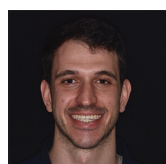


## Clinical Pearl

# Palatal skeletal anchorage: multiple applications with a single appliance

Mario Palone<sup>1</sup>, Giulia Romagnolo<sup>1</sup>, Francesca Cremonini<sup>1</sup>, Emanuele Paoletto<sup>1</sup>, Luca Lombardo<sup>1</sup>

<sup>1</sup>Department of Orthodontics, University of Ferrara, Ferrara, Italy.



### \*Corresponding author:

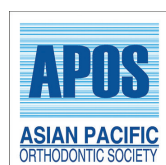
Giulia Romagnolo,  
Department of Orthodontics,  
University of Ferrara, Ferrara,  
Italy.

giulia01.romagnolo@edu.  
unife.it

Received: 16 January 2023  
Accepted: 19 February 2023  
EPub Ahead of Print: 27 March 2023  
Published: 10 July 2023

DOI  
10.25259/APOS\_7\_2023

Quick Response Code:



## ABSTRACT

Using a single bone-borne maxillary appliance with twofold mechanics, that is, rapid palatal expander and non-frictional distalizing appliance (Pendulum) is a valuable option to treat young-adult patients with poor compliance. In this particular case, the same appliance was used to disinclude 2.3, eliminating reaction forces on the arch. Therefore, the first expansive phase was followed by the distalizing phase. After enough space was obtained for the recovery of tooth 2.3, a triple-looped titanium-molybdenum alloy (TMA) spring was used to perform canine orthodontic traction. The core concept is that digital planning and optimal positioning of two palatal mini-screws can ensure a bicortical anchorage which, in turn, enabled to tolerate the different orthodontic phases. As a matter of fact, a tooth-bone-borne anchorage was followed by a pure bone-borne anchorage with no lost of stability.

**Keywords:** Miniscrew, Pendulum, RPE, Rapid palatal expansion, Surgical assisted eruption

Palatal vault is considered an election site for mini-screws placement, due to its availability, the presence of high-quality bone, and the absence of nerves and blood vessels, which makes the zone safe and suitable for many clinical applications.<sup>[1]</sup>

As a matter of fact, palatal mini-screws could be effective for Class II malocclusion in young-adult patients to achieve both adequate transverse maxillary expansion (with both hybrid or bone-borne anchorage) and distalization of upper molars, avoiding or minimizing some common side effects of these procedures, such as vestibular tipping of molars, mesialization of premolars, and flaring of incisors.<sup>[2]</sup>

This case shows how a hybrid T-Rex rapid palatal expander (RPE) could be an efficient option to achieve both transverse maxillary expansion and upper molar distalization, thus avoiding multiple appliances and waste of time. Moreover, it was applied for the recovery of maxillary canine too, without the undesired intrusion of contiguous teeth and the occurrence of anterior open bite. Furthermore, these mechanics were accomplished without asking for the patient's compliance.

To fulfill all these objectives, a bicortical engagement of palatal mini-screws was ensured by MAPA protocol.<sup>[3]</sup>

A 14-year-old Caucasian female patient presented a Class II malocclusion with skeletal maxillary constriction and inclusion of tooth 2.3. The total lack of space for its eruption was evident, with the upper dental midline shifted completely toward the second quadrant, whereas posterior teeth shifted mesially establishing a full cusp Class II molar relationship [Figure 1].

This is an open-access article distributed under the terms of the Creative Commons Attribution-Non Commercial-Share Alike 4.0 License, which allows others to remix, transform, and build upon the work non-commercially, as long as the author is credited and the new creations are licensed under the identical terms.

©2023 Published by Scientific Scholar on behalf of APOS Trends in Orthodontics



Figure 1: Initial intraoral photographs.

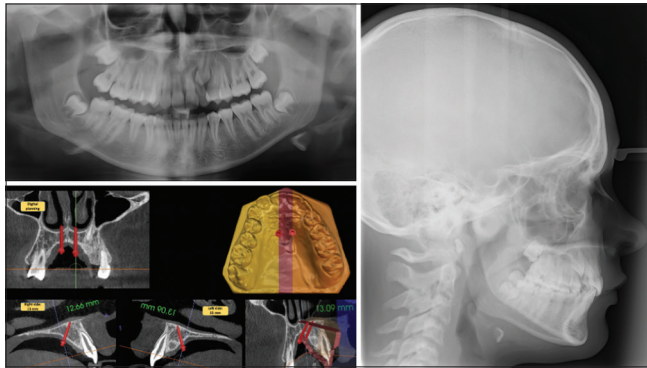


Figure 2: Initial x-rays and digital planning on cone-beam computed tomography system.

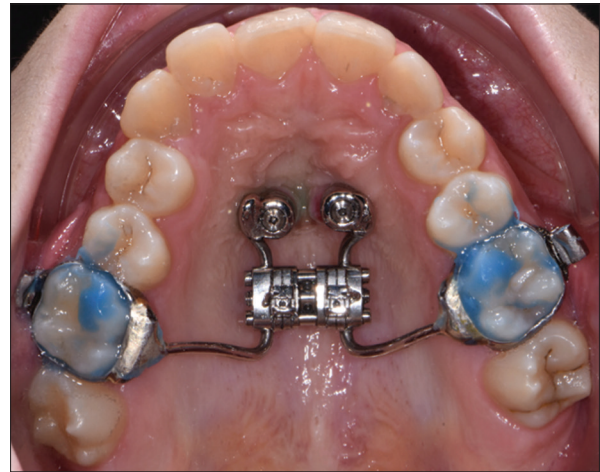


Figure 4: Bonded hybrid rapid palatal expander appliance.

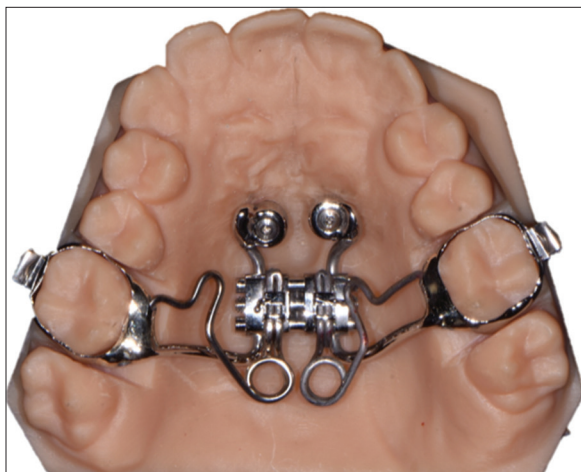


Figure 3: Hybrid T-rex rapid palatal expander appliance.

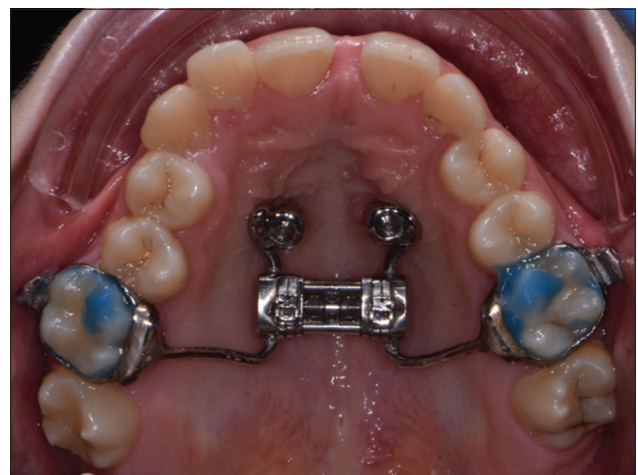
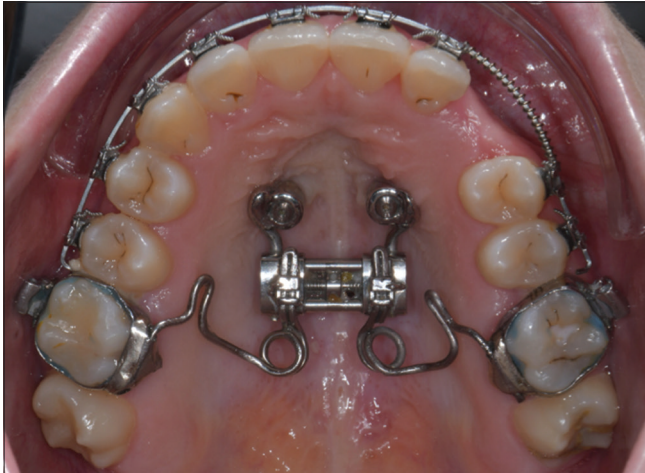


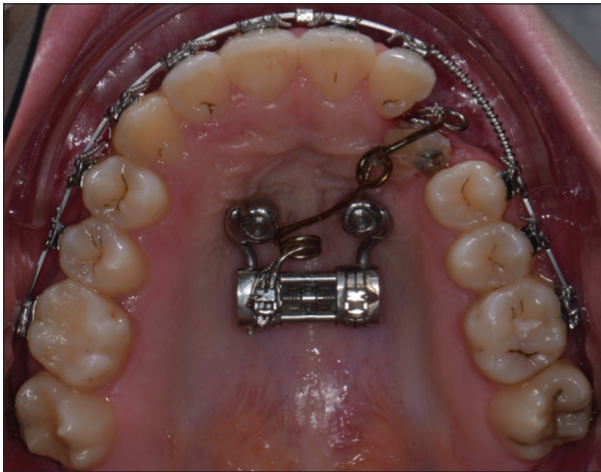
Figure 5: Rate of expansion after 30 turns.

Conventional orthodontic treatment alternatives would implicate an RPE, headgear extraoral appliance (to avoid premolars mesial shifting), and the recovery of the 2.3 with fixed appliances (FAs).<sup>[4]</sup>

Through digital planning [Figure 2], hybrid T-rex RPE was designed to perform all these biomechanics [Figure 3]. After



**Figure 6:** Insertion of TMA springs after removing expander arms and open coil inserted in fixed appliance.



**Figure 7:** 2.3 Eruption and engagement with triple-looped TMA spring.



**Figure 8:** 2.3 successfully aligned and engaged in the 0.019 × 0.025 SS archwire.



**Figure 9:** Final intraoral photographs.

the first phase of expansion (30 turns) [Figures 4 and 5] and 2 months of stabilization, TMA springs were inserted to perform upper molar distalization. After 9 months of repeated activations, a bilateral Class I molar relationship was achieved and the space for 2.3 recovered, together with the use of FAs [Figure 6]. After the surgical exposition, an extrusive force for 2.3 recovery was applied with a triple-looped 0.036-inch blue-Elgiloy spring [Figures 7 and 8] until also bilateral Class I canine relationship was obtained [Figure 9].

#### Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent.

#### Financial support and sponsorship

Nil.

#### Conflicts of interest

There are no conflicts of interest.

#### REFERENCES

1. Wilmes B, Ludwig B, Vasudavan S, Nienkemper M, Drescher D. The T-zone: Median vs. paramedian insertion of palatal mini-implants. *J Clin Orthod* 2016;50:543-51.
2. Lombardo L, Palone M, Maino G, Paoletto E, Carlucci A, Siciliani G. Class II subdivision with skeletal transverse maxillary deficit treated by single-sitting bone-borne appliance: A case report. *Angle Orthod* 2021;91:129-37.
3. Maino G, Paoletto E, Lombardo L, Siciliani G. MAPA: A new high-precision 3D method of palatal miniscrew placement. *Eur J Clin Orthod* 2015;3:41-7.
4. Schneider-Moser UE, Moser L. Very early orthodontic treatment: When, why and how? *Dental Press. J Orthod* 2022;27:2.

**How to cite this article:** Palone M, Romagnolo G, Cremonini F, Paoletto E, Lombardo L. Palatal skeletal anchorage: multiple applications with a single appliance. *APOS Trends Orthod* 2023;13:193-5.