Multidisciplinary approach of congenitally missing maxillary canines: A clinical report

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Abstract

Objective: This case report describes the multidisciplinary approach to treat congenitally missing maxillary canine, how to improve patient’s smile using orthodontic fixed appliance, endosseous dental implant, gingivectomy, bleaching, composite resin and porcelain veneer to achieve the treatment results of function and esthetic.

Materials and procedures: The patient was a 31-year-old male congenitally missing maxillary canine, with anterior cross-bite, crowding, maxillary anterior teeth shape and color abnormality as well as an improper gingival margin. He wanted his smile to be improved. A treatment plan was developed with the orthodontic treatment to move teeth into alignment and preparing spaces for implant placement. The implant was then placed and porcelain veneers were fabricated. An interdisciplinary approach was observed to provide a result with good predictability and meet the esthetic and functional expectations of the patient. Study outcome: Orthodontic treatment with fixed appliance, helped in preparing spaces before implant placement and veneer restoration. As the gingival margin is a major concern when attempting to achieve the esthetic outcome. Vital tooth whitening has given the patient’s teeth a natural appearance.

Keywords: congenitally missing canine, orthodontic appliance, implant placement, crowding, gingivectomy, tooth whitening


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Introduction

Physical appearance is very important and beyond that smiling is amid enhancing people’s impressions as well as their own expressions. A beautiful smile can often increase the impressions. Moreover, it will make more self-confidence of their own expressions and improving their social interaction. Teeth are key elements of facial appearance, a beautiful smile is known to be quite charming. Anterior teeth malocclusion and crowding are major problems being an esthetic concern. Insufficient space for implant placement is also a condition of orthodontic treatment. Implant is one of the choices used to replace congenitally missing maxillary canines in adolescent orthodontic patient. Additionally, abnormal tooth shape can occur during growth and tooth development may be from a trauma, infection, genetic congenital and or idiopathic reason.1

Missing maxillary canines with prolonged primary canines, create an esthetic problem with specific orthodontic and prosthetic consideration. Maxillary first premolar substitute canine or implant placement are alternative ways to treat congenitally missing maxillary canine in adolescent orthodontic patients. However, an interdisciplinary approach should be observed during the oral examination, diagnosis, prognosis, treatment plan and treatment procedure to provide a good result for the esthetic and functional to meet expectation of the patient.

Dental agenesis is the absence or failure of teeth formation. According to Leong (1999), exclusive aplasia of maxillary permanent canines is rare. There are only a few cases of absence reported in the literature.2 Several epidemiological studies have been conducted. Jarvinen and Vaataja (1979) cited three studies illustrating this anomaly, and showed the incidence percentage at 3.3 of missing teeth and this abnormality is more common when bilateral.3 Patients who exhibited congenital absence of teeth also experience increased ectopic dental eruption and other dental anomalies.4

Minimally invasive dentistry can be defined of maximal preservation of healthy dental structures. It would be inappropriate to remove enamel and dentin excessively because it will reduce ability to bond restorative material. Especially, patients with dental agenesis, it would be the best way to replace space with endosseous dental implant instead of doing fixed partial denture which is reducing enamel and dentine tooth structure of the abutments. Subgingival margins are required in esthetic situations, but these are associated with increased gingival inflammation. While some clinicians may suggest that a resin-bonded prosthesis is a viable option, clinical experience has shown that these resin-bonded pontics do not have long-term success rate if the teeth are not prepared aggressively enough for mechanical retention. In these cases, implants were represented the most conservative treatment to rehabilitate patients with absence of permanent teeth. For the dental implant, edentulous area should be evaluated for example quality, quantity of bone and amount of space to confirm the possibility of surgical implant installation without compromising the esthetic result. The appropriate amount of space for implant and crown is determined by size of implant, surrounding living tissue, crown shape, occlusion and the recurring esthetic dental (RED) proportion from patient smiling. As the result, an interdisciplinary approach including orthodontics, periodontics, surgery implant placement and operative treatment is taken into account.

Therefore, the aim of the present paper was to report a case of bilateral agenesis of maxillary canines in adult patient. The
multidisciplinary treatment was conducted with an integrated planning allowed the result of the case with excellence esthetic. Radiographic examination showed the treatment of 2 fixed implant-supported prosthesis successfully.

**Clinical report**

A 31-years Thai male who had visited the Esthetic and Implant Clinic, Faculty of Dentistry Chulalongkorn University, Bangkok, Thailand with a chief complaint of “I want my anterior teeth look nice”. Despite unpleasant anterior teeth, the patient was seeking the best treatment to mimic the natural look of normal teeth and for corrected anterior esthetic. The medical history of the patient indicated no immediate concerns.

Upon facial examination, the patient had interpupillary line and commissural line parallel to horizontal line. Patient’s profile was Mesofacial type (normal face), symmetrical face, normal lower facial height. His profile was orthognathic, convex, normal sized nose and normal chin. (Fig. 1). Compare to E-line (Esthetic line), upper lip was +1 mm and lower lip was +3 mm. For the lips, upper was medium but thick in the lower.

Upon oral examination, the patient had a medium lip line and showed convex incisal curvature. Occlusal relationship was class I molar relationship, unclassified canine relationship due to congenital agenesis of maxillary canine 13 and 23, prolonged maxillary primary canines (Fig. 2), anterior maxillary lateral cross-bite and edge to edge relationship. The dental midline coincided with the facial midline; however, the midline of maxillary teeth was 2 mm deviated to the right compared with the mandibular incisor. The gingival margin showed an asymmetrical gingival level. (gingival margin of tooth 22 higher than the others) and abnormal shape and color of maxillary anterior teeth (Fig. 2).

The panoramic and periapical radiographs confirmed the diagnosis of bilateral maxillary canine agenesis with no periapical lesions of maxillary anterior teeth (Fig. 3 and 4). Interpretation of Cephalometric analysis found skeletal class I (SNA = 90º, SNB = 88º, ANB = 2º, WITs= -0.5) (Fig.5), normal divergent, normal in interincisal angle (U1-L1) 133 degree, normal in upper incisal angle (U1-SN) 106 degree, normal in lower incisal angle (L1 to GoGn) 89 degree, upper incisor normal inclination and position (U 1-NA 3 mm and U1-NA 20 degree), normal nasolabial angle 91 degree.

![Figure 1](image.png) A 31-year-old male Thai patient presented with concerns about his front teeth (a). Facial view of the patient’s smile showed a medium smile line (b) and patient’s profile (c).
Figure 2  Pre-operative photos in right, frontal, left, occlusal of maxillary teeth, occlusal of mandibular teeth view (a,b,c,d,e).

Figure 3  The panoramic showed bilateral maxillary canine agenesis and no periapical lesions.

Figure 4  The periapical films showed no periapical lesions in maxillary anterior teeth (a,b,c).
ALTERNATIVE TREATMENT PLAN

1) Extraction primary maxillary canines 53, 63 with opening spaces for restoration canine 13, 23; this treatment will need permanent restoration such as removable prosthesis (i.e., removable partial denture, acrylic partial denture) or fixed prosthesis (i.e., dental implant, fixed partial denture). The treatment plan was delivered. The patient refused to have removable prosthesis. The comparison of treatment between implant and fixed partial denture was explained to the patient.

There are several major advantages of the implant

1. Prevent bone loss; minimal bone resorption of the anterior residual ridge occurs with the placement of implants compared with fixed partial denture.
2. Improve hygiene compared with fixed partial denture, hygiene conditions at home maintenance procedures are improved with implant due to prevent food entrapment during function and ease for cleaning.
3. Fixed partial denture is reducing enamel and dentine tooth structure of the abutments.
4. Esthetic outcome is improved compared with fixed partial denture. The dental implant is more natural look like because it emerged from the bone socket through gingival tissue.
5. Dental implant can last longer than fixed partial denture because it integrates with the bone preventing bone loss which can cause major oral health problems later in life.

There are several major disadvantages of the implant

1. Dental implant cost is higher than fixed partial denture.
2. Treatment time consuming, dental implant need bone healing time for osseointegration therefore; the treatment time is greater than fixed partial denture.
3. Dental implant requires surgery that may carries the risk of infection.
4. In the case of patient with thin soft tissue biotype, the grayish color of the titanium may show through the soft tissue in the anterior region.

All the information was given to the patient and he desired to have dental implant instead of doing fixed partial denture.

2) Extraction primary maxillary canines 53, 63 and mandibular first bicuspids 34, 44 with maxillary first bicuspids substitute for canines.

There are several major advantages

(Extraction primary maxillary canines 53, 63 and mandibular first bicuspids 34, 44 with maxillary first bicuspids substitute for canines.).

1. The treatment cost is less than the first plan because the patient doesn’t have to pay for restoration canine 13, 23 prostheses.
2. The patient wouldn’t have canine 13, 23 prostheses for replacing missing teeth

Figure 5 The Cephalometric radiograph showed skeletal class I malocclusion.
therefor didn’t need to endure for the prosthesis.

On the other hand, there are several major disadvantages of the second plan

1. Maxillary canines require post-orthodontic grinding or cosmetic bonding to simulate canines.

2. Maxillary canines are wider than adjacent teeth, creating an esthetic mismatch and an anterior tooth-size discrepancy. The discrepancy can caused an improper overjet unless interproximal reduction is contemplated.

3. In canines substitution cases, the first premolar serves as a canine; the lingual cusp often needs to be reduced for functional reasons.

4. Teeth no 34, 44 need to be extracted for orthodontic reason.

5. It could affect to patient’s profile due to extract mandibular first premolars which patient didn’t want to change that much.

6. The treatment time would be extended because the extraction spaces in the mandibular arch had to be closed.

For all these reasons, the first treatment plan was selected and the definite treatment plan was developed.

TREATMENT PLAN

The following treatment plan was agreed with the patient:

1. Orthodontic treatment; to correct cross-bite and edge to edge in the anterior teeth, shifting of midline, alleviating lower anterior crowding, leveling tooth 22 and preparing spaces for implants finished in 14 months.

2. A retainer; to maintain the tooth position after orthodontic treatment.

3. Extraction primary teeth 53, 63 incorporate with immediate placement implant teeth 13, 23 with a 4-month healing period.

4. During the healing period, patient was given a acrylic retainer with artificial teeth13, 23 to stabilize the position and for the esthetic outcome.

5. Second stage surgery and impression teeth 13, 23; for temporary implant abutments to form gingival tissue around implants until we can achieve the expected gingival margin.

6. Gingivectomy might be used to correct the gingival level of between right and left of two central incisors to create symmetrically by using clear acrylic periodontal stent with a 3-weeks healing period.

7. In office whitening with 32% Hydrogen peroxide; to provide the patient with the whiter teeth he desired.

8. Finally, porcelain veneers at teeth 12, 11, 21, 22 and crown on implant at teeth 13, 23; to restore the abnormal shape of four incisors and congenitally missing maxillary canines.

Acrylic retainers were to be provided to maintain tooth alignment after treatment.

Therefore, the treatment plan considered of 2 stages. In the first stage performed orthodontic treatment to correct cross-bite and edge to edge in the anterior teeth, shifting of midline, alleviating lower anterior crowding, preparing spaces for implants and orthodontic leveling tooth 22 during that time needed to adjust occlusion. In the second stage, after creating the appropriate spaces allowed for placing implant then evaluated gingival margin and restored with veneers and crown on implant to close the spaces. The restorative dentist assessed the size of teeth, calculating esthetic proportionality. The tooth shape and proportion were analyzed based on the recurring esthetic dental (RED) proportion. The repeated proportion of central-incisor-to-lateral-incisor width and lateral-incisor-to-canine width (as seen in frontal view), which is about 0.66-0.78, was used to calculate the width of each upper anterior tooth.5,6 The optimal width/
The height ratio of the upper central incisors is 0.88. Thus, this was used to calculate the height of teeth 11 and 21.\textsuperscript{7,8} The diagnostic wax setup was very important. It was determined the requirement needs for the case and helped formulate a treatment plan. Furthermore, it would help the operator to visualize the tooth-size (width & height) and position of the teeth that it should be as well as making it easier for the restorative dentist to communicate with the patient while in the treatment planning stage.

**TREATMENT PHASE**

**Orthodontic stage**

The patient was treated with orthodontic fixed appliance. Orthodontic intervention was used to move the gingival margin of tooth 22 incisally with Kobayashi’s hook and intermaxillary elastic technique from teeth 22 to 32. For the negative overjet (Crossbite) and opening spaces was corrected by expanded U loop arch wire with stop at molar tube.

Therapeutic goal of orthodontic treatment was to open space to total prosthetic replacement of maxillary canines. Leaving space for placing implant(s), we needed the space at least 7 mm. The implant diameter that we planned to use 4.0 mm AstraTech and appropriate distance between implant and natural tooth was 1.5 mm.\textsuperscript{9} Overall space for placing one implant was 7 mm. Opening the space with an open-coil spring after we got enough space then maintained the space with dead-coil spring (Fig. 6).

Planing anchorage using tie up 24, 25 and 26 together tried to correct the midline with a c-chain elastic from tooth 24 to 21. Orthodontic treatment was completed in 1 year 2 months (Fig. 7). After this stage, the patient was given the clear retainer by thermoplastic sheet (Omnivac Sheet, Essix Machine, Essix Raintree Co., New Orleans, LA, USA) to maintain position.

When completed orthodontic treatment provisional diagnosis was made to assess the tooth size proportion in relation to the space obtained.

The use of implants for the restoration of anterior missing teeth has been established and documented during the past decades. Today, the single-tooth implant has become the most popular treatment alternative for the replacement of missing teeth.\textsuperscript{10-15} Various studies have shown the successful osseointegration and long-term function of restorations supported by single-tooth implants.\textsuperscript{16-18}

![Figure 6](image_url)

*Figure 6* Progressing orthodontic photos in right, frontal, left, occlusal of maxillary teeth, occlusal of mandibular teeth view (a,b,c,d,e).
However, the treatment of dental implants in the anterior region is a technique-sensitive procedure. It has been more of a concern and rather difficult for both patient expectation and clinical technique. The use of endosseous implant would normally be performed in cases where the patient’s vertical alveolar growth has ceased. In females, growth cessation generally is reached at the age 15, but males will complete growth in their early 20s. The implant will behave like an ankylosed tooth the restorative dentist should make sure that the patient’s growth has ceased and things will not change. In this case the patient’s age at 31-years-old, we can consider the patient for a candidate in placing an endosseous implant.

Before the day of surgery, the diagnosis wax up from the post-orthodontic treatment cast was prepared to create a radiographic stent. Patient has been evaluated with Cone beam CT scan (i-CAT™, USA) at the site of implant placement before placing the implant to confirm the shape and size of the defect. A planned prosthetic treatment was chosen and predetermined due to the choice of implant type, diameter and size.

On the day of implant placement surgery, oral antibiotic (1,000 mg) was administrated 1 hour before surgery and antiseptic mouthwash 0.12% chlorhexidine gluconate was used. Under local anesthesia, surgery was performed. Atraumatic extraction by forceps was used to extract primary teeth 53, 63 and to place the surgical guide on. The most important thing for implant placement is an ideal three-dimensional (3D) management of implant positioning. The implant should be placed in the mesiodistal center of the definitive restoration. Positioning the implant lingually facilitates maintenance of adequate labial bone thickness. If the practitioner considers the buccolingual width of the teeth and the necessary prosthetic space, the implant platform should be placed 2 mm lingual to the free gingival margin. For vertical depth of implant platform, the platform of the implant should be located 2 to 3 mm apical to the midfacial aspect of the free gingival margin, with the long axis directed lingual to the incisal edge of the definitive restoration. The vertical prosthetic space must be 2 to 3 mm to create a smooth transition from the round implant platform to the natural root and scalloped cervical anatomy. Ideally, the implant platform adjacent to a natural tooth should be positioned at the bone crest level, 2 to 3 mm apical to the free gingival margin at the facial

![Figure 7](image-url)

**Figure 7** Completed orthodontic photos in right, frontal, left, occlusal of maxillary teeth, occlusal of mandibular teeth view (a,b,c,d,e).
aspect, to maintain both biologic width and an adequate prosthetic space. The position of implant should be parallel with labial bone and located at cingulum position. The ideal three-dimensional (3D) management of implant positioning which can be located with the aid of a surgical guide that we waxed up.

For tooth 23, flap operation and elevation was done. Sufficient amount of bone in the buccopalatal direction was found and later drilled the bone with pilot round bur. Implant osteotomy step by step used Meisinger bone spreading (Meisinger® USA, LLC, Jacksonville, Fla) as manufacturer recommended. Implant (OsseoSpeed™ AstraTech Ø 4.0 S length 11 mm) was inserted also covered screw hole with healing abutment (AstraTech Ø 4.0 height 4.0 mm). For tooth no 13, flap operation and elevation was done and drilled with pilot round bur. Implant osteotomy step by step used Meisinger bone spreading (Meisinger® USA, LLC, Jacksonville, Fla) as manufacturer recommended until we got the depth. Implant (OsseoSpeed™ AstraTech Ø 4.0 S length 11 mm) was inserted also covered screw hole with cover screw. Autogenous bone was grafted. Flap was released and sutured with Vicryl (4-0, 5-0) for primary wound closure. The peri-apical radiographs were taken for post-operative treatment. During the healing period, patient was given a clear acrylic retainer with artificial tooth13, 23 to stabilize the position which was reduced the artificial tooth on the tissue side not to occlude the head of healing abutment and the wound. Two weeks later, the suture was removed and the wound healed nicely. Within 2 months, the bone was healing and osseointegrating between bone and implant was occurred ready for early loading stage. The periapical radiographs showed osseointegration and the position of implants in the alveolar bone before taking impression for temporary implant abutment (Fig. 8).

Esthetic crown lengthening

For the esthetic point of view, the gingival margin will be evaluated in the first place. The patient had irregular gingival margin especially in the area of tooth 22 which was higher than the other areas and asymmetry of gingival area teeth 11, 21 which was an effect to the esthetic result. After the patient went through the orthodontic forced eruption treatment, which was to extrude tooth 22 and expected that the

Figure 8 x-ray implant tooth number 13, 23 OsseoSpeedTM AstraTech Ø 4.0 S length 11 mm.
gingival margin would reduce to relatively match the anterior gingival margin. Unfortunately, when the orthodontic treatment was completed, there was no change to the gingival margin of tooth 22 and only extruded the tooth. Therefore, the treatment goal has shifted with only concern regarding the symmetry between two anterior teeth 11 and 21. The diagnostic wax up of the final result was made and clear acrylic template for periodontal surgery was fabricated. The day of surgery, oral antibiotic (1,000 mg) was administrated 1 hour before surgery and antiseptic mouthwash 0.12% chlorhexidine gluconate was used. Under local anesthesia, we inserted clear acrylic periodontal stent and made an incision for gingivectomy. The reason why osseous surgery was not performed is due to the level of the gum above CEJ which was more than 3 mm.20 First, we made an external incision followed by the stent from the diagnostic wax-up. After that an internal bevel incision was performed. The excessive gingival was removed and the bleeding ceased from the pressure (Fig. 9). We waited ten days for the wound to heal before continuing the restorative process.

**Implant crown installation**

Under local anesthesia on the area of tooth 13, the surgical stent was used to locate the cover screw of the implant position. The incision was made in a very small area to minimize cutting the gingival tissue to preserve soft tissue as much as possible, merely for the removal of the cover screw. The healing abutment 4.0 mm was inserted to form gingival tissue. During the healing period, in-office bleaching treatment was executed to satisfy the patient and complete the treatment for the desired esthetic outcome.

**Restorative stage**

In this case, the orthodontic treatment could redistribute the spaces between the maxillary anterior teeth prior to the restorative procedures. The repeated proportion of central-incisor-to-lateral-incisor width and lateral-incisor-to-canine width (as seen in frontal view), which is about 0.66-0.78, was used to calculate the width of each upper anterior tooth.5,6 This proportion is also a guide of diagnostic full mouth cast wax-up for esthetic evaluation and for patient provisional state. The

![Figure 9] Anterior gingival margin after gingivectomy.
operator used the wax-up cast to determine adequate distribution of the spaces between the teeth and to guide the restorative intervention. For the healing period 2 weeks after placing healing abutment, temporary implant abutment (screw type) of teeth 13 and 23 were fabricated and used for forming gingival tissue. During the healing period the contouring soft tissue would be guided into position with the applied pressure from the provisional restorations. A self-cured acrylic resin was added to the provisional restoration every time the patient returned for recall until we could achieve the expected gingival margin. The tooth shape (width and height) of the canines were evaluated too. The position of four anterior maxillary incisor teeth was spread accordingly in order to minimize preparation for conservative treatment. Four veneers would be a good choice for esthetics. The day for veneer preparation, 2% Mepivacain HCL with epinephrine 1:100,000 was used for local anesthesia. Preparation was performed with silicone index (that was made by using full mouth diagnostic cast wax-up) as a guide. After the preparation of four anterior maxillary incisor teeth (Fig. 10), cord was packed and removed temporary implant abutments. Transfer copings were placed for teeth 13 and 23 (Fig. 11). A silicone impression light and putty was made in full maxillary arch. At this stage we would make an impression for maxillary canine implant and

Figure 10 Preparation of the #12, 11, 21, 22 for veneer works.

Figure 11 Occlusal view before making impression for veneer and implant works.
as well as fabricating veneers which will make it easier for the lab technician to fabricate the prosthesis. Temporary restorations were given to the patient with the direct technique using light cure polymerizing composite resin (Premise®, Kerr) by spot etching without the bonding stage. The temporary restoration can also stay by way of mechanical lock with an undercut between proximal tooth contact and also for the implants used the same temporary implant abutments.

The working model was fabricated and the wax pattern was completed (Fig. 12, 13 and 14). The material that we used for veneers were empress esthetic (Empress I), for implant (screw type) we chose UCLA abutment with crown porcelain fused to metal on implant. The type of metal alloy that we used for the crown was semiprecious. Before the appointed day, the fabricated veneers were examined in the stone dies and models to see how it fit and checked for any flaw before hand. All inner surfaces of porcelain veneers were carefully etched with 9% hydrofluoric acid (Porcelain Etch®,
Ultradent, USA) for 4 min, then washed with water and air-dried. A silane coupling agent (Monobond-S; Ivoclar Vivadent) was carefully applied to the internal porcelain surfaces with a fine-tipped brush and, after 30 s, it was gently air-blown with hot air from a hair drier (Parlux® 2800, Italy). A thin layer of bonding agent (Heliobond; Ivoclar Vivadent) was applied to internal porcelain surfaces, air-blown, and left uncured.

The visit for permanent fixation veneers, temporary veneers were removed and clean all the teeth with wet pumice applied with a rubber cup. The adjacent teeth were separated using Teflon tape. The prepared teeth were etched with 37.5% phosphoric acid (Kerr Gel Etchant; Kerr). This was followed by application of an alcohol-based adhesive system (OptiBond FL; Kerr). The veneers were cemented with photo-polymerized resin cement (NX3 Nexus; Kerr) using a clear shade (NX3 Nexus; Kerr). The results showed excellent work, good characterization, and natural color (Fig. 15, 16, 17 and 18). The patient was then instructed on how to take care of his restorations, and he was provided with the retainers. Follow-up evaluations at 1 month and 6 months after cementation exhibited exceptional results. Most importantly, the patient was very satisfied with his new, confident smile (Fig. 19).

Figure 14 Waxing full contour of veneers and implants (occlusal view).

Figure 15 Porcelain veneers and crowns on implant.
Figure 16  Porcelain veneers and crowns on implant.

Figure 17  After the porcelain veneers and crowns were delivered.

Figure 18  After the porcelain veneers and crowns were delivered.
Maintenance phase

The patient was provided a retainer and specific instructions to wear at all times except while in taking food during the first month. After the first month the patient could opt to wear the retainer during the day or night for the next three months. In conjunction with the specific instructions on maintaining the retainer for hygienic purposes such as cleaning procedures, and the type of solution was also provided.

Discussion

A congenitally absent tooth for maxillary permanent canines is rare. There are several treatment options for replacing the congenitally missing maxillary canine. These include removable denture prostheses, conventional fixed partial denture, orthodontic repositioning of premolars to close the edentulous spaces, and single-tooth implant. In this case patient could be treated in another way by extraction teeth. The extraction teeth would be teeth 53, 63, 34, and 44. The first maxillary premolars will be used to substitute for the canines. The positive side to this treatment method is that the patient will not require to do the dental implant restoration. On the negative, the patient will require extraction of two mandibular bicuspid and thus affect the patient’s profile. However, the patient is currently content with his profile and wishes to refrain from unnecessary change. For that very reason, we settled with the second treatment option for non-extraction treatment. This treatment prepared spaces for placing implants which in retrospect provided many advantages. The treatment time is less than in the case of the extraction method. It don’t have to remove healthy teeth from patient which he doesn’t need. The most importantly the patient’s facial profile will remain as is.

An irregular anterior gingival margin was evaluated before the treatment. In the beginning we tried to bring the gingival margin of the tooth 22 to relatively match the contra-lateral side and create the symmetry for both sides. The gingival margin of tooth 22 was improved yet still higher than the others. This may be due to the surrounding alveolar bones which wasn’t changed. Furthermore, the treatment was shifted to make a symmetrical of two central teeth. As gingivectomy was performed and healing time was required, the veneers’ preparation began after ten days. Direct resin composite for temporary veneer restoration was applied. Temporary resin

Figure 19  Patient's smile after finished.
composite veneers were implemented to push and prevent gingiva from over growth before the permanent fixation of empress esthetic (empress I) veneers teeth 12, 11, 21, 22.

A dental implant was used as replacement for the canine. Normally, if a single implant retained crown is to be screw retained, the screw must pass through palatal or lingual to the incisal edge of anterior teeth. This is possible if the abutment axis and the implant axis are coincident. The advantages of this method are the crown may be easily removed from the abutment, no cement lute subgingivally. We used screw retained for crown on abutment for implant on tooth 23 but on the tooth 13 we chose cement-retained crown. The reason why tooth 13 didn’t use screw-retained prosthesis because the angulation of the implant angulated a little bit labial. The screw hole is to pass through lingual/palatal to the incisal edge of anterior teeth (Fig. 20) may be because during surgical procedure the operator tried to avoid labial fenestration of the bone. Huynh et al.21 found the average maxillary anterior bony wall thicknesses following maxillary anterior extraction to be approximately 0.8 mm with 87% less than 1 mm. Therefore, the implant had to be placed off axis in labial direction. The possibility of use of a screw-retained prosthesis was ruled out, thereby eliminating the problem of incisal/labial access holes. Consequently, a cement-retained prosthesis was considered the best option.22,23,24,25 The advantages of this procedure are complete integrity of the porcelain of the crown, no compromise of aesthetics of the crown due to no screw hole and anteriorly the crown can be made less bulky.

This case report presents the clinical manifestations of prolonged retention of the primary maxillary canines due to congenitally missing of permanent canine. Improper spaces of the maxillary canines for placing implants was corrected by orthodontic treatment. Abnormal tooth size and shape restored by ceramic veneers at incisor teeth. As the result of treatment, excellent function and esthetic of patient was obtained with minimal invasiveness, while the patient regained confidence because of his new, esthetically pleasing smile.

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Figure 20. The screw hole is to pass through lingual/palatal to the incisal edge of anterior teeth.
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