News & Trends in Orthodontics

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Indiana Alumni (left to right): Drs. Chris Chang, Charles J. Burstone, W. Eugene Roberts, and James J. Baldwin. Oil painting adapted from a photo taken at the 109th AAO, in Boston, 2009.

News & Trends in Orthodontics is an experience sharing magazine for worldwide orthodontists. Download it at http://orthobonescrew.com.

2011 熱愛學矯正

張慧男 博士

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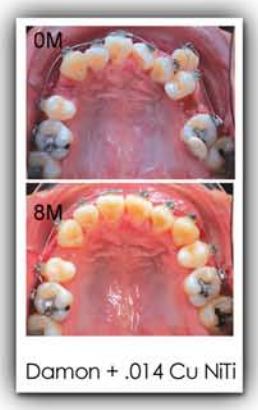
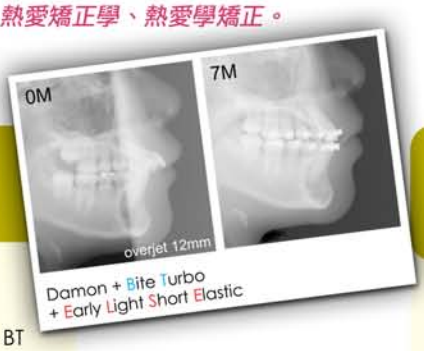
學會開始做矯正需多久?

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 + .014 Cu NiTi



Damon + Bite Turbo
+ Early Light Short Elastic

Damon矯正課程

【課程】9:00 - 12:00
【實習】另外安排

使用最新一代矯正器 Damon Q 進行課程，歡迎舊生報名參加。

	台北 (二)	高雄 (四)	LECTURE	LAB
1	5/24	5/26	理想入門病例 + Damon Q 黏著	Bonding (Damon Q) + BT
2	5/31	6/2	快速矯正療程四部曲	Ceph + Photo
3	6/7	6/16	簡捷有效的錨定系統	Damon + OrthoBoneScrew I
4	6/21	6/23	不拔牙與拔牙分析	Damon + OrthoBoneScrew II
5	6/28	7/14	Damon 診斷流程及微調	Finish Bending
6	7/19	7/21	完工檢測及報告示範	Fixed Retainer (FR)
7	7/26	8/4	維持及復發；病例示範	Presentation Demo
8	8/2	8/18	矯正力學及診斷分析 (1)	DDX + Case Reports I
9	8/23	9/1	軟硬組織及診斷分析 (2)	DDX + Case Reports II
10	8/30	9/8	兒童矯正及診斷分析 (3)	DDX + Case Reports III
11	9/6	9/15	成人矯正及診斷分析 (4)	DDX + Case Reports IV

International workshop

Keynote & managment
OrthoBoneScrew & Damon

A班 5/10~12
B 班 8/9~11
C班 11/15~17

矯正植體課程

【課程】 9:00 - 12:00
【實習】13:30 - 20:00

矯正植體的操作時機、植法與實習、個案討論、臨床跟診及實作示範。

新竹(五) 9/16 (含午、晚餐)

矯正進階課程

【課程】14:00 - 17:00

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

	高雄 (四)	Paper reviews	Topics & Case Demo
1	5/26	Bracket placement & workshop	Crowding: Ext. vs. Non-ext.
2	6/2	Impacted canines	(U) Impacted Teeth: Ant. vs. Post.
3	6/16	Canine Substitution	(L) Impacted Teeth: Ant. vs. Post.
4	6/23	DI & CRE Workshop (1)	Missing: Ant. vs. Post.
5	7/14	DI & CRE Workshop (2)	Crossbite: Ant. vs. Post.
6	7/21	Anterior Esthetics	Deep Bite vs. Open Bite
7	8/4	Excellence in Finishing (occlusion)	Low vs. High Angle & Gummy Smile
8	8/18	Excellence in Finishing (esthetics & perio)	Root Resorption & Relapse
9	9/1	Ortho-Perio-Restore connection	Perio-Ortho
10	9/8	Adjunct to perio	Implant-Ortho
11	9/15	Unhappy patient	IDT

助理訓練課程

【課程】10:00 - 14:30
【實習】15:00 - 20:00

每梯次共兩堂課程與技術操作，內含照相技術、Morph 與公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 (含午、晚餐)

矯正精修課程

【課程】9:00 - 12:00

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

新竹 (二) 精修II 1/18 2/15 3/22
新竹 (二) 精修III 4/19 5/17 6/14 7/12 8/16 9/20 10/18 11/29 12/20 2/14/12' 3/13

課 程 資 訊

上課地點

【台北】
恒毅資訊中心 畢卡索廳
/ 台北市復興北路99號12F
（捷運南京東路站旁）

【新竹】
金牛頓藝術科技公司
/ 新竹市建中一路25號2F

【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
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＊每次上課請依最新一期NTO公告為主

My Love Affair with Orthodontics & Implantology

As publisher of NTO, I am delighted to give a brief account of my Ortho-Implant learning in the past few years. I was lucky enough to be a student of Dr. Roberts' twenty years ago and had the privilege to witness his pioneer work of using implants as orthodontic anchorage. Since then Dr. Roberts' concept has been widely adopted for the last two decades especially when the Korea group redesigned orthodontic implants. The 2nd WIOC held in Taipei two weeks ago was the best demonstration so far for the contemporary development in this field.

The transition from orthodontic implants to dental implants is certainly a huge jump in terms of knowledge and clinical application. However, as dentists are facing more and more complex adult cases, it will soon be the new imperative to master orthodontic-implant combined treatment for us. Again, I was lucky enough to learn from two of the best experts and teachers in this field, Dr. Kwang Bum Park and Dr. Homa Zadeh. With their excellent coaching I have been able to apply their implant surgical techniques, such as VISTA, lateral window and bone grafting, to my surgery of impacted cuspids.

I have certainly come a long way from my days of innocence and ignorance before appreciating how to combine implant treatment with my orthodontic practice. There are many more miles ahead before I can master the surgery techniques and concepts that I have learned from these two giants. So far it has been a very rewarding journey. In my view the only way to reach perfection is through hard work, but hard work alone is not enough. One needs to have a little "flair" for techniques. I find interests, curiosity and constant study are essential ingredients of the recipe of success. If you want to try it, you must be able to stand the heat in the kitchen, which is rigorous years of a lonely pursuit. The pursuit may not be profitable in a material sense, but definitely so spiritually and intellectually. Nothing can beat it.

Keep learning and enjoy it.

Chris HN Chang, DDS, PhD, Publisher

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Consultant
Dr. Tom Pitts

Consultant
Dr. Kwang Bum Park

Consultant
Dr. Frederick J. Regennitter

Consultant
Dr. Larry White

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Rojas-Vizcaya

Consultant
Dr. Homa Zadeh

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Dr. Frank Chang, Consultant
Dr. Johnny Liao, Consultant
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All about TADs: Review of 2nd WIOC

Introduction

The author tries to review most of the 46 lectures in the 2nd WIOC (World Implant Orthodontic Conference). WO-18 represents the 18th lecture in 2nd WIOC (as in Table 4). Some lectures were not commented because the author didn't attend the lecture.

WO-14 Eugene Roberts used ISPs (Osseointergrated Implant-Supported Prostheses) to treat a young patient with multiple missing teeth. ISPs were placed earlier than traditional thinking. This difficult case was treated successfully. For more detailed review please refer to Sabrina's article in this issue of NTO.

WO-29 Johnny Joung-Lin Liaw presented amazing results of very difficult high angle protrusion cases. His talk really impressed all of the participants.

WO-31 James Cheng-Yi Lin used implant anchorage to treat long face partially edentulous patients. This presentation opened up the eyes of the audience with fantastic finishing of very difficult patients with mutilated dentition.

WO-46 Chris HN Chang's excellent keynote presentation on tough impacted teeth was the best presentation in the whole 2nd WIOC. Chang beautifully presented on how to deliver a good speech. Also it was the only lecture on how to apply TADs on severely impacted teeth.

Meeting	Place	Time
3rd AIOC, 17th TAO	Taipei, Taiwan	2004-12-4~6
6th AIOC, 20th TAO	Taichung, Taiwan	2007-12-14~16
7th AIOC, 1st WIOC	Seoul, Korea	2008-09-27~28
7th IOC	Sydney, Australia	2010-02-6~9
2nd WIOC, 22nd TAO	Taipei, Taiwan	2010-12-12~13

Table 1: Implant Orthodontic Meeting in past 6 years

WO-48 Eric Jein-Wein Liou's research papers about TADs were widely quoted in this meeting. Fortunately TAO has Eric Liou and James Lin, who published so many TADs articles. Compared to Taiwan's TADs publications and with our neighboring countries, we are far behind Korea and Japan. Luckily we have Eric and James Liou who presented on management of lower 3 incisors by using orthodontic mini-screws. The author didn't see any special use of mini-screws in his cases. Some of the cases presented would be better if treated in an inter-disciplinary approach.

If the speakers have published on related topics, the author try to make reference to them in this review. For further research, please refer to the reference section.

TAO and implant orthodontic meeting (Table 1)

On March 13, 2002, as the president of TAO (Taiwan Association of Orthodontists), I invited Junji Sugawara to give an one day lecture in Taipei. Sugawara proposed to organize a conference which became the future Asian Implant Orthodontic Conference (AIOC). On September 9, 2002, Young Chel Park organized the 1st AIOC. Since then Korea, Japan and Taiwan start to hold the AIOC in turns annually. The 3rd AIOC, was held in Taipei, Taiwan. Major speakers from Taiwan included Eric Liou and James Lin in that meeting. By organizing this AIOC, Taiwanese orthodontists gained much understanding on this subject in a short period. So when it came to the 6th AIOC in Taichung,

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

Taiwan, the development of Implant Orthodontics in Taiwan has improved much since.

The 1st WIOC (World Implant Orthodontic Conference) was started by Young Chel Park again in Seoul, Korea on September 27 ~ 28, 2008. Though the name was world IOC, actually only 300 participants attended the event. The average attendance of AIOC in Japan and Korea, ranged from 200 to 250 participants. The 3rd and 6th AIOC organized by TAO, the number of participants almost doubled to 500 to 600 (Table 1).

Korea was the first to invent min-screws, after Sugawara's mini-plates. Currently there are many different types of TADs in the market. For example, one of the earliest Korean TADs was Micro Implant Anchorage (MIA). Since MIA was amongst the 1st TADs group, they not only engage in the manufacture and sales of the screw but also are actively involved in publishing and sponsoring many famous speakers, such as Jae-Hyun Sung, Hee-Moon Kyung, Seong-Min Bae and Hyo-Sang Park. The MIA is a very big group and host their own annual meeting. Perhaps this is the main reason that in Korea AIOC and 1st WIOC, the participants seldom exceeded 300.

We should give the biggest credit to Junji Sugawara for the success of the AIOC and WIOC. Because of his famous mini-plate clinical application, the whole world has noticed the importance of TADs. But in Japan, according Chi-Wen Chen's observation, only mini-plates can be legally placed by oral surgeons. So far min-screws have yet to be officially approved. That's why there were not many lectures about TADs in the Japanese orthodontic conferences. As such, mini-screws are not as popular in Japan as in Korea and Taiwan. Furthermore, most of of the AIOC organized by Japan were on a small scale, with 200 to 300 participants.

In Taiwan the development of TADs is different from Korea and Japan. Although we are not the earliest mini-screws and mini-plates developers, we learned very hard and caught up very quickly. We started out as beginners in the 3rd AIOC, and became more matured in the 7th AIOC, and have grown to fully competent in the 2nd WIOC. In this meeting there were 941 participants (Table 2). Indeed it was one of the largest international implant orthodontic conferences. We

Country	Free	Paid	Total
Taiwan	96	450	546
Foreign	83	312	395
Japan	20	50	70
Philippines	3	62	65
Thailand	3	46	49
Hong Kong	1	33	34
Korea	15	14	29
USA	9	14	23
Malaysia	4	17	21
Indonesia	3	17	20
Singapore	4	14	18
Brazil	2	13	15
Australia	1	6	7
Germany	2	5	7

Table 2: Participants of 2nd WIOC

48 speakers From 16 countries
2 absent:
WO-26 Aldo Giancotti (Italy), WO-40 Shigeru Murai (Japan)

have to thank James Cheng-Yi Lin for his earliest design of LOMAS screw, and Eric Jein-Wein Liou for publishing many classical TADs related articles. Also I would also to acknowledge Ming-Guey Tseng and Johnny Joung-Lin Liaw's effort to make the clinical application of mini-screws popular in Taiwan.

Eric Liou and James Lin had lectured quite often in Japan and Korea and the Philippines. The author has lectured many times in Hong Kong, Singapore, the Philippines, Thailand, Malaysia, Indonesia. Johnny Liaw has lectured at the Philippines with Chris HN Chang. Chris Chang also lectured at Malaysia, Indonesia, Thailand recently. Maybe this is one of the main reasons that the 2nd WIOC have attracted more than 250 participants from Asian countries.

There were only around 29 participants from Korea. Since min-screws were originally developed in Korea, some Korean orthodontists might have less interest in attending meetings overseas. Though Taiwan organized the 2nd WIOC, there were only 8 local speakers and 11 from Japan (Table 3). This is a very odd situation. Unfortunately, there was one Japanese speaker, Shigeru Murai, who suddenly cancelled his lecture. TAO should reconsider their arrangement of speakers. I felt very unfortunate about this when many good TADs speakers in Taiwan couldn't speak at the 2nd WIOC.

Improper chairperson and absent speakers

There were 48 lectures held in two separate rooms, located on the opposite side of the convention center. Many participants were tired running between the two rooms to listen the best lecture. It would be better next time if there was a shortcut between the two rooms.

When most participants treasure the opportunity to attend the meeting, two speakers cancelled their lecture at the last minute. The author had been to many international conferences and this was the first time in my experience. The two speakers were WO-26 Aldo Giancotti from Italy and WO-40 Shigeru Murai from Japan. The organizer was informed the cancellation was due to visa problems. However, the schedule has long been arranged and the oversight was inexcusable. Such action was very disrespectful to the audiences and the organizing committee (Table 4).

Another unfortunate incident was the delay of the chairperson. WO-3 Dror Aizenbud was from Israel. His session was chaired by George Anka and WO-02 Birte Melsen. Melsen was late for about 15 minutes and Anka had to start the session. Dror Aizenbud presented for about 14

Country	#	Country	#
Japan	11	Denmark	1
Korea	8	Israel	1
Taiwan	8	Germany	1
USA	5	India	1
Italy	3	Australia	1
Brazil	2	philippines	1
Singapore	2	Portugal	1
Thailand	1	Malaysia	1

Table 3: Invited Speakers of 2nd WIOC

TADs (Temporary Anchorage Devices)	16	Mini-plate	1
Mini-screw	12	C-implant	1
Mini-implant	7	Mini-screw implant	1
Micro-implant (MIA = Micro Implant Anchorage)	5	Implant orthodontics	1
SAS =Skeletal Anchorage System	3	Implant Anchor	1
TSAD (Temporary Skeletal Anchorage Devices)	1	Skeletal Anchorage Device	1
OBS = Ortho Bone Screw	1	MIS = Micro Implant Screw	1
Mini Implant System	1	Orthodontic Mini-Implants	1

Table 5: Summary of Terminology

minutes and was stopped by Melsen when it was the time according to the official schedule. Dror Aizenbud could only finish about half of his lecture and Melsen didn't apologize for her delay. As chairperson, she committed a serious mistake.

Terminology of implant orthodontics (Table 5)

The author surveyed the program of the 2nd WIOC and found 16 terms referring to orthodontic implants in all 48 abstracts. It's quite confusing. Luckily TADs (Temporary Anchorage Devices) was the most often used one. As it was used more frequently, in the 2004 meeting of the American Association of Orthodontists[1] it was agreed to standardized the lexicon with the term TADs to signify mini-screw devices used specifically for orthodontic tooth movement.

Actually I like Chris Chang's proposition of OrthoBoneScrew (OBS) because it's very straight forward and meaningful. Considering lingual holding arch and headgear can both be used as temporary anchorage devices, TADs may be not be most fit but probably most commonly understood. So for better international communication, we still use TADs.

About osseointegration and immediate loading

In this meeting most of the min-screws are made of titanium alloy, except Bioray and OrthoBoneScrew offering stainless steel screws. There was little emphasis on osseointegration. It means most of the min-screws can be loaded immediately or shortly after. There is one special exception, which is C-implant (Fig. 1). The C-implant was developed by Kyu-Rhim Chung[2, 3, 4]. It's a sandblasted,

#	Speaker	#	Speaker	#	Speaker	#	Speaker
1	Chih-Peng Su	13	Won Moon (USA)	25	Noriaki Yoshida (Japan)	37	Yasoo Watanabe (Japan)
2	Birte Melsen (Denmark)	14	W. Eugene Roberts (USA)	26		38	Cesare Luzi (Italy)
3	Dror Aizenbud (Israel)	15	Jorge Faber (Brazil)	27	Dott. B. Giuliano Maino (Italy)	39	Hideo Suzuki (Brazil)
4	Somchai Manopatanakul (Thailand)	16	Joong-Ki Lim (Korea)	28	Hee-Moon Kyung (Korea)	40	
5	Jane Chung-Chen Yao (Taiwan)	17	John Jin-Jong Lin (Taiwan)	29	Johnny Joung-Lin Liaw (Taiwan)	41	Korrodi Ritto (Portugal)
6	Chung How Kau (USA)	18	Cheol-Ho Paik (Korea)	30	Young-Chel Park (Korea)	42	Teruko Takano-Yamamoto (Japan)
7	Peter Wing Hong Ngan (USA)	19	Kelvin Foong (Singapore)	31	James Cheng-Yi Lin (Taiwan)	43	Masato Kaku (Japan)
8	M. Ali Darendeliler (Australia)	20	Benedict Wilmes (Germany)	32	Kwangchul Choy (Korea)	44	Eung-Kwon Pae (USA)
9	Hsin-Chung Cheng (Taiwan)	21	Seong-Hun Kim (Korea)	33	Junji Ohtani (Japan)	45	Kazuo Tanne (Japan)
10	Satoshi Kozato (Japan)	22	Om P Kharbanda (India)	34	Tomio Ikegami (Japan)	46	Chris HN Chang (Taiwan)
11	Loh Kai Woh (Singapore)	23	Dennis C. Lim (Philippine)	35	Shalene Kereshanan (Malaysia)	47	Kee-Joon Lee (Korea)
12	Junji Sugawara (Japan)	24	Jang Yeol Lee (Korea)	36	Shingo Kuroda (Japan)	48	Eric Jein-Wein Liou (Taiwan)

Table 4: Invited Speakers of 2nd WIOC, cross-marks - absent speakers

large-grit, acid-etched titanium screw. Chung strongly emphasized there is osseointegration of the C-implant. The problem is if osseointegration did happen, it would be either very difficult to remove or fracture. But Cung stressed it could be removed easily. So it's not convincing that there is much osseointegration.

Liou's study[5] showed that mini-screws are not absolutely stable. Poggio et al[6] recommend for a inter-

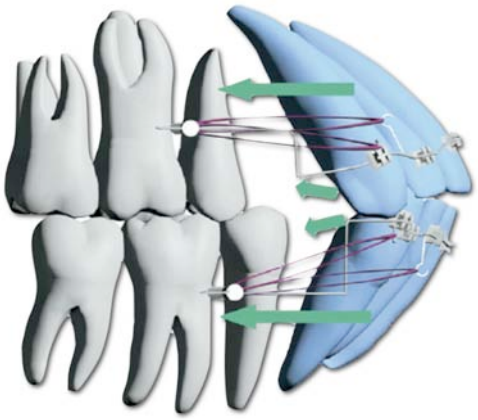


Fig. 1: C-Implant, developed by Kyu-Rhim Chung.

radicular space[7] about 3.5 mm (table 6). The largest safe screw should be 1.2 - 1.5 mm in diameter. But the size of the C-implant is 1.8 mm which implies the chance of hitting the root is very high. Unless C-implant change the implant site to the non inter-radicualr area., the chance of hitting the root will be high.

To retract the anterior 6 teeth in bimaxillary protrusion (Fig. 1), using the C-implant in front of the 1st molar, it needs:

(1) good clinical skill for wire bending.

(2) The 1st and 2nd molaras are well aligned in the position.

Due to its unorthodox approach, it's difficult to receive much popularity.

About Implant placement torque (IPT)

WO-28 Hee-Moon Kyung quoted Motoyoshi's article[8] that IPT should be within 5 - 10 NCm.

WO-33 Junji Ohtani used Dual Top Anchor screws which are 1.6 mm in diameter and 6 mm in length. He recommended that we should control twisting torque during screw implantation to be under 15 NCm in the maxilla and 18 NCm in the mandible. He emphasized one can increase the success rate of implantation by using a torque control driver.

Interestingly, at our study group meeting on Jan 14 2011, when I asked the audience, who uses the torque control driver in the office? Out of the 30 experienced orthodontists, non of them use the so-called torque control driver.

Kyung said most MIA users use 1.2 ~ 1.3 mm MIA screw[9, 10]. And Ohtani uses 1.6 mm Dual Top Anchor

Interradicular Distance (mm)

2009 Park's Maxillary buccal			
	IR5	IR7	IR9
7-6	1.63	1.67	2.06
6-5	2.47	2.76	3.33
5-4	2.12	2.32	2.47
4-3	2.22	2.45	2.69

2009 Park's Mandibualr buccal			
	IR5	IR7	IR9
7-6	2.85	3.22	3.79
6-5	2.77	3.13	3.58
5-4	2.84	3.35	3.81
4-3	2.13	3.41	2.68

2006 Poggio's Maxillary Buccal				
	2 mm	5 mm	8 mm	11 mm
7-6	2.5	2.3	2.5	0.8
6-5	2.7	2.9	3.0	1.6

2006 Poggio's Mandibular Buccal				
	2 mm	5 mm	8 mm	11 mm
7-6	3.2	3.8	3.5	4.7
6-5	3	2.9	3.1	3.6

Table 6: Inter-radicular Distance (mm)

screws. In Taiwan most of the orthodontist use 2.0 mm stainless steel or Titanium alloy screws, according the sales record of a local major TADs company. Probably because in Taiwan we use larger size screws, especially stainless steel ones, torque is not an issue at all. Hopefully, someday there can be a good research about the critical size and material that are most relevant to torque control.

Jolley et al[11] compared 5 kinds of bone screws examining the peak torque value at fracture. The result shows that as the core diameter increases, the value also rises. It takes only 23.26 NCM to fracture a 1 mm core diameter screw, but up to 78.24 NCM to fracture a 1.5 mm core diameter screw. Although there is no data yet for Bioray and OrthoBoneScrew stainless steel bone screws, due to its large 2.0 mm diameter and good ductility, no fracture has ever been reported (Table 7).

Can TADs replace headgear?

WO-28 Hee-Moon Kyung quoted Mitani's slide (Table 8) that face bow caused tissue trauma and showed an image of the ugly mean girl, Darla (Fig. 2) wearing headgear (from the famous movie Finding Nemo). His point was to emphasize that no headgear is needed now that we have with TADs.

(survey done on 4000 patients) by AAO, USA

Injury	Counts
Intraoral	133
Lips, Chin & Nares	31
Upper Face except eye	5
Eyes, Eyelids, Nasal bridge	41
Permanent impairment	7
Total Blindness	5
	216

Courtesy of Mitani

Table 8: Face Bow; Accidents

Fig. 2: The ugly mean girl Darla wearing headgear from the famous movie Finding Nemo.

LOMAS	Quattro	Dual-Top	TOMAS	Orlus	Ortho Implant	A1 Screw
Fracture	Yes	Yes	Yes	Yes	No	No
Mean	23.26	29.72	32.44	58.33	78.24	Not available
Diameter	1.5 mm	1.6 mm	1.6 mm	1.6 mm	1.8 mm	2.0 mm
Core	1 mm	1 mm	1.2 mm	1.2 mm	1.5 mm	1.3 mm
Length	7 mm	6 mm	8 mm	7 mm	6 mm	12 mm
Materials	Ti6Al4V	Ti6Al4V	PureTi	Ti6Al4V	Ti6Al4V	SS
Company	Mondeal Germany	Jeil Korea	Dentaurum Germany	Ortholution Korea	Imtec America	Bioray Taiwan

Table 7: Peak Torque Value at Fracture (NCM)

Mitani's data was incomplete, without proper references to the source and the particular study it was based on. In fact, it's the "J" hook[12, 13] which causes more facial injury, not the face bow.

For young patients aging from 10 to 12 years old, our Class II cases are quiet different from our Caucasian counterparts. Mostly it is because ours tend to exhibit some anterior teeth protrusion[14]. During mixed dentition if we can instruct the patient to wear a headgear, upper molars can be distalized, and anterior spacing can be created, both of which can generate a more favorable condition for later fixed appliance treatment. During the age of 10 to 12, usually the success rate for mini-screws is low due to lower bone density. So it's neither ideal and nor necessary to place screws on young Class II patients prematurely. While waiting for the permanent dentition, using a headgear can create distalization of upper molars and faciliate the 2nd stage treatment (Fig. 3). It's not accurate to suggest stop using headgear for Taiwanese or oriental Class II patients with protruded upper anterior teeth.

More screw failure in the mandible?

WO-28 Hee-Moon Kyung emphasized more mini-screw failure in the mandible (Table 9). WO-22 Om P Kharbanda who uses 1.4 - 1.5 MIA screw from Dentos Co. Quoted 8 articles. Mostly showed higher failure rate in the mandible (Table 10).

According the author's own clinical experiences, the success rate in the maxila is about 85% and 95% in the mandible. What's the major difference? The author use stainless steel screws of 2 x 12 mm or 14 mm. I think the diameter of the screw and length of the screw makes a big difference.

The buccal shelf of the mandible has the most dense cortical bone in the mouth. The author recommends the following protocols: 1. choosing 2 mm x 12 mm stainless steel screw, 2. placing extra-radicularly (Table 11) and avoiding the roots of mandibular molars, 3. performing proper flap surgery to keep the mini-screw through attached gingiva[15]. The success rate in the mandible is much higher

Fig. 3: A Class II with big overjet. At age 10y7m cervical headgear and lower lingual holding arch (LHA) were used. Headgear helped distalization of upper molars and created upper spacing, both of which makes later treatment much easier. No need to use TADs. LHA helps solve the lower crowding, without further proclination of lower incisors.

than in the maxilla. As Reynder's systematic review[16] of implant orthodontics suggests, "clinical studies on mini-implant placement are still in their infancy."

Since there are many variations in the research methodology, if one does not have a careful research design, a lot of the so-called studies on implant orthodontics are questionable. One should interpret them very carefully.

Screw and root contact is acceptable.

So far most of the mini-screws are still placed inter-radicularly (Table 11). What happens if the mini-screw hits the root during teeth movement? Maino et al[17] found out that when purposely forcing teeth to contact mini-screws, no patients reported discomfort through out the study. After

	Hee-Moon Kyung's comments	John Jin-Jong Lin's comments
1	Less buccal alveolar bone volume?	It's not true, compare with maxillary bone, the mandibular buccal bone cortex is much thicker.
2	Narrow attached gingiva.	Indeed the more posterior molar, the more narrow zone of attached gingiva. But it can be treated by the flap surgery to get wider zone of attached gingiva.
3	More chance of root touch?	Put the mini-screw outside the buccal of mandibular molars, instead of inter-radicularly, so no issue of root touch.
4	More heat during drilling?	Whenever drilling always irrigate with plenty of normal saline, heat will not cause problem.
5	More occlusal force?	Buccal shelf screw mostly can last through the whole treatment session. It means occlusal force is not the issue.

Table 9: Mini-screw failure in mandible

Study		Maxilla %	Mandible %
Miyawaki et al	2003	84.1	83.6
Chen et al	2006	88.2	77.0
Park et al	2006	96.0	86.4
Kuroda et al	2007	89.7	68.3
Moon et al	2008	83.5	84.1
We et al	2009	90.7	87.4
Antoszewska et al	2009	84.7	92.6
Lim et al	2009	86.0	76.1

Most studies report higher success rate in maxilla than the mandible.

Table 10: Recipient Jaw: Maxilla vs Mandible

	Inter-radicualr	Extra-radicualr
Countries	Korea started it 1st, Now popular worldwide	Taiwan started it 1st, Getting popular in South East Asia
Maximal anchorage	Same	Same
Screw size	< 1.5 mm	2.0 mm
Chance of fracture of the screw	Higher	Almost none
Hitting the root	Higher	Low
Insertion torque	Critical	Not critical
Whole arch distalizal	Little and difficult	Much and easy

Table 11: TADs Placement

removal, repair begins through the deposition of cellular cementen.

Kodioglu et al[18] did a similar study and concluded root surfaces that were in contact with mini-screws showed swift repair and almost complete healing within a few weeks after removal of the screw or the orthodontic force.

In the report WO-5 Jane Chung-Chen Yao's animal study showed that despite the contact of root with mini-screws, the wound will heal after force removal. However, Yao et al[19] found out if the screw was in contact with the root, the failure rate will increase.

Kau's CBCT study[20] showed that among the 35 inter-radicular placements of 1.5 x 7 mm TADs, 65.2% were found in contact with the PDL. It means among the TADs placed, 2 out of every 3 screws contacted the PDL. So inter-radicular placement of TADs is quite dangerous.

There are many so-called mini-screw placement guides today. Some even try to use cone beam computer tomography (WO-6 Chung-How Kau, put 3 question marks after CBCT guides), to make the placement guide. However, no practical and precise one is currently available. It suggests whenever we are placing mini-screw inter-radicularly, the chances of the mini-screw hitting the roots are almost unavoidable.

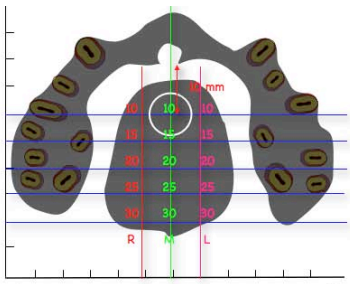
Poggio[6] claimed inter-radicular space was 3.5 mm. So the lagest screw that can be placed in this area should be 1.5 mm in diameter. Screws of smaller size have a higher chance of fracture. The insertion torque is also very critical. The chance of drilling through the root is possible for inter-radicular placement. To avoid the above disadvantages extra radicular placement is advised (Table 11).

WO-11 Kai Woh Loh was the only speaker who used OrthoBoneScrew successfully to treat two difficult cases. He put screws over the extra-radicular infrazygomatic area to distalize the maxillary dentition. It was the only presentation of this conference showing extra-radicular mini-screw placement in the maxilla. Compared with WO-20 Wilmes and WO-27 Maino's distalizing mechanics this design was much easier.

He attended the author's TADs lecture in Malaysia and applied it beautifully to clinically. It's not easy to switch from the popular inter-radicular placement to the new extra-radicular placement. Loh successfully made the switch. I think this popular Taiwanese method will be applied more and more after its major advantages are better known in the field.

Mini-screws over hard palate

Park's study[7] showed the mesiodistal inter-radicular space of maxillary 2nd premolar, 1st molar and 2nd molar on the palatal side, is larger than the space on the buccal side. The cortical bone thickness(mm) on both sides is about the same (Fig. 4). Kang's study[21] showed the thickest cortical



2009 Park's Palatal bone thickness

	R10	R15	R20	R25	R30
PB	4.32	3.23	2.76	2.3	1.42
	M10	M15	M20	M25	M30
PB	6.3	6.19	7.04	6.99	6.09

2006 Poggio's Maxillary - Palatal - Mesiodistal

	2 mm	5 mm	8 mm	11 mm
7-6	3.4	3.9	3.1	1
6-5	4.5	5.5	4.6	1.9

2006 Poggio's Maxillary - Buccal - Mesiodistal

	2 mm	5 mm	8 mm	11 mm
7-6	2.5	2.3	2.5	0.8
6-5	2.7	2.9	3	1.6

2009 Park's Palatal Cortical bone thickness

	7-6
CB5	1.18
CB7	1.22
CB9	1.23

2009 Park's Maxillary buccal cortical bone thickness

	7-6	6-5	5-4	4-3
CB5	1.18	1.21	1.22	1.22
CB7	1.26	1.26	1.25	1.24
CB9	1.31	1.3	1.28	1.27

2009 Park's Mandibular buccal cortical bone thickness

	7-6	6-5	5-4	4-3
CB5	1.18	1.21	1.22	1.22
CB7	1.26	1.26	1.25	1.24
CB9	1.31	1.3	1.28	1.27

Fig. 4: The cortical bone thickness of the whole hard palate is thick enough for placing TADs.

bone is in adults' midpalatal suture, about 6 - 7 mm. It gets thinner from anterior to posterior, from center to lateral (Fig. 5).

Still the thickness around maxillary posterior teeth on the palatal side is about the same as the buccal area. It means one can place mini-screws over almost the whole hard palate, except unossified midpalatal sutures, incisive canal, greater palatine vessels.

WO-20 Benedict Wilmes[22] emphasized the usefulness of using the hard palate as the mini-screw placement site. So he developed all kinds of palatal appliances. For example BENEslider (Fig. 6), which includes many different kinds of accessories, and claims they can not only mesialize but also distalize the maxillary dentition.

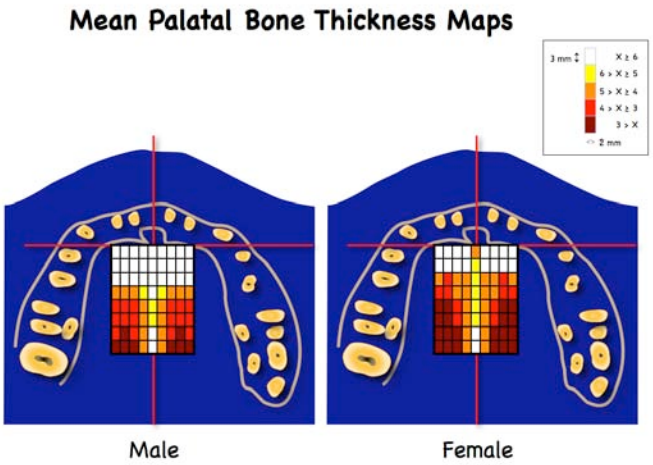


Fig. 5: In the midpalate region has the densest cortical bone thickness, from anterior to posterior and from center to lateral the cortical bone get thinner.

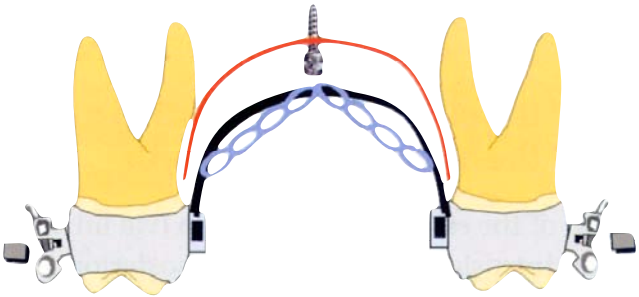


Fig. 7: Paik's slow Le Fort I TPA.

It sounds like a very good German mechanic product, but it's too complicated in practice. Also there were not enough good clinical cases to demonstrate the efficiency and major advantages of this system.

So far in most of the clinical applications I have seen in case reports and my own experiences, the author recommends the following protocols:

(1) For maxillary molar intrusion, the lingual cusp of the upper 2nd molar may hang down, if the screw was only placed on the palatal side. For better intrusion one should place screws buccal-lingually.

(2) Paik[23] put one screw in the midpalatal region between two upper 1st molars to facilitate the intrusion of molars by the TPA (Fig. 7).

(3) The author[15] modified Paik's method, referred as the modified slow Le Fort I. I inserted 2 x 7 mm screws about 1 mm beside the midpalatal suture

Fig. 6: Wilmes's complicate BENEslider, also WO-27 Maino has similar palatal, power plates with spider link.

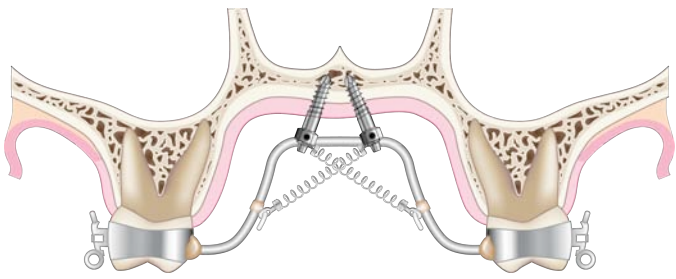


Fig. 8: Lin's slow Le Fort I TPA.

directly using a self-drilling method(Fig. 8). One can predictably intrude the maxillary posterior molar segments efficiently to correct anterior open bite, and a retrognathic mandible. Since 2 mm stainless steel screw is very sharp and strong, it is self-drilling without using the contra-angle hand-piece for pilot drill. It is very direct and easy to use.

Mini-plates vs Mini-screws

In 2nd WIOC, there were only 6 speakers using mini-plates, WO-8 M. Ali Darendeliler (only one case), WO-12 Junji Sugawara (all cases), WO-15 Jorge Faber, WO-20 Benedict Wilmes, WO-21 Seong Hun Kim (only one case use so called C-tube mini-plate), WO-36 Shingo Kuroda (only one case), WO-37 Yasoo Watanabe (most cases). Though most of the cases were treated by mini-plates, the results were amazingly good. However, most of the cases can be treated with mini-screws now.

To use mini-plates, most orthodontists have to refer to oral surgeons or periodontists to perform the procedures. The costs are much higher and orthodontists have to communicate well on the location of TADs placement. The surgical flap required is usually quite big. The post surgery swelling and pain are unavoidable. The worst part is, after orthodontic treatment is finished, patients have to suffer another major surgery to have the mini-plate removed (Table 12).

	Mini-sccrew	Mini-plate
Belong	TADs	TADs
Screw	Only one	2 - 3
Flap surgery	Much less	Every case needed
Swelling and pain	Less	More
Removal	Easy	Same as original flap surgery
Operator	Mostly orthodontist can do	Most has to refer to specialist
Fee	Economic	Much higher
Operation time	Short	Long
Popularity	More	Less

Table 12: Mini-screw vs Mini-plate

MARPE

Mini-screw assisted RPE (Rapid Palatal Expansion)

WO-13 Won Moon, WO-20 Benedict Wilmes[22] (Fig. 9), WO-47 Kee-Joon Lee[24]. They all used the MARPE.

The Damon system[25] is famous for generating the RPE effect without using the RPE appliance. Damon himself showed so many difficult narrow maxillary arches expanded by using the Damon system only. It will be good to see the CBCT studies of Damon's wire expansion only, or RPE appliances only, to make a true comparison of the two ways of RPE.

The limitation and side effects of RPE is the buccal plate. Usually after expansion the buccal plate will be thinner, even dehiscence can happen[26, 27]. The author doesn't think using the mini-screw to fix both side palate is helpful for expansion, because the thickness of buccal plate is

Fig. 9: WO-20 Benedict Wilmes's BENEFIT Hyprid Hyrax. Wilmes uses only 2 miniscrews in the front of regular RPE, but Won Moon & Kee-Joon Lee use 4 miniscrews on the RPE.

limited. Orthopedic-wise, using the MARPE's hook for maxillary arch protraction sounds like a much better idea. It can do much better bony protraction of the maxilla.

Orthopedic protraction of maxilla seems very brilliant idea by using the MARPE, but there is a limitation. After so call early orthopedic protraction of the maxilla, usually for patient around age 12 - 14. During this period a lot of late mandibular growth is still expected. So far no orthopedic appliance can stop the late mandibular growth. So relapse of the severe CIII treatment by this MARPE will happen. It'll be good to see the long term comparison of the RPE and MARPE. The author doesn't think palatal expansion is a wise option; there will be much difference between the two methods.

Unbelievable Micro Implant Pearl

WO-41 Korrodi Ritto's topic was "The micro implant pearl concept"[28]. At the beginning, the author thought he's going to present some technical pearls (key points) on micro implants. Surprisingly he strongly believes most of the anterior open bite and Class III's important etiology is tongue thrust. So in all these kind of cases, he put the real micro implant pearl during treatment and after treatment, hopefully to train the tongue to prevent relapse due to tongue thrust (Fig. 10).

Ritto's way of preventing tongue thrust is far beyond our imagination. The author has treated thousands of Class III cases, and never do any tongue training at all. Those cases still stay quite stable.

Ritto even performed extraction on an Pseudo CIII case, which the author doesn't think it is needed. Ritto not only did the extraction treatment, but also put an micro implant pearl on patients' anterior palate in the hope of changing patients' bad tongue habit. All of these procedures are deemed unnecessary by the author (Fig. 11, 12).

Ikegami's HOTS (Hybrid Orthodontic Treatment System)

WO-34 Tomio Ikegami[29] used micro implant as skeletal anchorage in premolar extraction case, retracted the canines first, then four anterior teeth, using the 468 DISCOpender long power arm and finished the case with MEAW. With mini-screw anchorage, the author doesn't think we need to retract canine first. We can retract the whole anterior six teeth as one segment, and there is no need to use complicated wire bending (MEAW) for finishing.

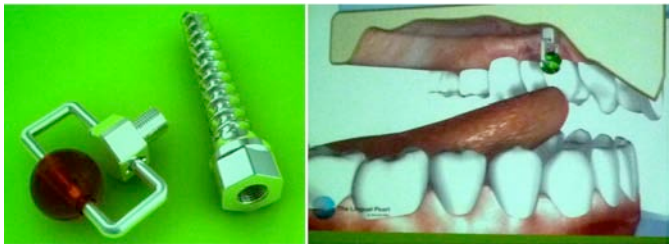


Fig. 10: WO-41 Korrodi Ritto's Micro-Implant Pearl.

Fig. 11: This CIII case remains quite stable after treatment, without special tongue training.

Fig. 12: This CIII open bite case remains quite stable after treatment, without special tongue training.

Maybe due to his title as the president of Japanese MEAW Association, he has to use the MEAW. As I have emphasized many times, Damon has MEAW effect, especially good for correcting Class III malocclusion. Luckily we don't have to bend complicated MEAW arch to correct difficult CIII anymore[15].

Ikegami's design of 468 DISCOpender (Fig. 13) is a good idea. While using TADs for retraction, this long power arm can create better bodily translation of anterior teeth, with less extrusion side effect.

WO-25 Noriaki Yoshida explained the advantages of using longer power arm to get more bodily retraction of anterior segments by using DISCOpender (Fig. 13, 14). According to his study, he said on .018 slot system, by using the longer power arm, can get good torque control on the retraction with longer power arm, but not in the .022 slot system (Table 13).

On premolar extraction cases, for patients with normal overbite, retraction of upper anteriors with longer power arm can prevent extrusion of anterior teeth. In the case of open bite, regular short hook will be fine. The extrusion of the anterior while retraction will help the bite closure. For deep bite and gummy smile patients, auxiliary mini-screws over the apical region of anterior teeth to intrude the anterior teeth is indicated.

WO-07 Peter Ngan's finite element analysis[30] showed, by increasing hook length, the force will apply closer to the center of resistance, which can reduce normal stresses in PDL and create a more uniform stress profile. All of these promote better tooth translation.

	Torque control of anterior teeth	Prevention of bowing effect
.018" slot	Yes	Yes
.022" slot	No	Yes

Table 13: Is power arm effective?

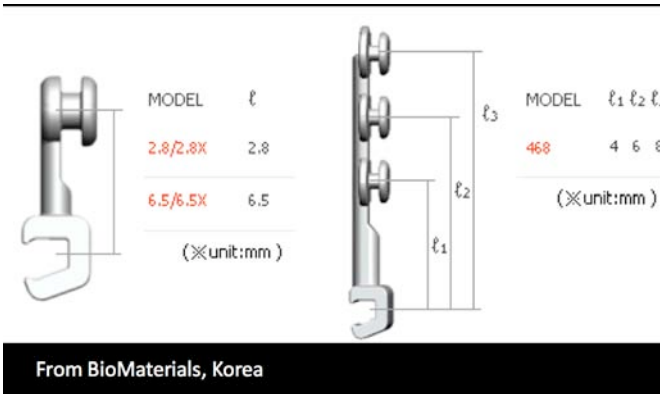


Fig. 13: WO-34 Tomio Ikegami's 468 DISCOpender from BioMaterials, Korea.

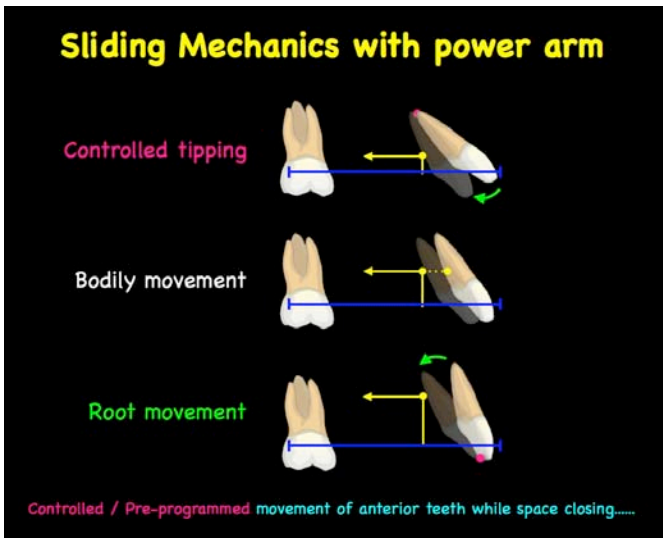


Fig. 14

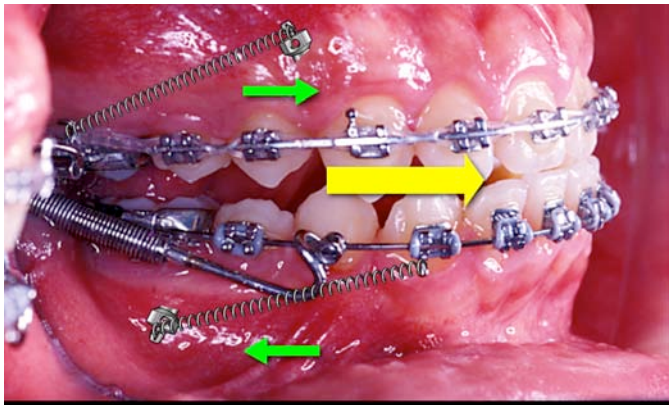


Fig. 15

Orthopedic correction with TADs

(A) Class II treatment

WO-13 Won Moon used mini-screws on a Class II case treated with Forsus like appliance (Fig. 15). He used mini-screw between upper canine and 1st premolar to hold the upper first molar to prevent unwanted distalization of upper dentition and mini-screw between lower 2nd premolar and molar to prevent flaring of the lower incisors. By the adjunct of using these mini-screws to prevent unwanted dental movement, it'll maximize the orthopedic correction to get more mandibular growth. It's an excellent idea to get better orthopedic change without dental side effects.

(B) Class III treatment with MARPE (Mini-screw Assisted RPE)

WO-13 Won Moon is currently the clinical director of UCLA. The past chairman, Patrick Turley had established a classic traditional treatment of Class III with RPE and face mask protraction of the maxilla. Unfortunately like the Turley's Chinese female case in these articles[31, 32], this kind of so-called orthopedic correction was not really orthopedic correction.

In the presentation following the same protocol, Won Moon presented a Class III case turning into a bimaxillary protrusion with MARPE and then used 4 more mini-screws to retract the protruded anterior dentition to a more upright position. To the author it's kind of round trip treatment. If the author were to treat this Class III case, I would only use lingual holding arch to maintain the precious large E-space on the lower arch. After permanent dentition, there would be plenty of E-space for closing and correcting the anterior crossbite. Also I would improve the lower lip profile by retracting the lower anterior teeth back.

(C) Class III treatment with mini-plates on the infrazygomatic crest

WO-07 Peter Ngan quoted a severe Class III asymmetry case treated with mini-plates[33] in the infrazygomatic crest. The documentation was incomplete in this case. After the treatment, the case still showed severe asymmetry. It was a CI relationship on one side and a big Class III on the other side. In the future the asymmetric growth will create relapse.

The problem of the so-called orthopedic correction of Class III with TADs is that many mild Class III can be treated easily with Damon system (Fig. 16) or by using the E-space. For the severe ones, in fact, there is no good appliance for treatment, because of their limited effect on late mandibular growth control.

(D) Treatment of Class III with Benefit Hybrid Hyrax and Mentoplate

WO-20 Benedict Wilmes shows two cases treated with the same protocol. But no long term follow up on these two cases was available in the presentation. For the severe Class III asymmetry cases, the author thinks that the continuous mandibular growth will cause the relapse. Another severe crowding and crossbite case can be treated with the Damon system easily (Fig. 16).

The key issue here is the correct diagnosis on the severity of the case, Is there any other less agressive treatment approach available? To the author the mentoplate

Fig. 16

is a very invasive surgical procedure and should only be considered when there is no other option.

(E) Hugo De Clerck's orthopedic correction of Class III

WO-20 Benedict Wilmes quoted Hugo De Clerck's orthopedic traction of Class III[34]. Hugo De Clerck uses two Bollard miniplates in the infrazygomatic crest and the other two Bollard miniplates by the mandibular canines. The patient was instructed to wear Class III elastics directly from the hooks of the mini-plate. Wilmes commented there are four drawbacks of the methods:

(1) Irritation of the soft tissue from Class III elastics.

(2) Mandibular canines have to be erupted.

(3) Loosening of mini-plates.

(4) No opening of the sutures.

So Wilmes changed De Clerck's method. On the upper arch he used Benefit Hybrid Hyrax and Mentoplate on the lower to prevent the above drawbacks.

Originally the organizing committee wanted to invite De Clerck to be one of the speakers. Maybe he is currently one of the most popular speaker about using mini-plate to correct severe Class III, too busy to come to 2nd WIOC. Indeed his Class III orthopedic cases were very impressive. In most of the current international lecture, like 2010 7th IOC at Sydney and AAO at Washington he was the main keynote speaker.

Though he didn't come for 2nd WIOC, the author would like to analyze his published 3 cases[34] to understand what's really about his orthopedic treatment of Class III.

I. Case 1:

This is the only one with functional shift before treatment. We can assume originally the CR (Centric Relation) profile was more orthognathic, but he didn't show CR profile on the article. It's a mild class III with functional shift. Dental treatment alone will be sufficient to correct this case. Enclosing the author's case with functional shift at beginning though CO (Centric Occlusion) profile looks very prognathic, CR profile is orthognathic. She was corrected with simple inclined bite plane (Fig. 17).

II. Case 2:

A very small mesial step, the first molar almost in end on relationship. It's a kind of Class I case with anterior crossbite. Unfortunately it was over-treated to Class II with big overjet, created another malocclusion, by so called orthopedic appliance.

Fig. 17

Fig. 18

III.Case 3:

Indeed this is a severe Class III case, at age 12y7m, the prognathic profile was corrected to orthognathic really beautiful orthopedic correction. Unfortunately at age 15y9m the mandible grew further and the mandible become prognathic again. 2 - 3 more years of late mandibular growth is expected.

Is it worthwhile to put 4 mini-plates in easy cases such as the first two cases? In the severe case there is no way to prevent further late mandibular growth (Fig. 18). Is it worthwhile to perform a major surgery by placing 4 mini-plates on this kind of severe case?

Treatment of Class III with mini-screws

WO-36 Shingo Kuroda introduced 3 ways of correcting Class III with mini-screws:

(1) Placing mini-screws between upper 2nd premolar and 1st molar. Then use the Class III elastics. It requires patient compliance.

(2) Inter-radicular mini-screws between lower 2nd premolar and 1st molar. Due to limited inter-radicular space (2 - 3 mm), the amount of whole lower dentition distalization is limited.

(3) Placing mini-screws in the retromolar area to distalize the whole arch. Since the insertion area is behind the 2nd molar, the force application to the main archwire is rather indirect. Therefore the amount of distalization is limited and screws can only be used for mild Class III correction. WO-16 Joong Ki Lim and WO-18 Cheo Ho Paik also use this method.

WO-36 Shingo Kuroda emphasized molar intrusion should be avoided in Class III treatment. While it is true in most of Class III cases indeed, the author will argue, in some rare special cases, the Class III patient may have a retrognathic profile and open bite. Then the use of molar intrusion will be an excellent indication (Fig. 19A, 19B).

The author prefer use the buccal shelf mini-screw (Fig. 20), since it's outside the lower molar roots, so the amount of lower arch distalization is big, can be used to correct severe Class III.

Fig. 19a

Fig. 19b

WO-35 Shalene Kereshanan did extraction of 2 lower 1st premolars in many Class III patients and ended with lingual dumping of lower incisors due to difficult torque control. Nowadays, by using the buccal shelf mini-screw to distalize the whole lower dentition, the author tried to avoid early extraction treatment in young patients and adult patients. Buccal shelf mini-screw can do the big amount of whole lower arch distalization as long as the patient's profile is acceptable.

Double J Retractor (DJR) + Aligner

WO-4 Somchai Manopatanakul claimed using palatal TADs to retract whole upper anterior segments and combined with aligner is the future trend in esthetic orthodontics.

Indeed in the 1st WIOC at Seoul on Sep 28, 2008, Joo Bo Hoon presented the way of using Double J Retractor[35] and Aligner to treat bimaxillary protrusion patient esthetically.

Chung et al[36, 37] successfully retracted the anterior teeth using a palatal plate and lingual retractor.

Jang et al[34] found that the center of resistance of the six maxillary anterior teeth, retracted by Double J Retractor with palatal mini-screws, was estimated to be 12.2 mm apically from the incisal edge of central incisor (Fig. 21).

Hoon used DJR over the palate to retract the maxillary anterior segment bodily. He showed a bimaxillary protrusion case retracted with DJR in 15 months. He then continued aligning and finishing with Invisalign in 7 months.

For patients with strong esthetic concerns, Joo Bo Hoon combined the use of Double J Retractor with Invisalign as one of the good options during orthodontic treatment.

WO-32 Kwang Chul Choy used FRC (Fiber Reinforced Polymer) to bind all the 6 anterior teeth together and retracted them as in the C-implant Biocreative system. As in the C-implant system, the friction of the free posterior teeth in the buccal segments will be less. The disadvantages of this technique are similar to C-implant, and patients need to have well aligned anterior teeth and posterior teeth. The author doesn't think it will be a popular method for clinical application of TADs.

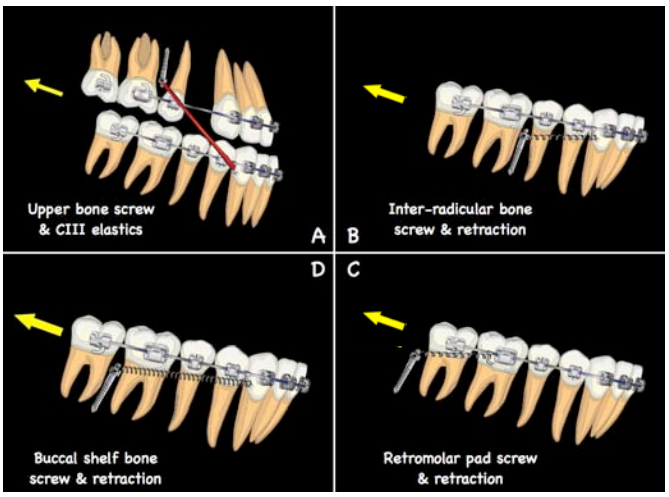


Fig. 20: 4 methods for whole arch mandibular distalization. Buccal shelf bone screws can get the maximum distalization among the 4 methods.

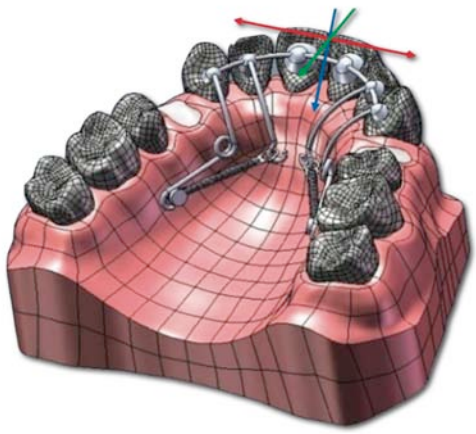


Fig. 21

Special TADs application

WO-10 Satoshi Kozato placed mini-screws in the edentulous patient for stabilization of the endotracheal tube during surgery.

WO-03 Dror Aizenbud comprehensively reviewed the literature about distraction osteogenesis. He used mini-screws in edentulous ridge to help distraction osteogenesis which will develop the alveolar bone successfully.

New ideas of increasing vertical dimension with TADs

WO-12 Junji Sugawara bonded a buccal tube on the hooks of the mini-plate and activated a loop to extrude the maxillary posterior teeth. This design of mechanics increased the patient's vertical dimension dramatically (Fig 22A).

WO-13 WOn Moon used open coil springs to extrude the maxillary incisors, and open loop to extrude lower molars, both of which could dramatically increase patient's vertical dimension (Fig 22B, 22C).

Summary

(1) Mini-screw can replace mini-plate in more and more clinical situations with much simpler surgical procedures.

(2) Larger diameter screws, 1.8 mm ~ 2.0 mm is stronger to avoid screw fracture.

(3) Stainless steel screw is sharp sand strong, ideal for clinical application.

(4) Osseointegration is not needed in TADs.

(5) Immediate loading is acceptable in most clinical mini-screw placements.

(6) Only in very limited special occasions, the complicated screw head with .022 slots is needed. Most of the time a simple head is good for attaching coil springs or power chains. It is the most simple and practical design.

(7) Hard palate is a very good area for mini-screw placement. One should avoid come in contact with unossified midpalatal suture, incisive canal, greater palatal vessels.

(8) For distalization of the whole dentition in larger amount, better avoid inter-radicular placement.

(9) For extra-radicular placement, larger size screw like 2 mm in diameter can be used. One should also avoid the chance of hitting the root, and using smaller diameter screws which might fracture more easily.

(10) For larger screws, like 2 mm, one should not worry about insertion torque.

Acknowledgement

(1) Thanks for the arrangement by the President of my study club, Po-Chi Lin, for me to give the special 2nd WIOC review lecture on Jan 14, 2011, so I have this chance to turn the review into an article.

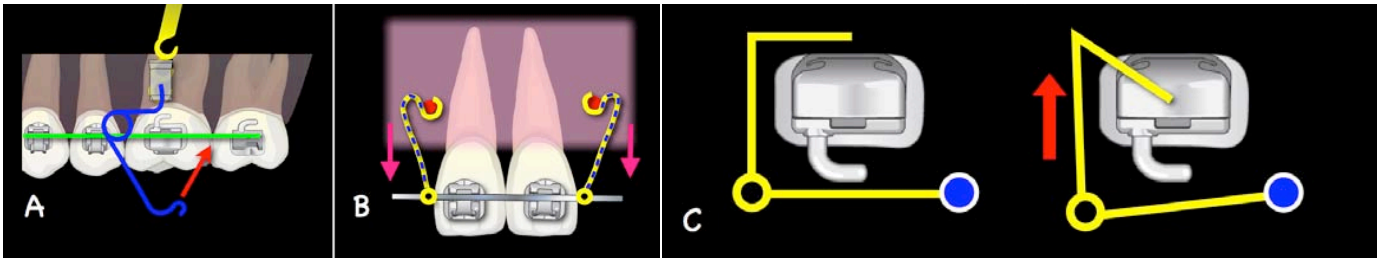


Fig. 22A, B, C: Methods of increasing vertical dimension with TADs.

(2) Thanks for the help of Huei-Mei Tsai, James Cheng-Yi Lin, Ming-Guey Tseng, Johnny Joung-Lin Liaw, Birte Melsen, Chris HN Chang, Leslie Yen-Peng Chen, and Shou-Hsin Kuang for reviewing the 2nd WIOC with me in the study group.

(3) Thanks for Chris HN Chang for not only presenting on how to manage difficult impacted teeth with TADs, but also setting up the standards of delivering a good lecture.

(4) Thanks for Tsu-Han Huang's great help on English editing.

(5) Thanks to Chin-Yu Chiang and Yi-Yang Su for taking video records of the lecture.

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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).

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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 deed.

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 bone screws.

Day 1	
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

Day 2	
9:00—10:30	Optimized Orthodontic Treatment I Dr. Chris Chang
10:30—11:00	Break
11:00—12:30	Optimized Orthodontic Treatment II Dr. Chris Chang
12:30—13:50	Lunch
14:00—15:00	Model Practice
15:00—18:30	Chair-side observation

Day 3	
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

Day 3	
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

Day 4	
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

Palatally Impacted Maxillary Canine

HISTORY AND ETIOLOGY

A 13-year-3-month-old male was referred by his dentist for orthodontic consultation (Figure 1). His chief concern was an unerupted permanent canine with the primary canine retained (Figure 2 and 3). There was no contributory medical or dental history. The patient was treated to a near ideal result as demonstrated in Figures 4-6. Cephalometric and panoramic radiographs at 3 months and after treatment are compared in Figures 7 and 8.

Pretreatment clinical palpation indicated that the permanent canine was impacted palatally, which was confirmed by two periapical radiographs from different projection angulations, according to SLOB rules.[1-5] A panoramic radiograph at the start of active treatment suggested that the etiology of the impaction was an aberrant path of eruption (Figure 7).

DIAGNOSIS

Skeletal:

Bimaxillary protrusion (SNA 88°, SNB 84°, ANB 4°)

Low mandibular plane angle (SN-MP 29°, FMA 22°)

Dental:

Bilateral Class II malocclusion with end-on molar relationships

Right Class II canine relationship

Mandibular dental mid-line 2mm right of the facial and maxillary midlines

9 mm overjet (OJ); impinging deep overbite (OB)

Labially inclined upper and lower incisors

Mesially oriented, palatal impaction of the upper left canine

Buccal cross-bite of the right 2nd premolars

Fig 1. *Pretreatment facial photographs*

Fig 2. *Pretreatment intraoral photographs*

Fig 3. *Pretreatment study models*

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

Fig 4. *Posttreatment facial photographs*

Fig 5. *Posttreatment intraoral photographs*

Fig 6. *Posttreatment study models*

Interdental spacing in the maxillary anterior region

UR, UL and LR posterior crowding

Facial:

Protrusive competent lips

SPECIFIC OBJECTIVES OF TREATMENT

Maxilla (all three planes):

- A - P: Retraction
- Vertical: Allow for normal expression of growth
- Transverse: Maintain

Mandible (all three planes):

- A - P: Allow for normal expression of growth
- Vertical: Allow for normal expression of growth
- Transverse: Maintain

Maxillary Dentition

- A - P: Retraction
- Vertical: Intrusion of incisors for bite opening
- Inter-molar Width: Correct right 2nd premolar (#4) buccal cross-bite

Mandibular Dentition

- A - P: Retraction of incisors
- Vertical: Flatten Curve of Spee (Molar extrusion and incisor intrusion)
- Inter-molar / Inter-canine Width: Maintain

Facial Esthetics: Correct lip protrusion and balance

TREATMENT PLAN

Non-extraction treatment with a full fixed orthodontic appliance was indicated to align and level the dentition. Surgery was necessary for bonding a button, with a power-chain (PC) attached, on the lingual surface of the impacted canine. The maxillary arch was the anchorage to bring the impacted canine (Figures 10-15). Anterior bite turbos

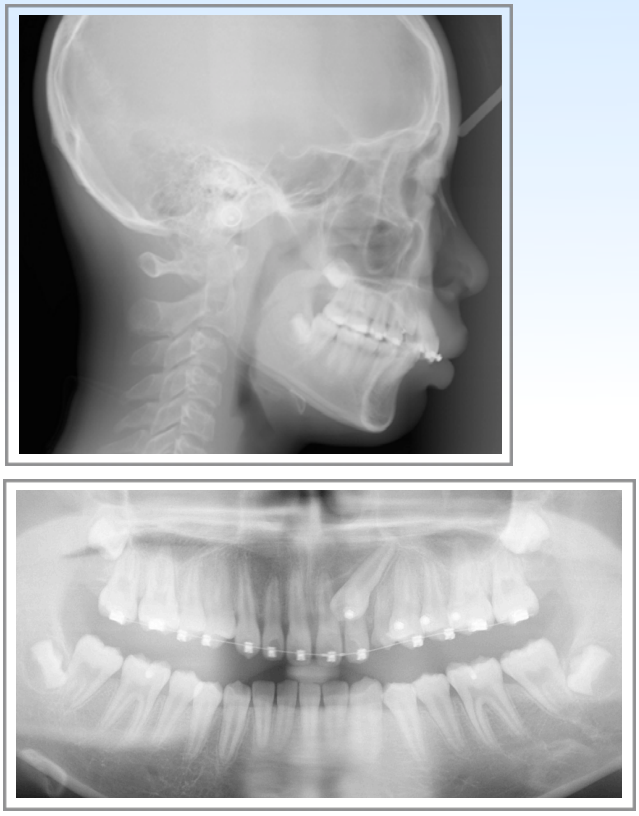


Fig. 7. *3M pano and ceph radiographs*

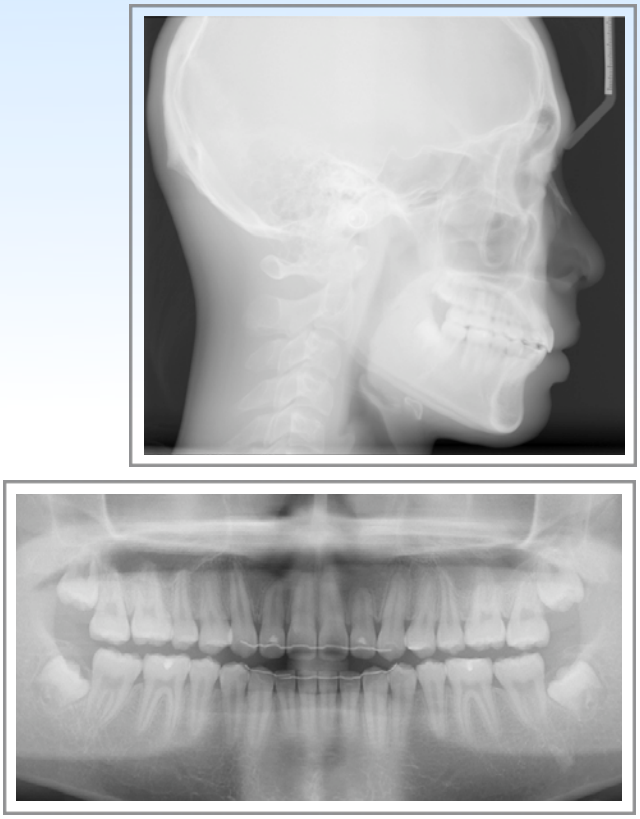


Fig. 8. *Posttreatment pano and ceph radiographs*

(Figure 16) were used to correct the 100% overbite and facilitate the alignment of the impacted canine (#11).

Class II elastics were used to resolve the sagittal occlusal discrepancy, and detailing bends produced the final occlusion. Fixed appliances were removed and the corrected dentition was retained with fixed anterior retainers in both arches.

APPLIANCES AND TREATMENT PROGRESS

0.022" slot Damon D3 brackets (Ormco) were selected. After 3 months of preliminary alignment, surgery (closed method) was performed to bond a button, with power chain attached, on the impacted canine. Once the wound healed, the power chain was attached to the lingual of teeth #12-14 for distalization of #11, and then the traction was attached to the maxillary right 1st molar (#3) to move the crown of #11 away from the root of tooth #10 (Figures 11 and 13).

After 6.5-months of orthodontic traction, the crown of #11 erupted just to the palatal of the deciduous primary canine. The deciduous canine was extracted, another button was bonded on the labial surface of #11, and a PC was attached to the main archwire (16X25 CuNiTi) to achieve de-rotation and alignment

CEPHALOMETRIC			
SKELETAL ANALYSIS			
	PRE-TX	POST-TX	DIFF.
SNA°	85°	84°	1°
SNB°	80°	78°	2°
ANB°	5°	6°	-1°
SN-MP°	41°	41°	0°
FMA°	32°	32°	0°
DENTAL ANALYSIS			
U1 TO NA mm	9 mm	4 mm	5 mm
U1 TO SN°	119°	99°	20°
L1 TO NB mm	10 mm	9 mm	1 mm
L1 TO MP°	91°	91°	0°
FACIAL ANALYSIS			
E-LINE	1 mm	0 mm	1 mm

Table 1. *Cephalometric summary*

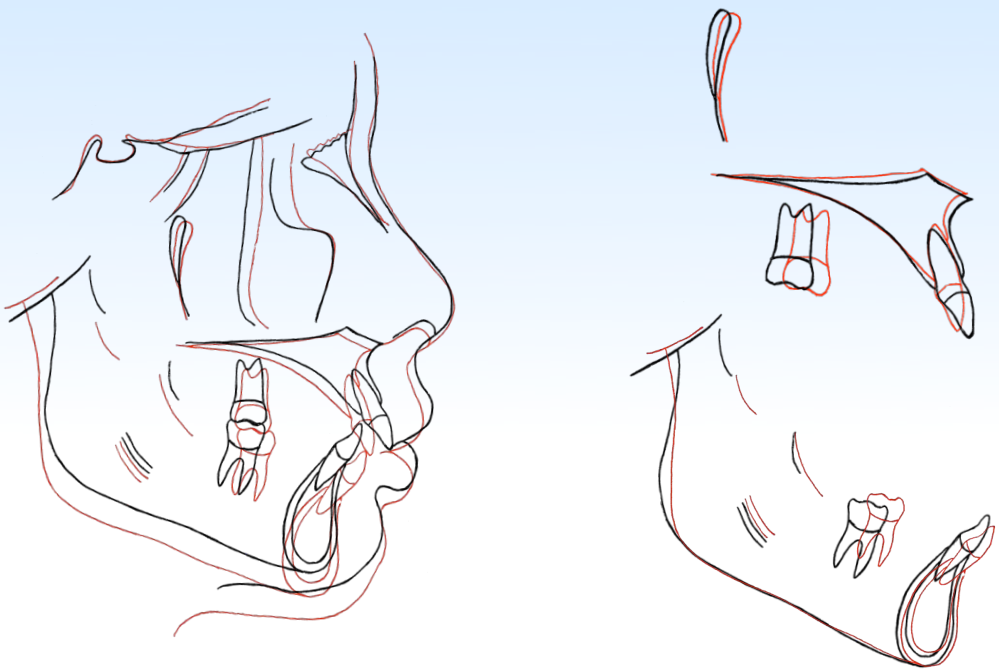


***Fig 9**. Superimposed tracings*

(Figure 15). Three months later, the buttons on #11 were removed and a bracket was bonded on the labial surface to achieve ideal alignment. Bite turbos with Class II elastics were used to correct the A-P discrepancy and deep overbite (Figure 16). The radiographic sequence of impacted canine alignment is shown in Figures 10, 12, and 15.

One month prior to the completion of active treatment, the upper archwire was sectioned distal to the cuspids. Light up and down elastics (2 oz) were used for final detailing. After 31 months of active treatment, all appliances were removed and fixed anterior retainers were delivered for both arches.

RESULTS ACHIEVED

Maxilla (all three planes):

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

Mandible (all three planes):

- A - P: Favorable growth
- Vertical: Favorable growth
- Transverse: Maintained

Maxillary Dentition

- A - P: Retracted upper incisors
- Vertical: Intruded incisors, impacted canine recovered and optimally aligned
- Inter-molar / Inter-canine Width: Maintained

Mandibular Dentition

- A - P: Flared incisors
- Vertical: Intruded incisors; extruded molars
- Inter-molar / Inter-canine Width: Maintained

Facial Esthetics: Improved

RETENTION

The upper fixed retainer 3-3 and the lower fixed retainer 4-4 were bonded on every tooth. An upper Hawley retainer was delivered. The patient was instructed to wear it full time for the first 6 months and nights only thereafter. The patient was instructed in the home care and maintenance of the retainers.

FINAL EVALUATION OF TREATMENT

The ABO Cast-Radiograph Evaluation scored at 26 points, which was deemed to qualify as a board case report. The major discrepancies were problems in alignment/rotation, marginal ridge discrepancies, and occlusal relationships. The impacted canine was well aligned, and all of the canine and molar relationships were near ideal. Gingival texture on #11 was satisfactory, but there was less root prominence than for the opposite canine.

Collectively, retraction of the maxillary incisors, inferior growth of the maxilla, and more labial position of the mandibular incisors resulted in overjet correction and a pleasing facial profile (Figure 9). Although not part of the treatment plan, the use of Class II elastics to anteriorly position the mandibular dentition was necessary, because there was insufficient anterior growth of the mandible. Overall, this difficult case was treated to an appropriate facial and dental result.

DISCUSSION

3D imaging was considered before designing a treatment plan for the impacted canine. The primary benefit would be to reveal the relationships among the impacted tooth, adjacent teeth and the cortical bone. This information would be helpful for selecting an appropriate surgical technique and designing a precise force system to align the impacted tooth without damaging the adjacent roots or being inhibited by dense cortical bone.[1] Moreover, any obstacles to the designed pathway of eruption can be removed during the surgical procedure.

In this case, the 3D image was not indicated because the impacted canine was palpable.[2-4] After the PC was attached to the crown, the operator intuitively used distal traction followed by cross-arch tipping to move the impacted canine away from the root of the adjacent lateral incisor (Figures 11 and 13).

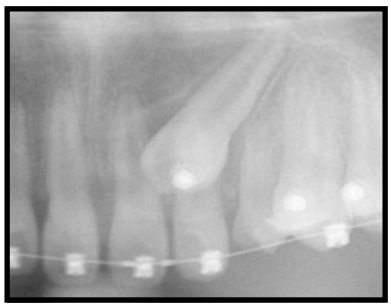


***Fig. 10**. 0M-traction (Note: root of tooth #10 is shorter than #7' in the very beginning)*

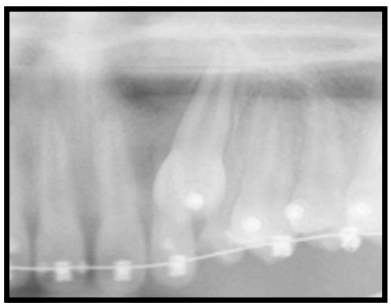


***Fig. 12**. 4M-traction*

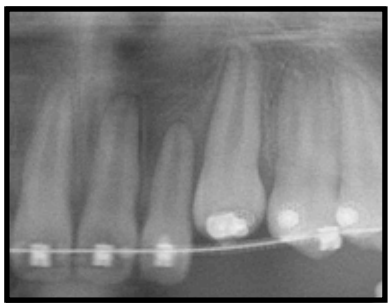


***Fig. 14**. 8.5M-traction*

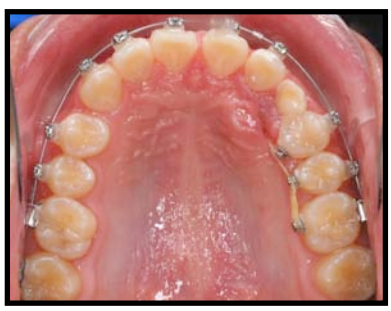


***Fig. 11**. PC for pulling #11 distally and occlusally (2M-traction)*

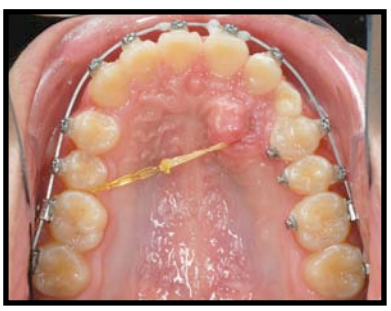


***Fig. 13**. PC for pulling #11 distally and occlusally, away from root of #10 (4M-traction)*

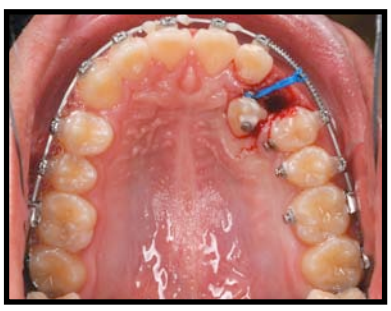


***Fig. 15**. Buccal botton bonded for labially traction with clockwise rotation. Coil spring for PC rest. (7.5M-traction)*

***Fig. 16**. Bite turbos combined with Class II elastics (17M of tx.)*

Fortunately, the outcome was acceptable although the root of #10 more blunted than before treatment (Figure 17). In retrospect, it would have been desirable to delay bonding of #10 until the canine crown had been moved palatally. From the speech of Dr. Kokich in 2006, we were taught that palatally impacted teeth erupt spontaneously after surgical exposure.[1] Thus, the use of PC traction immediately after surgical bonding of the button on impacted canine may have decreased treatment time, but that point is not clear. In this case, extraction of the primary canine was delayed until #11 erupted which may have increased treatment time (Figure 15).

In the 17th month of treatment, Class II elastics combined with anterior BT were applied for molar extrusion and to bring the mandible forward, which significantly improved the facial profile (Figure 16). Class II elastics for 13 months resulted in more labial positioning of the mandibular incisors relative to supporting bone (Figure 9). Possibly this problem could have been prevented or at least by applying early, light and short elastics, low torque brackets, pre-torqued wire or two anchorage screws in the mandibular buccal shelves. After completion of treatment, it was noted that #11 had less root prominence than the opposite canine (Figure 18). This problem could have been prevented by using low torque brackets or labial root torquing springs.

The DI score was 24, indicating a major malocclusion for an ABO case report. However, it is necessary to assess the complexity of the canine impaction. An additional *impaction Specific Assessment System (iSAS)*[6] was necessary to realistically evaluate the treatment necessary to recover and align #11. The *impaction Discrepancy Index (iDI)*[6] was **8**, as documented later in this report

The ABO CRE score was 26 points, with most of the points due to problems in alignment, marginal ridge discrepancies and residual Class II interdigitation. Pre-finish casts, obtained about six months before the end of active treatment, would have been helpful in identifying and resolving finishing problems. To more thoroughly evaluate the recovery and alignment of #11, the *impaction Cast Radiograph (iCRE)*[6] score was **4**, indicating a relatively good result. The documentation will be presented later in this report. A revision of the CRE more strictly evaluate 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.

CONCLUSION

For palatally impacted canines, early surgical exposure followed by spontaneous eruption is an effective treatment method.[1] 3D imaging is not indicated if the impacted tooth can be palpated, but may be helpful for labial impactions or for high unerupted canines, deep in the alveolar process. However, if immediate traction, on an impaction uncovered with a closed technique, is the preferred method of treatment, *the adjacent lateral incisor should not be bonded until the canine erupts*. Moving impacted canine from the palate usually results in inadequate root movement to achieve an ideal canine alveolar prominence. Careful consideration for torque control of the previously impacted tooth is necessary. ***The iDI is effective for assessing the complexity of an impaction and the iCRE is helpful for documenting the result.***[6,7]

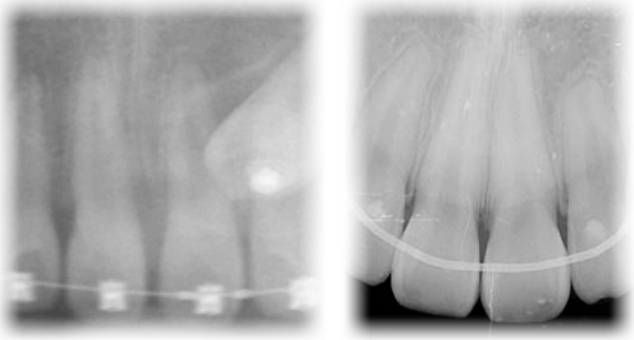


***Fig. 17**. More blunted root apex of #10 was showed after treatment compared to the 3rd month of tx.*

***Fig. 18**. Less root prominence of #11 than #6*

References

1. Kokich VG. Surgical and orthodontic management of impacted maxillary canine. Am J Orthod Dentofacial Orthop 2004;126:278-83.
2. Niagara K. et al. Impacted maxillary central incisor, canine, and second molar with 2 supernumerary teeth and an odontoma. Am J Orthod Dentofacial Orthop 2009;135:390-9.
3. Cherish S. et al. Lingual orthodontic treatment and absolute anchorage to correct an impacted maxillary canine in an adult. Am J Orthod Dentofacial Orthop 2008;134:811-9.
4. Becker A. The Orthodontic Treatment of Impacted Teeth. 2007; Second edition : 93-143.
5. Tseng SP, Chang CH., Roberts WE. High Maxillary Canine Impaction with Mesial and Labial Displacement. News & Trends in Orthodontics 2010: vol 18 Apr. 1: 36-44.
6. Su B, Chang CH, Roberts WE. Class II Malocclusion Complicated by a Complex Impacted Cuspid; Introduction of the iSAS Method for More Clinical Assessment. News & Trends in Orthodontics 2010: vol 19 July 1: 32-46.
7. Chang CH. Advanced Damon Course No. 10,11 : DI & CRE Workshop (1)(2)., Podcast Encyclopedia in Orthodontics 2010, Newton's A Ltd, Taiwan.

DISCREPANCY INDEX WORKSHEET

CASE # 1 PATIENT Tseng-Fu Wang

TOTAL D.I. SCORE 24+8=32

EXAM YEAR 2009
ABO ID# 96112

OVERJET

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

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

Total = 4

OVERBITE

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

Total = 5

ANTERIOR OPEN BITE

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

Total = 0

LATERAL OPEN BITE

2 pts. per mm. per tooth

Total = 0

CROWDING (only one arch)

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

Total = 1

OCCLUSION

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

Total = 4

LINGUAL POSTERIOR X-BITE

1 pt. per tooth Total = 0

BUCCAL POSTERIOR X-BITE

2 pts. per tooth Total = 4

CEPHALOMETRICS (See Instructions)

ANB ≥ 6° or ≤ -2° = 4 pts.

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

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

SN-MP

≥ 38° = 2 pts.

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

≤ 26° = 1 pt.

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

1 to MP ≥ 99° = 1 pt.

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

Total = 0

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

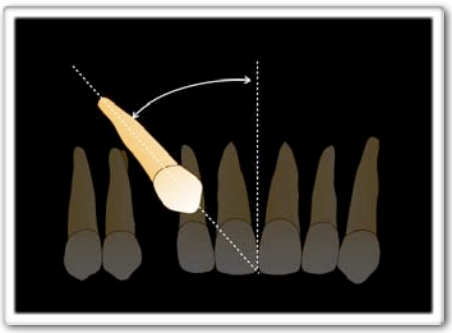
Identify:

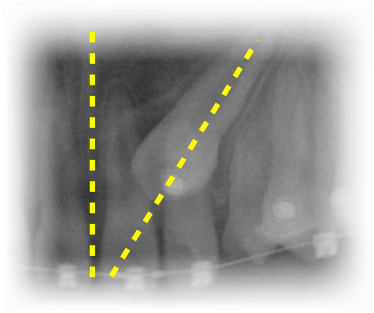
Total = 6

impaction Discrepancy Index

8

1. Angulation of the canine to the midline in degree

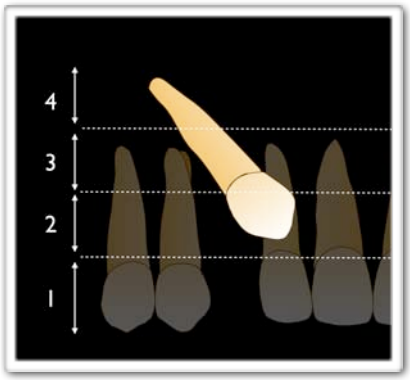


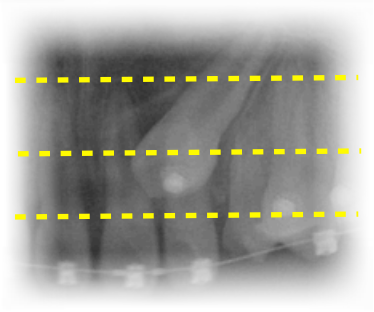


Grade 1 : 0º ~ 15º = 1 pt.
Grade 2 : 16º ~ 30º = 2 pts.
Grade 3 : ≧ 31º = 3 pts.

Total = 3

2. Vertical distance from the occlusal plane

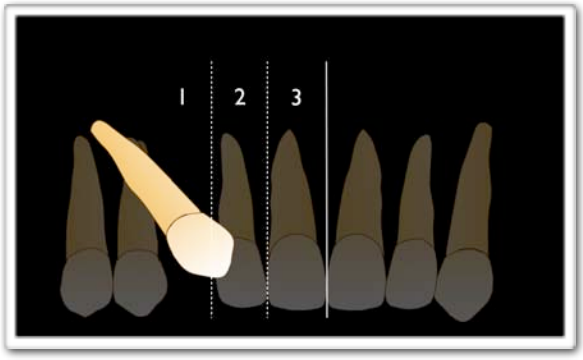


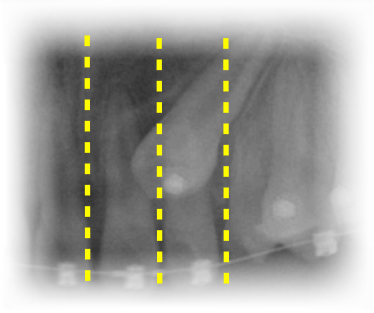


Grade 1 : Below the level of the CEJ = 1 pt.
Grade 2 : Above the CEJ, but less than halfway up the root = 2 pts.
Grade 3 : More than halfway up the root, but less than the full root length = 3 pts.
Grade 4 : Above the full length of the root = 4 pts.

Total = 2

3. Mesiodistal position of the canine tip





Grade 1 : No horizontal overlap = 1 pt.
Grade 2 : Overlap with lateral incisor = 2 pts.
Grade 3 : Overlap with central incisor = 3 pts.

Total = 3

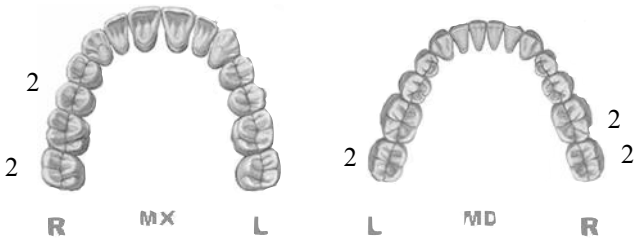
ABO Cast-Radiograph Evaluation

Case # 1 **Patient**

Total Score: 26+4=30

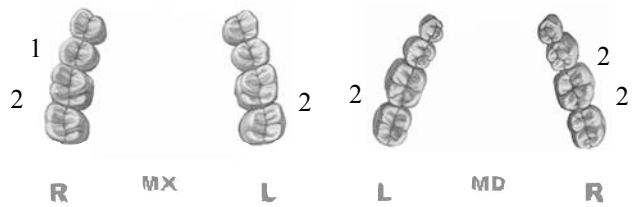
Alignment/Rotations

10



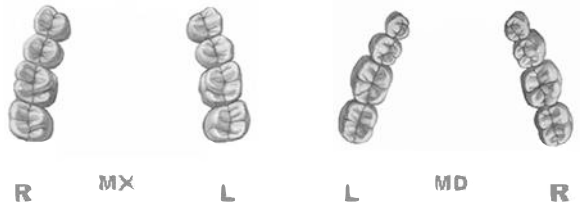
Marginal Ridges

11



Buccolingual Inclination

0

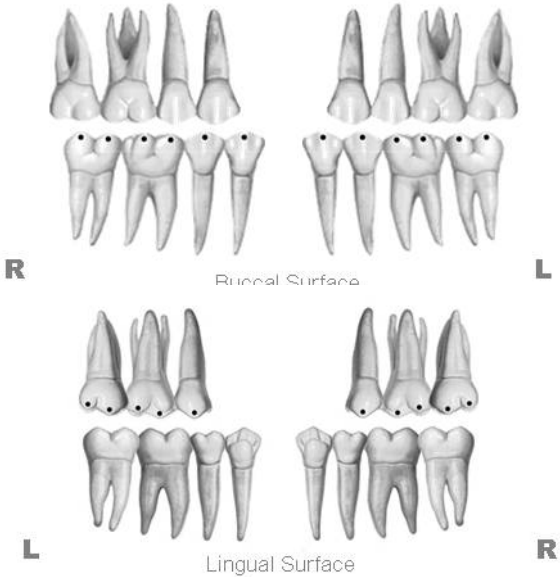


Overjet

0

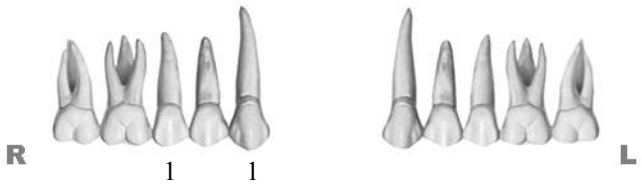
Occlusal Contacts

0



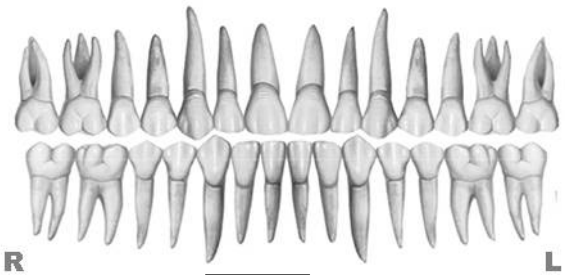
Occlusal Relationships

2

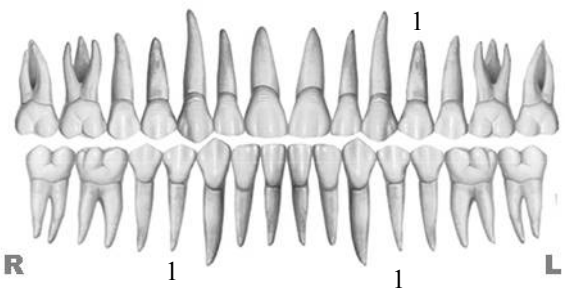


Interproximal Contacts

0



3



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.

impaction Cast-Radiograph Evaluation iCRE

Total Score: = 4

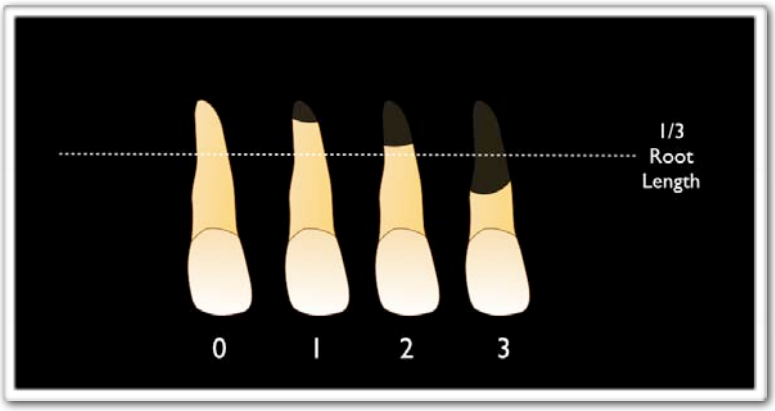
1. Gingival esthetic score

Total = 2

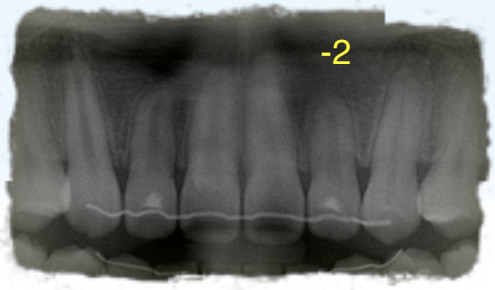
1. Mesial Papilla	0	1	2
2. Distal Papilla	0	1	2
3. Curvature of Gingival Margin	0	1	2
4. Level of Gingival Margin	0	1	2
5. Root Convexity (Torque)	0	1	2
6. Scar Formation	0	1	2

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

2. Root resorption of the adjacent teeth



Normal apical contour	0
Apical irregularity	1
Apical root resorption less than one third original root length	2
Apical root resorption more than one third original root length	3



Normal apical contour	0
Apical irregularity	1
Apical root resorption less than one third original root length	(2)
Apical root resorption more than one third orignal root length	3

Speaker：張慧男醫師、張金山醫師、陳惠華醫師、黃瓊嫻醫師

矯正與植牙聯合治療

Ortho - Implant Combined Treatment

主辦單位：台南市牙醫師公會

協辦單位：湧傑企業股份有限公司

演講時間：2011/4/10 Sun. 9:00~17:00

演講地點：台南市東區大學路1號 國立成功大學 第四講堂

報名方式：07-5361701 王小姐

備註：1.參加者發給繼續教育學分 2.演講期間備有茶點及午餐 3.報名未出席者恕不退還既收款項

費用：台南縣市會員1,200元 / 外縣市1,500元 / 住院醫師800元

ABO Case Report

High Maxillary Canine Impaction with Mesial and Palatal Displacement

HISTORY AND ETIOLOGY

A 11-year-8-month girl presented with a chief concern of "delayed eruption of upper left canine". Oral soft tissues, periodontium, frenum, and gingival health were all within normal limits. The patient was in good general health and the dentition was developing normally except for a high impaction of the maxillary left canine (Figures 2 and 3). The apparent etiology was an aberrant path of eruption.

The patient was successfully treated to a near ideal result as documented by Figures 4-9. Three dimensional radiographic imaging (Figure 10) revealed that the crown of the impacted canine was lodged between the adjacent lateral incisor and first premolar roots. A specific surgical plan[1-2] was devised to uncover the impacted canine (Figure 11). Orthodontics mechanics tipped the tooth distally, so that it could be extruded and properly aligned (Figure 12). Figure 9 is pre- and post-treatment cephalometric documentation. The diagnosis and treatment details will be discussed below.

DIAGNOSIS

Pre-treatment facial photographs (Figure 1) showed a straight profile. The pre-treatment intraoral photographs (Figure 2) and study models (Figure 3) revealed a molar relationship of Class I on both sides. The lower dental midline was shifted 1.5 mm to the right of the facial midline. Intra-oral exam and the panoramic radiograph (Figure 7) revealed impactions of the left maxillary canine (#11) with the deciduous canine retained, and maxillary 2nd molars are unerupted. 3-D imaging with cone beam CT (Figure 10) confirmed that #11 was palatally impacted.

Cephalometric analysis showed a skeletal Class I pattern. The ANB angle was 3°, the SN-MP angle was 31°, and the lower incisors were proclined 100° to Md plane. The cephalometric values are summarized in the Table. The

Fig 1. *Pre-treatment facial photographs*

Fig 2. *Pretreatment intra-oral photographs*

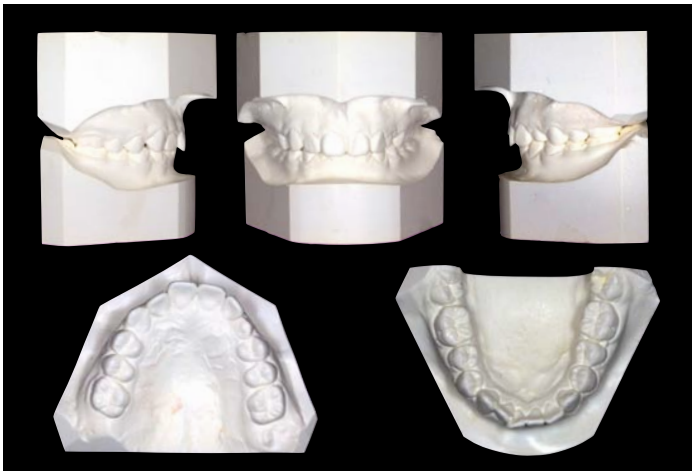


Fig 3. *Pre-treatment study models*

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. *Post-treatment facial photographs*

Fig 5. *Post-treatment intraoral photographs*

Fig 6. *Post-treatment study models*

American Board of Orthodontics (ABO) discrepancy index (DI) was 8, as documented in the DI worksheet.

SPECIFIC OBJECTIVES OF TREATMENT

The overall objective of treatment was to recover the palatally impacted left maxillary cuspid and to achieve a Class I molar and canine relationships with ideal overjet and overbite. The specific treatment objectives were to :

Maxilla (all three planes):

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

Mandible (all three planes):

- A - P: Maintain consistent with normal growth
- Vertical: Maintain consistent with normal growth
- Transverse: Maintain

Maxillary Dentition

- A - P: Maintain
- Vertical: Recover palatally impacted canine on the left side
- Inter-molar Width: Maintain

Mandibular Dentition

- A - P: Maintain Class I molar relationship; align anterior segment
- Vertical: Maintain
- Inter-molar / Inter-canine Width: Maintain

Facial Esthetics:

E-line: Maintain a normal growth pattern; slight retraction of the upper lip

TREATMENT PLAN

Bond both arches with fixed appliances and use an open coil spring to prepare pathway for the impacted canine,

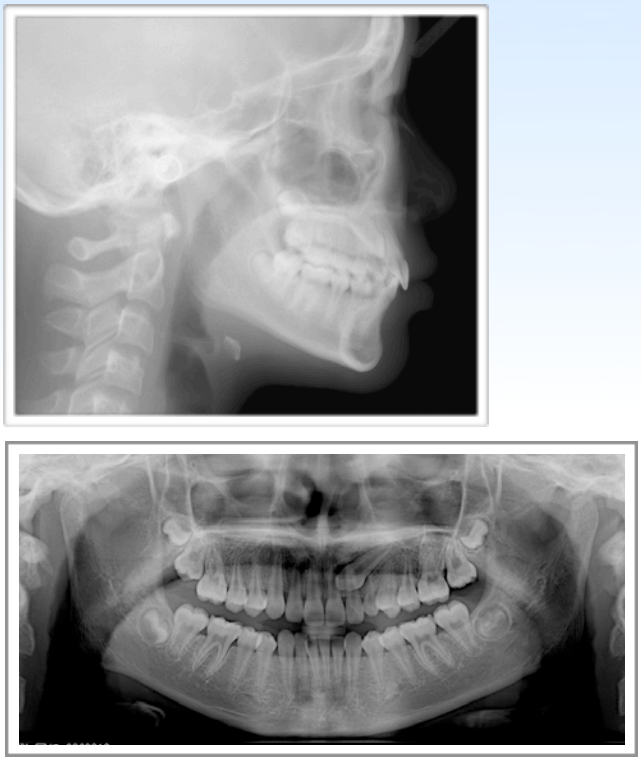


Fig. 7. *Pretreatment ceph. and pano. radiographs*

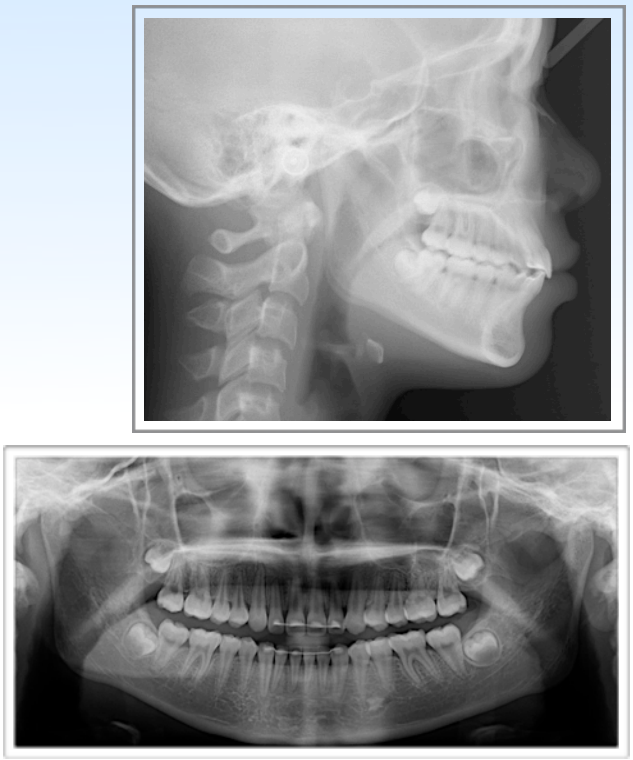


Fig. 8. *Posttreatment ceph. and pano. radiographs*

which was subsequently exposed to allow self eruption (Figure 11). Two OrthoBoneScrews® were placed palatally and labially in the infrazygomatic crest (IZC), to retract the canine distally and to distalize the upper left buccal segment (Figure 12a & b). Then bring the canine into occlusion with light elastics and a continuous maxillary arch wire (Figure 12c).

Treatment included anterior and posterior bite turbos with Class II elastics to maintain a favorable occlusion and profile. Remove fixed appliances and retain the corrected dentition with fixed retainers from 2-2 in upper arch and 3-3 in lower.

APPLIANCES AND TREATMENT PROGRESS

0.022-in Damon D3MX® (low torque on upper incisors) and Damon Q® (low torque on lower incisors) brackets (Ormco Corporation) were used. Upper arch was bonded first with a very light open coil spring placed between #10 and #12 to open a pathway for the extrusion of the impacted canine. After 6 weeks of initial alignment and leveling, surgical uncovering of the impacted canine was performed. The covering soft tissue was removed, and the bone was removed to CEJ level of the canine. The open wound was covered with periodontal dressing. The canine erupted spontaneously in 32 days (Figure 11c). After 8 months of treatment, two OrthoBoneScrews® were placed distally to #11 in the palate (Figure 12a) and in left infrazygomatic crest (IZC) (Figure 12b). An elastomeric chain, attached from the palatal bone screw to a lingual button that was bonded on palatal surface of #11, was utilized to move #11 away from #10. And another elastomeric chain attached from IZC screw to #12 was used to distalize the buccal segment (Figure 12c). Following 1 month of distal traction, a

CEPHALOMETRIC			
SKELETAL ANALYSIS			
	PRE-TX	POST-TX	DIFF.
SNA°	84°	84°	0°
SNB°	81°	80°	-1°
ANB°	3°	4°	1°
SN-MP°	31°	32°	+1°
FMA°	22°	24°	+2°
DENTAL ANALYSIS			
U1 TO NA mm	4 mm	4 mm	0 mm
U1 TO SN°	107°	107°	0°
L1 TO NB mm	5 mm	4 mm	-1 mm
L1 TO MP°	100°	100°	0°
FACIAL ANALYSIS			
E-LINE	1.0 mm	0 mm	1.0 mm

Table 1. *Cephalometric summary*

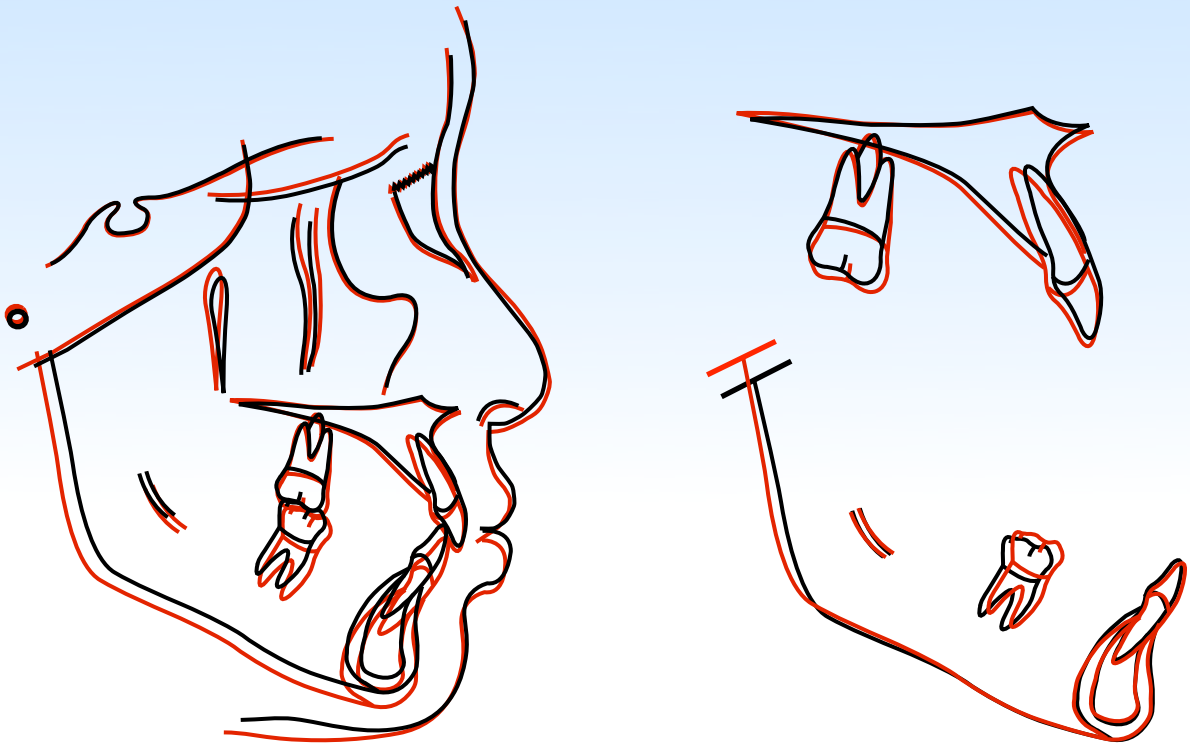


***Fig 9**. Superimposed tracings*

continuous .014 Copper-Ni-Ti archwire was inserted and tied to the eyelet, that was bonded on labial surface of #11. In the 10th months of active treatment, the lower arch was bonded with Damon Q bracket and a bite turbo was placed on #22. An elastomeric chain was attached to the lingual surface of #11 and extended to IZC screw to move it toward buccally. Subsequently, a light 2 oz cross-elastic from the lingual button of #11 to brackets on #21 & #22 was used to correct the lingual cross-bite. In the 12th month, the impacted canine was almost aligned in the arch, but there was excessive buccal gingiva. After a gingivoplasty with a Diode laser, an inverted high torque bracket was boned on #11, and #10 was also bonded with a standard bracket. A very light Class II elastic from #9 to #22 was used to correct midline discrepancy. In 16th month, bilateral full time Class II elastics were used to correct the Class II relationship.

Shortly after completion the bonding of the brackets and near the completion of canine traction, panoramic radiographs were taken to examine the bracket positions relative to the axial inclination for all teeth.

One month before removing the fixed appliances, light up and down elastics (2 oz) were used posteriorly for final detailing. After 21 months of active treatment, appliances were removed. Gingivoplasty on #9 with a Diode laser was performed to correct the gingival margin discrepancy between #8 & #9. The wire sequences for the treatment were as follows: .014 Copper Ni-Ti, .014x .025 Copper Ni-Ti and . 017x .025 TMA.

TREATMENT RESULTS

The overall results were pleasing to both the clinician and the patient. The impacted cuspid was successfully aligned in 3D to contribute a balanced facial harmony and occlusion (Figures 4-6). Posttreatment intraoral photographs and study casts (Figures 5-6) show a Class I buccal interdigitation bilaterally. Dental midlines were aligned with the facial midline, and ideal overjet and overbite were achieved.

Cephalometric analysis and superimpositions (Figure 9) showed good maintenance of axial inclination of the incisors and moderate vertical growth of the mandible, which was consistent with an increase in the vertical dimension of occlusion. The upper incisor to the SN angle was maintained at 107°. The lower incisor to the Md plane angle was maintained in 100°. Critical assessment of this case with the ABO cast-radiograph method resulted in score of 8, as documented on the form appearing later in this report. This score is well within the limit of 26 for an acceptable board case. The following deviations from ideal were noted:

1. Maxillary left canine, 2nd premolar and right 1st premolar, mandibular bilateral canines exhibit minor mesial-in rotation.

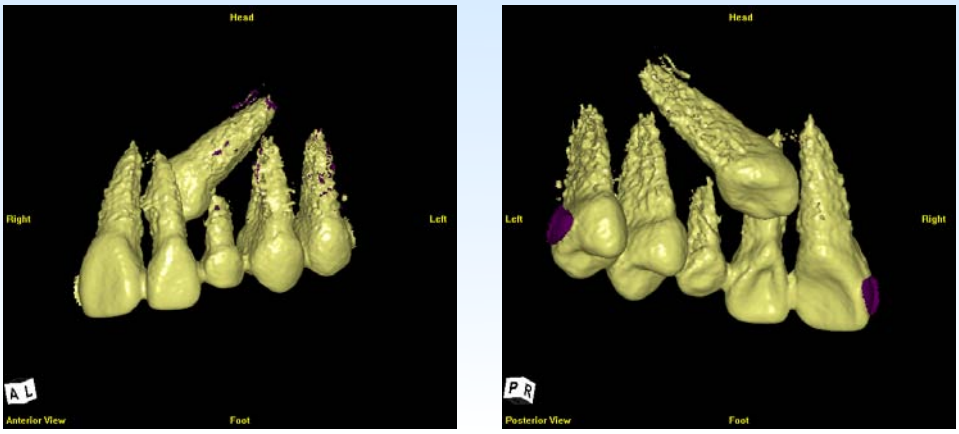


***Fig. 10**. 3D images show #11 in good morphology without any pathological change. It was palatally impacted with the crown tip located between #9 & #10 and the root located high above apex of #12.*

2. Maxillary left 2nd molar exhibits inadequate buccolingual inclination.
3. Slight Class II buccal interdigitation of upper canines.
4. Inadequate distal root angulation on the mandibular right lateral incisor.

RETENTION

The upper 2-2 and lower fixed 3-3 retainers were bonded on every tooth with clear retainer on upper arch. The patient was instructed in home care and maintenance of the retainers.

FINAL EVALUATION OF TREATMENT

Three dimensional radiographic imaging (Figure 10) was important diagnostic information for selecting the appropriate surgical uncovering procedure (Figure 11) to compliment the specific orthodontic traction to be used to recover and align the impacted canine (Figure 12a-c). For the present patient, this potentially difficult canine impaction was corrected in about 5 months. The treatment resulted in pleasing crown length and gingival contour on tooth #11. The relatively symmetrical maxillary labial gingival form is expected to improve after treatment and crown exposure of the lateral incisors equalizes.

DISCUSSION

For impacted canines, extraction should be limited to ankylosis, uncontrollable infection, internal or external root resorption, severe root dilacerations and/or pathology that may compromise adjacent teeth during or after orthodontics treatment[1-4]. 3D radiographic imaging revealed normal tooth that unfavorably displaced from the normal path of eruption. As mentioned previously[5], palatally impacted canines that are not uncovered properly can be clinical frustrations for orthodontists. After experience with previous impacted cuspids, an effective treatment plan was devised to recover and align high impacted canines that were displaced mesially and palatally.

The classic treatment protocols for impacted maxillary canines is opening space, performing surgical exposure, and applying light traction forces in an appropriate direction. In this case, an open coil spring was used to increase the space

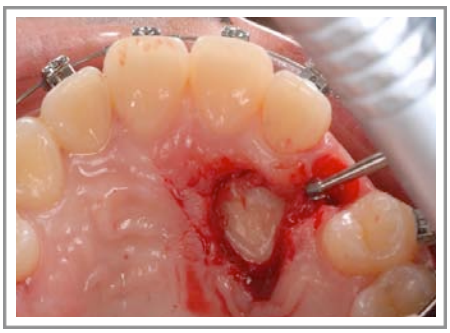


***Fig. 11a.** Operation procedures show as illustrated. Especially noted that the bone covering crown and the pathway for erupting cuspid are removed.*

***Fig. 11b**. Uncovering Day 7. Periodontal dressing removed.*

***Fig. 11c.** Uncovering Day 32. Spontaneously erupt.*

between the lateral incisor and the first premolar to create a pathway for eruption of the impacted canine. In order to limit further protrusion of anterior teeth induced by open coil spring and Class II mechanics later in treatment, a low torque prescription was used on both upper and lower incisors[6].

For a high palatally-impacted canine, Kokich and Methews[1] recommended an alternative technique with earlier timing for uncovering of palatal canines and allowing for spontaneous eruption before the start of orthodontic traction. During surgical uncovering, it is important to remove all bone over the crown down to cementoenamel junction and leave an opening in the flap for the tooth to erupt. The open wound, with the impacted tooth exposed, may or may not receive a periodontal dressing depending on the discretion of the surgeon. After the impacted cuspid erupts spontaneously, it is important to start traction on it before it passes the level of the occlusal plane, because a late application of force results in excessive tipping of the root in the opposite direction. In this case, #11 erupts closely to #10, so it was necessary to retract #11 distally before it could be moved buccally. If a lingual button had been bonded on palatal surface of #14 and an elastomeric chain applied to generate distal force to the impacted cuspid, the upper arch would skew mesially and anteriorly. The resulting shift in midline would be difficult to solve. Generating distal force from a supplemental anchorage system i.e, the palatal OrthoBoneScrew®, helps prevent this side effect.

To avoid harming the roots of adjacent lateral incisor, it is important to avoid placing a bracket on #10 during the cuspid recovery phase of treatment. To avoid gingival impingement with the flexible .014 CuNiTi archwire, two dots of flowable resin was polymerized on the labial surface of the lateral incisor to serve as a stop for the archwire (Figure 13). Two months after inserting the continuous archwire, the impacted cuspid was almost aligned in the arch and a bracket was applied to the lateral incisor (#10). When palatally impacted cupids are moved buccally, there is usually an excessive accumulation of gingiva, because teeth do not move through gingiva, but merely push the excess soft tissue ahead of the tooth (Figure 14). This problem was resolved with a Diode laser. After the laser gingivoplasty, an inverted high torque bracket[4] was bonded in a relatively ideal position to deliver -7° of torque to upright the root of #11 (Figure 15). The impacted cuspid was aligned with and the gingiva was healed in an ideal position within 14 days after gingivoplasty (Figure 16). Figure 17a-c shows the buccal view of the cuspid alignment and crossbite correction from 8-13 month of treatment. Meanwhile, the deep bite and Class II

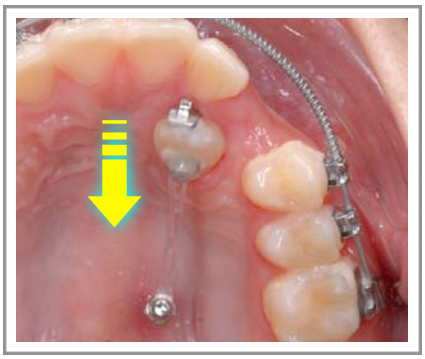


***Fig. 12a**. Use the palatal OrthoBoneScrew to drag #11 distally away from #10.*

***Fig. 12b**. Elastomeric chain attached from #12 to IZC screw to keep opening pathway for #11 to erupt.*

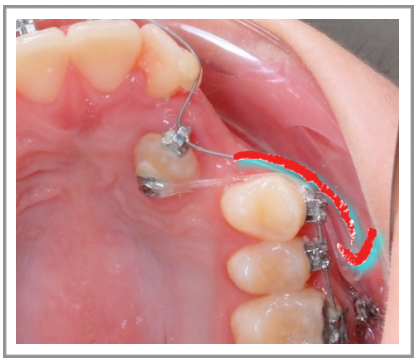


***Fig. 12c**. Elastomeric chain attached from #11 lingual button to IZC screw to drag it bucally.*

relationship were corrected with routine approach of bite turbos and Class II elastics. The progress panoramic radiographs from 2.5-16 months of treatment show the alignment relative to the anchorage bone screw. Note that there was no discernible root resorption on any of the adjacent teeth in the segment (Figure 18a-c).

High impaction of a maxillary canine is a difficult problem in orthodontics. When an impacted tooth is recovered, there is often a discrepancy in occlusion, root resorption and/or gingival compromise. The impaction recovery force system is a very important aspect of the treatment sequence for limiting these side effects. *For the present patient, the DI score was only 8 points. However, the clinical effort and skill to treat this patient is not adequately reflected by the current ABO version of the DI.* Although the DI has proven to be an effective indicator of treatment complexity (severity) for most patients, *it underestimates the difficulty of high canine impactions*. A revision of the DI more appropriately weight the difficult osseous impactions is indicated. An *impaction Specific Assessment System (iSAS)* to supplement the ABO DI is helpful when recognizing case difficulties.[7,8] For the subject of this case report, the iDI (impaction DI) score was 8 points. When added to the ABO DI score of 8 points, the total DI score was 16 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 2 points and the total CRE was 10 points (the original CRE score 8 + iCRE score 2). A revision of the CRE more strictly evaluate 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.

CONCLUSION

A thorough diagnosis, a well planned surgical strategy, and an efficient force system are essential components for efficient management of unfavorably positioned, high maxillary canine impactions. 3D radiographic imaging is important for precisely determining the relative position of the impacted canine to its adjacent teeth. This information is necessary for designing an effective treatment approach to consistently achieve optimal outcomes for these difficult clinical problems. Extra-alveolar endosseous bone screws are efficient anchorage for specialized mechanics, that does not compromise the alignment of adjacent teeth. The methods described are designed to produce an efficient recovery of palatally impacted cuspids.

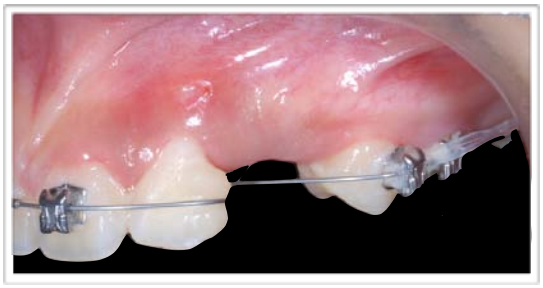


Fig. 13. *The .014 CuNiTi archwire was held by two stops made from flowable resin.*

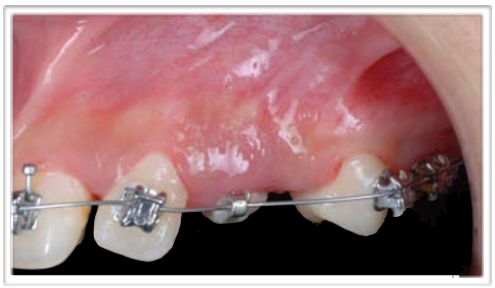


Fig. 14. *#11 was almost in the arch 2 months after the continuous .014 CuNiTi archwire. At this point, we bonded #10 with brackets.*

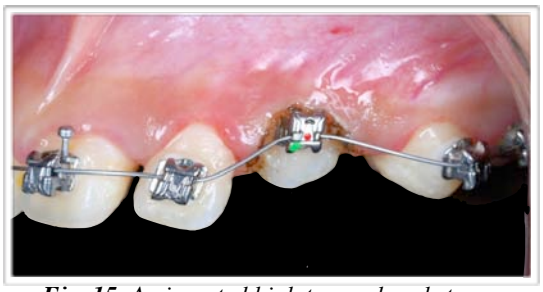


Fig. 15. *An inverted high torque bracket was bonded on #11 after gingivoplasty with a Diode laser.*

Fig. 16. *14 days after gingivoplasty.*

Fig. 17a. *8th months. Elastomeric chain extended from IZC screw to palatal side of #11 to drag it buccally.*

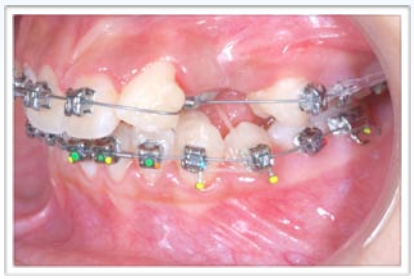


Fig. 17b. *10th months. Lower arch bonded with bite turbo on #22 and cross-elastic (2oz, Quail) from #11 to #21 & #22.*

Fig. 17c. *13th months. #11 almost aligned. Started Class II elastic (2oz, Quail) from #9 to #22 to correct upper dental midline.*

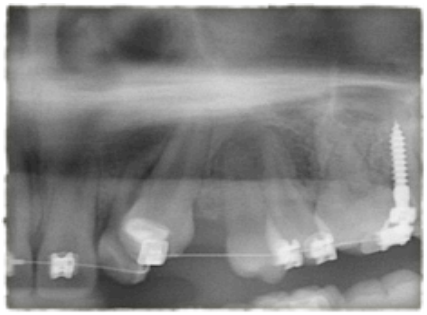


Fig. 18a. *2.5 months after orthodontic traction of #11 started.*

Fig. 18b. *4 months after orthodontic traction of #11 started.*

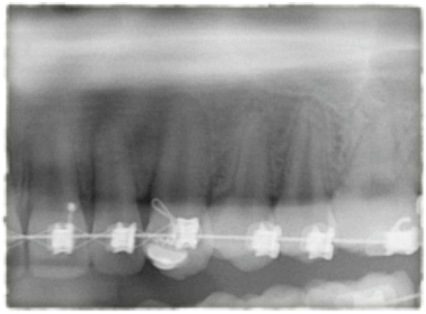


Fig. 18c. *16 months after orthodontic traction of #11 started.*

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2. Heloisio de Rezende Leite et al: Labially displaced ectopically erupting maxillary permanent canine: interceptive treatment and long-term results. Am J Orthod Dentofacial Orthop 2005;128:241-51
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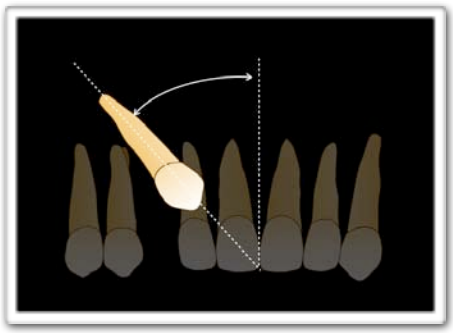
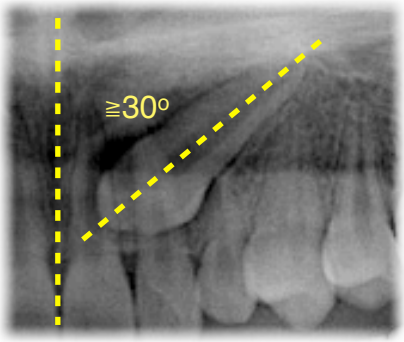
impaction Discrepancy Index

8

1. Angulation of the canine to the midline in degree

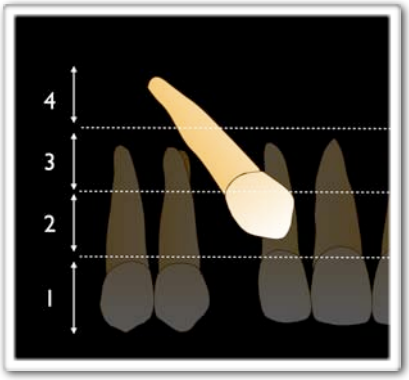


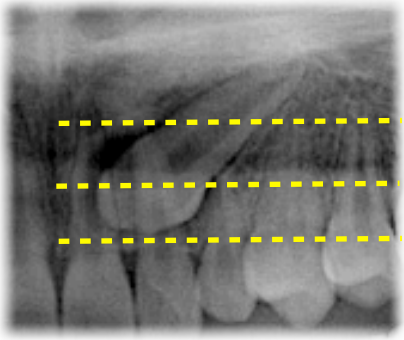


Grade 1 : 0° ~ 15° = 1 pt.
Grade 2 : 16° ~ 30° = 2 pts.
Grade 3 : ≧ 31° = 3 pts.

Total = 3

2. Vertical distance from the occlusal plane

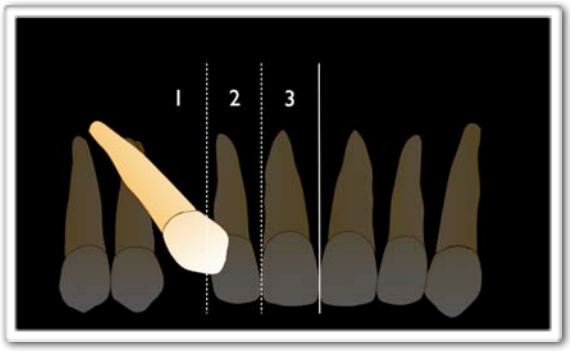


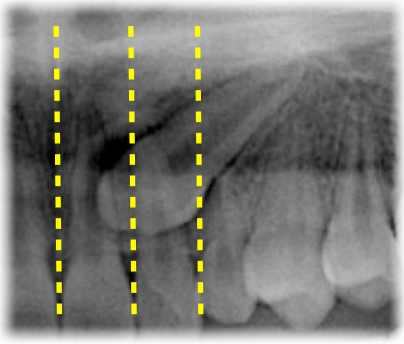


Grade 1 : Below the level of the CEJ = 1 pt.
Grade 2 : Above the CEJ, but less than halfway up the root = 2 pts.
Grade 3 : More than halfway up the root, but less than the full root length = 3 pts.
Grade 4 : Above the full length of the root = 4 pts.

Total = 2

3. Mesiodistal position of the canine tip





Grade 1 : No horizontal overlap = 1 pt.
Grade 2 : Overlap with lateral incisor = 2 pts.
Grade 3 : Overlap with central incisor = 3 pts.

Total = 3

DISCREPANCY INDEX WORKSHEET

CASE # _____ **PATIENT**

TOTAL D.I. SCORE 8+8 = 16

EXAM YEAR
ID#

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 = 2

OVERBITE

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

Total = 2

ANTERIOR OPEN BITE

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

Total = 0

LATERAL OPEN BITE

2 pts. per mm. per tooth

Total = 0

CROWDING (only one arch)

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

Total = 2

OCCLUSION

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

Total = 0

LINGUAL POSTERIOR X-BITE

1 pt. per tooth Total = 0

BUCCAL POSTERIOR X-BITE

2 pts. per tooth Total = 0

CEPHALOMETRICS (See Instructions)

ANB ≥ 6° or ≤ -2° = 4 pts.

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

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

SN-MP

≥ 38° = 2 pts.

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

≤ 26° = 1 pt.

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

1 to MP ≥ 99° = 1 pt.

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

Total = 0

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. =	2
Midline discrepancy (≥3mm)	@ 2 pts. =	_____
Missing teeth (except 3rd molars)	_____ x 1 pts. =	_____
Missing teeth, congenital	_____ x 2 pts. =	_____
Spacing (4 or more, per arch)	_____ x 2 pts. =	_____
Spacing (Mx cent. diastema ≥ 2mm)	@ 2 pts. =	_____
Tooth transposition	_____ x 2 pts. =	_____
Skeletal asymmetry (nonsurgical tx)	iDI @ 3 pts. =	8
Addl. treatment complexities	_____ x 2 pts. =	_____

Identify:

Total = 10

impaction Cast-Radiograph Evaluation iCRE

Total Score: = 2

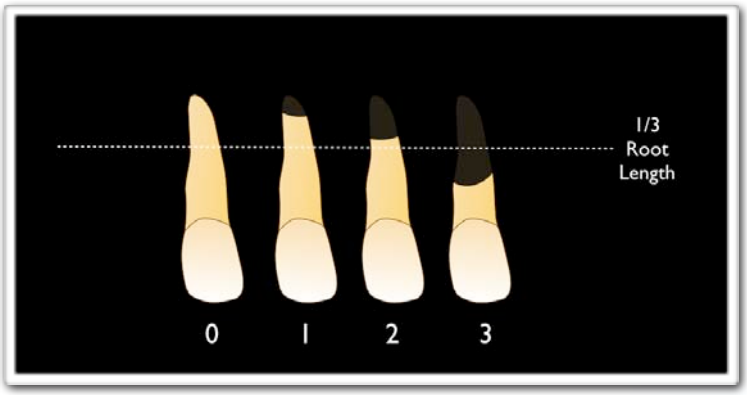
1. Gingival esthetic score

Total = 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

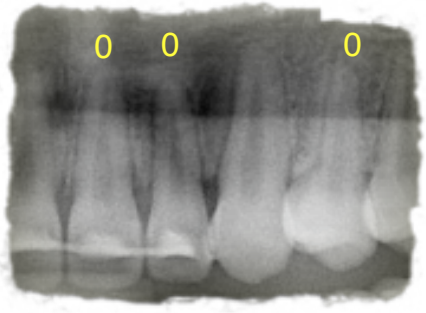
1. Mesial Papilla	(0)	1	2
2. Distal Papilla	(0)	1	2
3. Curvature of Gingival Margin	(0)	1	2
4. Level of Gingival Margin	0	(1)	2
5. Root Convexity (Torque)	0	(1)	2
6. Scar Formation	(0)	1	2

2. Root resorption of the adjacent teeth



Total = 0

Normal apical contour	0
Apical irregularity	1
Apical root resorption less than one third original root length	2
Apical root resorption more than one third original root length	3



Normal apical contour	(0)
Apical irregularity	1
Apical root resorption less than one third original root length	2
Apical root resorption more than one third orignal root length	3

Exam Year
ABO ID#

Examiners will verify measurements in each parameter.

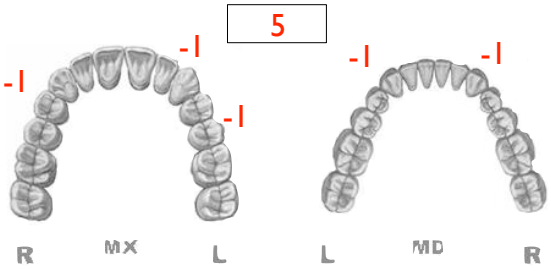
ABO Cast-Radiograph Evaluation (Rev.

Case # **Patient**

Total Score: 9+2 =11

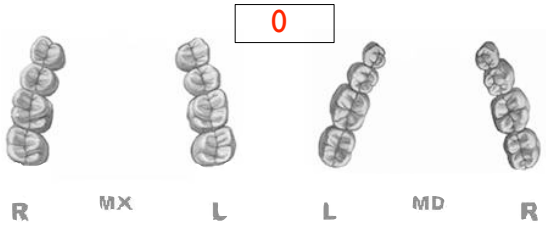
Alignment/Rotations

5



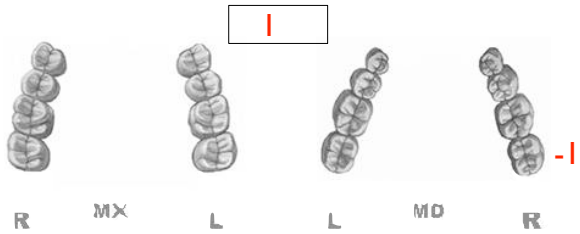
Marginal Ridges

0



Buccolingual Inclination

I

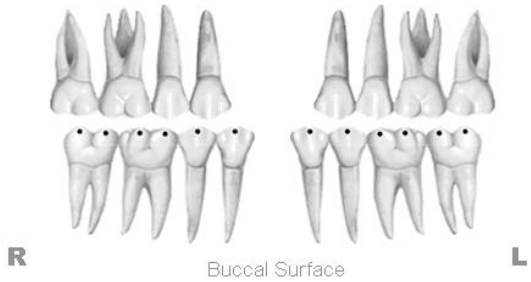


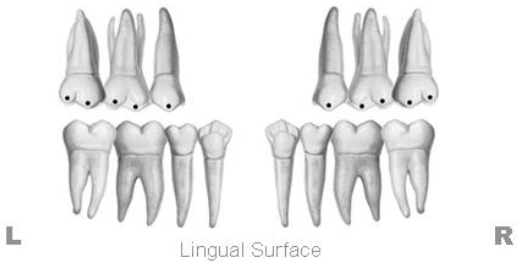
Overjet

0

Occlusal Contacts

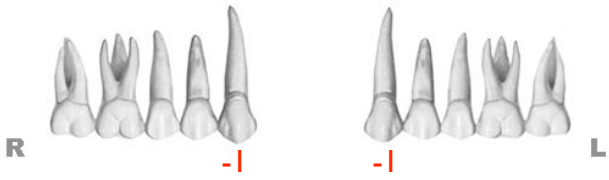
0





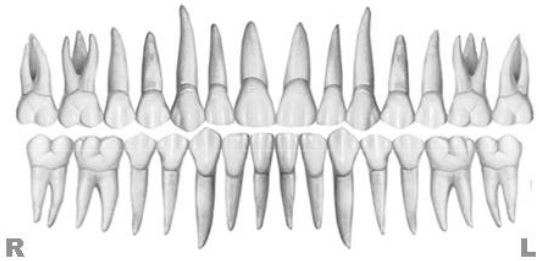
Occlusal Relationships

2



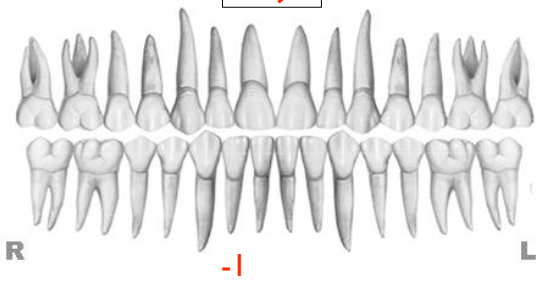
Interproximal Contacts

0



Root Angulation

9



iCRE 2

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

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Session 4: Extraction vs. Non-extraction analysis	Session 10: Case Demo and Analysis (3)
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Session 6: Biomechanics and Finish Examination	

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Session 3: (L) Impacted Teeth: Ant. vs. Post	Session 9: Perio-Ortho
Session 4: Missing: Ant. vs. Post.	Session 10: Implant-Ortho
Session 5: Crossbite: Ant. vs. Post	Session 11: IDT
Session 6: Deep Bite vs. Open Bite	

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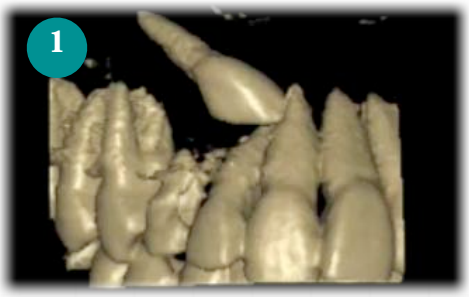
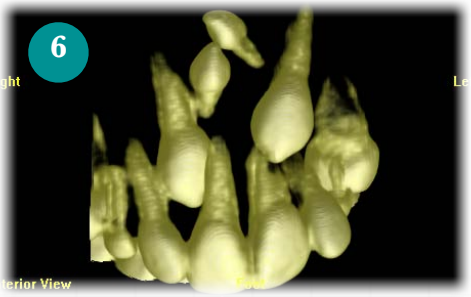
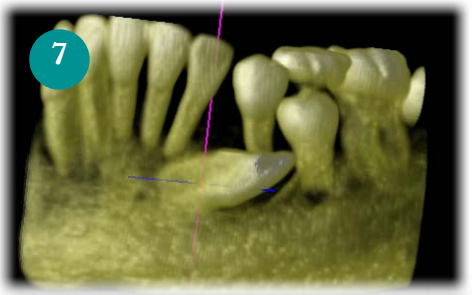
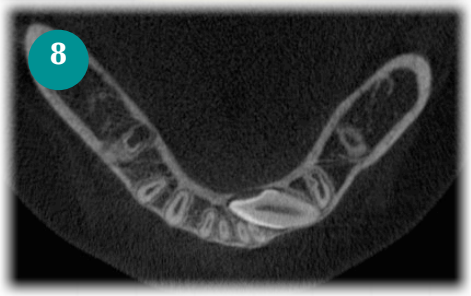
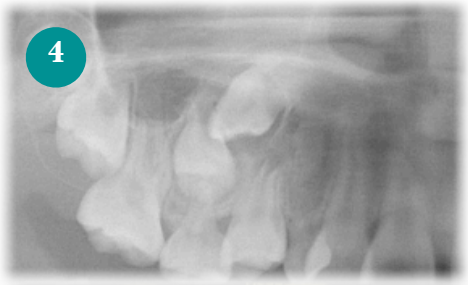
The 10 Applications of OBS on the Impacted teeth

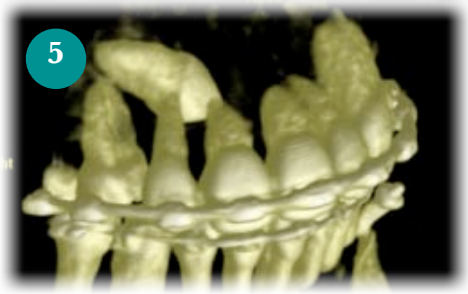












OrthoBoneScrew

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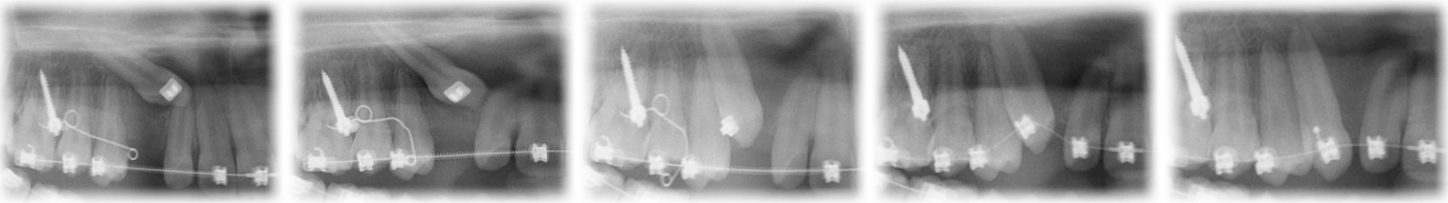
Upper labially impacted cuspids 1

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.

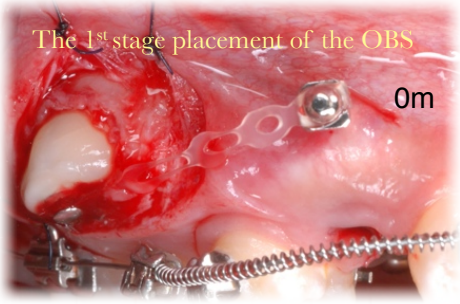
Mechanics design:

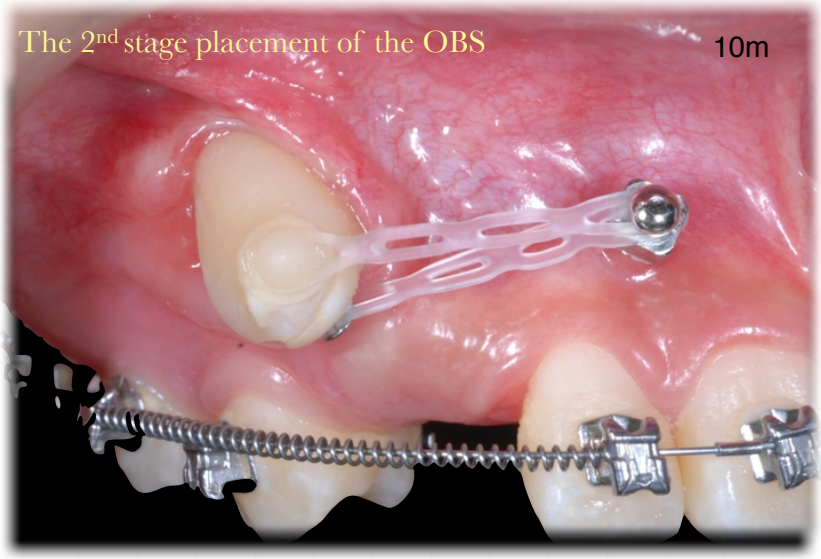
A 0.017 x 0.025-inch TMA lever arm was consisted of a helical coil on one end and helical attachment on the other end. When this lever arm was inserted in the square hole in the OrthoBoneScrew (located at infrazygomatic crest) and activated, it could build a force system which distalized the canine first, 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.



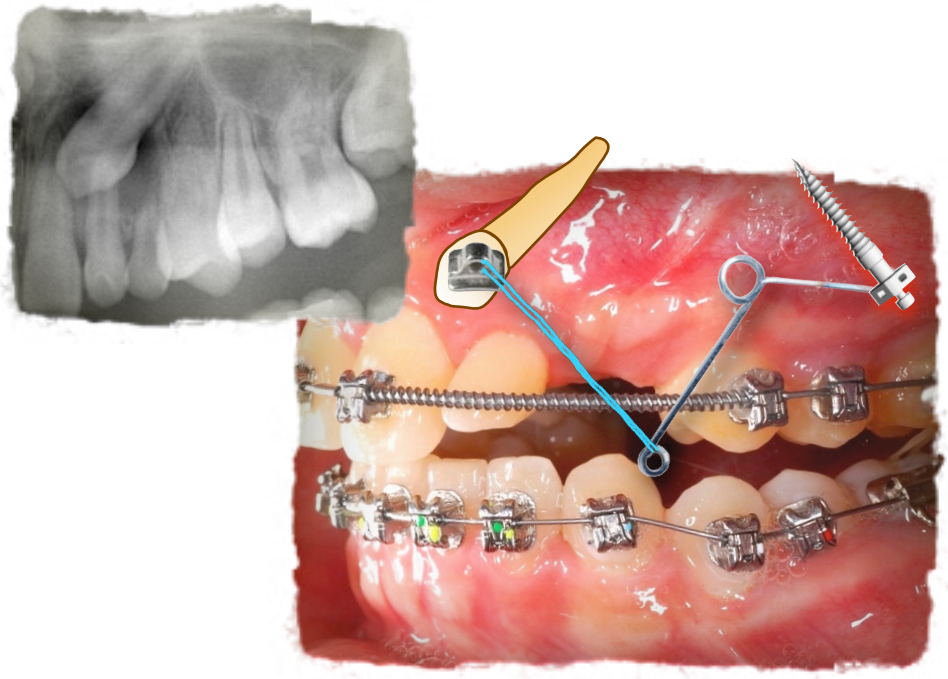
Upper labially impacted cuspids 2

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.

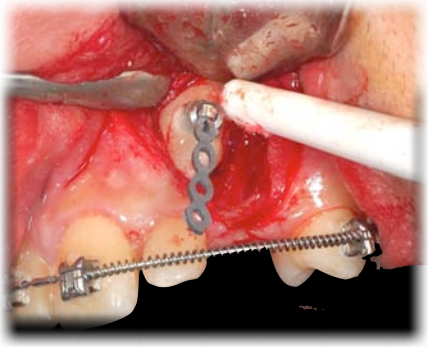




Upper labially impacted cuspids 3



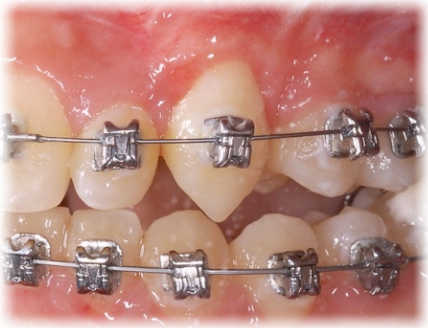
Firstly the space was created by NiTi opening spring between #21 & #24 without engaging adjacent tooth during switching. Secondly a modified apically positioned flap was designed to expose the impacted canine. Then a 3D lever arm was inserted in the square hole of OBS, and attached to the impacted canine 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.



0m

1m

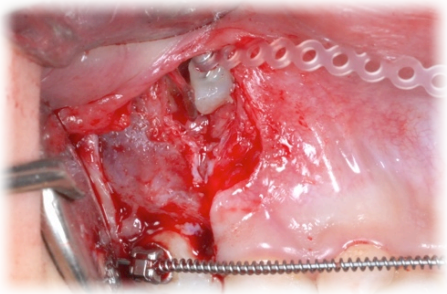
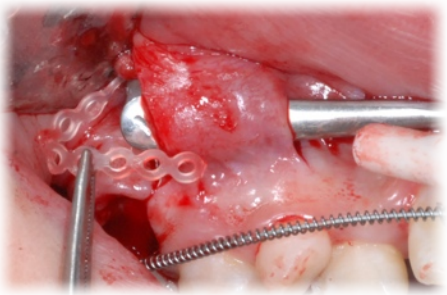
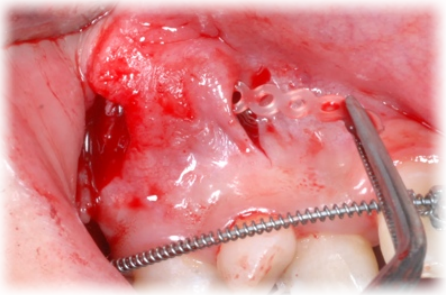
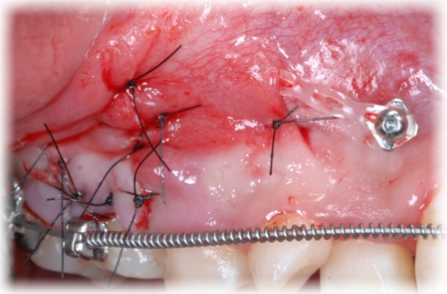
3m

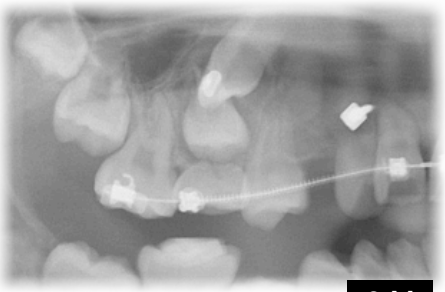


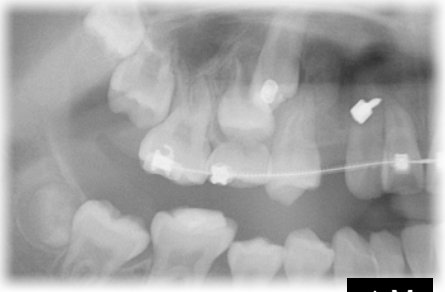
8m

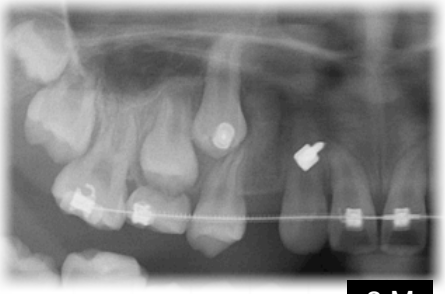
Upper labially impacted cuspids 4

Closed eruption technique combined with **V**ertical **I**ncision **S**ubperiosteal **T**unnel **A**ccess **VISTA** (Dr. Homa Zedah, USC)

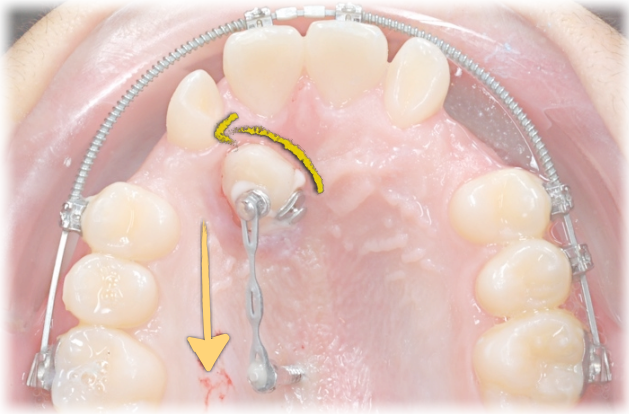




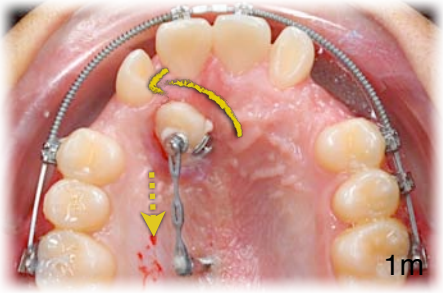


In this case, closed eruption technique was chosen for primary wound healing which is more comfortable than APF. The VISTA technique can not only avoid the 2-stage placement of OrthoBoneScrew but also offer a good connection between the OBS and the covered transpositional cuspid. Meanwhile, one should keep OBS as high as possible to make the switch easier. After 2 months of treatment, this transpositional cuspid has been pulled mesially for 3~4 mm.

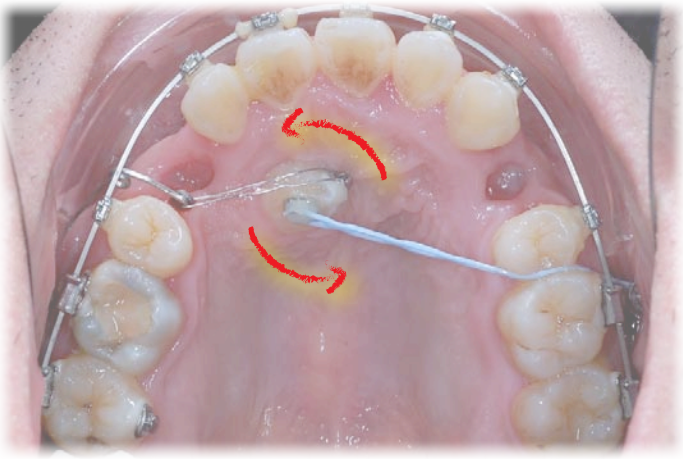
Upper palatally impacted cuspids 5



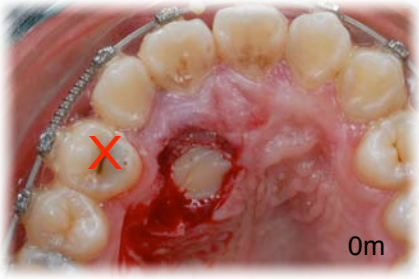
Firstly, the space was created by open coil spring. Secondly, the impacted canine was uncovered to allow auto-eruption. After the canine erupted, a rotating force system was created by a palatally inserted OBS, and an elastic chain connecting to the archwire. Once the impacted canine moved within the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



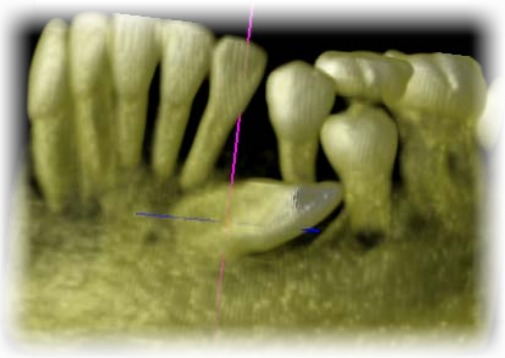
Upper palatally impacted cuspids 6



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.

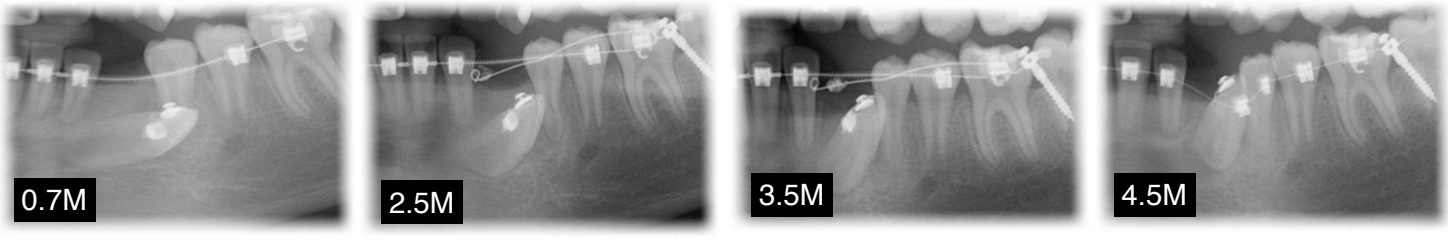


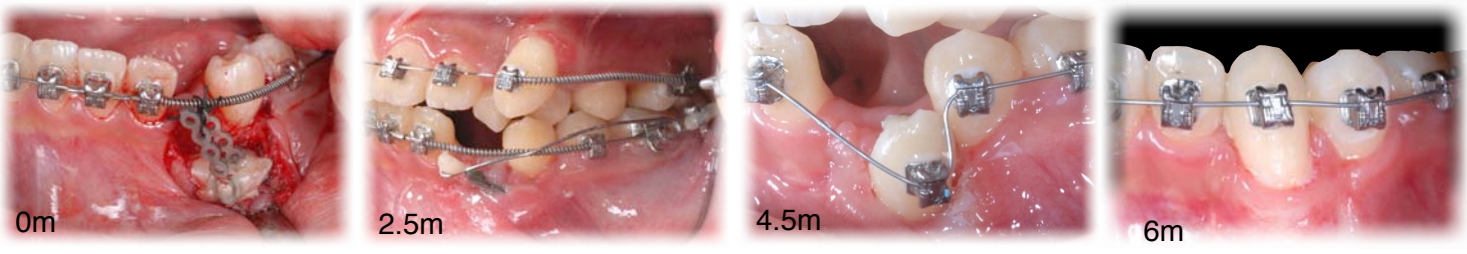
Lower horizontal impacted cuspids 7



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.



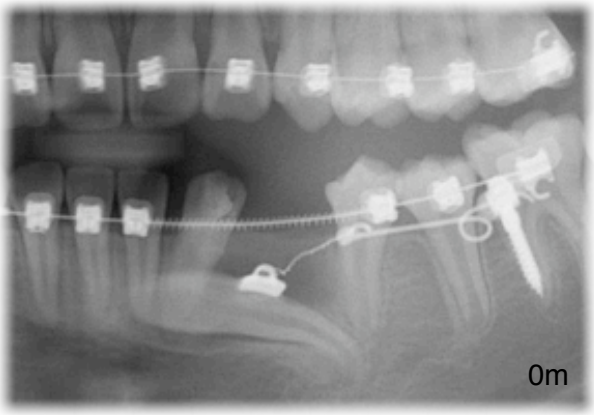


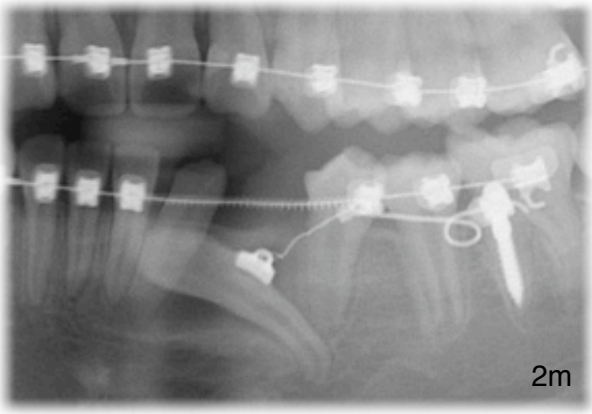
Sublingual trans-alveolar impacted cuspids

8

1st surgery

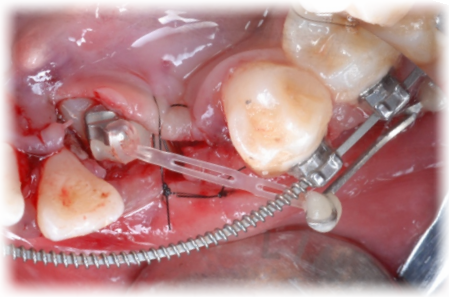
The force system was designed by a 0.019 x 0.025-inch SS lever arm and the OBS which was located at buccal shelf. When this lever arm was inserted in the square hole in the OBS and activated, it could upright the trans-alveolar canine first, then moved buccally, and finally elevated to the reserved canine space. During the exposure surgery, it was important to keep the operation field as superficial as possible on both the labial



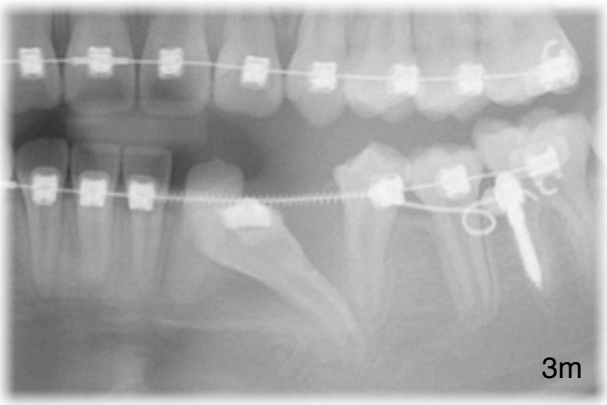


Sublingual trans-alveolar impacted cuspids

2nd surgery

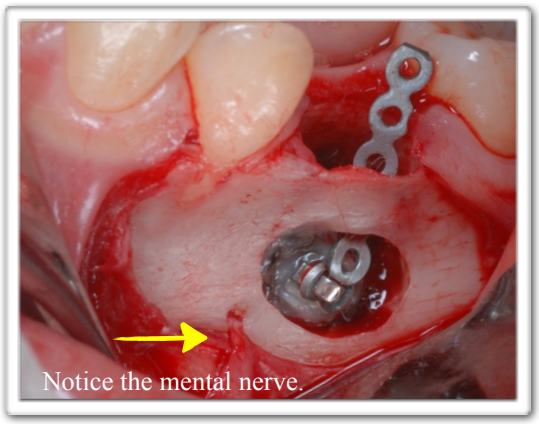


and lingual side to avoid cutting the mental nerve and sublingual artery. This safety consideration led to a restricted bonding position of the eyelet on the surface of the root. 2 months after the operation, the horizontal impacted canine was uprighted successfully, and the 2nd exposure surgery aimed to change the position of the eyelet to the crown. By adjusting the lever arm, the tip of the impacted canine revealed in the oral cavity 2 months later.

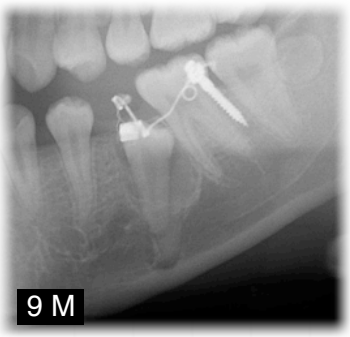


Lower impacted premolar

9

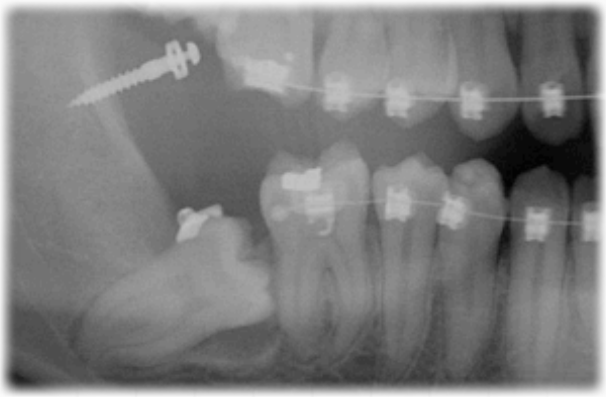


A 13-year old female had a lower impacted 2nd premolar, approximately 10 mm deep on the left side. The treatment plan was to extract the 2nd primary molar and pull out the 2nd premolar. During the treatment, the 2nd primary molar was first extracted, followed by bonding an eyelet bracket on the surgically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

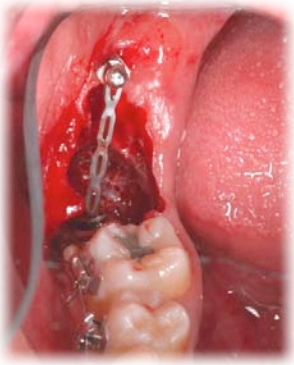


Lower impacted molar

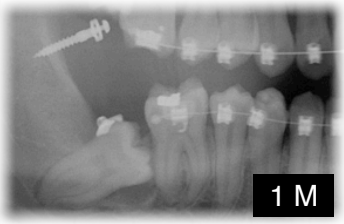
10

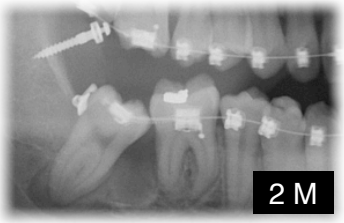


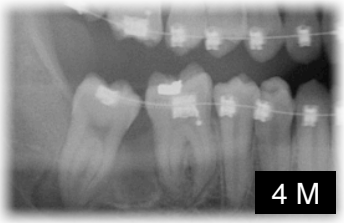
A 19-year-and-10-month-old male had lower impacted second and third molars on the right side. The treatment plan was to extract the 3rd molar and upright the 2nd molar. During the treatment, the third molar was first extracted, followed by exposing the second molar surgically. Meanwhile, the bone surrounding 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.



2m







Technology Facilitates Patient Communication: Applications at the Beethoven Orthodontic Clinic

Tzu Han Huang

"Good content alone does not guarantee a good presentation,"

...to focus on how to communicate your treatment plan in a clear and simple way so everyone can appreciate the need for treatment.

-Dr. Chris Chang

Patient communication- key to success

How to make patients feel their problems are thoroughly analyzed and can be easily handled at a reasonable cost is a constant challenge for dentists. When Dr. Chris Chang first opened his practice in Hsinchu, Taiwan after receiving his Ph.D degree in Orthodontics from Indiana University-Purdue over a decade ago, he only had two patients in the first month. It was a solemn reminder for Dr. Chang that providing excellent treatment to patients alone is good, but not enough to satisfy patients' needs and distinguish oneself in this field. "Excellent treatment is of little use if doctors and assistants can't convince patients into treatment with effective communication."

Dr. Chris Chang, founder of the Beethoven Orthodontic Clinic, likes to say he was going to be a preacher before becoming an orthodontist and a professional lecturer. In his view communicating with patients is like making a presentation to them. "Good content alone does not guarantee a good presentation," he says. Instead, the caveat is to focus on how to communicate your treatment plan in a clear and simple way so everyone, whether it's the teenage daughter seeking treatment or her mother, even her grandmother can appreciate the need for treatment.

Dr. Chris Chang (right) is explaining the case to a group of international doctors using iMac and iPad.

With the aid of technology patient communication has become more visual and accessible than ever before.

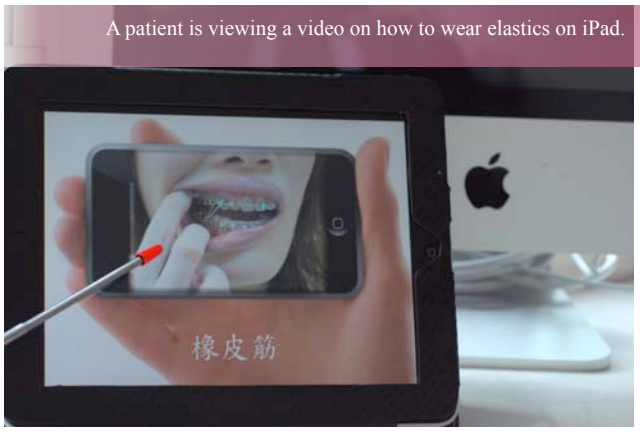
Technology-aided communication- more visual and accessible

Most people agree technology has transformed doctor/ patient communication in the modern world. Good use of technology increases efficiency, ensures consistency, lowers material costs and subsequently generates success. In Beethoven a typical clinical session lasts only 5 hours during which doctors have to see over 80 to 100 patients. Technology is a really important vehicle to ensure patient communication is informative, easily understood and still efficient. Beethoven's dental education is a great example of how we use technology to guide our communication with patients.

Mac + Keynote- maximum visual impact

Against the traditional beliefs that patient communication is mostly about building rapport between patients and doctors, in Beethoven most of the patient communication is done by assistants with patients and parents. For example, in a typical one-hour free initial consultation session, doctors spend about 5 minutes in two times to first examine the patient on the chair and formulate a treatment plan using Keynote, a Mac presentation software, to explain to the patient. The rest of the session is filled up by data collection and consultation on treatment process, types, and fees done by the assistants. In the Keynote presentation assistants will first give the patient a five minute orientation about what's going to be done in the next hour, followed by taking photos and X-rays. Immediately after collecting the patient's data, assistants will begin to organize the digital images and put them into a customized Keynote template. In merely 10 to 15 minutes the patient can see his or her photos on a 27" iMac, Apple's largest desktop computer. "The reason we use a 27", instead of a 21.5", is because we want to have a significant impact on the patient when seeing his or her own conditions shown up on a screen with high-resolution," says Dr. Chang. In addition to just showing the patient's own pictures, Dr. Chang would immediately inform the assistant which type of the patient this is so the assistant can then pick out a similar type of case and demonstrate the before and after results to the patient. "Besides using still photos, we use Morpheus to show patients the changes in other cases of a similar type. The animated video clips showing movement of the teeth is a very clear and powerful demonstration to help

An assistant uses Keynote on iMac to provide initial consultation for the patient.



A patient is viewing a video on how to wear elastics on iPad.


You can view your case file on iPad even when you're lying on the chair.

dental hygiene is very critical in preserving dental health. It's our routine practice to teach patients on how to brush teeth properly. In the Keynote presentation clear headings, high-resolution photos, and short video clips, instead of lots of text and bullet points are used to create an image-based presentation. "No sophisticated equipment is needed to create a visually rich presentation. We just want you to see what we mean, plain and simple," Dr. Chang explains from his years of experience teaching professional presentation skills.

Mac + Keynote- consistency and efficiency

Another reason that Beethoven started to use standardized patient consultation presentation is to ensure consistency and quality of communication. Frequent turnover rate in dental clinics and the associated training costs are common challenges for dentists. "Providing patient consultation is as easy as telling a story from a picture book, only with more photos and videos," adds Dr. Chang. "The story told to our patients should be accurate and consistent. In order to ensure this goal, the content should be easy to change but standardized across the board."

"No sophisticated equipment is needed to create a visually rich presentation. We just want you to see what we mean, plain and simple."

-Dr. Chris Chang

Mobile technology-more patient oriented and more fun

"While we continue to use desktop computers combined with Keynote to conduct most of our communication, we have started to introduce iPad to our patients because people just love it so much," adds Dr. Chang. "Beethoven is always exploring new technologies to improve our communication with patients. The popularity of iPad and its mobility and ease of use make us believe it will soon replace the bulky monitors fixed besides most dental chairs in clinics." While most clinics use computer monitors or flat screen TV just to passively show images sent from a remotely controlled computer, iPad provides a cheaper and more flexible choice to not only present images but run presentation, play games and many more.

"Currently we have converted our dental education presentations into short videos so patients can watch

them while they're waiting on the chair. Patients can choose a topic of their interests and enjoy it at their own pace. This really gives patients and parents more freedom to explore treatment-related information that are not covered in the consultation session but are made available to them." Learning on an iPad just makes the experience easier and more fun, than reading some old pamphlets or heavy books. "If you are not into dental health, you can check out some fun games, or simply update your Facebook status while you're sitting on a dental chair." Dr. Chang emphasizes, "we believe by providing patients what they want, that is excellent treatment, and informative communication in an engaging way, we can bring about patients' happy smile."

Future Plan-application for iPad/iPod touch/iPhone

Having trouble with your elastics? Don't know what an orthodontic bone screw is for?

Beethoven is currently working with a team of engineers to develop its own application for iPad. "The benefits of using it wherever you are, whenever you want is really attractive for a lot of our patients and doctors as well," adds Dr. Chang. "We have accumulated a lot of good visual content on patient education and orthodontic consultation over the years. The wide software platform, Apps store, combined with the exceptional hardware quality, iPad, that Apple provides are the two main reasons for us to adopt the pair as our future primary communication tools."

the Herman Ostrow School of Dentistry of USC

USC UNIVERSITY OF SOUTHERN CALIFORNIA

UNIVERSITY OF SOUTHERN CALIFORNIA'S COMPREHENSIVE IMPLANT AND ESTHETIC DENTISTRY SYMPOSIUM

TAIWAN 2011

南加大植牙課程體驗學術研討會

4/23/2011 (六) 9:00am - 6:00pm

集思交通部國際會議中心. 台北市中正區杭州南路一段二十四號

報名費

3/15/11前報名:美金$120

3/15/11後報名:美金$150

現場報名:美金$200

Dr. Homa Zadeh
(Symposium Chair)

Dr. Avishai Sadan
(Web-Based Lecture)

Dr. Casey Chen
(Web-Based Lecture)

Dr. Baldwin Marchack

Minimally Invasive Surgery in Implant Therapy

Comprehensive Esthetic Dentistry - An Update

Clinical and Microbiological Assessment and Management of Peri-Implant Diseases

Fixed Esthetic Implant Supported Restoration

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USC UNIVERSITY OF SOUTHERN CALIFORNIA

USC Comprehensive Surgical and Restorative Implant Training Program in Taiwan

南加大植牙專科進修課程

2011

時間:

7/9~7/10, 2011 (六，日 - 演講與實作workshop)
8/14, 2011 (日 - 視訊教學)
9/17~9/18, 2011 (六，日 - 演講與實作workshop)
10/2, 2011 (日- 視訊教學)
11/12~11/13, 2011 (六，日 - 演講與實作workshop)
12/11, 2011 (日 - 視訊教學)
1/25, 2012 (三 - 美國演講)
1/26, 2012 (四 - 美國可選修的cadaver workshop)
1/27~1/28, 2012 (五，六 - 美國演講)
1/29, 2012 (日 - 美國可選修的cadaver workshop)
1/30, 2012 (一 - 美國演講，畢業典禮)
9:00am - 6:00pm

地點: 集思交通部國際會議中心. 台北市中正區杭州南路一段二十四號. (2011年7月到12月)
Wilshire Grand Hotel. 930 Wilshire Blvd., Los Angeles, CA 90017. (2012年1月)

報名費: 台北和美國課程(包含USC牙醫學院發出的培訓證書)
6/1/11前報名:美金$8500 • 6/1/11後報名:美金$9000

台北課程(不含USC牙醫學院發出的培訓證書)
6/1/11前報名:美金$5950 • 6/1/11後報名:美金$6450

可選修的Cadaver Workshops on Bone and Soft Tissue Grafting課程(不含USC牙醫學院發出的培訓證書)
9/1/11前報名:每一堂課美金$1115 • 11/1/11前報名:每一堂課美金$1395 • 11/1/11後報名:每一堂課美金$1595

南加大講員陣容

Homa Zadeh ★ Avishai Sadan ★ Baldwin Marchack ★ Casey Chen ★ Domenico Cascione
Ilan Rotstein ★ Yang Chai ★ Songtao Shi ★ Parish Sedghizadeh ★ Ramin Mahallati

演講嘉賓: Stephen Wallace ★ Lyndon Cooper ★ Fernando Rojas-Vizcaya ★ Clark Stanford

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An Innovative Type of Implant for Fresh Extraction Sockets of Seriously Compromised Multi-rooted Teeth: The "RESCUE" Implant (Part 2)

Felice P[1], Park KB[2], Corvino V[3], Pistilli R[4], Pellegrino G[5], Checchi V[1], Piattelli M[3]

Introduction

Wide diameter implants are indicated in maxillary posterior cases because they create an ideal support for the following prosthetic rehabilitation. They can tolerate high occlusal loads[1] with consequent marginal bone resorption reduction[2-6]. Meanwhile, the high interface with supporting bones reduces the risk of locking screw fracture[7-8].

Clearly in these situations the distance between mesio-buccal and/or bucco-lingual walls is greater than 6 mm in fresh extraction sockets; the interradicular septum is inadequate while a residual basal bone height is less than 7 mm from the maxillary sinus or the mandibular nerve.

When these particular clinical situations were present in the past years, dentists did not have a n ideal therapeutic option and implant therapy had to be postponed for three or four months until socket healing. Nowadays the use of wide diameter implants[9-10] (> 6 mm) allows dentists to perform an immediate implant therapy using mesio-distal and/or bucco-lingual walls of the socket, although the interradicuar septum has an inadequate thickness, height or is totally absent.

The aim of this multicentric retrospective study is to evaluate clinical utility and effectiveness of Rescue® implants (*Rescue® Implant Eupchun-ri 114-8, Jain myun, Gyeongsan, Kyungsangbuk-Do, South Korea*) in fresh extraction sockets after the extraction of seriously compromised teeth or removal of failed implants.

MATERIALS AND METHODS

1. Inclusion criteria

Patients with mandibular and maxillary compromised posterior teeth, including natural teeth and failed implants, were included in this study. Concerning smoking habits patients were splitted into non smokers, moderate smokers (≤ 10 cigarettes/day) and heavy smokers (≥ 10 cigarettes/day).

Before the surgery each patient signed a consent form.

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2. Implants used

- Implant design

Rescue Internal Trip® implants were used (Fig 1) in this study. 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 (Resorbable Blast Material) surface achieved through sandblasting with hydroxyapatite particles and characterized by a high Ra value (1.7 um).

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

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, in order to achieve a better primary stability. Since the platform diameter is smaller than the implant body, it takes place a platform switching to advantage the biological width.

- Radiographic analysis

During the clinical examination a periapical radiograph was taken in order to evaluate the bone level. The same procedure was performed after tooth extraction in order to determine if the residual bone septum was adequate or not, as shown in fig. 5 – Part 1, after implant placement and during the follow up period at the 12 and 24 month to evaluate any potential bone resorption.

Radiographic analysis was performed by an indipendent examinator using a measurement software: UTHSCSA Image Tool 3.0 (*Texas University, Health Science Center, San Antonio, USA*). Radiographs were digitalized and converted into a TIFF format with a resolution of 600 dpi. Radiographs were calibrated on the known implant height and measurement was performed parallel to implant axis (Fig. 2).

Bone level was calculated from the most coronal point of the fixture platform to the first bone-implant contact, mesially and distally. The average of these data was adopted as the bone-implant level. The same

Fig. 1. *Rescue Internal Trip® view by scanning electron microscopy (Jeol 5200, Tokio, Japan).*

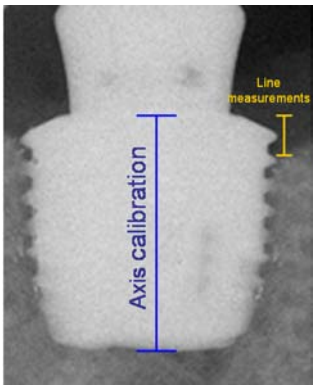

Fig. 2. *Simplified pattern of the radiographic measurement procedures.*

measurements were taken at baseline and then repeated during each next follow-up.

3. Surgical procedures

To each patient, as prophylaxis, were administred 2g. of Amoxicillin one hour before the surgical procedures. Patients allergic to penicillin were administred 600 mg of Clindamicin.

Before disinfecting the perioral skin with a iodopovidon (Betadine®) solution, a periapical radiography was taken in the surgical area of interests.

Patients were then asked to rinse for 60 seconds with a mouthwash of gluconate chlorhexidine 0.2%.

After applying peripheral anaesthesia with articaine 1:100,000, the exctracion was performed in a less traumatic way, to preserve both socket walls and intra-radicular septum. Granulation tissue from the extraction socket was removed carefully with a surgical curettage.

- Implant protocol

Rescue Internal Trip® implant placement needs a really short surgical sequence (Fig. 3). The first bur is a trephine that can be used with some depth limitators and the diameter is selected in relation to the socket width and consequently to the diameter of the selected implant. The second bur is a pilot bur used to extend the osteotomy and only if cortical bone is present would a threading tap be used.

The last step of the surgical procedure is the fixture insertion, placed 2 mm under the bone crest (Fig. 4 a-f).

When the distance between implant surface and socket walls was higher than 2 mm, mainly mesially and distally, the bone core obtained with the trephine was grinded and the particles were grafted into the gap[11].

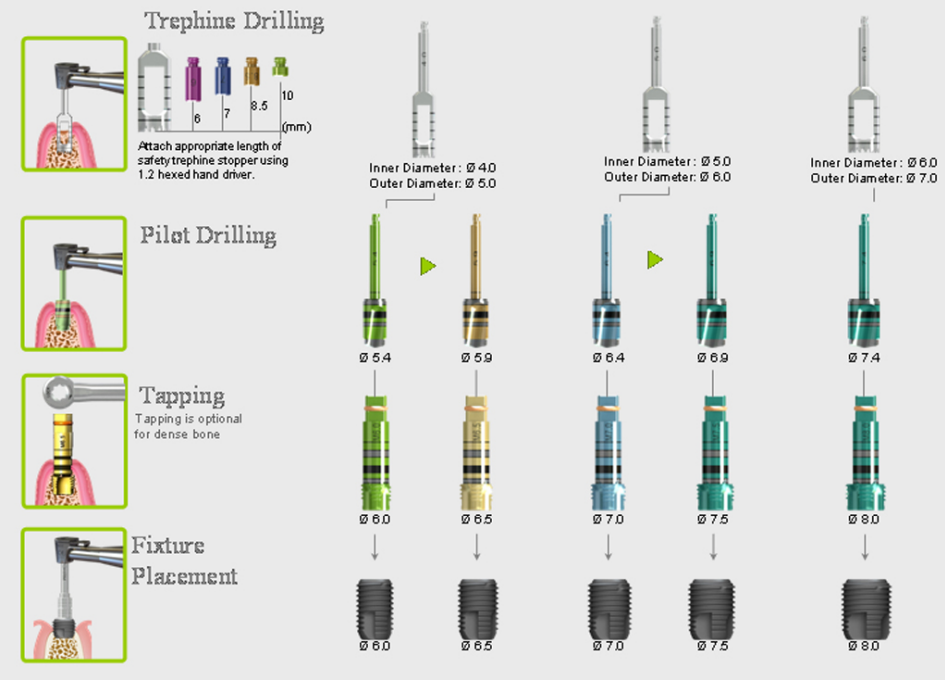

Fig. 3. *Surgical sequence for Rescue Internal Trip® implant placement.*

4. Statistical analysis

Data were stratified according to interest variables and were expressed in average (*min-max*). The comparisons between the groups were performed with the Kruskal Wallis non-parametric test and, if necessary, with the Dunn post-hoc test. The maximum threshold of significance was 0.05.

5. Results

From February to April 2008 forty-eight patients were enrolled (18 wimen and 30 men), with a mean age of 45 years (range 29-67), because they needed implant rehabilitations in maxillary or mandibular molar areas.

Patients and placed implants characteristics are reported on table 1.

Even if our cases are all in unfavourable clinical conditions (Fig. 5,6,7), only two implant failures were registered, one before the second surgical stage and the other during the prosthetic procedures. These two failed implants were placed in a first mandibular molar socket and in one case the residual septum was classified as inadequate in height and in the other as totally absent.

However, in both cases failure happened before functional load and consequently it is likely that implants were fiberintegrated and not osseointegrated.

The amount of bone resorption after 12 and 24 months from the functional load was measured and no statistically significant differences were found either in relation to the diameter or implant lenght (Tab. 2).

Implant diameter resulted higher than 7 mm in partially conserved bone septa and higher as well when no septum was present (Tab. 3). Bone resorption after 12 and 24 months was not correlated to the type of the residual interradicular septum (Tab. 4).

DISCUSSION

Implant survival percentage of the present study is 95,8%, in collusion with data in the literature that

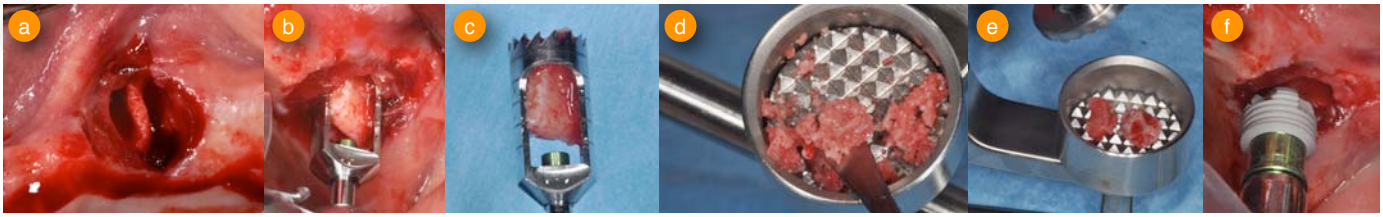

Fig. 4 (a-f). *Implant protocol. The extraction socket shows a bucco-palatal interradicular septum suitable in height and thickness (a). The first bur of the surgical sequence is a trephine (b). The evident advantage of using this bur is that a real autologous bone graft can be harvested. The bone core dimensions can also be very big, depending on diameter and lenght of the trephine (c). The second and last bur used in D3 and D4 bone is a pilot bur. The bone harvested, using a bone grinder (Bone Mill ®) (d), is crushed into small dimensions particles (e), that will be packed into the gap between implant surface and bony walls if the gap is > 2 mm. The last step is the implant placement (f).*

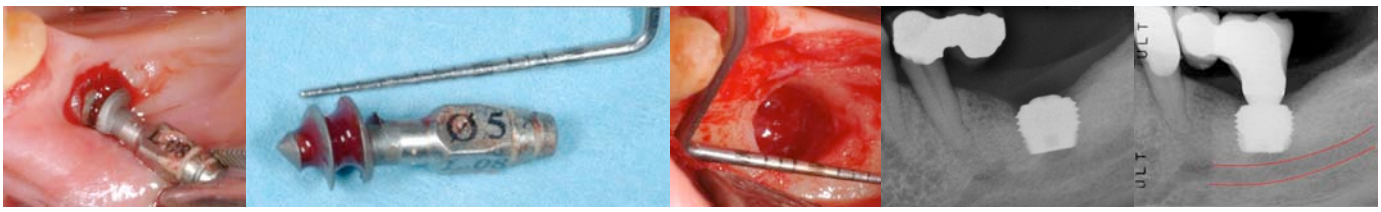

Fig. 5 (a-e). *Mandibular implant removed due to peri-implantitis (a,b). Residual bone crest with adequate width but with reduced height over the mandibular canal. Implant site preparation for a wide diameter fixture (c). Clinical control at baseline (d) and after 12 months (e).*

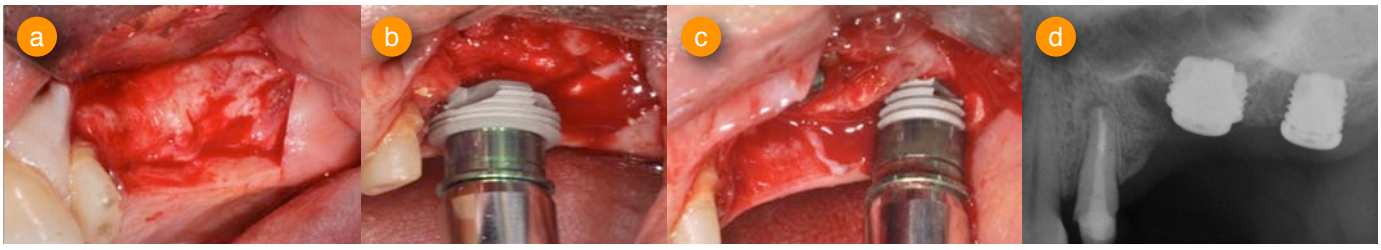

Fig. 6 (a-f). *Superior maxilla with residual bone crest with adequate thickness and reduced height under the maxillary sinus floor (a). Placement of two wide diameter implants (b,c). Radiographic control at baseline (d) and after 18 months (e). Intraoral view (f).*

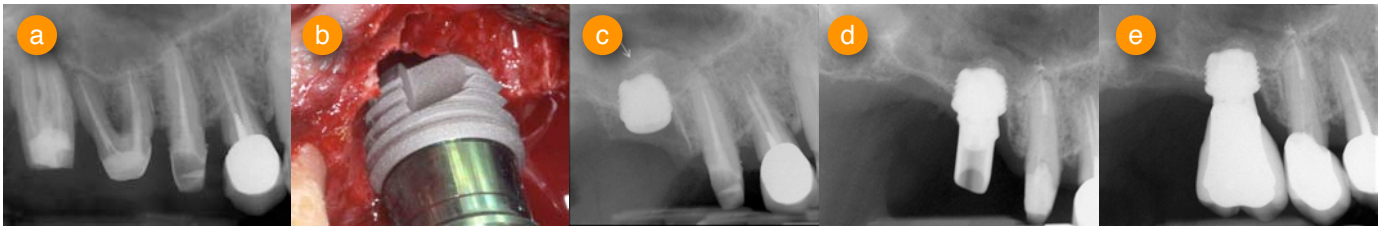

Fig. 7 (a-f). *First and second compromized superior molars to be extracted (a). Placement of one implant in place of the first molar with contemporary crestal sinus lift (b). Radiographic controls at baseline (c), after 4 months (d) and after 12 months (e), Intraoral view (f).*

indicates a tight correlation between implant survival and fixture diameter increase[12-16].

However, other authors reported high implant failure and crestal bone resorption percentages, related to wide diameter implants in the mandible[17–20], whereas only one study reported a lower survival percentage in the upper maxilla[21].

This is probably due to overheating of the implant site during the preparation, to the placement of wide diameter implants in residual bone crests with inadequate vestibular-oral width or to the placement of two implants too close to each other; all these factors determined secondary bone resorption, blood supply reduction and bone necrosis1.

Rescue® implant is characterized by a very brief surgical sequence that gives double advantages: reducing overheating and limiting clinicians errors.

Higher bone resorption values have been observed around wide diameter implants than standard diameter implants[1,21], but, as supported by the authors, this data is due to wrong modalities of implant site preparation that could cause a peripheral bone sequestrum.

The amount of bone resorption observed in this study after 12 and 24 months from the prosthetic load was 0.56 (0.10-1.88) and 1.28 (0.41-2.39) respectively, in collusion with data already present in the literature[21,23-26].

From our data, however, there is no statistical significance found in correlation between marginal bone loss and fixture dimensions (diameter and lenght) either after 12 or 24 months. This could be contributed to the implant design that allows a very good crestal bone preservation but also to the size of the sample examinated in the study.

Analysis of finally restored implants demonstrated that vertical and horizontal occlusal forces that affect implants are mainly distributed on the crestal bone than along the whole area of the bone-implant interface[27,28]. Most stress is located on the implant neck and decreases in inverse proportion on the implant-bone interface with the increase of osseointegration percentage[29]. In other words, the design of the implant-abutment interface plays a decisive role in the mechanical stresses distribution on the marginal bone[30].

Therefore, in recent years the use of wide diameter implants with increased platform, on one hand, increased the bone-implant interface and gained a wider contact surface; on the other side, due to the dimensional scrap between the implant platform diameter and the prosthetic tools, facilitated a wide platform switching with evident positive impact on marginal bone loss[2-6].

Based on the findings in this study, we believe that wide diameter implants represent a valid alternative to postponed implant and to the regenerative surgery in

Total number of implants	48			
Sex	M		F	
	30		18	
Age	Average			
	45			
Smoke	0	>10	<10	
	21	7	20	
Maxillary	Superior		Inferior	
	22		26	
Implant diameter	<7 mm	7mm	8mm	
	4	32	12	
Implant height	5mm	7mm	8.5mm	10mm
	30	5	7	6
Connexion	Internal		External	
	44		4	
Crestal sinus lift or biomaterial graft	yes		no	
	10		38	

Table. 1. *patients and implants characteristics*

	1 year	2 years		1 year	2 years
Diameter			**Lenght**		
6	\	\	5	0.58 (0.1-1.62)	1.22 (0.44-2.22)
6.5	0.35 (0.34-0.6)	1.44 (0.41-1.73)	7	0.92 (0.62-1.48)	1.45 (1.07-2)
7	0.69 (0.1-1.88)	1.27 (0.44-2.39)	8.5	0.79 (0.2-1.88)	1.34 (0.71-2.39)
8	0.74 (0.23-1.84)	1.34 (0.66-2.22)	10	1.26 (0.34-1.84)	1.61 (0.41-2.2)
Chi-Square	2.22	0.69		3.86	2.69

Table. 2. *implant resorption (mm) after 1 and 2 years depending on diameter and length*

fresh extraction sockets, when placing a standard implant is not a viable option. In other words we think that it could offer clinicians a chance to manage those particular situations that occur after extraction of a compromised posterior tooth or an implant failure in a single appointment.

Unfortunately, little scientific evidence on this topic is available and our study provides only preliminary results from a retrospective study with no control group and in a short follow-up period; therefore, the data needs to be validated by a randomized controlled clinical trial in the future.

	Septum totally absent	Septum partially absent	Narrow septum		Septum totally absent	Septum partially absent	Narrow septum
Diameter				Lenght			
6	0	0	1 (2%)	5	16 (34%)	12 (25%)	2 (4%)
6.5	0	2 (4%)	1 (2%)	7	1 (2%)	4 (8%)	0
7	13 (27%)	15 (31%)	4 (8%)	8.5	0	4 (8%)	3 (6%)
8	5 (11%)	3 (7%)	4 (8%)	10	1 (2%)	0	5 (11%)

Table. 3. *implant diameter and length distribution depending on the septum type*

	1 year	2 years
Septum totally absent	0.62 (0.23-1.62)	1.27 (0.41-1.14)
Septum partially absent	0.67 (0.1-1.88)	1.33 (0.61-2.39)
Narrow septum	0.68 (0.43-1.84)	1.37 (1.07-2.22)
Chi-Square	0.25	1.52

Table. 4. *implant resorption (mm) depending on the septum type*

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6/30（四） K1：簡報聖經 9-16：00

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

7/28（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，更知其所然！

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

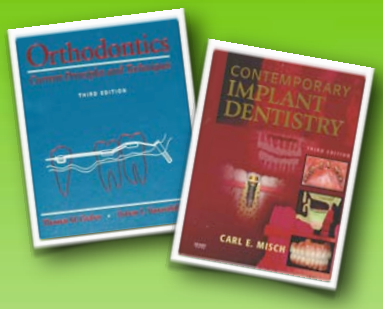
8/25（四） K3：Jobs令人目眩神迷的五項演講技巧 9-17：00

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

報名專線：03-5735676 Hours：2-9 pm 上課地點：新竹市建中一路25號（交大華廈）2樓

當矯正遇上植牙



2011 Newton's 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：22,000
  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

2011 Newton's Implant Forum

	日期 (W5)	09:00 ~ 10:20 Lecture Moderator: Chris Chang		10:40 ~ 11:20 Case Analysis (12+8)mins x2		11:20 ~ 12:00 Classic Article Review
1	2/25	實用植牙骨生理學	張慧男 醫師	Case 1	Case 2	ITP chap 10, Stable occlusal scheme
2	3/25	6個植體補綴的製作盲點	廖文堅 醫師	Case 3	Case 4	ITP chap 6, Diagnostic driven IDT planning
3	4/29	特別演講 - 植體設計		主講人 林靜毅 醫師		
4	5/27	上顎竇增高術面面觀	方鍾鼎 醫師	Case 5	Case 6	ITP chap 8, Approaches to vertical dimension
5	6/24	矯正與植牙-前牙美觀區	黃瓊嫻 醫師	Case 7	Case 8	ITP chap 2, Altering vertical dimension-The orthodontic possibilities
6	7/29	特別演講 - 前牙植體美學		主講人 溫世政 醫師		
7	8/26	常見植體的錯誤與修正	王肖龍 醫師	Case 9	Case 10	Immediate screw-retained provisional implant crown Custom milled abutment and impression coping
8	9/30	特別演講 - 植體的6個膺復祕訣		主講人 張光漢 醫師		
9	10/28	特別演講 - 植體贋復中的魔鬼與細節		主講人 彭炯熾 醫師		
10	11/25	前牙美學-牙周觀	邱上珍 醫師	Case 11	Case 12	Immediate implants loading-The operative protocols Immediate fixed restoration of the edentulous maxilla after implant placement
11	12/30	特別演講 - 全口重建		主講人 歐亦焜 醫師		

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》

Prosthetics Considerations in Treatment Planning

The Restoration of the Cervical Contour; a Key to Implant Planning, Placement, and Restoration

Dr. Fernando Rojas-Vizcaya

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

前言

在未進入北卡進修補綴碩士之前，我為很多患者、親朋好友、其他牙醫師植牙。但是結果總是覺得少了一些些，未能盡善盡美。所以，我決定負笈美國找回這失落的一環。

從前在植牙前我會參考 tomograph 的骨頭情況，來訂定植牙計畫。植完以後，接著就是等著接 abutment，然後做假牙。有時真的可以得到完美的假牙，但有時卻又不然。這就是一個迷思！

所以實際上，設計一個完美的植牙計畫，其實要同時將外在與內在的軟硬組織因素都考量進去！以前所謂合乎美觀的植牙，都剛好是植牙區的骨頭夠寬夠長，軟組織也都在完美狀態，所以無形中，結果就好。但是，若有其中一些條件不符合，結果就差強人意了。就像明明植體在骨頭長得很好，但是接出假牙就是不在我們所要的位置，結果就不合乎美觀。

就在修完補綴課程後，我終於知道如何讓結果可達到預期。猶如 Dr. Homa 所言：At the beginning, we need to start thinking about how looks the final restoration（圖一）。

所以，在植牙以前，要思考的是 3D 的關係。我們最先要考慮到的是：以後假牙的位置會在哪裡？然後以此類推下面的軟組織，再來是植牙的骨頭位置。亦即從 surgical driven 進化到 prosthetic driven！

以門牙為例，我們首先要由原來牙齒所在的 incisal edge 來決定。而 incisal edge 的決定取決於患者在 resting position 時門牙所露出的量（約 2 mm），決定了切端位置後，加上門牙長度 11 mm（因人而異，可用 wax up 來決定），此時（植牙牙冠）齒頸部的位置與底下 bone level 的相對位置就可以知道（圖二）。

植牙牙冠齒頸部距離骨頭 3 mm 的距離，維持足夠軟組織的量，方能提供好的生物輻徑（biological width），那麼做出來的牙齒就會很好看。另外要考量的是植體要植進骨頭的相關位置，假如太靠近唇側，就會造成軟組織沒有足夠的骨頭來支撐，所謂的 pink esthetics 就會不好看。所以理想的位置是往 palatal 內移 2 mm，如此才能確保往後的 pink esthetics。

假如這一位患者當初拔完牙，經過一長時間後才要植牙，此時骨頭已經萎縮，若我們沒有預先用以上的思維，就冒然用骨頭來思考去植牙，就會造成假牙的齒頸部與植體距離相差太遠，無法順利接軌的窘境。

假設此患者現在的門牙切端與骨頭距離是17 mm，而我們要的軟組織要維持 3 mm，結果是門牙長度就會變成 14 mm，如此情況就會很難跟患者交代了（若又是 high smile line 的話）。除非在術前已經與患者溝通並已示範給他看過，患者可以接受如此長的牙齒，或是用 pink porcelain 燒成牙齦型態來掩飾；另外一種情形是：只注意到軟組織的位置而忽略了切端的位置，就直接接出假牙（仍維持 11 mm），此時就會造成患者在笑的時候看不到牙齒了（圖三）。

謝金龍 醫師
金龍牙醫診所

以下我會舉幾個例子來闡述上面我提到的理念，也就是要由外到內的思考，如何用 cervical contour 來決定植牙的位置，同時來修飾 pink esthetics。

我將以如下的順序，分別詳加討論：

1. Prosthetic considerations in treatment planning introduction:
2. Key factors to achieve a high esthetic result
3. Key factors affecting the esthetic outcome
4. Soft tissue management (How and When)
5. Case Presentations
6. Single implant; soft tissue = cervical contour
7. Single implant; soft tissue ≠ cervical contour
8. Multiple implants
9. Conclusions

1. Key factors to achieve a high esthetic result

(A) Bone foundation：

- Maintains the implant。
- Maintains and supports the soft tissue：pink esthetics 就可表現出來。

(B) Soft Tissue：

- Optimal biological width。
- Protects the marginal bone。
- Esthetics（contour and papilla）。

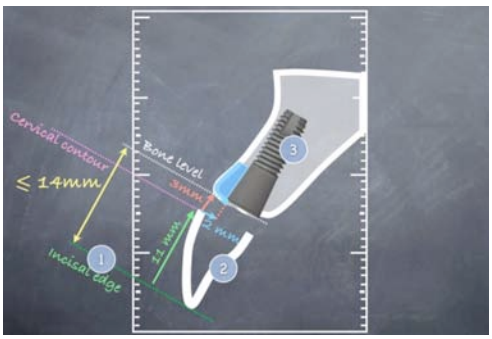
(C) Prostheses：

- Implant - preserves the marginal bone：要選對植體，否則會造成 saucerization。
- Abutment - increase connective soft tissue contact zone and volume。
- Crown - esthetics（ceramic）- white esthetics。

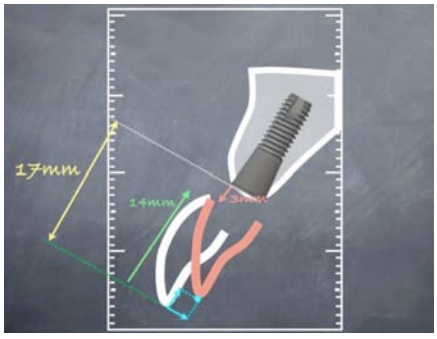
以上幾個因素看似獨立存在，卻又互為因果：1. implant 維持著 marginal bone 與增加軟組織的量，而骨頭又保存了植體；2. Abutment 增加軟組織的量，可使 biological width 維持住，如此又保護到了marginal bone；3. 假牙與軟組織更是互為表裡，互相關係著 white and pink esthetics 的呈現。

現在用一簡圖來呈現植體、假牙、軟組織與骨頭的關係（圖四）：在這四個因素同時存在的交接處裡有一個很重要的 biological width，若有其中一個因素不對，就影響到後來的結果。

圖一



圖二



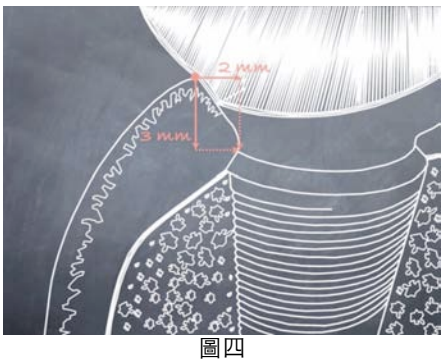
圖三

所以，我們希望 margin（finishing line）不可超過 gingival margin 1~1.5 mm。

Implant body 與骨頭的交接面是呈粗糙面（最好是有 osseospeed 設計）在冠狀處有細螺紋，可讓骨頭有更好的 integration。與軟組織的接觸面呈現內縮，亦即所謂的 platform switching，則是光滑面，可讓組織緊密貼上（hemidesmosome）。

Implant 與 abutment 的交接處，我們則希望沒有 micro-movement and micro-leakage，否則會讓口腔的 fluid 流進 implant body 裡面，長期會讓細菌滋生，破壞 biological width，骨頭也會跟著破壞。所以此處一定要有 conical seal！

Cervical contour 與 marginal gingiva 的關係則是希望從 free gingiva 的最高點到 crestal bone 維持 3 mm（如此才能有好的biological width），往內到植體邊緣要維持要有 2 mm 的厚度（buccal side），也才能一定的骨頭厚度（圖四）。



圖四

2. Key factors affecting the esthetic outcome

以牙齒斷裂需拔除為例（圖五），我們需要考慮的因素：

(A) Existing relationship of hard and soft tissues at the adjacent teeth

(B) Buccal resorption : Zenith position 會跟著改變

(C) Dimensions of the edentulous space：MD, BL, OG

(D) 3D implant placement

分別討論如下：

(A) Existing relationship of hard and soft tissues at the adjacent teeth: Papillae

< 5 mm = 100% present
6 mm = 51% present
> 7 mm = 23% present

(Wu YJ et al., Chang Gung Medj. 2003)

< 5 mm = 100% present
6 mm = 56% present
> 7 mm = 27% present

(Tarnow et al., periodontol. 1992)

“The height of peri-implant papillae in single-tooth gap is independent of the proximal bone level next to the implant but is dependent on the interproximal bone height of the adjacent teeth（圖六）”

(Joseph Y.K. Kan et al. J periodontol, 2003)

5mm 的距離，決定了以後 papillae 是否能夠長得漂亮。

(B) Buccal resorption: Zenith postion（圖七）

當牙齒拔除以後，骨頭與軟組織跟著萎縮，此時原來的 zenith 就會往 apically move。若是沒有察覺就做上去，則會形成太長的牙冠，或是為了維持原來的長度，則會露出「牙根」出來。所以我們應該是要追求維持原來牙冠的長度，同時保持骨頭。這再前牙美觀區是非常要的觀念。

(C) Dimensions of the edentulous space: MD, BL, OG（圖八）

近遠心的最少距離是：6 mm, MD ≥ 6 mm

between the implant/abutment interface and the occlusal surface ≥ 6 mm

當然，也要參考對側的牙齒。

(D) 3D implant placement

The zenith of the crown define the 3D position of implant（圖九）：

- 3 mm beyond the cervical contour
- 2 mm palatal

每顆牙齒從 D-M 或 L-B 各有不同的寬度（圖十），我們在拔除牙齒以後，同時植進植體，此時會與原來的 socket 有一 gap，假如這個 gap 小於 2 mm，那麼無需填入 graft materials，自然就會長好骨頭。在這種 case 我通常會用 Direct Abutment 接上（圖十一、十二），有如下的好處：

Solid Titanium Abutment Placement 的好處：

(A) Biocompatible surface at the implant/bone/mucosa interface。

(B) Establishment of BW in the supracrestal position。

(C) Prevent bacterial colonization and inflammation。

(D) Torque of 10 Ncm（用手鎖）。

(E) Restorative margin for a well adapted provisional restorations。

除了 Direct Abutment 外，還有 ZirDesign、Ceramic、TiDesign、Profile BiAbutment、Cast-to Abutment 以後會再分別介紹。

Resrorative margin 應位於 1.5 - 2 mm above crest of bone，所以我們依此來選擇不同高度的 direct abutment，如此可將 finishing line 維持在 0.5-1 mm in sulcus（圖十三），接上 abutment 後就可利用它來做 provisional restoration。

Provisional Restoration 製作原則：

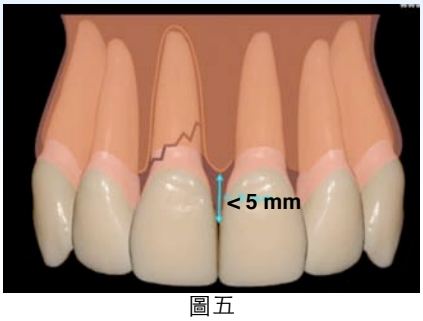
(A) Transitional contour 要修型好，如此才能決定以後軟組織的形狀。

(B) Restorative margin

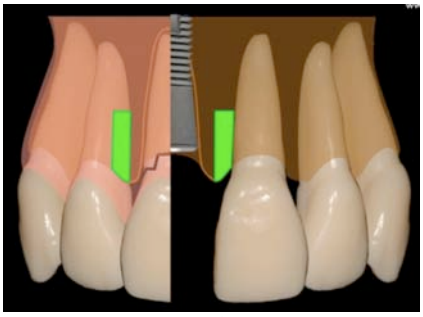
(C) Highly polished

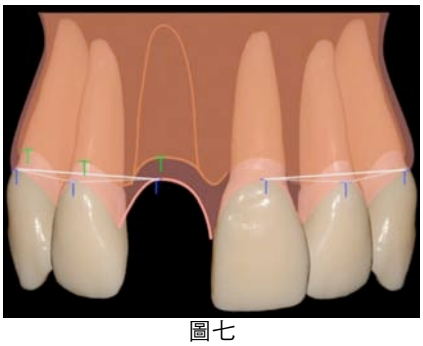
(D) Non functional occlusion

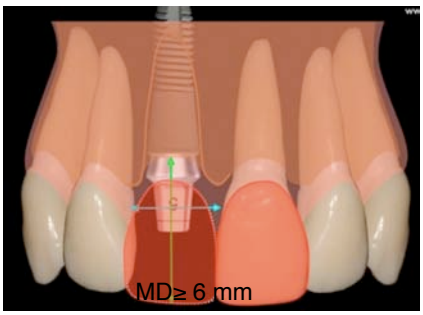
Cementation 時，我們採用 Tempbond 當做 permanent cementation。假牙有鬆動時，易造成發炎與咬合改變，我們就可很容易的調整。同時要請患者 7-10 天回診，來看牙齦是否有紅腫發炎，因為殘留的 cement（尤其在近遠心處）會成為異物刺激牙齦。12周以後就可做final impression，我用 TiDesign（圖十四）來做永久假牙的 abutment，原則上我們希望植體的邊緣是在往 palatal 2 mm，往 apical 3 mm，假如有 case 雖然可維持往 palatal 2 mm，但卻



圖五


圖六


圖七



圖八

植在往 apical 6 mm 處，我們會建議先做 GBR，將高度做出來再植牙。

假牙完成後，我們會用以下的方法，來評估軟組織—The pink esthetic score（PES）（Furhauser et al., 2005）（圖十五）：

(A) Mesial papilla

(B) Distal papilla

(C) Soft-tissue level

(D) Soft-tissue contour

(E) Alveolar process deficiency

(F) Soft-tissue color

(G) Soft-tissue texture

當我們在執行 esthetics in implant dentistry 時，要同時兼顧到 pink and white esthetic score。White esthetics（tooth axis, level of the interdental contact, tooth dimensions, tooth form, tooth characterization, surface texture, color, and incisal edge configuration）可由技工來執行完成，但也須由醫師來提供良好的相關的空間與位置。牙醫師的重點就是要創造出好的 pink esthetics：

(A) Gingival health。

(B) Interdental closure 不能有 black triangle。

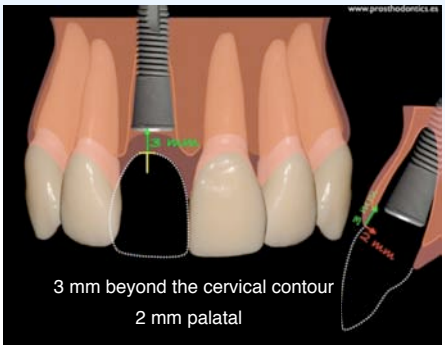
(C) Zenith of the gingival contour 符合高低高，側門牙低於 1 mm，它的 zenith 剛好在中間，正中門齒及犬齒偏向遠心一點。

(D) Balance of the gingival levels。

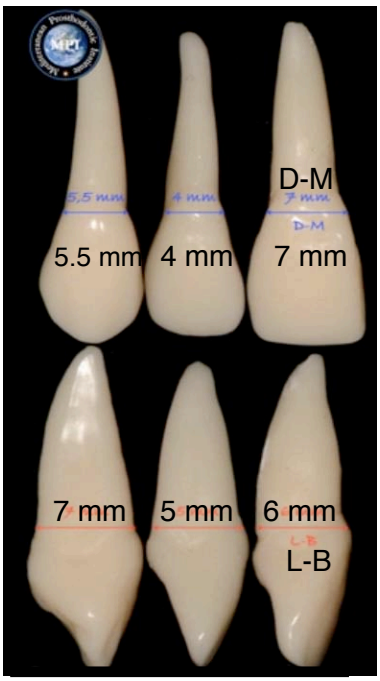
(E) 但要如何能達成上面所說的需求，則又回到最初所說的：要植在一個理想的位置！才能提供往後軟組織的覆蓋與塑型（圖十五）。而技工在做假牙的依恃，則是由醫師在口腔完成好的軟組織與正確的 provisional crowns 翻模及各種記錄而來。

總結而言，在植牙之前，就應先決定好假牙的外型與位置，再從 cervical contour 往下延伸 3 mm（biological width），依此做為植體 platform 的位置（圖十六）。

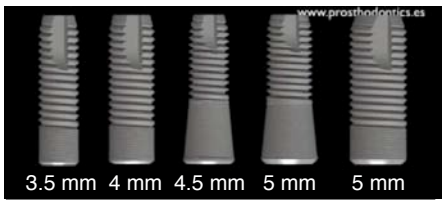
我們不只要注意拔完後 crest bone 的位置，也要注意周圍是否有足夠的骨頭來撐起papilla。這又回到我們所重複提到：「3 mm」重要的觀念，軟組織會順著我們選擇的 abutment 的 connective contour 及 provisional



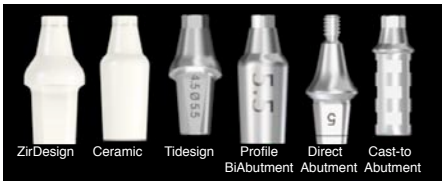
圖九



圖十



圖十一



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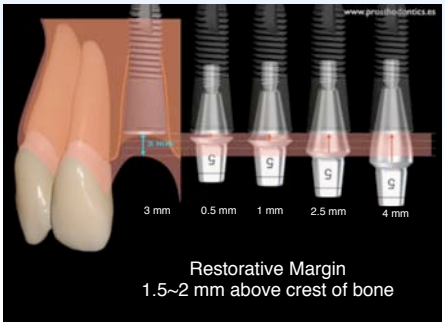

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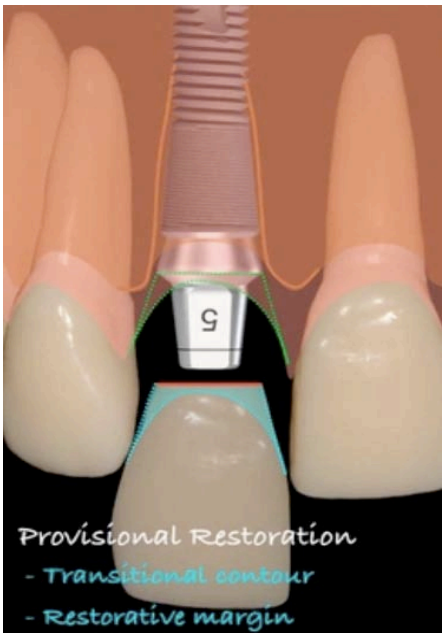
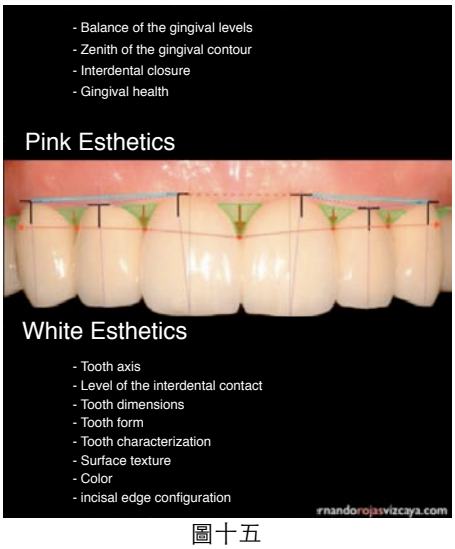


圖十四



圖十五

crown的 transitional contour 來塑型。牙齒間的 crestal bone 最好能維持在小於 6.5 mm（理想是 5 mm），才能有美觀的 papilla（圖十七）。

2nd case: #11~22 maissing

除了植牙區要遵守 3 mm 的原則外，無牙區的 pontic亦然：pontic 往軟組織壓 1.5 mm，cervical contour 與 pontic 的底部有 1.5 mm 的距離。若超過 5 mm 則可在製作假牙時，將 connector 與 pontic 往牙齦處延伸一點，如此可將牙齦往 papilla 方向擠，就不易有 black triangle發生。

3. Soft tissue management (How and When)

先談How:

Abutment⇒Soft Tissue Sculpturing⇒Natural Esthetics

Provisional Restoration 的製作是非常重要的，其中 ovate pontic 與 embrasures 關係到 papillae，而 Transitional Contour 則與假牙的 profile 有關。

Soft Tissue Sculpturing 可經由下列方法得到：

(A) Supporting：在拔多顆牙時，可用臨時假牙來支撐喪失牙齒支撐的軟組織，以免塌陷（圖十八）。

(B) Removing：植牙完後，植體皆在理想位置，但無牙區的軟組織不盡理想時，可用大的 round bur 來去除多餘的牙齦，以符合 scallop 的外觀（圖十九）。

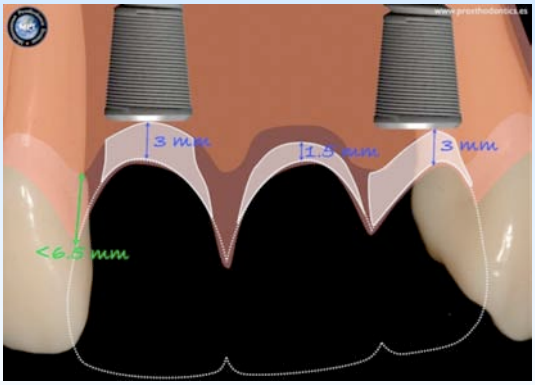
(C) Compressing：利用臨時假牙的 pontics 與 profile 的外形去壓出我們要的軟組織外形（圖二十、二一）。 7 天後要回診，看是否達到預期的位置，若否，就要調整。

(D) Guiding：植完牙的當時，放上由技工所完成的臨時假牙，然後刻意將 flap 往冠向縫合，如此就可引導軟組織向牙冠方向長，建議多做一點over-correction（圖二十二）。

再來談When:

(1) **Extraction**—Healing—(8 weeks) ➜ **Delayed Placement**—Osseointegration—(8 weeks) ➜ **Provisional**—ST Scculpturion—(8 weeks) ➜ **Final Impression = 20 weeks**（最常也最安全的作法）。

(2) **Extraction**—Healing—(8 weeks + Immediate Loading) ➜ **Delayed**



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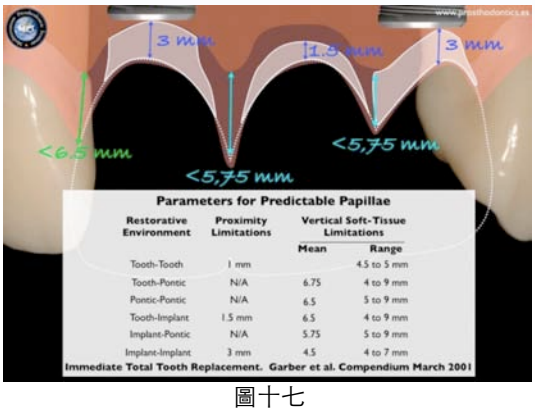

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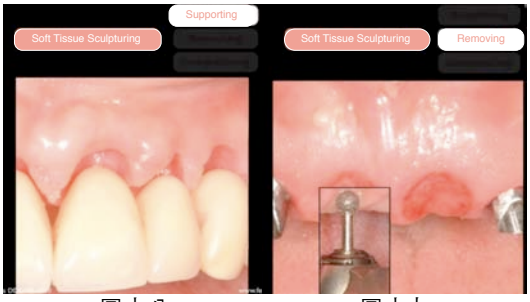
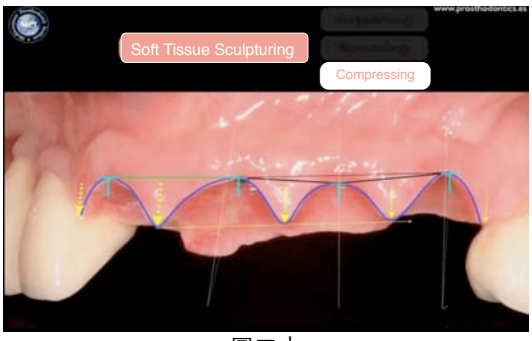
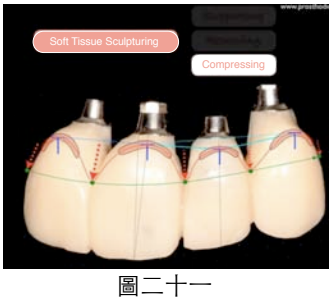


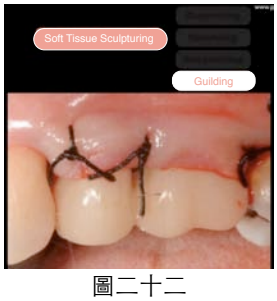
圖十八 圖十九



圖二十



圖二十一



圖二十二

Placement— Osseointegration/Soft Tissue Sculpturing—(8 weeks) ➜ **Final Impression = 16 weeks**

(3) **Extraction + Immediate Placement** —Osseointegration—(12 weeks) ➜ **Provisional**—ST Sculpturing— (4 weeks) ➜ **Final Impression = 16 weeks**

(4) 最快速的方法：在某些情況下，因拔完牙後，可預見軟組織會塌陷，此時就馬上做臨時假牙來撐住軟組織，使其外形得以維持。

Extraction + Immediate Placement & Immediate Loading — Soft Tissue Sculpturing /Osseointegration—(12 weeks) ➜ **Final Impression = 12 weeks**

總結而言，Extraction and weeks until final impression 如下：

Delayed placement+Conventional loading => 18 weeks

Delayed placement+Immediate loading => 16 weeks

Immediate placement+Conventional loading => 16 weeks

Immediate placement+Immediate loading =>12 weeks

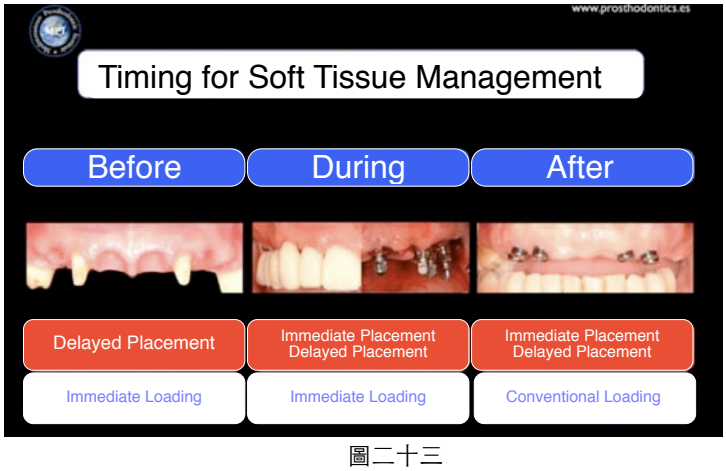
吾人可以視患者的情形擇一執行。每一種都有其適應症，但以第一種是最安全的方法。而其成功的要件，則又回到最初的原則：要植到對的地方，又有好的provisional crown。

＊＊而軟組織處理的時機，又可與植牙時機分成前中後來處理：

(1) 前：Delayed Placement (Immediate Loading)，植牙前就先用臨時假牙壓出所要的軟組織外形，再來植牙。

(2) 中：Immediate Placement/Delayed Placement (Immediate Loading)，植完牙時，就做臨時假牙，並利用假牙來塑型。

(3) 後：Immediate Placement/Delayed Placement (Conventional Loading)，植完牙，等二階時接出後，再來做臨時假牙來塑型。



圖二十三

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Feedback from the International Damon Workshop

Dr. Chris Chang's Orthodontic Bone Screw Workshop:

I had the pleasure of attending Dr. Chang's workshop at the Beethoven Clinic in Taiwan. At this seminar, Dr. Chang shared with the audience the numerous indications, the technique of placement and the results that can be achieve through Bone Screw placement. You realized that the use of Bone Screws adds an entirely "new" dimension to orthodontics. Over the entire history of orthodontics, orthodontists have used various means of creating anchorage or support to a force system that we were applying to move a tooth or teeth in a certain direction. The principle of "for every force applied, there is an equal and opposite force" is absolutely true. The use of Bone Screws creates this anchorage system or support that enhances normal orthodontic movement without the equal and opposite force. It truly adds a new and exciting dimension that will enhance orthodontics now and into the future. During our clinical day at the Beethoven clinic, Dr. Chang placed numerous bone screws on multiple patients. You were able to witness the ease and quickness of his technique and I was impressed with his technique. One can readily learn this technique through his seminars and clinical demonstration. I enjoyed the experience of being with Dr. Chris Chang and having him share this new and exciting venue in orthodontics. Thank you also to the supporting staff, especially Tzu Han, for making my trip to Taiwan as easy and uneventful in terms of obstacles as it was. Every detail was handled so well, I commend you for your thoroughness.

Much Aloha,

Errol Y. W. Yim Honolulu, Hawaii
the American Association of Orthodontists
the Pacific Society of Orthodontists
the American Dental Association

Hi Tzu Han,

I had a wonderful time in Taiwan in December. I would be happy to share my experience. I was very moved by the improvements in the Beethoven Dental-Pedo-Ortho complex since I visited 3 years ago.

I was informed some time ago that Dr. Chang had a teaching center. I was fortunate to visit Beethoven in December 2010 during an orthodontic instruction, while Dr. Chang was giving a morning lecture and then a visitation in the afternoon as he worked on patients. His students were in the midst of a 3 day hands-on orthodontic course and it was very exciting to be able to participate with them for one day. Besides seeing patients in the afternoon we spend an hour prior to the patients with models and I was able to place several mini-implants using Dr. Chang's technique. This hands-on experience with Dr. Chang and his wonderful staff was one of the best experiences I had in orthodontics in 2010. I marveled at the patients I saw and the great orthodontic results I was able to witness. I feel that Dr. Chang is one of the best modern time teachers in orthodontics.

Thomas R. Pitts DDS, MSD
the American Association of Orthodontists
the Pacific Coast Society of Orthodontists
the Northern Nevada Dental Society
the American Dental Association
the Nevada State Dental Association and the Progressive Study Group.

Dear Chris and Shu-Fen,

Many thanks for the royal treatment you provided me during my recent trip to Taiwan. I am most appreciative for all the gifts and outstanding hospitality. The Canon camera you gave me takes outstanding photos and is so easy to use. Thanks again!

And Indeed, it was an honor to visit your clinics and home. I am so proud of your accomplishments your determination to excel in all your endeavors.

I am looking forward to being with you again in Orlando at the Angle Society Meeting. It will be my pleasure to review your cases to be treated for the membership requirement.

Last but not least, I very much appreciate your assistance in finding an importer for my Jawbone wine. I am looking forward to a long and mutually beneficial relationship with Medoc and Aileen Lan.

Happy holidays to all,

Gene Roberts

WIOC Report

"This was my second opportunity to attend a WIOC and I was impressed by the progress of the field relative to the use of implant anchorage for managing complex malocclusions in three dimensions. There is now a balance of clinical approaches using nonintegrated miniscrews in both interradicular and extra-alveolar positions. In addition, osseointegrated implants are being used not only as temporary anchorage devices (TADs), but for vertical anchorage as prostheses to restore the vertical dimension of occlusion in adults, and help insure the full expression of growth in children. A highlight of the meeting was the use of TADs as a conservative approach for treating skeletal malocclusions and for the efficient recovery of impacted canines."

Gene Roberts

Faculty, Department of Orthodontics,
School of Dentistry Indiana University

Feedback from Dr. Chang's Lectures

林伯璣 醫師
名人牙科

OrthoBoneScrew 如果說是近代矯正的一次革命，那麼 Dental Implant，則是正在進行中的二次革命了。OrthoBoneScrew 為矯正界帶來空前的震撼，這大家都已深深的體會到了。但是 OrthoBoneScrew 畢竟是局外人，並未融入實際的咬合運作，因此仍留下一部份的空白！如在垂直高度的控制，由於 Dental Implant 是局內人，本身參與咬合功能，它又是最惰性的一份子，因此它領頭決定其他較隨性的牙齒的命運，從而帶入另一片新景象，而這是 OrthoBoneScrew 所無法做到的。

這陣子聽了張慧男醫師有關於矯正和植體如何相輔相成的演講，覺得張醫師一直在快速的進步中，他很多的思維，都令我覺得他是在創世紀，當一個人結合矯正和植牙的精髓於一身，他所肇劃出的局面，是極為震撼的，這並非是單一矯正大師或單一植牙大師所能達到的境界！敬請大家隨時注意張醫師即將有什麼震撼彈和未爆彈要發射，這將都是當今全世界牙科最夯的頭條新聞。

Beethoven Scholarship Reports

參加完這次的見習活動，我只能用嘆為觀止來形容，雖然在學術、技術方面的學習可能不能在這短短三天使我們全盤了解，但是就如同張慧男醫師對我們所言：「這次見習的重要性是給你們一個啟發。」在貝多芬、金牛頓、安徒生裡面的每一處所見所聞，都不斷衝擊我的思考，不斷地想：「為什麼有人能做到這樣地步?」、「原來還有這樣的做事方法！」在這邊三天之中我覺得絕對可以讓我們學習到的就是面對事情、處理事情的態度；因為張慧男醫師有了passion、practice、persistence的信念，他能有凡事都盡可能做到最好的熱忱，這種精益求精、鍥而不捨的態度感染了在醫師身邊工作的所有人，讓大家在正向的環境中互相進步成長。對我來說，這次見習給我的啟發就是讓我在往後的日子中不斷思考該如何成為一個擁有passion、practice、persistence且具有領導特質的人。

國防醫學院 謝尹騰

這次能夠獲選參加貝多芬獎學金實習覺得非常幸運且收穫良多，不管是聽講課程的安排還是到貝多芬齒顎矯正中心及安徒生兒童牙醫診所的見習，每每都讓我對習得的新事物或見聞感到驚喜不已。也由於創辦人張慧男醫師對電腦硬體軟體的重視，以致不論在醫師經營的金牛頓藝術科技中心或診所內皆使用蘋果電腦，而教學課程更由於有Morph軟體的輔助，讓平常艱深難懂的植體、矯正教學簡單起來。

喜歡兒童牙科的我，在徐玉玲醫師生動的教導過程下，對於臨床上兒童的早期治療不論是全口X光片的判讀、阻生齒的拔除或是異位萌生齒的牽引時機等...有了更進一步的認識。而見習參觀安徒生兒童牙醫診所，對於診間內空間上的配置、內部的裝潢等，處處可見設計的巧思及所要打造出童話王國的氛圍，如：天花板上的超大花朵，讓躺在診療椅上的小孩猶如成了拇指姑娘、王子般置身於花蕊上；旁邊玻璃窗上彩繪著故事—國王的新衣；椅子上的牙齒形抱枕...。相信小孩在這樣的環境與親切、充滿愛心與耐心的醫師、助理的招呼下，皆能順利就診、不感到害怕。而在矯正方面，用來墊高咬合用的 Bite Turbo 則大大改變了我原先對於這類病患應製作咬合板的舊觀念；校內課堂略為提到的最新型 Damon 矯正器、迷你骨釘，在這裡也已廣泛的使用，使我可以近距離看到它們的運用，並對於使用上所帶來的好處更為了解。除此之外，在矯正診所的見習中，也讓我深深了解除了牙醫師本身的技能知識外，科技的運用、助理的培訓都是相當重要的。透過科技運用，使得醫師與醫師或病人間的溝通更為順利；好的助理能使看診過程更為順暢、省時、且能大大減少醫師的負擔。

除了牙科相關學習活動外，也很感謝貝多芬另外安排了教授我們演講祕訣及自傳履歷書寫要點的課程，使我們未來不論在校內還是職場上能比他人更突出，爭取更好的機會。歷經這三天的實習課程，腦中猶記得此活動創辦人－張慧男醫師送給我們的良言：「每天只要做對一件事就好了！持續下去，十年下來必定能有不錯的成就。凡是皆要抱著持之以恆，不被挫折打敗的心！」

台北醫學大學 謝春怡

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Chris H.N. Chang, DDS, Ph.D. Founder, Beethoven Orthodontic Center

- Taiwan Orthodontic specialist
- ABO-Certified Orthodontist
- Publisher, News & Trends in Orthodontics
- Ph.D, Dept. Orthodontics, Indiana University-Purdue

The Beethoven Dental Group

A Learning Organization

Tzu Han Huang

Beethoven, a worldly renowned musician, is also the name of a famous dental clinic in Taiwan. If you google it, it ranks the 5th in the research results, with more than 6,000 findings. From this you get an impression of its popularity by the general public on the internet.

The Beethoven Dental Group

The Beethoven is a dynamic team, led by Dr. Chris Chang, with its origin in orthodontics but quickly extending to general practice, pedodontic center, as well as specialized care in periodontics and prosthodontics. The team is consisted of excellent specialists as well as dental assistants. In addition to dental clinics, the Beethoven group established a subsidiary, Newton's A, Inc, whose primary focuses include dental information technology, development of dental equipment and providing dental education. In order to provide more comprehensive dental care, we will open an implant clinic next year.

Beethoven Orthodontic Center-Environment

When you first enter the clinic, you will be immediately greeted by the beautiful and warm smile of our assistants. We have a very spacious waiting area and consultation space surrounded by lines of bookshelves with a wide selection of books and magazines to entertain you. What's even more precious is the open atmosphere created by French window and ample natural lighting.

Such a stress-free environment is appreciated by not only patients but also doctors who spend all day in the clinic. The greens from the outside is a soothing reminder of another beautiful day at work. The open design of the waiting area aims to create ample space for patients and facilitate communication between parents and doctors. This type of space design also allows a smooth and efficient workflow when patients arrive during peak hours.

The supply station is located at the rear side of the chairs, mainly for equipment and patient records. In addition, the technology structure is built on a Mac-based system, using Apple desktops, iMac, to store patient data, run the customized patient appointment system and its native presentation software, Keynote, to guide clinical consultation. All patients' records and photos are entered and saved before the end of a clinic session. The saved data is also shared between computers located in the internal network.

Dr. Yang and Dr. Park visiting Beethoven（first 1, 2 on the left）

waiting area

Beethoven Orthodontic Center-Operating system

One of the most unique features of the Beethoven clinic is its operating system. The daily average number of patients that enter the clinic is very significant and the combination of residents and specialists change in different days of the week. However, patients can still expect to go through a standard treatment process, fully executed by the doctors and assistants. A key secret weapon is a simple, concise, image-based patient record. You can clearly identify a patient's background, extra-oral, intra-shots, chief complaints, source of referral, treatment plans, all in a piece of A4 size paper. All doctors can easily pick up a patient record and immediately follow the instructions left from the previous visit. Most of all, an ideal treatment outcome can still be obtained despite the changes in doctors. An effective and efficient system should be able to be replicated by different operators, in different location. The aim of the system in Beethoven is to create such a model so doctors can make treatment more easy and predictable.

Continuing Education

Indonesian doctors practing screw placement on a model.

One may wonder how doctors can continue to update their knowledge and skills in today's busy world. The answer for Beethoven's doctors is the standardized training process. All residents in Beethoven have to complete Beethoven's Comprehensive Damon Q course, the Advanced Damon Course and continue their pursuit of excellence in the Finishing course. Dr. Chang's teaching style is very interactive and engaging, filled with fresh cases. Students constantly find cases they just saw last week or yesterday at the clinic, demonstrated and analyzed in the class next day.

International Course

Beethoven's courses are not only designed for the local doctors; many doctors from overseas also attend the customized international workshop. The response from the participants were so overwhelmingly positive that several of them repeated the class. Besides providing international courses, Dr. Chang is frequently invited to give lectures around the world and brining the most up-to-date news and internationally renowned speakers back to Taiwan's audience.

News & Trends in Orthodontics

After over a decade of service to the people in Hsinchu, Dr. Chang has won the trust and support of his patients. In addition to providing orthodontic treatment, Dr. Chang dedicates most of his energy to providing continuing education and devoting himself to academic exchange locally and internationally. In order to provide a platform for dentists to share their clinical experiences, Dr. Chang also publishes a quarterly journal, News & Trends in Orthodontics. Famous doctors in Taiwan and abroad frequently share their clinical secrets or summaries of recent lectures in the journal. We hope through this channel we can spread the messages of knowledge sharing and pursuit of excellence to our readers.

The Beethoven Team

The Beethoven team is not only consisted of Dr. Chang himself. We have a team of doctors specializing in pedodontics, prosthetics, periodontics as well as implant therapy. So we can take care of patients from 1 year old to 99 years old. In addition to specialized care, we also have a general practice taking care of patients common dental issues. Through this comprehensive approach, we can provide total care to our patients.

Needless to say, dental assistants play an indispensable role in Beethoven's operating system. When every new patient enters the clinic, he or she will immediately be greeted by a professional assistant whose main function is to provide orthodontic consultation.The assistant will walk you through the consultation process, explain the data she will collect in this visit, including photos and X-rays, and the fees and stages of the treatment process. In terms of controlling the flow of patients during a clinic session, a senior assistant acts as the conductor in the clinic, assigning assistants to each chair and notifying doctors the order of patient sequence. Assistants are the crucial link between doctors and patients. If you think your assistants haven't met your expectations, you can consider signing up for Beethoven's assistant training for them.

The Beethoven team

Andersen Pedodontic Center Guarding children's dental health

Flower-decorated ceiling is what children see during treatment.

Andersen Pedodontic Center-Introduction

After serving the local community for over a decade, the local community leader approached Dr. Chang to express the community's needs for a doctor who understands children's dental health. At the time when children had toothache, parents have to travel to the crowded city center for treatment. In response to such wishes from his own community, and the repeated requests from parents of his orthodontic patients, he and Dr. Hsu together established "Andersen Pedodontic Center". "Our mission is to create an environment where parents can feel safe, children can experience joy and doctors can provide the best possible care to children", Dr. Hsu said.

Andersen Pedodontic Center-Environment

The clinic is named after the famous children's book author, Hans Andersen. The image design of the clinic is

Newton's A Dental education center

The constant dilema for successful dentists is the conflict between time and need for continuing education. It's almost a luxury to devote one's full attention to a full-day lecture or a new book. Newton's A understands doctors' needs for a more flexible and effective method of learning and has turned Beethoven's excellent teaching materials to videos. Combined with a mobile device, such as iPad or iPod touch, one can learn orthodontics anytime and anywhere. This latest utilization of technology has revolutionized the orthodontic world.

Newton's A-Mobile Learning: Orthodontic Podcast Encyclopedia + iPad

Dr. Chang is the first dentist to combine the three seemingly distinctive but closely related courses, Damon orthodontics, orthodontic bone screws and assistant training into easy viewing educational presentation videos. Using Mac's native presentation software, Keynote, he can instantly record live narration with his slides and turn his lecture into an engaging movie. Students can use these videos as electronic notes, carry them in their iPod or iPad wherever they are and review the content whenever they want. Whether you are past, current or prospective students of Beethoven, you can use these videos for course preview or review to enhance the learning experience. Since the content is digitalized and frequently updated, students won't have to worry about being outdated once they purchase the course videos.

Newton's A-Effective teaching tools: Mac + Keynote

In addition to produce professional dental educational podcast, Newton's A is also in charge of the design, execution and maintenance of Beethoven's technical environment. For example, recently the chairman of the premier teaching hospitals in Taiwan came to visit Beethoven with his son-in-law from the US. During the visit Dr. Chang performed an out-patient surgery. Some trained assistants provided clinical assistance to Dr. Chang while others took photos and videorecorded the procedures in small segments. Immediately after the surgery, assistants uploaded the patients' photos and videos and organized them in Beethoven's standardized patient record template, utilizing Mac's presentation software, Keynote. So Dr. Chang then used data from the previous visits as well as the procedures that just took place a moment ago to demonstrate to the patient the treatment progress and surgery process instantly. Followed by the presentation to the patient, Dr. Chang used the same file to continue a further in-depth discussion with the chairman.

A case report as described may take several interns a week to complete in other institutions. With the aid of proper technology, one can finish such tasks in less than 30 minutes.

inspired by Andersen's most famous fairy tales, the emperor's new clothes, the little match girl and thumbelina. Dr. Hsu hopes visiting the clinic can bring children not just the thought of stinky smell or feary drills but also beautiful stories. Besides the pleasant visual stimulants, the brushing station is designed at three levels to fit the varying heights of children of different development stages.

Andersen-Long-term dental growth data preservation

Andersen sees itself as the long-term guardian of children's dental health. In order to closely monitor patients' growth, we routinely take intra-oral, extra-oral photos and X-rays to make sure we won't miss the first sign of an emerging problem at a later stage. To achieve this goal, we use high quality digital cameras and wireless memory cards to ensure fast and secure data transmission. Mac's dual operating system allows us to take advantage of both windows and Mac's functions.

Andersen-Children's health education

Prevention is better than cure. This is particularly true for parents battling with young children's cavity. In view of this common challenge for parents, Andersen regularly collaborates with local kindergartens to administer supplemental fluoride. Parents can also play a strong advocate for children's dental health by helping children develop proper concepts and practices of dental hygiene.

This wonderful combination of Mac and Keynote makes preparing case reports, producing educational materials or presenting treatment progress to doctors, assistants, patients or parents so easy and effective. The built-in recording function allows presenters to record voiceover as the slides advance so the audience can better appreciate the content.

Newton's A- OrthoBoneScrew

Originated from Beethoven's clinical experiences, Dr. Chang is leading a team of experts from academia and engineering to develop an orthodontic mini anchorage device, OrthoBoneScrew. The research and development team include experts from University of Indiana-Purdue's professor of Emeritus, Dr. Eugene Roberts, Dr. John Lin and Dr. Lin Shan Jie from National Central University in Taiwan. Our products have improved over the last two years and received positive feedback from orthodontists in Taiwan and abroad. The combined use of bone screw and Damon can significantly reduce extraction rates in borderline surgical cases. Cases that traditionally require surgery can achieve satisfactory results with the use of orthodontic bone screws.

Implant Center Future plan

In recent years Beethoven have seen a growing number of adult patients seeking treatment for missing teeth. This indicates a stronger need for esthetic appearance for adult patients. However, this brings a new set of challenges for orthodontists because the problems are far more complex than creating ideal alignment. Patients often have periodontal problems, multiple missing teeth and the reconstruction of prosthetics or implant placement. Hence, Beethoven believes providing adult patients a comprehensive treatment is our new goal.

Traditionally adult dental treatment can be summarized in two words, periodontics and prosthetics. However, in the era of inter-disciplinary treatment, orthodontics and implantology have become the new two pillars in this treatment structure. Orthodontics can lay a solid foundation to suppor future implant placement. Therefore, the establishment of the new implant center is to provide a more comprehensive care to our patients in our dental network.

The core value of the Beethoven group is education. The new implant center will also integrate education into its routine operation. Through Beethoven's courses we have established a common platform to showcase their clinical results in their practice. Dr. Chang believe the most effective way of learning is through case presentation to the course participants. The organization and delivery of the case report demands the presenter to fully digest and internalize the lessons learned in the case. This continuous teaching and learning enables us continuously improving our treatment quality.

The new implant center will be open in the spring of 2011. Before that, we have set up an Implant Forum to prepare ourselves. In 2010 we collaborated with University of Southern California to host a 6-month certificate course for dentists interested in continuing education. We hope doctors of similar ideas and passion can join our efforts in improving treatment quality for patients.

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專業簡報	Keynote 簡報法 series 1 簡報聖經	1. 常見簡報謬誤 2. Keynote 入門	6 月 30 日（四） 09:00～16:00	科技人、醫師、 教師、學生
專業簡報	Keynote 簡報法 series 2 Kokich的10大演講秘訣	1. 多媒體影像處理 2. 簡報設計	7 月 28 日（四） 09:00～17:00	科技人、醫師、 教師、學生
專業簡報	Keynote 簡報法 series 3 How to Wow'em like Steve Jobs?	1. 賈伯斯演講秘訣 2. 簡報設計進階應用	8 月 25 日（四） 09:00～17:00	科技人、醫師、 教師、學生
International	Damon and OBS workshop	1.Damon System 2. OrthoBoneScrew	5/10-12, 8/9-11, 11/15-17	International Orthodontists

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For more information visit http://orthobonescrew.com

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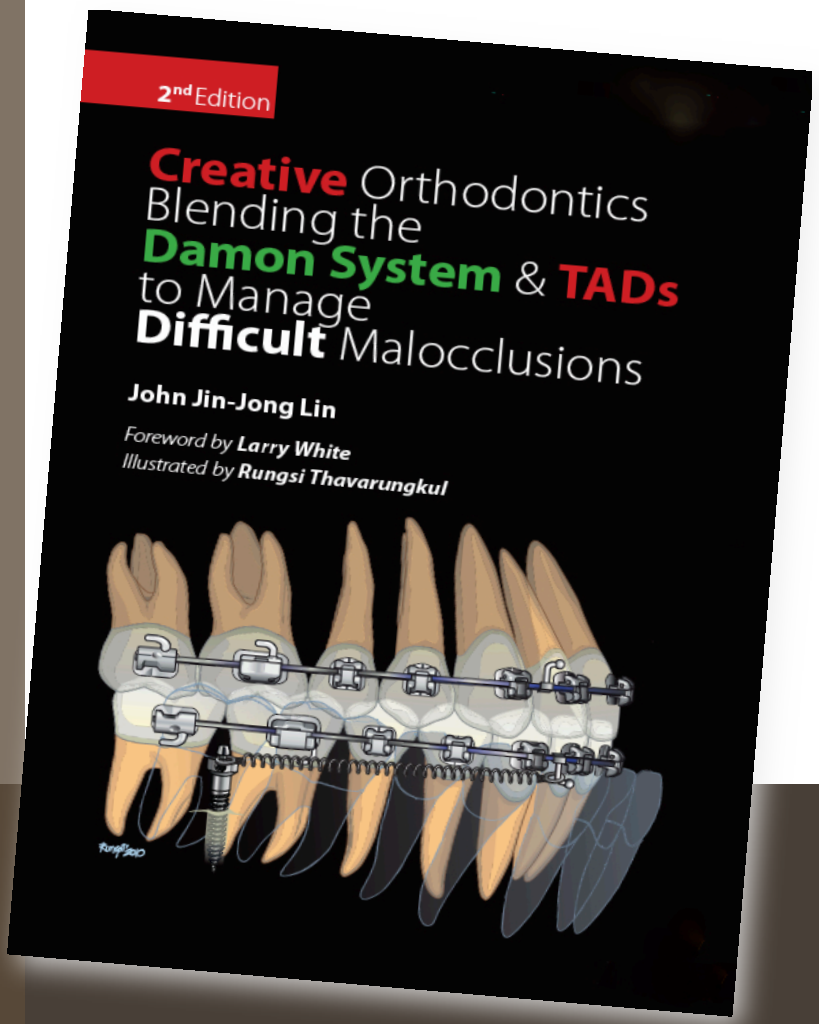

Beethoven International Damon & OBS Workshop, Hsinchu, Taiwan, 12. 8, 2010