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全新改版的 2023 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 1－4／13

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

Module 2－5／11
1．Four stages of efficient orthodontic treatment
2．Simple and effective anchorage system
3．Extraction vs．Non－extraction analysis
Practice：Patient photo management

## Module 3－5／25

1．Soft \＆hard tissue diagnostic analysis
2．Big overjet correction
3．Damon diagnosis \＆fine－tuning
Practice：Ceph tracing

## Module 4－6／8

1．Excellent finishing
2．Retention \＆relapse
Practice：Ceph superimposition \＆measurement

## Module 5－6／29

1．Simplify your system
2．Extraction vs．non－extraction
Practice：Case report demo

Computer training（Mac）：1：30－3：00 pm

時間：週四全天（9am－5 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

## Module 6－7／13

1．Class III correction
2．Class II correction
Special lecture

## Module 7－7／27

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

## Module 8－8／10

1．ABO DI，CRE workshop
2．Open bite
Special lecture

## Module 9－8／24

1．Implant－ortho combined treatment
2．Asymmetry
Special lecture

## Module 10－9／7

1．Minor surgeries in orthodontics
2．Digital orthodontics
Special lecture

## Module 11 －9／21

1．Aligner \＆TADs
2．Keys to aligner learning
Special lecture

Special lecture：1：30－2：30 pm


LINE＠
官方帳號

# Impacted Maxillary Canines: Auto-Eruption in Moderately Crowded Mixed Dentition 


#### Abstract

Introduction: A $10 y$-9m-old female presented with chief complaints of bilateral maxillary impacted canines in the late mixed dentition stage. The premolars had begun to erupt.

Diagnosis: There was moderate anterior crowding in the maxillary arch, and the maxillary canines were impacted. Crossbite of both maxillary lateral incisors was noted. The total Discrepancy Index (DI) for this malocclusion was 57, including an Impaction Specific Assessment System (iSAS) score of 19 points.

Treatment: The anterior crossbite was corrected using a passive self-ligating appliance, supplemented with a bite turbo on the lower left lateral incisor. Open coil springs were placed to gain spaces for eruption of the impacted canines.

Results: After 25 months of active treatment, the Cast-Radiograph Evaluation (CRE) score was 13. Superimposition of the cephalometric tracings showed that the $S N A, S N B$, and $A N B$ angles increased $8^{\circ}, 3^{\circ}$, and $5^{\circ}$ respectively, which resulted in a more harmonious facial pattern. Besides, U1-SN and L1-MP both increased from retroclined to more ideal angles. The 1-year follow-up photographs revealed that both facial esthetics and occlusion were stable.

Conclusions: In mixed dentition, clinical signs of delayed or ectopic eruption should be confirmed by panoramic and cephalometric films first. For upper canine impactions to erupt spontaneously, angle of inclination and initial height of the impaction are critical. Preserving Leeway space can help relieve crowding. Lastly, different bracket selections depending on factors such as displaced position of impacted canines, non-lextraction of the adjacent teeth, and initial inclination of anterior segment are efficient for achieving desirable outcomes. (J Digital Orthod 2022;68:46-63)


Key words:
Impacted maxillary canine, mixed dentition, Leeway space, open coil spring

## 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. Deciduous teeth are marked A-E from the midline in each quadrant, e.g., an upper right primary canine is URC. Permanent teeth are numbered 1-8 from the midline in each quadrant, e.g., a lower left canine is LL3.

The prevalence of impacted maxillary canines (lU3s) by most studies are two-thirds palatal. ${ }^{1}$ In 1995, an international sample of I-U3s reported by Peck and Peck² showed that $73.4 \%$ of I-U3s encroached on first premolar. Corresponding data for other teeth was $20.5 \%$ lateral incisor, $4.1 \%$ first molar, and $2 \%$ central incisor. Furthermore, there is a 3\% prevalence of transposition with the adjacent lateral incisor. The dental esthetics and functions in patients with an impacted canine(s) could be negatively influenced by its long and complex treatment. ${ }^{3-6}$ Therefore, the ameliorated treatment

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 Training Resident, Beethoven Orthodontic Center (Left) Joshua S. Lin, Associate Director, 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)
(
for a transposed canine cannot be overemphasized. In this case, bilateral impacted maxillary canines were present in a 10-year-9-month-old female, which was the chief complaint.


Fig. 1: Pre-treatment facial and intraoral photographs


■ig. 2: Pre-treatment study models

## History and Etiology

A 10-year-9-month-old female presented with a moderately crowded dentition (Figs. 1 and 2). An


Fig. 3: Posttreatment facial and intraoral photographs


■ig. 4: Posttreatment study models
intraoral examination revealed recently erupted right and left maxillary first premolars, but the maxillary right second primary molar was retained. The anterior dentition was moderately crowded, both maxillary lateral incisors were in crossbite, and the maxillary canines were unerupted. Since there were no obvious anomalies and pathology which could be observed in the panoramic and periapical films of the maxillary arch, the assumed etiology for the impactions was crowding and abnormal paths of eruption.

There was no evidence of contributing oral habits or temporomandibular dysfunction. Good alignment was achieved after 27 months of active treatment, as shown in Figs. 3, 4, 6, and 7.

## Diagnosis

## Facial:

- Facial Height: Normal (54\%) with tapered facial form
- Protrusion: Relatively protrusive lips (upper: 1.5 mm to the E-line; lower: 2 mm to the E-line)
- Incisal Exposure: Within normal limits (WNL) when smiling


## Skeletal:

- Intermaxillary Relationship: Retrusive maxilla (SNA, $74^{\circ}$ ) and mandible (SNB, $73^{\circ}$ ), as well as skeletal Class I (ANB, $1^{\circ}$ )
- Mandibular Plane: High mandibular plane angle (SN-MP, 49.5 ${ }^{\circ}$; FMA, 42.5 ${ }^{\circ}$ )


## Dental:

- Incisal Inclination: Retrusive upper incisor (U1SN, $97^{\circ}$ ) and lower incisor (L1-MP, 78.5 $)$
- Classification: End-on Class II molar relationship on both sides
- Unerupted: UR3, UR5, UR7, UL3, UL7, LR7, and LL7

The total Discrepancy Index (DI) for this malocclusion was 57, including an Impaction Specific Assessment System (iSAS) score of 19 points, as shown in the subsequent Worksheets 1 and 2.

## Treatment Objectives

The treatment objectives were to:

1. Induce bilateral impacted maxillary canines to erupt.
2. Correct the retroclined upper and lower incisors and asymmetrical dental arches.
3. Resolve the crowded dentition.
4. Reduce high mandibular plane angle.

Maxilla (all three planes):

- Incisal Exposure: WNL when smiling
- A-P:Allow for normal expression of growth.
- Vertical: Allow for normal expression of growth.
- Transverse: Maintain.


Fig. 5:
Pre-treatment cephalometric and panoramic radiographs document the original dentofacial morphology.


Fig. 6:
Posttreatment cephalometric and panoramic radiographs reveal the dentofacial morphology immediately after fixed appliances were removed.


## [Fig. 7:

Pre- (black) and posttreatment (red) cephalometric tracings are superimposed on the anterior cranial base (left), the maxilla (upper right), and the stable internal structures of the mandible (lower right). See text for details.

## CEPHALOMETRIC SUMMARY <br> PRE-TX POST-TX DIFF.

| SKELETAL ANALYSIS |  |  |  |
| :--- | :---: | :---: | :---: |
| SNA $\left(82^{\circ}\right)$ | $74^{\circ}$ | $82^{\circ}$ | $8^{\circ}$ |
| SNB $^{\circ}\left(80^{\circ}\right)$ | $73^{\circ}$ | $76^{\circ}$ | $3^{\circ}$ |
| ANB $^{\circ}\left(2^{\circ}\right)$ | $1^{\circ}$ | $6^{\circ}$ | $5^{\circ}$ |
| SN-MP ${ }^{\circ}\left(32^{\circ}\right)$ | $49.5^{\circ}$ | $48.5^{\circ}$ | $1^{\circ}$ |
| FMA $^{\circ}\left(27^{\circ}\right)$ | $42.5^{\circ}$ | $41.5^{\circ}$ | $1^{\circ}$ |


| DENTAL ANALYSIS |  |  |  |
| :--- | :---: | :---: | :---: |
| U1 TO NA mm (4mm) | 6 | 1.5 | 4.5 |
| U1 TO SN $\left(104^{\circ}\right)$ | $97^{\circ}$ | $101^{\circ}$ | $4^{\circ}$ |
| L1 TO NB mm $(4 \mathrm{~mm})$ | 5 | 8.5 | 3.5 |
| L1 TO MP ${ }^{\circ}\left(90^{\circ}\right)$ | $78.5^{\circ}$ | $89^{\circ}$ | $10.5^{\circ}$ |
| FACIAL ANALYSIS |  |  |  |
| E-LINE UL (-1mm) | 1.5 | 1 | 0.5 |
| E-LINE LL (0mm) | 2 | 2 | 0 |
| \%FH: Na-ANS-Gn (56\%) | $54 \%$ | $53.5 \%$ | $0.5 \%$ |
| Convexity: G-Sn-Pg (13 $)$ | $6.1^{\circ}$ | $9.2^{\circ}$ | $3.1^{\circ}$ |

Table 1: Cephalometric Summary

Mandible (all three planes):

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


## Maxillary Dentition:

- A-P: Protrude incisors to correct UT-SN.
- Vertical:Maintain.
- Inter-Molar/Inter-Canine Width: Expand as needed to relieve crowding.


## Mandibular Dentition:

- A-P: Protrude incisors to correct L1-MP angle.
- Vertical:Maintain.
- Inter-Molar/Inter-Canine Width: Expand as needed to relieve crowding.


## Facial Esthetics:

- Maintain.


## Treatment Alternatives

The ideal objectives for a full fixed-appliance treatment would be to resolve the malocclusion and align the impacted cuspids. Judging from the profile, bilateral impacted maxillary canines, retroclined upper and lower incisors (U1-SN, $97^{\circ}$; L1-MP, $78.5^{\circ}$ ), crowded anterior dentition, and high mandibular plane angle (SN-MP, 49.5 ; FMA, $42.5^{\circ}$ ) are all essential points to note when considering alternative treatments. Possible treatment options are listed below (Fig. 8):

## Option 1: U4s Extraction

Relieve the crowding by extracting UR4 and UL4. For this treatment option, instead of extracting only the UR4, removing both maxillary first premolars could prevent the midline from deviating. However, since this was a case with only moderate crowding, bilateral first premolar extractions would provide too much space, which could aggravate the retrusive upper incisors, causing excessive retraction of the anterior teeth and a dished-in profile.

## Option 2: Rapid Maxillary Expansion (RME) Device (Non-extraction)

Relieve crowding by expanding the arches with a rapid maxillary expansion (RME) device. The main objective would be to enhance forward displacement of the maxilla by sutural growth. Based on previous studies," in the "infantile" stage ( 8 to 10 years of age), the midpalatal suture is broad and smooth; in the "juvenile" stage ( 10 to 13 years), the suture becomes more squamous and overlapping; in adolescence, the suture becomes more heavily interdigitated. Since the patient was between the infantile and juvenile stages, the effect on the advancing maxilla was uncertain.

Option3: Open Coil Springs (Non-extraction)
Relieve the crowding by expanding the arches using passive self-ligating appliances supplemented with open coil springs.

The objective for this non-extraction option is to use passive self-ligating appliances combined with open coil springs to preserve teeth and enhance facial profile. For this moderately crowded dentition, Option 3 is the best choice. Furthermore, maxillary expansion induces incisal flaring to correct the retrusive anterior teeth.

Since the UR3 was a high-position, labially impacted canine, surgical intervention was also considered. The UR3 could be exposed by a VISTA procedure. Then a button could be bonded on the labial surface, and a chain of elastics could apply distal and occlusal traction to the UR3, via a 3D lever arm inserted into the hole on an infrazygomatic crest (IZC) bone screw. However, the patient's parents preferred non-surgical


■ig. 8:
Diagram showing the configuration of different treatment plans of tooth extraction, RME (rapid maxillary expansion), and open coil springs respectively
treatment. Thus, after discussing the advantages and disadvantages of each option with the patient's parents, a non-extraction treatment with open coil springs (Option 3) was chosen.

## Treatment Progress

The treatment can be roughly divided into two phases: the first is to induce eruption of the impacted canines as well as to correct the UR2 and UL2 crossbite, and the second is to complete the final alignment. The progress of intraoral photographs is documented in Figs. 9-13.

A self-ligating fixed appliance (Damon $Q^{\circledR}$, Ormco Corporation, Brea, CA) was bonded on all maxillary permanent teeth except for UL3, which was left unbonded to erupt naturally (Fig. 11). A 0.014-in CuNiTi archwire was engaged. Two open coil springs were inserted between UR2 and UR4, as well as between UL2 and UL4, respectively to create space for the impacted maxillary canines (Figs. 10 and 11). On the same visit, a lingual bite turbo was placed on LL2 in order to correct the UL2 crossbite (Fig. 13).

One month later, a self-ligating fixed appliance (Damon Q®, Ormco Corporation, Brea, CA) was bonded on all mandibular permanent teeth except for LR5, and a 0.014-in CuNiTi archwire was engaged. An open coil spring was inserted between LR4 and LR6 (Fig.10).

By the 3rd month, crowding around both UR3 and UL3 was relieved, so the upper archwire was changed to 0.018 CuNiTi. By the $4^{\text {th }}$ month, the LR5 had erupted enough so a bracket was
bonded and the archwire was engaged. In the $7^{\text {th }}$ month, the lower archwire was changed to $0.014 \times 0.025$ CuNiTi. In the $11^{\text {th }}$ month, the upper archwire was changed to $0.014 \times 0.025$ CuNiTi. In the $13^{\text {th }}$ month, an elastic (Parrot $5 / 16-\mathrm{in}$, 2oz, Ormco) was applied from UR2 through LR4 to LR6 in order to close the space between UR2 and UR3. In the $15^{\text {th }}$ month, inter-proximal reduction (IPR) was performed on the mesial sides of UR1 and UL1 in order to correct the black triangle, and a 4loop power chain was applied from UR2 to UL2 to close the space. In the 19th month, the upper archwire was changed to $0.017 \times 0.025$ TMA, and a 5-loop power chain was applied between UR2 and UR6 in order to close the space between UR2 and UR3. The lower archwire was changed to 0.016 CuNiTi at the same appointment.

In the 20th month, the lower archwire was changed to $0.014 \times 0.025$ CuNiTi, and then to $0.017 \times 0.025$ TMA in the $22^{\text {nd }}$ month. Class III elastics (Fox $1 / 4-$ in, 3.50 , Ormco) were applied bilaterally from U6s to L3s to close the open contacts. In the 23 rd month, an elastic (Kangaroo $3 / 16-\mathrm{in}, 4.5 \mathrm{oz}$ ) was applied from UR4 to the lingual button of LR5, and another one was applied from UR3 to the lingual button of LR4. In the 24th month, all elastics (Kangaroo 3/16-in, 4.5oz) were removed, and IPR was performed on UR1, UL1, LR1, and LL1 to correct the midline. In the $25^{\text {th }}$ month, an elastic (Squirrel $1 / 8-\mathrm{in}, 3.5 \mathrm{oz}$ ) was applied from UR4 to the LR5 lingual button, and another from UR3 to the LR4 lingual button. After 25 months of active treatment, all appliances were removed.

$\square$ Fig. 9: Frontal view of treatment sequence shown in months (M):0M, $2 M, 6$, $11 \mathrm{M}, 13 \mathrm{M}, 17 \mathrm{M}$ and 25 M .


■ig. 10: Right view of treatment sequence shown in months ( $M$ ). Note: the eruption procedure of the impacted maxillary right canine.


■ Fig. 11: Left view of treatment sequence. Note:the eruption procedure of the impacted maxillary left canine.


Fig. 12:
Upper arch progress. Note: Two open coil springs were applied between UR2 and UR4, and between UL2 and UL4, to create space for the impacted maxillary canines.

$\square$ Fig. 13: Lower arch progress. Note: A bite turbo was bonded on the lingual surface of LL2 to correct the crossbite of UL2.

## Treatment Results

Cephalometric superimpositions (Fig. 7) and analysis (Table 1) document improved intermaxillary relationship as well as inclinations of the upper and lower incisors.

The treatment results for this patient were excellent. Facial esthetics, dental alignment, and intermaxillary occlusion were significantly improved (Figs. 3 and 4). The posttreatment panoramic radiograph (Fig. 6) documented acceptable root parallelism, except for UR4 and LR5, which is reflected in the CastRadiograph Evaluation (CRE) score (Worksheet 3). Bilateral canines erupted spontaneously without


## Table 2:

The Archwire Sequence Chart shows all the mechanics of treatment. Principal archwires are shown for the maxillary and mandibular arches in blue and green respectively.
any surgical exposure. Superimposed cephalometric tracings (Fig. 7) document that the axial inclination of the upper incisors (U1-SN) increased $4^{\circ}$ after treatment ( $97^{\circ}$ to $101^{\circ}$ ), and the axial inclination of the lower incisors (L1-MP) increased $10.5^{\circ}$ ( $78.5^{\circ}$ to $89^{\circ}$ ). The American Board of Orthodonticts (ABO) CRE score was 13 points, as shown in the supplementary Worksheet 3 . The major discrepancies in the final alignment were rotation, marginal ridge discrepancies, and buccal lingual inclination of the posterior teeth. The Pink and White esthetic score was 3 points, as shown in the supplementary Worksheet 4 . The patient was very satisfied with the results.

## Discussion

## 1. Labially Impacted Maxillary Canine

Maxillary canines are commonly impacted teeth with an incidence of $2 \%$, second only to the third molars.' It is twice as common in females as it is in males, and the prevalence of a labial or palatal impaction is one-third and two-thirds respectively. A useful tool to evaluate the severity and path of eruption of impacted canines is radiography; however, its reliability differs among different age groups. In children aged 10 years or younger, attempting to determine the path of eruption radiographically generally has little effect due to the
large variations in the position of and changes in tooth germ in the path. However, in children aged 11 years or older, clinical signs of delayed or ectopic eruption can be confirmed by the radiographs. 8,9 In this case, since the patient was $10 y-09 \mathrm{~m}$, the labial impacted inclination of UR3 could be diagnosed by the panoramic film and the cephalometric radiograph. ${ }^{9-12}$

Labially impacted maxillary canines result either from ectopic migration of the canine crown over the root of the lateral incisor or from shifting of the maxillary dental midline, causing insufficient space for the canine to erupt. ${ }^{13}$ Olive ${ }^{14}$ suggested that spontaneous eruption of an impacted canine may be feasible by creating space for the canine crown with routine orthodontic mechanics. Bishara ${ }^{15}$ claimed that without surgical intervention, labially impacted canines still have a chance to erupt spontaneously. In this case, bilateral labially impacted canines erupted without surgical intervention.

Warford et al. ${ }^{16}$ suggested that compared to patients without canine impactions, those with canine impactions generally need longer treatment time because of increased tooth displacement relative to the occlusal plane. Smith's ${ }^{17}$ study showed that the mean value of the maxillary canine eruption rates from alveolar bone to oral cavity was 0.08 mm per week. Generally, a permanent tooth may take 2-4 years to move through the alveolar bone into the occlusion, at which point the root would be two-thirds complete. Nonetheless, the rate of movement can be rapid once permanent teeth erupt.

It has been reported that labial impaction of maxillary permanent canine is most frequently associated with crowding, which is consistent with a lack of space diagnosed in 60-90\% of patients with maxillary impacted canines. ${ }^{18}$ After removal of the primary canine and expansion of the dental arch, about $42 \%$ of maxillary impacted canines erupted spontaneously within a one-year period, which shows that space is critical to tooth eruption. Besides, two factors which affect selferuption are the critical angle ( $20^{\circ}$ ) of inclination (Fig. 14) and the initial height of the impacted tooth. If the angle is less than $20^{\circ}$, spontaneous eruption is more possible. Meanwhile, if the initial vertical position is higher, a favorable inclination can be anticipated.

## 2. Leeway Space vs. E Space

The Leeway space is the difference between the combined mesiodistal (m-d) diameter of the primary canine plus the first and second molars and the combined m-d diameter of their corresponding permanent successors. ${ }^{19}$ Another approach is E space, which only subtracts m-d diameter of the second premolar from that of the deciduous second molar. However, many orthodontists use E space instead of the Leeway space, because it is easier to measure and because they believe that the two measurements are similar. Fernandes et al. 20 found that the E space predicts a larger space than the Leeway space, and the difference is about 1 mm . Thus, clinicians should be careful not to overestimate the space available.

For the UR3 in this case, the pre-treatment panoramic and the cephalometric radiographs


■ig. 14:
If the inclination of the impacted canine $\left(X^{\circ}\right)$ is less than the critical angle $\left(20^{\circ}\right)$, spontaneous eruption is more likely to happen.
show that the angle of inclination was $21^{\circ}$, and the crown was superior to the cementoenamel junction (CEJ). Therefore, the inclination of the high-position, impacted UR3 was confirmed. However, since the upper right primary second molar was retained, it provided the E space for the impacted UR3. Therefore, the impacted UR3 could be corrected merely by means of self-ligating fixed appliances with open coil springs.

## 3. Bracket Selection

There are two kinds of maxillary canine displacements: palatal or labial impactions. If a maxillary canine is palatally displaced, it can be moved into the arch by a lateral force, and the crown becomes labially tipped. Thus, a low-torque bracket is needed to upright the canine as it is moving into the arch. On the contrary, if a maxillary canine is labially displaced, moving it into the arch causes its crown to tip palatally. In this case, a hightorque bracket should be considered. ${ }^{21}$ Leveling and aligning of a crowded dentition without
extraction usually leads to incisal flaring, and the use of open coil springs in the maxilla to regain space for impacted canines may worsen the situation. ${ }^{14}$ Fortunately, the upper incisors were retroclined and could benefit from the flaring side effects of the non-extraction protocol with open coil springs.

As discussed above, low torque brackets were chosen for the anterior segment of the upper arch.

## Conclusions

Clinical signs of delayed or ectopic eruption should be confirmed by panoramic films and cephalometric radiographs. The critical angle of inclination and the initial height of the impacted canines are both crucial for spontaneous eruption. Preserving the Leeway space or E space can help relieve crowding. In addition, bracket selection depends on the displaced position of impacted canines, extraction of an adjacent tooth, and the initial inclination of the anterior segment.

## References

1. Manne R, Gandikota C, Juvvadi SR, Rama HRM, Anche S. Impacted canines: Etiology, diagnosis, and orthodontic management. J Pharm Bioallied Sci 2012;4(Suppl 2):S234-S238.
2. Peck S, Peck L. Classification of maxillary tooth transpositions. Am J Orthod Dentofacial Orthop 1995;107:505-517.
3. Becker A, Chaushu S. Etiology of maxillary canine impaction: a review. Am J Orthod Dentofacial Orthop 2015;148(4):557-567.
4. Takahama Y, Aiyama Y. Maxillary canine impaction as a possible microform of cleft lip and palate. Eur J Orthod 1982;4:275-277.
5. Sacerdoti R, Baccetti T. Dentoskeletal features associated with unilateral or bilateral palatal displacement of maxillary canines. Angle Orthod 2004;74:725-732.
6. Kılıç N, Oktay H. Orthodontic intervention to impacted and transposed lower canines. Case Rep Dent 2017;ID 4105713. Doi: $10.1155 / 2017 / 4105713$
7. Bedoya MM, Park JH. A review of the diagnosis and management of impacted maxillary canines. J Am Dent Assoc 2009;140:1485-1493.
8. Baume LJ. Physiological tooth migration and its significance for the development of occlusion: III. The biogenesis of the successional dentition. J Dent Res 1950;29:338-348.
9. Ericson S, Kurol J. Radiographlc assessment of maxillary canine eruption in children with clinical signs of eruption disturbance. Eur J Orthod 1986;8:133-140.
10. Ericson S, Kurol J. Radiographic examination of ectopically erupting maxillary canines. Am J Orthod Dentofacial Orthop 1987;91:483-492.
11. Ericson S, Kurol J. Resorption of maxillary lateral incisors caused by ectopic eruption of the canines: a clinical and radiographic analysis of predisposing factors. Am J Orthod Dentofacial Orthop 1988;94:503-513.
12. Ericson S, Kurol J. Early treatment of palatally erupting maxillary canines by extraction of the primary canines. Eur J Orthod 1988;10:283-295.
13. Kokich VG. Surgical and orthodontic management of impacted maxillary canines. Am J Orthod Dentofacial Orthop 2004;126:278-283.
14. Olive RJ. Orthodontic treatment of palatally impacted maxillary canines. Aust Orthod J 2002;18:64-70.
15. Bishara SE. Impacted maxillary canines: a review. Am J Orthod Dentofacial Orthop 1992;101:159-171.
16. Warford Jr JH, Grandhi RK, Tira DE. Prediction of maxillary canine impaction using sectors and angular measurement. Am J Orthod Dentofacial Orthop 2003;124:651-655.
17. Smith R. A clinical study into the rate of eruption of some human permanent teeth. Arch Oral Biol 1980;25:675-681.
18. Smailienė D, Šidlauskas A, Lopatienė K, Guzevičienė V, Juodžbalys G. Factors affecting self-eruption of displaced permanent maxillary canines. Medicina 2011;47(3):163-169.
19. Gianelly AA. Leeway space and the resolution of crowding in the mixed dentition. Sem Orthod 1995;1(3):188-194.
20. Fernandes LQ, Almeida RC, de Andrade BN, Felipe de Assis RC, Almeida MADO, Artese FR. Tooth size discrepancy: Is the E space similar to the leeway space? J World Fed Orthod 2013;2(2):e49-e51.
21. Damon DH. The rationale, evolution and clinical application of the self-ligating bracket. Clin Orthod Res 1998;1:52-61.

## impaction Discrepancy Index (iDI) Worksheet

Total iDI Score

## 1. Angulation of the impaction to the midline in degrees



Grade 1: $0^{\circ} \sim 15^{\circ}=1 \mathrm{pt}$.
Grade 2: $16^{\circ} \sim 29^{\circ}=2$ pts.
Grade $3: \geq 30^{\circ}=3$ pts.
2. Vertical distance from the occlusal plane

Total $=3+2=5$


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

## 3. Mesiodistal position of the impaction tip

Total $=2+1=3$


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

## 4. Anterior-posterior position of the impaction root apex

Total $=1+1=2$


Grade 1: Above the canine position region $=1 \mathrm{pt}$.
Grade 2: Above the upper first premolar region $=2$ pts.
Grade 3: Above the upper second premolar region $=3$ pts.

## 5. Root resorption of the adjacent tooth apex



Normal apical contour $=0$ pt.
Apical irregularity, same length as pre-treatment $=1 \mathrm{pt}$.
Apical root resorption of less than $2 \mathrm{~mm}=2 \mathrm{pts}$.
Apical root resorption more than 2 mm , less than one third original root length $=3$ pts. Apical root resorption more than one third original root length $=4$ pts.

## 6. Age relative to the completion of root formation apex

$<9 \mathrm{y} / \mathrm{o}$ (Before central incisor root completed) $=0 \mathrm{pt}$.
$9 \sim 11 \mathrm{y} / \mathrm{o}($ Before lateral incisor root completed $)=1 \mathrm{pt}$.
12~13 y/o (Before 1st premolar root completed) $=2$ pts.
$>13 \mathrm{y} / \mathrm{o}($ canine root completed $)=3 \mathrm{pts}$.

## 7. Labial or palatal position of the impaction apex

Total $=$ $2+2=4$

Palatal impaction $=1 \mathrm{pt}$.
Labial impaction $=2$ pts.

## Discrepancy Index Worksheet

Total D.I. Score

## 57

OVREJET

| 0 mm. (edge-to-edge) | $=$ |  |
| :--- | :--- | :--- |
| $1-3 \mathrm{~mm}$. | $=$ | 0 pts. |
| $3.1-5 \mathrm{~mm}$. | $=$ | 2 pts. |
| $5.1-7 \mathrm{~mm}$. | $=$ | 3 pts. |
| $7.1-9 \mathrm{~mm}$. | $=$ | 4 pts. |
| $>9 \mathrm{~mm}$. |  | 5 pts. |

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

$$
\text { Total } \quad=2
$$

## OVERBITE

| $0-3 \mathrm{~mm}$. | $=$ | 0 pts. |
| :--- | :--- | :--- |
| $3.1-5 \mathrm{~mm}$. | $=$ | 2 pts. |
| $5.1-7 \mathrm{~mm}$. | $=$ | 3 pts. |
| Impinging $(100 \%)$ | $=$ | 5 pts. |
| $\quad$ |  |  |
| $\quad$ Total | $=0$ |  |

## ANTERIOR OPEN BITE

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

$$
\text { Total } \quad=0
$$

## LATERAL OPEN BITE

2 pts. per mm. Per tooth

$$
\text { Total } \quad=0
$$

CROWDING (only one arch)

| 1-3mm. | = | 1 pt . |
| :---: | :---: | :---: |
| $3.1-5 \mathrm{~mm}$. | = | 2 pts. |
| $5.1-7 \mathrm{~mm}$. | = | 4 pts. |
| $>7 \mathrm{~mm}$. | = | 7 pts . |
| Total | = | 2 |

## OCCLUSION

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

Total

$$
=4
$$

## LINGUAL POSTERIOR X-BITE

1 pt. per tooth Total

## BUCCAL POSTERIOR X-BITE

2 pts. per tooth Total $=0$

## CEPHALOMETRICS (See Instructions)

$\mathrm{ANB} \geq 6^{\circ}$ or $\leq-2^{\circ} \quad=4 \mathrm{pts}$.
Each degree $<-2^{\circ}$ $\qquad$ x 1 pt . $\qquad$
Each degree $>6^{\circ}$ $\qquad$ x 1 pt. $\qquad$
SN-MP

$$
\geq 38^{\circ}
$$

Each degree $>38^{\circ} \ldots 12 \times 2$ pts. $\leq 26^{\circ}$
$=1 \mathrm{pt}$.
Each degree $<26^{\circ}$ $\qquad$ x 1 pt .
$=$


L1 to MP $\geq 99^{\circ}$
$=1 \mathrm{pt}$.
Each degree $>99^{\circ}$ $\qquad$ x 1 pt. $\qquad$

Total

OTHER (See Instructions)


Total $\square$

## Cast-Radiograph Evaluation

Total Score: 13

## Alignment/Rotations



## Marginal Ridges

4

$\mathbf{R} \quad M \times \quad L \quad L \quad M D \quad R$


L

2


R MX

## IBOI Pink \& W/hite Esthetic Score

Total Score $=3$

1. Pink Esthetic Score

2. White Esthetic Score (for Micro-esthetic)



| 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 |

Total $=$ $\square$

1. Midline

012
2. Incisor Curve

012
3. Axial Inclination $\left(5^{\circ}, 8^{\circ}, 10^{\circ}\right) \quad 0 \quad 1 \quad 2$
4. Contact Area $(50 \%, 40 \%, 30 \%) \quad 0 \quad 1 \quad 2$
5. Tooth Proportion

012
6. Tooth to Tooth Proportion $\begin{array}{lll}0 & 1 & 2\end{array}$

| 1. Midline | 0 | 1 | 2 |
| :--- | :--- | :--- | :--- |
| 2. Incisor Curve | 0 | 1 | 2 |
| 3. Axial Inclination $\left(5^{\circ}, 8^{\circ}, 10^{\circ}\right)$ | (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 |  |



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買 Zoo Pack Elastics x 4 盒動物圈




Power Chain x 4 卷 （任選open／close／wide）矯正專用彈力鏈


Quail 2oz，3／16＂ 0

Chipmunk 3．5oz，1／8＂


Fox 3．5oz，1／4＂

## （1）㙯銷組！

小資新手穚正稀著套組
Bonding Sample Kit ：
Enlight Syringe x 1 支 Ortho Solo x 1 瓶

© Enlight Syringe x 2 支



## 線定優恵組



Copper Ni－Ti x 5 盒（線涇任選）
感溫性銆鈦合金線－Level and Align


Low－Friction TMA x 2 盒（線徑任選）低摩擦力鈦鉬合金線－Finishing and Detailing監NT\＄14，500／相


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## 特惠組1

## DAMON DAMON $T_{2}^{2}$

（Q／Q2 共200顆）
（＋）$\frac{6 \mid 6}{6 / 6} \frac{7 \mid 7}{7}{ }_{7}$ Bondable Tube ${ }^{*} \times 10$ 人份


## 穓NT\＄135，999 <br> ／組

## DamonQ2 特色

Under tie－wing空間加大 • 掛Power chain好操作
－Torque，rotation角度控制升級
（－）滑蓋scribe line標誌，提升臨床效率
－配件加購
Drop－in Hook
DQ／DQ2 插入式挂鉤
留NT $\$ 1,800$／畣

＊限與訂單同時加購，訂單成立後怒無法再行追加。

Drop－in hook 使用說明


1．㨋人稪正器vertical slot （位於墧正器undercut遺心側）


2．黃色點朝唇側／頝則將尾媏彎折至燆正器凹槽内

特恵組2

DAMON DAMON Ch厽只 CLEAR 2
（Clear／Clear2 共200顆）
篗NT\＄175，999 ／用
（4）$\frac{6 \mid 6}{6} \frac{7}{7} \frac{7}{7}$ Bondable Tube $\times 10$ 人份

＊以上販售及譄品品項皆不含 SnapLink Tubes，Accent Mini Tubes，$A^{+}$

## 

－． 014 Damon Copper Ni－Ti x 20 條
感温性銆鈦合金線－Level and Align
－ 014 x ． 025 Damon Copper Ni－Ti x 20 條感溫性鎳鈦合金線－Begin Torque Control
－． $016 \times .025$ Damon SS x 20 條不鉘鋼合金線－Space Closure
－． 017 x ． 025 Damon Low－Friction TMA Wire x 20 條
低摩擦力鈦鉬合金線－Finishing and Detailing

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 <br> <br> A rich learning experience}

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本年度邀請賽已正式登錄 $R \& A$ 寒需行程

秉持貝多芬齒頃綮喬正堅持完美與感動之創院䞍神，藉由高爾夫運動参與，養成宗旨健康運動的習慣，活絡人際間的互動，致力推動高爾夫運動人口倍增回積於社會並鼓㛯具潛力之青少年選手參與，開拓選手的國際視野。

54 洞比棌赛
預赛：2022年12月30－31日
決 赛：2023年1月1日

## 地點

璝山高爾夫球場（新竹縣嘪山凔實新路二段465 號）

## 資格

2009 年（含）以前出生具業餘身份選手参加。

11／28 日前向新竹市高爾夫球委員會報名。
電話：0922－986546 楊小姐；傳真：03－5388112
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[^1]
## 2023 Beethoven Clinical Education



Beethoven Clinical Education 主要針對修習過 Damon Master Program，並想要繼續獲取更進階臨床與學術訓練的醫師所專門設計的課程。此訓練課程除了新增學術文章寫作與演講的訓練，也加入了骨釘與VISTA術式等操作課程，醫師不僅可以就近學習張慧男醫師的技術與經驗，亦同時培養醫師期刊寫作的能力與高效簡報的技巧。

修習完 Damon Master Program 與本課程，並完成兩篇案例報告文章後，即可取得赴德國碩士班進修資格證書。此系列課程能讓醫師在進入德國碩士班之前，做好最充分的準備。


## ABO Writing Training

Medical Writing Training－1
5／18
Medical Writing Training－2
6／1
Medical writing skills are crucial for clinicians，educators and researchers．This training contains academic medical writing on case reports．Participants will have a chance to publish articles for journals like Journal of Digital Orthodontics（JDO）．

## Presentation Workshop

6／15
The presentation workshop designed to help participants utilize the most frequently used presentation tools in Keynote to manage patient clinical records and create simple but effective patient communication presentation．



[^0]:     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)

[^1]:    8. Once downloaded, click the book's icon to launch the e-book and enjoy.
