Early Management of
Impacted Maxillary Incisors
with Skeletal Anchorage

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Maxillary central incisor impaction is relatively uncommon, at a rate of only .06-2%, but can be problematic for the clinician when encountered. Treatment options include orthodontic eruption of the impacted tooth, extraction of the impacted tooth and restoration of the retained space after growth has ceased, and surgical repositioning of the impacted incisor. In addition, various authors have reported successful extraction of the impacted central incisor and replacement with an autotransplanted premolar or with the adjacent lateral incisor after prosthetic restoration.

Orthodontic traction of the patient’s own impacted tooth appears to be the preferred treatment, although it may be more time consuming and carries the risks of pulp devitalization, ankylosis, and root resorption. A further challenge

Fig. 1 A. Easy-Way-Coil (EWC®) system. B. Beneplate** with two abutment screws.

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Comprehensive treatment with full-arch fixed appliances can then be performed when the patient is more dentally mature.18

This article presents a case in which the Beneplate** skeletal anchorage system19,20 (Fig. 1B) was used in combination with the EWC to erupt an impacted central incisor.

** Case Report **

A 9-year-old female presented with impacted upper left central and lateral incisors (Fig. 2A). A supernumerary between these two teeth had been diagnosed radiographically (Fig. 2B) and surgically removed.

Fig. 2 A. 9-year-old female patient with impacted upper left central and lateral incisors before treatment. B. Nine months earlier, supernumerary tooth detected between central and lateral incisors and surgically removed.

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The EWC’s bondable attachment was affixed to the tooth’s labial surface between the middle and incisal thirds of the crown. The EWC spring was then connected passively to the helical loop at the free end of the Beneplate.

One week after surgical exposure, the sutures were removed, and the closed-coil spring was cut 1mm short of the Beneplate’s helical wire loop. A ligature cutter was used to carefully bend the last three threads of the spring, forming a small eyelet (Fig. 3A). This eyelet was attached to the helical loop of the Beneplate with a ligature wire (Fig. 3B). The 1mm activation delivered about 15cN of force.14

Four weeks later, the coil was recut and a new eyelet was bent to produce another 1mm of activation. These activations were repeated every four weeks until the incisal edge of the impacted incisor contacted the anchoring helical loop (Fig. 4A).
At this point, the looped wire leg of the Beneplate was removed with a coarse diamond bur. One week later, orthodontic brackets were bonded to the labial surfaces of both upper central incisors, and an .016" round superelastic sectional wire was inserted to complete eruption of the central incisor (Fig. 4B).

Once the desired vertical tooth position was achieved, an .017" × .025" TMA*** sectional wire was inserted to provide torque control of the central incisor (Fig. 5A). Minor bends were placed in the archwire for final tooth positioning (Fig. 5B).

Total treatment time between surgical exposure and debonding was six months. At the end of treatment, the impacted upper left lateral incisor had erupted spontaneously (Fig. 6).

**Discussion**

In a case such as the one shown here, the non-ligated leg of the Beneplate should be bonded to the palatal surface of the overerupted adjacent central incisor to prevent further eruption and thus reduce the tendency toward a gummy smile (Fig. 7A). If the patient exhibits a flat smile and therefore requires elongation of the incisors, the

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The combination of the Beneplate and EWC systems provides excellent control of treatment mechanics with simple activations. Shortening the EWC spring by 1mm (three threads) at every activation visit generates a standardized force of 15.8cN, enough to produce eruptive movement without increasing the risk of adverse effects such as external root resorption. The technique shown here is recommended primarily for young patients who are not dentally mature enough for comprehensive treatment with fixed orthodontic appliances.

Fig. 7 A. Bonding of non-ligated Beneplate wire leg prevents overerupted upper right central incisor from erupting further, thus alleviating gummy smile tendency. B. With wire unbonded, upper right central incisor can erupt freely, facilitating esthetic smile arc in patient with flat smile.

non-ligated leg should not be bonded to the adjacent incisor, allowing it to erupt freely and facilitating the establishment of an esthetic smile arc (Fig. 7B).

Depending on the severity and location of the impaction, orthodontic mini-implants can be used as direct or indirect anchorage for orthodontic eruption of impacted teeth. Using a Beneplate as an anchor unit eliminates the need for fixed appliances and a rigid upper archwire while preventing unwanted side effects on the teeth adjacent to the impaction. Inserting the mini-implants in the anterior palate ensures stability of the anchor unit, which is atraumatic and comfortable for the patient. Previous studies have demonstrated a high success rate for mini-implants in the anterior palate due to the quantity of bone and favorable mucosal tissue. The appliance’s rigidity and its distance from the occlusal surfaces provide adequate protection against masticatory forces and toothbrushing; similar appliances using TMA cantilever wires have been reported to distort easily and therefore result in longer treatment.

REFERENCES

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