbite Malocclusion with Bimaxillary Crowding

SUMMARY

A 24-year-old woman presented for orthodontics evaluation of a severe Class III malocclusion, that was complicated with an an anterior open bite, marked crowding in both arches, and lower lip protrusion. Maxillary first premolars and mandibular first molars were extracted. Differential space closure with a fixed, self-ligating appliance was supplemented with short, light Class III elastics. These conservative mechanics retracted the mandibular dentition to correct the negative overjet, reduced the buccal discrepancy and corrected the lower lip protrusion. In addition, the short, light Class III elastics produced a differential moment on the mandibular dentition to rotate the plane of occlusion counterclockwise, to correct the anterior open bite. This severe Class III malocclusion with a Discrepancy Index of 60 was corrected to an excellent functional and esthetic result, as documented by a Cast-Radiograph Score of 20, and a Pink and White Esthetic Score of 2. (IJOI 2014;34:12-25)

Key word:
Class III openbite malocclusion, bimaxillary crowding, atypical extraction, self-ligating appliance

History and Etiology

A severe Class III openbite malocclusion (*Figs. 1-3*) was treated to a near ideal result (*Figs. 4-6*) without orthognathic surgery. Chief complaints were anterior cross-bite and protrusive lower lip. An intraoral examination revealed a severely decayed mandibular right first molar and a restoratively compromised mandibular left first molar. The maxillary canines were blocked out bilaterally. The panoramic radiograph (*Fig. 7*) revealed that both mandibular third molars were mesially-angulated impactions. There was no additional contributing medical or dental history.

Low tongue posture was considered to the prevailing environmental etiology of the malocclusion, as evidenced by anterior interdental spaces and posterior cross-bite in centric occlusion (*CO*). The patient was treated with light force mechanics in an attempt to reverse the tongue posture etiology. When the dental morphology was corrected, the low tongue posture corrected spontaneously. The pleasing result is documented with clinical photographs (*Figs. 4-5*), casts (*Fig. 6*), as well as both lateral cephalometric and panoramic radiographs (*Fig. 8*). Superimposed cephalometric tracings (*Fig. 9*) show that light force, extractions and carefully focused mechanics resolved this severe dentoalveolar malocclusion without opening the vertical dimension of occlusion (*VDO*).

Diagnosis

Skeletal:

- Skeletal Class III (*SNA 80°, SNB 81°, ANB -1°*)
- Increased mandibular plane angle (*SN-MP 44°, FMA 37°*)

Dental:

- Negative overjet (*2 mm*)
- Anterior open bite (*3 mm*)
- Severe crowding (*>7mm*) in both arches

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

Fig. 1: Pretreatment facial photographs

Fig. 4: Post-treatment facial photographs

Fig. 2: Pretreatment intraoral photographs

Fig. 5: Posttreatment intraoral photographs

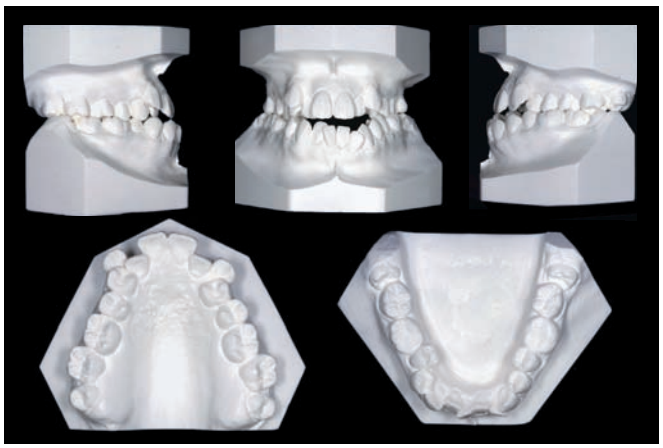

Fig. 3: Pretreatment study casts

Fig. 6: Posttreatment study casts

Fig. 7:

Pre-treatment panoramic and lateral cephalometric radiographs. The panoramic film shows that both mandibular third molars are mesially-angulated impactions.

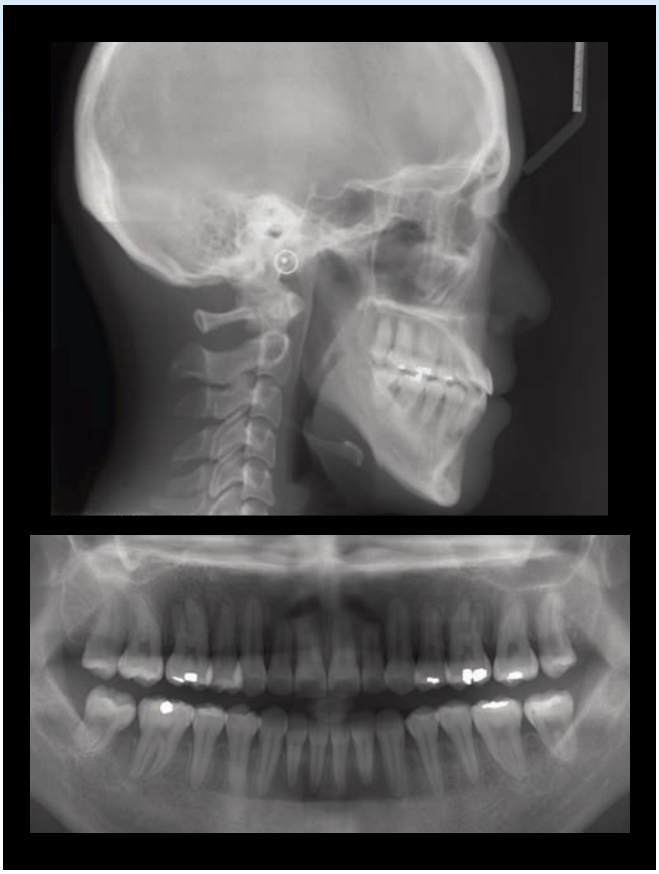

Fig. 8:

Post-treatment panoramic and lateral cephalometric radiographs. The panoramic film reveals that both mandibular third molars were uprighted and well aligned.

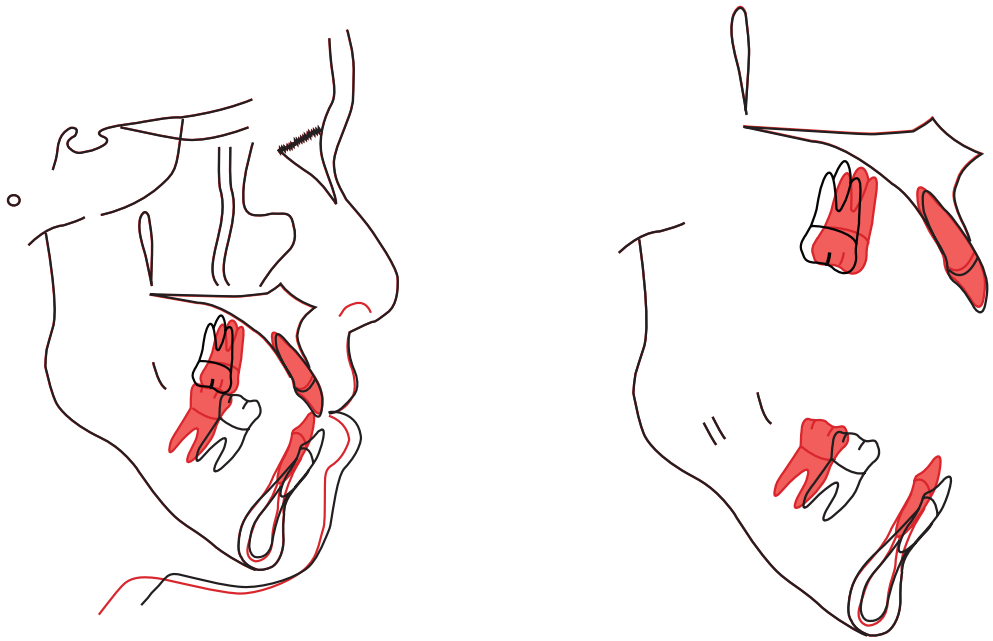

Fig. 9:

Superimposed cephalometric tracings indicate that the maxillary incisors have been maintained and molars have been protracted. The lower incisors have been retracted and the second molars have replaced the first molars. The protrusive lower lip has been corrected.

CEPHALOMETRIC			
SKELETAL ANALYSIS			
	PRE-Tx	POST-Tx	DIFF.
SNA°	80°	80°	0°
SNB°	81°	81°	0°
ANB°	-1°	-1°	0°
SN-MP°	44°	44°	0°
FMA°	37°	37°	0°
DENTAL ANALYSIS			
U1 TO NA mm	8 mm	8 mm	0 mm
U1 TO SN°	117°	117°	0°
L1 TO NB mm	8 mm	5 mm	3 mm
L1 TO MP°	82°	74°	8°
FACIAL ANALYSIS			
E-LINE UL	-3 mm	-3 mm	0 mm
E-LINE LL	1 mm	-0.5 mm	1.5 mm

■ Table 1: Cephalometric summary

- Bilateral Class III molar relationship (*7-8mm, more than a full cusp*)
- Posterior lingual crossbite (*#3, 4, 12, 13*)

Facial:

- Orthognathic profile Protrusive lower lip
- As shown in the subsequent worksheet, the Discrepancy Index (*DI*) was 60.

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: Maintain
- Vertical: Maintain
- Inter-molar Width: Expansion

Mandibular Dentition

- A - P: Retract the mandibular incisors
- Vertical: counterclockwise rotation of the occlusal plane to correct the openbite
- Inter-molar / Inter-canine Width: Maintain

Facial Esthetics: Retract protrusive lower lip

Treatment Plan

Extract both maxillary first premolars to resolve crowding of the upper dentition. Since the long-term prognosis for mandibular first molars was poor, they were extracted instead of the first premolars. This approach created space for resolving the mandibular crowding and correcting the negative overjet. Light, short Class III elastics were used to retract the entire lower dentition, as well as to rotate the lower occlusal plane counterclockwise to correct the anterior openbite.

Appliances and Treatment Progress

The maxillary first premolars and the mandibular first molars were extracted prior to bonding with a .022" Damon Q fixed appliance (*Ormco, Glendora, CA*). The maxillary incisors were bonded with low torque brackets, and high torque brackets were placed on the maxillary canines. For the lower arch, low torque brackets were bonded upside down on the incisors, and high torque brackets were placed on the lower canines (*Fig. 10*). The maxillary archwire was tied-back

Fig. 10:

The maxillary incisors were bonded with low torque brackets and the mandibular incisors were bonded with upside-down low torque brackets. High torque brackets were bonded on the upper and lower canines.

to the maxillary first molar to prevent labial flaring of the anterior teeth. An elastic chain was placed between the maxillary lateral incisor and canine to correct the mesial rotation of the lateral incisor. On the lower arch, the wire was tied-back from the mandibular second molar to the second premolar to avoid the archwire being pulled out of the second molar tube (*Fig. 11*). After the initial alignment, light short Class III elastics (*2 oz*) were applied from the

Fig. 11:

The maxillary canines are tied-back with stainless steel (SS) ligature first molar to canine to prevent labial flaring as the anterior teeth align. A elastic chain from the maxillary canine to the lateral incisor was used to correct and canine to correct mesial-in rotation of the lateral incisor. Another SS ligature was used to tie back the mandibular second premolar to the second molar to help avoid disengagement of the archwire during mastication.

maxillary first molar to the mandibular first premolar (*Fig. 12*). To correct the posterior crossbite, four buttons were bonded on the palatal side of the maxillary first and second molars and cross elastics were applied from these buttons to the mandibular molars (*Fig. 13*).

In the 11th month, .019x25" and .017x25" SS archwires were placed on the upper and lower arches, respectively. Elastic chains and intra-arch elastics (*3.5 oz*) were used to close the spaces.

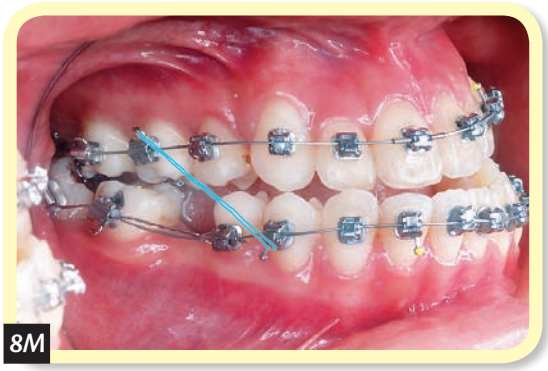

Fig. 12:

Light short Class III elastics (2 oz) were applied from the maxillary first molar to the mandibular first premolar.

Fig. 13:

Four buttons were bonded on the palatal side of the maxillary first and second molars and cross elastics were applied to the mandibular molars to correct the posterior crossbite.

At about 13 months after the initiation of active treatment, the negative overjet was corrected. Apparent gingival recession of the mandibular anterior teeth was noted and the patient was evaluated for connective tissue graft surgery (*Fig. 14*). However, careful assessment of the photographs relative to the radiographs revealed the problem was interproximal black triangles due to the tapered shape of the incisor crowns.

After closing all the spaces, the upper archwire was expanded with cross-elastics to correct the posterior crossbite. The lower archwire had step-in bends to move the mandibular third molars lingually (*Fig. 15*). In the finishing phase, the mandibular anterior brackets were rebonded to correct the angulation of the incisors and deepen the overbite (*Fig. 16*). Interproximal reduction was applied to reshape the mandibular incisors, which increased the contact area between the mandibular incisors and reduced the black triangles (*Fig. 17*). For final settling of the molar occlusion, the upper archwire was sectioned

Fig. 15:
The mandibular third molars were stepped-in to complete lower arch alignment.

Fig. 14:
Once the negative overjet was corrected, black triangles were noted between the tapered crowns of the mandibular incisors.

Fig. 16:
The brackets on the mandibular anterior teeth were rebonded to correct the axial inclinations and deepen the overbite.

Fig. 17:

Interproximal enamel reduction reshaped the mandibular incisors. Space closure with an elastic chain was indicated to reduce the black triangles.

Fig. 18:

The maxillary archwire was sectioned distal to the second premolars to allow the molars to settle.

distally to the second premolars (*Fig. 18*). After 27 months of active treatment, all appliances were removed.

Results Achieved

Maxilla (*all three planes*):

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

Mandible (*all three planes*):

- A - P: Retraction of the alveolar process
- Vertical: Maintained
- Transverse: Maintained

Maxillary Dentition

- A - P: Molars moved mesially
- Vertical: Maintained
- Inter-molar Width: Expanded in the molar area

Mandibular Dentition

- A - P: Mandibular incisors retracted
- Vertical: incisors were extruded due to counterclockwise rotation of the occlusal plane
- Inter-molar / Inter-canine Width: Maintained

Facial Esthetics: Protrusive lower lip retracted

Retention

Upper Hawley and lower spring retainers were delivered for upper and lower arches, respectively. Full time wear was prescribed for the first 6 months, and nights only thereafter. The patient was instructed in the home care and maintenance of the retainers.

Final Evaluation of Treatment

The ABO Cast-Radiograph Evaluation (*CRE*) score was 20 points, indicating an excellent resolution of a severe Class III openbite malocclusion. The major CRE discrepancies were buccolingual inclination and marginal ridge discrepancies. Since both of the mandibular first molars had a questionable long-term prognosis, and there were normal mandibular third molars on both sides, the optimal treatment plan for the mandible was extraction of the first molars rather than the first premolars. This extraction

pattern minimizes the eventual need for prosthetic restoration, but does result in bilateral Class II molar relationships.

The IBOI Pink & White Esthetic score was 2. The only problems were a flat incisal curve and the excessive axial inclination of the canines. The buccolingual angulation of the upper incisor and the nasolabial angle were maintained. The lower incisors were retracted which corrected the protrusive lower lip.

Discussion

The treatment of Class III malocclusion is challenging primarily due to inadequate diagnosis which often results in inappropriate mechanics. The 3-Ring Diagnosis[1] (*Fig. 19*) is an effective method for identifying Class III malocclusions conducive to conservative management. In addition, new technologies such as the MEAW[2] effect of the Damon system (*Ormco, Glendora, CA*) and extra-alveolar (*E-A*) Temporary Anchorage Devices (*TADs*) like the OrthoBoneScrew (*OBS*) (*Newton's A, Taiwan*) expedite the treatment of Class III malocclusion. Particularly when the two techniques are combined, there is a considerable expansion of the 3D envelope for conservative correction.

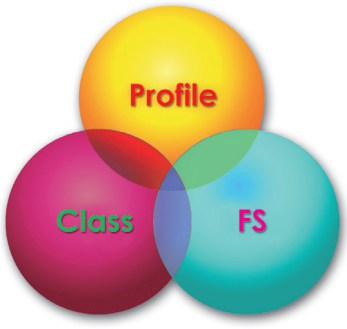

Fig. 19:

The 3-Ring Diagnosis:

1. **Profile** - *orthognathic profile at centric relation (CR) position.*
2. **Class** - *Canine and molar sagittal relationship (interdigitation).*
3. **FS** - *functional shift fro the CR to the CO positions of the mandible.*

The treatment options of Class III malocclusion depend on the nasolabial angle and the upper incisor inclination. For Class III patients who have a good nasolabial angle with normal upper incisor angulation, Class III elastics and low torque maxillary incisor brackets are sufficient to correct the malocclusion.[3] Labial flaring of the upper incisors is controlled by the low torque brackets when Class III elastics are used to retract the lower dentition. Low torque mandibular incisor brackets are placed upside down to achieve a high torque effect to prevent the lower incisors from tipping lingually, as the lower arch is retracted with Class III elastics (*Fig. 20a, b*).

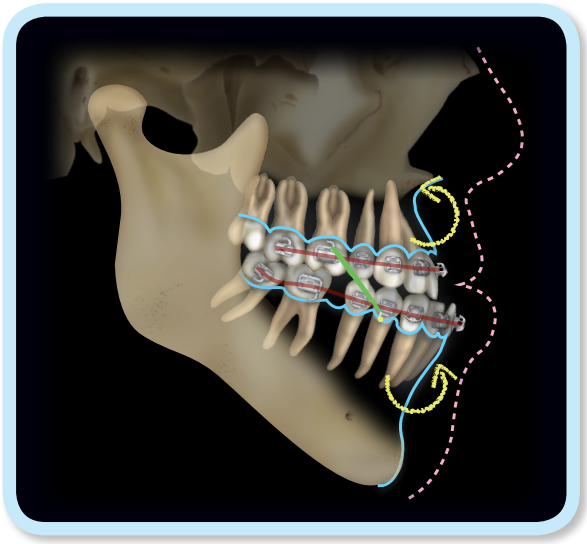

Fig. 20a:

Class III elastics produce counterclockwise moments on both arches, as well as tend to flare maxillary incisors, and tip mandibular incisors lingually. The undesirable incisor effects can be prevented with incisor brackets that have decreased labial root torque (LLT) in the maxilla and increased LLT in the mandible.

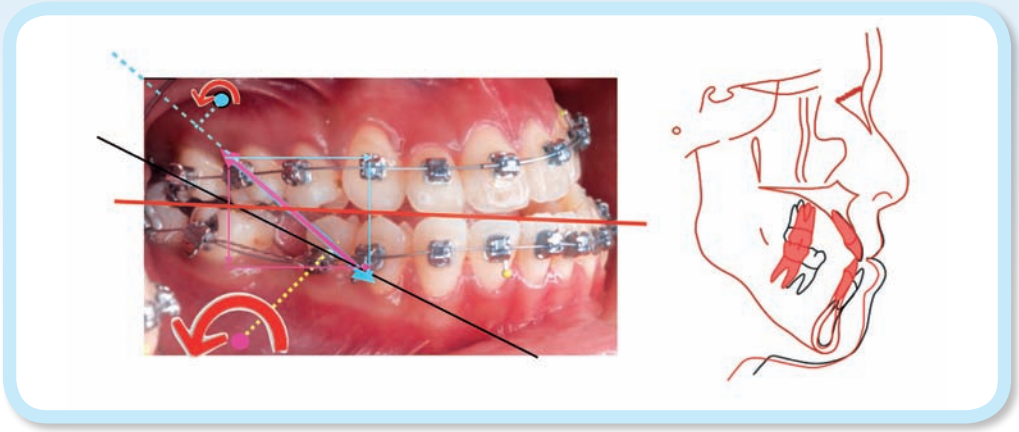

Fig. 20b:

Light, short Class III elastics have a line of force relative to the centers of resistance of the arches that produces differential counterclockwise moments on the maxillary and mandibular dentition favoring a flattening to the lower plane of occlusion (solid to dotted black line).

For severe Class III malocclusions with proclined upper incisors, mandibular buccal shelf E-A TADs can be used to retract the lower dentition to avoid a further increase in the axial inclination of the upper incisors. Another method is to place OBS screws in the infrazygomatic crest (*IZC*) areas. IZC screws are effective for retracting the upper dentition to resolve the problem of upper incisor proclination. Furthermore, Class III elastics from the IZC screws can be used to retract the entire lower dentition.[3]

To effectively retract the lower dentition of some severe Class III patients, the extraction of mandibular teeth is necessary. Lower arch extractions are helpful for the following aspects of treatment: 1. providing space for lower incisor retraction, and 2. controlling distal angulation of the terminal molar when the entire lower arch is retracted. Lower first premolar extractions are efficient for incisor extraction, but may be unfavorable for the correction of molar relationships.[4-5] Third molar extractions provide space to retract the entire lower dentition, but controlling the axial inclination of the second molars can be a problem. If a severe Class III molar relationship has a large negative overjet and the lower third molars are present, extraction of lower first or second molars provides several advantages: 1. more space for retracting the lower dentition, 2. less tendency to compromise the axial inclination of the terminal molar, 3. an opportunity to salvage third molars that otherwise may require extraction,[6] and 4. eliminate teeth with extensive caries, apical pathoses, or compromised restorations. All of these advantage applied to the present patient, so extraction the mandibular first molars was indicated.[7-8]

Facial profile plays a critical role for treatment planning of Class III malocclusion. An acceptable profile can deteriorate with Class III mechanics, so torque control of the anterior teeth is important.[9-10] For the present patient, low torque maxillary incisor brackets and reversed low torque mandibular incisor brackets were used to resist the axial inclination effects of Class III elastics. During the retraction of the lower dentition and extrusion of the anterior segment, gingival recession and black triangles were

noted for the lower incisors. Interproximal enamel reduction was indicated.[11] Moreover, rebonding the mandibular incisor brackets in a more gingival position improved the overbite (*Fig. 21a, b*).

Conclusion

Effective management of Class III malocclusion is a three step process. First, the 3-Ring Diagnosis method is used to assess the face. If a patient has an orthognathic profile or is willing to accept a slightly prognathic profile, conservative treatment without orthognathic surgery is indicated. Second, determine the position of the upper incisors required for an ideal nasolabial angle. If the upper incisors are proclined and/or there is crowding in the upper arch, placing IZC screws is a better option than using Class III elastics. Third, determine the optimal method for retracting the lower incisors: 1. buccal shelf E-A OBS, 2. Class III elastics and/ or 3. extraction of teeth in the lower arch. Careful adherence to these principles leads to efficient, conservative management of skeletal Class III malocclusion when indicated.

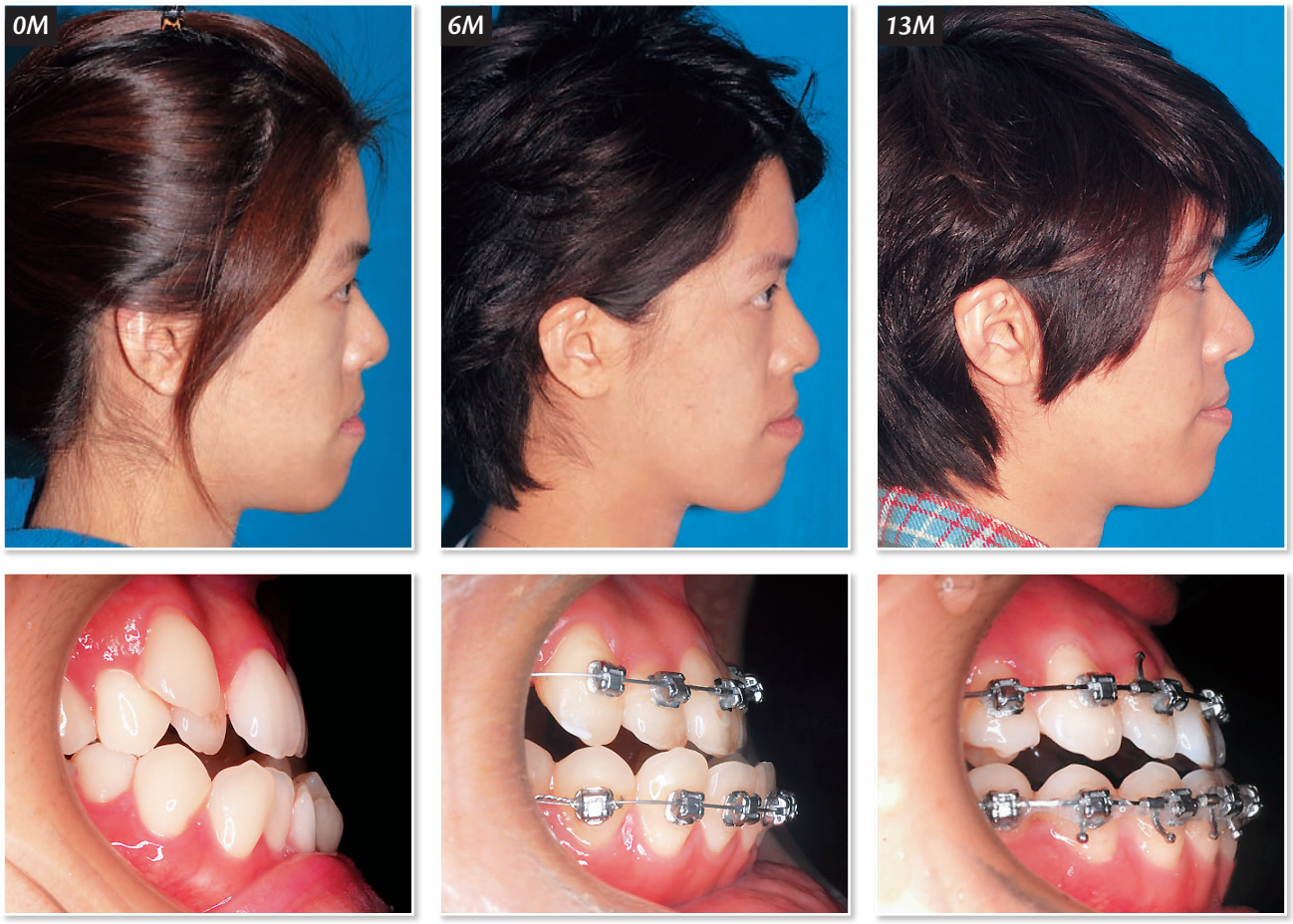

Fig. 21a:

At the initial leveling phase (6 mo), the profile became more protrusive. The subsequent use of light force Class III elastics improved the profile by retracting the lower incisors and decreasing their axial inclination (13 mo).

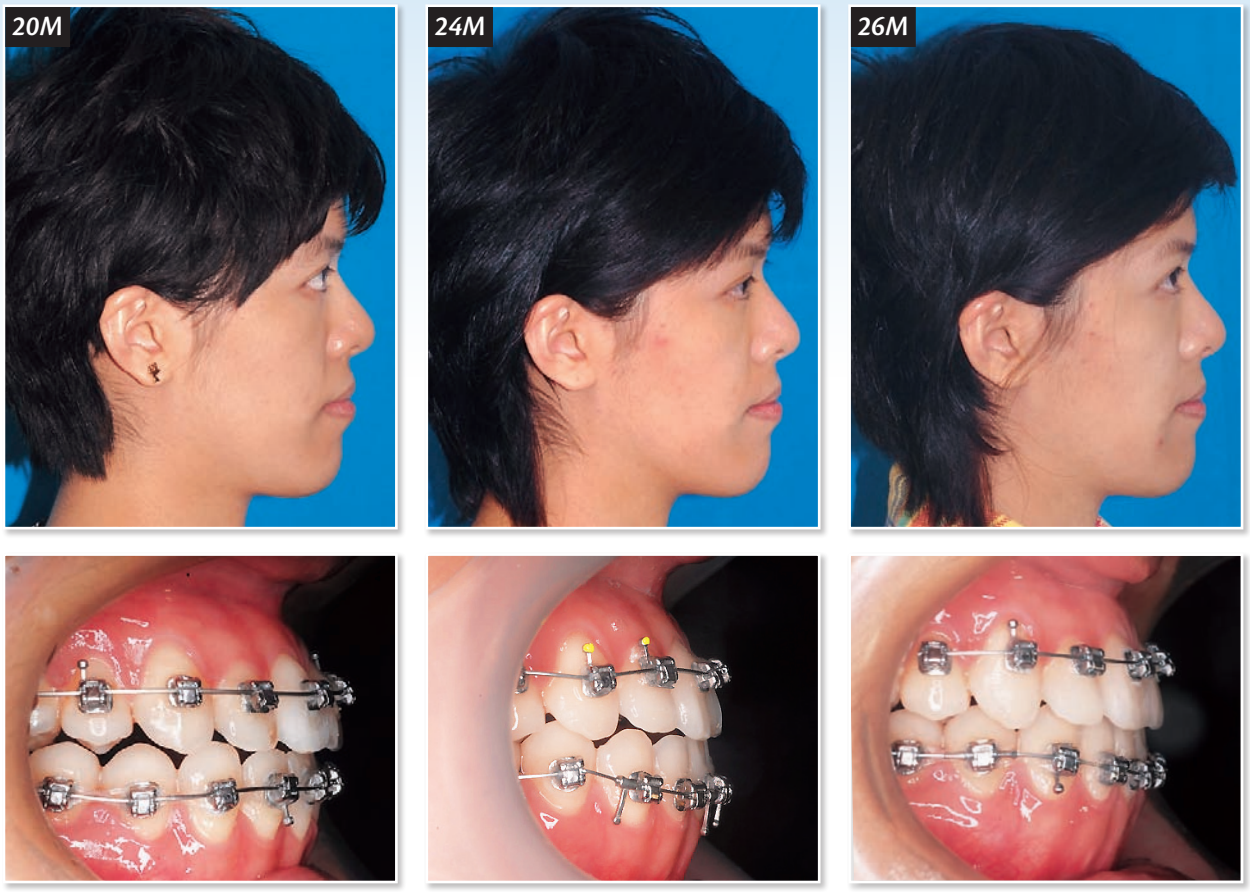

Fig. 21b:

During finishing, the mandibular incisor brackets were rebonded gingivally (24 mo) to adjust the labial crown torque and overbite. The profile was further improved (26 mo).

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Discrepancy Index Worksheet

TOTAL D.I. SCORE 60

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 = 16

OVERBITE

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

Total = 0

ANTERIOR OPEN BITE

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

Total = 11

LATERAL OPEN BITE

2 pts. per mm. per tooth

Total = 0

CROWDING (only one arch)

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

Total = 7

OCCLUSION

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

Total = 8

LINGUAL POSTERIOR X-BITE

1 pt. per tooth Total = 4

BUCCAL POSTERIOR X-BITE

2 pts. per tooth Total = 0

CEPHALOMETRICS (See Instructions)

ANB ≥ 6° or ≤ -2° = 4 pts.

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

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

SN-MP
≥ 38° = 2 pts.
Each degree > 38° 6 x 2 pts. = 12

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

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

Total = 14

OTHER (See Instructions)

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

Identify:

Total = 0

IMPLANT SITE

Lip line : Low (0 pt), Medium (1 pt), High (2 pts) =_____
Gingival biotype : Low-scalloped, thick (0 pt), Medium-scalloped, medium-thick (1 pt), High-scalloped, thin (2 pts) =_____
Shape of tooth crowns : Rectangular (0 pt), Triangular (2 pts) =_____
Bone level at adjacent teeth : ≤ 5 mm to contact point (0 pt), 5.5 to 6.5 mm to contact point (1 pt), ≥ 7mm to contact point (2 pts) =_____
Bone anatomy of alveolar crest : H&V sufficient (0 pt), Deficient H, allow simultaneous augment (1 pt), Deficient H, require prior grafting (2 pts), Deficient V or Both H&V (3 pts) =_____
Soft tissue anatomy : Intact (0 pt), Defective (2 pts) =_____
Infection at implant site : None (0 pt), Chronic (1 pt), Acute(2 pts) =_____

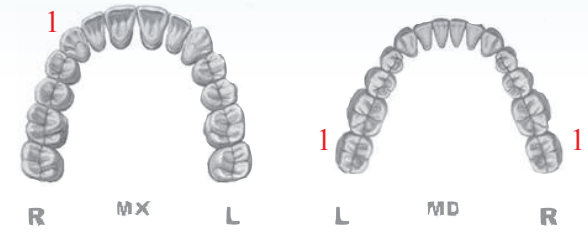
Total = 0

Cast-Radiograph Evaluation

Total Score: 20

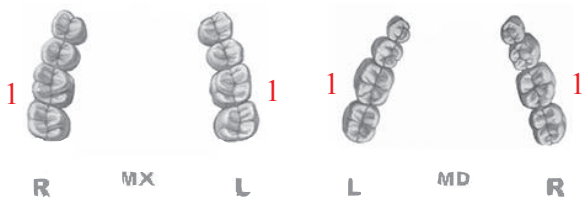
Alignment/Rotations

3



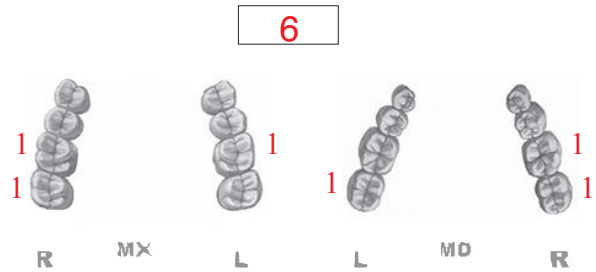
Marginal Ridges

4



Buccolingual Inclination

6

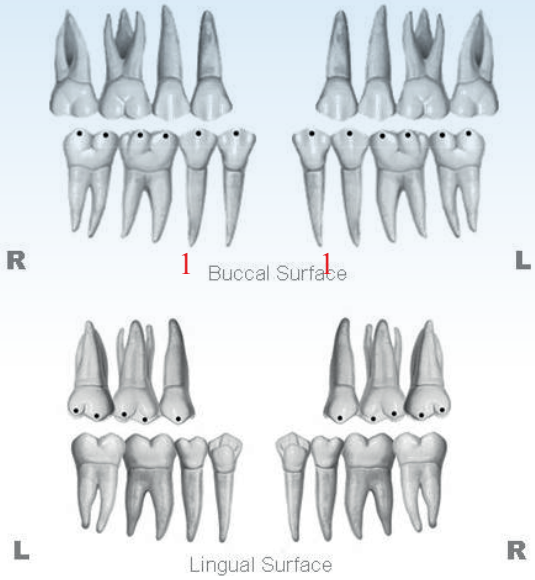


Overjet

2

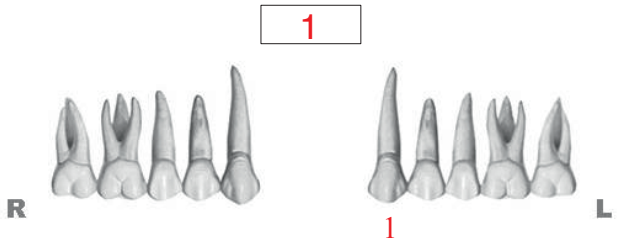
Occlusal Contacts

2



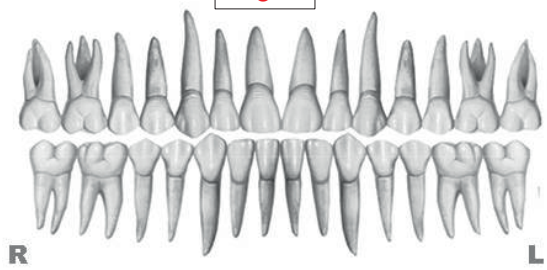
Occlusal Relationships

1



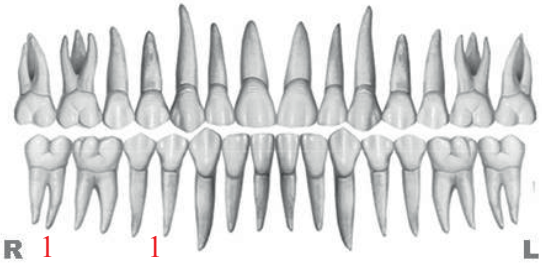
Interproximal Contacts

0



Root Angulation

2



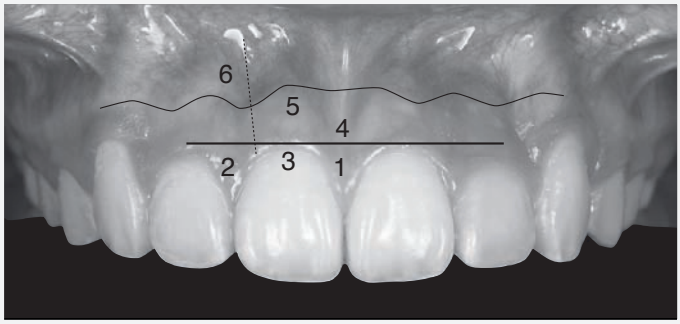
INSTRUCTIONS: Place score beside each deficient tooth and enter total score for each parameter in the white box. Mark extracted teeth with "X". Second molars should be in occlusion.

IBOI Pink & White Esthetic Score

Total Score: = 2

1. Pink Esthetic Score

Total = 0

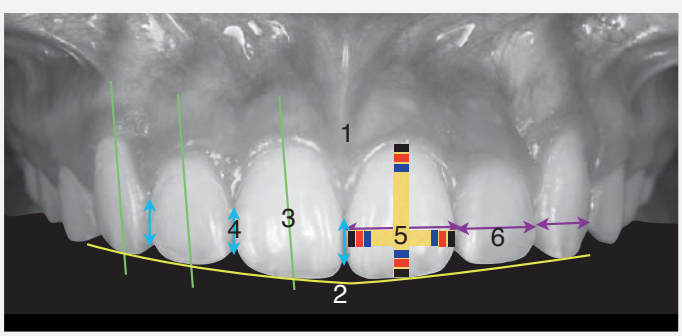


1. M & D Papillae	0	1	2
2. Keratinized Gingiva	0	1	2
3. Curvature of Gingival Margin	0	1	2
4. Level of Gingival Margin	0	1	2
5. Root Convexity (Torque)	0	1	2
6. Scar Formation	0	1	2

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

2. White Esthetic Score (for Micro-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

2014 Beethoven International Damon, OBS & VISTA Workshop

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

LECTURER: Dr. Chris Chang

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

LECTURER: Dr. John Lin

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

Dear Chris:

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

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

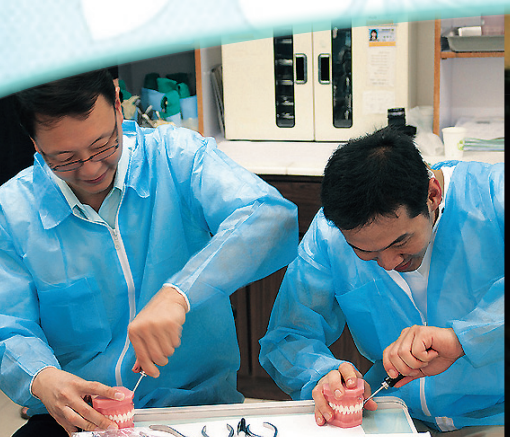
Dr. Patricia Vergara Villarreal (right)
Orthodontist, the Military University.CIEO. of Bogota

Dear Chris:

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

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

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



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

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

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

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

Damon, OBS & VISTA

Day 1

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

Day 2

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

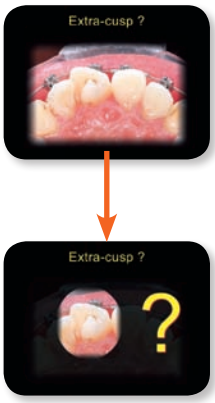
Day 3

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

Keynote Workshop

Make your presentation great

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



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

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

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

Day 4 - Keynote

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

Damon & OBS Workshop

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

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

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

Keynote Presentation workshop

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

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

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

Registration:

A 50% deposit is required to complete registration.

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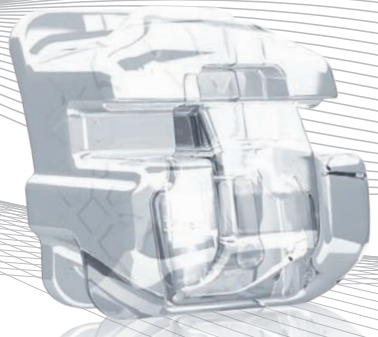
Keynote Workshop 簡報課程



即日起至2014/06/25止

Sale	10人份	20人份	50人份
DAMON Q	贈品 ❶ .014 Damon Copper Ni-Ti 10條 ❷ .014x.025 Damon Copper Ni-Ti 10條 ❸ .019x.025 Damon SS 10條	贈品 ❶ .014 Damon Copper Ni-Ti 10條 ❷ .014x.025 Damon Copper Ni-Ti 10條 ❸ .019x.025 Damon SS 10條 ❹ Damon Q 器械 1支 ❺ Enlight(光照含氟矯正專用黏著劑) 1支 ❻ Ortho Solo(多功能光照黏著基底劑) 1瓶 ❼ 張慧男醫師-助理訓練課程 1名	贈品 ❶ Damon Copper Ni-Ti 100條(任選) ❷ Bondable Tube 100顆 ❸ 金牛頓 Keynote Workshop 高效簡報學習法系列課程(K1~K3)
DAMON CLEAR 5┼5 3┼3 + DAMON Q 54|45	贈品 ❶ .014 Damon Copper Ni-Ti 10條 ❷ .014x.025 Damon Copper Ni-Ti 10條 ❸ .019x.025 Damon Colored TMA-Honeydew 5條 ❹ Enlight(光照含氟矯正專用黏著劑) 1支	贈品 ❶ .014 Damon Copper Ni-Ti 10條 ❷ .014x.025 Damon Copper Ni-Ti 10條 ❸ .019x.025 Damon Colored TMA-Honeydew 5條 ❹ Enlight(光照含氟矯正專用黏著劑) 1支 ❺ Ortho Solo(多功能光照黏著基底劑) 1瓶 ❻ 張慧男醫師-助理訓練課程 1名	贈品 ❶ Damon Copper Ni-Ti 100條(任選) ❷ Clear Debonding Plier 1支 ❸ .019x.025 Damon Colored TMA-Honeydew 20條 ❹ Damon Clear + Q Typodont 1個 ❺ 金牛頓 Keynote Workshop 高效簡報學習法系列課程(K1~K3)

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Orthodontics and Implant Treatment of a Class II Crowded, Partially Edentulous Malocclusion

SUMMARY

An adult female presented with a compensated Angle Class II malocclusion complicated by severe crowding, posterior crossbite and absence of five permanent teeth. An extended period of dental neglect resulted in a severe asymmetric malocclusion with major discrepancies in the vertical, transverse, and anterior-posterior dimensions. A self-ligating appliance with bite turbos and bone screw anchorage achieved a preprosthetic alignment consistent with the patient's desire for normal function and pleasing esthetics. However, a bite turbo on the maxillary left lateral incisor was associated with pulp necrosis, internal resorption and an unrestorable tooth fracture during orthodontics treatment. The fractured tooth was temporarily restored by bonding the factored crown to the adjacent teeth. Cone bean CT images were taken, and one month later the fractured incisor was gently extracted. An implant was placed with a surgical stent via a flapless approach, and Platelet Rich Fibrin (PRF) was used to fill the apical fistulous tract and the gap between the fixture and the alveolar crest of bone. An immediate provisional restoration was used to restore optimal esthetics and function, as well as to serve as a guide for optimal healing of soft and hard tissue. (IJOI 2014;34:30-55)

Key word: *Angle Class II malocclusion, deep bite, posterior crossbite, multiple missing teeth, self-ligating appliance, bite turbo, internal root resorption, fatigue fracture, bone screw anchorage, atraumatic extraction, immediate implant placement, surgical stent, Platelet Rich Fibrin (PRF), immediate provisional restoration.*

History and Etiology

A 27-year-and-10-month-old female desired comprehensive treatment for a complex malocclusion (*Figs. 1-3*). Her chief complaints were an unesthetic dentition and functional problems when chewing. There were no known harmful habits which might have contributed to the malocclusion. The initial clinical exam revealed a complex malocclusion that was compromised by a long period of dental neglect. The patient preferred an interdisciplinary treatment plan to align and restore her teeth with a minimum of implants, prosthetics and treatment

Fig. 1: Pretreatment facial photographs

Fig. 2: Pretreatment intraoral photographs

Fig. 3: Pretreatment study models

Dr. Yu-Hsin Huang, Diplomate, International Association of Orthodontists and Implantologists (iAOI) (right)
Dr. Chris Chang, Director, Beethoven Orthodontic Center (middle)
Dr. W. Eugene Roberts, Consultant, *International Journal of Orthodontics & Implantology* (left)

Fig. 4: Progress facial photographs

Fig. 5: Progress intraoral photographs

Fig. 6: Progress study models

time. She was treated to an acceptable result as documented in Figs. 4-6. Cephalometric and panoramic radiographs document the complexity of the malocclusion (*Fig. 7*), as well as the post-treatment results (*Fig. 8*). Note that the patient is not in occlusion when the panoramic radiographs were exposed to provide a better view of the crowns for all teeth. Superimposed cephalometric tracings reveal the treatment achieved (*Fig. 9*).

Diagnosis

Bilateral class II buccal segments were complicated by: 1. missing first and second molars (#*30 & 31*) in the lower right quadrant, 2. residual roots for the upper right first molar (#*3*) and upper left second molar (#*14*), 3. multiple compromised restorations, and 4. active caries (*Figs. 2-3*). Orthodontics evaluation revealed a 6.5mm overjet, 4mm overbite, and anterior crowding was noted in both arches. Fig. 10 is a differential display of the anterior crowding, irregular dental alignment, and compromised gingival display in both anterior segments. The right posterior crossbite is more clearly visualized in a pharyngeal (*back*) view of the right segments of the pretreatment casts (*Fig. 11*). The upper right second molar (#*2*) was extruded and contacting the opposing edentulous ridge. Preprosthetic

Fig. 7:
Pretreatment panoramic and cephalometric radiographs

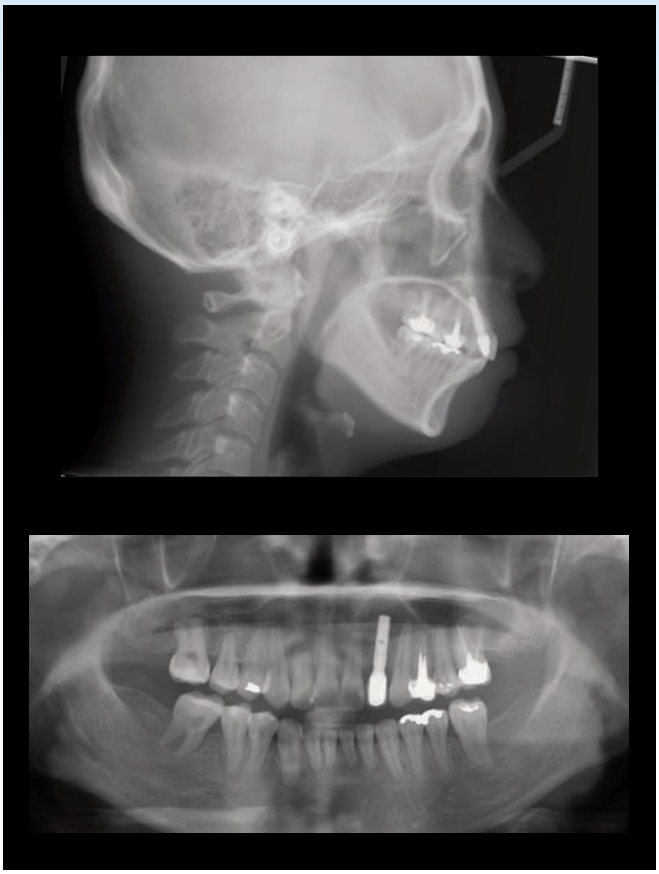


Fig. 8:
Post-treatment panoramic and cephalometric radiographs

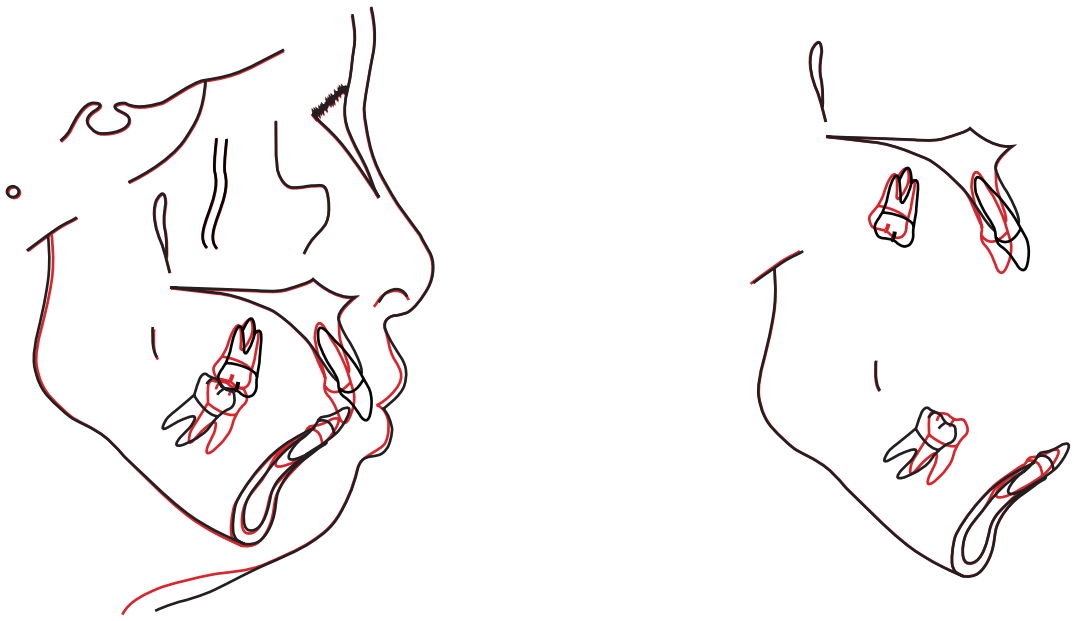


Fig. 9:
Superimposed tracings show retraction of the maxillary incisors and the intrusion of the lower incisors. Maxillary molars were retracted and slightly intruded. Mandibular molars were uprighted and moved mesially. Lip protrusion was reduced to improve the facial profile.

CEPHALOMETRIC			
SKELETAL ANALYSIS			
	PRE-Tx	POST-Tx	DIFF.
SNA°	80°	80°	0°
SNB°	73°	73°	0°
ANB°	7°	7°	0°
SN-MP°	45.5°	46°	0.5°
FMA°	38°	38.5°	0.5°
DENTAL ANALYSIS			
U1 TO NA mm	8 mm	2 mm	6 mm
U1 TO SN°	109°	98°	11°
L1 TO NB mm	12.5 mm	8 mm	4.5 mm
L1 TO MP°	102°	102°	0°
FACIAL ANALYSIS			
E-LINE UL	3.5 mm	1.5 mm	2 mm
E-LINE LL	5 mm	3 mm	2 mm

Table 1: Cephalometric summary

orthodontics was essential for restoring this patient to optimal esthetics and function, in a cost-effective manner.

Angle Classification:

- Bilateral Class II molar relationship
- Full cusp discrepancy bilaterally is simulated in Fig. 12 for this complex, acquired malocclusion.

Tooth Size Arch Length Discrepancy:

- Maxillary: 9mm of crowding
- Mandibular: 2mm of crowding

Transverse Problems:

- Buccal crossbite of upper right 2nd molar (#2)
- Lower midline discrepancy was 1.5mm to the right

Facial: Protrusive lips

Radiographic\Cephalometric:

- Skeletal: Class II (*SNA 80°, SNB 73°, ANB 7°*), high mandibular plane angle (*SN-MP 45.5°*)
- Dental: Increased axial inclination of the lower incisors (*IMPA 102°*)

Radiographic\Panoramic:

- Atrophic bony height in the posterior edentulous areas of the mandible
- A faint periapical radiolucency was noted mesial to the root of the upper left lateral incisor (#*10*), but the tooth was asymptomatic

Radiographic\Other:

- Asymmetric contours of the condylar heads were noted (*Fig. 13*)

ABO Discrepancy Index (*DI*)

- Score of 61 including 4 points added for implant site evaluation as shown in the subsequent worksheet.[1]

Specific Treatment Objectives

Maxilla (*all three planes*):

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

Mandible (*all three planes*):

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

Maxillary Dentition

- A - P: Retract molars and incisors
- Vertical: Slight intrusion of molars and incisors

Fig. 10:

Adults with crowded incisors that have a tapered shape and irregular gingival contours are prone to loss of papilla height and interproximal black triangles when the teeth are aligned. This problem is best managed in during orthodontic finishing with enameloplasty: IPR (interproximal reduction) and recontouring of wore incisor edges.

Fig. 11:

The posterior (pharengeal) view of the casts shows the right posterior third molar is in full buccal crossbite.

Fig. 12:

Bilateral full-cusp, Class II relationships in both buccal segments of this partially edentulous malocclusion are clearly demonstrated with virtual first molars.

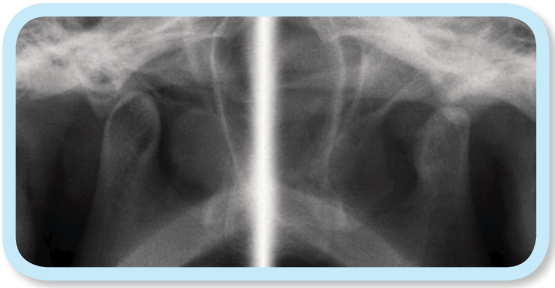


Fig. 13:

Asymmetric mandibular condylar heads were noted, but there were no signs or symptoms of temporomandibular disorder.

- Intermolar Width: Maintain
- Intercanine Width: Maintain
- Buccolingual Inclination: Maintain

Mandibular Dentition

- A - P: Mesial movement and uprighting of molars, slight retraction of incisors
- Vertical: Slightly extrude molars as they are uprighted and intrude incisors
- Inter-molar Width: Maintain
- Inter-canine Width: Maintain
- Buccolingual Inclination: Correct right 3rd molar axial inclination

Facial esthetics: Reduce lip protrusion

Treatment Plan

Minimizing the numbers of implants was an important orthodontics objectives. The first priority was to extract residual roots of the upper right first (#3) and upper left second (#15) molars, as well as the lower left third molar (#17). The patient was informed that a root canal might be needed for the upper right lateral incisor (#10), because of the radiolucency (*Fig. 14*). Standard torque brackets were prescribed

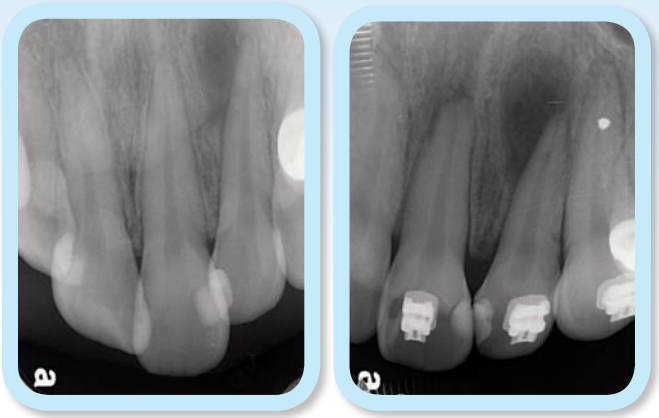


Fig. 14:

Although a possible periapical lesion is shown pre-treatment (left), the upper left lateral incisor (#10) was not symptomatic until six months later, shortly after a bite turbo had been applied. Note the small area of external root resorption in the distal cervical area of #10 prior to endodontic treatment.

for both the upper and lower incisors. Bite turbos were needed in combination with cross elastics to correct the crossbite.[2] Freedom to upright the right lower third molar required intrusion of the upper second molar. Bone screws in the infrazygomatic crests were necessary to retract the protruded maxillary dentition. A third bone screw in the lower right buccal shelf was necessary to protract the lower right third molar. If the residual spaces, especially the 17mm on the lower right side, could be closed completely, the upper right 3rd molar (#1) could be extracted, and no posterior implants would be placed. Final occlusion was detailed with vertical elastic traction.[3] The corrected dentition would be retained with fixed retainers and clear retainers.

Appliances and Treatment Progress

After the residual roots of #3 & 15, as well as tooth #17, had been extracted, a .022" slot self-ligating appliance Damon Q bracket system (*Ormco*) was used. Standard torque brackets were bonded on both upper and lower incisors. The initial upper

Fig. 15:

A bite turbo on the upper right lateral incisor is used to disarticulate the occlusion to expedite alignment of both arches. Occlusion on the bite turbo produces an intrusive force and a moment on the incisor that is directly proportional to the length of the lever arm.

archwire was .014 CuNiTi was fitted with resin "*pearls*" that were bonded on the ends of the archwire to prevent mucosal irritation. Bite turbos were placed on teeth #7 & 11 (*Fig. 15*) to correct the crossbite of #7 & 32. Furthermore a lingual button was bonded on tooth #32 for to attach a criss-cross elastic (*Quail 3/16" 2oz*). In the 4th month of active treatment, the crowding was relieved and the crossbite of #7 was corrected. Then a upper .014"x.025" CuNiTi wire was engaged for root torque and axial inclination control. At the same appointment, the left anterior bite turbo was moved from the maxillary canine (#11) to the adjacent lateral incisor (#10). Two months later, the patient complained of pain, and the pulp of the upper left lateral incisor (#10) was found to be necrotic, so the patient was referred for root canal therapy (*Fig. 14*). After 10 months of treatment, the

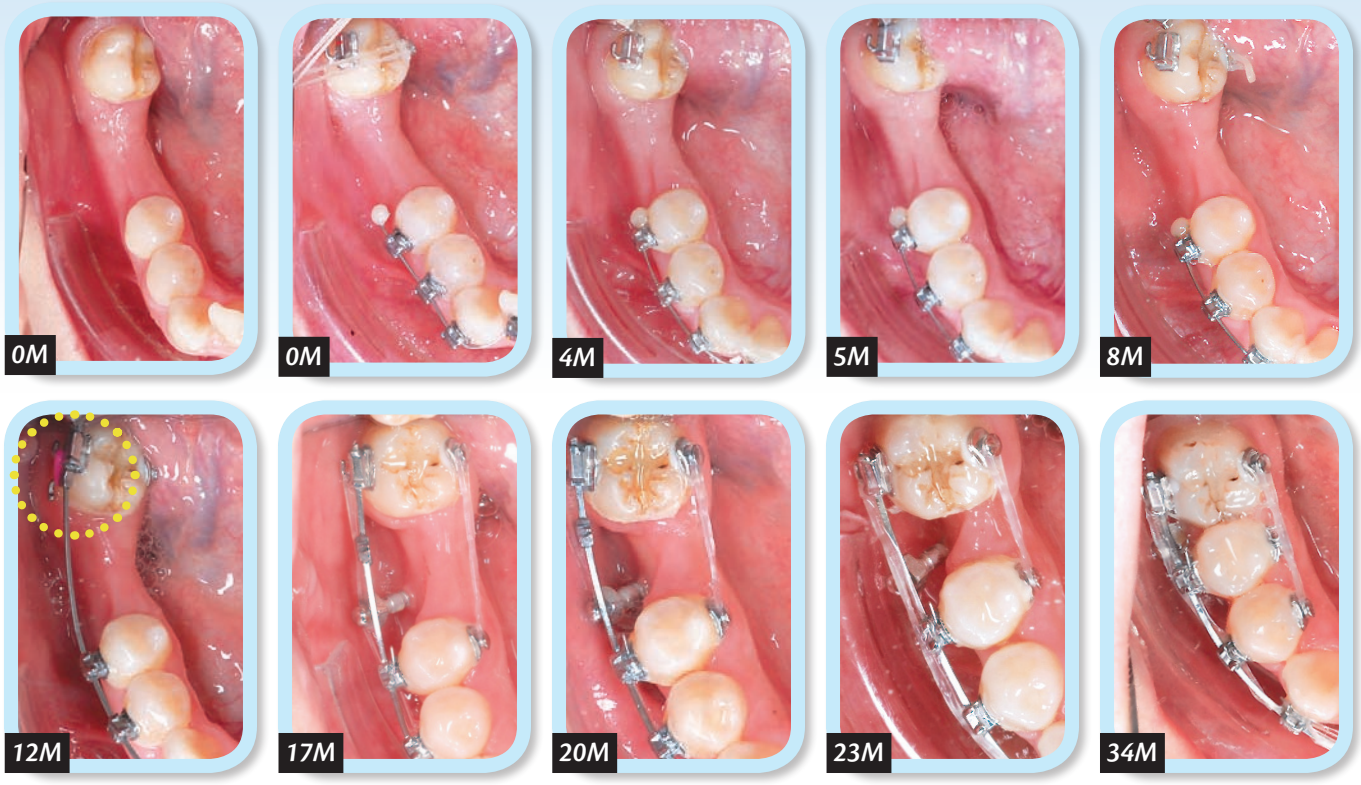


Fig. 16:

Progress photographs for the first 8 months of treatment (top four views) show little progress in uprighting the third molar (#32). Subsequent use of a rectangular archwire and a bone screw efficiently uprighted the molar. The bone screw was also used to protract the molar to close the edentulous space from 12-34 months.

criss-cross elastics had not corrected the lingual collapse of the lower right third molar (*Fig. 16*). A bone screw (*2x12mm OrthoBoneScrew, Newton's A Ltd.*) was placed in the lower right buccal shelf to upright #17. Two months later #17 was uprighted and in occlusion, so the bone screw was removed (*Fig. 17*). In the 11th month, a new upper .017"x.025" TMA arch wire was placed and the figure-eight ligature was tied to maintain firm contact of the six anterior teeth. In the 12th month, the bone screw in the buccal shelf was removed and a lower 014" x.025" CuNiTi wire was placed (*Fig. 18*). However the distance between teeth #29 & 32 was too large to maintain the archwire in the slot. A crimpable hook was placed on the archwire in front of #32, and an O-ring was used to secure the archwire to the tooth to prevent the tail of the wire from slipping out (*Fig. 16*). Bite turbos were placed on the upper second premolars to open the bite to allow #17 to be moved mesially into the plane of occlusion. Drop-in hooks were fitted in the vertical slot of the lower second premolars to secure class II elastics (*Parrot 5/16" 2oz*).

In the 15th month, a lower .016"x.025" stainless steel archwire was placed to accommodate the greater force for the class II elastics (*Fox 1/4" 3.5oz*). One month later, bone screws (*2x12mm OrthoBoneScrew, Newton's A Ltd.*) were inserted into the infrazygomatic crests bilaterally to retract the entire maxillary dentition, except for tooth #2. Another bone screw was placed buccal and distal to the lower right second premolar to protract the third molar with the power chains. The lower six anterior teeth were tied together with a figure-eight ligature. Drop-in hooks were fitted in the vertical slot of the upper canines for wearing Class II elastics, which were used continuously until the end

Fig. 17:

A power chain from a lingual button bonded on the lower right third molar (#32) applied an intrusive and buccal force that uprighted the molar in 3 months.

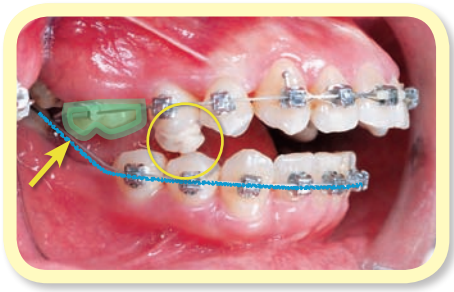


Fig. 18:

A bite turbo was added to the upper right 2nd premolar (#4) to provide clearance for the lower archwire (yellow arrow) to prevent it being dislodged form the tube on #32. The lower archwire was secured with a crimpble hook on the archwire that was connected to the buccal tube hook with an elastic O-ring, as shown for the 12th month of treatment in Fig. 16.

Fig. 19:

After the crowding was relieved, the black triangles were corrected with IPR (interproximal reduction) and the space created was closed with power chains.

of active treatment.

In the 30th month, black triangles were noted interproximally between the four upper incisors. After interproximal enamel reduction, an elastomeric chain was applied to close the space (*Fig. 19*).[4] Two months later, both bone screws on the right side were removed. A progress panoramic film showed that most of the residual spaces had been closed, so implants would not be needed (*Fig. 20*). However, unacceptable root inclinations of teeth #4, 5, 12 and 32 were managed by repositioning their brackets and realigning with the flexible .014"x.025" CuNiTi wires. During the bracket repositioning procedure for the upper left lateral incisor the coronal portion of the tooth fractured from its root (*Fig. 21*). It was clear that the tooth was hopeless and an implant was required to replace it. As a temporary measure, the coronal portion of the upper left lateral incisor was shaped to simulate an oval pontic and it was

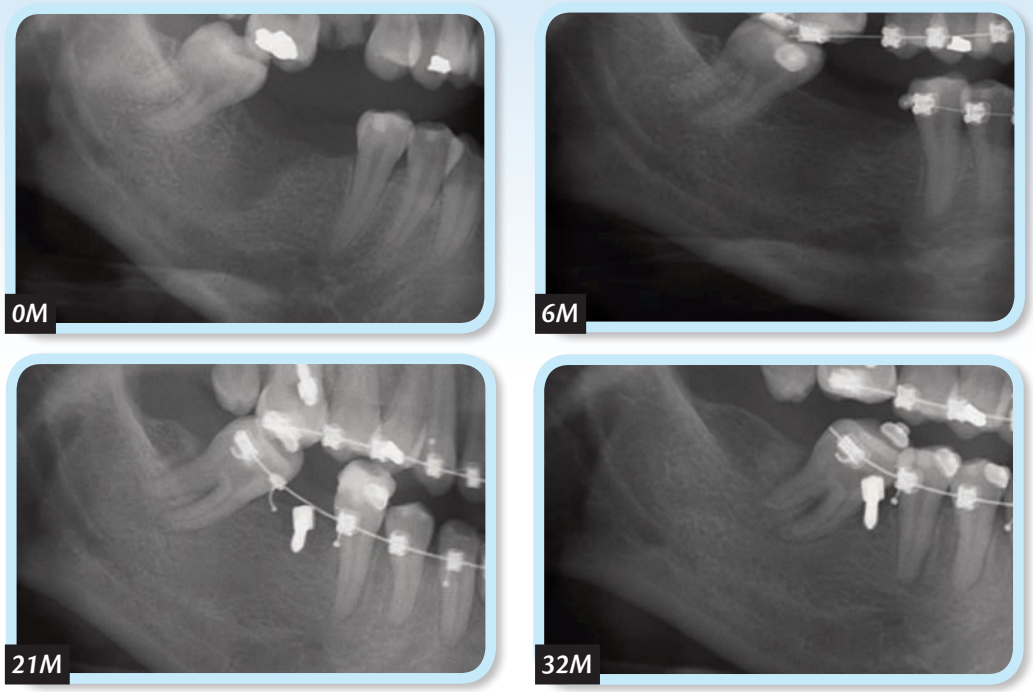


Fig. 20:

The buccal uprighting and 17mm mesial protraction of the lower right third molar is shown in a series of panoramic radiographs taken at 0, 6, 21 and 32 months of treatment. The mesial protraction of the molar was actually accomplished in about 22 months because the first 10 of treatment involved the unproductive attempt to upright #32 with cross-elastics.

Fig. 21:

Internal resorption of the lateral incisor, that was first noted at 6 months of treatment (Fig. 14), progressively weakened the incisor which was also used to secure a bite turbo. Subsequently the tooth fractured due to the moment produce by the turbo lever arm. The unfavorable fracture and internal root resorption precluded a forced eruption followed by a post and core procedure. To prevent the collapse of the soft tissue, the cervical portion of the fractured crown was filled with composite resin and smoothed to form an pontic, that was bonded immediately to the adjacent teeth with flowable resin.

bonded interproximally to the adjacent teeth.

Implant Placement

Presurgically, the gingiva surrounding the residual root of #10 was assessed as flat with a thick gingival bio-type. The fistula was near the mucogingival junction and the tissue surrounding it was inflamed (*Fig. 21*). The overbite and overjet had been corrected to a minimal overlap favorable for the implant placement. Radiographic slices from the CT scan showed the alveolar process of the residual root was intact at the crest and was ~1mm thick along the facial surface, except for the area of the apical fenestration (*Fig. 22*).

According to the 2B-3D rule, the implant was inserted virtually into a slice of the CT scan to confirm the diameter and length of the fixture, consistent with the ideal prosthetic position of the implant-supported crown. The angulation and location of the fixture were duplicated on the cast, as well as the clear surgical stent (*Figs. 22-23*).[5]

Before implant placement, a relatively atraumatic removal of the residual root was performed. The tooth-connected residual fibers were severed with a #15c blade, and the root was sectioned into palatal and facial fragments with a high speed handpiece. First the palatal fragment was removed gently by inserting an elevator (*periotome*) in the mesial and distal periodontal ligament space (*Fig. 24*). Subsequently, the facial fragment was more easily removed, without harming the integrity of the labial plate of bone. After extraction of the root segments, all of the granular tissue and residual debris were removed with a surgical bone excavator and curettes. The labial surface of the alveolus was gently probed to detect the apical perforation due to the fistulous tract (*Fig. 25*).

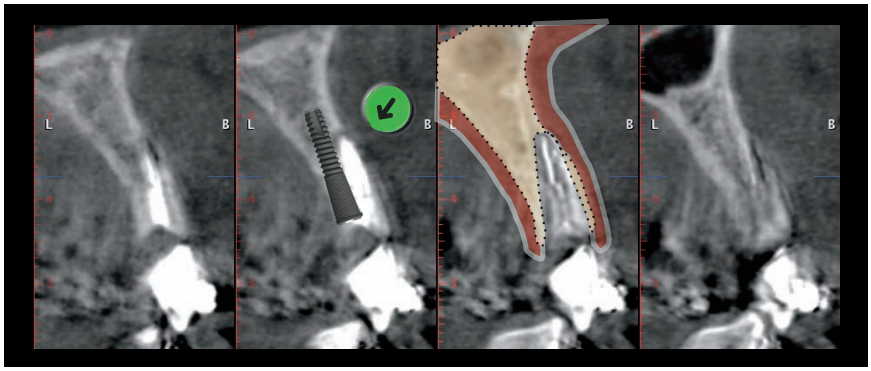


Fig. 22:

To determine the appropriate diameter and length of the proposed fixture, implant placement was simulated with the central slice for the CBCT scan. The alveolar process was adequate to receive the fixture except for the area of the fenestration (green arrow).

Fig. 23: A clear surgical stent was fabricated to guide the path for the osteotomy burs.

Fig. 24:

A relatively atraumatic extraction of the root fragment was facilitated by sectioning it in the mesio-distal plane with a high speed handpiece. Then the palatal and facial portions of the root were easily removed.

With a clear surgical stent, the initial osteotomy in the palatal wall of the socket was made with a round bur. The path of the fixture insertion was carefully prepared step-by-step with the same bur. Before implant placement, the apical perforation of the labial plate was filled with compacted, platelet-rich fibrin (*PRF*) membranes. Then the fixture, 3.8mm in diameter and 14mm in length, was inserted; however, its flared inclination was unacceptable. The fixture was removed and the insertion pathway was corrected with a side-cutting Lindemann drill (*Fig. 26*). The fixture was then seated with a torque of > 35 N-cm, and fitted with a solid abutment, inserted with a torque of 25 N-cm (*Fig. 27*). The surface of the plastic healing cap was roughed. Then flowable composite was added and polymerized, layer by layer, to fit the coronal shape and contour of the extraction socket (*Fig. 28*). The final provisional restoration was fitted, carefully inspected intraorally, and polished with a rag wheel to a smooth, semi glossy surface. Before seating the provisional restoration, additional PRF membranes were packed on the buccal side of the fixture to fill the gap between the fixture and the alveolar crest of bone. This step is important for : 1. preventing exuded cement form filling the space and compromising the healing of the periodontium, and 2. capturing a blood clot in the labial defect which will achieve new bone formation via vascular

Fig. 25: The residual debris was removed from the alveolus and the surgical stent was used guide the osteotomy.

Fig. 26:

Compacted PRF membranes were placed into the apical fenestration, and the fixture was seated, but the its angulation was excessively labial. A Lindemann drill with side-cutting ability was used to extend the ostectomy into the palatal wall to correct the angulation of the fixture.

Fig. 27:

After the probing depth to the fixture was confirmed to be at least 3mm below the gingival margin, the abutment was fitted to the fixture with a torque of 25 N-cm. This is an important step because the submerged portion must be well sealed to avoid microbe contamination.

invasion. To stimulate a positive gingival response, the provisional restoration was fitted on the replica (*analog*), which was identical to the intraoral one (*Figs. 29-30*).

Orthodontic Finishing Stage

In the 34th month, a .017"x.025" TMA upper archwire was placed for finishing adjustments. The lower arch received a .016"x.022" stainless steel archwire. One month later, the attachment on #30 (*mesially repositioned #32*) was changed from a third molar tube to a first molar bracket, and a .017"x.025" TMA archwire was inserted. The upper right third molar was then extracted.

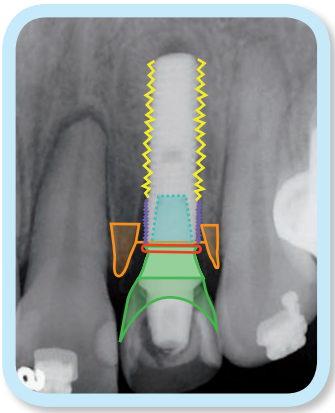
In the 40th month, all fixed appliances were removed and clear retainers were delivered. Following

Fig. 28:

The surface of the healing cap was roughed, and flowable resin was added incrementally to form the provisional crown. Then is was carefully smoothed, especially the portion below the gingiva margin.

Fig. 29:

The cement-type provisional restoration was filled with the temporal cement and seated extraorally to extrude the excess cement. Once the provisional crown was seated, the gingival ecchymosis returned to pink after three days.



- *Macro-thread design for the primary stability.*
- *Micro-thread design for reducing the crestal stress during loading.*
- *Conical seal at the implant-abutment interface to reduce micro-motion and microbes contamination.*
- *Platform switching to reduce marginal bone level alterations.*
- *Adequate Inter-dental implant distance to maintain the interproximal bone and papilla.*
- *Smooth emergence profile to seal-off the underlying tissue and help achieve soft tissue adherence.*

Fig. 30:

A schematic drawing, superimposed on the radiograph, is color coded to show the geometric design of an optimal immediate implant placement.

completion of the final crown for the #10 implant, new clear retainers were made.

Implant Prosthesis Fabrication

There was an uneventful healing of the surgical area during the final stages of the orthodontic treatment. Six months later, the integrity of the soft and hard tissue were optimized by the delicate implant placement procedures. The outcome of the esthetic zone had a natural appearance due to the careful immediate implant placement. The provisional restoration was removed for an impression, and the gingival sulcus around the abutment was healthy (*Fig. 31*). Adequate height of the gingival margin was achieved superior to the shoulder of the abutment, which is important for avoiding the unfavorable display of the metal collar. Subsequently, a direct impression was made utilizing braided cord for gingival retraction (*Fig. 32*). To ensure adequate thickness of the definitive crown, adequate clearance was prepared on the abutment with a high speed handpiece, and its surface was polished until smooth. The exact replica of the abutment and its surrounding soft tissue and dentition was made with a polyvinyl siloxane impression, that was subsequently poured with gypsum that had been mixed with water (*stone*). A week later, a full ceramic crown was fitted, and the abutment and carefully inspected. The permanent crown showed some occlusal and contour discrepancies. The porcelain surface was adjusted and stained to achieve adequate occlusal contact and esthetics, as well as to develop a profile that was consistent with the adjacent teeth. The desired morphology was carefully developed to achieve a natural appearance (*Fig. 33*). The crown was luted and the restoration was assessed with respect to occlusal and esthetic details, relative to adjacent teeth. After sounding to the crest bone and calculating the essential 3mm biologic width, a diode laser was used to perform gingivoplasty.[6] Removal of less than 1mm of the gingival margin of the three adjacent natural incisors dramatically improved the "*pink and white*" esthetics (*Fig. 34*).[7,8]

Fig. 31:
Four months later, the jumping distance (gap between the alveolar wall and the implant surface) was filled with new bone, and the healthy gingival sulcus could be packed gently with braided cord for abutment preparation.

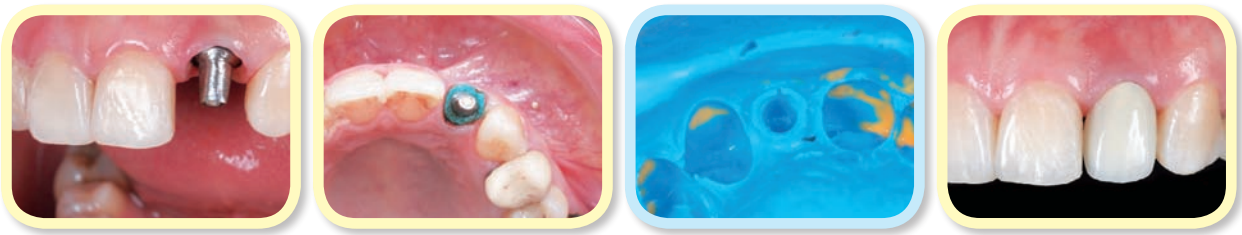


Fig. 32: Double cords were packed to achieve a direct impression with well defined margins to achieve a well fitting prosthesis (crown).

Fig. 33:

Final subtle adjustments for the definitive restoration achieved a light occlusal contact, and the appearance of the restoration that was in harmony with the adjacent natural dentition.

Fig. 34:

The biological width for all the incisors was measured by sounding to the alveolar crest of bone. Since there was excess marginal gingiva, a modest gingivectomy and gingivoplasty were performed with a diode laser.

Results Achieved

Maxilla (*all three planes*):

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

Mandible (*all three planes*):

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

Maxillary Dentition

- Alignment: #8 rotated distal side out
- Anchorage: Maintained
- Incisor Control: Retracted and slightly intruded
- A - P: Retracted, although there was apparent interference of first molar roots with the bone screws (*Fig. 35*)
- Vertical: Molars intruded
- Intermolar Width: Increased
- Intercanine Width: Maintained
- Buccolingual Inclination: Acceptable
- Marginal Ridges: discrepancies on #4 & 5

Mandibular Dentition

- Alignment: #26 rotated distal side out
- Anchorage: molars moved mesially
- Incisor Control: Intruded

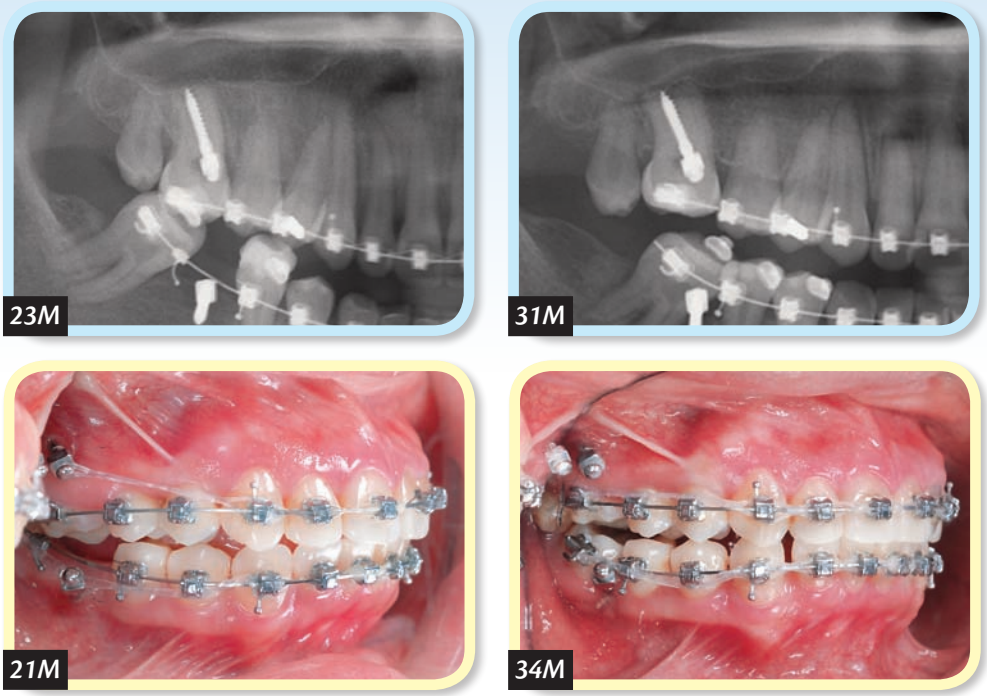


Fig. 35:

The upper right second molar was constantly intruded from the 21st to 34th month, but then intrusion ceased probably because the roots of the molar were in contact with the bone screw. If further intrusion was needed, repositioning of the bone screw is indicated.

- A - P: Retracted
- Vertical: Molars extruded
- Inter-molar Width: Increased
- Inter-canine Width: Increased
- Buccolingual Inclination: Acceptable
- Marginal Ridges: discrepancies on #19 & 20

Facial esthetics: Lip profile was decreased.

Superimposition: The maxillary dentition was retracted and the lower incisors were intruded. Anchorage was preserved as needed by the bone screws. The lower left third molar was protracted as planned. Despite extensive use of Class II elastics and anterior bite turbos, the vertical dimension of occlusion was not increased, primarily because of bone screw anchorage. No mandibular growth was detectable. Class I molar relationship was achieved consistent with ideal overjet and overbite. The protrusive lips were retracted to achieve a more attractive profile (*Figs. 7-9*).

Retention

As prescribed in the treatment plan, upper and lower clear overlay retainers were delivered after the fixed appliances were removed. A new clear maxillary overlay retainer was made after the completion of the implant-supported crown. The patient was instructed to wear the retainers full time for the first 6 months and nights only thereafter. Home care and retainer maintenance instructions were provided.

Final Evaluation of Treatment

The major discrepancies in the anterior segments

were corrected to a normal alignment, overjet and overbite. All extraction spaces were closed and the upper dental midline was corrected relative to the facial and mandibular midlines. The gingival texture was healthy with improved esthetic contours.

The ABO Cast-Radiograph Evaluation (*CRE*) score was 15 points, as documented on the form appearing later in this report. The outcomes were considered an excellent result for a malocclusion with an initial DI of 61. However, the following deviations from ideal were noted: [9]

- The upper right central incisor was rotated distal in, and the lower left incisor was rotated distal out.
- Marginal ridge discrepancy existed between the upper right (*#4 & 5*) and lower left segments (*#19 & 20*).
- Excessive buccal overjet was observed for both maxillary first molars.
- Occlusal contact was absent for the lower left 2nd bicuspid.
- The occlusal relationship was Class II for the maxillary right first molar through canine (*#3-6*) (*Fig. 36*).
- Root angulation discrepancies were observed for the left lateral incisor and lower 2nd bicuspid.

Discussion

In Taiwan, adult orthodontic treatment is often complicated by missing teeth and caries, secondary to a compromised diet with a high sugar content. The major problems for the present patient were intermaxillary crowding, protrusive lips, multiple missing teeth, and residual roots of maxillary molars. The treatment priority was to achieve optimal function and esthetics with minimum implants, prostheses and treatment time. Treatment planning focused on the protrusive profile, high mandible angle and severe crowding. Hopeless and significantly damaged teeth were extracted.[10] Anchorage control for closing the spaces was challenging. Initially bite turbos were used to open the interocclusal space to enhance the alignment of the anterior segments. The most significant problems

Fig. 36:

The occlusal interdigitation relationships were Angle Class I on the left side, but there was still a Class II tendency on the right side. The upper anterior soft tissue showed bilateral symmetric curvatures except for a moderate root prominence of the immediate implant-supported crown that replaced tooth #10.

were the protrusive maxillary dentition with 6.5mm overjet, lingually inclined lower right third molar (#32), and the 17mm edentulous space mesial to the lower right third molar.

In the first 10 months of treatment, it was clear that the cross elastics were inadequate to upright the lower right third molar (#32). Furthermore, Class II elastics were inefficient to retract the upper dentition. A bone screw in the right buccal shelf provided anchorage to upright #32 in three months. Bilateral bone screws in the infrazygomatic crests offered adequate anchorage for en masse retraction of the maxillary dentition.[11]

This Class II deep-bite malocclusion with posterior crossbite had significant discrepancies in all three planes of space. According to Parker,[12] overbite correction often results in intrusion of the incisors, extrusion of the posterior teeth, and increased axial inclination of the incisors. These effects can be seen with a variety of appliances: intrusive arch, utility arch combined with high pull head gear, J-hook head gear, or miniscrew anchorage.[12] For the present patient, utilizing bite turbos to disarticulate the occlusion resulted in an effective correction of the overbite, without excessive flaring of the lower incisors.

Where can bite turbos be placed and how thick should they be? For the present patient, bite turbos of at least 5mm in thickness were bonded on the upper second premolars to prevent interference of the extruded right maxillary molar with the lower .014"x.025" CuNiTi archwire. Subsequently, there was adequate occlusal clearance for the rectangular lower CuNiTi archwire to torque the tilted molar into an upright position. The mandibular plane angle did not increase because of the intrusive effect of the posterior bite turbos. The TMJ was closely monitored at each recall visit and no negative effects were observed.

In assessing the final result, substantial edentulous ridge space was closed in the lower arch, and the whole upper dentition was successfully retracted using bone screw anchorage. The occlusal relationship on the right side was Class I, but on the left a residual Class II relationship was noted (*Fig. 36*). The upper dental midline was aligned with both the facial and lower dental midlines. The total CRE score was 15 points, which is an excellent result for a difficult malocclusion. From panoramic images at 21 and 32 months, it was determined that the upper right second molar was not continuing to intrude despite force from the infrazygomatic crest (*IZC*) screw (*Fig. 35*). If further intrusion were needed, it would be necessary to reposition the IZC screw to avoid interfering with the roots of the upper right second molar. A cone beam CT image would be necessary to look for an appropriate, new location for the IZC screw to permit further intrusion of the posterior maxillary dentition.[11]

When large posterior spaces are closed in the lower arch, lingual tipping of the incisors is a frequent problem. The 6.5mm overjet, anterior crowding and Class II buccal segments were corrected with Class

II elastics, bone screws and bite turbos. Correction of the anterior crowding reduced the tendency for lingual tipping of the lower incisors. Using a bone screw as anchorage to protract the third molar to close the edentulous space also help prevent the lower incisors from tipping lingually. In brief, bone screw anchorage was essential for maintaining an appropriate inclination and sagittal position of the lower incisors over the apical base of bone. Because of the mechanics employed, standard torque brackets were adequate for the lower incisors.

The velocity at which a tooth moves is limited by the linear rate of resorption at the PDL/bone interface.[13] Roberts et al.[13] reported that: (*1*) sustained orthodontic translation is a physiological manifestation of bone modeling and remodeling throughout the adjacent alveolar process, and (2) the rate of mandibular molar translation is inversely related to the apparent radiographic density of the resisting alveolar bone. These concepts were applicable for treatment the present patient. Especially, in the final stage of the movement, there was increased radiographic density of the resisting alveolar bone between the second bicuspid and molar, that slowed the rate of tooth movement as the space was closed.[13]

The pulp necrosis and fracture of #10 was a major complication in treating the present patient. Magnification and careful examination of the pretreatment panoramic radiograph (*Fig. 7*) reveals a faint radiolucency, consistent with the well-defined lesion in Fig. 14. Although asymptomatic initially, the tooth may have already been compromised before treatment. Superimposing a bite turbo (*Fig. 15*) may expose a tooth to significant occlusal trauma, because a long lever arm on the turbo may be necessary to provide a centric stop with the lower incisors. The moment due to the occlusal force is proportional to the length of the lever arm. The mechanical effect is a production of rotation at a point apical to the center of resistance of the root (*center of rotation*). The traumatic occlusion due to the bite turbo may have enhanced the degeneration of the pulp, precipitating infection, pain and a fistulous tract. A search of PubMed failed to produce any reports on pulp necrosis associated with bite turbos. However, there are recent reports that traumatized maxillary incisors, especially lateral incisors, have a higher susceptibility to pulp necrosis during orthodontic intrusion than non-traumatized teeth.[14, 15] Bite turbos in the anterior region clearly concentrate occlusal forces and moments on the affected teeth, which may jeopardize the vitality of pulp.

In the fourth month of treatment, the anterior bite turbo on the left side was moved from the canine to the adjacent lateral incisor (#*10*). Signs and symptoms of a periapical abscess occurred, and the tooth was treated endodontically. Following root canal treatment, the lateral incisor was still used as a bite turbo. Occlusal force on the turbo produces an intrusive force on the tooth, as well as a moment, that is proportional to the distance from the long axis of the tooth to the point of of occlusal contact on the turbo. The moment results in a cyclic flexure

of the root that tends to create fatigue damage below the alveolar crest. The occlusal trauma may also have been a factor in the internal root resorption noted when the incisor fractured (*Fig. 21*).

Once the root fracture occurred, it was necessary to consult Dr. Chang's decision making tree for evaluating deficient roots (*Fig. 37*).[16] First it is important to consider the reason for the root fracture: trauma, root caries and/or root resorption. The proportionality of the final prothesis requires at least a 4mm length for a sufficient ferrule effect, and to achieve the proper biological width. If the root fragment is deficient in this regard, it should be evaluated for an appropriate prosthetic procedure. Extraction, direct crown lengthening or forced eruption may be necessary.[17] The deficient roots can sometimes be submerged to secure appropriate soft and hard tissue esthetics of a multiple-unit fixed.[18, 19]

Both patients and clinicians desire implant-supported restorations that provide optimal function and esthetics. Tarnow[20] divided maxillary extraction sockets into three types, according to the presence or absence of the buccal and hard palate bone, as well as adequate soft tissue. The socket type affects decisions relative to treatment timing and choosing the proper operative procedures.[20] A type I extraction socket has thick soft tissue and well-defined alveolar crest margin. Basilar bone beneath the alveolar process can also provide primary stability for the implant fixture. Applied to the present patient, a careful clinical examination, plus an implantation simulation utilizing the CT slice of the site, helped determine the optimal prosthetic approach. Immediate implant placement was

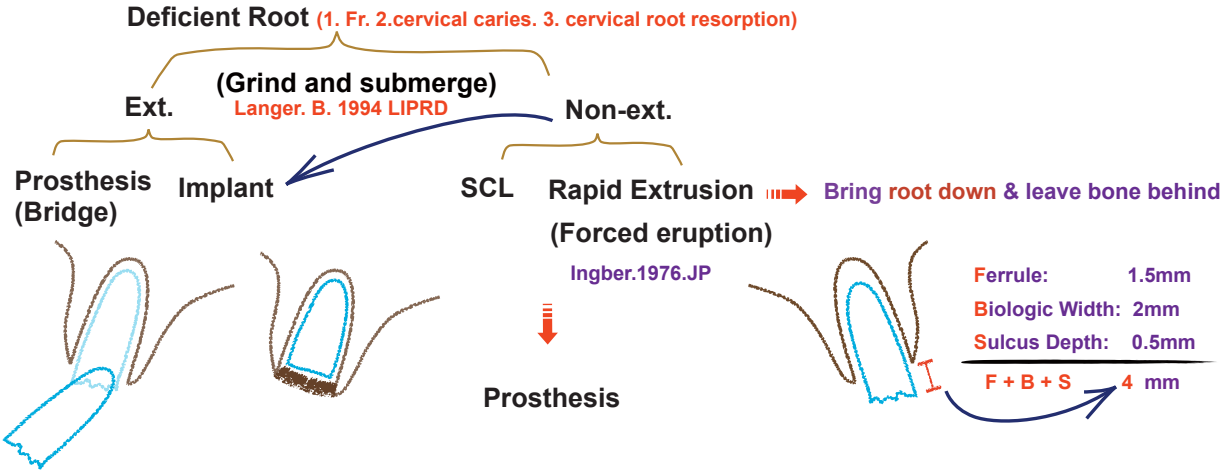


Fig. 37:

The decision making tree (Chang[16]) shows that the residual length of the deficient root caused from fracture, cervical caries and cervical root resorption. The crown/root ratio can be anticipated by subtracting the essential distance of 4mm. The roots with favorable crown/root ratio can be preserved for further treatment via surgical crown lengthening or rapid extrusion. The roots with an unfavorable ratio should be extracted in preparation for an implant placement or prosthesis. Alternatively, deficient roots can be submerged to preserve alveolar bone and provide a platform for gingival healing. Subsequently the site can be restored with an implant or multiple unit prostheses.

indicated to achieve optimal function, as well as a favorable esthetic outcome, within a relatively short treatment duration.

Placing an implant fixture in a fresh extraction site usually results in a gap between the alveolar crest and the fixture. Unless this defect fills with bone, the outcome may be recession, resulting in esthetic compromise, or even implant failure.[21] Maintenance of the original buccal and vertical bone volume is best achieved with a flapless surgical approach. For the present patient, this method was preferred to: 1. maintain the blood supply, 2. allow for a good 3D positioning of the fixture at 3mm depth below the gingival margin, 3. preserve 2mm of buccal bone thickness, and 4. provide for a 1.5mm distance to the adjacent teeth to preserve optimal healing and growth potential for the gingival complex.[5, 22, 23] However, the alveolus for the present patient had a labial defect due to the fistulous tract (*to be subsequently discussed*), and a gap at the alveolar crest between the implant and supporting bone. A recent article by Araújo, Linder, and Lindhe[24] suggests that a xenograft material can be used in the gap between the bone wall and implant surface. These particles may be incorporated into the soft tissue without any inflammatory reaction and maintain the esthetic profile.

Platelet Rich Fibrin (*PRF*) contains not only varied cytokines, beneficial to the inflammatory and healing processes, but also fibrin matrix which supports angiogenesis, immunity, and epithelial covering of the wound.[25] In general, placing bone graft particles covered with resorbable collagen membranes, via VISTA (*Vestibular Incision Subperiosteal Tunnel Access*)[26] or an Esthetic Buccal Flap,[27] is appropriate for repairing apical fenestrations. However, the apical defect in the present case was not threatening the stability of the implant fixture because of the wide base of the alveolar process, thick buccal crest bone, and soft tissue with a favorable biotype. Thus PRF membranes without bone graft material were packed in to the alveolar crest gap and the apical fenestration to enhance bone fill and healing of the soft tissue. It is important to remember that resorption of xenograft materials may be slow and unpredictable, so good surgical technique to capture a blood clot to promote natural bone healing may be the best approach.

Another key to success is the coronal seal of the socket by the provisional prosthesis. Once the chosen abutment is fitted in the fixture, it is best to use an immediate provisional restoration, with a smooth emergence profile. Adapt it to the wound without pressure and do not remove it until the bone maturation is complete. Subsequently, tissue adherence between the abutment and soft tissue occurs, presumably via hemi-desmosomes. Close approximation of the soft tissue to the implant abutment helps preserve the optimal volume of new bone.[28, 29, 30] In general, the conical seal design reduces the micro-movement and pumping effect, which can introduce unfavorable microbes.[31] The screw-retained provisional restoration is superior to a cemented one, because the latter can cause an inflammatory reaction, due to excessive cement

coating the submerged base of the abutment.[32] It may be difficult to avoid a cemented provisional restoration, particularly if there is an unfavorable angulation of the fixture. In this circumstance, an extraoral pre-cementation procedure or under-cementing the union is recommended (*Fig. 29*).

Six months later, the permanent restoration was delivered. When the provisional restoration was removed, a slight recession was noted. However, there was a satisfactorily buccal gingival contour of the implant-supported crown, compared to the natural right lateral incisor. Overall, the outcome was acceptable and will be periodically reevaluated in years to come (*Fig. 36*).

Conclusion

This complex malocclusion was challenging to resolve. It required careful diagnosis and treatment planning to devise a realistic approach for achieving optimal esthetics and function, consistent with minimal prosthetics and treatment time. The facial objectives, reducing lip protrusion and maintaining the vertical dimension of occlusion, were achieved by utilizing bone screw anchorage. The fracture and loss of the maxillary left lateral incisor was disappointing, but the immediate implant-supported crown had a good outcome. In retrospect, it is very important to carefully evaluate all teeth to be fitted with bite turbos, particularly maxillary lateral incisors, because they are susceptible to excessive flexure, which may compromise vitality and lead to fatigue failure. Overall, the final occlusion, function and esthetics were considered to be an optimal, cost-effective result. However, treatment efficiency could have been improved by 1. avoiding the 10 month attempt to correct the buccal crossbite with cross elastics, 2. bonding a first molar bracket on the lower right third molar, and 3. using more durable teeth for the bite turbos. Finally, it was clear that preprosthetic orthodontics was essential for the excellent, cost-effective outcomes. The patient was well satisfied with the results.

Acknowledgement

Thanks to Mr. Paul Head for proofreading this article.

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Discrepancy Index Worksheet

TOTAL D.I. SCORE 61

OVERJET

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

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

Total = 3

OVERBITE

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

Total = 2

ANTERIOR OPEN BITE

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

Total = 0

LATERAL OPEN BITE

2 pts. per mm. per tooth

Total = 0

CROWDING (only one arch)

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

Total = 7

OCCLUSION

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

Total = 8

LINGUAL POSTERIOR X-BITE

1 pt. per tooth Total = 0

BUCCAL POSTERIOR X-BITE

2 pts. per tooth Total = 2

CEPHALOMETRICS (See Instructions)

ANB ≥ 6° or ≤ -2° = 4 pts.

Each degree < -2° ____ x 1 pt. = ____

Each degree > 6° 1 x 1 pt. = 1

SN-MP

≥ 38° = 2 pts.

Each degree > 38° 7 x 2 pts. = 14

≤ 26° = 1 pt.

Each degree < 26° ____ x 1 pt. = ____

1 to MP ≥ 99° = 1 pt.

Each degree > 99° 3 x 1 pt. = 3

Total = 25

OTHER (See Instructions)

Supernumerary teeth	____ x 1 pt. =	____
Ankylosis of perm. teeth	____ x 2 pts. =	____
Anomalous morphology	____ x 2 pts. =	____
Impaction (except 3rd molars)	____ x 2 pts. =	____
Midline discrepancy (≥3mm)	@ 2 pts. =	____
Missing teeth (except 3rd molars)	5 x 1 pts. =	5
Missing teeth, congenital	____ x 2 pts. =	____
Spacing (4 or more, per arch)	____ x 2 pts. =	____
Spacing (Mx cent. diastema ≥ 2mm)	@ 2 pts. =	____
Tooth transposition	____ x 2 pts. =	____
Skeletal asymmetry (nonsurgical tx)	@ 3 pts. =	____
Addl. treatment complexities	____ x 2 pts. =	5

Identify: Lingual collapsed lower right third molar correction

Total = 10

IMPLANT SITE

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

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

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

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

Bone anatomy of alveolar crest : H&V sufficient (0 pt), Deficient H, allow simultaneous augment (1 pt), Deficient H, require prior grafting (2 pts), Deficient V or Both H&V (3 pts) sufficient in the extraction socket with the apical perforation = 2

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

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

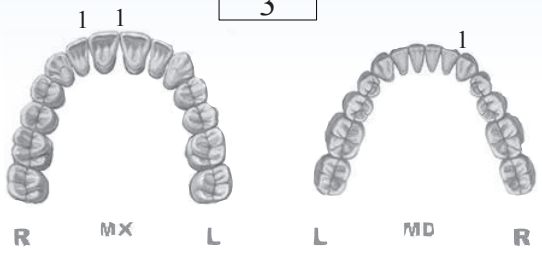
Total = 4

Cast-Radiograph Evaluation

Total Score: 15

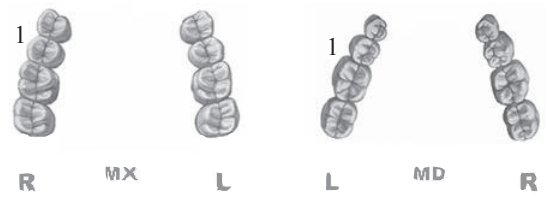
Alignment/Rotations

3



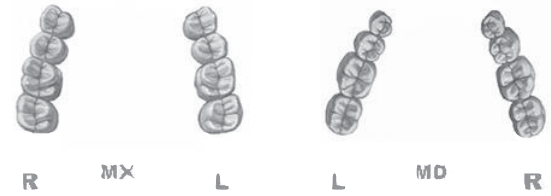
Marginal Ridges

2



Buccolingual Inclination

0

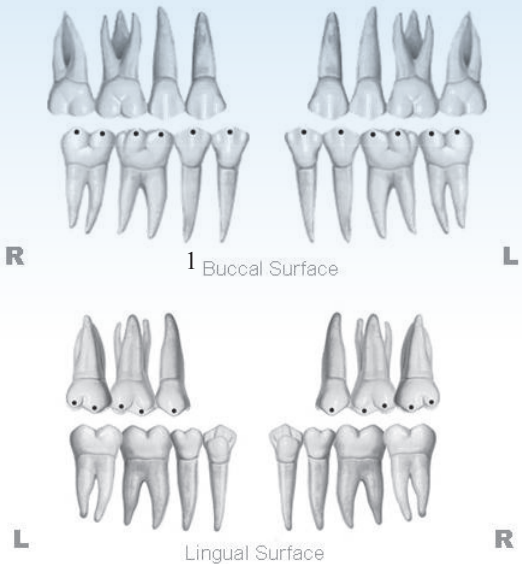


Overjet

3

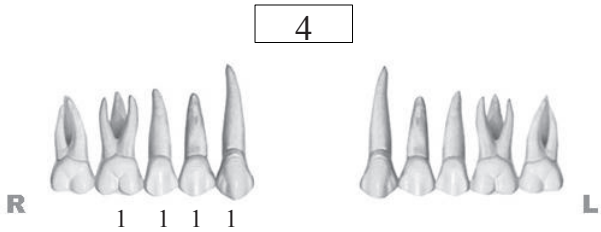
Occlusal Contacts

1



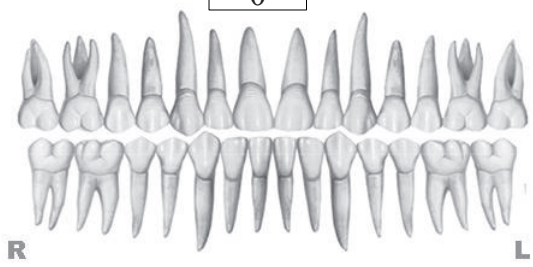
Occlusal Relationships

4



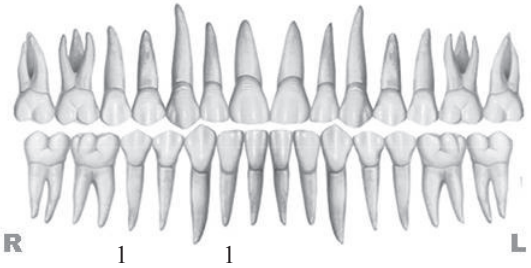
Interproximal Contacts

0



Root Angulation

2

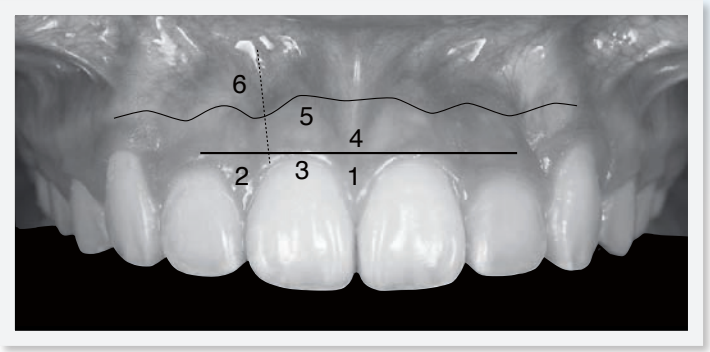


INSTRUCTIONS: Place score beside each deficient tooth and enter total score for each parameter in the white box. Mark extracted teeth with "X". Second molars should be in occlusion.

IBOI Pink & White Esthetic Score

Total Score: = 2

1. Pink Esthetic Score

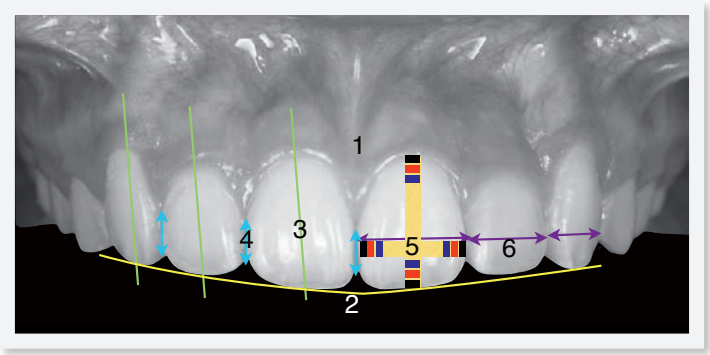


Total = 0

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

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

2. White Esthetic Score (for Micro-esthetics)



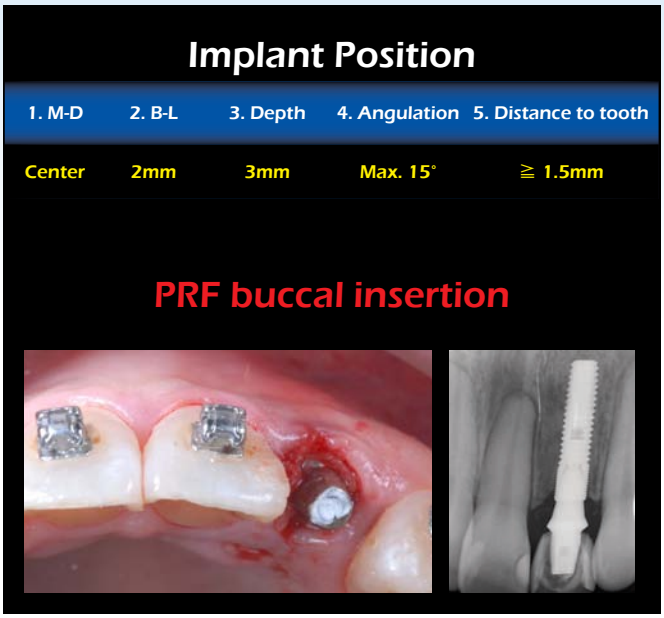
Total = 2

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

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

Implant-Abutment Transition & Position Analysis

3. Implant Position

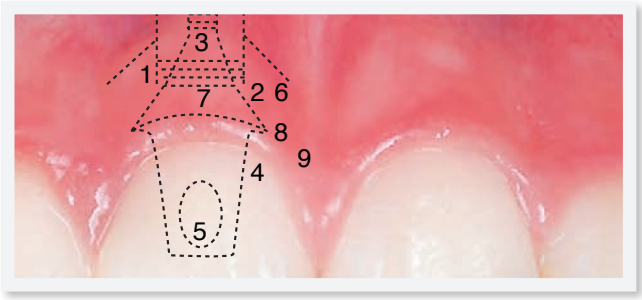


Total = 0

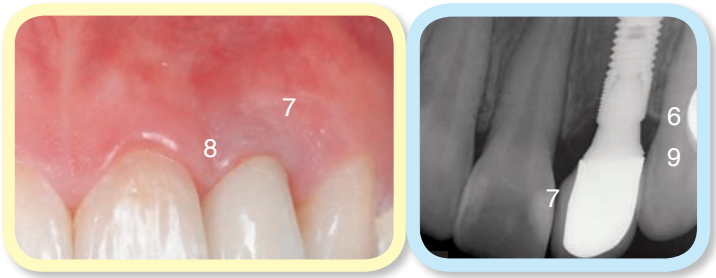
1. M & D (Center)	0	1	2
2. B & L (Buccal 2 mm)	0	1	2
3. Depth (3 mm)	0	1	2
4. Angulation (Max. 15°)	0	1	2
5. Distance to Adjacent Anatomy	0	1	2

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

4. Abutment transition Contour



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



Total = 1

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

1. Fixture Cervical Design	(N)	Y				bone level
2. Platform Switch	N	(Y)				platform
3. I-A Connection Type	E	(I)				11° morse taper
4. Abutment Selection	S	(C)				cement-retained
5. Screw Hole Position	P	B				incisal
6. Marginal Bone Loss	N	Y	(0)	1	2	
7. Modified Gingival Contour	N	Y	(0)	1	2	
8. Gingival Height	N	Y	(0)	1	2	
9. Crown margin fitness	N	Y	0	(1)	2	

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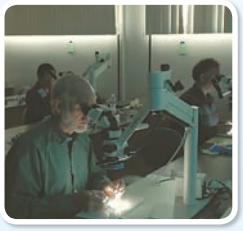

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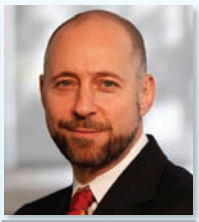

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Uprighting and Protracting a Horizontally Impacted Lower Third Molar in an Adult

SUMMARY

This case report for an adult male presents an innovative treatment modality to manage an acquired malocclusion that was associated with a poor dental prognosis for multiple molars. Compromised upper right and lower left 1st molars were extracted. The lower left third molar was a deep horizontal, bony impaction that was uncovered and uprighted. The asymmetric first and second molar extraction sites were closed by molar protraction. Through this dental conservation approach, the patient maintained a full dentition of healthy teeth and avoided the need of artificial prostheses. (IJOI 2014;34:58-77)

***Key word**: atypical extraction, impacted molar uprighting, surgical exposure, closed eruption technique, ramus screws, molar space closure.*

A 26-year-old male patient was referred by his dentist for orthodontic consultation (*Fig. 1*). His chief concerns were caries, a missing tooth and impacted 3rd molars (*Figs. 2-3*). There was no contributory medical history. Clinical examination revealed a hopeless maxillary right 1st molar due to severe caries, as well as a poor prognosis for a mandibular left 1st molar due to extensive loss of tooth structure. His mandibular right 2nd molar had been extracted many years ago by his previous dentist (*Fig. 2*). After 41 months of orthodontic treatment, the patient was treated to an acceptable result as documented in Figs. 4-9. The details for diagnosis and treatment will be discussed. The initial panoramic radiograph (*Fig. 7*) revealed a soft tissue, impacted maxillary left 3rd molar, mesially tilted mandibular right 3rd molar, and a horizontal bony impaction of the mandibular left 3rd molar.

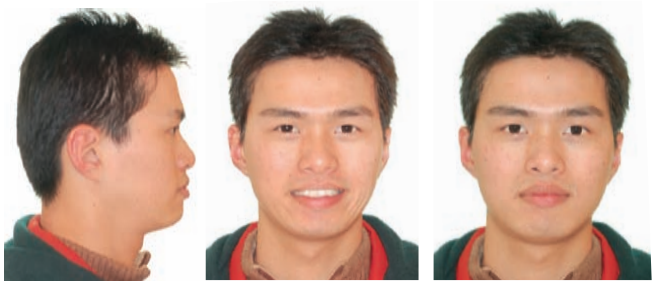

Fig. 1: Pretreatment facial photographs

Fig. 2:

Pre-treatment intraoral photographs. The poor prognosis upper right and lower left 1st molars, missing lower right 2nd molar and mesial tilted 3rd molar were the major problems.

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Fig. 3. Pre-treatment study models

Fig. 4: Posttreatment facial photographs

Fig. 5:

Post-treatment intraoral photographs. The upper right and lower left 1st molars were extracted and the missing teeth spaces were replaced by their neighboring 2nd and 3rd molars. The lower right mesially tilted 3rd molar was uprighted and brought into a good position.

Fig. 6. Post-treatment study models

Diagnosis

Skeletal:

1. Skeletal Class I (*SNA 87°, SNB 86°, ANB 1°*)
2. Low mandibular plane angle (*SN-MP 25°, FMA 22°*)

Dental:

1. Bilateral Class I malocclusion
2. The overbite was 2 mm and overjet was 3 mm
3. Mild crowding about 3 mm in upper arch, and mild crowding about 2 mm in the lower arch
4. Maxillary left 1st premolar cross bite
5. Deep caries: Maxillary right 1st molar and mandibular left 1st molar
6. Mandibular right 2nd molar missing
7. Soft tissue, impacted maxillary left 3rd molar, mesially tilted mandibular right 3rd molar, and horizontal bony impacted mandibular left 3rd molar

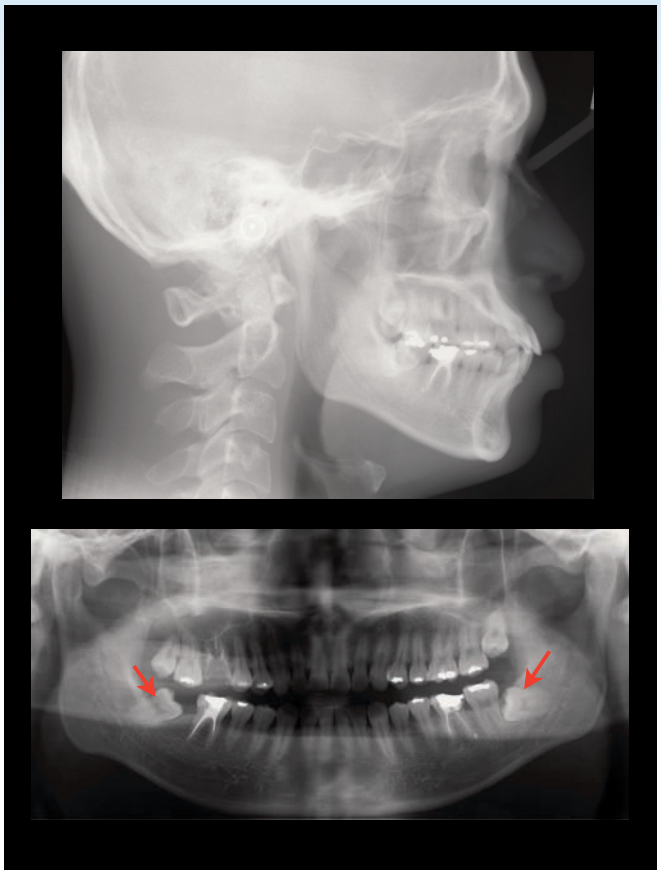

Fig. 7:

Pre-treatment pano and cepha radiographs. Note the lower right mesially tilted 3rd molar and lower left deeply horizontal impacted 3rd molar.

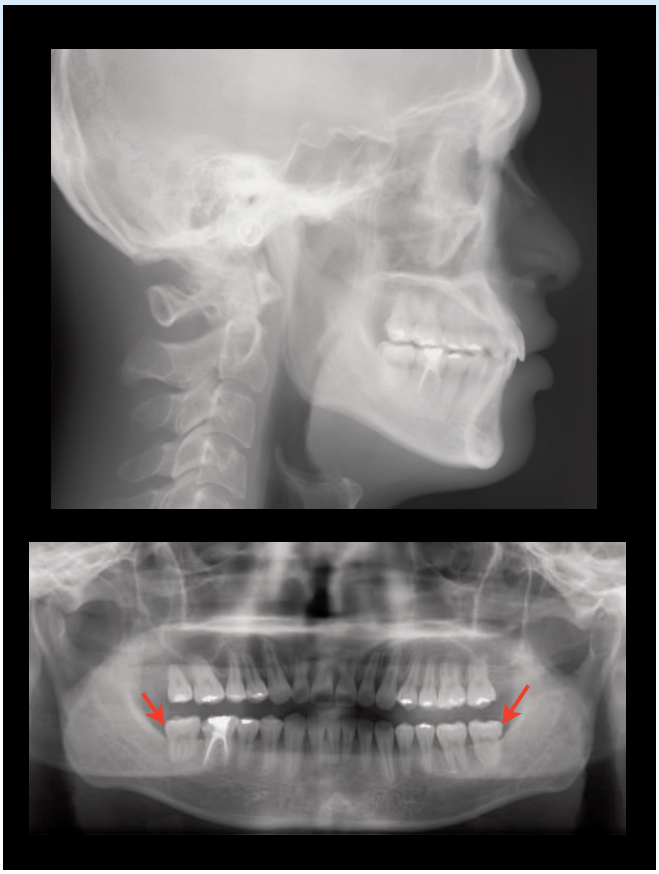

Fig. 8:

Post-treatment pano and cepha radiographs. The lower right and left 3rd molars were uprighted and protracted into an ideal occlusal relationship.

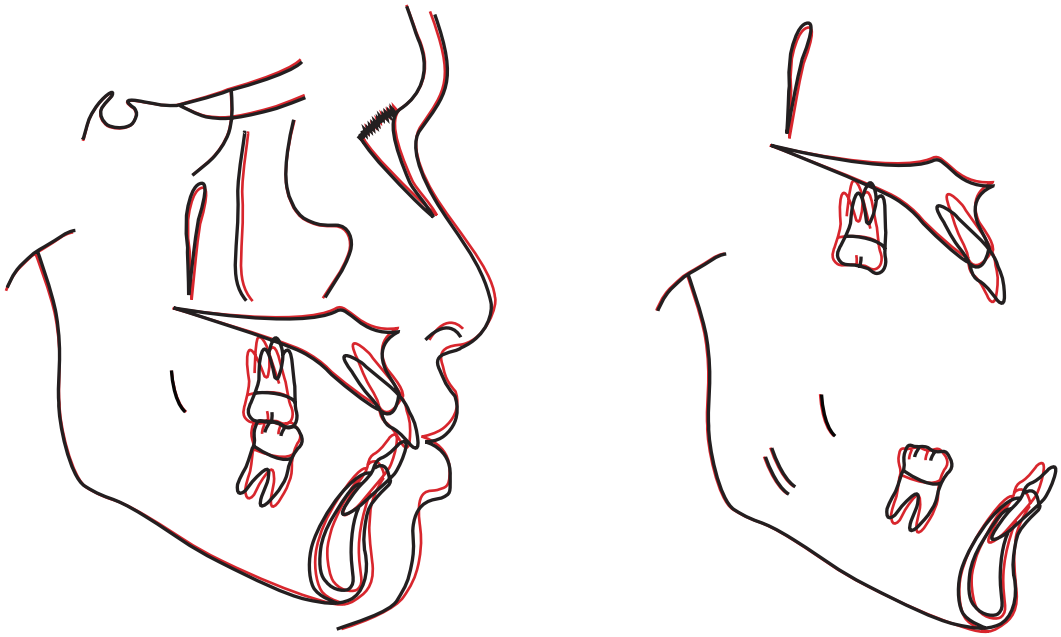

Fig. 9:

Superimposed tracings. The upper and lower anterior teeth were slightly retroclined with no affect on the patient's vertical dimension and facial profile after the treatment.

CEPHALOMETRIC			
SKELETAL ANALYSIS			
	PRE-Tx	POST-Tx	DIFF.
SNA°	87°	85°	2°
SNB°	86°	85°	1°
ANB°	1°	0°	1°
SN-MP°	25°	25°	0°
FMA°	22°	22°	0°
DENTAL ANALYSIS			
U1 TO NA mm	9 mm	6 mm	3 mm
U1 TO SN°	129°	116°	13°
L1 TO NB mm	8 mm	4 mm	4 mm
L1 TO MP°	106°	99°	7°
FACIAL ANALYSIS			
E-LINE UL	-1 mm	-2 mm	1 mm
E-LINE LL	2 mm	0 mm	2 mm

■ Table. 1: Cephalometric summary

8. Maxillary dental midline 1.5 mm right off the facial midline

Facial:

Acceptable profile and slightly protrusive lower lip

The ABO Discrepancy Index (*DI*) was 25[1] as shown in the subsequent worksheet.

Specific Objectives of Treatment

Maxilla (*all three planes*):

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

Mandible (*all three planes*):

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

Maxillary Dentition

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

Mandibular Dentition

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

Facial Esthetics: Maintain

Treatment Plan

The patient had not previously considered an orthodontic approach to treat his debilitated malocclusion. Three treatment plans were offered, all of which featured the extraction of the maxillary right 1st molar. Only the third option included orthodontics.

Option A: Extract the maxillary and mandibular left 3rd molars. Restore the maxillary right edentulous space with a conventional fixed partial denture (*bridge*), and place a crown on the mandibular left 1st molar. The mandibular right edentulous area would not be treated (*Fig. 10*).

Option B: Extract both left 3rd molars, as well as the mandibular right 3rd molar. Restore the mandibular left 1st molar with a single crown. Place implant-

supported crowns to replace the maxillary and mandibular right 2nd molars (*Fig. 11*).

Option C: Extract the maxillary left 3rd molar, and the mandibular left 1st molar. A full fixed orthodontics appliance was indicated to align and level the dentition. Since the patient's lips are competent with an acceptable protrusion, close all the edentulous space to eliminate the need for prostheses.

After a through discussion and extensive communication, the patient preferred the orthodontics option. All spaces were closed and the treatment was finished with detailing bends in the terminal archwires. The fixed appliances were removed and the corrected dentition was retained with clear overlay retainers in both arches (*Fig. 12*).

Fig. 10

Treatment option A. The upper right 1st molar, upper left and lower left 3rd molars were going to be extracted. The upper right 1st molar was going to be restored by conventional crown and bridge, whilst the lower left 1st molar by a single crown.

Fig. 11:

Treatment option B. The upper right 1st molar, upper left and lower left and right 3rd molars were going to be extracted. The upper right 1st molar and lower right 2nd molar were going to be restored by dental implants, and the lower left 1st molar by single crown.

Fig. 12:

Treatment option C. The upper left 3rd molar, upper right and lower left 1st molars were going to be extracted. The meisally tilted lower right 3rd molar and horizontal impacted lower left 3rd molar were going to be uprighted, and all 3 quarters of molars except upper left were going to be protracted to develop an ideal occlusal function.

Appliances and Treatment Progress

After the extractions, an 0.022" slot Damon D3MX bracket system (*Ormco*) was bonded on both arches with standard torque in the anterior segments. The archwire sequence for the upper arch was .014" CuNiTi, .014"x.025" CuNiTi, .017"x.025" TMA, .019" x0.25" SS, and for the lower arch was .014" CuNiTi, .016" CuNiTi, .014"x.025" CuNiTi, .017"x.025" TMA, .019"x0.25" SS. In the 10th week of the treatment, when the lower arch wire was .016 CuNiTi, soft tissue primarily on the buccal surface of the mandibular right 3rd molar was removed with a diode laser to obtain better access for precise bracket bonding.

NiTi tension (*closed-coil*) springs were activated with a ligature wire to close the edentulous space in the upper right and lower left segments in the 6th and 8th months of treatment, respectively (*Figs. 13-1 and 13-2*). A left Class II elastic (3.5 oz) was used to correct the midline discrepancy. The mandibular right 3rd

Fig. 13-1:

Right lateral view on the 8th month of the treatment. The Ni-Ti spring was applied on upper right area to close the space with a ligature wire to control the magnitude of the acting force. The power chain was also used to reinforce the force.

Fig. 13-2:

Left lateral view on the 8th month of the treatment. The Ni-Ti spring was applied on lower left area to close the space with a ligature wire to control the acting force. The power chain was also used to reinforce the force.

Fig. 14:

Mandibular occlusal view on the 10th month of the treatment. 2 buttons were bonded on the lower left 2nd premolar and molar, and the power chain were attached on them to close the space.

molar was brought into an ideal occlusal position to close the mesial space by using a precisely bonded bracket and power chain in the 10th month of the treatment. On the mandibular left side, buttons were bonded on the lingual surface of the mandibular 2nd premolar and 2nd molar, and a power chain was activated between them (*Fig. 14*).

After 22 months of active treatment, the maxillary right and the mandibular left edentulous spaces were closed (*Fig. 15-1 and 2*), however, the mandibular left 3rd molar did not erupt spontaneously and was still impacted in the original position (*Fig. 16*). Three months later, it was surgically exposed as describe in the next section.

Fig.15-1:

Maxillary occlusal view on the 22th month of the treatment. The upper right edentulous space was closed.

Fig.15-2:

Mandibular occlusal view on the 22th month of the treatment. Note the lower left 1st molar space was closed.

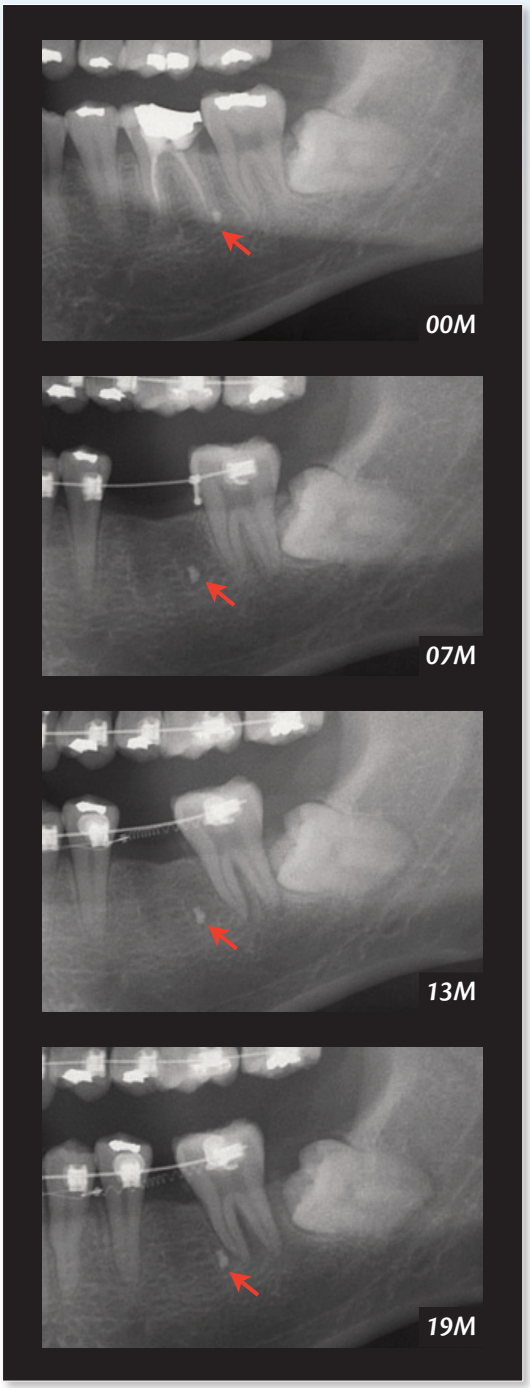

Fig 16:

Progress x-ray revealed that the lower left 3rd molar didn't erupt spontaneously as the 2nd molar was protracted. The intrabony pushed-out endodontic filling material (red arrow) of lower left 1st molar acted as a good indicator for the molars protraction distance.

Surgical Procedures for Molar Uprighting

To preserve as much keratinized tissue as possible, a closed eruption technique was chosen. Following the injection of local anesthesia, a #15 scalpel blade was used to make a sulcular incision on the distal surface of the mandibular left 2nd molar. The incison was extended beyond the mucogingival junction to achieve a vertical release to improve access. The 2nd incision was along the dental ridge superior to the impacted molar.

A full thickness flap was reflected, exposing the clinical crown of the impacted molar, which was buccal to the adjacent 2nd molar. The bone covering the 3rd molar anatomic crown was removed with a high speed round carbide bur (*Fig. 17-1*). Bone removal was extended to the distal to establish a path of movement for uprighting the tooth. Then an elevator was used to gently luxate the 3rd molar to rule out ankylosis.[2] An eyelet was bonded on the occlusal surface of the #38 under strict moisture control conditions (*Fig. 17-2*).

After the surgical exposure, a miniscrew (*2x12 mm, OrthoBoneScrew, Newron's A, Inc.*) was inserted into the ramus area of the left mandible to serve as anchorage to upright the 3rd molar (*Fig. 17-2*). It was important for the patient to occlude his teeth before and after the miniscrew insertion to make sure there was no interference. A power chain was attached on the eyelet of the 3rd molar and fed through a slit in the flap to access the miniscrew. The flap was closed with 6-0 nylon interrupted sutures (*Fig. 17-3*). A panoramic radiograph was taken after the surgery.

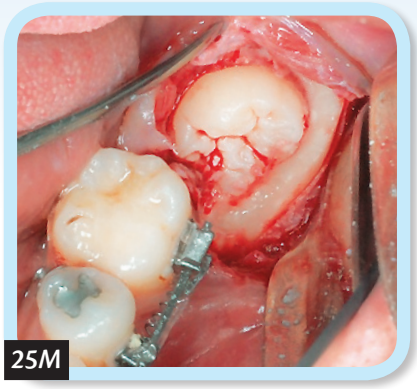

Fig. 17-1. Surgical exposure.

One week later, all the sutures were removed, and the power chain was progressively stretched during the next several appointments. The panoramic radiograph was taken in the 27th month of treatment to evaluate the position of the molar being uprighted. A thick over-growth of fibrous connective tissue was noted due to the chronic irritation associated with the closed eruption technique (*Fig. 18-1*). The overlying soft tissue was removed with a diode laser equipment to expose the clinical crown at the same appointment (*Fig. 18-2*).

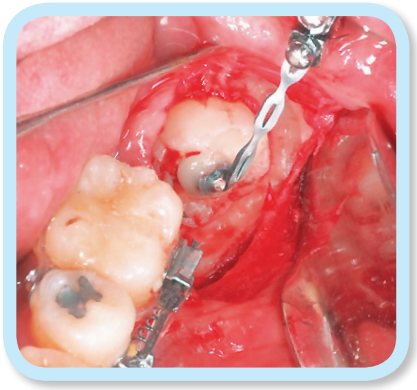

Fig. 17-2:
Miniscrew insertion on ramus area with a power chain attached to it.

Fig. 18-1:
2 months after the sutures were removed, the over-growth tissue over lower left 3rd molar was noted.

Fig. 17-3. Suture of surgical site.

Fig. 18-2:
The over-growth soft tissue was removed by diode laser.

Orthodontic Finishing

Because of the buccal tipping and mesial out rotation of the 3rd molar, power chains were used to apply force to the buccal and the lingual aspects (*Figs. 20-1, 20-2*). In the 29th month of treatment, a buccal tube and lingual button were bonded on the mandibular left 3rd molar (*Fig. 19, 20-1*), and the ramus miniscrew was removed. The following month the mandibular arch wire was changed from a .019" x.025" SS to a .016" CuNiTi that was inserted in the buccal tube of the mandibular left 3rd molar (*Fig. 21*).

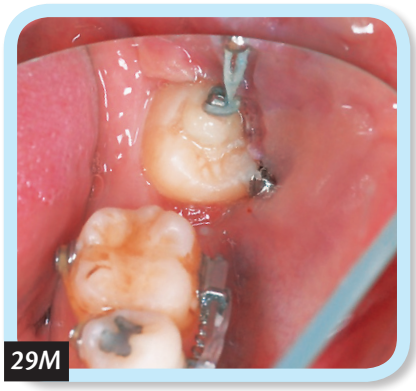

Fig. 19:

Buccal tube bonding of the 3rd molar after 1.5 months of over-growth soft tissue removal.

Fig. 20-1:

Lingual button bonding over the 3rd molar with power chain attachment.

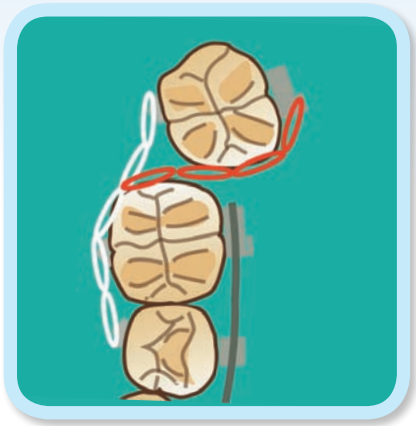

Fig. 20-2:

It would be better to hang the power chain on the buccal tube (red) of the 3rd molar than the lingual button (white) to correct the buccal inclination and distal-in rotation at the same time.

Fig. 21: .016" CuNiTi archwire insertion to the buccal tube.

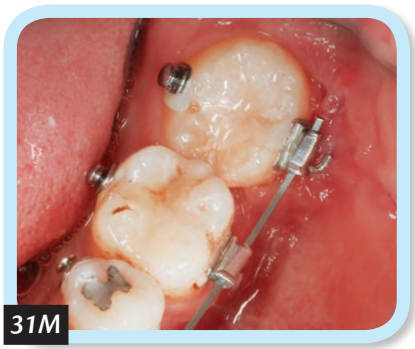

Fig. 22:

The main wire was changed to .014"x.025" CuNiTi archwire.

With sequential archwire changes, the previously impacted molar was gradually aligned into an ideal position (*Figs. 22-24*). Fig. 25 is a sequential series of panoramic radiographs that shows treatment progress in aligning the lower left 3rd molar. Unfortunately, the lower left space closure caused a further deterioration in the midline discrepancy. In the 35th month of treatment, another miniscrew was inserted in the left infrazygomatic crest to serve as an anchorage to correct the maxillary midline discrepancy (*Fig. 26*). Right Class III and left Class II elastics (*3.5 oz, 1/4"*) were used to assist in the midline correction.

In the 37th month of active treatment, enamel reduction and recontouring of the maxillary central

Fig. 23:
The main wire was changed to .016"X.025" SS archwire as finishing archwire.

Fig. 24. Finishing of the treatment.

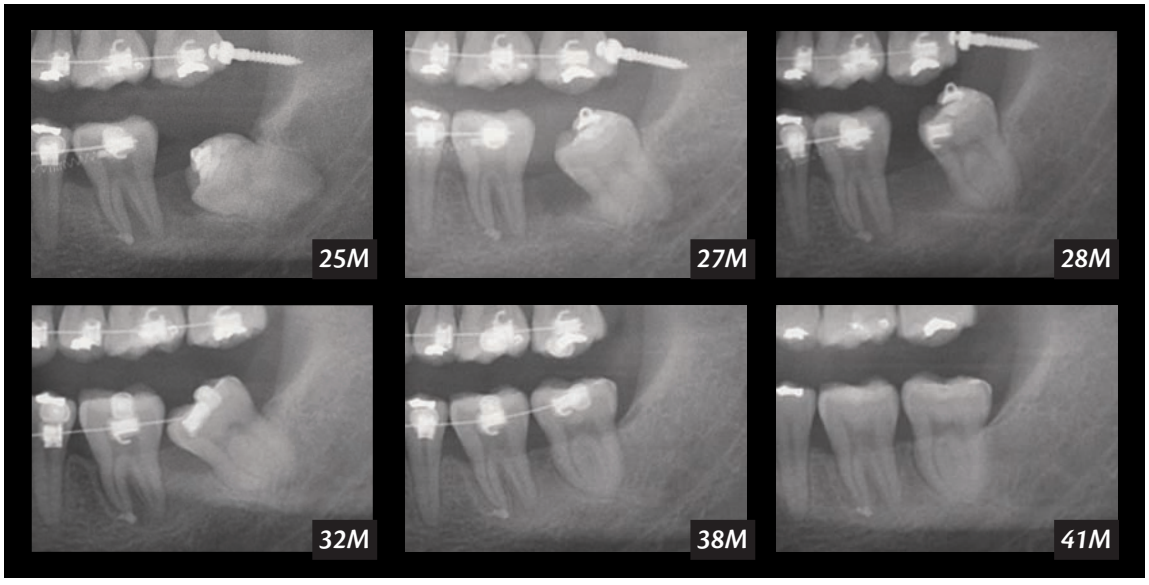

Fig. 25:
The panoramic radiographic view of lower left 3rd molar uprighting treatment progress. The horizontal impacted 3rd molar was up-righted by the force provided by the ramus screw and power chain that were attached to it.

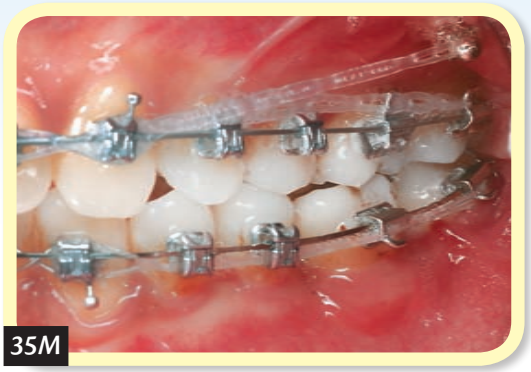

Fig. 26:
Upper left miniscrew insertion on IZC for midline correction.

and lateral incisors was performed (*Fig. 27*) for 3 reasons:

1. Improve the upper anterior tooth size ratio.
2. Change the triangular shaped central incisors to a more esthetic rectangular contour.
3. Obtain space to correct the excessive overjet.

Fig. 27:
Upper anterior teeth frontal photo before and after reshaping.

An Ivory's separator (*Figs. 28 and 29*) was used between the incisors to improve access and control the amount of enamel removed. A diamond-coated fissure bur is recommended for gross enamel removal followed by a finishing bur for more refined reshaping. The resulting rough enamel surface was smoothed out with dental polishing band (*Fig. 28*).

Fig. 28:
Ivory's separator (upper) was used for teeth contour reshaping. Dental polishing band (lower) was used to refine the reshaped surface of the tooth.

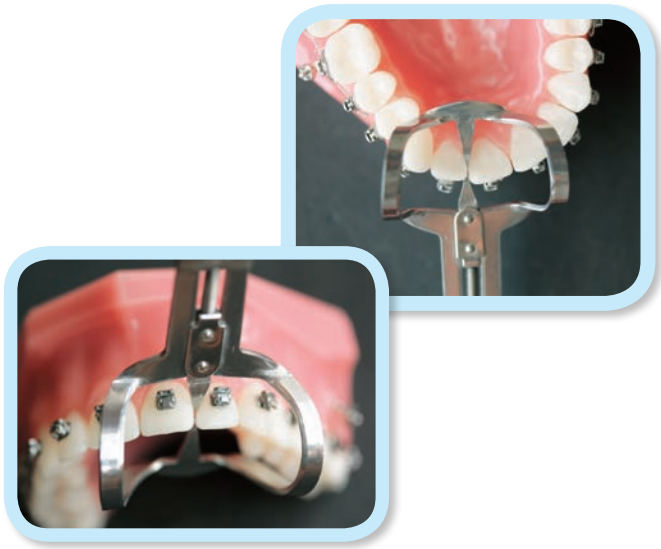

Fig. 29:
Ivory's separator was used on interdental area to separate 2 neighboring teeth when reshaping the anterior teeth contour.

Bracket repositioning was performed repeatedly throughout treatment as indicated by the sequential panoramic films. Wire bending was performed for detailing the occlusion during the final stages of the treatment.

One month before the completion of active treatment, the upper archwire was sectioned distal to the cuspids, and up and down elastics were used to improve the articulation of the posterior teeth. After 41 months of active treatment, all appliances were removed (*Fig. 30*). Upper and lower clear overlay retainers were delivered for both arches.

Fig. 30:
Pre- and post-treatment upper anterior teeth frontal photo. The teeth alignment, shape, and gingival margin contour were improved after the treatment.

Results Achieved

Maxilla (*all three planes*):

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

Mandible (*all three planes*):

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

Maxillary Dentition

- A - P: Incisors slightly retracted and uprighted
- Vertical: Maintained
- Inter-molar / Inter-canine Width: Maintained

Mandibular Dentition

- A - P: Incisors and molars slightly retroclined
- Vertical: Maintained
- Inter-molar / Inter-canine Width: Maintained

Facial Esthetics: Improved lower lip position

Superimpositions: Upper arch slightly retracted. Upper and lower incisor were uprighted (*Fig. 9*).

Retention

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

Final Evaluation of Treatment

The ABO Cast-Radiograph Evaluation score[1] was 16 points. The major discrepancies were in the left occlusal relationships (*4 points*), occlusal contacts (*3 points*), and marginal ridges (*3 points*).

Collectively, 3 quadrants of molar extraction spaces were successfully closed. Due to the asymmetry of the space closure mechanics, the occlusal relationship on the left side was slightly compromised and the midline of the upper arch was 1.5 mm to the right of the mandibular midline. The facial profile was improved because of correction of the protrusive lower lip. The patient was satisfied with the treatment outcome (*Fig. 31*).

Fig. 31:
Post-treatment photo. The patient was satisfied with the treatment outcome.

Discussion

Atypical extraction patterns are common for orthodontic treatment of adults primarily because of tooth loss resulting from caries. Currently in Taiwan the mean DMFT (*decayed, missing and filled teeth*) index for 12 to 17-year-old adolescents is 2.58, 3.78, 4.23, 4.52, 4.72 and 5.14, respectively.[3] These results are far greater than the World Health Organization (*WHO*) 2010 goal, which is a DMFT of 2 in 12-year-old children. Dentitions mutilated by caries are common, and the dental treatment plans to correct the problem are progressively more complicated if tooth loss is asymmetric.

Lower posterior teeth play an important role in occlusal function, particularly in maintaining the vertical dimension of occlusion (*VDO*). The current patient complained about difficulties chewing on the right side before treatment because of a fractured upper right 1st molar and a missing lower 2nd molar. Without treatment, his chewing function would probably further deteriorate and eventually compromise the lower left 1st molar. Vanarsdall and Swartz[4] described the common sequelae for a missing mandibular 1st molar as (*1*) mesially inclined 2nd and/or 3rd molar, (2) distal drift of the premolars, (3) extrusion of the maxillary molars, (*4*) altered gingival form due to constriction of the edentulous ridge, (5) infrabony defect mesial to the inclined molar, (*6*) stepped marginal ridges, (*7*) food impaction, and (*8*) posterior collapse. Chang, Chang and Roberts[5] have noted a similar pattern.

There are many treatment options for replacement of missing teeth, including orthodontic space closure, single tooth implants, and tooth-supported restorations.[6] The present patient preferred a treatment plan with the least need for restorative treatment. Asymmetric extractions, particularly molars, increase the complexity of orthodontic

treatment. Despite these mechanical problems, patients usually benefit from extraction of molars with a questionable prognosis rather than removing healthy premolars. Furthermore, the cost of treatment is often considerably less because expensive surgical and restorative procedures are avoided.[6,7]

According to William and Hosila,[8] maxillary 1st molar extraction treatment is less likely to affect the profile than premolar extraction. The present patient had an acceptable profile with a slightly protrusive lower lip. During treatment, the hopeless upper right 1st molar and poor prognosis, lower left 1st molar were successfully replaced by the 2nd and 3rd molars within their own quadrant. The missing lower right 2nd molar space was closed by 3rd molar protraction, thus avoiding the need for artificial prothesis fabrication and improving the facial profile by slightly retracting the lower lip.

The chance of successful 3rd molar eruption is much higher when the 1st molars are extracted, compared to when premolars are extracted.[8] However, for the case under discussion the lower left 3rd molar did not erupt spontaneously after the 1st molar extraction and protraction of the 2nd molar. This is probably because it was horizontally impacted under a layer of dense cortical bone.

Many methods for molar uprighting have been described in literature.[9] Most approaches require at least partial exposure of the clinical crown. Lin[9] reviewed two viable methods for uprighting horizontally impacted molars: Bach (*Fig. 32-1*) and Chang (*Fig. 32-2*). The first approach inserts an .014"

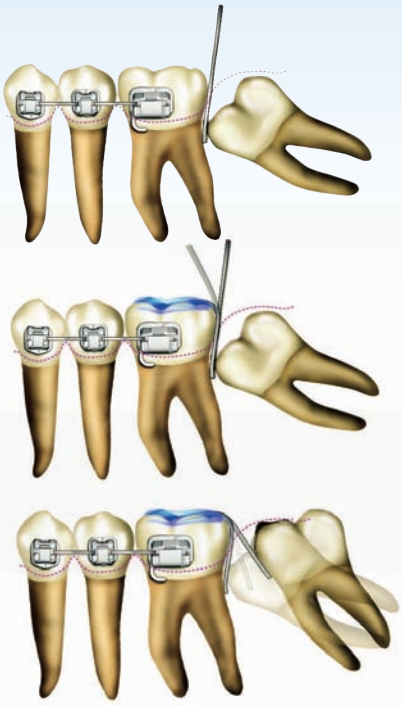

Fig. 32-1:
Bach's method for molar uprighting, which is suitable for soft tissue impacted molars.

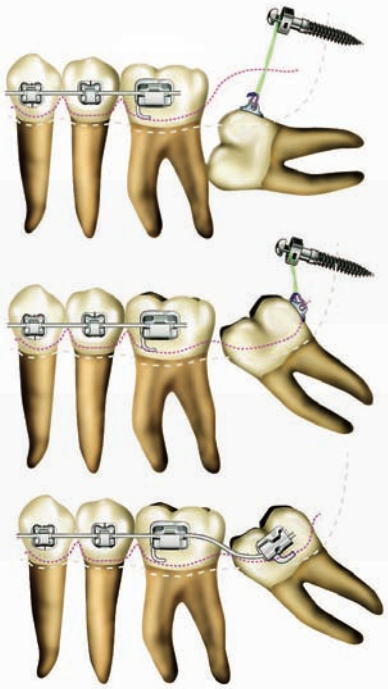

Fig. 32-2:
Chang's method for molar uprighting, which is indicated for deeply horizontal bony impacted molars.

x .025" CuNiTi wire down to the occlusal level of the impacted molar, then flexes the wire onto the occlusal surface of the adjacent molar and secures it with light-cured composite resin. After several months, the impacted molar is uprighted and erupts spontaneously. Thus, surgical exposure is not required, but occlusal interference may occur due to composite on the occlusal surface of the molar in occlusion. A significant interference may require placing a bite turbo on the opposite side of the arch for bilateral occlusion during the uprighting phase. The Bach method is not indicated for openbite patients nor bony impactions. The Chang method was performed in the 25th month of treatment, following one year of observation to determine if the impacted molar would begin to erupt. In retrospect, the surgical procedure should have been performed earlier to decrease treatment time. If it does not begin to erupt within 6 months after the 2nd molar is protracted, surgical uncovering is indicated.

Closed eruption technique was used for the present patient in an attempt to preserve keratinized tissue, especially on the buccal surface. However, the buccal position of the 3rd molar and the overlying fibrous tissue response prevented the tooth from erupting. Thus the 2nd surgical procedure was needed to remove the overlying soft tissue. In retrospect, an apically positioned flap may have been a better initial surgical approach to keep the path of eruption open and avoid the 2nd surgery.

The position of the miniscrew for lower molar uprighting is very important. Care must be taken not to cause occlusal interference when the miniscrew is inserted. The ramus area is often covered with thick soft tissue that may hasten the loosening of the miniscrew; a longer size (*2x14 mm*) miniscrew is indicated to help to solve this problem.

In brief, there are 6 keys to success for treatment of lower impacted 3rd molars: (*1*) precise diagnosis and a pragmatic treatment plan, (*2*) proper flap design usually apically positioned to increase keratinized gingiva, (*3*) gently luxate the impaction to rule out ankylosis and speed up extrusion, (*4*) trim away bone in the path of eruption down to the cementoenamel junction (*CEJ*), (*5*) bond on a button with a power chain, and (*6*) insert a ramus screw for distal and occlusal traction.

The impacted molar was uprighted and extruded until there was enough clinical crown height for bracket bonding in an ideal position: 90° to the long axis of the 3rd molar root. However, it may have been better to bond the bracket earlier with a compromised angulation to enhance the rate of tooth movement (*Fig. 33-1 and 2*).[10]

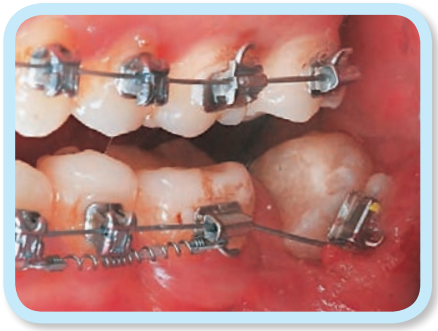

Fig. 33-1:
The lower left 3rd molar tube was put with a more mesially angulation to help correct the tilted molar.

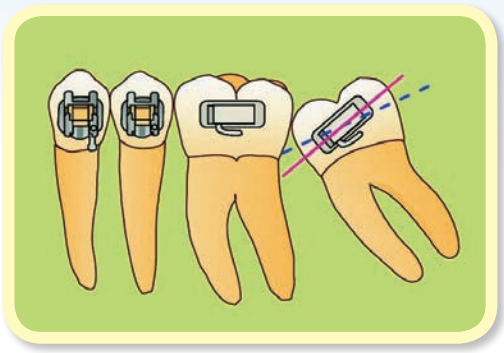

Fig. 33-2. Cartoon illustration of molar tube bonding positon.

Space closure is a challenge for 1st molar extraction sites. Precise control of tooth movement during closure of extraction spaces in 3 dimensions is of paramount importance in meeting treatment goals. The large mesial root surface of mandibular molars enhances their anchorage value which may result in lingual tipping of the incisors.[11] When protracting the 2nd and 3rd molars to close a first molar space, there is a tendency to tilt mesially and roll lingually when subjected to a mesially directed force. Sandler et al.[12] advise that active space closure should not be attempted before the lower teeth are well aligned and in a full-sized working arch wire. For the present patient, a . 016x .025 stainless steel archwire was placed in the lower arch. Balancing lingual force was applied by a power chain and 3 buttons bonded on the lingual surface of 3rd molar, 2nd molar and 2nd premolar (*Fig. 20-23, 34*).[5] This lingual force can facilitate the process of extraction space closure and prevent mandibular 3rd molar rotating distal-out. Another method to prevent the molars from tilting mesially is to apply an adequate root mesial moment during protraction. After the treatment, the total amount of space closure was measured: 11mm

Fig. 34:
The lingual force can facilitate the process of extraction space closure and prevent mandibular 2nd and 3rd molars rotating distally-out.

for the lower left 1st molar area, and 9.5 mm for the upper right 1st molar area.

The buccolingual width of the edentulous ridge is an important factor for molar protraction treatment time. The best timing of extraction is just before teeth protraction.[7] The edentulous alveolar ridge might undergo resorption with time after extraction of the tooth. From a traditional perspective, this problem is thought to prolong treatment time, narrow the ridge, cause gingival dehiscence, root resorption, or other periodontal problems for the teeth being protracted. However, Roberts et al.[13, 14] have noted that these problems do not occur when the periodontium is healthy on teeth adjacent to the extraction site. For the present patient, the maxillary right 1st molar and mandibular left 1st molar were extracted just before the start of orthodontics treatment; furthermore, the adjacent teeth were

periodontally healthy. Both factors may have contributed to the satisfying results obtained.

Conclusion

Mesially tilted or impacted molars are commonly seen in dental practice. If the molar is deeply impacted, a miniscrew inserted into the ramus is effective anchorage for uprighting. There are 6 keys to ensuring success when treating deeply impacted molars: (*1*) precise diagnosis and a pragmatic treatment plan, (*2*) proper flap design, usually an apically positioned flap, to increase keratinized gingiva, (*3*) gently luxate the impacted tooth to rule out ankylosis, (*4*) adequate bone trimming to open a clear path of tooth movement, (*5*) bond buttons and activate them with power chains to rotate the tooth as it erupts, and (*6*) place a ramus screw for anchorage.

Asymmetric extraction patterns increase the complexity of orthodontic treatment, especially when permanent molars are involved. However, patients usually benefit from extraction of molars with a questionable prognosis rather than removing healthy premolars. This type of treatment could become more popular with further development of temporary anchorage devices. It is hoped that the careful study of this case report will broaden the scope of possibilities for clinicians faced with this type of malocclusion.

Acknowledgment

Thanks to Teacher Paul Head and Dr. Hsin Yin Yeh for proofreading this article.

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Discrepancy Index Worksheet

TOTAL D.I. SCORE 25

OVERJET

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

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

Total = 2

OVERBITE

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

Total = 0

ANTERIOR OPEN BITE

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

Total = 0

LATERAL OPEN BITE

2 pts. per mm. per tooth

Total = 0

CROWDING (only one arch)

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

Total = 1

OCCLUSION

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

Total = 0

LINGUAL POSTERIOR X-BITE

1 pt. per tooth Total = 1

BUCCAL POSTERIOR X-BITE

2 pts. per tooth Total = 0

CEPHALOMETRICS (See Instructions)

ANB ≥ 6° or ≤ -2° = 4 pts.

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

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

SN-MP

≥ 38° = 2 pts.

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

≤ 26° = (1 pt.)

Each degree < 26° 1 x 1 pt. = 1

1 to MP ≥ 99° = (1 pt.)

Each degree > 99° 7 x 1 pt. = 7

Total = 8

OTHER (See Instructions)

Supernumerary teeth	_____	x 1 pt. =	_____
Ankylosis of perm. teeth	_____	x 2 pts. =	_____
Anomalous morphology	_____	x 2 pts. =	_____
Impaction (except 3rd molars)	_____	x 2 pts. =	_____
Midline discrepancy (≥3mm)		@ 2 pts. =	_____
Missing teeth (except 3rd molars)	1	x 1 pts. =	1
Missing teeth, congenital	_____	x 2 pts. =	_____
Spacing (4 or more, per arch)	_____	x 2 pts. =	_____
Spacing (Mx cent. diastema ≥ 2mm)		@ 2 pts. =	_____
Tooth transposition	_____	x 2 pts. =	_____
Skeletal asymmetry (nonsurgical tx)		@ 3 pts. =	_____
Addl. treatment complexities	6	x 2 pts. =	12

Identify: 1. Molars protraction x 3
2. Lower left horizontal bony impacted 3rd molar uprighting x 3

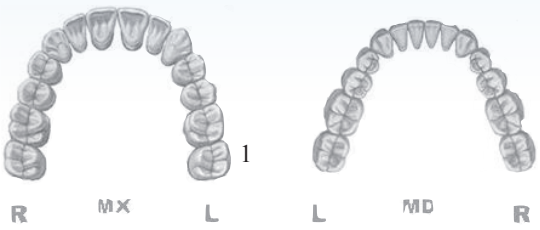
Total = 13

Cast-Radiograph Evaluation

Total Score: 16

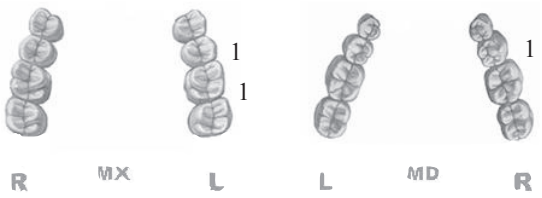
Alignment/Rotations

1



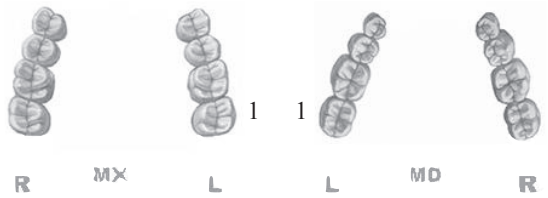
Marginal Ridges

3



Buccolingual Inclination

2

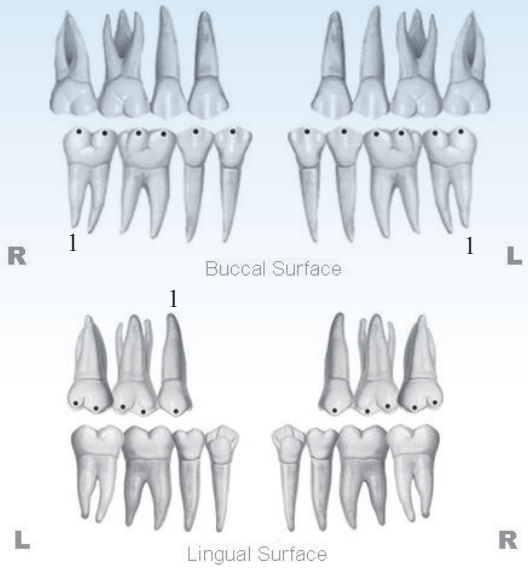


Overjet

1

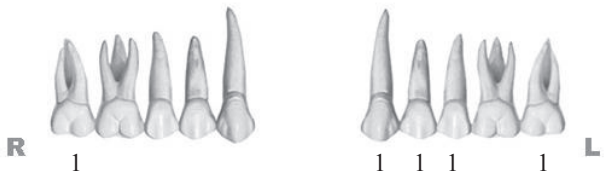
Occlusal Contacts

3



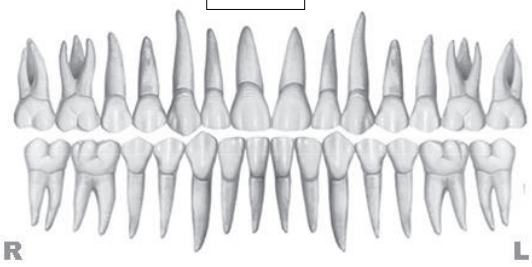
Occlusal Relationships

5



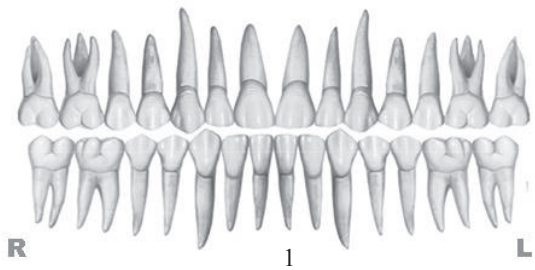
Interproximal Contacts

0



Root Angulation

1



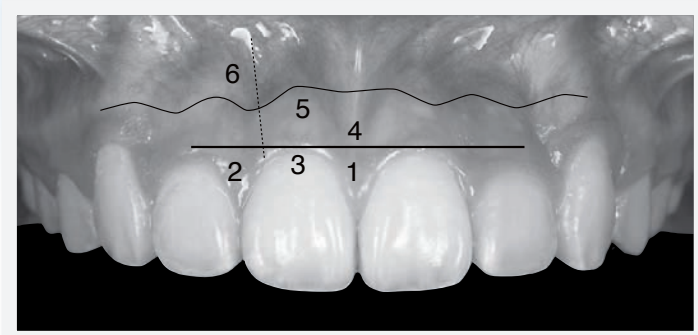
INSTRUCTIONS: Place score beside each deficient tooth and enter total score for each parameter in the white box. Mark extracted teeth with "X". Second molars should be in occlusion.

IBOI Pink & White Esthetic Score

Total Score: = 3

1. Pink Esthetic Score

Total = 1

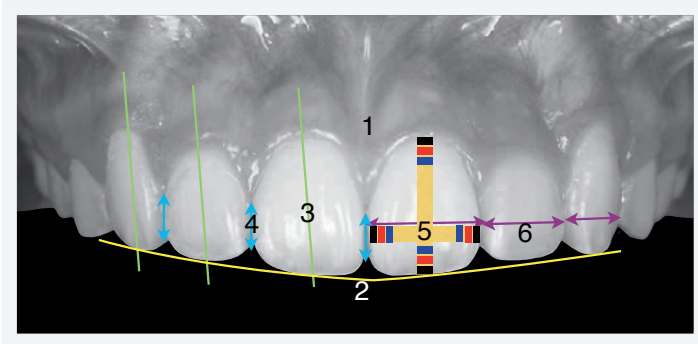


1. Mesial Papilla	0	1	2
2. Distal Papilla	0	1	2
3. Curvature of Gingival Margin	0	1	2
4. Level of Gingival Margin	0	1	2
5. Root Convexity (Torque)	0	1	2
6. Scar Formation	0	1	2

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

2. White Esthetic Score (for Micro-esthetics)

Total = 2



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

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

Bimaxillary Protrusion Treated with Miniscrews

SUMMARY

This report describes a conservative orthodontic treatment of a bimaxillary protrusion adult case. After four first premolars extraction, two bone screws were laced in the infrazygomatic crests to ensure maximal retraction and two additional bone screws were placed in between the central and lateral incisors for the vertical control of the maxillary anterior segment. Pleasing esthetic and functional results were achieved. (IJOI 2014;34:78-89)

Key word: *Bimaxillary protrusion, miniscrew*

History and Etiology

A 31-year-4-month-old woman presented with the major concerns of protrusive lips, mildly crowded teeth, and excessive gingival exposure (*"gummy smile"*) (*Figs. 1-2*). The patient's medical and dental histories were non-contributory. Moreover, there was no evidence of contributing oral habits or temporomandibular dysfunction. The patient was treated to an acceptable result as (*Figs. 4-9*), as will be subsequently discussed.

Fig. 1: Pretreatment facial photographs

Fig. 2: Pretreatment intraoral photographs

Fig. 3: Pretreatment study models (casts)

Diagnosis

Pretreatment facial photographs showed a convex profile with protrusive lips and a gummy smile (*Fig. 1*). The pretreatment intraoral photographs and study models (*casts*) revealed a Class I molar relationship on both sides (*Figs. 2-3*). The maxillary midline was deviated 1 mm to the right of the facial midline. The cast evaluation (*Fig. 3*) documented the following dental problems: 1. anterior cross-bite (#*24-26*), 2. mild crowding of the upper and lower anterior segments.

The ABO Discrepancy Index (*DI*) was 18 as shown in the subsequent worksheet.[1]

Dr. Teng-Kai Huang, Diplomate, International Association of Orthodontists and Implantologists (iAOI) (right)

Dr. Chris Chang, Director, Beethoven Orthodontic Center (middle)

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

Fig. 4:

Post-treatment facial photographs showing considerable facial profile improvement.

Fig. 5: Posttreatment intraoral photographs

Fig. 6: Posttreatment study models (casts)

Skeletal:

- Skeletal Class II (*SNA 81°, SNB 76°, ANB 5°*), high mandibular plane angle (*SN-MP 40°*)

Dental:

- Class I canine and molar relationship
- Anterior cross-bite #24-26
- Crowding: moderate in the maxillary and mild in the mandibular anterior segments

Facial:

- Convex profile
- Bimaxillary protrusion with lip strain and excessive gingival exposure (*"gummy smile"*)
- Maxillary dental midline shifted 1 mm to the right of the facial midline

Treatment Objectives

The principal objectives were to: 1. intrude the maxillary dentition, 2. retract the maxillary and mandibular anterior segments, 3. retract the lips, and 4. achieve an ideal overjet and overbite relationship.

Maxilla (*all three planes*):

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

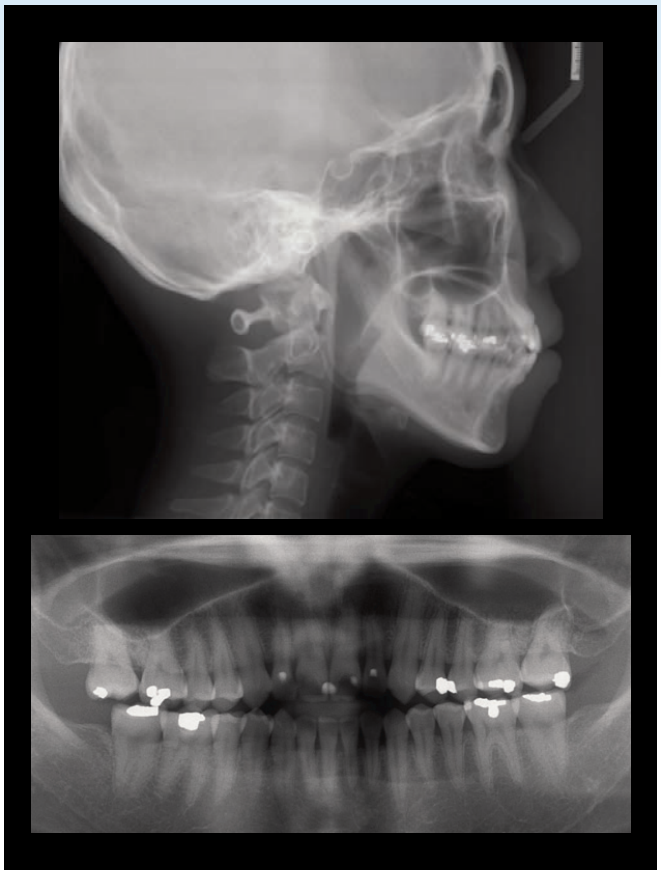


Fig. 7: Pre-treatment panoramic and cephalometric radiographs

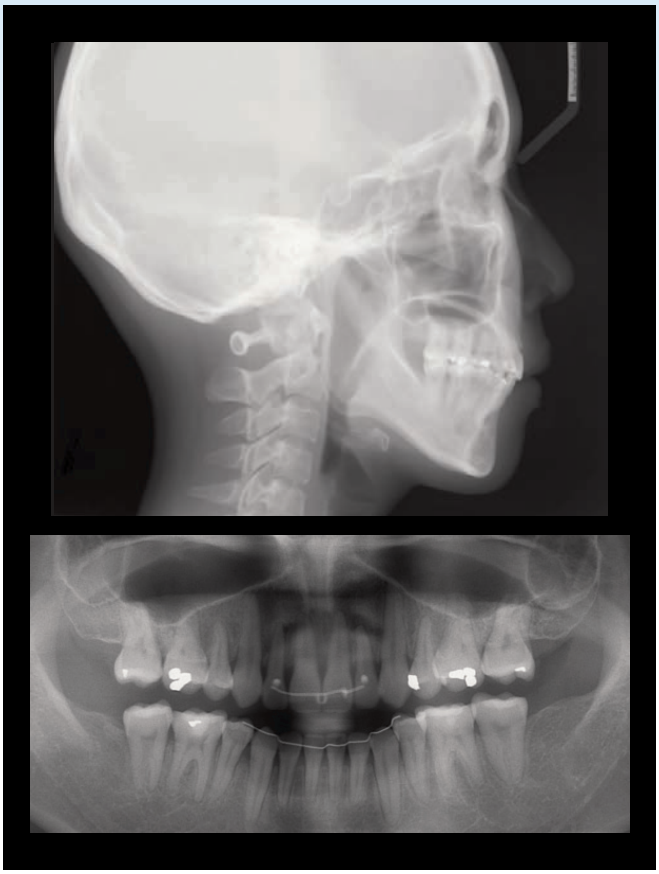


Fig. 8: Post-treatment panoramic and cephalometric radiographs

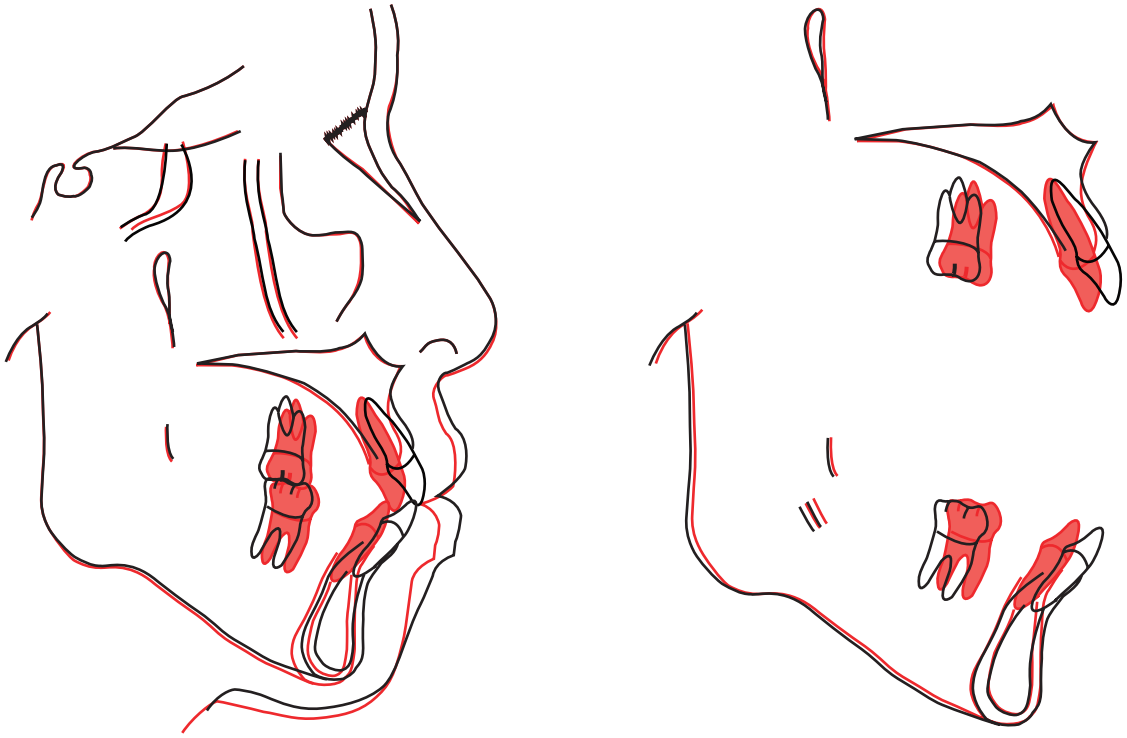


Fig. 9:

Superimposed cephalometric tracings reveal retraction of the incisors, slightly increased vertical dimension of occlusion, and reduction of lip protrusion.

CEPHALOMETRIC			
SKELETAL ANALYSIS			
	PRE-Tx	POST-Tx	DIFF.
SNA°	81°	80°	1°
SNB°	76°	75°	1°
ANB°	5°	5°	0°
SN-MP°	40°	41°	1°
FMA°	33°	34°	1°
DENTAL ANALYSIS			
U1 TO NA mm	6 mm	0 mm	6 mm
U1 TO SN°	103°	95°	8°
L1 TO NB mm	14 mm	8 mm	6 mm
L1 TO MP°	103°	95°	8°
FACIAL ANALYSIS			
E-LINE UL	2 mm	0 mm	2 mm
E-LINE LL	5 mm	0.5 mm	4.5 mm

■ Table 1: Cephalometric summary

Mandible (*all three planes*):

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

Maxillary Dentition

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

Mandibular Dentition

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

Facial Esthetics:

- Retract upper and lower lips

Treatment Alternatives

Because of the convex profile and protrusive lips, an orthognathic surgical option was discussed, but the patient deemed it to be too aggressive. Therefore, a more conservative plan was devised to meet the patient's needs: 1. extract all four first premolars, 2. place bone screws in the infrazygomatic crests bilaterally to ensure maximal retraction of the maxillary anterior segment, 3. use bone screws between the roots of the maxillary central and lateral incisors to control the vertical dimension of the upper incisors.

Appliances and Treatment Progress

Extraction of the four first premolars was accomplished before orthodontic treatment commenced. Brackets (*.022" Damon Q®, Ormco*) were used (*Maxillary: high torque; Mandibular: standard torque*). Both arches were bonded and aligned with the following arch wire sequence: .014" CuNiTi, .014"x.025"NiTi, .017"x.025" TMA, .019"x.025" SS. During the course of treatment, Class II elastics were upgraded from 3.5 to 4.5 oz. Two months after the .014"x.025" CuNiTi wires were placed, a panoramic radiograph revealed axial inclination problerms, and brackets were repositioned accordingly. Extraction spaces were closed with power chains on a .019" x0.25" SS archwire.

In the 20th month, two bone screws (*Ortho-BoneScrews®, Newton's A*) were placed bilaterally in the infrazygomatic crests, and two additional Orthobonescrews (*OBS*) were placed bilaterally between the central and lateral incisors roots. These four bone screws acted as anchorage to reduce

Figs. 10-12:
Four bone screws were used to retract and intrude the maxillary dentition: infrazygomatic crests and in between the central and lateral incisors roots, bilaterally. This was the principal anchorage for correcting the lip protrusion and gummy smile.

the gummy smile, by retracting and controlling the extrusion of the maxillary arch (*Figs. 10-12*). After twenty-seven months of active treatment, the appliances were removed and retainers were delivered.

Results Achieved

Maxilla (*all three planes*):

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

Mandible (*all three planes*):

- A - P: Retracted
- Vertical: Increased ~1-2mm (*posterior rotation of the mandible*)
- Transverse: Maintained

Maxillary Dentition

- A - P: Anterior segment retracted
- Vertical: Maintained
- Inter-molar / Inter-canine Width: Maintained

Mandibular Dentition

- A - P: Incisors were retracted
- Vertical: Molars were extruded ~1mm
- Inter-molar / Inter-canine Width: Maintained

Facial Esthetics:

- Upper and lower lip protrusion was reduced, and lip competence was achieved

Retention

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

Final Evaluation of treatment

Cephalometric analysis (*table*) and superimpositions (*Fig. 9*) show that the lower molars were extruded ~1mm and the mandible was rotated posteriorly,

resulting in a slight increase in the mandibular plane angle and reduction of SNB. The upper incisor to SN angle decreased from 103° to 95°. The angle of the lower incisor to the Md plane decreased from 103° to 95°. Both lips were retracted and lip competence was achieved. The gummy smile was improved due to the retraction of the maxillary incisors and upper lip.

The ABO Cast-Radiograph Evaluation score was 16 points.[1] There are some discrepancies in occlusal contacts, but the overall alignment was good. The protrusive lips were corrected and facial harmony was improved. The patient was particularly pleased with the improvement in her facial profile.

Discussion

Bimaxillary protrusion is a condition associated with proclined incisors (*increased axial inclination*) and protrusive lips.[2] Because of the negative perception, relative to a protrusive dentition and lips in most cultures, many patients with bimaxillary protrusion seek orthodontic care to resolve the problem.

Bimaxillary protrusion can be treated effectively in growing patients and in adults with conventional orthodontic therapy. For many adult patients, orthognathic surgery is necessary to achieve an optimal esthetic result.[3] However, some patients are resistant to orthognathic surgery due to expense, postoperative morbidity and the potential for complications. Despite the potential esthetic benefits associated with surgery, many patients opt for conventional orthodontics therapy.

Orthodontics treatment to correct bimaxillary protrusion usually involves extraction of four first premolars and the utilization of maximal anchorage to retract the anterior segments of both arches. Retracting the maxillary anterior segment may result in extrusion of the incisors and exacerbation of the gummy smile. To provide vertical control of the anterior segment, bone screws are used between the roots of the maxillary central and lateral incisors (*Fig. 13*). Currently, bone screws as temporary anchorage devices (*TADs*) provide increased anchorage and thereby expand the potential for orthodontic tooth movement.4 Premolar extractions are necessary to achieve maximal retraction with interradicular TADs. However, when bone screws placed in an extra-alveolar site such as the infrazygomatic crest (*Fig.14*), the anterior segments can be retracted effectively without resorting to extractions in some cases. For the present patient premolar extractions were necessary because there was inadequate retromolar space to sufficiently retract both arches (*Fig. 15*).

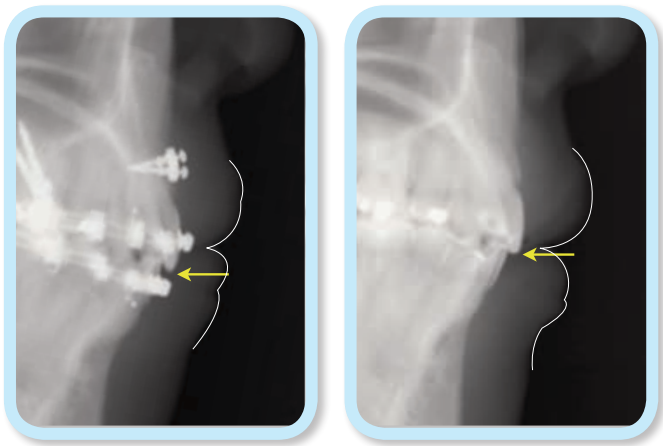


Fig. 13:

The bone screws placed between the roots of central and lateral incisors effectively correct the gummy smile by controlling the vertical position of the maxillary incisors.

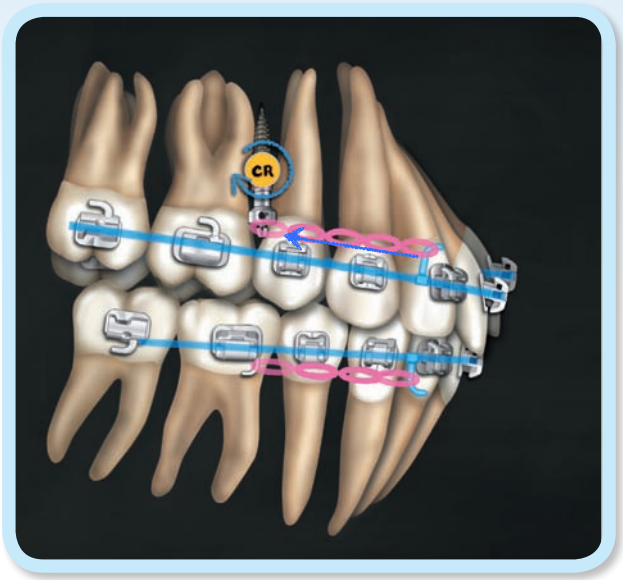


Fig. 14:

Using infrazygomatic bone screws for anchorage to retract maxillary incisors to reduce protrusion may have undesirable side effects: lingual tipping of the anterior teeth, increasing upper incisor exposure, as well as dehiscence and fenestration of the labial plate. These problems are due to the clock-wise rotation of the maxillary arch because the line of force (pink elastic chain) is occlusal to the center of resistance (CR) of the maxilla.

When using extra-alveolar TADs, the retraction of the arches is only limited by anatomic restraint. The space between the terminal molar and the external oblique ridge of the ascending ramus of the mandible, or the tuberosity in the maxilla, limits the distance that the entire arch can be retracted (*Fig. 15*).

There are some side effects associated with retracting the entire upper arch with posterior extra-alveolar TADs because the line of force is typically occlusal to the center of resistance (*CR*) of the maxilla, which causes the entire arch to rotate clockwise around the CR (*Fig.14*). This effect results in downward movement (*extrusion*) of the anterior teeth and additional gingival exposure when smiling, which is unacceptable for patients being treated to correct

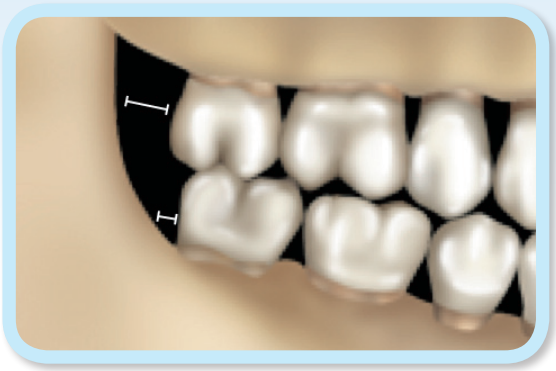


Fig. 15:

The limiting factor for retracting the entire arch is the retromolar space between the distal of the terminal molar and the external oblique ridge of ascending ramus in the mandible, or the tuberosity in the maxilla.

a gummy smile. Additional undesirable side effects are lingual tipping of the anterior teeth, as well as dehiscence and fenestration of the labial plate of bone. An effective solution for the side effects due to retraction of the arch, via direct anchorage from posterior extra-alveolar TADs, is to place bone screws bilaterally between the central and lateral incisors roots (*Figs. 13 and 16*). Vertical traction, from

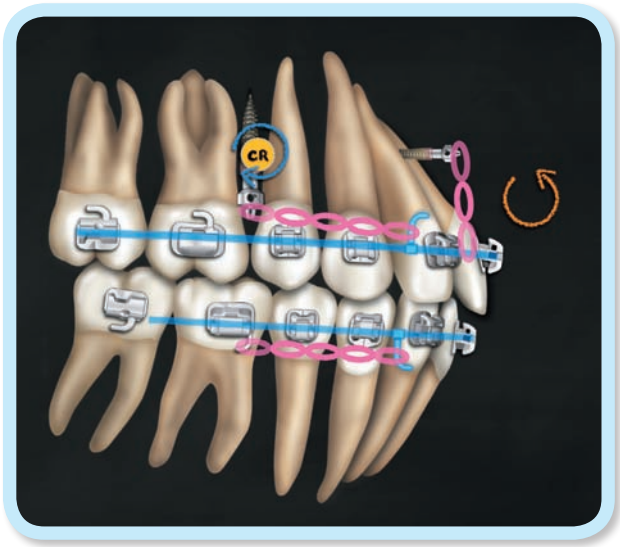


Fig. 16:

One of the solutions is to create a counter-clockwise rotation by placing two OBS bilaterally in between the central and lateral incisors root.

these interradicular TADs to the archwire, creates a moment in the opposite direction, producing counter-clockwise rotation of the maxillary arch. The correction of the gummy smile is achieved by intrusion of the anterior maxillary segment, in addition to preventing the clockwise rotation of the arch due to traction from the posterior TADs. Thus, four TADs, two in the infrazygomatic crests and two in the anterior maxilla, effectively intrude all maxillary teeth, thereby correcting the gummy smile due to the inferiorly positioned maxillary dentition.

High-torque brackets were used on the maxillary incisors to compensate for the loss of torque during retraction of the maxillary arch. Employing high-torque brackets (*Fig. 17*) introduces torque correction gradually as the size of the rectangular archwire increases, thereby avoiding roundtrip tooth movement to correct excessively tipped incisors.[5]

There are other alternatives for correcting the torque of the anterior teeth, such as pre-torqued archwires, and root torquing auxiliaries (*The ART® Auxiliary, Atlanta Orthodontics*). When the ART® auxiliary wire is hooked on the main archwire, the roots of the anterior teeth are effectively torqued in a lingual (*palatal*) direction (*Fig. 18*).

Light force should be used during intrusion to minimize the root resorption. According to Burstone,[6] 20 g of force is recommended for the intrusion of anterior teeth. As observed in Fig.13, the maxillary incisors were successfully intruded using OBS anchorage, and no significant root resorption was apparent (*Figs. 7-8*).

The soft tissue profile of the face does not always reflect changes in the under-lying skeletal structure during orthodontic treatment.[7] The lip profile change is also influenced by lip thickness, posture and strain.[8]

For the present patient, cephalometric analysis (*Cephalometric Summary Table*) documents the substantial reduction in lip protrusion. The U1 to NA distance reduced from 6 to 0 mm while the E-line

Fig. 17:
High-torque brackets were used in the maxillary anterior segment to compensate for the tendency to tip the incisors lingually as the segment is retracted.

Fig. 18:
The ART® torquing auxiliary is a wire segment that is effective for increasing the axial inclination of the maxillary incisors.

Fig. 19:
Abnormal enamel abrasion was noted on the left central incisor once the crossbite was corrected.

to UL was decreased from 2 to 0 mm. The L1 to NB distance was reduced from 14 to 8 mm while the E-line to LL was decreased from 5.0-4.5 mm. These morphologic changes resulted in a lip profile that was much improved after treatment.

It is important to note that the present patient presented with an anterior cross bite that was associated with abnormal enamel abrasion of the incisors[9] which compromises esthetics and occlusion[10] (*Fig. 15*). After orthodontic treatment, the anterior cross bite was corrected, thereby preventing further anterior teeth mobility, potential for fracture, periodontal problems, and temporomandibular joint dysfunction.[11] A mutually protected occlusion was achieved by establishing ideal overjet, overbite and canine guidance.

Conclusion

Bimaxillary protrusion is common in the Asian population. Conventional orthodontics treatment involves extraction of all four first premolars, followed by retraction of the anterior segments to reduce dental and soft tissue protrusion. Torque control of the incisors is an important issue. With the aid of four OBSs, the whole maxillary arch can be retracted and intruded to achieve an optimal result.

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Discrepancy Index Worksheet

TOTAL D.I. SCORE 18

OVERJET

0 mm. (edge-to-edge)	=	1 pt.
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 = 0

ANTERIOR OPEN BITE

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

Total = 0

LATERAL OPEN BITE

2 pts. per mm. per tooth

Total = 0

CROWDING (only one arch)

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

Total = 1

OCCLUSION

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

Total = 0

LINGUAL POSTERIOR X-BITE

1 pt. per tooth Total = 0

BUCCAL POSTERIOR X-BITE

2 pts. per tooth Total = 0

CEPHALOMETRICS (See Instructions)

ANB ≥ 6° or ≤ -2° = 4 pts.

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

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

SN-MP

≥ 38° = 2 pts.

Each degree > 38° 3 x 2 pts. = 6

≤ 26° = 1 pt.

Each degree < 26° 4 x 1 pt. = 4

1 to MP ≥ 99° = 1 pt.

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

Total = 13

OTHER (See Instructions)

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

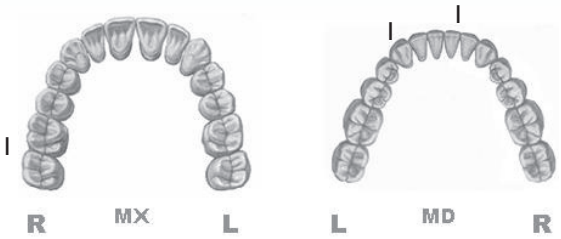
Identify: 0

Cast-Radiograph Evaluation

Total CRE Score 17

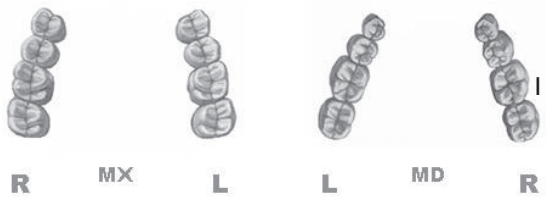
Alignment/Rotations

3



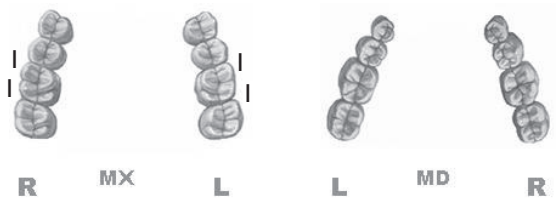
Marginal Ridges

1



Buccolingual Inclination

4

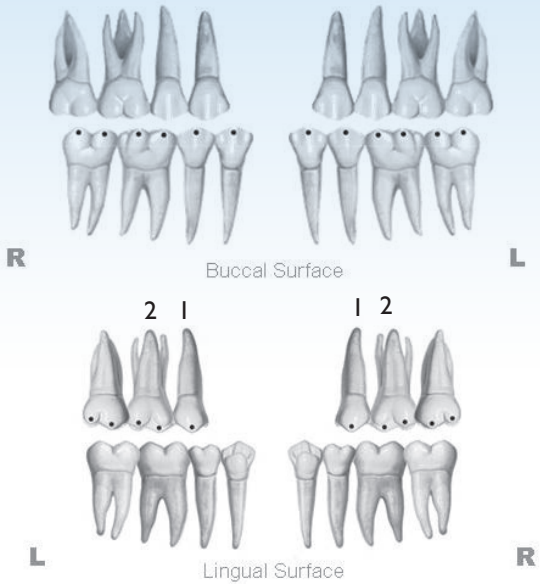


Overjet

0

Occlusal Contacts

6

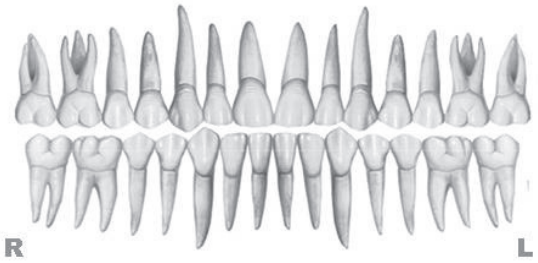


Occlusal Relationships

1

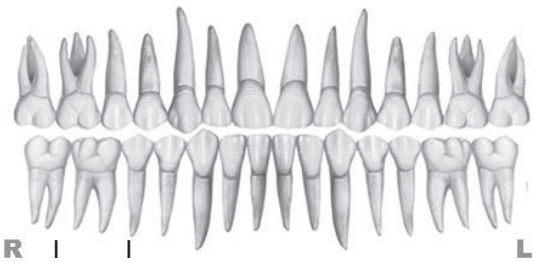
Interproximal Contacts

0



Root Angulation

2



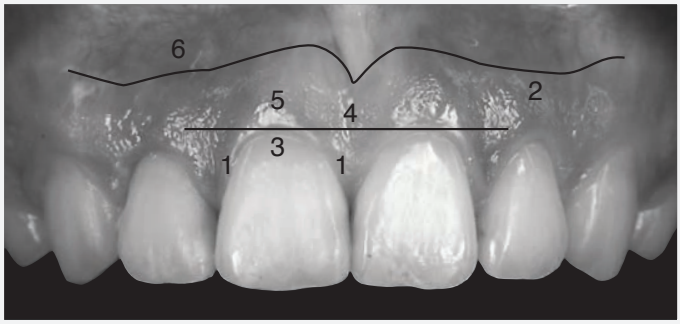
INSTRUCTIONS: Place score beside each deficient tooth and enter total score for each parameter in the white box. Mark extracted teeth with "X". Second molars should be in occlusion.

IBOI Pink & White Esthetic Score

Total Score: = 6

1. Pink Esthetic Score

Total = 3

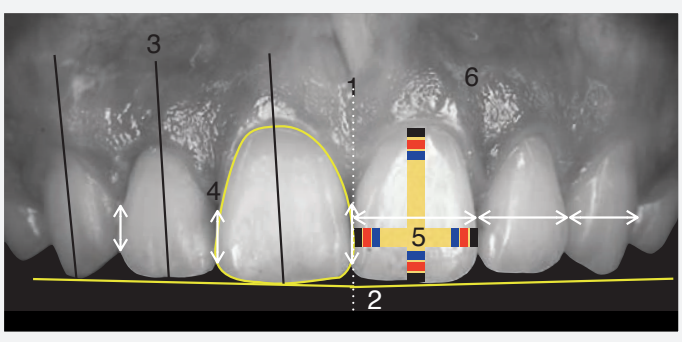


1. M & D Papillae	0	1	2
2. Keratinized Gingiva	0	1	2
3. Curvature of Gingival Margin	0	1	2
4. Level of Gingival Margin	0	1	2
5. Root Convexity (Torque)	0	1	2
6. Scar Formation	0	1	2

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 = 3



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

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

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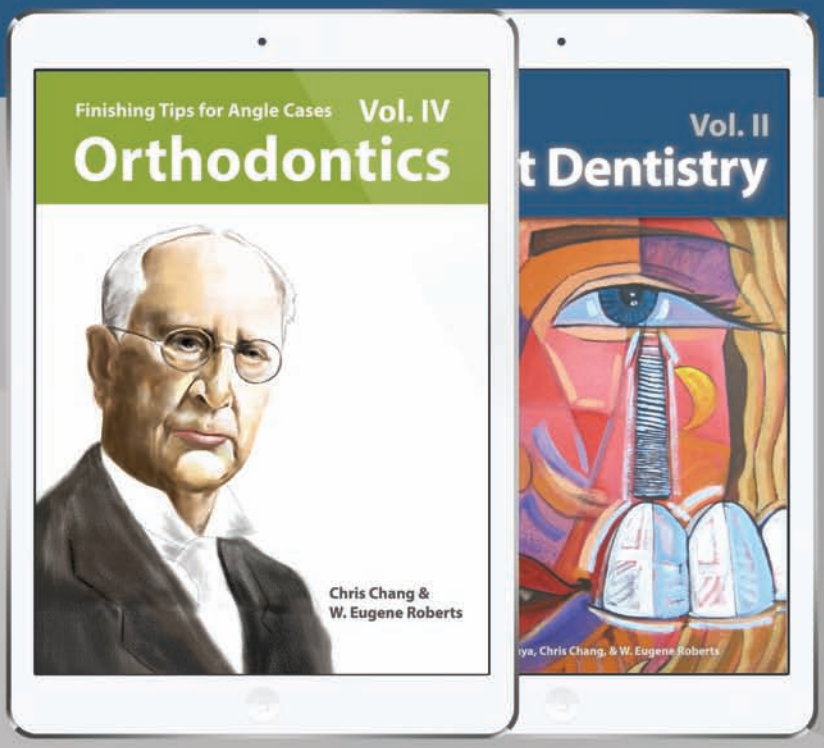

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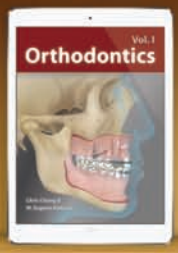

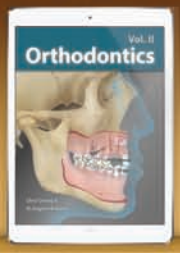

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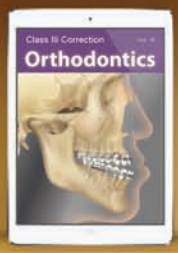

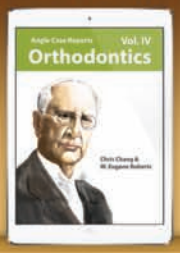

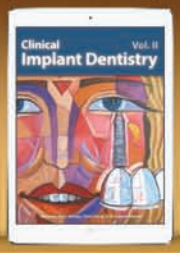

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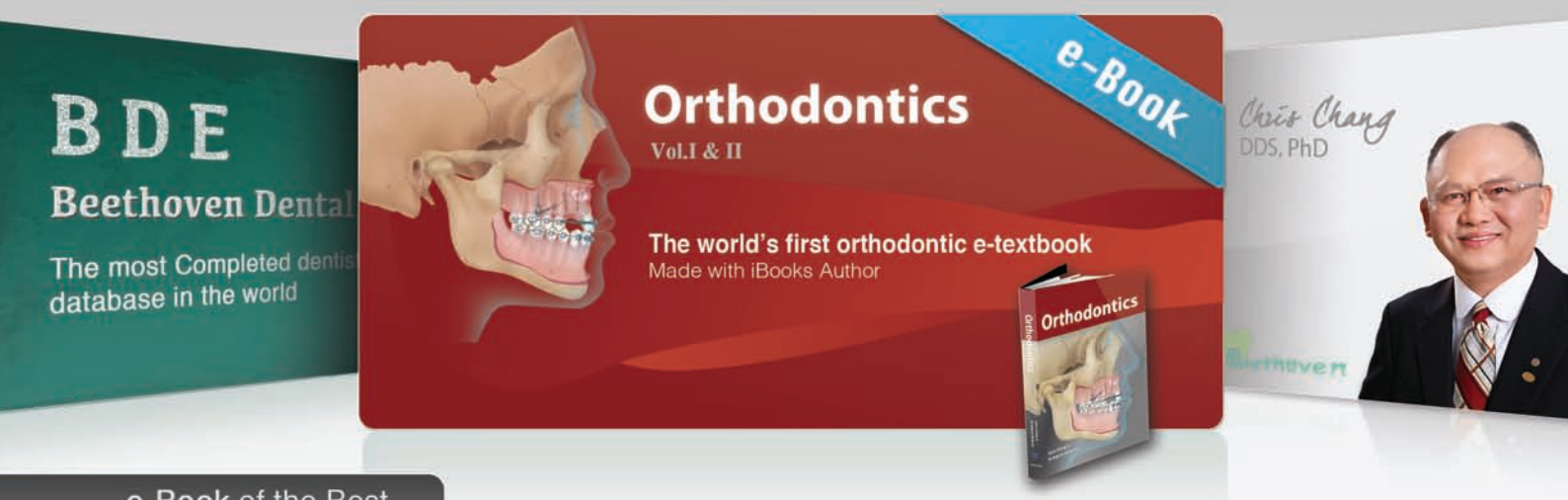

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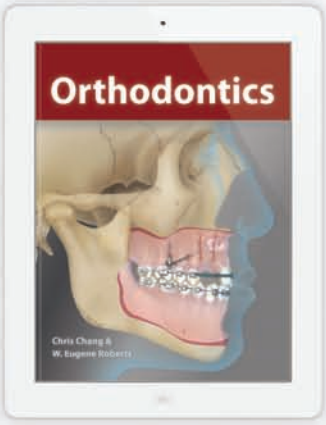

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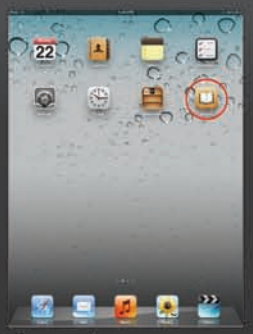

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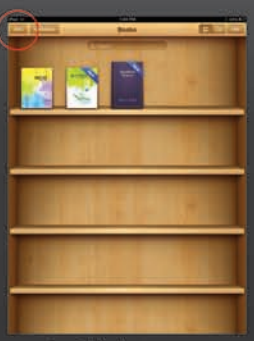

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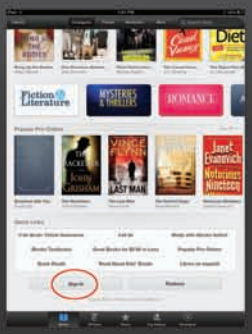

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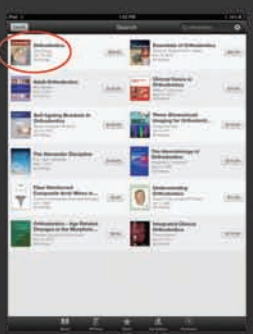

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引言

貝多芬，是世界知名的音樂家，但是在台灣，他同時也是一家牙醫診所的名字。在知名的搜尋引擎 Google 中輸入關鍵字「貝多芬」，在第五個順序就會自動出現「貝多芬牙醫」，點入之後有將近六千筆搜尋結果，可見民眾在網路上想要去了解「貝多芬牙醫」的熱烈程度。

貝多芬牙醫團隊簡介

貝多芬牙科集團是由張慧男醫師領導，從草創**貝多芬矯正中心**，陸續成立**貝多芬一般牙科**、**安徒生兒童牙科**，近年更開設**金牛頓植牙中心**，提供缺牙困擾的民眾更全面的治療環境。四間診所皆由牙周病專科、贋復專科等牙醫專科醫師及優秀的牙醫助理團隊所組成。此外，強調以「學習」為核心價值的貝多芬集團還另外成立**金牛頓藝術科技**，專職負責牙醫資訊科技、醫療器材研發以及牙科教育推廣的工作。

貝多芬矯正中心-環境介紹

一進到貝多芬矯正中心，櫃台美麗而親切的助理立即起身招呼，眼前寬敞的候診區以及初診病患的諮詢台，周圍不僅有整排的書櫃，有各種張醫師精選的書刊提供候診病患自由翻閱，最難能可貴的是大面積的落地窗，讓光線自然而豐富的灑入，舒適而且無壓。

向內進入看診區，同樣的還是一整排的落地窗，這對於整天在診所內工作的牙醫師而言，可真是一個天堂！因為只要一抬頭，就可以看到窗外中庭的綠樹，紓緩工作中的壓力與緊張感；看診區是開放式的安排，且前方有足夠的陪診空間，方便醫師與家長溝通，或是讓候診病患能預備看診，這樣的設計能有效率地處理大量病患。

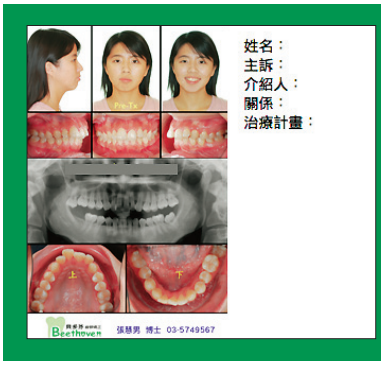
診療台後方的供應區，主要是擺放看診器械及病歷資料，讓所有的治療過程都能有足夠的後援，供應區台面上的蘋果電腦 iMac 也提供醫師在治療時所需要的資訊，而櫃台掛號資訊系統也整合在 iMac 裡面了，病患看診結束，助理也會即時記錄病歷並完成照片輸入。當然囉，所有的工作站之間都是內部網路連線的，這樣，不管醫師走到哪裡，只要有電腦，配合診療過程，所有的病例資料都可以一覽無遺。

韓國名醫 Dr. Park 與韓國醫師代表團參訪貝多芬。

診療區

貝多芬矯正中心- 診療運作系統

貝多芬矯正中心最值得研究之處，就是它的診療運作系統。診所內的每日看診病患量非常大，而且每天到診所內支援的住院醫師及專科醫師組合都不相同，但是對於病患的處理卻都能依照標準作業流程，按步就班的貫徹張醫師為病人量身訂作的治療計畫，而且效率依



圖像式病歷

然一流！這要歸功於精簡明瞭的病歷設計，不論病患的外觀、口內照片、主訴、基本資料、治療計畫、拔牙位置、特殊發現等，都整合在一張病歷紙上，一目了然！每位住院醫師只要看到病歷上的指示，依照標準操作方式完成每個病例每次的調整，不管是由誰操作，治療的結果都能成就完美。這表示，只要診斷正確，貝多芬矯正牙醫的標準作業流程如果複製到其他牙醫診所，每一位醫師都能如此輕鬆、快樂、有效率的完成矯正治療！

貝多芬團隊 BEETHOVEN

OBS 繼續教育

印尼國際班醫師認真在模型上練習植入迷你骨釘。

也許大家都會有疑問，住院醫師的訓練不是應該經過4~5年嗎？為什麼大家都能這麼快的進入狀況呢？我想答案應該是「標準訓練流程」。所有的住院醫師都需要經過張醫師的矯正基礎班、進階班的訓練，然後繼續在精修班中逐漸精進成熟。張醫師的教學活潑而且與門診同步，您很難看到萬年不變的教材幻燈片，因為張醫師自己一直在進步。我們會看到就在上個禮拜或是昨天門診中遇到的病例，及時的套入當天的課程主題，而且更令人驚奇的是，當天上完的課程，下午的門診病患裡就有同一類型的病例，真是現學現用零時差！

貝多芬國際化課程

張醫師所設計的課程，不光適合國內醫師，就連國外的醫師也都踴躍報名參加 Beethoven International Workshop，每個梯次的報名都非常踴躍，學員們結業後都說還要再來參加，可見張醫師的演講魅力非常吸引人！張醫師也同時與國際接軌，國際間的演講邀約不斷，漸漸地成為另一個台灣之光！另外，每每只要有國際學者到台彎演講，張醫師有機會都會邀請他們到診所參觀，親自為他們介紹診所的運作以及教育訓練，我們看到這些國際大師他們專注而且驚訝的表情，貝多芬牙醫確實在他們心中留下深刻的印象。

國際矯正植牙期刊
International Journal of Orthodontics & Implantology

貝多芬矯正中心經過張醫師十幾年來的經營，深獲病人的信任與支持，除了提供矯正專業服務外，張醫師也致力於繼續教育課程以及國內外學術活動的交流。為了讓更多牙醫師能有一個實務交流平台，張醫師出版了一份著重牙科臨床經驗分享以及報導國外矯正植牙新知的季刊 創刊 News & Trends in Orthodontics，近年更名為 International Journal of Orthodontics & Implantology (IJOI)擴大發行。藉由這個平台，邀請國內外知名牙醫師分享他們臨床上的秘訣，讓貝多芬矯正的理念能夠透過教育，傳達給認同這份精神的醫師，並且啟發學習熱忱，不斷精進。

貝多芬醫療團隊

貝多芬醫療團隊，當然不是由張醫師一個人單打獨鬥，我們面對的是廣泛的病人群，年齡從0歲到99歲。沒關係，小的可以送到安徒生兒童牙醫，年長者有贋復專科解決您「無牙」的問題，牙周病及植牙方面有牙周專科醫師，其餘如口腔外科及根管治療、一般牙科都有專人負責，因為都是團隊內轉診，團隊醫師群共同來照顧，對於治療計畫的擬定及溝通較為直接且方便，對於病患的照顧當然是無微不至。

當然，有一群像貝多芬牙醫這樣的全能助理是必要的。助理群也是貝多芬牙醫治療標準流程的重要關鍵！每一位新病人從進入診所開始，就由專業的公關組助理引導填寫基本資料，並介紹環境及諮詢流程，並且拍攝收集病患的口外及口內照片、取模。而在每日的門診治療流程，則由資深的助理組長來指揮，跟診助理引導回診病患就診前刷牙，看診前對病患的關心及詢問，器械準備好了之後由住院醫師先執行治療計畫，之後由張醫師檢查、微調。最後再由助理來指導病患口腔衛教，橡皮筋的佩戴、術後注意事項....等等，然後結束回診流程。助理在病患及醫師之間，扮演重要的關鍵角色，就像鋼筋永遠需要水泥一樣，如果您診所的助理還沒能達到您的理想，請參加貝多芬舉辦的專業助理訓練課程吧！

貝多芬醫師團隊。

貝多芬團隊 BEETHOVEN

安徒生兒童牙科 守護孩子口腔的健康

安徒生兒童牙科 - 緣起

在貝多芬矯正中心與一般牙科深耕新竹公學新村社區多年後，社區的里長跑來跟貝多芬集團負責人張醫師反應說，社區的孩子牙齒痛都需要跑到市區才能得到專科的照顧，里長伯代表社區的家長們希望貝多芬也能在社區開設專門為兒童設計的兒童牙科。因為聽到社區民眾的心聲，以及許多在貝多芬做矯正的家長也在反應一樣的需求，2008年元旦我們開設了「安徒生兒童牙科」。安徒生的院長徐玉玲醫師表示，安徒生的理念是希望能塑造一個父母安心，孩子開心的看牙環境，提供永續優質的服務，照護不僅是孩子的口腔生理，還有心理的健康。

診療台頂上就是繽紛的花朵，讓孩子徜徉在童話的懷抱裡。

金牛頓藝術科技 牙醫科技教育中心

成功的牙醫師們經常要面臨的兩難就是，一方面想持續精進臨床技術，但卻永遠抽不出足夠的時間好好坐下來聽一場演講，或是從頭到尾讀完一本新書。金牛頓藝術科技將貝多芬精湛的臨床技術以及完整的教學系統，透過蘋果先進的硬體 iPad 及 iPod touch，變成隨時隨地可以學習矯正的行動學習工具，已經掀起國際矯正界的一場新風潮。

金牛頓藝術科技- 行動學習軟體BDE＋iPad

張慧男醫師率先研發將 Damon 高效矯正、迷你骨釘 OrthoBoneScrew 以及助理訓練這三種屬性完全不同，但卻又與牙醫師在職教育密切相關的課程，透過蘋果電腦內建的簡報軟體 Keynote，製作成以照片和影片為主的簡報檔案，再透過軟體本身內建的轉檔功能，將平時授課的 Keynote 簡報內容轉化為視訊影片，並安裝在 iPad 或 iPod 裡。不論是已經上過課希望溫故知新，或是沒時間親自來上課的牙醫師，都可以透過反覆觀看這些包含清楚分解動作的視訊影片，來增強高效學習的效果。由於數位化的課程內容會不斷更新，所以醫師完全不用擔心已購買的珍貴資料變成過期垃圾。

金牛頓藝術科技-教學利器蘋果電腦＋Keynote

金牛頓除了提供牙科專業視訊課程外，也負責設計、規劃、維護貝多芬牙醫集團的教學資訊環境。舉例來說，日前台大張心涪主任帶著目前仍在美國接受矯正專科訓練，正好回台休假的女婿來參觀貝多芬。診所當天剛好有一個門診手術的個案，訓練有素的助理們有些協助醫師執行臨床上的步驟，有些則進行手術過程的拍照及錄影。待手術過程結束後，助理立刻

安徒生兒童牙科 - 環境介紹

診所以經典童話作家安徒生命名，將耳熟能詳的故事，如國王的新衣、賣火柴的小女孩、拇指姑娘融入診所的場景中，並結合童趣的想像信手塗鴉，留予親子間歡欣共處的童話氛圍。希望在寶貝的成長過程中，看牙不只是為了健康，也能是一件有趣、親子同樂的經驗。從依孩童身高設計不同高度的刷牙檯面，兒童專屬的廁所，到專為兒童設計的遊戲區和閱讀區，安徒生從許多細節裡體現一個以兒童為中心的診療環境。

安徒生兒童牙科 - 長期完整保留兒童口腔資料

對兒童牙科而言，安徒生希望能提供全面性的長期照護，一來在小孩成長的過程中與他們建立有好關係，另一方面，更希望能透過收集口內外照片與追蹤，充分掌握他們整體口腔健康，關懷口腔顏面發育及骨骼生長的情況。為了達成這個目的，安徒生在完整收集孩子們的資料後，以最先進的軟硬體技術處理大量數據，並將單眼相機拍攝的高畫質影像即時整合至個人病歷內，一點一滴地保存所有小朋友的生長及看牙記錄。多虧蘋果電腦Mac與Windows雙作業系統功能，讓健保作業及病例影音記錄可以同時進行，藉以提升學術研究與服務品質。

安徒生兒童牙科 - 兒童衛教

預防勝於治療，尤其是幫年紀尚幼的孩子處理蛀牙更是一項挑戰父母與醫師心臟的浩大工程，有鑑於此，衛生健康教育應向下紮根，所以安徒生兒童牙科除了與幼稚園合作定期來院檢查塗氟以外，希望還能為社區媽媽充實口腔知識以及提供一對一教學，幫助媽媽們從小幫助孩子養成正確的觀念與習慣。另外與孩子口腔健康有切身相關的領域，就是乳牙幹細胞的培養。有鑑於國內外此方面的研究發展已漸臻成熟，聰明的爸媽除了自寶寶出生後打好口腔健康的基礎，更要懂得保存未來的本錢。

就將剛才手術錄影畫面、照片，整合進這個患者歷次的電子病例檔案中。執刀的醫師則立刻在電腦銀幕上秀出這個病人的治療歷程，向病患及家屬說明治療的進程以及成效，之後再繼續利用這個案例與張醫師進行深度的專業個案討論。討論結束後立刻將這個案例的電子檔燒成光碟，讓張醫師和他的女婿可以帶回去做進一步的研究。

一般醫師可能認為這需要幾個實習醫師花上一個星期才能做出來的病例報告，利用適當的科技工具，在短短的30分鐘內就全部完成了，不論是與病人及家屬溝通、訓練新進醫師及助理，或與其他資深醫師進行專業討論，蘋果電腦加上 Keynote 的組合，讓個案探討和製作專業訓練教材都變得輕而易舉。再搭配 Keynote 最新加入的即時錄音功能，醫師教學講解的內容可以透過電腦內建的麥克風全程錄下，透過影片轉檔的功能，將製作好的最新教學內容放進 iPad 或 iPod 裡，立刻隨身帶著走。

金牛頓藝術科技-研發迷你骨釘 OrthoBoneScrew

由貝多芬矯正中心的實務經驗出發，張慧男醫師領導開發矯正用的迷你骨釘，金牛頓的研發團隊包含國內外學界專家如 University of Indiana-Purdue 牙醫所所長 Dr. Eugene Roberts 教授，中央大學林上智教授，以及國內知名矯正醫師林錦榮醫師等。兩年來不斷改進，深受國內醫師的喜愛。透過矯正骨釘的使用，可以大大減少因為矯正需要拔牙的機率，傳統上某些特殊需要接受手術矯正的案例也可以透過骨釘獲得不錯的治療效果。

金牛頓藝術科技－電子書、BDE應用程式

2012年金牛頓藝術科技出版了世界第一本3D互動式電子書《矯正學》，作者正是張慧男醫師及 Dr. Eugene Roberts 教授。所有經典案例皆通過世界認可的美國矯正學會（ABO）頒布之客觀評量標準，並以高解析圖片、影片、3D模型等互動科技展示。Dr. Larry White 曾贊許《矯正學》是「連矯正學者都未曾見過，迄今最令人驚嘆、有助益且創新的教科書。」至2014年初，已陸續出版《矯正學》共四冊、《臨床植牙醫學》共兩冊，堪稱世界上最完整的牙科電子書資料庫。

金牛頓除了製作專業課程視訊外，近期更進一步研發出 Beethoven Dental Encyclopedia (BDE) 應用程式，所有的視訊都可以雲端方式串流觀看，喜歡的片段還能夠下載，甚至閱讀每期IJOI精采矯正植牙案例，並獲得集團最新產品資訊。BDE 已於蘋果 App Store 上架，並限時開放免費下載，將帶給您有趣、有效的學習經驗。

貝多芬團隊 BEETHOVEN

金牛頓植牙中心 毋需再為缺牙遮掩　牙周照護的守護者

近年來，貝多芬矯正中心的病人結構逐漸由兒童、青少年轉為成人，這意味著成人對美感的要求也愈發強烈，但這也是貝多芬的全新挑戰，因為面對成人的治療時，往往除了牙亂的問題需要矯治外，還會碰到牙周病、大範圍的缺牙、舊有假牙補綴物汰舊，或是矯正後的植牙或假牙補綴的評估與重建。因此貝多芬有義務，也必須為成人提供矯正前、中、後全面的專業建議與治療。

過去一般認為成人的牙科治療只需要兩個專科：牙周與補綴，但我們現處於強調 inter-disciplinary 科際間協同治療的時代，其中，矯正與植牙更是扮演了協同治療中最重要的兩個支柱，矯正提供了地基，植牙則是蓋房子的支柱

為此，金牛頓植牙中心於2011年正式成立，以提供患者更完善的治療，以及建構更完整的貝多芬醫療體驗。植牙中心的成立為貝多芬集團在科際間協同治療上設立一個里程碑。診所運用最新3D斷層掃描技術，能夠提供諸如植牙區骨量等診斷資訊，甚至作為植牙前的矯正考量。金牛頓植牙中心也運用雲端科技來管理患者資料、提供衛教諮詢及員工教育訓練。

結語

貝多芬體系的核心價值在於教育兩字，透過課程的建立，激發貝多芬集團內各個專科的駐診醫師的學習熱忱，並借此創造出相互溝通的平台，張醫師相信，唯有在課程透過報告來分享最新臨床技巧，才會認真整理自己的病例或是將治療心得轉化為系統性的標準作業流程。透過一次次的自我釐清、整理、相互討論，將大大提升醫師自我的專業能力，診所的醫療品質也會大幅提升。

Keynote Workshop

高效簡報學習法 系列課程

輕鬆製作簡報

K1 簡報聖經 2014.07.24

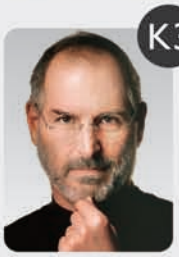
看過太多充滿複雜文字和圖表的幻燈片，聽過就忘了的演講嗎？這堂課將教您如何製作目眩神迷、印象深刻的簡報。透過小班教學，貼身指導，讓您在八小時裡輕鬆掌握簡報技巧。

學習重點：1. 操作入門　2. 演講常見十大謬誤　3. 資料視覺化技巧

K2 Dr. Kokich令人屏息的十大演講秘訣 2014.8.14

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

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



K3 賈伯斯令人目眩神迷的五項演講技巧 2014.09.11

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

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

連續報名K1~3
學費9折

備註：

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

繪圖簡報達人

K4 K5 K6 經修繪圖及動畫技巧 2014.12.05-07

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

Lecturer:
Dr. Rungsi Thavarungkul

報名2014 K456 課程即贈送 2013 及 2014 課程視訊。

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，11/05 前退款將扣除10% 行政手續費，11/06 後扣除30%行政手續費。

Advanced Keynote Animation & Illustration Workshop 2014.12.05-07

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

Learning objectives

- Basic application of a drawing board.
- Design illustration in your Keynote.
- Showcase your own drawing with stunning animation in Keynote.
- Create complicated diagrams using Adobe Illustrator and Photoshop.
- Animation composition.

貝多芬正畸菁英班課程回饋

致貝多芬、金牛頓團隊：

經過半年的準備和期盼，2014年3月10日我們一行三人來到了台灣新竹，住進了金牛頓為我們安排的「煙波大飯店」。很詫異，因為是來學習的，怎麼會安排住這麼好的酒店呢?帶著疑問進入夢鄉，期待著明天的課程。

第二天，當接駁車把我們帶到學習地點：金牛頓藝術科技，迎接我們的是熱情洋溢的金牛頓團隊－未曾謀面、卻已很熟悉的央如、小熊和他們的同事。稍作安排和簡介後就帶我們進入了貝多芬國際精英正畸班的課堂。見到了偶像張醫師和他的夫人高老師及貝多芬團隊。很興奮！

• 嚴明、袁峰、張慧男、邴宇慶、周杰醫師體驗IMAX電影（由左至右）。

課程安排的很好！主講正是張慧男博士，還聽到林錦榮的加場，特別配備了臨床見習。很貼心的安排，讓我們感到很溫暖。

自從在瀋陽聽過張醫師的課程後，我們就產生了要來台灣學習的想法，渴望近距離的學習感受，特別是貝多芬診所的高效運轉流程更是令我們念念不望，這次終於有機會一睹芳容！

張醫師幽默詼諧的演講風格和美侖美幻的Keynote課件讓我們耳目一新，極大地提高了我們的學習效率，通過張醫師和林錦榮兩位大師三天的課程，我們收穫很大，瞭解了台灣正畸的現狀也學習到了先進的知識和理念！特別是門診見習，更讓我們領略了張醫師和貝多芬助理團隊的風采。

先進的診間流程，高效地簡報溝通、助理小姐們團結合作的工作風格，更是讓我們耳目一新，讓我們有了要盡快更新門診的管理理念！見習中，無論多忙，張醫師和高老師都會見縫插針的為我們講解，告訴我們怎麼了？為甚麼？應該怎麼做！我們很有收穫，同時也很感動！敬佩張醫師的敬業、為 人、大方和幹練！敬佩高老師的細心、周到、溫馨、體貼！很模範的一對夫婦，向您們學習、致敬！

更加與以往不同的是在這個學習班，張醫師每晚都會宴請我們大陸來的學員，第三晚還陪著我們觀看IMAX電影讓我們真的很感動！在踏上這片土地之前,我們已感受到了張醫師團隊的熱情和細緻的服務，在協助我們辦理手續和自助游等方面可以說是不遺餘力，不厭其煩地一封封的回復我們的電子郵件！到了新竹後更是讓我們親身感受到了高老師管理下所有的貝多芬、金牛頓團隊的友好和熱情！交談中讓我們知道了住的舒服會更有利於休息，也是為了能更有精神好好學習，很貼心的服務！

總體來說這次台灣之行是超值的，台灣人民的友好熱情和敬業精神給我們留下深刻印象！再見了貝多芬、再見了金牛頓、再見了新竹！我們一定還會再來學習的！謝謝！

嚴明、邴宇慶、周杰

2014年3月15日瀋陽永嘉口腔門診部

張老師、高老師:

非常感謝，這次培訓收穫非常大、也非常開心。

我從醫十五年，參加國內、國外培訓幾十次，唯有這次是最貼近臨床，學到的東西最有利於病患。

現在培訓講理論的多，能敢於開放診所，展示真實臨床實際操作過程的少之又少。這需要醫生有非常棒的技術外，更需要有非常OPEN的胸懷。在這方面張醫生絕對是佼佼者。

其實醫生有好的技術是根本，但終極目標卻是讓好技術能夠服務於盡可能多的患者。

我一直不相信有這樣的醫生：自詡很資深，年齡也不小，但病患卻不是很多。因為說到底，病患數量是衡量醫生技術、服務、團隊、流程等綜合實力高低的唯一指標。而在這方面高老師的睿智絕對不亞於張醫生，如果沒有高老師在團隊流程建立、系統優化方面做的努力，張醫生是絕對不可能一天看一兩百個患者。所以在這些非技術領域，通過這幾天的學習，我也受益匪淺。

總之，這次台灣之行有價值，有收穫。感謝張老師、高老師以及全體團隊的耐心細緻的講解陪同。

下次我還會來學習，我希望能帶領我的團隊一起來。

謝謝！

袁峰
上海齊美矯正

這是一套非常棒的課程，通過這套課程，張慧男醫師向我們展示了貝多芬矯正系統的高效簡潔的獨到特點。

張醫師真正的過人之處不止於創立了這一套矯正體系，而是更進一步地向全世界矯正醫師來推廣和分享他和他的團隊的經驗，所以這才是矯正界最寶貴的財富！

另外非常感謝張醫師以及他的團隊這幾日的款待，真心感謝！

姚家俊 杭州牙科醫院

It is an honor for me to have my article, Surgery First with CDGs, published in IJOI. I also feel honored to be a member of this selective group-IAOI. I have attached my photo with the journal brought by our good friend, Dr. Patricia Vergara. I couldn't go there in November because I had to present in two conferences with Dr. Pitts, but I am planning to attend your course in June, 2014. I'm sending you a special greeting from Colombia. We really admire your work, and will be welcoming your visit this September with open arms. I wish you and your family all the best in this new year.

Warm Regards

Dr. Tomas Castellanos Arteaga Odontólogo
Ortodoncista Self ligating International Speaker

2014 Newton's Implant

	日期	USC 學程精選 （主講：張慧男、蘇筌瑋、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: IAOI 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

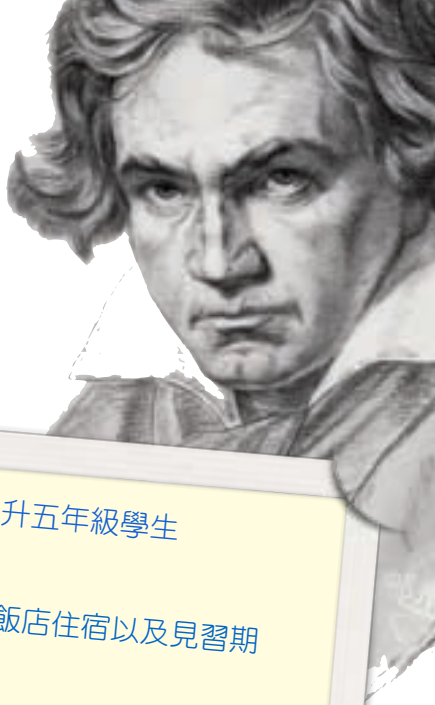
南下高雄開業，迄今已逾十五年時間，邱醫師最感受用的，是她在三十五歲開業之初學會矯 正，在四十六歲還沒得老花眼時學會了植牙。邱醫師坦言，在職進修必然造成壓力，它可能來自於 時間、金錢與家庭，畢竟一天只有二十四小時，但終身學習所創造的成就感與報酬，卻讓她覺得當牙醫「真是好玩」，而且將持續下去，謹此與讀者分享。

～本文摘錄自2010最新一期《台大牙友》

iAOI

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。

★ 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。

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

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，3PPassion、Practice and Persistance，「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。

I nternational
A ssociation for
O rthodontists &
I mplantologists

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2014/4/20（日）於台灣台北金融研訓院。

3. Diplomate

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

4. Ambassador

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

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

iAOI 2014年中大會

蘋果科技在牙醫上的應用

Mac Technology Application in Dentistry

4/20(日) 21(一) 大會 高醫學術研究大樓
Workshop 高雄科工館

活動簡介

還在使用繁複過時的治療方式嗎？本次大會將顛覆你對牙醫科技的想像，一窺它的全新面貌。張慧男醫師再次突破窠臼、打破迷思，帶領您層層剖析艱難案例，從中發掘創新且簡易的治療技巧，發揮臨床上的最大效率。來自泰國的矯正及 Keynote 大師 Dr. Rungsi 將傳授新版 Keynote 在牙科運用上的優勢，並分享如何跨平台、跨裝置協助您的診間工作；第二天 Hands-on 實作課程讓您快速掌握 Keynote 技巧，成為牙科科技的先驅！

活動議程

	時間	講題	講者
04/20（日）大會 高雄醫學大學 國際學術研究大樓 B2 （高雄市十全一路100號，建議從同盟一路校門進入）	09:00～10:30	牙科的破壞性創新 Part 1 Cutting-edge Orthodontics - Part 1	張慧男 醫師
	10:40～12:10	牙科的破壞性創新 Part 2 Cutting-edge Orthodontics - Part 2	
	12:10～13:30 12:10～13:00	午餐 Lunch iAOI 第一階段資格考 Board Eligibility Exam	
	13:30～15:00	蘋果科技在牙科上的應用 Part 1 Mac Technology Application in Dentistry - Part 1	Dr. Rungsi Thavarungkul
	15:10～16:30	蘋果科技在牙科上的應用 Part 2 Mac Technology Application in Dentistry - Part 2	
	16:30～17:00	交流討論 Discussion	張慧男 醫師 Dr. Rungsi Thavarungkul
04/21（一）Workshop 國立科學工藝博物館 S103教室 （高雄市九如一路797號）	09:00～10:00	牙科諮詢跨時代的高效整合 Efficient and Effective Initial Consultation	張慧男 醫師
	10:30～16:30	Keynote 工作坊 – 快速掌握牙科新科技 Keynote Hands-on Workshop 1. 新版 Keynote 在牙科的運用優勢 2. 讓 Keynote 成為診間得力助手	Dr. Rungsi Thavarungkul
	16:30～17:00	交流討論 Discussion	張慧男 醫師 Dr. Rungsi Thavarungkul

報名方式、費用

報名專線：03-5711377　線上報名：iaoi.pro

iAOI	入會費 One time enrollment fees	年費 Annual fees	第一階段資格考 Board Eligibility Exam
費用 Fees	NT$1,000	NT$3,000	NT$9,000 ~~NT$13,000~~ （含入會費、年費、考試及證書費）

	02/28 前報名		03/01 後報名	
	大會（原價 6,500）	Workshop（原價 9,000）	大會（原價 6,500）	Workshop（原價 9,000）
會員價	3,000元 +	7,000元	4,000元 +	8,000元
非會員價	5,000元 +	8,000元	6,000元 +	9,000元

- Workshop 不開放單獨報名。
- 助理與醫師共同報名大會，一位助理可享半價優惠。

匯款方式

戶名：國際矯正植牙學會
銀行代號：815 日盛銀行 光復分行
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＊匯款後，請務必來電03-5711377核帳

- 「會員」為已註冊並繳交入會費、當年年費之醫師，其餘皆適用 「非會員」價（未註冊者請至 http://iaoi.pro註冊）。
- 報名繳費後，恕不退費！

Workshop限額報名

iAOI 國際矯正植牙學會
International Association of Orthodontics and Implantologists

主辦單位：國際矯正植牙學會、高雄醫學大學牙醫學系總校友會、高雄市立小港醫院牙科部
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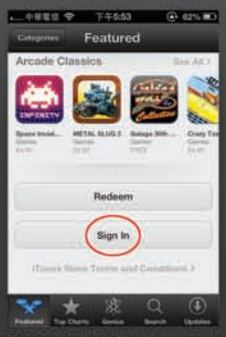
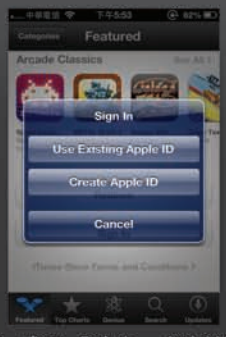
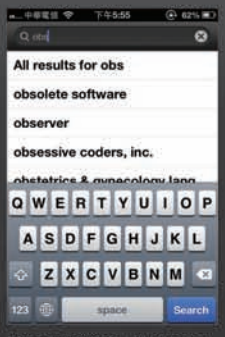


2. 「登入」您的 Apple ID。



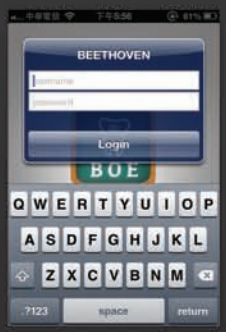
3. 或是「建立一個新的 Apple ID」。



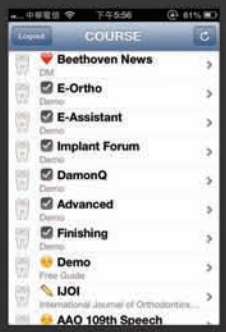
4. 搜尋關鍵字「BDE」。

5. 點選「免費」並「安裝」。

6. 下載完成後，點擊以打開該程式。



7. 輸入本 DM 右方提供的帳號、密碼，點選「登入」。



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植牙精進包

由矯正名師張慧男醫師主持，邀集國內外植牙講師，整理當前植牙的熱門主題，透過33堂課的專題演講和個案分析，讓您在植牙學習之路上不斷精進！

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（Topic 01-11）
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（Topic 34-44） New

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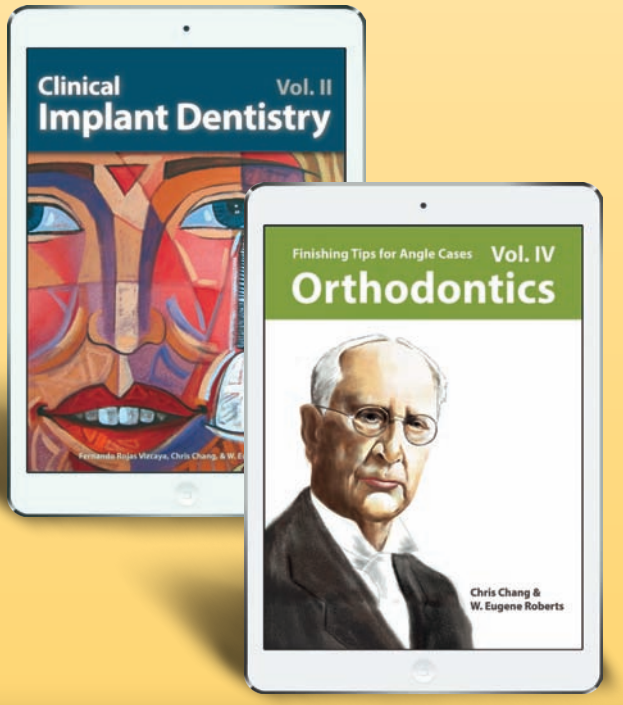

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Dr. Chris gave a lecture on "Gummy Smile Correction" at 2014 Damon Forum in Phoenix, Arizona, USA.

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