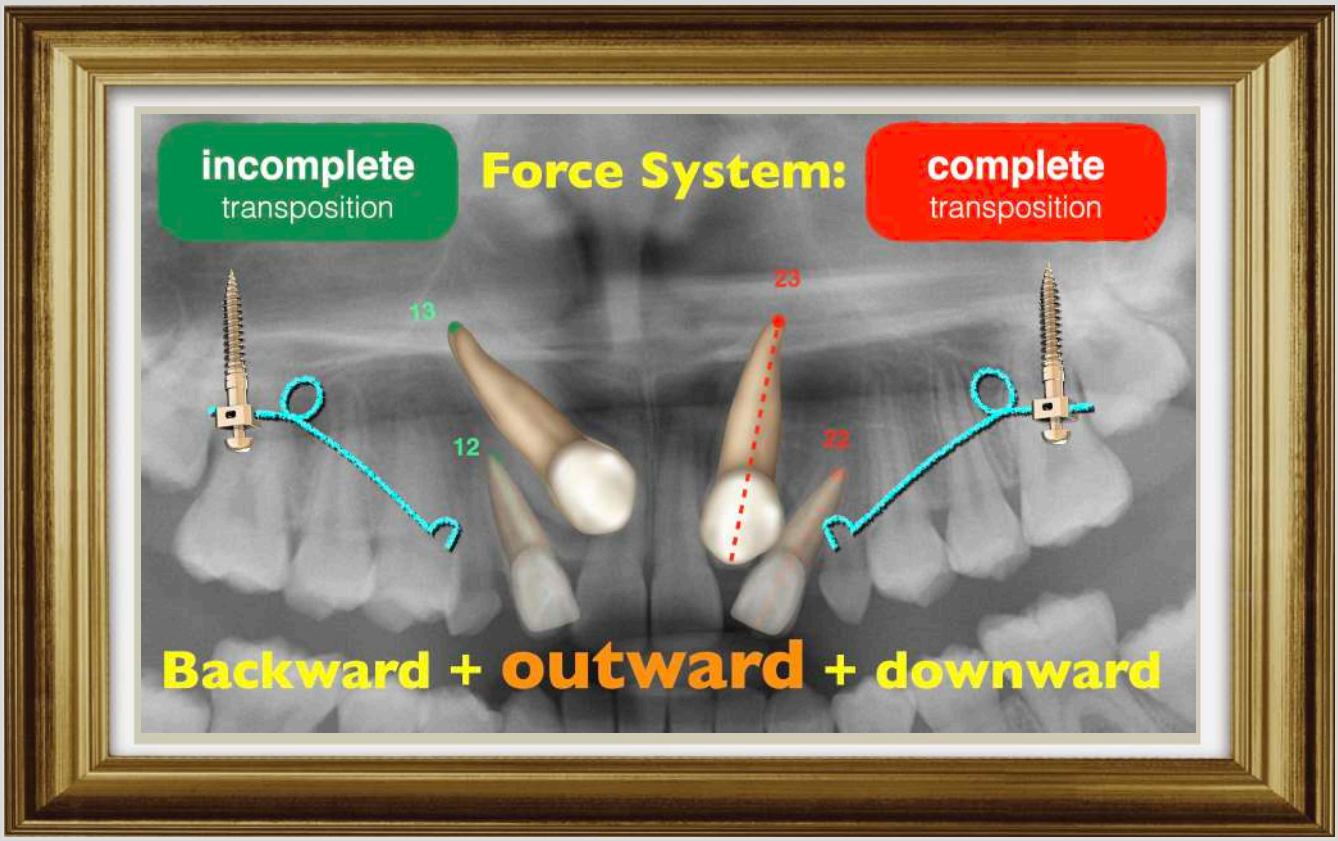
JDO

Journal of Digital Orthodontics
International Journal for Orthodontists and Implantologists

Vol. 76 Jan 1, 2025



Two transposed canine impactions were uncovered and aligned using the vertical incision subperiosteal tunnel access (VISTA) technique and 3D lever arms, with the force anchored by two infrazygomatic crest screws and power chains. The 3D lever arms provided a backward, outward and downward force that successfully facilitated the repositioning of the two canines.

ISSN 2523-9406
977 2523940 002

This journal is available for free download at iJDO.pro.

2025
熱愛學矯正

全新的貝多芬高效 Damon 矯正大師系列課程是由國際知名講師張慧男醫師親自規劃及授課，課程特色強調由臨床病例帶動診斷、分析、治療計畫擬定與執行技巧。此外，透過數位影片反覆觀看，課堂助教協助操作，以及診間臨床見習，讓學員在短時間能快速上手，感染「熱愛矯正學，熱愛學矯正」的熱情。

張慧男 博士

新竹貝多芬齒顎矯正中心負責人
中華民國齒顎矯正專科醫師
美國齒顎矯正專科醫師學院院士（ABO）
美國印地安那普渡大學齒顎矯正研究所博士
美國 Angle 學會會員

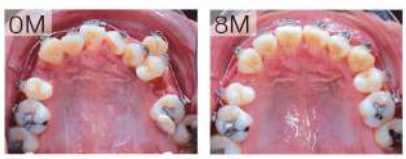
Damon Master

(Thu) 9:00-17:00 中文授課

The Beethoven Damon Master Program, led by the world-renowned Dr. Chris Chang, is a 11-module course tailored for clinicians who desire to master the treatment protocols of self-ligating brackets/aligners with the combined use of TADs. The versatile course structure, including webinars and live Q&A, allows participants to receive maximum learning value without interruptions to their busy practice schedule.

2025

Module 1 - 3/13
Module 2 - 4/17
Module 3 - 5/1
Module 4 - 5/15
Module 5 - 5/22
Module 6 - 6/5
Module 7 - 6/19
Module 8 - 7/3
Module 9 - 7/17
Module 10 - 7/31
Module 11 - 8/14



Damon + .014 Cu NiTi

Excellent Finishing

(Tue) 9:00-12:00 中文授課

Critically reviewing classical literature and contemporary papers and applying lessons learned to clinical work; utilising ABO's DI and CRE standards to turn excellent finishing into attainable goals.

Finishing XVII

Module 1 - 3/18
Module 2 - 4/15
Module 3 - 5/13
Module 4 - 6/10
Module 5 - 7/8
Module 6 - 8/19
Module 7 - 9/9
Module 8 - 10/21
Module 9 - 11/11
Module 10 - 12/9
Module 11 - 1/13/26'

Damon Clear

Screws & Aligners

International Workshop English Class

The workshop demonstrates how to incorporate TADs and minor surgeries in complex orthodontic treatment, combining world-class lectures, model and surgical hands-on practices, and clinical observation.

course@newtonsa.com.tw
+886-3-573-5676 #218 Annie

2025

Class - 11/4-6

Damon + Bite Turbo + Early Light Short Elastic

每次上課請依最新一期 JDO 公告為主

報名專線
湧傑 Yong Chieh

北區 邵美珍 02-27788315 #120
中區 張馨云 04-23058915
南區 王慧靜 07-2260030

上課地點：新竹市建中一路25號2樓（金牛頓藝術科技）
2F, No. 25, Jianzhong 1st Rd., Hsinchu City, Taiwan (Newton's A)

Why YouTube for Orthodontic Learning Videos?

Upon my return to Taiwan after 10 years of orthodontic learning, I embarked on another learning journey, namely guitar! I had enrolled with Maestro Paco Wu, a fellow golfer and dear friend, when I came across a talented young Korean player on a then innovative platform called YouTube. On his channel, I could find all the musical pieces that I had ever wanted to learn, with detailed, broken-down instructions. I thought that was a brilliant idea and introduced this concept to my guitar teacher. My suggestion was promptly discarded by Maestro Paco, which back then made perfect sense, as no one really knew what YouTube was, and learning from it seemed foreign and most unconventional. Following my instincts, I decided to try it myself, but instead of creating videos on how to play the guitar, I chose to share how I treated my patients. My YouTube channel premiere focused on bite turbos, a topic about which I had frequently received questions. After a while, I uploaded the first case report, simply entitled "Amazing Class III" (2011). It did not take long before it had reached 1 million views. That was 13 years ago, and currently the same video has over 2.2 million views.

At the beginning of my content sharing, I featured Maestro Paco's virtuosic guitar melodies as the background music to accompany my presentation slides, and would, from time to time, receive requests for narrated versions, which at the time was a rather unnerving prospect and therefore declined. A couple of years ago, we started publishing with AJO-DO, and with every article published, Dr. Jae Park, the editor, requested an accompanying 3-min narrated video to briefly describe the highlights and contents of our publications. That was the pivotal moment when we finally decided to also include commentary on my YouTube channel, not only to enable our videos to cater to more orthodontic learners but also for the training residents at my clinic to practice their presentation skills.

Heading into 2025, we aim to keep publishing with AJO-DO. In addition, submitting and including our valuable clinical tips respectively to JCO and in JDO, our own journal, is also a goal we sincerely hope to attain. I plan to maintain producing videos and tutorials for at least another 10 years, after which I believe there will hardly be any remaining orthodontic topic that has not been covered on my channel. This will provide a plethora of accessible information for young orthodontists to advance themselves with, and bring our specialty a step further forward along our path to glory.

Chris Chang PhD, ABO Certified, Publisher of JDO

Site Selection for Mandibular Buccal Shelf (MBS) and Infra-Zygomatic Crest (IZC) Bone Screws

(J Digital Orthod 2025;76:4-8)

Introduction

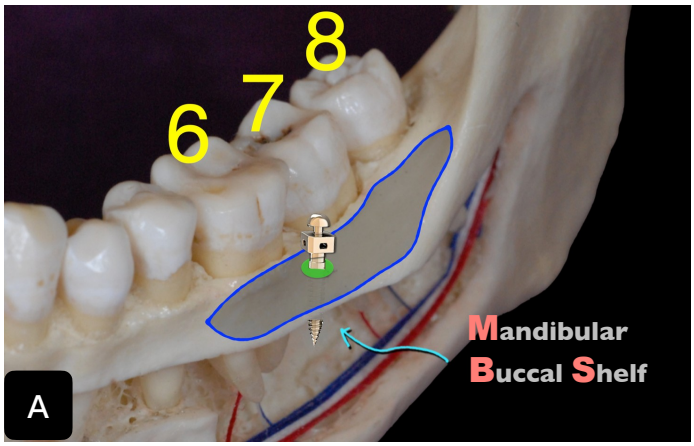
Multiple studies indicate primary stability of TAD is the critical factor for clinical success.[1-3]

Primary stability has a positive relationship to cortical bone thickness and density.[1-4] At least 1 mm of buccal cortical bone thickness is necessary to achieve primary stability.[5,6]

To facilitate oral hygiene and prevent soft tissue irritation, Chang et al.[7] recommended 5 mm distance between screw head and soft tissue surface. With the 5 mm soft tissue clearance, screws can be positioned in either attached gingiva or movable mucosa. There is no statistical significance affecting screw success rate between these two types of tissue.

Anatomical Analysis of MBS Screw

The mandibular buccal shelf (MBS) is the buccal aspect of alveolar bone of the mandibular molars. It extends from the alveolar crest to the external oblique ridge (Fig. 1).[8] The flatness and cortical bone thickness increase gradually from the anterior to posterior MBS. The insertion point, around the mucogingival junction (MGJ), depends on patients' individual anatomy; however, the flatter platform of MBS and the more attached gingiva are favorable factors that make it a suitable location to insert a



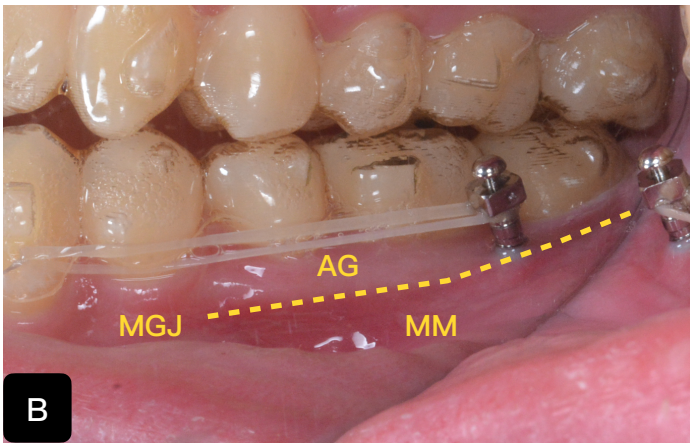


Fig. 1:
A. *The lateral cutaway view of human mandible shows the area of buccal shelf (gray area lined by blue contour). The green area shows the insertion site for MBS screw.*
B. *The insertion point of MBS screw is suggested around MGJ which separates the attached gingiva (AG) and movable mucosa (MM). However, it is acceptable to place on either AG or MM depending on the individual MBS anatomy of each patient, as long as there is a 5 mm screw head clearance from the soft tissue.*

Lily Y. Chen,
Training Resident, Beethoven Orthodontic Center (Left)
Chris H. Chang,
Founder, Beethoven Orthodontic Center
Publisher, Journal of Digital Orthodontics (Center right)
W. Eugene Roberts,
Editor-in-Chief, Journal of Digital Orthodontics (Right)

MBS screw.[9] The relatively consistent and flat zone was noted around the interproximal area of first and second molars, which is an ideal site for MBS screw insertion. As to the insertion angle, 30° to the perpendicular plane of bone surface is recommended as more cortical bone engagement leads to higher primary stability of the screw.[10]

Inferior alveolar nerve is a common anatomical concern when inserting MBS screws. The distal side of the mandibular second molar shows the greatest proximity to the inferior alveolar nerve (5.46 ± 1.63 mm) measuring from the screw tip. It is still considered sufficient and safe for screw placement.[11] However, considering the root length of the lower molars, the length and the 5-mm soft tissue clearance of screw, as well as the distance between the apices of the molars and the inferior alveolar canal,[12] there is sufficient distance for MBS screw insertion.

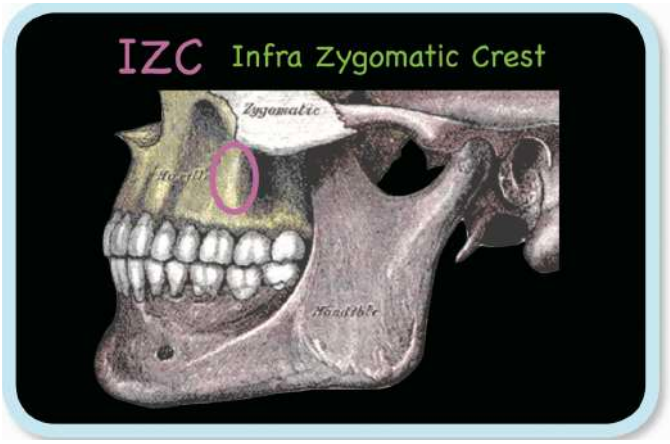


Fig. 2:
Infra-zygomatic crest (IZC), lateral to the roots of maxillary first and second molar, is marked with pink ovoid circle. Courtesy to Dr. John Jin-Jong Lin)

Anatomical Analysis of IZC Screw

The infra-zygomatic crest (IZC) is an osseous bone crest on the buccal side of posterior maxilla. It originates from the buccal alveolar process, lateral to the roots of maxillary first and second molars, to the zygoma (Fig. 2). IZC screws are placed in the base of the zygomatic crest eminence which is the IZC region and buccal to the roots of U6 and U7 (Fig. 3).[13] In patients younger than 14 years old, since U7s have not erupted yet or have just erupted, the buccal bone outside the mesiobuccal root (MBR) of U7s might still be soft as it lacks the force loading to condense the alveolar bone. The first choice of screw insertion site in patients younger than 14 is buccal to the root of U6s (Fig. 4).

Sinus perforation is a common concern among clinicians. Chang et al.[14] reported sinus penetration will lead to decreased insertion torque and interface bone contact but not to TAD success. Fortunately, there are three compensating factors: bicortical stabilization, age-related increase in bone quality, and increased TADs surface (2-mm diameter). Also none of the samples with sinus perforation

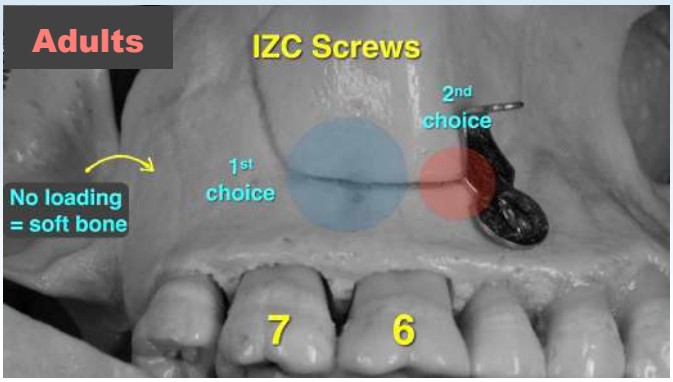


Fig. 3:
The first choice of IZC screw insertion site is around the U6 and U7 (blue circle).

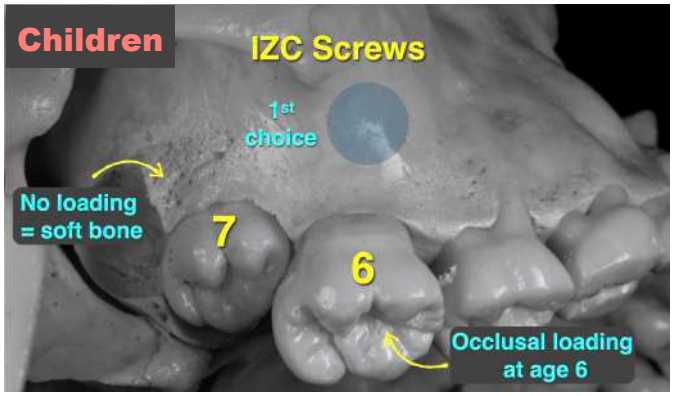


Fig. 4:
In young patients, the first choice of IZC screw insertion site is over the MBR of U6 (blue circle). See text for details.

presented any adverse signs or symptoms. This might be contributed to the use of prophylactic antibiotics and/or small sinus wound diameter (≤ 2 mm) which has good healing potential.[15]

MBS Screw for Class III

MBS miniscrews are proposed to be a reliable source of extra-alveolar (E-A) anchorage for retracting the entire mandibular arch to correct severe crowding, protrusion, and skeletal malocclusion, with/without extractions or orthognathic surgery.[16-18] Since the retraction force does not pass through the center of resistance (CR) of the entire lower dentition (Fig. 5), it is likely to lead to posterior rotation (counterclockwise rotation) of the lower dentition, often causing a posterior open bite (Fig. 6). This side effect could be corrected by passive eruption,[19] such as intermaxillary elastics and patients' chewing force after debonding the active devices.

IZC Screws for Class II

Correcting a skeletal Class II with excessive overjet in adult is a challenging task (Fig. 7). Protrusive maxilla with excessive overjet (> 10 mm) usually requires extractions and/or orthognathic surgery. However, patients often appeal more to conservative approaches such as non-extraction and non-surgical treatments. With non-extraction or non-surgical approaches, the finished results might be compromised, for instance, flared lower incisors and incompetent, protrusive lips. E-A bone screws in the

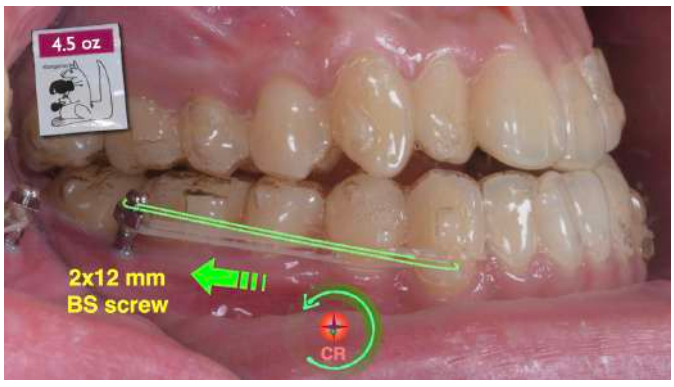


Fig. 5:
The force system of MBS screw anchorage to retract the mandible. Since the retraction force does not pass through CR of the mandible, it tends to cause a counterclockwise rotation of the lower dentition, often leading to a posterior open bite.

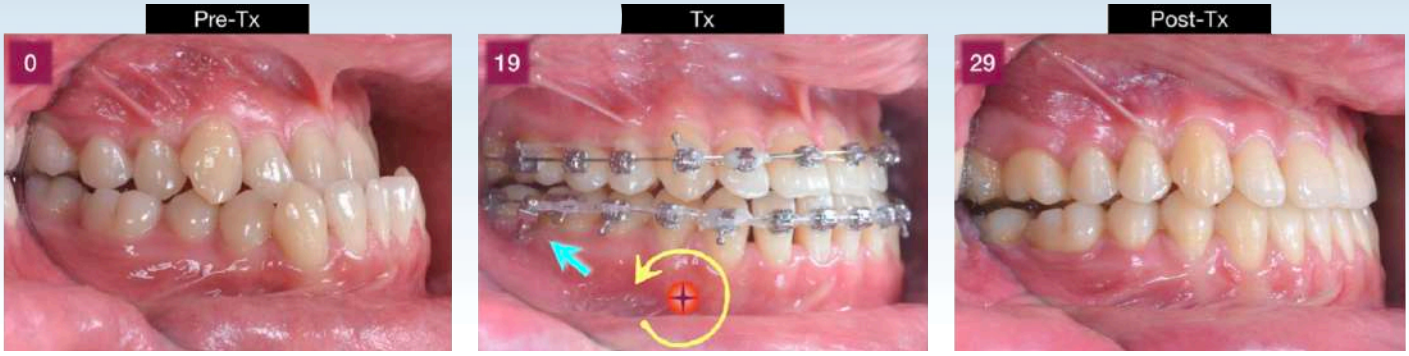


Fig. 6:
A panel shows pre-treatment (Pre-Tx), during treatment (Tx), to posttreatment (Post-Tx) records from left to right for a Class III patient treated with MBS screw (blue arrow) as mandibular retraction anchorage. The months of treatment are marked on the upper left side. Since the retraction force of the mandible did not pass through the mandibular center of resistance, it created a counterclockwise rotation of the mandibular arch and led to a posterior open bite.

Fig. 7:
A 3-image panel of intraoral photographs documenting the correction of skeletal Class II with 8 mm overjet. Pretreatment (Pre-Tx), in-treatment (Tx), and posttreatment (post-Tx) records are shown from left to right. The major mechanics were elastics anchored by the IZC miniscrew with Class II elastics to retract the maxilla and correct the excessive overjet.

IZC produce definite anchorage to retract the entire maxillary arch. The bilateral force system is diagrammed in a 2-dimensional representation (Fig 8).[8] However, not only in Class II treatments, IZC screws can also be used with Class III elastics to correct skeletal Class III cases by hooking elastics from mandibular canines to the IZC screws. The downside is elastics are prone to fall-off during mouth opening if the screw is tilted mesially.

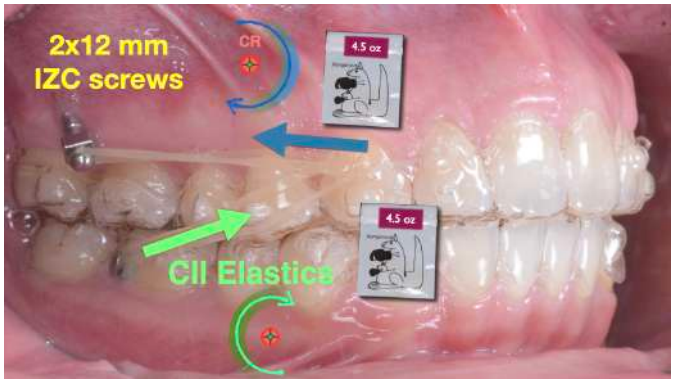


Fig. 8:
IZC screws served as anchorage to retract the maxillary arch backward (blue straight arrow). Class II elastics hooked from lower molars to upper canines reduced overjet (green straight arrow). Since both forces on the maxilla and the mandible did not pass through the CR of both arches, they created a clockwise rotation on both dentition (green and blue curved arrows). See text for details.

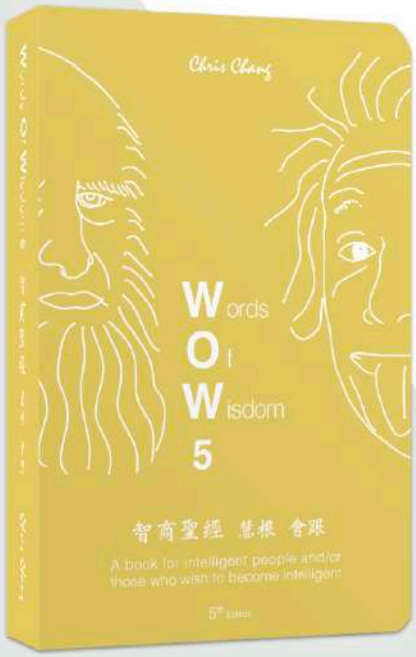
References

1. Wilmes B, Rademacher C, Olthoff G, Drescher D. Parameters Affecting Primary Stability of Orthodontic Mini-implants. J Orofac Orthop/Fortschritte der Kieferorthopädie 2006;67(3):162-74
2. Huja SS, Litsky AS, Beck FM, Johnson KA, Larsen PE. Pull- out strength of monocortical screws placed in the maxillae and mandibles of dogs. Am J Orthod Dentofacial Orthop 2005;127:307–313.
3. Ure DS, Oliver DR, Kim KB, Melo AC, Buchang PH. Stability changes of miniscrew implants over time: a pilot resonance frequency analysis. Angle Orthod 2011;81:994–1000.
4. Shank SB, Beck FM, D'Atri AM, Huja SS. Bone damage associated with orthodontic placement of miniscrew im- plants in an animal model. Am J Orthod Dentofacial Orthop. 2012;141:412–418.
5. Motoyoshi M, Inaba M, Ono a., Ueno S, Shimizu N. The effect of cortical bone thickness on the stability of orthodontic mini-implants and on the stress distribution in surrounding bone. Int J Oral Maxillofac Surg 2009;38:13-8.
6. Motoyoshi M, Yoshida T, Ono A, Shimizu N. Effect of cortical bone thickness and implant placement torque on stability of orthodontic mini-implants. Int J Oral Maxillofac Implants 22(5):779-84.
7. Chang C, Liu SSY, Roberts WE. Primary failure rate for 1680 extra-alveolar mandibular buccal shelf mini-screws placed in movable mucosa or attached gingiva. Angle Orthod 2015;85(6):905–10. doi:10.2319/092714.695.1
8. Chang CH, Lin JS, Roberts WE. Temporary skeletal anchorage devices to correct challenging malocclusions with clear aligners. Am J Orthod Dentofacial Orthop Clin Comp 2021;1(2):102–12. doi:10.1016/j.xaor.2021.05.002
9. Liaw JJ, Robert WE. Paradigm shift in Class III treatment with TADs. Int J Orthod Implantol 2012;28:22–36.
10. Chang C, Huang C, Roberts WE. 3D cortical bone anatomy of the mandibular buccal shelf: a CBCT study to define sites for extra-alveolar bone screws to treat Class III malocclusion. Int J Orthod Implantol 2016;41:74-82.
11. Elshebiny T, Palomo JM, Baumgaertel S. Anatomic assessment of the mandibular buccal shelf for miniscrew insertion in white patients. Am J Orthod Dentofacial Orthop 2018;153(4):505–11. doi:10.1016/j.ajodo.2017.08.014
12. Srivastava S, Alharbi HM, Alharbi AS, Soliman M, Eldwakhly E, Abdelhafeez MM. Assessment of the proximity of the inferior alveolar canal with the mandibular root apices and cortical plates—a retrospective cone beam computed tomographic analysis. Journal of Personalized Medicine. 2022;12(11):1784. doi:10.3390/jpm12111784
13. Chang CC, Lin JS, Yeh HY. Extra-alveolar bone screws for conservative correction of severe malocclusion without extractions or orthognathic surgery. Curr Osteoporos Rep 2018;16(4):387–94. doi:10.1007/s11914-018-0465-5
14. Chang CH, Lin J-H, Roberts WE. Success of infrazygomatic crest bone screws: Patient age, insertion angle, sinus penetration, and terminal insertion torque. Am J Orthod Dentofacial Orthop 2022;161(6):783–90. doi:10.1016/j.ajodo.2021.01.028
15. Kravitz ND, Kusnoto B. Risks and complications of orthodontic min- iscrews. Am J Orthod Dentofacial Orthop 2007;131(Suppl):S43-51.
16. Chang C, Roberts WE. Orthodontics. Taipei: Yong Chieh, Ltd; 2012. pp. 285–298.
17. Lin J, Liaw J, Chang C, Roberts WE. Orthodontics: Class III Correction. Taipei:Yong Chieh; 2013.
18. Chang C, Sean SY, Liu W, Roberts WE. Primary failure rate for 1680 extra-alveolar mandibular buccal shelf mini-screws placed in movable mucosa or attached gingiva. Angle Orthod 2015;85: 905-10.
19. Chang CH, Lin LY, Roberts WE. Orthodontic bone screws: A quick update and its promising future. Orthod Craniofacial Res 2020;24(S1):75–82. doi:10.1111/ocr.12429

iNewton

Newly Released!

Unlock powerful insights with words



智商聖經 慧根 會跟

Words Of Wisdom 5

A book for intelligent people and/or those who wish to become intelligent

- *More than 800 wisdom accumulated over 5,000 years into a small handbook.*
- *The best way to learn from special people with their quotes condensed from their whole life experience.*
- *"The Formula for Success," a new section designed to give you the edge you need.*

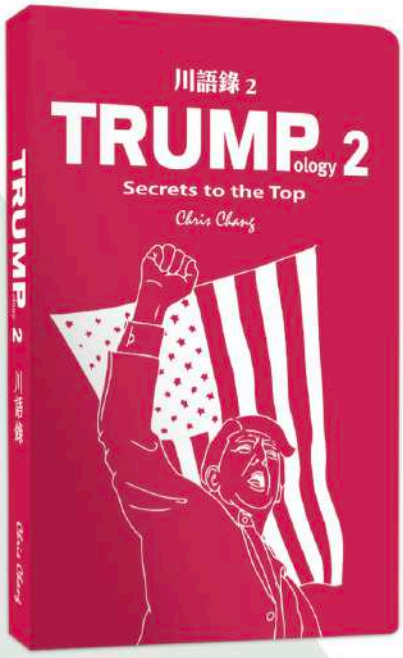
We're students for life. Learn ambitiously.

川語錄 2

TRUMPology 2

Secrets to the Top

- *Collected more than 300 famous quotes of the President Trump.*
- *Understand the secrets of Trump's success and improve your English ability simultaneously.*
- *Gain a comprehensive window into the mind of the president Trump and his enduring influence.*



The re-election of Donald Trump is the greatest comeback victory of all time.

Get it on Books

Chris Chang

+886-3-573-5676 orthobonescrew.com inewton.dental@gmail.com

iworkshop.beethoven.tw

Dental Clinic Established 1996
Beethoven

Screws & Aligners International Workshop

Beethoven International Workshop

demonstrates how to incorporate TADs and minor surgeries in complex orthodontic treatment. Experienced practitioners get to (1) learn firsthand from the world-renowned orthodontist and lecturer, Dr. Chris Chang, (2) observe management secrets behind a highly efficient clinic, and (3) take home effective clinical tips developed by the Beethoven group to take your clinical results to the next level!

Observership at Beethoven

Chair-side observation of Dr. Chang's clinical treatment and patient communication

Master-level TAD Learning

Identify various clinical indicators for TADs and master application skills

All New Hands-on Workshop

Custom-made model designed by Dr. Fernando Rojas-Vizcaya for realistic impaction treatment practice

+886-3-5735676 #218 Annie
course@newtonsa.com.tw
Hsinchu, Taiwan

Screws & Aligners **Keynote** (optional)

2025 Nov 04-06 Nov 07

Dr. Chris Chang

DDS, PhD. ABO certified, Angle Midwest member, director of Beethoven Orthodontic Center, Taiwan

"Dr. Angle would be glad to know that contemporary orthodontics has a professional as Chris Chang!"

Prof. Dr. Paulo Fernandes Retto, Portugal

Dr. Chang received his PhD in bone physiology and Certificate in Orthodontics from Indiana University in 1996. As publisher of Journal of Digital Orthodontics-a journal for interdisciplinary dental treatment, he has been actively involved in the design and application of orthodontic bone screws.

IMPACTION

Course Schedule

DAY 1 **Chair-side observation**

DAY 2 **Lecture, chair-side observation**

Lecture topic: Screws & Aligners

DAY 3 **VISTA & 4 other minor surgeries for orthodontic practice**

Hands-on workshop

DAY 4 **Keynote workshop**

(optional) conducted by Newton's A team

VISTA

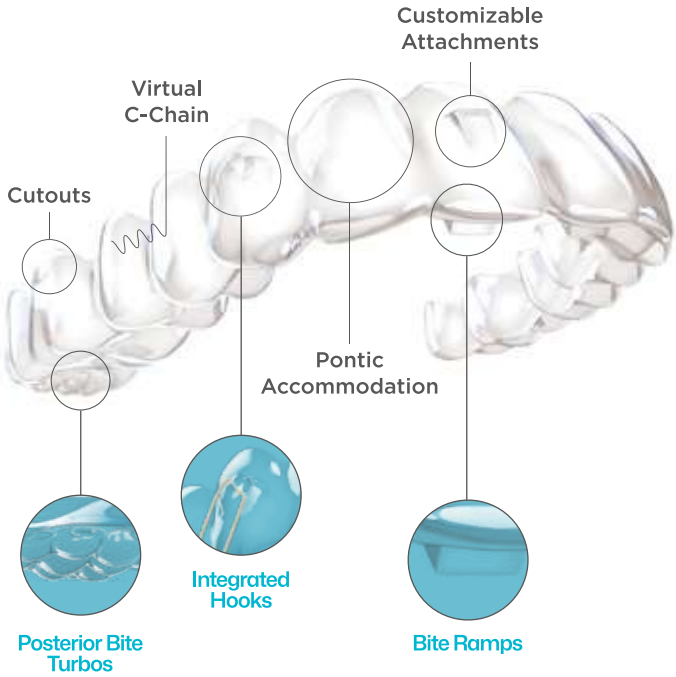
Vertical Incision Subperiosteal Tunnel Access

SPARK™
CLEAR ALIGNER SYSTEM

精耀
全球透明矯正
新選擇

更透亮 | 更舒適 | 更抗染

Spark™ 精耀透明矯正系統由 Ormco 公司製造。
Ormco 公司是全球齒顎矯正產品的領導者，在全球超過 140 個國家已累計協助齒顎矯正醫師創造超過 2,000 萬個滿意的笑容。憑藉超過 60 年齒顎矯正領域的深厚積累、研發創新以及嚴格的製造標準，Ormco 公司已成為每位齒顎矯正醫師首選的領導品牌。



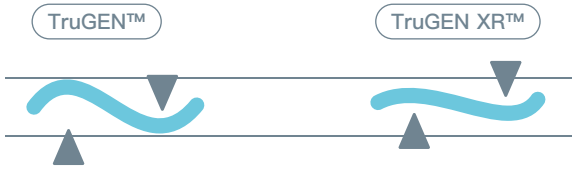
成為 Spark™ 醫師

TruGEN™ 專利彈性材料

更高的力量保持力，更好的牙齒表面接觸

Spark™ 精耀透明矯正器採用 TruGEN™ 最新材質及技術製作而成，其近乎隱形，相較它牌矯正器更加透明、舒適且不易染色。

兩種軟硬的材質，運用於不同療程



SPARK™
CLEAR ALIGNER SYSTEM

更透亮 More Clear

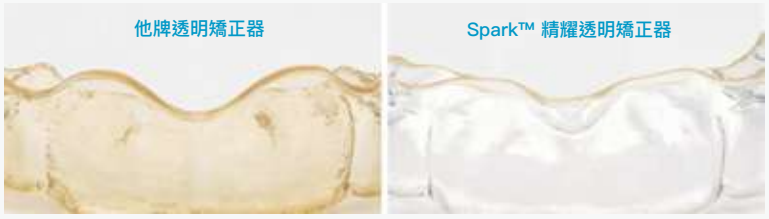
特殊材料製程，相較其他領導品牌顯得更隱形透亮。

更舒適 More Comfortable

客製化矯正器沿著患者牙齦緣做善行切割，專業的修磨技術將矯正器邊緣修得更平滑，與它牌相較配戴更舒適。

更抗染 Stains Less

經實驗測試，將矯正器持續泡在咖啡裡數小時，Spark™ 矯正器相較於它牌矯正器抗染能力更強。



Clenchy™

ALIGNER SEATERS

買 3 送 1

Clenchy

定價 NT$3,300
/50包 (100個)

Clenchy 2

定價 NT$6,700
/50包 (100個)

升級增加的藍色勾，體驗摘除牙套的舒適感與便利性。

	Clenchy™	Chewies
Seats aligners with two textures	✓	✓
Offers soft and firm textures	✓	
2 in 1 aligners seating and removal	✓	
Created by a dental patient	✓	
Hygenic	✓	
Compact	✓	
Durable	✓	
Recyclable	✓	

INSTRUMENTS

特價 NT$39,999/ 盒

Includes
G5-ProLign 0.5 mm

SDC-IPR G5-ProLign Starter Kit

定價 NT$69,500 /盒

sdc SWISS dentacare QUALITY DENTAL PRODUCTS

Description:

4 G5-ProLign files 0.1, 0.2, 0.3, 0.4, 0.5 mm2 sides
2 G5-ProLign files 0.1, 0.2 mm 1 side
1 G5-UltraSoft file 6 µm 2 sides
1 CombiStrip file 6 µm (ultra-fine) polishing, 2 sides
1 CombiStrip file 15 µm (fine) contouring, 1 side
1 Hand piece NSK Ti Max X55 with Water
1 Measuring gauge 5 thicknesses
20 G5-Shanks Pink (Metal HP)
1 Nozzle for spray lubrication
1 Extractor for some instruments
1 IFU

iNewton

NEW DESIGN

Stainless Steel Mirror 2.0

全新**不鏽鋼口鏡**曲線設計**更舒適**亦方便握持，一支即可拍攝全口照片，提供照相最廣可視範圍。

專利設計

鏡面改良

成像清晰

加倍舒適

圓滑邊角

咬合面拍攝

側面拍攝

無鍍膜的**不鏽鋼拋光鏡面**，可增加影像清晰度、色澤穩定度。**多道修邊工序**，可適應不同大小的口腔環境，增加患者口腔舒適感。

新品上市特惠價，詳情請洽金牛頓

這個鏡子最厲害的是頰側鏡的長度，拍頰側面不會因為鏡面長度不夠，切到前牙的影像（坊間其他這種一邊頰側鏡一邊咬合鏡的拍照鏡大多都有這個問題）。

挑園 宋醫師

它牌口鏡

不鏽鋼口鏡2.0

orthobonescrew.com　03-5735676　inewton.dental@gmail.com

2025 第十七屆

貝多芬 矯正精修班

時間：週二上午 09:20-12:00

地點：金牛頓教育中心（新竹市建中一路 25 號 2 樓）

上課日期：

2025　3/18、4/15、5/13、6/10、7/8、8/19、9/9、10/21、11/11、12/9、1/13/26'

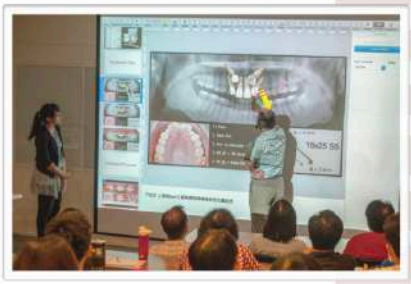
全新的第十七屆貝多芬精修班是由國際知名講師-張慧男醫師主持，並偕同貝多芬牙醫住院醫師群聯合講授，內容包含下列主題：

1. 精選矯正權威期刊 AJODO 的文章做文獻分析與評讀。
2. 精緻完工 ABO 案例報告，其中因應數位矯正的世界趨勢，Invisalign 病例為課程探討的主要內容之一。
3. 分享臨床上常犯的錯誤以及解決方法。

2025 貝多芬精修班內容豐富精彩，讓您經由每個月一次的課程，在面對各式的臨床案例時，更能游刃有餘、得心應手。

學習目的：

研讀最新趨勢文章可以窺知世界文獻公認的治療方式，而藉由評論文章的優缺點不僅能夠訓練判斷與思考能力，更可以清楚比較作法上的不同，達到完整理解治療方向、內容與穩定性的目標。



報名專線：03-5735676 #218 陳小姐

Class II Division 2 Malocclusion with Severe Deep Bite, Unilateral Posterior Scissors Bite, and Missing Lower First Molar in an Adult Treated with Miniscrews and Bite Turbos

Abstract

A 27-year-old female with Class II division 2 malocclusion, severe deepbite, right posterior scissors bite, and a missing right mandibular first molar presented for orthodontic consultation. After 49 months of treatment, intrusion of the incisors in both arches and maxillary whole arch distalization were successfully achieved with anchorage provided by temporary skeletal anchorage devices (TSADs), including an incisal screw and bilateral infra-zygomatic crest (IZC) screws. The left mandibular first molar was extracted due to poor prognosis, and then the symmetric lower first molar spaces were close with bilateral L-shaped Class II elastics and power chains. Anterior bite turbos, anterior root torquing (ART) springs, and pre-torqued archwires were used to correct the deep bite and increase the inclination of maxillary incisors. An ideal dentofacial result was achieved in a minimally invasive manner. (J Digital Orthod 2024;76:16-33)

Key words:

Class II division 2, deep bite, unilateral scissors crossbite, miniscrews, bite turbos, whole arch distalization, molar extraction space closure, anterior root torquing spring

Introduction

Deep bite malocclusion is usually treated by intrusion of the anterior teeth and/or extrusion of posterior teeth in either or both arches.[1-5] The most appropriate treatment option considers the patient's skeletal pattern and other occlusal characteristics to achieve a harmonious profile, functional occlusion, and long-term stability.[6]

Scissors bite (buccal crossbite) is a malocclusion where the palatal cusp of a maxillary tooth is buccal to the mandibular buccal cusp. Brodie termed this malocclusion a "Brodie bite" when the mandibular teeth are telescoped within the maxillary arch.[7] Temporary skeletal anchorage devices (TSADs) can be used to correct a scissors bite.[1,8]

Given the low likelihood of mandibular growth in adult patients, non-extraction treatment for Class II malocclusion usually requires maxillary whole arch distalization to achieve an ideal overjet.[9] Since the use of mini-screws combined with fixed labial appliances was first introduced by Park et al.[10,11] in 2004, TSAD-based interventions have been reported to be effective in retracting the maxillary posterior teeth[2,8] with fewer unwanted side effects.[12]

This case report describes the comprehensive treatment of a 27-year-old female patient with Class

Huang-Ting Lee
Training resident, Beethoven Orthodontic Center (Left)
Jia-Hong Lin
Resident, Beethoven Orthodontic Center (Center left)
Chris H. Chang,
Founder, Beethoven Orthodontic Center
Publisher, Journal of Digital Orthodontics (Center right)
W. Eugene Roberts,
Editor-in-Chief, Journal of Digital Orthodontics (Right)

Fig. 1: *Pre-treatment facial and intraoral photographs*

II division 2 malocclusion, severe deep bite, unilateral scissors bite, and a missing right mandibular first molar. Intrusion of the incisors and maxillary whole arch distalization were successfully achieved by anchorage provided by TSADs.

This report uses a modified Palmer notation for dental nomenclature. The dentition is divided into four quadrants: upper right (UR), upper left (UL), lower right (LR), and lower left (LL). Teeth are numbered from 1 to 8 in each quadrant starting at the midline. For example, the lower right first molar is designated as LR6.

History and Etiology

A 27-year old female sought orthodontic consultation for a deep bite and prosthetic rehabilitation of a missing tooth (Fig. 1). She also complained of pain in the left temporomandibular joint (TMJ). No relevant medical or dental history was reported.

Clinical examination revealed a straight facial profile with a slight chin deviation to the left. Intraoral examination showed a severe deep bite, a right posterior buccal (scissors) crossbite, and a missing LR6. The overjet was 2 mm, and the overbite was 100%, with the mandibular incisors impinging on the palate. The molar relationship on the right side could not be assessed due to the missing LR6, but both canines and buccal segments had a Class II tendency. The lower dental midline was shifted about 3 mm to the left in centric occlusion (C_O) but shifted to the right when the patient opened her mouth (Fig. 2), indicating a functional shift that apparently contributed to her temporomadibular joint (TMJ) discomfort. There was no significant crowding in either arch.

Panoramic radiography (Fig. 3) revealed that LL6 had received endodontic treatment, but a radiolucent periapical lesions were evident. Lateral cephalometric radiographs (Fig. 4) showed skeletal mandibular retrognathism (SNB, 74°) with an ANB angle of 5°. Severely retroclined maxillary and mandibular incisors (U1-SN, 69°; L1-MP, 82°) were noted. Pre-treatment dental models (casts) are shown in Fig. 5.

Diagnosis

Facial

- Facial Convexity: Straight (G-Sn-Pg', 9°)
- Lip Protrusion: *Within normal limits (WNL) (upper and lower lips were -1 mm and -2 mm to the E-line respectively)*

Fig. 2: *Frontal view of pre-treatment intraoral photographs (mouth open slightly)*

Fig. 3: *Pre-treatment panoramic radiograph*

Fig. 4: *Pre-treatment cephalometric radiograph*

Fig. 5: *Pre-treatment dental models (casts)*

Skeletal

- Skeletal Class I (*ANB, 5˚*)
- Mandibular Plane Angle: *WNL (SN-MP, 35˚; FMA, 28˚)*

CEPHALOMETRIC SUMMARY			
	PRE-TX	POST-TX	DIFF.
SKELETAL ANALYSIS			
SNA˚ (82˚)	79˚	78˚	1˚
SNB˚ (80˚)	74˚	75˚	1˚
ANB˚ (2˚)	5˚	3˚	2˚
SN-MP˚ (32˚)	35˚	35˚	0˚
FMA˚ (27˚)	28˚	28˚	0˚
DENTAL ANALYSIS			
U1 TO NA mm (4mm)	2	2	0
U1 TO SN˚ (104˚)	69˚	88˚	19˚
L1 TO NB mm (4mm)	1	1	0
L1 TO MP˚ (90˚)	82˚	92˚	10˚
FACIAL ANALYSIS			
E-LINE UL (-1mm)	1	3	2
E-LINE LL (0 mm)	2	5	3
%FH: Na-ANS-Gn (56%)	55%	56%	1%
Convexity: G-Sn-Pg (13˚)	9˚	8˚	1˚

Table 1: *Cephalometric Summary*

Dental

- Sagittal
  - Canine relationship: *Left - Class II; right - Class II*
  - Molar relationship: *Left - Class I; right - could not be defined.*
  - Overjet: *2 mm*
  - Upper and Lower incisor: *Retroclined (U1-SN, 69˚; L1-MP, 82˚)*

- Transverse
  - Crossbite: *LR lingual tipping (scissors bite)*
- Vertical
  - Overbite: *8 mm (exceeding 100% and impinging in the palate)*
  - U1 and L1 extruded
  - Deep curve of Spee
- Others
  - Missing: *LR6*

American Board of Orthodontics (ABO) Discrepancy Index (DI): 11 points (Worksheet 1).

Treatment objectives

1. Level and align both arches.
2. Intrude and flare both upper and lower incisors.
3. Prosthetic rehabilitation or space closure of the missing tooth (LR6)
4. Correct right posterior buccal crossbite.
5. Maxillary whole-arch distalization may be needed.

Treatment plan

The overall objectives were to correct the deep bite, procline and intrude both upper and lower incisors, correct the right posterior crossbite, and address the missing LR6 either through prosthetic rehabilitation or space closure. Given the questionable prognosis of LL6, two options were considered.

First Option:

A non-extraction treatment. Procline the upper incisors using high-torque brackets and anterior root torquing (ART) springs. Intrude and procline the lower incisors using composite bite turbos placed on the palatal side of the upper central incisors. The space for LR6 is maintained with an open coil spring, and an implant is planned to be placed after achieving ideal alignment.

Second Option:

Achieve symmetric space closure in the lower arch following the extraction of LL6. Extraction in the maxillary arch is unnecessary because the retroclined upper incisors may not be corrected due to the bowing effect. To correct the potentially large overjet, the upper arch is retracted using anchorage provided by infrazygomatic crest (IZC) miniscrews bilaterally. To prevent the occlusal plane from dumping, maintain vertical control of the upper incisors by anchorage provided by an incisal miniscrew placed between the upper central incisors.

After a thorough discussion of the two options with the patient, the first option was preferred as the LL6 was asymptomatic at the time, its prognosis was fair, and it was expected to deliver a near-ideal dentofacial result in a minimally invasive manner.

Appliances and Treatment Progress

A Damon Q® fixed appliance with passive self-ligating (PSL) brackets (Ormco, Glendora, CA) was initially bonded only on all upper teeth. High-torque brackets were chosen for the central incisors to procline their decreased inclination.

Composite bite turbos (Fig. 6) were placed on the palatal side of the upper central incisors to intrude lower incisors and open the bite to establish clearance for placing brackets in the lower arch. PSL brackets were subsequently bonded on the lower arch. Low-torque brackets were chosen for the four incisors to prevent excessive proclination. Crossbite elastics were utilized between buccal side of UR6 and lingual side of LR7. After initial alignment and leveling, an ART spring (Fig. 7) was utilized in the upper arch to further procline the anterior teeth.

In the 8th month, the previously asymptomatic LL6 started to cause discomfort, leading to a change in the treatment plan. Given the poor diagnosis of LL6, after thorough discussion with the patient, the second treatment option became the treatment plan. The LL6 was then extracted, followed by space closure using power chains and bilateral L-shaped buccal Class II elastics.

In the 13th month, after flaring the upper incisors, the ART spring was removed and an incisal mini screw was inserted between the root apices of UR1 and UL1 to intrude the upper anterior teeth. Additionally, an extra-alveolar miniscrew was installed in each IZC to retract the upper arch. Cone beam computed tomography (CBCT) documented that the miniscrews were buccal to the roots of the respective molars, and were well-anchored in the cortical plate (Fig. 8). Extra-alveolar insertion of the IZC miniscrew was crucial for whole-arch retraction of the maxillary dentition without tooth root interference.[8]

In the 49th month, the incisor and two IZC miniscrews were removed, along with all other appliances. Figs. 9 and 10 are panels of intraoral occlusal photographs showing the treatment progress in the maxillary and mandibular arches, respectively. Immediately after the fixed appliances were removed, a maxillary 2-2 and a mandibular 3-3 lingual retainers (sectional twisted wires) were bonded in place.

Fig. 6: *Occlusal view of composite bite turbos constructed at two months (2M) by placing composite resin on the lingual surfaces of the upper central incisors*

Results Achieved

After 49 months of active treatment, the severe overbite with a missing molar was significantly improved. Molar Class I relationships were achieved

Fig. 7: *Frontal view of ART spring applied at eight months (8M)*

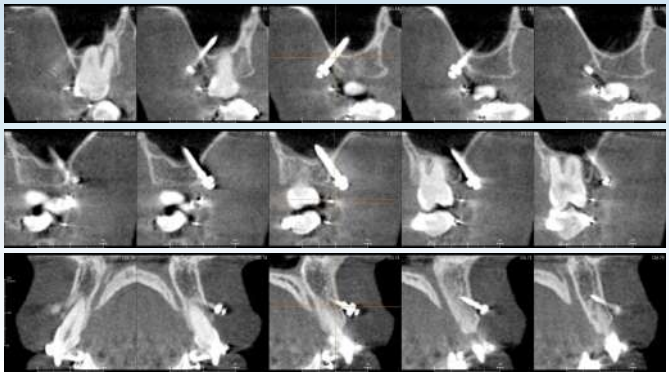


Fig. 8:
CBCT slices in the 13th month show the extra-alveolar insertion of infra-zygomatic crest bone screws on the right (upper) and left (middle) sides, and incisor bone screw between the root apex of UR1 and UL1 (lower).

on both sides. The malocclusion (DI = 11) was treated to optimal alignment (CRE = 15) with an excellent Pink esthetic score of 0 and a White esthetic score of 1 (see worksheets at the end of this case report). Two discrepancies from an ideal outcome were noted: (1) the buccolingual inclination of UR7 and UL7, and (2) their occlusal contacts with LR8 and LL8 respectively. Open contact resulted from the tip-back of the maxillary second molar, which is normal in whole arch distalization treatments. Posttreatment panoramic and lateral cephalometric radiographs are shown in Figs. 11 and 12, respectively.

Although both UR7 and UL7 were slightly buccally tipped, the occlusion was stable at the end of the treatment (Fig. 13). Superimposition of the pre-treatment and posttreatment cephalometric tracings revealed the distalization of upper molars, mesialization of lower molars, intrusion and proclination of both upper and lower incisors, and forward movement of the mandible (Fig. 14).

The superimposition on the mandible shows an upward displacement of the cephalometric landmark articulare after treatment. This is due to the forward and downward displacement of the mandible following the removal of dental interference. Fig. 15 is a panel of posttreatment facial and intraoral photographs. The improvement in chin deviation and dental midline was evident as a result of the crossbite correction in the right buccal segment and the resolution of the functional shift.

Assessment of Specific Objectives

Maxilla (all three planes)**:**

- A-P: *maintained*
- Vertical: *maintained*
- Transverse: *maintained*

Mandible (all three planes)**:**

- A-P: *advanced*
- Vertical: *maintained*
- Transverse: *maintained*

Maxillary Dentition:

- A-P: *retraction and increase in palatal root torque of the central incisors; whole arch distalization*
- Vertical: *intrusion of the incisors*
- Inter-Molar Width: *increased (whole arch distalization)*

Mandibular Dentition:

- A-P: *retraction and increase in lingual root torque of the incisors; mesialization of the molars*

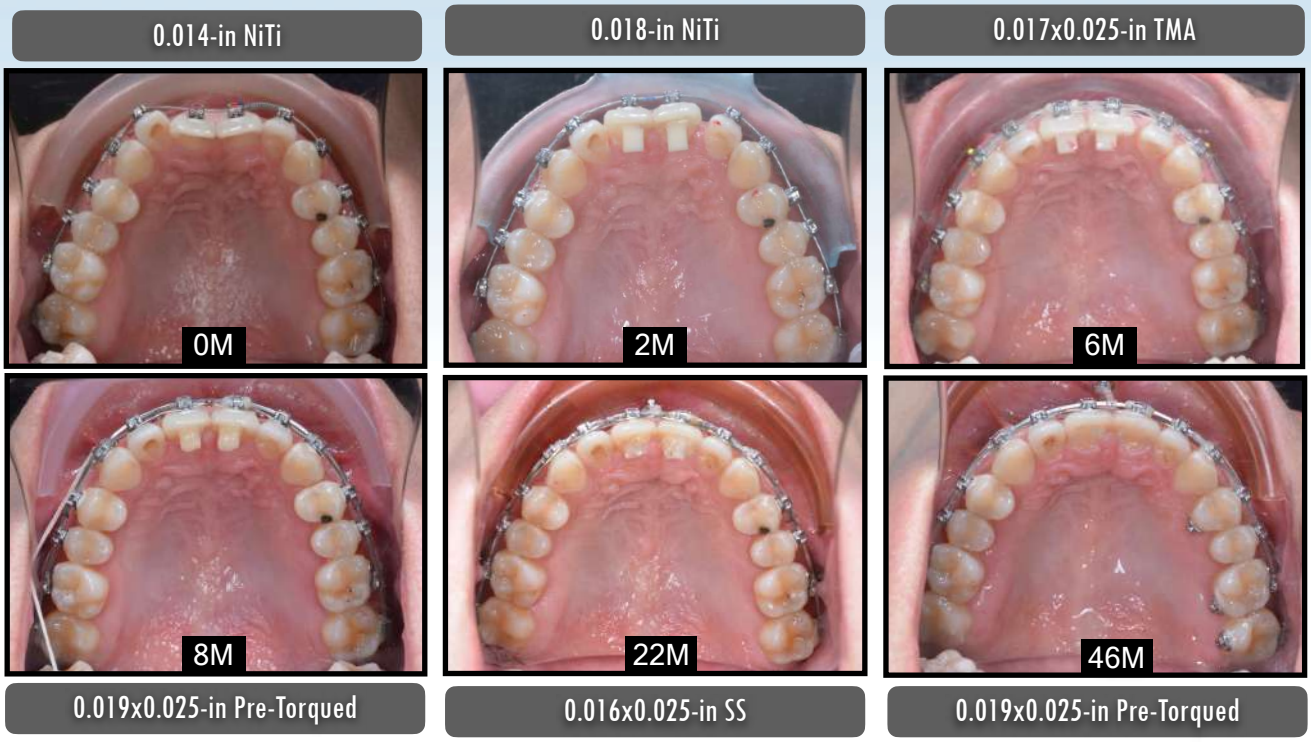


Fig. 9:
Treatment progression from the maxillary occlusal view in months (M) with archwire specification is shown from the start of treatment (0M) to forty-six months (46M).

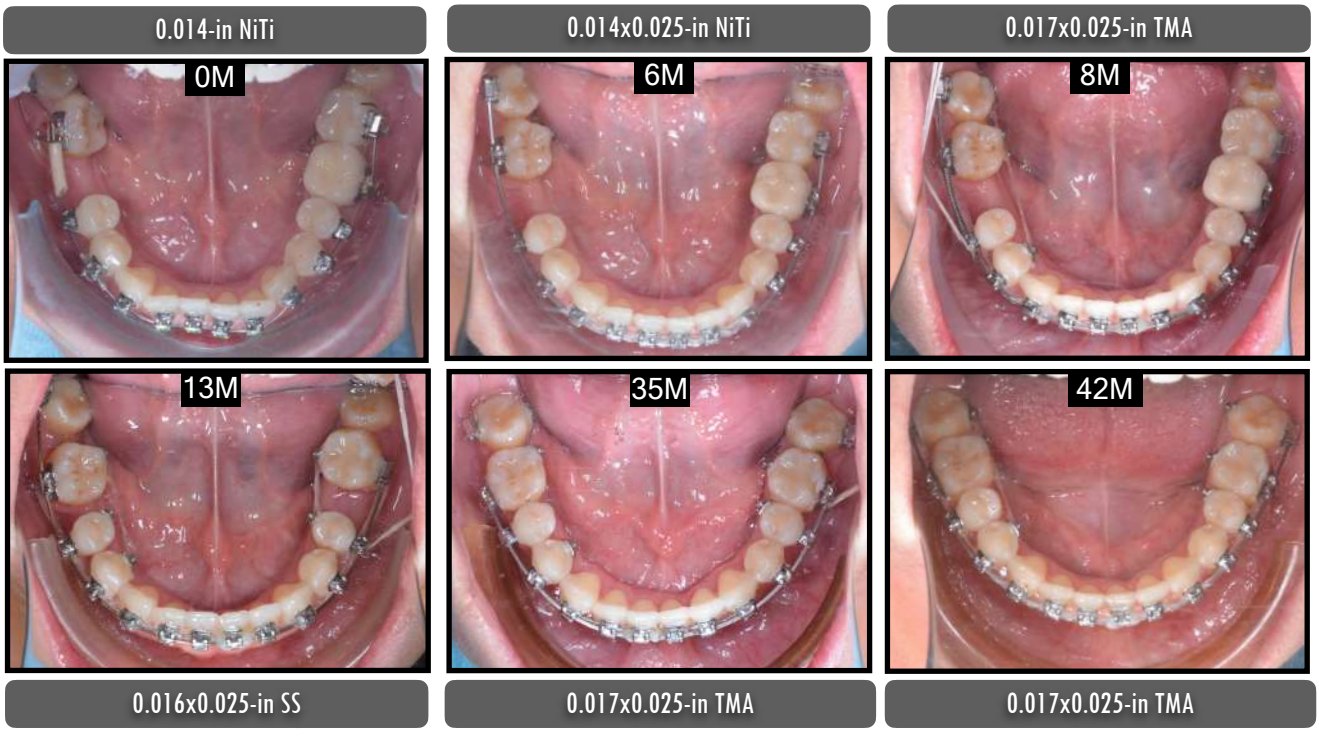


Fig. 10:
Treatment progression from the mandibular occlusal view in months (M) with arch wire specification is shown from the start of treatment (0M) to forty-two months (42M).

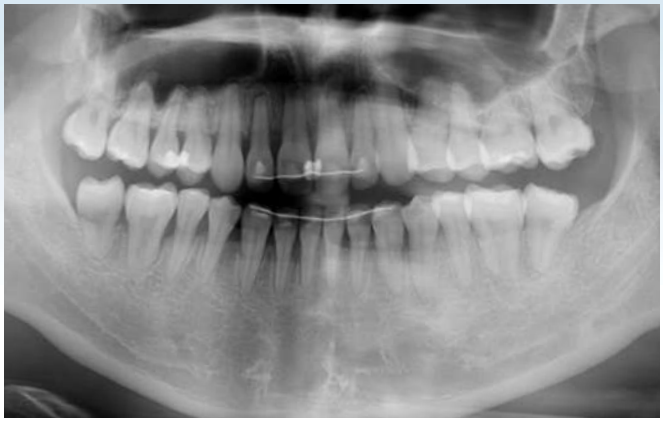


Fig. 11: *Posttreatment panoramic radiograph*

Fig. 12: *Posttreatment cephalometric radiograph*

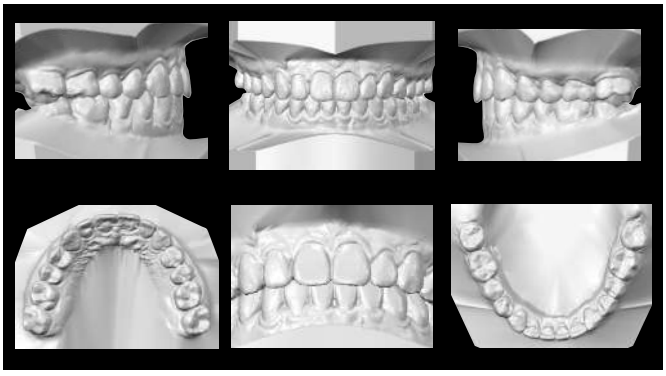


Fig. 13: *Posttreatment dental models (intra-oral scans)*

- Vertical: *intrusion of the incisors*
- Inter-Molar Width: *increased (LR buccal tipping)*

Facial Esthetics:

- The harmonious facial profile was maintained.

Final Evaluation of Treatment

Clinical examination revealed that the retraction and intrusion of upper and lower incisors resolved the deep bite. The whole upper arch distalizaton and mesial bodily movement of the lower molars by power chains closed the bilateral lower first molar space symmetrically. The buccal crossbite was also corrected. Both lips were retracted relative to the E-line as the upper dentition was retracted. Dental alignment and esthetics were near-ideal.

The only significant discrepancies were buccolingual inclination of UR7 and UL7, and their occlusal contacts with LR8 and LL8 respectively. One-year follow-up evaluation documented the stability of the final occlusion (Fig. 16). Neither relapse of the deep bite nor buccal crossbite were noted.

Discussions

Torque control of maxillary incisors

Literature has shown that success of overbite correction is associated with reduction of inter-incisal angle[6] and excessive overlap of maxillary incisors with the lower lip.[14] In this case, high-torque brackets were utilized on the upper central incisors to increase inclination, counteracting the retroclination side effect during maxillary whole-

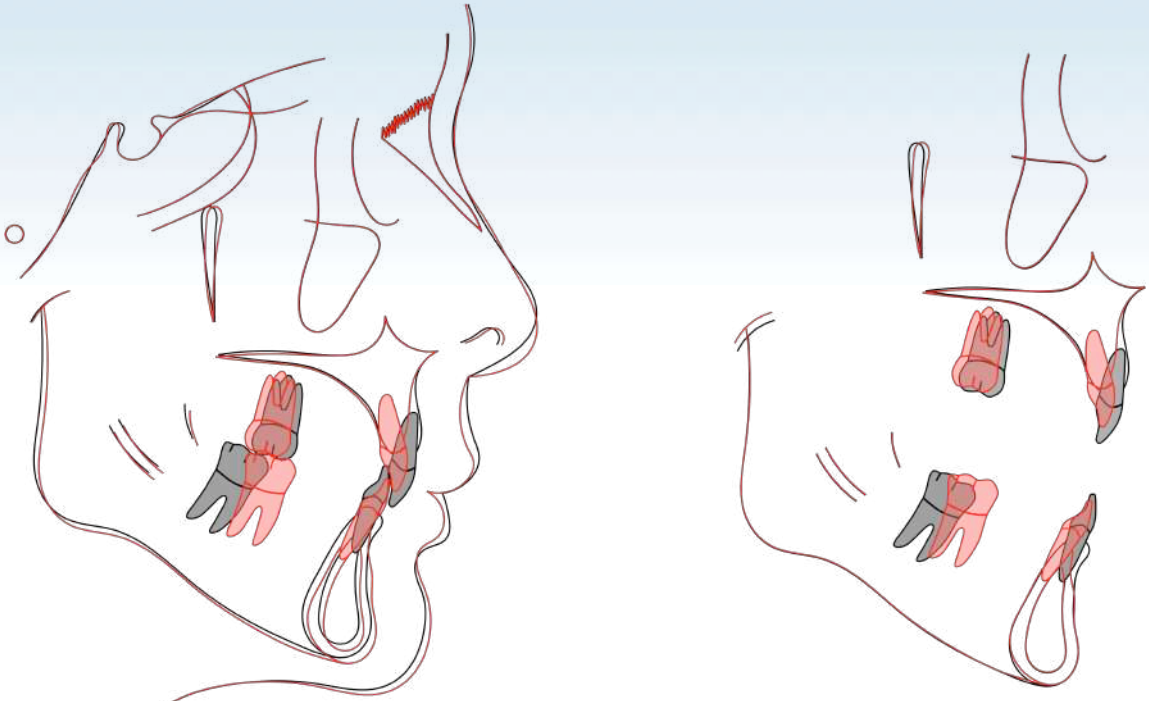


Fig. 14:
Superimposition of the pre-treatment (black) and posttreatment (red) cephalometric tracings shows the dentofacial effects of treatment.

arch distalization and Class II elastic wear. Additionally, ART spring, pre-torqued archwire, and anchorage from an incisal miniscrew were utilized to maintain the inclination of upper anterior segment because the force from the power chain was occlusal to the center of resistance of the incisors.

Anchorage by TSAD: maxillary whole-arch distalization and incisor intrusion

TSAD-based interventions are proven to be more effective in maxillary whole-arch distalization, with fewer unwanted side effects compared to conventional mechanics such as the Pendulum appliance.[12] Extra-radicular miniscrews are often used for skeletal anchorage due to their ease of placement and low demand for patient compliance.[2,3,5,15-17] Some authors report that buccally-placed interradicular microimplants can achieve up to 3.5 mm of distal movement without negative effects.[10,18] However, the limitation of distalization when using interadicular miniscrews is determined by the distance between adjacent roots. To maximize the amount of distalization in the current case, extra-alveolar bone screws were utilized. Studies have shown that bilateral extra-alveolar infrazygomatic crest (IZC) bone screws were effective for retracting the entire maxillary arch.[8,19,20]

Mandible shift (A-P, Transverse)

Superimposition of the pretreatment and post-treatment cephalometric tracings (Fig. 14) reveals a forward displacement of mandible. This change might be reversal of the restriction of mandible protrusion due to retroclination of upper incisors

Fig. 15: *Posttreatment facial and intraoral photographs*

and severe overbite in the initial occlusion. After the proclination of upper incisors and reduction of overbite, the mandible was unlocked and shifted right and to a relatively forward position. Studies showed that one-fourth to one-third of Class II division 2 malocclusion patients displayed a functional posterior displacement[21,22] and the correction of overbite may unlock the occlusion, which modified the path of mandible closure and subsequently improved the Class II molar relationship.[23,24]

From the pre-treatment frontal view (Fig. 2), a functional shift was noted; therefore crossbite elastics were applied to correct the occlusal interference caused by the right buccal crossbite, which is reported to be an effective approach in patients with unilateral crossbite.[25,26] The improved alignment of the facial and dental midlines was stable, as shown in the posttreatment (Fig. 15) and 1-year follow-up records (Fig. 16).

Lower anterior intrusion (bite turbos)

To correct the overbite and overjet, anterior bite turbos were used to reduce the overbite and procline the mandibular incisors to improve the overjet. L-shaped Class II elastics were utilized to reduce the overjet, and low-torque brackets were

Fig. 16: *Facial and intraoral photographs at 1-year post-treatment document the current condition of the patient.*

bonded on lower incisors to prevent over proclination. Anterior bite turbos are an effective tool for correcting anterior deep bite.[2,27,28] The L1-MP angle was corrected to a more ideal value (L1-MP, 92°).

Bilateral first molar extraction and space closure

Some endodontically treated teeth can become uncomfortable after orthodontic tooth movement.[13] LL6 was extracted due to progressive discomfort and poor prognosis. Although Edward Angle called the first molar the "keystone" of the dental arch, a recent study shows that it is sometimes better to extract a compromised first molar instead of a healthy premolar.[29] Study has shown that tooth movement into a fresh extraction socket occurs more quickly and effectively because the extraction site stimulates increased osteoclastic activity and metabolic changes in the alveolar bone for up to four months, which accelerates orthodontic tooth movement.[30] The transseptal fiber between LL7 and LL8 can also facilitate mesial movement of LL8.[31] Given that LL6 was a fresh extraction socket and considering the anatomical limitation on the buccal side of LL8, there was insufficient space to bond a bracket. Therefore, LL7 was protracted using reciprocal forces from both the buccal and lingual sides without incorporating LL8, to

prevent unwanted side effects such as buccal sweeping or mesial rotation of the posterior teeth.

On the other hand, since LR6 had been absent for two years, the resulting atrophic edentulous ridge impeded the forward movement of LR7, with space partially closed due to mesial tipping of LR7. This space could be closed orthodontically or restored prosthetically. In order to close the LL6 extraction space and retract the lower anterior teeth without deviating the dental midline, the LR6 space was closed as well to achieve symmetry. Space closure can be difficult in atrophic sites[31] and may lead to bone loss, gingival recession, and root resorption in adults.[32] To prevent complications such as soft-tissue clefts and space reopening, light forces and extended intervals between activations are essential for proper tissue recovery.[31]

The most significant challenge was achieving minimal overjet without extractions in the maxillary arch, while closing the bilateral molar spaces in the mandible. Additional complicating factors were the patient's mandibular retrognathism and severe deep bite. Ideal mesial translation of the bilateral mandibular second molars was achieved, along with complete closure of the first molar spaces, and proclination plus intrusion of both upper and lower incisors. These challenging mechanics required a prolonged treatment time.

Conclusions

1. In adults, jaw growth modification treatment is complicated by mandibular retrognathism. Whole maxillary arch distalization can be achieved with anchorage from extra-alveolar miniscrews. An incisor miniscrew should be considered to prevent occlusal plane dumping (a deepened curve of Spee).

2. Extraction may be considered for an endodontically-treated molar if the prognosis is unfavorable for long-term stability.

3. After improving alignment of the upper incisors and the correction of the buccal crossbite on the right side, the mandible shifted forward and to the right. TMJ dysfunction improved as the dental interferences were removed.

4. The incisor miniscrew was an effective tool for achieving palatal root torque of the upper incisors.

5. This case demonstrated that Class II division 2 malocclusion with severe deep bite and unilateral scissors bite can be successfully treated using a combination of ART springs, extra-alveolar miniscrews on the IZC, interradicular incisor miniscrew, and anterior bite turbos.

References

1. Sasaki A, Fujimoto M, Sonokawa T, Fujita T, Yamaguchi K, Kato Y, et al. Comprehensive dental treatment of a patient with skeletal Class II, deepbite, severely narrow arches, and scissor bite. AJO-DO Clin Companion 2022;2:484-495.

2. Park H-S, Kim J-Y, Kwon T-G. Treatment of a Class II deepbite with microimplant anchorage. Am J Orthod Dentofacial Orthop 2011;139:397-406.

3. Jung M-H. Vertical control of a Class II deep bite malocclusion with the use of orthodontic mini-implants. Am J Orthod Dentofacial Orthop 2019;155:264-275.

4. Varlık SK, Alpakan ÖO, Türköz Ç. Deepbite correction with incisor intrusion in adults: a long-term cephalometric study. Am J Orthod Dentofacial Orthop 2013;144:414-419.

5. Wang X-D, Zhang J-N, Liu D-W, Lei F-F, Zhou Y-H. Nonsurgical correction of a severe anterior deep overbite accompanied by a gummy smile and posterior scissor bite using a miniscrew-assisted straight-wire technique in an adult high-angle case. Korean J Orthod 2016;46:253-265.

6. Millett DT, Cunningham SJ, O'Brien KD, Benson PE, De Oliveira CM. Treatment and stability of class II division 2 malocclusion in children and adolescents: a systematic review. Am J Orthod Dentofacial Orthop 2012;142:159-169.e9.

7. Brodie A. Bureau of public relations. Orthodontics. J Am Dent Assoc 1943;30:433-438.

8. Lee S-A, Chang CC, Roberts WE. Severe unilateral scissors-bite with a constricted mandibular arch: Bite turbos and extra-alveolar bone screws in the infrazygomatic crests and mandibular buccal shelf. Am J Orthod Dentofacial Orthop 2018;154:554-569.

9. Liaw JJ, Park JH. Total arch distalization with extraalveolar miniscrews for nonextraction treatment of a patient with low-angle Class II Division 1 malocclusion: a 10-year follow-up. AJO-DO Clin Companion 2023;3:43-54.

10. Park H-S, Kwon T-G, Sung J-H. Nonextraction treatment with microscrew implants. Angle Orthod 2004;74:539-549.

11. Park H-S, Bae S-M, Kyung H-M, Sung J-H. Simultaneous incisor retraction and distal molar movement with microimplant anchorage. World J Orthod 2004;5:164-171.

12. Ritchie C, McGregor S, Bearn DR. Temporary anchorage devices and the forces and effects on the dentition and surrounding structures during orthodontic treatment: a scoping review. Eur J Orthod 2023;45:324-337.

13. Hamilton R, Gutmann J. Endodontic-orthodontic relationships: a review of integrated treatment planning challenges. Int Endod J 1999;32:343-360.

14. Lapatki BG, Baustert D, Schulte-Mönting J, Frucht S, Jonas IE. Lip-to-incisor relationship and postorthodontic long-term stability of cover-bite treatment. Angle Orthod 2006;76:942-949.

15. Chang CC, Lin JS, Yeh H. Extra-alveolar bone screws for conservative correction of severe malocclusion without extractions or orthognathic surgery. Curr Osteoporos Rep 2018;16:387-394.

16. Chang CH, Lin JS, Roberts WE. Temporary skeletal anchorage devices to correct challenging malocclusions with clear aligners. AJO-DO Clin Companion 2021;1:102-112.

17. Chang CH, Lin J-H, Roberts WE. Success of infrazygomatic crest bone screws: patient age, insertion angle, sinus penetration, and terminal insertion torque. Am J Orthod Dentofacial Orthop 2022;161:783-790.

18. Barros SE, Abella M, Janson G, Chiqueto K. X-ray beam angulation can compromise 2-dimensional diagnosis of interradicular space for mini-implants. Am J Orthod Dentofacial Orthop 2019;156:593-602.

19. Chang CH, Lin LY, Roberts WE. Orthodontic bone screws: A quick update and its promising future. Orthod Craniofac Res 2021;24:75-82.

20. de Almeida MR. Current status of the biomechanics of extra-alveolar miniscrews. J World Fed Orthod 2024;13:25-37.

21. Swann GC. The diagnosis and interception of Class II, Division 2 malocclusion. Am J Orthod 1954;40:325-340.

22. Erickson LP, Hunter WS. Class II, Division 2 treatment and mandibular growth. Angle Orthod 1985;55:215-224.

23. Cleall JF, Begole EA. Diagnosis and treatment of Class II division 2 malocclusion. Angle Orthod 1982;52:38-60.

24. Mirzasoleiman P, El-Bialy T, Wiltshire WA, Santos PB, Pinheiro FHdSL. Evaluation of mandibular projection in Class II division 2 subjects following orthodontic treatment using clear aligners. J Contemp Dent Pract 2024;25:295-302.

25. Farret MM. Orthodontic biomechanics with intermaxillary elastics. Dent Press J Orthod 2023;28:e23spe3.

26. de Menezes LM, Ritter DE, Locks A. Combining traditional techniques to correct anterior open bite and posterior crossbite. Am J Orthod Dentofacial Orthop 2013;143:412-420.

27. Al-Zoubi EM, Al-Nimri KS. A comparative study between the effect of reverse curve of Spee archwires and anterior bite turbos in the treatment of deep overbite cases: a randomized clinical trial. Angle Orthod 2022;92:36-44.

28. Elbarnashawy SG, Keesler MC, Alanazi SM, Kossoff HE, Palomo L, Palomo JM, et al. Cephalometric evaluation of deep overbite correction using anterior bite turbos. Angle Orthod 2023;93:507-512.

29. Sabri R. Multidisciplinary management of permanent first molar extractions. Am J Orthod Dentofacial Orthop 2021;159:682-692.

30. Liou EJ, Chen P-H, Wang Y-C, Yu C-C, Huang C, Chen Y-R. Surgery-first accelerated orthognathic surgery: postoperative rapid orthodontic tooth movement. J Oral Maxillofac Surg 2011;69:781-785.

31. Dhole PM, Maheshwari DO. Orthodontic space closure using simple mechanics in compromised first molar extraction spaces: Case series. J Indian Orthod Soc 2018;52:51-59.

32. Saga AY, Maruo IT, Maruo H, Guariza Filho O, Camargo ES, Tanaka OM. Treatment of an adult with several missing teeth and atrophic old mandibular first molar extraction sites. Am J Orthod Dentofacial Orthop 2011;140:869-878.

Discrepancy Index Worksheet

TOTAL D.I. SCORE 11

OVREJET

0 mm. (edge-to-edge)	=	
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 = 0

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 = 0

LINGUAL POSTERIOR X-BITE

1 pt. per tooth Total = 0

BUCCAL POSTERIOR X-BITE

2 pts. Per tooth Total = 2

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.	= _____
Midline discrepancy (≥ 3mm)	@ 2 pts.	= _____
Missing teeth (except 3rd molars)	_____ x 1 pt.	= 1
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)	@ 3 pts.	= _____
Addl. treatment complexities	_____ x 2 pts.	= 2

Identify: Difficulty in closing LR6 space.

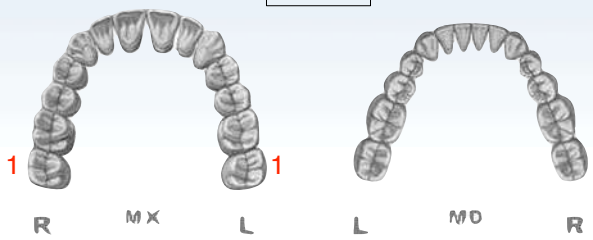
Total = 3

Cast-Radiograph Evaluation

Total Score: 15

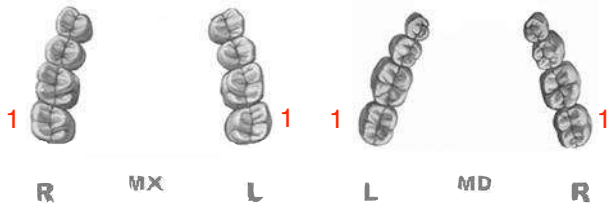
Alignment/Rotations

2



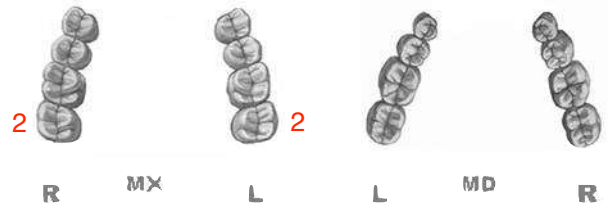
Marginal Ridges

4



Buccolingual Inclination

4

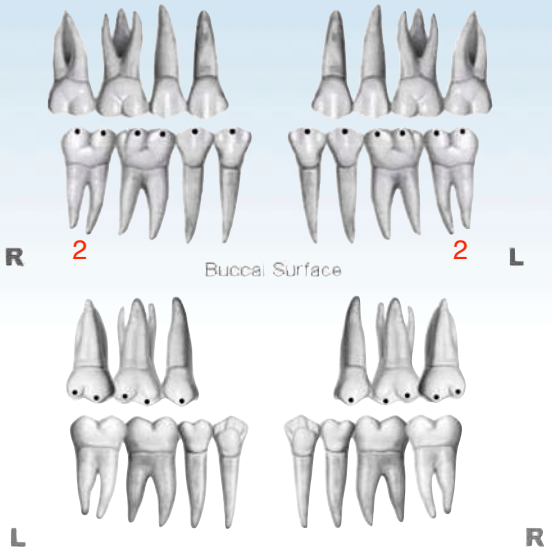


Overjet

0

Occlusal Contacts

4

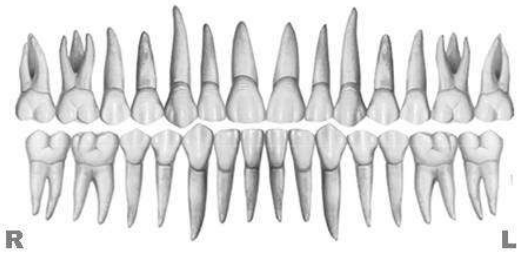


Occlusal Relationships

0

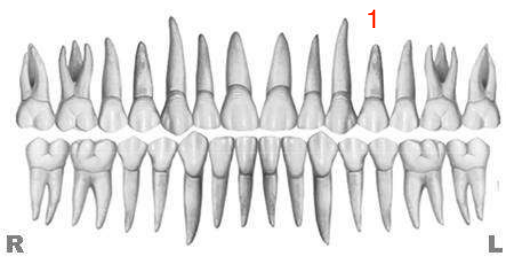
Interproximal Contacts

0



Root Angulation

1

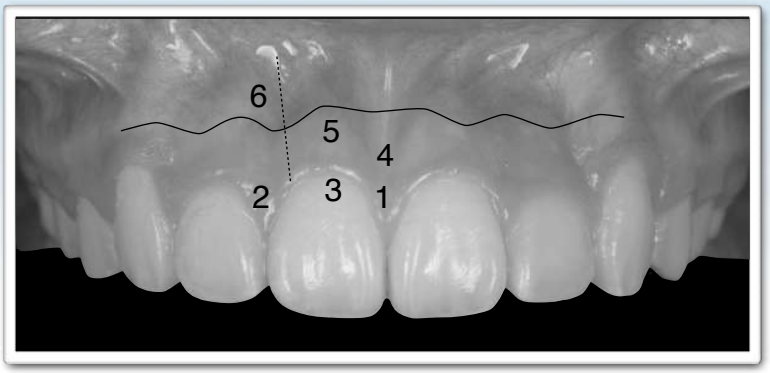


INSTRUCTIONS: Place score beside each deficient tooth and enter total score for each parameter in the white box. Mark extracted teeth with "X". Second molars should be in occlusion.

IBOI Pink & White Esthetic Score

Total Score = 1

1. Pink Esthetic Score

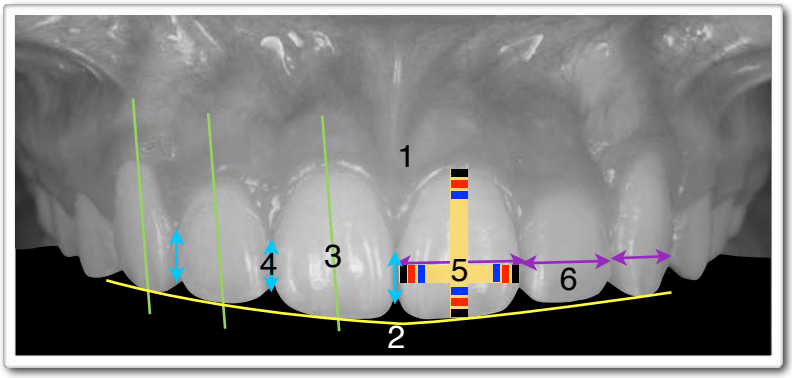


Total = 0

1. M & D Papillae	0	1	2
2. Keratinized Gingiva	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. M & D Papillae	(0)	1	2
2. Keratinized Gingiva	(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. White Esthetic Score (for Micro-esthetic)



Total = 1

1. Midline	0	1	2
2. Incisor Curve	0	1	2
3. Axial Inclination (5˚, 8˚, 10˚)	0	1	2
4. Contact Area (50%, 40%, 30%)	0	1	2
5. Tooth Proportion	0	1	2
6. Tooth to Tooth Proportion	0	1	2

1. Midline	(0)	1	2
2. Incisor Curve	(0)	1	2
3. Axial Inclination (5˚, 8˚, 10˚)	(0)	1	2
4. Contact Area (50%, 40%, 30%)	(0)	1	2
5. Tooth Proportion	(0)	1	2
6. Tooth to Tooth Proportion	0	(1)	2

International Association for Orthodontists & Implantologists

Join the *iAOI* the future of dentistry!

About our association-iAOI

International Association of Orthodontists and Implantologists (iAOI) is the world's first professional association dedicated specifically for orthodontists and implantologists. The Association aims to promote the collaboration between these two specialties and encourage the combined treatment of orthodontic and implant therapy in order to provide better care for our patients.

How to join iAOI?

Certified members of the Association are expected to complete the following three stages of requirements.

1. Member

Doctors can go to http://iaoi.pro to apply for membership to join iAOI. Registered members will have the right to purchase a workbook in preparation for the entry exam.

2. Board eligible

All registered members can take the entry exam. Members will have an exclusive right to purchase a copy of iAOI workbook containing preparation materials for the certification exam. The examinees are expected to answer 100 randomly selected questions out of the 400 ones from the iAOI workbook. Those who score 70 points or above can become board eligible.

3. Diplomate

Board eligible members are required to present three written case reports, one of which has to be deliberated verbally. Members successfully passing both written and verbal examination will then be certified as Diplomate of iAOI.

4. Ambassador

Diplomates will have the opportunity to be invited to present six ortho-implant combined cases in the iAOI annual meeting. Afterwards, they become Ambassador of iAOI and will be awarded with a special golden plaque as the highest level of recognition in appreciation for their special contribution.

For more information on benefits and requirements of iAOI members, please visit our official website: http://iaoi.pro.

iAOI Ambassador & Diplomate

國際矯正植牙大使與院士

Ambassadors

Dr. Kenji Ojima◆

Dr. 林詩詠 Joshua Lin *▲

Dr. Diego Peydro Herrero◆

Dr. 陳俊宏 Chun-Hung Chen *▲

Dr. 張銘珍 Ming-Jen Chang *

Dr. 曾令怡 Linda Tseng *▲

Ambassador（大使）:

- * *One who has published 9+ case reports in JDO.*
- ◆ *Keynote speakers for iAOI annual workshops*
- ▲ *Case report(s) published at least once in referral journals.*
- ● *Referral journals/Research paper - 3 points*
  ABO case report - 2 points
  Clinical tip - 1 point

Diplomates

Dr. 徐玉玲 Lynn Hsu ▲

Dr. 李雙安 Angle Lee ▲

Dr. 蘇筌瑋 Bill Su

Dr. 葉信吟 Hsin-Yin Yeh ▲

Dr. 徐重興 Eric Hsu ▲

Dr. 黃育新 Yu-Hsin Huang

Dr. 黃祈 Richie Huang

Dr. 邱上珍 Grace Chiu ▲

Dr. 黃瓊嫥 Sabrina Huang

Dr. 鄭惠文 Joy Cheng

Dr. 林彥君 Lexie Lin ▲

Dr. 曾淑萍 Shu-Ping Tseng

Dr. 林曉鈴 Sheau-Ling Lin

Dr. 張倩瑜 Charlene Chang

Dr. 林佳宏 Alex Lin ▲

Dr. 林森田 Chris Lin

Dr. 黃登楷 Kevin Huang

Dr. 張馨文 Sara Chang

Dr. 李名振 Major Lee

Dr. 陳惠華 Judy Chen

Dr. 魏明偉 Ming-Wei Wei

Dr. 黃荷薰 Ashley Huang

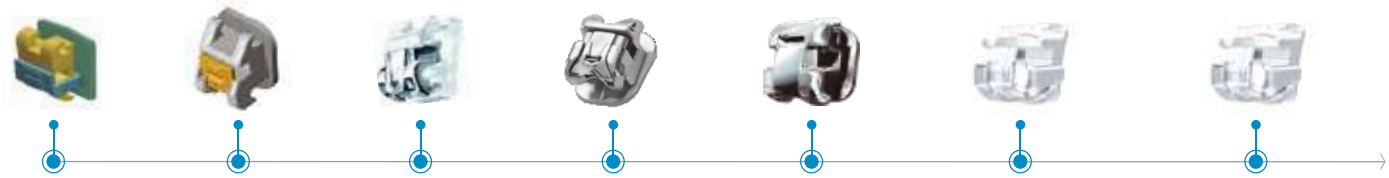
Dr. 李彥峰 Yen-Feng Lee

Dr. 張銘津 Ariel Chang

Dr. 彭緯綸 Wei-Lun Peng

Dr. 呂詩薇 Julie Lu

Ormco™
Driving the Future of Orthodontics
together

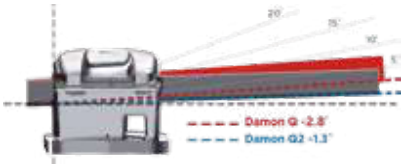


Damon™ SL	Damon™ 2	Damon™ 3	Damon™ 3MX	Damon™ Q	Damon™ Clear	Damon™ Clear2
1996	2001	2004	2005	2008	2009	2014

DAMON™ Q2

EFFICIENT. PREDICTABLE.

Four solid walls with refined precision slot for **+2x the rotational control** designed for predictable finishing and efficient treatment.



VERSATILE. CONVENIENT.

Ample under tie-wing area accommodates all powerchain, elastics, steel ligatures, and other auxiliaries for treatment versatility.

Damon™ Q

Damon™ Q2

PACKAGES

DAMON™ Q2

DAMON™ CLEAR 2

	10人份套組特價	30人份套組特價
DAMON™ Q2	NT$149,999	NT$369,999
DAMON™ CLEAR 2	NT$189,999	NT$459,999

Damon Q2/ Clear2 Brackets	200 個	600 個
Bondable Tubes .22 (G/O , Accent , Peerless)	80 個	240 個
Damon Copper Ni-Ti Wire size .014 / .014 x .025	40 條	120 條
Damon Stainless Steel Wire size .016 x .025	20 條	60 條
Damon TMA Low-Friction Wire size .017 x .025	20 條	60 條

2025 一年一度 Damon Master Program


+


全新改版的 2025 年貝多芬高效 Damon 矯正大師系列課程，是由國際知名講師張慧男醫師親自規劃及授課，課程特色強調由臨床病例帶動診斷、分析、治療計畫擬定與執行技巧，本年度亦特別加入最新的**數位矯正與隱形牙套**的內容，並邀請了貝多芬牙科集團各院院長演講特別矯正專題。

此外，透過數位影片反覆觀看，結合矯正與電腦教學，課堂助教協助操作，讓學員在短時間能快速上手，感染「熱愛矯正學，熱愛學矯正」的熱情。

名額有限，一年僅有一次機會在台完整體驗 Damon 矯正大師課程，錯過只能等明年囉！

Module 1 - 3/13

1. Selecting your ideal first case
2. Bonding position
3. Bonding + BT + ceph tracing
4. TADs + space closing + hook + spring
5. Finishing bending & fixed retainer

Practice: Clinical photography（黃亭雅, 陳韻如醫師）

Module 2 - 4/17

1. Four stages of efficient orthodontic treatment
2. Simple and effective anchorage system
3. Extraction vs. non-extraction analysis

Practice: Patient photo management（金牛頓工程師）

Module 3 - 5/1

1. Soft & hard tissue diagnostic analysis
2. Big overjet correction
3. Damon diagnosis & fine-tuning

Practice: Ceph tracing（金牛頓工程師）

Module 4 - 5/15

1. Excellent finishing
2. Retention & relapse

Practice: Ceph superimposition & measurement（金牛頓工程師）

Module 5 - 5/22

1. Simplify your system
2. Extraction vs. non-extraction

Practice: Case report demo（陳俊宏醫師）

▲ **Computer training (Mac): 1:30-3:00 pm**

Module 6 - 6/5

1. Class III correction
2. Class II correction

Topic: Early orthodontic treatment（曾淑萍醫師）

Module 7 - 6/19

1. Upper impaction
2. Lower impaction
3. Gummy smile correction

Topic: Modified VISTA（蘇筌瑋醫師）

Module 8 - 7/3

1. ABO DI, CRE workshop (林彥君醫師)
2. Open bite

Topic: Ortho-viewed interdisciplinary treatment（徐重興醫師）

Module 9 - 7/17

1. Implant-ortho combined treatment
2. Asymmetry

Topic: Impacted cuspid treatment（張譯文, 張瑜珍, 黃亭雅, 陳韻如醫師）

Module 10 - 7/31

1. Minor surgeries in orthodontics
2. Digital orthodontics

Topic: Modified 2X4 appliance in ortho treatment（李亮賢醫師）

Module 11 - 8/14

1. Aligner design
2. Comprehensive aligner treatment
3. Aligner & its challenges

Topic: Pre-aligner treatment（林詩詠醫師）

▲ **Special lecture: 1:30-3:00 pm**

時間：週四全天（9:20 am - 5:00 pm）

地點：金牛頓藝術科技（新竹市建中一路 25 號 2 樓）

費用含課程視訊*、iPad、課程電子書與材料。

*贈送之課程視訊提供兩年時間串流觀看。

報名專線 湧傑 Yong Chieh

北區 邵美珍	中區 張馨云	南區 王慧靜
02-27788315 #120	04-23058915	07-2260030

LINE@ 官方帳號

Facebook 官方帳號

Transposed Maxillary Canine Impactions with Gingival Recession Treated with the Vertical Incision Subperiosteal Tunnel Access (VISTA) Technique and Infrazygomatic Crests (IZC) Screws

Abstract

Introduction: *A 10-year 6-month-old girl presented with impacted and transposed maxillary canines.*

Diagnosis: *The patient was skeletal Class I (SNA 84˚; SNB 81˚; ANB 3˚) with bilateral Class I molar relationships. Both maxillary deciduous canines (URc and ULc) were present. Maxillary right canine was incompletely transposed while maxillary left canine was completely transposed. The Discrepancy Index (DI) was 9.*

Treatment: *The impacted and transposed canines were treated using the vertical incision subperiosteal tunnel access (VISTA) technique and custom 3D lever arms anchored by an OrthoBoneScrew® (OBS) inserted in the infrazygomatic crest (IZC).*

Discussion: *After 40 months of active treatment, both the incomplete (UR3) and complete (UL3) transposed impacted canines were successfully aligned into the arch. Although gingival recession on both maxillary canines was observed after the eruption, they were treated with the VISTA technique to recover the gingiva. The Cast-Radiograph Evaluation (CRE) was 4, and the dental esthetic (Pink & White) score was 4.*

Conclusion: *The VISTA surgical exposure is a unique approach for submucosal movement of the impactions. Skeletal anchorage using OBS with a 3D lever arm provides an independent force system for retracting both impactions. (Reprinted with permission from Perio Clínica 2024;28:46-66; J Digital Orthod 2025;76:38-60)*

Key words:
Impacted maxillary canine, infrazygomatic crest miniscrews, bone screw anchorage, vertical incision subperiosteal tunnel access (VISTA), 3D lever-arm, root resorption, gingival recession.

Introduction

The dental nomenclature for this report is a modified Palmer notation. Upper (U) and lower (L) arches, as well as the right (R) and left (L) sides, define four oral quadrants: UR, UL, LR, and LL. Teeth are numbered 1-8 from the midline in each quadrant, and deciduous teeth are delineated a-e.

Tooth transposition is the positional interchange of two adjacent teeth that can be divided into two categories: complete or incomplete.[1,2] A complete transposition is defined when both teeth are completely transposed (i.e. crowns and roots), and incomplete when only the crowns or roots have interchanged their positions. The overall prevalence of transposition is about 0.4%.[3] Maxillary permanent canines are the teeth most commonly affected.[4]

In this present case, both maxillary right and left canines were impacted. UR3 was incompletely transposed, its crown was located ectopically in-between the roots of UR1 and UR2 while the root apex was located above the URc. UL3 was

Chris H. Chang,
Founder, Beethoven Orthodontic Center (Upper left)
Lily Y. Chen*,
BDS. Department of Science in Specialized Orthodontics, International Medical College, University Duisburg-Essen, Germany (Upper right)
Jenny Chang*,
BDS. Department of Science in Specialized Orthodontics, International Medical College, University Duisburg-Essen, Germany (Lower left)
W. Eugene Roberts,
Professor Emeritus of Orthodontics, School of Dentistry, Indiana University. Adjunct Professor of Mechanical Engineering, Indiana University-Purdue University Indianapolis, USA. (Lower right)

* *Joint second author. Lily Y. Chen and Jenny Chang have equal contributions to this article.*

Fig. 1: *Pre-treatment facial and intraoral photographs*

completely transposed, both crown and root apex were ectopically positioned in-between UL1 and UL2.[1,5,6] Since both canines were ectopically positioned, surgical intervention with orthodontic traction forces was necessary. A modified VISTA technique[7-11] was performed with extra-alveolar bone screws, which provided anchorage for 3D lever arms to properly position the impacted canines into the arch.

History and Etiology

A 10-year 6-month-old girl presented with her parents to evaluate unerupted bilateral maxillary canines (Fig. 1). Clinical examination showed both maxillary deciduous canines were retained in the oral cavity and U2s were tilted. Bilateral Class I molar relationships were noted (Figs. 2 and 3). The panoramic radiograph and cone beam computed tomography (CBCT) image revealed the position and direction of the impacted maxillary canines (Figs. 4 and 5). The UR3 was labially impacted and was in incomplete transposition with its crown located between the UR1 and UR2, while its root remained in a normal position. The UL3 was also labially impacted in complete transposition, meaning both the crown and root were ectopically positioned between UL1 and UL2.

Diagnosis

Skeletal:

Skeletal Class I: *SNA, 84˚; SNB, 81˚; ANB, 3˚*

Mandibular Plane Angle: *SN-MP, 32˚; FMA, 25˚*

Fig. 2: *Pre-treatment study models*

Fig. 3: *Pre-treatment cephalometric radiograph*

Fig. 4: *Pre-treatment panoramic radiograph*

Dental:

Occlusion: *Class I molar*

Overjet: *3 mm*

Upper incisors: *Within normal limits (WNL) (U1-NA, 3 mm; U1-SN, 104˚)*

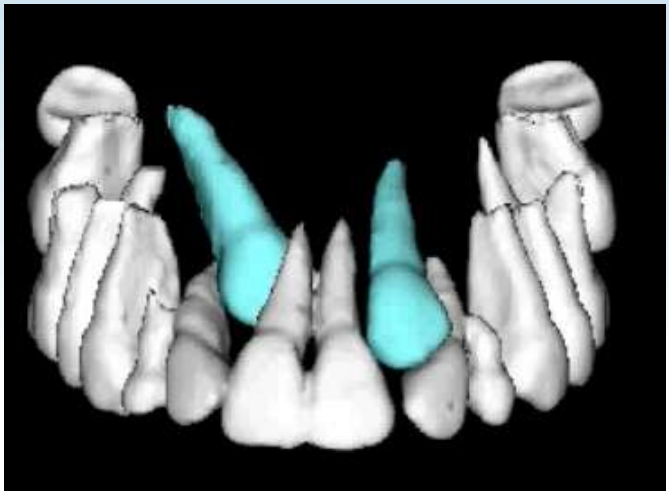


Fig.5:
Pre-treatment CBCT images of the maxillary dentition shows a labially impacted UL3 positioned between the roots of UL1 and UL2.

Lower incisors: *Increased axial inclination (L1-NB, 6 mm; L1-MP, 95˚)*

Impaction: *Labially impacted U3s; UR3 incomplete transposition, UL3 complete transposition*

Facial: *Slightly protrusive lower lip (upper/lower: 0 mm/ 4 mm to the E-line)*

The cephalometric summary is in Table 1. The American Board of Orthodontic (ABO) Discrepancy Index (DI) was 9 points as shown in the subsequent Worksheet 1.

Treatment objectives

1. Maintain Class I canine and molar relationships
2. Resolve the labially impacted maxillary canines
3. Attain an ideal overjet, overbite and facial esthetics.

CEPHALOMETRIC SUMMARY			
SKELETAL ANALYSIS			
	PRE-TX	POST-TX	DIFF.
SNA˚ (82˚)	84˚	85˚	1˚
SNB˚ (80˚)	81˚	82˚	1˚
ANB˚ (2˚)	3˚	3˚	0˚
SN-MP˚ (32˚)	32˚	33˚	1˚
FMA˚ (25˚)	25˚	26˚	1˚
DENTAL ANALYSIS			
U1 TO NA mm (4mm)	3	5	2
U1 TO SN˚ (104˚)	104˚	114˚	10˚
L1 TO NB mm (4mm)	6	7	1
L1 TO MP˚ (90˚)	95˚	98˚	3˚
FACIAL ANALYSIS			
E-LINE UL (-1mm)	0	0	0
E-LINE LL (0mm)	4	3	1
%FH: Na-ANS-Gn (53%)	56%	55%	1%
Convexity:G-Sn-Pg' (13˚)	10˚	10˚	0˚

Table 1: *Cephalometric Summary*

Treatment alternatives

Three treatment options were proposed using full fixed appliances:

Option 1: Non-extraction with modified VISTA and OBS 3D lever arm

Chang's extraction decision table was consulted to assess the necessity for extraction (Table 2).[12] Since the profile was nearly straight with mild crowding, non-extraction treatment was indicated. Extract only the deciduous canines (Ucs) and use the modified VISTA and OBS 3D lever arm technique to uncover and align the impacted U3s. Reposition each

	Ext	Non ✓
1. Profile	Protrusive	Straight
2. Md. angle	High	Low
3. Bite	Open	Deep
4. Ant. inclination	Flaring	Flat
5. Crowding	> 7 mm	None
6. Decay/ missing	Present	Impacted 13,23
7. P't perception	Ok	No
8. Etc...		

Table 2: *Chang's Extraction Decision Table*

impacted U3 with a 3D lever arm and power chain anchored to an IZC OBS (Fig. 6). The advantages are lower cost and better esthetics. However, this preferred option require the longest treatment time.

Option 2: Extract the impacted canines (U3s) and substitute with premolars (U4s)

Extract URc and ULc, surgically remove the impacted U3s, and finish in a bilateral molar Class II,

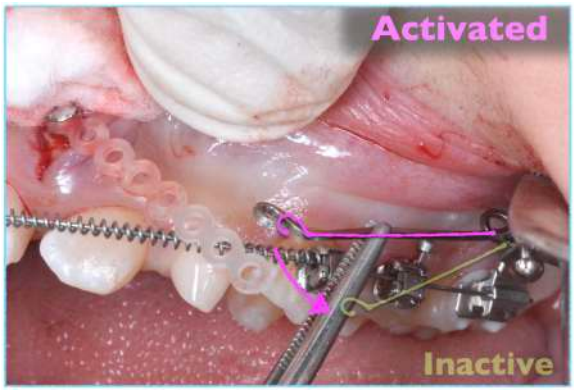


Fig. 6:
The 3D lever arm was activated by connected it onto the power chains (pink), and the tendency of the 3D lever arm wanting to bounce back to its original position (green) would then produce downward, backward, and outward forces.

which would decrease the duration and difficulty of the treatment. However, substituting the impacted UL3 with the adjacent first premolar would compromise the esthetics and function of the occlusion because of a lack of occlusal guidance, an unbalanced occlusion, dental arch asymmetry, compromised dental esthetics, and possibly temporomandibular joint disorder.[13]

Option 3: Extract the impacted canines (U3s) and substitute with implants

Surgically remove the impacted U3s and retain Ucs to maintain alveolar bone for future implant placement. Open spaces for maxillary canine implants to optimize dental alignment. Overall treatment timing is problematic because implant placement should be delayed until at least 18 years of age. The overall cost would also be much higher. The advantage is an esthetic and functional result with less orthodontics.

After thoroughly discussing all three options, the first treatment option was considered the most suitable treatment plan for both the patient and clinicians (Fig. 7).

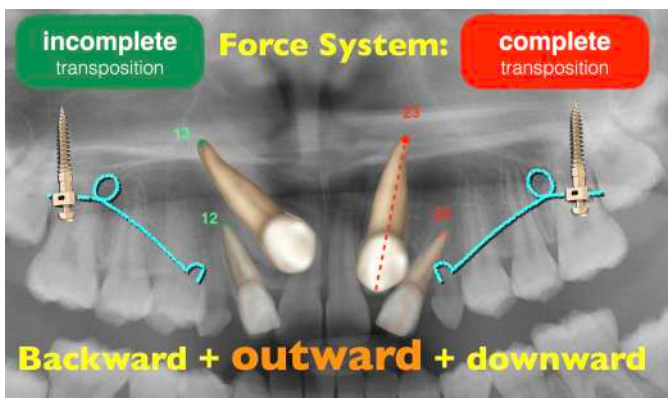


Fig. 7: *Proposed treatment (Option 1) in illustration*

Treatment Progress

A passive self-ligating (PSL) fixed appliance (Damon Q®, Ormco Corporation, Glendora, CA) was bonded on all maxillary teeth except for the UR2, UL2, UR3, and UL3, and a 0.014-in CuNiTi archwire was engaged in order to start the active treatment. Open coil springs were placed between the central incisor and the first premolar on both sides to maintain adequate space for the transposed impacted canines. The impacted canine was surgically uncovered with the VISTA technique and mechanics were applied with IZC screws and 3D lever arms, the independent force system designed by Chang.[8,10] Details for the surgical flap and force system design will be discussed later in this report.

The post-operative radiographs monitored the movement of the transposed canines (Fig. 8). After 4 months of activation, the 3D lever arms were removed after the impacted U3s erupted into the oral cavity. A backward (distal) and slightly outward force was applied when two new power chains (PCs) were attached from the button on the U3s to the mini-screws. The backward force from the PCs was supplemented with slightly outward (buccal) force from the extra-alveolar position of the mini-screw (Fig. 9).

From the 4th to 6th months, the PCs from U3s to the mini-screws were progressively activated at 1 month intervals to align the U3s.

In the 14th month of treatment, buttons were bonded on the distal surfaces of the U3s and PCs were attached from the buttons to the second

Fig. 8:
A panel of six radiographs shows the treatment progress of transposed canines. Each radiograph is labelled with the time in months since surgery and initiation of the traction (first number), and the number of months into active treatment (second number). Thus, the upper middle view (2/3) is the 2 months post-surgery radiograph performed 3 months into treatment. Note the U2s were not bonded with brackets during traction of the U3s in the first 6 months of treatment. Little root resorption of UR1, UR2 and UL2 can be observed (yellow arrow).

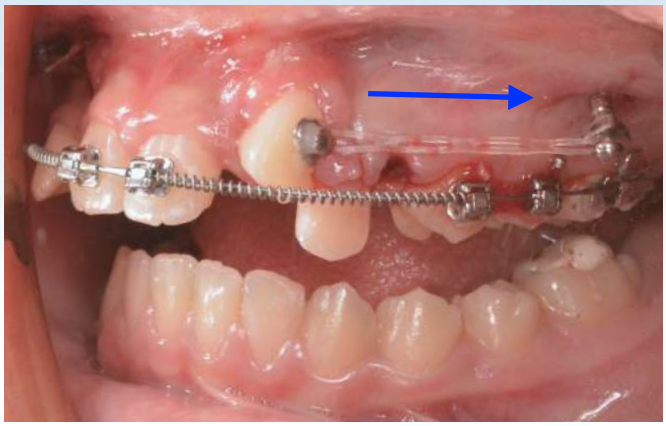


Fig. 9:
The backward and slight outward force provided by PC to the transposed canine.

molars to control the distal rotation of the U3s. Low-torque brackets were bonded on the UR3 and UL3 in the 19th month, and a 0.014-in CuNiTi archwire was placed for final alignment (Figs. 10-13).

Results

After 40 months of treatment, both the incompletely transposed (UR3) and completely transposed (UL3) impacted canines were successfully aligned into the arch. Slight root resorption was noted on UR1, UR2, and UL2 in the panoramic radiograph (Fig. 7). Gingival recession was present on both UR3 and UL3 so a VISTA procedure was performed to reestablish the keratinized tissue with connective tissue graft (CTG).

The dentition was well-aligned, with bilateral Class I canine and molar relationships. Despite inadequate occlusal contacts in the posterior section, it was decided that the patient should complete finishing with mastication movements to naturally settle the occlusion. This method was successful as observed in the 4-year follow-up records (Figs. 14 and 15).

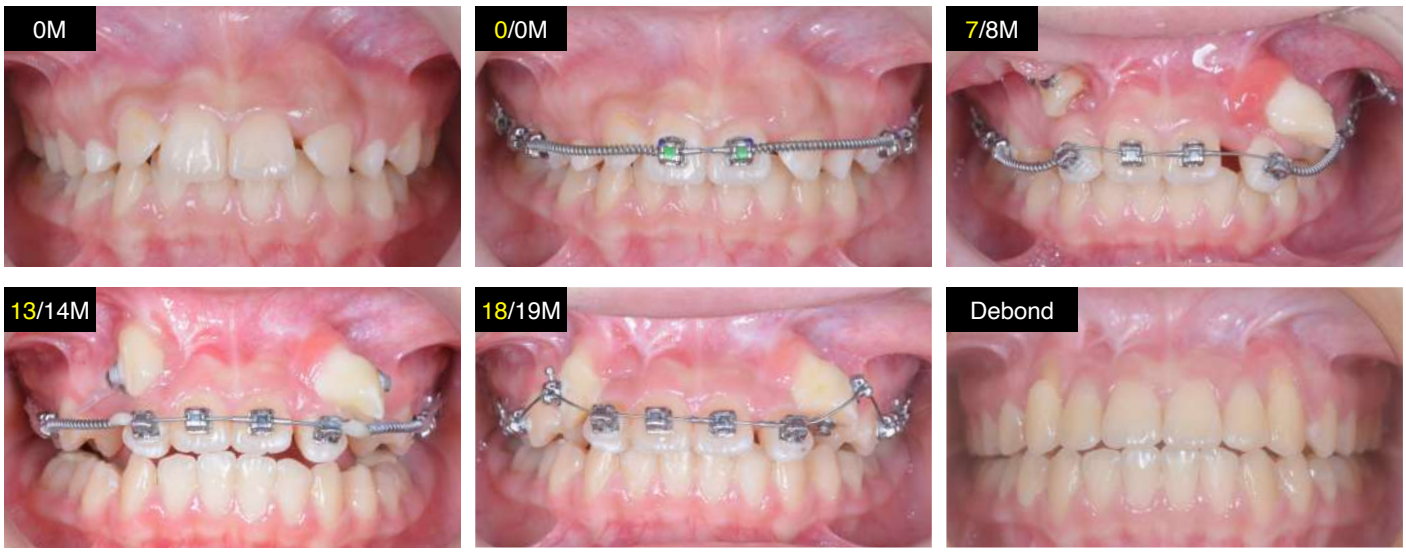


Fig. 10:
Treatment progress - frontal view. Open coil spring were applied in the 1st month to provide and maintain space for transposed canines. In the 19th month, U3s were bonded with bracket in order to bring them down into occlusion.

Fig. 11:
Treatment progress - right buccal view. U2s were bonded with low torque brackets in the 7th months of treatment after the transposed canine had passed the U2s.

Fig. 12:
Treatment progress - left buccal view. U2s were bonded with low torque brackets in the 7th months of treatment after the transposed canine had passed the U2s.

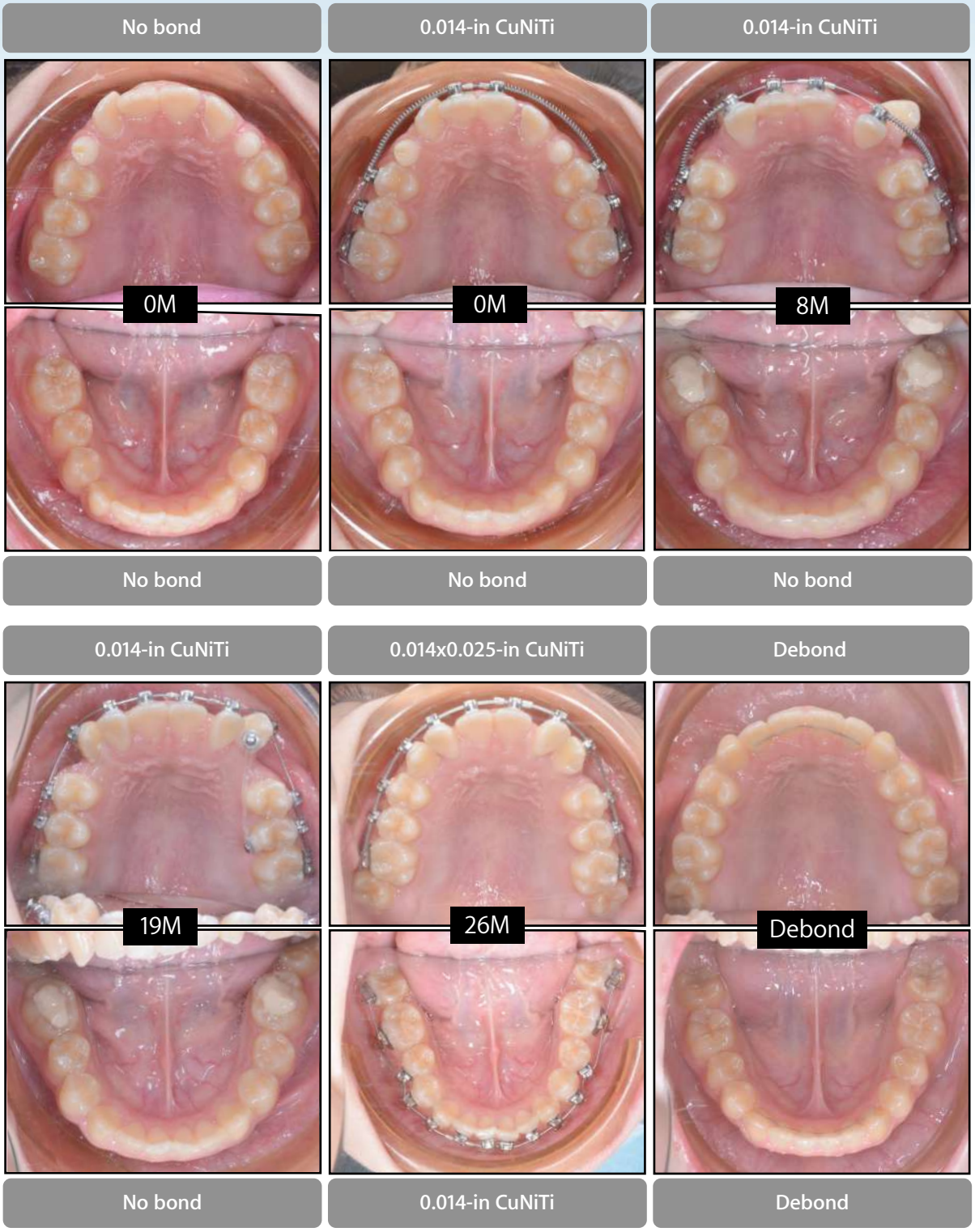


Fig. 13:
Treatment progress from both upper and lower occlusal viewers is specified in months (M), and the archwire sequence is provided from the beginning of the treatment (0M) to debond.

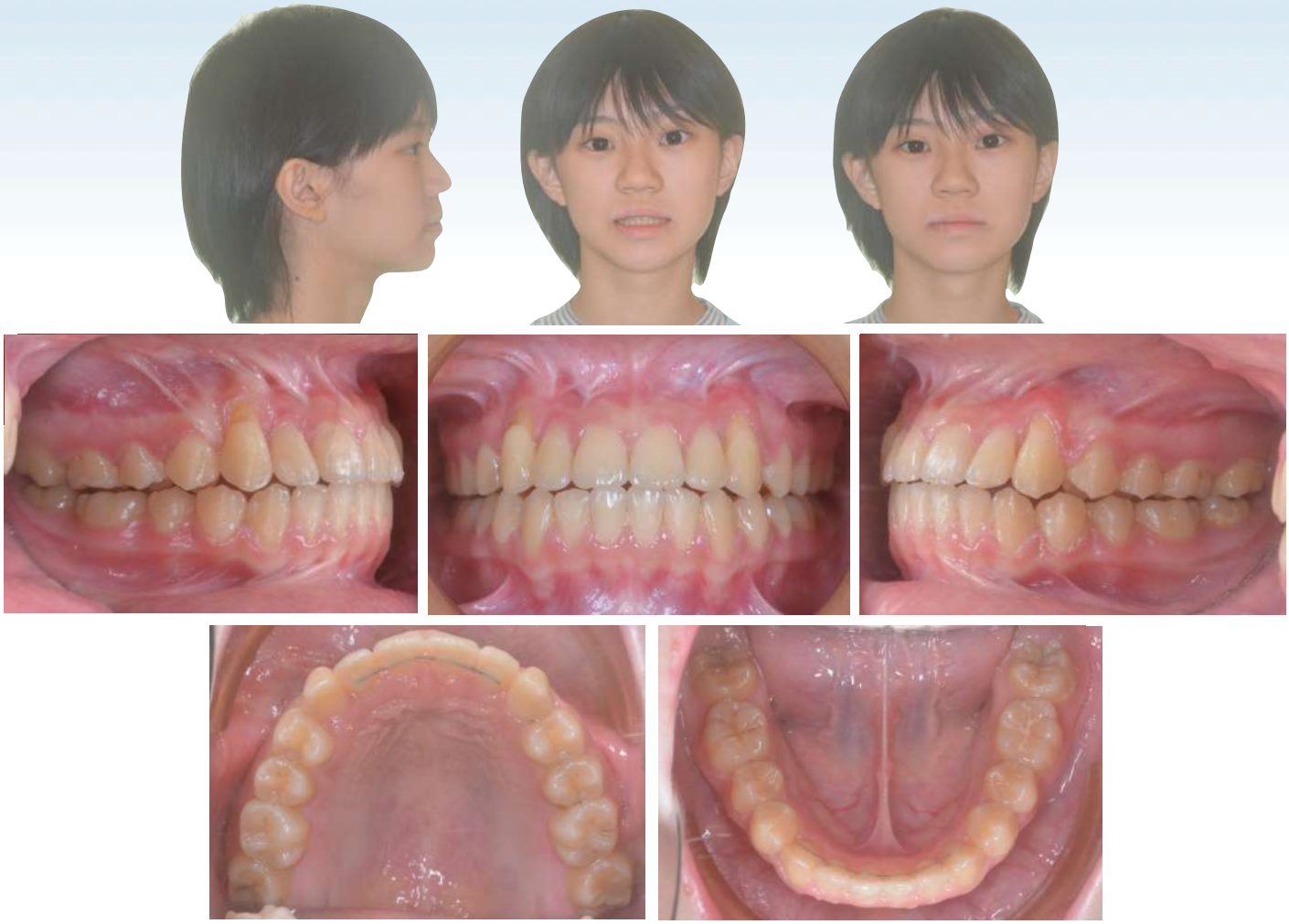


Fig. 14: *Posttreatment facial and intraoral photographs*

The posttreatment panoramic radiographs, cast models, and lateral cephalometric radiographs document the outcome following 40 months of active surgical and orthodontic treatment (Figs. 16-18). Superimposed cephalometric tracings (Fig. 19) show the effect of growth superimposed on treatment. The ABO Cast-Radiograph Evaluation (CRE) score of 4 is based on 4-year follow-up records (Worksheet 2). The major CRE scores were due to the marginal ridge discrepancies between L6 and L7 on both sides.

Retention

An anterior fixed retainer was bonded on the lingual surfaces of both arches (UR2 to UL2 and LR3 to LL3). Removable clear overlay retainers were delivered for both arches, and the patient was instructed to wear them full time for the first 6 months and nights only thereafter.

Fig. 15: 4-year follow-up showed the occlusion was settled naturally through mastication.

Discussion

Delay bonding of the canine and lateral incisors

1. Root resorption

The most common side effect in treatment of impactions is root resorption of the adjacent teeth, and the occurrence rate is 27 up to 49.5%.[14,15] However, in a study where the adjacent teeth were left unbonded as a free body while the canine was moving toward the occlusal plane, the prevalence of root resorption of the lateral incisor dropped to 7.8%.[16] Thus, the UR2 and UL2 were not bonded with brackets for the first 6 months of active traction of the impacted canines (Fig. 8). This allowed UR2 and UL2 to move spontaneously out

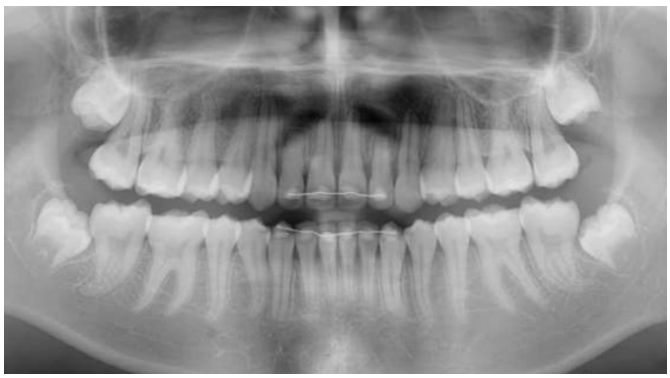


Fig. 16: Posttreatment panoramic radiograph

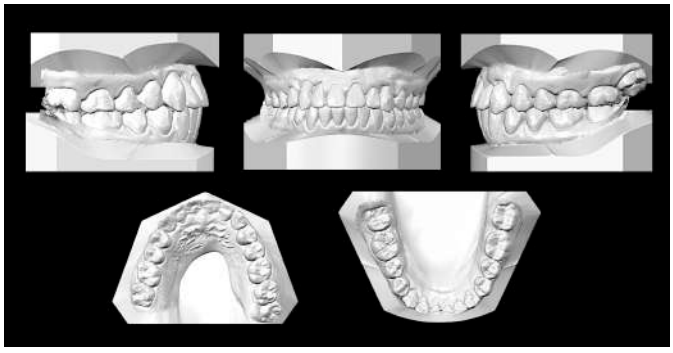


Fig. 17: Posttreatment study models

Fig. 18: Posttreatment cephalometric radiograph

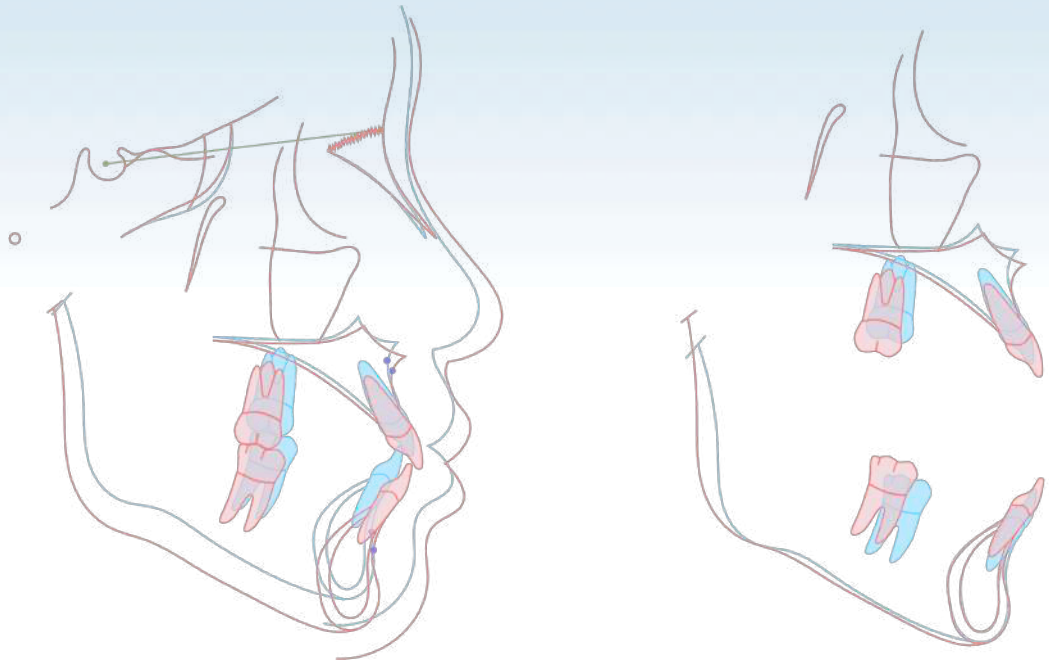


Fig. 19:
Superimpositions of the cephalometric tracings before (blue) and after (red) treatment. Profile and skeletal differences were mainly due to patient's growth.

of the path of movement and thus resulted in decreased risk of root resorption.[1]

2. Torque control

The most challenging part when treating transposed impactions is torque control of the transposed impaction and the adjacent tooth to prevent root damage possible. At the 6th month of treatment, the panoramic radiograph indicated both U3s were tipped labially and retracted, but their roots still overlapped the roots of the adjacent lateral incisors (Fig. 8).

Low-torque brackets were bonded on the UR2 and UL2 in the 7th month to control the flaring effect during leveling. Note that the brackets were bonded with 15° overcorrection, in which the axis

Fig. 20:
The brackets were bonded with 15° overcorrection to create mesial movement to the root apex of U2; the open coil spring was inserted to create a mesial tipping force to the crown of the U2, resulting in the bodily movement of the U2. Mvt: movement.

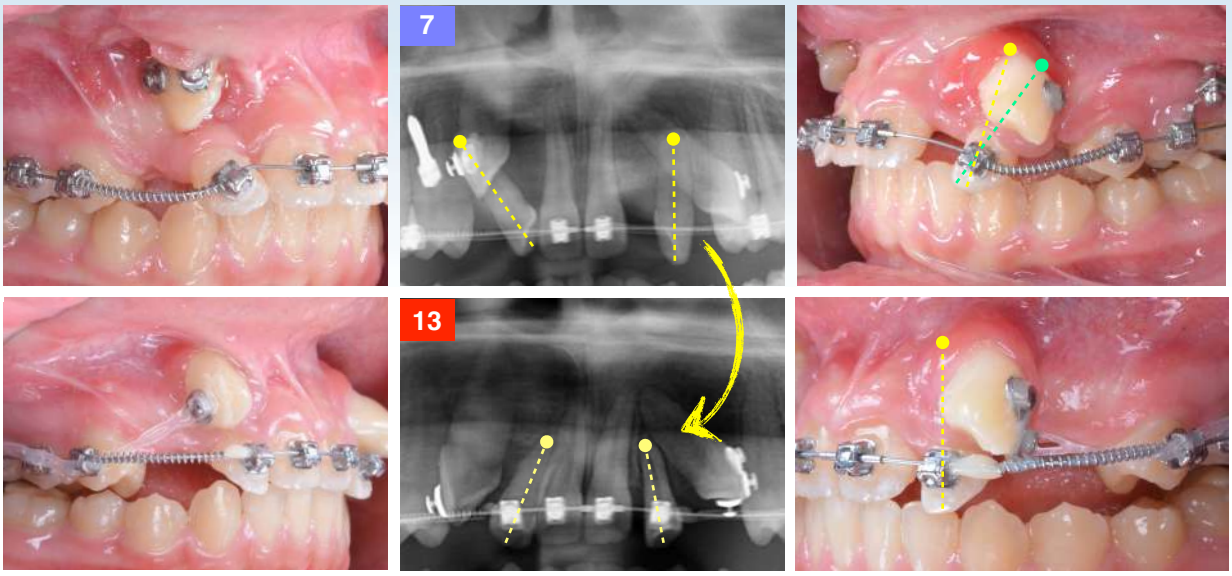


Fig. 21:
Note the mesial root movement effect of U2s with 15˚ overcorrection of bracket position by comparing the panoramic from 7 months to 13 months.

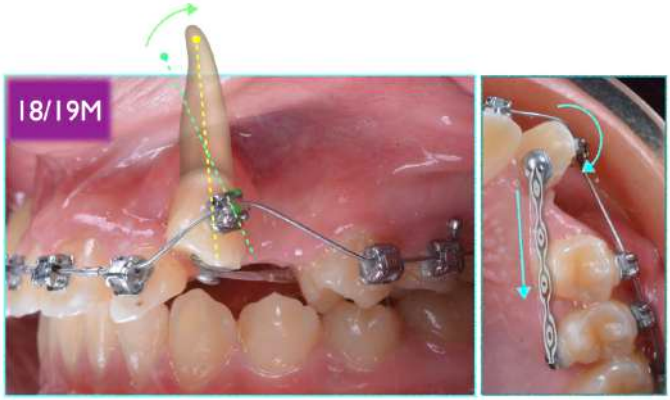


Fig. 22:
UL3 bracket was bonded with a 15° overcorrection in the 18th months, the axis of the bracket was tilted mesially relative to the axis of the canine, to create a distal movement of the transposed UL3 root apex. The buttons were bonded on the lingual surfaces of the UL3 and UL5, then PCs were attached from UL3 to UL5 to create a distal pulling force to the crown of UL3.

of the bracket was tilted distally relative to the axis of the lateral incisors, to create a mesial movement of the lateral incisor root apices. Open coil springs were inserted between the U2 and U4 on both sides to create a mesial tipping force to the crowns of the U2s, resulting in bodily movement of the U2s to correct the transposition of the U2s and U3s (Fig. 20). The effect of the mesial crown tipping and mesial root movement of UR2 and UL2 can be observed in the panoramic radiograph from 7th to 18th months (Fig. 21).

Low-torque brackets were bonded on the UR3 and UL3 in the 18th month. The UL3 bracket was bonded with 15° overcorrection, the axis of the bracket was tilted mesially relative to the axis of the canine, to create a distal movement of the transposed UL3 root apex. Buttons were bonded on the lingual surfaces of the UL3 and UL5, and a

PC was attached from UL3 to UL5 to retract the crown of UL3 (Fig. 22). In the finishing stage, an anterior root torquing spring was inserted for further crown retraction; however the outcome was not satisfying. As an afterthought, individual torque springs should have been placed on UR3 and UL3 to increase lingual root torque and gain buccal bone height to prevent gingival recession.

Surgical design

Ascertaining the precise localization of an impacted tooth is critical prior to designing the surgical access. With the help of Cone Beam Computed Tomography (CBCT), the 3-dimensional (3D) relationship of the impacted teeth is accurately determined. CBCT images can help clinicians to (a) decide whether to perform with buccal or palatal/lingual access; (b) assess potential damage to the roots of the adjacent teeth; (c) obtain a clear view of the amount of bone surrounding the impacted teeth; and (d) design the direction of the orthodontic forces.

A. Flap design

With thorough CBCT analysis, the surgical approach selected was the VISTA technique devised by Zadeh[18] and modified by Chang.[8] The modified VISTA is a minimally invasive surgery that only requires vertical parallel incisions without reflecting a large flap which can traumatize the surgical area and could further lead to unfavorable soft tissue healing.

The combined application of the modified VISTA technique with IZC OBS anchorage and 3D lever arm mechanics will be discussed in the next section - Mechanics: Force system design.

The following modified VISTA surgical steps were performed:

1. Impacted canines were precisely located with the help of CBCT (Fig. 5). The initial vertical incision was made with a no. 15 surgical scalpel to expose the crowns of the impacted canines.

2. A mucogingival flap was reflected with a surgical curette and periosteal elevator to detach the periosteum.

3. The surrounding bone around the impacted UR3 crown was removed with a #5 carbide round bur down to the cementoenamel junction (CEJ). A hand instrument removed the bone near the CEJ to avoid cervical damage to the tooth which can lead to external root resorption.[19] The guide was a sharp recoil when the explorer engaged the enamel compared to adjacent bone.

4. The surface of the impacted canine crown was etched, and a button was bonded on the labial surface of the exposed enamel.

5. A surgical explorer was used to make a dent in the soft tissue over the area of infra-zygomatic crest bone where the mini-screw was planned to be inserted.

6. An OBS (2x14-mm, OrthoBoneScrew®, iNewton, Dental, Inc., Hsinchu City, Taiwan)

was inserted in both the left and right IZC, and 3D lever arms (0.019x0.025" SS) was inserted into the rectangular hole as the anchorage device.

7. A second vertical incision was made on the vestibular side of the primary canine for the power chain to exit.

8. Bone was removed in the proposed path of canine traction which facilitated tooth eruption and up-righting without bone obstruction. Note that the bone in the tunnel was removed after bonding the button because excessive bleeding after bone removal complicates bonding.

9. The 3D lever arm was then activated by connecting the U-shaped end to the button attached on the crown of the impacted tooth using a power chain (Fig. 6).

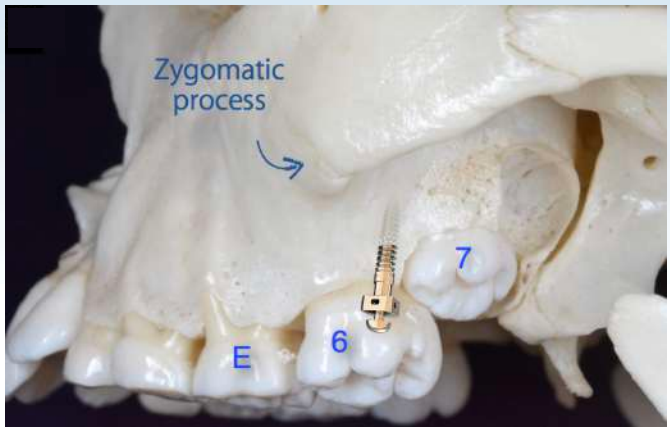


Fig. 23:
The bone screw is positioned around the mucogingival junction (MGJ) of the infrazygomatic crest (IZC) bone that is buccal to the root of first and second maxillary molars

10. The vertical incisions were sutured to ensure minimal damage to the mucosa.

11. Progress was monitored monthly with panoramic radiographs until the impactions erupted (Fig. 8).

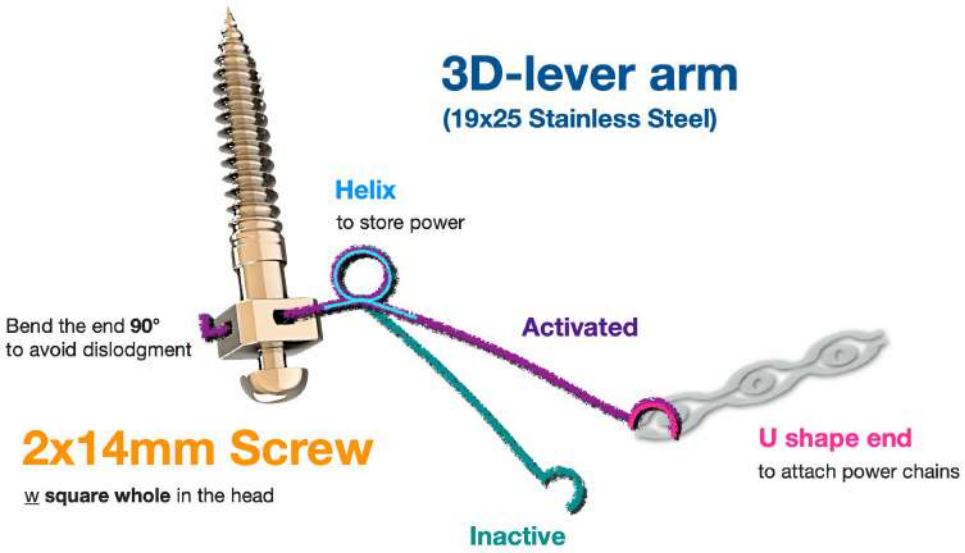


Fig. 24:
A 3D lever arm formed from a 0.019x0.25-in rectangular SS wire segment that has a helix in the body (to store power) and u shape in the end (to attach power chains).

B. Mechanics: Force system design

There are two keys to the force system design: stable anchorage and properly designed mechanics.

1. Stable anchorage: IZC screw

Stable anchorage is essential for the traction of the impacted tooth. Using teeth and archwires as anchorage may distort the occlusion and the arch. The use of mini-screws provides an independent anchorage that does not affect any other teeth or the occlusion. Moreover, since the mini-screw is installed within bone, it provides a stronger and more stable anchorage to move the impaction. The location to insert the mini-screw is around the mucogingival junction (MGJ) covering IZC bone, which is located between the first and second molars (Fig. 23). The mini-screws were inserted with a progressive rotation to achieve an upright position outside the root of U6s and U7s.

2. Properly designed mechanics: 3D lever arm

The 3D lever arm is made with a 0.019x0.025" SS archwire segment with a helix in the body for an increased range of action and a U shape at the end to easily attach PCs using a bird beak plier (Fig. 24). After inserting the 3D lever arm through the dedicated rectangular hole in the mini-screw head, it is then activated by connecting a PC from the end of the lever arm U shape to the button attached on the crown of the impacted tooth (Fig. 6).

The force system of the 3D lever arm provides customized 3D traction: backward, outward, and downward, which is essential for treating transposed impactions with adjacent root impingement. The direction of the force needed for starting UR3 traction is mainly a backward force. Buccal force should be avoided to keep the UR3 away from the UR1 root. The direction of force is adjusted with a three-jaw plier to create a more backward force (Fig. 25). After 3 months of active traction, the UR3 moved away from the UR1 root, and then an outward force was applied by using a three-jaw plier to adjust the force direction. On the other side, the force needed for the UL3 was

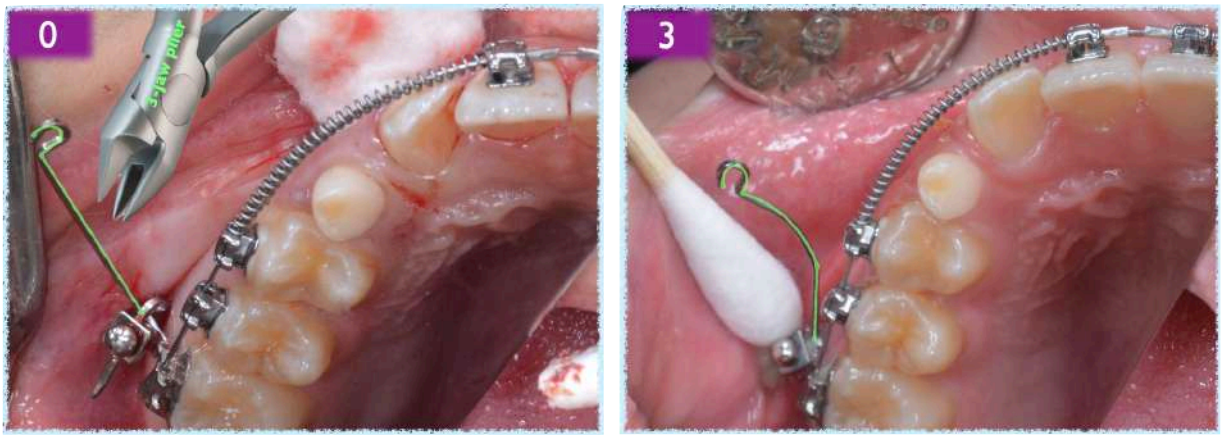


Fig. 25: *The direction and intensity of the force of the 3D lever arm was adjusted with three jaw pliers..*

backward, buccal, and slight downward. The outward force prevented direct impingement of the canine crown movement against the UL2 root, which further reduced the chance of UL2 root resorption.

Gingival recession

Biological limits are of concern when treating transpositioned teeth in order to preserve buccal cortex bone and to prevent gingival recession.[20] There are two main reasons leading to gingival recession after moving transposed teeth back into their normal position: 1. fast traction speed and 2. insufficient buccolingual alveolar bone width. In this case, gingival recession was present on both UR3 and UL3. Since the alveolar bone was maintained by Ucs whose roots were thin, the bone width was not thick enough to support UR3 and UL3 to move into the desired position. Gingival recession is frequently observed on transposed teeth since bone resorption potential exists near periodontal ligaments and dental follicles.

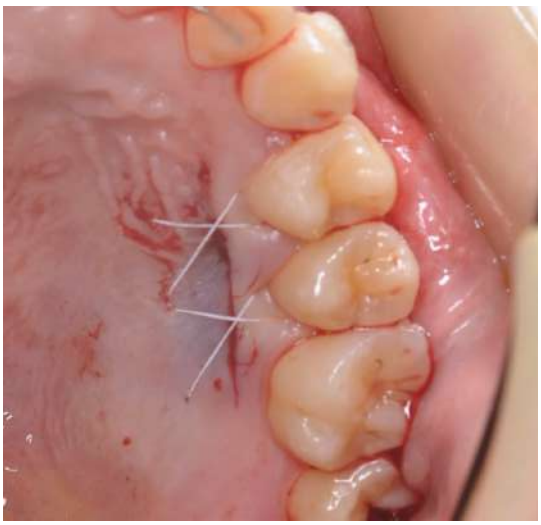


Fig. 26:
The incision of the CTG extended from mesial side of U4 to the mesial side of U6 for better bleeding control.

VISTA was performed to reestablish keratinized tissue. The main difference of VISTA from other gingival augmentation techniques is the coronal advancement of the gingival margin.[10] The gingival margin is recommended to be reattached coronally 2-3 mm below the CEJ, which inhibits apical relapse of the gingival margin during the healing process.

Connective tissue graft (CTG) is usually harvested in the palatal vault 2 mm below the gingival margin and 3 mm away from the greater palatine artery from the mesial of U4 to the distal of U7.[21] However, in this case the incision only extended to the mesial of U6 to avoid cutting the greater palatal artery (Fig. 26). Furthermore, anterior esthetic concerns prevented CTG harvesting from the palatal rugae or the tuberocity due to the irregular mucosa elevation and bulky pale color respectively.

The VISTA approach began with a vestibular incision mesial to the recession defect and straight through the periosteum; an elevated subperiosteal tunnel was created (Fig. 27). CTG of 2-3 mm thickness was placed within the tunnel, whose blood supply was from the covering tunnel tissue. 6-0 nylon suture was used to secure the CTG in place. Since there were several factors, such as scar tissue around the recession area, a lack of buccal bone, short vestibule, and thin gingival biotype of the patient, the result was unsatisfactory after the first VISTA surgery (Fig. 28). The patient was informed prior to starting the treatment that a second surgery might be necessary and would be performed 3 months after the first VISTA surgery.

Fig. 27:
Treatment progress of VISTA. Upper left: providing a concave space for the CTG to grow. Upper middle: UR3 subperiosteal tunnel was created with the VISTA elevator. Upper right: UL3 subperiosteal tunnel was created with the VISTA elevator. Lower left: CTG harvested from the palatal vault. Lower middle: Placing the CTG into the subperiosteal tunnel of UL3. Lower left: 6-0 nylon suture was used to secure the CTG in place.

Fig. 28:
The result of the 1st VISTA surgery was not satisfactory but it provided a thicker mucosal base for the 2nd VISTA.

The first surgery provided a thicker mucosal base, which enabled a more coronal position of the gingival margin to cover the whole CTG during the second surgery, enhancing the prognosis. Since there was no buccal bone on both UR3 and UL3, the formation of long junctional epithelium maintained the graft along the previously exposed root surfaces.[22,23] The result remained stable at 6-month and 1.5-year follow-up after the second VISTA surgery (Fig. 29).

Conclusion

Maxillary canine transposition is a complex and challenging task for orthodontists but can be successfully corrected with careful diagnosis and careful planning of the orthodontic mechanics. The canines were surgically exposesd with VISTA. The mechanics design using a mini-screw as skeletal anchorage combined with a 3D lever arm that provided an independent force system for retracting the impaction. Root resorption and torque loss during the recovery process can be controlled by delaying bonding of adjacent teeth and with bracket torque selection to compensate for the mechanics. If resulting gingival recession

Fig. 29: *The result remained stable at the 6 months and 1.5 year follow-up after the second VISTA surgery.*

occurs, VISTA with CTG is a feasible way to cover the exposed root surfaces.

Reference

1. Shapira Y, Kuftinec MM. Tooth transpositions: A review of the literature and treatment considerations. Angle Orthod 1989;59(4):271–6.

2. Lorente C, Lorente P, Perez-Vela M, Esquinas C, Lorente T. Orthodontic management of a complete and an incomplete maxillary canine-first premolar transposition. Angle Orthod 2019;90(3):457–66. doi:10.2319/080218-561.1

3. Chattopadhyay A, Srinivas K. Transposition of teeth and genetic etiology. Angle Orthod 1996;66:147-52.

4. Shapira Y, Kuftinec MM. Maxillary tooth transpositions: characteristic features and accompanying dental anomalies. Am J Orthod Dentofacial Orthop 2001;119:127-34.

5. Tseng YC, Chang HP CT. Canine transposition. Kaohsiung J Med Sci 2005;21:441–447.

6. Liu PH, LaiEH YH, JZ C. Orthodontic treatment of a complete transposed impacted maxillary canine. J Dent Sci 2015;10:102e108.

7. Su CW, Chang CH, Roberts WE. Management of an impacted maxillary canine with the vertical incision subperiosteal tunnel (VISTA) technique. J Digit Orthod 2018;50:52–71.

8. Su CW, Hsu YL, Chang CH, Roberts WE. Soft tissue considerations for the management of impactions. Int J Orthod Implant 2011;24:50-9.

9. Su CW, Chang CH, Roberts WE. Soft tissue considerations for the management of impactions. Int J Orthod Implant 2013;31:100–9.

10. Chen CK, Chang CH, Roberts WE. Class III with multiple gingival recession: Vestibular incision subperiosteal tunnel access (VISTA) and platelet- derived growth factor BB. Int J Orthod Implant 2014;35:22–36.

11. Lin A, Chang CH, Roberts WE. VISTA and 3D OBS Lever-arm to recover a labially-impacted canine: Differential biomechanics to control root resorption. J Digital Orthod 2019;54:28–48.

12. Huang C, Shern L, Chang CH, Roberts WE. Extraction vs. non-extraction therapy: Statistics and retrospective study. J Digital Orthod 2016(44):76-86.

13. Becker A, Smith P, Behar R. The incidence of anomalous maxillary lateral incisors in relation to palatally-displaced cuspids. Angle Orthod 1981;51(1):24-9.

14. Kim Y, Hyun HK, Jang KT. The position of maxillary canine impactions and the influenced factors to adjacent root resorption in the Korean population. Eur J Orthod 2012;34(3):302-6.

15. Yan B, Sun Z, Fields H, Wang L. Maxillary canine impaction increases root resorption risk of adjacent teeth: a problem of physical proximity. Am J Orthod Dentofacial Orthop 2012;142(6):750-7.

16. Hsu E, Chang CH, Roberts WE. Surgical procedures, mechanics, and problems in recovering 51 impacted maxillary canines for 46 patients with the OBS-3D lever arm appliance. J Digital Orthod 2020;59:24-33.

17. Hsu YL, Chang CH, Roberts WE. Canine-lateral incisor transposition: Controlling root resorption with a bone-anchored T-loop retraction. Am J Orthod Dentofacial Orthop 2016;150(6):1039-50.

18. Zadeh HH. Minimally invasive treatment of maxillary anterior gingival recession defects by vestibular incision subperiosteal tunnel access and platelet-derived growth factor BB. Int J Periodontics Restorative Dent 2011;31(6):653-60.

19. Discacciati J, de Souza EL, Costa SC, Sander HH, Barros Vde M, Vasconcellos WA. Invasive cervical resorption: etiology, diagnosis, classification and treatment. J Contemp Dent Pract 2012;13(5):723-8.

20. Matsumoto MA, Stuani MB. Tooth transposition: A multidisciplinary approach. Dental Press J of Orthod 2018;23(1):97–107. doi:10.1590/2177-6709.23.1.097-107.

21. Monnet-Corti V, Santini A, Glise J, Fouque-Deruelle C, Dillier F, Liébart M, et al. Connective tissue graft for gingival recession treatment: Assessment of the maximum graft dimensions at the palatal vault as a donor site. J of Periodontol 2006;77(5):899–902. doi:10.1902/jop.2006.050047

22. Chambrone L, Chambrone LA, Tatakis DN, Costa Hanemann JA, Shibli JA, Nevins M. Wound Healing os the laterally positioned flap a histomorphometric assessment. Int J Periodont Rest 2015; 35: 785-792.

23. Fernandes-Benedito I, Vieira-Falabella. ME. Therapy of gingival recessions using laterally positioned flap plus connective tissue graft: Case reports. Int J Interdiscip dent 2021;14(1):52–4. doi:10.4067/s2452-55882021000100052

Discrepancy Index Worksheet

TOTAL D.I. SCORE 9

OVREJET 3 mm

0 mm. (edge-to-edge)	=	
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 = 0

OVERBITE 3 mm

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

Total = 0

ANTERIOR OPEN BITE

0 mm. (Edge-to-edge), 1 pt. per tooth
Then 1 pt. per additional full mm. Per tooth

Total = 0

LATERAL OPEN BITE

2 pts. per mm. Per tooth

Total = 0

CROWDING (only one arch) 2 mm

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

Identify:

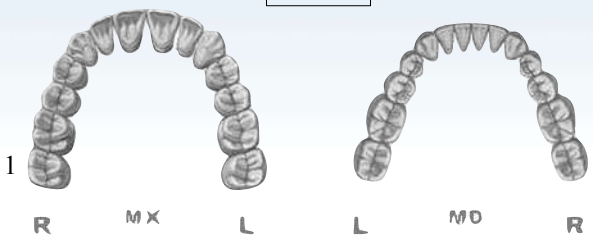
Total = 8

Cast-Radiograph Evaluation

Total Score: 4

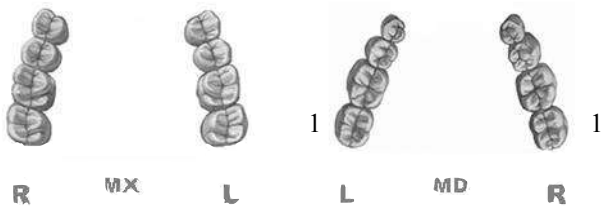
Alignment/Rotations

1



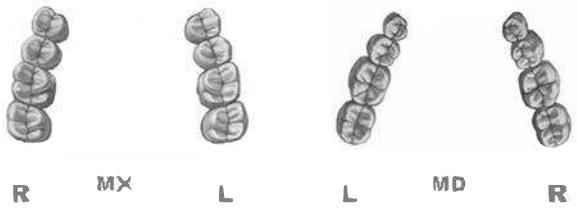
Marginal Ridges

2



Buccolingual Inclination

0

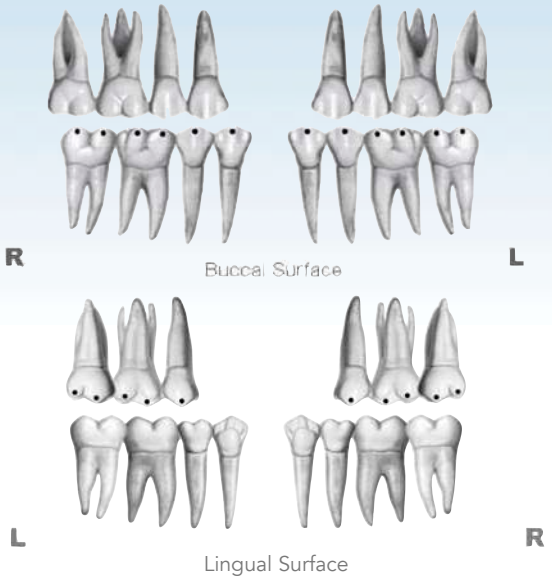


Overjet

0

Occlusal Contacts

0

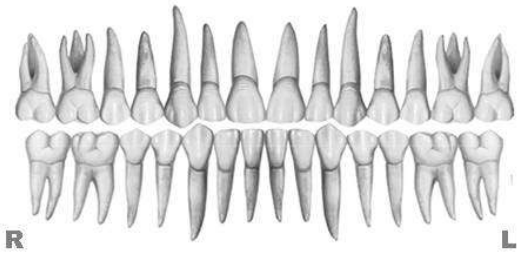


Occlusal Relationships

0

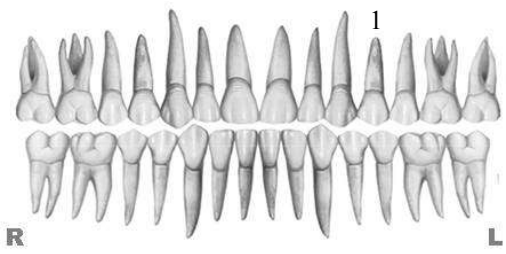
Interproximal Contacts

0



Root Angulation

1



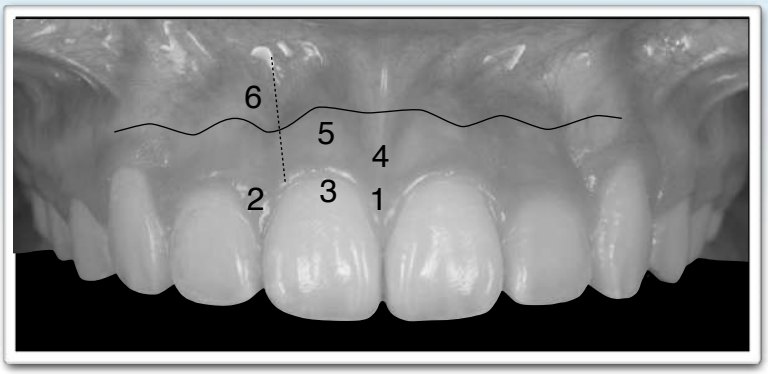
INSTRUCTIONS: Place score beside each deficient tooth and enter total score for each parameter in the white box. Mark extracted teeth with "X". Second molars should be in occlusion.

IBOI Pink & White Esthetic Score

Total Score = 4

1. Pink Esthetic Score

Total = 3

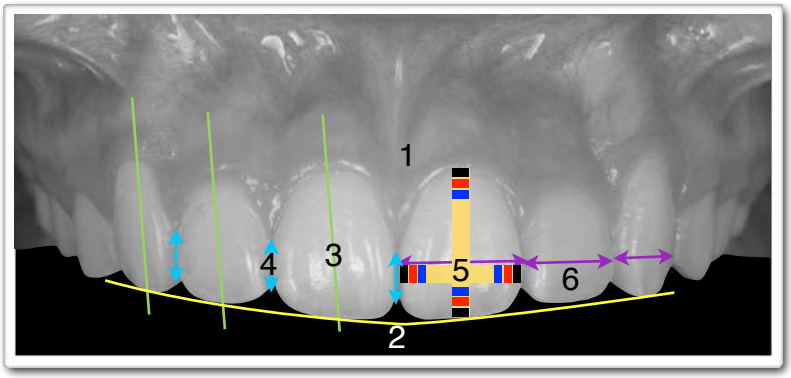


1. M & D Papillae	0	1	2
2. Keratinized Gingiva	0	1	2
3. Curvature of Gingival Margin	0	1	2
4. Level of Gingival Margin	0	1	2
5. Root Convexity (Torque)	0	1	2
6. Scar Formation	0	1	2

1. M & D Papillae	(0)	1	2
2. Keratinized Gingiva	(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. White Esthetic Score (for Micro-esthetic)

Total = 1



1. Midline	0	1	2
2. Incisor Curve	0	1	2
3. Axial Inclination (5°, 8°, 10°)	0	1	2
4. Contact Area (50%, 40%, 30%)	0	1	2
5. Tooth Proportion	0	1	2
6. Tooth to Tooth Proportion	0	1	2

1. Midline	(0)	1	2
2. Incisor Curve	(0)	1	2
3. Axial Inclination (5°, 8°, 10°)	(0)	1	2
4. Contact Area (50%, 40%, 30%)	(0)	1	2
5. Tooth Proportion	0	(1)	2
6. Tooth to Tooth Proportion	(0)	1	2

2025 第四届 张慧男正畸大师班


全新重启的 2025 贝多芬张慧男正畸大师系列课程是由**国际知名讲师张慧男医师亲自规划及授课，课程特色强调由临床病例带动诊断、分析、治疗计划拟定与执行技巧**。

本年度**特别新增两天的课程，加入最新的隐形牙套内容**，让学员可以物超所值地学习最新正畸趋势！透过数位视频反覆观看，课堂助教协助实操，让学员在短时间能快速上手，感染**“热爱正畸学，热爱学正畸”**的热情。

名额有限，一年仅有一次机会完整体验正畸大师课程，错过只能等明年啰！

课程地点：五星级厦门五缘湾凯悦酒店（厦门，湖里区，湖里区日圆二里五号）

课程 1- 6/24 (二)

1. 如何选择第一个病例:建立自信
2. 精准的托槽定位法
3. 高效正畸治疗“四步法”
4. 病例总结和讨论
5. 托槽粘结+BT(合垫)+头影测量

练习：临床摄影技术

课程 2 - 6/25 (三)

1. 简单高效的支抗系统的运用
2. 拔牙与否的诊断分析
3. 病例总结和讨论
4. 实操：微种植支抗系统 + 间隙关闭法 + 牵引钩的使用 + 弹簧的使用

练习：头影测量；完成患者照片记录（模板）

课程 3 - 7/15 (二)

1. 戴蒙系统的诊断与微调
2. 正畸完成后的效果评判
3. 病例总结和讨论
4. 实操：弓丝的弯制和固定保持器的制作

练习：指导患者拍照记录（用自己的时间）；修图技术

课程 4 - 7/16 (三)

1. 完美的结束：病例演示
2. 保持和复发：病例演示
3. 病例总结和讨论
4. 实操：演讲演示

练习：演示病例报告

课程 5 - 9/16 (二)

1. 正畸中生物力学的诊断分析
2. 正畸中软组织和硬组织的诊断分析
3. 青少年与成人正畸的诊断分析
4. 病例总结和讨论

练习：病例报告

课程 6 - 9/17 (三)

1. 对于拥挤病例拔牙与否的诊断分析
2. 如何实现上颌的压入
3. 如何实现下颌的压入
4. 病例总结和讨论

文献探讨：托槽的定位；埋伏尖牙的正畸

课程 7 - 10/14 (二)

1. 缺失牙的正畸分析：前牙缺失 vs. 后牙缺失
2. 反合的正畸分析：前牙反合 vs. 后牙反合
3. 病例总结和讨论

文献探讨：尖牙替代缺失的侧切牙的正畸分析

课程 8 - 10/15 (三)

1. 高角开合与低角深覆合病例的诊断分析
2. 美国正畸协会，DI CRE 分值测量实操
3. 病例总结和讨论

文献探讨：DI & CRE 文献

课程 9 - 11/18 (二)

1. 如何改善露龈笑；矫治器拆除的注意事项
2. 正畸结束时的微调
3. 病例总结和讨论

文献探讨：完美的正畸效果（良好的咬合；前牙的美学效果）

课程 10 - 11/19 (三)

1. 联合种植支抗的正畸治疗
2. 多学科联合治疗成人复杂病例
3. 病例总结和讨论

文献探讨：IDT

课程 11 - 12/23 (二)

1. 隐形牙套正畸
2. 隐形牙套及其挑战

文献探讨：隐形正畸前置治疗

课程 12 - 12/24 (三)

1. 隐形牙套结合支抗钉治疗
2. 隐形牙套力学

文献探讨：（待公布）

课程含案例互动与模型实操，并赠课程电子书讲义、课程视讯。
（赠送之课程视讯提供两年时间串流观看）

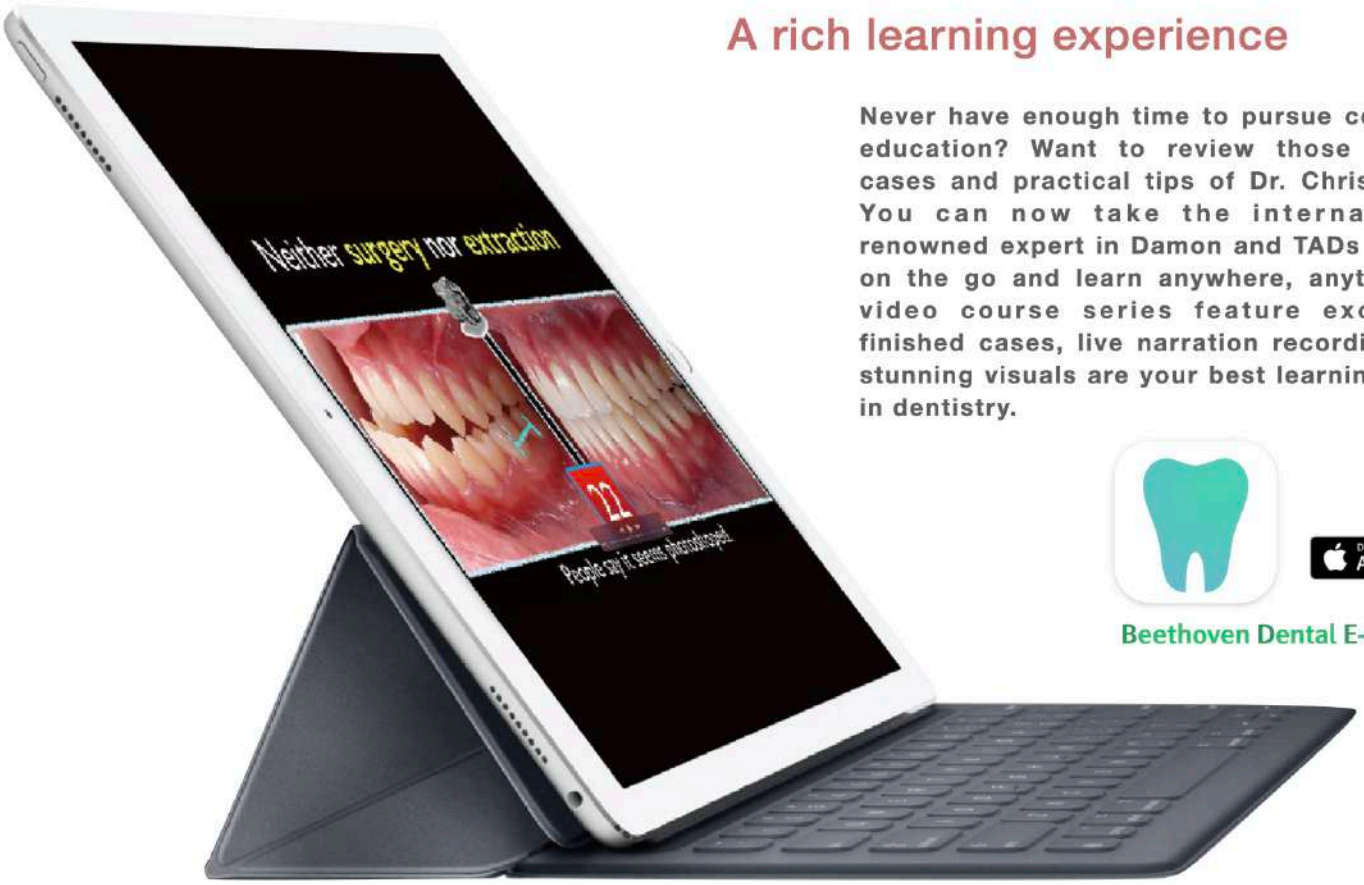
报名专线

金牛顿艺术科技
Newtonsa

何进辉 18960059996
潘超 18170078338
邱强 13509310501
苏佩玟 15280211624

e-Courses

A rich learning experience



Never have enough time to pursue continuing education? Want to review those amazing cases and practical tips of Dr. Chris Chang? You can now take the internationally renowned expert in Damon and TADs with you on the go and learn anywhere, anytime. The video course series feature excellently finished cases, live narration recordings, and stunning visuals are your best learning source in dentistry.

Download on the App Store

Beethoven Dental E-Learning

Series Each video course is valid for 3 years

narrated

Damon Master

Damon Master

narrated

E Lecture

E-Lecture

narrated

OBS TAD

OBS (TAD)

non-narrated

Finishing

Finishing
(14 seasons)

non-narrated

Implant Forum

Implant Forum
(9 seasons)

non-narrated

Assistant

Assistant

non-narrated

E Ortho

E-Ortho

non-narrated

E Implant

E-Implant

non-narrated

E Pedo

E-Pedo

Note:

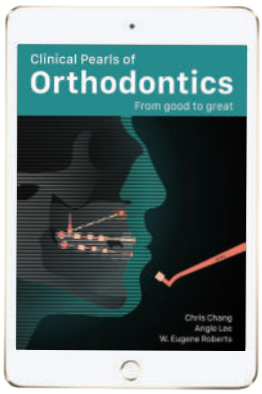
1. Most video courses are available in both English and Chinese and are sold separately.
2. Damon Master and OBS (TAD) are renewed annually and each renewal is to be purchased separately with a 50% discount.

iNewton +886-3-573-5676 orthobonescrew.com inewton.dental@gmail.com

e-Books

Learn it your favorite way!

Best of all



+ BUY BOOK

This book requires iBooks 3.0 or later and iOS 5.0 or later.

The World's Best e-Textbook

Beethoven Dental Encyclopedia

e-Books collection

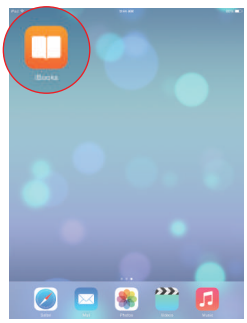
Beethoven Orthodontic and Implant Group has been publishing the International Journal of Orthodontics and Implantology since 2007. This Journal features excellently finished case reports evaluated by objective grading systems. **The Orthodontics and Implant Dentistry eBook series** is a special selection of exciting cases with interactive functions and multimedia resource. Once opening this book, your understanding of dentistry will never be the same!

Now available in iBooks Store in 51 countries:

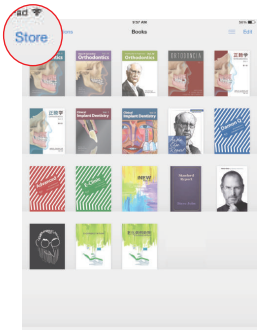
Argentina, Australia, Austria, Belgium, Bolivia, Brazil, Bulgaria, Canada, Chile, Colombia, Costa Rica, Cyprus, Czech Republic, Denmark, Dominican Republic, Ecuador, El Salvador, Estonia, Finland, France, Germany, Greece, Guatemala, Honduras, Hungary, Ireland, Italy, Japan, Latvia, Lithuania, Luxembourg, Malta, Mexico, Netherlands, New Zealand, Nicaragua, Norway, Panama, Paraguay, Peru, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland, United Kingdom, United States, and Venezuela.

Get it on iBooks

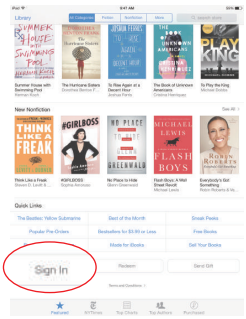
Step-by-step Instructions



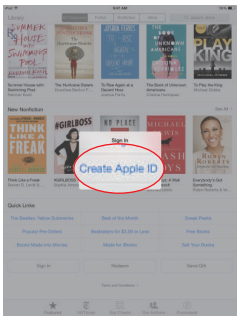
1. Launch "iBooks" app on your iPad.



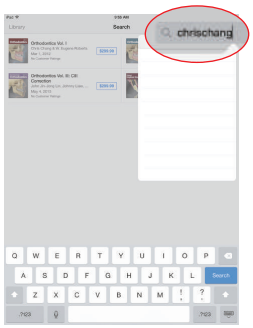
2. Click "Store."



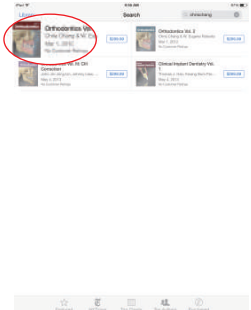
3. "Sign in" with your Apple ID.



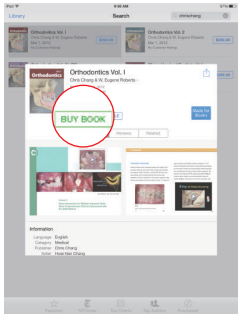
4. "Create Apple ID" if you don't have one.



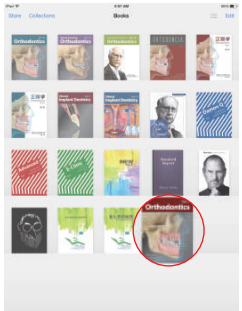
5. Search for "chrischang."



6. Click the book's icon.



7. Check the price and click "BUY BOOK."



8. Once downloaded, click the book's icon to launch the e-book and enjoy.

If you are interested in our paid video or medical products, contact **inewton.dental@gmail.com** for more information.

+886-3-573-5676

orthobonescrew.com

iNewton

My Journey of Orthodontic Education

Embarking on a journey of orthodontics has been a transformative experience, marked by a series of milestones that have shaped my career and passion for dental care.

From my initial focus on prosthodontics to becoming a dedicated orthodontist, my path has been driven by a desire to create beautiful smiles and enhance patients' quality of life. Each phase of my education has been pivotal, leading to profound shifts in my understanding and approach to orthodontics. The journey began with a foundational passion for dentistry, where I initially found joy in restoring teeth through prosthodontics as specialized prosthodontist with a PhD from Tokyo Medical and Dental University in Japan. However, over long years of practice, as I delved deeper into the field, I experienced a need of a paradigm shift. I realized that the true essence of dental esthetics lies not only in restoring functionality but also in achieving proper alignment and harmony in the smile. This realization ignited my interest in orthodontics, where I could make a more significant impact on patients' overall dental health and self-esteem with minimally invasive and less destructive treatment.

To solidify my passion, I sought opportunities to expand my knowledge and skills in orthodontics. One of the most significant experiences was attending the Beethoven Damon and VISTA Workshop in Taiwan in May, 2017, where I had the privilege of learning from Dr. Chris Chang. His innovative techniques and insights into

Fig. 1:
Dr. Almutawa among fellow participants at the 2017 Beethoven Damon and VISTA Workshop

orthodontic practice opened my eyes to the dynamic possibilities within the field. The course was not just an educational experience; it was a pivotal moment that fueled my desire to specialize in orthodontics. I was fascinated not only by Dr. Chris Chang's philosophy in biomechanics but also by his presentation style and skills.

Unsurprisingly, I found out that the first workshop with Dr. Chris Chang was only a stop in my journey in orthodontics, which was followed by several trips to Beethoven and Newton's A for more training. In December 2017, I went back to Taiwan to attend the keynote workshop at Newton's A Education Center. As I progressed in my studies, I became particularly fascinated by the Damon system, a modern approach to orthodontics that emphasizes efficiency and patient comfort. In 2018, I attended the Beethoven Insignia Workshop, where I gained valuable insights into the latest technologies and techniques in orthodontic treatment. Through rigorous practice and dedication, I mastered different orthodontic

Dr. Nawal J. Almutawa
DDS, MSc, PhD
Consultant, Al Mutawa Dental, Manama
University Medical Center, Arabian Gulf University, Bahrain

techniques, which culminated in the publication of a case report of a Class III treatment with TADs, in the Journal of Digital Orthodontics (JDO) in 2019. The report highlighted the transformative power of Damon techniques and TADs in solving complex cases with nonsurgical approaches. This achievement not only solidified my understanding of the technique but also encouraged me to share my knowledge with peers and contribute to the ongoing dialogue in the orthodontic community.

Simultaneously, I recognized the growing trend of and demand for clear aligner techniques in orthodontics. Understanding the need for versatile treatment options, I immersed myself in learning about these innovative solutions. In December 2019, I attended a workshop on clear aligners and TADs for complex cases at the Beethoven iAOI (International Association of Orthodontists and Implantologists) symposium, which enhanced my knowledge and skills in managing intricate orthodontic scenarios and guiding me to master Invisalign, a leading clear aligner system that allowed me to offer my patients a discreet and effective orthodontic treatment option. My expertise in Invisalign further enabled me to become a speaker, sharing my experiences and insights with fellow orthodontists. In addition, I published another case report in JDO in 2022, showcasing successful treatment outcomes of a Class II with severe overjet treated non-surgically with clear aligners and TADs, reinforcing my commitment to advancing in the field.

Fig. 2:
Dr. Almutawa attended the Beethoven Insignia Workshop in 2018.

Fig. 3:
At the 2019 Beethoven iAOI symposium, Dr. Nawal received certification as a diplomate of the association. From left to right are Dr. Chris Chang, Dr. Kenji Ojima, Dr. Nawal Almutawa, and Dr. Bill Su.

The culmination of my learning and experience set the stage for another significant step in my career: entering the Specialized Orthodontic Master Program at the International Medical

College of the University of Duissburg-Essen in Germany in 2022 for two years. This decision was strongly influenced by Dr. Chris Chang, whose mentorship and guidance has been invaluable throughout my journey. The program provided me not only with advanced theoretical knowledge but also with practical skills that are essential for a successful career in orthodontics. Collaborating with experts in the field and engaging in hands-on training has further honed my abilities and deepened my understanding of patient care.

In conclusion, my journey in orthodontics education has been a remarkable evolution, characterized by milestones that reflect my dedication, passion, and commitment to excellence in dental care. From my initial interest in prosthodontics to mastering various orthodontic techniques, each experience has contributed to my growth as a clinician and educator. As I continue to advance in my career, I remain committed to enhancing the smiles and lives of my patients, driven by the knowledge and skills I have acquired along the way.

Fig. 4:
Dr. Almutawa completed the 2-year master program in Specialized Orthodontics in the International Medical College at the University of Duissburg-Essen, Germany in 2024.

Fig. 5:
Dr. Almutawa with fellow Beethoven doctors at the University of Duissburg-Essen for their thesis defense presentations.

OBS Super Set

Created by Dr. Chris Chang, OBS is made of medical grade, stainless steel and titanium, and is highly praised by doctors for its simplistic design, low failure rate and excellent quality. OBS is your must-have secret weapon for maximum, reliable anchorage.

Smooth Mushroom Head

For comfort & retention of elastic chain

4-way Rectangular Holes

For lever arm to solve impacted tooth

Double Neck Design

Easy hygiene control & extra attachment

FDA

ISO 9001 SGS ISO 13485 SGS

Directive 93/42/EEC G.M.P. MEDICAL DEVICE

Made in Taiwan

New **Titanium Higher biocompatibility***

1.5 | 1.5X8mm

Stainless Steel**

2.0 | 2.0x12mm

2.7 | 2.0x14mm (with holes)

Buy a Super Set, get ***OBS Clinical Guide*** (eBook) for free.

* TADs made of Ti alloy have a lower failure rate compared to SS when placed in thin cortical bone. These results are consistent with a biocompatibility-related tendency for less bone resorption at the bone screw interface.
Reference: Failure Rates for SS and Ti-Alloy Incisal Anchorage Screws: Single-Center, Double Blind, Randomized Clinical Trial (J Digital Orthod 2018;52:70-79)

** The overall success rate of 93.7% indicates that both SS and TiA are clinically acceptable for IZC BSs.
Reference: Failure rates for stainless steel versus titanium alloy infrazygomatic crest bone screws: A single-center, randomized double-blind clinical trial (Angle Orthod 2019;89(1):40-46)

iNewton +886-3-573-5676 orthobonescrew.com inewton.dental@gmail.com

iNewton

Dental Products

Must-Have Secret Weapons

Autoclavable

Double Retractors 2.0

Double Retractors x2, Black Board x2

While keeping the same lip & cheek two-way design, the new Double Retractors 2.0 is upgraded to medical grade PPSU.

NEW

Stainless Steel Mirror 2.0

Strong, durable stainless steel, autoclave-proof, the specially designed size, improved shape and thickness ensure maximum intra-oral view without sacrificing patient comfort.

Bite Turbo 3.0

Handle x1, BT molds x6, BT extended molds x6, Button molds x6

Designed by Dr. Chris Chang, the new Bite Turbo 3.0 allows you to solve all kinds of deep bite and large horizontal overjet. A simple and powerful tool you should add to your kit!

orthobonescrew.com +886-3-5735676 inewton.dental@gmail.com

"From this book we can gain a detailed understanding of how to utilize this ABO system for case review and these challenging clinical cases from start to finish."

Dr. John JJ Lin, Taipei, Taiwan

"I'm very excited about it. I hope I can contribute to this e-book in someway."

Dr. Tom Pitts, Reno, Nevadav, USA

"A great idea! The future of textbooks will go this way."

Dr. Javier Prieto, Segovia, Spain

"No other book has orthodontic information with the latest techniques in treatment that can be seen in 3D format using iBooks Author. It's by far the best ever."

Dr. Don Drake, South Dakota, USA

"Chris Chang's genius and inspiration challenges all of us in the profession to strive for excellence, as we see him routinely achieve the impossible."

Dr. Ron Bellohusen, New York, USA

"This method of learning is quantum leap forward. My students at Oklahoma University will benefit greatly from Chris Chang's genius. "

Dr. Mike Steffen, Oklahoma, USA

"Dr. Chris Chang's innovation eBook is at the cutting edge of Orthodontic Technology... very exciting! "

Dr. Doraida Abramowitz, Florida, USA

"Dr. Chang's technique is absolutely amazing and cutting-edge. Anybody who wants to be a top-tiered orthodontist MUST incorporate Dr. Chris Chang's technique into his/her practice."

Dr. Robert S Chen, California, USA

"Dr. Chris Chang's first interactive digital textbook is ground breaking and truly brilliant! "

Dr. John Freeman, California, USA

"Tremendous educational innovation by a great orthodontist, teacher and friend."

Dr. Keyes Townsend Jr, Colorado, USA

"I am awed by your brilliance in simplifying a complex problem."

Dr. Jerry Watanabe, California, USA

"Just brilliant, amazing! Thank you for the contribution."

Dr. Errol Yim, Hawaii, USA

"Beyond incredible! A more effective way of learning."

Dr. James Morrish Jr, Florida, USA

New Release!

In October, 2024, a group of Beethoven's young doctors travelled to Duissburg-Essen University in Germany for their master's thesis defense presentations, and welcomed their graduation soon afterwards. Among them was Dr. Nawal Almutawa (rightmost) from Bahrain, who very warmly shares her journey of orthodontic learning in this issue.