

# NEWS & TRENDS IN ORTHODONTICS

Jan. 1 Vol. 13 2009

A new method of placing Orthodontic Bone  
Screws in IZC

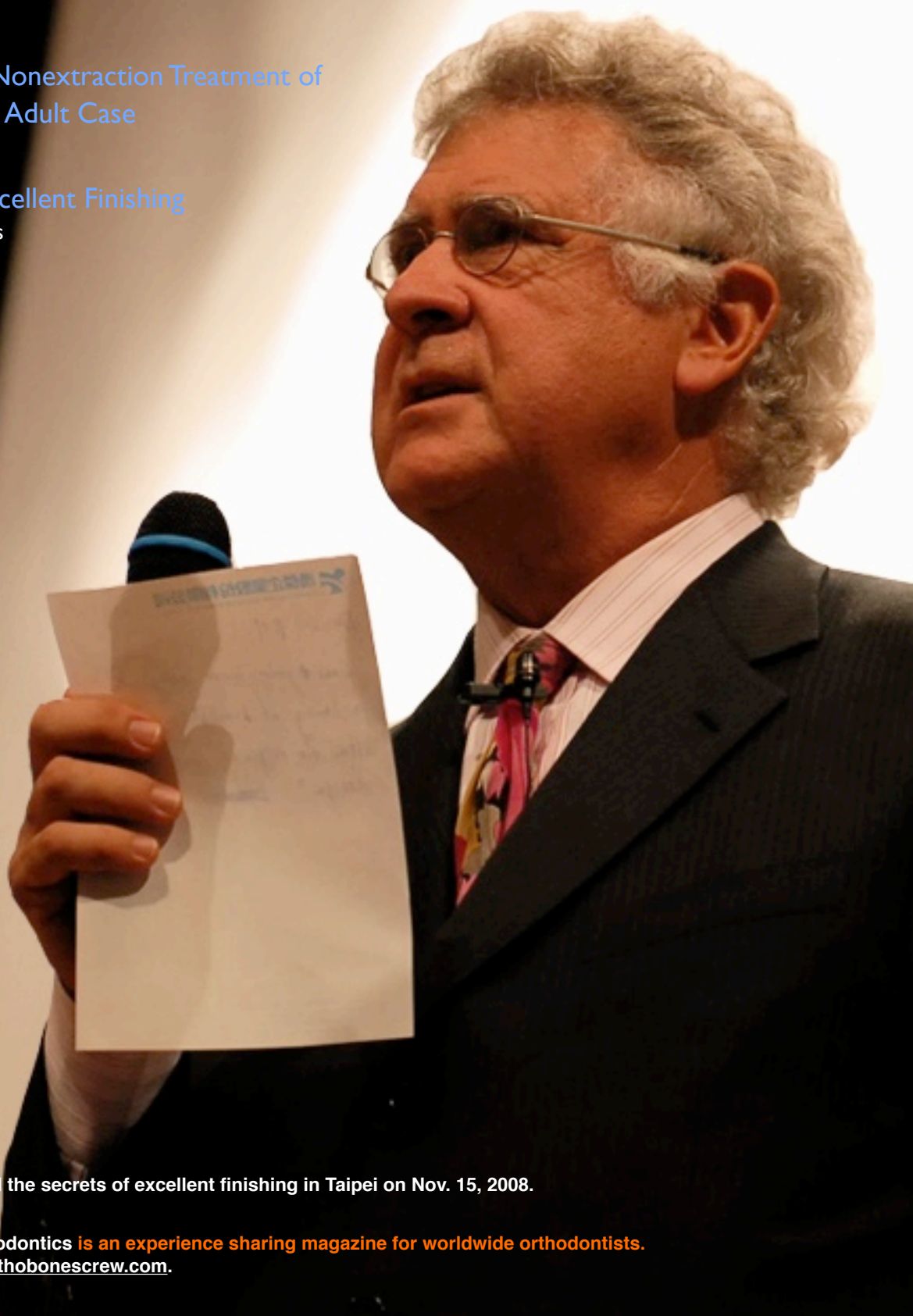
Dr. John Lin

Nonsurgical and Nonextraction Treatment of  
a Skeletal Class III Adult Case

Dr. Etsuko Kondo

The Secrets of Excellent Finishing

Tips from Dr. Tom Pitts



Dr. Tom Pitts presented the secrets of excellent finishing in Taipei on Nov. 15, 2008.

News & Trends in Orthodontics is an experience sharing magazine for worldwide orthodontists.  
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## 學會開始做矯正需多久?

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

用最短時間、最輕鬆的方式，讓每位學員：**熱愛矯正學、熱愛學矯正**



## 2008 ...已開課

### 矯正基礎

	高雄 (四)	台北 (日)	LECTURE	LAB
1	09/25/08	11/23/08	理想入門病例 + Damon黏著	Bonding (D3MX) + BT
2	10/09	12/21	快速矯正療程四部曲	Ceph + Photo
3	10/16	12/28	簡捷有效的錨定系統	Damon + OrthoBoneScrew I
4	10/23	01/11/09	不拔牙與拔牙分析	Damon + OrthoBoneScrew II
5	11/06	01/18	Damon診斷流程及微調	Finish Bending
6	11/20	02/15	完工檢測及報告示範	Fixed Retainer (FR)
7	12/04	03/01	維持及復發：病例示範	Presentation Demo
8	12/18	03/15	矯正力學及診斷分析 (1)	DDX + Case Reports I
9	12/25	03/29	微力秘訣及診斷分析 (2)	DDX + Case Reports II
10	01/08/09	04/12	病例示範及診斷分析 (3)	DDX + Case Reports III
11	01/15	05/17	病例示範及診斷分析 (4)	DDX + Case Reports IV

### 矯正進階

	新竹 (二)	高雄 (四)
1	09/23/08	09/25/08
2	10/07	10/09
3	10/21	10/23
4	11/04	11/06
5	11/18	11/20
6	12/02	12/04
7	12/23	12/25
8	01/06/09	04/09/09
9	03/10	04/23
10	03/31	05/14
11	04/07	05/21

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



### 診所實習課表

1. Initial Consultation
2. Initial Record (Pano + Ceph + TMD + Photo + Model)
3. Final Consultation & Tx. Plan
4. Banding & Bonding (黏瓷牙、金牙、智齒、埋伏牙、舌側維持器)
5. Archwire Adjustment & Bending
6. Refire & Power Chain & Clinical Tips
7. De-banding & De-bonding
8. Retainer (Removable & Fixed)
9. OrthoBoneScrew Implantation
10. Assistant Training & Patient Instrument Selection
11. Orthodontic Material & Instrument Selection
12. Practice Management & Office Design

## 2009 ....全新開課

### 矯正植體

床頭診及實作示範。法與實習、個案討論、矯正植體的操作時機、植

### 矯正基礎

	高雄 (四)	新竹 (二)
1	05/14/09	05/19/09
2	05/21	05/26
3	06/04	06/02
4	06/18	06/16
5	06/25	06/23
6	07/09	07/07
7	07/16	07/14
8	07/30	07/28
9	08/06	08/04
10	08/13	08/11
11	08/27	08/25

## 課程資訊

課程項目	時段	上課地點
矯正基礎	台北 / 高雄 / 新竹 【課程】09:00 - 12:00 【實習】另外安排	台北 圓周教育學苑 / 台北市南昌路二段216號8F (古亭捷運站2號出口)
矯正進階	新竹【課程】09:00 - 12:00 高雄【課程】14:00 - 17:00	新竹 金牛頓藝術科技公司 / 新竹市建中一路25號2F
矯正植體	新竹【課程】09:00 - 12:00 (含中、晚餐) 【實習】13:30 - 20:00	高雄 科學工藝博物館S104教室 / 高雄市三民區九如一路720號
International workshop	新竹【課程】All Day	

International Workshop  
• Keynote & management  
OrthoBoneScrew & Damon

03/02 - 03/05/09



*Change is all we need*

Last month, I received an email from Dr. Tom Pitts. He shared with me his excitement of converting to Apple. He wrote, "It will be a learning curve and take some time, but life is a journey." Dr. Tom Pitts, a 68-year-old orthodontic master, is willing to make a complete switch from PowerPoint to Keynote in his digital presentation. Such a change takes not only time, but most importantly, courage.

We all have heard about those life-turning changes people make in their lives. When we try to follow these examples and aren't quickly rewarded, we might end up feeling worse. The problem, of course, is not that change is impossible, but that it does not come easily. It takes years for the most important change to be made.

In this issue we will feature Dr. Pitts' lecture in Taiwan in November. Dr. Pitts' approach to the Damon system is quite different from the way you may have known. This may not seem easy to follow, especially the way he positions the brackets. However, it has proven to be one of the best quality and most efficient.

Major changes in life will not be finished in one day, but it can certainly start today. If a 68-year-old master has the courage to make such changes in the digital field, why should I have second thoughts in doing so in my orthodontic practice?

*Chris Hwai-Nan Chang, DDS, PhD, Publisher*



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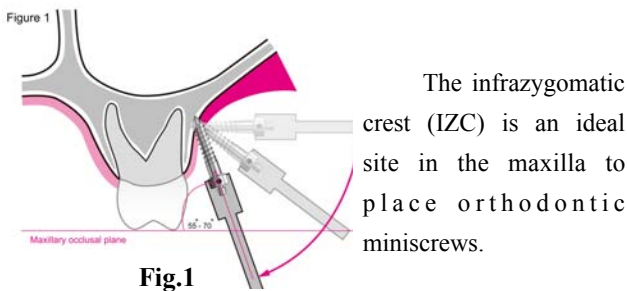


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# A New Method of Placing Orthodontic Bone Screws in IZC



**Fig.1**

IZC is an area of cortical bone at the zygomatic process of the maxilla. It is a palpable bony ridge running along the curvature between the alveolar and zygomatic processes of the maxilla. In younger patients, it is located between the maxillary second premolar and first molar, whereas it is above the maxillary first molar in adults.

Liou's computed tomographic study ( reference 1 ) of the IZC placement of screw over the mesiobuccal root of the upper first molars suggested that insertion of orthodontic bone screws in the IZC for adults should be at the 14 to 26 mm above the maxillary occlusal plane and the maxillary first molar, and at an angle of  $55^{\circ}$  to  $70^{\circ}$  to the maxillary occlusal plane. ( Fig.1 )

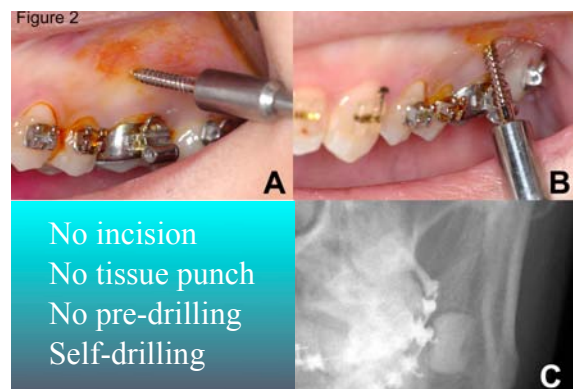
The author followed the referenced guide line and used a 2 mm x12 mm stainless steel orthodontic bone screw. At first the orthodontic bone screw was inserted perpendicular to the bone surface to about 1 to 1.5 mm deep over the mucogingival junction around mesiobuccal root of the upper first molar. Then the author changed the orthodontic bone screw's direction at an angle of  $55^{\circ}$  to  $70^{\circ}$  to the maxillary occlusal plane before drilling the orthodontic bone screw into the IZC bone region. The strength and sharpness of the stainless steel orthodontic bone screw requires neither incision nor tissue punch. Self-drilling is sufficient. ( Fig.2 )

Clinically the author observes the IZC bone over the mesiobuccal root of upper first molars is quite thin in many cases. Recently cone beam CT images have shown that the buccal bone over the mesiobuccal root area of the upper

second molar is much thicker than the buccal bone over the mesiobuccal root area of the upper first molars. Both a patient's CT ( Fig.3 ) and a dry skull with part of the sinus wall removed ( Fig.4 ) can confirm such a finding. The cone beam CT images study ( reference 2 ) of Chen also provided a favorable proof. So nowadays the author prefers to place orthodontic bone screws in the IZC area over the mesiobuccal root area of upper second molar, instead of first molar.

From a clinical case ( Fig.5 ) we can see a 2mm x12mm stainless steel orthodontic bone screw was placed over IZC above the mesiobuccal root of upper second molar. The PA cephalometrics showed the orthodontic bone screw was away from the root. From the panoramic radiograph it revealed the orthodontic bone screw was over the mesiobuccal root of upper second molar. The cone beam CT image suggested a 2mm x 12mm orthodontic bone screw made a good bicortical engagement. The tip of a orthodontic bone screw just penetrated about 1mm into the sinus. ( Fig.5 )

This is a case ( Fig.6 ) that a 2mm x 10mm orthodontic bone screw was placed over the right upper edentulous area. After placing the IZC orthodontic bone screw, the patient complained about sinusitis on the right side and was diagnosed by an ENT doctor. The author suspected it was caused by the insertion of the screw. For a more thorough



**Fig.2**



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

diagnosis, the author sent the patient to have a cone beam CT taken. The result showed the short 2mm x 10 mm orthodontic bone screw provided only mono cortical engagement, without touching the sinus wall at all. When tracing back the patient's past history, it turned out she has suffered chronic sinusitis. The latest sinusitis occurred simply coincided with the IZC placement of the orthodontic bone screw. From the panoramic view of the cone beam CT it clearly showed radiopaque shadow on the lower part of the sinus. ( Fig.6 )

Regarding soft tissue, the author try to limit the placement of the IZC orthodontic bone screw only over attached gingiva zone. On Fig.7, the zone of attached gingiva is quite narrow on the right buccal size of the case C. After placing the orthodontic bone screw, the head would almost touch the buccal tube which made it impossible to distalize the whole upper dentition. The case A, B and the left buccal of the case C all have enough attached gingiva for the IZC placement of the orthodontic bone screw.

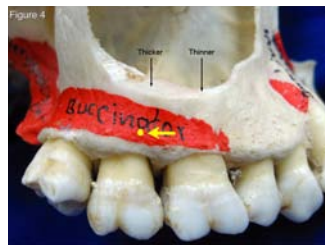


Fig.4

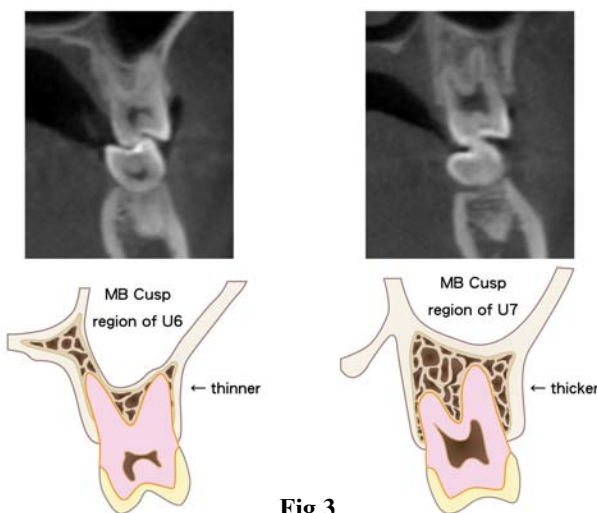


Fig.3

The upper case of Fig.8, a 16-year-and-3-month-old female came for treatment. Her soft tissue had enough attached gingiva, but the orthodontic bone screw became loose and failed in one week. The cone beam CT found out the sinus floor was very low. Even though it's a bicortical engagement, the engagement was only about 2~3mm on the solid bone wall. No wonder it failed. ( upper Fig.8 )

The lower case of Fig.8 was a 29-year-2-month-old male patient. A similar case of the same IZC orthodontic bone screw with only around 2~3mm bicortical engagement. However, the orthodontic bone screw stayed in place for more than 6 months and distalized the whole upper arch.

When comparing the two cases ( Fig.8 ), it clearly showed that a bicortical engagement only needs 2~3mm on a mature adult bone. However, if the patient was young and the bone was not mature, then it'd be easily result in failure. These two cases also demonstrated that the perforation of sinus wall happened quite often. However, as long as the aseptic procedure was performed during screw placement, one should not worry about sinus perforation by the orthodontic bone screw. We can observe similar successful results from mini-plate fixation of the sinus wall on Le Fort I cases on the orthognathic surgery patients.



Fig.5

Even though we can place IZC orthodontic bone screw over mucosa easily, but it is usually not ideal in the long run. In this case ( Fig.9 ) the orthodontic bone screw was placed over mucosa region. Two months later, soft tissue piled up due to the movable mucosa around the screw head. As time went on the screw head became totally embedded in the soft tissue and caused severe cellulitis.

Sugawara's study ( reference 3 ) the distalization of the whole upper arch showed the distal movement of the crown by 3.78mm and the root by 3.2mm with the use of min-plate system. Liaw's study ( reference 4 ) on the whole upper arch distalization revealed the distal movement of the crown by 2.8mm and the root by 1.4mm with the IZC placement of the orthodontic bone screws. Even though the amount of distalization seems less in the orthodontic bone screw group, clinically it is a very useful adjunct ( see reference 5.6.7.8.9 ) The mini-plates are not only more expensive but also involve quite a comprehensive surgery. Patients have to suffer from severe pain, swelling and a removal surgery afterwards. Comparing to mini-plate, the orthodontic bone screw is a very simple procedure. Orthodontists don't have to refer to other specialists to perform this easy and economical procedure. In conclusion the new IZC placement (over mesiobuccal root of upper second molars) is a very useful clinical adjunct.

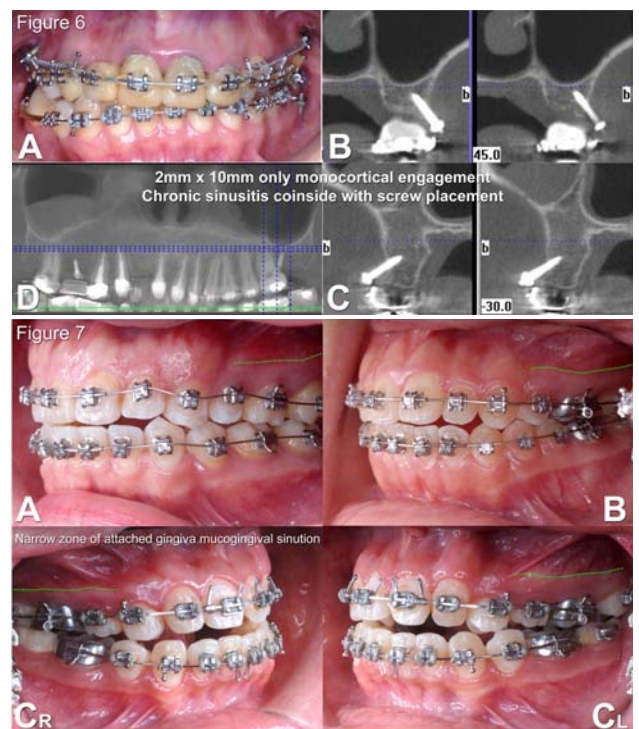


Fig.6、7

### Summary of the new IZC placement:

- It's outside of the root area. Unlike inter-radicular placement, the size has to be limited to 1.2mm~1.5mm. Instead using a 2mmx12mm stainless orthodontic bone screw for bicortical engagement avoids root damage and caused almost no fracture to the screw.
- It can be as an excellent anchorage unit as inter-radicular placement of orthodontic bone screws.
- It's much better than inter-radicular placement of orthodontic bone screw for distalization of the whole upper arch.
- The 2mx12mm stainless steel orthodontic bone screw requires neither incision nor tissue punch. Self-drilling is sufficient.
- IZC placement over mesiobuccal root area of upper second molar is better than over that of the upper first molars.
- Better be placed over the attached gingiva area.
- Contra indicated for patients of a very young age and with low sinus floor among the roots of maxillary molars.
- Using about 10~12oz (or 284-340gm ) to distalize the whole upper arch. An excessive force will result in failure!

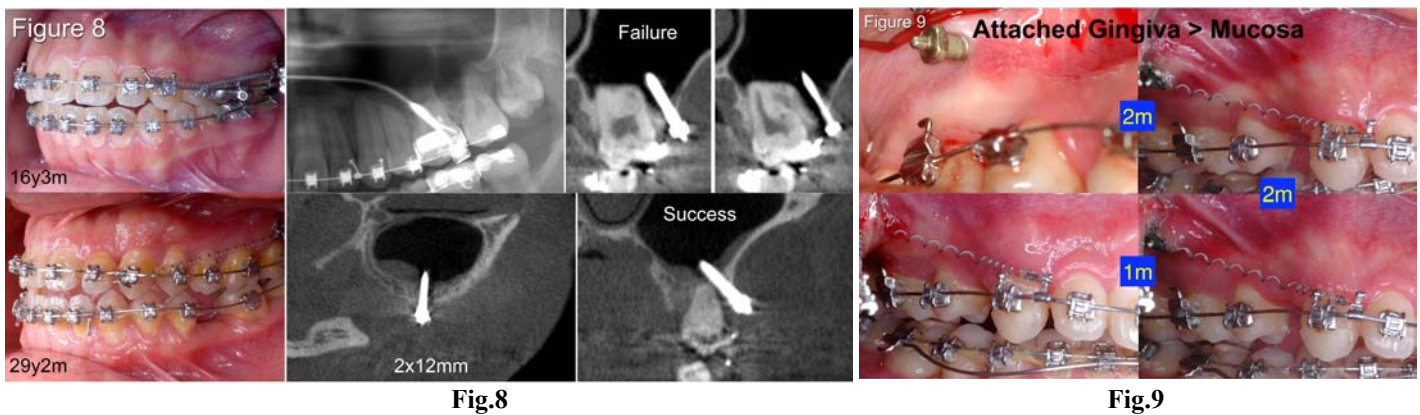


Fig.8

Fig.9



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# Nonsurgical and Nonextraction Treatment of a Skeletal Class III Adult Case

## The patient

A 19-year-old Japanese female came in our clinic for consultation. Her chief complaints included anterior cross bite, speech and chewing dysfunction, dished-in face and TMJ symptoms. She appeared in good health with no contributory medical history.

The patient has hereditary Class III malocclusion from her mother. She presented a long-lower facial height and a concave profile. Her upper lip appeared short and tight with flattened lower lip.

## Diagnosis

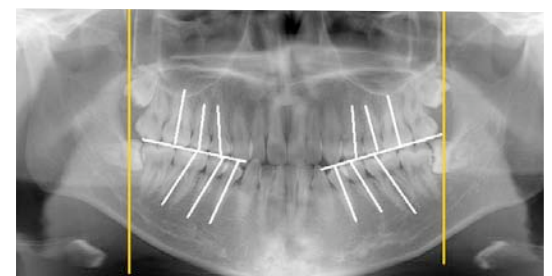
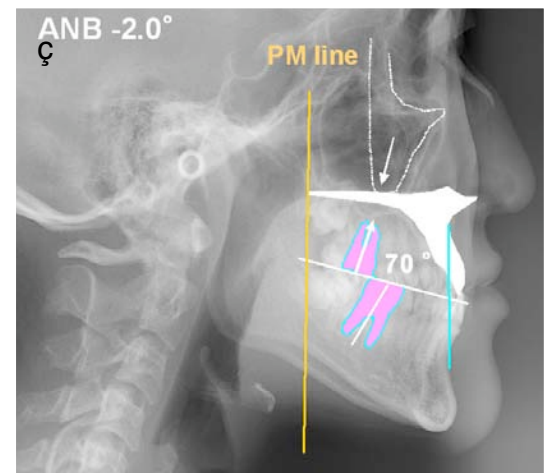
The cephalometric analysis indicated this was a case of skeletal Class III malocclusion. The maxilla was retruded (SNA;  $76.0^\circ$ , MEAN;  $81.5^\circ \pm 3.1^\circ$ ). The mandible was in an average position (SNB;  $78.0^\circ$ , MEAN;  $78.2^\circ \pm 3.1^\circ$ ).

The patient also had a narrow maxillary dento alveolar arch, causing occlusal interference in the posterior area. The intra-oral examination revealed that the tongue was unable to lift up to reach the palate. She also had habitual anterior placement of the tongue with mouth breathing.

The mandibular posterior teeth were mesiolingual tilted, creating an excessive posterior vertical occlusal dimension (ANS-PNS to GoGn;  $30.0^\circ$ , MEAN;  $26.3^\circ \pm 6.3^\circ$ ) and mandibular rotated open (SN to GoGn;  $43.0^\circ$ , MEAN;  $34.5^\circ \pm 6.1^\circ$ ). According to these findings, this skeletal class III malocclusion combined with TMD symptoms had been aggravated by functional and environment factors as well as growth, development and genetic factors. Therefore, the form and function of the joint may be adversely affected in skeletal class III malocclusion by the structural and functional asymmetry.

## Treatment Plan

A treatment plan was made to treat this malocclusion only orthodontically with Damon 3 brackets and reshaping of the maxillary and mandibular dento-alveolar arches. The expansion of maxillary arch was assisted by use of removal palatal expansion plate. The reshaping technique aimed to restore harmony and function of the tongue, perioral, and chewing muscles. Such procedure could also reestablish the proper functions of nose



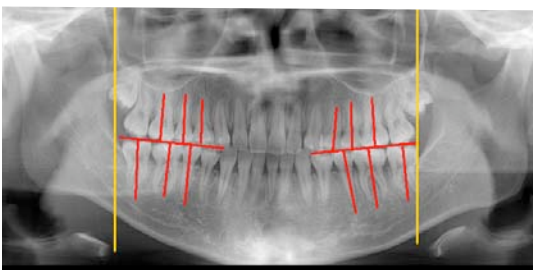
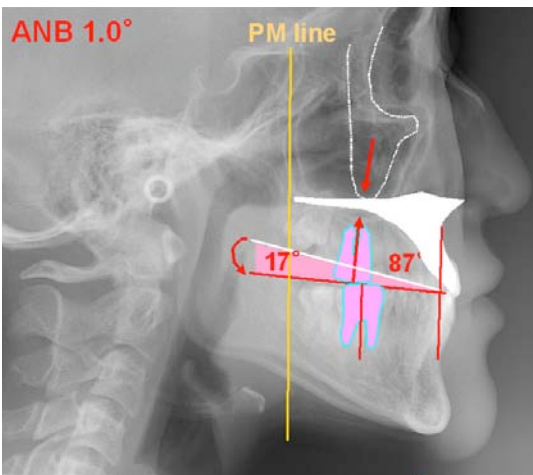
	wits	SNA	SNB	ANB	GoA	SN-GoMe
Pre	-9.0	76.0	78.0	-2.0	126.0	43.0
Post	-3.0	76.5	75.5	1.0	126.0	42.5

Fig 1. Pre-treatment ( 19Y8M ) 2007.02.07





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 Editorial Board for the World Journal  
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 Author of “ Muscle Wins ! Treatment  
 in Clinical Orthodontics ”



Pal.P-GoMe	∠ - SN	T̄ to GoMe	T̄ to DC-Li	F.Occp-AB	O.J.	O.B.
30.0	95.5	88.0	99.0	70.0	0	0
29.0	100.0	80.0	98.0	87.0	1.5	2.0

Fig 1. Post-treatment ( 20Y11M ) 2008.05.31

breathing without extraction or surgical intervention.

The total active treatment time was 14 months. Begg type and tooth positioner was adopted for retention. Appliances used included the followings : Damon 3 brackets, removal maxillary expansion plate, lift up tongue training with chewing gum.

### Discussion and Summary

This case was skeletal class III malocclusion with complicated maxillary and mandibular dento-alveolar arch form disharmony, abnormal tongue behavior, mouth breathing and TMD. This case , which was originally classified as a surgical case by other orthodontists, was successfully treated solely orthodontically by uprighting and intruding mandibular posterior teeth to reconstruct the functional occlusal plane.

As a result, this case was treated without pushing the patient to receive extractions or surgical therapy. These revealed that the key factors of occlusal improvement were creating a favorable environment, reshaping the dento-alveolar arches and creating adequate tongue space to open the air way and to establish nasal respiration with effortless lip closure. Therefore, functional recovery that restored the harmony of the tongue, perioral chewing muscle activities and the creation of normal nasal breathing are the best way in achieving successful treatment during short active treatment time. Especially for the skeletal class III malocclusion cases, a low friction brackets with light force wire is necessary to stimulate the functional recovery. Light force and low friction system cannot offer optimal torque expression for all teeth. If such appliance is used to correct the malocclusion, we need additional force to create torque. Therefore, the best way to achieve functional recovery during treatment is by using light force and low friction brackets. The light force and low friction system needs additional forces generated by tongue, perioral, masticatory and neck muscle functions. Thus, the normal nasal respiration and normal swallowing pattern can be achieved with the lip closed effortlessly.



*Pre-treatment ( 19Y8M ) 2007.02.07*



*Start of treatment ( 19Y9M ) 2007.03.10*



*8 months into active treatment ( 20Y5M ) 2007.12.01*



*10 months into active treatment ( 20Y7M ) 2008.02.09*



*Post-treatment ( 20Y11M ) 2008.05.31*

*Active treatment time : 14 months*

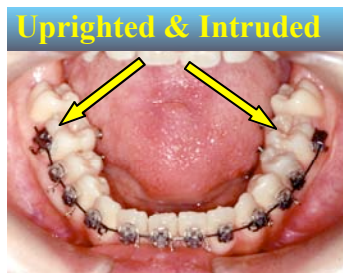
**Fig.2:** Intra-oral photographs from pre-treatment to post-treatment



Class III molar and canine relationship with 0 mm overjet and overbite. The tongue was unable to be positioned up to the Mx. dento-alveolar arch. The patient also showed habitual anterior placement of the tongue and mouth breathing. These created a narrow Mx. arch with posterior cross bite, causing interferences in the posterior area and TMD.



Active treatment was started with Damon 3 brackets and removable Mx. expansion plate, in conjunction with short class III and canine triangle elastics.



The Max. dento-alveolar arch has been reshaped to eliminate occlusal interferences in the posterior area and TMD symptoms. The Max. posterior teeth were uprighted and intruded with distalization of the Mand. arch. Short class III and canine triangle elastics also made part of the contributions. As a result, antero-posterior occlusal disharmony was almost corrected in only 8 months. O.J. and O.B. became 1.0mm respectively. The tongue achieved a normal posture and nasal breathing was established. After starting MFT with lift up tongue training, a lower lingual frenectomy was performed. Then, the Max. expansion plate was removed and lift up tongue training continued.

**Plate removed & Gum training start**

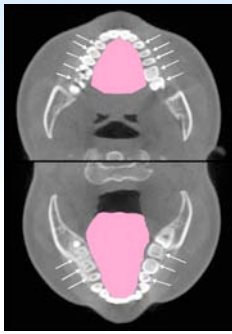


The patient was instructed to put the tongue within the Max. arch and to bite anything as hard as possible. Antero- posterior and vertical skeletal occlusal disharmonies were almost corrected to Class I canine and molar relationships with 1.5 mm O.J. and 2.0 mm O.B.. Furthermore, adequate tongue space with favorable incisor inclination accompanied an improvement in speech dysfunction were also achieved.

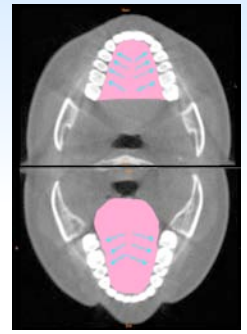


12 months after treatment started, all elastics were discontinued for the final two months. Another 3 weeks later, since the tongue and other perpeioral muscles seemed to be adapted to the new environment, the Max. appliance has been removed.

14 months after treatment started, a stable occlusion with class I canine and molar relation with matched midline, normal O.J. and O.B. ( 1.5 and 2.0 mm respectively ) were achieved. There were no recurrent TMD symptoms and jaw movement appeared smoothly without any interferences. The Max. appliance was removed. Active treatment time was 14 months.



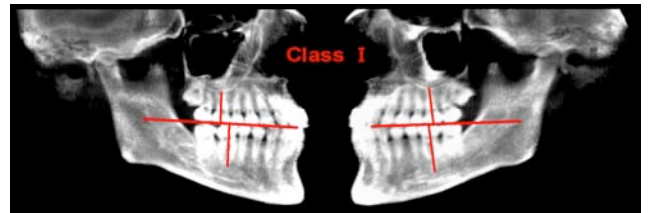
**Fig.3-A: CT image at pre-treatment and post-treatment**  
 Axial TCT image at post-treatment revealed all teeth held within the cancellous bone of the alveoli, by balanced tongue pressure and the perioral and masticatory muscles. The alignment was satisfactory and the arch fits the shape of a relaxed tongue.



**Fig.3-B-1: CT image at pre-treatment and post-treatment**  
 Sagittal CT image at post-treatment revealed the tongue was able to be positioned within the maxillary arch, and the air way was opened, establishing nose breathing with the lips close effortlessly. As a result, favorable interincisal angle, beautiful lip and neck profile were achieved.



Pre-treatment ( 19Y8M ) 2007.02.07



Post-treatment ( 20Y11M ) 2008.05.31

**Fig.3-B2: 3D image at pre-treatment and post-treatment**

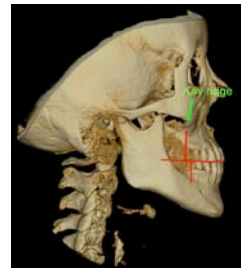
Lateral 3D image at post-treatment revealed a stable occlusion established with posterior support. The long axes of maxillary and mandibular posterior teeth being perpendicular to the functional occlusal plane.



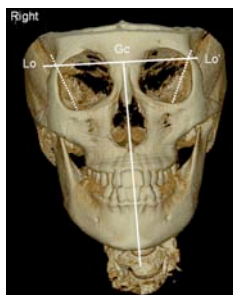
Pre-treatment ( 19Y8M ) 2007.02.07

**Fig.3-C: 3D image at pre-treatment and post-treatment**

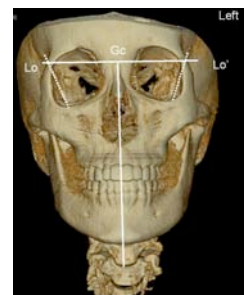
Lateral 3D image at post-treatment revealed a stable occlusion established with posterior support that the long axes of maxillary and mandibular posterior teeth were perpendicular to the functional occlusal plane. The Key ridge (normal line at inferior apex of the zygomatic arch) goes through the bifurcation point of the mesiobuccal and distobuccal root of the maxillary first molar.



Post-treatment ( 20Y11M ) 2008.05.31



**Fig.4: 3D image frontal at post-treatment** revealed that Right-sided deviation of the mandible was improved with a matched midline in occlusion.



Pre-treatment ( 19Y8M ) 2007.02.07      Post-treatment ( 20Y11M ) 2008.05.31

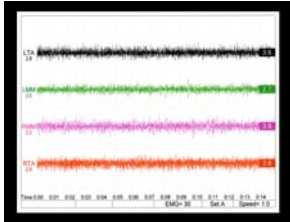


**Fig.5:** Curved MPR CT image at post-treatment revealed both condyles were in comparable position within the articular fossae, indicating that normal function had been attained after treatment.



Pre-treatment ( 19Y8M ) 2007.02.07

Post-treatment ( 20Y11M ) 2008.05.31

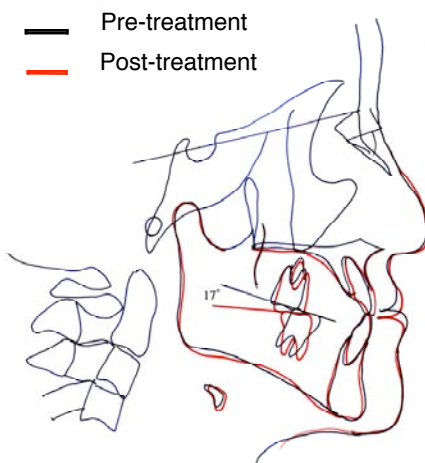
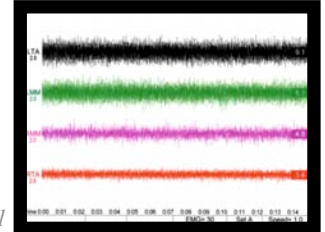


**Fig.6 : Functional findings: Comparison of electromyogram (EMG) record from pre-treatment to post-treatment**

Post-treatment EMG record revealed that both the Masticatory muscles (MM) and Temporal muscles (TM) achieved favorable bilateral balance after active treatment.

Pre-treatment ( 19Y8M ) 2007.02.07

Post-treatment ( 20Y11M ) 2008.05.31



The functional occlusal plane moved down 17° posteriorly during treatment by uprighting and intruding mandibular posterior teeth. As a result, the long axes of both maxillary and mandibular posterior teeth were corrected to perpendicular to the functional occlusal plane, establishing posterior support with minimal and balanced loading of the TMJs. The upper incisors' crown inclined labially, providing proper incisal guidance and freedom of mandibular movement in all direction. As a result, temporomandibular problems were solved during treatment.

Superimposition of pre-treatment and post-treatment

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## Dr. Tom Pitts' Secrets of Excellent Finishing

11月15日，非常高興再次邀請 Dr. Pitts 來台演講，去年 Damon Forum，Dr. Pitts 已帶給我們許多的震撼，今年更是帶給我們更多驚奇，讓我們獲益良多，以下是11月15日 Dr. Pitts 演講的重點整理，與各位分享。

**當**代矯正治療由於顏面美學觀念的改變，Dr. Tom Pitts 認為治療觀念也應隨著改變，尤其著重在藉由不拔牙治療，增加牙弓寬度，以維持美觀微笑並增加 dento-skeletal volume，使患者能有更年輕的外表！近十年，因為 Damon 系統的發明及使用，讓我們可以更接近這個目標！

今天演講的內容主要分為以下七項：

- New Esthetic Model
- Getting The Best Esthetics possible from Passive Self-Ligation
- The Art of Arch Development, Proper Torque, and Smile Arc Protection
- A Close look at Bracket Placement, Working Arch Wires and "Finishing"
- Revolutionary Early Elastics
- Extraction mechanics
- Retention

● **New Esthetic Model**

Dr. Sarver 於 1990 年代提出的理念，以男明星為例，臉型標準已經從過去的高鼻子尖下巴，嘴唇內收形成較凹陷的 dish-in 臉型，漸漸轉成較為現代人接受、豐隆飽滿的嘴唇，

以及唇紅部較外露的美學標準。(Fig. 1)

Dr. Sarver 就美學的觀點，將外觀區分為巨觀 (Face)，迷你觀 (Mouth) 及微觀 (Teeth and Gingival Tissue) 三種層面 (Fig. 2)，原本主要是讓矯正治療達到最美觀的效果，也應用於針對正顎手術患者術前評估之用，而在使用 Damon 系統治療的患者中，因為拔牙治療的減少，更加適用這套治療前診斷工具。因為過去矯正的治療往往因為過於著重咬合而忽略顏面外觀，未根據軟組織外觀來決定拔不拔牙，bonding 時也未能針對個人的微笑線來上矯正器，往往造成前牙排列過於扁平或是牙齦外露 (Gummy Smile) 而不美觀，現在我們可就患者的門牙及牙齦露出程度、笑線等，將患者門牙作 intrusion 或 extrusion 的動作，就可以形成一種配合理想橫向微笑的前牙排列。

目前矯正治療的一種新思維轉換，不僅是要能達到兼具美觀及功能的咬合，更重要的是要針對顏面美學來決定如何治療。理想的矯正治療結果，不僅是咬合、功能以及牙齒緣壙的重要性而已，更要包含其他美觀的考量。過去為了達到理想咬合而妥協犧牲了美觀，然而今天藉由 Damon 這種 passive self-ligating 系統治療，既可以同時擁有美麗的微笑及臉型，又能保有功能與美觀兼具的咬合！



Fig. 1

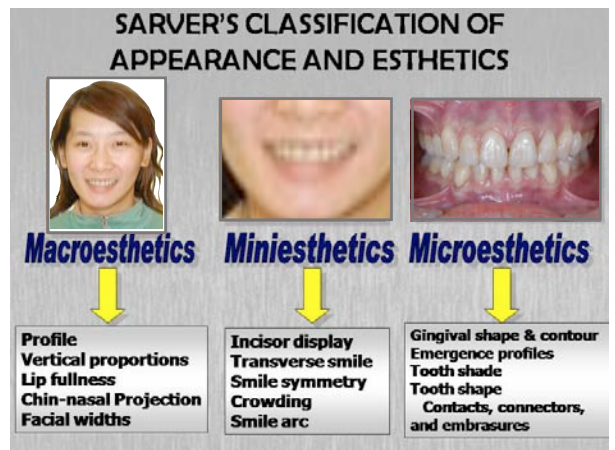


Fig. 2

● **Best Esthetics Possible**

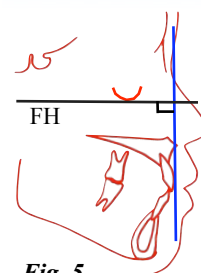
如何達成“Best Esthetics Possible”？首先保持患者的外觀，尤其是上唇，也就是患者嘴唇的豐滿度（Lip fullness），微笑時上嘴唇上揚的形狀及程度（Smile curtain），以及唇紅部外露的多寡（Vermillion display）。臉部的垂直分布比例（Vertical proportion）亦非常重要，理想的 vertical proportion 可維持微笑弧線（Smile arc）及牙冠外露的程度；相反的，也可透過改變臉部的垂直分布比例來建立較理想的 smile arc 及 enamel display。

就西方人而言，巨觀上藉由不拔牙治療來達到 arch development 以增加 Dento-skeletal volume，即可盡量保留中臉部豐隆度，而達到美觀的效果，這也就是我們矯正醫師能為患者做的最好的“臉部拉皮效果”。現今，患者多希望擁有 Full smile、理想的 Lip-tooth relationship，以及理想的微笑弧線。另外，牙齒傾斜角度（torque）— 尤其是 canine — 在迷你觀的美觀表現上也佔了很重要的地位。較為 upright 的 canine 通常會有比較擴展的 Arch width 及較為美觀的 Smile arc (Fig. 3, 4)。所以在治療時要盡量 keep canine upright，不要變成 retroclined。Dr. Pitts 另外強調的一個重點是：不要 over-torque 上顎門牙。理想的上



**Fig. 3** 左方患者前牙形成平直的微笑線 (Smile line) 較為不美觀；右側案例前牙形彎曲的微笑弧 (Smile arc) 較美觀。

顎門牙角度應該是：如果我們在上顎門牙的 crown 上畫一條切線，這條切線會垂直於 FH plane (Fig. 5)。FH plane 應為 Po - Or 連線，但由於在 Ceph 上 Po 較難定位，所以 Dr. Pitts 習慣用 condyle 最上緣的點取代 Po。



**Fig. 5**

以美籍亞裔患者而言，使用不拔牙合併這種 passive self-ligating 系統治療，比較容易達到前牙對唇部的支撐，並獲得較飽滿的效果及美觀的外表，因而衍生出新的亞洲矯正治療觀念如下：

1. 藉由使用 Damon 系統以達到美觀的治療效果。
2. 現今的美籍亞裔患者較能接受比較飽滿的外型。
3. 如何維持 Wider arch, Smile arc 以及 Enamel display 亦日趨重要。
4. 降低拔牙治療比率。
5. 矯正骨釘在台灣及韓國的廣泛使用，大大地降低了拔牙治療的比率，更使得 Damon 系統的應用達到極致。

在前牙深咬的案例中，我們可選擇適當的上顎前牙



不理想的犬齒傾斜角度（約為  $-9^\circ$ ），牙弓也未能擴展，易形成不美觀的 Buccal Corridor！  
這是較為理想的犬齒角度，和咬合面呈垂直！

**Fig. 4**

Bracket torque，並依照 Smile arc 來決定 Bonding position，以達到理想的 Enamel display 及 Smile arc。利用 Damon 系統可藉由增加 lower face height、獲得適當的牙弓寬度、調整牙弓外形，以達到理想的療效！

● Arch Development, Proper Torque, and Smile Arc Protection

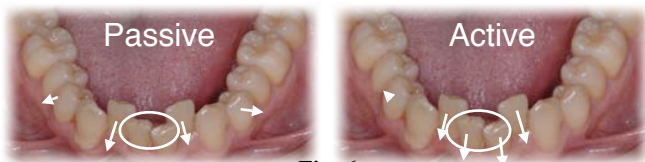


Fig. 6

Dr. Hisham Badawi 利用向量測試機，比較 Active self-ligating bracket 及 Passive self-ligating bracket 治療模擬操作中發現，在擁擠的下顎前牙區，使用 Passive self-ligating bracket 將在 1st premolar area 形成 Buccal displacement，而非 active self-ligating bracket 所造成的 incisor flaring ( Fig. 6 )。

這種特性將使得 Damon system 在牙弓擴展 ( Lateral adaptation ) 的表現上，遠優於其他系統。Dr. Pitts 在此分享了一個 Bilateral lingual crossbite case。這個患者因為 Low tongue position，上顎牙弓無法適當發展，早期必須使用 RPE 方法，得到的效果多為 crown buccal tipping，而且患者

十分的不舒適 — 尤其是成人患者。Dr. Pitts 使用 Damon system，換到 .016 CuNiTi 線之後病人消失一段時間，雖然患者三年後才回診，wire 也只連到 1st molar，卻發現牙弓得到完整擴張，錯咬也得到大幅改善。所以舌頭位置自然的上提，再加上 Passive self-ligating bracket system 才能達到自然的牙弓擴展。

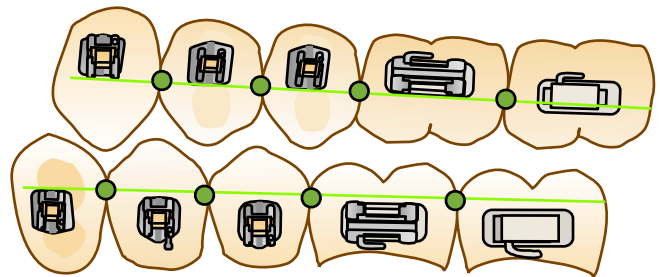
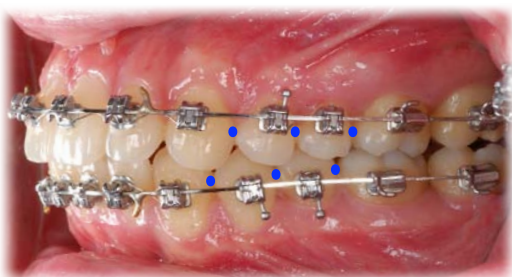
● Bracket Placement, Working Arch Wires and “Finishing”

理想的矯正器放置必須考慮以下要素：( Fig. 7、Fig. 8 )

- Smile Arc
- Mutually Protected Occlusion
- Marginal Ridges and Contacts
- Symmetry
- Transition from the Anteriors to the Buccal Segments/ Occlusion of Buccal Cusps
- Torque Control

Dr. Pitts 認為，“Bonding can Make us or Break us！”一開始精確粘好矯正器，即可以在 Finishing 時得到最好的成果。我們也必須要在治療過程中，精確地判斷何時以及哪些牙齒需要 “Rebonding”。Precision bonding 的方法步驟如下：

1. 請患者站起來，面對面微笑地看著醫師。此時可觀察



- 下顎犬齒到第一大白齒的放置位置，Bracket pad 的 occlusal surface 應略低於 contact point 連線，至於下顎第二大白齒則應略低 (Gingival) 於第一大白齒
- 上顎犬齒到第一大白齒放置位置，Bracket pad 的 occlusal surface 應座落於 contact point 連線，至於第二大白齒放置位置則應略低 (Occlusal) 於第一大白齒

Fig. 7

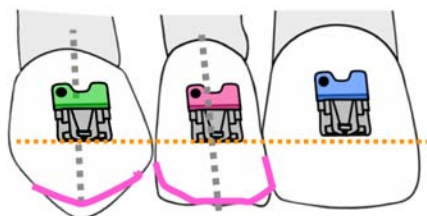


患者的咬合平面是否傾斜，牙弓的寬度和形狀，以及微笑弧。

2. 接下來要在模型上先用鉛筆畫出後牙 contact point 的位置，並觀察齒軸，型態…等等。Dr. Pitts bonding 時一定會在 chairside 準備 Pano、患者正面照片、以及模型。
3. 由兩位助理先準備，將所需要的器具材料安排好。Dr. Pitts 會在 tube 的 base 先塗抹 bonding agent，用氣吹一吹後再塗上 resin，並用金屬鋼杯蓋住避免樹脂硬化。
4. Bonding 前用 football diamond bur 將牙齒作 reshaping，之後再用 white stone 及 black rubber polish，這樣可以讓 bracket 粘在較精確的位置。Reshaping 的範圍包括太尖的 cusps，尤其是 Canine，Dr. Pitts 在 bonding 前會 reshape 99% 的 canine。此外，如果牙齒的 labial surface 有一些形狀的變異導致 bracket base 無法平貼牙齒表面，也應作 reshaping 的動作。
5. 先 bonding 下顎，後 bonding 上顎。
6. 用 rubber cup 沾 pumice powder 清洗牙面。使用長的

棉捲隔開舌頭、口水和臉頰。從右下的 2<sup>nd</sup> molar 先粘。觀察 contact point 的位置，下顎 bracket 上緣略低於 contact point 連線。利用大口鏡觀察牙齒長軸 (long axis)，粘到犬齒後換另一邊的 2<sup>nd</sup> molar 粘到犬齒，粘側門牙時 bracket 稍往 mesial 粘 (因為 lateral incisor 從側面看起來的視差會誤以為已經粘得夠 mesial 了，事實上如果 bonding 完從正面看其實都還是太 distal，這樣會導致側門牙無法完全 derotation)。Bracket base 要確實壓到底、定位後再光照。

7. 再來 Bonding 上顎。開始 Bonding 上顎前先用蠟條蓋住下顎前牙，以避免尚未關起的 bracket slides 刮傷患者嘴唇。利用小口鏡拉開臉頰觀察 2<sup>nd</sup> molar 的 buccal groove 和 contact point 確定 bracket 的位置，上顎 bracket 下緣約在 contact point 連線上。粘 Premolar 時利用大口鏡觀察牙齒長軸 (long axis)，同時加上 Loupes 顯微放大鏡來幫忙可以看得更清楚。粘側門牙時 bracket 的 mesial surface 要平行側門牙的 mesial surface，可以稍往 mesial 粘。至於 Central 除了要平行 mesial surface 以外，也要注意兩側 central 與



- 牙齒太尖或不規則，先用 football diamond bur 修形。
- 前牙依照患者的微笑弧線決定擺的位置，因此 Dr. Pitts 會把正中門牙粘較靠 gingiva 一點，側門牙和犬齒幾乎在同一位置。
- 側門牙及犬齒粘在軸線靠 mesial 的地方。
- 前牙為深咬則往齒切緣黏置，若為開咬則往牙齦向黏置。



矯正器位置常犯錯誤：

- 犬齒粘得不够 mesial。
- 第一小白齒粘不够 distal。

Fig. 8



mesial side 距離須相同。Canine 則須注意兩側高度必須相同，這樣 occlusal plane 才不會 canting。粘完後，依照 case 需求決定是否在 insicor palatal side 加 bite turbos，並調整適當的咬合高度。最後把 wire 置入。

接下來談到使用 Working wire 的原則，原則如下：

- 在第一次放 working wire 的那次約診便開始進行 working wire 的 1<sup>st</sup>、2<sup>nd</sup>、3<sup>rd</sup> order bend adjustment。
- 使用 Stainless steel or TMA 為 Working wire。
- Working wire 在側門牙遠心端一定要有 Posts 或 Loops。
- 上下顎的 Working wire 必須左右對稱，上下協調。所謂上下協調指的是上下顎 Working wire 在犬齒到犬齒的區段是完全一致的曲線。若後牙區需要較寬時則將 Stainless steel wire 做 expansion。

至於什麼時候用什麼樣的 Working wires 呢？大部分時候上顎用 19X25 SS，下顎用 16X25 SS。若為 open bite case，或 Class III 時則用 19X25 TMA 或 17X25 TMA。若為 Class II 或要拔牙 case 時則用 Stainless steel 為 working wire。為了避免因為 arch development 而產生不必要的小空間，使用 K modules 或 .008 ligature wire 來做 tie back。

如何精通 Damon 系統的 finishing work，Dr. Pitts 認為包含四項步驟：

1. 利用矯正器的特性，達到完美的咬合，也就是經由正確定位黏置矯正器，並選擇適當的 torque。

2. 學習如何經由適當的 torque control，由足夠的空間創造及牙弓寬度的形成，得到最佳的 Facial 及 smile esthetics，而非利用拔牙來達到矯治的效果。
3. 同時兼顧維持治療品質並增加矯正的效率：方法包含正確放置矯正器、選擇適當的 torque、讓這個系統有足夠的時間展現最大效能、Early light short elastics 的使用、Finishing elastics 的使用、以及修整牙齒外形。
4. 如何維持治療效果。最後希望達到美觀的功能性咬合以及美觀的臉部外觀平衡！

#### ● Early Light Short Elastics

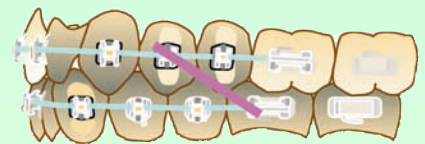
使用 early light short elastics 的優點如下：( Fig. 9 )

- 在治療早期就能控制 Vertical dimension，對於 deep bite 或是 open bite 都可以有效的改善。
- 不論 Class II or Class III 方向，都可藉由使用 2 oz 的 early light short elastics，避免因 elastics 水平向量過大所造成 side effect，在治療早期就可做 AP direction 改正。
- 早期提升 tongue position。
- 或是使用 cross elastics 在治療早期幫助增加 arch width，因為力量很小，所以不會產生太多的牙齒 tipping。
- 提高治療的效率。
- 也正因為 light force，病人也較不會感到疼痛！

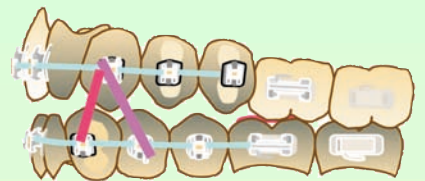
正確使用 Early light short elastic + Bite turbo 這個方法，可以藉由選擇 intrusion 或是 extrusion 正確的牙齒，來控制



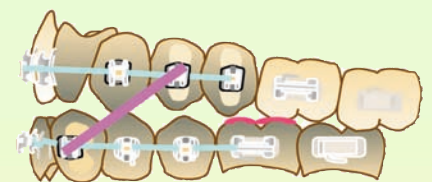
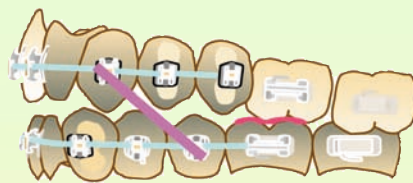
Class I, II 的 Deep bite cases，請將 Bite turbo 放置在前牙，用 class II elastic 放在 U4 to L6，在 .014 or .018 的軟線上，請用 3/16” 2 oz ( Quail ) Full time，到了換成 .014 x .025 CuNiTi 後，才改 3/16” 4 oz ( Kangaroo )，拉在同一個位置，注意：Keep it short (亦即減少 horizontal vector)！病人會有幾天不舒服，而且因為後牙懸空，建議食用 soft diet，食物切小塊，直到後牙接觸為止！



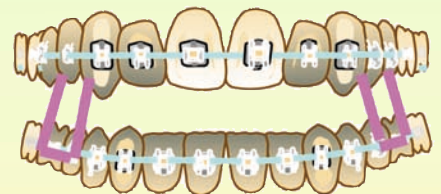
對於 Class I anterior open bite case，請在 molar area 加上 Bite turbo，使用 3/16” 2 oz 在 U3 to L4 or L3 (依 case 決定 Class II or Class III direction)，並且搭配“後牙咬緊運動 (Squeeze exercise)” — 把手指放在 post. fiber of temporalis muscle area，每次咬緊時，都要感覺到肌肉的隆起 (收縮)，50下為一個 set，每天 6 個 set，以加快 molar intrusion 的效果。



而在 Class II open bite case，用“more” class II elastic，要把 elastic 放在 U3 to L5，依然配合 Squeeze exercise，記得不要用 3.5 oz，依然使用 3/16” 2 oz，因為 2 oz 的 tissue reaction 較好。對於 Class III open bite，則只有改變 elastic 的方向 (U5 to L3)，其餘皆相同。



對於 Post. cross bite case，可以在上顎 2nd premolar & 1st molar 的 palatal side 黏上 Kaplan hooks，用 5/16” 2 oz (Parrot) 從 U5-6 palatal 拉到 L5-6 buccal side，必要時 molar area 用 bite turbo 在 lower molar cusp 墊高咬合，第二次約診可換線 0.018 NiTi，elastic 改成 5/16” 3 oz (Dolphin)。



另外，Class III severe open bite，post. crossbite，narrow upper arch 的 case，可以用 cross bite elastic，class III，加上 Ant. up & down elastic 用 2 oz 開始，幾個禮拜後再換到 3 oz (Dolphin)，再換成 .018 x .025 NiTi 時，改用 Zebra。

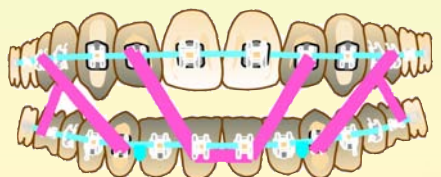


Fig. 9 Dr. Pitts 對於 elastics 的用法

vertical dimension，用以維持 smile arc。而且這是 reversed curve wires 很難達到的效果，以前 Dr. Pitts 只在下顎用 Reversed curve wires，自從用了 Damon + Early light short elastics + Bite turbo 以後，已經不需要再用 reversed curve wires 了。

Dr. Pitts 告訴我們，永遠同時考慮 vertical 及 AP 的問題，而在臨床應用上，Deep bite 的 case 就在前牙墊高，後牙拉 elastics；而 Open bite 就在後牙墊高，前牙拉 elastics。如果要讓 early elastics 更有效，就要思考 “disarticulation”！

一定要記得，在 Deep bite case，要盡量 “Keep the elastics distally” 以利後牙的 extrusion；至於 Open bite case 則要盡量 “Keep the elastics anteriorly” 以利前牙的 extrusion。為了維持良好的治療效果，Open bite case 最好要 overcorrection 到有一點 Deep bite；反之，Deep bite case 最好要 overcorrection 到 bite 淺一點。而 Class II case 最好要 overcorrection 到 edge-to-edge；Class III case 則最好要 overcorrection 到 bite 略深、有一點點 Class II 的感覺。

不過，一定要讓病人了解的是，必須要 “整天配戴”（Full time 24 hours）！讓病人知道這可以為他節省治療時間（有時甚至可節省 12 個月）並且能得到更好的治療結果！還有，因為橡皮筋容易斷，請隨身攜帶足夠的量。

### ● Extraction mechanics

記住！“Extraction for the face, not for the space”！因此，拔牙的適應症只有下列兩種：

1. Bimaxillary protrusion with Lip incompetence
2. Crowding with protrusion & very wide arches

Dr. Pitts 很少進行拔牙治療，除非患者外觀不美觀。

大多數是因為 Bimaxillary protrusion with Lip incompetence 才會考慮拔牙治療，少數是因為 Crowding with protrusion 而且患者的牙弓已經很寬才選擇拔牙治療，但這樣的情形很少見。Lip incompetence 的患者每天要練習 Lip seal exercise，以保持嘴唇閉合，即使是要拔牙患者一樣要練習。

若患者的牙弓較寬且門牙角度（Torque）適當，就可以避免拔牙治療。嘴唇較平的患者則盡量不拔牙，一般患者會先治療 10 到 12 個月，再決定要不要拔牙。

拔牙的治療會先將所有牙齒 Leveling and alignment，等 crowding 及 rotation 都改正了，3-3 用 .008 ligature wire 綁在一起。關空間時一定要用 Stainless steel wire 以避免前牙產生不必要的 dumping，最常用的是 19 X 25 SSW，但 wire 只到第一大臼齒後方，不必連到第二大臼齒，即始是關空間仍然會讓第二大臼齒 free，只有用 NiTi 方線做 leveling and alignment 時才會連到第二大臼齒。

在治療拔牙病例時，特別注意犬齒一定要用 High torque (+7°) 的矯正器，這是為了要讓牙根遠離 Buccal plate，避免牙根碰到 Buccal plate 而導致空間關不起來。另外也可在 Buccal segment 的 wire 上，額外加上 20° Lingual root torque，目的也是為了要讓牙根遠離 Buccal plate 以利空間關閉。Posts 或 loop 通常放置在側門牙遠心端，這樣力量可均勻分布；並使用 Medium NiTi coil spring（4 ~ 6 oz, 9 mm）關空間，從第一大臼齒的 distal wire 掛到 posts 或 loop 上，而不直接掛到犬齒上。Coil spring 每 11 週 activate 一次，不用太頻繁看病人。若力量使用得當，關閉空間的速度約為每個月 1.2 mm 左右。

Dr. Pitts 喜歡用 9 mm medium NiTi coil spring，先將一端的掛環彎成 90 度掛到第一大臼齒的 distal wire。相對於直接掛到矯正器的 hook 上，這樣比較不會產生 binding，另一端用 ligature wire 綁著跨過犬齒矯正器到側

門牙遠心的 hook 上，跨過犬齒矯正器 coil spring 比較不會晃動 (Fig. 10)。Activate 到 18 mm (約 200 gm)，每次調整只需將ligature wire 向前 activate 即可。如果某一邊空間關閉速度較慢，Dr. Pitts 會請患者盡量用那邊嚼東西或咬些口香糖或是加上單邊的 Class I elastic；有時遇到某些空間關閉速度較慢的病例，Dr. Pitts 會在 Buccal segment 的 wire 加上 Lingual root torque，這樣空間就可順利關閉。如果中線有偏斜，可以只 activate 空間未關那邊，再配合單側 CII 或 CIII elastics 使用。Dr. Pitts 認為 coil spring 不需要

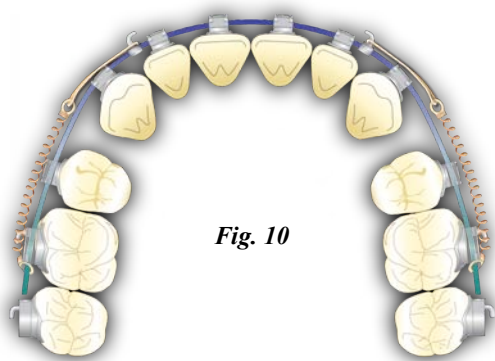


Fig. 10

回掛到第二大臼齒上，因為使用這種低摩擦力的 passive self-ligating bracket 並不需要擔心 anchorage 的問題，只要獲得足夠的 arch width，前牙就可以 retraction 更多。

如果空間已經關閉了，Dr. Pitts 會用 .010 ligature wire 將牙齒用 figure 8 綁在一起，重新回到 18 X 25 NiTi 並連接到第二大臼齒上進行 8 ~ 10 週的 leveling & alignment，最後換回 16 X 25 SS 或 TMA 進行 detailing 及 finishing。Dr. Pitts 強調，在拔牙 case 應盡量保持牙弓的寬度，牙弓愈寬，前牙就可以後退更多。保持較寬的牙弓也可避免造成 buccal corridor。

關於 19 X 25 SS，Dr. Pitts 覺得當我們在做 A-P correction 及 Space closure 時，這是一條很好的 wire。它可維持 arch 的 integrity，尤其在 Vertical 方向的維持有重大的貢獻。

Dr. Pitts 通常會告訴患者，拔牙治療會比不拔牙治療多 6 ~ 8 個月，而一般不拔牙治療要花 18 個月，拔牙花 24 個月。

#### 黃瓊嬋醫師對 Dr. Pitts 的提問：

Q1. 之前在 Phoenix 聽演講時，Dr. Thomas 建議如果有需要做 Transverse development 時，Canine 要使用 High torque bracket，請問您的意見如何？

Ans: Dr. Pitts 說，只有在兩種情況下才會使用 High torque canine bracket！

1. Canine 原來的角度就很 retrocline。
2. 拔牙病例。  
因為我們不希望 over-torque canine，而且 Arch 在 Lateral development 時，canine 就會跟著放寬並且 upright，所以不須要特別用 High torque bracket。

Q2. 演講的幻燈片上看到的 1<sup>st</sup> molar tube 都是 accent tube，請問是用 2<sup>nd</sup> molar tube 代替嗎？這樣會不會影響 1<sup>st</sup> molar 的 torque 表現嗎？

Ans: Dr. Pitts 說，他用的是有正確角度的 1<sup>st</sup> molar tube，差別只是在於 U6 的 offset 是 12 度，U7 的 offset 是 10 度，以下是他使用的角度及貨號：

LL6/ #342-5131/-27 torq/0 ang LL7/ #342-5117/-10 torq/0 ang LR6/#342-4131/-27 torq/0 ang LR7/#342-4117/ -10 torq/0 ang  
UL6/ #342-5115/-10 torq/0 ang UL7/#342-0445/ -27 torq/0 ang UR6/#342-4115/-10 torq/0 ang UR7/#342-0545/-27 torq/0 ang

Dr. Pitts 給的是他二十年前找到的 A company tube，當時上顎 2<sup>nd</sup> molar 還沒有 -27° 的 tube，所以他用右下 2<sup>nd</sup> molar 當作左上的用，左下當右上用。目前也有 -27° 的 Upper 2<sup>nd</sup> molar tube 可用，但因為他已經習慣了，所以一直沿用至今。

Q3. 請問您 Bonding 時用的 small tip light cure machine 在哪買，看起來 curing 後牙時好像很好用！

Ans: Dr. Pitts 說，那種 Laser tip 其實沒有想像中好用，光纖管容易折斷，而且換一個 tip 要 USD 1000，所以.....

## ● Retention

為了維持良好的治療效果，治療中就要特別注意隨時 check 患者的 CR position。一定要確定我們治療後，患者沒有 Dual bite 或 CO - CR sliding，這樣治療結果才會穩定！而使用 Early light short elastics 也正是希望在治療早期就能改正 A-P discrepancy，讓患者的神經肌肉系統可以有良好的 adaptation 及 balance。另外，Finishing stage 除了拉 finishing elastics 之外，做 Occusal adjustment 以去除 interferences、確保 CO = CR 也是很重要的！Dr. Pitts 的 Occusal adjustment 有 99% 都是在修整 Lingual cusps，因為只要 Lingual side 有 premature contact，那麼 Buccal side 無論怎麼拉 finishing elastics 都不可能咬得好！！Dr. Pitts 認為 Finishing 階段一定要確實讓每一顆牙齒咬好，不要期待它以後會自己 settle！絕對不能讓咬合自己 settle！

Dr. Pitts 幾年前才開始在上顎使用 Lingual fixed retainer，因為 Dr. Pitts 看到約 50% 治療完成的患者，側門牙會向牙齦位移動，這樣會不美觀；因此盡可能將上顎 2 到 2 固定。Dr. Pitts finished 的患者，除了 CIII 及 anterior openbite 患者要 overcorrection，可能沒有足夠空間可以粘 fixed retainer 之外，其他患者 Bite 都較淺通常有足夠空間可以黏著。下顎則用 .027 TMA 或 .0175 / .0195 twisted wire 固定3到3，還會合併使用 Clear retainer。上下顎的 Clear retainer 在 debonding 後前 4 週必須整天配戴，以後則改成晚上戴。上顎的 fixed retainer 必須固定三年以上，下顎的則須終生固定，至於晚上的 Clear retainer 也須終生配戴。

### References :

1. Tom Pitts' lecture in Taipei 11/15/2008
2. Chang CHN. Beethoven Orthodontic Mobile Learning Program. Advanced Damon Course No. 4: Dr. Pitts' secrets of finishing. 2008; Newton's A Ltd, Taiwan.

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要特別注意的是，治療前上顎較窄的患者，不要把 Clear retainer 作成馬蹄形，palatal side 要留寬一點以維持住牙弓寬度。

Dr. Pitts 喜歡讓患者晚上戴 muscle training splint ( Fig. 11 )，通常是第一個 retainer 戴 3 個月之後再取模製做，使用時機為：1. Herbst retention，2. Severe posterior crossbite，3. Lat. tongue thruster，4. CI II' s corrected with elastics or Herbst with springs，5. CI III malocclusion，6. Deep overbite cases，7. Anterior open bite，8. Any patient with severe muscle dysfunction，9. Tongue trainer，10. TMJ - bruxing / clenching，11. Sleep Apnea。所用的材質是相當硬的 Dual hardness material，與軟組織接觸的內面外面都硬，而接觸牙齒的中間部份則是軟的，只需要覆蓋硬組織部份。CI II 及 Sleep apnea 患者會讓他咬到 edge to edge，Anterior bite opening 約 5 ~ 6 mm，Apnea 患者可將 bite open 更多一點；CI III 則取在 CR 位置或往前 1 mm。



Fig. 11

Dr. Pitts 認為，我們生在這個時代是幸運的！我們有了 Damon Light Force System，再藉由 Precise bonding + Torque selection + Bite turbo + Early light short elastics，讓系統發揮最大的效能，矯正治療可以兼具 Effective & Efficient !!

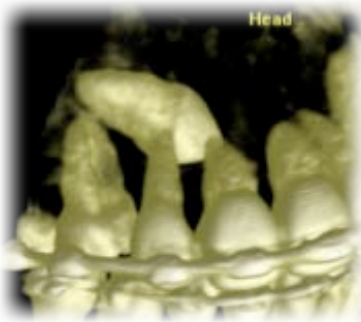


The Dream Screw for the Next Generation's Orthodontists

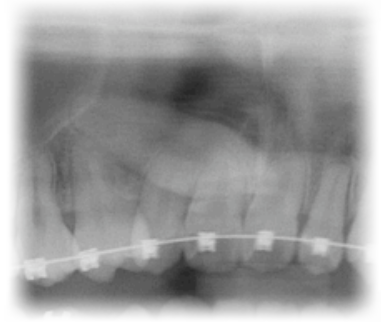
# OrthoBoneScrew



Beethoven Orthodontic Center

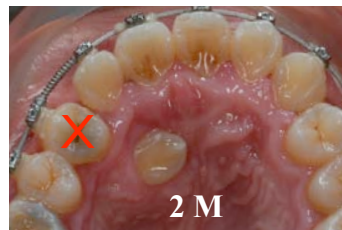
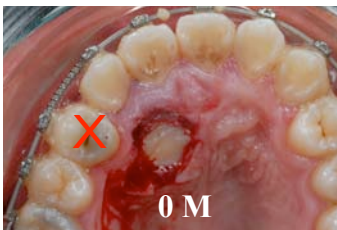


OrthoBoneScrew (OBS) has a double-crossed rectangular slot on its neck. This 0.018 x 0.025 inches rectangular slot provides a versatile use of orthodontic mechanics. A 0.017 x 0.025 wire in dimensions can be secured in the slot firmly.



## Case report of palatal impacted canines: Demonstration of OBS application

Yi Yang Su, Chris Hwai-Nan Chang, Beethoven Orthodontic Center



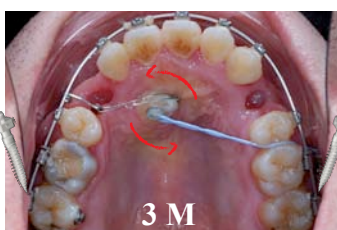
### Mechanics Design :

A 24-year-and-7-month-old male had one maxillary right impacted canine located on the palatal side.

Firstly, we uncovered the impacted canine to allow auto-eruption. Secondly, we extracted the maxillary right 1<sup>st</sup> premolar. After the canine erupted, a rotating force system was created by a 3D lever arm stretching out from the right side of **OBS**, and an elastic chain connecting to the left side of **OBS**. Once the impacted canine moved within the reach of a wire, a .014 CuNiTi was then placed for further alignment. Finally, the impacted canine was successfully moved into the arch .

OrthoBoneScrew

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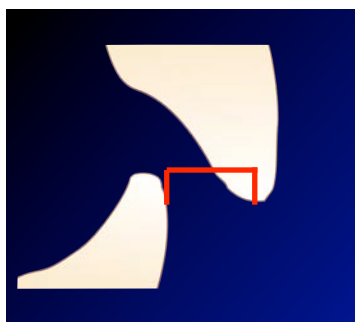


# The ABO Discrepancy Index: A Measure of Case Complexity

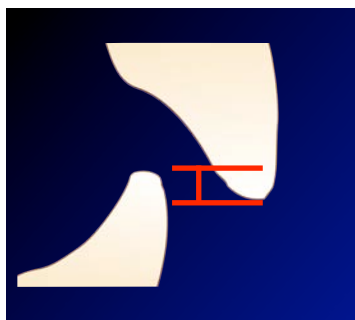
ABO 美國矯正專科審查會近年來開始使用 DI ( Discrepancy Index ) 為矯正的難易度作記分，包含了 12 個項目：Overjet、Overbite、Posterior Open Bite、Anterior Open Bite、Crowding、Occlusion、Buccal Posterior Crossbite、Lingual Posterior Crossbite、ANB Angle、SN-MP Angle、L1 to MP、Others。透過這些項目讓我們有一個統一的標準來評定 case 的難易，而 ABO 美國矯正專科醫師考試更透過這個 index 來決定考試 case 的選擇。



開始計算 DI 前，矯正標準模型需依照咬合關係放置，同時當模型的背面靠著平坦的平面時，不能造成咬合關係的偏移。



1. **Overjet**：為上門牙切端到門牙唇側最遠的距離；若 overjet 為 0 mm ( edge-to-edge ) 得 1 分，overjet 為 0 ~ 3 mm 得 0 分，3.1 ~ 5 mm 得 2 分，5.1 ~ 7 mm 得 3 分，7.1 ~ 9 mm 得 4 分，超過 9 mm 則計入 5 分。如果前牙區中有 negative overjet ( anterior crossbite ) 者，下顎每顆 crossbite 的 overjet 距離加總一併記入分數，例如 # 42 overjet = - 2 mm，# 41 overjet = - 1 mm，則本項目計分為 3 分。



2. **Overbite**：為上門牙切端到門牙切端的距離；3 mm 以內得 0 分，3.1 ~ 5 mm 得 2 分，5.1 ~ 7 mm 得 3 分，若下顎門牙咬到上顎，或是 100 % 的 overbite，則記入 5 分。



3. **Anterior Open Bite**：依上下顎每顆前牙間 ( canine to canine ) 的距離來加總計分，edge to edge ( overbite = 0 mm ) 為 1 分，距離多少 mm 的總合即為此項的總分，例如 # 11 與 # 41 open bite 4 mm，# 21 與 # 31 open bite 2 mm，前牙區其它關係為 edge to edge，則本項計分為 1 + 1 + 4 + 2 + 1 + 1 = 10 分；但是前牙區中如果有牙齒為 blocked-out 在牙弓外或是尚未完全萌發者，則該牙不列入計分。

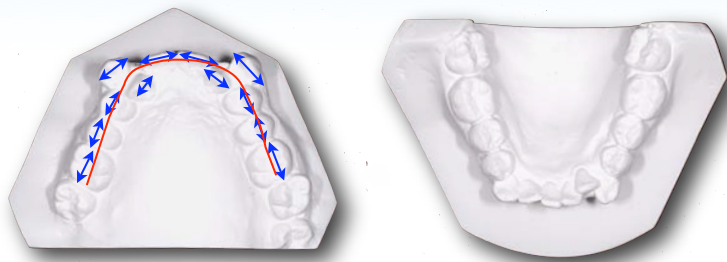




蘇荃瑋醫師 貝多芬矯正課程講師



4. **Lateral Open Bite** : 依上下顎每顆後牙間 ( 1<sup>st</sup> premolar to 3<sup>rd</sup> molar ) 的距離來加總計分, 距離多少 mm 的總合 x 2 即為此項的總分。



5. **Crowding** : 計算 crowding 的分數時, 只取最擁擠的 arch circumference 列入計分 ( 單顎 ), 測量方式為 1<sup>st</sup> molar to 1<sup>st</sup> molar 間各顆牙近遠心距離總合減去牙弓徑, 1 ~ 3 mm 為 1 分, 3.1 ~ 5 mm 為 2 分, 5.1 ~ 7 mm 為 4 分, 大於 7 mm 者計入 7 分。



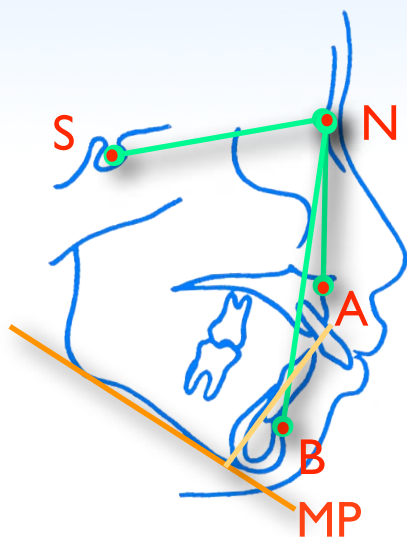
6. **Occlusion** : 我們使用 Angle Classification 針對左右兩側的 molar relationship 各別做計分, 當上顎 1<sup>st</sup> molar 的 MB cusp 咬在下顎 1<sup>st</sup> molar 的 buccal groove 到 MB cusp 之間 ( cusp-to-cusp or end on ) 為 0 分, Class II or III end on relationship ( cusp-to-cusp ) 計 2 分, Full Class II or III relationship 計 4 分 ( Full Class II : 上顎 1<sup>st</sup> molar 的 MB cusp 咬在下顎 1<sup>st</sup> molar 與 2<sup>nd</sup> premolar embrasure 之間; Full Class III : 上顎 2<sup>nd</sup> premolar 咬在下顎 1<sup>st</sup> molar buccal groove )。當超過 Full Class II or III, 則每多 1 mm 再累加 1 分。



7. **Buccal Posterior Crossbite** : 如左圖, 從 1<sup>st</sup> premolar 到 3<sup>rd</sup> molar。每顆 2 分。

8. **Lingual Posterior Crossbite** : 如右圖, 每顆 1 分。





- 9. ANB angle : 當  $ANB \geq 6^{\circ}$  或  $\leq -2^{\circ}$  , 得到 4 分 , 每  $> 6^{\circ}$  或  $< -2^{\circ}$  一度 , 另外累加上一分。
- 10. SN-MP : 當  $SN-MP \geq 38^{\circ}$  , 得到 2 分 , 每  $> 38^{\circ}$  一度 , 另外累加上兩分 ; 當  $SN-MP \leq -26^{\circ}$  , 得到 1 分 , 每  $< 26^{\circ}$  一度 , 另外累加上一分。
- 11. L1-MP : 當  $L1-MP \geq 99^{\circ}$  , 得到 1 分 , 每  $> 99^{\circ}$  一度 , 另外累加上一分。

12. Others : 當以下的情況出現時我們另外列入計分。

- |                                                                               |       |                                                   |       |
|-------------------------------------------------------------------------------|-------|---------------------------------------------------|-------|
| • Supernumerary : 每顆                                                          | x 1 分 | • Midline discrepancy : 偏移中線 3 mm 以上              | x 2 分 |
| • Ankylosis : 每顆                                                              | x 2 分 | • Spacing : Mx central diastema 2 mm 以上           | x 2 分 |
| • Anomalous morphology ( tooth size & shape ) : 每顆 ( 例如 peg lateral incisor ) | x 2 分 | • Spacing : 一顎牙弓有超過 4 顆以上的牙齒有 generalized spacing | x 2 分 |
| • Impaction ( 除了 3 <sup>rd</sup> molar 外 ) : 每顆                               | x 2 分 | • Tooth transposition : 每顆                        | x 2 分 |
| • Missing ( 除了 3 <sup>rd</sup> molar 外 ) : 每顆                                 | x 1 分 | • Skeletal asymmetry ( treated nonsurgically )    | x 2 分 |
| • Congenitally missing ( 除了 3 <sup>rd</sup> molar 外 ) : 每顆                    | x 2 分 | • Additional treatment complexities : 其它未列入的情況    | x 2 分 |

矯正的初學者要如何判斷 initial pre-treatment 矯正 case 的難易複雜度，DI ( Discrepancy Index ) 列出的這些項目以及計分提供了我們相當好的參考，ABO 對 DI 這套系統信度及效度的測試修改後，更於近年宣佈入會及專科醫師考試的入選 case 標準，改成以 DI 計分，三個 case 在 DI score 10 分以上、以及三個 case 在 DI score 20 分以上才可以入選參加審核，可見得 DI 這套系統已經受到 ABO 的重視，希望透過這篇介紹能夠讓各位醫師簡單的了解 DI 的評分計分方式。

**Reference :**

1. Thomas J : The ABO Discrepancy Index: A Measure of Case Complexity. Am J Orthod Dentofacial Orthop 2004;125:270-8.
2. The American Board of Orthodontics Clinical Examination Guide. Third Edition May 2008 - May 2009.
3. www.americanboardortho.com/professionals/clinicaalexam/casereportpresentation/preparation/measurementinstruments.aspx
4. Chang CHN. Beethoven Orthodontic Mobile Learning Program. Advanced Damon Course No. 4: Dr Pitts' secrets of finishing. 2008; Newton's A Ltd, Taiwan.

# DISCREPANCY INDEX WORKSHEET

CASE #  PATIENT   
 TOTAL D.I. SCORE   
 (Rev. 9/22/08)

## OVERJET

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

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

Total =

## OVERBITE

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

Total =

## 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 =

## OCCLUSION

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

Total =

## LINGUAL POSTERIOR X-BITE

1 pt. per tooth Total =

## BUCCAL POSTERIOR X-BITE

2 pts. per tooth Total =

## CEPHALOMETRICS (See Instructions)

ANB  $\geq 6^\circ$  or  $\leq -2^\circ$  = 4 pts.  
 SN-MP  $\geq 38^\circ$  = 2 pts.  
 Each degree  $> 38^\circ$   x 2 pts. =   
 $\leq 26^\circ$  = 1 pt.  
 Each degree  $< 26^\circ$   x 1 pt. =   
 1 to MP  $\geq 99^\circ$  = 1 pt.  
 Each degree  $> 99^\circ$   x 1 pt. =

Total =

## OTHER (See Instructions)

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

Total =

# American Board of Orthodontics

## Objective Grading System for Dental Casts and Panoramic Radiographs ( Part I )

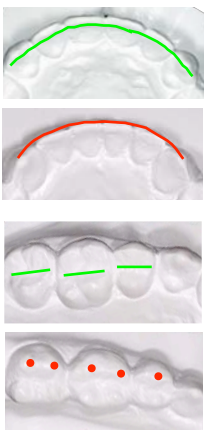
### Introduction and Background

美國矯正專科審查會（以下簡稱 ABO）常年以來，一直致力於讓專科醫師認證的第三階段臨床考試，能有更公平、正確以及有意義的參考標準和測量工具。由於齒顎矯正治療的優劣通常著重在 final occlusion，因此，從 1994 年開始，他們著手去發展能夠客觀測量治療後模型及口內照片的工具和方法。

過去，有一些方法曾被用來評估矯正治療結果例如 Occlusal Index，但是這個方法過於繁瑣，而且事實上它更適合被用來評估矯正治療前的咬合不正情形而非治療結果。1987 年，有學者分析 200 套 dental casts 後發展出另一套 PAR ( Peer Assessment Rating ) Index 來評估治療前後的咬合狀況。雖然 PAR Index 的可信賴度及正確度很高，但是它的測量方法不夠精確到可以辨別在 ABO case reports 中常見的一些牙齒位置的 minor discrepancies，因此，從 1994 年開始，ABO 成立了一個委員會，並開始著手去研發能夠精確測量治療後模型及 pano 的方法。

1995 年，ABO 委員會用 15 項 criteria 分析當年受試的 100 套模型後發現，治療後模型上常見的錯誤有 85% 都出現在這 15 項標準的其中 7 項，包含了 Alignment, Marginal

ridges, Buccolingual inclination, Occlusal relationships, Occlusal contacts, Overjet, 以及 Root angulation。訂出這 7 項標準後，1996 年委員會開始著手進項第二階段的測試。這一個階段測試主要是要分析，在有多位審查官的狀況下，測量結果是否依然一致、可靠。此次的測試由 4 位審查官分析 300 套模型及 X 光，測試結果發現常見錯誤與前一年結果相同，但不同審查官之間的審查結果卻各有分歧。因此，委員會決定發展出一個可靠的測量工具來提高檢查結果的一致性。1997 年，由 5 位審查官利用研發出來的測量工具以前述 7 項標準共同分析當年受試的 832 套治療後模型及 X 光後發現，使用測量工具後不同審查官之間審查結果的一致性提高了。不過，他們同時決定要增加第 8 項標準— Interproximal contacts，並針對測量工具再做一些修改。1998 年，五位審查官利用修正後的新工具再做第四階段測試。這個階段主要是在評估測量結果後，訂出一套更臻成熟、客觀的第三階段臨床考試的標準測量方法及扣分標準。1999 年二月，ABO 開始將這套評分標準運用在 St. Louis 所舉行的第三階段臨床考試。ABO 鼓勵所有想要參與第三階段臨床考試的醫師，利用 ABO objective grading system 來評估自己的治療結果，以篩選出能成功通過考試的病例！！



### 前牙區

上顎前牙區： Incisal edges 以及 lingual surfaces 的連線；

下顎前牙區： Incisal edges 以及 labio-incisal surfaces 連線。

選擇這些區域的原因是因為這不只是這些牙齒的 functioning areas，而且這也是影響 esthetics 的重要區域。

### 後牙區

上顎後牙區： Premolar 到 molar 的 mesiodistal central groove 連線是否一致；

下顎後牙區： Premolar 到 molar 的 buccal cusp tips 連線。

選擇這些區域的原因是因為在這些牙齒上這些觀測點很容易辨認，而且這也是這些牙齒的 functioning areas。

### 常見錯誤

不論上顎或下顎，有 80% 的錯誤都出現在 lateral incisor 與 canine 交界處以及 1st molar 與 2nd molar 交界處。

Fig. 1



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成大醫學中心口醫部兼任主治醫師  
幸福牙醫診所主治醫師  
貝多芬課程講師

## Criteria and Rationale

ABO Objective Grading System 共有八項標準來針對模型及 Pano 做評分，這八項標準包括：Alignment，Marginal ridges，Buccolingual inclination，Occlusal relationship，Occlusal contacts，Overjet，Interproximal contacts，以及Root angulation。以下分述制定這八項標準的理由、量測標準以及常見錯誤。

### 1. Alignment

毋庸置疑，alignment 是任何矯正治療皆應達到的基本目標。因此，ABO 很合理的將 alignment 訂為評估矯正治療結果的第一個標準。ABO 將 alignment 分成 anterior 及 posterior 兩段來看 (Fig. 1)。

### 2. Marginal Ridges

ABO 用 marginal ridges 來評估後牙 vertical position。如果患者的牙齒沒有補綴物，沒有明顯磨耗，也沒有 periodontal bone loss，那所有鄰接牙的 marginal ridges 必須是在同一個 level。對牙周健康的患者而言，marginal ridge 等高，表示 CEJ 也會等高，表示 bone level 也會等高。除此之外，因為某些 marginal ridges 是對咬牙 cusps 的 contact areas，因此如果 marginal ridge 等高，那麼我們就可以輕易的建立理想的 occlusal contacts。

#### 常見錯誤

最常見的錯誤是在上顎第一及第二大臼齒交界處，其次則是下顎第一及第二大臼齒交界處，而這通常肇因於 2<sup>nd</sup> molar 沒有上矯正器。



### 3. Buccolingual Inclination

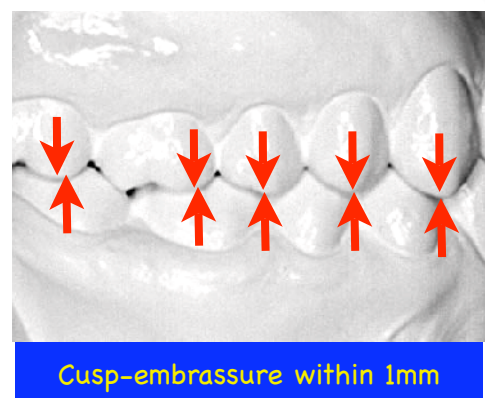
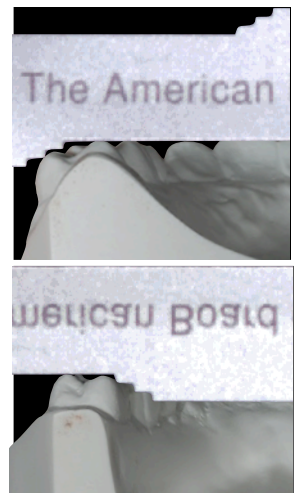
Buccolingual Inclination 是用來評估後牙的 buccolingual angulation。為了使後牙在咬合時能達到 maximum intercuspation 並避免側方運動時的 balancing interference，上下顎後牙的 buccal 及 lingual cusps 高度不應該有太大的差異。審查官會用特殊量尺測量，buccal 與 lingual cusps 兩者間的高度差異應小於 1 mm。

#### 常見錯誤

Buccal 及 lingual cusps 高度差異最大的位置通常是發生在上下顎 2<sup>nd</sup> molar。

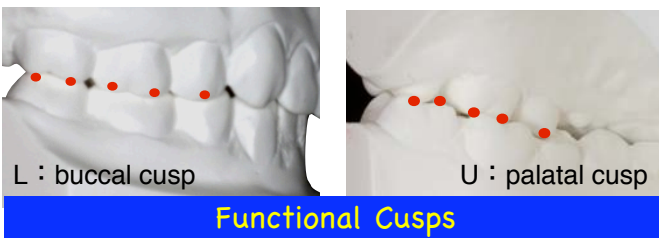
### 4. Occlusal Relationship

顧名思義，occlusal relationship 是用來評估上下顎後牙的前後向位置關係，並以 Angle's classification 為作為評分基準。因此，上顎的大臼齒、小臼齒及犬齒頰側的排列與下顎的 interproximal embrasures 相對應位置不可偏離大於 1 mm。舉例來說，上顎 1<sup>st</sup> molar 的 mesiobuccal cusp 必須咬在下顎 1<sup>st</sup> molar buccal groove 的前後 1 mm 以內。



5. Occlusal Contacts

Occlusal contacts 是用來評估上下顎後牙的垂直向位置關係，因為理想矯正治療的基本目標之一，就是要建立後牙的 maximum intercuspation。因此，這個項目將針對所有的 functional cusps 來作評分，也就是下顎後牙的 buccal cusps 以及上顎後牙的 lingual cusps。如果 functional cusps 的形狀有變異或是很小，則不予計分。

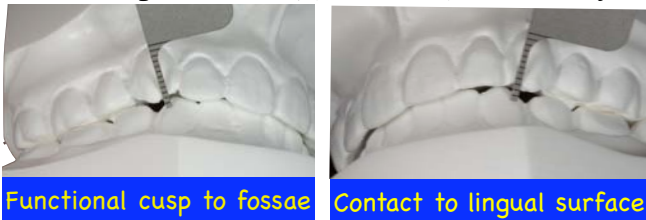


常見錯誤

最常見的錯誤通常發生在上下顎第二大臼齒間的 intercuspation 不好。

6. Overjet

Overjet 用來評估後牙的橫向 ( transverse ) 以及前牙的前後向關係。在後牙區域主要觀察 functional cusps — 也就是下顎 buccal cusps 和上顎 lingual cusps — 是否有確實咬在 fossae 中。在前牙區域，所有下顎前牙 incisal edges 必須和上顎前牙 lingual surfaces 確實接觸，也就是不能有 overjet。



常見錯誤

常見錯誤在上下顎門牙區域以及第二大臼齒出現 overjet。

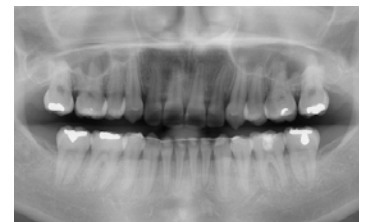
7. Interproximal Contacts

測量 interproximal contacts 的目的主要是要確定所有的空間都已經確實關閉。有空間存在除了不美觀之外，也容易會有 food impaction 的問題。在 ABO 受試的病例中，space 通常不是太大的問題，很少人會在這個項目被扣到分數。



8. Root Angulation

Root angulation 這個項目是利用 pano 來評估牙根相對位置是否適當，也就是測量牙根平行度。雖然 pano 有放大倍率及特定部位 distortion 的問題，但截至目前為止，它仍是評估牙根位置是否適當的較方便可行的方法。如果牙根的平行度以及相關位置不錯，那麼兩顆鄰接牙之間就會有足夠的 bone，這對於原來就有牙周問題或有牙周病 tendency 的患者而言攸關重大。對這些患者來說，如果兩個牙根位置不平行或太靠近，那麼一旦發生牙周破壞時，這個區域 bone breakdown 的速度會更快。若牙根有 dilaceration 情形，則該顆牙不予計分。



常見錯誤

上顎常見錯誤在側門牙、犬齒與第一小白齒，而下顎常見錯誤則出現在第一小白齒。

以上我們先針對 ABO grading 的 criteria 及 rationale 做闡述，下一期的 NTO，我們將以一個 finished case 的模型及 pano 來示範實際測量標準及方法。

Referecnce

1. Casko JF, et al: Objective grading system for dental casts and panoramic radiograph. Am J Orthod Dentofacial Orthop 1998;114:589-599
2. Chang CHN. Beethoven Orthodontic Mobile Learning Program. Advanced Damon Course No. 4: Dr. Pitts' secrets of finishing. 2008; Newton's A Ltd Taiwan.

Exam Year	<input type="text" value="Auto-Fill"/>
ABO ID#	<input type="text" value="Auto-Fill"/>

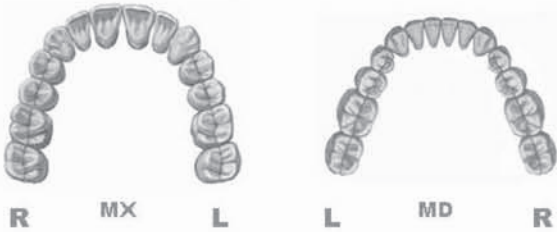
Examiners will verify measurements in each parameter.

**ABO Cast-Radiograph Evaluation** (Rev.6-1-08)

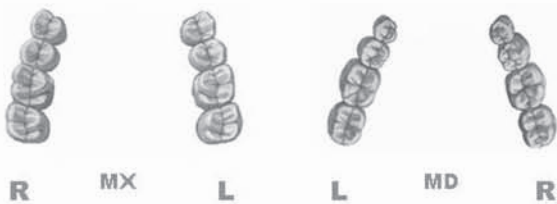
Case #  Patient

Total Score:

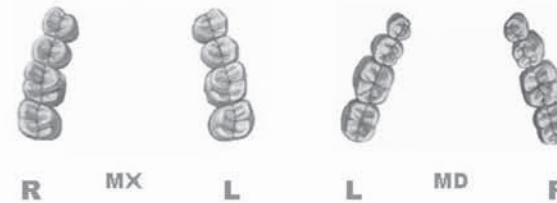
**Alignment/Rotations**



**Marginal Ridges**



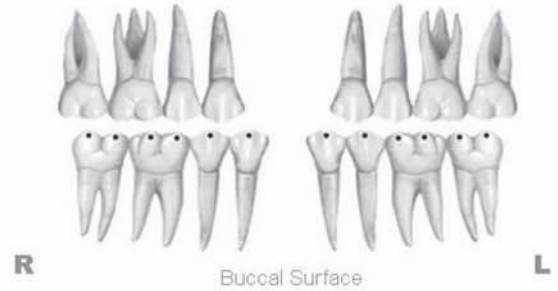
**Buccolingual Inclination**



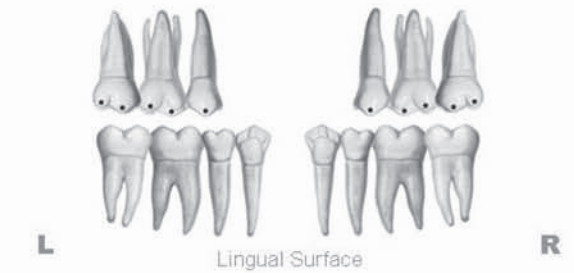
**Overjet**



**Occlusal Contacts**



Buccal Surface

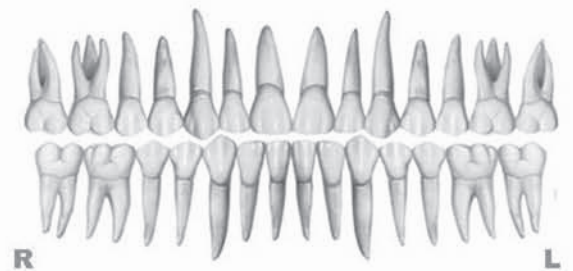


Lingual Surface

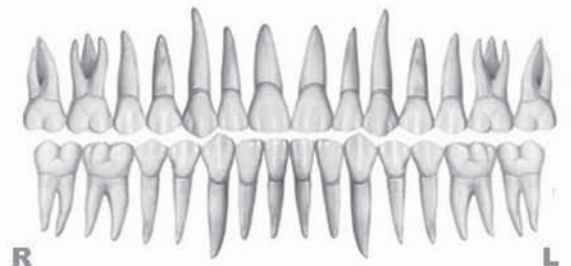
**Occlusal Relationships**



**Interproximal Contacts**



**Root Angulation**



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

# Early Treatment of Multiple Missing Teeth

## ~ Response for Unsolved Mystery

A healthy 5 year and 10 month old girl was brought to our clinic for a routine check up. Panoramic X-rays showed a total of 11 missing permanent teeth. The missing teeth were #18,15,14,24,28,38,35,34,44,45,48. In addition, there was an ectopic eruption of her upper right 1<sup>st</sup> permanent molar. Her primary dentitions were in solid Class I occlusion and her lower first permanent molars were about to erupt. The lower permanent central incisors were halfway erupting and came in contact with her upper primary central incisor with a lower midline shift 2 mm to the left. The treatment goals were to keep all the permanent teeth in occlusion and to preserve the dental alveolar bone for future implant.

Parents were informed the advantages and disadvantages of early treatment, and that their daughter would need at least 3 implants when she reached adulthood.

An upper Schwartz appliance with thin occlusal coverage was worn by the patient only at night. Her mother was instructed to turn the expansion screw once a week ( 1 turn = 0.25







mm ) for upper arch development and to allow the permanent molars and incisors to erupt into a better occlusion.

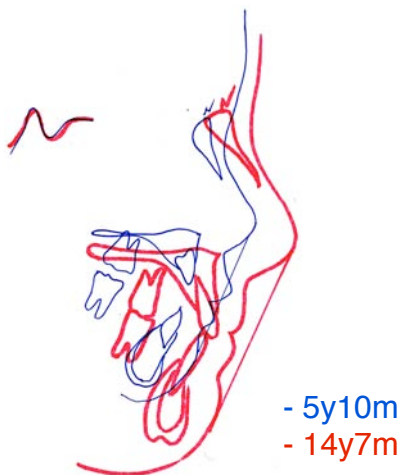
The patient was very cooperative with the treatment. The appliance was active for 8 months and she wore the appliance as a retainer until she lost her upper right primary 2<sup>nd</sup> molar.

At the age of 7 years and 9 months, her 1<sup>st</sup> molars had fully erupted. At this time a new appliance was made to distalize her upper right 1<sup>st</sup> molar in order to create the space for a #15 implant in the future.



At the age of 10 years and 8 months, a fixed appliance was placed on the upper arch. At the time her mother requested closure of all the upper space so that her daughter would require only two lower implants in the future.

The patient had worn the upper fixed appliance for 2 years with multiple no-show appointments. The fixed appliance was removed at the age of 12 years and 8 months. An upper Hawley retainer and a lower 3-3 spring retainer were worn at night only. There was no fixed appliance put on her lower arch. We have since obtained a reasonable occlusion and esthetic result.



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# Apically Positioned Flap in Exposing an Impacted Maxillary Central Incisor

上顎側埋伏齒是在矯正過程中很常遇到情況。Dr. Vincent G. Kokich 曾經仔細描述過上顎側埋伏齒的三種露出手術方式 (Kokich 2004)，包括：

1. **Excisional Uncovering**：直接把覆蓋在埋伏齒上的組織切除以利牙齒萌發。
2. **Closed Eruption Techniques**：經由翻瓣手術把覆蓋在埋伏齒上的骨頭或軟組織移除，必要時並黏合上所需的矯正裝置後，再將翻瓣縫合回原來位置。
3. **Apically Positioned Flap**：經由翻瓣手術把覆蓋在埋伏齒上的骨頭或軟組織移除，必要時並黏合上所需的矯正裝置後，將翻瓣往牙根間方向縫合固定。

此三種術式各有其不同的適應症，Dr. Kokich (2004) 在其文章中已有詳細的探討，大家可以自行參考。本期的 NTO 將就其中較為複雜的 Apically Positioned Flap 部份，提出一案例仔細來探討手術的翻瓣設計細節與步驟，希望對大家在處理這一類的病例時，能有較為具體的方向。

**病例：**患者為一位七歲孩童，由其母親陪伴求診。其母敘述患者於幼稚園時，因跌倒撞擊到上顎門牙，可能因此導致上顎左側門牙阻生無法正常萌出 (Fig. 1)。患者希望經由矯正的處理達到理想的牙齒萌發和排列。

臨床檢查發現埋伏牙的牙冠位置約在 Mucogingival Junction 的上方 (Fig. 1)。為避免牙齒從 mucosa 長出造成



Fig. 1

日後角化牙齦不足，影響牙齒美觀、以及口腔衛生照護的容易性，我們決定為病患採取 Apically Positioned Flap (APF) 以增加角化牙齦，並合併矯正裝置來引導牙齒萌發至適當位置。



Fig. 3

由病患取得的 3D 影像資料及 panoramic radiograph (Fig. 2) 中，我們可以清楚的知道門牙的位置以及目前牙根的生長狀態。一般而言，牙齒的萌發時機約在牙根發育 1/2 至 2/3 的時候。如果太早施以矯正力量使其萌發，會影響牙根的正常發育；相對的，異位的埋伏牙如果沒有及時施以矯正力量將其引導至正確的萌發方向，則會造成牙根在形成過程中碰到較硬的 palatal cortical bone 而順勢彎曲，形成 dilacerated root (Fig. 3)，造成日後矯正處理上的困難。

觀察患者的 3D 影像 (Fig. 2, 右) 可以知道此時牙根約已形成 1/2，是個合適的手術時機。因此決定及時施行 APF 露出手術以及矯正治療。



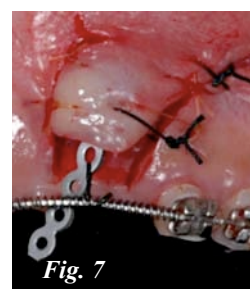
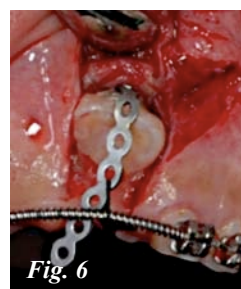
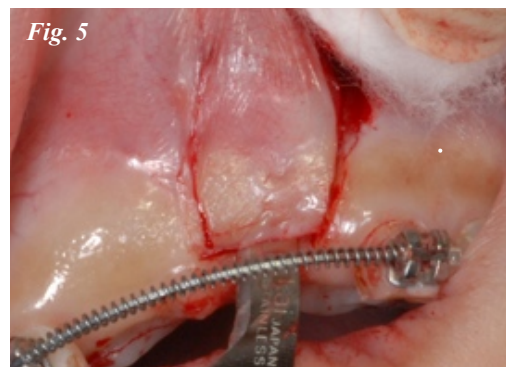
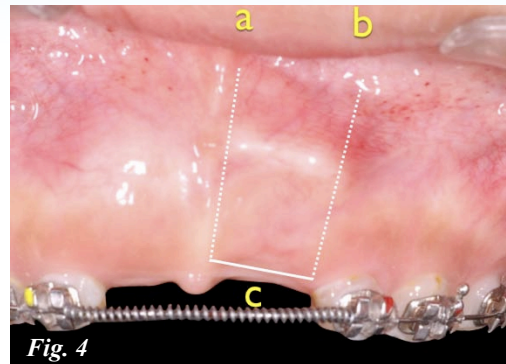
Fig. 2 3D 影像資料及 panoramic radiograph

蘇乙洋醫師 (左) 貝多芬矯正課程講師 新洋牙醫診所  
張慧男醫師 (中) 貝多芬矯正中心負責人  
邱上珍醫師 (右) 貝多芬矯正課程講師



### Apically Positioned Flap 的術式設計及討論：

1. 首先將門牙區先以 open coil spring 維持住所需的空間。而後如 a, b 所示 ( Fig. 4 ) 在埋伏齒兩側由 apical 往 coronal 方向做兩條平行切線。此兩平行切線的設計可使之後 flap 往根間向移動時，避免 flap 兩側出現縫隙，以利傷口癒合。
2. 接著在 coronal 方向約等同於相對應牙或鄰接牙的 free gingival margin 處以 internal bevel incision 方式作一水平切線 ( Fig. 4, c and Fig. 5 )。如此的設計可以使我們保留大量的角化牙齦。此外，水平切線的兩側要距離 papilla 約 3 mm，避免直接切到 papilla 造成日後鄰牙可能的牙齦萎縮。
3. 由 coronal 方向以 partial thickness 方式逐漸翻開 flap；當接觸到牙齒時轉為 full thickness flap 露出門牙，直到整個門牙的 CEJ 之上均已暴露出為止。
4. 將 button 黏在門牙的 labial side 上，並接上 elastic chain，以利後續的矯正牽引 ( Fig. 6 )。
5. 將 flap 往 apical 方向移動，可能的話，將 flap 的水平切線對齊在 Mucogingival Junction 的位置而後縫合 ( Fig. 7 )。
6. 由咬合面可以看到暴露出的左上門齒，以及往根間方向移位的 flap ( Fig. 8 )。
7. 術後請患者以漱口水 chlorhexidine，一天三至四次漱口，並持續回診進行後續的矯正治療。



**結論：** Apically positioned flap 是在處理上顎頰側埋伏齒露出時很常應用的術式，只要掌握描述的幾個原則：

1. Mimic the nature growth，模擬牙齒的自然生長的形式。
2. Eruption from mucosa should be avoided，避免牙齒從 mucosa 長出。
3. 3 mm away from papilla，不要 cut papilla，切線離 papilla 3 mm，相信您一定可以得心應手的進行相關處理，並達到理想治療效果。

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1. Hsiao HY. 3D Control of An Ectopic Tooth. News and Trends in Orthodontics 2008;9:8-9.
2. Kokich VG. Surgical and Orthodontic Management of Impacted Maxillary Canines. Am J Orthod Dentofacial Orthop 2004; 126: 278-83.
3. Chang CHN. Beethoven Orthodontic Mobile Learning Program. Advanced Damon Course No. 1: Impacted Tooth. 2008; Newton's A Ltd, Taiwan.

# Dental Morphological Relation to the Bonding Position

Do you have problems bonding the upper first premolars? Do you feel its unusual anatomy affects accuracy of the bonding position? Do you need detailing bending frequently at the finishing stage? After this article, we hope you no longer will have problems bonding the upper first premolars.

## Mesial/Distal angulation on the buccal view of the upper first premolar

In most cases, because of the different length of the mesial and distal slopes of the upper first premolars, it gives us the illusion that the tooth is tilting ( Fig. 1 ). Therefore, we should not use mesial or distal buccal slopes as reference to position the bracket. Instead, we should use the marginal ridge ( blue arrow ) as reference. If there is no marginal ridge discrepancy between adjacent teeth, we should position the occlusal part of the bracket base parallel to the marginal ridge ( Fig. 2 ).

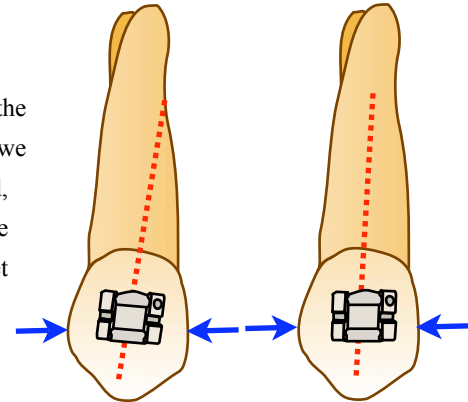


Fig. 1

Fig. 2

## Mesial/Distal position on the occlusal view of the upper first premolar

In the normal alignment of upper premolars, the line between the buccal cusp ridge and the central groove is not anatomically parallel. Because of this character, it is likely for clinicians to put the bracket at a more mesial location ( Fig. 3 ) and cause a break of the alignment of the central groove. Therefore, it is suggested to put the bracket more distally (still on the height of contour) parallel to the central groove ( Fig. 4 ).

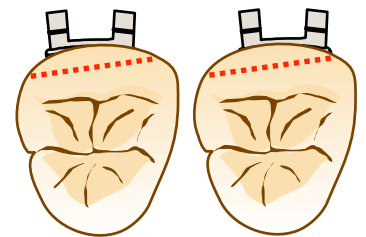


Fig. 3

Fig. 4

## Vertical position

When we consider the vertical position, the first thing we should notice is that there are different cusp lengths over the buccal side from canine to molar. In addition, there is usually some asymmetrical attrition on the adult dentition. Thus, it is unwise to use them as reference. Therefore, we should use the marginal ridge or the contact area in a healthy periodontium as reference (Fig. 5). After determining the proper premolar position, we can use upper first premolars to place the canine bracket and then transfer it to the canine bracket position. The vertical position of the distal contact area should be on the same level of the marginal ridge of the upper first premolars.

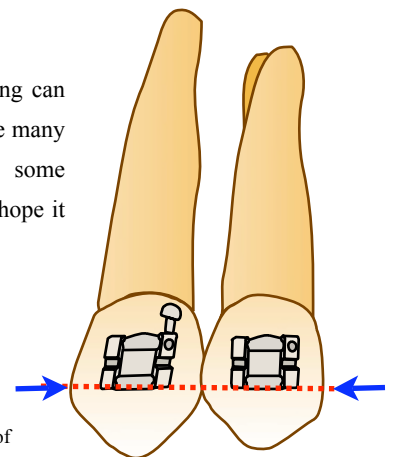


Fig. 5

## Conclusion

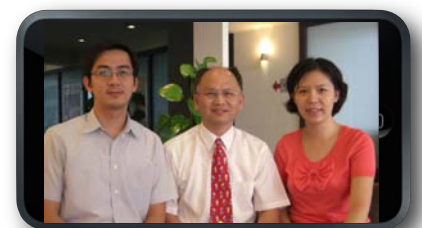
Bonding is the most important step in the pre-adjusted appliance mechanics. Precise bonding can reduce the need for wire bending and the complexity of finishing and detailing. However, there are many morphological characters that affect the bonding position. In this article, we discussed some morphological characters of upper first premolars and their relations to the bonding position. We hope it will help you achieve a more accurate bonding position on the next bonding appointment.

## References

1. Tom Pitts' lecture in Taipei 11/15/2008
2. Wheeler's Dental Anatomy, Physiology, And Occlusion six edition
3. Chang CHN. Beethoven Orthodontic Mobile Learning Program. Advanced Damon Course No. 4: Dr Pitts' secrets of finishing. 2008; Newton's A Ltd, Taiwan.

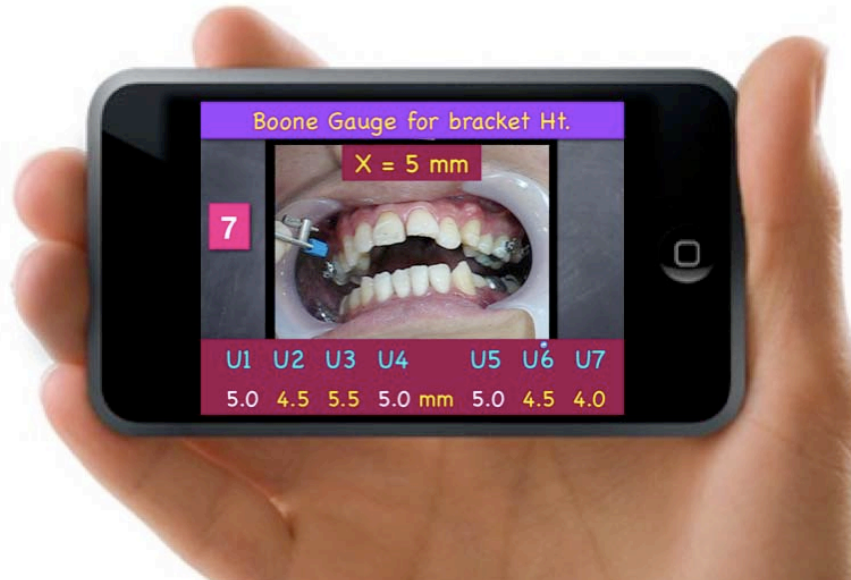


Dr. Hao-Yi Hsiao (left) Beethoven Orthodontic Course Lecturer  
 Dr. Chris Hwai-Nan Chang (middle) Beethoven Orthodontic Center Director  
 Dr. Shang-Chen Chiu (right) Beethoven Orthodontic Course Lecturer



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# Orthodontic Motto

## 1 迴響

幾位 Damon system 的講師中，我個人最欣賞的，莫過於 Dr. Tom Pitts 了。這兩年來有幸聆聽他的幾場演講：從 2007 年在台北舉辦的亞洲 Damon 大會 - Finish and Detailing，2008 年初美國鳳凰城 Damon 大會 - Finish from the Start，直到這次的個人專題演講 - Optimal esthetic orthodontics and Finishing techniques。三場演講下來，深深感受到 Dr. Tom Pitts 將 Damon system 在臨床操作的技巧與病例的完成度不斷地向上提升：

- (1) Finish and Detailing：強調在矯正末期的各項 Finishing 和 detailing 之技巧。
- (2) Finish from the Start：從矯正之初便配合 Torque selection、Early light short elastics 及 Bite turbo 等三項利器更有效率地完成病例。
- (3) Optimal esthetic orthodontics and Finishing techniques：利用 Damon bracket 以獨創的黏著高度來保留 Smile arc 並且更輕鬆地讓側方咬合 settling down 來達到顏面美觀與理想咬合的雙贏局面。

11/15 這場演講，除了感受 Dr. Tom Pitts 嶄新技巧和 case 完美 finish 的衝擊外，最後和他的台灣病人 Michael 相見歡那一幕，更感動於他和病患間的深厚友誼。

使用 Damon system 不知不覺也五年多了，卻能讓我一直保有著初學時的衝動與熱忱，這都歸功於 Dr. Tom Pitts 等醫師，在讓這套系統更臻完美境界之餘，還戮力於世界各地推廣 Damon system 的臨床教育。有朝一日 Damon system 必定會成為溝通世界地球村的橋樑，我想一點都不為過。



百立牙醫診所 吳致賢 醫師

## 2 迴響

### 寶藏

在日新月異、科技發達的今天，「電腦」早已成了現代人生活的一部分，但對一個年過半百且從未接觸過電腦的我來說，是一件多麼令人為之卻步的難題。凡是需要透過電腦處理的相關事務，都必須向診所的助理小姐請求協助，更遑論做簡報之類的繁雜工作。直到有一天，認識了 Keynote，Keynote 上圖形化的工具列，簡單易懂，用直覺的反應就可以將矯正圖片快速插入而且變化多端，就連我這個電腦新手都能在短時間內駕輕就熟，使用之後更讓我愛不釋手。誠如蕭浩宜醫師所言：Keynote 鼓舞創意我的靈感。


人生就像不斷的在追尋寶藏，從天南到地北，從年少到老邁。在新竹，以「金牛」為單位的「金牛頓藝術中心」，是一處蘊含各式各樣、五花八門的金礦山，包含了 Keynote、OBS、矯正新知、科技新知……等，俯拾即是珍貴的寶物。

在這寶藏裡面更告訴你 OBS 植入的部位、時機、方式以及施力的大小，鉅細靡遺的教導你。連可能發生的狀況，事後的處理都有詳細的說明。Artificial Bone 的實地操作更是令人拍案叫絕，像我這樣手腳笨拙的人也能輕鬆的學會。每一次求取矯正知識，每一次都有不同的感受，不僅教你基本的觀念，更拿出最新的臨床病歷說明，這些矯正新知在我處理臨床上受用無窮。

「金牛頓藝術中心」裡所陳列的寶物琳瑯滿目，取之不盡也用之不竭，尋找知識寶藏的你還不付諸行動，不怕你來挖寶，只怕你自己未曾發現。



興達牙醫 朝輝雄 醫師



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## Orthodontics is not hard, if you know how to position brackets!



### 3 迴響

在一個偶然的機會下，張醫師大力推薦我們參加 Dr. Tom Pitts 的演講。在演講中，Dr. Tom Pitts 將他的經驗與他使用 Damon System 新發現分享給大家。其中我對於 bracket position 與他的研究執業態度留下深刻印象，並影響也改變我的想法。

那天 Dr. Pitts 將他的每個 case 的每個階段做完整的記錄，便於觀察每個 case 的矯正過程，並做適當的調整。聽完這場精彩演講，我相信都深深影響到每個人，從初起評估到實作過程最後完成整個療程，都需要精確細膩的分析與思考，選對 bracket torque, bonding 在對的 position，讓每個 patient 都能達到最好的 finish。

最後，我也很敬佩 Dr. Pitts 對人生的態度就是他能接受改變，並且對他那種活到老學到老的精神，讓自己時時保持在學習的狀態！



怡仁醫院  
施甄甄 醫師

### 4 迴響

#### 犀利的 Bonding，神奇的 Smile Arc

從來沒想到過，居然有人把矯正器黏到那麼靠近牙肉的位置（Gingivally），而且 Bur 一拿，就能恣意的雕出牙齒完美的外型（Reshaping），重現前牙完美的黃金比例。更神奇的是，矯正後病患迷人的 Smile Arc，真是把 Dr. David Sarver 經典的 Cosmetics 精髓發揮到極致。最近看矯正病患的時間變長了，因為很多病患 Brackets 拆掉重新 Bonding，也在嘗試將牙齒 Reshaping，或許有一天矯正病患會當著醫師面前大聲說出：“給我 Smile Arc”，其餘免談！

感謝 Dr. Tom Pitts 在矯正學上又帶給我們一次心靈衝擊，雖然“From Good to Great”，仍然是一條漫長的道路。但我們確實又大大往前邁出了一大步！



屏東千鼎牙醫診所  
李裕隆 醫師

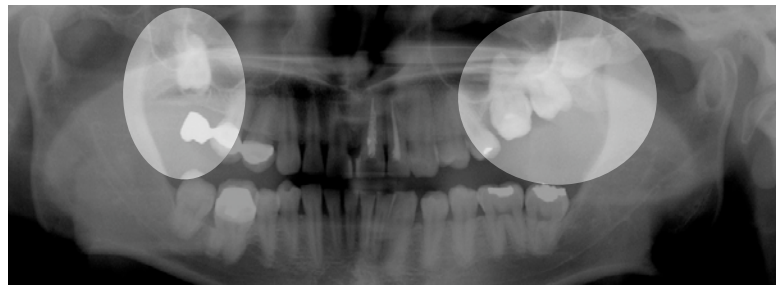


# Unsolved Mystery :

## Ankylosed Upper Posterior Teeth



The pursuit of excellence is a never-ending journey. NTO aims to provide a platform for world-wide orthodontists to exchange and share their clinical experience so together we can move further and faster. From last year on we were opening a column to publish difficult cases that our readers encountered in their practice. We invite our colleagues to brainstorm and share with us your clinical analyses and treatment plans. Our consulting team will together review these ideas and select the best one to be published in the next issue. NTO will give out a box of the latest OrthoBoneScrew as a token of appreciation to the orthodontist whose plan is selected. The complete set includes one handle, 2 blades and 20 pieces of screws in a carrying box, and is worth of USD 1500.



A 32-year-old male complained about posterior open bite on the left side. From the panoramic and cephalometric radiograph, we found #17, #26, #27, and #28 did not erupt fully, which were suspected of ankylosis. Besides, deep bite was observed. We appreciate many of our colleagues have been sharing with us your clinical insights and look forward to seeing more responses from our readers. Please send your treatment plans to [beeth.oven@msa.hinet.net](mailto:beeth.oven@msa.hinet.net) by February 28, 2009.



# Response for Unsolved Mystery ( NTO 12 )

The unsolved mystery published in the 12<sup>th</sup> issue of NTO received a wide range of responses from our readers and we are pleased to facilitate such an enthusiastic participation of learning and sharing. After a thorough discussion among our consultants, we are glad to report that Dr. Hong-Po Chang (張宏博)'s treatment plan is most recommended among all the received proposals. He will receive one super set of OrthoBoneScrew which includes 20 screws ( no squared-holes ), 2 blades, one handle and one container. We have also selected two quality treatment plans provided by Dr. Chiung Hua Huang (黃瓊嬋) and Dr. Huan-Wen Chen (陳煥文), each of who will receive 10 screws in appreciation of their generous contribution to our collective learning.



## Dr. Chang's Treatment Plan

1. Firstly, leveling and alignment of maxillary dentition should be performed, by-passing the ankylosed canine. Vertical elastics may be used to achieve intercuspation except the canine.
2. The ankylosed canine can be freed merely by light luxation, breaking the area of ankylosis and an immediate continuous force can be used to position the tooth orthodontically into the arch. The orthodontic force must be reactivated every 10 days if the elastomeric chains are used. Surgical luxation of ankylosed teeth to break the ankylosis and allow orthodontic movement of the tooth has been used with considerable success ( Newton 1957, Albers 1986 ). The patient should understand that the treatment may either not produce movement of the tooth or result in the need for endodontic treatment.
3. An alveolar distraction osteogenesis and immediately reposition the dentoalveolar structure might be considered if surgical luxation followed by orthodontic traction of the ankylosed canine failed.
4. Otherwise extract the ankylosed canine and restore with a bridge or a dental implant later, when growth had ceased.

Dr. Hong-Po Chang

School of Dentistry, Kaohsiung Medical University, Taiwan



## Dr. Huang's Treatment Plan

U3 ~ 3 High Q brackets

Plan I

1. Rebond #15 to correct mesial tilted root and to create space for corticotomy.
2. Corticotomy of the ankylosed canine.
3. Put OBS on R't buccal shelf ( between #46 & #47 ).
4. Starting Class II elastics to pull down the ankylosed canine and distalize R't upper dental segment.
5. Use power chain from R't lower posterior main archwire to OBS in order to slightly intrude and correct torque of #43 ~ #46 which is resulted from previous vertical elastic.

Plan II

If the ankylosed canine still failed to come down, try surgical luxation or autotransplantation to bring the canine into occlusion.

Dr. Chiung-Hua Huang



## Dr. Chen's Treatment Plan

1. Remove main wire of the upper arch
2. Self-adjustment for a period of time ( Upper right segment may be downward ).
3. Put OrthoBoneScrew at the upper right side to distalize #15, #16, #17.
4. Inter-arch elastics for correction of #11, #12, #41, #42.
5. Treatment of ankylosed canine: Single Tooth Subapical Osteotomy
  - 如果下移量不多時，直接放至定位和鄰牙固定;如果下移量多時，則用 wire 慢慢往下拉，或利用 elastics 和下牙對拉 ( The most importance is blood supply ) 。
6. Treatment of retrusion of labiomental fold : Jasper Jumper, Forsus,...etc.

Dr. Huan-Wen Chen





Newton's A

## 金牛頓藝術科技

## 2009 課程表

類型	課程名稱	內容	開課日期	上課對象
免費推廣	iWork系列：免費 個人化的印刷品	Pages	1/3, 2/7 (六) 15:00~16:00	樂於嘗試生活科技應用者
免費推廣	iWork系列：免費 簡單上手的多媒體簡報	Keynote	1/10, 2/14 (六) 15:00~16:00	樂於嘗試生活科技應用者
免費推廣	iLife系列：免費 多采iPod影音生活	iPod + iTunes	1/17, 2/21 (六) 15:00~16:00	樂於嘗試生活科技應用者
免費推廣	iLife系列：免費 剪輯數位生活影像	iMovie + iDVD	1/24, 2/28 (六) 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. Keynote入門 2. 常見簡報問題	3月19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 Dr. Kokich的十大秘訣	1. 多媒體簡報製作 2. 簡報演練	4月16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 掌握賈伯斯的演講秘訣	1. 簡報設計 2. 演說技巧	6月11日(四) 09:00~17:00	科技人、醫師、教師、學生
青少年簡報	魅力領袖簡報營	1. 簡報入門 2. iLife + iWork導覽	2009年2月5日~2月6日 09:00~17:00	國一至高三學生
International	Keynote, OBS & Damon Workshop	Keynote, Management OrthoBoneScrew & Damon	2009/3/02 ~ 3/05	International Dentists

注意事項：上課期間欲租借教學用電腦，酌收維護費200元。

上課地點：金牛頓藝術科技教育中心（交大華廈2樓）新竹市建中一路25號（巴士馬偕醫院下車步行5分鐘）

報名專線：03-5735676 黃小姐 金牛頓網頁：[www.newtonsa.com.tw](http://www.newtonsa.com.tw)



ONE size fits  
all

# Ortho Bone Screw



diameter	length	squared-hole	code
2 mm	12 mm	No	OBS 2.0
2 mm	12 mm	Yes	OBS 2.4

OBS 訂購專線：03-573-5676 呂小姐  
金牛頓網頁：[www.newtonsa.com.tw](http://www.newtonsa.com.tw)

“An excellent instructive and reference text for postdoctoral orthodontic students and specialist clinical orthodontists. Definitely recommended reading!”

—Alex Jacobson, associate editor of *AJODO*

