

CASE REPORT

Customized Metal Coping for Elastic Traction of an Ectopic Maxillary Central Incisor

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A number of factors have been cited as contributing toward delayed incisor eruption^{1,2}: the presence of a supernumerary in the midline, generalized or localized crowding, dilaceration of the incisor root, and fibrous changes in the overlying mucosa following supernumerary removal or deciduous extraction. Regardless of the etiology, ectopic incisors often have to be removed because of the difficulty of placing a bonded attachment for orthodontic traction.

In the following case, an ectopic maxillary central incisor was brought into the arch with elastic traction to a customized metal coping.

Diagnosis and Treatment Plan

A 7¹/₂-year-old female in the mixed dentition presented with a Class I incisor relationship on a skeletal Class I base. An anterior open bite was present due to a persistent thumb-

sucking habit. The deciduous maxillary left central incisor was retained, and there was a history of trauma to the maxillary anterior segment at 18 months of age.

Radiographs revealed the permanent left central incisor to be ectopically placed and dilacerated, with the labial surface of the crown lying superiorly and parallel to the nasal floor (Fig. 1). The panoramic radiograph showed that the root of the maxillary left lateral incisor was short.

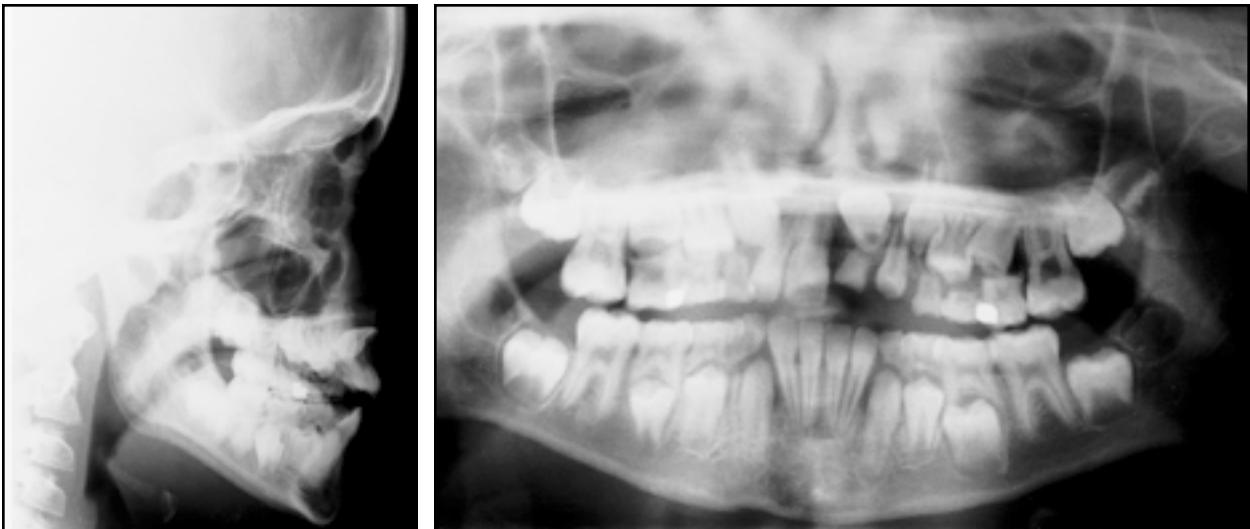


Fig. 1 7¹/₂-year-old female with ectopic maxillary left central incisor.



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Treatment options were to:
1. Extract the deciduous incisor and surgically remove the ectopic tooth; create sufficient space orthodontically for eventual restoration with a bridge or implant.
2. Extract the deciduous incisor and provide orthodontic traction to guide the ectopic tooth into position, prior to comprehensive orthodontic treatment.

The patient and parents chose the second option.

Treatment Progress

An upper removable appliance was constructed to allow arch expansion and later provide a point of attachment for elastic traction. The appliance was re-



Fig. 2 Working cast used for construction of coping.

tained with .032" stainless steel double clasps on the first permanent molars and second deciduous molars. Expansion was achieved using a midline screw and wire stops mesial to the maxillary right central and left lateral incisors.

After six months of arch

expansion, a metal coping was made to the crown of the erupted maxillary right central incisor from the initial working cast (Fig. 2). The coping and attached incisal loop were cast in Engelhard Silver Casting Alloy at 800°C in a casting ring, using the lost-wax technique.

The ectopic incisor was surgically exposed, and the coping was bonded to the incisal edge with a chemically cured composite. A length of gold chain was soldered to the incisal loop and then guided into the mouth through the socket of the deciduous incisor, which was simultaneously extracted (Fig. 3). The chain was temporarily sutured to the oral mucosa in the depth of the labial sulcus.



Fig. 3 Patient after placement of coping and attached gold chain.

One week after surgery, an S-shaped hook, made of .016" × .022" stainless steel wire, was crimped onto the last link of the gold chain (Fig. 4), and the suture was removed. A 50g force was applied by a 3/8", size 5 elastic* from the S-hook to a distal-facing wire loop placed near the posterior edge of the acrylic baseplate of the upper removable appliance. The elastic was worn full-time except during oral hygiene.

As the tooth descended, the force level was maintained by progressively shortening the gold chain with a ligature cutter and by changing from size 5 to size 3 elastics (Fig. 5).

Fifteen months after bonding, the tooth had erupted into the arch (Fig. 6). The coping was

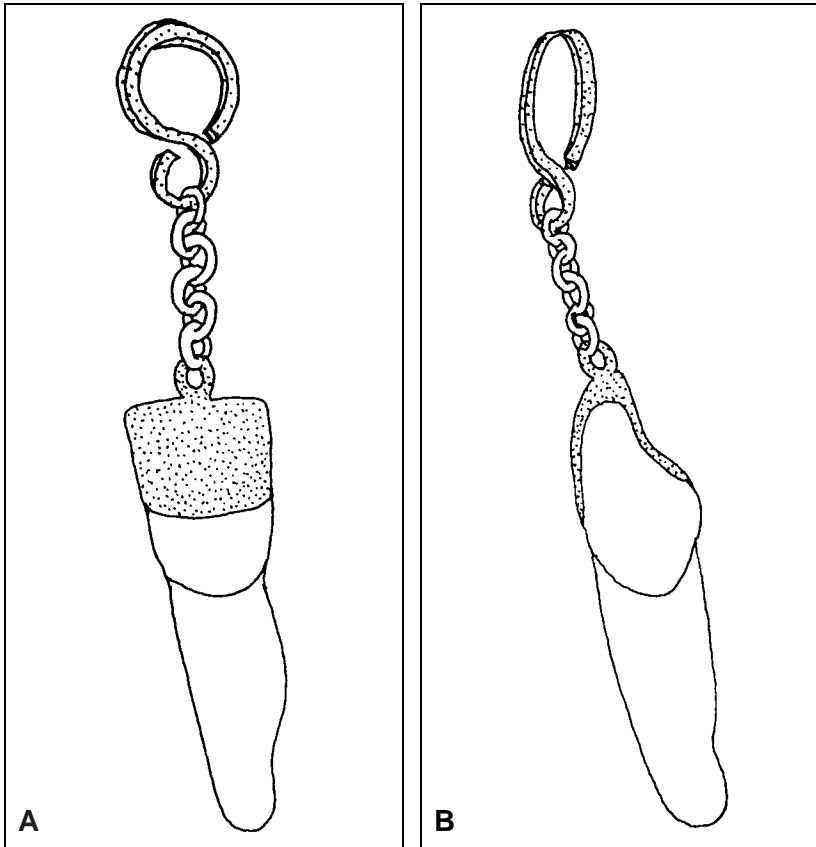


Fig. 4 Coping and gold chain after attachment of S-hook. A. Labial view. B. Mesiodistal view.

*Ormco/"A" Company, 1717 W. Collins Ave., Orange, CA 92867.

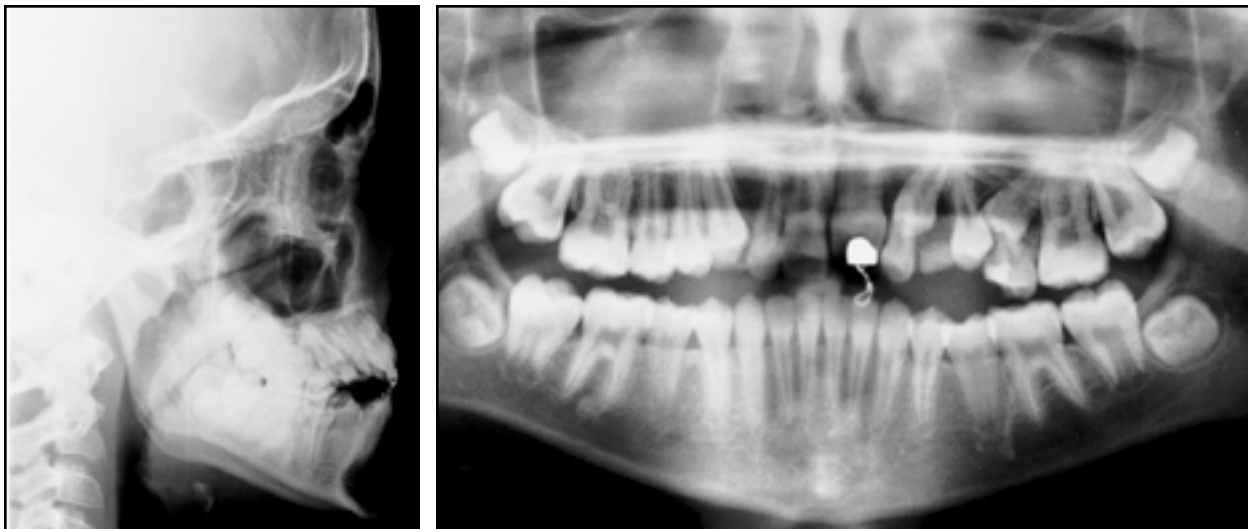


Fig. 5 Progress radiographs.

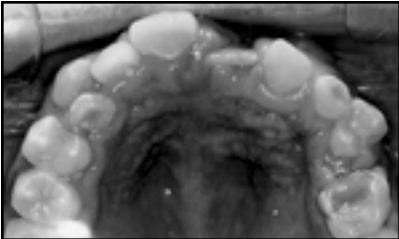


Fig. 6 Eruption of ectopic incisor after 15 months of traction.



Fig. 7 Attachment of labial bracket to left central incisor.



Fig. 8 Alignment of maxillary arch over five months.



Fig. 9 After removal of fixed appliances.

then sectioned on the palatal aspect using a tapered diamond bur in a high-speed handpiece. A slot was cut down the length of the coping, and a Mitchels trimmer was inserted and twisted to flex the coping open, fracturing the composite bond. The residual adhesive was carefully removed from the crown of the tooth with a tungsten carbide bur. A conventional bracket was then bonded to the labial surface (Fig. 7).

The maxillary arch was aligned over a five-month period with a fixed appliance (Fig. 8). After debonding (Fig. 9), a removable vacuum-formed retainer was delivered.

Discussion

The labial surface of the ectopic incisor in this case was not readily accessible, lying beneath the nasal floor. Placing a bracket on the palatal surface would have diminished the uprighting effect of traction. The custom-made metal coping provided a means of applying force from a palatally placed hook to the incisal edge of the tooth, thus allowing the incisor to assume a more vertical position prior to eruption into the arch. This method also ensured that the incisal edge would perforate the gingival tissue first, promoting a better gingival contour.

Although the technique shown here appears useful for moving a horizontally impacted incisor, the bulk of the device at the incisal edge makes it less suitable for a maxillary canine, since close proximity to the lateral incisor root might increase the risk of root resorption.

REFERENCES

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2. DiBiase, D.: Midline supernumeraries and eruption of maxillary central incisors, *Trans. Br. Soc. Study Orthod.* 55:83-88, 1969.