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Comparison between Damon and TenBrook T1 Brackets

Dr. John Lin

ABO Case Report : Early Intervention for Multiple Impacted Teeth:
More Comprehensive Clinical Assessment with the iSAS Method

Dr. W. Eugene Roberts



Dr. Chris Chang lectured at the annual meeting of the Association of Philippine Orthodontists in Malina, Aug. 3, 2010.

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2010~2011

熱愛學矯正



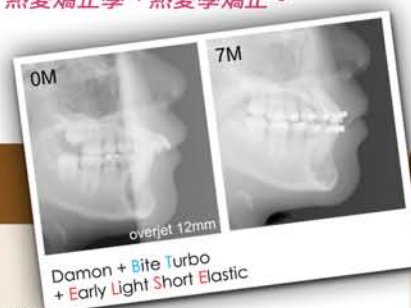
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學會開始做矯正需多久?

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



Damon矯正課程

將使用最新一代矯正器 Damon Q 進行課程，歡迎舊生報名參加。

台中 (二)	高雄 (四)	LECTURE	LAB
1 09/28/10'	09/23/10'	理想入門病例 + Damon Q 黏著	Bonding (Damon Q) + BT
2 10/05	10/07	快速矯正療程四部曲	Ceph + Photo
3 10/19	10/28	簡捷有效的錨定系統	Damon + OrthoBoneScrew I
4 10/26	11/04	不拔牙與拔牙分析	Damon + OrthoBoneScrew II
5 11/02	11/25	Damon 診斷流程及微調	Finish Bending
6 11/23	12/02	完工檢測及報告示範	Fixed Retainer (FR)
7 11/30	12/30	維持及復發：病例示範	Presentation Demo
8 12/21	01/06/11'	矯正力學及診斷分析 (1)	DDX + Case Reports I
9 12/28	01/20	軟硬組織及診斷分析 (2)	DDX + Case Reports II
10 01/04/11'	02/10	兒童矯正及診斷分析 (3)	DDX + Case Reports III
11 01/11	02/17	成人矯正及診斷分析 (4)	DDX + Case Reports IV

矯正植體課程

矯正植體的操作時機、植法與實習、個案討論、臨床跟診及實作示範。

新竹(五) 6/3/11'

International workshop

Keynote & management
OrthoBoneScrew
& Damon

5/10~12/11'

8/9~11/11'

11/15~17/11'

助理訓練課程

每梯次共兩堂課程與技術操作，內含照相技術、Morph 與公關衛教之電腦資料處理；另安排一次診所見習。

新竹(五) 10/7、14/11'

矯正進階課程

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

新竹 (四)	Paper reviews	Topics & Case Demo
1 09/30/10'	Bracket placement & workshop	Crowding: Ext. vs. Non-ext.
2 10/14	Impacted canines	(U) Impacted Teeth: Ant. vs. Post.
3 10/21	Canine Substitution	(L) Impacted Teeth: Ant. vs. Post.
4 11/11	Anterior Esthetics	Missing: Ant. vs. Post.
5 12/23	Excellence in Finishing (occlusion)	Crossbite: Ant. vs. Post.
6 02/24/11'	Excellence in Finishing (esthetics & perio)	Deep Bite vs. Open Bite
7 03/17	Ortho-Perio-Restore connection	Low vs. High Angle & Gummy Smile
8 03/24	Adjunct to perio	Root Resorption & Relapse
9 04/07	Unhappy patient	Perio-Ortho
10 04/14	DI & CRE Workshop (1)	Implant-Ortho
11 04/28	DI & CRE Workshop (2)	IDT

課程資訊

課程項目	時段	上課地點
Damon矯正	台中/高雄 【課程】09:00 - 12:00 【實習】另外安排	【新竹】 金牛頓藝術科技公司 / 新竹市建中一路25號2F
矯正進階	【新竹】09:00 - 12:00	【台中】 文化大學台中教育推廣部 / 台中市西屯區中港路二段128 之2號3樓 (RICH 19大樓)
矯正精修	【課程】09:00 - 12:00	
矯正植體 (含中、晚餐)	【課程】09:00 - 12:00 【實習】13:30 - 20:00	【高雄】 高雄國際會議中心 六合廳 / 高雄市前鎮區中山二路5號 (捷運獅甲站4號出口)
助理訓練班 (含中、晚餐)	【課程】10:00 - 14:30 【實習】15:00 - 20:00	

矯正精修課程

協助每位學員了解由古典到現代之文獻，進而應用於實際病例；並藉由DI及CRE讓精緻完工 (Excellent Finishing) 變成易達到的目標。

精修II (二) 05/11/10' 06/22 07/13 08/17 09/14 10/12 11/16 12/14
01/18/11' 02/15 03/22

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Winners Are Made, Not Born

In the past six months, our group had visited Dr. Park's MIR Dental Hospital twice. The way Dr. Park and his assistant conduct implant surgery is like two top musicians performing a piece of music with such passion, precision, and speed. The harmonic collaboration does not come from their talents. Instead, it comes after grueling hours of practice.

What made Dr. Park's group so successful? The main difference between those who achieve their goals and those who don't isn't exciting or mysterious. The key is simply conscientiousness. **People who approach things with order, common sense, consistency, and persistence will ultimately succeed like Dr. Park.**

The successful model of Dr. Park's group can be applied to every field of dentistry, including orthodontics. Come to see their magical and inspirational performance in next January because their achievements are both relevant and attainable.



Chris HN Chang, DDS, PhD, Publisher



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Comparison between Damon and TenBrook T1 Brackets

(A) Dr. TenBrook's lecture

Through Taiwan Association of Orthodontists and Concern's arrangement, Dr. TenBrook gave an one-day introductory course about TenBrook Axis Passive Self-ligating system on July 18th, 2010 in Taipei, Taiwan.

In the course all the participants received one TenBrook self-ligating system brochure¹ and one TenBrook Axis Passive Self-ligating system syllabus².

The brochure includes details on the bracket design, prescription of the bracket, archwire sequence, five finished cases, an interview with Dr. James TenBrook. He used the Damon brackets since June of 2002, but with his own wire sequence, and mostly round wire in the working phase by adapting Begg concept³. Furthermore, he emphasized torque loss in the Damon system, though Ormco has many torque options to solve this problem. Since he still was not satisfy with it^{4,5} (Fig 1), he developed his own bracket system.

Dr. TenBrook was very thoughtful for the participants. He put most of his lecture contents into one syllabus² with most of the slides in it. This syllabus is a very good reference for the participants. With a comprehensive bracket brochure and a detail course syllabus, Dr. TenBrook gave a very thorough, impressive and successful lecture on passive self-ligating brackets!

The T1 brackets (Fig 2) are much cheaper than the Damon brackets (Fig 3). This lecture gave the author a big shock! If T1 brackets could do the same job as Damon brackets, why not use the more economical T1?

I think most participants, and those who were not present on that day are probably eager to know what the major differences are and how to choose between these two passive self-ligating systems?

(B) Comparison between Damon and T1 Brackets

1. T1- a much lower profile?

Dr. TenBrook claims that T1 has a lower profile than Damon. As such, T1 has far fewer problem with rebonding. I agree that brackets of low profile require less rebonding. It's easier to align anterior teeth with thinner traditional edgewise brackets. On the other hand, thicker self-ligating brackets due to its higher profile, it is more technique

Torque Prescription of Damon System

D3MX	U1	U2	U3	L1	L2	L3
High	17	10	7			7
Standard	12	8	0	-1	-1	0
Low	7	3		-6	-6	
DQ	U1	U2	U3	L1	L2	L3
Super	22	13	11			13
Standard	15	6	7	-3	-3	7
Low	2	-5	-9	-11	-11	0

Fig. 1: Torque options of Damon Q.

Through clinical use of, the newly developed Damon Q has improved the insufficient torque prescription^{6,7} in the previous versions of Damon 3, Damon 3MX by increasing the value of high torque and decreasing the one of low torque to better suit common clinical needs. These new torque options make the Damon Q one of the most complete self-ligating systems.

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



sensitive and requires doctors to bond in the right position. The tolerance of misplacement is very limited. Hence, one would expect more rebonding using this type of system (Fig 4).

Since the data on profile comparison of the T1 and Damon brackets are insufficient (Fig 5, 6), it is yet to be determined how T1 brackets are compared with Damon in terms of profile size. In the brochure two out of the 5 cases provided showed the upper incisors irregularity not well aligned until the 9th month (Fig 7, 8). This is a common phenomenon among thicker self ligating brackets. It seems that T1 is, just like the Damon series brackets, not thin enough to avoid rebonding.

2. Dr. TenBrook prefers .018 system

There are .18 and .022 systems available in the T1 system, and Dr. TenBrook highly recommends the .018 system.



Fig. 2: James TenBrook's .018 T1 bracket with a rotating cap.

Dr. TenBrook likes to apply Begg's concept of differential light forces³ using the round wire to retract incisors. He quoted Liu's article⁸ to demonstrate the effect of light round wires to correct Class II deep bite cases (Fig 9). Indeed, in this case he beautifully treated this case with round wires and closed all the extraction spaces. However, he did not show any bimaxillary protrusion and Class III extraction cases of more difficulty using the same type of wires.

3. Using round wire on working phase

Dr. TenBrook said he developed the T1 because Ormco company did not respond well to his practical requests: insufficient torque on the anterior teeth⁶ (Fig 1). He insists-only using a .017 x .025 rectangular wire on a .018 x .025 slot and together one will have less torque loss. Dr. TenBrook only uses round wires in the working phase and then finished with fuller size rectangular wires (Fig 10).



Fig. 3: Dwight Damon's .022 Damon Q bracket with a sliding cap.

Comparison between Damon and T1 Brackets

	Damon	TenBrook
Price	Expensive	Cheaper
RPE	Not required	Required difficult to get expansion in the .018 slot?
Cap	Sliding Sometimes calculus deposit	Rotating No calculus deposit (?)
Wire engagement on the slot	Easier in severe crowding due to vertical cap	More difficult in severe crowding due to rational cap
Working phase	Rectangular wire	Round wire
Slot size	22 x 28	18 x 25
MEAW ⁹ effect	Excellent Large lumen with smaller wire	Never showed a difficult CIII case? Smaller lumen larger size wire difficult?
CII deep bite Tx	Rectangular wire	Round wire with control of curve of spee (Begg and Liu's concept)
Torque control	Better with rectangular wire	Only showed simple CI, CII cases. On difficult CII and CI bimax, and CIII ext case will be very difficult. Not enough difficult extraction cases to show efficiency
Alignment	Best	Best
Control of in-out	More technique sensitive Need more rebonding	Less rebonding Is T1 thinner than Damon Q?
Bonding 2 nd molar	Early	Late, using 018 slot bracket, can use the rectangular NiTi to pick-up 2 nd molar at a later stage (?)
Using the bracket system	As edgewise	As Begg bracket, using the round wire in the working phase
Hooks on 3, 4, 5	drop-in hooks available, easier to bond on short clinical crown	Convenient for wearing elastics, but not good for hygiene, difficult to bond gingivally on short clinical crown
True bracket height	On upper central incisor Damon Q = 0.081"	T1 = ? (Wrong data on brochure?)

- ❖ Calculus deposition seems more related to patients' oral hygiene than the mechanics of opening and closing the cap of self-ligating brackets.
- ❖ So far there is insufficient information to determine whether the T1 brackets are thinner than the Damon Q brackets.

For easy cases working on round wires may be acceptable. However, for difficult cases, in the case of extraction, this will be a big problem. For nonextraction oriented American Caucasian patients, working on round wire may be sufficient. It will be far more difficult to apply such method in Taiwan to close extraction space. Dr. TenBrook needs to show how it applied to difficult extraction cases successfully, such as those severe bimaxillary protrusion and Class III cases.

Upper Central	O-G	B-L	M-D
Damon Q	.123" 3.124 mm	.081" 2.057 mm	.110" 2.794 mm
D3MX	.144" 3.658 mm	.098" 2.489 mm	.105" 2.667 mm
In-Ovation R	.135" 3.429 mm	.114" 2.896 mm	.116" 2.946 mm
In-Ovation C	.156" 3.962 mm	.093" 2.362 mm	1.57" 3.988 mm
Vision LP	.144" 3.658 mm	??	.105" 2.667 mm
SmartClip	.132" 3.353 mm	.083" 2.108 mm	.122" 3.099 mm

4. Delay bonding on 2nd molars

Dr. TenBrook does not bond 2nd molar tubes in the early stage of

Fig. 4: Comparison of self-ligating brackets.

Data source: Ormco. Compared to other self-ligating brackets, Damon Q is a quite small bracket.

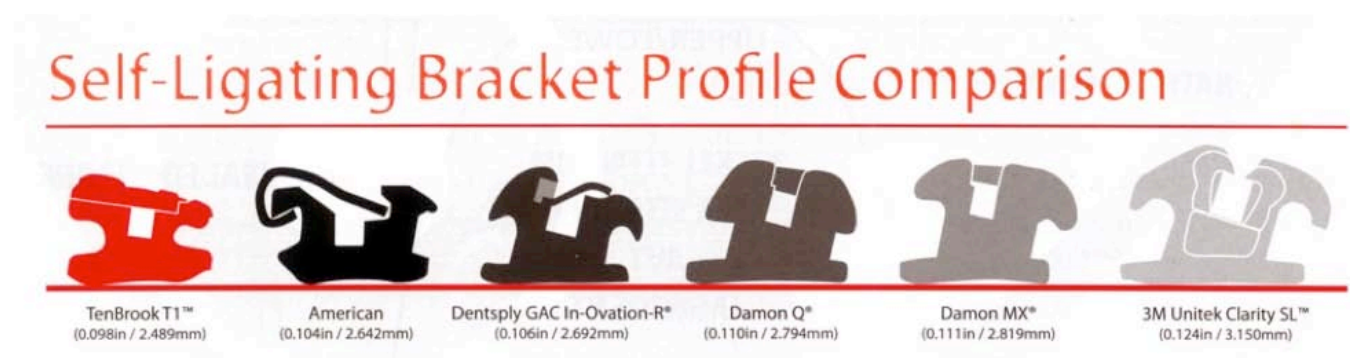


Fig. 5: Profile comparison of self-ligating brackets.

The data shown here seems not to be the buccal-lingual thickness. Instead it seems the data for the mesial-distal width. The buccal lingual thickness of Damon Q is only .081", if T1 is .098". It means Damon Q is much thinner. OrthoClassic has been mistakenly using the mesiodistal width, instead of the buccal-lingual width, to measure its profile. The author has contacted Concern Co., to verification but no correction has been made. Data source: OrthoClassic T1 brochure.



Fig. 6: The upper case used thinner traditional edgewise brackets while the lower case used relative thicker self-ligating brackets. Even though the left upper brackets in the traditional edgewise case was too mesially positioned, the alignment between two centrals remained acceptable. The lower case used self-ligating brackets. Even though the brackets were positioned almost in the center, a small gap was still created in the incisors due to thicker self-ligating brackets.

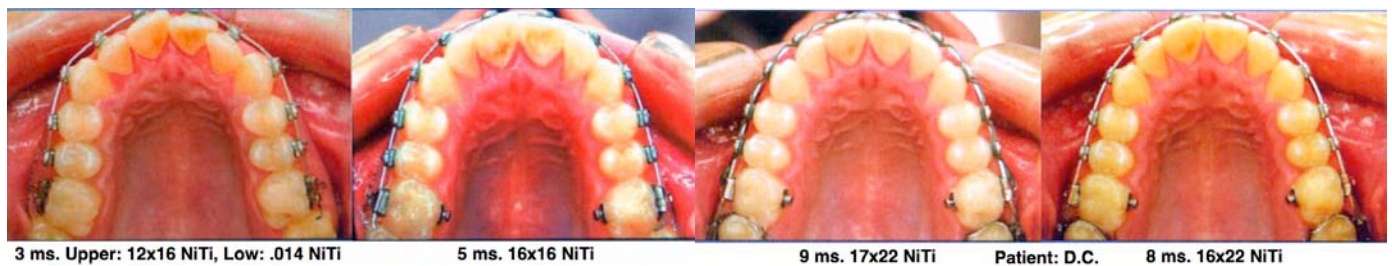


Fig. 7: Case DC on p. 14 and 15 of the T1 brochure.

The upper central incisors are not aligned until the 9th month. (Photos from T1 brochure¹)

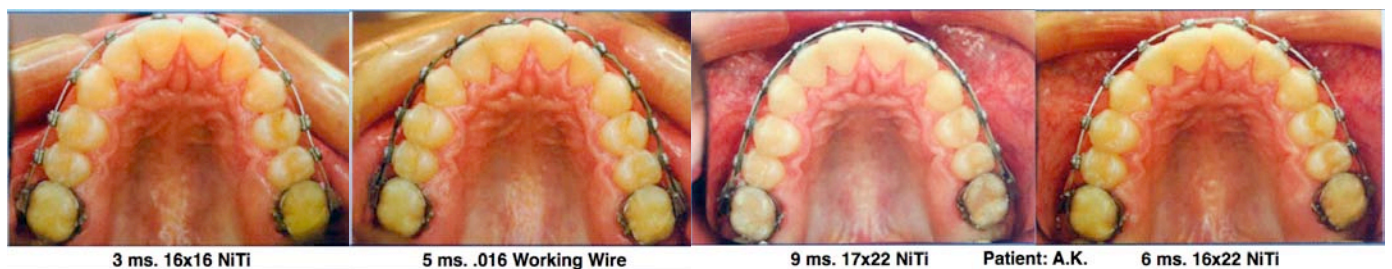


Fig. 8: Case AK on p. 22 and 23 of the T1 brochure.

The upper central incisors are not aligned until the 9th month. (Photos from T1 brochure¹)

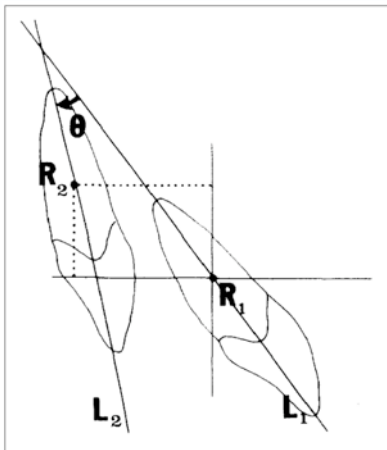


Fig. 9: Using round wires to retract Class II extraction case. Dr. TenBrook used Begg³ concepts and techniques modified by Liu⁴ to treat Class II deep bite extraction case.

treatment. Instead, he delays it until the finishing stage. He emphasizes he can catch up 2nd molar easier in a 18x25 slot.

If the 2nd molars are in very good position, of course one is in no need to bond it in the beginning. However, in most cases they are in ideal positions. Hence early bonding of 2nd molars will save a lot of clinical time.

5. Rotating cap causes less calculus deposit?

Dr. TenBrook claims that rotating cap catches less calculus. So T1 is much better in maintaining oral hygiene when compared with Damon's sliding cap. I think Damon's sliding cap, indeed, in some rare situations, is difficult to open due to calculus deposition. However, the rotation movement is rather cumbersome. Calculus depositions happen when there are long intervals between-visits. Such problem is more related to oral hygiene than the closing and opening mechanics. This theory of rotating cap for preventing calculus deposition is not convincing.

Clinically, it's much more direct to push close and wedge open the sliding cap while rotational movement is more indirect.

The width of rotational cap movement is much wider than the width of the bracket itself. It means in a severe crowding with very narrow inter-bracket distance, it is possible to engage the vertical direction cap in Damon system, it'll be very difficult to close the rotational cap in the T1.

6. Questionable MEAW effect?

Overall, Dr. TenBrook showed beautifully that his system could manage difficult severe crowding cases as well as the Damon system. However, due its smaller lumen (.018 x .025) made me doubt it's MEAW⁹ effect on CIII treatment. He just showed two CIII cases which, in my view, were just CI cases. All the cases he showed were mostly easy to treat, compared to common Taiwanese cases. I emphasized Damon's cases are most rich in its volume and quality of documentation in the self-ligating bracket field. T1 needs to provide more evidence in the treatment of difficult cases.

(C) Conclusion

1. TenBrook T1 bracket can solve severe crowding as efficiently as Damon brackets do.
2. There is only one prescription bracket in TenBrook T1 system. Working on round wire, combined with limited torque options, leads to questions about retraction with bimaxillary protrusion extraction or Class III extraction cases. If these cases could be treated with T1's round wire remains highly

questionable. Further evidence needs to be provided by Dr. TenBrook.

3. Damon system the large lumen of the .022 slot, even when using 19x25 wires, still allows plenty of play. Such feature enables the Damon system to have an amazing MEAW⁹ effect (Fig 12), especially in Class III treatment. The author suspects that TenBrook's .018 slot system, due to smaller lumen, will not allow as much play as in the Damon's .022 system. Dr. TenBrook needs to demonstrate this MEAW⁹ effect with difficult Class III cases treated with T1 to convince users (Fig 13).

4. Damon has demonstrated beautifully that arch expansion, is possible, without RPE, using only the Damon system. Dr. TenBrook still strongly believes in using rigid heavy forces to create rapid palatal expansion. Maybe in Dr. TenBrook's T1 system, there is not enough play in the .018 slot, so in most cases upper arch expansion is not as significant as the Damon cases. So in cases in need of arch expansion, Dr. TenBrook still frequently count on RPE (Fig 11).

Stage 1		0.18 & .022 Bracket Slot	Working Force (gms)	Treatment Time (months)	Archwire	TenBrook Shape Upper	TenBrook Shape Lower
Alignment Phase	Severe Crowding	.013	30	2	Premium Thermal	61.41.110.00013	61.41.210.00013
	Severe Crowding	.014	50	2	Premium Thermal	61.41.110.00014	61.41.210.00014
	Moderate Crowding	.012 × .016	55-70	2	Premium Thermal	61.41.110.01216	61.41.210.01216
	Mild Crowding	.014 × .016	75-90	2	Premium Thermal	61.41.110.01416	61.41.210.01416
	Alignment	.016 × .016	100	2	Premium Thermal	61.41.110.01616	61.41.210.01616
	Alignment	.018 × .018	140	2	Premium Thermal	61.41.110.01818	61.41.210.01818
		Light rectangular wires; allowing for unique directional forces, optimizing fast and efficient tooth alignment with minimal friction.					
Stage 2		0.18 Bracket Slot	Working Force (gms)	Treatment Time (months)	Archwire	TenBrook Shape Upper	TenBrook Shape Lower
Working Phase	Space Closure, Bite Opening, Overjet Reduction	.016	75-100	2 to 6	Premium Working	61.41.140.00016	61.41.240.00016
	Space Closure, Bite Opening, Overjet Reduction	.018	75-100	2 to 6	Premium Working	61.41.140.18000	61.41.240.18000
		Tensile stiff round wire					
Stage 3		0.18 Bracket Slot	Working Force (gms)	Treatment Time (months)	Archwire	TenBrook Shape Upper	TenBrook Shape Lower
Finishing Phase	Second Molars, Detailing	.016 × .022	70	2	Ultra-Soft Thermal	61.41.120.01622	61.41.220.01622
	Detailing, Finishing	.016 × .022	130	3	Premium Thermal	61.41.110.16220	61.41.210.16220
	Finishing	.016 × .022	235	3	Premium Elastic	61.41.130.01622	61.41.230.01622
	Second Molars, Detailing	.017 × .022	80	2	Ultra-Soft Thermal	61.41.120.01722	61.41.220.01722
	Detailing, Finishing	.017 × .022	175	3	Premium Thermal	61.41.110.17220	61.41.210.17220
	Finishing	.017 × .022	270	3	Premium Elastic	61.41.130.01722	61.41.230.01722

Fig. 10: TenBrook Technique Archwire Sequence.
TenBrook emphasize using round wire on the working phase.



Fig. 11: No need to use RPE in Damon system.

In Damon's case treated within Damon system, no RPE needed, the upper arch expanded beautifully to a much broader arch form with computer tomogram proved after expansion still have enough healthy buccal bone. In TenBrook's case, after treatment, the upper arch is still not broad enough. This maybe due to in the .018 slot. There is not much room for archwire play, so less RPE effect. (Photos from Damon workbook⁵ and T1 brochure¹)

"Play" in the system

Damon feels that "if the mechanical system is not bound up by archwire ties or active self-ligation, **the slight play in the mechanical system allows teeth to "settle into occlusion" as they align and level.**

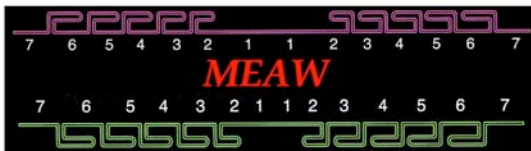


Fig. 12: Even in .019 x .025 rectangular wire in the .022 slot Damon brackets, there is still plenty of play between archwire and the large lumen slot. This is the main reason that in Damon system there is MEAW⁹ effect. Severe Class III can be corrected without using the multiloop wire.



Fig. 13: A Class III case treated with Damon system, the Class III was corrected by using straight wire and Class III elastics. It's the typical MEAW⁹ effect of the Damon system.

Special thanks to

1. Tzu-Han Huang's English editing.
2. Sabrina Hwang and Coin Matheson's information about the bracket design.

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Invisalign:

A Potential Alternative for the Future of Orthodontics?

Dr. How Kim Chuan

Introduction

I first came across Invisalign about 7 years ago when it was first promoted in Singapore. I was impressed but skeptical about it because of the immense limitations of case selection and high cost of treatment with mismatch of expectation between high fees and less than ideal treatment outcome.

Many years has gone by and I was increasingly requested by patients to provide Invisalign as an alternative to conventional bracket treatment; the relatively poor aesthetic, high friction and unpredictable bond strength of the ceramic bracket have prompted me to venture into lingual orthodontics. However, lingual braces is hardly any consolation, while it may solve the aesthetic problem by moving the ugly metal brackets into the lingual surface, it has also created a completely new arrays of problems necessitating complex wire bending skills and high adaptation and tolerance from the patients.

This has prompted me to revisit the possibility of Invisalign.

Problems with Invisalign

Extraction cases

The problem with Invisalign treatment is that it is usually not recommended for extraction cases. This is because of the difficulty in achieving a good root control and thus translational bodily movement. However, many bold orthodontists had defied the odds and tried extraction cases with successful outcomes and this has open up a new horizon with expanded possibilities in what Invisalign could offer originally.

With recent improvements in the design of the attachments system and the best treatment protocol, this problem has been minimized to a very large extend because these new attachments focus on root based movement rather than the conventional crown based movements. Root movement is essential to translational bodily movement, expression of torque as well as tip, which are critical for





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better aesthetic and stability of orthodontic treatment.

As we gain more understanding of how the root move under Invisalign system, more and more extraction cases have been treated with reasonable results.

Poor Rotational control

Rotational control which is also known as the first order movement, surprisingly is difficult to achieve with the aligners. This is probably due to inadequate space resulting in poor fitting of the aligners as well as poor attachment design. This problem, however, has been improved with new attachment designs, application of coupling force, relief of crowding and creating spaces before derotation as well as over-correction treatment.

Creating space prior to derotation is the key to rotational control. This would also reduce the amount of interproximal reduction (IPR) performed during the treatment. Invisalign has often been criticized for incorporating too much IPR in the treatment. In my opinion, IPR should be discretely used in disproportional tooth size discrepancy rather than a routine of orthodontic treatment.

Tipping movement

The second order control of the Invisalign movement is primarily achieved through vertical rectangular attachment. This would create a crown tip but the root is still left in situ. This has resulted in poor finishing and high relapse tendency. The new Invisalign treatment concept focuses on root base movement rather than crown base while the new attachment designs aim to improve this problems.

	Invisalign®	Metal braces
How does it work?	Invisalign® uses a series of clear removable aligners to straighten your teeth without braces, metal wires or brackets.	Metal braces use wires and brackets to pressure your teeth into straighter alignment.
Nearly invisible	✓	No. Metal braces are usually noticeable.
Removable during treatment	✓	No. You cannot remove braces until treatment is completed.
Treatment doesn't involve metal that can irritate teeth and gums.	✓	No. The metal wires and brackets used with braces can cause mouth irritation.
Allows you to brush and floss normally during treatment	✓	No. Braces hinder the ability to reach the entire tooth/gum area when brushing and flossing.

Root Torque versus crown inclination

The third order which is torque of tooth movement is the most poorly understood aspect of orthodontics. Clinicians are often confused of the use of variable torque mechanics concepts to achieve better aesthetic, better stability and more physiological position of the root with respect to the crown movement. Recent studies have also suggested that there is bone appositional growth following gentle root torque movement with light force. Therefore, it is important for Invisalign to be able to achieve root torque in the same manner as conventional brackets in 3D control movement. So far the aligners have not been able to achieve good root torque control in the treatment. This could probably be attributed to poor understanding of the TREAT technician, poor attachment design as well as fast teeth movement with lesser aligners used. It must be understood that crown move faster than root. Thus when the aligners sequence is too fast, it produces crowns inclination rather than root movements. Further the root moves better with the application of force closer to the centre of rotation of tooth. Invisalign has this advantage as it is possible

to incorporate dimple onto the buccal or palatal aspects of the root inducing palatal or buccal root torque as deemed necessary.

Extrusion

Contrary to conventional braces, Invisalign is very poor in extrusion and uprighting of tooth. This is probably because the occlusal coverage of the aligner that prevents the extrusion or vertical eruption of tooth. However, this problem can be solved by the use of horizontal attachment in combination with vertical elastic and the aid of orthodontic bone screw (OBS).

Intrusion

The full occlusal coverage with selective light occlusal pressure from the aligner is probably the reason that Invisalign is very effective in intruding teeth. This is completely opposite to conventional braces where extrusion is a natural consequences of treatment, however, on the contrary, intrusion would be relatively more difficult. Hence in the conventional orthodontic bracket system, intrusion of teeth often require the use of OBS or extra-oral orthodontic traction force to achieve the desired results.

The author deliberately choose an intrusion case with gummy smile to illustrate clinically how the Invisalign system could be used eloquently to solved a difficult orthodontic problem faced by the conventional bracket system (refer to the diagrams of the clinical case).

Why I see Invisalign as the potential of future orthodontic system?

Arch development versus expansion

The self ligating bracket is popular because of its ability to apply light continuous forces under a near frictionless environment. By the same token, Invisalign aligners may have the same capability in achieving this end because it is truly frictionless. Furthermore, the amount of force delivery is dependent on the force delivery of the aligner, that primarily is

the design and sequencing of the aligners during the treatment planning by the orthodontist. As our understanding of the biology of tooth movement increases, this would enable us to apply this principle in developing a new generation of invisible braces that is independent of conventional metal brackets. The concomitant incorporation of buccal root torque would effect bodily movement of teeth.

Anterior root Torque versus distal tipping of crown

Overjet reduction is often associated with too much of lingual tipping of upper anterior teeth that results in a disc in appearance. This is due to inadequate torque in the aligner. The development of the power ridge at the labial gingival root area would build in torque in the aligner. However, it is not sure how this built in torque would be expressed compared to the conventional bracket system. The beauty of Invisalign system is that the addition of the torque can be easily incorporated into each individual tooth without affecting the adjacent tooth. A more sophisticated development of the Clincheck would be to enable orthodontists to customize the amount of torque required for each individual tooth.

Skeletal discrepancy

This is one of the hardest treatments for both conventional bracket systems as well as the Invisalign system. The use of headgear, transpalatal arch, lingual arch, orthodontic bone screw, inter-arch elastic, bite jumper, Herbst as well as many functional appliances aims to counter this musculo-skeletal discrepancy has been developed with variable degrees of success. The common problem with these appliances is that they are bulky and very much patient dependent compliant appliance system. The Invisalign system, with its excellent anchorage control offers a potential solution to this problem. The ability to incorporate variable and selective anchorage controls on each individual tooth increases the potential of this system. In my humble opinion, further incorporation of the

OBS system, would increase the power of this system to treat this complex neuromuscular skeletal discrepancy effectively.

Increase aesthetic demand for invisible orthodontic appliance system

The aesthetic demand for dental treatment has expanded to orthodontic discipline. There is an ever increasing demand for invisible braces in orthodontics, however, there is no effective alternative at this moment. Ceramic bracket has been a big disappointment in terms of both aesthetic and frictional force. The bond strength of the ceramic bracket is also highly unpredictable. We used to face the problem of having too much bond strength with the ceramic bracket in the 1980s and now we are facing frequent loose bracket problem due to the weakening of bond strength in the ceramic bracket system.

I see Invisalign as a potential alternative to fill in this demand because of the superior aesthetic quality, excellent anchorage control, virtually friction free system, ability to incorporate variable and selective tip, torque and rotational control and the ease to work in conjunction with the OBS system.

Recommendation to further unleash the potential of Invisalign System

The need to develop a more sophisticated Clincheck System

At present, the Clincheck system is operated by the TREAT technician under the instruction of orthodontists. The software system, though fantastic in allowing both the clinician to visualize the proposed treatment outcome, is still incomplete because of the limitation in incorporating precise 1st, 2nd and 3rd order into the aligner. The correlation between the amount of built in order and the effect on the tooth is still not fully understood. Therefore there is a need to further develop the

software to express this effect into the system and hence more precise tooth movement.

The need to visualize the smile in relation to face in the Clincheck System

The contemporary orthodontic emphasize on Face Driven Philosophy. Many treatment decision are based on aesthetic smile arc creation and achieving facial harmony with the occlusion of teeth. This would not be possible with the current Clincheck system as it would allow the clinician to visualize teeth movement. In the absence of detail information on how these teeth movement would impact the nose-lip-chin relationship as well as the overall facial form, it would most certainly impair the diagnosis and treatment planning of the Invisalign system.

Therefore we look forward to the development of the new Clincheck system that would incorporate this important facial information into the treatment plan.

The need to empower the orthodontist to manage the Clincheck System

As a way forward to improve the efficacy of the Invisalign system and to further explore the the potential, there is a need to empower selective orthodontists into further research and development of the system. This includes development of new attachment, further improvement of best clinical protocols, systematic and comprehensive staging of treatment and embarkment of treatment of complex malocclusion in conjunction with the OBS system.

As Invisalign is a system enabling orthodontists to commence a treatment with the end in mind and a system to view the progress of treatment in stages with reasonable precision. This is certainly a clear advantage which was not possible in the past and Invisalign should capitalize on this strength and develop further into a truly system of “What you see is what you get”.

In the past, what makes a good orthodontist is someone who is able to bend the best wire. Nowadays, a good orthodontist is someone who is able to position brackets accurately, and in future, a good orthodontist would be someone who is able to plan accurately and precisely with the end in mind.

The need to develop new materials that would variable force delivery on different stages of treatment

Just like in conventional bracket systems when various archwire materials give a different range of forces with variable Modulus of Elasticity to deliver different effects. The size of the archwire change and the choice of archwire materials would produce different clinical effects. The same goes to aligner materials. During the alignment stage, softer aligners with a longer range of action should be used during the alignment stage. Whereas when it comes to the leveling stage, a more rigid property with firmer control of vertical relationship is desired; thus the use of a more rigid aligner material is desirable.

Similarly when it comes to torquing and tipping of tooth, a semi rigid material should be used to allow application of selective point forces onto the tooth surface. This concept of variable Modulus of Elasticity may well be applicable for the future of aligner materials where each stage of treatment, specialized material is used to achieved the optimum results.

The need to have more scientific research to substantiate the biology of tooth movement within the physiological limit

Currently there is no evidence to suggest that tooth movement by Invisalign is not physiological. There have been

many criticism that the tooth movement is only “cartoondontic” and there is no scientific evidence base to support that.

However, on the other hand, it is a well known observations from our patients that the Invisalign system is usually less painful and better tolerated by the patients compared to conventional bracket system.

If this observation was true, then we could surmise that there should be lesser root resorption in the Invisalign System! However, currently there are very few published studies to support this observation convincingly. From the evidence based study perspective, it is desirable to have more scientific evidences to support this claim.

The need to treat more complicated malocclusion

The current recommendation from Invisalign is to treat simple cases and preferably non-extraction cases. However, given the immense potential of this system, it is absolutely possible to embark on more complex malocclusion with better control and arguably shorter treatment time. For Invisalign System to develop as a potential system for the future of orthodontics, this is certainly a compelling and mandatory requirement to be able to treat complex malocclusion with satisfactory result and excellent control with minimum efforts.

The author has embarked on a few complex malocclusions and has achieved satisfactory results so far. More results would be published in the near future.

Conclusion

Considering the strengths and weaknesses of the Invisalign System, the strength definitely outweighs the weakness, and thus is my humble opinion to submit that the Invisalign System has immense potential to be the future orthodontic system. However, more research and development is needed to achieve this end.

Clinical Case Illustration of a Simple Gummy Smile Case

The author deliberately choose an intrusion case with gummy smile to illustrate clinically how the Invisalign system could be used eloquently to solved a difficult orthodontic problem faced by the conventional bracket system.

An adult female complained of gummy smile with relatively well aligned teeth requested for treatment to improve her smile.

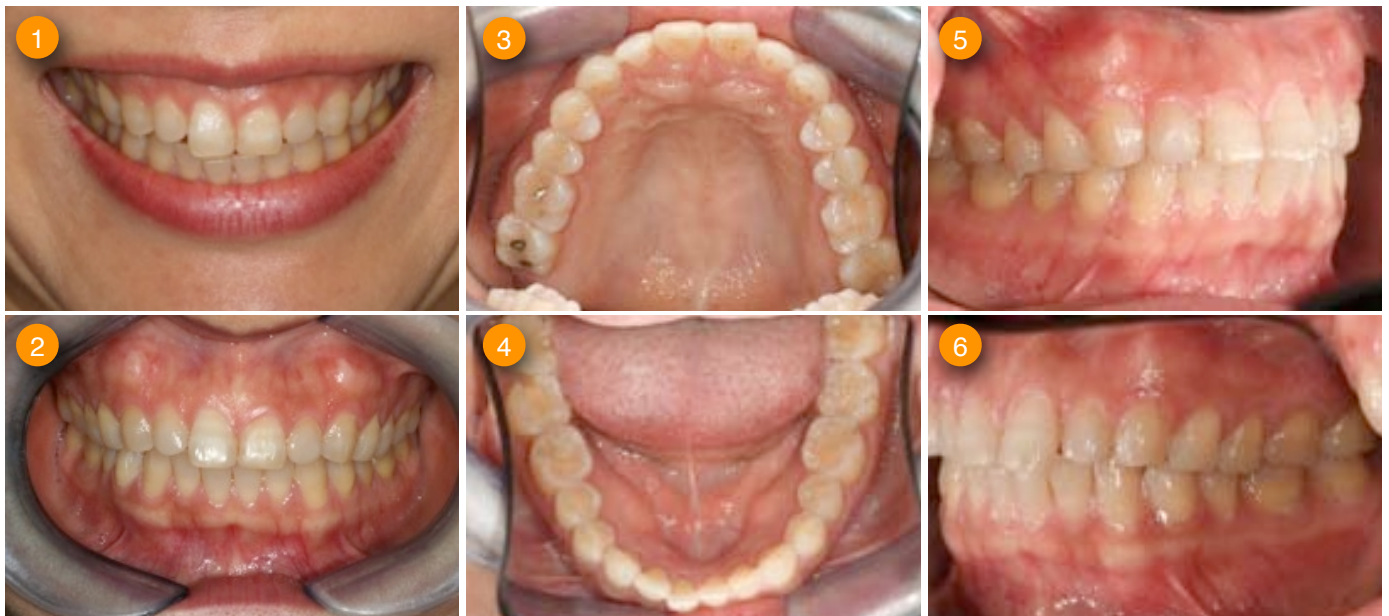


Fig. 1. Gummy smile with asymmetrical smile, notice the soft tissue lip lifted higher on the right, exposing more gingival on the right on smiling. **Fig. 2.** Frontal view, notice the uneven incisor length and asymmetry between the left and right segments. **Fig. 3.** Upper occlusal. Notice the slight asymmetry in the archform between the left and right sides. **Fig. 4.** Lower occlusal. Note the corresponding asymmetry and mild imbrication of lower incisors. **Fig. 5-6.** Notice good buccal interdigitation of the occlusion.



Fig. 7. Pretreatment Lateral Cephalograph showing skeletal I with high angle and increase vertical proportion. **Fig. 8.** The orthopantomograph shows the full compliment of teeth with the exception of upper third molars. **Fig. 9.** The postero-anterior skull view shows a mild degree of facial asymmetry between the left and the right.

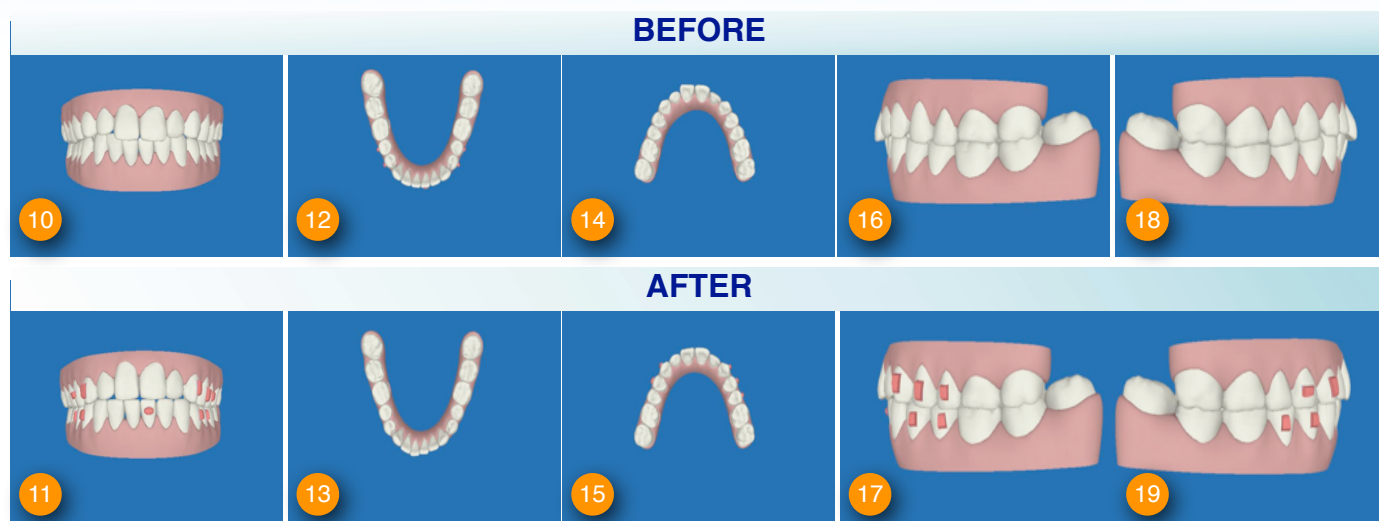


Fig. 10-11. (Clincheck before and after). Clincheck computer software planning aimed at intrusion of upper anterior, creating a smile arc and relieve mild crowding in the lower anterior.

Fig. 12-15. (Clincheck before and after). These figures show the Clincheck on the occlusal aimed at developing and symmetricizing the archform for the upper and lower occlusal.

Fig. 16-19. (Clincheck before and after). The left and right buccal occlusion is maintained. Notice the incisal proclination is corrected by distal tipping rather than proclination due to space gaining lateral arch development.



Fig. 20-22. shows the treatment progress of intrusion which causes the change in smile line at 0, 12 weeks and 28 weeks of treatment.



Fig. 23-25. shows the change in frontal aesthetic at 0, 12 28 weeks of treatment

Fig. 26-28. show the change in occlusal symmetry and archform development at 0, 12, 28 weeks of treatment.



Fig. 29-31. show the change in symmetry and archform development as well as the spontaneous alignment of the lower anterior.



Fig. 32-34. show the left buccal segment at 0, 12, 28 weeks. Note there is metal bracket bonded at 28 weeks to improve on the buccal interdigitation as finishing procedure.



Fig. 35-37. show the right buccal segment at 0, 12, 28 weeks. Note there is mild occlusal opening due to poor extrusion capability of the Invisalign system, hence metal brackets is needed as finishing procedures to detail the occlusal fit.





2011 Beethoven International Damon & OBS Workshop

OrthoBoneScrew and Damon workshop

includes two half-day lectures, two half-day chair-side observation sessions, one model practice and one case discussion session.

The costs also covers local transportation, two days of food and two nights of shared accommodation (double occupancy). Airport pick up is available upon request with additional charges.

Cost: USD 1,400;

For May session, register
before 3/10 discount \$200 off;
before 4/10 discount \$100 off

Keynote Presentation workshop

includes a total of 6.5-hours of lecture and hands-on practice, focusing on improving your professional communication skills. The workshop will use Macintosh computers and its presentation software, Keynote 09. The costs also covers one day of food and one night of shared accommodation (double occupancy).

Cost: USD 350

For May session, register
before 3/10 discount \$100 off;
before 4/10 discount \$ 50 off

Registration:

A 50% deposit is required to confirm registration. To make a payment by wire, please email thhuang@newtonsa.com.tw or call +886-3-5735676



LECTURER: Dr. John Lin

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

Dear Chris:

I must say what I learnt these few days is possibly much more than what I learn in the past few years. You obviously had surpassed my expectation.

I learn how one could create a kingdom out of a little town; how one could **manage an efficient patient flow in a shortest possible time frame with the biggest possible number**; I further learn that how one should **delegate the works effectively, empower the staff systematically and inspire them spontaneously to be contributory to the growth of the organization**.

I also reckon that effective presentation does not depend on how flowery the language we use but on how we connect to the audience and engage their attention to our flow of thoughts. An effective presentation needs an effective tool to support the need.



*Dr. How Kim Chuan, Malaysia (middle)
President of the Malaysian Dental
Association*



2011 Workshop Dates: 5/10-12, 8/9-11, 11/15-17

LECTURER: Dr. Chris Chang

President of the Beethoven Orthodontic Center. He received his PhD in bone physiology and Certificate in Orthodontics from Indiana University in 1996. As publisher of News & Trends in Orthodontics, he has been actively involved in the design and application of orthodontic bone screws.



December 07, 2010

13:00—14:00	Welcome Lunch
14:00—14:40	Orientation
14:40—15:00	Introduction of Beethoven and Anderson Clinic
15:00—18:30	Chair-side observation

December 08, 2010

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

December 09, 2010

09:00—10:00	6 Essentials of the new Damon Q
10:00—10:10	Break
10:10—12:30	Damon + Screw Dr. John Lin
12:30—13:30	Lunch

December 09, 2010

14:00—15:30	Introduction of Keynote: Organize your patient files for presentation
15:30—15:45	Break
15:45—17:00	Key Presentation Principles I

December 10, 2010

09:00—10:00	Key Presentation Principles II
10:00—10:10	Break
10:10—11:30	Make it Visual
11:30—13:30	Lunch



ABO Case Report

Non-extraction Management of Skeletal Class III Malocclusion with Facial Asymmetry

A young adult female, aged 19 years 2 months, came to our clinic to evaluate a chief complaints of severe crowding, anterior cross bite and prognathic mandible. The patient was in good general health. Oral soft tissues, periodontium, frena, and gingival health were all within normal limits. Oral hygiene was excellent. Medical and dental histories were noncontributory.

DIAGNOSIS AND ETIOLOGY

Pretreatment facial photographs (Fig. 1) showed a concave profile with a retrusive upper lip. Mild facial asymmetry as noted with chin deviated to the right of facial midline. The pretreatment intraoral photographs (Fig. 2) and study models (Fig. 3) revealed a molar relationship of Class I on the right and Class III on the left. The lower dental midline was shifted 3 mm to the right of the facial midline. A lingual cross-bite, extending from the maxillary right 1st molar to the left lateral incisor, was due to a narrow and tapered upper arch. A lateral open bite was noted in the left canine and premolar area. Intra-oral exam as well as the initial panoramic (Fig. 7) and cephalometric (Fig. 8) radiographs revealed impactions of all four third molars.

Cephalometric analysis showed a skeletal Class III pattern, due to a retrognathic maxilla and a prognathic mandible that was manifest as a 7-mm anterior cross bite. The ANB angle was -2° , the SN-MP angle was steep (47°), and the lower incisors were inclined 75° to mandibular plane. The cephalometric values are summarized in the Table 1. The American Board of Orthodontics (ABO) discrepancy index (DI) was 64, as is documented in the DI worksheet presented later in this report.



Fig 1. Pretreatment facial photographs



Fig 2. Pretreatment intraoral photographs

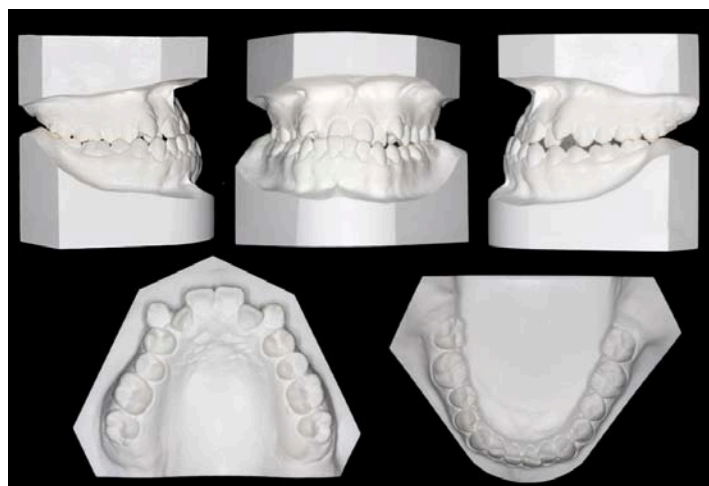


Fig 3. Pretreatment study models

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



Fig 4. Posttreatment facial photographs



Fig 5. Post-treatment intraoral photographs



Fig 6. Post-treatment study models

TREATMENT OBJECTIVES

The overall objective of treatment was to maintain the vertical dimension of occlusion (VDO), rounding out the maxillary arch, and leaving the maxillary incisors in a more forward position to compensate for the prognathic mandible. This approach allowed the achievement of bilateral Class I molar and canine relationships, with ideal overjet and overbite. The specific treatment objectives were:

- Maintain the A-P position of the maxilla.
- Avoid extruding lower molars to maintain the VDO and correct anterior open bite.
- Protract the maxillary incisors.
- Correct the anterior and lateral lingual X-bite, and align the midlines
- Establish a normal overjet and overbite in a mutually protected, Class I occlusion.
- Enhance upper lip protrusion to improve facial balance.

TREATMENT ALTERNATIVES

The patient's chief concerns were the crowding of upper arch and the anterior cross bite. Because of the retrusive upper lip, narrow upper arch, concave profile, and mild facial asymmetry, an orthognathic surgical option was discussed, but the patient and her parents deemed that to be too aggressive. Thus a nonsurgical camouflage treatment plan was devised to meet the patient's needs: 1. non-extraction, 2. bilateral bone screws in the mandibular buccal shelves to prevent flaring of lower anterior segment, 3. Expand the upper arch to correct the posterior lingual cross-bite, 4. extract the impacted lower 3rd molars, and 5. remove appliances in preparation for upper and lower fixed retainers.



Fig. 7-8. Pretreatment pano and ceph radiographs

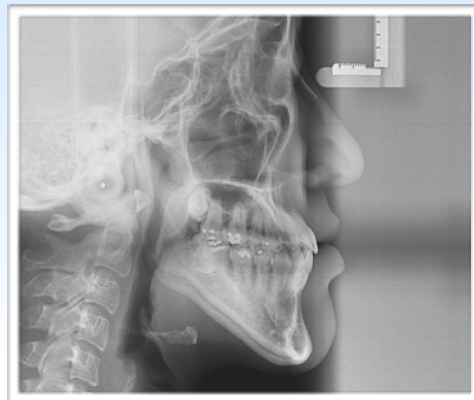


Fig. 9-10. Post-treatment pano and ceph radiographs

TREATMENT PROGRESS

0.022-in Damon D3[®] (standard torque) and D3MX[®] brackets (Ormco) were used. Both arches were bonded and aligned with .014 NiTi arch-wires. In 3rd month of treatment, the anterior cross-bite was corrected, a .016 x .025" NiTi arch wire was placed in the lower arch, and a triangle vertical elastic (3/16", 3.5 Oz) with slight Class III vector on #11, #21 & #22 was used to close the anterior and lateral open bite. In the 4th month, a .014x.025 NiTi arch-wire was placed in the upper arch. In 6th month of treatment, a .019 x .025 SS arch-wire was placed in upper arch and Class III elastics (5/16", 6 oz, Moose) were started on the left side to correct the midline discrepancy. One month later, another right side Class II elastic was added to facilitate midline correction. In the 9th month of treatment, the midline discrepancy had been successfully corrected for the lateral open bite in the left premolar area. For correcting the lateral open bite, brackets of teeth #22 and #23 were re-bonded in a more gingival position, and elastics were continued to over-correct the midline discrepancy. In 19th month of treatment, the maxillary incisors were bonded with low torque brackets to de-torque and correct the mesiodistal angulation according to a periapical film. For correcting the torque of upper anterior segment (26th month of treatment), an anterior root torquing

[illegible]

Table 1 Cepha analysis

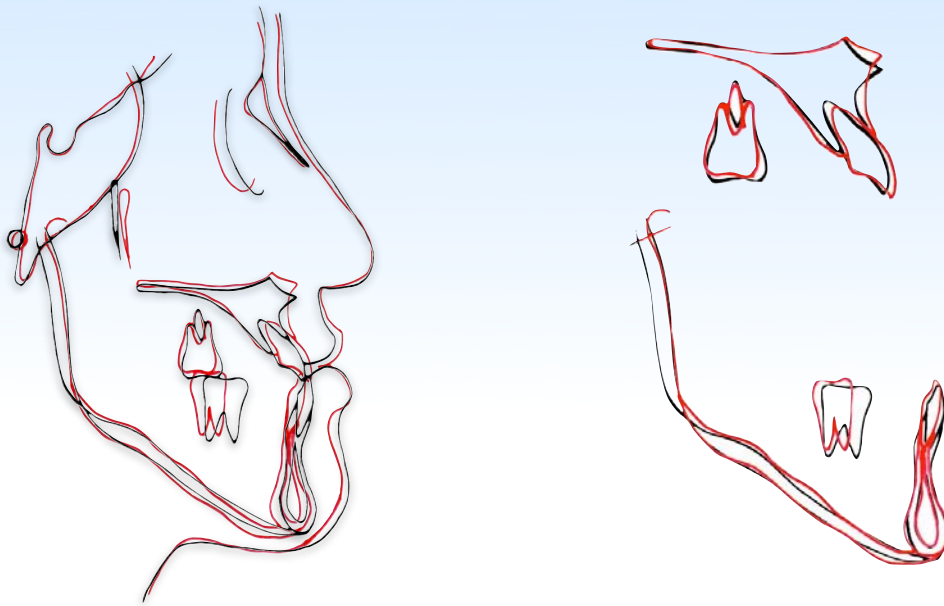


Fig 11. Superimposed tracings. Superimposition on maxilla and mandible revealed extrusion of anterior teeth and tip-back of molars. These contributed to correction of anterior cross-bite and Class III relationship.

(ART) spring was placed after a .017 x .025 TiNb arch-wire was seated. The upper anterior axial inclination was overcorrected in about 5 months. With the flexible .017 x .025 TiNb, it was possible to do some finishing bends as well as detorquing of the upper anteriors with Class II elastics. In 31th month of treatment, appliances were removed and retainers were delivered.

TREATMENT RESULTS

The overall results were pleasing to both the clinician and the patient. Facial harmony and upper lip retrusion were improved (Fig. 4). Posttreatment intraoral photographs (Fig. 5) and study casts (Fig. 6) show a Class I buccal interdigitation bilaterally. The maxillary dental midline was aligned with the facial midline while mandibular midline was still slightly deviated to right side. Ideal overjet and overbite were achieved. The posttreatment panoramic radiograph (Fig. 9) documents the axial alignment of the dentition, and the cephalometric film (Fig. 10) shows the relative skeletal and dental balance.

Cephalometric analysis and superimpositions (Fig. 11) showed a slight extrusion of the maxillary and mandibular anterior teeth and modest opening of the mandibular plane angle. The upper incisor to the SN angle was maintained at 107°. The lower incisor to the Md plane angle decreased from 79° to 77°. Critical assessment of this case with the ABO cast-radiograph method resulted in a score of 25, as documented on

the form appearing later in this report. This score is within the limit of 26 which is deemed acceptable for an ABO case report. The following deviations from ideal were noted:

- Maxillary right 2nd molar and mandibular lateral incisors exhibit minor mesial-in rotation.
- Marginal ridge discrepancies exist between #13-14, #30-31, #18-19 and #17-18.
- Mandibular 2nd molars exhibit excessive lingual root torque.
- Inadequate overjet on the maxillary right canine and left 2nd molar.
- Lack of occlusal contacts was noted on the buccal aspect of left maxillary 2nd molar, lingual side of 1st and 2nd premolars bilaterally, and on the right 2nd molar.

DISCUSSION

A Class III skeletal malocclusion, with marked negative overjet, was treated conservatively with a non-surgical approach. These malocclusions have long been challenging for orthodontists, particularly when complicated with an open bite and high mandibular plane angle. The treatment of skeletal open bite often involves extraction of 1st premolars, 2nd premolars or even 1st molars, even when crowding is deemed to be mild¹. Differential intermaxillary space closure for sagittal discrepancies is the approach preferred by many clinicians. It

has been suggested that if the molars are moved anteriorly without extrusion, the mandible will show an anterior rotation. Conversely, extrusion of molars results in posterior mandibular rotation. Therefore, the most challenging part of non-extraction treatment for skeletal openbite malocclusions is the control of molar extrusion to avoid posterior rotation of mandible.

A non-extraction approach for anterior open bite usually requires extrusion and lingual tipping of both upper and lower incisors, as well as intrusion of upper and lower molars. Multi-loop Edgewise Arch Wire (MEAW) technique can effectively treat high-angle adult patients by extruding incisors and intruding molars². Another effective method to correct anterior open bite is the skeletal anchorage system invented by Dr. Sugawara³. Since our patient had a retrusive upper lip and the parents don't like invasive treatment with skeletal anchorage, we decided to do treatment without extraction in combination with muscle training technique, introduced by Dr. Kondo⁴. Class III open bite patients usually have low tongue posture and a mouth breathing habit which is reflected by a narrow upper arch as well as anterior open bite. Successful correction of anterior open bite with the achievement of good facial balance involves: 1. myofunctional training to elevate the tongue, 2.



Fig. 12. Day 1, Full mouth bonding.
Use Damon 3 on upper arch and Damon 3MX on lower with standard torque.

lip posture training to assist establishment of more ideal axial inclination of the incisors, and 3. Class III elastics to tip-back back the lower molars. With conventional appliances, molar tip-back can be attained by MEAW technique with inter-arch elastics. Wire bending, including multiple L-loops and tip-back bends in MEAW technique, can deliver light force with relatively a low load-deflection rate. These wire bends can improve the effects of elastics. But there are some disadvantages of the wire bends such as technically difficulty, excessive chair time, and the loops interfere with the patient's oral hygiene. Conversely, it is possible to generate a similar force system with the low friction passive self-ligation system without the complicated wire bending.

For the present patient, delayed application of inter-arch elastics⁵, and no posterior bite turbos to open the bite, resulted in a prolonged treatment time (31 months). In the 2nd month of treatment, the left maxillary lateral incisor, which was not locked in by the occlusion of the lower anterior teeth, has been aligned (Figs.12 and 13) but the locked in right side is still palatally positioned. After 6 months of leveling and alignment, without utilization of early elastics, the lower dental midline was deviated 6 mm to the right of the facial midline (Fig. 14).



Fig. 13. 2nd month in progress.
Note #7 still in cross-bite position because we didn't unlock bite with bite turbos.

A Class III elastics (5/16", 6 oz, Moose) was used on the left side to correct the midline discrepancy. Thanks to the cooperation of the patient (24 hours wearing elastics), the midline was effectively corrected in 3 months (Fig. 15a, 15b). In 26th month of treatment, the maxillary incisors are too proclined (Fig. 16) because of the application of Class III elastics. An anterior root torquing (ART) spring and Class II elastics were used to de-torque the upper incisors. In 31th month of treatment, all appliances were removed. Retention was with a clear retainer on the upper arch and a fixed retainer for the lower anterior segment.

When evaluating our final results with ABO grading system, the principal problems were marginal ridge discrepancies and lingual occlusal contacts (see scoring form below). Marginal ridge discrepancies (Fig. 17) between lower 1st and 2nd molars were primarily due to application of Class III elastics. Side effects of using Class III elastics include lingual tipping of lower incisors, labial tipping of upper incisors, extrusion of upper molars, and tip-back of lower molars. Flaring of the upper incisors were corrected later by ART, and the extrusion of upper molars were controlled by squeezing exercises (myofunctional therapy)⁶. The patient was instructed

to place fingers over the posterior fibers of the Temporalis muscle to feel the muscle contraction with maximum intercuspation. The exercise is repeated 50 times as a cycle, and 6 cycles day are prescribed to avoid molar extrusion. Since the lower 3rd molars were not extracted, the tip-back effect on the lower 2nd molars could not be resolved even though the teeth were rebonded twice. Lack of occlusal contacts on lingual aspects of premolars and 1st molars (Fig. 18) were primarily due to the sharp buccal cusps of those teeth. Treatment of the open bite from right maxillary canine to left 1st premolar aligned unworn teeth in an arch of worn ones, even though the patient



Fig 15a. 9th month in progress.
Facial asymmetry seemed to be solved as well as dental midline by means of inter-arch elastics.



Fig 14. 6th month in progress.
Wires changed to 19x25 SS on upper and 16x25 NiTi on lower. Use anterior diagonal and Class III elastics (5/16", 6 oz, Moose) on left side to correct 6 mm midline discrepancy.

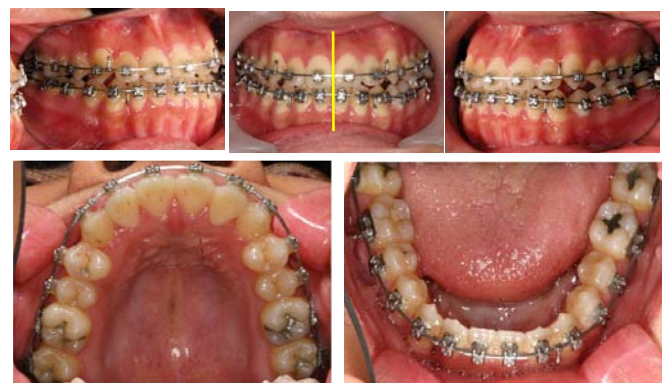


Fig 15b. 9th month in progress.
Midline discrepancy has been successfully corrected by elastics.

was 19 years old. Therefore, it was necessary to perform enamel re-contouring^{5,6} to achieve good occlusal contacts. This is a common problem for adult malocclusions, particularly if there are teeth in crossbite.

In conclusion, this case presentation demonstrates that severe skeletal Class III open bites can be corrected with relatively simple mechanics. Long-term stability of open bite, non-extraction treatment is still debated. Extraction treatment for open bite malocclusion seems to have greater stability of the overbite than open bites that are corrected by non-extraction treatment⁷. Although extraction treatment demonstrates a statistically greater stability of the overbite, there is no statistically significant difference in relapse of the open bite between extraction and non-extraction treatment. After 1-year-follow up (Fig. 19), the overbite was maintained relatively well, but there was some relapse in the left canine and premolar area which appeared to be due to the patient's lateral tongue posture habit. Close follow up is indicated to maintain tongue training to help prevent further relapse.

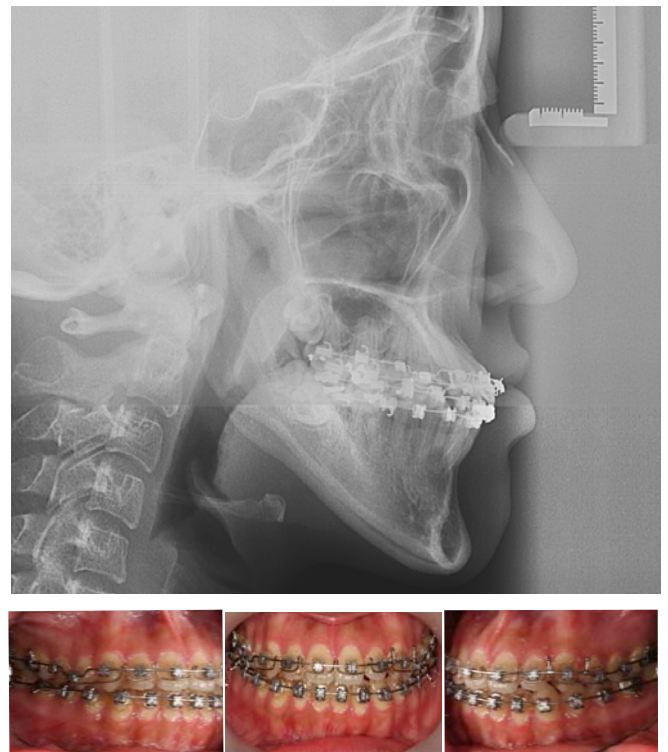


Fig 16. 26th month in progress.
Anterior root torquing spring (ART) is used to correct proclined upper incisors.

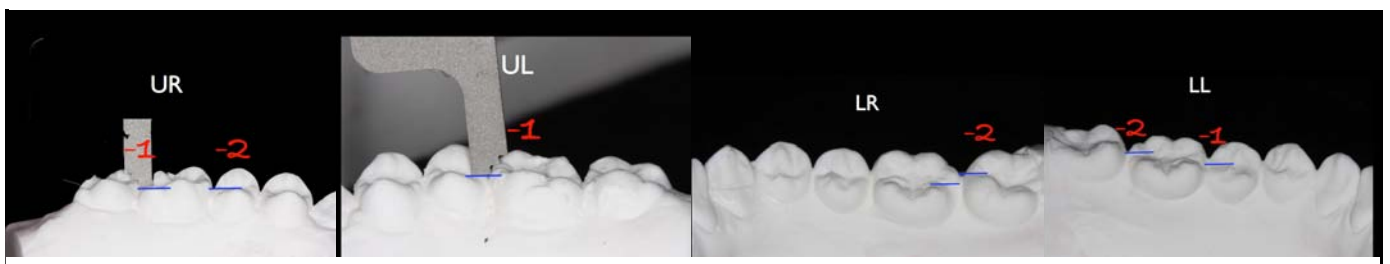


Fig 17. Marginal ridge discrepancies.
Marginal ridge discrepancies were noted particularly on lower molar areas because of tip-back effects of Class III elastics and not re-contouring the unworn cusps.

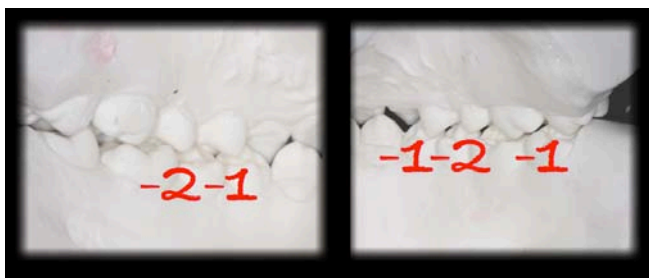


Fig 18. Lack of occlusal contacts on lingual aspects.
Lack of occlusal contacts on lingual aspects of premolars and 1st molars were primarily due to the sharp buccal cusps of those teeth.



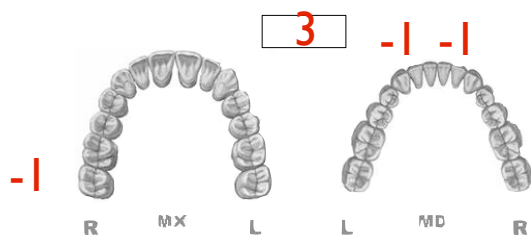
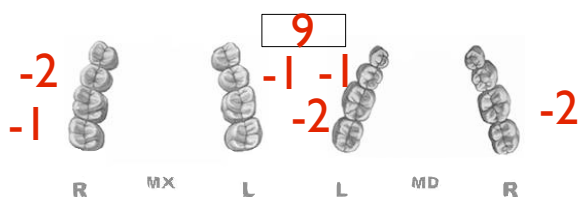
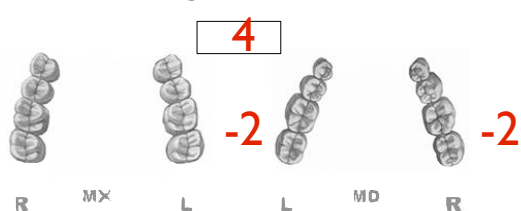
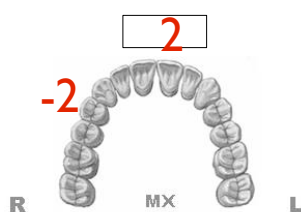
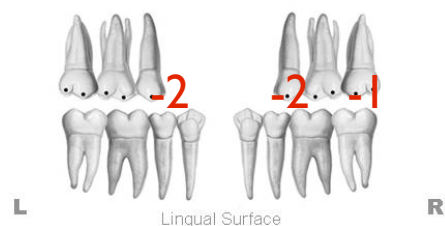
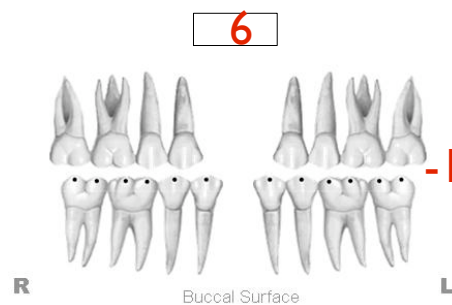
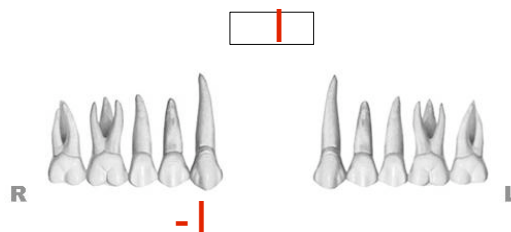
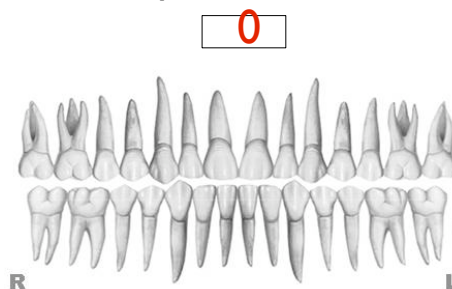
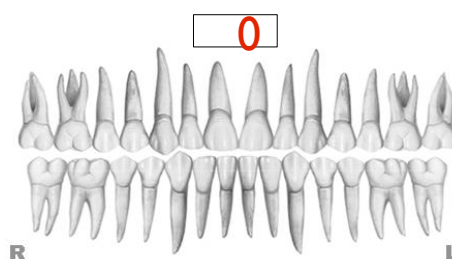
Fig 19. 1-year follow up.
The overbite was maintained relatively well, but there was some relapse in the left canine and premolar area.

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Exam Year	<input type="text"/>
ABO ID#	<input type="text"/>

Examiners will verify measurements in each parameter.

ABO Cast-Radiograph Evaluation (Rev.Case # Patient Total Score: **25****Alignment/Rotations****Marginal Ridges****Buccolingual Inclination****Overjet****Occlusal Contacts****Occlusal Relationships****Interproximal Contacts****Root Angulation**

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

ABO Case Report

Early Intervention for Multiple Impacted Teeth: More Comprehensive Clinical Assessment with the iSAS Method

HISTORY AND ETIOLOGY

A 9 year 5 month girl presented with her parents for an orthodontics consultation (Figure 1). There was no contributory medical history, but she had a dental history of extensive restorative and space saving treatment of the deciduous molars in the mandibular arch. The chief complaint was multiple unerupted and malaligned teeth (Figures 2). The patient and her parents had consulted several orthodontists previously. They were well aware of the complexity of the malocclusion and sought a comprehensive solution for the severe malocclusion.

Two residual roots of the upper primary canines and both lower primary molars were retained (Figure 2). Following the loss of the mandibular primary teeth, casts were obtained (Figure 3). The initial clinical examination revealed a bilateral Class II molar relationship with inadequate space in both arches (Figures 2 and 3). The treatment plan proposed resulted in a near ideal resolution of the malocclusion (Figures 4-6). The clinical details of this successful result will be documented later in this report.

The pretreatment cephalometric and panoramic radiographs (Figure 7) revealed an impacted central incisor and two impacted premolars in the maxillary arch. The lower 2nd premolar has insufficient space for eruption on the right side, despite the previous use of a space maintainer (Figures 2 and 7). Although the treatment plan was to achieve an ideal alignment of the entire dentition (Figure 8), the relationship of the impacted teeth to the adjacent teeth and the alveolar process was not clear. The patient was referred for a pretreatment cone-beam computed tomography (CBCT) radiograph (Figure 9). The CBCT images revealed that the upper right 2nd and left 1st premolar were both palatally impacted. The long axis of the upper right central incisor was about 110° to the left central incisor. Figure 10 is cephalometric documentation of the treatment rendered.

DIAGNOSIS

Skeletal :



Fig 1. Pretreatment facial photographs



Fig 2. Pretreatment intraoral photographs



Fig. 3. Pretreatment study models

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



Fig. 4. Posttreatment facial photographs



Fig. 5. Posttreatment intraoral photographs



Fig. 6. Posttreatment study models

- Skeletal Class I with SNA 89°, SNB 87°, and ANB 2° (Figure 7 and Table).
- Normal mandibular plane angle (SN-MP 28°, FMA 20°).

Dental :

- Class II molar relationship on the left side.
- The overbite and overjet were both 1 mm.
- Mx R 2nd and Mx L 1st premolars were palatally impacted, Mx R central incisor was a labial impaction.
- Both maxillary primary canines were retained.
- There were no signs or symptoms of TMJ dysfunction.
- The ABO Discrepancy Index (DI) was 14 as shown in the subsequent worksheet.

Facial : Near ideal profile with acceptable lip position.

SPECIFIC OBJECTIVES OF TREATMENT

Maxilla (all three planes):

A - P : Allow for normal expression of growth.

Vertical : Maintain

Transverse : Maintain

Mandible (all three planes):

A - P : Allow for normal expression of growth.

Vertical : Maintain

Transverse : Maintain

Maxillary Dentition

A - P : Maintain

Vertical : Maintain.

Inter-molar Width : Maintain

Mandibular Dentition

A - P : Maintain

Vertical : Maintain

Inter-molar / Inter-canine Width: Maintain.

Facial Esthetics : Maintain.



Fig. 7. Pretreatment pano and ceph radiographs show multiple impacted teeth and retained primary canines.

Fig. 8. Posttreatment pano and ceph radiographs show a balancing lip profile.

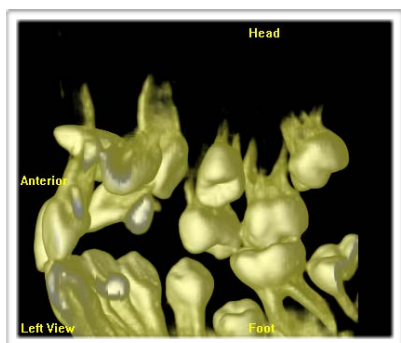
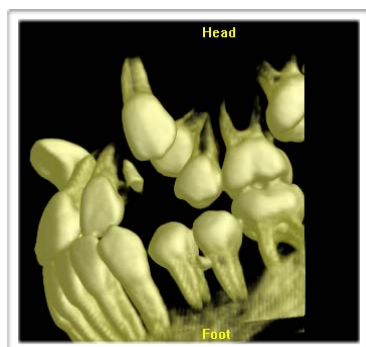


Fig. 9. 3D images show that #15,24 were palatally impacted, and #11 was labially impacted.

Table 1. Cephalometric summary

[illegible]

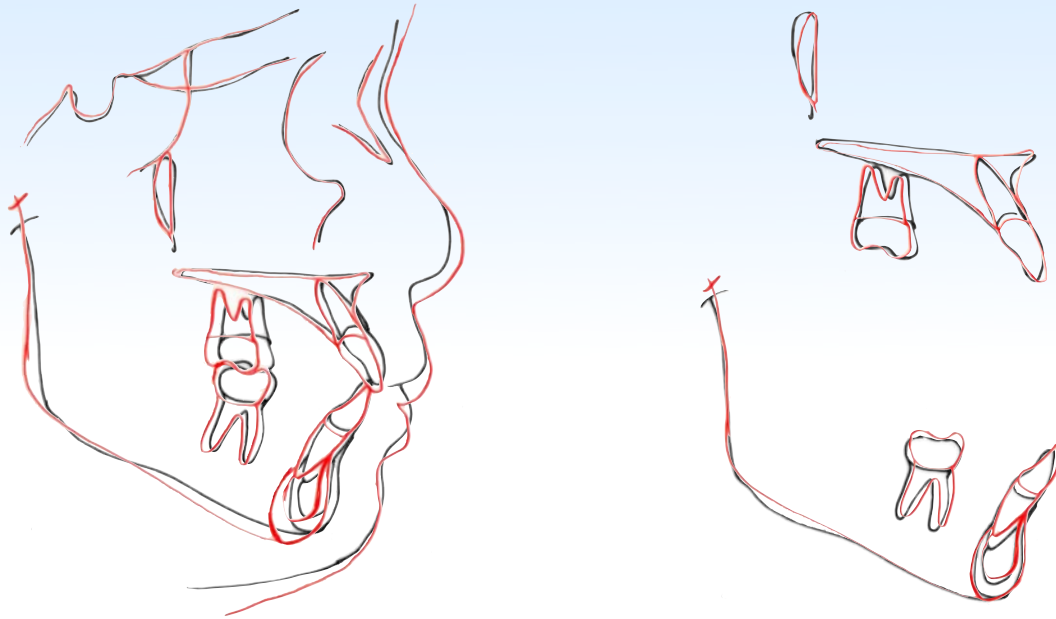


Fig. 10. Superimposed tracings show a slight extrude and protraction of the mandibular molars.

TREATMENT PLAN

A non-extraction treatment, with a full fixed orthodontics appliance, was indicated to correct crowding, level the curve of Spee, and coordinate the arches. At the initial stage of treatment, space was opened for all the impacted teeth. The surgical plan included palatal exposure of impacted maxillary premolars, and an apically positioned flap to expose the impacted maxillary central incisor.

Elastics were needed to achieve a good interdigitation in the detailing stage. For retention, upper & lower 3-3 fixed retainers were supplemented with an upper clear overlay retainer.

APPLIANCES AND TREATMENT PROGRESS

0.022" Damon D3MX® brackets (Ormco Corporation) were used. Upper 2-2 low torque brackets (central incisor : 7°; lateral incisor : 3°) were used to prevent flaring of



Fig. 11. Open coil springs were placed over the sites of impactions to create proper spaces.

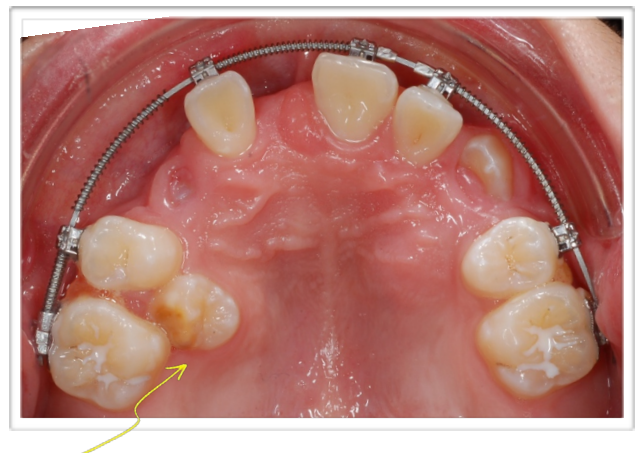


Fig. 12. Localized enamel hypoplasia was noted on the distal-buccal surface of right 2nd premolar. The texture was smooth.

incisors. Open coil springs were used to open spaces for the impacted teeth (Figure 11). The wire sequence was as follows: 0.014" CuNiTi, 0.014X25" CuNiTi, 0.017X25" TMA.

In the 7th month of treatment, the impacted right maxillary 2nd premolar erupted spontaneously with a yellow-brown spot on its buccal surface (Figure 12). In the 10th month of treatment, the right maxillary central incisor was exposed with a modified apically positioned flap. The procedure involved two vertical incisions and one horizontal incision on the alveolar ridge. A full thickness flap was reflected to expose the central incisor. A lingual button, attached to a power chain, was bonded on the labial surface of the incisor, and it was tied to the main arch wire. The flap was positioned at the CEJ level of the adjacent teeth and sutured with silk. An open window for exposure of the left maxillary 1st premolar was performed in the same visit.

The surgical exposure and initial orthodontic alignment of the impacted maxillary central incisor is documented in Figure 13. After 2 months of traction (12th month of treatment), the impacted incisor was exposed in the oral cavity (Figure 13). In the 15th month, all the maxillary teeth were engaged with the 0.014" CuNiTi archwire, except the left 1st premolar. In the 19th month, the left 1st premolar was engaged with the 0.014 CuNiTi wire (Figure 14). At the 21st

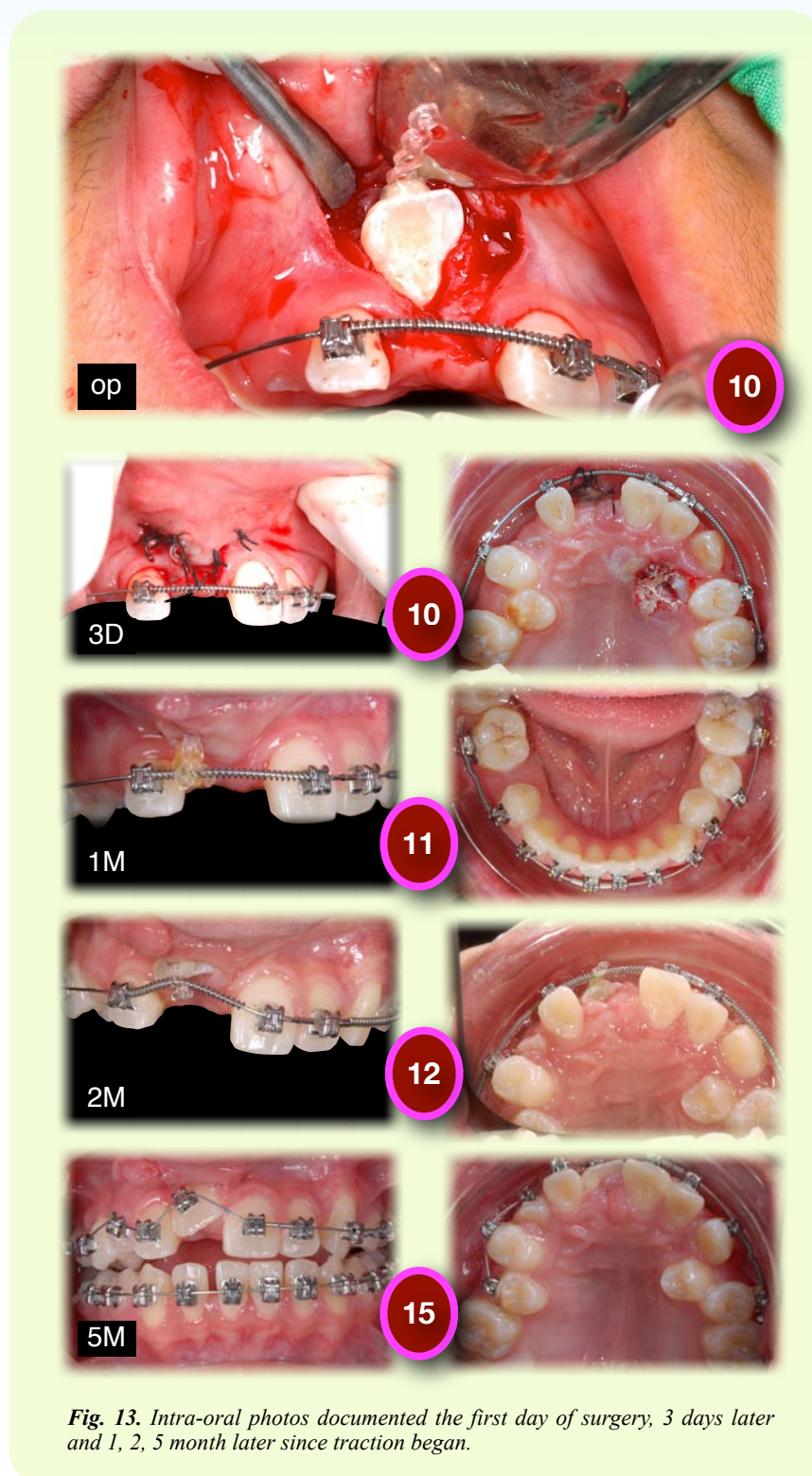


Fig. 13. Intra-oral photos documented the first day of surgery, 3 days later and 1, 2, 5 month later since traction began.



Fig. 14. Intra-oral photos showed the progress of maxillary alignment.

month of treatment the main archwire was changed to 0.014X25" CuNiTi, and the alignment of both arches was achieved. A panoramic radiograph was taken to evaluate root angulation of the teeth and reposition the brackets. The wire sequence was as follows: 0.014X25" CuNiTi, and 0.017X25"

TMA. In the 24th month, a minor odontoplasmy procedure on the cusp tip of the bilateral maxillary canines and occlusal adjustment on maxillary premolars were performed using a green stone. U3 to L34 triangular elastics (3.5 oz) were also applied bilaterally (Figure 15). Appliances were subsequently removed and retainers were delivered after 30 months of active treatment. Figure 16 documents the orthodontics alignment with a comparison of panoramic radiographs, exposed at the 13th and 24th month of treatment.



Fig. 15. In the 24th month, vertical elastics (3.5 oz, 1/4 inch) were used for final detailing.

RESULTS ACHIEVED

Maxilla :

A - P : Maintained

Vertical : Maintained.

Transverse : Maintained.

Mandible :

A - P : Posterior 2-3 mm.

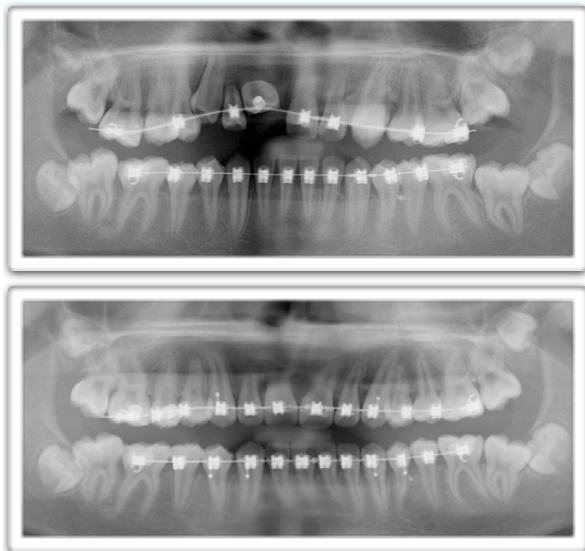


Fig. 16. Comparison between radiographs in 13th and 24th month.

Vertical : Increased 1-2 mm.

Transverse : Maintained.

Maxillary Dentition :

A - P : Molars retracted ~1 mm.

Vertical : Maintained.

Inter-molar Width : Maintained.

Mandibular Dentition :

A - P : Incisors anterior 1-2 mm.

Vertical : Molars and incisors extruded ~ 2 mm.

Inter-canine Width : Maintained.

Inter-molar Width : Increased 3 mm.

Facial Esthetics : More convex profile due to nasal growth and posterior rotation of the mandible.

RETENTION

An upper clear overlay retainer was delivered. The patient was instructed to wear it full time for the first 6 months and nights only thereafter. The upper and lower fixed 3-3 retainer were bonded (Figures 4, 5, 6 and 10). The patient was instructed on home care and maintenance of the retainers.

Tongue posture, lip competence and bite-squeeze (clenching) exercises were also recommended after treatment. In addition, the extraction of bilateral impacted 3rd molars were suggested.

FINAL EVALUATION OF TREATMENT

Superimposed cephalometric tracings revealed an unusual skeletal response (Figure 10). The mandible grew several millimeters in length, but was more distally positioned in the sagittal plane after treatment. This pattern suggests that the patient had a centric relation to centric occlusion discrepancy initially ("Sunday bite"). This additional complication, which was not evident at the initial examination, resulted in a posterior rotation of the mandible. This problem does not appear to be related to orthodontics mechanics, but did require labial tipping of the mandibular incisors to correct the overjet.

The ABO Cast-Radiograph Evaluation was scored at 28 points, indicating a finished occlusion that is marginal for an ABO case presentation. The goal for an ABO case is ≤ 26 points. The major discrepancies were alignment and marginal ridge discrepancies on the second molars, which were newly erupted and not bonded.

For the present patient, the impacted teeth were corrected in a direct manner. CBCT imaging provided important diagnostic information to design appropriate surgical approaches (Figures 9, 17). The treatment timing may have been a little early because of the unerupted second molars. Considering the ever increasing complexity of clinical cases, early intervention might be a better choice than delayed treatment for this type of cases. In general, the treatment results were deemed to be very good, for such a complex malocclusion.

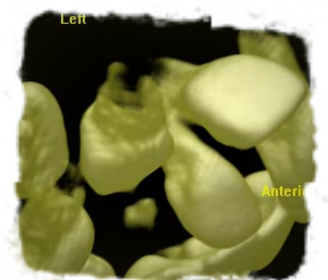


Fig. 17. CBCT.

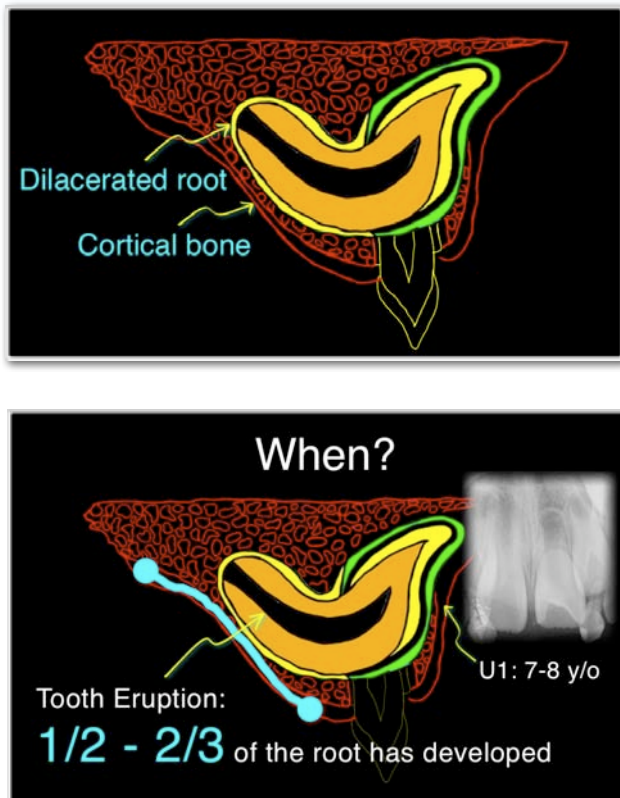


Fig. 18. Treatment timing for upper impacted incisor.

DISCUSSION

The time at which orthodontic treatment should be started remains a matter of conjecture. Anomalies of dental development and functional problems tend to be addressed in the mixed dentition, while definitive treatment tends to be delayed until the late mixed dentition to maximize growth potential, optimize patient compliance, and allow for eruption of second molars during active treatment. Delayed eruption of a maxillary incisor often results in mid-line shift and an irregular alveolar ridge height.¹ The images of CBCT show that the palatal surface of

the impacted central incisor faced the labial side of alveolar ridge. This orientation presents a high risk of root dilaceration of the incisor.^{2,3} Dilaceration of a maxillary incisor root has long been a challenge to clinicians.^{4,5} Treatment options for a dilacerated incisor are either extraction or surgery combined with orthodontic traction. As the CBCT image shows, the root development of the ectopic incisor is only one-third completed. Hopefully, early orthodontic retraction prevent root dilaceration. In this case the anomalous dental development was a key factor in initiating early treatment.⁶ (Figure 18, 19)

The surgical method affects the outcome of soft tissue for labial impactions significantly. There are three techniques for treating the labial ectopic incisor: excisional uncovering, closed eruption, and apically positioned flap (APF).⁷ According to criteria to determine the appropriate method, a closed eruption technique and APF are possible choices in this case.⁷ The APF usually results in a deepened vestibule and increased keratinized gingiva, but there may be a soft tissue scar. The closed eruption technique often results in a shallow vestibule, preserved keratinized gingiva, and good soft tissue esthetics. In this case the APF is used because that

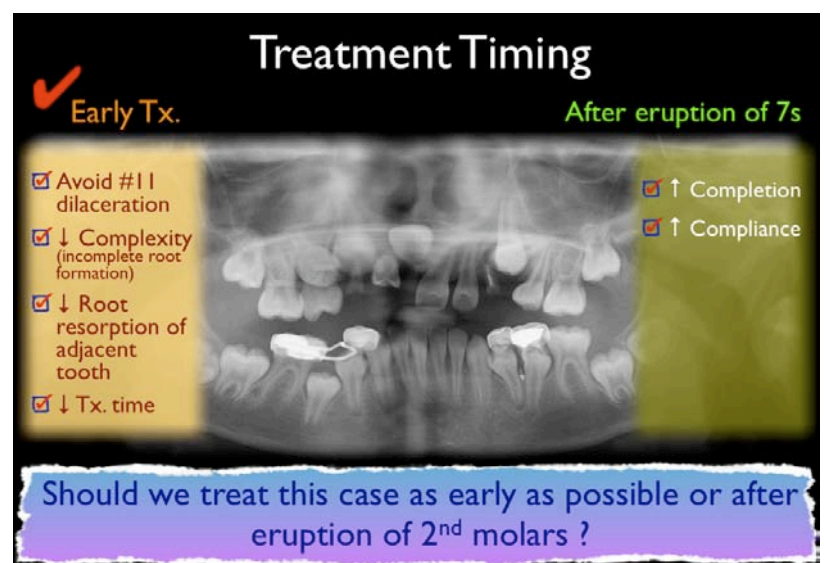


Fig. 19. Treatment timing consideration in this case.



Fig. 20. Pink esthetic comparison between pre-tx and post-tx photos.

the patient already has shallow vestibule and narrow keratinized gingival band. The position of incisor crown was above the mucogingival junction. The surgeon placed the flap apically and covered the crown instead of the CEJ level, due to the relation between the vestibule and the crown position. This modified APF procedure resulted in a good outcome both functionally and esthetically. (Figures 20, 22)

Enamel hypoplasia (EH) is a tooth enamel defect that results in a tooth or teeth having less than the normal amount of enamel⁸ (Figure 21). When the impacted right maxillary 2nd premolar erupted, a yellow-brown spot was noted on its distal-buccal surface. This anomaly of enamel structure is usually localized, which results in small dents, grooves or pits on the outer surface of the affected tooth. This anomaly makes the tooth's surface very rough, and the defects are often highly visible because they are brown or yellow in



Fig. 21. Enamel hypoplasia over #15 was noted.

color. In extreme cases, the tooth enamel is missing entirely, causing the affected tooth to be malformed or abnormally small. Fortunately, EH can usually be managed by restoring the missing enamel.

The patient must adhere to proper oral hygiene methods, receive regular fluoride treatments, and avoid foods containing an excessive amount of sugar.⁹ If the EH is very mild, the dentist may fill in the pits or dents with a clear sealant. Another common treatment for this dental condition involves bonding a tooth-

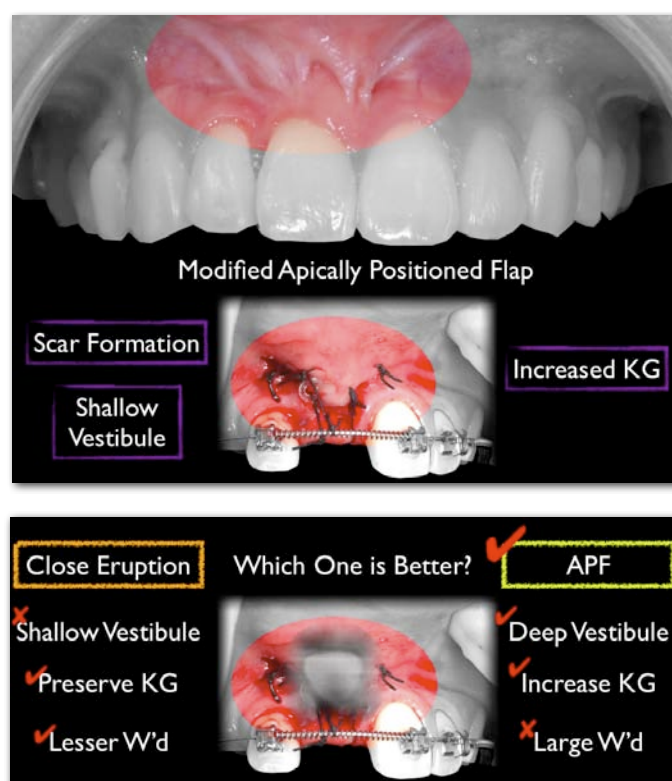


Fig. 22. Pros and cons in modified apically positioned flap.

colored material to the tooth in order to protect it from further wear. If the enamel has such an irregular surface, that it is impossible to bond to it, the dentist may choose to place a permanent cast or stainless steel crown on the affected tooth. In this case, the informed consent to parents is important.⁹

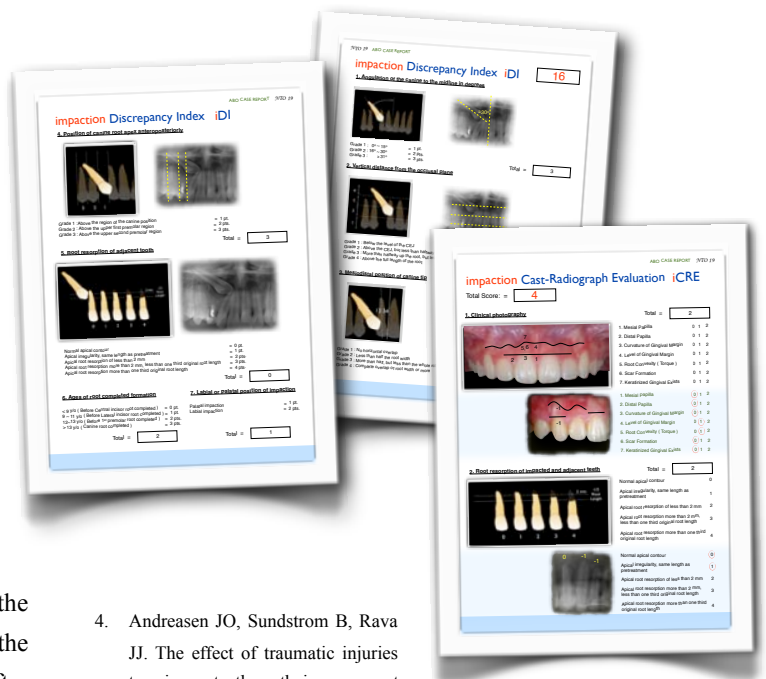
Ectopic eruption and impactions are challenging problems in orthodontics.¹⁰ Although the DI score has proven to be an effective indicator of treatment complexity (severity) for most patients, it underestimates the difficulty for such impactions. A revision of the DI more appropriately weights the difficult osseous impactions is indicated. An Impaction Specific Assessment System (iSAS) to supplement the ABO DI is helpful when recognizing case difficulties.¹¹ For the subject of this case report, the iDI score was 29 points. When added to the ABO DI score of 14 points, the total DI score was 43 points. It is proposed that this revised DI method, for weighting the clinical challenge of impacted teeth, is a more appropriate indicator of the complexity of the malocclusion. For the present case report, the iCRE score was 7 points and the total CRE was 35 points (the original CRE score 28 + iCRE score 7). A revision of the CRE more strictly evaluates the soft tissue condition after impacted tooth surgery is indicated. The formerly qualified score of 26 in the CRE may be broadening for the tolerance of the pink esthetic result.

ACKNOWLEDGEMENT

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DISCREPANCY INDEX WORKSHEETCASE # PATIENT

TOTAL D.I. SCORE

14+29 = 43**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 =

EXAM YEAR

ID#

LINGUAL POSTERIOR X-BITE1 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.Each degree $< -2^\circ$ x 1 pt. = Each degree $> 6^\circ$ x 1 pt. =

SN-MP

 $\geq 38^\circ$ = 2 pts.Each degree $> 38^\circ$ x 2 pts. = $\leq 26^\circ$ = 1 pt.Each degree $< 26^\circ$ x 1 pt. = 1 to MP $\geq 99^\circ$ = 1 pt.Each degree $> 99^\circ$ x 1 pt. = Total = **OTHER** (See Instructions)

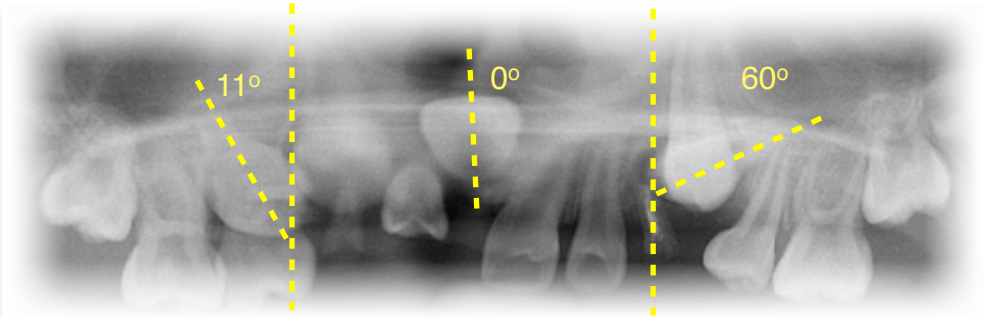
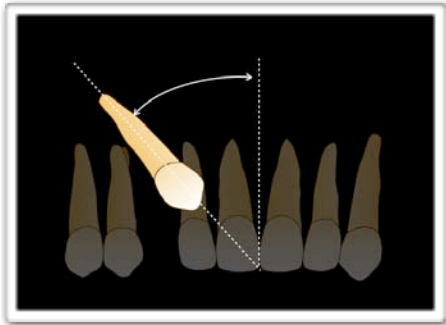
Supernumerary teeth x 1 pt. =
 Ankylosis of perm. teeth x 2 pts. =
 Anomalous morphology x 2 pts. =
 Impaction (except 3rd molars) x 2 pts. =
 Midline discrepancy (≥ 3 mm) @ 2 pts. =
 Missing teeth (except 3rd molars) x 1 pts. =
 Missing teeth, congenital x 2 pts. =
 Spacing (4 or more, per arch) x 2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

Identify:

Total =

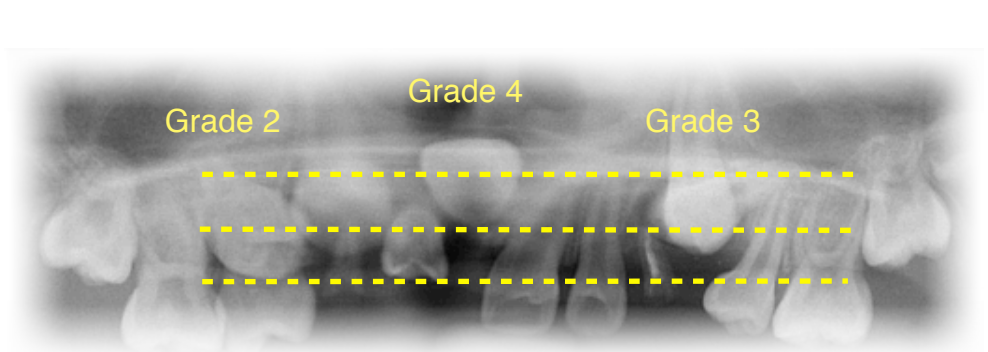
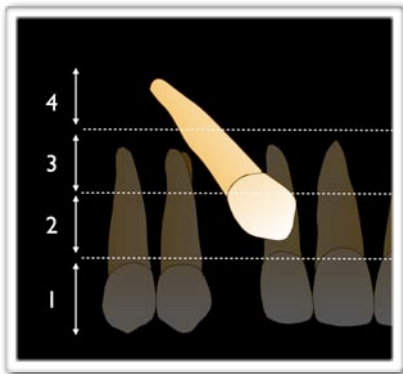
iDI **impaction** Discrepancy Index

Total score =

29**1. Angulation of the impaction to the midline in degree**

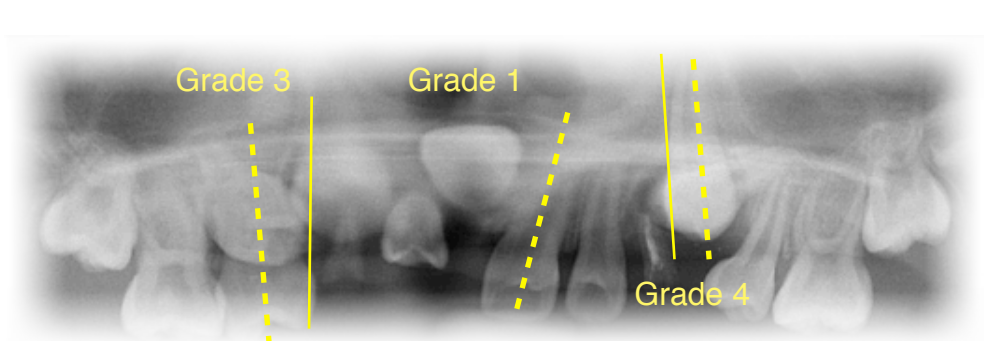
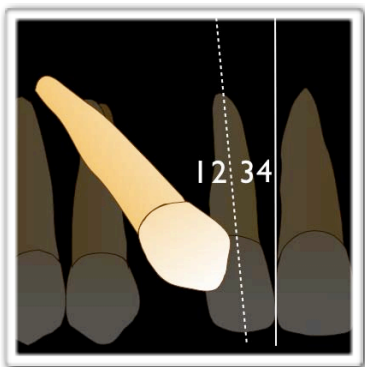
Grade 1 : $0^{\circ} \sim 15^{\circ}$ = 1 pt.
 Grade 2 : $16^{\circ} \sim 30^{\circ}$ = 2 pts.
 Grade 3 : $\geq 31^{\circ}$ = 3 pts.

Total =

4**2. Vertical distance from the occlusal plane**

Grade 1 : Below the level of the CEJ = 1 pt.
 Grade 2 : Above the CEJ, but less than halfway up the root = 2 pts.
 Grade 3 : More than halfway up the root, but less than the full root length = 3 pts.
 Grade 4 : Above the full length of the root = 4 pts.

Total =

9**3. Mesiodistal position of the impaction tip**

Grade 1 : No horizontal overlap
 Grade 2 : Less than half the root width
 Grade 3 : More than half, but less than the whole root width
 Grade 4 : Complete overlap of root width or more

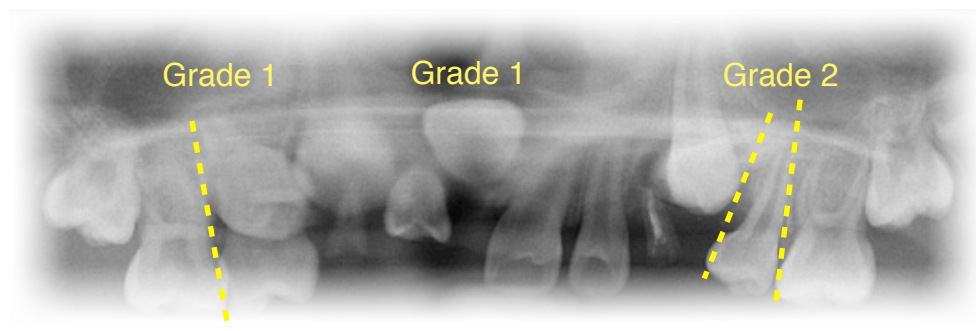
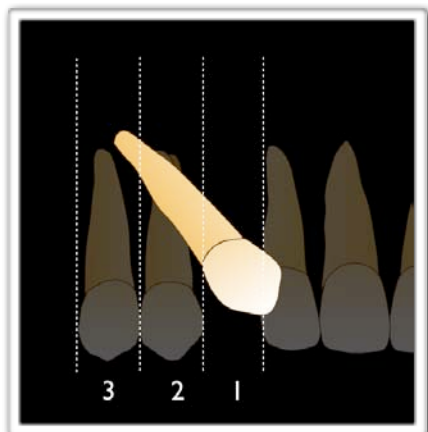
= 1 pt.
 = 2 pts.
 = 3 pts.
 = 4 pts.

Total =

8

iDI **imp**action **Dis**crepancy **I**ndex

4. Anterior-posterior position of the impaction root apex



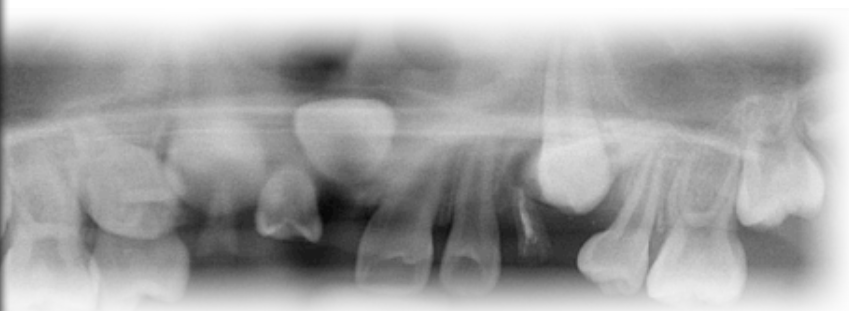
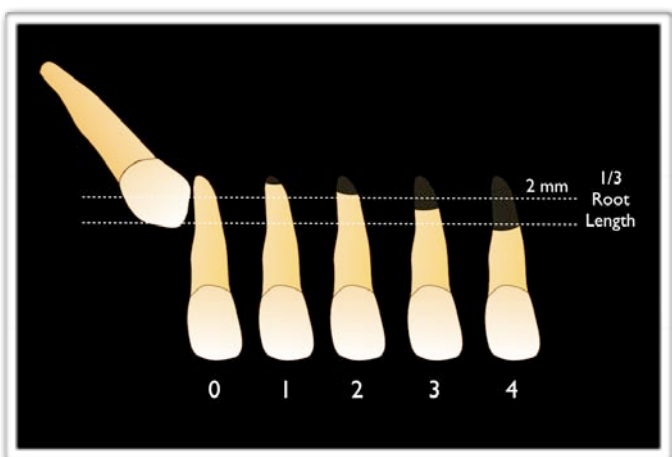
Grade 1 : Above the region of the ideal position
 Grade 2 : Above the neighbouring teeth region
 Grade 3 : Above the next next teeth region

= 1 pt.
 = 2 pts.
 = 3 pts.

Total =

4

5. Root resorption of the adjacent tooth



Normal apical contour
 Apical irregularity, same length as pretreatment
 Apical root resorption of less than 2 mm
 Apical root resorption more than 2 mm, less than one third original root length
 Apical root resorption more than one third original root length

= 0 pt.
 = 1 pt.
 = 2 pts.
 = 3 pts.
 = 4 pts.

Total =

0

6. Age relative to the completion of root formation

< 9 y/o (Before Central incisor root completed) = 0 pt.
 9 ~ 11 y/o (Before Lateral incisor root completed) = 1 pt.
 12~13 y/o (Before 1st premolar root completed) = 2 pts.
 > 13 y/o (Canine root completed) = 3 pts.

Total =

0

7. Labial or palatal position of the impaction

Palatal impaction = 1 pt.
 Labial impaction = 2 pts

Total =

4

Exam Year
ABO ID#

Examiners will verify measurements in each parameter.

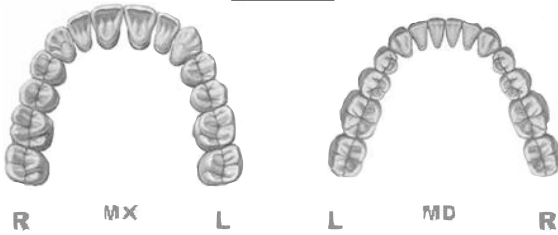
ABO Cast-Radiograph Evaluation (Rev.6-1-08)

Case # Patient

Total Score: **28+7=35**

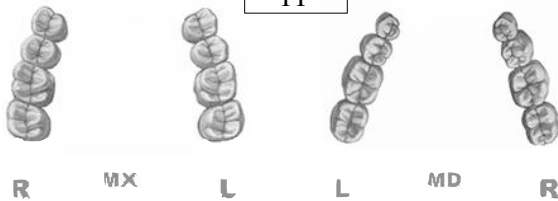
Alignment/Rotations

7



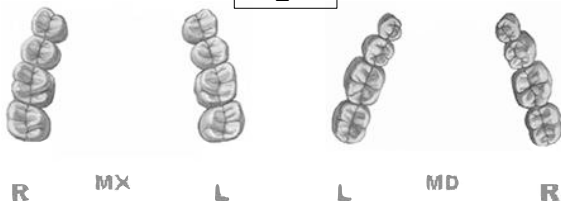
Marginal Ridges

11



Buccolingual Inclination

2



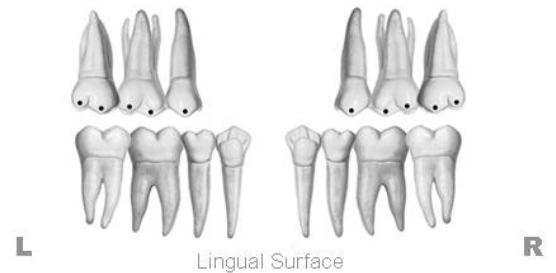
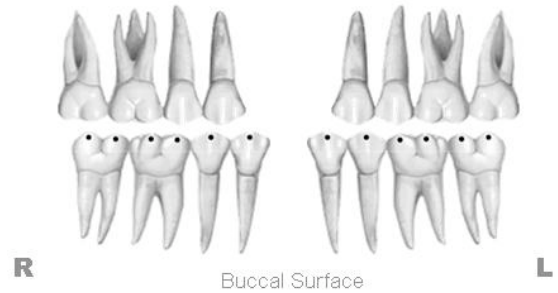
Overjet

4



Occlusal Contacts

4



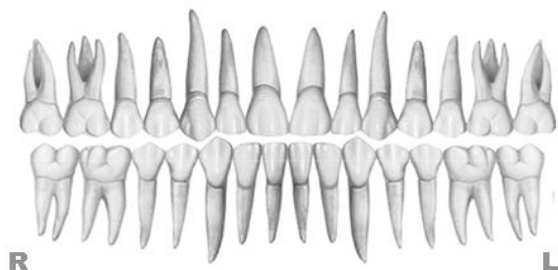
Occlusal Relationships

0



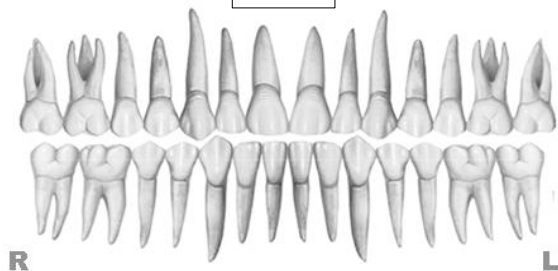
Interproximal Contacts

0



Root Angulation

0



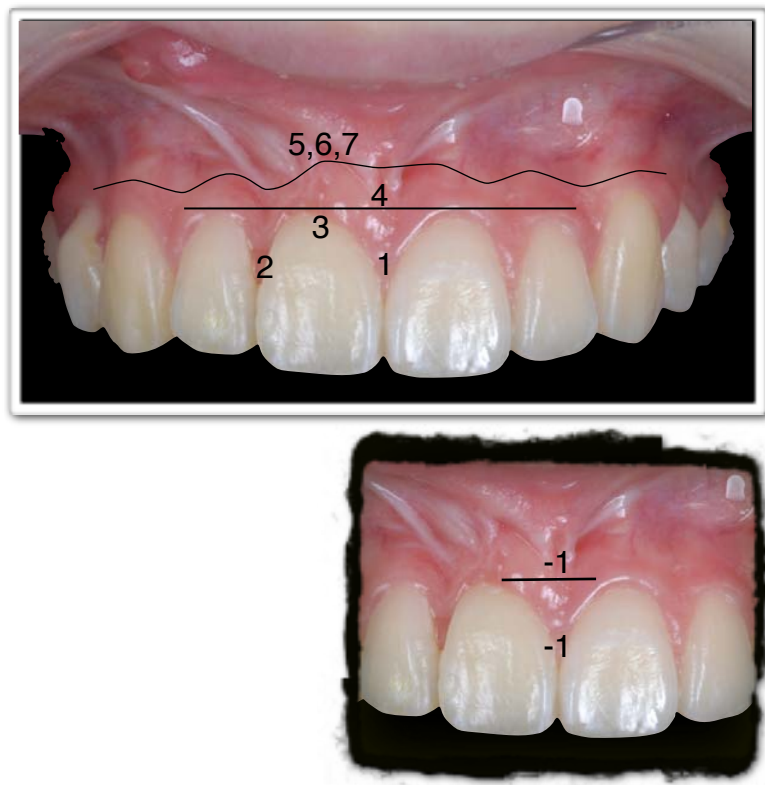
INSTRUCTIONS: Place score beside each deficient tooth and enter total score for each parameter in the white box. Mark extracted teeth with "X". Second molars should be in occlusion.

iCRE 7

iCRE **impaction** Cast-Radiograph Evaluation

Total Score: = 7

1. Gingival esthetic score

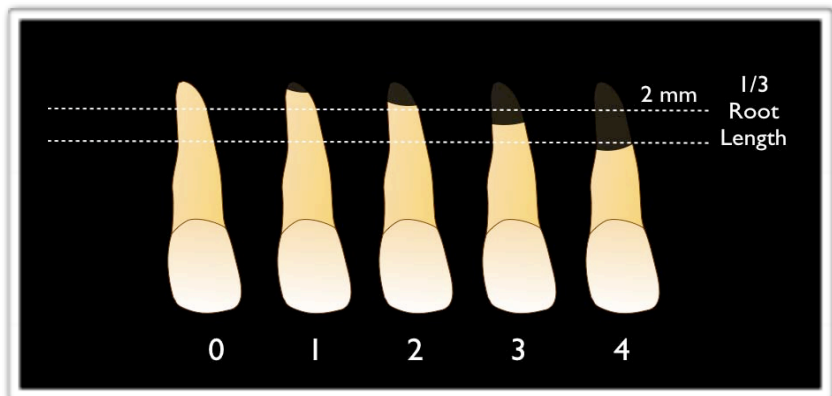


Total = 4

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

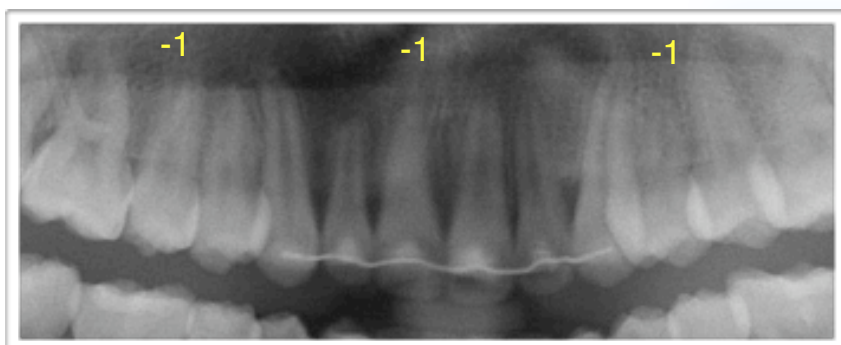
1. Mesial Papilla	0	1	2
2. Distal Papilla	0	1	2
3. Curvature of Gingival Margin	0	1	2
4. Level of Gingival Margin	0	1	2
5. Root Convexity (Torque)	0	1	2
6. Scar Formation	0	1	2
7. Keratinized Gingival Exists	0	1	2

2. Root resorption of the recovered and adjacent teeth



Total = 3

Normal apical contour	0
Apical irregularity, same length as pretreatment	1
Apical root resorption of less than 2 mm	2
Apical root resorption more than 2 mm, less than one third original root length	3
Apical root resorption more than one third original root length	4



Normal apical contour	0
Apical irregularity, same length as pretreatment	1
Apical root resorption of less than 2 mm	2
Apical root resorption more than 2 mm, less than one third original root length	3
Apical root resorption more than one third original root length	4



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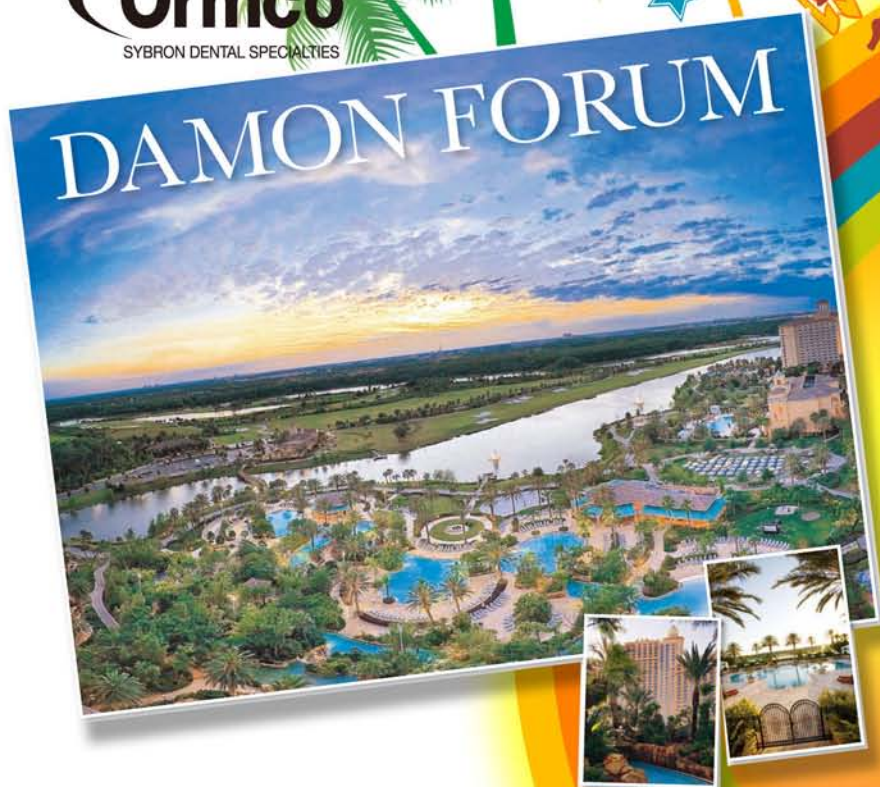
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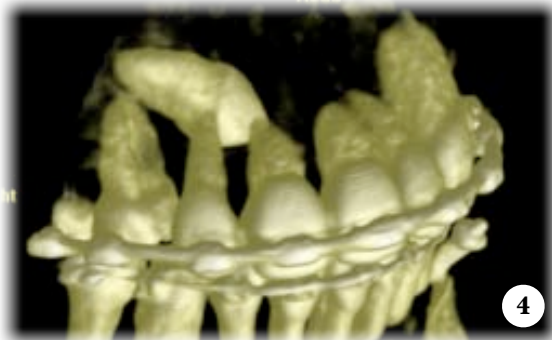
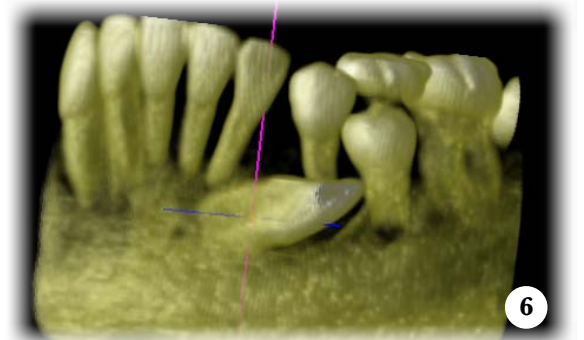
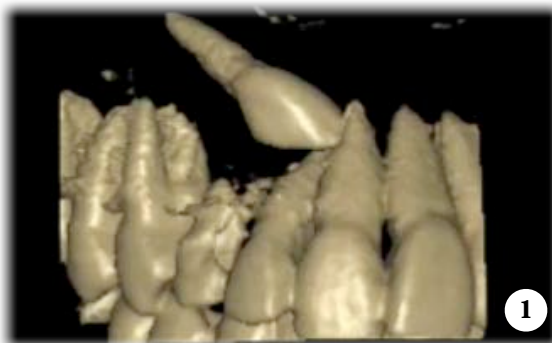
OrthoBoneScrew

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Beethoven Orthodontic Center, Taiwan

Yu-Lin Hsu, Chris HN Chang, W. Eugene Roberts

The 8 Applications of OBS on the Impacted teeth.



OrthoBoneScrew

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Road, Hsinchu, Taiwan 300
Tel: +886 3 5735676
Fax: +886 3 5736777

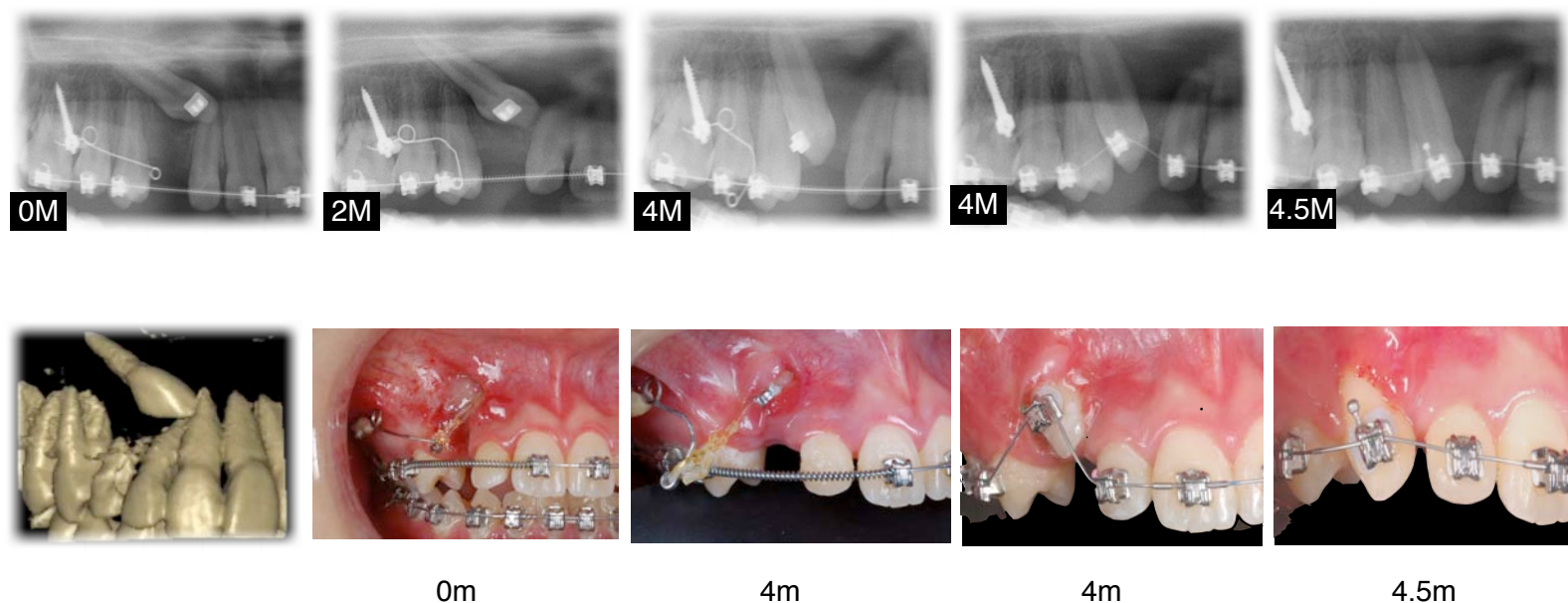
Upper labially impacted cuspids

1

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

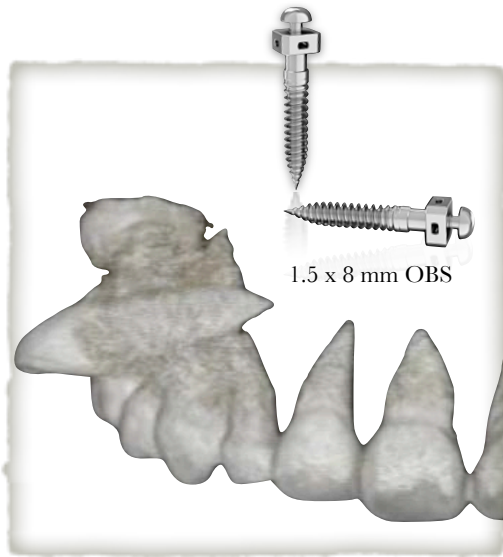
Mechanics design:

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 lateral incisor. 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.

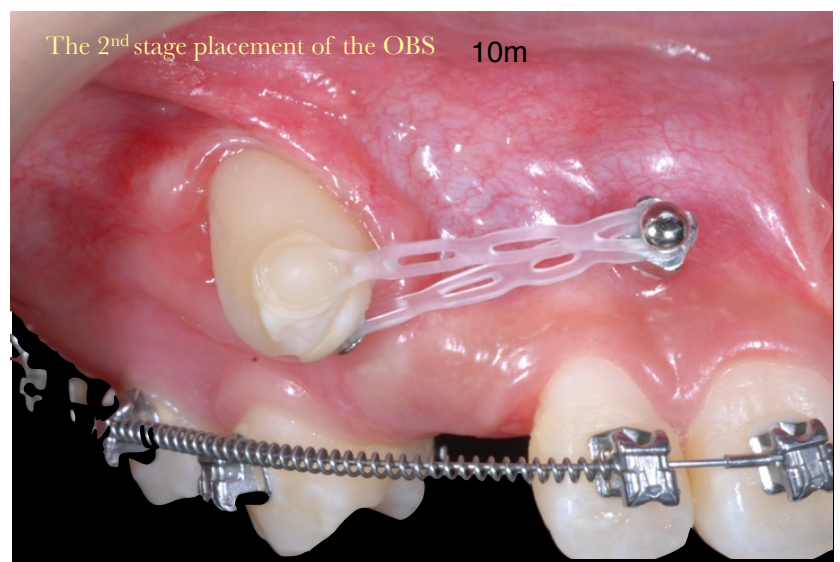


Upper labially impacted cuspids

2

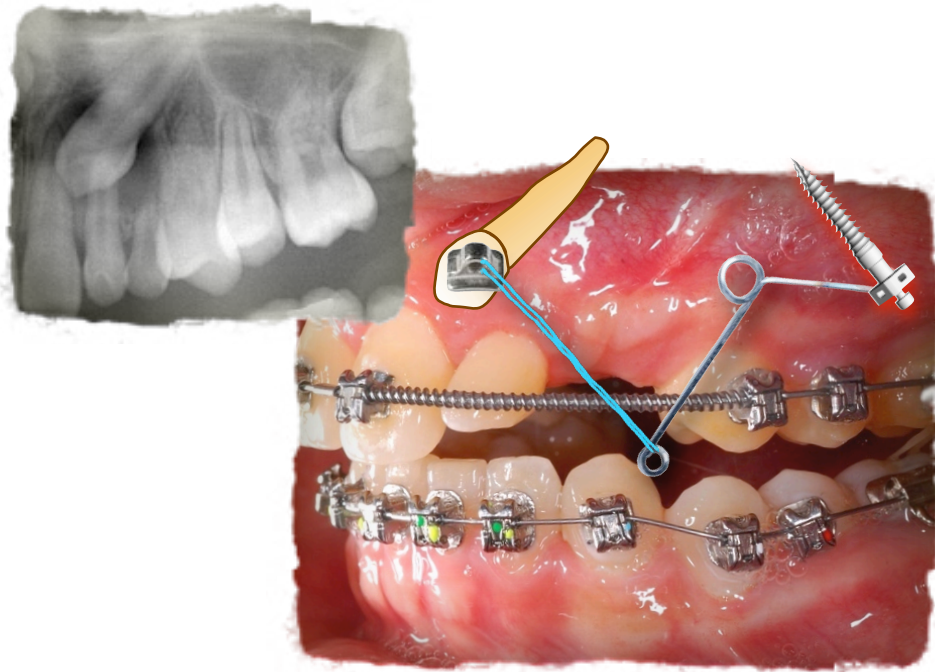


The transpositional cuspid has been exposed with a full-thickness apically positioned flap. After bonding a button, an 1.5x8 mm OrthoBoneScrew was inserted on the buccal side of canine space to protract the cuspid. Meanwhile, one should keep OBS as high as possible to make the switch easier. After 7.5 month-long treatment, this transpositional cuspid has been pulled mesially for 12 mm. The distance between the OBS and the cuspid has been shortened, as a result in the protraction, then the placement of the OBS was changed to the interdental space of the incisor and the lateral incisor. This two-stage placement of the OBS was to prevent the gingival impingement around the corner of the alveolar arch.



Upper labially impacted cuspids

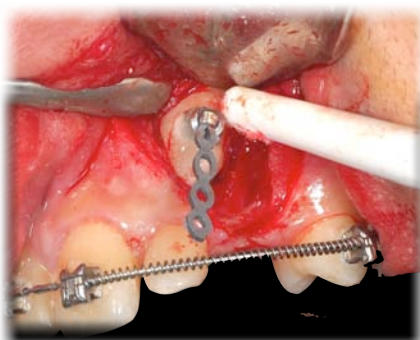
3



Firstly the space was created by NiTi opening spring between #21 & #24 without engaging adjacent tooth during switching. Secondly a modified apically positioned flap was designed to expose the impacted canine. Then a 3D lever arm was inserted in the square hole of **OBS**, and attached to the impacted canine by an elastic chain. The force was applied consistently by adjustment of the 3D lever arm. Finally the crown of the impaction appeared in the oral cavity, and allowed for bracket bonding.



1m



0m



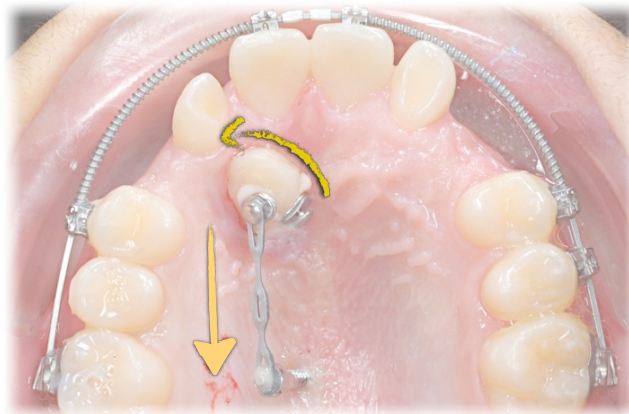
3m



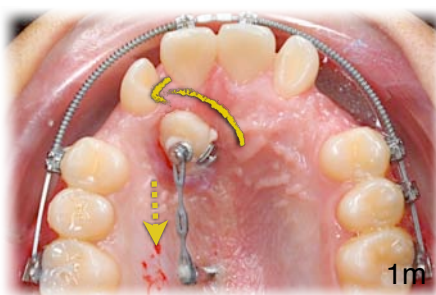
8m

Upper palatally impacted cuspids

4

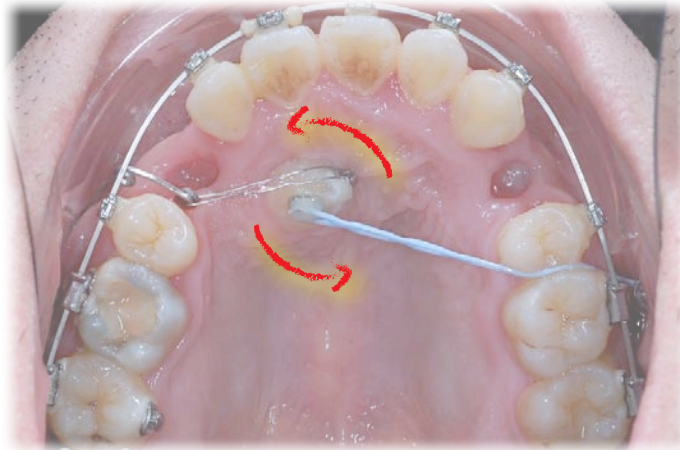


Firstly, the space was created by open coil spring. Secondly, the impacted canine was uncovered to allow auto-eruption. After the canine erupted, a rotating force system was created by a palatally inserted **OBS**, and an elastic chain connecting to the archwire. Once the impacted canine moved within the reach of a wire, a .014 CuNiTi was then placed for further alignment. Finally, the impacted canine was successfully moved into the arch .

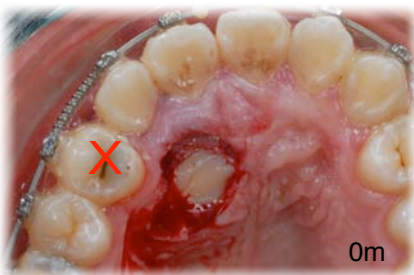


Upper palatally impacted cuspids

5



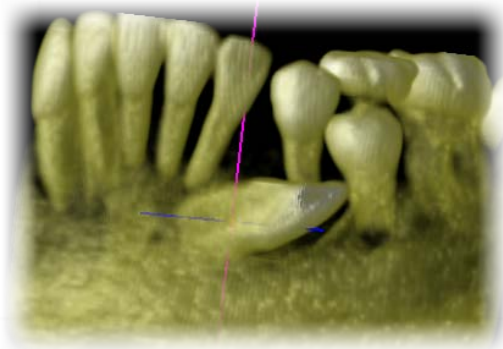
Firstly, the impacted canine was uncovered to allow auto-eruption. Secondly, the maxillary right 1st premolar was extracted. After the canine erupted, a rotating force system was created by a 3D lever arm stretching out from the right side of **OBS**, and an elastic chain connecting to the left side 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.



Lower horizontal impacted cuspids

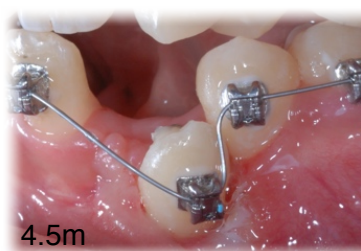
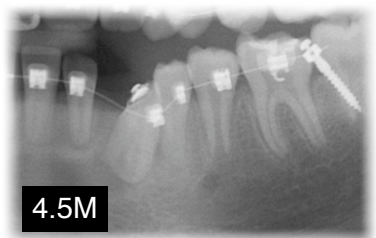
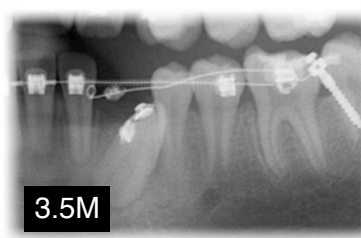
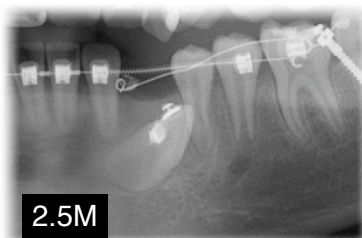
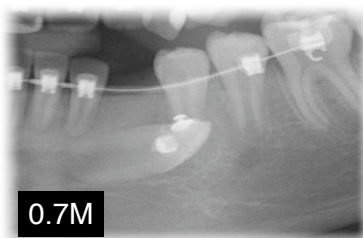
6

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



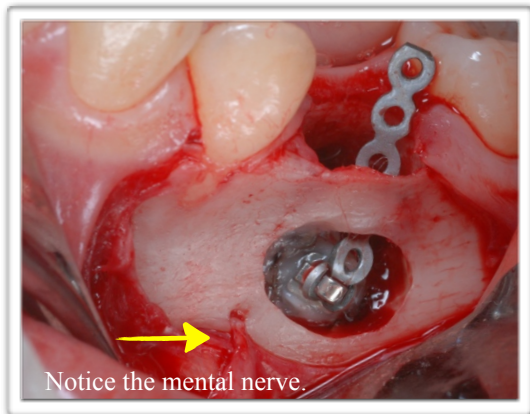
Mechanics design:

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 OBS (located at buccal shelf) and activated, it could build a force system which protracted the tip of canine first, then moved buccally, and finally elevated to the reserved canine space. If the mechanics were designed to exert force directly from the main arch wire only, it would have been detrimental to the roots of first premolar. During the follow-up visits, the helix was adjusted without taking it out. After three months from operation, the impacted canine was successfully moved away from the previously impacted site and was ready for bracket bonding.



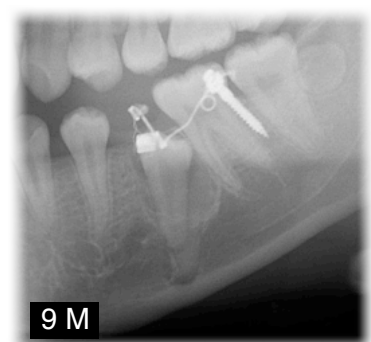
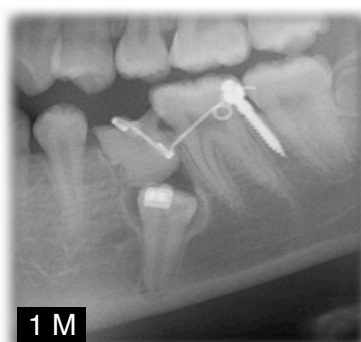
Lower impacted premolar

7



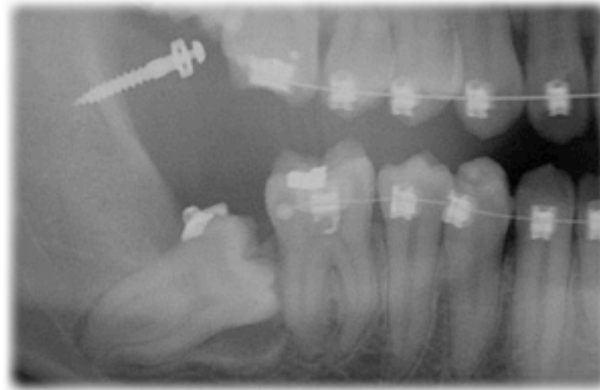
A 13-year old female had a lower impacted 2nd premolar, approximately 10 mm deep on the left side. The treatment plan was to extract the 2nd primary molar and pull out the 2nd premolar. During the treatment, the 2nd primary molar was first extracted, followed by bonding an eyelet bracket on the surgically exposed 2nd premolar.

Meanwhile, the bone surrounding the crown of the second premolar was reduced until reaching CEJ and a lateral window was made for bracket bonding. An eyelet bracket was bonded on the buccal surface of the deeply impacted second premolar. The **OBS** was inserted on the left buccal shelf area. A power-chain was attached between a 3D lever arm and the eyelet bracket to extrude the second premolar. This 0.017 x 0.025-inch TMA lever arm was consisted of 3 helical coils: one in the middle, two in both ends. When this lever arm was inserted in the square hole of the **OBS** and activated, it would form a force system which extruded the second premolar directly.

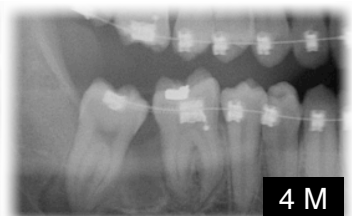
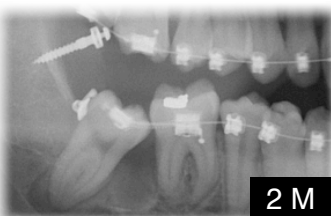
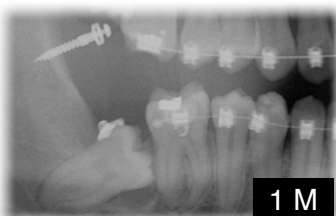
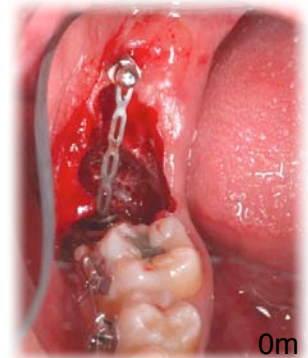


Lower impacted molar

8



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





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An Innovative Type of Implant for Fresh Extraction Sockets of Seriously Compromised Multi-rooted Teeth: The “RESCUE” Implant (Part I)

Felice P¹, Park KB², Corvino V³, Pistilli R⁴, Pellegrino G⁵, Checchi V¹, Piattelli M³

The use of dental implants currently represents an effective and reliable technique¹ for treatment of partially or totally edentulous patients, with good long term results. The success rate and predictability of results depend on various factors²⁻³, some of which are related to the surgeon, such as the choice of surgical and prosthetic protocols; others, are associated with the patient, mainly regarding the bone quality of the rehabilitation site. Maxillary and mandibular posterior regions are often considered high risk for implant rehabilitation despite their high success and survival rate. The reasons can be contributed to the poor quality and quantity of residual bone tissue. In these cases sinus pneumatization is often found in the maxilla while partial superficialization of the alveolar nerve, consequent to bone atrophy is frequently observed in the mandible. The association between these anatomical limitations and biomechanical considerations regarding the high masticatory loads of posterior regions⁴, is the reason for limited use of implant therapy in these regions.

Nowadays, when the clinician needs to rehabilitate posterior sites, the choice is between using short

implants⁵⁻⁶ or guided bone regeneration (G.B.R.) techniques⁷⁻⁸, osteogenetic distraction⁷⁻⁸, inlay, onlay⁸ and interpositioned grafts⁹⁻¹⁰ and alveolar nerve repositioning⁵.

On one hand, these bone increment techniques significantly increase the number of appointments¹¹⁻¹² and treatment time necessary to restore masticatory functions¹³. On the other hand, the use of short implants (less than 7mm) in posteriors areas shows a lower success rate than standard implants¹⁴⁻¹⁷.

Sullivan¹⁶ reported a high percentage (14%) of fractures in standard diameter implants used as substitutes for single molar tooth. He proposed that standard diameter implants could be suitable for the rehabilitation of posterior regions.

Other authors¹⁷⁻¹⁸ assert that a high percentage of implant fractures can be found in single restoration in the molar area, due to bone resorption, as a result of overloading. With the aim of avoiding short implants fracture, it was suggested to use wide diameter implants with an adequate surface treatment, in order to extend the bone-implant contact surface.

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Therefore, wide diameter implants seem to present better fatigue resistance and higher resistance to tension forces, than standard diameter implants¹⁹; they assure a B.I.C.²⁰ increase, allow bicorticalism and provide good primary stability. Moreover, in order to reduce gap between bone tissue and implant surface, a minor bone regeneration procedure will be necessary to facilitate osseointegration²¹⁻²².

However, the first data concerning their success rate was quite disappointing. The reasons for this can be found in the clinical indications for short implants with wide diameter: clinical conditions with inadequate bone quantity or quality, the need to substitute a failed implant²² and immediate placement in compromised fresh extraction sockets²²⁻²⁴.

Shin²⁰ reported a success rate of 80.4% for wide diameter implants, versus a 96.8% for the standard diameter implants, although failure percentages referred to turned wide diameter implants in literature are between 9% and 24%^{20,25}.

One should note most reported failures took place before the second surgical stage, such as errors in surgical protocols, indications, implant design selection and consequently in the reduced implant stability. In the end all these errors were caused by the surgeon's inexperience²⁵.

Implants of wide diameter are often used in maxillary posterior cases because they provide ideal support for the following prosthetic rehabilitation. In

addition, they can tolerate high occlusal loads²⁵ and reduce consequent marginal bone resorption²⁶⁻²⁹. Meanwhile, the increased B.I.C. reduces the risk of fracture of abutment screw¹⁶⁻¹⁷.

In recent years high diameter implants have been used very often in fresh extraction sockets in order to replace seriously compromised multirooted teeth or implant failures because of fracture or loss of osseointegration; These implants, unlike the standard diameter ones, can provide good primary stability even when the interradicular septum is often too thin and short.

After a multirooted tooth extraction, ideally an implant has to be inserted in the middle of the socket, that is the interradicular septum located between the buccal and palatal cortical bone, in order to obtain a three-dimensional placement adequate for the following prosthetic rehabilitation³⁰ (Fig. 1). Unfortunately after extraction of seriously compromised or ankylosed posterior teeth, even if the clinician tries to perform an atraumatic surgery, in most of cases, both interradicular septum and residual alveolar process are inadequate for standard implant placement (Fig. 2).

Clearly in these situations fresh extraction sockets have a distance between mesio-buccal and/or bucco-lingual walls wider than 6 mm, an inadequate interradicular septum and a residual basal bone height

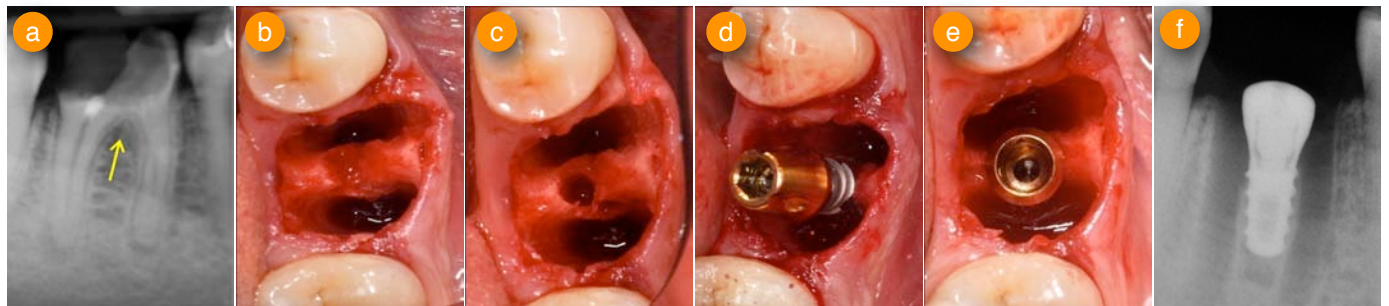


Fig. 1 (a-f). First inferior molar with decay and lesion of the pulp chamber floor (a). Tooth extraction and immediate implant placement is planned. In the middle of the septum, suitable in diameter and height (b), the implant site is prepared and the fixture inserted (c,d). At the clinical (e) and radiographic (f) views the implant seems to have a correct three dimensional placement.

INADEQUATE inter-radicular septum

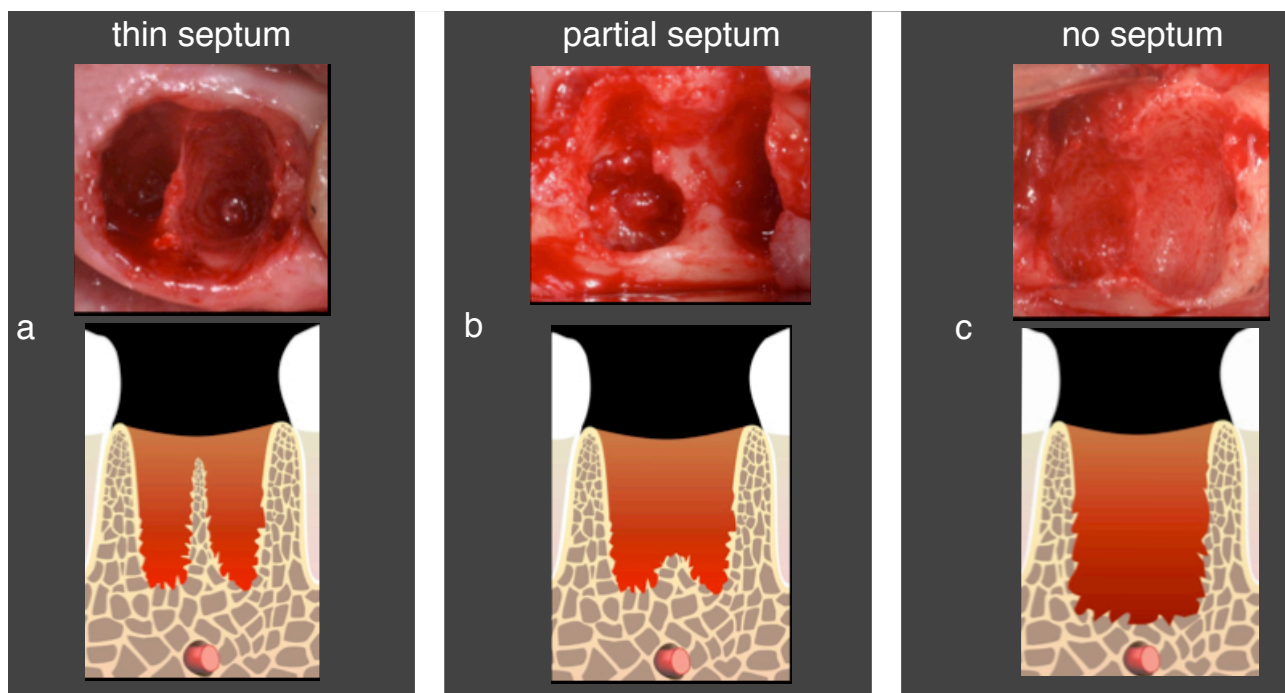


Fig. 2. After extraction of ankylosed or seriously compromised teeth, socket walls and/or interradicular septum can be inadequate: a) presence of a septum with a reduced thickness; b) presence of a septum with reduced height; c) septum totally absent.

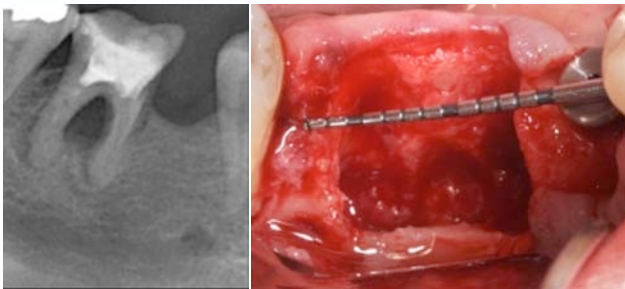


Fig. 3 (a-b). Second inferior molar with osteolytic lesion in the furcation and wide resorption of the interradicular septum. It is observable the meagre height of the alveolar process from the mandibular canal (a) and mesio-distal and bucco-oral diameter of the extraction socket > 6 mm (b).

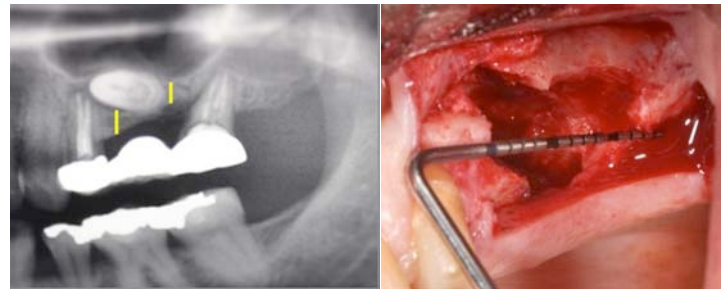


Fig. 4 (a-b). Second upper molar compromised due to periodontal lesion and presence of a tooth in total inclusion. It is observable the meagre height of the alveolar process from the maxillary sinus floor in the site that needs implant placement (a). After the extraction of the impacted tooth and of the second molar the extraction site shows mesio-distal and bucco-oral diameters > 6 mm (b).

less than 7 mm from the maxillary sinus or the mandibular nerve (Fig. 3-4).

When these particular clinical situations were present in the past years, dentistry did not have a therapeutic option and implant therapy had to be postponed for three or four months or after socket healing. Nowadays the use of wide diameter implants (> 6 mm) allows to perform an immediate implant therapy using mesio-distal and/or bucco-lingual walls of the socket (Fig. 5-6), although the interradicular septum has an inadequate thickness (Fig. 7), height (Fig. 8) or is totally absent (Fig. 9).

Rescue (Rescue® Implant System, MegaGen Implant Co. Ltd., South Korea) Internal Trip® implants can be used in these clinical situations³¹⁻³² (Fig 10); they are available in five different diameters (6, 6.5, 7, 7.5 and 8 mm) and in seven different lengths (5, 6, 7, 8.5, 10, 11.5 and 13 mm), with a super-RBM surface achieved through sandblasting with resorbable

hydroxyapatite particles and characterized by a high Ra value (1.7 µm).

The internal connection is obtained through a triple groove that prevents the stripping of the antirotational device, even in the case of a high insertion torque (>500 Ncm) (Fig. 11).

The diameter of the coronal part of the fixture is 0.1 mm wider than the apical part and this allows more contact between implant surface and cortical bone, in order to achieve better primary stability. Since the platform is smaller than the implant body, which is commonly referred as platform switching, it is favorable for the biological width (Fig. 12).

Unfortunately, there is limited scientific evidence on this topic. In order to evaluate clinical utility and effectiveness of Rescue® implants in fresh extraction sockets after the extraction of seriously compromised teeth or removal of failed implants, a multicentric study is needed in the future.

INADEQUATE inter-radicular septum

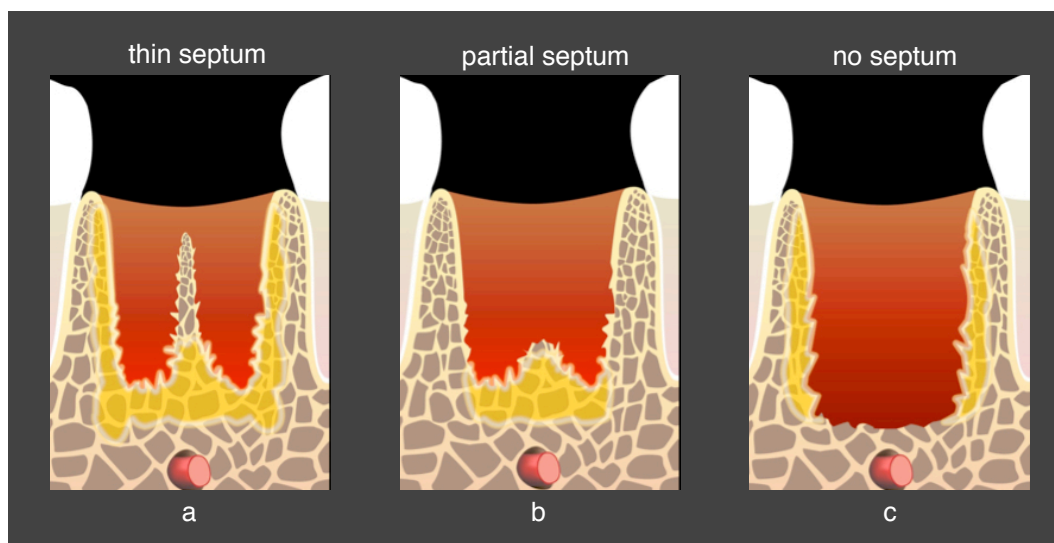


Fig. 5. Interradicular septum inadequate in thickness (a), height (b) or totally absent (c) and mesio-distal and bucco-lingual diameters > 6 mm (a,b,c).

INADEQUATE inter-radicular septum

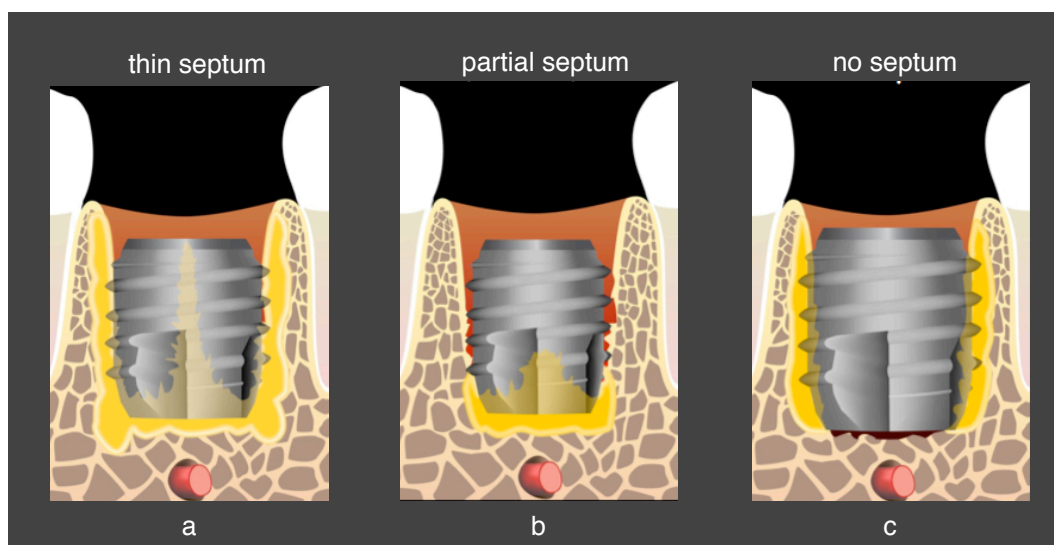


Fig. 6. When a interradicular septum inadequate in thickness (a), in height (b) or totally absent (c) and with mesio-distal and bucco-lingual diameters > 6 mm is present (a,b,c), the immediate placement of a large diameter implant is possible due to the septum engagement (a,b) and/or to the alveolar walls (a,b,c).

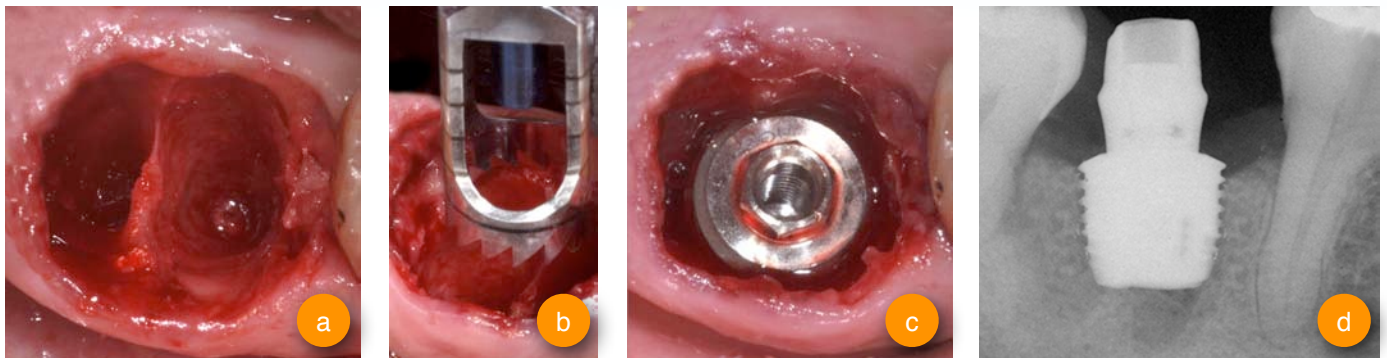


Fig. 7 (a-d). Mandibular second molar extraction socket with an interradicular septum adequate in height but reduced in thickness (a). Implant site preparation only with the trephine bur (b). Fixture placement 2 mm under the bone crest in order to compensate the physiological resorption that will occur during socket remodeling (c). Radiographic control after 4 months during the prosthetic procedures (d).

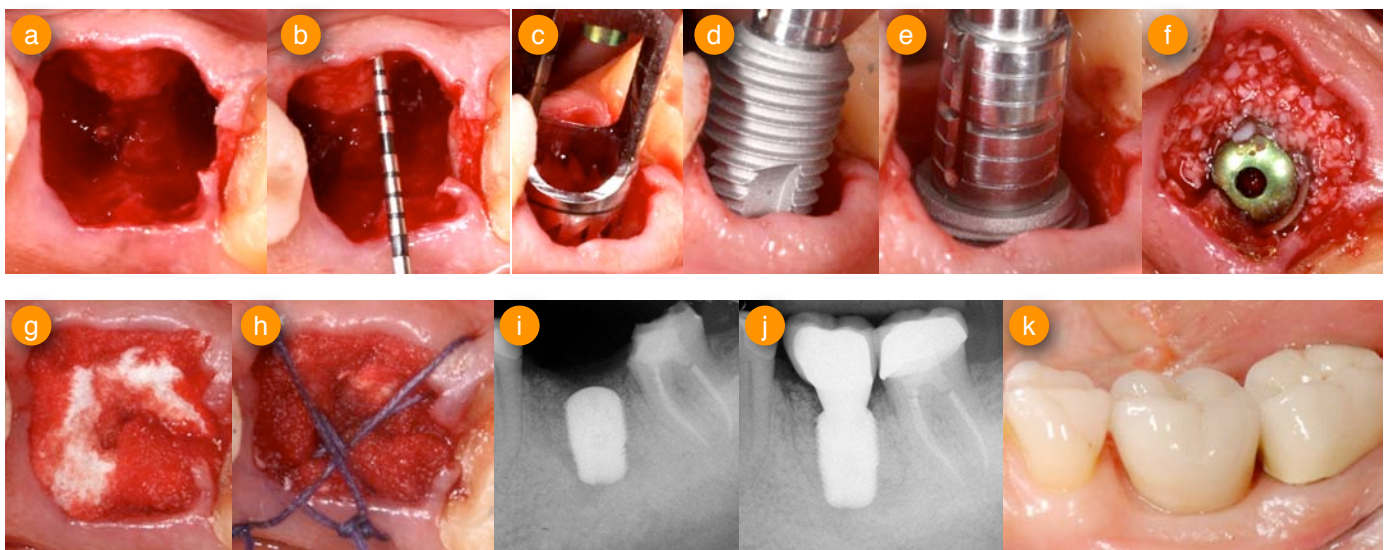


Fig. 8 (a-k). Mandibular first molar fresh extraction site (a), with bucco-lingual diameter of 10 mm and with interradicular septum inadequate in height (b). Implant site preparation only with the trephine bur (c). Fixture placement (d) 2 mm under the bone crest (e). Autologous bone (f), harvested with the trephine, and fibrin sponges grafted in the gap between fixture and alveolar walls (g). Vicryl sutures (h). Radiographic control after the surgical procedure (i). Radiographic and clinical control after 24 months from the prosthetic load (j,k).

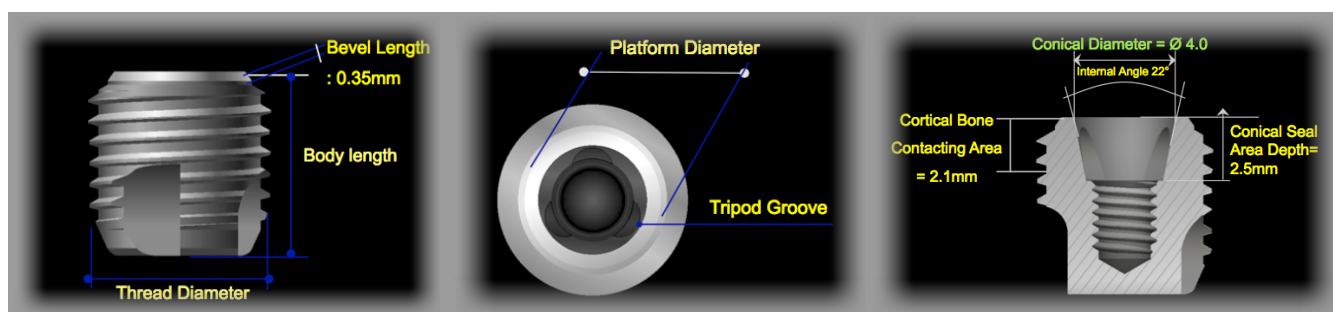
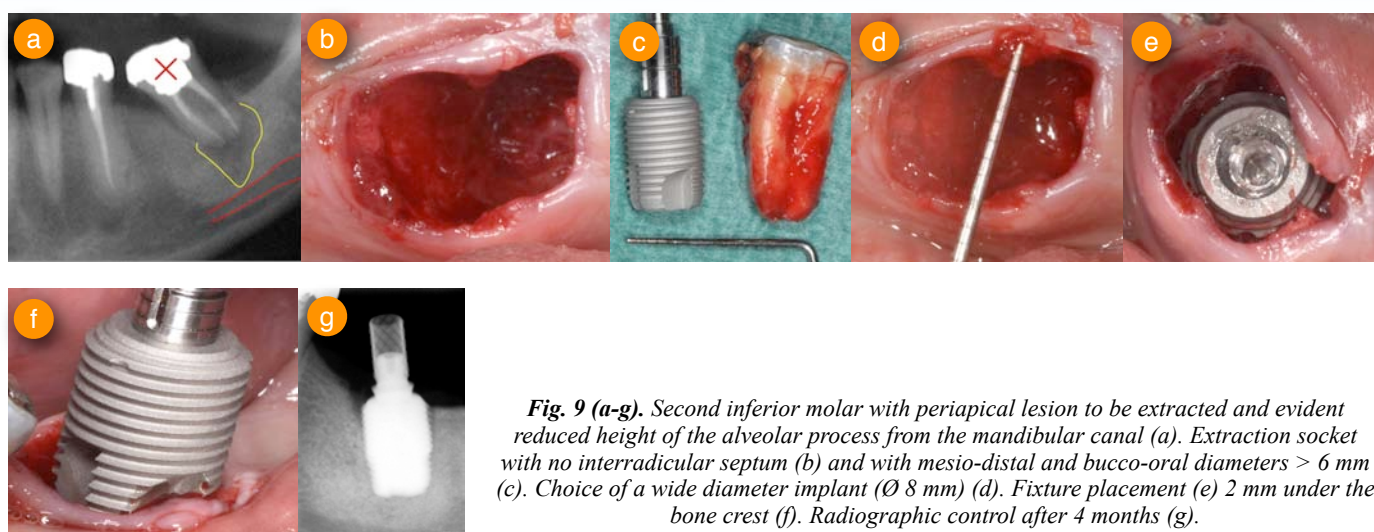


Fig. 11. The triple internal groove assures the antirotational effect of the abutment.

Fig. 12. The internal connection allows a hermetic seal. The diameter of the coronal part of the fixture is 0,1 mm wider than the apical part and this allows a higher contact between implant surface and cortical bone.

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植體補綴物材料的選擇

Material Selection in Implant Restoration

Dr. Fernando Rojas-Vizcaya



Dr. Fernando Rojas-Vizcaya
Instructor, USC Implant
Training Program in Taiwan

支柱體的種類 (types of abutment)

選擇連接植體的補綴物前，植體的位置以及補綴物齒頸部輪廓(cervical contour)必須先得到確認，這些在植體手術前就可以決定的（圖一）。即**真正的補綴計畫是早在植牙前就要確認的**（圖二）。

美觀和功能的建立是唇齒相依的重要，良好的美觀是建立在理想位置的植體上，有理想位置的植體才能連接理想的支柱體，提供理想的咬合接觸點、進而維持骨頭高度及軟組織形態，最後獲得理想的成功率（圖三）。

選擇適當理想的支柱體及植體周圍軟組織的調控處理是獲得自然美觀的不二法門。因此不同的植體位置與植體周圍軟組織狀況，支柱體選擇的策略也會有所不同（圖四）。

若植體植在理想位置，軟組織也有理想的厚度，支柱體的選擇就簡單，可選擇的總類也多。若在前牙美觀區，二氧化鋁支柱體是好的選擇。

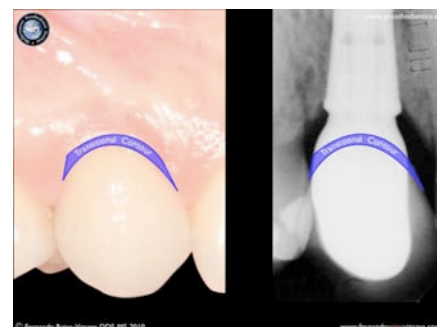
當植體接出角度不理想，或是兩支以上不平行的植體要做成牙橋，就必須利用有角度的支柱體，或是客製化的支柱體。若是硬組織或軟組織缺損太多時，就必須運用可撤式的補綴設計，可選擇的支柱體也單純。

植體與支柱體的連接界面 (Implant and abutment connection)

Dr. Rojas-Vizcaya 首先引述一篇植體與支柱體的連接界面微運動的研究¹。當植體補綴物受到側方力或斜向力時，植體與支柱體皆會有微幅的移動，若植體與支柱體的連接界面出現微裂縫（microgap），這個地方會窩藏細菌，導致局部發炎，造成骨頭萎縮，影響骨頭高度，而降低骨頭對



圖一、植體理想的植入位置



圖二、自然美觀的植體補綴物與理想的植體植入位

1. Micro-movements at the implant-abutment interface: measurement, causes, and consequences. Holger Zipprich, Paul Weigl, Bodo Lange, Hans-Christoph Lauer. Implantologie, Vol. 15, 2007 Issue 1, p.31-46. (www.kgu.de/zzmk/werkstoffkunde/index_en.html)



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貝多芬矯正課程暨植牙論壇講師

植體的支持（圖五）。因側向咬合力而造成植體和支柱體連接界面的微裂縫開合的現象，稱為抽吸效應（Pumping effect）。這與植體周圍牙槽骨吸收有相關性。

根據實驗顯示，當受力 50N 時，大部分的實驗植體和支柱體連接界面都不會有微裂縫，但力量增加到 150N 時，剩下 Bego-Semados, Straumann solid abutment, Ankylos, Astra Tech 沒有微裂縫。當力量再增加到 200N 時，只剩下 Ankylos 和 Astra Tech 沒有微裂縫。錐形密封設計（Conical Seal Design）是能夠避免植體和支柱體連接界面微裂縫的理想設計。

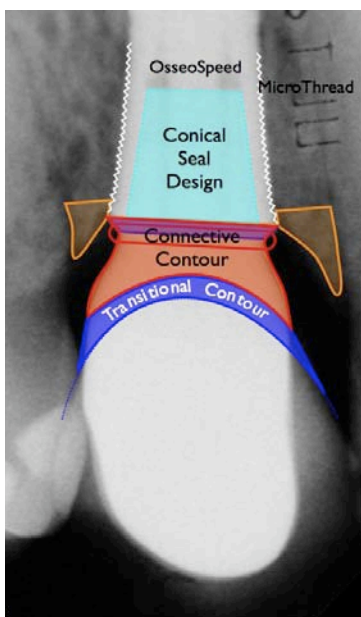
錐形密封設計同時也可以避免前牙美觀區的問題黑三角的問題（圖六）。此乃因植體周圍牙槽骨能夠維持穩定，再配合適當的臨時補綴物調控軟組織，如此可以確保有美觀的固定補綴物。越是複雜的病例，這種觀念越是重要，而詳細的治療計畫可確保每個環節在治療時

不易被忽略或是遺漏。

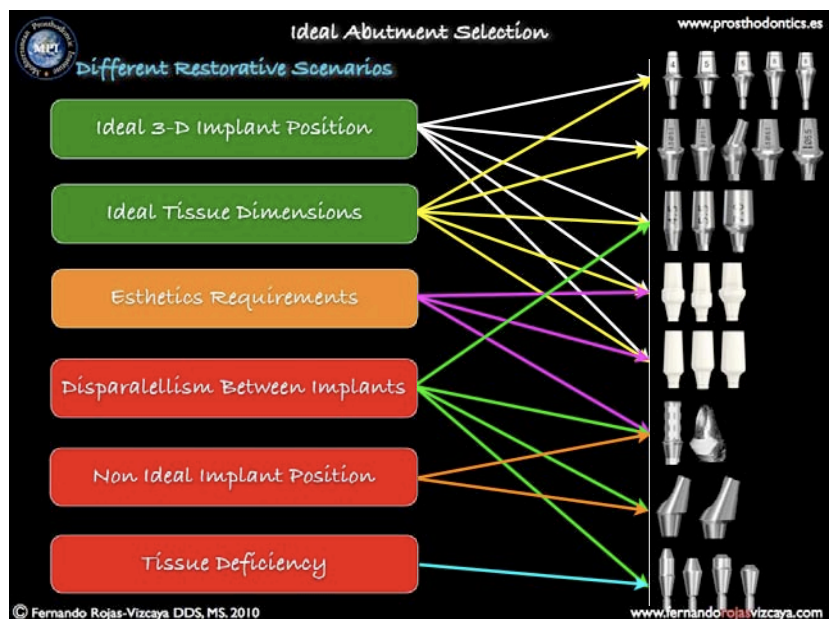
電腦輔助設計製造的支柱體（CAD/CAM abutment）

如何把植體位置的決定、支柱體的選擇、軟組織的調控到最終補綴物的製作等繁雜步驟，化成有系統而易於執行的流程，這裡提供兩個方法：1. 以原廠的支柱體配合模型和蠟型設計完成。2. 電腦輔助設計製造的支柱體，這裡介紹 Atlantis 電腦摹擬客製化及製造的支柱體系統的流程（圖七）。

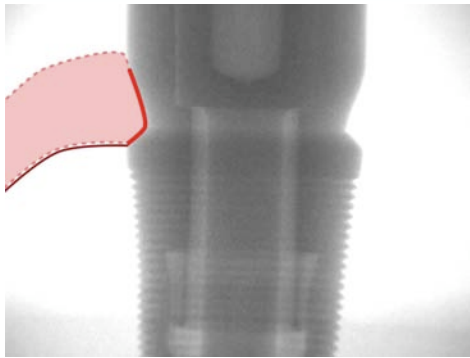
無論選擇使用上述哪一種方法，對於複雜的病例的考量都是一樣的（圖八）。從臨床檢查與口內照片、X 光片及上咬合器的診斷模型，開始完整的設計流程。利用電腦輔助設計，並使用蠟型刻出牙齒理想外型，製作出導引板（Stent），使用在牙科電腦斷層的定位，確定



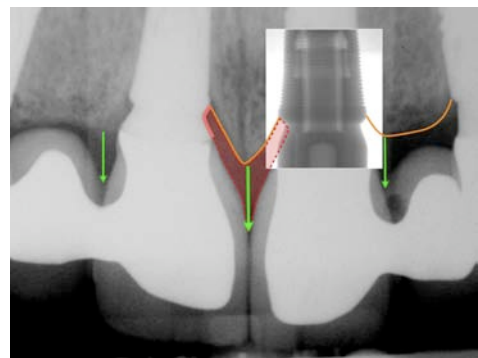
圖三、理想的植體與補綴物接合處考慮因素



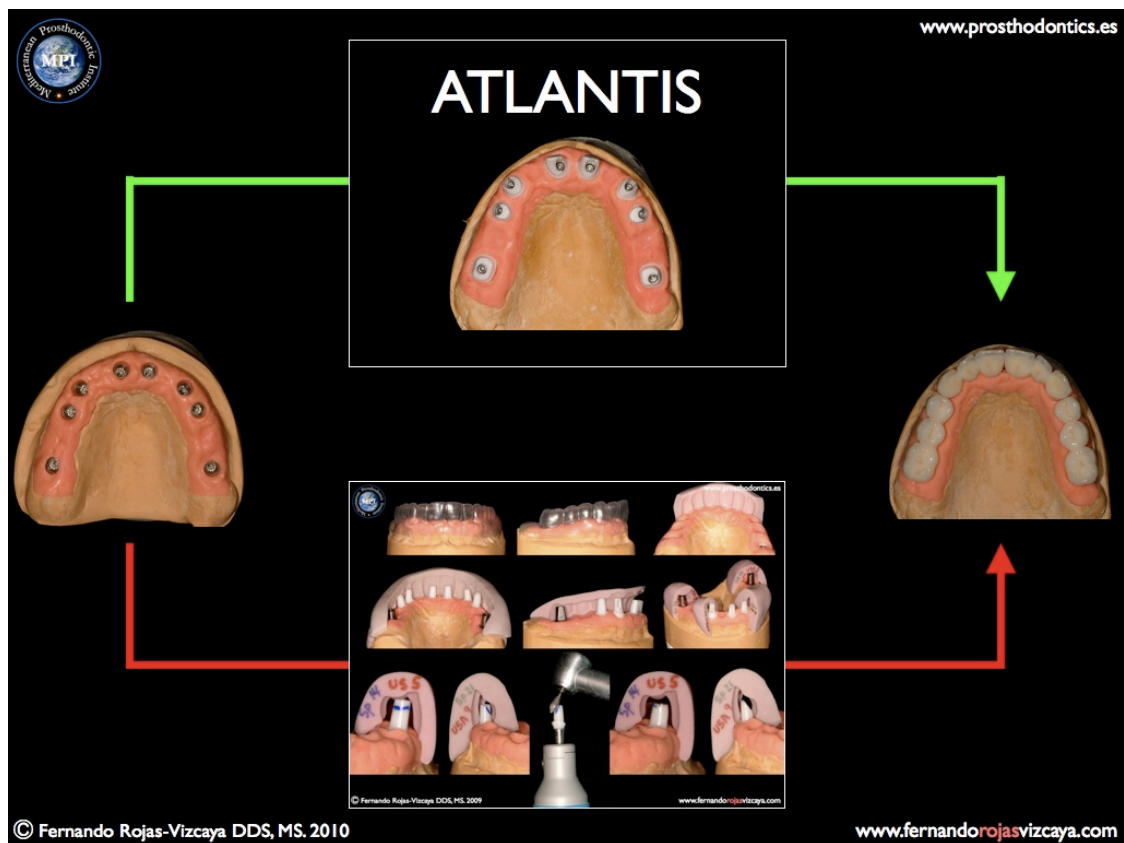
圖四、各種狀況相對應的支柱體選擇方案



圖五、植體與支柱體連接界面微裂縫實驗圖



圖六、錐形密封設計與前牙美觀區相關圖

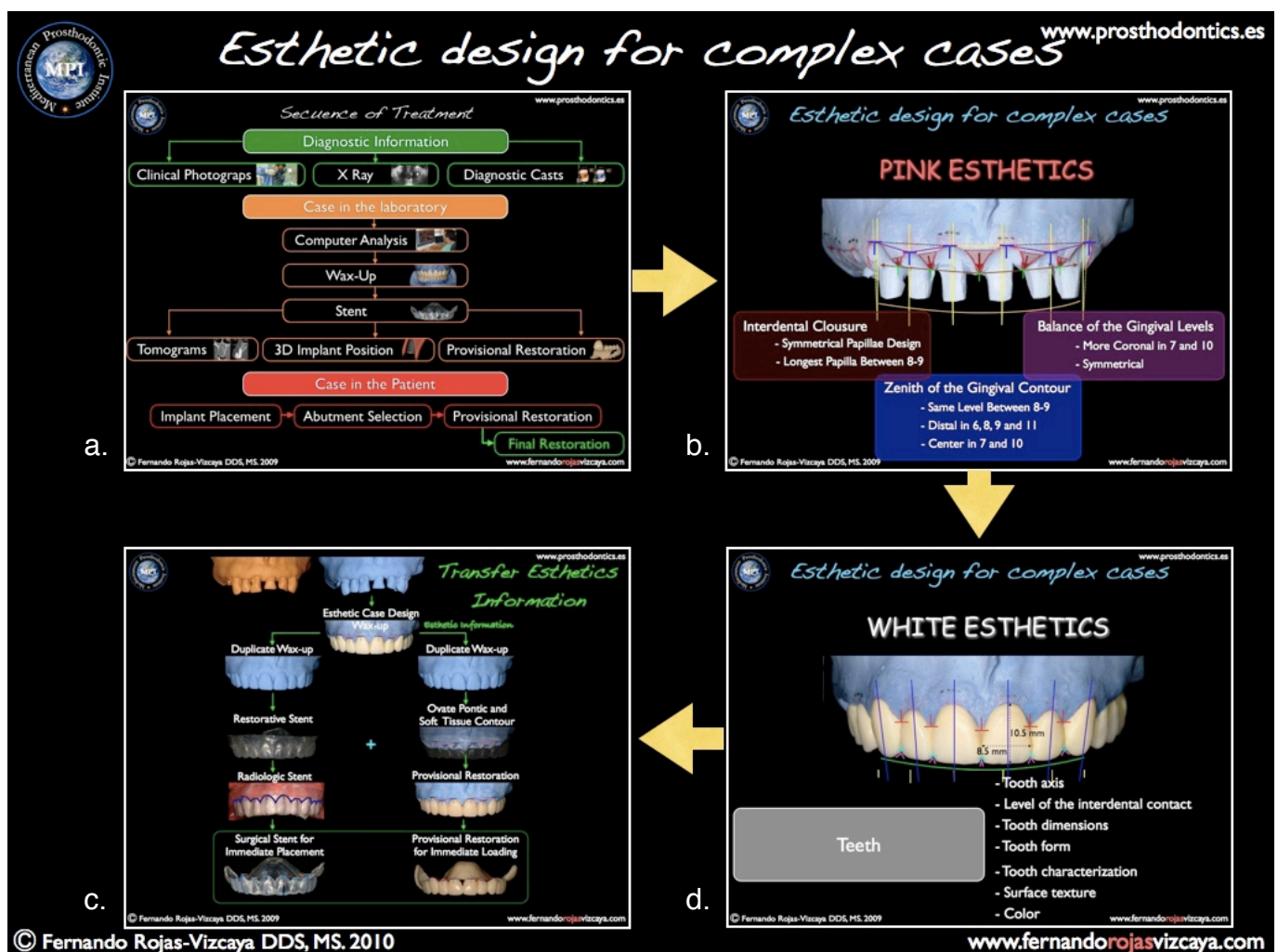


圖七、支柱體的設計方式（循上面綠線的方式為 ATLANTIS 系統，使用 CAD/CAM 的流程，循下面紅線的方式是以原廠的支柱體配合模型和蠟型設計完成）

病例的流程就可很準確的從植體植入、支柱體選擇，到暫時性補綴物，最終是正式補綴物，都能依照計畫精確而無誤的進行（圖八 a）。有關粉紅色牙肉美學（Pink Esthetics）和白色牙齒美學（White Esthetics）治療計畫的擬定都需要仔細設計（圖八 b,c）。

計的資料詳實的定位在口腔裡，也可事先製作臨時性補綴物，減少病患臨床等待的時間（圖八 d）。

首先，介紹選擇支柱體的第一個方法，使用原廠支柱體配合模型和蠟型設計完成。乃是在模型上裝上原廠的支台齒，根據補綴材料的空間配置、平行性、牙冠邊



圖八、複雜病例考量的流程

緣線及萌發外型，將支柱體修型完成（圖九）。配合蠟型刻出的牙齒外型，利用硬矽膠指標（Heavy body silicone index）量測出理想支柱體的高度外型，修型完成（圖十）。

選擇支台齒的第二個方法，運用 Atlantis 電腦摹擬客製化及製造的支柱體系統（ATLANTIS Virtual Abutment Design）（圖十一）。

將模型外型掃描到電腦裡，接下來的步驟和上述的方法大致一樣。Dr. Rojas-Vizcaya 提到使用這個方法的好處有：1. 可隨時更換支柱體材料和大小，沒有成本問題。2. 影像傳輸即可以達到醫師和技師間的溝通，不受交通阻隔。3. 電腦可以做更仔細且更複雜的分析（圖十二）。

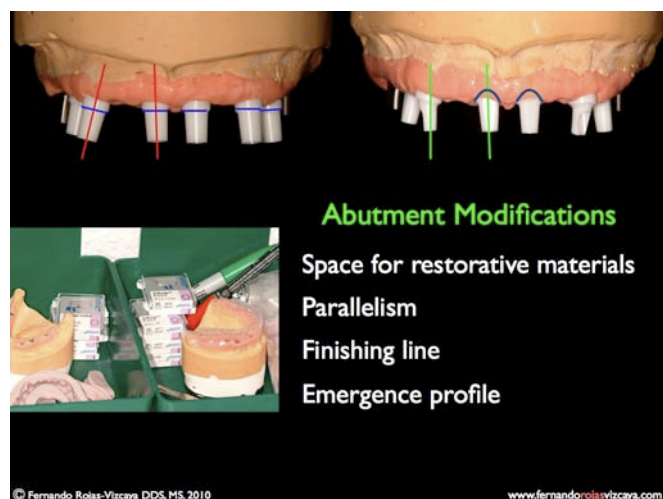
透過表格填寫（表格一），可以詳實描述支柱體和軟組織的關係，進而達到支柱體客製化的目的。

模型上模擬牙肉軟組織的部份，有三種選擇：1. 矽膠材質。2. 石膏。3. 沒有軟組織（圖十三）。

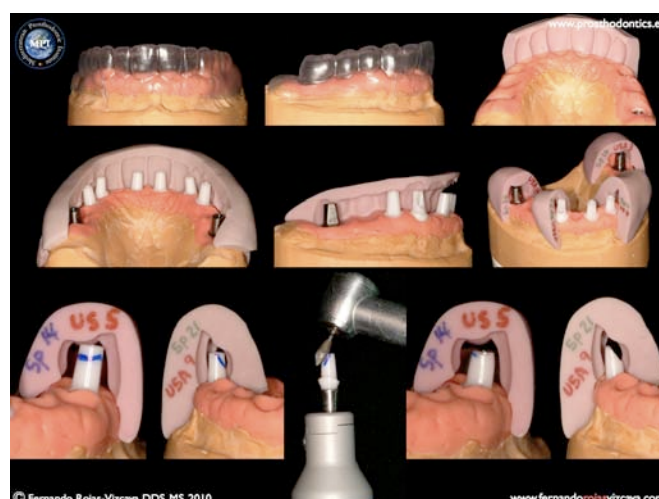
支柱體的邊緣也可以設定（圖十四），藍線是牙齦高度，黑線是預定支柱體邊緣位置，綠線是植體體頸部位置。填寫表格時可以指定藍線到黑線的距離，也可以指定綠線到黑線的距離，特別的情況還可以指定支柱體邊緣越低越好。

關於露出寬度（Emergence width）的選擇，可以依照軟組織需要多少程度的塑造外型，而勾選不同選項（圖十五），紅色部分是軟組織需要大量的外展，橘色及黃色依序減少，綠色部分是不更改軟組織外型，依照原有的即可。

為維護 Dr. Fernando 的智慧財產權，兼顧更詳細的影像品質和解說，相關運用的病例請參考 iPod touch 的影片 3-1 後半部及 3-2（Newtons' A Implant Podcast）。



圖九、支柱體的修飾



圖十、硬矽膠指標與支柱體的修型

ATLANTIS™

Prescription Form

SECTION I: CUSTOMER INFORMATION				Please PRINT clearly. All information in Sections I and II are required. See case requirements on reverse side.			
Today's Date		Patient Name or PO/Reference Number		Prescribing Clinician Zip Code (Required)		Astra Tech Customer Number (if available)	
Prescribing Clinician or Lab Signature: The signature below confirms that this product is being ordered at the request of a licensed dentist or on behalf of a licensed dentist whose information is on file with the lab.				Payment Method		Shipping Preference	
				<input type="checkbox"/> Invoice <input type="checkbox"/> Am Ex <input type="checkbox"/> Visa <input type="checkbox"/> MasterCard CC#: _____ Exp Date: _____		<input type="checkbox"/> Next Business Day PM (default) <input type="checkbox"/> 2-Day <input type="checkbox"/> Next Business Day AM	
Ordered By (Name of Lab or Practice)				Bill To <input type="checkbox"/> Same as "Ordered By"		Ship To <input type="checkbox"/> Same as "Ordered By" <input type="checkbox"/> Same as "Bill To"	
Contact				Contact		Contact	
Address				Address		Address	
City		State		Zip		City	
Phone		Fax		State		Zip	
Email address:				Email address:		Email address:	

☐ Send images and hold case. (Case held until approval of abutment design images is provided.) ☐ Send images and process case. (Images will be sent to "Ordered By" email address.)

SECTION II: CASE DATA										
Please select from the Margin Position and Emergence Width Options to the right based on the type of case materials you are submitting: - SILICONE Model of the Soft Tissue: Margin Position A, B or C; Emergence Width Option 1, 2, 3 or 4 - STONE Model of the Soft Tissue: Margin Position A, B or C; Emergence Width Option 4 - NO Model of the Soft Tissue: Margin Position B or C; Emergence Width Option 1, 2, 3 or 4										
IMPLANT INFORMATION			ABUTMENT MATERIAL/TYPE				MARGIN DESIGN (select only one)		RETENTIVE SURFACE	HEALING ABUTMENT DIAMETER (in mm if present)
Tooth #	Implant brand & type	Platform diameter (in mm)	Atlantis™ abutment in titanium	Atlantis™ abutment in zirconia*	Atlantis GoldHue™ abutment	Atlantis Gemini™ abutment	Chamfer	Shoulder	Yes	No
			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
PARALLEL ABUTMENTS (If final restorations will be splinted, the abutments must be designed to be parallel to one another.) Will restorations be splinted? <input type="checkbox"/> No <input type="checkbox"/> YES (Circle groups of abutments and/or teeth that will be splinted together.) 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 32 31 30 29 28 27 26 25 24 23 22 21 20 19 18 17										
*Atlantis™ abutment in zirconia is not available as a Gemini (duplicate) or with a Retentive Surface.										



表格一、ATLANTIS 處方單

ATLANTIS

Virtual Abutment Design

Process using 3D optimized scanning

Abutments individually designed from the final tooth shape

Natural tooth-prep shape

Emergence profile

Finishing line

Different materials

www.prosthodontics.es

© Fernando Rojas-Vizcaya DDS, MS, 2010

www.fernandorojasvizcaya.com

圖十一

Atlantis VAD (Virtual Abutment Design)

Both the upper and lower models are scanned

Virtual restoration in ideal position

Abutment design

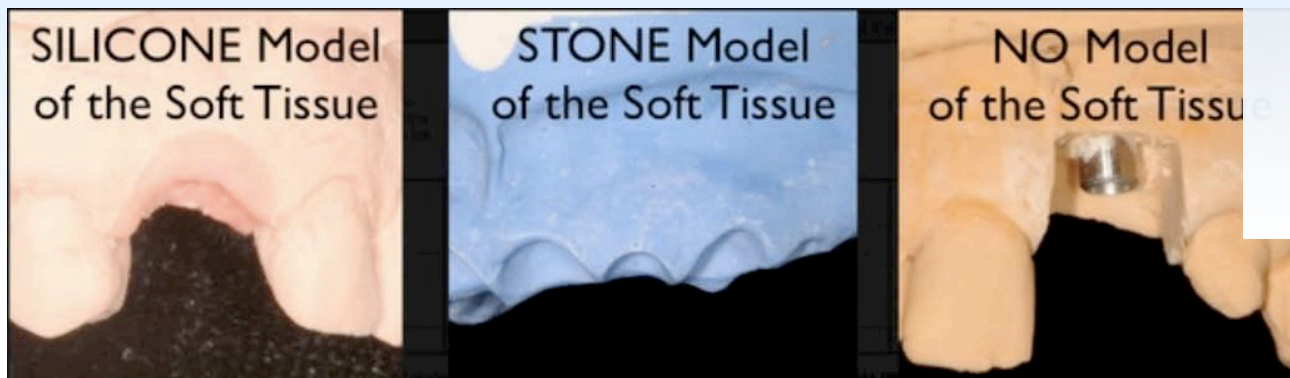
Final inspection of the abutment design

www.prosthodontics.es

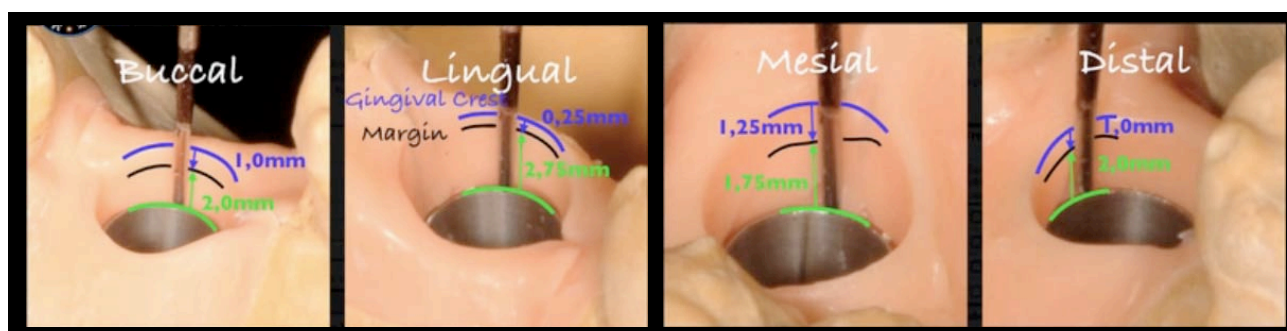
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圖十二



圖十三、模型上模擬牙肉軟組織部份的三種選擇



圖十四、支柱體邊緣的設定

EMERGENCE WIDTH OPTIONS	
	<input type="checkbox"/> 1. Full Anatomical Dimensions Largest diameter abutment provided with best emergence profile possible. A surgical incision for placement may be required.
	<input type="checkbox"/> 2. Contour Soft Tissue (default) Medium diameter anatomically shaped abutment up to 1.0 mm larger than sulcus of model of soft tissue provided.
	<input type="checkbox"/> 3. Support Tissue Anatomically shaped abutment will be up to 0.2 mm larger than sulcus of silicone model of soft tissue provided with desired emergence profile. "Easy" insertion.
	<input type="checkbox"/> 4. No Tissue Displacement Abutment with no soft tissue support. The abutment will not touch the soft tissue or stone model of the soft tissue provided.

圖十五、露出寬度 (Emergence width) 的選擇



Keynote 高效簡報學習法

11/18
(四)

K1：簡報聖經

9 - 17 : 00



看過太多充滿複雜文字和圖表的幻燈片，聽過就忘了的演講嗎？Keynote系列一的演講要教你如何利用Keynote，製作出令人目眩神迷、印象深刻的電腦簡報。透過小班教學，貼身指導，務必讓你在八小時裡輕鬆掌握Keynote的簡報技巧。

- 學習重點：
1. Keynote操作入門
 2. 演講常見十大謬誤
 3. 視覺化技巧

12/16
(四)

K2：Dr. Kokich的十大演講秘訣

9 - 17 : 00



Keynote系列二為各位介紹世界牙醫界的天王講師Dr.Kokich的十大演講秘訣，讓您在進階的課程中更加掌握演講設計的關鍵原則，不但讓你知其然，更知其所以然！

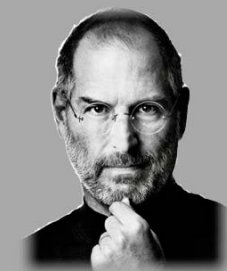
- 學習重點：
1. Dr. Kokich 十大演講秘訣
 2. 準備演講的九個步驟
 3. 多媒體影片剪輯

2011

1/13
(四)

K3：Jobs令人目眩神迷的五項演講技巧

9 - 17 : 00



總結我們Keynote系列的系列三，我們要為大家逐步解析跨界演講大師Steve Jobs是如何說出打動人心、價值數十億美金的關鍵故事。透過逐步的分析拆解，要讓你也可以成為獨具魅力的演講人。

- 學習重點：
1. Steve Jobs的五項演講技巧
 2. 幻燈片的設計概念
 3. 幻燈片修改應用

不同植牙部位的植體選擇方式

Site-Specific Implant Therapy

Dr. Homayoun Zadeh



Dr. Homayoun Zadeh
Instructor, USC Implant
Training Program in Taiwan

一. 下顎後牙區 (Fig. 1)

在下顎後牙區植牙時通常會有理想的骨密度（D2 約佔50%，D3 約佔46%），但是需注意 inferior alveolar nerve 的位置。一般較大的問題在於拔牙時沒有做 socket preservation，之後沒有辦法植入較寬的植體。往往會造成所能承受的咬合力較小、embrasure 太大或是 emergence profile 不理想（像個蘑菇一樣）等問題。因此在大臼齒區缺牙的近遠心空間（Mesio-distal Dimension）大於 14 mm 時，建議以兩支 3.75 mm 植體取代一支寬的植體。如此能有較好的咬合承受力，也有較好的 emergence profile（Fig. 2）。

通常植體與自然牙之間至少相隔 2 mm，兩支植體之間至少相隔 3 mm。再加上 3.5 mm 的植體。所以是：2 + 3.5 + 3 + 3.5 + 2 = 14 mm（Fig. 3）。如果缺牙區越大、則應盡可能選擇更寬的植體。兩支植體依照兩顆小白齒的外型相連，可作成一顆大臼齒的形狀，而中間需保留隧道結構（Tunnel）可供牙間刷清潔保養。以上結果可整理成 Table 1。

Recommended number of implants for molars	
One implant	Two implants
Interdental space <14mm	Interdental space ≥14mm
Wide(5mm)implant is possible	Wide(5mm)implant is not possible
Low-normal occlusal forces	High occlusal forces or bruxism

Table 1.

二. 下顎後牙區 (Fig. 4)

此區的骨密度較高（D2 約佔66%，D3 約佔25%），手術時需注意足量水灌注冷卻，才不會過熱造成骨壞死。有時因為植牙區過小而無法在每顆缺牙處入植體時，可選擇在部份缺牙區植入植體後，使用 cantilever bridge 的贗復設計。另外，可選用較小的 3 mm 直徑的植體，但只適用於下顎的門牙或部份的上顎側門牙案例。



劉芳燕 醫師
美齊牙醫診所
貝多芬矯正課程暨植牙論壇講師

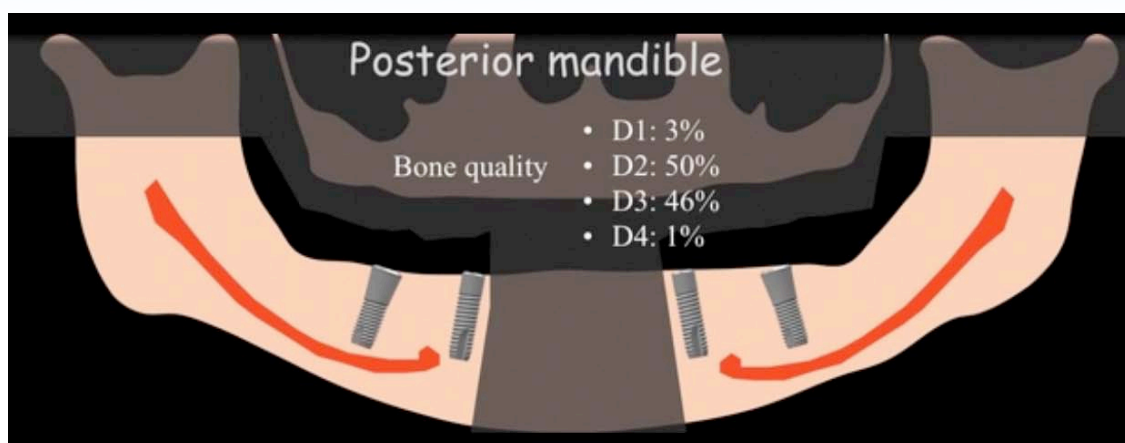


Fig. 1.



Fig. 2.



Fig. 3.

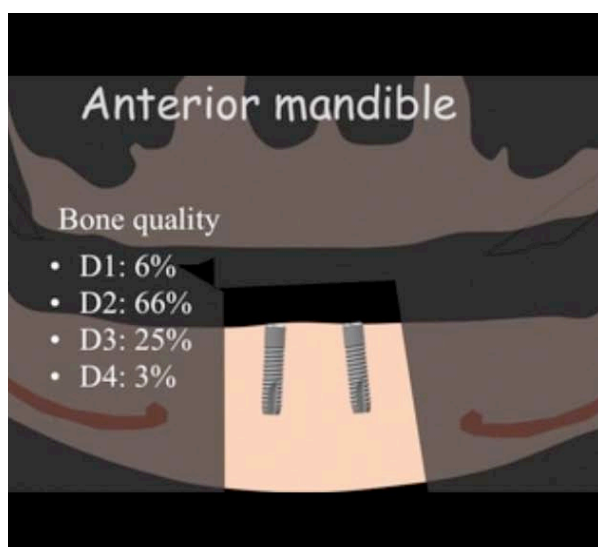


Fig. 4.

三. 上顎後牙區

上顎後牙區常因為 sinus floor 過低、alveolar ridge 吸收以及 D4 的低密度骨質等原因，造成植牙成功率只有約60%~80%，且預後並不太好。但透過鼻竇增高術（sinus floor lifting）可以增進此區植牙的成功率，目前常用的術式可分為：1. crestal approach 和 2. lateral window（Caldwell-Luc operation）兩種（Fig. 5），差別在於置入 graft material 的方式。

1. Crestal approach

常用的器械有 Osteotomes（字義為撐開骨頭、亦可分為 concave（又名summers）及convex兩種）（Fig. 6）。convex osteotome 用於將骨頭做 site dilation。另一種常用的器械為Piezosurgery®（超音波骨刀）（Fig. 7），如同其他器械一樣也有多種接頭可選擇。

2. Lateral window（Caldwell-Luc operation）

由於 piezosurgery 只是直線式的震動、可以直接切進骨頭而不會傷害神經 sinus 等軟組織。其中，圓柱狀的接頭常用於 crestal sinus surgery（Fig. 8a-h）。右上第

一大臼齒有 periodontal bone loss 及 periapical lesion。在拔完牙之後做了 socket preservation surgery。三個月後做 sinus lifting 同時植入植體。1. 先以 drill 鑽出接近 sinus 而不穿破 sinus floor 底部 cortical bone 的洞（Fig. 5a）⇒ 2. 再以超音波骨刀來繼續 preparation（因為使用超音波骨刀接近 membrane 時會有不一樣的手感，尤其在 sinus floor 底部不平整有高有低的情況下較好操作）⇒ 3. 放入guiding pin 照X光確定所鑽的洞方向正確 ⇒ 4. 將 graft material 放入洞內再用超音波骨刀（圓頭）慢慢地將 graft material 推入撐起 sinus floor ⇒ 5. check 的 X-ray film 中可見到所放入的 graft material 形成一個圓頂狀 ⇒ 6. 再依一般步驟植入植體。另外一個例子中也是用超音波骨刀將 sinus floor 震開再用 osteotome 將 graft material 推上去。Dr. Homa 特別提醒在做 sinus lifting surgery 時：1. 拔牙後仍須做好 socket preservation。2. 術前先照 CT 了解 anatomy。3. 使用超音波骨刀時須像做 endodontic treatment 一樣注意手感，否則也會破壞軟組織。4. 除了 graft material 之外，所有的金屬器械都不可以進入 sinus 內。5. 將植體植入後，其底下仍須留有 1~2 mm 的 graft。



Fig. 5.

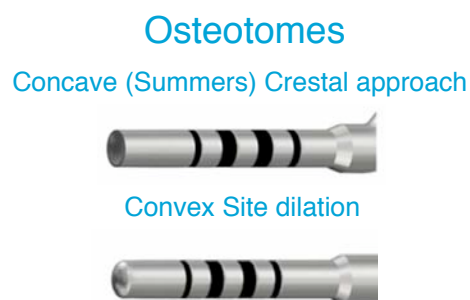


Fig. 6.

PIEZOSURGERY®



Fig. 7.

Outcome of augmentation techniques :

1. Sinus augmentation 約有 91.8% 的成功率。
2. Vertical alveolar ridge augmentation 的成功率依其術式不同約在 90%~95%

a. 垂直增加高度都有其難度，平均使用的 graft 是 3.4 mm、在經過六個月後大約會吸收 42% 只剩約 2.2 mm (Fig. 9)。

b. 必要時可使用短植體。

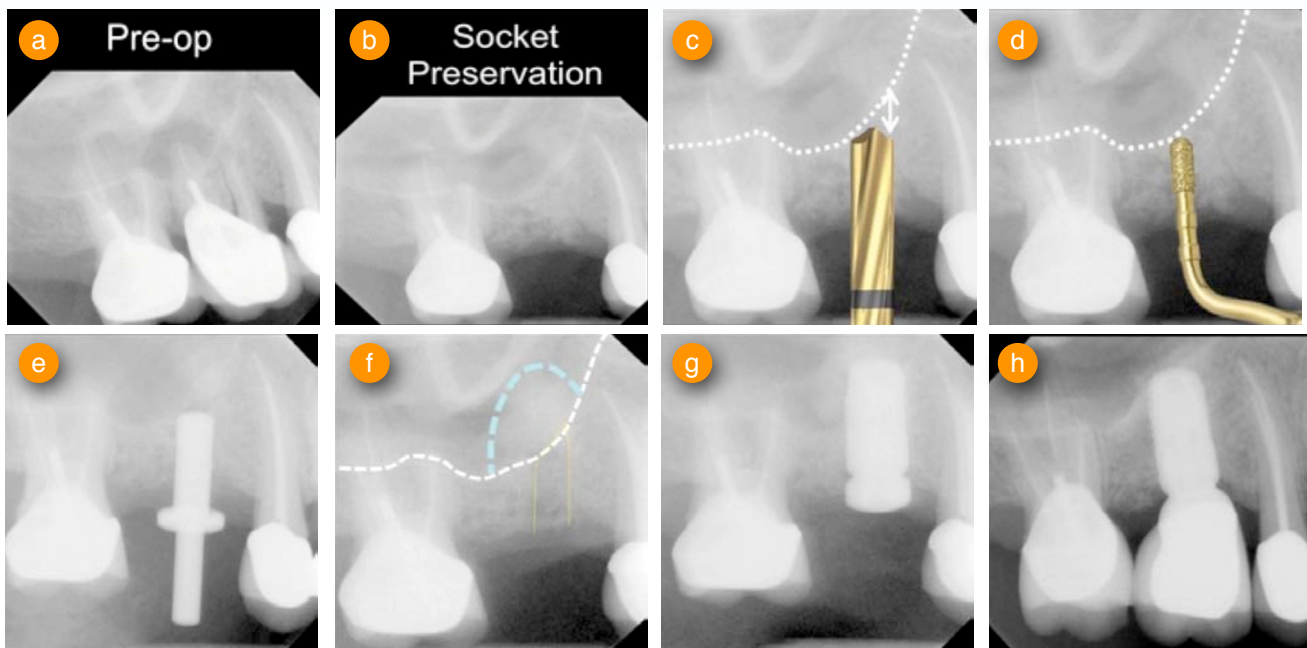
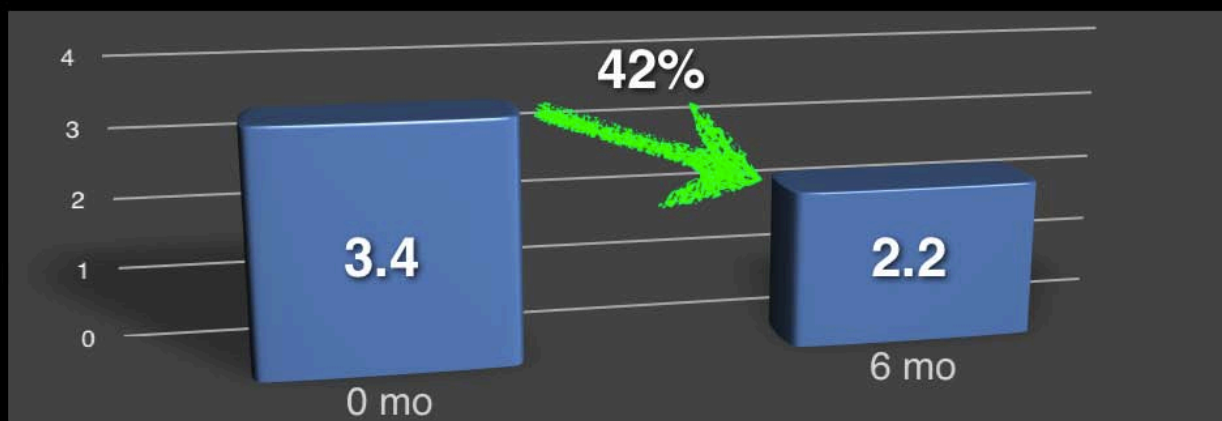


Fig. 8a-h.

Vertical ridge augmentation with mandibular block bone graft



Cordaro L, et al. Clin. Oral Impl. Res. 13, 2002; 103.

Fig. 9.

Short and Narrow Implant

理論上短和窄的植體可以承受咬合力嗎？臨床結果如何？周圍骨頭的反應如何？在 Dr. Himmlova (2004) 用電腦做不同長度的植體所能承受力量的研究中發現，在同樣的植體直徑下：17mm 長的植體只比 8mm 長的植體周圍的骨頭承受應力減少 7.3% 而已 (Fig. 10)。但是在同樣的植體長度下：4.2mm 寬的植體比 3.6mm 寬的植體減少了 31% 骨頭承受應力，5.0mm 寬的植體比 4.2mm 寬的植體減少了 16% 了骨頭承受應力（但是大於 5mm 就沒有很大的差別）(Fig. 11)。因此可見植體的寬度遠比長度來得重要。但是植體直徑的選擇雖是越大越好也要考慮 anatomy 上的限制、本身的 blood supply 以及 2 mm 的 safe zone 等因素。另外用數學分析發現，即使在

不同長度的植體下，crestal area 的骨頭才是力量的主要承受區，越靠尖端越無關乎力量的承受。

所以選擇植體尺寸原則是：考慮可行的情況下，選擇儘可能寬的植體。如果沒辦法植寬一點的植體，盡可能增加植體的數量。雖說植體的長度對於咬合力的分散不是那麼重要，但是在以下兩個情況下不建議選用短植體：

1. 在 immediate loading implant 時（因為攸關 initial stability），盡量選擇長一點的植體。一旦 osseointegration 之後長度就不是重要考量了。
2. 另一個考慮的是 crown / Implant 比例：相同的

The difference between stress on 8 to 17 mm implants is 7.3%.



Fig. 10.

The difference between stress on 2.9 to 6.5 mm implants is 60%.



Fig. 11.

1.5mm 的 marginal bone loss 在短植體上就算很多。

所以在使用短植體時要選用 implant 上半部有 microthread 的設計。以減少 marginal bone loss 的產生。一般的植體咬合力開始 loading 之後就約有 0.5mm 的 bone loss。而有 microthread 的植體大約只有 0.2mm 的 bone loss。因為 microthread 可以降低最會造成 bone loss 的 pitch stress (Fig. 12)。

雖然一般 crown / implant ration 的增加與植牙成功率 implant survival rate 和 crestal bone loss 沒有關連。但是會增加技術上的併發症 (technical complication)，如：螺絲斷裂、假牙破損 (screw fracture, prosthesis fracture) 等現象。

Dr. Homa 在 2010 年三月發表的一篇文章得到當年的 best clinical trial，他比較同為 6mm 寬各為 6mm 與 11mm 長的植體 (Fig. 13)，在植入 implant 六週後，做上 provisional crown，六個月後做上 final prosthesis，過了十二個月後看兩個植體的 bone loss 是一樣的、都大約在 0.2 mm 左右 (Fig. 14)。所以如果要種短植體的話，要慎選 case，也要注意 marginal bone loss。

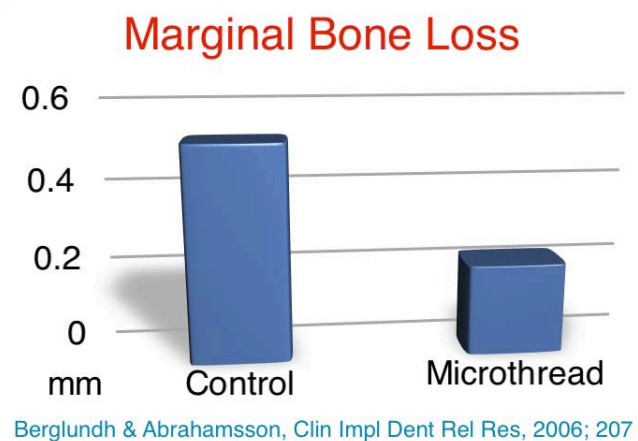


Fig. 12..

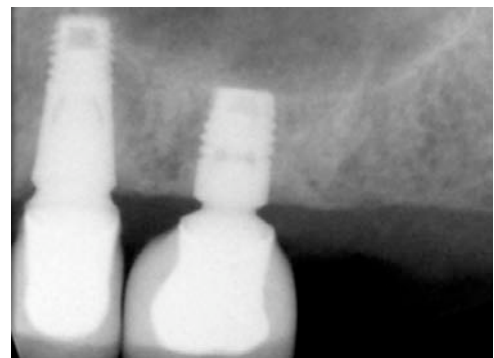


Fig. 13..

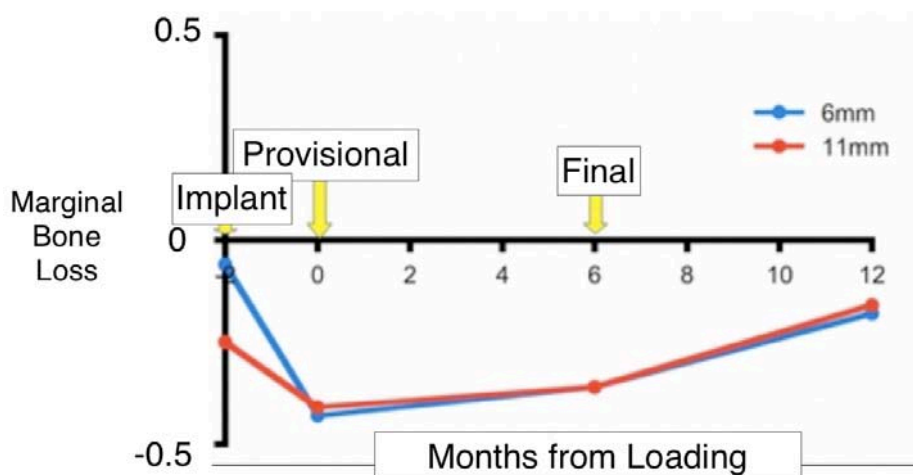


Fig. 14.

軟組織移植

垂直前庭切線骨膜下隧道法

Vertical Vestibular Incision Subperiosteal Tunnel Access (VISTA)

貝多芬齒顎矯正中心



張慧男 醫師

牙齦萎縮不僅會引起牙根敏感，同時在前牙區也會影響美觀。目前，我們可以取得一些材料來進行牙根覆蓋（root coverage），改善牙根裸露，像是結締組織（connective tissue）、真皮基質（dermal matrix）、膠原再生膜（collagen membrane）等等。一般而言，不論牙齦厚薄，結締組織移植（簡稱 C.T. graft）的牙根覆蓋術，成功率是最可預期的方法之一。我們長期關注於如何運用各種方法做好 C.T. graft，包括冠向移翻瓣手術（coronally advanced flap）、側向移位翻瓣手術（Lateral sliding graft）、隧道法（Tunnel method）等。在前牙美觀區，隧道法不僅可以不留疤痕，而且可以保留牙齦乳突和保持軟組織的完整，是個很好的手術方式；但傳統的隧道法需精巧的將 C.T. graft 從一顆牙穿越傷口隧道至另一顆牙，作法上非常不容易。Dr. Zadeh 發明了 VISTA（Vertical Vestibular Incision Subperiosteal Tunnel Access）垂直前庭切線骨膜下隧道法，使隧道法在臨床上的運用更方便。這裡，我們進一步提出 Chang's Three Head Technique，讓 VISTA 更簡化且更容易成功。

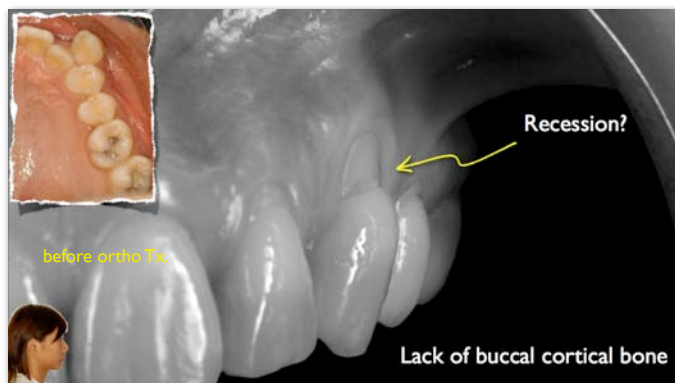


A Case Report

以 VISTA 術式來治療左上側門牙及犬齒的牙齦萎縮

一位年輕女患者，因二級咬合合併深咬及左上犬齒（#23）外翻而接受矯正治療。矯正結束後，因 #23 唇側骨頭太薄，經不當的刷牙力道，造成 #22、#23 牙齦萎縮和齒頸部磨損。和病患充分討論後，計畫以牙根覆蓋術（root coverage）來改善美觀及牙根敏感的問題。

進行牙根覆蓋術前，必須先確定 CEJ 位置、兩側骨頭高度、及有多少角質化牙齦。這個案例屬於 Miller's 分類第 I 級分類，我們有很好的機會得到百分之一的牙齦覆蓋成功率。以下就是 VISTA 手術的步驟。



張雪芬 醫師
普洛牙醫診所
貝多芬矯正課程講師



SURGICAL PROCEDURES

1. 受皮區（recipient site）的準備

(a) 牙根準備 Root preparation (圖 1)

在手術前，先進行洗牙及牙根整平術。然後以 fine diamond bur 或是 Neumyer's bur，將牙根表面修型成稍微凹陷的平滑表面，再以 20% EDTA 做牙根清潔，以去除塗抹層（smear layer）而達到解毒作用（detoxification effect）。



(b) 切兩條垂直前庭切線（圖 2），翻開骨膜下全層皮瓣（full thickness subperiosteal）

以骨膜起子做 blunt dissection，從牙齦乳突（papillae）開始，超過黏膜牙齦交界（MGJ），用隧道法翻全層骨膜下皮瓣，同時要記住讓齒間牙齦乳突保持附著在骨頭上。



2. 供皮區（Donor site）手術：從硬顎取 C.T. graft（圖 3,4）

根據受皮區大小，剪裁一塊無菌樣版，來量測及決定移植的軟組織大小。

- (a) **第一刀（一刀到骨）**：在離最深牙周囊袋下方 2~3 公釐處，垂直硬顎且直接在骨頭上，連續不間斷地劃下第一刀。
- (b) **第二刀（打薄片）**：從第一刀處，量測表皮深度 1~1.5 公釐，沿著牙齒長軸，慢慢的一點一點地剝離表皮和結締組織，直到硬顎頂部彎折附近。
- (c) **第三刀（四周切斷）**：將表皮下已經剝離的結締組織，在近心及遠心切斷，再使用骨膜起子連著骨膜剝開，取出 C.T. graft。



- (d) 放 Colla-Tape 在供皮區的傷口內，進行縫合，並以組織三秒膠加強傷口的密合。

3. 口外移植組織的處理 (Extra-oral graft preparation)

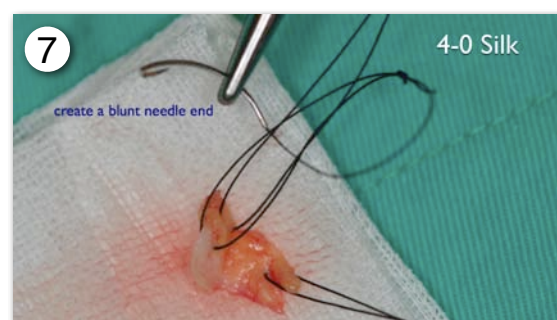
- (a) 不須將油脂組織移除 (圖 5)。
- (b) Three Head Technique：使用 4-0 絲線分別縫穿在 C.T. graft 的三個角落 (圖 6)，將針頭弄彎成鈍端 (圖 7)。

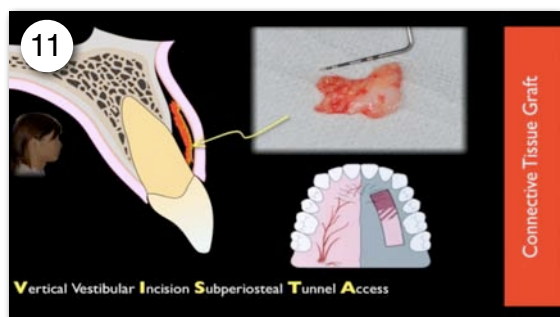
4. 將 C.T. graft 以折彎的鈍針頂端帶入受皮區，往內小心穿越瓣膜隧道，將三個線頭分別留在隧道三處開口 (圖 8,9,10)。

5. 調整隧道內的 C.T. graft 在 CEJ level，然後施行冠向移翻瓣手術 (Coroally advanced reposition)，位置最好超過 CEJ 1 公釐，以矯正術後牙齦些微的萎縮 (圖 11)。

6. 以 6-0 Nylon 縫合 C.T. graft 和皮瓣 (圖 12) 再以沾生理食鹽水的濕紗按壓十分鐘，以去除死腔 (圖 13)，同時戴透明維持器防止牙齒微幅移動及保護供皮區的傷口 (圖 14)。

7. 縫線最好超過三個星期後再拆，如此較易得到預期且穩定的結果 (圖 15,16)。





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MINEC-UCLA教育長
Dr. Kwang Bum Park



台灣臨床植牙首席講師
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Feedback from the International Damon Workshop



Dear Dr and Mrs Chris Chang,

First of all, I would like to express my sincere gratitude to both of you for hosting me the study tour in Beethoven last week.

I must say *what I learnt these few days is possibly much more than what I learn in the past few years*. You obviously had surpassed my expectation.

I learn how one could create a kingdom out of a little town; how one could manage an efficient patient flow in a shortest possible time frame with the biggest possible number; I further learn that *how one should delegate the works effectively, empower the staff systematically and inspire them spontaneously to be contributory to the growth of the organization*.

I also reckon that effective presentation does not depend on how flowery the language we use but on how we connect to the audience and engage their attention to our flow of thoughts. An effective presentation needs an effective tool to support the need. This could not be more true as the old Chinese proverb saying, "If you need to do a job well, you would first have to pick the right tool and sharpen it".

"Leaders are made, not born". "Success is simply doing the same thing repeatedly over and over again till we perfect the skills". "Beware, it has to be done in a steady manner, not too fast.. not too slow..", thanks Chris, for such philosophical idioms.

Last but not least, thanks for the invitation to your lovely home and the sumptuous Japanese Dinner. Your warm hospitality is deeply appreciated. Indeed, great ideas are inspired in the toilet bowl, isn't it?

Yours humbly,



How Kim Chuan

President of the Malaysian Dental Association
Vice President for the Commonwealth Dental Association
Chief Editor of the Asia Pacific Dental Federation



My joining the International Damon Workshop and Keynote was worth remembering! I have learned very useful tips in my use of the OrthoBoneScrews. The difficult cases encountered in my practice becomes easier and *the use of the OrthoBoneScrews are now a must in my treatment plan for cases that need maximum anchorage*. So many questions in my mind had been answered and I have gained more confidence in my practice.

The lecture was great! I highly recommend the workshop to everyone!

The Beethoven Clinic of Dr. Chang is the biggest and most organized clinic I have seen so far. The trip to his clinics (Anderson Clinic) and his Mac center, Newton's A, inspired me to change my office set up and to update everything from office files to staff training.

The Keynote course helped me organize my cases, and presentation to the patients are awesome. With good presentation, the patients are impressed so much so that they want to undergo treatment without delay.



Susan Casipit

Orthodontist, Philippines

Feedback from the Beethoven Comprehensive Course



沒有人是這樣對待小偷的！本來只是來偷學點矯正技術，後來這課程給的，卻比原本想要的還多，甚至還會送夢幻公仔。以前聽了幾次張醫師演講，覺得他是真的用心要教會別人做矯正，於是買了他的基礎矯正視訊課程，反覆看了三遍，覺得內容都熟了，還需要再繳學費去聽一遍課程嗎？最後我做了正確決定，將荷包打開來。

牙科學習過程中，總是以為矯正學習是困難的，這個領域好像只屬於班上那前二名，然而上完這個課程，才感覺矯正學習可以是這麼簡單，這就像在台中買了票，坐上高鐵北上，沒有一個人會例外，大家都能到達新竹；參加這個課程，只要一切按部就班學習，就一定能夠複製張醫師的技術、診斷、思考方式、簡報方法、診所經營管理、甚至是關於助理訓練的一切細節。

沒有一個學習是如此容易的，只要願意打開心胸、打開錢包，就可以學會想要得到或原本不預期的。我已經完成矯正基礎班、矯正植體班、國際班、助理訓練課程以及三階段的專業簡報課程，現在正在上矯正進階課程，如果再完成矯正精修班課程，就可以得到張醫師頒發的矯正學之父～Angle 夢幻公仔了！



李名振 醫師
瑞聯牙醫診所



我聽過那麼多的演講，張醫師是我聽過的講師最出色的，儼然已成為台灣矯正界的一門顯學，要學 Damon 矯正，一定要來過張醫師的這一關。除了矯正之外，還可以學到演講的技巧，Mac Keynote 的呈現，讓不擅言詞的我有一天竟然可以上台演講，哇～哈！哈！這真的是想都沒想過的事，就像湯姆漢克演的「浩劫餘生」裡面的經典名句說的：

你永遠不曉得下一波潮汐會為你帶來甚麼！

人生就是這樣，能有機會在張醫師的麾下繼續前進，生活就是這麼快樂，因為大樹底下好乘涼啊！



黃泰源 醫師
福信牙醫診所



Feedback from the USC Implant Training Course

植牙是當今顯學已無庸置疑，每天的廣告信多過過江之鯽。不只琳琅滿目，甚至眼花撩亂！

實在無法去鑒別何者該去，何者又該捨棄？

一個好的課程應該是：可以讓學習者能學習到演講者所教，同時能馬上應用到臨床上。而非是只見講台上刀光劍影，火石電光，台下驚呼連連！出了場外，卻只能依稀記得；想用到臨床，又是捉襟見肘；是大師離我太遙遠？抑是自己智商不足？

當第一天上課報到時，接到厚厚一疊裝訂精美的講義，真有說不出的感動！國內好多的演講號稱名師，所以不能錄音錄影，錢收的超貴，連個講義卻也不給！好歹也印一些參考文獻，餵餵求知若渴的吾輩也不可得了！

如今，上課時有所有幻燈片的資料，在課堂上只需要專心聽講，不用擔心沒有抄到重點。課後還有視訊檔，讓你回家聽個夠。還有同學間整理的精美筆記，隨時可以翻閱查詢。

講師群雖個個是雄霸一方的專家，卻又是如此平易近人，恰似如沐春風！

學習就該如張慧男醫師所言：要高效的學習。

USC in Taiwan 的植牙課程，或許就是進入植牙殿堂，最近的路。



謝金龍 醫師
金龍牙醫診所

Beethoven Scholarship Reports



一直到現在依然驚訝而感到有些親切於當活動的主辦人——張慧男醫師說他畢業自國防醫學院。不過，他嚴謹而追求完美的態度與淵博的專業知識卻是真正使我心嚮不已的原因。

本次的參訪機會最讓我印象深刻的是張醫師對於阻生齒的獨到處理方式，這個簡明而易懂的處理方法讓矯正的流程變得容易掌握，然而同時我也了解到能夠發現這樣的方式並加以處理，架構在對基礎知識的深刻理解之上。透過這樣的案例讓我對張醫師處理學問的嚴謹態度益發佩服。

除了專業的見習與臨床案例之外，張醫師為我們講的「Kokich 演講成功的十個要訣」也讓我對一個牙醫師能夠達到的學術高度大感讚歎。除了從其中學到了很多作簡報時的實用方法以外，也藉著張醫師非常精妙的示範，驚訝於自己從前並沒有把「病例簡報」的能力認真的當作自己應該加強的本職學能。

充實的見習行程在張醫師與我們分享心路歷程的勉勵之下畫下一個令人大呼過癮的驚嘆號。我認為在這些臨床與操作之下，凌駕於其上的，也是張醫師勉勵我們的「成功的3P」—Passion、Persistence、Practice，正是這次見習中讓我真正學到的一態度，與持續不斷的努力，就會解開屬於成功的方程式，很感謝主辦的張慧男醫師，他所傳播的概念讓我大開眼界，也相信下一屆的參加者一定不會後悔申請爭取這個獎學金。

國防醫學院 李宇璿



有幸在眾多篩選之下脫穎而出，能夠參加本次的貝多芬矯正中心見習活動，雖然只有短短的三天二夜，但在這期間的所見所學，都讓我獲益良多。

見習活動當中，參加了臨床診所見習以及會議演講兩大部分的課程，在臨床診所見習部分，見識到了何謂高效率的診所營運模式。在將近一天半的臨床跟診之下，我了解一個診所除了需要醫師高超的技術之外，也需要一組能夠配合醫師動作的團隊一起合作，才能完成一家高水準診所的運作。在參觀期間雖然整家診所人滿為患，每位工作人員都相當忙碌，但張醫師以及他的診所團隊人員們，總是會抽空，毫不藏私的回答我們對於臨床部分以及診所經營部分的問題，所有工作人員的親切態度，讓我感到相當的溫馨。

會議演講部分，則有張醫師精彩的分享演講祕訣，張醫師的演講技巧真的令人佩服，一整場下來毫無冷場。此外，也有安排安徒生兒童牙科診所的徐醫師來為我們教授有關兒牙早期治療相關議題，讓我更深一步了解兒牙領域。最後一天的電腦運用以及教導如何寫自傳的專題，也讓我了解在資訊發達的年代，我們可以應用的東西更加多元化，利用一些科技的力量，可以自行作出令人驚艷的履歷表。

在貝多芬矯正中心的見習，廣闊了我的視野，很感謝張醫師願意提攜我們後輩們，讓我們有機會了解更深入的矯正世界，若明年有學弟妹問我有關貝多芬矯正中心的訊息，我一定會大力推薦，鼓勵學弟妹踴躍報名，把握這難得的機會！

台北醫學大學 吳怡箴





- 主辦單位：貝多芬齒顎矯正中心。
- 指導單位：新竹市政府教育局、新竹市體育會。
- 時間：元旦（六）6：30 am 報到（7:00 am 準時統一發球 **Shot-gun**）
- 地點：東方日星高爾夫球場 03-576-2200
新竹縣寶山鄉深井村9鄰寶新路676號
- 費用：每人全部費用 2000 元。
（含球車費、果嶺費、桿弟費、午餐、賽中點心水果）
- 報名方式：
 1. 新竹市體育會高爾夫球委員會林總幹事0939-496318，
Email:chunhong@mail.ypu.edu.tw，Fax:03-6102374
 2. 金牛頓藝術科技 黃小姐 Tel: 03-5735676，Fax: 03-573-6777



午餐酒會
於球場二樓舉行
11:40 am 開席頒獎

本活動採預約報名方式，恕不接受現場報名，敬請見諒！

當矯正遇上植牙



2011 *Newton's A* Implant Forum

金牛頓植牙論壇

Implant Technique + DDX + Basic Knowledge

◆ 時間：2011年每月底週五
早上9:00-12:00

◆ 地點：金牛頓教育中心
新竹市建中一路25號2樓

◆ 費用：20,000 (1.15 前匯款完成)
22,000 (原價)
單次2500元

費用包含講義、視訊

◆ 匯款帳號：109-25203060-000
戶名：金牛頓藝術科技股份有限公司

◆ 報名專線：03-573-5676
黃思涵小姐

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

邀請您一起迎接「協同性整合」的新牙科時代，讓我們從植體與矯正的對話出發，透過整合各科精華，締造集美觀、功能於一身的全方位治療。張醫師相信，儘管課程內容可能相似，但是貝多芬對於資料的呈現方式不一樣！唯有自己消化吸收後的整理，才是真正屬於自己的難能可貴的經驗，這就是貝多芬精神！

關於植牙論壇的定位與期許：

1. 將目前眾多植牙演講精華，重新整理過在自己的場合報告
2. 提供訓練平台供學員報告自己的case，從中相互學習。
3. 提升助教的演講技巧，培養新講師群。
4. 作為未來植牙專科醫師考試的考前訓練班



Newton's A

金牛頓藝術科技

2011 Implant Forum

	日期 (W5)	09:00 ~ 10:00	10:20 ~ 11:00		11:20 ~ 12:00
		Lecture Moderator: Chris Chang	Case Analysis (8+12)x2 mins		Classic Article Review
1	2/25	Implant Bone Physiology	Case 1	Case 2	Biologic Width around Implants
2	3/25	Practical GBR	Case 3	Case 4	Tension-Free Primary Closure
3	4/29	Dr. 林靜毅 Special Lecture			Inter-Implant Distance
4	5/27	Soft Tissue Management	Case 5	Case 6	Papilla Management
5	6/24	Ortho-Implant Connection	Case 7	Case 8	Lateral Incisor Missing
6	7/29	Dr. 溫世政 Special Lecture			Ovate Pontic
7	8/26	VISTA	Case 9	Case 10	3D Bone-to-Implant Relationship on Esthetics
8	9/30	Abutment Selection	Case 11	Case 12	Platform Switching
9	10/28	Dr. 彭炯熾 Special Lecture			Healing of Extraction Sockets
10	11/25	Sinus Lifting	Case 13	Case 14	Sinus Floor Elevation with Osteotomes
11	12/30	Problem Solving of Failed Implant	Case 15	Case 16	Simplified Socket Classification



邱丕霞醫師

邱丕霞牙醫診所負責人

南下高雄開業，迄今已逾十五年時間，邱醫師最感受用的，是她在三十五歲開業之初學會矯正，在四十六歲還沒得老花眼時學會了植牙。邱醫師坦言，在職進修必然造成壓力，它可能來自於時間、金錢與家庭，畢竟一天只有二十四小時，但終身學習所創造的成就感與報酬，卻讓她覺得當牙醫「真是好玩」，而且將持續下去，謹此與讀者分享。本文摘錄自2010最新一期《台大牙友》



貝多芬創辦人：張慧男醫師

· 中華民國齒顎矯正專科醫師

· 美國齒顎矯正專科醫師學院院士 (ABO)

· News & Trends in Orthodontics 發行人

· 美國印地安納普渡大學齒顎矯正研究所博士

貝多芬牙科團隊 A Learning Organization

文 / 陳建綱、徐玉玲、黃思涵、蘇瑩瑋

引言

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

貝多芬牙醫團隊簡介

貝多芬牙科團隊是由張慧男醫師領導，從矯正牙科出發，包含「貝多芬一般牙科」、「安徒生兒童牙科」牙周病專科、膺復專科等牙醫專科醫師及優秀的牙醫助理團隊所組成。此外，強調以「學習」為核心價值的貝多芬團隊還另外成立「金牛頓藝術科技」，專職負責牙醫資訊科技，醫療器材研發以及牙科教育推廣的工作。為了能提供更完整的牙科照顧，我們也即將在明年成立「植牙中心」，希望能讓有缺牙困擾的民眾更全面的治療環境。

貝多芬矯正中心-環境介紹

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

向內進入看診區，同樣的還是一整排的落地窗，這對於整天在診所內工作的牙醫師而言，這真是一個天堂！因為只要自然的一抬頭，就可以看到窗外中庭的綠樹，可以讓工作中的壓力與緊張感自然的舒緩；看診區是開放式的安排，且前方有足夠的陪診空間，方便醫師與家長溝通，或是讓候診病患能 standby，這樣的設計方便順暢的處理大量病患。

診療台後方的供應區，主要是擺放看診器械及病歷資料，讓所有的治療過程都能有足夠的後援，供應區台面上的 Apple 桌上型電腦 iMac 也提供醫師在治療時所需要的資訊，而櫃台掛號資訊系統也整合在 iMac 裡面了，病患看診結束，助理也及時的將

病歷記錄和照片輸入完成。當然囉，所有的工作站之間都是內部網路連線的，這樣，不管醫師走到哪裡，只要有電腦，配合診療過程，所有的病例資料都可以一覽無遺。



診療區

貝多芬矯正中心-診療運作系統

貝多芬矯正最值得研究的，應該是它的診療運作系統。診所內的每日看診病患量非常大，而且每天到診所內支援的住院醫師及專科醫師組合都不相同，但是對於病患的處理卻都能依照標準作業流程，按步就班的貫徹



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

韓國名醫 Dr. Park 夫婦（前排左一、左二）訪貝多芬。



貝多芬團隊 BEETHOVEN

OBS 繼續教育



印尼國際班醫師認真在模型上練習植入迷你骨釘。

也許大家都會有疑問，住院醫師的訓練不是應該經過4~5年嗎？為什麼大家都能這麼快的進入狀況呢？我想答案應該是「標準訓練流程」。所有的住院醫師都需要經過張醫師的矯正基礎班、進階班的訓練，然後繼續在精修班中逐漸精進成熟。張醫師的教學活潑而且與門診同步，您很難看到萬年不變的教材幻燈片，

因為張醫師自己一直在進步。我們會看到就在上個禮拜或是昨天門診中遇到的病例，及時的套入當天的課程主題，而且更令人驚奇的是，當天上完的課程，下午的門診病患裡就有同一類型的病例，真是現學現用零時差！

貝多芬矯正中心-國際化課程

張醫師所設計的課程，不光適合國內醫師，就連國外的醫師也都踴躍報名參加 international workshop，每個梯次的報名都非常踴躍，學員們結業後都說還要再來參加，可見張醫師的課程魅力非常吸引人！張醫師也同時與國際接軌，國際間的演講邀約不斷，漸漸的成為另一個台灣之光！另外，每每只要有國際學者到台灣演講，張醫師有機會都會邀請他們參觀診所，張醫師會為他們簡報介紹診所的運作以及訓練課程，我們看到這些國際大師他們專注而且驚訝的表情，相信貝多芬牙醫在他們心中都留下了深刻的印象。

貝多芬矯正中心-出版專業刊物

News & Trends in Orthodontics

貝多芬矯正中心經過張醫師十幾年來的經營，深獲病人的信任與支持，除了提供矯正專業服務外，張醫師也致力於繼續教育的開辦以及國內外學術活動的交流。為了讓更多牙

醫師能有一個實務交流平台，張醫師也出版了一份著重牙科實務經驗分享以及報導國外矯正新知的季刊「News & Trends in Orthodontics」，邀請國內外知名牙醫師分享他們臨床上的秘訣，並且透過此平台也讓貝多芬矯正的理念能夠透過教育，傳達給認同這份精神的醫師，並且對學習充滿熱忱，不斷精進。

貝多芬醫療團隊

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

當然，有一群像貝多芬牙醫的全能助理是必要的。助理群也是貝多芬牙醫治療標準流程的重要關鍵！每一位新病人從進入診所開始，就由專業的公關組助理引導填寫基本資料，並介紹環境及

諮詢流程，並且拍攝收集病患的口外及口內照片、取模。而在每日的門診治療流程，則由資深的助理組長來指揮，跟診助理引導回診病患就診前刷牙，看診前對病患的關心及詢問，器械準備好了之後由住院醫師先執行治療計畫，之後由張醫師檢查、微調。最後再由助理來指導病患口腔衛教，橡皮筋的佩

戴、術後注意事項....等等，然後結束回診流程。助理在病患及醫師之間，扮演重要的關鍵角色，就像鋼筋永遠需要水泥一樣，如果您診所的助理還沒能達到您的理想，請參加貝多芬舉辦的專業助理訓練班吧！

貝多芬醫師團隊。



安徒生兒童牙科 守護孩子口腔的健康



診療台頂上就是繽紛的花朵，讓孩子徜徉在童話的懷抱裡。

安徒生兒童牙科-緣起

在貝多芬矯正中心與一般牙科深耕新竹公學新村社區多年後，社區的里長跑來跟貝多芬院長張醫師反應說，社區

的孩子牙齒痛都需要跑到市區才能得到專科的照顧，里長伯代表社區的家長們希望貝多芬也能在社區開一個專門為兒童設計的兒童牙科。因為聽到社區民眾的心聲，以及許多在貝多芬做矯正的家長也在反應一樣的需求，2008年元旦我們開設了「安徒生兒童牙科」。安徒生的院長徐玉玲醫師表示，安徒生的理念是希望能塑造一個父母安心，孩子開心的看牙環境，提供永續優質的服務，照護不僅是孩子的口腔生理與心理的健康。

安徒生兒童牙科-環境介紹

診所以經典童話作家安徒生命名，將耳熟能詳的故事，如國王的新衣、賣火柴的小女孩、拇指姑娘融入診所的場景中，並結合童趣的想像信手塗鴉，留予親子間歡欣共處的童話氛圍。希望在寶貝的成長過程中，看牙不只是為了健

金牛頓藝術科技 牙醫科技教育中心

成功的牙醫師們經常要面臨的兩難就是，想學的新技術這麼多，永遠抽不出足夠的時間讓我們好好坐下來，完整地聽一場演講或是從頭到尾讀完一本新書。金牛頓藝術科技將貝多芬精湛的臨床技術以及完整的教學系統，透過蘋果科技的硬體 iPod touch 以及軟體 Podcast，變成隨時隨地可以學習矯正的行動學習工具，已經掀起國際矯正界的一場學習旋風。

金牛頓藝術科技- 行動學習 iPod touch + 視訊課程

張慧男醫師率先研發將 Damon 高效矯正、迷你骨釘 OrthoBoneScrew 以及助理訓練這三種屬性完全不同，但是又與牙醫師在職教育密切相關的課程，透過蘋果電腦內建的簡報軟體 Keynote，製作成以照片和影片為主的簡報檔案，

再透過軟體本身內建的轉檔功能，將平時授課的電腦簡報內容轉化為視訊影片，並安裝在 iPod touch 或 iPad 裡。不論是已經上過課希望溫故知新，或是沒時間親自來上課的牙醫師，都可以透過反覆觀看這些包含清楚分解動作的視訊影片，來增強高效學習的效果。由於 iPod 視訊課程是完全數位化的內容，也方便日後任何的修改和更新，所以完全不用擔心一旦有新的修正或改變，過去已經購買的珍貴資料就變成明日要被淘汰過期的垃圾。

金牛頓藝術科技- 教學利器蘋果電腦+Keynote

金牛頓除了提供牙科專業視訊課程外，也負責設計、規劃、維護貝多芬牙醫團隊的教學資訊環境。舉例來說，日前台大張心涪主任帶著目前仍在美國接受矯正專科訓練，正好回台休假的女婿來參觀貝多芬。診所當天剛好有一個門診手術的個案，訓練有素的助理們有些協助醫師執行臨床上的步驟，有些則進行手術過程的攝影及錄影。待手術過程結束後，助理立刻就將手術的照片放入病人專屬的 Keynote 簡報檔案中，連同病人過去的病例照片，以及剛才的手術錄影畫面，一起整理在這個病人的電子病例檔案中。執刀的醫師則立刻在電腦銀幕上秀出這個病人的治療歷程，向病患及家屬說明治療的進程以及療效，之後則繼續利用這個案例與張醫師進行深度的專業個案討論。討論結束後立刻將這個案例的電子檔燒成光碟，讓張醫師和他的女婿可以帶回去做進一步的研究。

What is Your Tx. Plan?



貝多芬團隊 BEETHOVEN

康，也能是一件有趣、親子同樂的經驗。從依孩童身高設計不同高度的刷牙檯面，兒童專屬的廁所，到兒童專屬的遊戲區和閱讀區，安徒生從許多細節裡體現一個以兒童為中心的診療環境。

安徒生兒童牙科-長期完整保留兒童口腔資料

對兒童牙科而言，安徒生希望能提供的是長期照護，因為生長的過程中，除了在心理上漸漸與小朋友建立關係之外，在口腔顏面發育的部份更希望能透過口內外照片的收集與追蹤，充分掌握整體口腔健康，骨骼生長的情況。所以，為了達成這個目的，每位孩子的資料完整收集，電腦傳輸方式以及大量資訊的統整合理，安徒生都採用最先進的軟硬體技術，高畫質數位單眼相機與即時無線傳輸直接到個人病歷，以及蘋果電腦方便的雙作業系統界面功能，兼顧健保作

業及儲存個人影音記錄等作業系統。一點一滴地保存所有小朋友的生長及看牙記錄，藉以提升學術及研究與服務品質。

安徒生兒童牙科-兒童衛教

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

植牙中心 未來展望

一般醫師可能認為這需要幾個實習醫師花上一個星期才能做出來的病例報告，利用適當的科技工具，這一切在短短的30分鐘內就全部完成了，不論是與病人，家屬溝通，訓練新進醫師、助理或與其他資深醫師進行專業討論，蘋果電腦加上 Keynote 的組合，讓進行個案討論和製作專業訓練教材，變得輕而易舉。再搭配 Keynote 最新加入的即時錄音功能，醫師教學講解的內容可以透過電腦內建的麥克風錄下來，透過影片轉檔的功能，新製作好的教學內容就可以放入 iPod，讓你立刻隨身帶著走。

金牛頓藝術科技- 研發迷你骨釘 OrthoBoneScrew

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

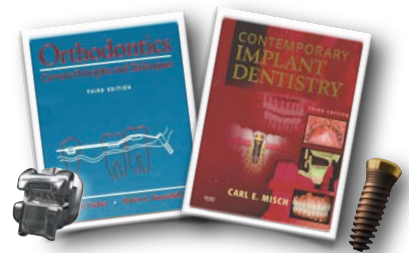


近年來，貝多芬矯正中心的病人逐漸由兒童青少年轉向成人病人為大宗的結構，這意味著成人對美感的要求也愈發強烈，但這也是貝多芬的全新挑戰，因為面對成人的治療時，往往除了牙齒排列的問題需要矯治外，牙周病，大範圍的缺牙，舊有假牙補綴物汰舊以及矯正後的植牙或假牙補綴評估與重建。因此貝多芬有義務，也必須為成人提供矯正前中後完整的全面專業的治療建議與治療。

過去一般認為成人的牙科治療只需要兩個專科：牙周與補綴，但我們現處於強調 inter-disciplinary 科際間協同治療的時代，其中，矯正與植牙更是扮演了協同治療中最重要的兩個支柱，矯正提供了地基，植牙則是蓋房子的支柱，因此，金牛頓植牙中心的成立，是為了要提供病人更完善的治療，以及建構更完整的貝多芬醫療專業。

貝多芬體系的核心價值在於教育兩字，金牛頓植牙中心也將落實教育當作成立的最高宗旨，透過課程的建立，會讓貝多芬各個專科的駐診醫師擁有相互溝通的舞台，張醫師相信，唯有在課程中報告給參與的學員分享，才會真正的認真整理自己的病例或是將自己的治療心得內化成有系統的 SOP。透過一次次的整理，相互討論，將能大大提升醫師的專業能力，醫療品質也相對提升。

金牛頓植牙中心即將於 2011 年成立，在去年，我們成立了植牙論壇，預先替矯正及植牙科際協同整合治療作暖身，今年度更與美國南加州大學（University of Southern California）合作，成立了南加大泛太平洋在台的植體繼續教育課程，希望對學習有相同熱忱的醫師能夠加入我們，一起為提升醫療品質作努力。



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專業簡報	Keynote 簡報法 series 3 How to Wow'em like Steve Jobs?	1. 賈伯斯演講秘訣 2. 簡報設計進階應用	2011 年 1 月 13 日 (四) 09:00~17:00	科技人、醫師、 教師、學生
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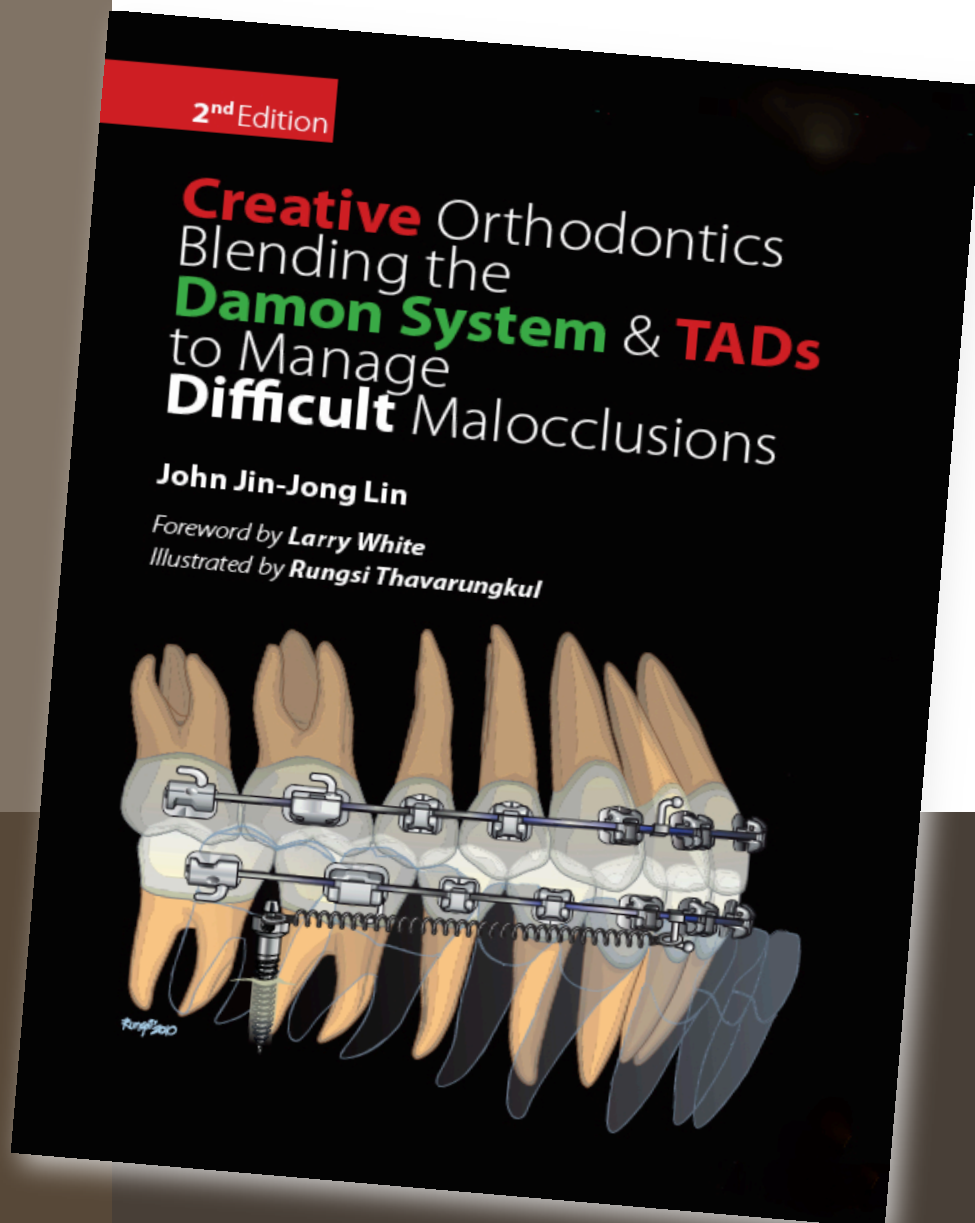
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Beethoven's Damon Comprehensive Orthodontic Course, Kaohsiung, 2010