THE MOUSETRAP

This paper demonstrates an unorthodox method to quickly erupt palatally impacted canines based on sound biomechanical principles. The unwinding of a stainless steel round archwire produces the required occlusobuccal force. Due to its snap-back release, it looks like a trap, which is why it was dubbed mousetrap. World J Orthod 2009;10:257–260.

Key words: erupt, mousetrap, palatally impacted canines

Since the early 1960s, several studies on the incidence of impacted canines were published,1–3 according to which the incidence in northern European Caucasians is approximately 2% with a female-to-male ratio of 2:1. The average age for the eruption of the maxillary canines is 11 ± 1 years. The impaction of maxillary canines can have a systemic, local, genetic, or idiopathic etiology.4 Impacted canines can cause pressure root resorption on adjacent teeth, which can be avoided when the impaction is detected early and the respective canines are orthodontically guided into their proper position.5 This, however, is not easy. Tying elastic power thread to an attachment on the canine to erupt is the simplest and most frequently used method, although the direction of the eruptive force is at times not adequate, ie, parallel to the long axis of the particular tooth. Elastic thread also fatigues in the wet intraoral environment, and replacement is therefore indicated in 2-week intervals. Instead of an elastic thread, a cantilever extending from the auxiliary tube on a maxillary molar could be used.6

The method described below to erupt impacted canines differs from that of Kornhauser et al6 but resembles that of Becker.7 Other names include Ballista Loop8 and mousetrap.

FABRICATION

The mousetrap is fabricated by using a 0.014-inch stainless steel or Australian round wire in a 0.018-inch edgewise appliance (or a 0.016-inch wire in a 0.022-inch edgewise appliance) and is activated by torsion (Fig 1). To develop torsion in a round wire, a stop is needed. Such a stop is provided by placing an almost 180-degree bend at the end of the wire. To secure this wire, the tube of the first molar must be converted into a slot. The tail part of the wire is placed either into the headgear tube or on the occlusal bracket wings (Fig 2).

The archwire is continuous from the right to the left maxillary first molar. It contains a vertical loop with a helix fitting into the edentulous space; the loop points occlusally. The length of this vertical loop depends on where the canine traction penetrates through the tissue. After the archwire is tied in, the vertical loop is rotated approximately 100 degrees downward toward the tooth to be extruded and tied to the impacted canine with a steel ligature (Fig 3). As the vertical loop tries to return to its original position, it develops an extrusive force. This occlusovestibular force should amount to approximately 1.5 N. In cases in which the canine is approaching the palatal

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midline, substitute a 0.016-inch round stainless steel archwire for greater resistance to the bending moment on the vertical loop (Fig 4). It is imperative that the patient is seen frequently because of the rapid extrusion.

This system can be used for bilaterally impacted maxillary and mandibular canines (Figs 4 and 5), as well as for other impacted teeth. In this patient, the loop in the mandibular arch was retied several times. It took approximately 5 months for the mandibular canine to erupt.

An alternative is a 0.017 × 0.025-inch Beta-titanium alloy (TMA) cantilever (Fig 6). A 45-degree activation of this cantilever will again produce a vertical force of approximately 1.5 N. Because the reciprocal force in both examples acts on the first molars, a transpalatal arch is indicated to avoid buccal crown inclination.
Fig 4  Panoramic radiographs of a patient with two palatally impacted canines and a lingually impacted mandibular right canine; situation before treatment (a), at the initial stage of treatment (b), after alignment of the maxillary canines (c), at the end (d), and after treatment (e).
REFERENCES