

# VELTRI 360-DEGREE MAXILLARY EXPANSION

Possible applications and solutions for the correction of maxillary anomalies with fixed appliances incorporating specially designed screws

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The first attempt to perform rapid maxillary expansion was made in 1860 by E.H. Angell, an orthodontist from San Francisco. By using a fixed appliance with an expansion screw, he was able to correct a posterior crossbite in a 14-year-old patient. In the following years, rapid maxillary expansion was used with alternating results especially in the European countries. In the 1960s, this technique gained popularity in the United States as well as Europe. Towards the end of the same decade, the Biederman expander became the most common design adopted for maxillary expansion. This appliance consists of four bands cemented to the upper dentition with a central "hygienic" screw that is connected to the bands with stainless steel arms. At a later date, Leone Orthodontic Products offered significant improvements in the screw design with the release of their Hygienic Screw A0620. These improvements included a smooth surface without rough areas and very rigid structure as a result of laser welding the arms of the device to the central body.

In recent years, a series of developments were proposed for this basic expansion system of the maxilla. All of these proposals included the use of fixed appliances incorporating bands and expansion screws. The outcome of these proposals resulted in an "expanded" range of therapeutical applications. The new features/applications of the "ad hoc" screw design include:

1) Utilization of only two teeth as anchorage instead of four to perform transverse orthopedic expansion of the maxilla

2) Multidirectional expansion not only on the transverse plane but also on the sagittal plane

3) Uni-lateral and bi-lateral contraction of the maxilla

4) Orthopedic/Dentoalveolar effect by varying the activation rate of the screw (3 activations per day for an orthopedic effect, 2 activations per week for a dentoalveolar effect).

The result of these innovative concepts is schematized in Figure 1, which illustrates the wide range of therapeutic opportunities of fixed appliances with screws applied to the maxillary dentition.



Fig. 2

## Orthopedic effect on the transverse plane

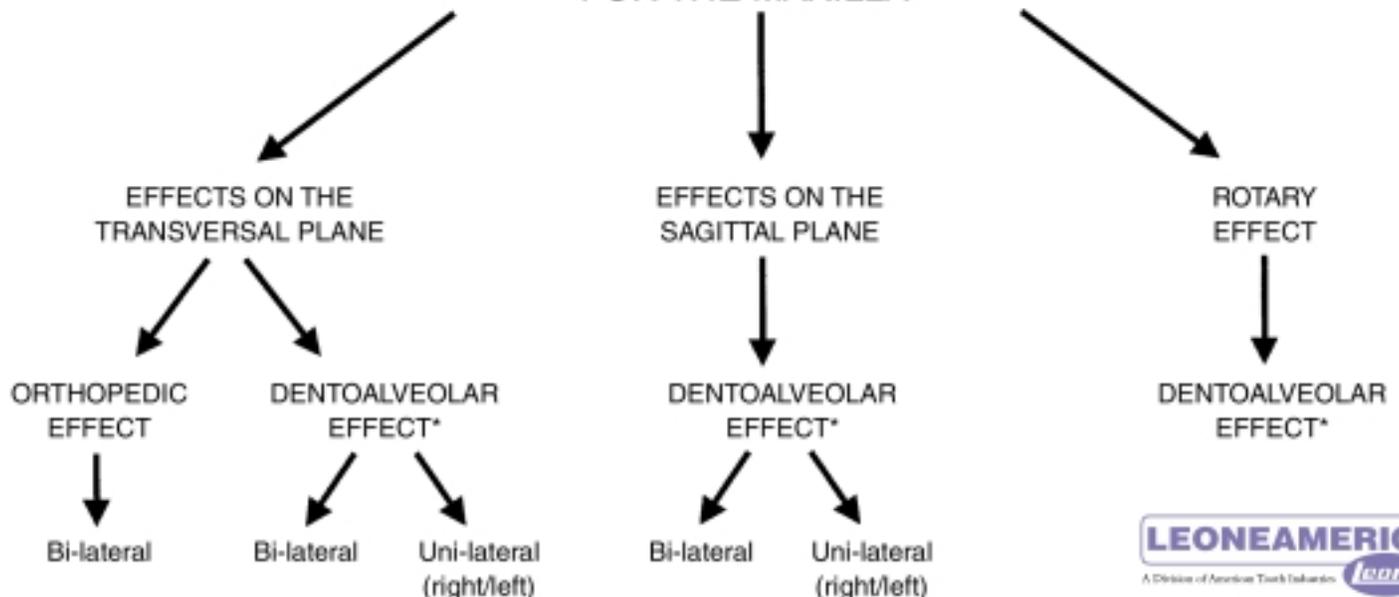
An orthopedic expansion of the maxilla



Fig. 3

Fig. 1

### THE USE OF FIXED APPLIANCES WITH SCREWS FOR THE MAXILLA



\*= in expansion or in contraction



Fig. 4



Fig. 5

### Effects on the sagittal plane

Another newly developed screw is able to induce dentoalveolar movement either in a distal or mesial direction within the upper arch. The indications for dentoalveolar movement on the sagittal plane are:

- 1) Distalization of the upper molars which results in correction of Class II occlusal relationships
- 2) Creation of space in the upper arch in cases with tooth-size/arch-size discrepancy
- 3) Mesialization of the upper arch in patients with Class III occlusal relationships
- 4) Dental movements as part of prosthodontic rehabilitation.



Fig. 6

can be performed by using orthopedic forces (3 activations per day) when the mid-palatal suture is responsive. This is dependent upon the skeletal maturity of the individual patient. The effect is bi-lateral and anchorage of the device can utilize the first permanent molars, the second deciduous molars or the first deciduous molars (fig. 2).

### Dentoalveolar effect on the transverse plane

When the biological reaction of the mid-palatal suture to orthopedic forces is absent, expansion on the transverse plane consists of dentoalveolar movement of the anchoring teeth (2 activations per week). This movement both conceptually and clinically can be described as a pure dental translation. The force generated by the screw is transmitted to the anchoring teeth via an extremely rigid system and this force is delivered close to the center of resistance of the teeth. Both expansion and contraction are obtainable by the dentoalveolar translation effect, which can be uni-lateral or bi-lateral. Either the first upper permanent molars or the upper premolars are used for bi-lateral activation (fig. 3). The uni-lateral expansion or contraction of an individual first permanent upper molar is obtained by a specially-designed screw with an anchoring tripod that includes the contralateral first permanent molar and the first premolars (fig. 4).

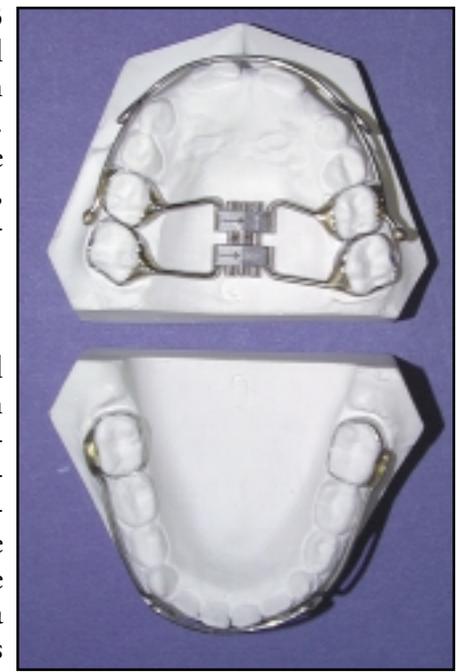


Fig. 7

Either the first upper permanent molars or the upper premolars are used for bi-lateral activation (fig. 3). The uni-lateral expansion or contraction of an individual first permanent upper molar is obtained by a specially-designed screw with an anchoring tripod that includes the contralateral first permanent molar and the first premolars (fig. 4).



Fig. 8a



Fig. 8b

The first permanent molars are the anchoring teeth for the distalization of the permanent second molars. Either the second deciduous molars or the first premolars are the anchoring teeth for the distalization of the first permanent molars (fig. 5). In cases with Class II malocclusion the therapeutic protocol requires the use of both upper and lower appliances. The upper appliance includes distalization screws and a soldered labial arch with hooks for Class II intermaxillary elastic traction (240 g. per side). The lower appliance consists of a lingual arch soldered on bands on the first permanent molars (fig. 6). The therapeutic protocol for Class III cases requires the same screw-device, which is used to mesialize the anterior part of the maxillary arch. This movement complements the

orthopedic effect of the facial mask in conjunction with intermaxillary Class III elastics (fig. 7). The distal/mesial dentoalveolar movement of the upper permanent molars can be also carried out uni-laterally. Once again a special screw and an anchoring tripod are required (fig. 8a and 8b).

### Rotatory effect

When sagittal asymmetry in the upper arch is present (for example Class II molar and canine relationships on one side of the upper arch and Class I or Class III molar and canine relationships on the other side of the upper arch), devices with special two-directional screws can be used to produce dentoalveolar movements in a mesial direction on one side and in a distal direction on the other side. Bands are usually placed on the first or second permanent upper molars and on the first upper premolars (fig. 9)



Fig. 9

In conclusion, the series of special expansion screws derived from the original Leone A0620 offers a vast range of therapeutic possibilities, which is suitably described as "360-degree maxillary expansion". This new series of fixed appliances with expansion screws represents the therapeutic solution for the majority of malocclusions, when you consider that maxillary transverse deficiency is the most common orthodontic problem encountered and the remaining bulk of malocclusions consist mainly of crowding and Class II/Class III problems. This latest offering by Leone provides the contemporary orthodontist with an essential and extremely versatile therapeutic tool.

(This article was completed with the scientific collaboration of Dr. Tiziano Baccetti and Dr. Lorenzo Franchi, University of Florence.)



## TWO-DAY COURSE IN FLORENCE, ITALY

### "MAXILLARY EXPANSION: THERAPEUTICAL INDICATIONS AND CLINICAL MANAGEMENT"



In coordination with the Leone Institute of Orthodontic Studies managed by Mr. Fiscella, we are bringing an opportunity to all orthodontists and orthodontic professionals to go to Florence, Italy and spend two (2) intensive days in this specialized school. The program will be presented by

Dr. Tiziano Baccetti, DDS, PhD and Lorenzo Franchi, DDS, PhD.

The 2-day course is \$950.00 per person, which includes manuals, 2 lunches, 2 snacks and shuttle services to and from the hotel. If you need to make special trip arrangements, our LeoneAmerica sales office in Arizona will put you in touch with our specialized travel office. The travel office will give you the very best package price to travel to Florence for five (5) nights, seven (7) days and attend the 2-day course at the Leone facility. The 2-day course is as per the following program:



#### TWO-DAY COURSE:\*

July 20-21, 2000 or  
Nov.30 and Dec. 1, 2000

#### Instructors:

Tiziano Baccetti, DDS, PhD  
Lorenzo Franchi, DDS, PhD

#### 1. BIOLOGIC BASES OF MAXILLARY EXPANSION

- Different types of maxillary expansion
- Slow expansion vs. Rapid expansion
- Appliances for maxillary expansion
  - Expansion plates
  - Banded rapid maxillary expander
  - Bonded rapid maxillary expander
  - Rapid expansion with the "Ragno" appliance
  - Rapid expansion with the "Veltri" appliance
- Biologic response of the mid-palatal suture to maxillary expansion

#### 2. CLINICAL INDICATIONS FOR MAXILLARY EXPANSION

- Normal vs. abnormal growth of the maxilla in the transverse plane
- Transverse Inter-arch Discrepancy: theoretical and practical aspects
- Maxillary expansion for the correction of posterior cross-bites
- Maxillary expansion in Class II cases
- Maxillary expansion in Class III cases
- Maxillary expansion in cases with tooth size/arch size discrepancy
- Short-term and long-term results of rapid maxillary expansion

#### 3. CONSTRUCTION AND DELIVERY OF THE RAPID MAXILLARY EXPANDER

- Checking the patient prior to rapid maxillary expansion
- Construction of the appliance in the orthodontic lab
- Appliance delivery
- Appliance removal
- Instruction for patients and parents
- (Costruzione dell'apparecchio da parte dei partecipanti al corso: parte pratica)

#### 4. USE OF RAPID MAXILLARY EXPANSION IN CONJUNCTION WITH THE FACIAL MASK IN CLASS III CASES

- Clinical management of the expander/face mask treatment protocol
- Treatment outcome in the mixed dentition
- Treatment timing
- Active treatment and retention: long-term observations

\*Dates and instructors are subject to change. Please contact LeoneAmerica for current information.

# VELTRI

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### Bilateral sagittal screw Veltri A0629-08 and A0629-11



A versatile bilateral screw to provide distal, mesial and sagittal expansion movement in the treatment of Class II and III malocclusions.

### Monolateral screw Veltri A0626-08 and A0626-11



A versatile monolateral screw to provide distal, mesial and expansion or contraction movements of a single tooth. Optimum movement and anchorage control to the tripod rest.

### Rotary screw Veltri A0627-08



Its design allows a mesial movement on one side and a distal movement on the other side.

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