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Clinicians Corner

The Trikki lingual appliance

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ABSTRACT

Lower anterior crowding is a frequent finding in early mixed dentition. Left untreated, it may lead to extractions of permanent teeth or even to impactions. The Trikki lingual appliance is a fixed device that aids in lower arch expansion and space gaining, especially in the lower anterior region, without the need for brackets. Patients with a deep-bite tendency, retroclined lower incisors, and/or lower anterior crowding are good candidates. The Trikki appliance may be used to shift the lower midline in cases of premature unilateral loss of a primary canine or to gain space and align ectopically erupted lower incisors. It requires no patient compliance, is effective, is easy for the clinician to adjust, and can be incorporated into any early treatment protocol.

1. Introduction

Lower anterior crowding is a frequent finding in young children [1–4]. The size of the lower permanent incisors, the intercanine and intermolar width, the leeway space, and any premature loss of primary teeth affect the presence and degree of this type of malocclusion [5–7]. In many cases, the orthodontist has to decide whether to proceed with a serial-extractions protocol, possibly with extraction of permanent teeth, or whether space-gaining mechanics and/or lower arch expansion is an appropriate treatment modality [3,8–11].

In this decision making, the lateral cephalogram plays an important role because it reveals the inclination of the lower incisors [2,12], while the patient's profile is also considered. The existence or absence of a deep bite is another factor to be taken into account [5].

2. Methods

Different appliances have been proposed to gain space in the lower anterior region [7,9,13–19]. To manage this problem early using preventive orthodontic mechanotherapy, we have been using a novel appliance for lower arch expansion and space gaining, especially in the lower anterior region. This *Trikki appliance* is being used in cases of lower anterior crowding in the mixed-dentition stage. In many cases, the primary canines have been lost prematurely and a dental midline shift might be present if the exfoliation or extraction of the primary canine is unilateral. When the exfoliation of the lower primary canines is bilateral, the lower incisors are usually retroclined, blocking the permanent canines from erupting at a later stage.

The design of the appliance resembles a lower lingual holding arch. It is composed of two bands that are placed on the lower second deciduous molars or the lower permanent first molars. Lower second primary molars are the preferred choice, when possible, to avoid banding the permanent teeth and thus to avoid any possibility of decay or rotation of the permanent teeth. The only possible disadvantage in banding the primary teeth is their early exfoliation, but this can be judged from the panoramic radiograph. Stainless steel tubes (round inner, 1.30 mm/51; Dentaurum Inc., Newtown, PA) of 5 mm in length and 1.3 mm in diameter are soldered in the lingual sides of the bands in which a lingual bar can slide freely (Fig. 1A). The latter is made of a round, 1.2-mm stainless steel wire (Forestanit, 1.20 mm–0.047 inch; Forestadent–Bernhard Förster GmbH, Pforzheim, Germany). We use two NiTi coil springs (nickel titanium springs, American Orthodontics, Sheboygan, WI), activated with minimal force with a 0.014-in/0.35-mm ligature wire tied from a loop fabricated on the distal end of the lingual arch to a 2-mm–diameter ring that slides freely (Spacer ring, Dentaurum)

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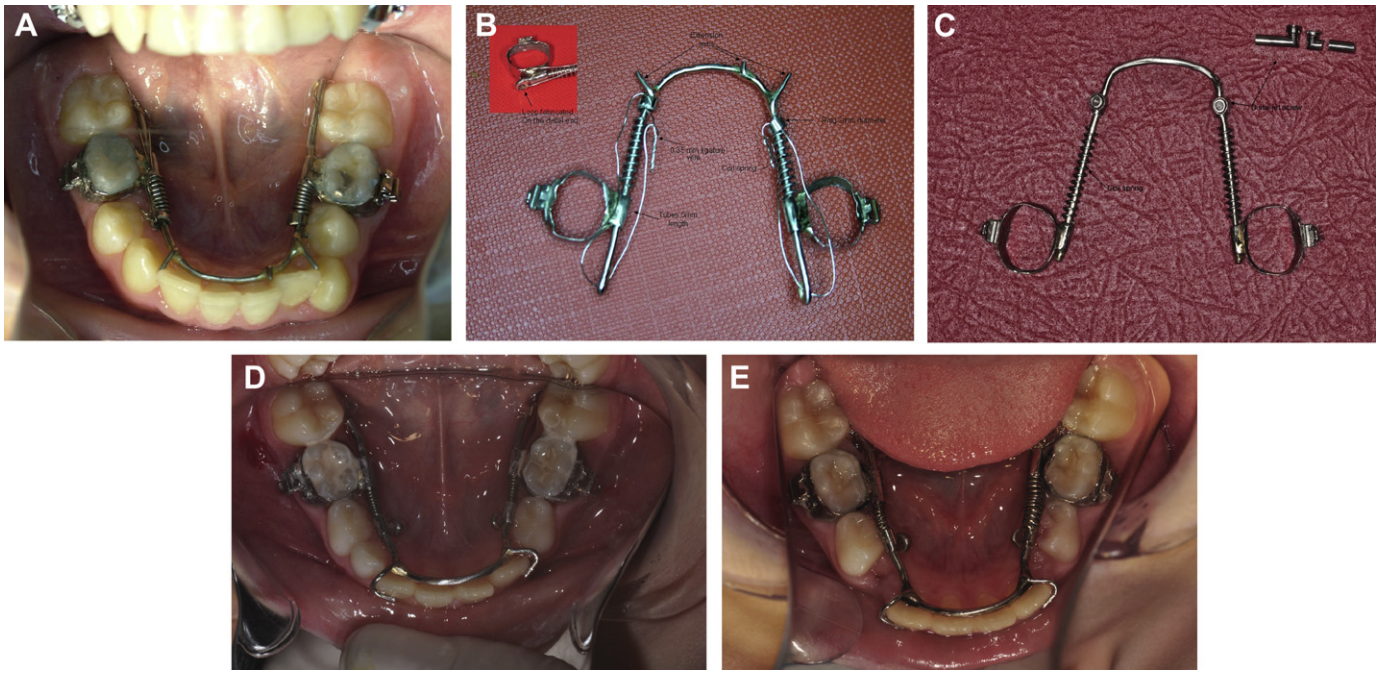

Fig. 1. (A) The Trikki lingual appliance. (B) The Trikki lingual appliance activated via a wire ligation. (C) The Trikki lingual appliance activated by using a Distal Jet screw. (D, E) Soldered extension arms on the lingual bar. Lost space is gained as the coils are deactivated.

at the mesial end of the coil (Fig. 1B). Another way to activate the coil spring is by utilizing a Distal Jet screw (Distal Jet activation lock, American Orthodontics), shortened to provide more activation space for the springs and activated at each appointment (Fig. 1C). As the coils are deactivated, the space that was lost is regained (Fig. 1D and 1E).

Extension arms are soldered onto the lingual bar using a 0.80-mm stainless steel wire. Those can be fabricated in to consolidate the lower incisors as one unit or to guide one displaced incisor into proper position, as is depicted in the subsequent case reports.

The lingual bar is placed to touch the lingual side of the incisors, as cervical as possible without irritating the gingival mucosa. The cervical position of the bar is preferred because the labial movement of the lower incisors might displace the lingual bar closer to the incisal edge. In this case, the location of the lingual bar can be adjusted by slightly bending the wire as close as

Fig. 2. In cases of displacement of the lingual bar toward the incisal edge of the lower incisors, a 3-pronged pliers is used to adjust the location of the bar.

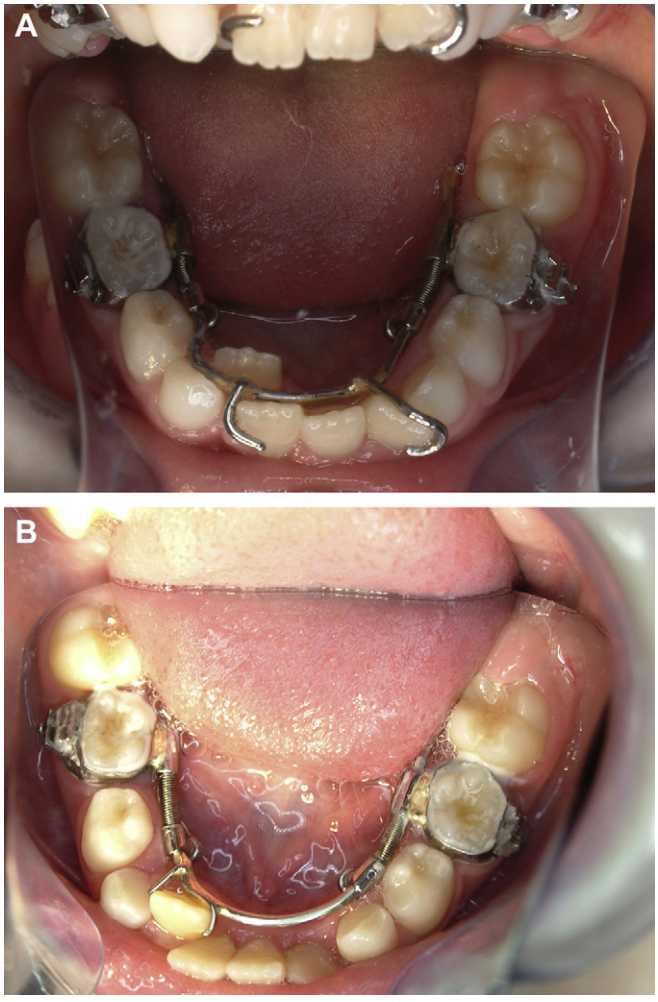

Fig. 3. (A, B) Appliance design to move a lingually displaced incisor into the arch.