News & Trends in Orthodontics

A JOURNAL OF INTERDISCIPLINARY TREATMENT FOR ORTHODONTISTS

Vol. 17 Jan. 1, 2010

Dr. Edward Il. Angle (1855-1930)

The Past, Present and Future Perfect Profession Dr. Larry White

Why Damon System Dr. John Lin

ABO Case Report : Management of Skeletal Class III Malocclusion with a Palatally Impacted Cuspid Dr. W. Eugene Roberts

TEETH

RREGULARITIES

TEETH AND THEIR COKRECTION

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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 <mark>,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</mark> 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。

MO



Damon + .014 Cu NiTi

矯正植體課程

矯正植體的操作時機、植法與 實習、個案討論、臨床跟診及

Damoi	∩矯正	課程	將使用最新一代矯正器 Damon Q 進行課程, 歡迎舊生報名參加。
台北 (二)	台中 (四)	LECTUF	RE LAB

			LEOTONE	2,12
1	05/25/10'	04/29/10'	理想入門病例 + Damon Q 黏著	Bonding (Damon Q) + BT
2	06/01	05/13	快速矯正療程四部曲	Ceph + Photo
3	06/15	05/27	簡捷有效的錨定系統	Damon + OrthoBoneScrew I
4	06/29	06/03	不拔牙與拔牙分析	Damon + OrthoBoneScrew II
5	07/06	06/24	Damon 診斷流程及微調	Finish Bending
6	07/20	07/08	完工檢測及報告示範	Fixed Retainer (FR)
7	07/27	07/15	維持及復發;病例示範	Presentation Demo
8	08/10	07/22	矯正力學及診斷分析 (1)	DDX + Case Reports I
9	08/24	08/12	軟硬組織及診斷分析(2)	DDX + Case Reports II
10	08/31	08/19	兒童矯正及診斷分析 (3)	DDX + Case Reports III
11	09/07	09/02	成人矯正及診斷分析 (4)	DDX + Case Reports IV

矯正進階課程

矯正精修課程

精修 I (二) 02/09/10 03/09 04/13

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。

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

	新竹 (二)	高雄 (四)	Paper reviews	Topics & Case Demo
1	09/15/09'	09/17/09'	Bracket placement & workshop	Crowding: Ext. vs. Non-ext.
2	10/06	10/15	Impacted canines	(U) Impacted Teeth: Ant. vs. Post.
3	10/27	10/29	Canine Substitution	(L) Impacted Teeth: Ant. vs. Post.
4	11/24	11/26	Anterior Esthetics	Missing: Ant. vs. Post.
5	12/01	12/03	Excellence in Finishing (occlusion)	Crossbite: Ant. vs. Post.
6	12/29	12/31	Excellence in Finishing (esthetics & perio)	Deep Bite vs. Open Bite
7	01/19/10'	01/21/10'	Ortho-Perio-Restore connection	Low vs. High Angle & Gummy Smile
8	04/06	04/08	Adjunct to perio	Root Resorption & Relapse
9	04/20	04/22	Unhappy patient	Perio-Ortho
10	05/04	05/06	DI & CRE Workshop (1)	Implant-Ortho
11	05/18	05/20	DI & CRE Workshop (2)	IDT

易達到的目標。

精修II(二) 05/11/10 06/22 07/13 08/17 09/14 10/12 11/16 12/14

Damc + Earl	on + Bite Turbo y Light Short Elastic	實作示範。 新竹(五) 9/17/10'
	International workshop	助理訓練課程
	Keynote & managment OrthoBoneScrew & Damon	每佛次共附呈歸裡與投附操作,內含照相技術、Morph與公關衛教之電腦資料處理;另 安排一次診所見習。
	5/18~20/10'	新竹(五) 10/8、15 /10

7M

	課程資	11 11 11 11 11 11 11 11 11 11 11 11 11
課程項目	時段	上課地點
Damon 矯正	台北/台中	【台北】
	【課程】09:00‐12:00	恆逸資訊中心畢卡索廳
	【實習】另外安排	/台北市復興北路99號12F
		(捷運南京東路站旁)
矯正進階	【新竹】09:00 - 12:00	【新竹】
	【高雄】14:00 - 17:00	金牛頓藝術科技公司
		/新竹市建中一路25號2F
矯正精修	【課程】09:00‐12:00	【台中】
		文化大學台中教育推廣部
矯正植體	【課程】09:00‐12:00	/ 台中市西屯區中港路二段128
(含中、晩餐)	【實習】13:30 - 20:00	之2號3樓
		【高雄】
助理訓練班	【課程】10:00‐14:30	科學工藝博物館S107教室
(含中、晚餐)	【實習】15:00 - 20:00	/高雄市三民區九如一路720號

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Season's Greetings to our NTO readers!



appy New Year!

I am very proud to report that I had just finished a grand project: Dr. Angle's statuette. It took me almost two years to create this statuette. Along with Dr. Angle's statuette is the new additions to my collection of

orthodontic antique books which date back to 1840. With over 400 orthodontic antique books and Dr. Angle's statuette, they make better wall decorations than paintings in my house. I can spend a lifetime in my library and not get bored (well, maybe some golf time on the side!). I didn't collect these antique books and make this statuette out of nostalgia, but love for orthodontics and its history.

Hundred years ago Dr. Angle devoted his life to create and refine our profession. All his life he strived to separate orthodontics from dentistry. However, with the increasing number of complex adult cases we treat today, it is almost impossible for us to accomplish those tough jobs by playing solo. Interdisciplinary treatment has rapidly become the mainstream treatment paradigm at the end of the last century. From this issue, NTO will begin to report trends in other dental specialties, namely, implantology, periodontology, prothodontics and so on, from an orthodontic perspective. Our goal for this year is to transform into a journal of interdisciplinary treatment for orthodontists. I hope you will find this new issue useful and informative. I wish you all have a prosperous new year.

Chris HN Chang, DDS, PhD, Publisher

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Consultant Dr. Larry White





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Guest Editor Dr. Rungsi Thavarungkul

The Past, Present, and Future Perfect Profession How We Got from There to Here



Figure 1: Edward H. Angle

irst third of this past century orthodontics found itself dominated by one man, Edward H. Angle (Fig.1), with

the resultant intellectual stagnation that issues from such monomaniacal control. This recognition in no way detracts from Angle's contributions - the establishment of orthodontics as a speciality, his clear and simple classification system along with the edgewise bracket. All of these have endured for a century, and that is no mean achievement in any scientific discipline. Nevertheless, orthodontists' slavish acceptance of his limited diagnostic and treatment planning regimens hindered the advancement of this discipline more than it helped, and the last half of this past century along with the first decade of this century has been spent trying to overcome the intellectual stupor of the first half of the 20th Century.

Angle's influence continued until an apostate student of his, Charley Tweed (Fig. 2), had enough courage and objectivity to challenge his nonextraction scheme. It wasn't a tremendous leap of intellectual power.Tweed simply and honestly recognized that when 100% of your patients relapsed, there might be something wrong with the diagnosis and/or treatment planning.

But Dr. Tweed acted appropriately in the face of this challenge. Quite unlike the ancient dentist who chided a young colleague who was describing his meticulous technique of endodontic filling to the monthly assembly of dentists. The old man explained his own technique that used a simple matchstick sharpened with a pocket knife and then jammed into the canal. When the young dentist asked if a lot of these root canal fillings didn't subsequently fail, the older man replied, "Every damn time!" Well, Dr. Tweed tired of those orthodontic abscesses and, unlike his peers sought to correct the deficiencies he saw in Angle's philosophy. Some would say that he overcorrected, but that said, you need to pay homage to anyone who has the skill and temerity to challenge successfully a mentor and his minions who are clearly wrong. Tweed's success brings to mind the remark of one, who said, "No genius is so fortunate as he who has the skill and ability to do well that which others have been doing poorly."

Nevertheless, I don't think that Tweed would have ever been able to deliver his paper describing his extraction technique had Dr. Angle still been alive. His influence over the society that bore his name was too immense to permit such hubris from a young upstart. But as Samuelson, the MIT economist, once noted, "Science progresses slowly – funeral by funeral." And so it was and is in orthodontics.

About the time Tweed introduced his staggering idea of extraction along with the first rational treatment planning mechanism, viz. the Tweed Triangle, swaged gold bands with soldered gold brackets and eyelets were being replaced with preformed stainless steel brackets and bands. Orthodontists had six-month waiting lists, little competition, a thriving economy and a new TV medium that was reminding a more affluent population that nice smiles made people look better. This has been fondly remembered as the Golden Age of Orthodontics. But it wasn't golden for everyone. Patients had to endure the agony of individualized band fabrication, and that usually took several hours to complete. These bands were then driven to place with a mallet or a medieval spring-loaded instrument known as an Ebby band driver.

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Forces were delivered by large and stiff stainless steel wires that punished the teeth for several weeks after adjustments. And the average United States working man labored 432 hours to pay for orthodontic treatment. Today, the average worker will pay for that therapy with only 225 hours of labor. Looking back, it astonishes me that anyone put up with this kind of orthodontic nonsense; but they did, and orthodontists prospered as never before and gathered new stature within their communities and among their peers.

A huge demand ensued for orthodontists' services, but the preceptor training programs were too small and too uneven to produce the quantity or quality of orthodontists the U.S. needed. Soon our dental colleges began to enlarge existing orthodontic programs and to develop new ones. Almost simultaneously there were technological and legal innovations that allowed even more rapid growth in orthodontic practices. One such innovation was the development and adaptation of the preadjusted appliance followed soon by nickel-titanium wires. Neither of these technological breakthroughs would have had much impact had it not been for the political pressure of dentists and orthodontists that encouraged liberalization of state dental practice acts, which allowed expanded duties of assistants. It was now possible for orthodontists to expand their services and enlarge their practices enormously while simultaneously keeping fees reasonable and quality high.

Nevertheless, dental schools soon responded to the federal government's request to produce more dentists by almost doubling their number of graduates, By the midseventies and early eighties, the profession faced new demographic challenges caused by birth control pills that dramatically reduced patient numbers even while the numbers of dentists were going up. The effect of water fluoridation, dental sealants and dietary control further reduced demands for traditional dental services. With an over capacity of practitioners, dentists now faced economic challenges they had never seen. Before this time. I had never heard of a dentist taking bankruptcy, and suddenly I personally knew several that had responded this way to their indebtedness and lack of busyness. It was during this period that the preadjusted appliance and direct bonding became popular, which greatly simplified the placement of orthodontic appliances - for both patient and orthodontist. These new technical advancements also appealed to underutilized and economically desperate general dentists who were easily convinced that orthodontic therapy was now much simpler than ever and within the grasp of anyone who would take the time to enroll in two or three weekend courses.

Dentists by training and by patient expectation are therapists – not diagnosticians. This is equally true of orthodontists. I know from personal experience that the quickest way to put an audience to sleep is to talk about diagnosis. On the other hand, if you want to generate some real enthusiasm and wake people up, just show a new bracket system or a new functional appliance that purportedly eliminates patient compliance problems.

Everyone in dentistry pays lip service to the importance of diagnosis, but the sad truth is that very few dentists or orthodontists make diagnosis the raison d'être of their professional lives. So in a way, general dentists can be forgiven for believing they could cement brackets and bands and then rely on a preadjusted bracket system to deliver the finished product. It was a no brainer.

Of course anyone who has done orthodontics exclusively for just a short

time realizes that conclusion is patently absurd. But that misconception developed, and it still endures in dentistry today. No matter h o w s o p h i s t i c a t e d orthodontic therapy becomes – and there is currently reason to believe that it will soon become enormously refined – there will always be the necessity of correct diagnosis and reasonable treatment planning.



Figure 2: Charles Tweed

The Past, Present, and Future Perfect Profession Where Do We Go from Here



Figure 1: Reed Holdaway reading to grandchildren

rom the inception of this specialty with Dr. Angle, diagnosis was never too important because everyone received the same nonextraction treatment with the same expansive appliance. The marvel of it all is that the collection of orthodontic records ever became important. A few months ago I ran into an orthodontist, who boasted that since invoking a different treatment regimen, he was treating 98% of his patient's nonextraction. I had to bite my tongue not to ask him if he still took records because with diagnostic certainty such as that, records are clearly redundant. You shouldn't waste your patient's time and money taking impressions, cephalometric X-rays or doing treatment simulations if all of your treatment plans are essentially the same. You don't need orthodontic records to come to that preconceived conclusion.

Obviously, this one-size-fits-all treatment planning didn't benefit patients much a hundred years ago, and it doesn't now in our own age. Nevertheless, such simplicity continues to hold enormous appeal for many orthodontists. Orthodontists pride themselves in being scientists, and without doubt they receive reasonably good training in the scientific method; but it takes very little anecdotal information to eclipse the scientific judgement of many in the profession. Albert Szent-Györgyi was probably more right than he knew when he said, "The brain is not an organ of thinking but an organ or survival like claw and fang. It is made is such a way as to make us accept as truth that which is only advantage."

No matter how spectacularly orthodontic therapy changes, it will benefit our patients minimally if there is not a concomitant improvement in our diagnostic and prognostic knowledge. I see this as the number one imperative for our profession, and any new therapy unaccompanied by equally sophisticated diagnostic knowledge should be viewed suspiciously. We have already had far too much orthodontic overtreatment and far too little diagnosis.

Almost 30 years ago Holdaway^{1,2} (Fig.1) published his articles that established the maxillary incisor and upper lip as the focus of orthodontic diagnosis and treatment planning (Fig. 2). This contrasted significantly with the then current regimens that emphasized planning treatment by first positioning the mandibular incisor with little thought how that might affect the soft tissue.

Holdaway named his technique the Visualized Treatment Objective, and he sought to combine a forecast of the patient's growth with the mechanics he planned to use. By using the maxillary incisor, which effectively determines upper and lower lip posture, he could forecast what orthodontic therapy would achieve with patients' profiles. This reduced the unhappy results that often occurred when employing the Tweed Triangle³, Steiner Analysis^{4,5} or the APo line advocated by Williams.⁶ Sadly, there has been no rush to endorse Holdaway's epochal suggestion although two more recent articles7,8 have concluded that using the maxillary incisor offers

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Figure 2: Holdaway's H-line

remarkable treatment planning advantages.

Now, we come to the latest challenge and find that, once again, it is from technology. The three-dimensional scanning with virtual models threatens to eliminate the need of plaster models with their expense, storage requirements and inconvenience. This technology also allows the repositioning of teeth through the fabrication of sequential positioner-like retainers. Also, we can now use 3-D scanning to fabricate custom brackets or combine with wire-bending robots (Fig. 3) to make truly customized and individualized appliances. Rather than depending on an average preadjusted appliances, we will be able to make appliances that will position teeth where they should be and can even correct for our malpositioning of brackets. The same technology also promises us unparalleled feedback that will allow us to compare where patients are with where they should be.

We haven't yet begun to imagine how nanotechnology will affect orthodontics, but knowledgeable people contend that it will markedly advance the application of computers, and can hardly avoid transforming our profession. The availability of computer numerical controlled tools (CNC), which cut out metal and other materials into whatever design is plugged into the computer have become affordable for individuals, and the cost will soon lower more. The milling machines, drills, miniature robots, lathes, laser cutters and rapid prototyping machines (3D printers that lay down layers of materials like plastic to form objects) are destined to play a role in dentistry because no profession has more ability or interest in hands-on applications than its members. With these tools, I can imagine dentists using them to print study models, construct retainers, fabricate crowns and bridges, even make their own brackets and customized wires right in their offices.

Yet the profession has started hearing concerns about orthodontists being eclipsed and made unnecessary by technology, but that will not happen. Technology will radically change orthodontics and dentistry, but what I see happening is a reemphasis on diagnosis, therapy simulation and treatment planning. I expect orthodontists to learn anew their diagnostic skills and spend more time determining a more predictable course of action for their patients.

The arrival of Temporary Anchorage Devices (TADs) offers a case in point (Fig. 4). These remarkable instruments offer orthodontists and their patients much in the way of improved and less invasive therapy, but if they think they can use these devices in a cavalier manner, they will receive a major disappointment. A recent article by Burstone⁹ illustrates how the use of TADs requires more sophisticated knowledge of orthodontic biomechanics rather than less.

An amateur status will not suffice for the diagnostic and therapeutic requirements of this new age, and the one-treatment plan-fits-all will, thankfully, become an anachronism. As in the past when orthodontists



Figure 3: Wire-bending robots

NTO 17 LIVE FROM THE MASTER



photographers, radiologists and metallurgists, the New Age orthodontists will have to be sophisticated computer specialists or they won't be able to practice orthodontics effectively or profitably.

I do expect the relative cost of our services to drop again due to the increased efficiency and productivity these new products will give. More people will be able to afford our services and more of them will have orthodontic treatment. Orthodontic treatment will become more predictable, faster, less traumatic and at relatively less cost. Practices will grow, more jobs will be created within our offices and orthodontists will prosper more than ever. This will not be without some dislocations and may even require what the economist Joseph Schumpeter called creative destruction, but the overall effect will be healthy for the profession and attractive and desirable to the public.

What may not be quite so obvious is the convergence of technologies. As 3D imaging and scanning become more sophisticated and user-friendly, there will be more efforts to incorporate these techniques into orthodontics. The Internet will certainly have an effect, but at this point it is still developing. Based on what we have seen so far, I expect astute consumers to begin to choosing orthodontists on the basis of the story they receive from web pages. Our future patients, in all probability, will want to see examples of treated patients with malocclusions similar to theirs. They will want to compare duration of treatments plus the



the prices of goods and services, and it would be naive to think orthodontics would escape this consequence. Nevertheless, a well-designed web page may very well turn into the most effective marketing tool yet devised. The profession will watch this interesting phenomenon as it evolves.

Of all the dental disciplines, only orthodontics has the appeal to strengthen all of dentistry in this powerful way by engendering the desire for great smiles. Orthodontics has a unique once-in-a-lifetime opportunity to promote all of dentistry and simultaneously give our citizens the greatest dental health ever seen. The most expensive strategy could well be to remain with the same paradigms we have used in the past. As Alvin Toffler said recently, "If you don't have a strategy, you will be permanently reactive and part of somebody else's strategy." That

d o e s n ' t appeal to me, and I hope it doesn't to dentistry's leaders.



Figure 4: TAD

Bibliography

- 1. Holdaway RH. A soft tissue cephalometric analysis and its use in orthodontic treatment planning, Part I. Am. J. Orthod. 1983;84:1-28.
- 2. Holdaway RH, op. cit. A soft tissue cephalometric analysis and its use in orthodontic treatment planning, Part II. Am. J. Orthod. 1984;85:279-293.
- 3. Tweed CH. The Frankfort mandibular incisor angle (FMIA) in orthodontic diagnosis, treatment planning and prognosis, Angle Orthod. 1954;24:121-169.
- 4. Steiner CC. Cephalometrics in clinical practice. Angle Orthod. 1959;29:8-29.
- 5. Steiner CC. The use of cephalometrics as an aid to planning and assessing orthodontic treatment. Am. J. Orthod. 1960;46:721.
- 6. Williams R. The diagnostic line. Am. J. Orthod. 1969;55:458-476.
- 7. Creekmore TM. Where teeth belong and how to get them there,. J. Clin. Orthod. 1997;30:586-608.
- 8. Alvarez A. The A Line: A New Guide for Diagnosis and Treatment Planning. J. Clin. Orthod 2001;35:556-569.
- 9. Burstone CJ. Dr. C. J. Burstone's Views of the Biomechanics of TADs. News and Trends in Orthodontics 2009;15:64-67.

Taipei Taiwan.

NOP OL& 9th Asian Implant Orthodontic Conference Dec. 10th ~12th, 2010

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World Trends in Anchorage Developments — TADs

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Why Damon System

There are much more good reasons for using Damon system,

besides faster alignment.

(A) Is Damon system faster than the conventional system in alignment? It depends!

Recently those orthodontists who don't like to use the Damon system, often quote Pandis's article 1 which compares the two systems in nonextraction treatment and Scott's article 2 of comparison in extraction treatment. Their common emphasis is that the Damon system is not faster than conventional brackets for initial alignment. The author would like to discuss these two articles in further details.

I. About Pandis's Article¹

Self-ligating vs. conventional brackets in the treatment of mandibular crowding: A prospective clinical trial of treatment duration and dental effects.

Pandis N, et al. Am J Orthod Dentofacial Orthop 2007;132:208-15

Methods	Conclusions	
 54 patients satisfying the following criteria Nonextraction treatment No spaces in the mandibular arch Irregularity index greater than 2 in the mandibular arch No therapeutic intervention planned with any extraoral or intraoral appliance The patients were randomly assigned to 2 groups: Damon self-ligating bracket. Microarch conventional 	 No difference in time to correct mandibular crowding. For moderate crowding (irregularity index < 5) Damon 2 - 2.7 times faster. For severe crowding (irregularity index > 5) marginally insignificance. Damon 2 group showed statistically greater intermolar width increase than the conventional group. Alignment-induced increase in the proclination of the mandibular incisors was observed in both bracket groups. 	
edgewise appliance		

Pandis's article, comparing nonextraction cases.

Lin's Comments

- Sample selection by irregularity index greater than 2. Those of irregularity index < 5 are defined as moderate crowding, irregularity index > 5 as severe crowding. All these irregularity index criteria are too small to demonstrate the capability of Damon brackets to correct severe crowding.
- 2. For severe crowding, the alignment mechanics are different between the Damon 2 and conventional brackets. However, the study didn't mention the details of how the teeth were aligned. Whether open coil spring was used or not? Where all the wires engaged on most of brackets from the beginning?
- 3. An alignment-induced increase in the proclination of the mandibular incisors was observed in both bracket groups. It confirms the author's view that there is no lip bumper effect in nonextraction Damon appliance treatment³. Most of the time it is acceptable for Caucasian with a flat or concave profile. For oriental patients with fuller profile it should be very careful. Otherwise patients may end with bimaxillary protrusion after crowding is relieved.



Dr. John Jin-Jong Lin MS, Marquette University Consultant of NTO

President of TAO (2000~2002) Author of *Creative Orthodontics*

II. About Scott's Article²

Alignment efficiency of Damon3 self-ligating and conventional orthodontic bracket systems: A randomized clinical trial.

Scott P, et al. Am J Orthod Dentofacial Orthop 2008;134:470.e1-470.e8

Scott's article, comparing extraction cases.

Methods

- 1. A multicenter randomized clinical trial was conducted in 2 orthodontic clinics.
- 2. 62 subjects, 32 male, 30 female, mean age 16.27 years.
- 3. Mandibular incisor irregularity index of 5 to 12 mm.
- 4. Prescribed extraction pattern included the mandibular first premolars.
- 5. Were randomly assigned to treatment with Damon 3 self-ligating brackets or Synthesis conventionally ligated brackets.

All patients required extraction of the mandibular first premolars Randomized (n=62)			
Allocated to Damon 3 (n=33) Received allocated intervention (n=33)	Allocated to Synthesis (n=29) Received allocated intervention (n=28) Did not receive allocated intervention (n=1) Reasons - decided against treatment		
Lost to follow-up (n=0) Requested removal of appliance (n=1)	Lost to follow-up (n=0)		
Analyzed (n=32) Excluded from analysis (n=0)	Analyzed (n=28) Excluded from analysis (n=0)		

Scott's guideline of case selection. They were selected without proper diagnosis. All cases had two lower first premolars removed just because their irregularity index fell between 5-12 mm.

Conclusions

Damon 3 self-ligating brackets are no more efficient than conventional ligated pre-adjusted brackets during tooth alignment.

Lin's Comments

- For the consecutive patients with mandibular irregularity from 5 to 12 mm, and absence of a complete deep bite, the two mandibular first premolars were removed. However, it's very dangerous to remove two mandibular first premolars due to the mandibular irregularity of 5-12 mm. If extraction was performed on flat to concave profile, which is quite common among Caucasian patients, it will create a dished-in profile. A class II will get worse after extraction of lower 1st premolar treatment. Nowadays with Damon appliances can correct the crowding 5 -12 mm easily and maintain healthy periodontal tissues. A lot of Caucasian patients with a good profile and crowded dentition can be corrected with the Damon system⁴.
- 2. In the editor's interview ⁵ with Cobourne, author in the study, he said that "I think most orthodontists would extract premolars if the patient had an irregularity index of 12 mm". In this study one patient was diagnosed with irregularity index 5-12 mm, and had all the lower first premolars removed without any consideration of the original profile. Even for patients with irregularity index greater than 12 mm, they still can be corrected easily with the Damon system.
- 3. The study also states that "fully ligated 0.014-in Nickel-titanium archwires were used first in both groups". To treat severe crowding with traditional edgewise brackets, open coil springs are frequently used to gain space before engagement. When using the Damon system in this kind of case, all the wires can be fully engaged at the beginning. If orthodontists are not familiar with the Damon system, the way of engagement should be different. As such the treatment time will be different. In the study there were no details provided regarding alignment and the use of coil spring. Without such information it's not fair to compare the speed of alignment.
- 4. In the sections regarding materials and methods the mandibular irregularity range fell between 5 to 12 mm. However, the results indicated that the mean irregularity at T1 of the Synthesis group is 12.44 mm. These two sets of numbers contraindicated

each other. The mean irregularity should have been smaller than 12 mm had the sample selection followed the original methods as stated.

- 5. How could you assign consecutive patients randomly to traditional twin brackets and Damon 3 brackets? It's unethical to randomly assign patients to two totally different bracket systems without consideration of their diagnosis and the strength of each system.
- 6. Considerable difficulty and bracket failure in the Damon 3 group were reported. However, the final comparison didn't ruled out these failure cases. These bracket failure cases definitely influenced the speed of alignment. This inclusion should be explained in the result or should be excluded in the comparison.
- 7. The irregularity index of 5-12 mm cannot fully represent the capability of Damon brackets in crowding relief. The irregularity index should be increased to 12-20 mm. In addition, the periodontal tissue change on the anterior teeth should be studied.



Fig 1: SP concentrations in the GCF samples from conventional brackets, Damon 3 and control teeth of 24 hours. Significant differences among the 3 groups. Compared to conventional group, the Damon 3 group has much less SP concentration, it means clinically patient feels less pain.

(B) There are much more good reasons for using Damon system, besides faster alignment.

In the treatment of well-aligned dentition extraction treatment, I don't think the Damon system will be much faster than traditional edgewise. But in severe crowding case, I do know Damon system can provide faster treatment. As mentioned above, so far most studies cannot scientifically deny the fact of faster alignment in severe crowded dentition. In fact, comparison of treatment should be made to the whole treatment system, performed by the same doctor, within the same doctor's office system, as in Tagawa's study ⁶. Indeed Tagawa's study showed the Damon system can treat in much less treatment time, less appointments, and longer appointment levels.

The following questions are the author's main reasons for selecting the Damon system, in Damon system, all answers are positive. I think choosing Damon system not just because Damon system can do early alignment faster only, we should think about more.

(1) Can the system shorten visit time, increase visit interval and shorten the overall treatment time.

For severe crowded dentition using the Damon system, after engaging all the crowded dentition, we can wait 2-3 months for teeth to align themselves. While treating with traditional edgewise, due to binding of ligation system, space has to be created before engaging the crowded dentition. The Damon system, because of a



Fig 2: Mean pain intensity gradually decrease through 8 days post bonding, Damon 3 group showed much less pain intensity all the time than in the conventional twin bracket group.

smaller size wire on the tube, like slot without binding, allow plenty of play. Hence, the crowded dentition can be aligned directly without creating space first in most cases. In Tagawara's Study ⁶ The Damon system can increase appointment intervals to 8-10 weeks and shorten treatment time for about 7 months, compared with conventional edgewise. In Eberting's study ⁷, the Damon system can shorten 7 visits and an average reduction in treatment time of 7 months, compared to conventional edgewise.

(2) Can the orthodontist and/or assistant to engage the wire into the slot and remove the wire from the slot in a more easy way and saving time?

For engaging the wire into the slot, in the Damon 2, it's not easy. It takes good skills to do it efficiently. For Damon 3 and Damon 3MX, it's much easier to open and close the slides. The new Damon Q is even easier to open. Both assistants and doctors can easily manipulate wires in and out of the brackets and save considerable clinical time. It can save even much more clinical times overall in a busy office.

(3)Can the system cause less pain in the treatment?

A number of neuropeptides, including Substance P (SP), are known to present in the nerve fibers that supply to tooth pulp and periodontium in humans. Norevall et al 8 reported that the expression of SP was increased after orthodontic tooth movement in rat periodontal ligament specimens. Further, SP is a mediator of pain transmission and modulates or stimulates the activity of several all types.

Yamaguchi et al 9 studied the gingival crevicular fluid (GCF) levels of SP for the Damon system compared with the GCF levels of SP for the traditional edgewise, and found out GCF levels of SP for the Damon system were significantly lower than the teeth with conventional brackets after 24 hours. Yamaguchi et al concluded, the Damon system is useful in reducing inflammation and pain resulting from orthodontic force. (Fig 1)

Pringle et al 10 did a randomized clinical trial on 66 patients treated with conventional twin bracket and Damon 3 bracket about pain intensity. In this study the Damon 3 appliance on average resulted in lower pain intensity, when compared with conventional twin

bracket. (Fig 2)

The above two studies coincide that clinically most Damon patients do not suffer pain as much as those with traditional edgewise.

(4) Can the system combined with bone screw, without creating big open bite on the posterior teeth while distalizing the whole dental arch?

Distalization of the whole upper arch with TADs is a very useful strategy to treat mild Class II borderline extraction case. If a whole upper arch distalization is done with the traditional edgewise appliance, it's much easier to create posterior open bite.

Perhaps due to the rigid binding between the main archwire and the slot, the whole upper arch becomes a solid mass. It often rotates as a whole which creates big posterior open bite. There is seldom big posterior open bite while distalizing the whole upper arch with the Damon system. It is likely because of the freedom between wires and brackets and so no big posterior open bite will be created. Whenever big posterior open bite is created, it's time consuming to settle the posterior open bite to normal occlusion and hence the treatment time is prolonged. So the author always distalize the whole upper arch only with the passive self-ligating Damon system to avoid the side effect of big posterior open bite. (Fig 3)

(5) Can the system align the severe crowded dentition without compromised periodontal health.



(A)Extraction for the ceph

Fig 3 Left: Damon combined with TADs can distalize the whole upper arch without too much posterior open bite, in this case the Class II molar was corrected to Class I in 7 months. Right: Conventional edgewise distalize the whole upper arch with more posterior open bite on the back of posterior molars. Tweed in his two volumes textbook ¹¹, wrote- "The average nonorthodontic normal selected from the group who presents facial balance and harmony. The inclinations of mandibular incisors are 90° when related to mandibular borders... My conclusions, as a result of these studies, were and are that orthodontists must, if s/he is to attain facial esthetics and dentures similar to those found in nonorthodontic normals, position the mandibular incisors within the normal range of -5° to +5°".

In Tweed's textbook volume II 10 , there is a case, whose treatment goal was to achieve the FMIA of 65° . Four premolars were removed, even though the patient has no obvious crowding and a very good profile at the beginning. The end result is a very concave senile profile at the age of 13 years and 7 months old (Fig 4). In author's case (Fig 5), even though for relief of crowding and correction of Class II, the lower incisors were proclined, the end result profile is very good. As long as the patient keeps wearing the retainer, the lower dentition will maintain well aligned. This is a typical example of extraction for the face, not for the ceph and space.

Tweed's philosophy of extraction for the cephalometric data is quite risky (Extraction for the Ceph). In the USA, the author has seen so many patients having four premolars removed just because the orthodontists tried to produce the better Tweed triangle data.



Fig 4: One of Tweed's case, despite original good straight profile, looking for more upright lower incisors by evaluating the cephalogram, four premolars were removed, even though post treatment the occlusion was very good. But at age 13y7m patient became a very dished-in profile. It's terrible to think about when patient's 50 years old?

reduces the extraction rate significantly in the Caucasian patients. For oriental patients, even though we have much fewer non extraction cases, the extraction rate is also cut down relatively significantly also, due to the use of the Damon system.

Nowadays, the Tweed International foundation for orthodontic research in Tucson, Arizona, offers very good wire bending typodont courses. It's an excellent institute for training basic wire bending. However, we still have to remember the important diagnostic knowledge, because extraction treatment planning should not solely rely on Tweed triangle data.

(B) Extraction for the lower incisors

Zachrisson's comments on SLB (Self Ligating Brackets)

	SLB	Zachrisson
Diagnosis, Tx plan, Tx objectives	Disregard	Regard
Mand inter canine width	Can be increased	Cannot be increased
Mand incisor position	Can be proclined	Cannot be proclined
Permanent retention	Yes	Not good

Zachrisson ¹² emphasizes that orthodontic treatment should not increase the mandibular intercanine width ¹³⁻¹⁹, procline lower incisors ²⁰or have long-term post treatment retention. Zachrisson quoted Bishara's study



Fig 5: A typical case of extraction for the face, the case has a straight facial profile and severe crowding. Using Damon system the severe crowding was corrected with healthy periodontal tissues around severe crowding canines regions. Of course long term retention is needed.

, winen emphasizeu mai, unougn growm anu aging, the mandibular intercanine width is only getting smaller (Fig 6). So expansion treatment of mandibular anterior teeth is not good. He demonstrates that he follows the above principle to treat a severe bimaxillary crowding. The author does not see the severe crowding in the case at all. This is a CII D1 9 years and10 months boy, with a 9mm overjet, deep overbite, with gingival impingement. To prevent increase proclination of lower incisors, Zachrisson used complicated VTO (Visual Treatment Objective) and developed a treatment plan not using bite-jumping appliances. Instead, two upper first premolars were removed. Right after 5 years of orthodontic treatment, the profile is kind of straight. However, after 16 years of follow up the patient has a dished-in profile (Fig 7). Zachrisson claimed that is due to unexpected nose growth (The author preferred to call it VTO failure) and the patient, after 16 years post debonding, still wears a mandibular canine-to-canine fixed retainer. (Why does Zachrisson keep mentioning that permanent retention represents practical and ethical hazards? Why does this patient, after 16 years of treatment, still wear fixed mandibular canine-to-canine retainer?)

Lin's Comments:

- (a) This is not a good case for doing two upper premolar extractions; it should be a nonextraction case to prevent a dished-in face.
- (b) For preventing mandibular lateral expansion and proclination of lower incisors, extraction of two upper premolars creates a dished-in face 16 years



Changes in mandibular intercanine

Fig 6: Bishara's study showed in the long term after age 13, the intercanine width naturally getting smaller. Follow this data, Zachirsson insist to keep original intercanine width, thus avoid expansion treatment.

later. It's a failure treatment plan. I believe Zachrisson's treatment plan disregarded the ideal treatment objectives.

(c) After 16 years post orthodontic treatment, the patient still wears a fixed retainer. So what's wrong with permanent retention?

Lin's Conclusion:

Orthodontists should not be limited or restricted not to increase mandibular inter canine width and avoid proclination of mandibular incisors. This leaves them no choice but to undertake extraction treatment and ultimately produces dished-in profiles and ruin patients' outlook. We should do extraction for the face, instead of for the space and for the ceph.

There is nothing wrong with permanent retention ²², as long as the patient has given informed consent for long-term stability and preserving the finished result (Fig 8). We should educate patients, that in their life, there is only one thing which will not change, that is everything changes. If patients want to keep post treatment dentition straight, only lifetime retention can prevent relapse.

(C)Extraction for the space

Basically, Wennstrom's concept 23 on tooth movement, can only be applied to traditional edgewise appliances (Fig 9, 10). It cannot be applied to the Damon system which use light and gentle force .

In the traditional edgewise, in severe crowding, the only way to solve space deficiency is extraction treatment to prevent expansion. This can and has



Fig 7: Zachrisson tried to avoid expansion and protrusion of lower incisors, so upper premolars were extracted in this case. Eventually made this original straight profile to a very concave senile profile. The only way to ensure continued satisfactory alignment posttreatment probably is by use of fixed or removable retention for life.

Little RM, Riedel RA, Artun J. An evaluation of changes in mandibular anterior alignment from 10 to 20 years postretention. Am J Orthod Dentofac ORthop. 1988;93:423–8.

Fig 8: Little and Ridel recommended permanent retention.

caused bone dehiscence and gingival recession (Extraction for the space). (Fig 10)

For relieving severe crowding, the Damon system can move teeth with bone. So we rarely need to follow Wennstrom's concept. After relieving severe crowding, the dentition still has healthy periodontium (Fig 5, $10\sim12$). This is why in the Damon system, we no longer extract for space deficiency. We extract just for a better profile. (Extraction for the face)

Little et al ²² showed that regardless of extraction or nonextraction treatment, long term stability is difficult to achieve for most cases (Fig 8). So in this article they highly recommend life time retention.

Damon ⁴ uses fixed and removable retainer, and both Damon and Zachrisson follow Little's guideline, for



Fig 9: Whenever teeth were moved lingually the alveolar bone and gingiva will become thicker over the facial surface. If teeth were moved facially, the alveolar boe will become thinner and thinner gingiva (gingival recession). This concept applied to most traditional orthodontic tooth movement. But not in the Damon system, see Fig 5, 10, 11. lifetime retention. So why should we concern that expansion will cause future relapse?

(D)Extraction for the face

If extraction treatment can get better periodontal health, stable occlusion and a good profile, then extraction treatment can be done.

If extraction treatment cannot guarantee better long term stability and cause dished-in profiles, then nonextraction treatment with Damon system is a much better choice. Even for severe crowding, Damon can treat it without compromising the periodontal health, maintaining good profile and preventing relapse by using long term retention! (Fig 5, 11)

(6) Can the system expand the maxillary arch with physiologically gentle force, without compromising periodontal health like the side effect of using Rapid Maxillary Expansion?

In Vanarsdall's study 24 on 55 cases post Rapid Palatal Expansion, 8-10 years follow up, showed 20% gingival recession but only 6% in the control group.

According to Garib's research ²⁵ utilizing CT technology, rapid palatal expansion exerts a high level of force (up to 20-40 lb.), which results in reducing the thickness of the buccal bone plate or even dehiscence. By using the Damon system mechanics, clinicians can easily achieve lateral expansion without creating the periodontal problems that RPE or RME may cause. It is not necessary to use such high-force

	Damon's Expansion	RME Rapid Maxillary Expansion	
Appliances	Simple	Complicated	
Force	Light continue	Heavy short (20-40 lb)	
Compliance	No	Yes	
Create diastema	Create diastema No		
Age limit	No	Yes Unpredictable suture splitting	
Moving teeth with bone	Yes	No	
Moving teeth though bone	No	Yes	
Side effects	No	Thinning of buccal plate	

Table 1. Damon's expansion vs. RME

appliances since the Damon system has become a welldocumented orthodontic appliance for expansion of the maxillary arch without periodontal compromise (Table 1).

From Mikulencak's thesis ²⁶ found out that in the study between Rapid Maxillary Expansion group vs. Damon expansion patients, there is no difference in the amount of molar tipping. It means without using heavy forces like in RPE or RME, the maxillary arch can be expanded with light force can still get good molar expansion as with RPE, while the periodontal structure remains healthy.

With continuous light-force mechanics, the Damon system generates lateral adaptation from canine to molar with the lateral expansion of alveolar bone, relieving significant space deficiency in severely crowded dentitions without the use of auxiliary appliances. The author's clinical experience validates Dr. Damon's assertions ⁴ that Damon system mechanics can replace the use of rapid palatal and rapid maxillary expansion (RPE and RME) appliances (Fig 13A). Computed tomography (CT) scans (Fig 13B) taken on numerous Damon cases after lateral adaptation corroborate that the adaptation is bodily tooth movement, not simply tipping ²⁶, while demonstrating healthy alveolar bone surrounding teeth. (Fig 13~15)

If there were Nobel prize in the orthodontic world, Dwight Damon should have won the orthodontic Nobel prize. Without complicating RPE appliance, just using the simple wires and elastics, the Damon system can do the same as RPE's effect, but with less complications. Unfortunately, despite that the Damon system has demonstrated this system for more than 20 years, the RPE is still so popular in the orthodontic field! What a pity!



Fig 10 Right: The severe crowded upper and lower dentition were treated with Damon system, the crowded relived in 4 months with healthy periodontal tissue. Left: try to align the severe crowded lower dentition after 12 months after extraction of two lower premolars, labial expansion or the traditional edgewise appliance caused severe gingival recession on lower central incisor.



Fig 11: A severe crowded case with straight profile was treated with Damon system and nonextraction. Post treatment with healthy periodontium and fuller profile. It's much better than extraction and get dished-in profile. Temporarily she looks fuller, but after removing the relative thick Damon 3MX brackets, the profile will be much better. For her age around 15 years old, and Taiwanese, it's quite normal and acceptable.



Fig 12: A severe crowding anterior crossbite with severe root resorption, treated to well aligned and normal overbite and overjet, without further obvious root resorption.



Fig 13A: Damon's case of RPE like effect. The severe narrow upper arch was corrected with simple Damon system with healthy periodontal tissues. (Courtesy of Dr. Dwight Damon)



Fig 14: Another Damon case, without using RPE, only Damon system gain excellent RPE like result. (Courtesy of Dr. Dwight Damon)



Fig 13B: The CT showed enough cortical bone around maxillary posterior teeth after expansion treatment. (Courtesy of Dr. Dwight Damon)



Fig 15: The author's own severe Class III narrow upper arch case, the upper arch was expanded and distalized with TADs. With Damon and TADs, it was possible to treat this narrow upper arch nonextracion.

About Sheldon Peck's article²⁷

So What's New? Arch Expansion, Again. Sheldon Peck. Angle Orthod 2008;78:574-5.

Comparison between Damon's and Angle's Expansion

	Damon's Expansion	Angle's Expansion
Nonextraction Tx face More beautiful, fuller profile		Unstable Horsey look
Treatment Mechanics	Small CuNiTi wire on 4 wall Damon bracket	German silver or chrome steel wires and E-arch
Extraction Tx Depends, extraction for the face		No
Summary from John Lin		Sheldon Peck

Peck, after attending Jan. 2008 Phoenix Damon forum, wrote a commentary article on "So what's new? Arch expansion, again." The author attended the same forum and would like to have in-depth comments about Peck's view points in this article. Hopefully, this will help clarify Peck's old view points on expansion.

Peck's comments:

However, the intimate linkage of this new hardware to yet another version of old fashioned dental arch expansion may ultimately be the undoing of the whole Damon business.

Lin's comments:

Damon's expansion is a revolutionary way of expansion in orthodontics. It can expand the maxillary arch with using the simple Damon system without traditional heavy force RPE and still maintain healthy periodontium. To me, those CT images which Damon showed, are very clear demonstrations that there are enough buccal plates on maxillary posterior teeth. It's a very convincing scientific evidence. Not as Peck exaggerated it as very fuzzy at all. (Fig 13B). Damon's easy expansion will attract more orthodontists to use it, rather than undoing the whole Damon business.

Peck's comments:

Seasoned orthodontists know well that natural equilibrium or homeostasis wins eventually and so we can work better with nature, rather than dreaming up a system that works against her.

Lin's comments:

Peck tried to use nature to explain extraction treatment for not doing expansion against natural equilibrium. This may be why Peck admires Tweed's courage of extracting premolars frequently. First of all, extraction treatment can not guarantee no relapse ²². If you always aim for "to keep the incisors over the basal bone" just like Tweed emphasize the importance of Tweed triangle, it means extraction for the ceph (cephalometric norms), it would be very dangerous to create dished-in profile very easily. (Fig 4)

As the author has seen so many dished-in profiles in Caucasian patients just because the orthodontist is a strong Tweed follower. Oriental patients have more convex facial profiles, so this over-extraction treatment scenarios do not happen as frequently in Asian countries.

Peck's comments:

As conscientious doctors, we must be vigilant in assuring that truth, not product, will drive the flow of progress in our science-based profession.

Lin's comments:

As conscientious doctors, if good products can provide excellent treatment result, we should not be afraid to use them. Today, we cannot do good orthodontic treatment without good orthodontic products. With the Damon system not only Damon himself can do the beautiful expansion treatment, so can many orthodontists beautifully and easily, including the author. This repeatable expansion procedure is a fact and solid science. Why can't Peck just see all these beautifully expansion cases but to criticize based on personal bias, rather than solid evidence to prove that Damon expansion indeed have many problems? Just speculation through old thinking is not good and fair for the readers of the famous Angle Orthodontist journal.

Lin's challenge to Peck:

(A)In the Tweed's case of Fig 4, will you still admire Tweed's courage do the same 4 premolars extraction?

As a conscientious doctor, I will never do extraction treatment in this case. The extraction treatment has terribly ruined her face at the age of 13 years and 7 months. It's hard to imagine her face at the age of 50. What a terrible thing has been done just for more uprighting lower incisors?

(B) In the cases in Fig 13~15, can yo do nonextraction treatment without compromising periodontal tissues with your current technique?

As a conscientious doctor, I am very grateful for Damon's great invention that I can enjoy using Damon system and achieve a wonderful treatment result. These successfully treated cases are the best scientific evidences. How could you ignore them?

(C) In the cases of Fig 5 and Fig 11, do you still want to keep the lower incisors on the basal bone, do the extraction treatment and eventually ruin the face into a dished-in appearance? If you want to do nonextraction treatment, could you show me a nonextraction case like these without compromising periodontal tissues? Following Damon's rules of extraction for the face, the author would prefer expansion and long term retention to get good occlusion and a fuller beautiful profile.

(7) Can the system creates MEAW effect without complicated loops?

Dr. Young H. Kim ²⁸, a famous Korean-American orthodontist, invented the Multiloop Edgewise Archwire (MEAW) technique in 1987 (Fig 16). A MEAW is bent from a 14" length of .016" x .022" stainless steel wire and used in .022-slot edgewise brackets. Because of the light orthodontic force that the multiple loops generate, MEAW is effective in treating open bites, severe Class IIs and Class IIIs, and asymmetry patients (Figure 17). MEAW is popular in Korea, Japan, and Taiwan for treating difficult cases.

There is around 7° of play between a .019" x .025" stainless steel archwire and the Damon bracket .022" x .027" slot (Figure 16); the smaller the wire is, the more the play generates, which creates an MEAW effect. It is, therefore, not necessary to bend complicated loops to treat difficult open bites, Class IIs, Class IIIs, and asymmetry patients with Damon system mechanics. Damon mechanics are renown for quick alignment and now with the MEAW effect in the final stage of treatment. Both patients and orthodontists benefit a great deal as a result. (Fig 18, 19, 20A, 20B, 21)

Conclusion:

The author chooses the Damon system because of following advantages:



Fig 16: There is about 70 of play for the .019" x .025" SS wire in the .022" x .027" slot Damon bracket. May be due to this play in the Damon system, it makes the Damon system has the dramatic MEAW effect.



Fig 17 Left: Using Damon system, the Class III was easily corrected to Class I by using straight wire and Class III elastics.

Right: Traditional edgewise using the complicated multiloop MEAW arch wire and Class III elastics to correct the Class III molar relationship.

- 1. Faster alignment in severe crowding.
- 2. Increase visit intervals and shorten overall treatment time.
- 3. Easy clinical operation.
- 4. Causes less pain.
- 5. Creates less posterior open bite when combined with TADs for distalization of the whole maxillary arch.
- 6. Align severe crowded dentition without

compromising periodontal health as in RPE and maintain healthy periodontal structure.

7. Create a MEAW effect easily, excellent for finishing.

The author would like to express sincere gratitude to Damon and Ormco for working so hard to improve the Damon system, from Damon 2, Damon 3, Damon 3MX, Damon Q. Now I really enjoy using Damon Q which has a smaller, high quality, size, wonderful positioning gauze, easy slide opening, more high torque and low torque options. I would like to quote Damon's saying at the 2006 Phoenix Damon forum "Challenge and commit yourself to be a far better orthodontist today than you were yesterday." My answer to this quote is yes, in the 6 years since I have started using Damon, I am a far better orthodontist today than I were yesterday. Thank you very much for offering me such a great system.



Fig 19: A case of Class II with big overjet, was corrected to Class I with bite turbo and Class II elastics in 4 months.



Fig 20A & B: A severe Class III patient, was treated to Class I by using Class III elastics in the Damon system. Watch the obvious lower 2nd molars tipped back distally makes the retromolar area much smaller post treatment. In about a year of Class III elastics treatment, the molar relationship was corrected from big Class III to Class I. Not only normal overbite and overjet established but also much balanced facial profile.



Fig 18: A case of big open bite was treated efficiently with Damon system in 16 months. (Courtesy of Dr. Chris Chang)



Fig 21: A severe Class III female was corrected to Class I and much better facial profile.

References

- Pandis N, et al. Self-ligating vs. conventional brackets in the treatment of mandibular crowding: A prospective clinical trial of treatment duration and dental effects. Am J Orthod Dentofacial Orthop 2007;132:208-15
- Scott P, et al. Alignment efficiency of Damon 3 selfligating and conventional orthodontic bracket systems: A randomized clinical trial. Am J Orthod Dentofacial Orthop 2008;134:470.e1-e8 (ONLINE ONLY).
- 3. Lin JJ. Creative Orthodontics. Yong Chieh Enterprise Co., Ltd., 2008.
- 4. Damon D. Damon system, The Workbook, 2004 Ormco Corporation.
- Scott P, et al. Alignment efficiency of Damon 3 selfligating and conventional orthodontic bracket systems: A randomized clinical trial. Am J Orthod Dentofacial Orthop 2008;134:470-1.
- Tagawa D. The Damon System versus conventional appliances – a comparative study. Clinical impressions 2006;15(1):4-9.
- Eberting JJ, Straja SR, Tuncay OC. Treatment time, outcome and patient satisfaction Comparison of Damon and conventional brackets. Clinical Orthodontics and Research 2001;4(4):228-34.
- Norevall LI, Forsgren S, Matsson L. Expression of neuropeptides (CGRP, substance P) during and after orthodontic tooth movement in the rat. Eur J Orthod 1995;17:311-25.
- Yamaguchi M, Takizawa T, Imamura R, Kasai K. The Damon system and release of substance P in gingival crevicular fluid during orthodontic tooth movement in adults. World J Orthod 2009;10:141-6.
- Pringle AM, Petrle A, Cunningham SJ, McKnight M. Prospective randomized clinical trial to compare pain levels associated with 2 orthodontic fixed bracket system. Am J Orthod Dentofaical Orthop 2009;136:160-7.
- Tweed CH. Clinical Orthodontics. Vol. I, II. St Louis, C. V. Mosby Co; 1966. p. 657-70.
- Zachrisson B. Use of self-ligating brackets, superlastic wires, expansion / proclination, and permanent retention – A word of caution. World J Orthod 2006;7(2):198-208.
- Riedel RA. Post-pubertal occlusal changes. In McNamara JA (ed). The biology of Occlusal Development, Monograph 7, Craniofacial Growth Series, Center for Human Growth and Development. Ann Arbor: University of Michigan, 1977:113-40.

- Riedel RA. A post-retention assessment of relapse, recidivism, adjustment, change, and stability. In sity of Nymegen, 1988:281-306.
- Gorman JC. The effects of premolar extractions on the long-term stability of the mandibular incisors. In Burstone CJ, Nanda R (eds). Retention and Stability in Orthodontics. Philadelphia: WE Saunders, 1993:81-95.
- Sadowsky C, Schneider BJ, BeGole EA, Tahir E. Long-term stability after orthodontic treatment: Nonextraction wit prolonged retention. Am J Orthod 1994;106:243-9.
- Paquette DE, Beattie JR, Johnston LE. A long-term comparison of nonextraction and premolar extraction edgewise therapy in "borderline" Class II patients. Am J Orthod 1992;102:1-14.
- Franklin GS. A longitudinal study of dental and skeletal parameters associated with stability of orthodontic treatment [thesis]. University of Tornoto, 1995.
- Franklin GS, Rossouw PE, Woodside DG. A longitudinal study of dental and skeletal parameters associated with stability of orthodontic treatment [abstract]. Am J Orthod 1996;109:109.
- 20. Mills JRE. The stability of the lower labial segment. Dent Practit 1968;18:293-306.
- Bishara SE, Jakobsen JR, Treder J, Nowak A. Arch width changes from 6 weeks to 45 years of age. Am J Orthod Dentofac Orthop 1997;111:401-9.
- Little RM, Richard AR, John Artun. An evaluation of changes in mandibular anterior alignment from 10 to 20 yesars postretention. Am J Orthod 1988;93:423-8.
- 23. Wennstrom JL. Mucogingival considerations in orthodontic treatment. Semin Orthod 1996;2:46-54.
- 24. Vanarsdall's in Graber: Orthodontics Current Principle & Techniques, 4th Edition, P. 904-5.
- Garib DG et al. Periodontal effects of rapid maxillary expansion with tooth-tissue-borne and tooth-borne expanders: A computed tomography evaluation. Am J Orthod Dentofacial Orthop 2006;129:749-58.
- Mikulencak DM. A comparison of maxillary arch width and molar tipping changes between RME and fixed appliance vs. Damon system. Thesis abstract, St. Louis University. Am J Orthod Dentofacial Orthop 2007;132:562.
- 27. Peck S. So what's new? Arch expansion, again. Angle Orthod 2008;78:574-5.
- Kim YH. Anterior Openbite and its Treatment with Multiloop Edgewise Archwire. Angle Orthod 1987;57:290-321.



Initial







1 M



2 M



4 M

OrthoBoneScrew

Corporate Headquarters 2F, No. 25, Jian-Jhong First Road, Hsinchu, Taiwan 300 Tel: +886 3 5735676 Fax: +886 3 5736777 Contact: info@orthobonescrew.com The Dream Screw for Next Generation's Orthodontists



Beethoven Orthodontic Center, Taiwan

OrthoBoneScrew (OBS) has a double-crossed rectangular slot on its neck. This 0.019" x 0.025" rectangular slot provides a versatile use of orthodontic mechanics. A 0.018" x 0.025" wire can be secured in the slot firmly.

A case report demonstrating OBS application on impacted 2nd molar.

Mechanics design:

A 19-year-and-10-month-old male had lower impacted second and third molars on the right side. The treatment plan was to extract the 3rd molar and upright the 2nd molar. During the treatment, the third molar was first extracted, followed by exposing the second molar surgically. Meanwhile, the bone surrounding the crown of the second molar was removed to CEJ and the second molar was surgically luxated by an elevator. A button was bonded on the distal surface of the second molar. The OrthoBoneScrew was inserted on the right ramus of the mandible. A power-chain was attached between the OrthoBoneScrew and the button to upright the second molar. In 4 months, the second molar was uplifted successfully. Finally, a molar tube was bonded for advanced alignment and leveling. An open coil spring was inserted between 1st and 2nd molars to push and upright 2nd molar. Key point: for easy installation of open coil spring, a self-ligated molar bracket was the first choice.



Management of Crowded Upper and Lower Anterior Teeth in the Mixed Dentition

Very often parents bring their child during the mixed-dentition period seeking treatment options for their ugly front teeth. Many questions have to be answered. When should treatment be started during the mixed-dentition stage? How long should the treatment last? Should the treatment be continued until all the permanent teeth have erupted? Should treatment be started only after the eruption of all permanent teeth?

The answers to the above questions should be considered with the views of the patient and the parents. Generally speaking, all cross bite, whether it is posterior cross bite or anterior cross bite, should be corrected as it can interfere with function and growth. For crowded anterior teeth, treatment should be started when all the permanent incisors have fully erupted. This will reduce treatment time as there is no need to wait for the full eruption of these teeth. If case selection is carefully considered, the total treatment time during the mixeddentition period should not be more than 9 months.

Treatment during the mixed-dentition can be prolonged to 4 or 5 years if it continues until the full eruption of all the permanent teeth. This type of treatment should be avoided as patient may develop cavities and loses interest in the treatment. Often, as the patient is bored with orthodontic treatment, co-operation is lacking and oral hygiene is poor.

A Japanese couple brought their 9 years 6 months old son for an orthodontic consultation. They complained that their son did not like to smile because of his ugly teeth. They felt that the condition of his front teeth is making him shy and he was quite an introvert. Intraoral examination showed the upper left lateral incisor was severely rotated disto-palatally. It was also in cross bite. The upper right lateral incisor was rotated













Fig. 1 9 years 6 months old Japanese boy in mixed-dentition before treatment.

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disto-labially. The lower right lateral incisor was displaced lingually. There was 5 mm upper crowding and 3 mm lower crowding. All the 1st molars, upper and lower incisors were fully erupted (Fig. 1).

As the crooked upper and lower front teeth were affecting the patient's self confidence, it was decided to correct the problems of the anterior teeth to get a better smile for the patient. Hopefully this will give the patient better self esteem.

The objectives of mixed-dentition treatment for this patient were to correct the cross bite on the upper left lateral incisors, correct all rotations, align the lingually displaced lower right lateral incisor, correct crowding and to improve his smile.

Damon MX brackets were placed on upper and lower right primary canines to the left primary canines. It was not possible to place the bracket in the correct position on the upper left lateral incisor as it was overlapped by the upper left primary canine. The initial archwire used was . 012 Niti and it was left in place for 4 weeks. The bite was propped open by placing light cure bonding material on the occlusal surfaces of the lower right and left 1st molars^{*}. (Fig. 2). This was needed to facilitate "jumping the bite" by the upper left lateral incisors which was in cross bite.



Fig. 2 The occlusion was propped open by composite bite turbo placed on the occlusal surface of the lower right and left 1st molars. Note the incorrect position of the bracket on the upper left lateral incisors due to constrain of space.

Fig. 3 The upper left lateral incisors bracket was bonded to a better position after there was sufficient space (3b).



(3a)

(3b)



Fig. 4. Upper -.012 Niti. Lower - .014 Niti.



Fig. 5 Upper -.014 Niti. Lower - .014 Niti. As the cross bite of the upper left lateral incisors was corrected., bite turbos on the occlusal surfaces of the lower right and left 1st molars were removed.

At the second visit, the upper left lateral incisors bracket was bonded to a better position as the tooth has moved and there was sufficient space to do so (Fig. 3). A new .012 Niti wire was inserted. The lower archwire was changed to . 014 Niti. The patient was seen 3 weeks later (Fig. 4).

At the third visit, the upper arch wire was changed to .014 Niti. A new .014 Niti was inserted to the lower arch. As the upper left lateral cross bite was corrected, the bite turbos on the lower right and left 1st molar were removed. The patient was seen 5 weeks later (Fig. 5).

The final upper arch wire was .016 Niti and the final lower arch wire was .014 Niti (Table 1).Total treatment taken for this mixed-dentition treatment was 16 weeks. Patient had a great smile and is more self confident. As the primary canines were bonded, care must be taken not to overload these teeth. If they are overloaded, they may become mobile. Before bonding the primary canines, there should be at least ³/₄ of the primary canines roots present as, if they are in an advance stage of resorption, they may be too mobile to provide sufficient anchorage for movement of the lateral incisors. Care must be taken not to tip the roots of the upper right and left lateral incisors distally as they may push against the crowns of the erupting canines. This may cause the roots of the lateral incisors to be resorped.

The use of a low friction and low force bracket system had enabled the patient's orthodontic problems to be resolved in just 4 months with all the treatment objectives met (Fig. 6). * Ormco light cure Gréngloo bracket bonding material.



Fig. 6 Records of patients upon completion of mixed-dentition orthodontic treatment

арр	Maxilla		Man	dible
1	.o12NiTi	4W	0.12NiTi	4W
2	.012NiTi	зw	.014NiTi	ЗW
3	.014NiTi	5W	.014NiTi	5W
4	.016NiTi	4W	.014NiTi	4W
total		16W		16W

Table 1. Arch wire sequence of treatment.



ABO Case Report Management of Skeletal Class III Malocclusion with a Palatally Impacted Cuspid

his 22-year-old male presented with a chief concern of " anterior cross bite and prognathic mandible." Oral soft tissues, periodontium, frena, and gingival health were all within normal limits. Oral hygiene was excellent. Medical and dental histories were noncontributory.

DIAGNOSIS AND ETIOLOGY

Pretreatment facial photographs (Fig. 1) showed a concave profile with protrusive lower lip. The pretreatment intraoral photographs (Fig. 2) and study models (Fig. 3) revealed a molar relationship of Class I on the right and Class III on the left. The lower dental midline was shifted 1.5 mm to the right of the facial midline. The cross-bite extended from the right 1st molar to the left lateral incisor and no contributing habits were evident. Intra-oral exam and the panoramic radiograph (Fig. 4) revealed impactions of the right maxillary canine (#6), both left third molars (#16 and 17) and the right mandibular third molar (#32). 3-D imaging with cone beam CT taken later during treatment (Fig. 11) confirmed that #6 was palatally impacted.

Cephalometric analysis showed a skeletal Class III pattern, due to a prognathic mandible that was manifest as a 7-mm anterior cross bite. The ANB angle was -4°, the SN-MP angle was 26°, and the lower incisors were inclined 106° to Md plane. The cephalometric values are summarized in the Table. The American Board of Orthodontics (ABO) discrepancy index (DI) was 44, as documented in the DI worksheet.

TREATMENT OBJECTIVES

The overall objective of treatment was to open the vertical dimension of occlusion (VDO), and retract the mandibular incisors, to compensate for the prognathic mandible, in order to achieve a Class I molar and canine relationships with ideal overjet and overbite. The specific treatment objectives were to :

• Maintain the A-P position of the maxilla.



Fig 1. Pretreatment facial photographs



Fig 2. Pretreatment intraoral photographs



Fig 3. Pretreatment study models



Fig. 4-5. Pretreatment pano and ceph radiographs

ABO CASE REPORT NTO 17

Dr. Sabrina Huang, Lecturer, Beethoven Orthodontic Course (left) Dr. Chris HN Chang, Director, Beethoven Orthodontic Center (middle) Dr. W. Eugene Roberts, Consultant, *News and Trends in Orthodontics* (right)





Fig 6. Postreatment facial photographs



Fig 7. Postreatment intraoral photographs



Fig 8. Postreatment study models



Fig. 9-10. Postreatment pano and ceph radiographs

- Extrude lower molars to open the VDO by clockwise rotation to effectively retract the mandible relative to the maxilla.
- Retract the mandible incisors.
- Correct the anterior X-bite and align the midlines
- Establish a normal overjet and overbite in a mutually protected, Class I occlusion.
- Retract lower lip to improve facial balance.

TREATMENT ALTERNATIVES

The patient's chief concerns were the anterior cross bite and prominence of the chin. Because of the protrusive lower lip and concave profile, an orthognathic surgical option was discussed, but the patient deemed it too aggressive. Thus a nonsurgical camouflage plan was devised to meet the patient's needs: 1. Extract both mandibular 1st premolars, 2. bilateral bone screws on mandibular buccal shelfs to ensure maximal retraction of lower anterior segment, 3. After cross-bite correction, evaluate the impacted maxillary canine for extraction or recovery, 4. Extract both maxillary 1st premolars if impacted canine recovery looks promising or extract it and retain the right 1st premolar in the canine position, and 5. Remove appliances and retain with upper and lower fixed retainers.

TREATMENT PROGRESS

0.022-in Damon D3[®] (standard torque) and Inspire Ice[®] brackets (Ormco) were used. Both arches were bonded and aligned. After 6 months, a .016 x .022" SS arch-wire was placed and the buccal shelf bone screws were installed to anchor retraction of the anterior segment. Bite turbos were placed on buccal cusps of lower 1st molars to open the bite and facilitate anterior retraction. In 16th month of treatment the anterior cross-bite was corrected but the lower incisors were excessively inclined lingually. For correcting the torque of lower anterior segment, the anterior root torquing (ART) spring was placed (Fig. 12a). Lower anterior torque was overcorrected in about 6 months (Fig. 12b). At the point in time the evaluation was made to extract the maxillary right 1st premolar





Fig 11. Palatal impacted canine

Fig 12a. ART to correct lower anterior root torque

Fig 12b. Over-corrected in 6 months





Fig 13a. Uncovering Day 1

Fig 13b. Day 14. Periodontal dressing removed. Fig 13c. Day 50. Spontaneously erupted.

or the impacted canine. Extracting the impacted canine would shorten treatment time but not achieve a canine protected occlusion. A 3D CBCT image revealed that it was positioned palatally (Fig. 11). Based on the recommendation of Dr. Vince Kokich the patient was presented with a thorough discussion of the options and he preferred to try to bring the canine into occlusion. In the 29th month of treatment, surgical uncovering of the impacted canine was performed. The covering soft tissue was removed, and the bone was removed to CEJ level of the canine. The open wound was covered with periodontal dressing. The canine erupted spontaneously in 50 days (Fig. 13). Two OrthoBoneScrews (OBS) with holes were placed in bilateral infrazygomatic crests. A lever arm made by .017x.025 Stainless steel wire extended from right OBS to provide traction and then serve as a component of a couple to rotate the canine (Fig. 14). At this point, both upper 1st premolars were extracted. The canine was brought almost to the middle of the ridge in 7 months and alignment was started with a 0.014 NiTi archwire (Fig. 15a). One month later, excessive buccal gingiva was removed with a Diode laser (Fig. 15b)

and an inverted high torque D3MX bracket was installed (Fig. 15c). The maxillary anterior segment was retracted with an elastic chain (Fig. 15d). In the 50th month, a torquing spring was placed on right upper canine to torque the root buccally (Fig. 15e). Occlusal adjustment was also performed at the same time to avoid premature contact on the canine. The upper archwire was sectioned behind bicuspids one month prior to the completion of treatment. Light up and down elastics (2 oz) were used for final detailing. In 54th month of treatment, appliances were removed and retainers were delivered (Fig. 15f).

TREATMENT RESULTS

The overall results were pleasing to both the clinician and the patient. Facial harmony and lower lip protrusion were improved (Fig. 6). Posttreatment intraoral photographs (Fig. 7) and study casts show a slight Class II buccal interdigitation bilaterally. Dental midlines were aligned with the facial midline, and ideal overjet and overbite were achieved.



Fig 14a. Incorrect traction force from lever arm to palatal surface of the impacted canine. This will cause unfavorable rotation of the canine.



Fig 14b. Correct couple force to derotate the canine. Two OrthoBoneScrews were inserted in bilateral infrazygomatic crests. One traction force from right lever arm to labial surface of the canine, and a elastomeric chain from left bone screw to palatal surface.

Cephalometric analysis and superimpositions (Fig. 16) showed maximal retraction of the mandibular anterior teeth and slight opening of the mandibular plane angle, which was consistent with an increase in the vertical dimension of occlusion. The upper incisor to the SN angle decreased from 115° to 114°. The lower incisor to the Md plane angle was from 95° to 80°. Critical assessment of this case with the ABO cast-radiograph method resulted in score of 19, as documented on the form appearing later in this report. This score is well within the limit of 26 for an acceptable board case. The following deviations from ideal were noted:

1. Maxillary right and mandibular left 1st molar exhibit minor mesial-in rotation.

2. Marginal ridge discrepancies exist between #2-#3, #13-#14, and #29-#30.

3. Maxillary right canine exhibits excessive lingual root torque.

4. Lack of occlusal contacts was noted bilaterally on the maxillary lateral incisors and 2nd premolars.

5. Inadequate overjet on the maxillary left 2nd molar.

DISCUSSION

Conservative treatment of a Class III skeletal malocclusion with marked negative overjet with a non-surgical approach has long been challenging to orthodontists. With bone screw anchorage the dental discrepancy can often be effectively treated within the limits of skeletal camouflage. In the present case, maximal retraction of lower anterior teeth was attained with bilateral bone screws inserted into the mandibular buccal shelves.

Another important issue for the current patient is the potential for recovering a palatally impacted cuspid in an adult with a prognathic mandible. Some of the major concerns are : 1. timing of specific surgical procedures for uncovering, 2. mechanics of orthodontic traction, 3. bone level distal to adjacent lateral incisor, and 4. torque control of the impacted cuspids. Timing and procedures of surgical uncovering, particularly for teeth impacted high within the alveolus, are critical for clinical success. If not uncovered properly, palatally impacted canines can be the most frustrating impactions for the orthodontists. Kokich and Methews¹ recommended an alternative technique with earlier timing for uncovering of palatal canines and allowing for spontaneous eruption before the start of orthodontic traction. During surgical uncovering, it is important to remove all bone over the crown down to cementoenamel junction and leave a hole on the flap for the tooth to erupt. The open



Fig 15a Excessive buccal gingiva

Fig 15b Gingivoplasty with a Diode laser

Fig 15c Inverting a high torque bracket



Fig 15d Class II elastics

Fig 15e Root torquing spring

Fig 15f Final intraoral frontal view

wound with the impacted tooth exposed may or may not receive a periodontal dressing depending on the discretion of the surgeon. Although the previous authors¹ primarily recommended the method for adolescents, the procedure has proven effective for at least some adults, but there is inadequate documentation to clearly resolve the issue. Another important consideration is to start traction on the erupting canine before it passes the level of the occlusal plane because a late application of force results in excessive tipping of the root in the opposite direction. The need for extensive root torque once the tooth is aligned in the arch may considerably extend the treatment time taxing the patient's compliance. Finally, torque control of the previously impacted cuspid has extraordinarily impact on the dental esthetics, particularly when the tooth is positioned more medially. Inadequate correction of buccal root torque, such as was noted in scoring for the present case, is a common problem because patients are often anxious to have the appliances removed. Unfortunately, the problem is not only a potential defect in occlusal function, but is readily noticeable when the recovered canine is compared to a normal contralateral canine. There are several methods for solving the canine torque problem: 1. Inverted a high torque canine bracket; 2. Torquing the segmental wire within canine bracket; 3. Add a torquing spring (auxiliary). For the present

patient an inverted high torque bracket was used initially to deliver -7° of torque, but the canine still assumed an unfavorable position. In the passive self-ligating Damon system, there is a difference between the amount of torque "expressed" compared to that built into the bracket slot. The degree of "wire play" between a .019x .025 stainless steel wire and a .022 x .028 slot is \pm 10.5°. Thus, the inversion of a high torque bracket initially, delivered 0° of torque with a . 019 x .025 stainless steel wire. Torque can be added to a segmental wire with the torquing plier, but additional torque should be added gradually to achieve full slot engagement and avoid excessive force that may result in root resorption. The most efficient and effective way to generate favorable torque expression is the use of an individual root torquing spring. These auxiliaries may be used without modification to apply lingual or labial root torquing forces, depending on whether the torquing arm is on the wire engages the tooth incisal or gingival to the bracket. By virtue of the lever arm being at the level of the main archwire slot, the torquing axis is centered along the main archwire and can generate a more effective torque expression than a twisted segmental wire. The lever arm has a relatively constant load-deflection rate and can deliver a continuous light force. In addition, the spring can be used earlier with round or relatively small rectangular archwires such as a .014 x .025 NiTi. Introduce



Fig 16. Superimposed tracings. Superimposition on mandible revealed maximal retraction of anterior teeth and extrusion of molars. These contributed to correction of anterior cross-bite and vertical dimension opening.

CEPHALOMETRIC

CEITIALOMETRIC					
SKELETAL ANALYSIS					
	PRE-TX	POST-TX	DIFF.		
SNA°	82°	83°	1°		
SNB°	86°	85°	1°		
ANB°	-4°	-2°	2°		
SN-MP°	29°	30°	1°		
FMA°	22°	23°	1°		
DENTAL ANALYSIS					
U1 TO NA mm	5 mm	4 mm	1 mm		
U1 TO SN°	115°	114°	1°		
L1 TO NB mm	6 mm	1 mm	5 mm		
L1 TO MP°	95°	80°	15°		
FACIAL ANALYSIS					
E-LINE (U)	-3 mm	-4 mm	1 mm		
E-LINE(L)	0 mm	-3 mm	3 mm		



torque expression earlier in treatment can shorten treatment tome as well as produce a more favorable and stable result. Of course, occlusal interferences may occur during canine uprighting, so it is important to frequently check occlusal contacts with articulation paper.

In conclusion, this present case demonstrates that even severe anterior cross bites can be corrected with relatively simple mechanics. Although the precise mechanism of tooth eruption is unknown, it may be inhibited by thick layers of palatal mucoperiosteum. These teeth usually erupt rapidly when the soft tissue and interfering bone are removed. The present case report demonstrates that a palatally impacted canine in an adult may be recovered by a simple uncovering procedure. The challenge is to carefully manage the traction to position the canine in the arch and then correct its axial inclination.

REFERENCES

 Kokich VG, Mathews DA. Impacted teeth: surgical and orthodontic considerations. In: JA McNamara Jr, editor. Orthodontics and dentofacial orthopedics. Ann Arbor (Mich) : Needham Press; 2001
 Kokich VG. Surgical and orthodontic management of impacted maxillary canines. Am J Orthod Dentofacial Orthop 2004;126:278-83.
 Bill Thomas. Variable torque for optimal inclination. Clinical impression 2009; 1: 1-9

DISCREPANCY INDEX WORKSHEET

TOTAL D.I. SCORE

44

22

0

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 = 22

=

OVERBITE

Total

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



LATERAL OPEN BITE

2 pts. per mm. per tooth

Total



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 sidepts.
Full Class II or III	=	4 pts. per sidepts.
Beyond Class II or III	=	1 pt. per mm. <u>pts.</u> additional
Total	=	4

LINGUAL POSTERIOR X-BITE

1 pt. per tooth	Total	=		3	
BUCCAL POSTERIOR X-BITE					
2 pts. per tooth	Total	=		0	
<u>CEPHALOMETRIC</u>	<u>CS</u> (Se	ee Instruct	tions)		
ANB $\geq 6^{\circ}$ or $\leq -2^{\circ}$	0		=	4 pts.	
Each degree $< -2^{\circ}$	2	_x 1 pt.	=	2	
Each degree $> 6^{\circ}$		_x 1 pt.	=		
SN-MP					
$\geq 38^{\circ}$			=	2 pts.	
Each degree $> 38^{\circ}$		_x 2 pts	.=_	_	
$\leq 26^{\circ}$			=	1 pt.	
Each degree $< 26^{\circ}$		_x 1 pt.	=		
1 to MP $\geq 99^{\circ}$			=	1 pt.	
Each degree $> 99^{\circ}$		x 1 pt.	=_		
			_		

<u>OTHER</u> (See Instructions)

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

Total

Identify:

Total = 2

= 6



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.

ABO Case Report Nonextraction Tx of a CI II High Angle Adult Case

HISTORY AND ETIOLOGY

A 30-year 5-month-old male was referred by his dentist (Figure 1-3). His chief complaint was crooked teeth. He was unaware of any perioral habits that may have contributed to the malocclusion. The patient was in good general health and was eager to receive treatment prescribed (Figures 4-6).

DIAGNOSIS

- Skeletal: Class II pattern with a retrusive mandible (SNA 83°, SNB 74°, ANB 9°) and a high mandibular plane angle (SN-MP 45°, FMA 39°). See Figure 7 and the Cephalometrics Table for details.
- Dental: An asymmetric malocclusion was noted with a Class II molar and canine relationship on the right, but Class I molar & Class II canine relationship on the left; the problem was complicated by 8 mm lateral incisor overjet, bilateral openbite in the premolar regions, 9 mm crowding in the lower arch, severe linguoversion of upper central incisors (Class II dental pattern), and a 4mm intermaxillary deviation of the mandibular midline to the right (Figures 2 and 3).

Facial: Convex profile with retrusion of the lower lip (Figure 1).

The American Board of Orthodontics (ABO) discrepancy index (DI) was 50 indicating a severe skeletal malocclusion. The major diagnostic factors were lateral openbite (10 points) and cephalometric skeletal discrepancies (23 points). This case conforms to the severe malocclusion category (DI >20) as prescribed by the ABO.

SPECIFIC OBJECTIVES OF TREATMENT

Maxilla (all three planes):

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

Mandible (all three planes):



Fig. 1 Pretreatment facial photographs



Fig. 2 Pretreatment intraoral photograph



Fig. 3 Pretreatment study models
Dr. Dennis HY Hsiao, Lecturer, Beethoven Orthodontic Course (left) Dr. Chris HN Chang, Director, Beethoven Orthodontic Center (middle) Dr. W. Eugene Roberts, Consultant, *News and Trends in Orthodontics* (right)





Fig. 4 Posttreatment facial photographs



Fig. 5 Posttreatment intraoral photographs



Fig. 6 Posttreatment study models

- A P: Maintain.
- Vertical: Decrease.
- Transverse: Maintain.

Maxillary Dentition

- A P: Correct upper incisor axial inclination and A-P position.
- Vertical: Intrude posterior molars.
- Inter-molar Width: Increase.

Mandibular Dentition

- A P: Maintain a Class I molar relationship and prevent incisor flaring.
- · Vertical: Intrude posterior molars.
- Inter-molar / Inter-canine Width: Maintain.

Facial Esthetics: Correct the lip step and increase lip protrusion.

TREATMENT PLAN

Non-extraction treatment was accomplished with bonded fixed appliances and posterior miniscrew anchorage bilaterally in both arches. High torque brackets and a 20° pretorqued archwire were used to increase the axial inclination of the upper central incisors. Low torque brackets and -20° and a pretorqued archwire were used on the lower dentition to control anterior flaring. NiTi springs attached to the miniscrews were used to retract both arches. Class II elastics resolve the intermaxillary discrepancy; detailing bends with seating elastics produced the final occlusion. Fixed appliances were removed and the corrected dentition was retained with an upper Hawley retainer lower fixed retainer from 4-4.

APPLIANCES AND TREATMENT PROGRESS

0.022" Damon D3MX[®] brackets (Ormco Corporation) were used. High torque brackets (+17⁰) were placed on the upper incisors and low torque (+7⁰) brackets were placed on the lower incisors. The archwire sequence for both arches



Fig. 7 Pretreatment pano and ceph radiographs

was .014 copper NiTi, .014X25 copper NiTi, .016X25 pretorqued copper NiTi, .017X25 TMA, and .019X25 SS.

After 24 months of treatment, a panoramic film was taken to examine axial inclinations relative to bracket positions. Bracket corrections were performed as needed. Post-treatment panoramic and cephalometric radiographs (Figure 8), and superimpositions of cephalometric tracings (Figure 9) document the final result.

Several aspects of the treatment sequence contributed to the favorable result. Following alignment of the maxillary arch (Figure 10), enamel reduction between the maxillary central and lateral incisors (Figure 11) controlled the tendency for interproximal black triangles.

Two Orthobonescrew[®] miniscrews (2X12 mm, stainless steel) were implanted bilaterally in the infrazygomatic crests to retract the upper buccal segments to a Class I relationship. Two additional miniscrews (2X12 mm, stainless steel) were placed bilaterally in the buccal shelves, lateral to the lower 1st and 2nd molars, to retract the mandibular buccal segments.

One month prior to the completion of treatment, the upper archwire was sectioned distal to the cuspids bilaterally, and 2oz vertical elastics were used for final detailing. After



Fig. 8 Posttreatment pano and ceph radiographs

CEPHALOMETRIC				
SKELETAL ANALYSIS				
	PRE-TX	POST-TX	DIFF.	
SNA°	83°	81°	2°	
SNB°	74°	73°	1°	
ANB°	9°	8°	1°	
$SN-MP^{\circ}$	45°	44°	1°	
FMA°	39°	37°	2°	
DENTAL ANALYSIS				
U1 TO NA mm	-10 mm	1 mm	11 mm	
U1 TO \rm{SN}°	68°	101°	33°	
L1 TO NB mm	6 mm	13 mm	7 mm	
L1 TO MP°	83°	101°	18°	
FACIAL ANALYSIS				
E-LINE (U)	0.5 mm	4 mm	3.5 mm	
E-LINE (L)	0 mm	1 mm	1 mm	

Table. Cephalometric summary



Fig. 9 Superimposed tracings. Upper molars were slightly intruded with the application of the miniscrews. The torque of upper incisors was improved with the aids of high-torqued brackets and the pretorqued wire.

the buccal segments were seated in occlusion, fixed 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: Maintained.
- · Vertical: Maintained.
- Transverse: Decreased.

Maxillary Dentition

- A P: normal inclination of the upper incisors.
- Vertical: Slightly intruded upper molars.
- Inter-molar Width: Increased 3 mm.

Mandibular Dentition

- A P: Flaring
- Vertical: Intruded lower molars.
- Inter-molar / Inter-canine Width: Increased 1 mm / Increased 0.5 mm.

Facial Esthetics: Improved facial balance by correcting the lip step and increasing lip protrusion.

RETENTION

When the upper Hawley retainer was delivered, the patient was instructed to wear it full time for the first 6 months and nights only thereafter. The lower 4-4 retainer was bonded on every tooth. The patient was instructed about home hygiene and maintenance of the retainers.

FINAL EVALUATION OF TREATMENT

The A-line of Alvarez et al.⁸ was used as a guide for correcting the axial inclination of the maxillary incisors (Figure 13). Dental compensation for the severe skeletal discrepancy was achieved by increasing the axial inclination of the mandibular incisors (Figure 14). To control bimaxillary protrusion, both arches were retracted and intruded with Orthobonescrew[®] anchorage (Figure 15). The favorable axial inclination of the maxillary incisors, despite the retraction mechanics on the maxillary dentition, was achieved by a combination of high-torque incisor brackets and pretorqued archwires.

Although severe crowding was resolved without extraction in the lower arch, the excessive axial inclination of the mandibular incisors precluded a complete correction of the Class II buccal relationships (Figure 6). Judicious enamel stripping and retraction of the mandibular incisors



Fig 10. aligned upper and lower dentition (3rd month)



Fig 11. Interproximal reduction of black triangle (18th month)



Fig 12. Orthobonescrews on the intrazygomatic crest and buccal shelf (24th month)

would have allowed for a more complete correction of the buccal interdigitation by additional retraction of the maxillary dentition with miniscrew anchorage. Furthermore, the proclined lower incisors present a challenge for long term stability that will require close follow up. Fixed retention of the mandibular anterior segment was essential. An alternative approach for correcting the incisor relationship was earlier intervention with lower miniscrew anchorage and more generalized interproximal enamel reduction in both arches.

Only modest intrusion of the maxillary molars was achieved because maxillary miniscrew anchorage was only used for 4 months. In retrospect, earlier intervention with upper arch miniscrew anchorage would have been valuable. However, to effectively intrude maxillary molars requires supplemental lingual traction from palatal miniscrews, or a transpalatal arch with full-size rectangular, buccal archwire segments.

The ABO Cast-Radiograph Evaluation was scored at 21 points indicting a finished occlusion that is within the ABO standard of \leq 26 points. The major discrepancy is the Class II interdigitation of some teeth in the buccal segments. Overall, there was significant improvement in both dental and facial esthetics. Because of the severe convexity, increased lip protrusion enhanced facial esthetics. The compromise treatment plan for this severe skeletal malocclusion produced an acceptable result which satisfied the patient.

Although the maxillary molars were intruded and the mandibular plane angle closed, the chin did not move

anteriorly, as expected. The mandibular superimposition of start and finish cephalometric tracings shows that the relative length of the mandible was decreased after treatment (Figure 9). Apparently, the mandibular condyle spontaneously repositioned more distally in the fossa. Despite this substantial change in the mandibular position, there were no signs or symptoms of temporomandibular disorder before, during or after treatment.

DISCUSSION

An adult with a class II high angle malocclusion is usually treated with extraction therapy and/or orthognathic surgery. A nonextraction approach usually requires extrusion and retraction of both upper and lower incisors, as well as intrusion of upper and lower molars, to produce a counterclockwise rotation of mandible¹.

Multiloop edgewise archwires can effectively treat high-angle adult patients by extruding incisors and intruding molars.² Dr. Park³ suggests another effective method to correct anterior open-bite with microscrew implant For the present patient, four extra-alveolar anchorage. miniscrews were used to distalize and selectively intrude the entire dentition. Although the mandibular plane angle decrease by only 1 degree, the vertical control of this adult patient was acceptable. Earlier intervention with extraalveolar miniscrew anchorage and more aggressive intrusion mechanics in both arches would probably have improved the result. However, the latter approach would probably have increased treatment time, and it may have been difficult to control incisal trauma if molars were intruded out of



Fig 13. Ideal position of the upper incisor



Fig 14. dental compensation for skeletal discrepancy



Fig 15. Distalization and intrusion of the upper and lower whole dentition by Orthobonescrews

occlusion. Overall, the results described were deemed optimal for the present patient.

Proclination of the lower anterior teeth was expected in this case due to the skeletal discrepancy and severe dental crowding. In addition to the selection of a negative torque prescription, interproximal reduction (IPR) would probably have improved the result, as previously mentioned. Orthobonescrews[®] in the buccal shelf can also be used to prevent the flaring of the lower anteriors. According to Mills⁴ the average amount of "stable" proclination of lower incisors is only about 1 to 2 mm, and even that modest protrusion usually requires fixed retention. For the present patient, the proclination of the lower anteriors was 3 mm beyond the normal range, so a lower anterior fixed retainer was essential for long-term stability.

According to Alvarez et al.⁵, the ideal position of the upper incisor for the current patient was about 12 mm anterior to the pretreatment position. In addition, the bulging of the anterior surface of the maxilla was associated with the severe anterior position of the maxillary incisor roots. The substantial anchorage requirements for the current treatment plan indicated the use of high-torque brackets and bilateral miniscrews in the infrazygomatic crests. This approach allowed for the correction of the maxillary incisor inclination without compromising the anterio-posterior position of the maxilla.

In brief, pre-torqued Damon[®] brackets in conjunction with Orthobonescrew[®] anchorage are effective mechanics for nonextraction correction of skeletal Class II malocclusion in an adult. A satisfactory result was achieved with 30 months of active treatment. The mechanics were relatively simple and efficient. This method is recommended for correction of high angle adult patients if the profile is acceptable. It is important to correct the etiology of the malocclusion by instructing the patient relative to optimal lip and tongue posture. Long-term stability of the present camouflage approach requires careful adherence to the retention protocol.

Acknowledgements: Thank Tzu Han Huang and Dr. Grace Chiu to proofread this article.

REFERENCES

- 1. Etsuko Kondo: Nonextraction and nonsurgical treatment of an adult skeletal Class II openbite with retrognathic mandible and temporomandibular disorders. World J Orthod 2007;8:261276
- 2. Kim YH. Anterior openbite and its treatment with multi-loop edgewise archwire. Angle Orthod 1987;57:290-321.
- 3. Hyo-Sang Park,et al: Nonextraction treatment of an open bite with microscrew implant anchorage. Am J Orthod Dentofacial Orthop 2006;130:391-402
- 4. Mills JR: The stability of the lower labial segment: a cephalometric survey. Dent Pract Dent Rec 1968;18:293-306
- 5. Alvarez et al: The A Line: a new guide for diagnosis and treatment planning. JCO 2001;35,556-569

DISCREPANCY INDEX WORKSHEET

CASE #	PA	TIENT
TOTAL D.I. SCORE		50

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 =



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

10

4

LATERAL OPEN BITE

2 pts. per mm. per tooth

Total



=

CROWDING (only one arch)

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

OCCLUSION

Class I to end on End on Class II or III Full Class II or III Payond Class II or III	= = =	0 pts. 2 pts. per sidepts. 4 pts. per sidepts.
Total	=	additional

EXAM YEAR 200)9			
ABO ID#				
LINGUAL POSTER	IOR X-	BITE		
1 pt. per tooth	Total	=		0
DUCCAL DOSTEDI		NTE		
BUCCAL POSTERI	<u>UK X-I</u>	<u> 511 E</u>		
2 pts. per tooth	Total	=		0
CEPHALOMETRIC	rs (s	ee Instruct	tions	
	<u>, , , , , , , , , , , , , , , , , , , </u>		.10115)	
ANB $\geq 6^{\circ}$ or $\leq -2^{\circ}$			=	4 pts.
SN-MP > 38°			_	2 nts
\leq 30 Fach degree > 38°	7	x 2 nts	=	2 pts. 14
	1	_^ 2 pts		
$\leq 26^{\circ}$			=	1 pt.
Each degree $< -2^{\circ}$		_x 1 pt.	=_	
Each degree $> 6^{\circ}$		x 1 pt.	= 3	
			_	
Each degree $< 26^{\circ}$		_x 1 pt.	=_	
1 to MP \geq 99°			=	1 pt.
Each degree $> 99^{\circ}$		_x 1 pt.	=_	
	Tot	al	=	23
OTHER (See Instru	ctions)			

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

Identify:

Total =

4





ABO Case Report

Class I Open Bite, High Mandibular Plane Angle and Hyperdivergent Facial Pattern

HISTORY AND ETIOLOGY

A young adult female, aged 24 years 2 months, was referred by her family dentist for a second opinion (Figure 1). There was no contributory medical or dental history. Her chief complaints were crooked front teeth and irregular lower incisal edges (Figures 2 and 3). The patient desired resolution of the crowding without orthognathic surgery or miniscrews, which was subsequently accomplished (Figures 4-6).

Clinical examination revealed bilateral Class I molar relationship and an anterior open bite from canine to canine. The mandibular dental midline was 3 mm to the left of the facial and maxillary midlines. Her maxillary lateral incisors were in crossbite bilaterally. The patient had a thumb sucking habit until age 10 and a residual tongue thrust was noted. The etiology for the malocclusion appears to be a combination of hereditary and environmental factors because the thumb sucking history and aberrant tongue posture are contributing to the anterior open bite.

DIAGNOSIS

Skeletal : Class I open bite with SNA 81°, SNB 79°, and ANB 2° (Figure 7 and Table)

> High mandibular plane angle (SN-MP 46°, FMA 39°); hyperdivergent facial pattern (Figure 7)

Dental :

Missing mandibular left third molar (Figure 8)

Bilateral Class I molar relationship .

Anterior open bite, 14 mm of maxillary and 5 mm of mandibular crowdin

The mandibular dental midline was 3 mm to the left of the facial and maxillary midlines.

Bilateral crossbite of the maxillary lateral incisors

There were no signs or symptoms of TMJ dysfunction.



Fig 1. Pretreatment facial photographs



Fig 2. Pretreatment intraoral photographs



Fig. 3. Pretreatment study models

Dr. Chris HN Chang , Director , Beethoven Orthodontic Center (middle) Dr. E-Young Su , Lecturer , Beethoven Orthodontic Course (left) Dr. W. Eugene Roberts , Consultant , *News and Trends in Orthodontics* (right)





Fig. 4. Posttreatment facial photographs



Fig. 5. Posttreatment intraoral photographs



Fig. 6. Posttreatment study models

Facial : Convex profile with lip incompetence and a 3 mm mandibular deviation to the left

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 : Reduce dentoalveolar protrusion
- Vertical : Intrude molars.
- Inter-molar Width : Maintain

Mandibular Dentition

- A P : Reduce dentoalveolar protrusion
- Vertical : Maintain
- Inter-molar / Inter-canine Width: Maintain

Facial Esthetics : Retract protrusive lips, correct lip incompetence and increase the nasolabial angle.

TREATMENT PLAN

Extraction of four first premolars and three third molars was indicated. The lower left 3rd molar was missing. Instruct the patient to practice lip closure and biting (bite-squeeze) exercises to prevent molar extrusion and intrude the posterior segment, if possible. In addition, the patient was trained to roll the tongue upward to correct the low tongue posture. These myofunctional exercises served as supplemental therapies for open bite correction. Both arches were bonded and an open coil spring was used to create space for the upper right lateral incisor. Extraction spaces were closed with sliding mechanics and the occlusion was detailed. Light



Fig. 7 -8. Pretreatment pano and ceph radiographs

vertical ("up and down") elastics were used to settle the occlusion immediately prior to removing the fixed appliances. Subsequently, brackets were removed and the correction was retained with an upper Hawley and a lower fixed 5-5 retainers.

APPLIANCES AND TREATMENT PROGRESS

0.022" Damon D3[®] brackets (Ormco Corporation) Four weeks after extractions, brackets were were used. bonded on both arches and lingual spurs were attached to the lower incisors. An open coil spring was used to create space for the upper right lateral incisor. The wire sequence was as follows: .014" copper NiTi, .014X25" NiTi, .016X25" upper 20° pretorqued copper NiTi, .019X25" upper 20° pretorqued copper NiTi, .017X25" TMA, and .019X25" SS. In the 3rd month of treatment, early light short elastics (2 oz) were applied from upper second premolars to lower canines. The elastics were upgraded gradually from 2 oz, 3 oz, 3.5 oz, 4.5 oz to 6 oz respectively. Extraction spaces were closed with NiTi springs on a .019X25 SS archwire. In the 19th month, a panoramic radiograph was taken to recheck the axis of teeth and re-positioned brackets. In the 21th month, interproximal enamel of lower incisors was reduced with a high speed fissure bur to correct black triangles. In the 28th month, lower incisors were restored with composite resin on incisal edges, because the patient wanted the irregular incisor edges corrected by adding composite rather than reshaping them with selective grinding. One month prior to completion of



Fig. 9-10. Posttreatment pano and ceph radiographs

CEPHALOMETRIC

SKELETAL ANALYSIS			
	PRE-TX	POST-TX	DIFF.
SNA°	81°	80°	1°
SNB°	79°	79°	0°
ANB°	2°	1°	1°
SN-MP°	46°	44°	2°
FMA°	39°	37°	2°
DENTAL ANALYSIS			
U1 TO NA mm	10 mm	6 mm	4 mm
U1 TO SN°	112°	98°	14°
L1 TO NB mm	7.5 mm	7 mm	0.5 mm
L1 TO MP°	84°	77°	7°
FACIAL ANALYSIS			
E-LINE (U)	-2 mm	-4 mm	2 mm
E-LINE(L)	3 mm	-1 mm	4 mm

Table. Cephalometric summary



Fig. 11. Superimposed tracings

treatment, the upper archwire was sectioned distal to the bicuspids. Light vertical elastics (2 oz) were used for final detailing. Appliances were subsequently removed and retainers were delivered after 35 months of active treatment.

RESULTS ACHIEVED

Maxilla :

- A P : Maintained.
- · Vertical : Repositioned inferiorly
- Transverse : Maintained.

Mandible :

- A P : Maintained.
- · Repositioned inferiorly
- Transverse : Maintained.

Maxillary Dentition :

- A P : Dentoalveolar protrusion reduced (Figure 9)
- Vertical : Reduced.
- Inter-molar Width : Maintained.

Mandibular Dentition :

- A P : Dentoalveolar protrusion reduced.
- Vertical : Maintained.
- Inter-molar / Inter-canine Width : Molar decreased 3 mm, canine width maintained.

Facial Esthetics : Lip protrusion was reduced and lip competence was achieved.

RETENTION

An upper Hawley retainer was delivered. The patient was instructed to wear it full time for the first 6 months and nights only thereafter. The lower fixed 5-5 retainer was bonded on every tooth after the finish records were obtained (Figures 5, 6 and 10). The patient was instructed on home care and maintenance of the retainers. Tongue posture, lip competence and bite-squeeze exercises were also recommended after treatment..

FINAL EVALUATION OF TREATMENT

All premolar extraction spaces were closed and the axial inclinations in the buccal segments were well controlled (Figure 10). Wearing the elastics and practicing the myofunctional exercises as instructed were the keys to correcting the patient's anterior open bite (Figure 11). Details of active treatment are illustrated in Figures 12 and 13. The detailing procedures at the end of treatment were sectioning of the maxillary archwire distal to the premolars (Figure 14) and light vertical elastics were used to settle occlusion of the buccal In comparison, morphological segments (Figure 15). aspects of the original malocclusion are illustrated in Figures 16-19. Reviewing these complicating factors, reinforces the effectiveness of the present mechanics for managing the malocclusion in concert with the patient's desires.

Anterior early Class III elastics were useful for



Fig 12. An open coil spring was used to create space.



Fig 13. Lower incisors were sliced.

maintaining buccal segment relationships as space was closed. The upper 20° pretorqued copper NiTi wires were also helpful for maintaining the axial inclination of the maxillary incisors during space closure. Marginal ridge discrepancies existed between the lower 1st and 2nd molars resulting in the loss of 5 points on the ABO cast score. In addition, 4 points were scored for first order alignment problems, and 3 points were lost for root axial inclinations on the panoramic radiograph. All of these problems could have been corrected by repositioning brackets and/or placing modest detailing bends in the finishing archwires. Furthermore, the axial inclination of the lower incisors was decreased (too upright), which was due to insufficient lingual root torque in the bracket and/or archwire. This problem could have been solved by choosing higher torque brackets and/or by using anterior pretorqued archwires. Also, external root resorption was noticed in the periapical films for four incisors (#8,10,24,25). Root resorption is often attributed to excessive orthodontic force, but for the present patient, it is more likely attributable to occlusal trauma during space closure. Even though tooth movement was accomplished with relatively low forces, the incisors can be moved into occlusal trauma, particularly if there is inadequate anterior torque in the maxillary archwire during space closure. Furthermore, periapical films of mandibular



Fig 14. The upper archwire was sectioned.



Fig 15. Light up and down elastics (2 oz) were used for final detailing.

canines (#22, 27) were consistent with hypercementosis, a reparative response that has no harmful effects on the teeth. These radiographic findings were not clearly evident on the panoramic radiograph but were seen in the periapical films. These findings underscore the importance of taking periapical films of the upper and lower anterior areas.

In general, the treatment results were deemed satisfactory. The patient was particularly pleased with her smile and the open bite correction. Long-term stability is a challenge for this case because of the history of aberrant tongue posture. Continuous tongue posture and bite-squeeze exercises are indicated to prevent relapse. The patient currently continues practicing these exercises.

DISCUSSION

Lip closure and bite-squeeze exercises are helpful for preventing molar extrusion to control the vertical dimension. Numerous studies¹⁻⁴ demonstrate that strength training of masticatory muscles can influence morphology. It has been a common finding that the elevator muscles of the mandible influence the transverse and vertical dimensions of the face.¹⁻⁴

For the present patient, the SN-MP° decreased from 46° to 44° and open bite was corrected. Nonsurgical options for correcting open bite malocclusions include anterior



Fig 16. Maxillary right lateral incisor was X-bite. Fig 17. Maxillary left lateral incisor was X-bite. Fig 18. Anterior open bite

vertical elastics, posterior bite blocks (active and passive), high-pull headgear, vertical pull chin-cups, and microimplants. Nonsurgical options usually require a longer treatment time and more patient compliance.¹

Most previous treatment modalities for correcting anterior open bite malocclusion have focused on intruding posterior teeth and facilitating autorotation of the mandible.¹ The rationale for extracting all four first premolars for this patient was to reduce the dentoalveolar protrusion without resorting to orthognathic surgery and/or miniscrews. Extraction spaces were closed by sliding mechanics with NiTi springs in conjunction with a .019X25 SS archwire. It is important to monitor the torque of incisor brackets and/or archwires to control the axial inclination the anterior segment. At the beginning of treatment high torque brackets begin the process and pretorqued large rectangular wires continue the positive engagement.

The limited effectiveness of these mechanics is evident after extraction spaces were closed. If the axial inclination of the incisors had not been controlled with the pretorqued appliances, the incisors would have tipped posteriorly into a traumatic occlusal relationship that is often associated with Class II buccal segments. Cephalometric analysis demonstrated that the axial inclination of both the maxillary and mandibular incisors was reduced as the bimaxillary protrusion and openbite were corrected. The retraction of the anterior dentoalveolar process resulted in the E-line decreasing from -2/3mm to -4/-1mm. As noted in Figures 4, 9 and 11, facial esthetics improved as the lips were retracted and the nasolabial angle was increased.

ACKNOWLEDGEMENTS

Thank Tzu Han Huang and Dr. Billy Su to proofread this article.

REFERENCES

1. Lindsey CA, English JD. Orthodontic treatment and masticatory muscle exercises to correct a Class I open bite in an adult patient. Am J Orthod Dentofacial Orthop 2003;124:91-8

2. Lowe A, Takada K. Associations between anterior temporal, masseter, and orbicularis oris muscle activity and craniofacial morphology in children. Am J Orthod 1984;86:319-30.

3. Proffit W, Gamble J, Christiansen R. Generalized muscular weakness with severe anterior open bite: a case report. Am J Orthod 1968;54:104-10.

4. Ingervall B. Facial morphology and activity of temporal and lip muscles during swallowing and chewing. Angle Orthod 1976; 46:372-80.

DISCREPANCY INDEX WORKSHEET

CASE #	6	PA	TIENT	YUEN-HSU LIU
TOTAL D	.I. SCORE	2	47	

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 =



= 9

OVERBITE

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



= 11

LATERAL OPEN BITE

2 pts. per mm. per tooth

Total

= 0

CROWDING (only one arch)

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

=

OCCLUSION

Class I to end on = End on Class II or III = Full Class II or III = Beyond Class II or III =

Total



EXAM YEAR 2	2009		
ABO ID# 9	96112		
LINGUAL POSTE	ERIOR X-	BITE	
		ſ	
1 pt. per tooth	Total	=	0
BUCCAL POSTE	RIOR X-I	BITE	
2 pts. per tooth	Total	=	0
		l	
CEPHALOMETR	ICS (Se	ee Instructi	ons)
			/
ANB $\geq 6^{\circ}$ or \leq -	·2°		= 4 pts.
SN-MP			
$\geq 38^{\circ}$			= 2 pts.
Fach degree > 38	° 8	x 2 nts	= 16
	0	_A 2 pts.	
$\leq 26^{\circ}$			= 1 pt.
			1
Each degree < -2	0	x 1 pt.	=
C		_ 1	
Each degree $> 6^\circ$	o 	_x 1 pt.	=
Each degree < 26	°	_x 1 pt.	=
1 to MP $\geq 99^{\circ}$			= 1 pt.
Each degree > 99	0	x 1 pt.	=
-			
	m .		10
	lot	al	= 18
OTHED (C. L.			
<u>UTHER</u> (See Inst	tructions)		
Supernumerary teeth		x	1 pt. =
Ankylosis of perm. te	eth	x 2 pts. =	
Anomalous morpholo	gy _	X	2 pts. =
Impaction (except 3 rd	molars) _	X	2 pts. =
Midline discrepancy ($\geq 3 \text{mm}$	($v_2 \text{ pts.} = 2$
Missing teeth congen	o.~ moiars)_ nital	X	2 pts. =
Spacing (4 or more ne	r arch)	^ x	2 pts. =
Spacing (Mx cent. diaste	$ma \ge 2mm$)		2 pts. =

Identify:

Tooth transposition

Skeletal asymmetry (nonsurgical tx)

Addl. treatment complexities

Total

2

x 2 pts. =

@ 3 pts. =_

 $_x 2 \text{ pts.} = _$

=



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.

The Relationship between Angiogenesis and Osteogenesis

ones are unique organs, composed of calcified and soft tissues that provides structural and metabolic functions. Understanding the fundamental mechanism of osseous development will help us make a realistic treatment plan for patient.

There are a lot of dental treatments involving bone metabolism. For examples, midpalatal expansion in orthodontic treatment requires the facial sutures to grow and deposit the mineral contents to adapt biomechanical changes.¹ Ridge augmentation with autogenous bone block before implant placement involves the new bone formation and bone remodeling. Although, it looks like that there is no relationship between midpalatal expansion and autogenous bone augmentation, however, to explore deeper we can find that they all envolve similar mechanism of osseous regeneration.

In clinical perspective, vascular invasion in expanded palatal sutures and augmented ridge is the first step for new bone formation. Vascular invasion involves the angiogenesis and the growth of vascular cells as well as the perivascular cells. Perivascular cells are mesenchymal cells which are directly related to the osteogenesis. The role of perivascular cells in the origin of osteoblasts was first reported in 1987.² Until 1996, Chang et al ³ further defined the angiogenic capillary budding process associated with the propagation of perivascular osteogenic cells (Fig 1). When angiogenesis begin, the capillaries start growing



Fig. 1

through budding process. Alone with the capillary budding, pericytes (Fig 2), the perivascular cells which express the osteogenic potential ⁴ grow with elongated sprout of capillary.



Fig. 2

When the vascular system has established, the multipotent pericytes

differentiate to osteocytes and begin the process of osteogenesis. Bones are then laid down through this mechanism.

Applying this concept in midpalatal expansion, Chang ⁵ used the rat model to explore the process of osteogenesis in the PDL of the incisors as well as the adjacent expanded sutures. He found that the widened PDL caused direct osteogenic induction of new bone, whereas the adjacent expanded suture went through a process similar to the postoperative regional acceleratory phenomenon, which is the character of wound healing of bone. Overall, the mechanism of midpalatal expansion are first through the angiogenesis to build up the vascular system, then through the pericyte differentiation to initiate the osteogenesis and complete the circle.

In implant dentistry, we often encounter a situation that patient has been lost teeth for a long time and has atrophy ridge that is lack of sufficient bone volume to place dental implants. It usually require bone grafting to build up the lost bone volume before further treatment. There are many types of bone grafts, including xenografts, allograft, and autogenous bone grafts. Autogenous bone grafts contain abundant bone morphogenic proteins (BMPs), have



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both bone conducive and inductive effects. They are often used as gold standard of donors for ridge augmentation.

There are two origins of autogenous bone: (1) endochondral bone, such as iliac crest and long bone. (2) membranous bone, such as mandibular ramus and symphysis. Joseph ⁶ found that autogenous bone graft originated from membranous bone shows the effect of "early revascularization" when compared to the graft from endochondral bone. The early revascularization of bone graft helps the angiogenesis and accelerates the vascular system build-up. The quicker the vascular system builds up, the less post-operative graft resorption occurs. Compared to the other grafting materials, such as allograft or xenograft, which needs at least 6 months to go through the "creeping substitution"⁷ to have new bone formation; autogenous bone graft only needs about four months to complete the healing and remodeling and shows good incorporation to the recipient site.

In Fig 3, An application of mandibular symphysis bone block to augment an atrophic ridge was demostrated. After four months, the bone graft showed good incorporation to the recipient site and with minimal resorption.

Consistent success with implant dentistry and orthodontics requires a thorough knowledge of the physiology, metabolism and biomechanics of bone. Clarifying the relationship between the angiogenesis and osteogenesis helps us understand the fundamental mechanisms of osseous development and adaptation. A firm grasp of these concepts in clinical practice will help us to get the optimal treatment results.



Fig. 3

References

- 1. Haas AJ: The treatment of maxillary deficiency by opening the midpalatal suture, Angle Orthod 35:200-217,1965
- 2. Roberts WE, Wood HB, Chambers DW et al: Vascularly oriented differentiation gradient of osteoblast precursor cells in rat periodontal ligament: implications for osteoblast histogenesis and periodontal bone loss, J Periodontal Res 22: 461,1987
- 3. Chang HN, Garetto LP, Katona TR et al: Angiogenic induction and cell migration in an orthopaedically expanded maxillary suture in the rat, Arch Oral Biol 41:985-994,1996
- 4. Doherty MJ, Ashton BA, Walsh S et al: Vascular pericytes express osteogenic potential in vitro and in vivo, J Bone Miner Res 13:828.1998.
- Chang HN, Garetto LP, Potter RH et al: Angiogenesis and osteogenesis in an orthopedically expanded suture, Am J Orthod Dentoacial Orthop 111:382-390,1997.
- 6. Josph et al., Plast Reconstr Surg 76(4): 510, 1985
- 7. Buchardt H: Biology of bone transplantation. Orthop Clin North Am 18:187-197, 1987



Begin with the End in Mind

Bracket Placement and Early Elastics Protocols for Smile Arc Protection



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序言 長久以來,矯正治療的目標 偏向以病人的齒列和咬合為

基準,而往往損害了顏面的美觀。所謂的 Damon 哲學就是強調以顏面美觀為基礎來 評估診斷、治療計畫、到最後的治療結 果,並且完全符合 Dr. David Sarver 所認為 的 individualized approach 才是當今的主 流。Sarver 的基本原則就是,在提供改善 所有負向問題的方法時,要維持病人顏面 美觀上的正面特質。而其中最重要的就是 病人的 smile arc ,Damon 哲學就是以 "smile arc protection strategy"為目標來訂 定治療計畫。在這篇文章中,Dr. Pitts 將 說明他如何黏著矯正器並使用 early light elastics protocols 這兩種方法來達到 smile arc protection 的策略性目標。

在我執業生涯中最開心的時候就是 debonding appointments,那一刻我們開心地 慶祝病人有了嶄新的漂亮微笑和完美的咬 合。因為有精確的 bracket placement 為基 礎,我們才能夠有漂亮完美的 case,所以 我喜歡 bonding appointments 的程度僅次於 debonding appointment。在矯正治療 中,"precise bracket placement"是讓我們 贏得效率、美麗怡人的笑容和功能性咬合 的不二法門。矯正治療計畫及 bonding 將 影響我們能否達到控制治療時間及獲得優 質成果的目標,因此,我們要一開始就要 將每個 case 最終的目標烙印在腦海中。

病人最關心的通常是 facial 和 smile

esthetics ,所以在我們一開始做治療計畫 和最後評估成果、努力追求完美咬合的同時, facial 和 smile esthetics 都是我們最不可忽視的標準。

近 20 年來,顏面美學標準的改變 是,患者多希望有更豐隆的唇型、更多的 vermillion display 和更寬的 arches 。 Facial based treatment planning 的核心就是指 smile arc protection strategy,它和 occlusal goals 是密不可分的。

以理想中的 smile arc 為上顎前牙的 依據,我們的目標是將 canine-to-canine 的 位置和 anterior bite 先理想化 (圖 1a-b)。盡 可能地讓上顎前牙前置同時使 nasolabial angle 趨近 90 度,能維持上唇的豐隆度並 得到理想的 mid-facial support,並維持或加 強上顎 vermillion curl。用了 Damon 這種 passive self-ligating 系統 13 年,我知道假如 運用得當,它有效的力學機制能促進相當 可觀的 arch adaptation ,多數的情況下能 保有 complete dentition。 除了第三大臼 齒,我現在只有在為了美觀,像是病人的 牙齒太前突而有 lip incompetence 的時候才 拔牙。

雖然我將 precise bracket placement 列 為有效達成一個完美矯正結果的 treatment list 中必要且最重要一環,其他諸如 soft and hard-tissue contouring、variable torque、 early light elastics 以及在正確的時間運用適 當的矯正線,也都是其中不可或缺的一

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環。同時我比較喜歡 direct bond 並且真的愛上這種藝術 的挑戰,我黏著矯正器的位置與方法對喜歡 indirect bonding 的醫師來說也似乎同樣有效。這篇文章中包含 有我的 Damon bracket placement protocols 和 使用 early light and anteroposterior (A-P) elastics 的基本原則。使用 early light elastics (常常被稱做 shorty elastics 或 shorties) 是一個我發明的且較新的治療方法, 許多使用 Damon 的臨床醫師也認為這與治療效率息息相關。 藉由 early light elastics,現在我們更容易控制 vertical dimension, 而且也是另外一種保護 smile arc 的有效方法。

Pitts 定位的基本原則

我黏著矯正器的原則如下:

- 在 bonding appointment 前先擬定好 bonding plan,並
 且小心謹慎地選擇 torques。
- 2. 確定所有 bonding 必要的物品都在 tray setup 裡面以便 能夠有效率的 bonding。
- 3. 由兩位助理幫忙 bonding。
- Bonding 前,因應美觀(如太尖的 cusps)或 bracket fit (如不規則的 labial surfaces)修形牙齒。
- 5. 根據正確的 bracket placement protocol 來保護或加強 smile arc 以及排齊 buccal segment cusp tips 和 marginal ridges。

以下分點詳述:

在 bonding appointment 前先擬定好 bonding plan , 並 且謹慎仔細地選擇 torques 。

在 bonding 約診之前,我會研究病人治療前的記 錄來建立 bonding plan。建立計畫的過程不需要花很久 的時間,因為我天天都在做。 藉由病人的照片讓我可 以評估患者的中線、 transverse plane、smile arc 和 enamel display, 並決定 canine 的 torques。 而 panorex 可 以讓我檢視牙根平行性和位置。 Cephalogram 則幫助我 決定上下顎門牙 brackets 的 torques。 仔細地分析這些 讓我可以計畫 bracket positioning 以便修正 inclination 。 病人的 tooth angulations、marginal ridges、contact points、cusp heights、anterior overlap, smile arc 和 missing teeth 都要納入 bonding plan 的考量。 Study model 可以幫 助決定是否需要 bite turbos 或是將 labial enamel 做修 形。 和許多人一樣,在 bonding 時我會在 chairside 準備 panorex 、口内及口外正面照片。但是有時照片會騙 人,所以我也會請病人站起來笑給我看來檢視 smile arc 和對稱性,這樣我就可以有個印象來幫助我作為 bonding 時 bracket placement 的依據。在這期 clinical impressions 的另一篇文章, Dr. Bill Thomas 有說明如何 選擇 torque,所以我在此僅提及要特別注意 lateral



圖 1a-b 以理想中的 smile arc 為上顎前牙的依據,我們的目標是 將 canine-to-canine 和 anterior bite 的位置先理想化。

cephalogram 以評估上下顎的門齒來選擇 torques。 在我們完成的 cases 中,我期望能夠達 到完美的 torque。 Proclined 的上顎門牙會破壞本 來漂亮的其他成果。 Under-torqued 的上顎 incisors 和 canines 也會導致不是那麼令人滿意的外觀和 功能。

Flashless bonding 是個簡單的觀念 - 我們只要將 brackets 塗上適量的黏著劑。多餘的樹脂越少, 治療完成後組織也會比較健康。我的目標是矯正 器周圍不要有溢出的樹脂,在定位 bracket 後也不 需要清除。矯正器要黏得牢的最好方法,是矯正 器一定位之後就不要再移來移去。

2. 確定所有 bonding 必要的物品都在 tray setup 裡 面以便能夠有效率的 bonding。

我使用的 bonding 方法中,有些工具我認為 是必要不可缺少的,必須放在 tray setup 裡。(圖 2)

●所有需要的 brackets,包括 special brackets (如 lingual buttons)和 bite turbos 等等,都放置適 當,molar tubes 先塗上樹脂並且用鋼杯遮住。

● Ormco 產品 Ortho Solo, 是 universal sealant and bond enhancer,我推薦使用以有效黏著矯正器。

● 2 时大口鏡可以提供最清晰的咬合面視野。

● 長的棉卷而非張口器,這樣可以讓病人較為舒服並且視野比較好。

 Orascoptic 的 Through-the Lens Loupes (放大 鏡),可以讓 bonding 和 debonding 時看的更清 楚。

● Zona Industries 的 Keat tweezers (鑷子),可以 確保 molar bracket 穩當地放至臼齒上(圖 3)。



圖 2 Bonding Tray Setup

3. 由兩位助理幫忙 bonding。

我使用六手操作,兩位助理互相幫忙,先 將病人準備好,然後在 bonding 時一起協助我。 當牙齒打磨光滑後,助理要確認沒有口水汙染。 我坐在中間,兩位助理相對坐著。我坐下時病人 的頭在我正前方,我是右撇子所以我右手邊助理 負責將塗上樹脂的 brackets 遞給我。我左手邊的 助理工作就是將口水吸乾淨和照光,並且要拿著 大、小兩支口鏡隨時幫助我做確認。還有一個工 作也是左手邊的助理要做的,就是隨時準備著一 支沾有 Ortho Solo 小毛刷,以便擦掉多餘的樹 脂。



圖 3 Keat tweezers 可以確保 molar bracket 穩當地放至 臼齒上。

4. Bonding 前,因應美觀或 bracket fit 修形牙齒。

在我夾起第一個 bracket 之前,我會先根據模型 研究 tooth anatomy 再將 enamel 重新修形。在做過相當 多次後,我現在做這個動作只需要不到 1 分鐘的時 間。讓牙齒的外型, buccal/labial surfaces, incisal tips and edges 和 plunging cusps 比較柔和,不僅可以加強美 觀,而且可以使 contact relationships, bracket 和咬合更 適當。能否達到適當的 torque 取決於 bracket fit; occlusal fit 對減少咬合干擾是必要的。 我們可以先從 model 來決定哪些牙齒需要 facial enamel contouring,特 別是 maxillary central and laterals。

為了美觀和咬合, 除非是咬秏,否則幾乎所有 的 canine 都需要 reshaping (圖 4a)。門牙和側門牙的 incisal edges 通常也同樣需要 recontouring 。 Reshaping canine 的 incisal surface 可以幫助 smile arc 的美觀也可 以改善和鄰牙的 contact relationships 而無損於達成 canine disclusion 的目標。而 reshaping canine 的 lingual surface 則有助於使用 elastics 時 Class II, Class III,以 及 vertical 方向的改正。對於某些 Asian 和 American Indian 血統的病人,我也會 reshape 上顎前牙的舌側面 (圖 4b)。

5. 根據正確的 bracket placement protocol 來保護或加強 smile arc 以及排齊 buccal segment cusp tips 和 marginal ridges。

我黏著矯正器有一些原則是必然會遵守的。 我 使用過 DAMON 3 MX 系統,現在使用的則是最新一 代的 DAMON Q。 我先黏下顎再黏上顎齒列,先從一 側的第二大臼齒到犬齒,再以相同順序黏對側,最後 再黏門牙區。我會這樣黏是因為我希望能像鏡像效果 一樣,確保兩側矯正器高度相同。 我只有在黏犬齒和 門齒時才會使用高度測量器來確認左右兩側高度相 同。上述的只是矯正器黏著的順序,至於應放置矯正 器在什麼位置則是基於經過深思熟慮才決定的 bonding plan。

多年來我了解到,即使我可能不會一開始就把所 有的矯正器 engage 到矯正線上,我還是會在黏著當次



約診就替每顆牙都黏上矯正器,因為這樣可以為我省下一至二次的約診時間。一次黏著全部牙齒可使病人同時習慣第二大臼齒上的矯正器和其他牙齒上的矯正器。 等到之後約診才黏會使我的治療時間延長並打斷我的計畫。

黏矯正器的原則,在上顎前牙要考慮美觀和維 持微笑弧線(smile arc protection),下顎前牙則以 overbite and overjet 來決定黏著位置,至於其他牙齒則 是為了能達到理想咬合。我會以上顎前牙為 template 來排列下顎前牙。顯而易見地,犬齒是前後牙的過渡 點,並且是達到整體美觀與功能咬合的重要角色。以 上顎犬齒為基石,使我可以確認犬齒-側門齒和犬齒 -第一小臼齒的接觸點是美觀且有功能性咬合。

至於 buccal segment 的部分,我們必須使 marginal ridge 和 contact point 有良好的排列。若使用 不規則的 buccal cusps 作為 buccal segments 主要矯正器 參考點,則會造成不協調且不標準的結果。對我來 說 contact points 是比較好的參考點。如果以 contact points 作參考來黏矯正器, buccal segment 的 marginal ridges 自然就會達到良好的排列及咬合關係。 Buccal segment 和犬齒根據 contact points 來黏矯正器,然後門 齒矯正器再依據上顎犬齒矯正器的 slot 高度來黏著, 這樣可以得到迷人的微笑弧線 (smile arc),而這也是 大家所追求的完美治療結果。

上顎六顆前牙不可或缺的美觀要素之一,就是 一定要有對稱的 gingival margins。配合使用雷射來作 牙冠增長術等方法,讓牙齦高度對稱這件事,現在已 經變得容易多了。接下來內容就是概述我所遵循的黏 著矯正器通則,然而我還是會因應特殊的病例情況而 做調整。

根據我四十年對於矯正器置放位置的研究,我 會將矯正器黏得比大多數矯正醫師所放的位置更靠近 牙齦一點。雖然這會造成我在小臼齒和臼齒的矯正器 很靠近或甚至是在牙齦組織下(這就是我不用 indirect bonding 的主要原因),但是我幾乎沒見過牙齒因為矯 正器黏得很靠近牙齦而出現脫鈣的情形。 圖 5 是我 置放矯正器的範例。

我看過許多臨床醫師在第一大臼齒到第二小臼 齒和第一小臼齒到犬齒的高度轉換會發生困難。 通 常,在這些轉換的地方我很少做 wire bending 的動 作,因為我以犬齒為基石,犬齒以後牙齒矯正器置位



圖 5 相較於傳統矯正器所置放的位置,我放的位置較靠近牙齦。



圖 6 在石膏模型上將犬齒、小臼齒和臼齒的接觸點用線 畫出來,幫助建立咬合--牙齦 (occlusogingival , O-G) 位 置的參考線。

的参考點則是定位在牙齒的 contact points 上。 Dr. Mike Steffan 和我發展出一套方法來幫助臨床醫師將這套技術做到 完美 ---那就是在石膏模型上將犬齒、小臼齒和臼齒的 contact points 用線畫出來 (圖 6)。

上顎前牙(圖7)。因為上顎犬齒是前牙轉到後牙的過 渡區,也是建立微笑弧線的延伸轉彎點,因此我計畫將 bracket 放在整個牙弓的位置時,會先決定這顆矯正器的位 置。就上顎犬齒 bracket 在咬合牙齦 occluso-gingival (O-G)方 向要置放的位置來說,我的經驗是上顎犬齒 bracket wing 的 最下緣 (incisal_edge),要放在上顎犬齒近心和遠心兩旁 contact point 的裡

D) contact line $\,\circ\,$

上顎正中門 作為參考點,正 過的尖端開始量 側門齒的溝槽則

(則門齒的溝槽則 0.25 mm)。將矯正器貓的太切隔曾个利於微笑弧線和 torque control。

正器

修型

;而

臨床醫師在前牙 M-D 置放最容易犯的錯誤就是將矯正 器黏的太偏遠心,尤其是上下顎的側門齒和犬齒(圖 8a-b)。



圖 7 上顎前牙 bracket 的定位

M-D: 矯正器的軸線要在牙齒的牙冠長軸 (crown-long axis)的最高點。 必須從咬合面來看而非從唇側看,不然會誤以為矯正器的位置看起來會已 經夠近心,但其實都黏得太靠遠心。

O-G:上顎犬齒 bracket wings 的切緣放在 M-D contact line [,] 側門牙和正 中門牙的矯正器位置會依序比犬齒 bracket 往牙齦方向置放。





圖 8 a-b 上下顎側門齒最常犯的定 位錯誤是 bracket 放的太遠心。



圖 8 c-d 上顎小臼齒最常犯的定位錯誤是 bracket 放 得太近心。上下顎犬齒的 bracket ,常犯的錯誤是放 得不夠近心。

Bonding 時使用放大鏡和大口鏡都可以減少此類的錯誤並且使 finishing 更容易。

我的研究清楚地指出,唇側最突點的位置經由 大口鏡從切端/咬合面(incisal/occlusal)來看和從唇 側來看是有差別的。從唇側來看,會覺得前牙的矯 正器會比 the height of contour上的長軸還要偏近心, 但是由大口鏡從切端/咬面來看,矯正器的軸線的確 是坐落在牙冠長軸的最突點上。

上顎小臼齒(圖9)。利用大口鏡從咬合面看, 上顎第一和第二小臼齒矯正器的軸線必須剛好坐落 在牙冠長軸上,跟 central groove 及 M-D 頰側線角平 行。 我們容易且常犯的錯誤是將上顎第一小臼齒 bracket 放得太近心(尤其是如果從頰側面來定位)。 這種置位會導致牙齒旋轉並且使頰側咬合不密合。 當定位至正確位置後再從頰側面來看,第一小臼齒 bracket 會看來好像在最突點的遠心;而第二小臼齒 bracket 則有時看起來會在最突點的近心。 Bracket wings 的咬合緣(the occlusal edge of the bracket wings) 應該坐落在 M-D contact line 上。

上顎大臼齒(圖 11)。第一大臼齒的 bracket 經 Ormco 設計後,在 M-D 的定位變的很簡單,因為它 在製造時 bracket pad 上面有buccal tip 可以和牙齒的 buccal groove 很自然的貼合。 Bracket 的近心部份會 坐落在 mesiobuccal cusp 的中間。為了得到從第一大 臼齒到第二小臼齒更精確的牙埠(cusp)高度轉換, 我會將第一大臼齒 molar tube pad 的咬合緣 (occlusal edge)放在 M-D 接觸線上。

上顎第二大臼齒 molar tube , M-D 置放的位置 跟第一大臼齒 molar tube 是一樣的。 而在 O-G 的定 位,我會將 bracket 放的比第一大臼齒更接近咬合面 約1.5 mm。這樣子定位加上 -27 度的 torque,可以讓 牙根向頰側傾斜並抬高 palatal cusps,以避免和下顎 臼齒的產生咬合干擾。上顎第二大臼齒的 palatal cusps 在治療後期有很高的比例都需要重新修型,因 為它們會朝近心傾斜,而這也是導致牙齒咬合干擾 最主要的原因。

下顎門齒(圖12)。為了達到最佳的近遠心位 置,我會使用大口鏡,將矯正器的軸線置放在牙齒 的牙冠長軸(crown-long axis)上也就是從切緣觀的最 高點,且矯正器軸向和牙冠長軸一致。O-G 位置則 依咬合(bite)的深淺決定。如果是深咬,我將矯正 器溝槽頂端放置在相當靠近切緣的位置,離切緣約 3.5 mm,此時在上顎前牙就要加上 bite turbos。就下 顎齒列而言,我喜歡對深咬的病患進行 over-level 以 達到一個反向的 curve of Spee 。 Early light elastics 可 以加速打開深咬,藉由 buccal segment 牙齒的萌發來 增加垂直高度。 若是開咬的情況,我放置矯正器 時,溝槽頂端則較靠近牙齦方向,約離切緣 5 mm, 對我來說,開咬的病人需要一些 curve of Spee。

下顎犬齒(圖 13)。如同上顎犬齒,下顎犬齒 是我放置下顎 buccal segment 牙齒矯正器,並達到良 好咬合的關鍵齒。最佳近遠心位置也是將矯正器的 軸線排列在牙齒的牙冠長軸上,也就是從切緣觀的 最高點。經長久研究,我認為下顎犬齒矯正器在咬 合-牙齦方向的最佳位置是將 bracket wings 的切緣端 對準牙齒的 M-D contact line。

下顎小臼齒(圖14)。最佳近遠心位置,也是 利用大口鏡,將 bracket 的軸線置放在牙齒的牙冠長 軸上,也就是從咬合面觀的最高點。O-G 方向的位 置,我將 bracket wings 的切緣對齊 M-D contact line 靠 牙齦方向約 0.5 mm 處(below contact points)。

下顎大臼齒(圖 15/16)。下顎第一和第二大臼 齒的 molar tube 定位方式是一樣的。 近遠心的最佳位





圖 10 上顎大臼齒的定位 -- 第一大臼齒

M-D: Tube pad 上的 central buccal tip 對齊牙齒的 buccal groove。 O-G: Tube pad 上的 occlusal edge 放在 M-D 的 contact line 上。

上顎大臼齒的定位 -- 第二大臼齒

M-D:Tube pad 上的頰側中間頂端(central buccal tip)蓋在牙齒的 頰側溝(buccal groove)上。

O-G: Tube pad 上的 occlusal edge 比第一大臼齒 molar tube 再往咬 合面移 1.5 mm。

i







上。

的牙冠長軸(crown-long axis) ›好像放的太靠近心而無法定位至

於離切緣約 3.5 mm。 於離切緣約 5 mm。





M-D:將 bracket 的軸線置放在牙齒的牙冠長軸 (crown-long axis) 上切緣觀的最高點。必須從切緣來看,不然會誤以為好像

放的太靠近心而無法定位至正確位置。

O-G:將下顎犬齒 bracket wings 的切緣放在近遠心 contact line



The second secon

置,是 molar tube 的頰側溝對齊牙齒的頰側溝。至於咬 合-牙齦方向,則是將 molar tube pads 的咬合端對齊 M-D contact line 略往牙齦方向約 0.5 mm 處。與上顎大臼 齒不同的是,下顎第一和第二大臼齒咬合-牙齦方向高 度是相同的。

Bracket Repositioning More Efficient than Bending Wires

在我的經驗裡,必須作過多 wire bending 的原因並 不是因為矯正器設計不好;而是因為 bracket 放在不恰 當的位置造成的。因為是位置不正的牙齒 (或是 bonding 那天心情不好),我們在一開始黏著的時候未 必總是能將每個矯正器都定位精準,除非重新定位這 些矯正器,否則在治療的後段就必須要做補償性的彎 線,而這些彎線將可能帶來原本可以被預防卻是難以 預料的事發生。

● 我總是在每個診療椅上備有 repositioning trays,我寧 可重黏一顆錯位的矯正器也不要靠費時的彎線導致延 長治療的時間。

對我來說,不去做重新置位矯正器的工作,而大 量依靠 wire bending 是很沒效率的。根據很多臨床醫師 的評估,重新置位矯正器,可以幫忙省下平均六個月 的治療時間。為了能夠更有效率的 rebonding,我準備 25 套 trays set up,並且放在每個診療椅最好拿到的地



方。 在拆掉矯正器重黏之前,我會先請病人站起來對 我微笑,這樣我可以看見那些牙齒需要調整到什麼的 位置,這樣可以將其適當的重新置位。必要的話我會 將牙齒修型。

Early Light Elastics Begin Correction Concurrent with Arch Leveling to Protect the Smile Arc

Damon 的基本原理就是在治療所有的階段都能在 large passive bracket lumen 上維持有效的力量使牙齒做最 理想的移動。長期以來,我們都是在完成 leveling 後, 再開始用力量較大的橡皮筋來改正前後、垂直和橫向 的關係,而這一直令我覺得不舒服。直到幾年前, 我 開始在深咬的病例 bonding 之後就使用力量小的橡皮筋 適度的引導後牙的 extrusion。 Damon 系統加上早期的 橡皮筋驚人的反應讓我震驚,因此我現在大部份的病 例都在 bonding 約診就開始拉橡皮筋(一開始不要超過 2 oz.),如此一來可以加速治療時間和增進治療品質 (Case 1)。使用這些 early light elastics 可以讓我在之後 慢慢地進展到拉 full Class II, Class III, deep bite, open bite 甚至 crossbite 橡皮筋。

因為可以引導牙齒在適當方向被 extrusion 或是 intrusion, early light elastics 可在 arch leveling 的同時有 輕微的前後向的修正(A-P correction)。 Elastics 最基本 準則就是,在深咬的病例中, elastics 要盡量施力在 buccal segments 的後牙區;而在開咬的病例,則是施力

圖 13 下顎牙齒矯正器的定位 -- 下顎小臼齒

M-D:將 bracket 的軸線置放在牙齒的牙冠長軸 (crown-long axis)上切緣觀的最高點。 O-G:Bracket wings 的切緣對齊近遠心接觸線再稍 往牙齦方向 0.5 mm 處。



且可以更加有效地控制垂直和前後向的改正,也因為可以控制 vertical dimension,我們更可以達成迷人的微 笑弧線 (smile arc)。

圖 16 下顎大臼齒 molar tube 近 遠心的最佳位置,是 molar tube 的頰側溝對齊牙齒的頰側溝。



因為 light elastics 很容易斷裂,而且必須整天戴著 才會有效,因此我會建議病人不論去哪裡都要隨身帶 著足量的橡皮筋。短期戴這種早期的橡皮筋病人並不 會不舒服。有深咬的病人因為前牙有放置 bite turbos, 因此他們在幾個星期內沒辦法用臼齒吃東西,直到後 牙接觸前,他們需要小口小口地吃較軟的食物。 我發 現在治療的早期比較容易鼓勵患者遵從這種 early light elastics 的配戴,並能夠因此達到很成功的治療結果。 告訴患者若全天戴著橡皮筋,將可以省去好幾個月的 治療時間,也證實可以讓他們產生有力的動機來配合 治療。

亞利桑那州的 Dr. Stuart Frost 和我製做了一些有 關於不正咬合在治療過程的不同時期中使用橡皮筋之 基本原則的圖表,讀者若有興趣可以上網查詢 DamonSystem.com / elastics。因為早期的橡皮筋的使用 方法五花八門,我發現若橡皮筋的力量逐漸加大卻保 持相同的長度,對病人而言會是最容易配合的方法, 對醫師而言也會是負擔橡皮筋庫存量最少的方法。

結論

我知道我的矯正器放置方式和傳統有很大不同, 且需要更進一步研究,但經我多年來分析包括我和我 在太平洋大學同事、學生的病例,我已經了解到若要 維持或改善微笑弧線、排齊頰側咬頭、邊緣脊、接觸 點,則需要一個新的矯正器放置方式,而該方式就是 以我在此篇文章中所述為基礎。如同我之前所提到, 我真的很享受 Damon 矯正器直接黏著的藝術性挑戰, 並且已經達到只需重新置位極少數的矯正器,就能以 很高的效率得到極佳矯正成果的階段。 我注意到我在 太平洋大學的學生,同樣也能以極少的重新黏著次 數,來達到極佳的成果。 如果我們要實現我們在專業 方面所謂的卓越,就必須在開始治療時先想好如何達 到最好的結果。



圖 14 下顎牙齒 bracket 的定位 -- 下顎大臼齒 M-D: Tube pad 上的 central buccal tip 對齊牙齒的 buccal groove。 O-G: Tube pad 上的 occlusal edge 放在 M-D 的 contact line 靠牙齦 方向 0.5 mm 處。



台中齒顎矯正學術演講

貝多芬團隊五年回顧與經驗分享



張慧男醫師 新竹貝多芬菌顎矯正中心負責人 中華民國歯顎矯正專科醫師 美國歯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

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Lecture Information

主辦	台中榮民總醫院牙科部 / 協辦 湧傑企業股份有限公司
時間	99年3月14日(日) 8:30~17:00
地點	台中市中港路三段160號1F
	台中榮民總醫院,第一醫療大樓2F視聽教室
報名	請先電話報名,04-23058915 張小姐
費用	3/1前 NT1000,3/1後 NT1500 (費用恕不退還)
	郵政劃撥 17471807, 湧傑企業股份有限公司

Time Schedule

0830 Registration

- 0900 張慧男 Orthodontic Treatment Timing: Why Early Treatment?
- 1020 Break
- 1040 吳致賢 Power up your Vertical Control

自鎖式矯正系統低摩擦,輕微施力的設計,除了提供前移動向以及側方擴大的快速改善。在垂直

控制方面,亦有其卓越的表現。本報告以 Damon 6 Finishing keys 的治療原則,分享如何藉由矯正器黏著位置,Bite turbo 和 Early light short elastics 的搭配,迷你螺絲的使用,乃至於利用口香糖針對後牙 intrusion 和舌頭的訓練,應用在複雜的深咬以及開咬兩種極端病例。

1200 Lunch

1300 黃瓊嬅 "Pseudo" Class II ?

Class II malocclusion 是否真的是一種 "disease" 呢? 尤其是關於 Class II, non-crowded malocclusion 的治療, 拔牙與不拔牙這個議題一直困擾著矯正醫師。我們不應該只是以患者的 "咬合" 而是以"臉形"為出發點來決定治療計劃, 並且必須將患者的年齡與未來的 "Aging" 同時考慮進 去。筆者將在此分享三年來決定拔牙與不拔牙治療計劃的心路歷程與病例報告分享。

1420 Break

1440 張慧男 Tough Cases Made Easy

1600 Discussion



News & Trends in Orthodontics

A JOURNAL OF INTERDISCIPLINARY TREATMENT FOR ORTHODONTISTS



現今的牙科治療是各科統合彙整的時代,協同矯正、植體、牙周、補綴 讓治療成果臻於完美是我們追求的目標。自本期起,加入協同矯正與植牙治 療的文章。此期摘錄南加大主任 DR. ZADEH 、DR. KOKICH演講精華及血 管生成與骨生成的關係三篇文章與大家分享。

Interdisciplinary Relationship Between Orthodontic, Periodontal and Implant Therapy 矯正、牙周與植牙間的科際整合關係

緣起

感謝南台灣牙醫植體學會以及李晃銘醫師的介紹,貝多芬團隊很榮幸能夠在 98 年 12 月 16 日邀請到 南加州大學副教授 Dr. Homa Zadeh,在金牛頓為我們分享他十多年來整合矯正、牙周與植牙治療的臨床 經驗,並由 Dr. 楊即席摘要翻譯。以下是 Dr. Zadeh 當天演講的摘錄,與各位醫師分享。



Fig. 1 Is this "inter-disciplinary" or " multidisciplinary" care ?



Introduction

Dr. Zadeh 自述在學生時代,常覺得牙醫的科際 合作關係,應該只分為 GP (restorative)、Surgeon 與 Lab 而已;但隨著科技的進步與專業的分工,現今 牙醫師手上的病人,常會需要許多專科互相合作才 能達到好的治療效果。如果矯正醫師只作矯正,不 去理會病的牙周狀況;植牙醫師不去理會病人牙齒 的排列咬合,那就只是 "multidisciplinary treatment"(Fig. 1):各科醫師只顧自己的專業部份, 沒有針對病人的需求互相做協調統合。真正的 " inter-disciplinary treatment",是需要以病人的需求為 出發點,各科醫師在經過協調後,相互了解彼此的 專業性,最後達到病人的需求。這也是我們在未來 需要去關注的目標。Dr. Zadeh 以一個牙周植牙醫師 的角度,分享 socket preservation、interdental papilla management 與 PDGF 在實際 case 上的應用 (Fig. 2)。

Socket Preservation

當病人的牙齒已是 hopeless 時,要怎樣診斷及



Fig. 2 IDT

Dr. Homa Zadeh, DDS, PhD Director of the USC Periodontal and Implant Symposium, and the USC Comprehensive Surgical and Restorative Implant Training Program.



處理這種情況為以後的植牙治療作準備 ? 很多情況 下,牙齒在必須被拔除時,周圍的骨頭便已不理想。 在牙齒周圍骨頭不完整時,拔牙後立即植牙並不是一 個好的治療模式。面對這種情形,應該如何處理呢 ? 我們通常會先做 socket preservation 修復這個缺陷。Dr. Zadeh 介紹其中一種術式 : "ice-cream cone technique"。之所以稱之為 ice-cream cone technique , 是因為在拔牙後的 socket 內,放入一個形狀剪得像 ice-cream cone 的 absorbable membrane ,然後填入 graft material。但要注意放入 graft material 之前,必須先把 membrane 固定在 facial side buccal plate 缺損的最底部的 flap 上,以避免放入 graft material 時 membrane 移位; 然後再把凸出的 membrane 折進去,蓋住 graft material。最後把 membrane 固定在 palatal side (Fig. 3)。 使用這個術式的一個前提,就是避免拔牙時翻開 類側的 flap。為什麼呢?因為牙齒周圍的骨頭,主要 的血液循環:一股來自 PDL;另一股來自 periosteum。 拔牙後,PDL 的血液循環就沒有了,此時若再翻 Flap,就會把另一股來自 periosteum 的血液循環也切 斷。因此不翻 Flap,可以保留來自 periosteum 的血液 循環,使 buccal plate 的 bone 仍有血液供應,減少 resorption。

另外建議當拔牙後,要用 curette 完全刮除 socket 內的 granulation tissue,若沒刮除乾淨,便會佔據之後 骨頭生長的空間,bone density 就會變小。要注意 curette 刮除 granulation tissue 時要非常小心,不要傷害 到 buccal plate;有研究指出,在 CT Scan 下觀察 buccal plate 厚度往往不超過 0.5 mm,因此很容易在拔牙中或



欲拔牙位置發現 頰側骨缺損。 將 membrane 修 剪成 ice-cream cone 狀後放入 socket。 Socket 底部縫合 固定 membrane。 填入骨粉。

將 membrane 的 冰淇淋球內折蓋 住 socket。 把 *membrane* 縫 合固定在顎側。





陳建綱 醫師 康軒牙醫診所 貝多芬矯正課程講師



拔牙後,傷害到 buccal plate 造成缺損,這也是我們放置 membrane 在 socket 内的原因:隔離有缺損處的 buccal plate,使軟組織較慢長入,進而使骨頭的 生長較多。

Case I (Fig. 4-5), Ice-ream Cone Technique

一位左上 central incisor 經過根管治療過的病人,描述他只吃了一片麵 包牙齒便斷了。拔牙後檢查發現 facial side 沒有任何骨頭,同時 buccal plate 有 8 mm 的骨缺損;我們將縫線從 socket 底部穿入後,經過 ice-cream cone 狀的 membrane 底端,然後將 membrane 帶入 socket 後固定,再置入 graft material。這個 case 的 membrane 形狀和 Fig. 3 的稍有不同,這是一個 modified ice-cream cone: 沒有凸起的 ice-cream ball;因為這個案例,socket 頂端部份是用軟組織蓋起來。

Facial side 的縫線,對 membrane 的穩定是非常重要的。這是一個 6-0 的顯微縫線(micro-suture)所以臨床照片上不太看得出來。縫線是從 buccal side 進入 socket 內,穿過 membrane 後再從 socket 內穿出到外面固定。所以 只要從外面拉縫線,便可以把 membrane 拉進來。縫線進針的位置要在 crest bone 的地方,因此 membrane 上的尖端(tip)就會在 socket 內;不用縫線的 話,放 graft material 時,往往會因外力,有時是助理拉扯或 suction,造成 membrane 位移。因此這條小小的縫線,對整個過程是有很大的幫忙。

再來就是把 graft material 放入 socket 內。Dr. Zadeh 比較喜歡用顆粒較大 的 graft material,直徑大約在 1 到 2 mm 之間;並且使用 cancellous bone。因 為 cancellous bone 本身有較多的孔洞。用較大的 graft material 和 較多孔洞的 cancellous bone,血液的供應會較好,骨細胞也較容易長進去形成新的骨 頭。放 graft material 時要注意不要太用力擠壓,鬆鬆的即可,使新生的骨頭 有生長的空間。



#21 Root fracture



拔完牙後發現幾乎沒有 buccal bone plate。



將 membrane 修剪成 ice-cream cone 狀後,在 buccal plate 缺 損的最底部穿入縫線然後縫過 membrane 的底端上2-3 mm, 拉線把 membrane 送入 socket 底部做固定。



在 socket 內填入骨粉, 注意不要過度擠壓。

FEATURE NTO 17



蘇筌瑋 醫師 貝多芬矯正課程講師



Socket 另外的開口部份,我們可以從顎側 punch 一塊軟組織,蓋上去縫合起來 (Fig. 4),需 注意當臨時假牙放上去時,它對軟組織是 (passive)沒有施力的。之後大約等六個月後,讓 socket 長好。因為這個病人的 facial bone plate 不 見了,所以等的時間要比一般長很多。如果 socket 有完整的 facial bone plate,通常傷口等待三 個月就可以了。但這個病人 facial bone plate 是缺 損的,必須靠 palatal side 的骨頭慢慢長到 facial side,所以要花比較長的時間。

梁嘉元 醫師

當代牙醫診所

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接下來置入植體;在美觀區的話,大部份 都會置入植體時同時放置另一個 soft tissue graft。 因為第一次放置的軟組織,在癒合後通常會有吸 收。 植體的 abutment 用 CAD/CAM 製 造。abutment 很重要,因為它可以幫忙撐住美觀 區的軟組織。

若拔牙而沒有做 socket preservation,有時會 有很大的骨缺損,這時要再重建,會比拔牙時重 建困難多了,flap 翻開後不但有水平的骨缺損 外,也有垂直的缺損,此時就會需要使用 bone block 來做 bone augmentation。因此理想的情形是 置入植體前,保存足夠的骨頭,再放入植體。





從 palatal side punch 一塊 graft 縫合在 socket 開口。



置入植體。此時通常會需要再放入 第二次的 soft tissue graft。



術後放入 provisional,注意 pontic 底部 要 release 不要碰到 graft。



放入 Zirconium abutment, 幫助撐住周圍軟組織的形態。



術後等待六個月。一般 buccal bone plate 還在的 case 通常只需三個月,



Restoration 置入後一年的追蹤照片。

Ortho-implant Inter-disciplinary Treatment

Case 2 (Fig. 6), Forced Eruption

這是一個前牙有嚴重牙周病的病人。central incisor 有 80% 的 bone loss。重建的方法,當然可以 使用拔牙後 ridge augmentation 的方式,但是可能需 要比較多次的手術;這時可以請矯正醫師做 forced eruption,將牙齒 extrude 同時把骨頭帶下來。要注 意的是:我們要使用很輕的力量,移動量每個月要 少於 1.0 mm。在做矯正治療之前,也必須先做常規 的牙周病治療,在矯正治療期間也要定期回診(約 六個星期)。 源可能是 Pulp。因為在 extrusion 之後必須要修牙, 越修越短後,可能會傷及牙髓造成發炎,進而造成 根尖病變破壞更多的 bone;因此若 occlusal reduction 會修到 pulp 時,就要做 endodontic treatment; 若需 要 endodontic treatment,則只要初步治療並放氫氧化 鈣即可。

另外一個需要注意的是咬合問題,因為牙齒在 移動之後很容易過長,造成 trauma from occlusion, 而這又是另一個破壞骨頭的原因。因此要隨時注意 咬合狀態,並加以適當調整。在牙齒移動到我們要 的位置之後,我們需要 maintain 一段時間,大概需 要維持六個月。

Forced eruption 另外的好處就是軟組織可以一 併拉齊整平,不必經由侵入性的手術,我們就可以



Fig. 6 Case 2, Forced eruption

牙齒在 forced eruption 期間,另一個發炎的來

將 bone level 拉到我們想要的位置。另外上門牙 forced eruption 的過程中要注意施力的方向,儘量能 向下向內,不要造成牙齒向外翻,以避免 buccal plate 的骨頭變薄。

在前牙美觀區要避免將兩支 implant 很靠近的放 在一起,以預防兩支 implant 間骨頭的吸收以及 interdental papilla 的 loss。因此在 Fig. 7 & Fig. 8 病例 中, Dr. Zadeh 選擇 #12, 22 植 implant 中間兩顆 pontic 設計的 restoration。這樣會比放置四顆 implant 更容易 處理 papilla。

為了防止一次拔四顆牙後骨頭吸收的太多,Dr. Zadeh 先拔掉兩顆側門牙,同時利用手術定位板立即 植牙,也立即放置臨時假牙。在立即植牙之後,若要 放置立即臨時假牙,因為它是一個 open socket,要小 心避免材料掉進去影響癒合。Temporary crown 也必 須要注意外型 contour,而且要 highly polished。這樣 牙齦的 healing 才會漂亮。也要注意不要在同一時間 拔除四顆門牙,因為這會引起嚴重的 bone loss。而且 在兩顆立即植牙的 implant 上放置 4 units bridge 也是 行不通的。我們必須移除 provisional restoration 上所 有的咬合接觸,並且避免任何的正中或是側方的咬合 力量。等到骨整合完成後,再將正中門牙拔除,並且 進行 socket preservation。Abutment 部份再同時換上二 氧化鋯材質,並放上 4 units temporary bridge。注意先 不要壓迫 free gingiva graft,六星期再做 ovate pontic 的 soft tissue re-contouring。在正中門牙區保留了 pontic area 再合併分段式的序列拔牙,比較容易塑造出美觀 的 papilla (Fig. 9)。



Fig. 7 Case 2, Forced eruption



Fig. 8 Case 2, Forced eruption





noted.




Fig. 10 Case 3, root proximity

Case 4 (Fig. 11-12), Orthodontic Implant Site Development

Dr. Zadeh 分享了利用矯正治療來處理植牙區域的 case;從臨床照片以及 X-ray 中看到兩側的第一大臼 齒都有缺牙而且 ridge 都有萎縮的情況。治療計畫是利 用矯正方式將下顎兩側第二小臼齒慢慢向遠心移動, 來帶動 atrophy ridge 的骨頭量。

右下的牙橋部份,先把 pontic 切斷以利 #45 移 動,一段時間之後回診,可看到移動的空間裡生長出 了骨頭;左下同樣移動第二小臼齒往遠心,卻發現#35 牙根有嚴重的外吸收現象。最後不得已只好改變治療 計畫,拔除第二小臼齒,放置 bone graft,並於缺牙空 間內植牙。從這個 case 我們可以發現矯正治療真 正 "長"出骨頭,而不是用手術方法 "補"出骨頭, 可以減少手術的複雜性。但矯正治療也要小心避免 complication,以免得不償失。

Case 3 (Fig. 10), Root Proximity

矯正將牙齒扶正可以幫植牙醫師很大的 忙,但有時矯正治療也會留下一些難題;這個 case 利用矯正將 #21,23 撐開後,照了 CT 後卻 發現 #21,23 的牙根仍然沒有分開 root proximity 的問題,會使接下來的 implant 治療 更加困難。這樣的狀況下,就要使用小直徑的 植體,並且照射多種角度的X光片,來確定植 體放在牙根之間,通常這類的 case buccal site 軟組織的厚度會不足,所以大多會搭配 soft tissue graft 來完成這個治療。



Fig. 11 Case 4, orthodontic implant site development



Fig. 11 #35, 45 藉由矯正的方式往遠心移動,可在近心處看到骨生成。但在 #35 的牙根觀察到 *External root resorption* 的現象。

Management of the Interdental Papilla

Case 5 (Fig. 13)

Dr. Zadeh 以 case 5 來作解說, 這病人一個 月前完成 #11 的植牙贋復, 但 #21 卻被他咬斷裂, 此時 Dr. Zadeh 問在坐的醫師有無治療計畫?有醫 師回答將 #21 拔除後再植一顆 implant, Dr. Zadeh 認 為 #21 周圍的骨頭高度是由 #21 牙根本身所維持 的。拔除 #21,整個 bone 都會被吸收掉,所以不管 如何都要盡量留下這一顆自然牙。因此 Dr. Zadeh 在這個 case 建議以 forced eruption 的方式讓牙齒露出 齒槽骨 4 mm,以便有夠的 ferrule 來重建這顆門齒。



將 #35 拔除,可看到 #34 的遠心因矯正移動有生成骨; 而 #37 的近心仍有骨缺損。



在骨缺損區填入骨粉作 GBR。



經過半年重新翻開 flap,可 看到有足夠的骨寬度,植入 #35,36兩顆植體。

Fig. 12 Case 4, orthodontic implant site development



但牙齒做 forced eruption 時, 牙根越拉越細,因此會使 #21 的 emergency profile 顯得纖瘦,而造成 black triangle。

此時 Dr. Zadeh 利用軟組織重建來回復 papilla。在 receipt site, Dr. Homa 以 改良的 tunnel technique,他稱之 VISTA technique (vertical vestibular incision subperiosteal tunnel access)。沿著 frenum 作 vertical incision,然後往 sulcus 的 方向作 tunnel 將整個 flap release 開。donate site 則是從 tuberosity 取一塊 FGG,這個地方的 graft 相較於 palate 處的差別是,它更為 dense,因此比 較不會 shrinkage; Fig. 14 可看到我們從 tuberosity 取出的 FGG 約 5-6 mm, 把 epithelium 去除掉後,分成二等分,然後把 connective tissue 塞進 papilla。這邊有個小技巧要提醒大家:針線先從 sulcus 穿入,沿著 vertical incision 出來後,穿入 connective tissue 然後線頭再尋著vertical incision 回去 到 sulcus,最後只需要頭尾的線一拉,整塊軟組織就輕而易舉的進到我們 要的位置。





接下來臨時假牙的調整, emergency profile 要以不壓到 papilla 為原

則。 #11 和 #21 之間的 contact point 刻意做得比較低,這樣才能維持 papilla 的高度。

這個 case 結合了牙周、矯 正、贗復三個專科,可作為協同 性治療很好的例子; Dr. Zadeh 表 示這個 case 如果 #11 不是植體的 話,也許不需補牙肉,只需透過 矯正將二顆牙齒拉近即可改善 papilla。



Fig. 13 Case 5, interdental papilla



Root Coverage

Case 6 (Fig. 14)

Dr. Zadeh 用這個 case 來介紹如何使用 VISTA tech. 作 root coverage;當考慮如何解決 gingival recession 時,有 三點考量要注意,第一,找出 CEJ 的位置。第二,找出 MGJ,看看還有多少的 attached gingiva。第三,要看牙齒 齒頸部的外型。

手術一開始我們必須先把 resin 去除,讓 CEJ 回復 正確的位置;接下來在 recipient site 處,沿著 frenum 切垂 直切口,然後用 elevator 或是 gingival knife 在 periosteum 底下作 full thickness 將 #13 ~ #23 的 flap 游離剝開形成一個 tunnel,只剩下 papilla 處沒有切斷; donate site 是從上顎 palate 取出 connective tissue graft,將 graft 塞入 flap 內之 後,將 flap coronal position 到 CEJ 的位置。

傳統我們可以利用 suspend suture 把 flap 做 coronally positioned 。而 Dr. Zadeh 做了一個小改變,將線 用 resin 固定在牙齒表面,這樣就可以簡單的把 flap 做 coronal position,而不須將縫線繞過牙齒當 anchorage。

VISTA techique 與一般傳統的 Root coverage 術式 最大的差別是:一, vertical incision line,因此與牙肉中微 血管的走向平行,所以不會破壞 flap 內的血液供應。二, 作 tunnel 時翻 full thickness,將 graft 放到骨膜的下方。











Fig. 14 Case 6, VISTA technique

Platelet-Derived Growth Factor (PDGF)

接下來的幾個 case, Dr. Zadeh 使用血小板衍 生的生長因子 Platelet-Derived growth Factor (PDGF) 配 合之前介紹的術式來治療前牙牙齦萎縮。

先約略介紹什麼是 PDGF: 血液裡面有紅血 球、白血球跟血小板,在血小板中有很多生長因子, 其中最重要的,我們稱作 Platelet-Derived growth Factor (PDGF), PDGF 有促進骨細胞增生、膠原蛋白生成 以及加速 bone healing 的作用; 1992 年 Dr. Matsuda 等 學者研究多種 PDGF 對於牙周韌帶纖維母細胞的影響。使用了包括 rhPDGF-AB (recombinant human Platelet-Derived Growth Factor AB)、rhPDGF-BB 與 natural PDGF-AB,發現讓細胞行有絲分裂反應最明顯 的是 rhPDGF-BB。在 1995 年 Dr. Park 等對狗進行研 究發現,將 rhPDGF-BB 放置於臼齒牙根叉侵犯處, 合併使用再生膜,過了八週在組織切片中不但可以看 到 new bone 的產生,也可以觀察到 PDL 的形 成。2003 年 Myron Nevins 等對九位病人,15 個牙周 骨缺損以及 molar Class II furcation defect 的部位放入 DFDBA 以及 rh-PDGF-BB,九個月後組織切片中觀察



Fig. 15 摘錄自 Myron Nevins et al, JP 2003; 74: 1282-1292

到根叉部位有 periodontal regeneration,出現 new cementum、 PDL、bone 完整的 periodontal attachement apparatus (Fig. 15)。

Rh-PDGF-BB 在 1997 年通過美國 FDA 核可,目前已經有商品化在美國販售,但是台灣尚未進 來,Dr. Homa 所使用的產品名稱為 GEM 21S (Fig. 16),是一種 Dental Bone Grafting Material with Growth Factor,由組織生長因子 recombinant human Platelet-Derived Growth Factor (rhPDGF-BB),及合成骨材 Betatricalcium phosphate (B-TCP) 所組成。手術置 GEM 21 s 入後,PDGF 會從 B-TCP 釋出,吸引 cementoblasts, fibroblast, osteoblast 幫忙 new bone, PDL, new cementum 的牙周再生。GEM 21 s 除了可 用來修復牙周骨缺損外,Dr. Homa 也將這個材料使用在 gingival recession,後面會繼續介紹。



GEM 21S® Growth-factor Enhanced Matrix was developed utilizing innovative tissue engineering principles which combine a bioactive protein (highly purified recombinant human platelet-derived growth factor, rhPDGF-BB) with an osteoconductive matrix (beta tricalcium phosphate, β -TCP).



After implantation, PDGF is released from the β -TCP matrix into the surrounding environment. PDGF then binds to specific cell surface receptors on the target cells initiating a cascade of intracellular signaling pathways.



PDGF-induced intracellular events lead to directed cell migration or chemotaxis and cell proliferation or mitogenesis of osteoblasts, periodontal ligament fibroblasts and cementoblasts.



Proliferation of osteoblasts, periodontal ligament fibroblasts and cementoblasts lead to increased matrix synthesis, resulting in formation of new alveolar bone, periodontal ligament and cementum. Angiogenesis (blood vessel formation) continues.

Case 7 (Fig. 17), #11, 21 Root Coverage

以這個 case 為例, #11、 21 有 recession, Dr. Zadeh 在 vestibular 處沿著繫帶作垂直 切線,作隧道從 incision site release 到 sulcus,過去的 術式是從 sulcus 往上作 tunnel,但是這樣相當容易破 壞 buccal site 的 flap,造成 laceration。這個方法比較 簡單和快速;當 flap release 後,我們將 recession 的 牙根表面修順並使用 EDTA 作表面的 root conditioning,然後放入 collagen membrane 到骨膜下 面,為了不讓 flap 後縮,flap 使用 horizontal suture 將線頭用樹脂固定在牙冠上,flap coronally advanced 後固定好後,沿著垂直切線將 membrane 翻起來一 點,再塞入 bone graft,最後垂直切線作縫合。在 這個的術式中,最重要的是要完全 release buccal flap,使 flap 能夠 passively 的自由移動,這樣才能 夠把 flap position 到我們要的地方,在 release 的過 程中,會 extend 到 papilla 的下緣,但是要注意絕對 不要破壞或切斷 papilla。

Case 8 (Fig. 19), #43, 44, 45 Root Coverage

這 case 是 Dr. Zadeh 在 2005 年第一次使用 VISTA technique 治療 #43 到 #46 多顆牙齒部位 recession 的臨床圖片,作 tunnel release flap 後,沿著 vertical incision 處塞入 collagen membrane,然後置入 骨粉,這個 case flap 的縫合是在每顆牙齒上使用 sling suture 作 coronal 的 position,最後是 3 年後追蹤 的照片,仍有相當不錯的治療效果。

Case 9 (Fig. 21), #41 Root Coverage

第三個 Case 是 soft tissue augmentation combine orthodontic treatment,當 Dr. Zadeh 接到這個 病人的時候已經是矯正快要結束的階段,可以看到



Clinical data suggests that over time (approximately 6 months), maturation of supporting alveolar bone, cementum and periodontal ligament occurs. The end result is enhanced bone and periodontal regeneration and retention of the natural tooth.



The goal of using GEM 21S® Growthfactor Enhanced Matrix is to restore normal esthetics, anatomic form and function. Fig. 16 GEM 21S 商品介紹,摘錄自 http://osteohealth.com/GEM21S.aspx





#11, 21 recession



將 graft material 從 vertical incision 處放在 membrane 的後面。



沿著 frenum 作 vertical recession 的牙根表面刮 incision, release labial flap 到 #11, 21 sulcus。 做表面處理。



horizontal suture 在 #11, 21 並將 *flap coronal position*, 然後將線 頭以樹脂固定在牙冠上。



Fig. 18 Case 7, root coverage with VISTA tech. and graft material



#43, 44, 45 recession °

沿著 frenum 作 vertical incision, release flap 到 sulcus。



放入 collagen membrane。



#43, 44, 45 sliding suture, 將 flap coronal position。 沿著 vertical incision 處在 membrane 的後面放入骨粉。



術後一週。



術後三年追蹤。

Fig. 19 Case 8, root coverage with VISTA tech. and graft material



放入 collagen membrane。

#42 缺牙而 #41 有 recession, #41 過去有做 過一次 free gingival graft 但沒有成功,治療 計畫是在 #42 放入植體, #41 作 root coverage。從 CT 中我們可以看到骨頭缺損 的形態,並在要種植植體的部位我們可以 取縱切面測量該區骨頭的唇舌徑厚度,確 定 #42 有足夠的厚度可以放置植體, 然後 做 surgical stent 決定植體的位置與角度,手 術中從上顎取了 CT graft, 植入 implant 後 在 recession 處放 graft,圖片可以看到 flap coronal position 並且用 horizontal suture 固定 在矯正器上,最後將 provisional 放上去。

Conclusion

跨領域的科際整合已經是目前牙科 的趨勢, Dr. Zadeh 認為,所謂的 interdisciplinary approach 應該是要以病人為出發 點。另外各科針對病人的需求彙整出一份 治療計畫,而不是在治療後,遇到問題才想 說要如何尋求專科來解決,minimal invasive surgery 術式的發展,也是希望帶給患者或 醫師更簡單,更輕鬆的治療理念,在這邊 提出來跟大家分享。

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#14 牙齦萎縮,在 #13 近心作垂 直切線。



CT graft 或 collagen membrane 被帶入 flap 底下,如果需要,在 membrane 底下放置 graft material。



萎縮區用 horizontal suture 並將線 頭用樹脂固定在 #14 的牙冠上,讓 buccal flap 作 coronal position。



用 elevator 翻 full thickness 作 tunnel 到 #14。



將 CT graft 或 collagen membrane 以 縫針固定尾端,將線帶入 sulcus。



垂直切線處作縫合。

Fig. 20 VISTA technique demonstration



CT可看到 #41 buccal site 的 骨缺損。



縫線固定在矯正器上,將*flap* 往 *coronal position*。

Fig. 21 Case 9, root coverage with VISTA tech

Interdisciplinary Treatment (Part III) Determine the responsibility for periodontal problems

Summary of Dr. Kokich's farewell lecture in Taiwan

许 多接受矯正治療的成人患者都有牙周病的問題,有些由一般牙科醫師治療,有些則是由牙周病專科醫師或者矯正醫師治療。矯正醫師治療的患者族群多為孩童或青少年,這些年輕的患者較不用擔心牙周病的問題,因為大部分的牙周致病菌都以侵犯成人為主,只有一種特殊的菌種(A.a.)會造成青少年的 aggressive periodontitis,所以青少年較不會有 bone loss 的問題。另外,青少年的牙齒大多都沒有磨耗,牙周組織健康,因此 incisal edge 和 marginal ridge 會和 bone level 平行,所以矯正醫師可以利用 incisal edge 和 marginal ridge 會和 bone level 平行,所以矯正醫師可以利用 incisal edge 和 marginal ridge 為 guideline 去 排列牙齒;但相對的,成人矯正患者通常都有牙周的問題,因此成人患者的治療目標是要 level the "bone",才 能夠維持牙周健康。對於有牙周病的成人矯正患者,需要考量到幾個問題,包括要如何正確的決定 bone level ?如 何決定正確的牙齒位置?在 team work 中該如何、又由誰來治療這類的患者?是要先矯正,利用矯正來 "level the bone",還是該先做牙周治療?如果要先做牙周治療,又該用什麼方式來治療,矯正治療又該何時介入呢?

首先我們需要了解有哪些 osseous defect。在2001年台灣學者提出一篇研究¹,本篇研究中涵蓋了137名中等到 嚴重程度的牙周炎患者。共分析 3542 顆牙,1376 顆牙利用手術方式檢查,發現其中 483 顆牙有 bony defect,有 bony defect 的機率是 35%。本篇研究發現,前後牙出現 bony defect 的機率不同;後牙區出現 bony defect 的機率比 較高。而其中在第一大臼齒及第二大臼齒之間的 interproximal area 出現 osseous defect 的機率較高。Defect type 的分 類中 interproximal crater 是最常出現的 osseous defect 形式,佔 26.50%; circumferential bone loss 次之,佔 23.40%; 接 著是 three-wall defect,佔 20.08%。

以下會介紹五種形式的 osseous defects, Dr. Kokich 認為, 在診斷及治療不同形式的 osseous defect 之前,必須 先了解以下四個問題:

- 1. Name the defect •
- 2. What perio treatment needed ?
- 3. Can orthodontics fix the defect?
- 4. When can ortho be started ?



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56 歲 8 個月女性²(Fig 1.), Class I malocclusion, deep bite, lower crowding。當 GP 醫師進行 charting 時發現在 #16 的 distopalatal 有 7 mm 的 pocket depth, 並有 bleeding on probing 的現象; 那麼, 在 charting 時出現 bleeding on probing, 是否就代表有 active disease? Dr. Kokich 並不這麼 認為, BOP(+) 可能是和引起蛀牙的細菌有關, 如 Streptococcus mutans 或 Streptococcus sanguis 這些細菌囤積造 成 supragingival plaque, 它們製造了一些會引起牙齦的發炎 反應的產物, 導致 active gingivitis, 因此有 BOP(+) 現象。

1. Name the defect

Interproximal region 是由四個 bone wall 圍成,分別是 distal、mesial、buccal 和 lingual。所以根據這個 charting 表,這個區域只剩下兩個 wall (buccal 和 lingual walls),所 以稱作 two-wall defect,又稱作 interproximal crater (只剩 buccal 和 lingual wall)。根據 crater 深度不同可再分成 shallow crater 和 deep crater。

這種 two-wall defect 可以用什麼樣的方式治療呢?我們 需要考慮三個問題:

2. What perio treatment needed ?

牙周治療有三種可能的治療方式如下:

a. Scaling and root planning:這種方式不能解決這個 case 的 bony defect 問題,因為 buccal 跟 lingual wall 會干擾牙線 和 curette的操作。



Defect 1 charting

- b. Regenerative surgery: Deep crater 的 case 因為 buccal 及 lingual wall 都很完整,補 bone graft 較不會流失,因此比 較適合這種治療方式;但這個 case 是屬於 shallow crater,故不適合這種治療方式。
- c. Resective surgery: Shallow crater 的 case 適合用 resective surgery 做一點 osteoplasty 以方便患者維持清潔,故這個 case 採用這個方式治療。
- 3. Can orthodontist fix the problem ?

答案是不行,不管是 intrusion 或者 extrusion 都沒辦法改善這個問題!!如果在矯正前沒有先做牙周治療,這類 deep crater 會因為清潔不好操作而導致 periodontal breakdown 更快,因此必須在矯正前先進行 periodontal therapy。

4. When can ortho. be started ?

因為考慮到患者的年齡已經 56 歲,為了提昇 ostoeblast 活性,所以建議在牙周治療後六個星期開始矯正治療,並 定期每三個月做牙周回診。這類牙齒在矯正時為了方便患 者清潔,建議最好不要用 Band 而是用 direct bonding 的方式 以減少 plaque retention。



Defect 2

57 歲女性² (Fig. 2), 左上 678 跟左下 578 都 missing, severe mandible retrusion, Class II occlusion, spacing。在矯正治療之前發現 #36 的 mesiobuccal 處有 7 mm 的 pocket depth, BOP (+)

1. Name the defect: 根據 charting 表顯示只剩下 mesial wall,所以是 one-wall (hemiseptal) defect,另外 X 光片 可以告訴我們喪失了多少 attachment,正常成人從 CEJ 到 bone level 的距離是 2 mm,患者 #36 CEJ 到 bone 的距離 是 5 mm,所以共有 3 mm 的 attachment loss,目前這個 case 因為有 active disease,並不適合立即開始矯正治療。 2. What peio treatment needed?

單純的 Scaling/root planing 無法解決這類問題;這類 case 因為只剩下一個 wall,若進行 Regenerative therapy 也無法





Defect 2 charting



hold 住補進去的材料;而 Resective surgery 對這類 case 而 言太 destructive,因此都不適合。這類患者在牙周治療中 屬於 "Maintenance patients" !! 只能定期 scaling / root planing 來維持牙周狀況。

3. Can orthodontist fix the defect?

Yes !! 可以將 molar 往後推, 往後推之後會出現 space, 再利用假牙方式去 replace; 或者做 molar uprighting + protraction。對患者來說 molar uprighting + protraction 可 以減少假牙的費用,所以選擇molar uprighting + protraction,再利用 extrusion 的方式去改善 bone defect 的問題。這類 case 在進行矯正治療時要特別注意的是 要 "Keep the mobility out of the tooth" !! 因此我們必 須進行 aggressive equilibration,隨時將 occlusal interference 去除。

但是針對 mesial tipping 的牙齒該如何 bonding bracket 呢?舉個例子(Fig. 3),患者#15 & 17 missing,□ 內看到 #18 有 mesial tipping,在沒有 perio. breakdown 的 case 中一般是參考 tooth anatomy,通常第一個放上的矯 正器是 first molar 的 bracket,之後再參考第一大臼齒去黏 其他顆牙齒的矯正器。但是當牙齒有大型的補綴物或有 bone level discrepancy 的問題時,則建議使用 X 光片當 bonding 的參考基準。X 光片上可看出 #16 有明顯 mesial



tipping, 且在 mesial 跟 distal 有 one wall bone defects, 我們要做的應該是"level the bone",而不是"level the teeth"。

1. Place ideal bracket first:因為要 level the bone,本 case 最 ideal 的位置是 #14,所以第一顆要 bonding 的 牙齒是 #14

2. Measure the bone level difference: bone level的差異就 是兩顆牙齒 bracket 位置差異的參考,本 case #14 和 16 bone level的差異,決定了#16 mesial bracket level。

3. Determine long axis:以X光片上牙齒 long axis 的走向當參考,甚至可在口內用鉛筆標出牙齒長軸。

4. Place bracket perpendicular: 將 brackets/tubes 垂直牙 齒長軸放置。

5. Equilibrate occlusal:在 level the bone 時,通常會造成某些地方 occlusal prematurity,在咬合的過程中那些地方會先接觸到,造成牙齒有明顯 mobility 而導致 periodontal breakdown 更快,所以要修掉那些點。



59 歲 4 個月女性³ (Fig. 4),在左下 canine 的 labialdistal 有 8 mm 的 pocket depth,且BOP(+)。

1. Name the defect: 根據 charting 表, labial wall 跟左下 canine 的 distal wall 都 missing,只剩下 lingual wall 跟左下 first premolar 的 mesial wall,所以這是個 two-wall defect。

另外可以從 X 光片上得知這個 bone defect 的 etiology 是 iatrogenic 所造成的,#33 牙根靠近 distal cervical 的地方有修補 root perforation 的材料。

2. What peio treatment needed?

Scaling and root planning 跟 regenerative therapy 都沒辦 法解決患者問題:若選擇 resective surgery 的話,就必須移 除 lingual wall 跟 #34 的 mesial wall,會移除較多的骨頭, 且會破壞到 #34 的 periodontal attachment。因此以上三種牙 周治療方式都沒辦法解決患者問題。

3. Can orthodontist fix the defect?

可以藉由 extrude #33 來改善 bone defect,但是 lingual wall 跟 #33 的 mesial surface 的 bone 被 extrude 後,需要藉 由 resective surgery 去做 bone recontouring 將 bone level 降 低,以改善因為 orthodontic extrusion 造成的 reversed architecture,並在 buccal side 補 Free gingival graft。像這類 病例在 Bonding bracket 時要參考 bone level 的差距 (而非 marginal ridges)去 bonding,而且在 ortho開始 extrusion 前 要先預做 occlusal reduction,以避免 extrusion 時premature contact 造成太大的 mobility 而導致 periodontal breakdown。

#32

3 2

L 3

3

В

Defect 3 charting

#33

3 3 ² 88 3

3,883,

#34



Defect 4

58 歲 1 個月女性² (Fig. 5), #36 的 distal buccal 有 9 mm 的 pocket depth, BOP (+)。

1. Name the defect : 根據 charting 表, buccal wall、lingual wall 跟 #37 mesial wall都在, #36的distal wall喪失,所以這是一個 three wall defect。

 What peio treatment needed? 若單純只有 Scaling and root planing 的話,患者不易維持 three-wall defect 的清潔。若是 Resective surgery 的話,要將三個 wall 的 bone 都拿掉,會太 過於 aggressive。Three-wall defect 因為有足夠的 bone wall 去 hold 住 bone graft,適合做 regenerative therapy。

3. Can orthodontist fix the defect?

單純矯正治療沒辦法改善問題。

4. When can ortho. be started ?

原本 Regenerative surgery 六個月後才能開始進行矯正 治療,提供 regenerative material 足夠的 healing time;但是這 是位 58 歲的患者,細胞的turnover rate 比較慢,可以利用 "tooth movement" 的方式來刺激 osteoblasts 的 turnover rate。這理論似乎會引起大家的疑慮,但是在 2003 年有學 者提出的研究中⁴,使用四隻狗,利用人為的方式形成被 perio pathogens 感染的 three-wall defect,之後再做 GTR,一 個月後開始將牙齒移動到預定的位置,再將牙齒拔下來去



#36 #37 2 2 В 3 29 4 3 3 3 29 4 L 2 2

Defect 4 charting

做組織切片,實驗結果顯示重新生長的 cementum 和骨頭約 有 70~80%,上皮細胞往下生長的速度反而比較慢。結論 就是在 GTR 之後,牙齒的移動會提升 regeneration 的速 度。

所以本 case 在 GTR 六週後即開始進行矯正治療,藉 由 tooth movement 來刺激 osteoblasts 跟 fibroblasts 的活性。 這個 case 會遇到的另一個問題是 #36 有一個很大的 amalgam restoration,直接 bonding 矯正器會容易脫落,而 banding 可能會造成清潔上的困難。Dr. Kokich 建議可以用 No. 35 inverted cone bur 在 amalgam 車出 undercut,在 undercut 上面補 resin, bracket 就 bonding 在有 resin 的區 域。一年後的 x-ray 追蹤發現,和 original 的 defect 比起 來, bone regeneration 的量大約有 70-80%。



Defect 5

61歲3個月女性³ (Fig. 6),口內情形為 Class I crowding,在 lower anterior teeth 的 charting 顯示只有 3~4 mm 的 pocket depth, BOP(-),表示患者可以 maintain 這區域 的清潔,沒有 active disease,從 X 光片上可以看到 #31 41的 bone loss,有嚴重的 periodontal breakdown。

1. Name the defect: Circumferential defect,或者可稱作 horizontal defect。

2. What peio treatment needed? 這位患者 maintain 得很好,並不需要額外其他的 perio treatment。

3. Can orthodontist fix the defect?

因為 #31 & #41的 bone support 很少,但是 lower anterior area 有 crowding,不適合利用 flare out 去 gain 空間。故希望藉 由拔除左下正中門齒去改善 crowding 問題,做完 diagnostic wax up 後發現咬合還不錯,所以建議患者拔除左下正中門 齒。之後的 bracket bonding 不能用 incisal edge 做基準去 bonding,因為 #33 到 #43 的 bone level 是平的,跟著 incisal edge 高度去 bonding 的話,會形成 vertical bone defect (#32 & #41會被 intrude,而 #33 & #42 會被 extrude)。有些醫師對於 這樣的說法不以為意,因為根據 Dr. Melsen 的研究結果顯

示, intrude 牙齒時會有 reattachment。Dr. Kokich 提出 case report 來証實 response of alveolar bone to tooth intrusion in humans, 一個 54Y3M 女性有 deep bite, 拔除 #41去解决 crowding 的問題, intrude下顎前牙去改善 deep bite的問題, 後來下顎前牙 intrude 的量有 3 mm,而 vertical dimension 没 有改變,從根尖片的 bone level 來看,治療前的 bone level 距離 CEJ 約 2 mm,如果 Melsen 的理論是對的,那治療後 的 bone level 應該要在CEJ 之上,但是治療後的根尖片顯示 bone level 距離 CEJ 約 2.5 mm。另外 Dr. Kokich 在 2008 年 也提出了一篇研究5, 實驗方法是有 43 個受測者, 平均年 齡 45 歲,incisor intrude 的量平均是 2.29 mm,利用X光片去 證實確實有 intrusion, 並測量 bone level 的高度。實驗結果 顯示,在 intrusion 的過程中,相對於 CEJ level, bone level 會跟著往下降。回到 case 本身,先做 #32 及 #41 的 occlusal adjustment, 之後再根據 bone level 的高度去 bonding bracket,矯正治療結束之後在 #32 及 #41 之間出現了dark triangle,最後一般牙科醫師做了 #32 及 #41 的 veneers 來改 善 dark triangle 的問題。



References

- The prevalence and distribution of bone defects in patients with moderate to advanced periodontitis. Chang Gung Med J 24:423-430, 2001
- 2. Vincent G. Kokich. Chap. 57 Adjunctive Role of Orthodontic Therapy
- 3. Vincent G. Kokich and Vincent O. Kokich. Chap. 28 Orthodontic Therapy for the Periodontal-Restorative Patient
- Movement of periodontally effected teeth after guided tissue regeneration : An experimental pilot study in animals. J Orafac Orthop 64, 224-227; 2003
- Using orthodontic intrusion of abraded incisors to facilitate restoration : effect on bone levels and root resorption. J Am Dent Assoc 139: 725-33, 2008

All New Damon Q

Ø

amon System 自上市以來不斷地改革精進,從早期第一代、第二代到近年的D3MX,整體的作業系統已發展臻成熟階段。但是好還要更好,針對病患的舒適度、醫師的操作簡便度以及達成 finishing 完成度的提升,邀請您一同鑑賞最新推出的DamonQ。

Passive SL Technology with Spin Tek Slide

除保留最重要的 passive ligation 原則之外, Damon Q 在開關蓋子的設計上有突破的發明。使用新的 open tool 只要塞入閘門旋轉 90 度

就可輕鬆地打開矯正器 (圖一),完全克服了 之前 D3MX 在醫生操作 不當下可能劃傷病人軟 組織的缺點,更重要的 是這樣的旋蓋技術幾乎 不會震動牙齒,可為病 人帶來更高的舒適感。



Fig. 1 Spin Tek slide

Four Solid Walls with Chamfered Slide

在原始設計中矯正器的 slot 是以四個 solid wall 環繞 (圖二),新的設計則將開關面的上緣直角稍稍改變成 chamfered angle(圖三)。這個小小的改變使得關閘門的 動作更簡單輕鬆。



Fig. 2 4 Solid wall



Fig. 3 Chamfered slide

Small Size Profile

新一代 Damon Q 對病人的另一項福音就是:尺寸變 小!不僅厚度(bracket profile)與 D3mx 相比減少了 9%,高度(occlusogingival)更減少了13%。除了整體尺 寸變小,所有的邊角也變的更圓滑,讓病人的異物感大大 減低(圖四)。



Fig. 4 Size reduced in both M-D and O-G with rounded corner

Dual Auxiliary Slots

Damon System 在發展 Early Light Short Elastics 之 時, 在 D3MX 上加了 vertical slot 以方便置入 drop in hook 來勾橡皮筋(圖五)。新的 Damon Q 除了延續此設

計(但須注意尺寸不 同: D 3 M X 為 0.0185X0.0185,而 D a m o n Q 為 0.0165X0.0165),另 外又加上了一 0.0165X0.0165 的水 平 slot。此設計可使 用於 double wire 的 technique(圖六)。



Fig. 5 Vertical and horizontal slots



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Fig. 6 Double wire technique

Removable Positioning Gauge

由於強調前牙美觀以及 bonding position 的重要 性,新一代 Damon Q 特地在前牙區域的矯正器加上了輔 助的 positioning gauge (圖六)。除了可以清楚地對照牙 齒長軸之外,此 gauge 更附有高度刻度(圖七),使醫 師了解 slot 到 incisal edge 的距離(圖八),顏色區別則

與 torque 一致:High torque 紅 色,Low torque 綠色,Standard 則是 藍色的 gauge。操作上要注意的是多 了此 gauge 之後多餘的 bonding cement 變的較不易清除,所以務必請 助理擠適量的樹脂、不要多餘。另外



Fig. 7 Positioning gauge

bonding 完成之後以 mosquito 夾住 gauge 的十字型交叉 處輕輕扭轉拆除即可。

在矯正器的角度上新一代 Damon Q 也有明顯的改 變。為了彌補 archwire 在 slot 中因為 "play"所損失的 torque, Damon Q 提供了新的 Super torque 以取代 D3MX 的 High torque: Standard 的角度也與之前的 D3MX 不 同,尤其上顎 canine 從 0° 改成 +7° 改變最為明顯。新的 Low torque 除了角度更小之外,上顎前牙也改成含 canine 也有 Low torque 的選擇(表一)。從矯正器 Torque 的諸多改變也反映了廠商願意製造更符合臨床需 求的產品來提高治療效率與品質。



Fig. 8 Distant marks

		1	2	2	;	3	4.	/5	6	7
Maxillary	D3	DQ	D3	DQ	D3	DQ	D3	DQ	SL	Ti
High/Super	+17	+22	+10	+13	+7	+11	-	-	-	-
STD	+12	+15	+8	+6	0	+7	-7	-11	-18	-27
Low	+7	+22	+3	-5	-	-9	-	-	-	-
	1	/2	;	3	4	1	ţ	5	6	7
Mandibular	1 D3	/2 DQ	: D3	3 DQ	D3	t DQ	D3	5 DQ	6 SL	7 Ti
Mandibular High/Super	1 D3 -	/2 DQ -	D3 +7	3 DQ +13	D3 -	DQ -5	D3 -	5 DQ -	6 SL -	7 Ti -
Mandibular High/Super STD	1 D3 - -1	/2 DQ - -3	D3 +7 0	DQ +13 +7	D3 - -12	DQ -5 -12	D3 - -17	5 DQ - -17	6 SL - -28	7 Ti - -10





Modern Orthodontic Office Design ~ Part II



Light

一般醫師在裝潢診所時考慮光源多半只有想到治療椅上 的 dental light 夠不夠亮,是不是自然光...等。殊不知在整體 光源的考量中,還隱藏了許多學問。首先要先認清牙醫師的 眼睛不是永遠都盯著強光照射的口腔區域,還會看向助理、 家長、工作枱面、電腦螢幕等等,所以我們要先將光源 分成工作光源 (Working Light)及環境光源 (Ambiant Light)。顧名思義,工作光源就是指病人口腔環境,而其它 所有範圍皆屬於環境光源。區分這兩種光源有何重要性呢? 是的,在1960年代就已經有醫師提出牙醫師常見的職業傷害 包括了眼睛的問題 (Eye strain),造成原因不是因為長期看 亮物所致,而是在亮與暗的環境中不斷切換,而導致眼球肌 肉 的 疲 勞,所以環境光源與工作光源的對比 就顯得相當重要,而 Kilpatrick 提出工作光源比環境光源不 得超過 10:1 的原則,之後 Coper 等人在 1990 年的研究更 是提出最適當比例應為 3:1。

既然了解了環境光源的重要性,在診所設計中就須考量 諸如牆壁的顏色、天花板的高度等會影響整體的環境亮度的 小細節。在光源的選擇上,1990 年 Dr. Hamula 在 JCO 中一 篇專題討論,也給我們許多建議。首先 Dr. Hamula 認為傳統 牙科治療椅上的 dental light 並不適合在矯正診所使用,原因 有三:1. 在 open bay 的 design 中顯得沒有秩序不整齊。2. 增加需要調整的麻煩。3. 易交叉感染,不易做好感控。換言 之,Dr. Hamula 認為在矯正診所的光源需求中,並不需要強 而獨立的工作光源,而是要加強環境光源。除了可以使二者 比例接近 3:1,還可以避免強光照在金屬矯正器上所產生 的眩光。

日光燈是公共空間照明常見的選擇,但是完全使用日光 燈來加強環境光源也有它的問題:1.全白光太過亮眼。2.會 產生熱,增加冷氣需求。3.會產生電磁,長期影響健康。文 獻中建議使用在矯正診所的光源是金屬鹵素光燈,它是一種 屬於 HID (high-intensity discharge)的光源,意即將電能高 效率地轉變為光能,少部份轉為熱能。而且金屬鹵素光燈的 另一個好處是隨著時間增加,它的輸出量也不會減少。所以 雖然一座鹵素光燈比起一支日光燈所需的電能較大,但是與



Fig. 1 整體光源考量



Fig. 2 工作光源與環境光 源比例過高



Fig. 3 金屬鹵素燈為主日光燈為輔的光源設計



徐玉玲 醫師 安徒生兒童牙醫診所負責人 貝多芬矯正課程講師

能提供的光能以及長期的衰變程度比較之下,金屬鹵素光燈是節能及 更有效率的光源選擇。總結來說,對於矯正診所的光源設計建議如 下:

- 1. 選擇 250 watt 的金屬鹵素光燈 (視空間需求決定數量)。
- 可從天花板加裝高度較低的光源 (金屬鹵素光燈或日光燈皆 可),因為天花板較高時(即距離較遠),照度需求會提高。
- 利用日光燈增加環境光源時最好加罩,並且每 6 個月更換燈 炮。
- 4.利用窗戶來提高被動光源(即自然光),並且在安排診療椅方向時將此因素考慮進去。
- 5. 牆壁、天花板及地板的顏色盡量選擇淺色。
- 如果一定需要 dental light 的話,應該控制在 1000 fc (footcandle, 呎燭光,指每英呎距離內之照度)以下。

Brushing Table

刷牙枱是矯正診所裡一定要具備的一個場所,除了養成病人看牙 前要先刷乾淨的習慣之外,更是可以強調診所對於口腔衛生的重視。 如果可以的話,刷牙枱越多越好,因為不但可以分散病患,不致有擁 擠的感覺,刷牙枱的大面鏡子更可以有衛教的用途。

Stand-Up Consultation

顧名思義就是站立式的諮詢方式,內容舉凡教刷 牙、牙線使用、帶橡皮筋或維持器...等等,都可 以請病患站在鏡子前由助理協助説明且讓病 患立即練習。所以,除了刷牙枱的鏡子之 外,在診所的柱面上也可貼上大面鏡來製 造 Stand-Up Consultation 的空間。如此一 來病患佔用診療椅的時間相對減少,在配 合前一期所提的 Open Bay 及 On Deck 的觀 念,對於病患流量大的矯正診所而言,使用 診療椅的"翻桌率"就大大提升了!





Fig. 5 刷牙枱

Fig. 6 站立式諮詢



Dr. Warren Hamula

Fig. 7 柱面貼鏡



2010 Newton's A Implant Forum 金牛頓植牙論壇

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- ◆時間:2010年每月底週五 早上9:00-12:00
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 黃思涵小姐

現在的牙科治療已經是各科統合彙整的時代,協同矯正、植 體、牙周、補綴讓治療成果臻於完美是我們追求的目標。

金牛頓植牙論壇邀請您一起迎接「協同性整合」的新牙 科時代,讓我們從植體與矯正的對話出發,透過整合各科精 華,締造集美觀、功能於一身的全方位治療。



透過精讀八篇結合矯正與植牙觀點的經典文章,並運用深入的 個案分析討論,讓醫師們能快速掌握植牙與矯正,以達成完美 治療的目標。

Neurona 2010 Implant Forum

			Implant Fe 9:00 ~ 10	Interdisciplinary Treatment Planning 10:45 ~ 12:00					
	日 期 (W5)	臨床導論 主講者 張慧男	臨床祕訣 病例分析		講師		精選文章分析		
1	02/26	臨床導論	無菌觀念 [,] 手術基本觀念 植體設計與贗復組件介紹			上珍	Inter-relationship of Ortho, Perio, Restorative Dentistry		
2	03/26	臨床導論	引導骨再生及齒槽骨保存 王			肖龍	Fundamental Treatment Planning		
3	04/30	特別演講 講師 黃怡豪醫師 / 主持人 張慧男							
4	05/28	臨床導論	植體的矯正考量			瓊嬅	Forced Eruption		
5	06/25	微創手術操作	植體的軟組織處理		歐	亦焜	Ant. Esthetic 1		
6	07/23	特別演講 講師 謝尚廷醫師 王國華醫師					/ 主持人 張慧男		
7	08/27	臨床導論	前牙美觀區的植體考量		Ŧ	肖龍	Ant. Esthetic 2		
8	09/24	臨床導論	上顎竇升高術		邱上珍 F		Inter-implant Papilla Consideration Peri-implant Architecture Preservation		
9	10/29	特別演	特別演講 講師 吳碧礽醫師 / 主持人 張慧男			特別	J演講 講師 楊家華醫師 / 主持人 張慧男		
10	11/26	臨床導論	3DCT應用與手術模板製作		歐亦焜		Save Tooth ! or Ext ?		
11	12/31	臨床導論	六個植牙補綴物常見的盲點		方	景亮	Establish Occlusal Scheme		

實作課程:1. 植牙模型操作2. 微創手術操作(依學員需求另行安排時段,費用另計)

植牙論壇主要講師群

歐亦焜,王肖龍,黃瓊嬅,邱上珍 醫師 補綴顧問:方景亮 主任

參考書籍

Interdisciplinary Treatment Planning Contemporary Implant Dentistry 3rd, Misch 特別外賓











吳碧礽醫師

王國華醫師

謝尚廷醫師

楊家華醫師

黃怡豪醫師

Feedback from the Visit of the Beethoven Orthodontic Center

I am very grateful to find a true treasure in orthodontics, Dr. Chris Chang. Not many treasures are shared, but Dr. Chang is always willing to share his secrets about his orthodontic knowledge. His presentations are top notch and his passion for teaching is never

ending. Thank you Dr. Chris Chang for being my mentor in orthodontics.

Dr. Samuel Lee (left), private practitioner in LA, USA Dr. Lee is the leader in dental implants and orthodontics. He is currently lecturing worldwide on his innovative techniques. He is the keynote speaker in many dental conferences throughout the world, and has published many journals in dentistry.



Feedback from the Beethoven Advanced Course



參加精修班後,非常感動,你非常成功帶動學生們,不但做好基本功,把臨床記錄做得非常完美,且教他們非常有效地利用 Keynote 做生動活潑的 presentation。感謝你大大地提高國內牙醫界的 presentation 水平,且讓有志學 Ortho 的一般 GP 可以有非常好且有效 率的學習地方。聽到韓國名醫將邀請你去韓國開 Keynote 課,真為你 為國爭光而感到驕傲!

關於個別牙齒之 torquing spring, 以前只會 routine 去做,卻沒想到 rounding 之重要步驟,非常感謝這麼清楚地解說,以後我也可以正確 做個別牙之 torquing 了! 非常驕傲身為 NTO 部份作者之一,感謝你和 高老師這麼用心投入,把 NTO 發行編輯成世界級之矯正刊物,看了 你 ABO cases 之精彩完美,我都只能謙卑地多學習了!



林錦榮醫師



Feedback from Keynote Workshop

從事植牙治療十年,上過無數國內外知名講師的課,雖因此 吸收了不少專業植牙知識與技術,卻對講師良莠不齊的表達方式 感到無奈,期許自己不要成為令人唾棄的講師。參加了張醫師的 Keynote 課程,縝密的演講架構,精彩的演説技巧,搭配 Apple 完 美的 Keynote 演繹,令人大開眼界,也讓我的演講備受好評,張 醫師的 Keynote 課程 "Slide 優美,邏輯無懈可擊,演説技巧不 凡,而且很便宜",您一定要親自前來研習。

常常聽別人演講,大師級的演説很精采因為他的臨床 case 多,令人目不暇給。但是到了下午因為生理時鐘再加上燈光情境 的關係,常常還是不敵瞌睡小蟲。聽別人說一生一定要聽一次張 慧男醫師的演講,很高興有這次機會參加講習,我們這些大哥大 嫂團員一人一機,聽完張醫師唱作俱佳的一段演説後,講解剛剛 的 magic 是如何做到的。再學 5-10 分鐘實地做一次,給人最深刻 的記憶,笑聲不斷,叫人想要打瞌睡也難。不斷的練習才能將短 暫的記憶變成長久的記憶,為了保存最新鮮的記憶,課後也順便 帶一台電腦回去練功。希望不久的將來,我也可以將自己的理念 想法能更完整的呈現給大家。

經由昇基公司的推薦,我將原本星期四一整天的排診病人改約,從台北去到新竹上張醫師的課。果然是不負所望,生動活潑的上課方式,張醫師的教學團隊結合電腦,演說,一步步教授大家最受歡迎的簡報技巧。學問本事很重要,但如何將它有效傳授給有心向您學習的學員呢? Keynote 高效簡報課程值得介紹給您。





歐亦焜醫師 UCLA植牙碩士課程結業 NYU植牙專科醫師 台灣植體學會專科醫師 群盛牙醫診所院長



陳美琦 醫師 家園牙醫診所



<mark>廖登漢</mark>醫師 台北市紐約牙科



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 News and Trends in Orthodontics.

LECTURER: Dr. Chris Chang

ABO certified orthodontist and president of the Beethoven Orthodontic Center, Dr. Chang received his PhD in bone physiology and Certificate in Orthodontics from Indiana University in 1996. As publisher of News & Trends in Orthodontics, he has been actively involved in the design and application of bone screws.



The visit to Beethoven and Newton's A center of this time was really an eye-opening experience for me in many ways. Among others, what impressed me the most was the confidence of staff members at work. Of course. it must be the consequence of a superb office management system. A lot of time and effort must have been poured in to establish the current status, which is well rewarded. Being



Dr. Tomio Ikegami, Japan (middle) President of the Japan MEAW Technique and Research Foundation

inspired by the visit to Hsinchu, I have come back to my office with several new ideas to improve my own office system.

It was also a fun to get acquainted with some new friends from Thailand, Malaysia and Vietnam. Thank you very much for the wonderful and refreshing 2 days. I want to return some day with my staff members to show them how efficient an orthodontic office can be. OrthoBoneScrew and Damon workshop includes two half-day lectures, two halfday chair-side observation sessions, one model practice and one case discussion session. Cost: USD 1,200

Next dates:

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Keynote Presentation workshop includes a total of 6.5-hours of lecture and handson practice, focusing on improving your professional communication skills. The workshop will use Macintosh computers and its native presentation software, Keynote 09. Cost: USD 300

Contact: Ms. Huang thhuang@newtonsa.com.tw

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類型	課程名稱	内容	開課日期	上課對象
入門推廣	Mac OS X 蘋果電腦新手入門	Mac OS X	2/20, 3/6(六) 15:00~16:00	樂於嘗試生活科技應用者
入門推廣	iWork系列: 簡單上手的多媒體簡報	Keynote	2/27, 3/13 (六) 15:00~16:00	樂於嘗試生活科技應用者
入門推廣	iWork系列: 整理表格數據的好幫手	Numbers	3/20(六) 15:00~16:00	樂於嘗試生活科技應用者
入門推廣	iWork系列: 製作個人化的印刷品	Pages	3/27(六) 15:00~16:00	樂於嘗試生活科技應用者
入門推廣	iPhone 3GS 新手上路	iPhone+iTunes	2/7, 3/7(日) 15:00~16:00	樂於嘗試生活科技應用者
入門推廣	iLife系列: 輕鬆剪輯精彩生活影片	iMovie+IDVD	3/ 14(日) 15:00~16:00	樂於嘗試生活科技應用者
入門推廣	認識蘋果世界裡的超好用小軟體	影音轉檔軟體	2/21, 3/21(日) 15:00~16:00	樂於嘗試生活科技應用者
入門推廣	iLife系列: 管理美好生活影像	iPhoto	2/28, 3/28(日) 15:00~16:00	樂於嘗試生活科技應用者
專業簡報	Keynote簡報法 series 1 簡報聖經	1. 常見簡報謬誤 2. Keynote 入門	7月1日(四) 09:00~17:00	科技人、醫師、 教師、學生
專業簡報	Keynote簡報法 series 2 Kokich的10大演講秘訣	1. 多媒體影像處理 2. 簡報設計	7 月 29 日 (四) 09:00~17:00	科技人、醫師、 教師、學生
專業簡報	Keynote簡報法 series 3 How to Wow'em like Steve Jobs?	1. 賈伯斯演講秘訣 2. 簡報設計進階應用	3 月 18 日 (四) 09:00~17:00	科技人、醫師、 教師、學生
青少年	魅力推甄Apple Camp	1.備審資料準備 2. 面試準備	2.6(六) 10:00~17:00	國、高中生
International	Damon and OBS workshop	1.Damon System 2. OrthoBoneScrew	5.18-20, 8/14-16, 12/7-9	Int'l Orthodontists

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Dr. Samuel Lee attended Beethoven Advanced Course on 12.29.2009