Combining Orthodontics with an Implant-Supported Prosthesis to Replace Multiple Congenitally Missing Maxillary Teeth

Abstract

***History**: Congenitally missing maxillary lateral incisors are the second most common dental agenesis, exceeding only by third molars. The congenital absence of one or more maxillary lateral incisors usually compromises the esthetics and may also be associated with dental midline as well as functional occlusion problems.*

***Diagnosis**: A 21-year-1-month-old male presented with a chief complaint (CC) of an unattractive smile due to irregular teeth and spacing. The UR5, UL2, UL4, UL5 were all missing. The upper left lateral deciduous incisor was retained, but there were several edentulous spaces in the maxillary arch. A clinical examination revealed a Class I molar relationship on the right side, end-on Class III molar relationship on the left side, lingually tipped incisors (U1-SN 96˚, L1-MP 76˚), an upper left lateral deciduous incisor (ULb) in crossbite, as well as spaces mesial and distal to it. The discrepancy index (DI) was 21.*

***Treatment**: The dentition had to be aligned while maintaining enough space for an implant-supported prosthesis (ISP) to restore the upper left incisor (UL2). The cusp height of ULe had to be reduced to let the gingiva grow over it and regain space for a crown and bridge prosthesis to restore the UR5, UL4, and UL5. The pre-prosthetic orthodontic treatment duration was 18 months. In the 16th month, the ULb was extracted and the UL2 area implant was placed simultaneously. Soft tissue was formed with a healing abutment associated with simultaneous guided bone regeneration around the implant. After a 6-month healing phase, the prosthetic abutment was placed and adjusted to achieve 2mm of interocclusal clearance. The final crown was delivered 2 weeks later.*

***Results**: The dentition was aligned, and all spaces were closed except for the UR5, UL2, UL4, and UL5 edentulous sites. Following the completion of the ISP to restore the UL2 and a bridge prosthesis to restore the UR5, UL4, and UL5, the overall treatment was excellent, as evidenced by a Cast Radiograph Evaluation (CRE) score of 15, and Pink and White (P&W) dental esthetic score of 6. (J Digital Orthod 2021;62:28-45)*

Key words:
Congenitally missing, implant placement, 2B-3D rule, bone augmentation

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 the four oral quadrants: UR, UL, LR and LL. The teeth are numbered 1-8 from the midline in each quadrant, and deciduous teeth are marked a-e, e.g., a lower right first molar is LR6, and a lower right second deciduous molar is LRe.

Following third molars, the permanent maxillary lateral incisor is the second most commonly-seen missing tooth when only one or two teeth are congenitally absent,[1] whereas the second premolar is the most frequently-seen missing tooth when more than two teeth are missing congenitally. For patients with a cleft, the maxillary lateral incisor has the most frequent agenesis, followed by the maxillary second premolar, and then the mandibular second premolar.

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Danesh-Sani et al.[2] and Flores-Mir et al.[3] have all concluded that the congenital absence of teeth is a phylogenic degeneration phenomenon. Nakata[4] blamed missing teeth on genes by claiming the polygenetic theory. He further elaborated that microdontic teeth were a consequence of other missing teeth. On the other hand, Flores-Mir et al.[3] and Magdalena et al.[5] have reported that tooth formation was delayed in children who had missing incisors or premolars compared with healthy children, and suggested that a congenitally missing tooth was related to the time of formation of other teeth.

Fig. 1: Pre-treatment facial and intraoral photographs

Diagnosis and Etiology

A 21yr-1mo-old male sought orthodontic consultation for his irregular teeth and diastema (Figs. 1-4). An extraoral evaluation showed facial asymmetry and a straight profile. The intraoral buccal relationships were unilateral Class I molar relationship on the right side and end-on Class III molar relationship on the left side. The mandibular arch was narrow, but the maxillary arch was normal. There was a crossbite of the ULb, a retained deciduous upper left lateral incisor, a missing UL2 and spaces in the upper arch.[6,7]

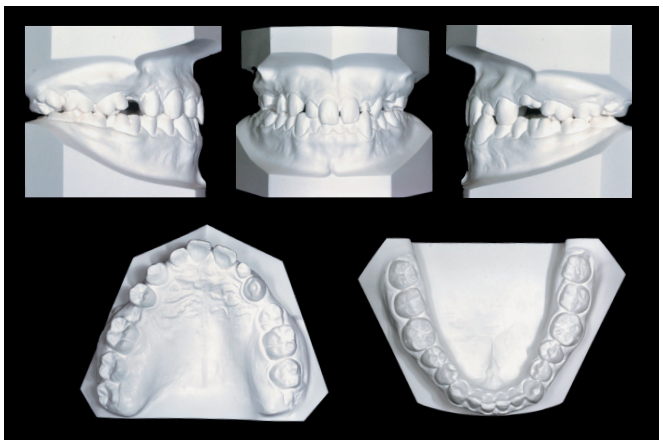

Fig. 2: Pre-treatment dental models (casts)

Fig. 3:
Smile evaluation from a frontal view shows excessive buccal corridors.

Fig. 4:
Left: *Decreased axial inclination is noted for upper and lower incisors.*
Right: *A frontal view of the lower anterior spacing and irregularities.*

The UR4 rotated distal-in and tipped into the edentulous UR5 space. The upper midline was shifted about 2mm to the left, and the lower midline was shifted about 1mm to the right. The pre-treatment cephalometric analysis revealed a skeletal Class I relationship (SNA 81˚ SNB 79˚, ANB 2˚), lingually- tipped maxillary and mandibular incisors (U1-SN 96, L1-MP 76 ˚), and retrusive upper and lower lips (-2mm/-2mm to the E-Line) (Fig. 5; Table 1). The panoramic radiograph (Fig. 6) showed multiple missing teeth: UR5, UL2, UL4 and UL5. The temporo- mandibular joint (TMJ) radiographs were within normal limits (WNL), and there were no signs or symptoms of temporomandibular disorder (TMD) (Fig. 7). The Discrepancy Index (DI) was 21 points, including 1 adjunctive points due to implant site complexity. For details, refer to Worksheet 1 at the end of this report.

Treatment Objectives

1. Increase the axial inclination of the incisors.

2. Relieve mandibular crowding.

CEPHALOMETRIC SUMMARY			
SKELETAL ANALYSIS			
	PRE-Tx	POST-Tx	DIFF.
SNA° (82°)	81°	81°	0°
SNB° (80°)	79°	79°	0°
ANB° (2°)	2°	2°	0°
SN-MP° (32°)	39°	38°	1°
FMA° (25°)	32°	31°	1°
DENTAL ANALYSIS			
U1 To NAmm (4mm)	2	2	0
U1 To SN° (104°)	96°	98°	2°
L1 To NBmm (4mm)	2	3	1
L1 To MP° (90°)	76°	80°	4°
FACIAL ANALYSIS			
E-LINE UL (-1mm)	2	1	1
E-LINE LL (0mm)	2	2	0
%FH: Na-ANS-Gn (53%)	53%	53%	0
Convexity: G-Sn-Pg' (13°)	5°	8°	3°

Table 1: Cephalometric summary

Fig. 5: Pre-treatment lateral cephalometric radiograph

Fig. 6: Pre-treatment panoramic radiograph

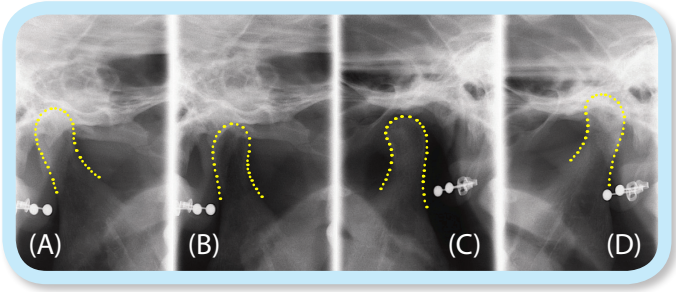

Fig. 7:
Pre-treatment TMJ radiographs - transcranial views of the right side open (A) and closed (B), as well as the left side open (C) and closed (D).

3. Correct Class III malocclusion over the left side.

4. Maintain a harmonious straight profile.

5. Prepare the UL2 area as an implant site.

6. Repair posterior missing teeth with fixed dental prostheses.

Treatment Alternatives

The ideal objective for this fully fixed appliance treatment was to resolve the malocclusion and align the dentition. Three options were considered (Fig. 8):

Option 1: Extract the retained primary tooth ULb and close the UR5, UL2, UL4, and UL5 spaces using orthodontic treatment and to substitute the UL2 space with the UL3.

The option has three disadvantages. First of all, the profile would not be improved. Second, as it would not be esthetically ideal to replace the UL2 with UL3, a full coverage restoration will be needed to achieve a desired appearance. Lastly, the Class III malocclusion on the left side would not be resolved, and it might not be possible to retain the Class I relationship on the right side. However, it would be a good choice if the patient has limited finances.

Option 2: Extract the ULb and reserve the space for an implant-supported prosthesis (ISP) to restore the upper left incisor (UL2). Open space from the UR5, UL4, and UL5 sites in preparation for fixed prostheses.

The bone ridge at the UR5, UL4, and UL5 sites is quite narrow, but the bone at UL2 site is thick. This method avoids sinus perforation, reducing both costs and discomfort during surgery. The time needed would be substantially reduced than having to restore all the spaces with dental implants. As the sinus floor is so thin, if the ULe were to be extracted, there could potentially be damage or fracturing of the sinus floor. Therefore, extraction was not considered, and instead only the upper half of the ULe cusp was reduced to let the gingiva grow over it. This is the main reason why a dental bridge prosthesis was considered. However, a major disadvantage of this treatment is the need for reduction of healthy teeth (UR4, UR6, UL3, and UL6) to accomodate the fixed prostheses. The design of the prothesis is shown in Fig. 8

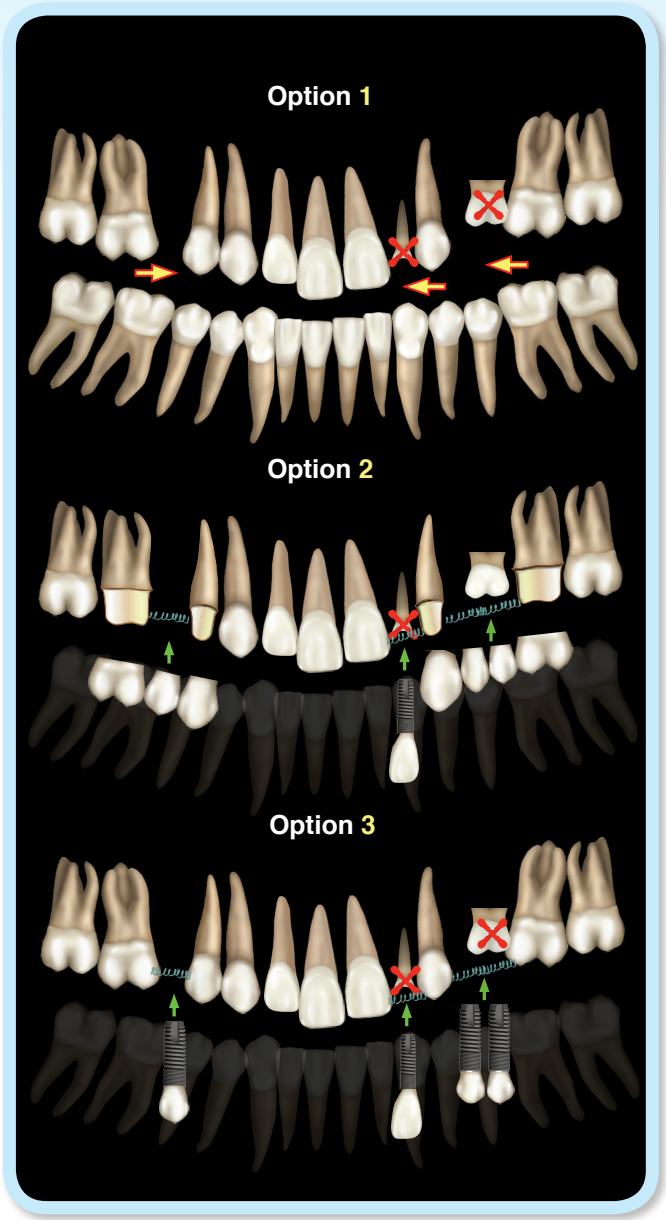

Fig. 8:
A three-part diagram shows three treatment approaches. See text for details.

Option 3: Extract ULb and reserve the space for an ISP to restore UL2. The UR5, UL4, and UL5 spaces would be regained for an ISP with an open window and large scale GBR.

This method achieves Class I occlusion on both sides without sacrificing any healthy teeth. However, the disadvantages are a larger scale of operation, more post-operative discomfort, and a higher cost.

After discussing the pros and cons of each option with the patient and his parents, they decided on Option 2. This treatment would be divided into two phases: (1) correct the alignment and (2) complete the final prosthesis.

Treatment Progress

A fixed 0.022-in slot Damon Q® bracket system (Ormco, Glendora, CA) was used with archwires and accessories produced by the same manufacturer (Fig. 9). The bracket torque selection for anterior teeth was standard for both arches. In the 1st month of treatment, the upper arch was bonded except for the ULe and ULb, both of which remained un-bonded throughout the treatment. Site development for the missing UR5, UL4, and UL5 was initiated using a compressed coil spring, and the UL2 implant site space was retained with an uncompressed coil spring between UL1 and UL3.

In the 3rd month of treatment, bite turbos composed of glass ionomer cement (GC America, Alsip IL) were bonded on the occlusal surfaces of the LR7 and LL7 to permit bonding of the lower incisor bracket, and a corresponding series of brackets were bonded on the lower arch, with an initial 0.014-in copper-nickel-titanium (CuNiTi) wire. L-type Class III elastics, from the upper 1st molars to the lower canines, were used bilaterally to correct the sagittal discrepancy. In the 6th month, after 3 months of leveling and

Fig. 9: A progressive series of maxillary frontal views show treatment progress from start to finish (18M)

alignment, the bite turbos were removed. The upper and lower archwires were changed to 0.017x0.025-in titanium-molybdenum-alloy (TMA) and 0.014x0.025-in CuNiTi, respectively.

In the 8th month of treatment, the maxillary archwire was changed to a 0.016x0.025-in stainless steel (SS) wire, and the lower archwire was changed to a 0.017x0.025-in TMA. In the 9th month, the LR3, LR1, LL1, LL3, and LL6 brackets were rebonded to correct the axis inclination. In the 10th month, a torquing spring was used to correct the torque of UL1. In the 12th month, both archwires were changed to 0.016x0.025-in SS. Unfortunately, the overjet of the UL molars (UL6, UL7) was not enough, so Chipmunk 1/8-in, 3.5-oz cross bite elastics were indicated to improve it. In the 16th month, an open-coil spring maintained the 7mm space at the ULb site in the mesiodistal dimension, and an ISP was installed to restore the UL2. The ULe height was reduced by

Fig. 10: Post-treatment facial and intraoral photographs

2mm so that the gingiva could grow over it. In the last month of treatment, a bilateral dental bridge was completed. The lower midline was shifted about 1mm to the left with an L-type Class II elastic (Fox 1/4-in, 3.5-oz) applied to the right side. After 18 months of active treatment, all fixed appliances were removed, and interim records were taken.

Treatment Results

After 18 months of active orthodontic treatment, all spaces were closed except for the UL2 implant site. The ULb crossbite and dental midline discrepancy were both resolved. The patient was satisfied with the result. Post-treatment photographs are documented in Fig. 10. Post-treatment panoramic film shows ideal axial inclination that was not clinically evident (Fig. 11). The post-treatment TMJ radiographs document both condylar heads as symmetrical and well positioned in the fossa (Fig. 12). The superimposed cephalometric tracings revealed that the upper and lower incisor torque (axial inclination) were acceptable (Fig. 13). The mandibular incisor inclination was increased by 4˚; the maxillary incisor inclination was increased by only 2˚ (Table 1). The mandibular plane angle was decreased by 1˚ (Fig. 14), which is consistent with Class III elastic application. The American Board of Orthodontics (ABO) Cast Radiograph Evaluation (CRE) score was 15 points, as shown in the supplementary Worksheet 2. The major residual

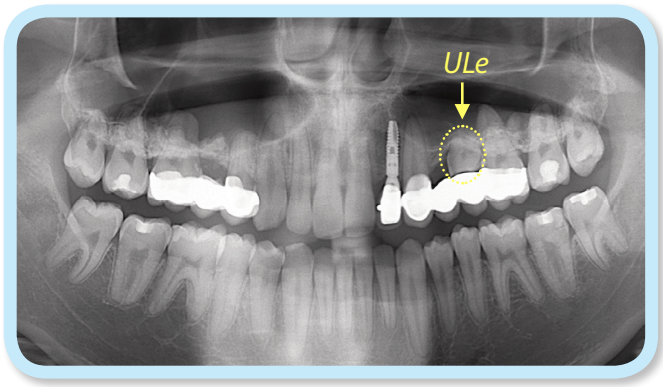

Fig. 11 :
Post-treatment panoramic radiograph. The ULe is marked marked in yellow.

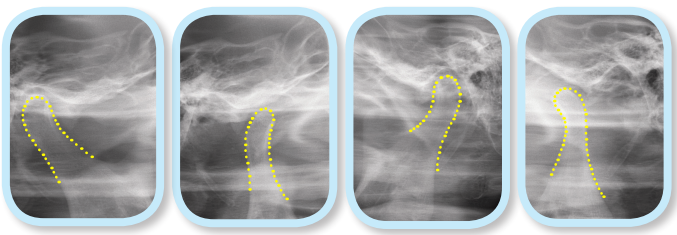

Fig. 12:
Post-treatment TMJ radiographs corresponding to the pretreatment TMJ views in Fig. 7. All morphology is WNL.

Fig. 13: Post-treatment lateral cephalometric radiograph

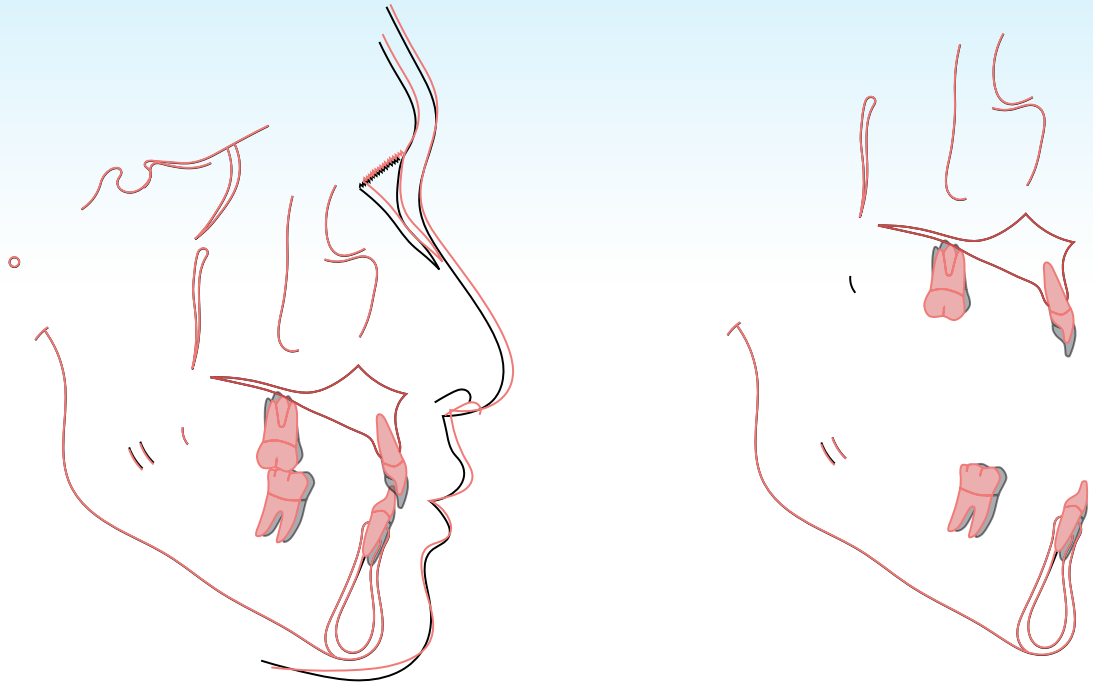

Fig. 14:
Superimposed cephalometric tracings show the dentofacial changes after 18 months of treatment (red) compared to the pre-treatment position (black). The tracings reveal that post-treatment upper and lower incisor torque (axial inclinations) were acceptable (Fig. 13). Mandibular incisor inclination was increased 4˚, but the maxillary incisor inclination was increased by 2°. The greatest improvement is the intrusion of the upper incisors, and the flaring and extrusion of the lower incisors. The upper and lower posterior teeth were slightly retracted. The profile has been well maintained

discrepancies were occlusal contacts (5 points), overjet (3), and buccolingual inclination (3). The Pink and White dental esthetic score was 6 points as detailed in Worksheet 3 at the end of this case report. Discrepancies were axial inclination, contact areas, tooth proportion, tooth-to-tooth proportion, root convexity and midlines.

Implant-Supported Prosthesis

The pre-operative CBCT imaging assessed the alveolar bone volume at the UL2 site. The edentulous ridge was 6.5mm wide, and the vertical bone height (depth) was over 10mm (Fig. 15). Under local anesthesia, the ULb was slowly and cautiously

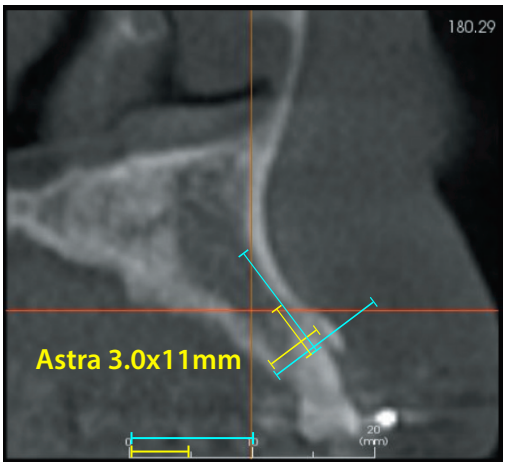

Fig. 15:
A sagittal CBCT cut through the UL2 implant site shows adequate ridge width (6.5mm, yellow line) and sufficient depth (11mm, blue line) for a 3.0x11-mm implant.

extracted in order to avoid bone loss. A crestal incision was performed lingual to the center of the edentulous ridge, and a full thickness mucoperiosteal flap was reflected. After that, the first lancer drill was positioned lingual of the center of the edentulous ridge and 2mm palatal to the buccal plate, and drilled to a depth of 11mm, where a surgical guide pin was placed. A periapical X-ray was exposed to check the mesiodistal angulation and ensure there had been no penetration. An implant fixture (3.0x11-mm OsseoSpeed™ TX,

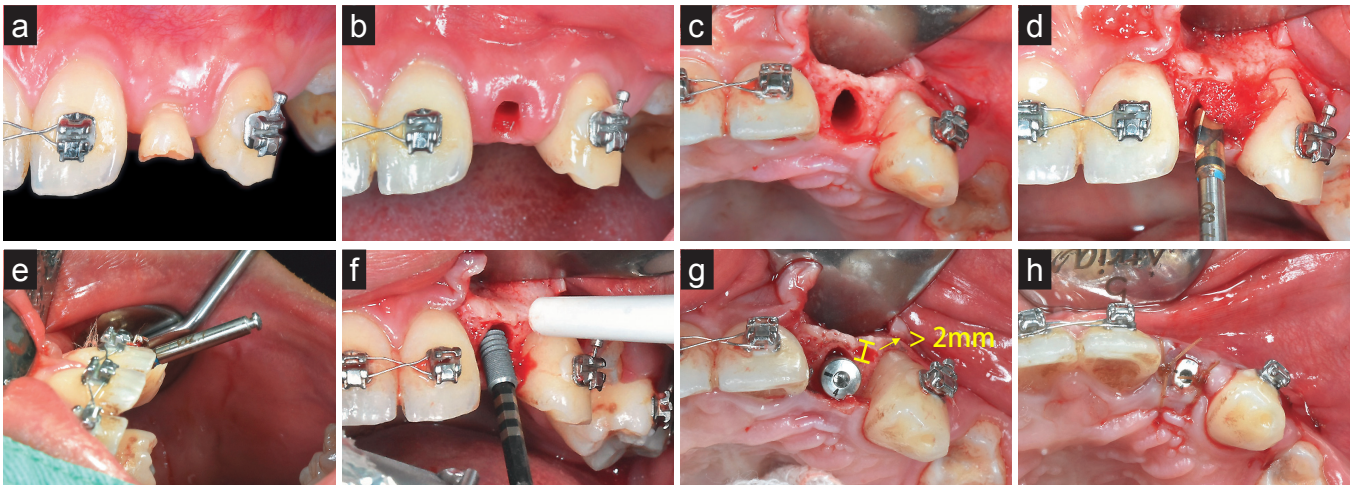

Fig. 16:

Steps involved in the placement of the implant are illustrated as follows. (a) UL2 edentulous site was prepared as a 6.5mm long implant space. (b) ULb extraction. (c) Incisions lingual to the mid-crestal and sulcular were performed for flap reflection. (d)&(e) A guide pin was placed to check axial direction and depth. (f) A 3.0x11-mm implant fixture was inserted. (g) Occlusal view of implant fixture and osseous ridge with a yellow bar showing the buccal bone thickness is >2mm. The healing abutment was placed. (h) Flaps were repositioned and sutured with direct loop interrupted 4-0 sutures. See text for details.

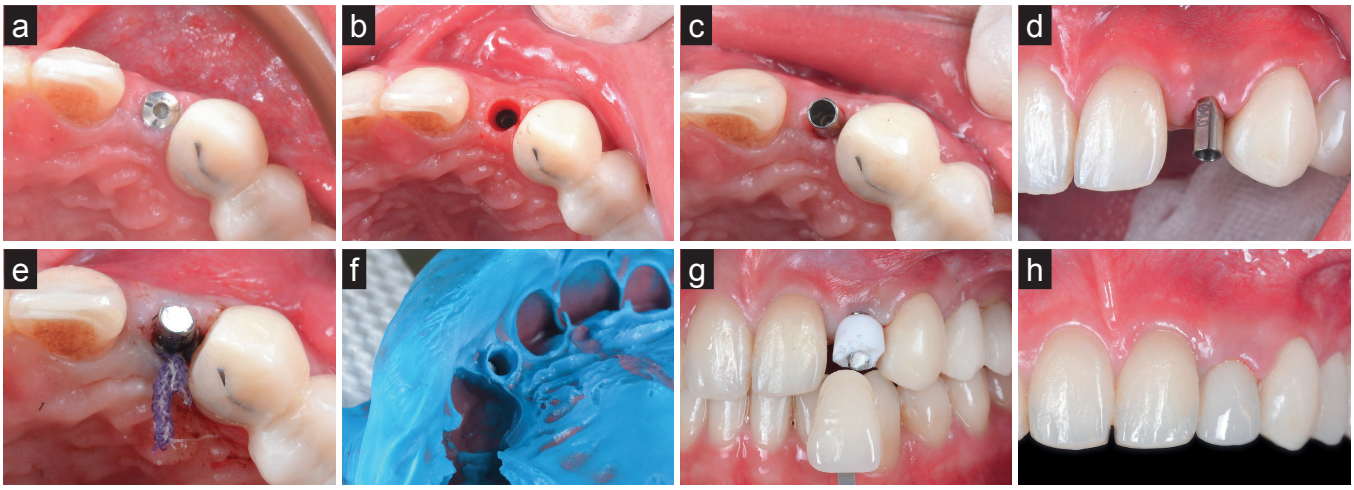

Fig. 17:

A panel of photographs showing the prosthesis fabrication procedure 6 months after implant placement. (a) Healing abutment exposure was noted. (b) Ideal soft tissue modeling. (c)&(d) Direct abutment was installed. (e)&(f) A double cord gingival retraction technique was used to make a direct impression. (g) A Tony Cap was used as a substitute for provisional crowns and for soft tissue modeling. (h) A porcelain crown delivered and luted with temporary cement. See text for details.

Dentsply International, York, PA) was installed according to the manufacturer's instructions, and a healing abutment (Ø4.0x H2.0-mm) was placed. The soft tissue flap was repositioned and closed with interrupted 4-0 sutures (Fig. 16). Fig. 16g shows that the buccal bone thickness was >2mm, which is ideal for the long-term success of an implant-supported prosthesis.[7] The prosthetic sequence of soft tissue formation and the implant-retained crown delivery is illustrated in Fig. 17. The post-surgical panoramic radiograph confirmed the accuracy of the implant position (Fig. 11). After a 6-month osseointegrated healing period, the healing abutment was replaced with a direct abutment (Ø4.0mm, 2.0mm height). A torque ratchet was applied at 15N-cm to seat and secure the abutment in the planned position. The inter-occlusal clearance for the post was increased to ~1.5mm for the porcelain crown fabrication.[8] A double cord gingival retraction technique compressed the soft tissue to expose the abutment margin. A direct impression was made with polyvinyl siloxane impression material while the thin compression cord was left in the gingival sulcus. The prepared abutment was then covered by a Tony Cap (Alliance, Taiwan), a device that substitutes for a temporary crown to allow for soft tissue modeling. The impression was poured in type IV dental stone, and the cast was mounted on an articulator with a silicon bite record. A porcelain crown was fabricated and delivered 1 week later. After checking the tightness of the contact area with dental floss and the margin integrity with a dental explorer, the permanent crown was luted with temporary cement (Fig. 17h). New upper and lower clear retainers were prepared after the delivery of the prothesis. Post-treatment records document the final result (Figs. 10, 11, and 18).

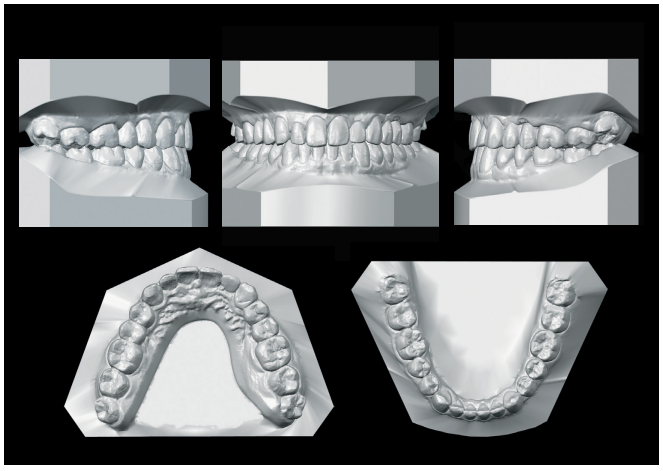

Fig. 18: Post-treatment dental models (casts)

Discussion

Open Coil Spring

In treating the current case, the open coil spring played a very important role, as it could be employed to apply or maintain force. In the alignment stage prior to placing the implant, the space between the posterior teeth on both sides of the upper

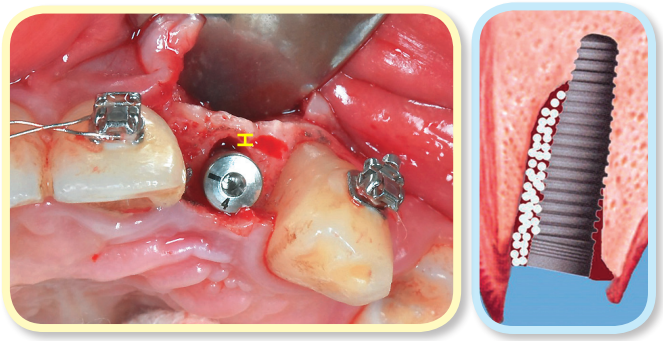

Fig. 19: Implant position and jumping distance (yellow bar)

jaw needed to be increased.[9] An open coil spring, measuring the width of 1-1.5 brackets longer than the original space was utilized, and subsequently the UL2 space was just right. As the purpose here was to maintain the space, by simply placing a spring of the appropriate size, the space could be maintained without applying any unwanted or excess force. The open coil spring was used throughout the entire treatment until it was removed at the debonding stage. Without it, it would not have been possible to have effectively controlled the space.[8]

Reduction of the ULe Cusp

Another major factor was that the ULe cusp was shortened in the 16th month of treatment. The purpose of the shortening was to allow the gingiva to grow over it, following the shape of the temporary crown to achieve an ideal morphology, after which the final prostheses could be delivered. If the ULe had been extracted, potential sinus perforation may have complicated the treatment.[6,7]

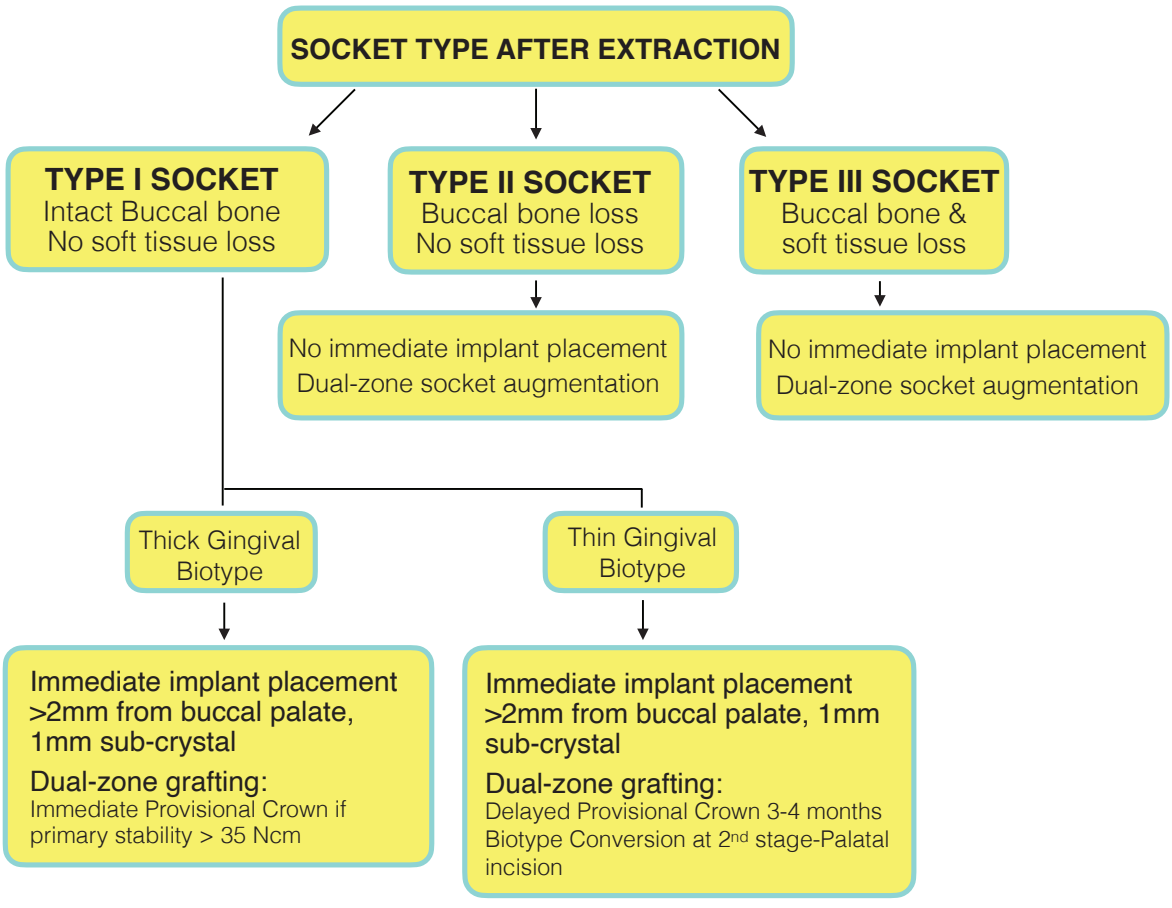

Fig. 20: Flow chart for immediate implant placement in esthetic zone

Immediate Implant Placement

The decision to place immediate implants after tooth extraction is dependent on numerous factors. The major debate of whether or not to perform immediate implants arises from individual bias, philosophy, as well as where the clinician was trained and their previous experience. In the era of evidence-based dentistry, there is adequate long-term evidence that indicates immediate implants not only reduce the overall treatment time and the number of surgeries for the patient, but also help preserve more bone and soft tissue. Both of these factors are very critical for good and stable results in the esthetic zone.[10-12]

The five critical factors that determine whether an immediate placement is the best option for the patient are:

1. Socket Type *(Fig. 20)*

Only a Type I socket is an ideal socket for immediate placement in the esthetic zone. Sometimes, acceptable results are obtained with Type II and Type III sockets, which otherwise are unpredictable in the esthetic zone. The risk of soft tissue and bone recession in a patient with a thin gingival biotype is compounded if the buccal plate of bone is missing. This patient was at low risk for long-term esthetic problems (Figs. 16a & b). Recognizing that a Type I socket was the correct choice, without staging the implant procedure by only grafting the socket at the time of extraction, increased the ability to regenerate the lost bone in the buccal plate. The implant could then be placed immediately in an adequate volume of bone, having ensured that there was at least 2mm of buccal bone for the implant.[13,14]

2. Soft Tissue Biotype *(Figs. 16a and 16b)*

A patient's gingival biotype is probably the most important aspect in planning an immediate implant. A thick gingival biotype almost always has a thick buccal plate. The implant position and dual zone grafting described in the following sections ensures adequate buccal bone thickness and soft tissue volume around the implant. Also, delaying the fabrication of the provisional crown until the second stage is advisable. However, if the thickness of the gingival biotype is not as thick as the one in this case, a simple yet effective technique is to push extra gingiva towards the facial aspect by making a palatal incision during the second stage. This biotype conversion technique allows the clinician to convert a thin biotype into a thick biotype. There is a high risk of recession with a thin biotype, which needs to be managed properly, whereas a thick biotype is safe and forgiving.[15]

3. Implant Position *(Fig. 19)*

More bone and soft tissue around an implant is essential for long-term success. The previously accepted guidelines of 1mm of bone around implants is not sufficient in the esthetic zone. Placing an implant >2mm from the buccal bone and 1mm sub-crestally results in greater preservation of the crestal bone. Placing an implant one size narrower than what is commonly accepted provides more chance of maintaining the papilla height. In thin biotype cases, whenever possible, a tooth-to-implant distance of 2-2.5mm is essential.[6,12]

4. Dual Zone Grafting

Previously, clinicians only grafted if the "jumping gap" between the implant and bone was

>1.5mm.[9,16] Today, it is recognized that adding a bone graft regardless of the distance between the implant and bone has tremendous esthetic benefits in maintaining soft tissue height. Grafting in conjunction with immediate implant placement has helped not only in preventing horizontal bone loss, but also in maintaining crestal bone, hence leading to better soft tissue volume around implants. The key is to graft not just the "bone zone", but also the "soft-tissue zone." In the anterior region of this case, the existing papilla height was always higher than the facial gingival height, so overbuilding the site with the grafting material allowed some extra bone height to be gained, which brought about extra soft tissue height.[17]

5. Immediate or Delayed Provisional Restoration

The timing of the provisional is not critical for the long term survival of the implant. Recognizing the patient's soft tissue volume and biotype helps clinicians to plan accordingly: whether to make an immediate provisional or to delay the fabrication of the provisional for 3-4 months in order to gain more soft tissue thickness. This biotype modification procedure is the key for better long-term results. The flow chart in Fig. 20 highlights some of the key points discussed, and will help guide the clinician in determining which protocol is appropriate to follow, based on the clinical scenario.

Conclusions

Interdisciplinary treatments require a thorough understanding of all aspects of dentistry, such as orthodontics, implantology, prosthodontics, etc. Orthodontists should be the leaders of interdisciplinary teams since they lay down the foundations for the rest of the team to build on.

When an orthodontist opens the space, the papilla heights are adversely affected, and some patients have altered passive eruption after treatment , which affects the level of gingival margins.

Immediate implants are commonly used to replace congenitally missing lateral incisors in orthodontic patients, but the restorations are often challenging because the anterior esthetics is quite demanding.

This difficult malocclusion (DI=21) was treated to a very good alignment (CRE=15), and both the patient and the clinician were pleased with the results.

Acknowledgments

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Discrepancy Index Worksheet

TOTAL D.I. SCORE 21

OVERJET

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

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

Total = 0

OVERBITE

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

Total = 3

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.	2mm	=	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	2 pts.
Full Class II or III	=	4 pts. per side	pts.
Beyond Class II or III	=	1 pt. per mm. additional	pts.

Total = 2

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.

SN-MP

≥ 38° 39° = 2 pts.

Each degree > 38° _____ x 2 pts. = 2

≤ 26° = 1 pt.

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

Each degree > 6° _____ x 1 pt. = 1

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

1 to MP ≥ 99° = 1 pt.

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

Total = 4

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

Identify: 10

IMPLANT SITE

Lip line : Low (0 pt), Medium (1 pt), High (2 pts) = 1

Gingival biotype : Low-scalloped, thick (0 pt), Medium-scalloped, medium-thick (1 pt), High-scalloped, thin (2 pts) =

Shape of tooth crowns : Rectangular (0 pt), Triangular (2 pts) =

Bone level at adjacent teeth : ≤ 5 mm to contact point (0 pt), 5.5 to 6.5 mm to contact point (1 pt), ≥ 7mm to contact point (2 pts) =

Bone anatomy of alveolar crest : H&V sufficient (0 pt), Deficient H, allow simultaneous augment (1 pt), Deficient H, require prior grafting (2 pts), Deficient V or Both H&V (3 pts) =

Soft tissue anatomy : Intact (0 pt), Defective (2 pts) =

Infection at implant site : None (0 pt), Chronic (1 pt), Acute(2 pts) =

Total = 1

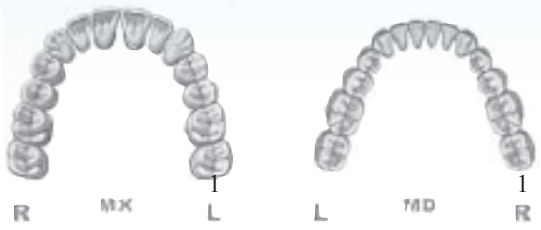
Cast-Radiograph Evaluation

Case # **Patient**

Total Score: 15

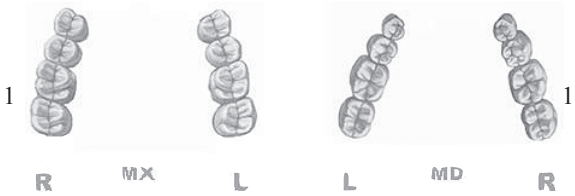
Alignment/Rotations

2



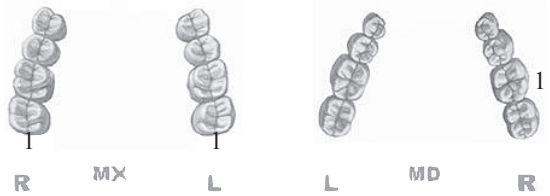
Marginal Ridges

2



Buccolingual Inclination

3

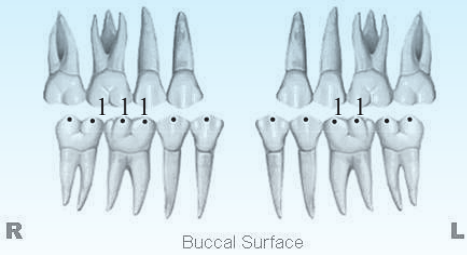


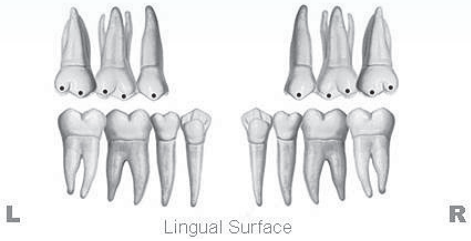
Overjet

3

Occlusal Contacts

5



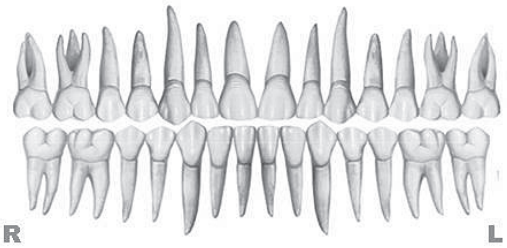


Occlusal Relationships

0

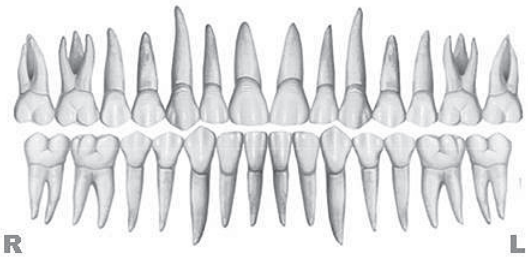
Interproximal Contacts

0



Root Angulation

0



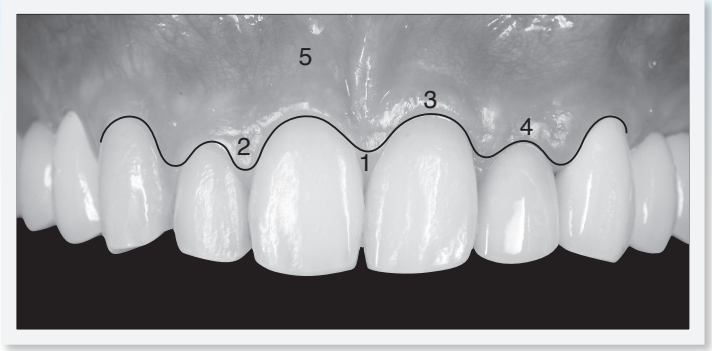
INSTRUCTIONS: Place score beside each deficient tooth and enter total score for each parameter in the white box. Mark extracted teeth with "X". Second molars should be in occlusion.

IBOI Pink & White Esthetic Score

Total Score: = 6

1. Pink Esthetic Score

Total = 1

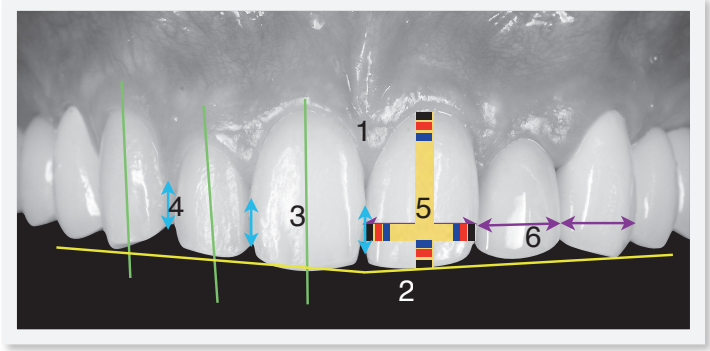


1. M & D Papillae	0	1	2
2. Keratinized Gingiva	0	1	2
3. Curvature of Gingival Margin	0	1	2
4. Level of Gingival Margin	0	1	2
5. Root Convexity (Torque)	0	1	2
6. Scar Formation	0	1	2

1. M & D Papilla	(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-esthetics)

Total = 5



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 (1:0.8)	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 (1:0.8)	0	(1)	2
6. Tooth to Tooth Proportion	0	(1)	2

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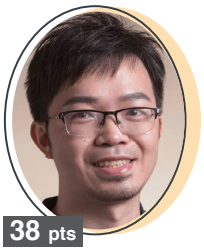

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  ABO case report - 2 points
  Clinical tip - 1 point

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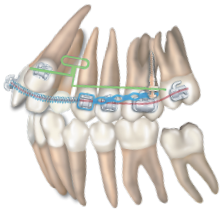

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地點：

新竹市建中一路25號2樓
（金牛頓藝術科技）

時間：

星期五上午 9:00-12:00
（每月一次）

報名專線：

03-5735676#203
clinton@newtonsa.com.tw
陳建名

	日期	專題演講 9:00 - 10:30	植牙案例報告 10:45 - 12:00（30 分鐘 / 人）	
1	3/19	**陳明時 醫師**（美國 Ohio State University 牙醫學院．碩士、美國德州 M.D. Anderson Cancer Hospital 專科醫師） **主題：** Part I：“Occlusal Scheme” ? “Organic Occlusion”! Part II：Comprehensive Treatment Plan Part III：Treatment Planning、Design、Option、Execution Part IV：Claspless RPD replacing Conventional Clasp RPD		
2	4/9	**黃裕新 醫師**（裕見美牙醫診所院長、台灣大學牙醫學系第一名畢業、美國賓州大學學術交流、美國南加大植牙美學專科訓練、美國華盛頓大學全口重建訓練、「裕見。新美學」瓷牙美學講師、2016 Dentsply 牙體復形競賽全球第三、2015 Dentsply 牙體復形競賽台灣冠軍、Nobel Biocare 產品發表會客座講師、台灣植體醫學會會員） **主題：**前牙美學 軟組織的究極進化		
3	5/28	**邱上珍 醫師**（美國明尼蘇達大學牙周病學碩士、美國牙周病學會院士） **題目：** Implants in Esthetic Zone	**蕭浩宜 醫師**（美國南加州大學植牙研究所進修、新綠牙醫診所院長）	**張慧男 醫師**（美國印第安那普渡大學齒顎矯正研究所博士）
4	6/18	**王巍穆 醫師**（基督教安息會台安醫院贋復牙科主任、台北醫學大學牙醫學院兼任講師暨牙科部主治醫師、佛教慈濟綜合醫院台北分院牙科部贋復科主治醫師、德國法蘭克福大學牙醫學院口腔植體學碩士、國立陽明大學口腔贋復碩士、台北榮民總醫院牙科部兼任主治醫師） **題目：**Prosthetic Driven Concept to Create Zero Bone Loss		
5	7/23	**蘇筌瑋 醫師**（高雄醫學大學牙周病學碩士、國際矯正植牙學會理事長） **主題：**垂直前庭切線骨膜下隧道法		
6	8/20	**林涵威 醫師**（台大醫學院臨床牙醫研究所碩士、台北醫學大學牙醫學士、衛福部定口腔顎面外科專科醫師、德國 Steigmann Institute 進階植牙訓練、第58屆日本口腔顎面外科大會傑出論文獎） **題目：**All-on-4 Basic Concept		
7	9/17	**陳健誌 醫師**（台北醫學大學牙醫學士、臺大牙醫專業學院臨床牙醫學研究所碩士暨博士、臺大牙醫專業學院牙醫學系兼任講師、台北醫學大學牙醫學院牙醫學系兼任助理教授） **題目：**The Modern Concept of Implant Location and Occlusion in Digital Dentistry	**林森田 醫師**（中山醫學大學學士、國際矯正植牙學會院士、美國南加州大學植牙研究所進修）	**翁蔚任 醫師**（中華民國植牙醫學會專科醫師、中華民國家庭牙醫學會專科醫師、高雄醫學大學牙醫學士）
8	10/22	**郭博仁 醫師**（臺灣牙周病醫學會專科醫師、中華審美牙醫學會專科醫師、中華植體美學醫學會專科醫師、日本審美牙科學會認定醫師、高雄醫學大學牙醫學士、國防醫學院牙科臨床研究所牙周病學碩士、國防醫學院醫學科學研究所博士、國防醫學院牙醫學系兼任助理教授、林錦榮齒列矯正中心牙周病醫師） **題目：**Another Tool in Your Toolbox: Alveolar Ridge Preservation （巧取補骨先機：齒槽嵴保存術）		
9	11/19	**李頌平 醫師**（台北醫學大學牙醫學系畢業、中華民國植體學會學員、台灣口腔矯正學會學員、中華民國口腔植體學會學員） **題目：**Daily Practice with Total Digital Dental Solution		
10	12/24	**蘇裕隆 醫師**（陽明大學牙醫學士、FB 前牙美學達人） **題目：**前牙美學	**黃育新 醫師**（國際矯正植牙學會院士、台北醫學大學牙醫學系、台灣植牙醫學會專科醫師）	**張慧男 醫師**（美國印第安那普渡大學齒顎矯正研究所博士）

本課表僅供參考，植牙論壇保留課程變動之權利

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“作為一個現在的牙醫師你不可能不學 Implant，當你學了 Implant，會急速地擴大你牙科的操作範圍，而植牙論壇就是最好的訓練。”

-Dr. 張慧男-

“歡迎大家和我們一起藉由每月一次的持續進修，保持對臨床的熱情和敏感度；並期許能提供給病人最佳的治療。”

-Dr. 邱上珍-

“歡迎與我們一起精進學習，分享傳承彼此的經驗。”

-Dr. 蘇筌瑋-

“數位科技的進步，讓牙科日新月異，適合已經有基礎的牙醫師持續進修。”

-Dr. 林森田-