

The Transverse Sagittal Maxillary Expander

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The treatment plan for a patient with maxillary hypoplasia depends on the clinical manifestation of the malocclusion in the sagittal, transverse, and vertical planes.¹ Studies have confirmed that anteroposterior traction of the sutural fibers to stimulate osteogenesis and correct the sagittal position of the upper jaw is the treatment of choice for Class III patients age 5 to 15.²⁻⁶ When combined with a facemask, a palatal expander acts predominantly in the transverse plane, placing traction on the median palatal suture and thus on the surrounding maxillary sutures. If applied before the pubertal growth peak, this anteroposterior traction can advance the entire upper dentoalveolar process.^{3-5,7,8} We have sometimes found it necessary to expand the maxilla in the sagittal plane as well, especially in a case with maxillary crowding. Adding bilateral sagittal screws to the palatal expander produces a relatively slow increase in the sagittal dimension.^{2,9-12}

The transverse sagittal maxillary expander (TSME) is our modification of the rapid palatal expander (Fig. 1). It is indicated in patients with mild skeletal Class III malocclusion and maxillary crowd-

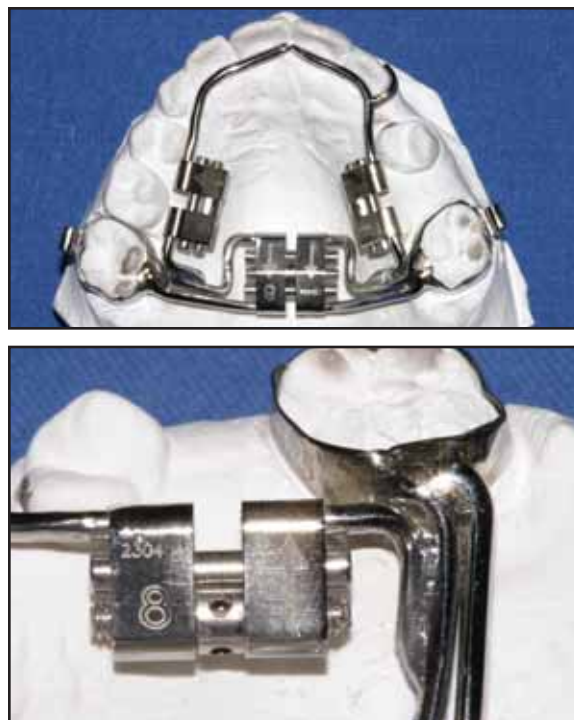


Fig. 1 Transverse sagittal maxillary expander, with transverse and sagittal expansion screws.



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ing, or with maxillary hypoplasia and reduced transverse and sagittal dimensions. In growing children with average or below-average divergence of the osseomaxillary bases, the TSME can be used in combination with a Delaire facemask. The resulting increase in maxillary perimeter length is especially useful in cases of crowding and dental inclusions.

Appliance Design and Use

The TSME consists of two bands cemented

to the left and right first molars, an 11mm Hyrax-type transverse expansion screw,* two .045" stainless steel wires extending to the palatal surfaces of the central incisors, and two 8mm Hyrax-type screws* attached to these wires between the molar bands and the incisors.

In the first phase of treatment, the palate is rapidly expanded by activating the transverse screw

*LeoneAmerica, 501 W. Van Buren St., Suite S, Avondale, AZ 85323; www.americantooth.com.

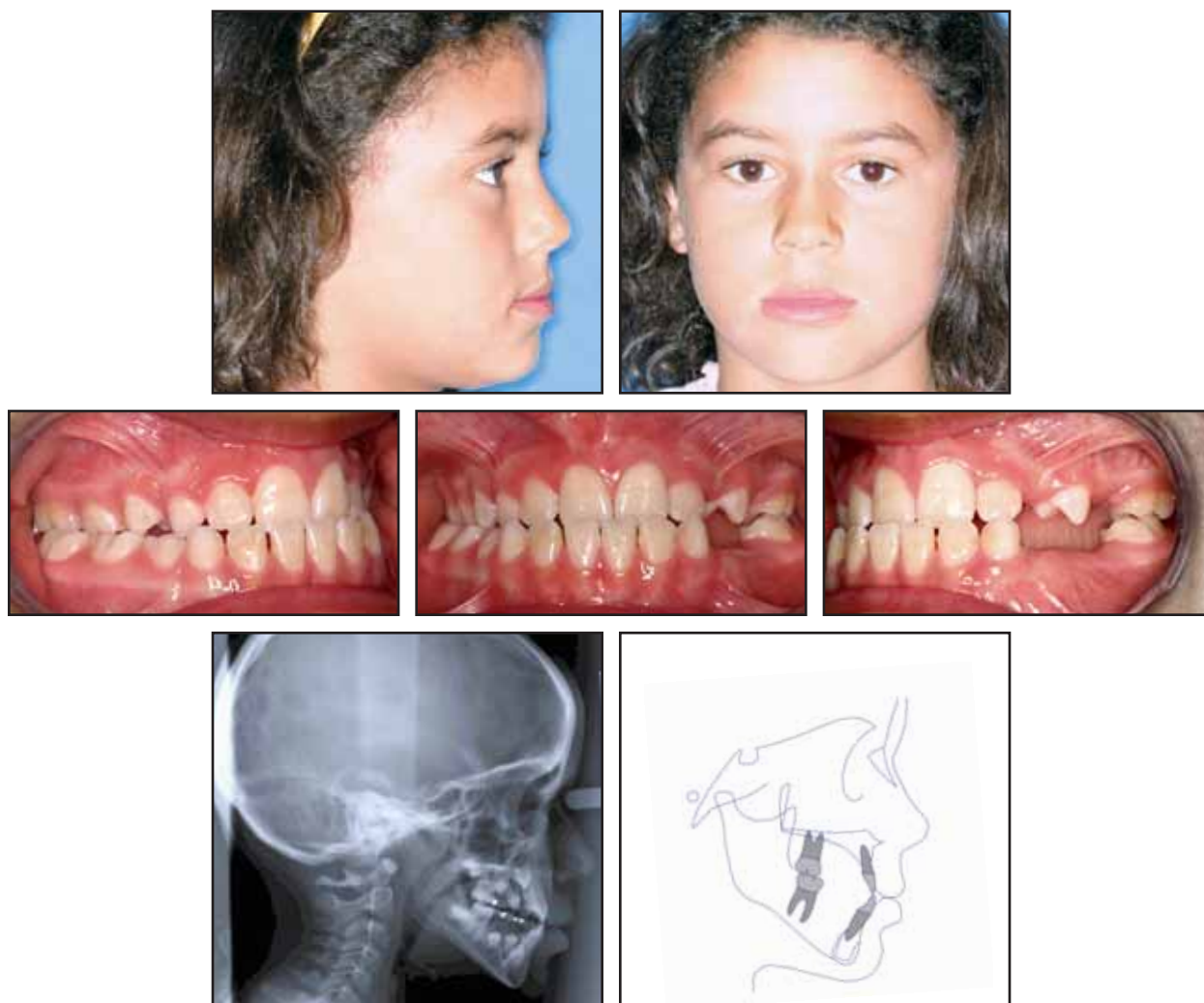


Fig. 2 9-year-old female patient with reduced maxillary transverse and sagittal dimensions and related cross-bite and dental crowding before treatment.

one-quarter turn twice a day for 15 days. In the second phase, the sagittal screws are activated one-quarter turn every seven days for six to eight months. This will slowly increase the maxillary perimeter until the overjet is overcorrected. The appliance is then kept passively in place for several months to stabilize the result.

Case Report

A 9-year-old female presented with reduced maxillary transverse and sagittal dimensions and related buccal and anterior crossbite and dental crowding (Fig. 2, Table 1). The TSME was placed

and activated as described above (Fig. 3). After 15 days of transverse activation (Fig. 4), the sagittal screws were activated for an additional eight

**TABLE 1
CEPHALOMETRIC DATA
(STEINER ANALYSIS)**

	Pre-treatment	Post-treatment	Norm
<i>Skeletal Analysis</i>			
SNA	79.5°	82.2°	82.0°
SNB	78.9°	81.1°	80.0°
ANB	0.6°	1.1°	3.0°
SND	75.0°	77.3°	76.0°
Occlusal plane angle	19.6°	17.7°	14.0°
Mandibular plane angle	38.2°	36.5°	32.0°
<i>Dental Analysis</i>			
Upper			
incisor position	2.1mm	4.1mm	4.0mm
Lower			
incisor position	3.3mm	3.1mm	4.0mm
Pg-NB	-0.2mm	0.1mm	4.0mm
Interincisal angle	138.6°	127.9°	131.0°
Upper incisor angle	17.6°	26.4°	22.0°
Lower incisor angle	23.2°	24.6°	25.0°
<i>Soft-Tissue Analysis</i>			
Upper lip protrusion	0.0mm	1.4mm	
Lower lip protrusion	1.5mm	3.9mm	



Fig. 3 TSME in place before activation.



Fig. 4 Patient after 15 days of transverse activation.

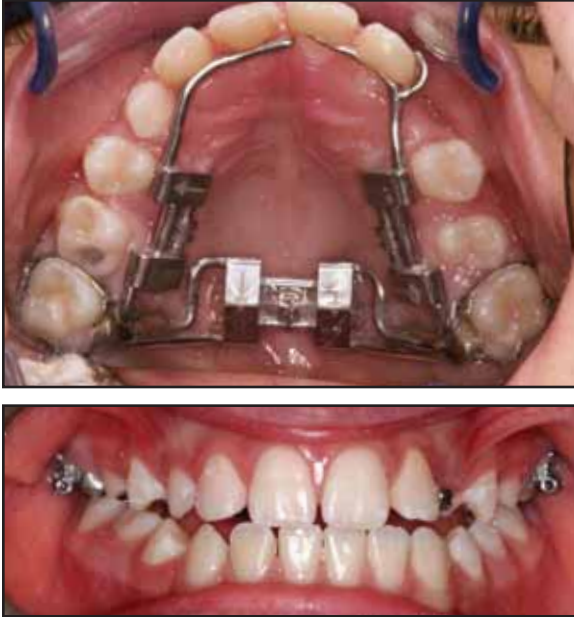


Fig. 5 Patient after eight months of sagittal activation.

months (Fig. 5). With the maxillary hypoplasia corrected, the appliance was left in place for four months of passive retention (Fig. 6).

Discussion

The TSME increases the perimeter length of the upper arch in cases such as the one presented here. It is easy to use, with placement and activation procedures similar to those of the traditional rapid palatal expander. Patient comfort is satisfactory, and compliance is not an issue because the appliance is fixed.

We have treated 40 patients (25 female, 15 male), age 5 to 15, with the TSME. All had reduced maxillary transverse and sagittal dimensions, with

related anterior and buccal crossbites and dental crowding. Treatment was successful in every case, increasing the arch perimeter in the posterior segment after transverse activation and in the anterior segment after sagittal activation.

The TSME is particularly effective in cases of mild Class III malocclusion with maxillary crowding, but it should be regarded as only one step in a complete orthodontic treatment plan.

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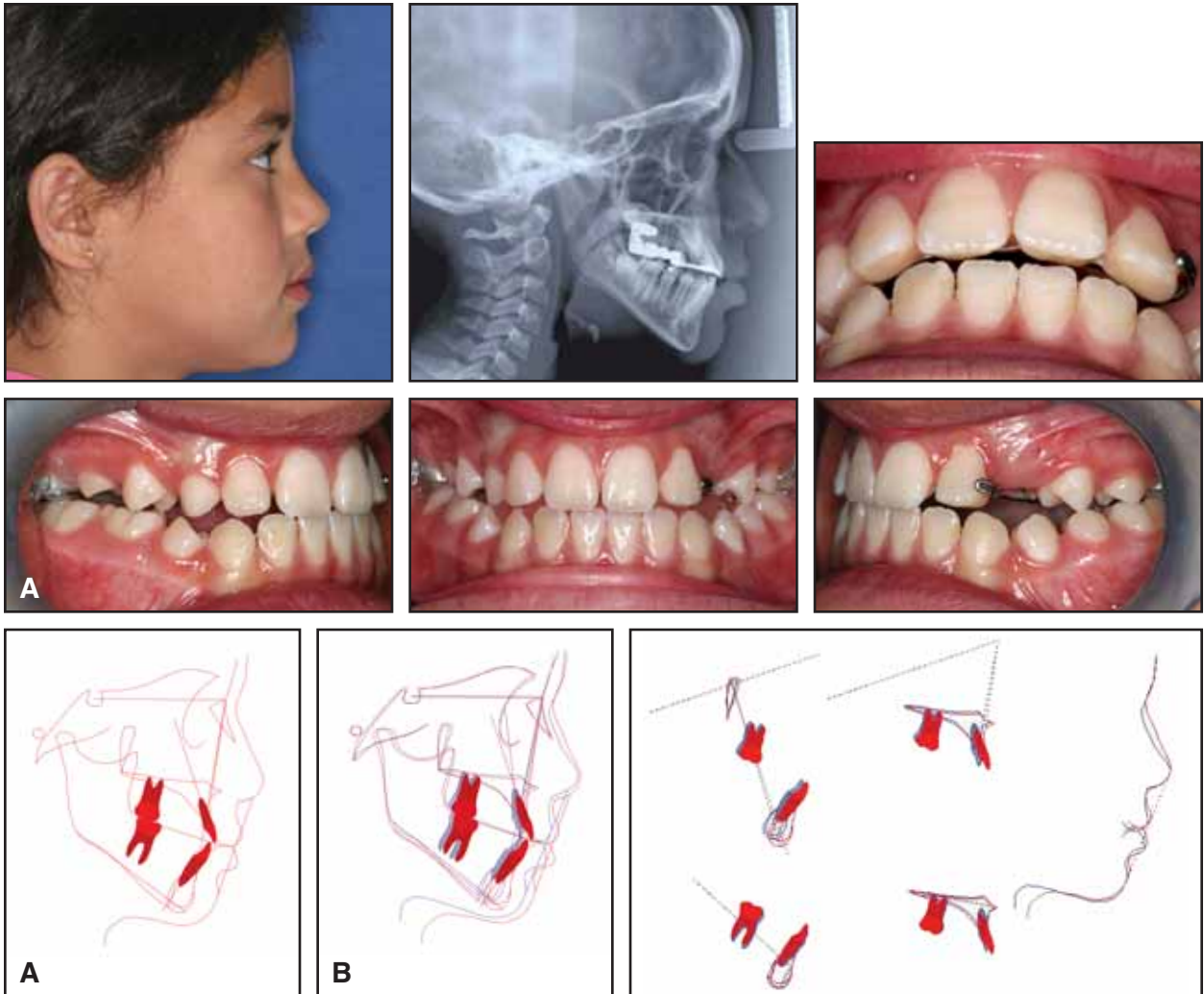


Fig. 6 A. Patient after four months of passive retention. B. Superimposition of pre- and post-treatment cephalometric tracings.