ALLEO+: AN AESTHETIC SOLUTION FOR THE SLOW TRANSVERSAL EXPANSION

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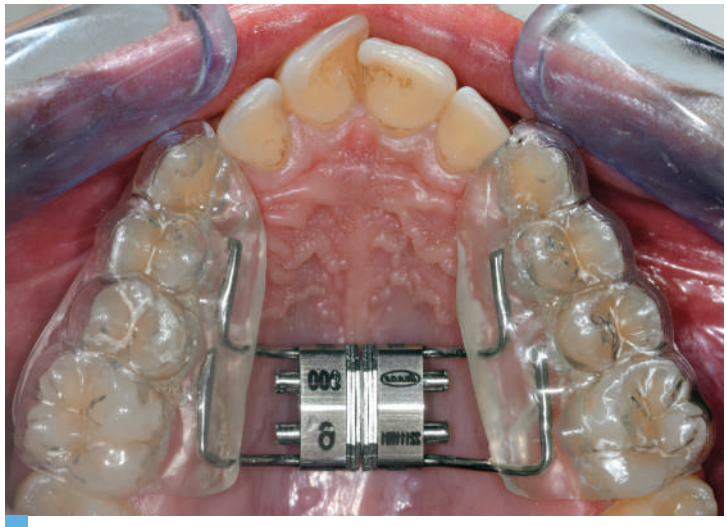
INTRODUCTION

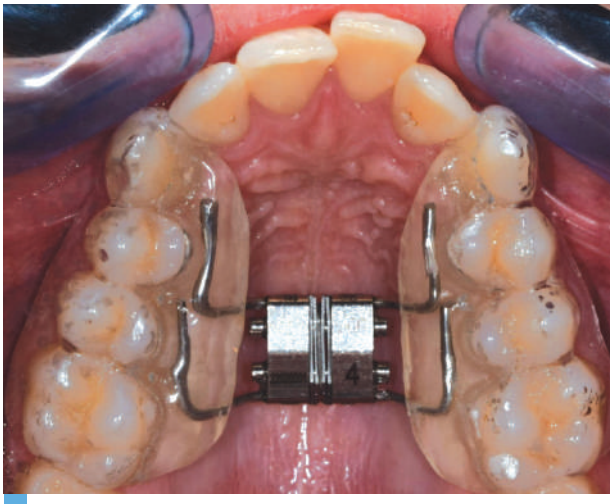
The transversal deficit represents a dysgnathia that manifests itself clinically with a reduction in the transverse diameter often associated with the presence of a mono or bilateral cross-bite and tooth crowding. (1) In these clinical conditions the therapeutic approach of choice, which has as its primary goal the restoration of the correct transversal diameters of the upper jaw, is palatal expansion. (2) Obviously, the choice of the correct appliance to be used must consider all the individual factors (age of the patient, bad oral habits, etc.), the the upper and the lower jaw discrepancy amount as well as the transverse diameters of the dentoskeletal structures. (3) ALLEO+ is a slow removable expander, conceived and designed as an aesthetic device that can be used in adult cases, both as a transversal dentoalveolar deficit therapy and as a pre-treatment device for the successive use of aligners. The Nickel-Titanium leaf springs of the HYBRID MODE EXPANDER® (HME) (Figs. 1a-c) exert a constant pressure on the posterior quadrants, stimulating a controlled expansion of the maxilla, resulting in a gain of space of the arch (Figs. 2a-c).



FIGG. 1a-c - Clinical case. The device is characterised by an active central part, represented by the nickel-titanium springs and arms, connected to the lateral parts, consisting of two customized thermoformed clear splints.

FIG. 1b

FIG. 1c

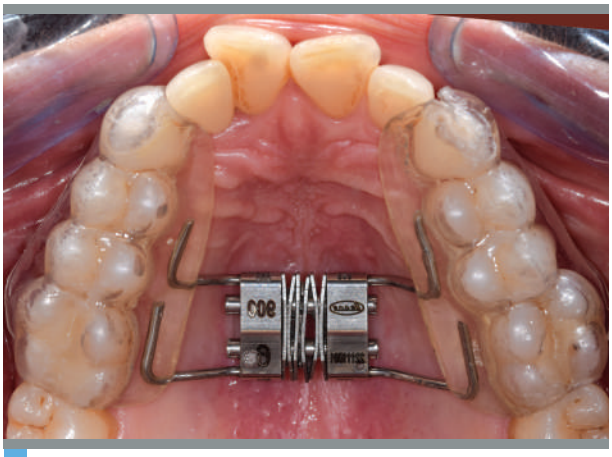


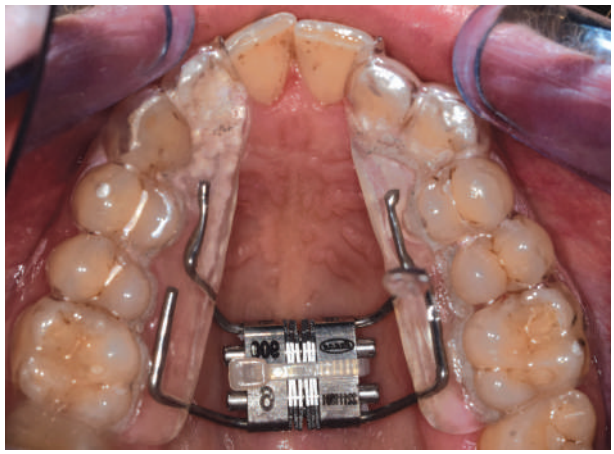
FIGG. 2a-c - The leaf springs, thanks to the exclusive HME® design, have a pure super elastic behavior, which ensures a release of a constant pressure of 900 grams on both the posterior quadrant.

FIG. 2b

FIG. 2c

From the clinical point of view, being a removable device, it promotes light and intermittent forces on the upper jaw, generating a slow expansion with a gain of space that allows us to reduce stripping, minimizing the number of aligners to be used after and reduce the treatment time by increasing predictability. From a biomechanical point of view, the forces produced by the nickel-titanium springs are light and continuous (900 g). The resin splints (Figs. 3a, b) are individualized and clinically generate an excellent bite-block effect helping the mandibular repositioning (in case of crossbite with laterodeviation) during the slow and gradual expansion process. In cases of unilateral contractions, a dedicated geometry of the splints with one anchoring side including more teeth than the other side, has been explicitly requested (Fig. 4).





FIGG. 3a, b - Occlusal splints are custom-made, however, can be made including both cuspids and molars or, if Clinician requires it, including even lateral incisors.

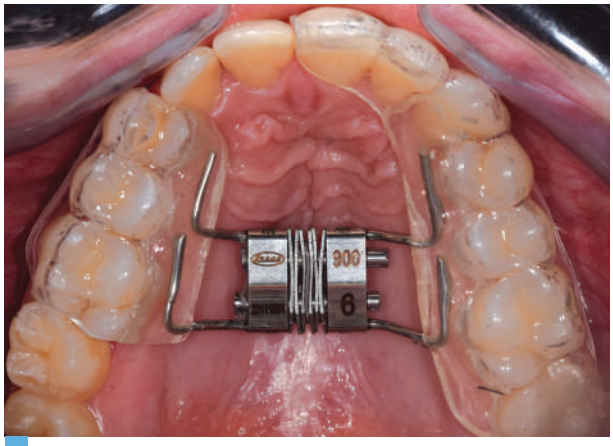
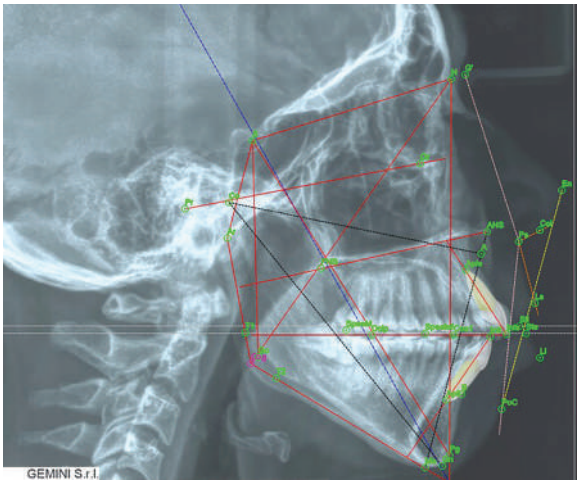


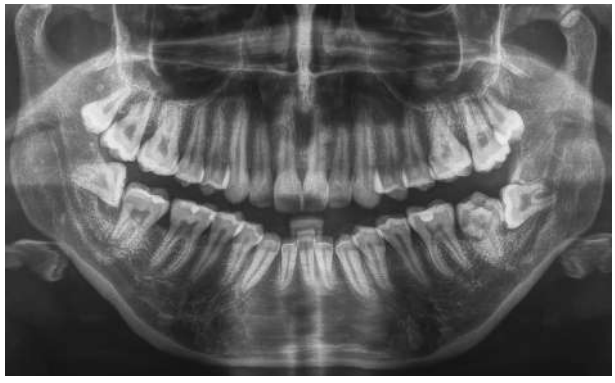
FIG. 4 - In this particular case, since the palate only needed expansion on one side, customization of the occlusal splints was requested with extensions over all the teeth of the anchoring side, in order to achieve the necessary anchorage to expand only the contracted maxillary side.

CASE REPORT

Patient M. P., aged 34, comes to our observation with a request for an aesthetic orthodontic treatment to improve teeth alignment and smile exposure. A facial analysis reveals a squared, symmetrical face with an extremely convex profile. On functional examination, no TMJ dysfunction are detected. Cephalometric analysis (Figs. 5a-c) shows a hyperdivergent skeletal class II with the presence of an anterior open bite. The upper incisors present an inclination with respect to the bi-spinal plane of 109.85°. The lower incisors (91.04°) are protruded in relation to the mandibular plane and their position in relation to the A-Pg line is normal. The intraoral examination (Figs. 6a-h) shows severe crowding in the upper and lower arch and an open bite with a Class I inter-arch ratio of both molar and cuspid. The upper arch contraction is expressed with the narrow and curved on the back palatal shape. The midsagittal lines are not coincident, the upper is deviated slightly to the right, the lower to the left. The orthopantomographic examination shows previous dental treatments and the inclusion of 38 and 48. Cephalometric values demonstrate a dolichofacial type with excessive anterior proclination of the upper and lower incisors. The treatment goals are: expansion of the upper arch to correct the transverse diameter and recovery of space with harmonisation of shape and function of the arches and subsequent dental alignment therapy.



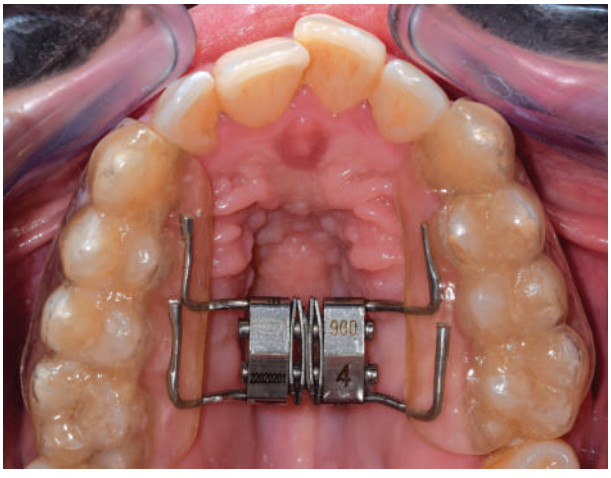
SNA	86,26°
SNB	74,46°
ANB	7,80°
WITS	7,65
S-N / Go-Gn	47,79°
ANS-NS/Go-Gn	46,18°
U1-ANS-PNS	109,85°
U1-A-Pg (mm)	14.48
L1-Go-Gn	91,04
L1-A-Pg (mm)	8.44
Overjet (mm)	6,37
Overbite (mm)	0,31



FIGG. 5a-c - Acquisition of radiographic records. Initial cephalometric tracing

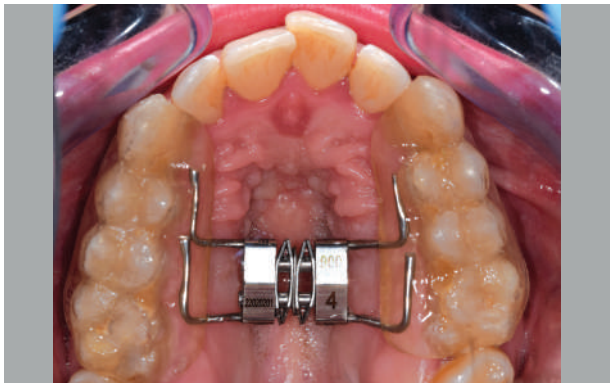
FIGG. 6a-h - Extraoral and intraoral pictures of the start of treatment

After 3 months from the beginning of the expansion, an excellent shape of the upper arch, a good recovery of space and a spontaneous improvement of the upper crowding is achieved; with the stabilization of the result and the harmonisation of the shape and function of the arches, we have achieved all the set goals. We will proceed to the next dental alignment phase certainly with fewer aligners and a reduced amount of stripping (Figs. 7-10).



FIGG. 7a-e - Intermediate Step

FIGG. 8a-d - Extraoral and intraoral pictures at the end of treatment



FIGG. 9a, b - During monthly clinical checks, we observed a progressive increase in the leaf springs recover, proving the slow and constant force release , with a consequent good expansion of the upper arch. In the picture you can clearly see how the leaf springs have completely opened up

FIGG. 10a, b - At the end of the treatment, the upper jaw is expanded and its shape modified, including the hypercorrection of the lateral sectors.

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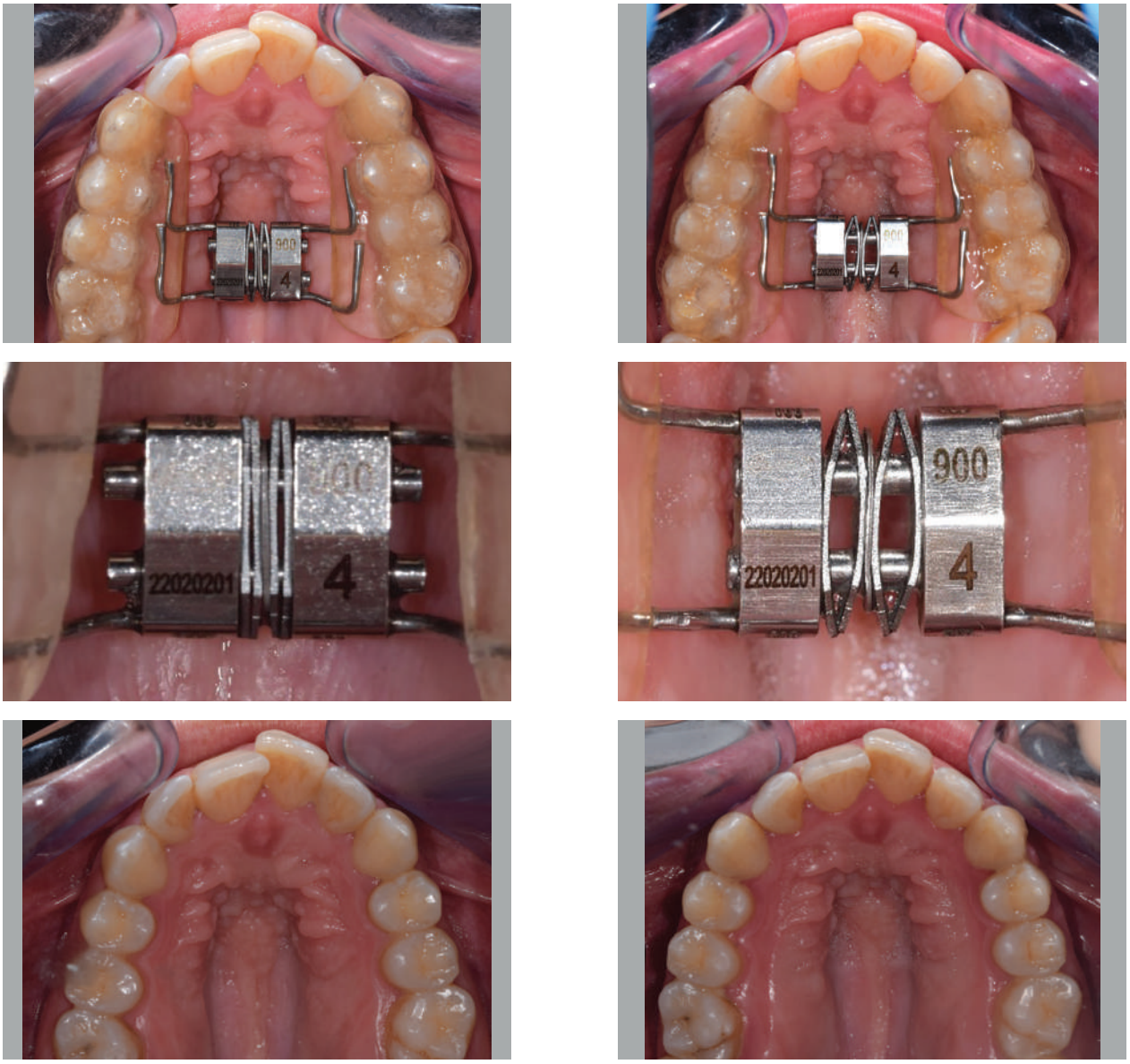
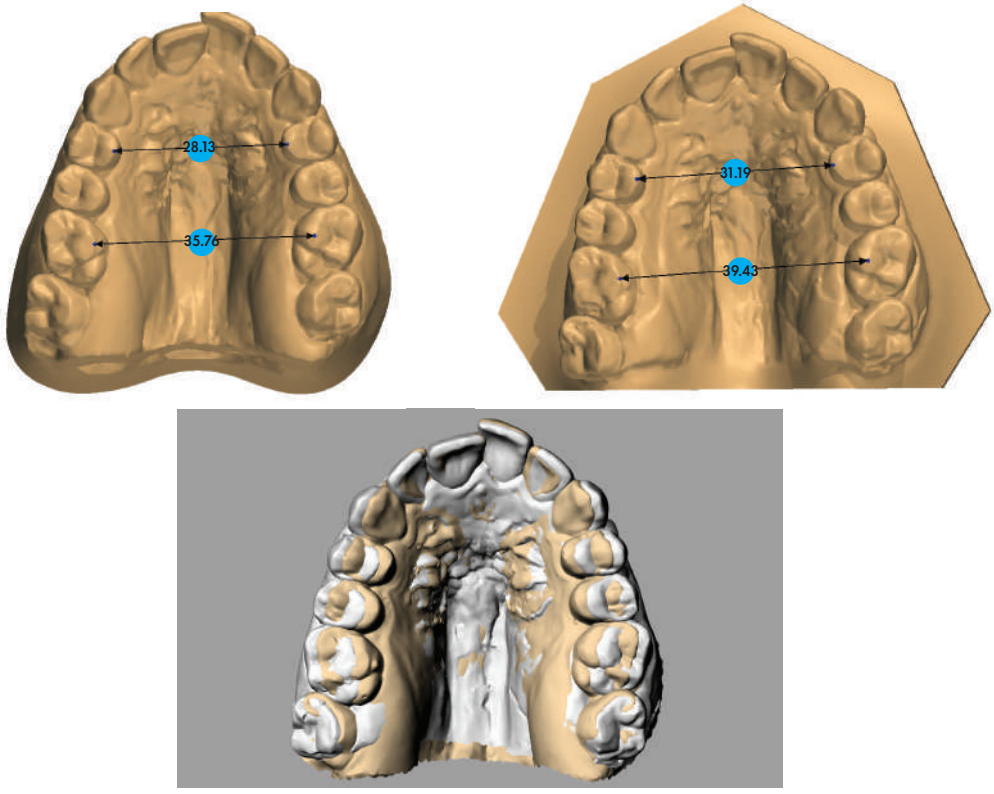


FIGG. 11a-f - Before and after-treatment comparison pictures

CONCLUSION

The results achieved prove the effectiveness, efficiency and ease of use of the slow expander (Figs. 11a-f) in the correction of transversal dentoalveolar deficits. The advantages are, above all, aesthetics, simplified handling of a pre-activated device with constant visual control of activation, excellent safety of use and furthermore, the use of predetermined, light, and constant forces, which are essential for good predictability of results. Based on the current scientific evidence (4-6), we are confident claiming the need to integrate the dental aligners treatment along with other aesthetic solutions and auxiliary devices, moving towards the hybrid therapy concept, to increasingly reduce the gap between what we can virtually design and what the patient's outcome shows us.[7-8]



FIGG. 12a-c - Le sovrapposizioni in foto e le rispettive misurazioni eseguite sui modelli 3D prima e dopo l'espansione dimostrano come il dispositivo Alleo+ abbia prodotto un'ottima espansione dento-alveolare di oltre 3 mm nei settori medio e postero-laterali

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