

A Fan-Shaped Maxillary Expander

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Patients with narrow maxillae sometimes require differential expansion of the anterior and posterior segments, as in cleft lip and palate cases. To that end, Schellino and Modica have designed a "spider screw"* that works asymmetrically.¹ This article demonstrates a new fan-shaped expander using the spider screw to produce differential expansion.

Fan-Shaped Expansion Mechanism

The expander is made of medical-grade stainless steel, with the spider screw as the active component. There are three pivot points: a posterior one, which allows the "fan" opening, and two anterior ones, which counteract the torquing forces produced during expansion. Four arms, two mesial and two distal, are welded to the expander and to bands on the teeth.

The type of expansion produced depends on the angulation and length of the arms. If the arms are mesially inclined (acute anterior angles with respect to the screw), the interarm distance will increase both anteriorly and posteriorly during expansion, but more in the anterior region. If the arms are perpendicular, only the anterior interarm distance will increase, with no appreciable change in the posterior dimension. With distally directed arms (obtuse anterior angles with respect to the screw), there will be a contraction in the posterior interarm distance, with no anterior change. Shortening the arms will decrease any of these effects.

Placement of the fan-shaped expander is similar to that of a traditional rapid palatal expander. After a bite registration is taken with the bands in place, the screw is adapted and welded to the bands by the laboratory technician.

Case Report

A 6-year-old male presented with bilateral

cleft lip and palate (Fig. 1). The patient needed a small amount of maxillary expansion in the posterior region, but more in the anterior region. Therefore, we designed a fan-shaped expander with the arms at acute angles, connected to bands on the deciduous molars and canines (Fig. 2).

After 21 adjustments, the active component had been expanded a total of 4.2mm. Inter-canine width increased more than intermolar width (Table 1, Fig. 3). The minor difference in intermolar measurements indicates a slight distal rotation of the molars produced by the expansion arms.

Conclusion

Proper resolution of any case with insufficient development of the maxilla depends on a thorough knowledge of the selected expansion mechanism. A screw with asymmetrical action can produce expansion, contraction, or conservation of the anterior or posterior transverse dimensions. These differential effects can also be used to correct the molar rotations often encountered in such cases.

Morphological considerations can affect expansion mechanics. In patients with exceptionally deep palates, for instance, it is impossible to place the screw very far forward. Anatomical considerations also come into play: the median palatine suture is known to grow asymmetrically ("V" growth), while the more posterior cranial resistance produces "fanned" growth.^{2,3}

Further studies are needed to determine the anteroposterior movement produced by the spider screw and the clinical efficacy of the fan-shaped expander in numerous cases.

REFERENCES

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Fig. 1 Patient with bilateral cleft lip and palate before treatment.

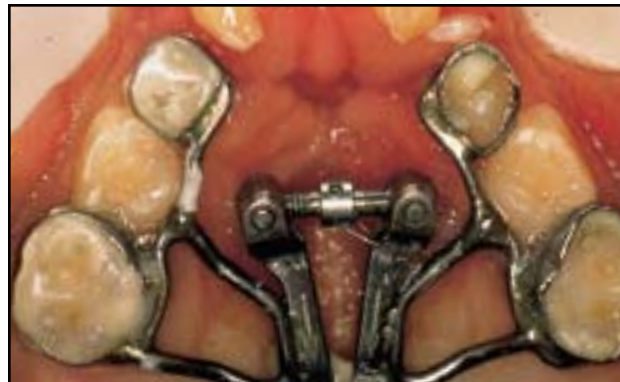


Fig. 2 After placement of maxillary expander.

**TABLE 1
CAST MEASUREMENTS (MM)**

	Before Treatment	After Treatment	Difference
Intercanine	17	25	+8
Intermolar A*	29	34	+5
Intermolar B**	40	44	+4

*Distance between mesiopalatine cusps.

**Distance between distovestibular cusps.

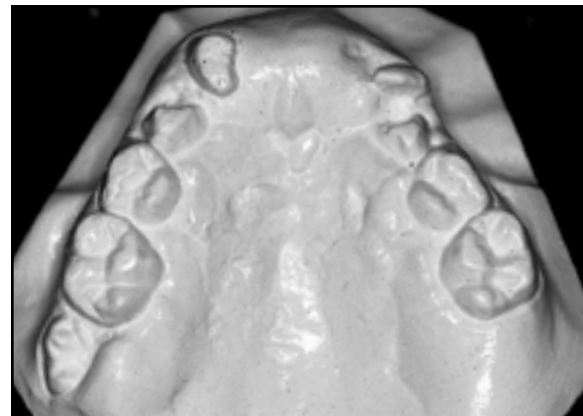


Fig. 3 Patient after three weeks of expansion.