

Rapid maxillary expansion: small details make the difference

By Leone

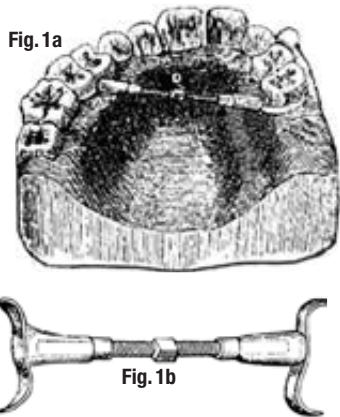


Fig. 1a

Nowadays, rapid maxillary expansion (RME) is a quite popular orthodontic therapy since maxillary deficiency is probably the most recurrent problem that can be detected among patients.

The history of this therapy goes back to 1860 when Dr Emerson C Angell wrote, and Dental Cosmos published, an article where he reported a case of a 14-year-old girl with a unilateral cross bite, treated by means of a jack-screw in order to widen the palate. The complete expansion was achieved in only 2 weeks and the patient showed an interincisor diastema (Figs. 1a & b).

Dr Angell was a real pioneer in dentofacial orthopaedics, and faced great criticism among the dental community even if, 35 years before the possibility of proving it by the use of X-ray, his palatal widening therapy was successfully and clearly proven today; in 1860 he defined the gold standard for actual maxillary expansion therapy.

An interesting fact to know but true as well as little sad, Dr Angell became frustrated with his colleagues' opinions, so he decided to leave the orthodontic discipline, as well as San Francisco, ending his professional carrier as a medical doctor in the US.

Many years after Dr Angell's futuristic vision, in the 1970s, Dr Haas reintroduced this therapy by means of an updated design of a rapid palatal expander, the so-called Haas expansor¹ (Fig. 2).

From that time, RME has been investigated several times by many authors focusing on the indications, the right timing, the various clinical procedures, initial outcomes and long-term stability, as well as regarding the influence of different appliance designs.

Today the 'hygienic RME', so called due to the absence of acrylic contacting with the palatal mucosa that facilitates oral hygiene, is largely more popular than the Haas one (Figs. 3a & b).

Leone, as one of the few orthodontic screw manufactures in the world, has played an important role in this development since the very beginning: in the early '70s, Leone started the production of the first RME dedicated screw, fully made of stainless steel with 4 integrated arms (Figs. 4 and 5).

Since then, Leone has continuously improved the quality of the material, the production technology as well as widening the the expander range in order to give the orthodontist the best tools to fit their various

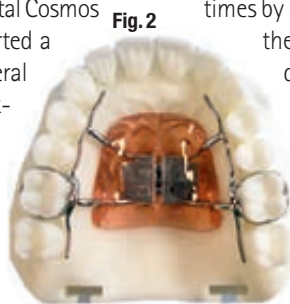


Fig. 2



Fig. 3a



Fig. 3b

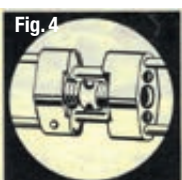


Fig. 4

The Leone 620 Hygienic expander for the separation of the palatal suture is now available in an improved model. Activation has been simplified, since the key cannot pass completely through the jack-screws, and the arms are separated from the guide pins and welded to the body. The expander, which is made of stainless steel and smoothly finished, is available in four sizes, all 8mm. in diameter. Price, \$5 each.



Fig. 5

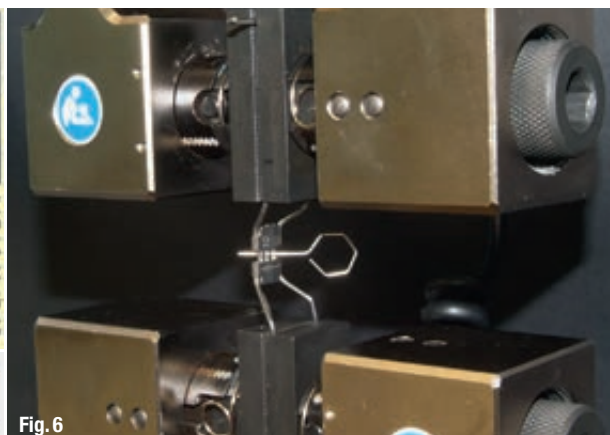
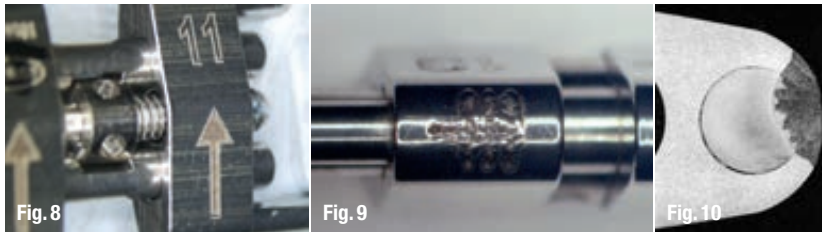


Fig. 6



Fig. 7

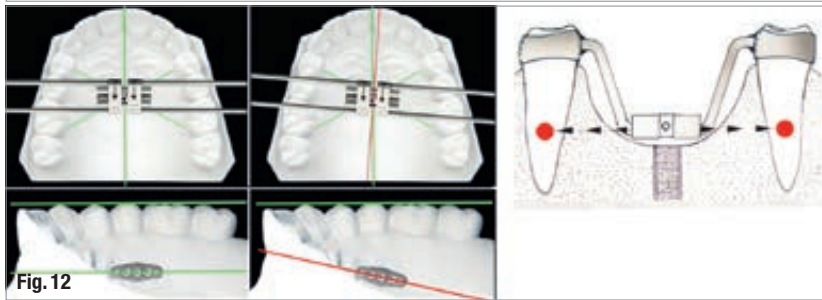


arms while each of them bears a laser marked identifying lot number that allows for complete traceability.

Knowing that a RME appliance 'produces the greatest dental and skeletal transverse changes by widening of the upper jaw, by separating the mid-palatal suture with large forces over a short time period, which subsequently allows the creation of more space for the permanent teeth' (from *Dental-pedia*, McGill University, Faculty of Dentistry), we have always been positively concerned about the functionality of each screw, thus we have paid maximum attention in all steps from design to the final quality test.



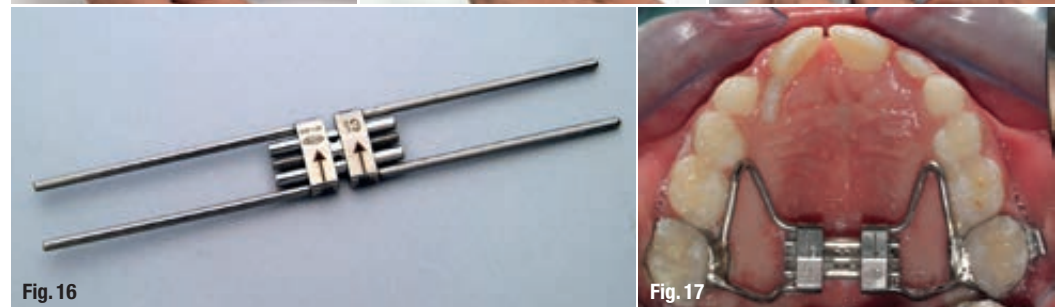
We have conducted extensive tests in order to know the mechanic limit of each RME models: our findings show that the 'weaker' component is always the activation key (at over 12 kg of force) that acts as a 'safety instrument'. In other words, it is highly unlikely that the RME will not produce a suture opening in youth patients, neither will the expansion mechanism be damaged by the counter force produced by the maxilla (Fig. 6).

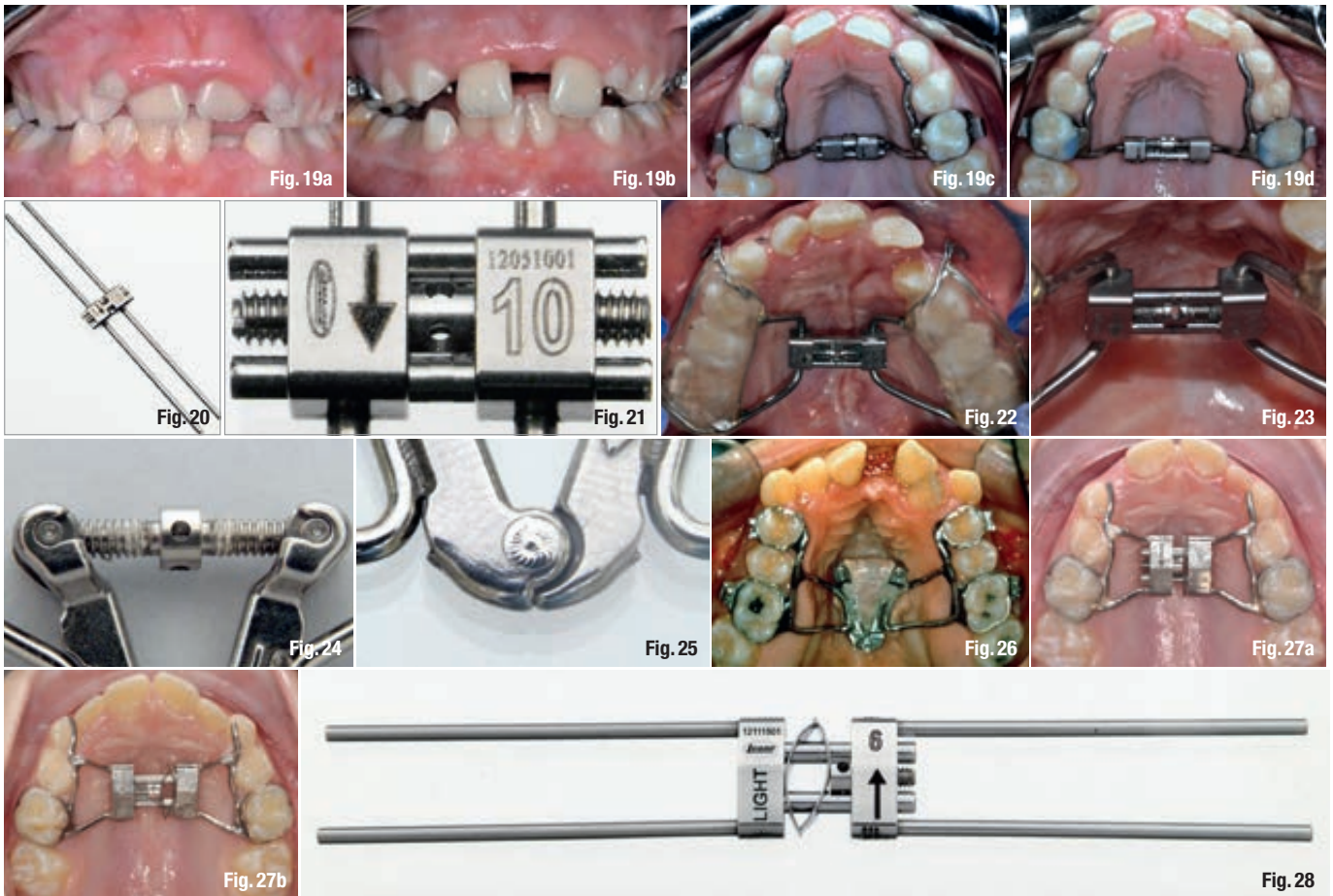


Each part of the RME expander is produced with tight tolerances and high polished surfaces to obtain controlled and precision expansion, once they are assembled together (Figs. 7 & 8).

clinical needs. Today, Leone offers a wide range of RME dedicated screws, all of them designed and manufactured in our high tech production facilities, fully made by surgical grade stainless steel, with laser welded

Leone RME expander's unique feature is the connection of the arm to the screw body: the arm fits perfectly in a blind hole created inside of the housing, then it is held in position by means of external high power laser welding (Figs. 9-10). This exclusive





method eliminates the possibility of arm detachment both during lab arm bending and in clinical use, as well as avoiding the overheating of the joint area, keeping the full strength of the wire thus assuring the required power.

The orthodontist and the technician can choose among various models of Leone expanders and appliance designs in order to fabricate the most appropriate device for the patient (Fig. 11).

Since the RME is an appliance that produces an orthopaedic maxillary modification, the orthodontic lab technician has to pay attention to the position of the screw as well of the arms: there are specific rules to be followed, as shown in Fig. 12.

We have designed specific tools to facilitate the lab procedures, avoiding the unwanted damage of the screw mechanism, as well as the overstress of the arms (Figs. 13–15).

Leone RME screw range with four arms have an expansion capacity ranging from 7 mm to 13 mm (Fig. 16).

Figure 17 (courtesy of Prof. P. Cozza University of Tor Vergata, Rome, Italy) shows a RME Butterfly design.

A smaller expander (Fig. 18) with two arms was developed for use in younger patients with mixed dentition and reduced palatal volume.

Figures 19a–d (courtesy of Dr A. Fortini, Florence, Italy) gives an example of the use of the smaller expander.

A RME with orthogonal arms has been developed in order to reduce the overall bulkiness, keeping a maximum stability thanks to the doubled guided pins expansion mechanism (Figs. 20–23; Figs. 22 Et 23 courtesy of Prof. Franchi, University of Florence, Italy).

A special fan type RME has been developed to enhance the anterior space gaining in cases with intercanine diameter (Figs. 24–26; Fig. 26 courtesy of Dr E. Schellino, Turin, Italy).

Maxillary expansion can also be obtained by means of a spring-loaded screw such as the newly developed Leaf expander that can produce two force levels, 900g and 450g, giving the orthodontist the possibility to expand the maxilla dentally and/or basally (Figs. 27 Et 28; Figs. 27a Et b courtesy of Dr C. Lanteri, Casale Monferrato, Italy).

Thank you Dr Angell for your intuition that has literally 'expanded' the orthodontic possibilities!_

Reference

[1] Haas AJ: The treatment of maxillary deficiency by opening the midpalatal suture. *Angle Orthod* 35:200-217, 1965.

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