Non-extraction, Non-surgical Treatment on Severe Class III
Dr. John Lin

Future Trends in Orthodontic Education
Dr. Eugene Roberts

Damon’s 3 Essentials in Maximizing Your Orthodontic Results
Tips from Dr. Tom Pitts
快速入門矯正，高效學習法

學會開始做矯正需多久？
42 小時讓您入門矯正，本課程採用高效學習法及高效矯正練習法。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，讓您親自練習，立即熟悉各種面帶的技
巧，而不需太多課後複習。本課程以 In-Office Training 方式，用病例學術分析-診斷，治療計畫與操作技巧，每
一步程序以圖片及影片輔助，讓您盡最短時間內學會任何細節，更不用擔心不懂或無法理解的可能。為提高課後自學
能力及臨床印證之效率，另備有教學電子儀，供學員家中練習。我們的終極目標是：
用最短時間，最多數的方式，讓每位學員。

熱愛矯正學，熱愛學矯正

高效矯正實習表（矯正基礎班）
1. Initial Consultation
2. Initial Record (Pano + Cephal + TMD + Photo + Model)
3. Final Consultation & 1st Plan
4. Bonding & Bonding (結蒂牙、金牙、自體、埋伏牙、舌側維持器)
5. Archwire Adjustment & Bending
6. Refine & Power-Chain & Clinical Tips
7. De-bonding & De-bonding
8. Retainer (Removable & Fixed)
9. Orthodontic Crew Implantation
10. Assistant Training & Patient Instrument Selection
11. Orthodontic Material & Instrument Selection
12. Practice Management & Office Design

Damon 高效矯正實習表（In-Office course Trainings）

台灣 DAMON 課程專線：(02)27786315 劉姿珮、邱美珍，(03)5711230 林美杏，(07)5361701 王惠靜
Passion for Learning

It was a PRIVILEGE for me to give a presentation at the annual meeting of the Progressive Study Group. The Progressive Study Group was organized by Dr. Tom Pitts and consisted of 30 active members. For the past 30 years Dr. Pitts only invites humble orthodontist who are “givers” and who are into excellence. What a wonderful objective! I have yet to hear of a better goal for a study club.

This year the meeting was held in Málaga, Spain (home of Picasso). It was a gorgeous spot for meetings. I was assigned to present on how to use our Taiwan’s OrthoBoneScrew to treat impacted cuspids. As usual, I used my favorite software, Keynote to demonstrate how visual-rich the messages could be and I was glad they were warmly received by this gracious crowds. After the presentation many came to me to ask questions, such as: how can I learn to use this screw? how much time do I need to master Keynote? As renowned orthodontists who are over 60s, it is quite extraordinary to witness their ever-lasting fever to learning. A more common scene would have been people patting your back and said good “job” or “interesting” . Only few will actually make a start. But this group is different. They exude passion, energy, and enthusiasm in their work and life. That is why they have become excellent orthodontists and peak performers as doctors and moreover, as educators.

This trip reminds me of the 20 years’ study of Dr. Charles Garfield about “Peak Performers”. He concludes that peak performers are:

1. Not born - they are made.
2. Not superhuman with special talents - but average people like you and me.
3. Not workaholics - but they are committed to results, not activities.

Those doctors in the Progressive Study Group have intense commitment to what they do and what they want. They credit their success more to such passion than to aptitude. This issue we will introduce some of the subjects featured in this year’s meeting in Spain. I’d like to end with a quote of Shakespeare: “our future lies not in the stars but within ourselves”. It is the passion of learning that makes all the difference.

Chris Hwai-Nan Chang, DDS, PhD, Publisher
A severe CIII asymmetry and open bite case came for consultation. The author proposed to treat with surgical correction but the patient insisted in using orthodontic treatment only. Facial asymmetry did factor in when choosing the treatment options.

Two 2 mm X 12 mm stainless steel OrthoBoneScrews were placed over buccal side between lower first and second molars*. After 2 months of alignment using the Damon system, the closed coil springs were then adopted to retract the whole lower dentition distally. Initially about 12 oz of force was applied on the right and 10 oz of force on the left side.

The center of rotation of the whole lower dentition is near the apical region of bicuspids. The force direction is above it. So the counter-clockwise rotation of the occlusal plan happened, it means not only the whole dentition was distalized, but also the lower molars were intruded and the lower anterior teeth were extruded. After 10 months of distalization using mini-screw, the CIII malocclusion was corrected to Class I and the open bite closed. During 10 months of
retraction by OrthoBoneScrews, no anterior box or vertical elastics were used. The major open bite was mostly corrected by rotation of the occlusal plane. After the OrthoBoneScrew and Damon treatment, not only occlusion but the facial appearance were improved significantly.

Conclusion: Until OrthoBoneScrew severe Class III cases could only be treated with the combination of traditional orthodontics and orthognathic surgery. The distalization of the whole lower dentition using buccal shelf OrthoBoneScrew offers a very powerful treatment option for treating severe Class III cases.

(*I’d like to thank my periodontist colleague, Dr. Huang Yi-Hao, who successfully placed the buccal shelf OrthoBoneScrew for this patient.)

Recommendation of “Creative Orthodontics”:  
“... The author enthusiastically endorses the Damon system of orthodontic treatment. The advantages of combining OrthoBoneScrews and bite-jumping appliances with the Damon system are discussed. The text is replete with numerous color photographs and sequences of magnificently treated cases. In all, an excellent instructive and reference text for postdoctoral orthodontic students and specialist clinical orthodontists. Definitely recommended reading.”

Alex Jacobson  
Associate Editor (AJODO)  
Birmingham, Alabama
Future Trends in Orthodontic Education

Eugene Roberts, DDS, PhD
Jarabak Professor of Orthodontics at Indiana University School of Dentistry
Consultant of NTO

International adjustment to the current economic crisis is expected to have a profound influence on many educational programs, including graduate orthodontics. Appropriate training of an orthodontist is an expensive enterprise that must be funded by the student, private and/or public sources.

There are two paths for formal orthodontics training leading to clinical certification. The most common approach is a university program, usually based in a dental school. The second avenue is a hospital-based residency. Each approach has strengths and weaknesses, so the specialty of orthodontics is best served by a combination of the two. However, this balance is being threatened by escalating costs of health care education which has considerably exceeded the rate of inflation for many years. Traditionally, private universities have relatively higher tuition and fees, but in recent years the costs have also been rising very rapidly in many public universities. Ultimately, these high costs (the “tuition bubble”) are passed on to students. Since hospitals have public health funds to finance orthodontics residencies similar to medical programs, the residents are paid and there are usually few if any educational costs. Hospital-based residencies will be increasingly attractive to potential students.

Cost of Orthodontics Training

Financing graduate orthodontics training is emerging as a serious dilemma for many institutions. Orthodontics students often have high debts acquired from their previous education. As a student assumes more debt, less borrowing can be publicly guaranteed and the interest rates increase for additional funds. Consequently, many students acquire a staggering debt by the time they graduate. To compound the problem, lending institutions are having trouble providing sufficient funds for student loans because of the current liquidity crisis.

Universities require the funds at the time that the education is rendered. If students are unable to borrow adequate money to fund their education, universities will have a financial crisis.

Funds for student loans are provided by investors. They are relatively safe long-term investments, if inflation is moderate and there is a low risk of default. Typically, investors buy bonds issued by lending institutions that then loan the money over a long period of time at a relatively low rate of return. Therefore, investors are very concerned about potential inflation. Because of the dramatic increase in energy costs, inflation is expected to accelerate worldwide which will decrease the supply of low cost funds to support orthodontics education. The “tuition bubble” may
burst resulting in a financial crisis for educational institutions.

**Hospital Residencies**

Orthodontics residencies are well suited to hospital settings because orthodontists provide important support for surgical and restorative programs. Since residents are paid and have little or no educational expense, a larger proportion of hospital-based residencies would help ease the financial burden for some students. However, research and didactic training may be compromised because hospital residencies are an intense clinical experience. There are also restrictions for foreign applicants because residents must be licensed by the state. The latter may require a US or Canadian dental degree, national board certification, and passing a regional clinical examination.

**Program Length**

Because of the increasing complexity of orthodontics, there is a trend toward three year programs. Compared to a two year program, the additional education requires borrowing more money for educational and living expenses, and there is a delay in the entry of the student into a financially productive career. It will be much easier for hospital-based and relatively low cost university program to increase program length. High cost institutions must increasingly focus on a good quality, compact education in as short a period of time as possible.

The universities with the highest tuition, fees and costs of living will be under increased pressure to retain two year programs. Furthermore, it will be difficult for accrediting agencies to increase the minimum program length, although it may be politically popular to do so. If it is necessary to increase program length to say 36 months, it would be wise to consider a composite program. For instance, the first two years in a traditional university setting (didactics, research and the initial clinical experience) with the last year in an affiliated hospital or private practice. In effect, an intense two year didactic program would be followed by a paid or low tuition clinical residency in an approved private practice.

**Private Loan Funds**

University alumni associations and orthodontics societies could underwrite student loan programs through lending institutions that require membership. By buying bonds to create specific loan funds for their constituency, professional associations could build loyalty and sustain membership. Annual donations over a period of time would build into a substantial fund that would be self perpetuating as students repay the loans with interest. Otherwise, heavily indebted students who do not perceive adequate, immediate benefits of membership, may opt out of alumni associations and professional societies.

Indeed, orthodontics graduate education faces substantial challenges, most of which are financial. Providing a high quality education that students can afford is the immediate need.
前牙 torque 的控制會主宰矯正治療的效率及結果，並且會影響治療結果的穩定性。自從 Dr. Andrew 在 1970 年代提出 “Six keys to normal occlusion” 之後，緊接著 Straight wire appliance 問世，使得矯正治療因為不需要複雜的 wire bending 而變得相對簡單許多。但如何讓 bracket 內建的 prescription 完全展現出來，則是我們矯正醫師所要面對的另一項重要課題！首先，我們必須要知道，前牙的 torque expression 並不完全等於內建的 torque prescription，前牙 torque 的展現與 bonding position、牙齒的 labial convexity、是否有 retraction mechanics 以及 size of finishing wire 息息相關。本次我們先針對 bonding position 以及牙齒的 labial convexity 做討論。

根據 Dr. Vigorito 2006 在 JCO 上所發表，針對 50 顆 extracted maxillary central incisor 所作的研究指出，如果以上頸正中門牙牙冠的 midpoint 為 bonding 參考點，當 bonding position 每往 incisal 方向推移 1 mm，就會增加 3°的 labial crown torque，也就是前牙會往外 flare 3°；而當 bonding position 每往 gingival 方向推移 1 mm，則會產生 5°的 lingual crown torque，也就是前牙會往 lingual side tipping 5°，但以上是在沒有使用 retraction mechanics，也就是不拔牙且 wire 沒有 cinch back 的情況下才會產生這樣的结果。此外，牙齒唇側面的 convexity 愈大，bonding position displacement 所造成的 torque expression 改變就會愈大！在 Dr. Vigorito 的研究中，在唇側面弧度特別明顯的牙齒上，即使 bonding position 的位置相對於 midpoint of the crown 只偏移 1 ~ 3 mm，torque expression 的差異可能會達到 25° 之多！

在某些病例中，我們可能會根據患者的 open bite 或 deep bite 情形，而將前牙 bonding 的相對位置往 gingival side 或往 incisal side 移動，由於門牙的唇側弧度通常不會太明顯，因此這種小幅度的 bracket level change 只會造成牙齒垂直高度與 archwire 相對位置的改變，對於 torque expression 的影響並不大。但對於某些因 skeletal discrepancy 導致前牙有明顯 dental compensation，需要特別改善 torque expression 並合併 severe open bite 或 deep bite
的病例，就必須針對個別病例做特別的 torque selection。

至於犬齒的 torque 則因為犬齒本身的唇側弧度很明顯，此外，在做 open bite 或 deep bite correction 時，通常四顆門牙會一起改變 bracket level，因此，單一顆犬齒的 bracket level change 將對 torque expression 有顯著的影響，常見的情形如犬齒 cusp tip 的磨耗。當一顆犬齒的 cusp tip 有 2 mm 的磨耗時，如果在 bonding 前沒有注意到而直接以 wearing 的 cusp tip 做參考點來 bonding，將使得 bracket level 在不自覺的情形下有 2 mm 的 gingival displacement，除了犬齒會有顯著的 vertical extrusion 之外，也會產生顯著的 lingual crown torque（Fig. 1），並導致上下顎的咬合無法吻合。所以，在矯正治療開始前一尤其是成人病患，必須仔細審視每一顆牙齒的 occlusal wearing 以及 bone level，以作為 bonding position 的基準。

如果發現牙齒有明顯的磨耗—尤其是上顎犬齒，應注意 bonding 時不要有太多的 gingival displacement 或過多的 extrusive step，以免造成 torque expression 的改變。至於 occlusal contact 應該在接近 finishing 時或矯正結束後，再做 lingual surface 的 reshaping，這一類的情形也告訴我們，當咬合的 interdigititation 不佳是 inadequate torque 所造成的時候，我們就無法期望在矯正器拆除之後還有任何的“occlusal settle”。這也解釋了為何 Dr. Tom Pitts 會在 bonding 之前 routine 先對所有的牙齒做 occlusal equilibration！

更正啟示：NTO Vol. 10 P.10 的第三段最後一句：“upper anterior 應選用 low torque，lower anterior 則選用 high torque”。因講者 slide 誤植，應改為“上下顎前牙都應選用 low torque”。很抱歉造成讀者的混淆，特此更正。
每一位矯正醫師不論使用哪一個系統，在矯正的完成階段，很難不使用 finishing elastics。就像中國人吃飯時，會自然而然拿起筷子，夾起美食送入口中一般自然而順暢，但學習矯正以來卻很難聽到一場專門為 finishing elastics 預備的兩小時課程，以下與您分享張顥男醫師的臨床經驗！

魔術工具：Class II 結合的整理橡皮筋

Fig. 1 Class II elastics 會造成上顎前牙 lingual tipping 及下頜前牙 flare out 的副作用。若是一開始即評估會使用大量的 Class II elastics 則可以使用上顎前牙的 high torque bracket 以及下顎前牙的 low torque bracket。另外，下顎 6、7 之間將主線斷開亦是增加效率的小技巧。

據歷史記載，西元 1728 年 Dr. Pierre Fauchard 曾以鐵線系緊的方法來關閉門牙牙縫。迄今已有許多的材料被嘗試用在關閉（拉緊）牙齦，以達到齒列矯正的目的。西元 1892 年 Dr. Calvin Case 發表以 inter-maxillary elastic 來矯正不良咬合的方法，elastic 正式成為矯正牙醫學不可或缺的工具之一。廿世紀初期以來，Dr. Angle, Dr. Tweed, Dr. Schudy 及 Dr. Roth 諸位矯正大師紛紛建議各種 elastic 的方向及戴法，西元 1963 年 Dr. Jarabak 及 Dr. Fizziel 更提出了 Class II elastic 的 biomechanics，就此確立了我們現今最熟悉的 Class II elastic 使用方法。

雖然我們都知道，矯正的完成需要病人配戴 elastic 是一件再自然不過的事，但是病人並沒有這樣的認知；所以在請病人合作之前，我們需要一再地解釋、解釋、再說明！明確的告知病人，原因、方式、方法、橡皮筋的型號，以及佩戴時間。一再的溝通及教育病人是非常重要！

市場的 orthodontic elastic 非常的多樣化，Dr. Ricketts 認為，上顎 635 gm 及下顎 550 gm 是適於生理移動的力量，或依照各牙根在骨內表面積總和，以 150g/cm2 換算後，依作用的方式、牙齒大小、距離及目的來做選擇。

在 Class II cases 中，當主線已經換到 full size main arch wire 後，選擇單側的 175~250 gm (6~7 oz) 的 elastic，每天更換四次，對於 elastics 的選擇要特別注意要長或短的 elastics 都有垂直向量的分力；在白天時，因為 function 的關係，垂直分力較多，而晚上休息時則水平與垂直向量較均衡。為此選擇的方式，張顥男醫師認為最重要的是“Read The Face”！在最短臉型 brachyfacial 的病例中，用 Class II elastics 使下顎牙齒向前移動，extrude 下顎後牙， tipping 下顎前牙向前，retract 上顎前牙向後，並造成 occlusal plane angle 改變，藉此解決前牙 overjet。但是對於長臉型 dolico facial 的病例，則要非常小心！

課程中，張顥男醫師特別提到在 Class II malocclusion 中，依 Damon System 的 anchorage control 方法，在需要牙齒移動較多的下顎，可將 lower 1st & 2nd molar 的主線剪除，並搭配上顎前牙 high torque 下顎前牙 low torque brackets 的選擇，可以有最佳治療效果，而且療
Class III malocclusion (Fig. 1)

Bi-lateral Class II (Fig. 2)

Class II left & ant. midline shift (Fig. 3)

Bi-lateral Class II’s & ant. open (Fig. 4)

Post. openbite (V elastic) (Fig. 5)

Post. open & ant. midline shift (Fig. 6)

Openbite in a specific area (Fig. 7)

“W” without a tail 3/4” 2 Oz. (Ostrich)
Damon’s 3 Essentials in Maximizing Your Orthodontic Results
Tips from Dr. Tom Pitts

Essential #1 – Begin with the End in Mind: Match Torque Selection to Case Goals

行動開始時就要知道終點在那裡！要讓牙齒呈現最後我們所希望的角度，最簡便的方法就是依據每一位病人不同的情況來選用 variable torque bracket。選擇矯正器時除了考量 crowding、是否抜牙，還有預計使用的 mechanics (elastics 也會影響 torque 的表現)。

一旦進入第一條方線，牙根便漸漸開始依照 bracket 上的 torque 設定開始移動，選用 variable torque bracket 的好處是讓牙齒提早開始適應，增加定位後牙根在骨頭的時間，所以在 debond 後牙齒角度相對的也較穩定。

談到在 passive self-ligating appliance 時的 torque expression，長期以來一般醫師普遍有個錯誤想法認為 archwire 必須緊密地壓住 bracket 的底部（即 fully engaged）才能表現出 bracket 的 torque。但其實 torque expression 實際上是因為方線的兩個邊緣接觸 bracket 相對的內壁 (opposing walls of lumen) 時就開始產生（Fig. 1）；而且整體的表現量必須扣除主線在 lumen 裡的 play，以及所使用的 major mechanics (如拉第二類橡皮筋) 造成的偏差量。

由 Pandis 主持的研究證明 Damon passive self-ligating brackets 對上顎門牙製造的 torque 和 conventionally ligated brackets 同樣地有效。兩者主要的差別在於 Damon bracket 沒有摩擦力； conventionally ligated brackets 則因橡皮圈或結紮線綁住而產生摩擦力。而 active self-ligating brackets 也有類似的摩擦力缺點。若要克服摩擦力就需要有產生更大力量的機制，而大的力量正是 Damon system 不想要的。

那麼該如何防止因 wire to lumen play 以及

Fig. 1 Torque expression
Essential #2 – Unlock the Malocclusion: Disarticulate the Arches with Bite Turbos

Just as de-occlusion of malocclusion, tooth movement takes on a more predictable process. In these cases where we are curetted or anterior guidance, the use of Bite Turbos can be used to our advantage. In these situations, for example, the use of Bite Turbos to improve archform is a proven technique. The following is a brief guide to how to use Bite Turbos:

1. Prevent the lingual root from moving, simultaneously avoiding bracket detachment.
2. Use light wire for arch development. This is especially effective.
3. Alter the inclination of the incisor for high or low angle cases.

Fig. 2a Initial bonding 0.014 CuNiTi
Fig. 2b 3-month progress 0.014 CuNiTi
Fig. 2c 7-month progress 0.014 X 0.025 CuNiTi
更有創造力地利用 Bite Turbos，對治療結果會有更深遠、廣泛的影響（Fig. 2）。

至於 high mandibular plane angle 的病例，Bite Turbos 的位置通常放在後牙區，除了利用 Bite Turbos 將後牙壓入，加上 elastic 輔助讓前牙 extrusion，進而改變 occlusal plane 使 mandibular plane angle 降低。相反的，low mandibular plane angle 的病例 Bite Turbos 則放在前牙區，合併使用 early light posterior vertical elastics，借助後牙 extrusion 修正 low mandibular plane angle 常伴隨的深咬問題。

當要修正後牙錯咬但前牙 Bite Turbos 放置有困難的時候，Dr. Stuart Frost 則在下顎第一大臼齒利用流動樹脂將咬合面填平，合併使用 early light crossbite elastics 來修正後牙錯咬。

**Essential #3 – Be Creative: Use Early Light Short Elastics for Early Inter-arch Correction**

一旦利用 Bite Turbos 讓上顎分開後，就可以依照最後的治療目標來決定 early light elastics 的方向。假如改善 Class II relation 是首要任務，則短的第二類橡皮筋將有助於早期牙齒基底的移動。或是 low angle case 主要考量是 ant. deep bite 的狀況，則可早期使用 post. triangle elastics（增加垂直分力），使後牙 extrusion。elastics 的設計可以考量水平和垂直的向量，只要有助於修正，幾乎任何位置都可以戴橡皮筋。

但是，在使用 early light elastics 時力量的控制必須非常注意。傳統上第二類橡皮筋是由下顎第一大臼齒拉到上顎犬齒近心處的 hook 上。在使用 early elastics 時，則擔心這樣的拉法會因水平向量的分力過大而造成下顎前牙外展；或因力量拉在犬齒位置（archwire 彎曲處）對牙弓形狀造成不利影響。所以若要在 initial leveling wire 上使用 early light elastics，就必須減小水平向量的分力，使不好的影響減到最少；因此 early light “short” elastics 是相當重要的概念！

我們以一個臨床病例來說明如何輕鬆使用以上三樣武器來改善 Class II large overjet。12 歲邱小姐因為上顎牙太暴來診所求助（Fig. 3），經檢查後發現兩側 molar 為 End-on Class II，canine Class II relationship，overjet 為 13mm（Fig. 4），upper incisors flare out，以及 upper arch spacing（Fig. 5）。在選擇上顎 standard 下顎 low torque brackets bonding 後，我們在 .014 CuNiTi archwire 時就開始請她配戴上4拉到下6的 early light short elastic（2 oz Quail），一天換四次，並且同時在下顎第一大臼齒上放置由 GI cement 調成的 Bite Turbos，希望藉著 disocclude 的動作讓 early light short elastic 的效益發揮到最大（Fig. 6）。中間換到 .014 X .025 CuNiTi 時橡皮筋改成 3.5 oz Fox 拉一樣位置，等到 11 個月時我們發現 overjet 已經改善到剩下約 6 mm（Fig. 7），這個時候我們將 molar 上的 Bite Turbos 去除，改成放在上顎門牙側的 Bite Turbos，目的是希望直接給予下顎門牙明確的咬合定位，並且繼續配戴 Class II elastic（4.5 oz Bear），位置改成上 3 到下 6，從 11 個月的照

<table>
<thead>
<tr>
<th>Elastic Type</th>
<th>Size</th>
<th>Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>Quail</td>
<td>3/16”</td>
<td>2 oz</td>
</tr>
<tr>
<td>Parrot</td>
<td>5/16”</td>
<td>2 oz</td>
</tr>
</tbody>
</table>

選擇橡皮筋的原則:
簡單的說就是依照主線的粗細決定力量，再根據拉的距離決定尺寸。上圖主線皆為 .014 CuNiTi 因此選擇 2 oz 的 elastic，但因拉的距離不同而選用 Quail（左）或 Parrot（右）。
Fig. 3  Initial profile
Fig. 4  13mm overjet
Fig. 7  11 months

Fig. 5 Initial
Fig. 6 Bonding
U: standard
L: low torque bracket
BT: 36, 46
Elastic: 上 4 下 6, Quail

Fig. 8 11 months
BT: 11, 21
Elastic: 上 3 下 6, Bear

片中几乎已经可以看到最后的治疗成果了（Fig. 8）。

结论：在拟定治疗计划时，使用 Damon System 的医师有很多方式可以使治疗更轻松、更有效率。关键在于如何早期灵活运用 variable torque bracket，Bite Turbos，以及 early light short elastics。有了这三样武器，您一定可以获得更卓越的治疗成果！

Reference:
Approaching Efficient Finishing
Hard and Soft Tissue Contouring

Part 1. Occlusal Equilibrium

Dr. Dunguni 曾於 2005 JADA 中的一篇文章中以一個矯正醫師的觀點談論與矯正治療相關的咬合調整，他認為以功能考量下，有六個常見情形會在矯正治療中進行咬合調整：

1. 外傷性咬合干擾
   有时候某些牙齒會因為我們黏著矯正器的位置或是所使用的機制，造成治療中或治療後的premature contact，甚至會產生牙齒疼痛的症狀，在ant. or post. cusp bite correction（Fig. 1）的病例也常見。除了改變矯正器位置及機制之外，可能還需要將受力過重的接觸點施以咬合調整，避免反覆性撞擊造成牙周受傷。

2. 美觀性牙形重塑
   對於一些 chipped or damaged 的牙齒可以於治療前進行 enamoloplasty，改善切緣的美觀（Fig. 2）。

3. 前牙舌側較厚之邊緣脊
   在某些病人會因為前牙的邊緣脊太厚（Fig. 3）造成無法建立正確的 overbite 及 overjet，此時需要將邊緣脊調整來改善。

4. 牙齒鄰接面的修磨
   由於 anterior Bolton’s ratio discrepancy，為了要使咬合關係正常，有時可利用 interproximal reduction 改善（Fig. 4），同時也可使單顆牙齒長寬比趨近於1：0.8。

5. 鄰近已磨耗牙頸之未磨耗牙頸
   如果在未磨耗的 cusp 附近存在因 malocclusion 造成磨耗的 cusp 時，在finishing stage 時需要稍作調整以避免 cusp 因未磨耗而造成干擾（Fig. 5）。這個情況可能在一些 post. cuspbite 的病人中發現。

6. 牙周受損之病人
   在患有牙周病（Fig. 6）牙周狀況不佳或是牙齒牙根很短的病人，要特別留意咬合力造成的傷害。因為有牙周病的牙齒或多或多有動

![Fig. 1 Post. crossbite](image1)
![Fig. 2 Irregular incisal edge](image2)
![Fig. 3 Large marginal ridge](image3)
![Fig. 4 Interproximal reduction](image4)
![Fig. 5 Unworn cusp](image5)
Part 2. Hard Tissue Contouring

熱到矯正治療中硬組織（牙齒）的修型，我們仍然可以依照 Dr. Dungoni 的分類，細述各項需要作 hard tissue contouring 的情況及方法：

Large or uneven marginal ridge

有時我們臨床上會看到上頷兩顆正中門牙或側門牙的 lingual side 會發現牙齒兩邊的 mesial 和 distal marginal ridge 特別明顯（或者可以說 incisor 的 lingual fossa 特別凹陷）（Fig. 7），這時我們可以稍微修整隆突的 ridge 以避免將來 overjet 無法 correct。可以用 high speed 加 diamond wheel 或 low speed 加 green stone 來修磨牙齒，差別在於 high speed 速度快，平常少使用的醫師要小心不要失手一下修太多；low speed 振動大產熱多，使用時要用手指頂住牙齒一點一點慢慢修；最後再用咬合紙確認是否有均勻接觸。

Fig. 6 Peri. compromised tooth
Fig. 7 Reduction of marginal ridge
Fig. 8 Interproximal reduction
Fig. 9 Medium sand strip
Fig. 10 Fine sand strip
Inter-proximal reduction

In orthodontic treatment, there are many cases where inter-proximal reduction is needed, such as increasing the interproximal space between teeth (Fig. 8), using high-speed or diamond burs to remove enamel and dentin, and then using finishing burs to achieve final results (Fig. 9, 10).

Esthetic re-contouring

A. Incisal edge

In cases of open bite, the incisal edge is often traumatized, causing it to be uneven. In such cases, the incisal edge should be contoured to create a more aesthetic result.

B. Substitution

In cases where the tooth has been reduced, a new tooth can be substituted to maintain the aesthetic appearance of the tooth.

C. Fusion

In cases where fusion of the tooth is necessary, the tooth is reduced to allow for hemisection. However, this process requires careful attention to detail to ensure a successful outcome.

Traumatic Interference

A. Dens Evaginatus

Dens evaginatus (Fig. 11) is a common condition that occurs in the premolar area. In cases where the tooth has been reduced, a new tooth can be substituted to maintain the aesthetic appearance of the tooth.

B. Talon cusp

In cases where the tooth has been reduced, a new tooth can be substituted to maintain the aesthetic appearance of the tooth.
Extra-cusp 发生在前牙時就是所謂的“talon cusp”（Fig. 14），為了達成 normal overjet，牙齒的修型是必需的，這時我們可採用“先加再減”的方法來處理，先將牙齒表面的深溝用液動的樹脂封填（為了預防蛀牙），再逐次地修磨舌邊 cusp，每次的修磨都要做到 finish 和 polish（用 resin point），再加上 fluoride varnish 來減輕敏感，其實最後總體修牙的量是有可能造成此類牙需要接受根管治療，這個可能性一定要事先與病人溝通，讓病人了解。不過，矯正醫師也不用太內疚，因為 talon cusp 的牙齒本身就因為表面深溝延伸至牙齦下面，常導致蛀牙，牙齦炎，所以幾乎都逃不過根管治療的命運，只要事先充分與病人溝通，病人通常可以理解及接受。

**Part 3. Cosmetic Gingival Contouring**

身為矯正醫師的您，在矯正 finishing 階段，可曾注意過患者在 posed smile 時，所露出來的牙齦外形（contour）（Fig. 15）是否美觀？牙齦的最高點（zenith）相對於牙齒長軸（long axis）的位置（Fig. 16）是否理想？lip line 與 gingival line 是否協調（harmony）？smile arc，意即 upper incisal edge curvature（smile line）與 lower lip curvature 的平行關係是否和諧（consonant）？是否有牙齦緣差異（Fig. 17）或牙齦露出過多（Fig. 18）的問題？正中門牙的長寬比例是否適當（Fig. 19）？

有了前述的基本概念，要如何運用呢？首先，要讓 smile arc 和諧，藉由 lower lip curvature 來決定 upper incisal edge 的位置；接著再由建立理想的門牙長寬比例，就能找到適當的牙齦緣位置。從而看看正中門牙、側門牙及犬齒的牙齦緣位階（gingival margin level），是否有高 - 低 - 高的變化？是否有牙齦緣差異及牙齦露出過多的問題？歸後，再確定 short crown height 是否起因於變異的被動萌發（altered passive eruption），即延遲性的牙齦緣根尖向位移（delayed apical migration of the gingival margin）的現象所造成？最後，還要看的就是牙齦外形，即三度空間的立體形態是否美觀。

在臨床操作上：一、如果只有牙齦外形的問題，您可以在塗抹局部麻醉藥（topical anesthetic）後，輕易地利用軟組織雷射（例如 Diode laser）做修型（contouring）處理。二、如果牙齦緣差異及牙齦露出過多的問題，係源自於變異的被動萌發；且所要改變的牙齦緣位置的量（X），加上牙齦緣深度（0.7 mm），小於牙齦緣探測深度（sulcular probing depth）（S）時，即 X + 0.7 < S，則您可以利用局部麻藥及軟組織雷射做牙齦切除（gingivectomy）即可。

![Fig. 15a Pre-surgery](image)

![Fig. 15b Post-surgery](image)

![Fig. 16 Zenith](image)

![Fig. 17 Gingival margin discrepancy](image)

![Fig. 18 Gummy smile](image)

![Fig. 19 Short crown height](image)
Part 4. Consideration of Soft Tissue Management

When the correction进入了finish的阶段时，针对前牙的部份，Dr. Sarver告诉我我们要从smile arc的角度来评估是否有达到美观的要求，从硬组织上：牙龈的长宽比例、龈缘到犬齿的排列及大小、切端是否有顺著微笑的曲线等，都希望能达到和谐的要求；软组织的考量上：微笑时暴露牙龈的量、以及牙龈边缘是否一致对称，形成均匀的海鸥型则是我们观察的重点；以下我们举出一个个案报告来跟大家分享这份部份的心得。

患者是十岁九个月小朋友，为双侧molar Class I、上中切牙位萌发的病例（Fig. 21），我们放上 Damon 3 矫正器以及 follow Damon wire sequence 換线經過 14 個月後，從臨床照片观察到前牙區的切端及牙龈邊緣不平整（Fig. 22），此時會直覺考慮作牙齦切緣的修磨和牙周手術來調整牙齦；但是當我們詳細看前牙咬合照片時（Fig. 23），發現兩個正中門牙的 inclination 其實不一樣，所以必須先調整 torque：我們在兩顆正中門牙都換上了 Damon high torque 的矯正器，5 個月後兩顆門牙的角度已大至相同（關於 torque 選擇，可以回顧 NTO Vol. 10，黃璇姍醫師有一篇精彩的文章介紹），因此在矯正的過程中，應該時常重新檢視臨床照片，先確定牙齒的排列、角度等都沒有問題後，才進行硬組織與軟組織的調整。

矯正進入第 19 個月 finish的階段時，我們發現前牙區牙齦邊緣高度仍然不一致（Fig. 24），如果想作牙齦的修整，該選擇 gingivectomy 還是 surgical crown lengthening？有什麼判斷的方法來讓我們決定使用的術式？我們可以依照下列原則來進行術前的評估：

1. Oral hygiene

當病人在矯正期間如果口腔衛生無法維持，牙齦邊緣容易產生發炎腫脹的狀況，必須清潔乾淨待牙齶回復原本健康的位置後，再評估牙齶的高度才會準確。

2. X-ray taking

Fig. 20a Sounding for detection  
Fig. 20b Diode Laser  
Fig. 20c Sounding for check-up  
Fig. 20d 1 week post surgery  
Fig. 21 Ectopic eruption  
Fig. 22 Uneven gingival margin
在手術區域應先拍攝根尖片，以評估牙根周圍的骨頭是否有牙周的破壞及缺損，是否需要先進行牙周部份的治療。

3. Probing

手術評估時，要先對欲處理的區域（通常是上顎六顆前牙）做 probing，通常建議手術前上完麻醉藥後沿著每顆牙齒的 sulcus 再做一次，因為這樣才可以精確的標定出最底部的骨頭到牙齦邊緣的距離有多少，因為 sulcus 底下的 bone level 是連続的，所以 probing 時也應該順著 walking；從 probe 接觸到最底部的 bone 到牙齦的距離，就是 clinical probing depth（Fig. 25），我們知道，牙齒的 biologic width 約為 2 mm（Fig. 26），因此需要修去的牙肉高度，就是將 clinical probing depth 減去 biologic width 的距離（Fig. 27）。

4. Attached gingiva

在需要做牙周手術的區域，我們要觀察是否有足夠的 attached gingiva，attached gingiva 是固定在骨膜上的一層角化上皮組織，它可以讓我們將刷毛放在該區來清潔牙齦溝而不會容易造成牙肉的受傷及萎縮，同時也能降低牙齦發炎的機會；有 attached gingiva 附著的牙齒，經過矯正移動後它比較不會因為口腔黏膜的運動而容易發生移動，而在考量牙周手術式時，缺乏 attached gingiva 的區域，我們也會盡量選擇在手術中補上 graft 或是轉入 pedicle flap 來增加角化牙齦的量。

總結來說，當牙周組織健康，有足夠的 attached gingiva，從 X-ray 上觀察沒有骨頭缺損，probing 時發現 bone level 一致，只有牙齦高度不整齊時，我們會選擇 gingivectomy 來單純修整牙肉（Fig. 28）；而當前三項目相同，但 probing 時發現牙齦間 bone level 的高度不相當時，我們會選擇 surgical crown lengthening 的術式，不但要調整 gingival height，更要修整 bone level（Fig. 29）。

這個 case 我們選擇用 diode laser 進行 gingivectomy，在術後12天牙齦部份傷口便已經癒合（Fig. 30），由於考慮這個病例可能是 altered passive eruption，但病人的年紀還在發育的階段，牙齦的高度仍有所變動，因此需要持續的觀察追蹤（關於 altered passive eruption 的診斷，將於下期 NTO 作介紹）。

至於成人的部份，經過牙肉的修整後，我們會要求一星期後回來檢查傷口及口腔清潔，軟組織的部份大致在兩個月後會達到穩定，所以如果需要製作後牙即非美觀區的補綴物，通常會在此時 delivery，但前牙美觀區補綴物的製作，也有文獻建議最久需要追蹤到六個月。
<table>
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<th>Attached Gingiva</th>
<th>Probing</th>
<th>Equal bone level</th>
<th>Bony discrepancy</th>
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<tbody>
<tr>
<td>Operation</td>
<td>Gingivectomy</td>
<td>Surgical crown lengthening</td>
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**Fig. 28** Indication of gingivectomy

**Fig. 29** Indication of surgical crown lengthening

**Fig. 30a** Initial

**Fig. 30b** The day after gingivectomy by Diode Laser

**Fig. 30c** 5 days after surgery

**Fig. 30d** 12 days after surgery
STb
Light Lingual System

Dr. Kyoto Takemoto

Interviewed by Dr. Rungsi Thavarunkul
Edited by Sandra Diver

Dr. Kyoto Takemoto, the man behind the success of lingual orthodontics in Japan. He is also one of the creators of the new STb lingual appliance, launched early in 2006 and evolved lingual orthodontics to a new era.
What are the problems that you experienced in the 7th generation of lingual brackets that made you come up with the new STb?

Dr. Takemoto: Most of my lingual orthodontic patients always complain about discomfort, especially when they are talking and eating, because of the 7th generation bracket size. They are quite big, so the patients cannot pronounce very well. For dentists, their complaints for the old lingual orthodontic appliances are difficult arch-wire insertion, difficult double over-tie, arch-wire ligation and longer treatment time. These huge brackets are also the obstacle for oral hygiene maintenance. So these are the reasons why the new STb lingual orthodontic appliances have been designed to be very small in both bracket profile and bonding pad. We found this increased significantly, the bonding strength, because of the closer distance between lingual tooth surface and bonding pad. We also changed the retentive mesh from the delicate 100 gauge mesh to the rougher 80 gauge. That increased bond strength between the pad and the Composite. So I’m proud to say that today we are stepping into the new era of lingual orthodontics by the development of four major innovations.

1. New STb lingual appliances that are very small, low profile and have passive ligation properties.
2. New technology archwire such as Copper-NiTi wire, SE NiTi wire and TMA that are very flexible compared to the conventional wires.
3. New improvement in laboratory procedure.
4. New Micro-Implant Anchorage that helps us a lot in anchorage control, especially in extraction cases.

So now it is a good opportunity to learn about lingual orthodontics because of the increasing demand for esthetic orthodontic treatment and these four new improvements.
Using the STb we can increase the inter-bracket distance by more than 50% compared to the 7th generation bracket. That means we can reduce considerable force, because we already know that the force of the NiTi wire is inversely proportional to the 3rd power of inter-bracket distance (Fig. 3). We also designed the built-in passive ligation step for every STb. (Fig. 4) So when leveling and aligning with the small NiTi wire, usually 0.010” or 0.012”, the friction between bracket and wire will be very low (as achieved labially when using Damon System). Therefore the teeth can be moved very fast by the light continuous force along the low-friction passive-ligation system, such as for the MTM (Minor Tooth Movement) in the relapse case. I can correct this in only 6 weeks, by using only 6 lower anterior STb and one 0.012” SE NiTi wire (Fig. 5). If you choose to treat the case like this, by using a clear aligner you would use 10 or 20 aligners with very good patient cooperation, and still find it impossible to correct. These can relapse in only 6 weeks. So in the new era of lingual orthodontics your patients can be treated more esthetically, more comfortably, faster and more reliably with these new STb.

\[ F = \frac{192IE}{L^3} Y \]

- \(F\): Wire exerts force.
- \(L\): The distance between the right edge of the bracket and the left edge of the bracket.
- \(I\): \(nD^4/64(D\) is the cross section diameter\)
- \(Y\): The deflection distance of the wire midpoint from the equilibrium position.
- \(E\): The modulus of elasticity of the wire.

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**Fig. 3** Estimation of force produced by nickel-titanium super-elastic arch-wires

**Fig. 4** Passive ligation step of STb with 0.012 super elastic NiTi wire can create the low friction system for faster tooth movement

**Fig. 5** The relapse of lower anterior teeth can be corrected by 6 STb and 0.012 SE NiTi wire in 6 weeks, before (left) and after (right)

**Is there any problem in controlling rotated teeth when using such a small bracket like STb?**

**Dr. Takemoto**: No, I think that orthodontists have misunderstood this point for a long time. From my experience I found that the larger inter-bracket distance and wire flexibility are playing a more important role in rotational control than the bracket width. In the past, I had to bend many vertical loops to correct lower anterior crowding. But nowadays, with the larger inter-bracket distance of STb and small and flexible 0.012” SE NiTi wires, I can correct crowding more easily and faster. The lower anterior STb brackets are the best proof for this because, although these bracket slots are only 1 mm width (Fig. 6), I can still use them with 0.012” NiTi wire to correct the lower anterior crowding very fast and effectively (Fig. 7).
**Fig. 6** Narrow and slim lower anterior STb with passive-ligation step (left) compared to the bulky 7th generation lower anterior bracket (right)

**Fig. 7** Larger inter-bracket distance and passive ligation step of STb make it more easier to correct rotation when using with 0.010" or 0.012" SE NiTi wire (7a,b) than the 7th generation of brackets that have shorter inter-bracket distance, and need some vertical loops for rotational correction. (7c)

**What is the most important thing that the Lingual orthodontic beginners have to concern?**

**Fig. 10** For ideal torque and in-out performances, STb should bond a little occlusally.

**For the orthodontists who have experienced the 7th generation brackets and switched to this new STb. Do they need to change their mechanics?**

**Dr. Takemoto**: The most important thing that not only beginners but also experienced lingual orthodontists have to concern is bracket position. You have to know how to place it right and how to set up the model to the right position. This is very important.

**Dr. Takemoto**: Almost the same, but less wire bending because of the larger inter-bracket distance of STb and the development of Micro Implant Anchorage (MIA). Nowadays, I use a lot of MIA in maxillary retraction mechanics by putting them in mid-palatal suture area, or in between U5 and U6. I also use them for intrusion of upper incisor but seldom use them in the lower arch.
Have you considered straight wire lingual appliance and self-ligation lingual appliance?

Dr. Takemoto: It’s my dream, straight wire lingual appliance, I’m still thinking of it. I already have some ideas but cannot tell you now. That’s our goal, I and Dr. Fillion. We always discuss this idea and how to avoid canine inset with comfortable design. Self-ligation system is too big for lingual and you will have problems with the rotation of teeth because of short inter-bracket distance. This is the reason why we designed a passive-ligation step in STb. The height of this step is 0.013˝, so when you use the small wire 0.010˝ or 0.012˝ it will be a passive slot, but for the larger wire 0.014˝ or 0.016˝ it will turn to an active slot.

Any secret to enjoy working?

Dr. Takemoto: Work with fun! Please enjoy your work by creating extraordinary experience. If you work in the same way every day, it will be very boring. So work with passion, always thinking of new ideas, new experiences, new trials, new appliances, new techniques and new life.

Excerpt from Align (June 2008)
I have used the Damon System as my fixed appliance of choice exclusively for 8 years and have practiced orthodontics for 19 years. For several years now I have watched the debate or should I say debasement of Dwight Damon and the Damon System with shock and dismay. The recent entries into this dialogue now make me feel that I can no longer sit idly by and ignore it.

Dr. Peck’s recent entry in one of our esteemed journals has really been the catalyst to make me want to respond. I must admit I was surprised that a journal would publish what really amounts to an unwarranted personal attack against Dr. Damon and all of us who choose to use the Damon System and I ask myself how any person who considers himself a thinking person and an educator can be so close minded and blind to the benefits that Dwight Damon has brought to our specialty.

For almost a century orthodontic theory has taught us that we should pursue the goal of using forces on the teeth that were light enough not to occlude the vasculature but strong enough to entice the teeth to move. Dr. Damon did not invent light forces, but what he has done has transformed the way thousands of orthodontists around the world treat patients. He has spent untold hours studying the interaction of various wires with different bracket configurations to maximize the benefits of each and has ended up with a system of low friction and light forces that produces a synergistic effect that now allows orthodontists worldwide to obtain results that were previously unheard of. Yes Dwight Damon is a skilled clinician, but the results are seen not only by him, but by everyone who uses the Damon System properly. When I described these effects to a former classmate, his question to me was whether what I was seeing was because I was now a better clinician than I was 10 or 20 years ago. As I told him, there is no question in my mind that I am now a better clinician than in years past and much of it is due to the tools that Dwight Damon has given me with which to practice.

The degree of misinformation bantered about by those who have no personal experience with the Damon System nor even the benefit of attending one of Dr. Damon’s complete courses is staggering. Dr. Damon has never claimed to not extract any teeth. Indeed, he claims that he extracts far fewer than he could before, and how can that be a bad thing for the patient? Does he promote bimaxillary protrusion as a goal of treatment? Absolutely not; although the anti-Damon System rhetoric would have one believe that were so. Does the system use “over expanded” archwires? Anything but! So where does the expansion come from? Only future research will tell us.

So where is the issue? Is it one of marketing? There are still orthodontists who hold a grudge against Align Technology for direct-to-consumer marketing a decade ago even though the side effect was to increase the public awareness of the need for orthodontic treatment and subsequently increase every orthodontist’s business, even if they themselves did not provide Invisalign as a treatment option. Marketing something that is a benefit to the patient
can not be a bad thing if it raises their awareness and moves them to action. Is it simply because the D3 Hybrid had some quality control issues? That is a problem that resides with ORMCO, not with the Damon System or Dr. Damon. By the way, ORMCO did acknowledge the problem and did replace all the faulty brackets if they were returned to the company. Is it because Dr. Damon has made a great deal of money from his designs? If so then every orthodontist who has profited from an innovation they

common jealousy by those who didn’t think of everything that Dr. Damon has thought of first.

I am also amazed at the amount of time and energy some orthodontists have spent on pursuing so-called stability without the benefit of mechanical assistance as if it were the “holy grail” of our specialty. There is no other area of medicine or dentistry where treatment results are anticipated or expected to last indefinitely. Even if one were to somehow place teeth in perfect balance with the musculature at the time of treatment completion, muscle tone changes as part of the aging process so even that impossible feat could be presumed to be only temporary in nature. Is it reasonable in the face of all current evidence to disparage those who achieve stunning esthetic results and then choose to use some form of mechanical retention, permanent or otherwise, to prevent or defer the natural aging process and so maintain their results? I think not. In fact to claim stability is important and then disparage those who use bonded retention is most disingenuous.

When all is said and done, the combined experience of thousands of orthodontists around the world that continue to utilize the Damon System to achieve extraordinary results for their patients speaks volumes. So while the orthodontic curmudgeons are comfortable in their belief that the sun continues to revolve around the earth and bemoan the loss of another colleague who has sailed off the edge, I personally will order another kool aide. After all, it is another sunny day in Damonland.
Keys in Determining Extraction or Not: Profile and Growth

A 11-year-and-one-month-old girl came for orthodontic consultation. Her mother mentioned that her one permanent premolar had been removed because of severe crowding. Subsequent extraction of remaining three premolars was suggested by the same doctor. There was no significant medical and dental history. Her oral hygiene was fair and she had received dental care since childhood. There was also no signs and symptoms of temporomandibular dysfunction.

DIAGNOSIS

The patient had a fairly straight profile and slight asymmetrical appearance (Fig. 1). She had a Class II malocclusion and 50% overbite. There was 8 mm space deficiency on the upper and 3 mm on the lower. Her lower dental midline was shifted to the left (Fig. 2 and 3). The panoramic radiograph showed four wisdom teeth present. There was a missing upper right premolar extracted one month before (Fig. 4). Cephalometric analysis revealed Class I skeletal relationship (Fig. 5).

TREATMENT OBJECTIVES

The primary objective of treatment was to attain Class I molar and canine relationships with ideal overjet and overbite while maintaining pretreatment facial esthetics. The specific treatment objectives were to:

1. Eliminate space deficiency over upper left canine area.
2. Correct midline deviation.
3. Preserve original facial profile

TREATMENT ALTERNATIVES

The first treatment option is to obtain a bilateral Class I occlusion by extracting the three first premolars according to the previous doctor’s
plan. The second one would be to achieve a Class I occlusion on the right side and a Class II occlusion on the left side with which we can then preserve the three first premolars. The third one would be to regain extraction space and fabricate a prosthesis, both of which would bring about a bilateral Class I occlusion.

Based on symmetry of extraction site and consistency with the original plan, the first option was chosen.

**TREATMENT PROGRESS**

The remaining three first premolars were extracted and 0.018 slot straight-wire fixed appliances were placed. Followed by alignment and leveling using a 0.016 and 0.016 X 0.022 NiTi wire, extraction space was closed with sliding mechanics made by 0.016 X 0.022 stainless steel. The extraction space was closed after 16 months. At the finishing stage the patient’s four second molars had not erupted. The debonding procedure had to wait until they all fully erupted. The total treatment time was 28 months. The retention protocol followed were a fixed retainer on the mandibular arch and a full coverage vacuum-made retainer on the upper arch.

**TREATMENT RESULTS**

The patient’s smile line was coordinated with the lower lip (Fig. 6) The posttreatment photographs and dental casts show a satisfactory occlusion with bilateral Class I molar and canine relationships. Lower dental midline was deviated 1 mm to the left (Fig. 7 and 8). Cephalometric analysis indicated a favorable inclination between the upper and lower teeth (Fig. 10). Superimpositions demonstrated that there was considerable growth of the mandible (Fig. 11).
DISCUSSION

Serial extraction has long been advocated to treat severe crowding. In most cases, when the erupting canine erupts into extraction site, its root inclination tends to tip mesially and there is residual space between canine and premolar. Therefore, in order to get ideal result, subsequent fixed appliance therapy is recommended.

Fixed appliance treatment in adolescent patients are sometimes faced with increased treatment time. It mostly happens when four second molars have not erupted completely.

In the examinations of the American Board of Orthodontics (ABO), five out of the seven scoring criteria involve second molar. Therefore, even in the finishing stage, we still have to closely follow the condition of second molars. The use of braces on second molars may be necessary if the alignment of the archform is concerned.

In this patient, the previous treatment plan of serial extraction was worth revisiting. According to this patient’s profile, non-extraction therapy might be an alternative. With the continual growth, the profile may become flatter. Nowadays we have more weapons to obtain ideal treatment results without extraction. Appropriate selection of appliance, such as low torque Damon brackets, will minimize the effect of anterior flaring. In addition, miniscrews can also prevent this side effect during the stage of leveling and alignment. Thus, extraction is no longer a necessity to solve crowding cases. However, it is still regarded the most appropriate treatment method for problematic profiles.

Fig 11. Superimposed tracings

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<tr>
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<td>79°</td>
<td>74°</td>
<td>76°</td>
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<tr>
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Table. Cephalometric summary
A 13 year-old male patient presents with the upper anterior teeth spacing as the chief complaint. The panoramic and cephalometric x-ray indicate a total of 13 permanent teeth missing and all of the deciduous molars ankylosed. The patient is now in his teenagehood and presents a shy demeanor.

His father, also a dentist, plans to put implants in lieu of the missing teeth; however, the patient is too young for the procedure. He is now soliciting alternative treatment plans from our NTO readers. We encourage all of our colleagues to draw from your clinical experience and creativity to develop a treatment plan of yours. Please send your proposals to beeth.oven@msa.hinet.net by August 31, 2008.

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 this issue on we are opening a new column to publish difficult cases that our readers encounter 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 1200.

A 13 year-old male patient presents with the upper anterior teeth spacing as the chief complaint. The panoramic and cephalometric x-ray indicate a total of 13 permanent teeth missing and all of the deciduous molars ankylosed. The patient is now in his teenagehood and presents a shy demeanor.

The first case that kicks off our new column was brought to us by our colleague, Dr. Rungsi, from Thailand during Newton’s A and Beethoven’s first international OrthoBoneScrew and Damon workshop back in June, 2008.

The unsolved mystery of ankylosis and multiple missing teeth.

X 20
The Dream Screw for Next Generation’s Orthodontists

OrthoBoneScrew

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

A case report demonstrating a 3D control of impacted tooth

Mechanics design:

A 0.017 x 0.025-inch TMA lever arm was consisted of a helical coil on one end and helical attachment on the other end. When this lever arm was inserted in the square hole in the OrthoBoneScrew (located at infrazygomatic crest) and activated, it could build a force system which distalized the canine first, then moved buccally slightly, and finally downward to the reserved canine space. If the mechanics were designed to exert force directly from the main arch wire, it would have been detrimental to the roots of the incisors. During the follow-up visits, the helix was adjusted without taking it out. After four months, the impacted canine was successfully moved away from the previously impacted site and was ready for bracket bonding.
In most cases we can differentiate “pseudo-class III” cases from “true-class III” cases by checking if a functional shift (FS) is present. Since a FS can deviate a centric relation (CR), we need to develop an easy and reliable method to record the accurate position of CR. The following example shows a simple, easy and most importantly, accurate way of recording the position of CR.

1. Check CO and CR intra-orally: Guiding the mandible to the centric occlusion (CO) and CR.
2. Use StoneBite for recording the CR position: Squeeze the soft mixture into the inter-arch space of posterior teeth and wait 1~2 minutes for it to set. (Fig. 3, 4)
3. There is a visible difference in the cephalometric films of the two. (Fig. 5, 6)

Accurate Positioning of the Centric Relation

This is a product by Dreve used for occlusion records during prosthodontic preparation.

As shown in the picture the tool is consisted by a mixture tube and a handle. When you press the handle, two differently colored pastes will instantly be combined into a rigid orange block in 1~2 minutes.
Dear Sandra:

You can't imagine what happened here. Dr. Chris, his wife and their staff at Beethoven are so energetic that impressed all Thai dentists a lot. We saw Chris and his team's treating 160+ patients only in two evenings, total of 10 hours working. Everything went so fast and smooth. For example, the new record of placing an OrthoBoneScrew is 15 seconds per side. His lecture was still stunning even for me who had seen his lecture for many times. The hotel is quite good but the food are better.

Tomorrow our group will have a good opportunity to attend Dr. John Lin's 2-hour lecture about Damon and OrthoBoneScrews which I am sure will be the another great lecture and everyone in our group will go home happily. This course convinces me to come back to Taiwan again with the new Thai group at the end of September.
3 簡報藝術—寓教於樂

參加繼續教育，如果能夠像觀賞一部好萊塢電影，聲光美，畫面佳，而且又能有所收穫，那是多棒的一件享受。在一
個偶然機會，聆聽張慧男醫師的演講，驚豔大師投影片的製作
技巧與一流的口才，是筆者經歷的簡報達人中的達人。大嘆
“有為者亦若是，大丈夫當如是也”。筆者從事牙科教育工作
超過二十年，自行摸索也積累不少心得，但有些“眉角”總是
無法突破。欣聞張醫師有在開班傳授教學藝術與簡報聖經。這
是企盼已久的課程，經過張醫師的一番調教後，功力大增。每
一位想從事牙科教育工作者，皆應有這方面的訓練，否則很有
可能被淘汰掉。張醫師的教育課程，理論與實務結合，筆者最
為贊賞。每一張投影畫，可能就是一段故事，而且投影畫本身
就會說故事。張醫師的簡報不是在賣蘋果電腦或 iPod，他是在
告訴我們這些產品的優點和使用經驗。您
如果想在下次的簡報令人刮目相看，耳目
一新，請參加張老師的簡報聖經課程。

林茂雄 醫師, Taipei, Taiwan

4 簡報藝術—魔鬼藏在細節中

聽了幾場張慧男醫師的演講，覺得很生動，很活潑，而且
很鮮明：感覺張醫師把演講當成一種藝術，全心的投注其中；
無論是音樂的出沒，畫面的處理和重點的輪番浮現，都配合的
天衣無縫，彷彿人和電腦合为一体，演講內容也讓人聽得一清
二楚。而為了提昇自己的演講技巧，最近報名參加 Keynote 連
串的課程，現簡介如下：

Keynote 1. 介紹很多基本的技巧，上完好像就可以上台演講了，
原來一個好的演講，背後不厭其煩地處理任何小細節，的確
如張醫師所說的“魔鬼藏在細節中”。
Keynote 2. 介紹進一步的技巧及 Dr. Kokich 的十大演講秘訣。
Keynote 3. 介紹構圖美學的概念，並介紹蘋果電腦總裁 Steve Jobs
的演講秘訣。

上完三堂課，覺得很棒，很多東西，額外的收
穫是張醫師演講常用的配樂和小道具，都
可以融合，以後隨時可“借用”，頗為方
便。

林伯瑩 醫師, Ilan, Taiwan

5 The International Workshop
Current and Practical Orthodontic Technique

“I feel so relieved and satisfied after attending
the workshop. The current and practical
orthodontic techniques demonstrated in the
workshop will assist me in solving those
complicated problems of many
patients that seemed unsolvable
in the past.”

Dr. Kittichai, Bankok, Thailand

6 The International Workshop
In-clinic Chair-side Learning

“At first I thought I might benefit from this
course more or less. My expectation was not high
because I never attended Dr. Lin and Dr. Chang’s
lecture before. After attending this 3-day course I
found that this course very useful. The lectures
were so informative not only about
OrthoBoneScrew placement but also treatment
plans. The in-clinic chair-side learning allowed me
to observe closely how to use OrthoBoneScrew
and how the clinical management was in action.
Thanks to Dr. Lin, Dr. Chang and all
of their staff.”

Dr. Kamon, Bankok, Thailand

7 The International Workshop
Clinical Management Tips

“It’s so amazing. I was so glad to be part of
this study group. I learned a lot of clinical
management tips and saw many
amazing cases using
OrthoBoneScrews in ways I
have never seen before.”

Dr. Pradit, Bankok, Thailand
## 金牛頓藝術科技

### 夏、秋季課程

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### 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
The Dream Screw for Next Generation’s Orthodontists

Easy Application
- Allow self-drilling with no machinery tools

Revolutionized Design
- Adopts square hole (0.018X0.025-in) to fit rectangle wires

Enhances Strength
- Made with stainless steel (316L) of improved strength and high bio-compatibility

Economic Cost
- Half of the price of compatible products in the market

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

http://orthobonescrew.com

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

—Alex Jacobson, associate editor of *AJODO*