

OrthoBoneScrew

The Dream Screw for Next Generation's Orthodontists

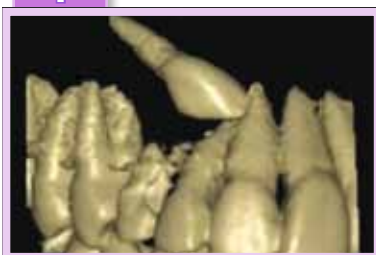
Beethoven Orthodontic Center, Taiwan

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The 12 Applications of OBS on the Impacted teeth



1



5



9



2



6



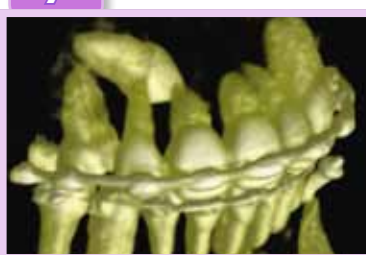
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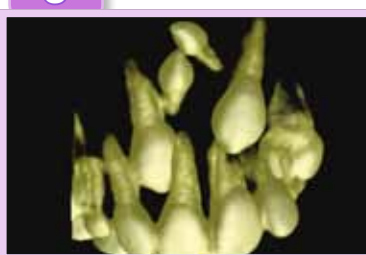
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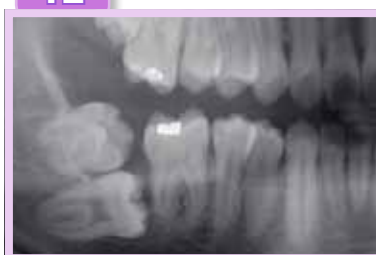
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OrthoBoneScrew

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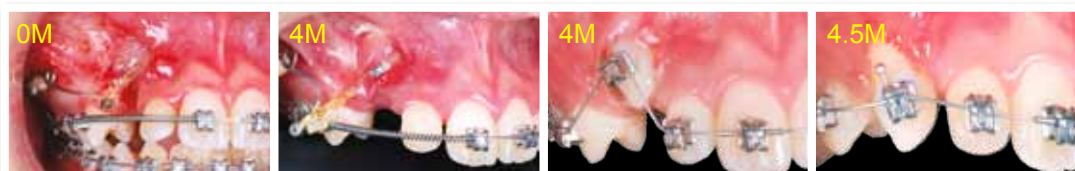
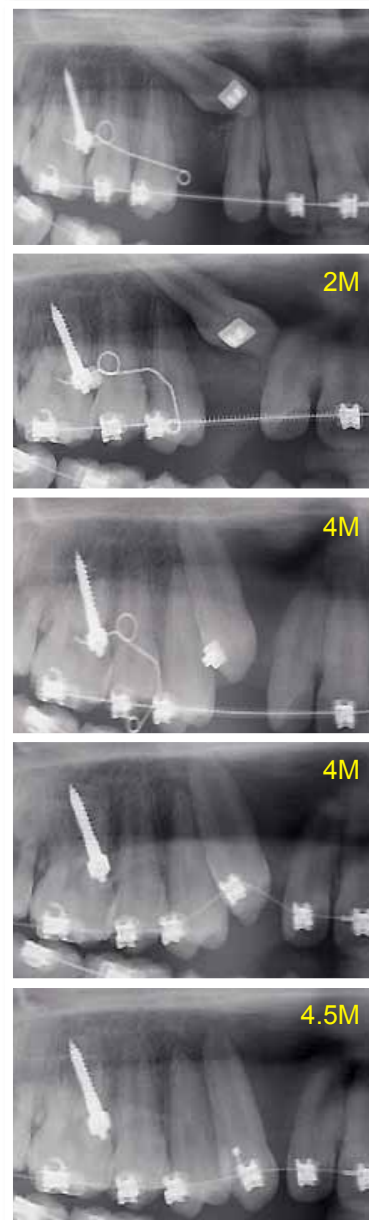
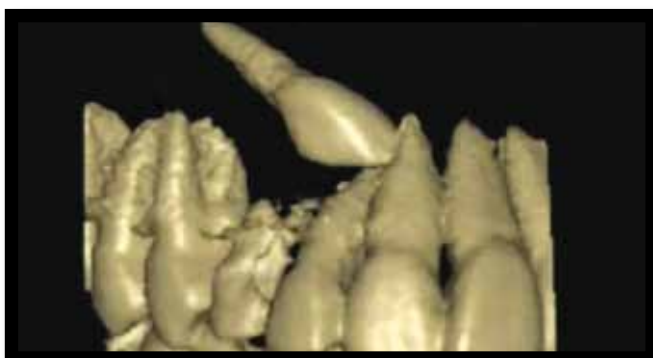
Upper labially impacted cuspids

1

OrthoBoneScrew (OBS) has a double-crossed rectangular slot on its neck. This 0.019" x 0.025" rectangular slot provides a versatile use of orthodontic mechanics. A 0.018" x 0.025" wire can be secured in the slot firmly.

Mechanics design:

A 0.017 x 0.025-inch TMA lever arm was consisted of a helical coil on one end and helical attachment on the other end. When this lever arm was inserted in the square hole in the OrthoBoneScrew (located at *infrazygomatic crest*) and activated, it could build a force system which distalized the canine first, then moved buccally slightly, and finally downward to the reserved canine space. If the mechanics were designed to exert force directly from the main arch wire, it would have been detrimental to the roots of the lateral incisor. During the follow-up visits, the helix was adjusted without taking it out. After four months, the impacted canine was successfully moved away from the previously impacted site and was ready for bracket bonding.

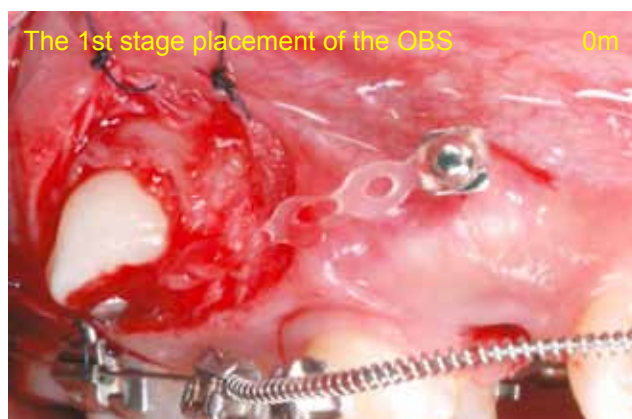


Upper labially impacted cuspids

2



The transpositional cuspid has been exposed with a full-thickness apically positioned flap. After bonding a button, an 1.5x8 mm OrthoBoneScrew was inserted on the buccal side of canine space to protract the cuspid. Meanwhile, one should keep OBS as high as possible to make the switch easier. After 7.5 month-long treatment, this transpositional cuspid has been pulled mesially for 12 mm. The distance between the OBS and the cuspid has been shortened, as a result in the protraction, then the placement of the OBS was changed to the interdental space of the incisor and the lateral incisor. This two-stage placement of the OBS was to prevent the gingival impingement around the corner of the alveolar arch.



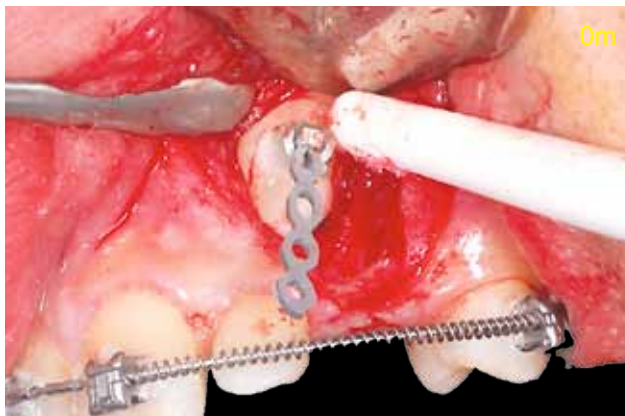
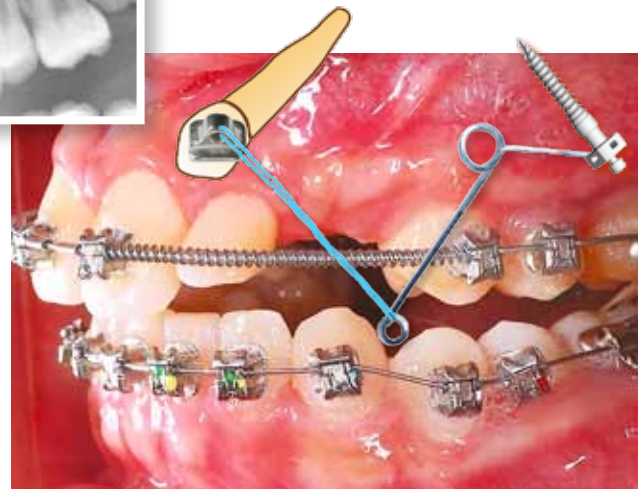
Upper labially impacted cuspids

3

Firstly the space was created by NiTi opening spring between #21 & #24 without engaging adjacent tooth during switching. Secondly a modified apically positioned flap was designed to expose the impacted canine.



Then a 3D lever arm was inserted in the square hole of OBS, and attached to the impacted canine by an elastic chain. The force was applied consistently by adjustment of the 3D lever arm. Finally the crown of the impaction appeared in the oral cavity, and allowed for bracket bonding.



Upper labially impacted cuspids

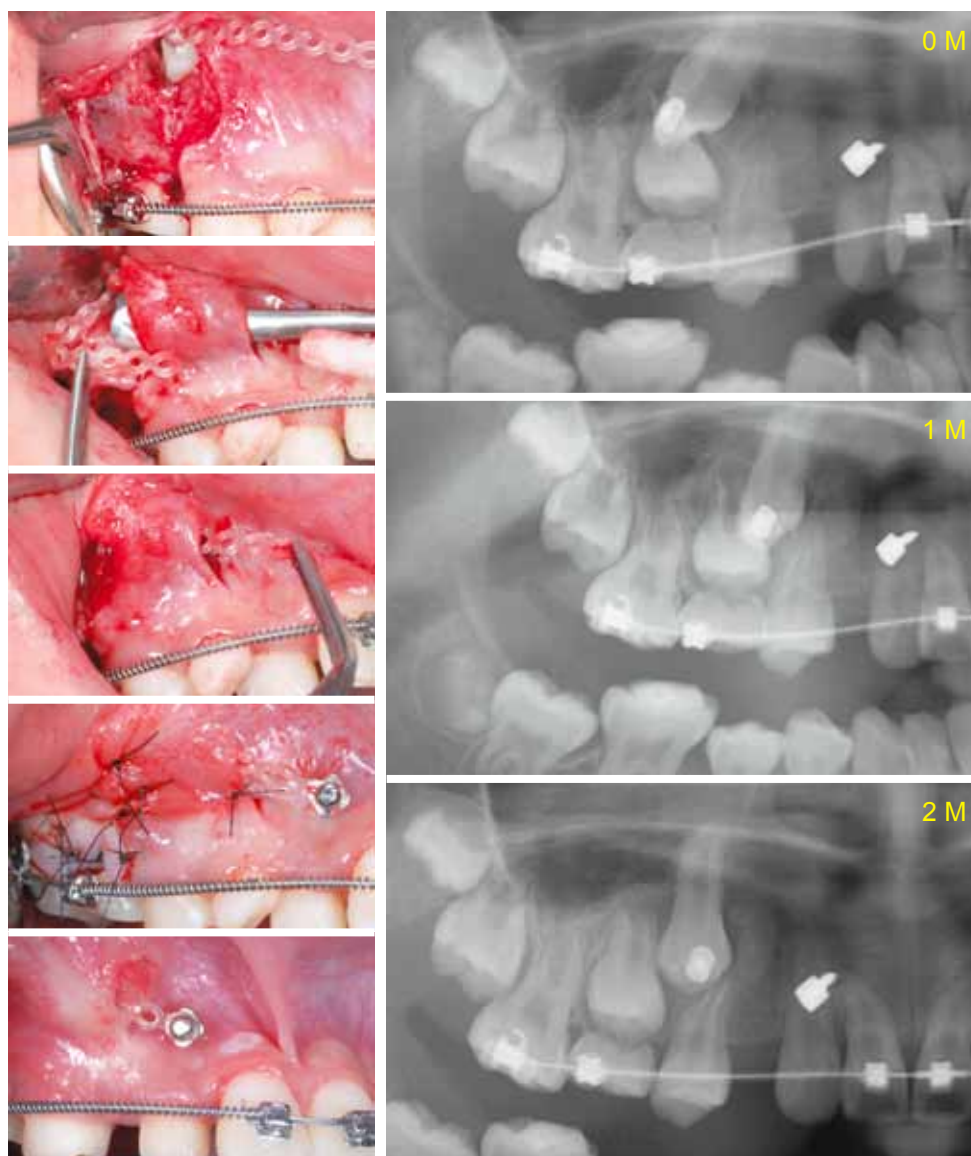
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A closed eruption technique

Modified from Vertical Incision Subperiosteal Tunnel Access

VISTA (Dr. Homa Zadeh, USC)

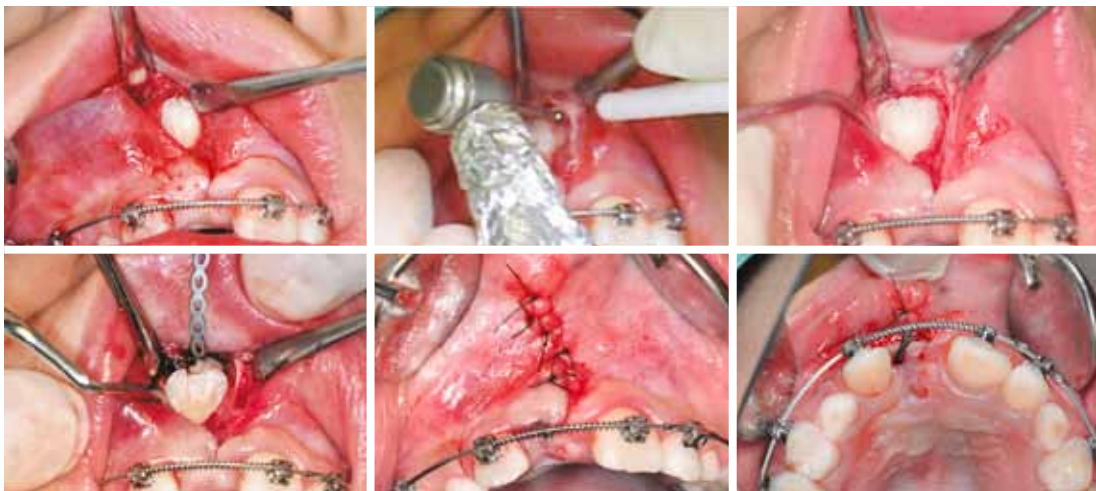
In this case, closed eruption technique was chosen for primary wound healing which is more comfortable than APF. The combination of VISTA technique not only avoid the 2-stage placement of OrthoBoneScrew but also offer a good connection between the OBS and the covered transpositional cuspid. Meanwhile,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



Upper labially impacted cuspids 5

A closed eruption technique
Modified from **V**ertical **I**ncision **S**ubperiosteal **T**unnel **A**ccess
VISTA (Dr. Homa Zadeh, USC)

The difficulty of this case is the position of the impacted incisor. The incisal edge was right in the anterior nasal spine. The treatment plan was to use a closed eruption technique modified from VISTA (*vertical incision subperiosteal tunnel access*). The key to the traction is the removal of the covering hard tissue. This modified technique is minimally invasive and relatively comfortable for patients with high impaction.



Upper labially impacted cuspids

6

A closed eruption technique
Modified from **V**ertical **I**ncision **S**ubperiosteal **T**unnel **A**ccess
VISTA (Dr. Homa Zadeh, USC)

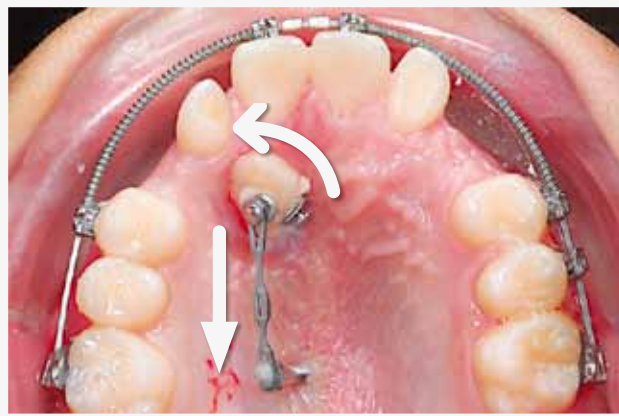


In this case, closed eruption technique was chosen for fast primary wound healing, more comfortable than APF. Unlike the traditional VISTA technique with only one vertical incision line, the double vertical incision lines could better expose the impacted tooth and create a clear field for removal of the bone on the traction route. This type of closed eruption technique, modified from VISTA, can not only avoid a 2-stage placement of OrthoBoneScrew but also allow power chains connecting the OBS and the covered impacted cuspid.

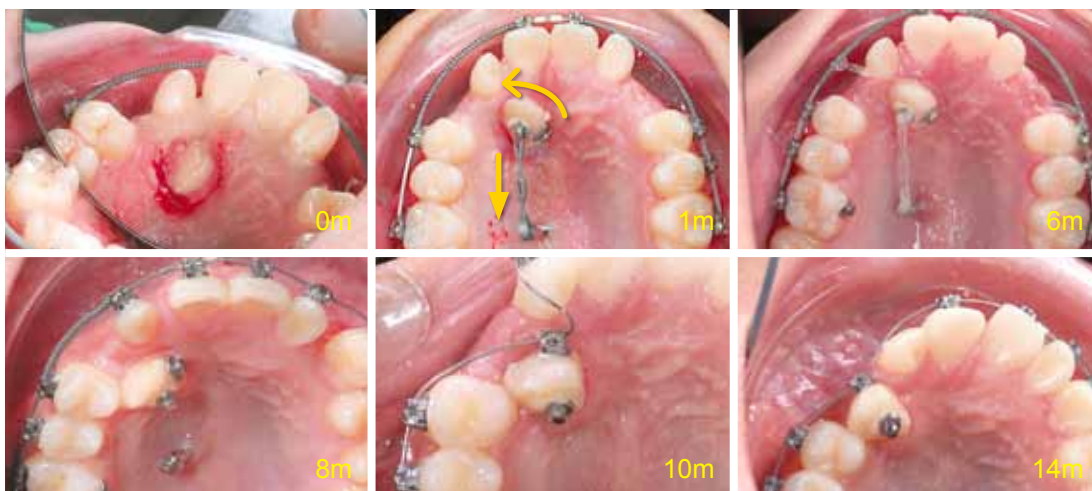


Upper palatally impacted cuspids

7



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



Upper palatally impacted cuspids

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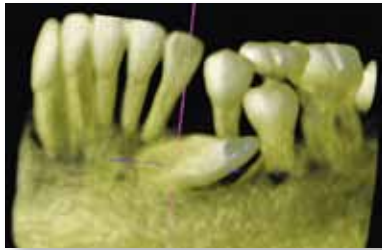
Firstly, the impacted canine was uncovered to allow auto-eruption. Secondly, the maxillary right 1st premolar was extracted. After the canine erupted, a rotating force system was created by a 3D lever arm stretching out from the right side of **OBS**, and an elastic chain connecting to the left side of **OBS**. Once the impacted canine moved within the reach of a wire, a .014 CuNiTi was then placed for further alignment. Finally, the impacted canine was successfully moved into the arch.



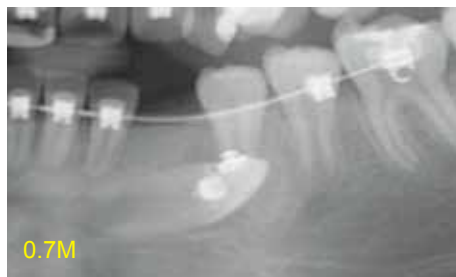
Lower horizontal impacted cuspids

9

Mechanics design:

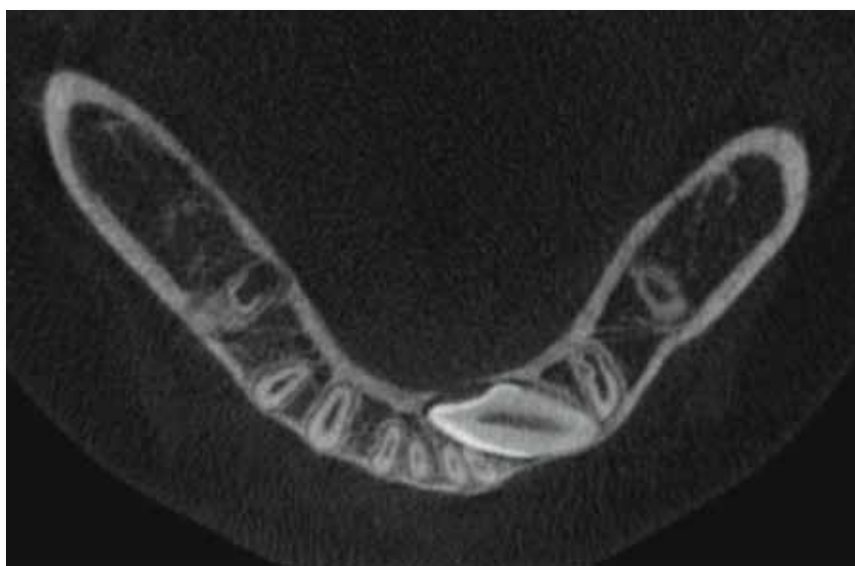


A 0.017 x 0.025-inch TMA lever arm was consisted of a helical coil on one end and helical attachment on the other end. When this lever arm was inserted in the square hole in the OBS (*located at buccal shelf*) and activated, it could build a force system which protracted the tip of canine first, then moved buccally, and finally elevated to the reserved canine space. If the mechanics were designed to exert force directly from the main arch wire only, it would have been detrimental to the roots of first premolar. During the follow-up visits, the helix was adjusted without taking it out. After three months from operation, the impacted canine was successfully moved away from the previously impacted site and was ready for bracket bonding.



Sublingual trans-alveolar impacted cuspids

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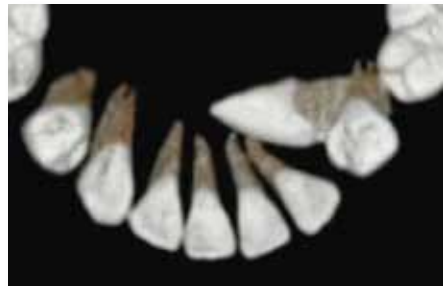
1st surgery

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



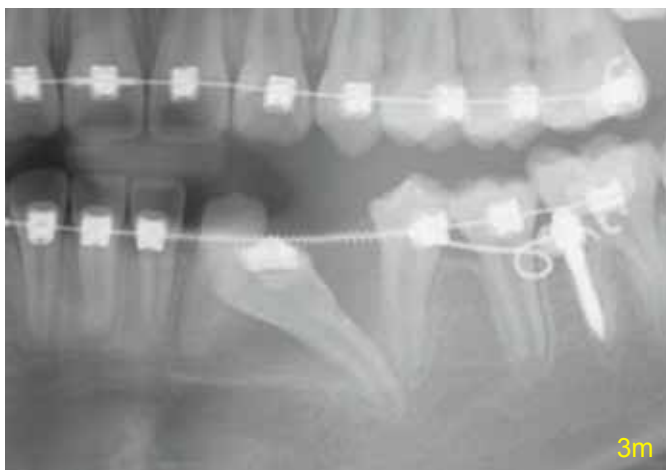
Sublingual trans-alveolar impacted cuspids

10



2nd surgery

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



Lower impacted premolar

11



Initial



1 M



6 M



9 M



Notice the mental nerve.

A 13-year old female had a lower impacted 2nd premolar, approximately 10 mm deep on the left side. The treatment plan was to extract the 2nd primary molar and pull out the 2nd premolar. During the treatment, the 2nd primary molar was first extracted, followed by bonding an eyelet bracket on the surgically exposed 2nd premolar. Meanwhile, the bone surrounding the crown of the second premolar was reduced until reaching CEJ and a lateral window was made for bracket bonding. An eyelet bracket was bonded on the buccal surface of the deeply impacted second premolar. The **OBS** was inserted on the left buccal shelf area. A power-chain was attached between a 3D lever arm and the eyelet bracket to extrude the second premolar. This 0.017 x 0.025-inch TMA lever arm was consisted of 3 helical coils: one in the middle, two in both ends. When this lever arm was inserted in the square hole of the **OBS** and activated, it would form a force system which extruded the second premolar directly.

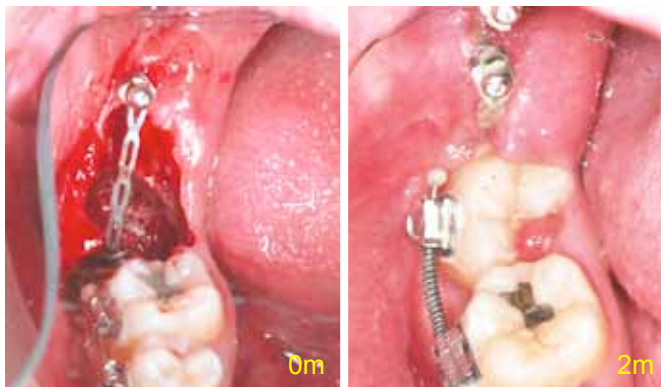


Lower impacted molar

12



A 19-year-and-10-month-old male had lower impacted second and third molars on the right side. The treatment plan was to extract the 3rd molar and upright the 2nd molar. During the treatment, the third molar was first extracted, followed by exposing the second molar surgically. Meanwhile, the bone surrounding the crown of the second molar was removed to CEJ and the second molar was surgically luxated by an elevator. A button was bonded on the distal surface of the second molar. The OBS was inserted on the right ramus of the mandible. An elastic chain was attached between the OBS and the button to upright the second molar. In 4 months, the second molar was uplifted successfully. Finally, a molar tube was bonded for advanced alignment and leveling. An open coil spring was inserted between 1st and 2nd molars to push and upright the 2nd molar.



More Applications of **OBS****Molar intrusion****13**

In this case the treatment plan was to use orthodontic treatment to intrude lower molars for subsequent implant therapy. However, it was very difficult to intrude the lower 1st molar in the absence of antagonist. Moreover, although a buccal miniscrew can provide an unilaterally intrusive force, it can also cause the 1st molar tipping buccally. Therefore, an **OBS** was placed in the upper missing area with its head covered by GIC. As such, an antagonist was created to provide an intrusive force when biting. In this way a lower molar intrusion was soon to be achieved.



More Applications of OBS

Molar intrusion 14



In this case the patient lost the upper right molars. The treatment plan indicated orthodontic treatment to level the lower molars followed by implant therapy. However, the absence of teeth over a long period of time had caused the upper sinus pneumatization. Furthermore, supraeruption of the mandibular molars had left little space for implant placement. Hence, intrusion of the mandibular molars was indicated. The primary concerns included 1. lack of antagonistic force 2. difficulty in simultaneous miniscrew placements on both buccal and lingual side. Considering the objectives of current orthodontic treatment and future implant therapy, a lateral window opening was performed for sinus lifting and bone graft placement. Five months later an OBS was placed with its head covered by GIC to intrude lower molars. OBS was chosen as a preferred alternative than a more permanent dental implant because the implant site couldn't be determined until the active orthodontic treatment was complete. In the event of loosening it is relatively easy to replace. Therefore, OBS provides an easy temporary solution to this type of ortho-implant combined cases.

