LEONEAMERICA
VOL I #39
Member of Orthodontic Manufacturers Association
AAOF CORPORATE PARTNER

LEONEAMERICA
ORTHONEWS

SUMMER/FALL 2017
A Periodical for Orthodontic Professionals

Clinical Evaluation of the Maxillary Expansion Screw–Eagle A0630

Dr. Matteo Camporesi, Dr. Caterina Masucci,
Dr. Andrea Vangelisti
University of Florence

Rapid maxillary expansion gained a leading role in modern orthodontics as a safe, predictable and effective method to correct maxillary deficiency in the transverse plane in a wide range of clinical conditions. Rapid maxillary expansion in growing subjects represents an effective orthopedic therapy.

Several types of rapid maxillary expanders have been described in literature. Rapid maxillary expansion can be carried out by means of both banded and bonded appliances on deciduous or permanent teeth. In addition to standard expansion protocols, a new approach consisting of alternating cycles of maxillary expansion and constriction has been proposed (Liou 2005; Liou and Tsai 2005). This approach is particularly effective in the orthopedic treatment of class III malocclusion, as it amplifies the effects of the maxillary protraction obtained by the application of the face mask.

Regardless of the protocol used, rapid maxillary expansion devices are subjected to a high level of mechanical stress during the expansion of the upper jaw. A force between 16.6 and 34.8 pounds is required to allow for the separation of the median palatal suture (Isaacson and Ingram, 1964; Zimring and Isaacson, 1965).

CONTINUED ON PAGE 2

Some differences among expansion protocols can be described from a clinical point of view:

- Number of daily activations to achieve rapid maxillary expansion (standard expansion protocol, or alternate expansion and constriction protocol),
- Type of expander: banded or bonded, anchored on permanent teeth, or deciduous teeth.

When rapid maxillary expansion is achieved, the device should be left in place for a minimum of six months to allow for stability of the expansion (Lione et al., 2008). At this stage, usually the clinician locks the screw of the rapid maxillary expander by means of a stainless-steel ligature or the application of composite (Fig. 1 and 2).

The goal of locking the screw at the end of the expansion phase is to avoid a relapse that could be caused by the forces delivered by surrounding tissue or by action of the tongue that could rotate the screw.

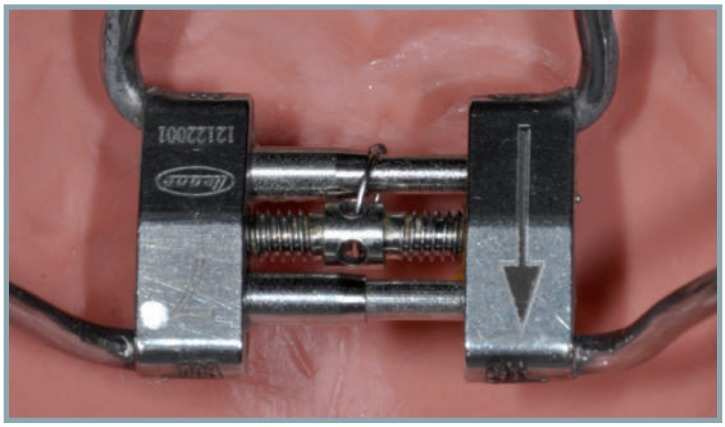


Fig. 1 Steel ligature to lock the screw at the end of the expansion phase.

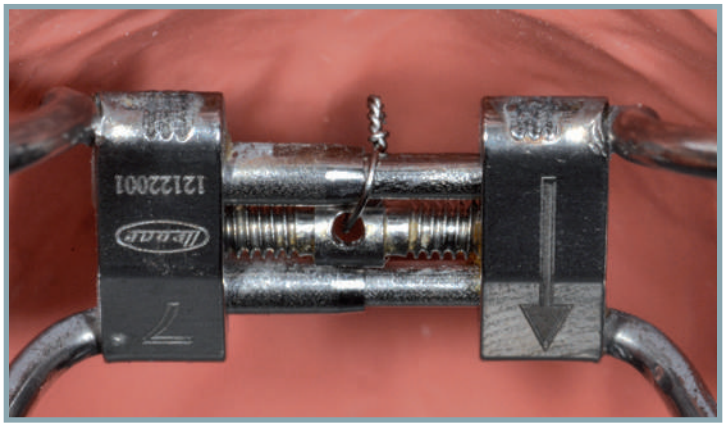


Fig. 2

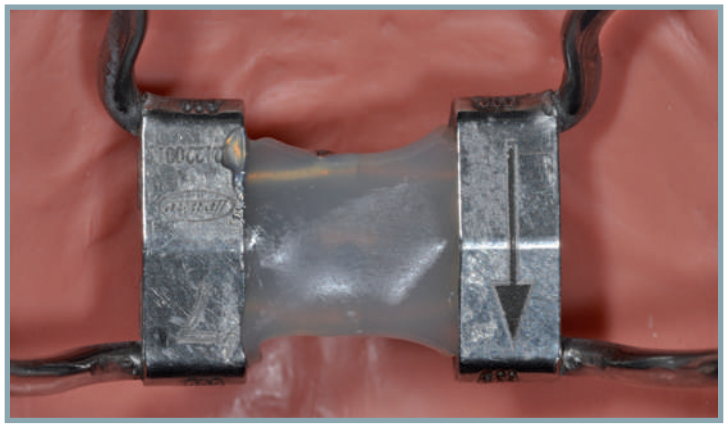


Fig. 3 Composite to lock the screw at the end of the expansion phase.

A previous study published in 2011 in the *Journal of Clinical Orthodontics* (Huanca-Ghislanzoni et al., 2011) demonstrated that the procedure of locking the screw at the end of the expansion phase performed with the Hyrax screw A0620 (Leone S.p.A., Sesto Fiorentino, Florence, Italy) was unnecessary. The Authors reported that at the time of expander removal, six months after the completion of the active phase of expansion, no patients had any movement of the screw in any direction in the absence of mechanical locks, which demonstrated absolute stability during the retention period.

There are no studies that analyze the post-expansion stability of the A0630 screw (Leone S.p.A., Sesto Fiorentino, Florence, Italy). The aim of this study was to evaluate the stability of this screw six months after the end of the expansion phase in the absence of mechanical locks, such as stainless-steel ligatures or composite.

Materials and Methods

Eighteen patients with mild transverse discrepancies alone or in association with sagittal and/or vertical disharmonies were observed. All the patients showed a negative transverse discrepancy and underwent rapid maxillary expansion; six patients presented with skeletal class I or class II malocclusion; 11 patients presented with skeletal class III malocclusion that required the use of the face mask to perform the maxillary protraction; and one patient was affected by cleft lip and palate.

The average age of the sample was 7 years +/- 6 months.

In the present study, three types of rapid maxillary expanders were used:

- Rapid maxillary expander with bands cemented on first permanent molars;
- Rapid maxillary expander with bands cemented on second deciduous molars; and
- Rapid maxillary expander bonded on deciduous teeth.

All the expanders included the Eagle A0630 screw (Leone S.p.A., Sesto Fiorentino, Florence, Italy).

The dimensions of the screws were: height of 4.5 mm, depth of 6.0 mm and the width of the screw body is chosen according to the amount of expansion requested (from 8 to 10 mm) and the morphology of the palatal vault. The threads of the screws are coated with a friction enhancer. One full turn of the screw (corresponding to 4 activations) resultes in an expansion of 0.8 mm.

Two different expansion protocols were used:

- Two activations per day, with a clinical check once per week until the end of the active phase of expansion (overcorrection)
- Two activations or deactivations of the screw per day in those patients treated with alternate expansion and constriction protocol. Clinical checks were performed once per week until the end of the active phase of expansion (overcorrection).

The parents of the patients were instructed to activate the expansion screws according to the standard expansion protocol, or the alternate expansion and constriction protocol. They were asked to log the exact number of the performed activations in a clinical diary.

Oral hygiene and food instructions specific to each type of expanders were provided. One week after the delivery of the expander, a clinical check was performed in order to control the regularity of the activation procedure and the quality of oral hygiene.

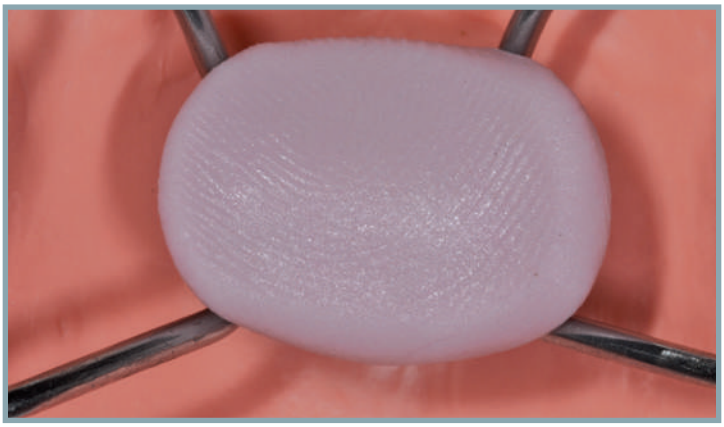


Fig 4 Impression of the body of the screw with silicone material at T1 and T2.

Once the rapid maxillary expansion was completed (overcorrection), parents of the patients were asked to stop the activation of the screw. The expander was left in place, and no stainless-steel ligature or composite were applied to the body of the screw.

At this time an impression of the body of the screw was done with silicone material directly in the mouth of the patient (fig 4) to measure the width of the body of the screw at the end of the active phase of expansion (T1). A clinical check was carried out once per month for every patient until the end of the retention period (6 months, T2). At this time, an impression of the body of the screw was done with silicone directly in the mouth of the patient (fig 4) in order to measure the width of the body of the screw at the end of the retention phase.

Impressions at T1 and T2 were measured by means of a caliper with double thin tips (fig. 5), and they were compared to evaluate the variations of the width of the body of the screw during the T1-T2 period (from the end of the active phase of expansion to the end of the retention period).

Fig.5 Measurements were performed by means of a caliper with double thin tips.

Results

None of the patients included in this study reported any problem during the active expansion phase or during the retention phase. None of the expanders were removed in advance due to the presence of decubitus of palatal mucosa or tongue mucosa or patient discomfort.

The average number of activations of the screw was 32 +/- 4 for patients with a consequent average expansion of 6.4 mm +/- 0.8 mm.

Measurements of the body of the screw at T1 (end of active phase of expansion) and T2 (end of retention phase) were the same in all the examined patients.

The absolute outcomes of the study did not require the use of statistical analysis.

Discussion

Locking the screw of the rapid maxillary expander at the end of the active phase of expansion is a very common procedure among orthodontists.

The study published in 2011 by Huanca-Ghislanzoni and collaborators demonstrated the post-expansion stability of the Eagle A0620 screw (Leone Ortodonzia), a widely tested product.

Recently expansion screws with a smaller body (Leone A0630) were manufactured and introduced in orthodontic practices. The Eagle A0630 screw shows considerable advantages from a clinical point of view, such as reduced obstruction with less patient discomfort during chewing, swallowing and phonation, decreased the risk of decubitus on the palatal mucosa and on the tongue, increased the level of oral hygiene and the possibility to insert screws with greater width in patients with minimal available space in the palatal vault.

The aim of the present study was to evaluate the characteristics and the mechanical properties of the Eagle A0630 screw, and to verify the capability of ensuring adequate levels of strength to counteract all the factors that oppose the expansion of the maxilla throughout the expansion process.

Factors involved in the deactivation of the rapid maxillary expander and in the relapse are represented by the resistance of the maxillary tissues as reported by Isaacson and collaborators in 1964 and by muscle strength of the cheeks (Halozenetis et al., 1994).

Other factors that could contribute to the deactivation of the expansion screw are represented by vibrations and lubrication. The voice frequency on the oral cavity may have some effects on the screw, but this remains a purely theoretical assessment, as there are no studies to support this theory. The same is true for the lubricant effect that saliva could have on the screw. This aspect has also never been confirmed by the literature.

However, it should be emphasized that the technical characteristics of the expansion screw analyzed in this study have a geometry that can significantly reduce the effect of disabling the maxillary tissues forces as demonstrated in the study of Huanca-Ghislanzoni (2011).

Another noteworthy aspect of the present study was the wide variability of clinical conditions in which the screw has been tested.

In the present study, we used both expanders with cemented-on bands (on first molars or second deciduous molars) and bonded expanders were used.

We treated patients presenting with class I, class II and class III malocclusions. We performed both a standard expansion protocol (2 activations per day) and a protocol involving alternating cycles of expansion and constriction in which the screw was subjected to greater stress.

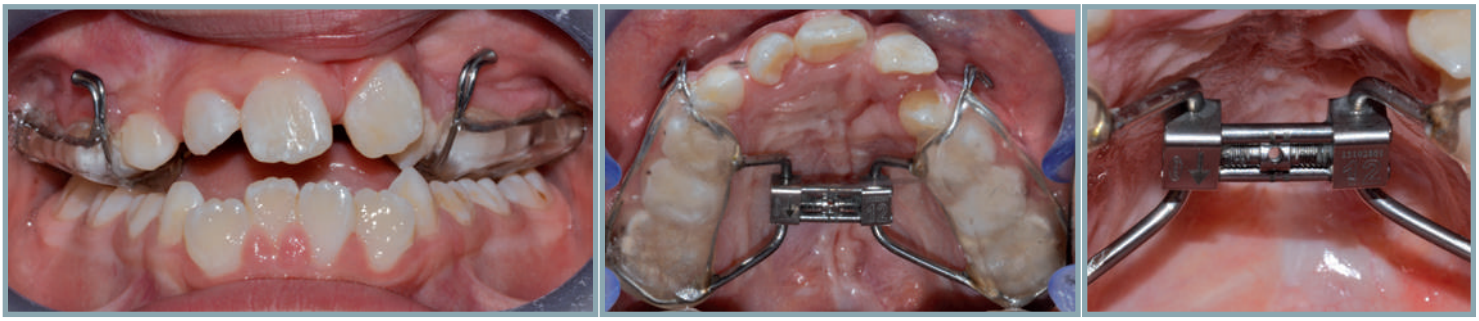
In all of the above clinical conditions, the screw showed stability during the six months between the end of the expansion phase and the post-expansion retention period.

CLINICAL CASE 1

C.E. 9 years old. Patient presented with lip and cleft palate. The patient presented with skeletal class III malocclusion and major contraction of the upper arch with unilateral cross-bite. Treatment plan included a first step of expansion using a bonded rapid maxillary expander (type McNamara) followed by the application of the Petit face mask.

Pre-Expansion

Post-Expansion



CLINICAL CASE 2

T.C. 8 years old. Patient presented with skeletal class II malocclusion associated with mandibular retrusion and transverse constriction of the upper arch. Treatment plan included a first step of maxillary expansion followed by mandibular advancement. The rapid maxillary expander was cemented on bands on second deciduous molars.

Pre-Expansion

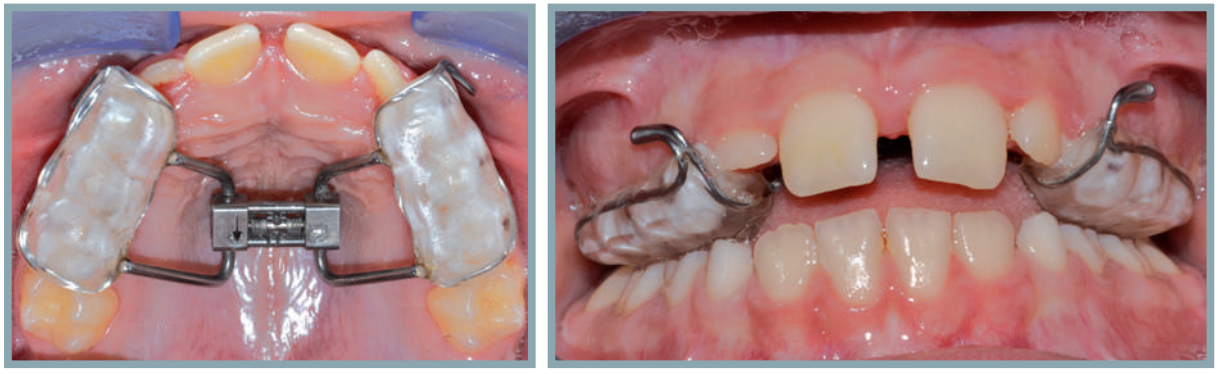
Post-Expansion

CLINICAL CASE 3

B.F. 9 years old. Patient presented with skeletal class III malocclusion with mandibular protrusion, upper dentoalveolar protrusion and unilateral cross bite. Treatment plan included the application of a bonded rapid maxillary expansion to correct the transverse deficiency in the upper arch followed by the face-mask therapy.

Pre-Expansion

Post-Expansion



Conclusions

According to the results of the present study, locking the screw at the end of the expansion phase seems to be an unnecessary precaution for the clinician. This study has shown that in the analyzed sample, the Eagle A0630 screw maintained the level of expansion achieved without deactivation during the retention phase of therapy. Therefore, we can conclude that in addition to the obvious advantages in terms of obstruvction and reduction in discomfort for the patient, the screw maintains the mechanical properties already tested for the Leone Eagle A0620 screw. Further studies with a larger sample of patients are needed to confirm the results of the present study.

References

Fürthauer U, Droschl H 1981 Die Gaumennahtsprengung als interzeptive Maßnahme. Stomatologie 78: 165–168.

Halazonetis Dj, Katsavrias E, Spyropoulos MN 1994 Changes in cheek pressure following rapid maxillary expansion Eur J Orthod. 16 295-300.

Huanca Ghislanzoni LT, Franchi L, Baccetti T 2011 Locking the screw after rapid palatal expansion: A superfluous procedure? J Clin Orthod Dec; 45(12):657-60.

Isaacson RJ, Wood JL, Ingram AH 1964 Forces produced by rapid maxillary expansion. Part I: Design of the force measuring system. Angle Orthod. 34: 256-260

Isaacson RJ, Ingram AH 1964 Forces produced by rapid maxillary expansion. Part II: forces present during treatment. Angle Orthod. 34:261–270.

Lione R, Ballanti F, Franchi L, Baccetti T, Cozza P 2008 Treatment and posttreatment skeletal effects of rapid maxillary expansion studied with low-dose computed tomography in growing subjects. Am J Orthod Dentofacial Orthop. Sep; 134(3):389-92

Liou EJ, Tsai WC 2005 Maxillary protraction: a repetitive weekly protocol of alternate rapid maxillary expansions and constrictions. Cleft Palate Craniofac J. 42:121–127.

Liou EJ 2005 Effective maxillary orthopedic protraction for growing class III patients: a clinical application simulates distraction osteogenesis. Prog Orthod. 6:154-71.

Melsen B 1972 A histological study of the influence of sutural morphology and skeletal maturation on rapid palatal expansion in children. Trans Europ Orthod Soc. 48:499-507.

Timms DJ 1981 Rapid Maxillary Expansion. Chicago, Berlin, Rio de Janeiro, and Tokyo: Quintessence.

Zimring JF, Isaacson RJ 1965 Forces produced by rapid maxillary expansion. Part III. Forces present during retention. Angle Orthod. 35:178-186. ■

M.A.D. MANDIBULAR ADVANCER DEVICE SERIES

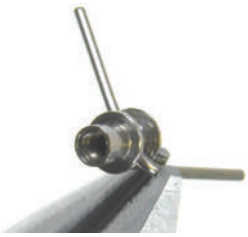
TELESCOPIC ADVANCER

New Product for Sleep Apnea Treatment

The plug and tube component are manufactured by using biocompatible stainless steel with the highest strength available assuring durability to any biomechanical stress.

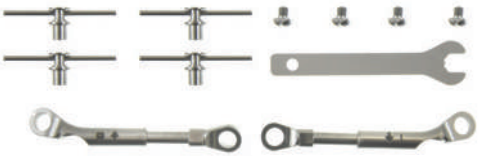
The plug component features a special mushroom design that does not permit the disassembling from the tube component once the patient is in open, wide-mouth position.

The multi purpose tool can be used as screwdriver or a wrench to tighten the squared-head screw into the housing.



The housing component is designed to be embedded in the acrylic splint: it features a laser welded wire throughout that can be easily bent to enhance the resin retention and avoid unwanted de-attachment.

The plug has an inner advancer screw that can be activated by using the wrench, following the direction showed by the laser marked arrow. Each ¼ activation produces 0.1 mm of advancement. The maximum elongation is 7mm on both sides.

Telescopic Advancer		code number	quantity
	TELESCOPIC. ADJUSTABLE ADVANCER KIT	A5100-07	1
		A5100-17	10
		A5100-97	100
	HOUSING SCREWS WITH WRENCH	A5101-00	5 pcs.
	HOUSINGS FOR ACRYLIC WITH SCREWS AND WRENCH	A5101-01	9 pcs.

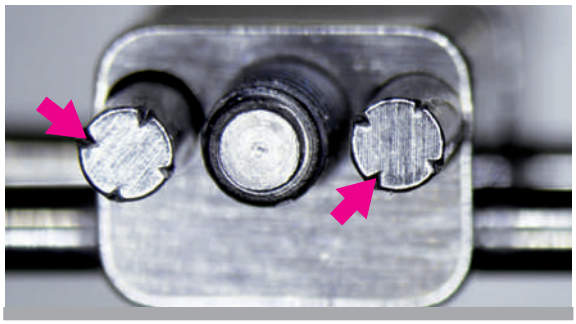
The Telescopic Advancer Kit includes all the components for an easier and more precise construction of most popular anti-snoring appliance.

See recommended tools on pages 24 & 25

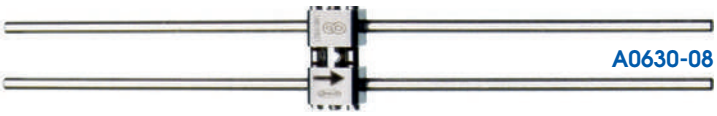
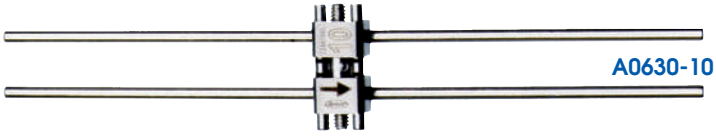
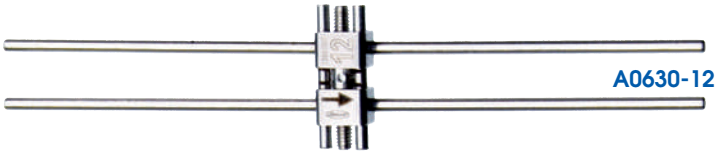
Eagle A0630 Rapid Expansor®

RAPID EXPANDER WITH ORTHOGONAL ARMS

This Leone anatomical expander is the ideal solution for patients who need an orthopedic maxillary expansion, as it allows for the fabrication of devices with limited dimensions, high stability, comfort, and safety. The small sizes of the body and the orthogonal position of the bending arms allow an optimal positioning of the expander even in case of very narrow palates, thus promoting the biomechanical control of the expansion.



- The orthogonal position of the arms reduces the overall size of the device.
- The arms are housed within a through-hole into the body, and the laser welding makes them to form an integral part of the screw, thus ensuring maximum safety and comfort for the patient.
- Two different placements are possible due to the marking of the arrows on both sides of the screw.
- Available in three expansion capacities for every therapeutic need.
- The ends of the guide pins are micro-machined to provide a mechanical friction throughout treatment.
- The end stop limits the possibility of overtreatment.

	6 mm	4,5 mm	∅ arms	body			activation turns for maximum expansion limit
	A0630-08		1,5 mm	12 mm	8 mm	0,8 mm	40
	A0630-10		1,5 mm	14 mm	10 mm	0,8 mm	50
	A0630-12		1,5 mm	16 mm	12 mm	0,8 mm	60

Maxillary Expansion Appliance Selection Criteria: Design, Tricks and Shortcuts.

Ciro Pisano CDT, Gennaro Pisano CDT, Ciro Maria Pisano CDT.
CP Lab, Napoli Italy

An orthodontic treatment can be performed by using fixed- and/or removable-based therapies. The appliance is a device used by the orthodontist to reach, in the quickest way possible, his/her therapeutic target. It represents the final result of a process that begins with diagnosis, and ends with the design and production of a custom-made appliance.

As well experienced ortho technicians, our main task is to build the device based on the clinician's prescription, according to the technical rules complying with the existing medical device laws.

It is mandatory to have a professional collaboration between the lab and the clinician, based on their respective roles, to produce an appliance. It won't be simply an orthodontic appliance made according to the general rule, but, like a tailor sews a custom-made suit, a therapeutic tool that will fit the individual needs of the patient.

Here below are some of the most common orthodontic RPE appliances and their possible variations.

Fig.1 Rapid Palatal Expander (RPE)

To produce an RPE (Rapid Palatal Expander), we need to receive a freshly taken impression with the presence of bands. This allows the technician to obtain a working plaster model, as well as the lower and the wax bite registration.

To create an RPE, we use these materials:

- Stainless-steel wire, diameter 1.1 mm: Leowire code #C0450-11
- An RPE screw selected from the Leone product line (in this case we used an Expansor A0620-09)
- Orthodontic cadmium-free solder, silver 55%, melting range 640°C (item #R0224-00)
- Flux: (item# R0226-00)

DESIGN AND CONSTRUCTION PHASES

After an accurate cleaning of the plaster model, we'll draw a median line as a reference to produce a perfect symmetrical RPE. We'll also draw two diagonal lines, one from the right first premolar to the left first molar and vice versa. The intersection point will be the right point for placing the screw (Fig. 2, 3). We recommend (before making the appliance) performing three screw activations, then using the expander slightly opened.

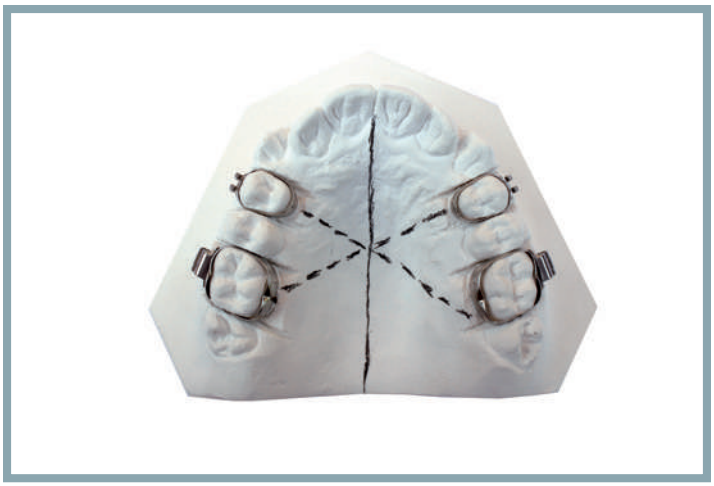


Fig. 2

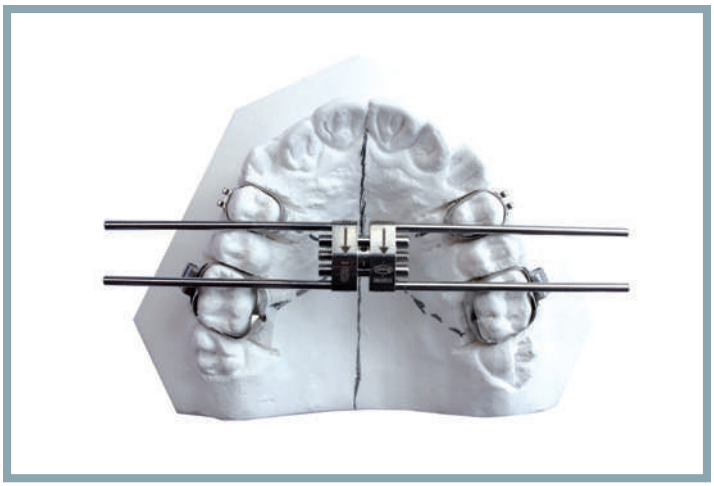


Fig. 3

The RPE can therefore be deactivated, allowing an easier application in case of little differences between the plaster model and the actual oral cavity anatomy (Fig. 4).

With the help of a specially designed instrument, P0620-00, which holds the screw stable, along with the arm-bender tool, P1620-02, we can easily and precisely bend the expander arms to the correct orientation (Fig. 5-7).

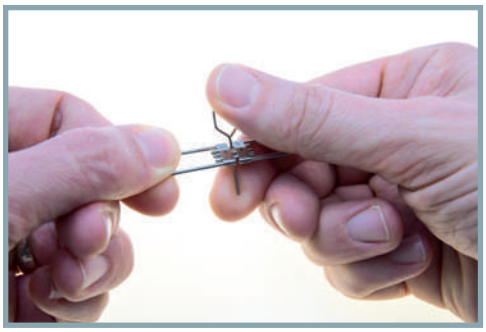


Fig. 4

Fig. 5

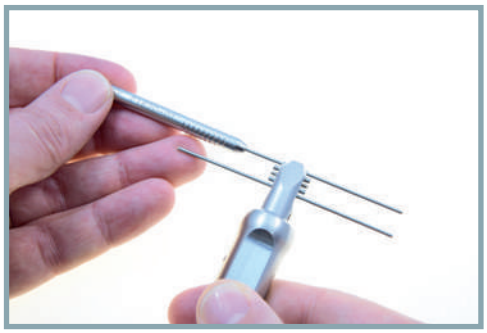


Fig. 6

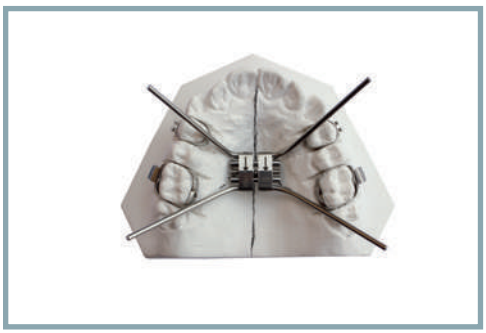


Fig. 7

Fig. 8

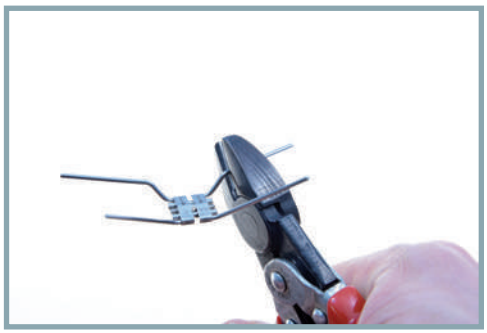


Fig. 9

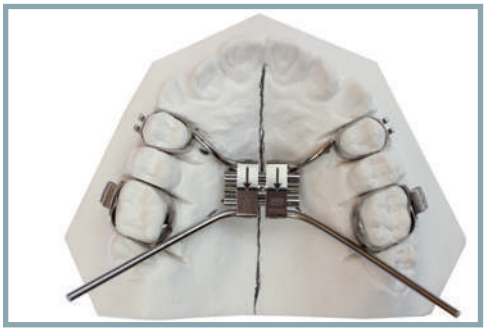


Fig. 10

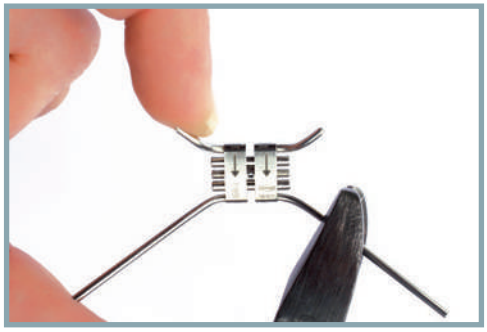


Fig. 11

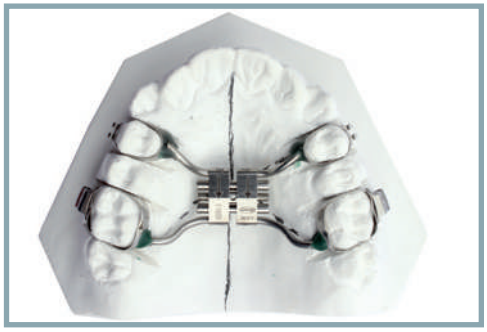


Fig. 12

The Three Jaw Round Prong Pliers, P1034-00, allows us to adapt the anterior arms while taking into consideration the anatomy of the palate and keeping a free space of about one millimeter (Fig. 8-10). To cut the excess wire, we'll use a heavy-duty cutter, P1099-00, then we'll keep the screw in place with sticky wax to carry out the final check on the model (Fig. 11, 12). We recommend keeping the arms as close as possible to the palatal side of the bands to avoid an excess of brazing materials, which could affect the solder joint strength. The linking arms between the first bicuspid and the first molars has to be made with 1.1 mm Leowire stainless-steel wire.

Fig. 13

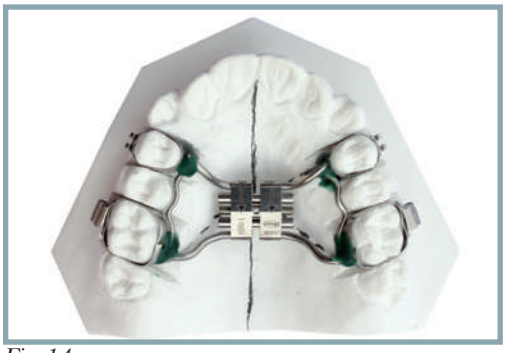


Fig. 14

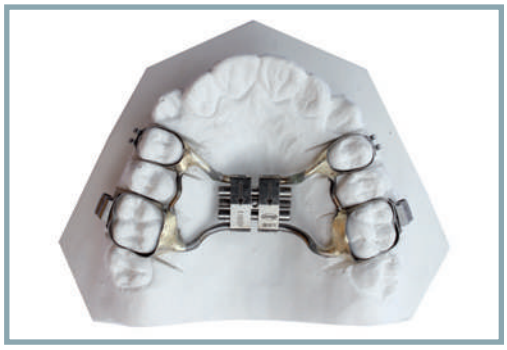


Fig. 15

Fig. 16

The brazing procedure should be made by using a thin and powerful flame, with the use of Flux in order to avoid oxidation, followed by refinishing and polishing the RPE (Fig. 13-16).

EXAMPLES OF CUSTOMIZED RAPID PALATAL EXPANDERS

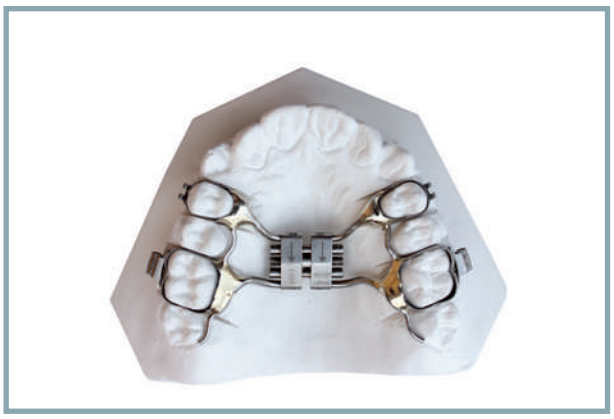


Fig. 17 RPE with extended arms up to the second molar

This solution is indicated in cases where the second molars are in need of expansion

Fig. 18 RPE with extended anterior unilateral arm.

This design is indicated in cases of anterior contraction and/or unilateral cross bite

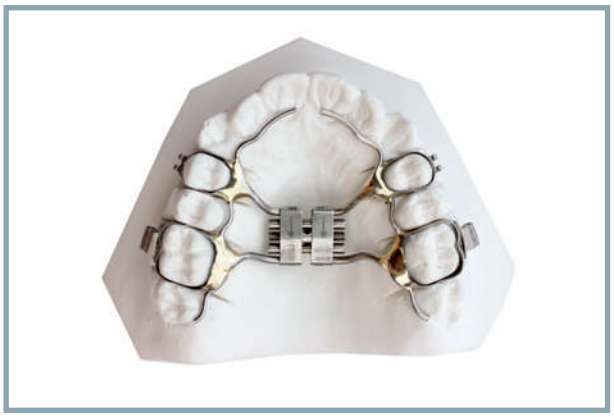


Fig. 19 RPE with extended anterior and bilateral arms.

This solution is indicated in cases of anterior contraction and/or bilateral cross bite, as well as in class III patients

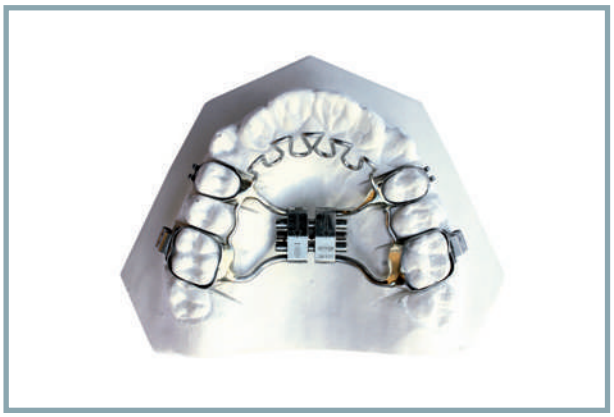


Fig. 20 RPE with lingual grid.

This design is indicated in cases of open bite and/or tongue interposition

GUIDELINES FOR SELECTING DIFFERENT SCREW MODELS TO BETTER FIT THE ORTHODONTIC PRESCRIPTIONS.

Therapeutic indications: deficit of the transverse diameter.

The Leone Expansor Screws A0620 are the most popular expanders worldwide. They have four arms and they are available in four sizes: 8, 9, 11 and 13 mm of maximum expansion capacity. With such a wide range, you can select the most appropriate screw to be adapted to any palate shape. The final appliance can also have options like anterior hooks suitable for class III traction, power arms, tongue lifting ramp and/or lingual grid. The RPE can be cemented on both permanent and deciduous teeth.

Fig. 21 RPE with posterior arms brazed on the first molar bands while the anterior arms are bent to be in contact with the premolars

Fig. 22 RPE on deciduous molar bands, wire frame from cuspid to first permanent molar

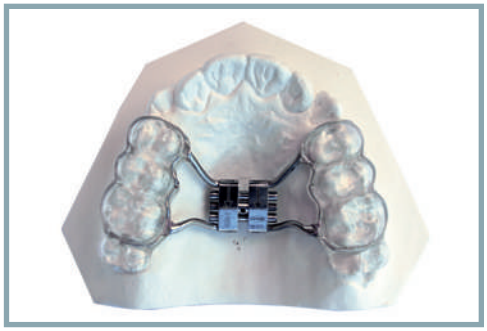


Fig. 23 RPE with acrylic splint according to McNamara

Characteristics: All the Leone RPE screws are made of stainless biomedical steel, and are completely smooth and polished for maximum comfort and easy hygiene. The expander max capacity is laser-marked on the screw body by two arrows showing the opening direction and a lot number.

RPE screws with only two arms can be helpful when the patient has a very narrow and deep palate and/or when the appliance is designed to be anchored on deciduous teeth.

Fig. 24 RPE made by using the Stealth A0621-08 two arms expander

Fig. 25 RPE with two arms expander Baby RPE A3626 according to Prof Veltri

RPE with orthogonal arms

Fig. 26 RPE with orthogonal arms Eagle A0630-12

The Eagle A06050 is a uniquely designed screw with orthogonal arms that require minimum room compared to a classic 4-arms design. It could be the ideal choice for a patient with both mixed dentition and a narrow arch.

Fan-Type RPE

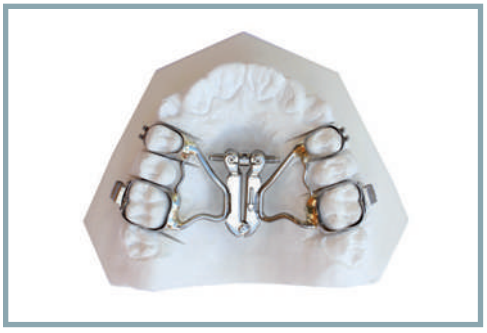


Fig. 27 RPE made by using a Fan-Type t screw A0625-09

Therapeutic indications: deficit of the transverse diameter in the anterior sector

Characteristics: This model opens like a fan, allowing more expansion in the anterior sector while keeping almost the same diameter on the posterior quadrants. Completely made by biomedical-grade steel, it has laser-welded arms on the metal-injected, molded bodies. There are two engraved arrows showing the opening direction. The RPE fan screw has a safety mechanism that does not permit going over the maximum expansion capacity, preventing overtreatment and preventing the screw from coming apart.

LEAF Expander

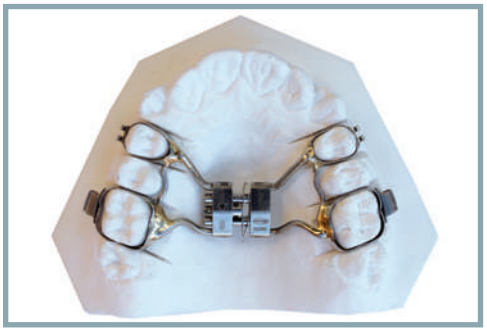


Fig. 28 Expander made by using a LEAF screw A2703, A2704

Therapeutic indications: symmetric and asymmetric dental-alveolar expansion, dental crown-palatal and crown-vestibular torque

Characteristics: It has a body similar to a classic RPE, but it is spring loaded thanks to the NiTi leaf springs that can deliver, according to the model, 450 or 900 g of constant force. This expander screw is available in two different models, one with two leaf springs and another with three leaf springs. The first one can expand to 6 mm, the second has 10 mm as its maximum expansion capacity.

ANALYSIS OF CRITICAL POINTS

Every appliance seems equal ... but they aren't! We have been working as orthodontic technicians for many years. We realize that, regarding custom-made orthodontic appliances, little details that we generally consider not so important, if unchecked, could cause discomfort to the patient and sometimes also therapeutic complications.

RAPID EXPANDER: ANALYSIS OF CRITICAL POINTS

THE CORRECT BRAZING

Fig. 29,30
Correct:
The quantity of solder used guarantees a strong connection with the other wire parts, giving the needed strength and stability.

Fig. 31,32
Lack of brazing:
The solder used is too low in quantity; therefore, the joint can be broken by the masticatory and therapy forces.

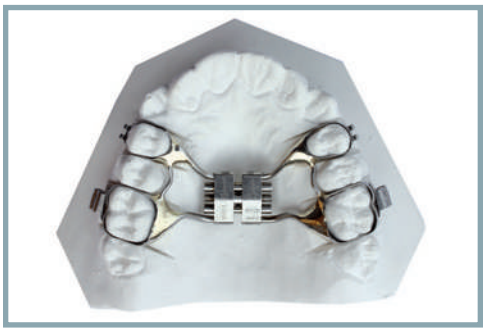
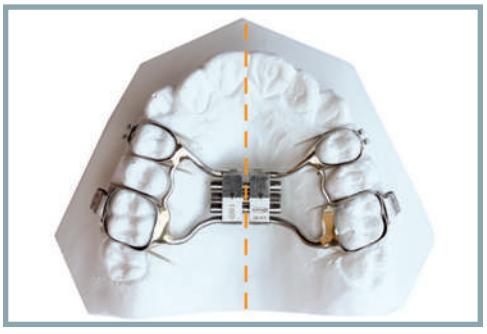


Fig. 33, 34
Excess of brazing:
The quantity of alloy is in excess, therefore, this can cause food impingements and soft tissue inflammations.

THE CORRECT ORIENTATION ON THE MEDIAN LINE



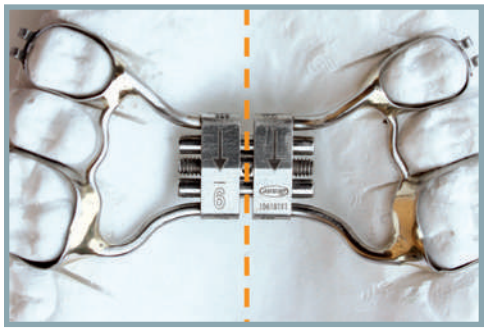
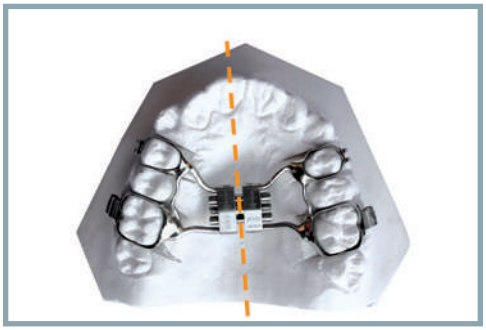


Fig. 35,36
Correct orientation:
This is mandatory in order to achieve the desired orthopedic effect.

(con't)



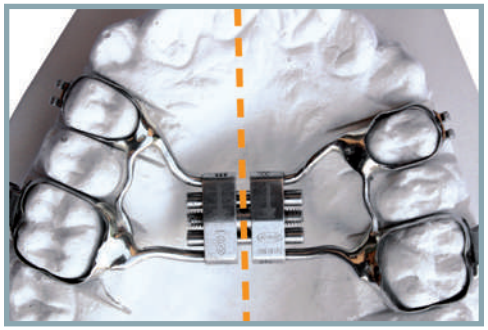


Fig. 37, 38
Incorrect orientation:
This won't produce the correct biomechanical behavior as well as it could cause to therapeutic complications.

SCREW POSITION IN RESPECT TO THE HEIGHT OF THE PALATE

Fig. 39
Correct position:
The recommended clearance between both the arms and screw body and the palatal vault should be not less than one millimeter to avoid any contact with the soft tissue

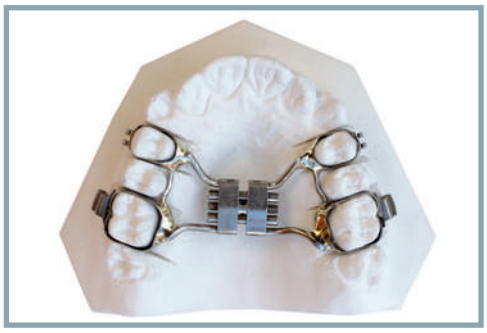


Fig. 40,41
Incorrect screw position:
If the screw is too low in the palate, it might not produce the orthopedic expansion needed; moreover, can cause discomfort and/or tongue injuries.

Fig. 42,43
Incorrect screw position:
If the screw is too high in the palate, it can drive to soft tissue irritation and decubitus. ■

Mini Exspider Screw

new

Leone
Orthodontics and Implantology

Distributed in North America by

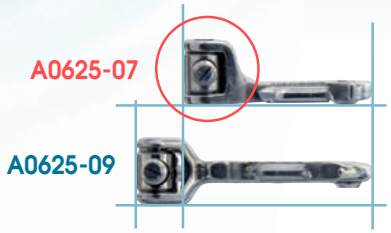
LEONEAMERICA
Leone

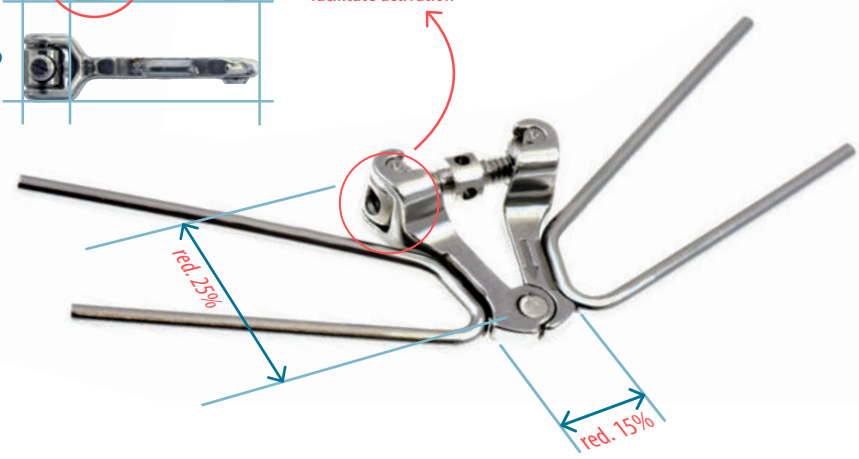
FAN-TYPE RAPID EXPANDER* 7mm

*patented

A0625-07
New Version
7 mm expansion

25% Smaller
than the original 9 mm fan-type expander A0625-09





Geometric Shape
designed for the highest possible placement in the palate for optimal patient comfort

		activation turns for maximum expansion limit
7 mm	0,7 mm	31

Courtesy of Prof. Paola Cozza - Department of Orthodontics, University of Rome "Tor Vergata", Italy

*patented

See recommended tools on pages 24 & 25

Exspider: Fan-Type Rapid Expander **Series 625**

A0625-09

EXSPIDER: FAN-TYPE RAPID EXPANDER

Conceived with the cooperation of Dr. Eleonora Schellino and Prof. Remo Modica

Entirely made of biomedical stainless-steel. The expanding arms are laser-welded to the screw body with laser-engraved directional arrows on the **MIM•** body. It is a device for the rapid expansion of the palate that allows you to get a widening of the single anterior sector of the maxillary arch, while maintaining the expansion at the molar level. It self deactivates when maximum expansion capacity has been achieved, preventing overtreatment.

		activation turns *for maximum expansion limit*
9 mm	0,9 mm	40

Expansor Screw **Series 620**

RAPID EXPANDER

Made entirely of biomedical stainless steel. The housing design is completely smooth, with no rough areas, for optimum hygiene. The expander limit, a directional arrow and the lot number are laser engraved on the expander's body.

	11 mm	4 mm	∅ arms	body			activation turns *for maximum expansion limit*
	A0620-08		1,5 mm	12 mm	8 mm	0,8 mm	35
	A0620-09		1,5 mm	14 mm	9 mm	0,8 mm	40
	A0620-11		1,5 mm	16 mm	11 mm	0,8 mm	50
	A0620-13		1,5 mm	18 mm	13 mm	0,8 mm	60

stealth

Expansor ® Screw Series 621

Strong, slender, an easy fit to get the job done!

See recommended tools on pages 24 & 25

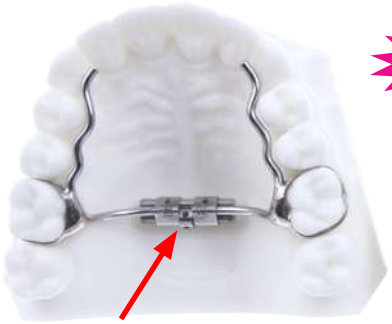
MICRO EXPANDER FOR PALATAL SUTURE

Features a significantly smaller body than other competing expanders.

Features two extra-long arms also supporting for anteriors and ensuring excellent stability and comfort for the patient.

The micro expander can also be used for the expansion of the mandible.

- It can be positioned in the standard way, i.e. with the markings of the arrow and maximum expansion visible.



Stealth A0621

Stealth Easy Access A1621

MICRO EXPANDER SINGLE ARM-EASY ACCESS

The Stealth Easy Access A1621Expander is comparable to the existing A0621, but once placed in the mouth; the body of the screw will remain closer to the pallet with reduced overall dimensions. The activation holes face toward the front of the pallet for easier key access and activation.

To be used primarily in upper palatal casses.

	4,95 mm	4,05 mm	arms 1,5 mm	0,8 mm	body mm		activation tur for maximum expansion limit
					12	8	35
A0621-08							
					16	11	50
A0621-11							
					12	8	35
A1621-08							
					12	11	50
A1621-11							
					12	13	60
A1621-13							

LEAF EXPANDER®

See recommended tools on pages 24 & 25

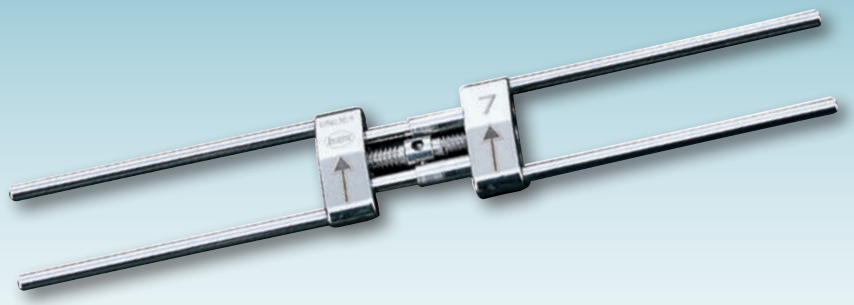
This device is an evolution in the design of the previous spring-loaded expander, designed under the technical and scientific collaboration of Dr. Claudio Lanteri and Mr. Filippo Francolini. This expander features a small-size body, and is equipped with two nickel-titanium MEMORIA® leaf springs, allowing the release of calibrated and continuous forces to promote the expansion of the maxillary arch. Reloading is needed when the two opposing leaf springs move apart. The intraoral activation, which must be done in the dental office, will put the springs in contact again, thus allowing the release of the selected force.

The expander is available in two models, A2703 and A2704, releasing 450 g and 900 g, respectively.

11 mm	4 mm		∅ arms	body			activation turns for maximum expansion limit
		**A2703-06** 2 springs 450 g approx	1,5 mm	12 mm	6 mm	0,4 mm	35
		**A2704-06** 2 springs 900 g approx					
		**A2703-10** 3 springs 450 g approx	1,5 mm	12 mm	10 mm	0,4 mm	50
		**A2704-10** 3 springs 900 g approx					

ZOOMRAX

See recommended tools on pages 24 & 25



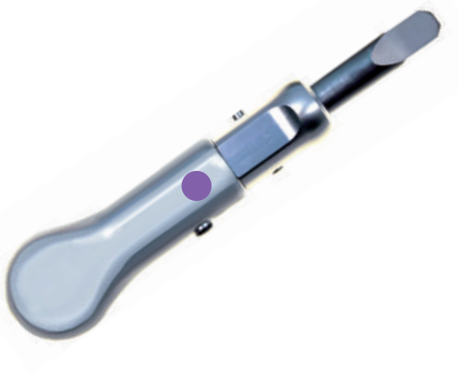
RAPID EXPANDER WITH TELESCOPIC GUIDES(patented)

The innovative telescopic guides assure constant friction throughout the expansion movement, perfect stability and small sizes. It self-deactivates when maximum expansion capacity has been achieved, preventing overtreatment. The 7 mm expander is ideal to treating very narrow palates.

The 10 and 12 mm expanders, featuring a compact design, allow for ease of arm bending, thus reducing the encumbrance of the device.

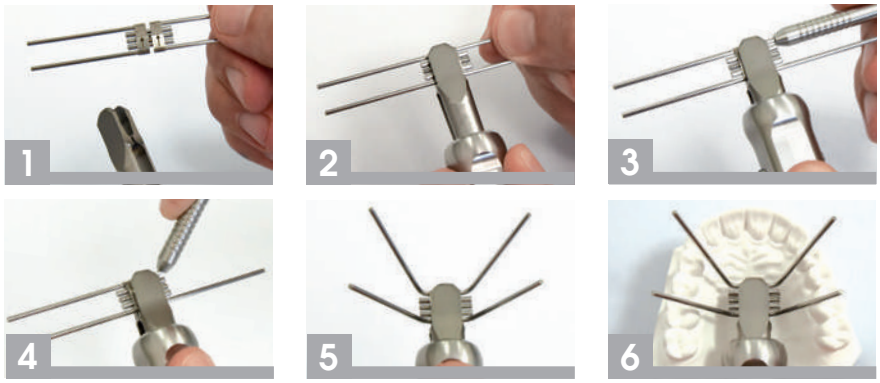
11 mm / 4 mm		∅ arms	↔ body			activation turns for maximum expansion
	A2620-07	1.5 mm	11 mm	7 mm	0.8 mm	35
	A2620-10	1.5 mm	14 mm	10 mm	0.8 mm	50
	A2620-12	1.5 mm	16 mm	12 mm	0.8 mm	60

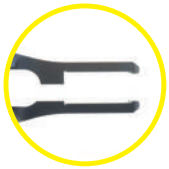
SELF-LOCKING HAND TOOL FOR EXPANDERS



This handy instrument designed to firmly hold the expander allows for easy and accurate modeling of the arms, along with the special arm bending tool, P1620–02 (P. 25) The instrument tips, with a clutch mechanism, are custom-shaped for each model of expander preventing damage to the bodies. The tips are kept closed by a cursor club device that is turned on and off with a simple thumb action. The clutching tips are designed to accommodate the minimal space between the body of the expander and the palatal vault. By placing the screw on the plaster model using the instrument, the correct positioning and the optimum height to bend the arms will be clearly visible.

Scan the QR Code to watch our tool demonstration video



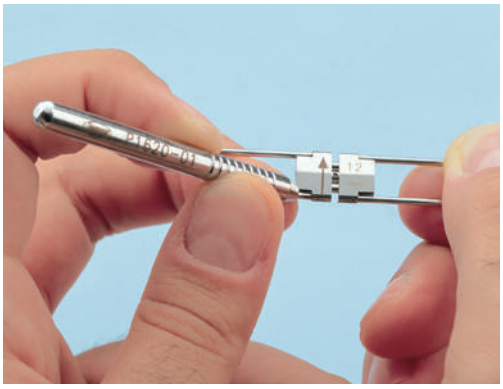
		for expanders	
	P0620-00	A0620-08/09/11/13	Expansor - Pg. 20
		A2620-07/10/12	Zoomrax - Pg. 23
		A2703-06/10	Leaf Expander - Pg. 22
		A2704-06/10	Leaf Expander - Pg. 22
	P0630-00	A0630-08/10/12	Eagle - Pg. 10
	P0621-00	A0621-08/11	Stealth - Pg. 21
	P0625-09	A0625-09	Exspider - Pg. 20
new 	P0625-07	A0625-07	Mini Exspider - Pg. 20 new

ARM-BENDING TOOL FOR EXPANDERS

Arm-Bending Instrument - Universal

Ideal for bending expander arms with ease and precision.

825-P1620-02



Three Jaw Pliers - Round

Very sturdy, does not score wires. Suitable for bending the rapid Expansor arms. For wires up to 1.5 mm.

P1034-00

Heavy Duty Diagonal Wire Cutter

Heavy-duty, 6 1/2"-long orthodontic utility cutter. It will cut round or rectangular wire, tensile or hardened, with ease. Hardened tooled-steel heads in black, rustproof, finish mounted on non-slip Teflon-coated steel handles. Will cut heavy-duty standard wire up to .062" in diameter.

P1099-00

Evaluation of Different Types of Activation Keys for Rapid Maxillary Expanders

Dr. Matteo Camporesi, Dr. Caterina Masucci, Dr. Andrea Vangelisti
University of Florence

Devices for rapid maxillary expansion have been extensively analyzed in the literature, both for their skeletal or dentoalveolar effects, and for their mechanical characteristics.

One of the determining factors for the success of these devices is represented by the minimum amount of compliance required by the patient, exclusively linked to the need to activate the screw daily. The activation procedure and the deactivation procedure (required in the alternate expansion/constriction protocols recently proposed in the literature) (Franchi et al., 2011) must be done by the parents. The characteristics of the key for the activation of the screw can be described in terms of greater simplicity and safety for the patient.

There are no studies that analyze the characteristics of activation keys; however, there are some studies that describe the possible iatrogenic injuries associated with accidental ingestion of keys during the activation procedure. Two case reports on this topic have been published in the "Clinician's Corner" of the *American Journal of Orthodontics and Dentofacial Orthopedics*. Monini da Costa et al. and Tripathi et al. illustrated and showed radiographically (Fig.1-3) that the inappropriate use of the activation key may represent a real risk of ingestion. Therefore, the authors suggested to use activation keys equipped with safety devices (as recommended by the manufacturers of orthodontic material).

Today, two types of activation keys are produced by orthodontic manufacturers, the stainless-steel key with a safety ring leash and the swivel key.

No study has compared these two models with the aim of identifying which one can be easier, more practical to use and safer for the patient.

The possibility of facilitating the insertion of the activation key in the screw hole, greater visibility of the operative field, less space in the patient's mouth and fluidity in the movement of activation are key features, and they may be essential for the simplification and effectiveness of the activation.

Fig.1 Radiograph showing the swallowed object in the stomach.

Fig.2 Two days later, the swallowed object had moved into the sigmoid colon.

Fig.3 Lateral radiograph of neck shows the key in the region of hypopharinx overlying the laryngeal shadow.

The use of protocols that require the alternation of maxillary expansion and constriction make these requirements even more indispensable. In fact the deactivation phase of the screw (constriction) is not particularly easy to perform in the mouth of a young patient. The parent must insert the key without having a direct view of the hole.

The aim of this survey is to evaluate the preference rate expressed by parents on 3 types of keys for the activation of the rapid maxillary expander based on simplicity and comfort.

Materials and methods

Three types of key for the activation of the expansion screw were tested:

- Stainless-Steel Key with 45° bent tip and safety ring leash (A0557-01 + A0557-02) (Fig.4);
- Stainless-Steel Key with safety ring leash "modified" (A0557-01 + A0557-02) Fig.5;
- Swivel-Key (A0558-00) Fig.6.

Immediately after the placement of the rapid maxillary expander, it was explained in detail and shown to the parents how to activate the screw with the 3 types of keys, and how to repeat the procedure using the 3 models under the supervision of the clinician. (Fig 7A - fig 9B)

At the end of this test, we asked the parents to express their preference of the type of key based on simplicity and comfort during the procedure.

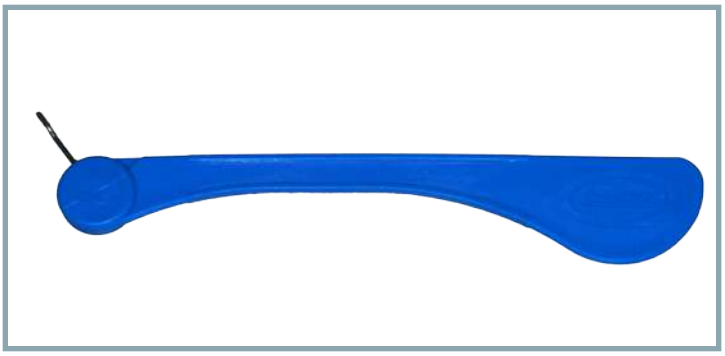


Fig.6 Expansion swivel key (A0558-00).

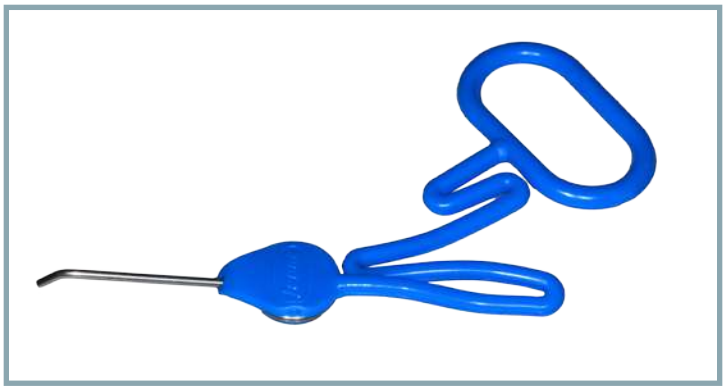


Fig.4 Stainles-steel skey with 45° bent tip and safety ring leash (A0557-01 + A0557-02).

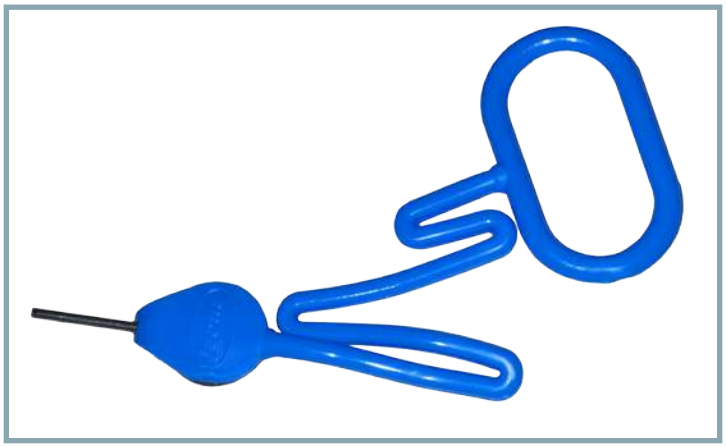


Fig.5 Stainless-steeel key with safety ring leash modified (A0557-01 + A0557-02).

Fig.7A Insertion of stainless-steel key with 45° bent tip and safety ring leash in the screw hole.

Fig. 7B End of the activation procedure with the stainless-steel key with 45° bent tip and safety ring leash.

Fig. 8A Insertion of the stainless-steel key with safety ring leash modified in the screw hole

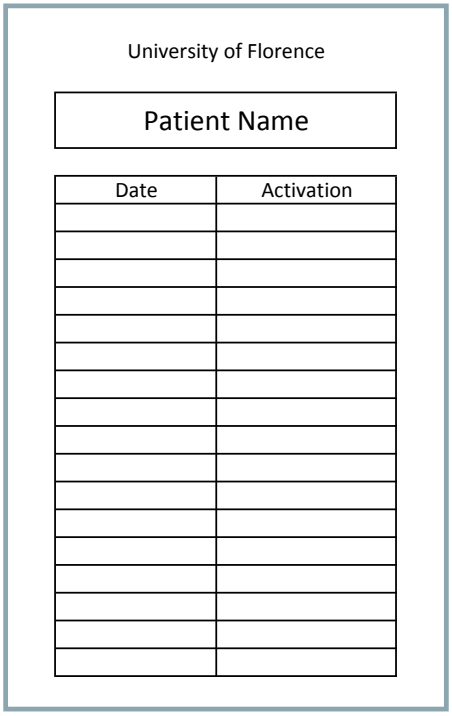
Fig. 8B End of the activation procedure with the stainless-steel key with safety ring leash modified

Fig.9A Insertion of expansion swivel key

Fig.9B End of the activation procedure with the expansion swivel key

We gave the chosen key to the parents in conjunction with a clinical diary schedule (Fig. 10) in which we asked them to report every activation carried out, to allow the clinician to know exactly the number of activations performed. This procedure is considered by the authors essential to avoiding exceeding the maximum number of activations allowed by the screw.

In the present study, we used both rapid maxillary expanders with bands cemented on primary teeth or permanent molars and acrylic splint rapid maxillary


University of Florence

Patient Name

Date	Activation

Fig.10 Clinical diary paper.

expanders (according to the design proposed by McNamara (ref)), with the small orthogonal screw Eagle A0630, or traditional Expansor body screw A0620 or Zoomrax A2620 .

The sample consisted of 52 parents of patients requiring rapid maxillary expansion. Three parents were excluded from the sample because they had already had a previous experience of using one of the keys (key with safety leash), so the choice could be influenced by a familiarity already acquired in the past. Only to satisfy the curiosity of the authors, parents excluded from the study were asked to express their preference anyway. Two of them preferred to use the key they had in the previous experience, while one parent chose the swivel key.

The final sample consisted of 49 parents.

Results

All 49 parents chose the swivel activation key.

The results obtained therefore have not required any statistical analysis, since all the parents made the same choice.

Discussion

The minimum compliance required during the orthodontic treatment with a rapid maxillary expander is represented by everyday use of the key for activation of the screw.

There are different kinds of keys for activation, each designed with unique safety features.

The 45° bent tip key with safety leash (A0557-01 + A0557-02) is designed for easier insertion into the hole of the expansion screw; however, this means that, at the end of the activation, the fingers of the parents are inserted into the oral cavity, increasing discomfort for the patient and the risk that the activation is not completed successfully. For the same reason, the deactivation of the screw (requested in expansion/constriction protocols) is much more difficult. Failure to complete the activation or deactivation procedures can result in additional inconvenience to the patient and parent, as they are often forced to go back to the treating orthodontist, since they're no longer able to access the activation hole.

At the Department of Orthodontics of the University of Florence, for many years the 45° bent tip key with safety leash was systematically modified by cutting off the terminal portion to reduce its total length, eliminating the 45° bend. This change was adopted to increase the distance between the tongue and the key itself to allow the parent a larger amount of space in the mouth, increasing the comfort for the patient. This change also allows for an easier key insertion into the activation hole during the deactivation procedure.

The results of this study showed an overwhelming preference by users for the swivel key. In our opinion the reasons can be:

- simplified grip
- greater visibility of the operative field with the fingers of the parent that remain completely outside the oral cavity
- the rotation mechanism of the device already embodied in the core of the key
- reduced chances of deactivation during the removal of the key at the end of the activation procedure
- greater simplicity during the deactivation of the screw in expansion/constriction protocols
- possibility to check the proper insertion of the key into the hole of the screw before the activation procedure
- impossible ingestion of the key due to the larger dimensions
- greater comfort perceived by the patient during the activation/deactivation procedure.

The results of this study suggest exclusive use of the swivel key.

Recently a new swivel activation key has been introduced, characterized by the presence of an activation counter A0558-01 (fig. 11) that allows tracking the number of activations directly on the handle of the key, through a slider that slides on a numbered scale. This eliminates the need to deliver to the patient the clinical diary schedule, simplifying the procedure. This change is in our view particularly interesting; however, upon delivery of the activation key, it should be clearly explained to the parents to keep the key out of the reach of children who could play with the cursor and alter the number of activations reported.

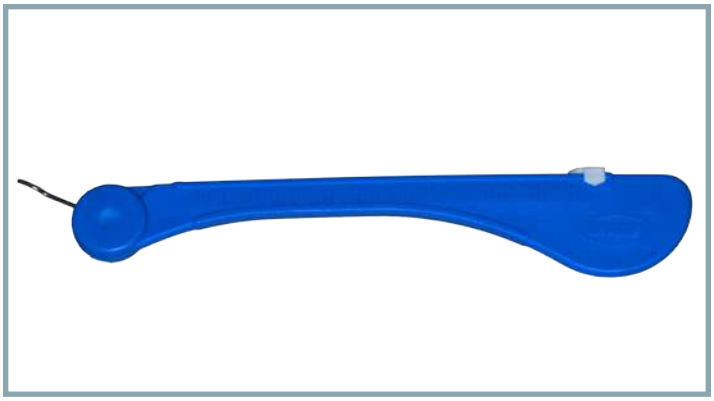


Fig 11 New swivel activation key with activation counter.

References

da Costa Monini A., Martins Maia L.G., Baldi Jacob H., Gonzaga Gandini L. Jr. Accidental swallowing of orthodontic expansion appliance key. Am J Orthod Dentofacial Orthop 2011; 140:266-8.

Franchi L., Baccetti T., Masucci C., Defraia E. Early Alt-RAMEC and facial mask protocol in class III malocclusion. J Clin Orthod 2011; 45; 601-09

Tripathi T., Rai P., Singh H. Foreign body ingestion of orthodontic origin. Am J Orthod Dentofacial Orthop 2011; 139:279-83. ■

SWIVEL ENDORAL KEYS

- Thumb grip for easy activation
- Self-stopping wheel for controlled activation
- Angled for easy insertion and control
- Partial enclosure of wire in handle prevents dislodging

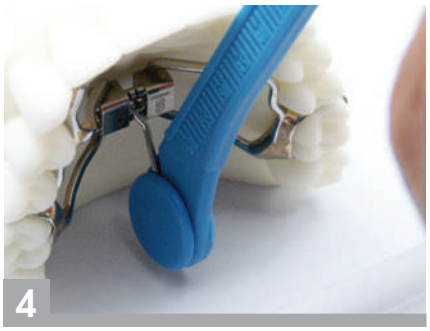
A0558-01
With turn activation counter

A0558-00

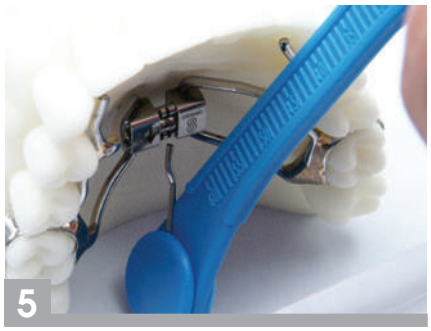
Find the first visible hole of the expander located in the oral cavity.

Place the key with stop into the located hole of the expander.

By using the handle, push the key to the anterior-posterior direction so as to begin the activation of the expander.



The activation ends when a click is detected by the key that exceeds the offset limit on the circular end of the handle (1 click equals ¼ turn).



Pull the key out of the hole when the activation is completed.

Check that the key has reached the stop on the circular end of the handle.

Place the tip of the white turn counter on the line corresponding to the number of turn activations done.

Leone®
Orthodontics and Implantology

LEOLAB®
USA Leone

Laboratories specialized in orthodontics

Selected by LeoneAmerica to provide expert solutions quickly and collaboratively

- ✓ Research
- ✓ Innovation
- ✓ Quality
- ✓ Expertise

LEONEAMERICA

APPROVED LABORATORIES

Find the LeoLabs and much information, news, resources, case articles, and products on the new website: **Leolabusa.com**

COTTONWOOD LABORATORIES

Murray, UT 84107
phone 801-904-2006
office@cottonwoodlabs.com

DURINGER ORTHODONTIC LABORATORY

Alameda, CA 94502
phone 510-522-2485
info@duringerortholab.com

EAST ORTHODONTIC LABORATORY

Albuquerque, NM 87120
phone 505-899-4344
eastortholab@comcast.net

EUROPEAN ORTHODONTIC LABORATORY, INC.

Cumming, GA 30041
phone 678-455-3613
info@europeanortholab.com

EXCEL ORTHODONICS, INC

Tigard, OR 97224
phone 971-249-0261
excel@excelorthodontics.com

OLYMPIC ORTHODONTIC LABORATORY, INC.

Woodinville, WA 98072
phone 425-806-9194
info@olyortholab.com

ORTHO ASSIST U.S. MESA ORTHODONTIC LAB

Tempe, AZ 85282
phone 480-247-9642
orthoassistus@gmail.com

ORTHODENT LAB

Williamsville, NY 14221
phone 716-839-1900
info@odlortho.com

PERFECT FINISH ORTHO LAB, INC.

Hackettstown, NJ 07840
phone 908-852-3035
info@perfectfinishortho.net

PRECISION APPLIANCES LAB, INC.

Southbury, CT 06488
phone 203-267-4221
precisionlab1@aol.com

ROQUE ORTHODONTIC LABORATORIES, INC.

Foothill Ranch, CA 92610
phone 949-581-9711
info@roqueortholab.com

Mission

We are a group of laboratories **SPECIALIZED** in **ORTHODONTICS** selected by LeoneAmerica, exclusively authorized to use the trademark "Leolab U.S.A." Our collaboration with LeoneAmerica allows us to maintain a high standard of quality in:

✓RESEARCH ✓INNOVATION ✓QUALITY

LEOLAB USA Leone

RETAINERS

Retainers are used to maintain a finished case. Active retainers are used for minor tooth movement and finishing. Our LeoLabs have extensive lines of Hawley retainers, clear aligner systems and fixed retention options. We also feature fully custom-designed acrylics, including patterns, sparkles, decals and custom artwork.

FIXED

Fixed appliances are attached to the tooth structure and can be used for orthodontic or orthopedic purposes, including expansion, distalization, habit and space maintenance. Our LeoLabs fabricate a wide range of fixed appliances to meet a variety of therapeutic needs.

REMOVABLE

Removable appliances can produce dental arch expansion, move single teeth or groups of teeth, correct deviations or create space for new teeth. We can incorporate multiple parts, such as hooks, screws, pontics, habit cribs, springs, and anterior and posterior bite plates to create these appliances.

Why choose us

Thanks to the level of combined expertise gained by LeoLabs throughout the years, we can provide **SOLUTIONS VERY QUICKLY**. We have laboratories across the country that doctors can interact with and be assured that they will receive a **HIGH LEVEL OF EXPERTISE**. Our constant updating of procedures and new materials permits our laboratories to be **STATE-OF-THE-ART** in production processes connected to **NEW DIGITAL TECHNOLOGIES.**

DIGITAL SERVICES

Digital services have changed the face of orthodontics. With today's state-of-the-art technology and the advancement of 3D printing, digital services can save time while improving accuracy and precision in fabricating orthodontic appliances.

FUNCTIONAL

Functional appliances utilize the muscle action of the patient to produce orthodontic forces for the correction of class II and class III malocclusions. These appliances are available in a multitude of configurations and types, including Herbst, Frankel, Twin Block, Activators, and Bionators.

SPLINTS

Our full line of splints is designed for a variety of treatment considerations, including finishing, intrusion, bruxing, and muscle or joint disorders. We offer a variety of material options to choose from, including hard acrylic, thermoplastic acrylic, and a soft or hard pressure-formed clear plastic to match your specific needs.

SLEEP APNEA

Although sleep apnea may be caused by a variety of conditions, a common cause is the posterior displacement of the tongue during sleep. Our LeoLabs carry a variety of sleep apnea and snoring appliances to treat this disorder. Each appliance is designed to position the mandible forward to open the patient's airway and is specifically tailored to each patient's dental anatomy for maximum comfort and fit.

LEOLAB®
USA Leone

Network of High Quality Orthodontic Laboratories

Olympic Orthodontics staff with Gabriele Scommegna in Woodinville, Washington.

OLYMPIC
ORTHODONTIC LABORATORY, INC.

Orthodent Lab staff with Gabriele Scommegna in Williamsville, New York.

ODL

Perfect Finish Ortho Lab staff with Gabriele Scommegna in Hackettstown, New Jersey.

PERFECT FINISH ORTHO LAB, INC.

Last year in September, Gabriele Scommegna of Leone S.p.A. in Italy, along with our LeoneAmerica sales representatives, visited some LeoLabs to certify lab owners and their employees on the history of Leone Orthodontics, new and existing products, and best practices for the fabrication of appliances.

LeoneAmerica has selected some of the most qualified orthodontic laboratories in the US to represent our new brand, LeoLab USA®.

The mission of this select group of laboratories is to achieve excellence in research, development, innovation and quality. Thanks to their many years of combined experience, these LeoLab laboratories are able to offer a wide array of orthodontic solutions expediently with excellent quality. Their readily available inventory of high-quality Leone® products allows them to design and manufacture the best-quality orthodontic appliances.

Since its introduction in 2014, the LeoLab USA network of labs has grown to 10 member labs: Cottonwood Laboratories-Utah, Duringer Orthodontic Lab-Northern California, East Orthodontic Lab-New Mexico, Excel Orthodontics Inc.-Oregon, Olympic Orthodontic Lab-Washington, Ortho Assist U.S. / Mesa Ortho Lab-Arizona, Orthodent Lab-New York, Perfect Finish Ortho Lab-New Jersey, Precision Appliances Lab-Connecticut, and Roque Orthodontic Laboratories-Southern California.

Find the LeoLabs and information, news, resources, case articles and products on the new website: www.LeoLabusa.com. ■

"Tradition, Knowledge and passion for the Quality of Orthodontics" since 1934

Pictured here are Elena Pozzi, current CEO of Leone S.p.A. and Emilio Pozzi, current President and CEO of LeoneAmerica and cousins, at the AAO Annual Session trade show in San Diego CA 2017.

LEONE S.P.A. AND LEONEAMERICA ATTEND 2017 AAO ANNUAL SESSION TRADE SHOW IN SAN DIEGO

Leone S.p.A. is the leading Italian manufacturer of orthodontic products and since 1993 has been a member of O.M.A (Orthodontic Manufacturers Association) which incorporates 12 worldwide leading orthodontic manufacturers.

In the mid 1990's when LeoneAmerica was officially named as Leone's sole distributor in North America, the two began exhibiting and attending the trade shows together.

Beginning last year, the LeoLab USA member labs were also in attendance at the AAO trade shows presenting their custom-made appliances featuring Leone screws and devices.

The enhanced partnership between Leone S.p.A. and LeoneAmerica will allow a better service and presence in North America. ■

LEONEAMERICA

Leone®

805-487-9860

800-235-4639

Email: info@LeoneAmerica.com

LeoneAmerica.com

1250 Stellar Drive
Oxnard, CA 93033-2404

LeoneAmerica sole distributor of Leone S.p.A. products in USA.

Leone®

Orthodontics and Implantology

LEONEAMERICA
1250 Stellar Drive
Oxnard, CA 93033-2404
805-487-9860

LEONEAMERICA
ORTHONEWS

SUMMER/FALL 2017
A Periodical for
Orthodontic Professionals

PRSRT STD
MAIL
U.S. POSTAGE
PAID
OXNARD, CA
PERMIT NO. 539