

# Butterfly Expander for Use in the Mixed Dentition

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**A**lthough rapid palatal expansion is often used to correct maxillary deficiencies in growing patients,<sup>1-4</sup> the transverse forces delivered during RPE have been shown to create undesirable side effects such as dental extrusion and tipping.<sup>5</sup> This article presents a new RPE appliance, called a “butterfly expander”, that we use to treat patients in the mixed dentition.

## Appliance Design

The butterfly expander follows the basic design of Haas,<sup>1</sup> with a few modifications. A

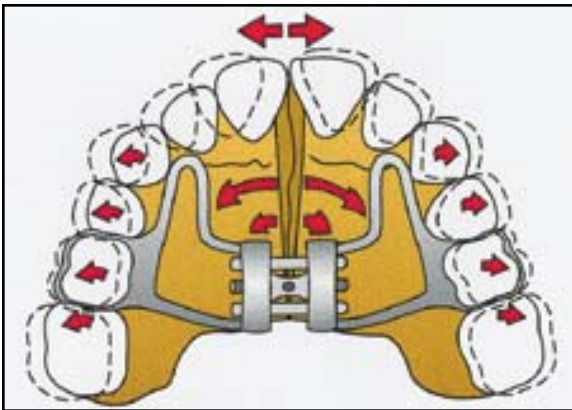


Fig. 1 Butterfly expander design.

high midpalatal jackscrew (A0620\*) is attached to a butterfly-shaped stainless steel framework that extends forward to the palatal surfaces of the deciduous canines (Fig. 1). The appliance is soldered to bands on the second deciduous molars.

\*LeoneAmerica, 501 W. Van Buren #S, Avondale, AZ 85323.

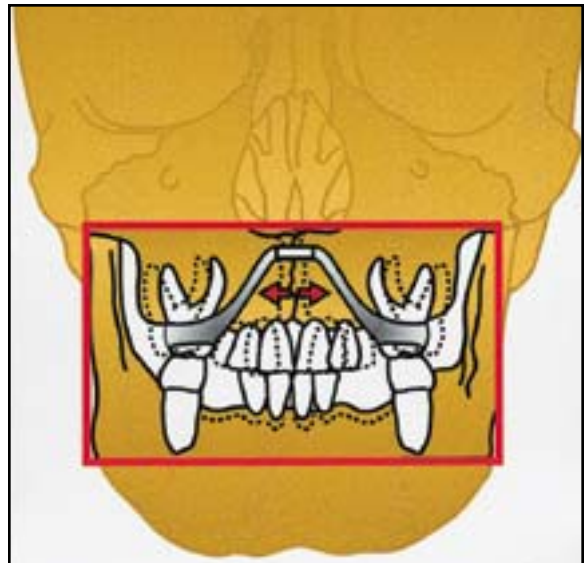


Fig. 2 Placement of butterfly expander in palatal vault places transverse force close to center of resistance of posterior teeth.

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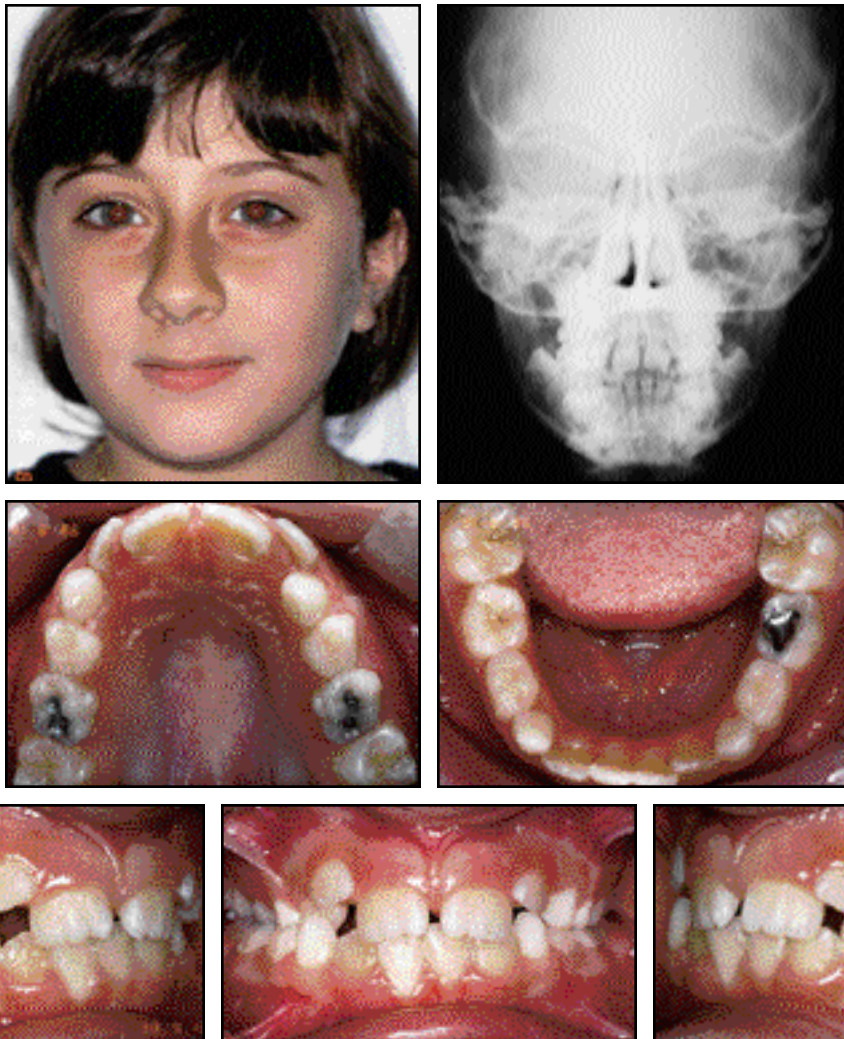
Dr. Cozza



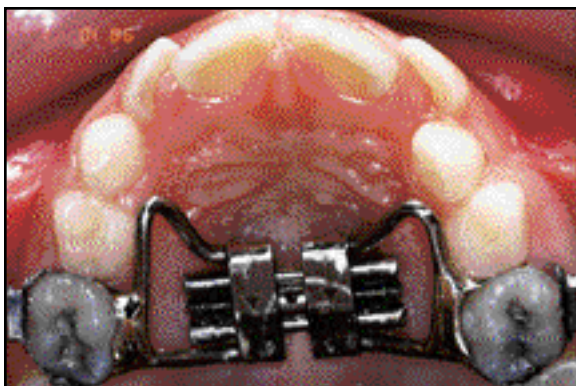
Dr. Giancotti



Dr. Petrosino



**Fig. 3 Case 1. 8-year-old female before treatment.**



**Fig. 4 Case 1. Butterfly expander placed to open midpalatal suture.**

A high-powered laser is used to weld the two arms to the screw housing, ensuring perfect, one-piece joints and eliminating any possibility of detachment. Because the laser beam is concentrated in a small area, the arms are not overheated; therefore, their mechanical characteristics are maintained and their resistance to breakage is improved.

The rigidity of the appliance and its location high in the palatal vault allow the transverse force to be delivered closer to the center of resistance of the posterior teeth than with conventional expanders. The butterfly design thus minimizes posterior tipping and extrusion (Fig. 2).

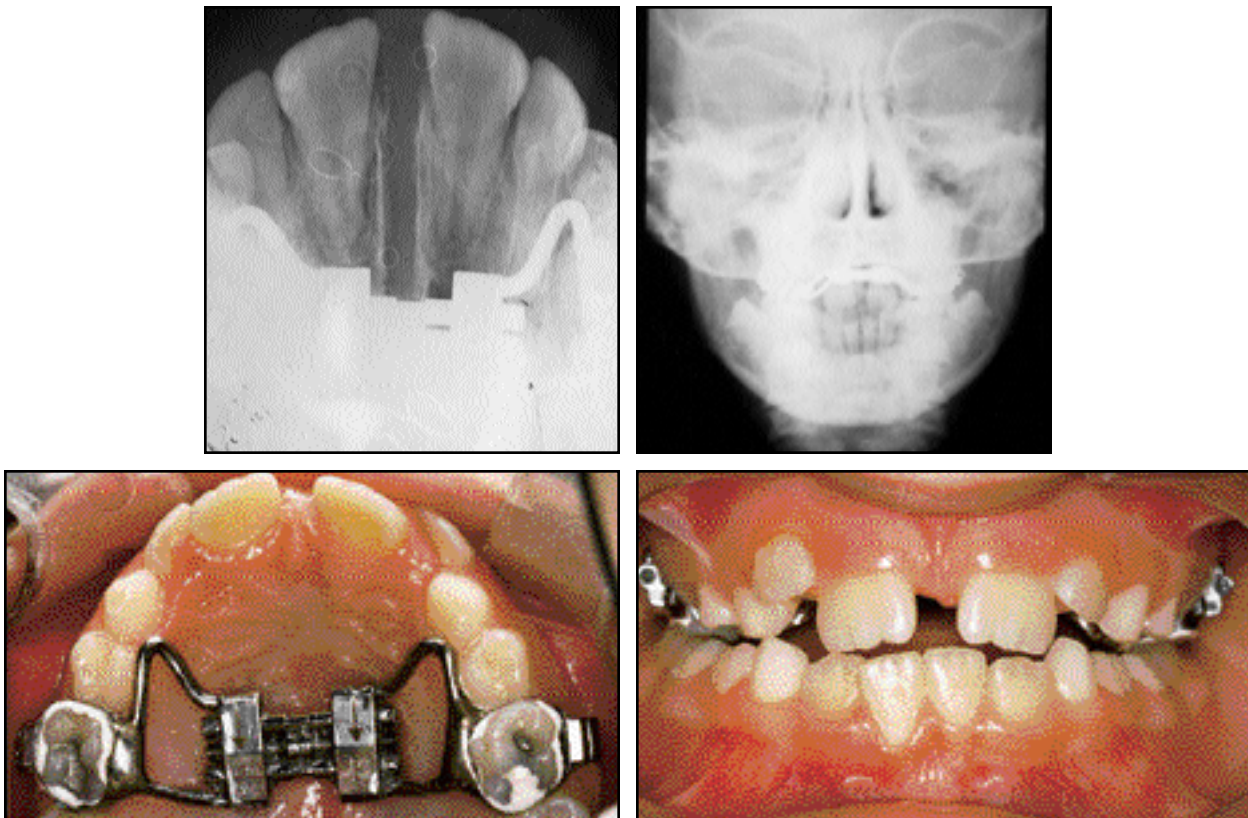


Fig. 5 Case 1. After eight days of expansion.

### Activation

Activation of the screw is begun with a complete turn (four quarter-turns) immediately after cementation of the appliance. The parents should be instructed to activate the screw a quarter-turn three times a day (morning, afternoon, and evening).

Active expansion takes seven to nine days, depending on the degree of maxillary constriction. Transverse expansion is usually deemed sufficient when the posterior crossbite is overcorrected by 2-3mm. The screw is then blocked, and the appliance is left in place as a passive retainer. Occlusal and anteroposterior x-rays should be taken at this point to confirm the expansion.

### Case 1

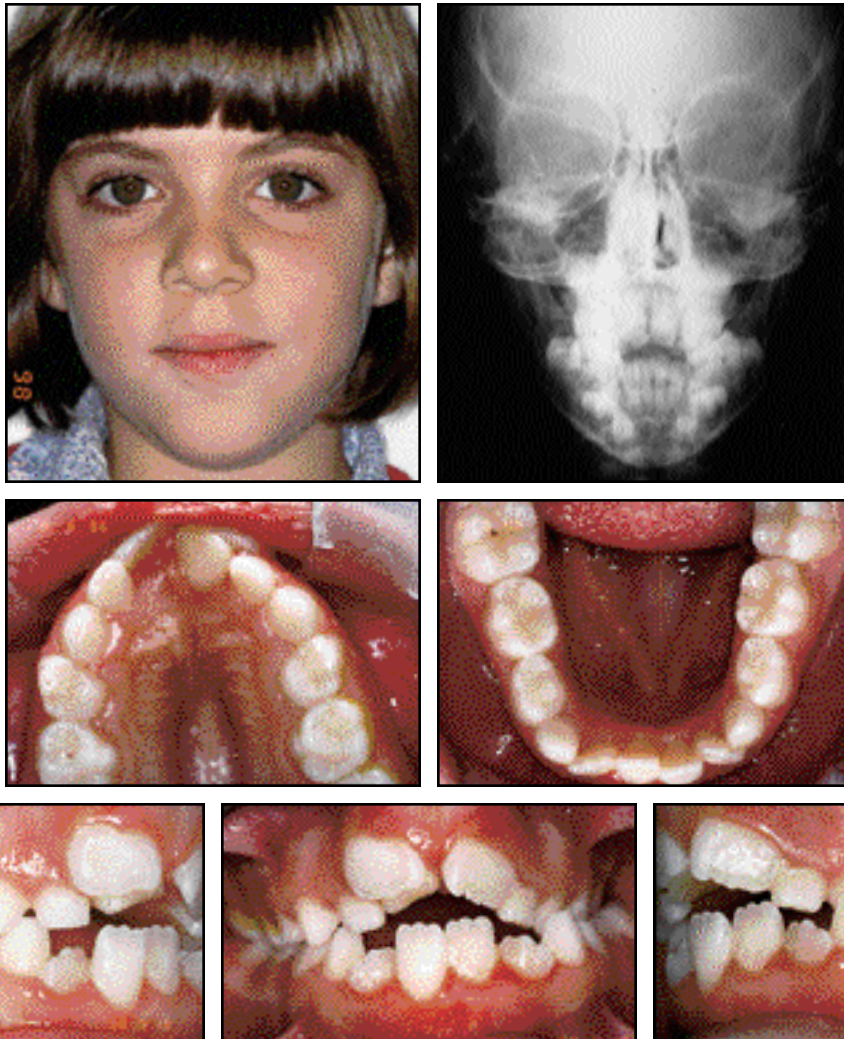
An 8-year-old female in the early transi-

tional dentition presented with a midline deviation and a unilateral functional crossbite from the right second molar to the canine (Fig. 3). The maxillary lateral incisors were erupting buccally and mesially, probably due to the constriction of the premaxilla, but the mandibular dentition was erupting normally. The patient showed a Class II molar relationship on the right side and a Class I molar relationship on the left. Cephalometric analysis revealed no skeletal abnormalities.

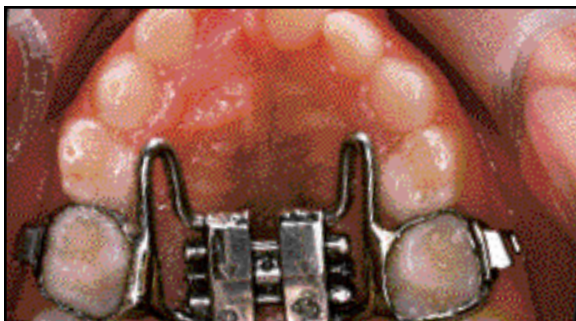
A butterfly expander was placed to open the midpalatal suture (Fig. 4). After eight days of activations, the unilateral crossbite was overcorrected. The screw was then blocked, and occlusal and anteroposterior x-rays were taken (Fig. 5).

### Case 2

A 6-year-old female in the early transitional dentition presented with a unilateral left crossbite and severe maxillary constriction, exacerbat-



**Fig. 6 Case 2. 6-year-old female before treatment.**



**Fig. 7 Case 2. Butterfly expander placed to open midpalatal suture.**

ed by a mouthbreathing habit (Fig. 6). The mandibular arch was slightly crowded in the anterior area. The patient had a Class II molar relationship on the left side and a Class I molar relationship on the right. Cephalometric analysis showed a Class II skeletal pattern.

A butterfly expander was placed to open the midpalatal suture (Fig. 7). After nine days of activations, the unilateral crossbite was overcorrected by 2-3mm. The screw was blocked, and occlusal and anteroposterior x-rays were taken (Fig. 8).

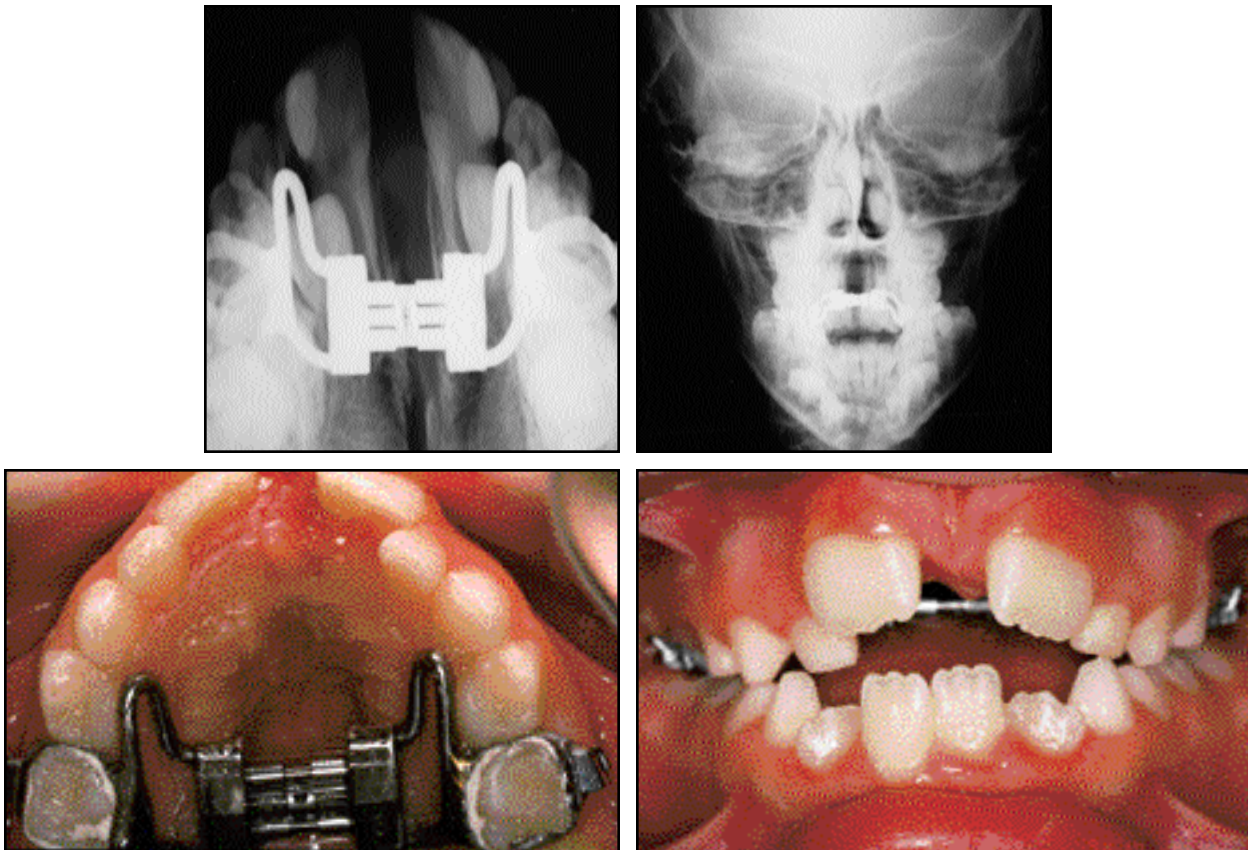


Fig. 8 Case 2. After nine days of expansion.

## Discussion

The design of the butterfly expander enhances the orthopedic and biomechanical effects of the appliance compared to conventional banded expanders. It allows early treatment of a skeletal problem that commonly manifests itself in the primary dentition and, as a rule, will not self-correct.<sup>4</sup> In younger patients, RPE does not encounter significant resistance of the maxillary and circummaxillary sutures, and therefore does not produce the microfractures observed by Isaacson and Zimring in older patients.<sup>6</sup> Furthermore, because the butterfly expander is applied to the primary molars, it will not cause root resorption of anchored premolars and permanent molars after RPE, as studies by Langford have demonstrated.<sup>7</sup>

The butterfly expander is relatively easy to

insert, is well tolerated and esthetic, and requires no special patient cooperation.

## REFERENCES

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