

Use of a Nickel Titanium Palatal Expander in Cleft-Palate Cases

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After closure of a cleft lip and palate, the patient often experiences a collapse of the maxillary fragments, resulting in a poor occlusion and an inability to chew properly.¹⁻⁵ While early surgical intervention improves the patient's quality of life, lip repair and closure of the palatal cleft also tend to constrict the maxilla and produce anterior crossbite.⁶ The resulting maxillary deficiency is probably the most common problem observed in such cases.^{6,7}

Although transverse expansion of the max-

illa has been used by orthodontists for more than a century to correct maxillary anomalies, it can be extremely difficult to use in cleft-palate patients.^{8,9} This article shows three cases in which the temperature-activated Nitium Palatal Expander* (NPE) was effective.^{10,11}

Case 1

A 12-year-old female cleft-palate patient presented with a Class III skeletal and dental

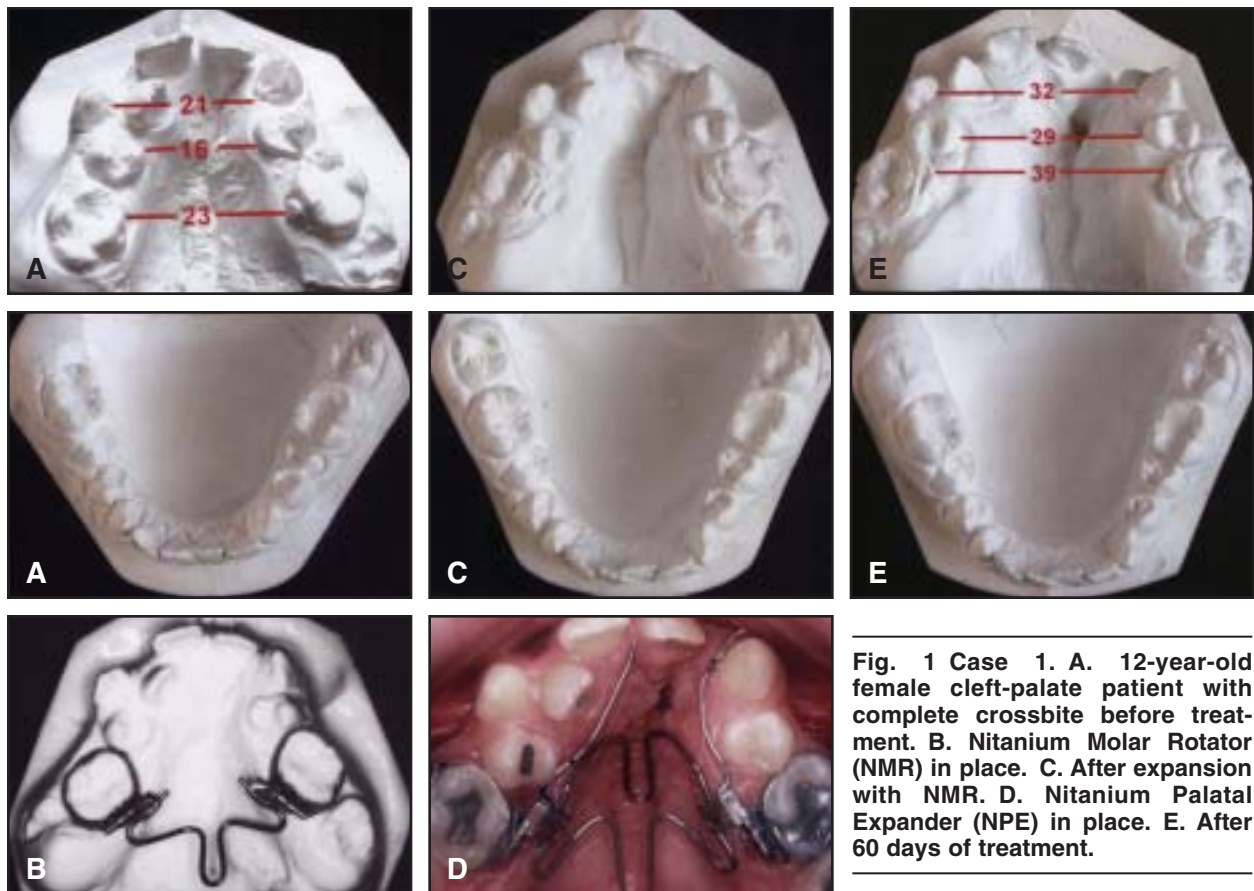


Fig. 1 Case 1. A. 12-year-old female cleft-palate patient with complete crossbite before treatment. B. Nitium Molar Rotator (NMR) in place. C. After expansion with NMR. D. Nitium Palatal Expander (NPE) in place. E. After 60 days of treatment.



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relationship, a complete crossbite, an overjet of -3.5mm , and an overbite of -2.5mm (Fig. 1). Because it was impossible to insert even the smallest size NPE, a Nitanium Molar Rotator* (NMR) was first used to correct the molar rotations and provide some degree of expansion. An NPE (the original version of the appliance, with two transpalatal wires) was then inserted to correct the crossbite.

After 60 days of treatment, the required expansion had been achieved and the maxillary first permanent molars had been rotated and distalized. The fistula that opened at the end of expansion was later corrected by surgery.

Case 2

A 13-year-old female cleft-palate patient presented with a Class I skeletal and dental relationship, a posterior crossbite and minor constriction on the left side, and an overjet and over-

bite of -0.5mm each (Fig. 2). Maxillary expansion was planned in conjunction with upper and lower fixed appliances.

A conventional Quad Helix** appliance was unable to correct the crossbite in three months and was then replaced with an NPE2 (the latest version, with one transpalatal wire). After 70 days, the crossbite was corrected, the maxillary first permanent molars were rotated and distalized, and the interdental space was increased.

Case 3

An 18-year-old male cleft-palate patient presented with a Class I skeletal and dental relationship, a bilateral posterior crossbite, an overjet of -1mm , and an overbite of 2mm (Fig. 3).

*Ortho Organizers Inc., 1619 S. Rancho Santa Fe Road, San Marcos, CA 92069. Nitanium is a registered trademark.

**RMO Inc., P.O. Box 17085, Denver, CO 80217.

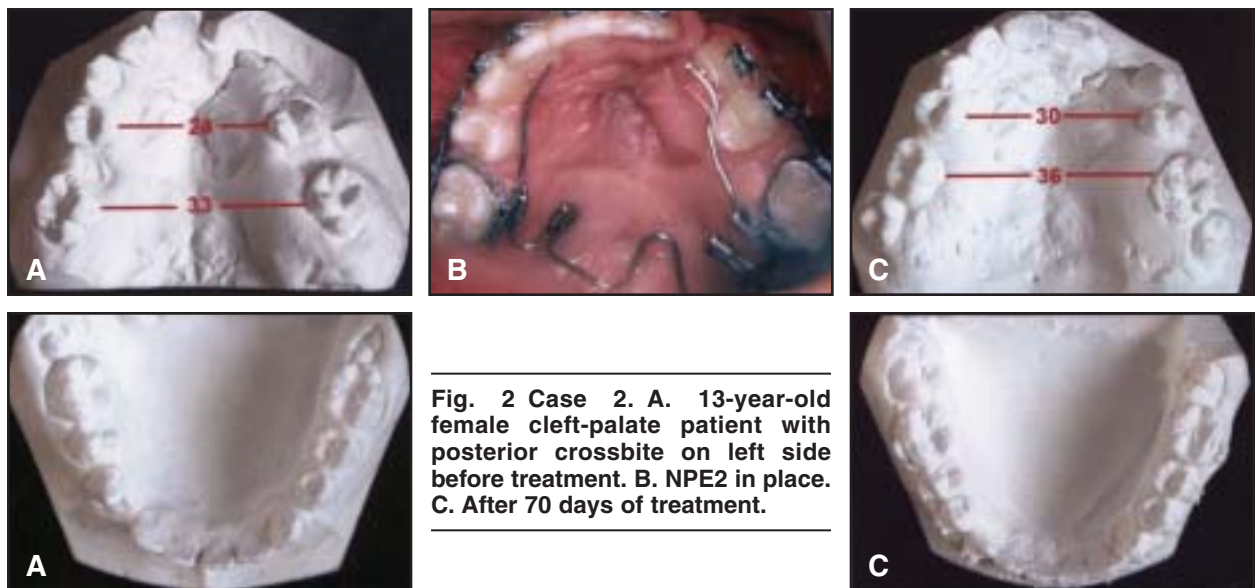


Fig. 2 Case 2. A. 13-year-old female cleft-palate patient with posterior crossbite on left side before treatment. B. NPE2 in place. C. After 70 days of treatment.

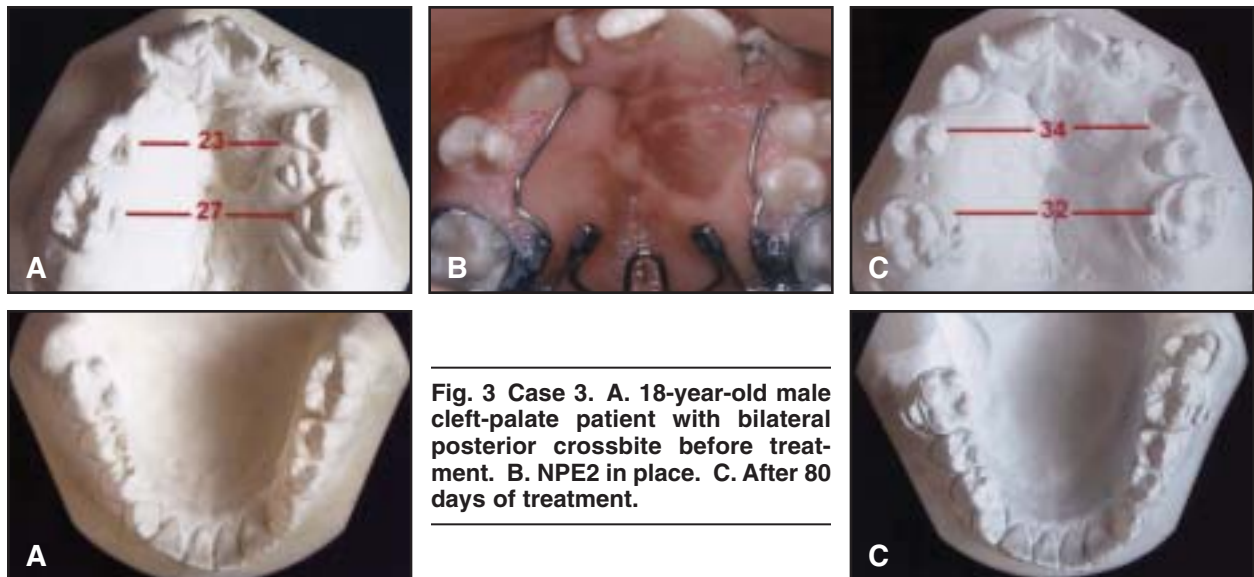


Fig. 3 Case 3. A. 18-year-old male cleft-palate patient with bilateral posterior crossbite before treatment. B. NPE2 in place. C. After 80 days of treatment.

After 80 days of expansion with the NPE2, the crossbite was corrected, the maxillary first molars were rotated and distalized, and the interdental space was increased.

Discussion

Many clinicians rely on some form of rapid or slow palatal expansion for maxillary transverse corrections. Conventional palatal expanders, besides being uncomfortable for the patients, may require labor-intensive laboratory construction.¹²⁻¹⁴ Furthermore, their intermittent force application makes them inefficient,¹⁰ and they are often attached to maxillary first molars with preexisting mesiolingual rotations that the devices are unable to correct.^{15,16} Such rotations can distort the appliances, wasting much of the potential expansion time until the rotations are corrected.¹⁰

On the other hand, the NPE, developed by Arndt, produces light, continuous pressure against the midpalatal suture while simultaneously uprighting, rotating, and distalizing the maxillary first molars.^{10,11} The action of the ap-

pliance is a consequence of nickel titanium's shape memory and transition temperature effects. Activated by body temperature, the NPE automatically expands to its predetermined shape, requiring little manipulation by the clinician and permitting the patient to mitigate the pressure, if necessary, by drinking a cold liquid.¹⁰

The NMR used in Case 1 was developed to correct molar rotations while providing torque control, expansion, and vertical control.^{10,15,16} As with the NPE, the shape memory of the transpalatal wire is activated by temperature. Below the transition point of 94°F, the metal is flexible enough for bending.¹⁰ After insertion, as the patient's mouth warms the wire, it tends to return to its original shape. The light, continuous force exerted by the wire assures patient comfort.

The cleft-palate cases presented in this article were successfully treated with various sizes and versions of the NPE, using force levels between 230g and 300g. The appliance also rotated and distalized the maxillary first molars, but no attempt was made to calculate either the amount of distalization or the relative amounts of orthopedic vs. orthodontic expansion.

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