SUMMARY: The authors describe a new instrument designed to noticeably reduce the amount of friction normally originated by the arch wire/slot interaction. This innovative product allows the clinician to apply “ideal” forces, reduces treatment time, increases patient comfort and produces more stable results.

KEY WORDS: Controlled Friction, Light Forces, Treatment Time, Comfort.

INTRODUCTION

For many years, manufacturers of orthodontic products and clinicians have focused on the properties of the arch wires used in multibracket therapy, seeking to develop more efficient wires, like Ni-Ti arch wires, whose peculiar thermo sensitivity and superelasticity are appreciated by orthodontists worldwide. These arch wires allow the release of continuous forces without a need for frequent activations and also permits ligation at early stages of treatment, to severely malpositioned or misaligned teeth. The new Leone Slide™ Ligature System is a step forward in making orthodontic treatment quicker and more comfortable for the patient.

THE NEW Slide™ LIGATURE SYSTEM: DESCRIPTION

The new Leone Slide™ Ligature System is a device that is
applied in the same way a traditional elastic ligature is (Fig. 1). Once it is in place, it provides a passive ligature around the slot, leaving the wire free to slide and to fully transmit its force to the dental-alveolar structures. The new ligatures are made of a special medical polyurethane mix and they are available in size small, medium and large, to fit the type of brackets they are employed with. The new Slide™ ligatures’ innovative shape also provides a buffer between brackets and soft tissues, thus considerably reducing the patient’s discomfort generally associated with wearing braces.

By using the new Slide™ ligatures the orthodontist can now “lock” the archwire inside the slot, turning a traditional 3-walled slot into a 4-walled “box” almost completely friction-free where the archwire can slide freely (Fig. 2). This can be achieved with most brackets available on the market today. The clinician can take advantage of the considerable reduction in friction thus obtained to apply forces that are at once very light but effective: this means these light forces are actually available, as they do not have to overcome the effects of conventional ligatures. It has been internationally accepted by the orthodontic community that the optimal force levels for orthodontic movement should be high enough to stimulate cellular activity without, on the other hand, obstructing the blood vessels of the periodontal ligament. Should this force be so intense as to cause obstruction, thus blocking the blood supply, the area involved will become hyaline. The vascular function in this area will have to be restored before teeth can start (or restart) to move. This whole process will eventually result in longer treatment time.

Reducing friction and being able to use really available light forces means:
• No ischemic areas
• Faster orthodontic movement
• More stable results
• Less discomfort -or none at all- for the patient as lighter forces cause less pain.

THE NEW Slide™ LIGATURE SYSTEM: INDICATIONS
The new ligatures are indicated in those cases where considerable levelling and aligning of the dental elements is required to correct a malocclusion, as well as in all those cases that require sagittal and transversal expansion. During the latter, the so-called “Frankel Effect” can be obtained, thus reducing the need for extractions. The benefits of this innovative product can be especially appreciated during the early stages of the orthodontic treatment, as it is during the levelling and aligning phases that the arch wire can flow freely inside the “tunnel” created by brackets slot and the Slide™ ligatures. Furthermore, the new Slide™ ligatures allow us to create along the same arch and at the same time, biomechanical solutions with friction or with low friction, without having to change the size or the shape of the wire. Depending on the situation and therapeutic stage, the orthodontist can use the new ligatures only in certain segments of the bracketed arch. For example, during a hypothetical space-closing phase (performed with any four wing Straight Wire bracket) in which a rectangular arch wire and elastic tie-backs are
being used and in which we need to mechanically retract the whole anterior section, the use of the new ligatures in the posterior segments will constitute an advantage, allowing these segments to slide without meeting any strong friction. In the anterior segment, some conventional ligatures will have to be used in order to obtain maximum torque control (Fig. 3).

**Clinical case**
16 yr. old patient with crowding in the lower arch and upper left canine very high vestibularly positioned (Fig. 4,5).

A non-extraction therapy was chosen. Using a .014” Ni-Ti Memoria superelastic arch wire and the new Leone Slide™ ligatures, the complete levelling of the cuspid was achieved in only 12 weeks (Fig. 6,7).

**Comparative case**
A similar clinical case was treated with a conventional Straight Wire approach: a complete cuspid levelling was achieved in 29 weeks. That is a noticeable longer treatment time when compared to the 12 weeks Slide™ “low friction” biomechanics (Fig. 8,9,10).

**CONCLUSIONS**
The new Leone Slide™ ligature is a new instrument, easy to apply, that makes light and constant forces actually available and can be used without altering the existing clinical methodology. This new product provides the orthodontist with new opportunities in managing friction, while increasing patient comfort and reducing treatment time during therapy.

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**Slide™ LOW FRICTION LIGATURES**

*Slide™* ligature is a device manufactured in a special polyurethane mix for medical use. It is likewise applied as the classical elastic ligatures and, once on the bracket, it performs a self-ligature on the slot leaving the wire free to slide and to act on the dento-alveolar structures. Its particular conformation noticeably improves the comfort of the patient in the first phases of the treatment. Silver color only. Multiple colors will be offered in the near future.

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**Slide™ LOW FRICTION LIGATURES KIT**

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Pack of 10 modules, 6 ligatures each
LEONE MINI ORTHODONTIC IMPLANT SYSTEM

On July the 2nd, 2004, the first International Course and workshop on the subject “Mini Orthodontic Implants and Extra Dental Anchorage” was held in the lecture hall of our “ISTITUTO STUDI ODONTOIATRICI” (ISO). Our speakers and demonstrators on the day were the Drs. Arturo Fortini and Stefano Cambi. Though the course only ran for one day, the presence of over 90 attendees from all parts of the world was a definite indication of the growing appeal of the chosen subject. Speaking of this, we would like to thank all our Dealers worldwide for gathering all applications, thus contributing to making the event such a success.

THE EVENTS OF THE DAY

In the morning, an introductory speech on the LEONE Mini Implant System was given by Drs. A. Fortini and R. Sacerdoti, highlighting the system’s features as well as showing some clinical cases. For the second part of the course, held in the afternoon following a light lunch, “live” surgery on two patients was performed. Through “State-of-the-art” audio/video equipment, comfortably seated attendees were able to follow the procedures on the large screen inside the “Marco Pozzi” lecture room. Finally, our enthusiastic group of participants was given a tour of the production plant, where the outstanding quality and total commitment of our staff join the highest technology to produce our world class line of products.

Over the years, we have found that it is of the utmost importance to promote and organise events such as this one. Here, professionals and experts from all over the world come to meet and exchange ideas, sharing their knowledge with others.

It is true that LEONE takes great pride in offering products of the highest quality, but also in providing opportunities to bring together the people and the ideas that push the Orthodontic sciences forward.

We hope to see you soon in Florence on one of our future courses.

Yours faithfully.

Steven Torelli
Export Manager
Leone S.p.A., Florence, Italy
skeletal Class I, bilateral molar Class I relationship, Class I canine relationship on right and Class II canine relationship on the left (Fig. 1). X-rays showed bone inclusion of the upper right canine and of the lower left second premolar (Fig. 2). Though we recommended a complete orthodontic treatment aimed at recuperating all the impacted teeth and especially the canine for its aesthetic and functional importance, the patient decided against it and requested a mere disinclusion of 35.

We therefore proposed the use of Mini Implants in our therapy, not with a complete arch banding but with a simple sectional realignment of the impacted tooth. Two factors determined our choice of Mini Implants:

1) Obtaining an orthodontic disinclusion of 35 while applying minimal dental load
2) The patient’s aesthetic concerns

Operative Stages

Simple palpation revealed the presence of swelling lingually, which enabled us to locate the unerupted molar with no need for any further diagnostic exams, such as computerised tomography. We did however use an endoral x-ray to evaluate the relationship between the radicular portion of the unerupted tooth and the roots of the adjacent teeth; this was done to avoid problems during traction. Furthermore, the orthopantomography allowed us to determine the mini anchorage implant’s future insertion site. We chose the inter-radicular area between 24 and 25, in the opposite arch, which appeared suitable on account of the marked divergence of the roots of these two elements (Fig. 3). Before inter-arch traction was applied, we put brackets on 34, 36 so as to recuperate the space and to disincline 34 which was distally inclined (Fig. 4-5). 75 was subsequently extracted and no. 35 was surgically exposed and a button was applied on its crown to which an elastic could be added. The Mini Implant was then inserted inter-radicularly between 24 and 25 (Fig. 6-7).

The operation did not present us with any major difficulties, nor were any special precautions necessary, on account of the marked divergence of the molars’ roots. We positioned the screw level with the mucogingival line, so as to avoid pressure sores to the mucosa of the cheek or any inflammatory reactions (Fig. 7).
The second unerupted premolar, as described earlier on, was considerably inclined lingually; it was therefore necessary to straighten the 35 in the lingual-vestibular direction before any inter-arch traction could be applied. To this end, we joined 34 and 36 using rectangular steel .021 x .025 wire, then allowing the previously unerupted element to be moved from mesio-lingual to disto-vestibular by traction forces. This applied to the 35's centre of resistance the clockwise movement needed to straighten it as well as the traction force.

After 6 weeks a new endoral x-ray showed how 35 had been straightened. Inter-arch traction was then applied. To this end, we provided the patient with 6.4 mm and 4.5 oz intermaxillary elastics (Fig. 8).

During the initial stages of traction, we noticed how the inter-arch section of the elastic was causing pressure sores to the upper alveolar mucosa; to overcome that, we added some composite vesti-bularly to 24 and 25 so as to detach the elastic from the gum (Fig. 9).

8 weeks after traction was first applied, 35 was erupted (Fig. 10, 11). We then proceeded to its alignment with the adjacent elements.

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**Bibliography**


ORTHODONTIC MINI IMPLANT ACCESSORIES

For Prices Please Call LeoneAmerica National Sales Office 800-242-9986

ORTHODONTIC MINI IMPLANTS KIT

The package contains:
- 24 mini implants, as listed aside,
- 4 drills,
- 1 screwdriver.

ORTHODONTIC MINI IMPLANTS

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**Slide™ Technique:**

1) Take either a mosquito forceps or a Mathieu style instruments and with the Slide ligatures in the other hand clamp the instrument on one side of the Slide ligature. Make sure to clamp onto but not completely over the entire opening. Then start by attaching the loop farthest from your instrument, over the gingival wings of the bracket.

2) Slowly pull toward the incisal wings of your bracket.

3) Attach the Slide ligature to either the mesial or distal wing and slowly roll your instrument over to the remaining wing of the bracket.

4) Open your instrument and remove from the Slide ligature. You are ready to move onto the next bracket.

Slide Ligatures come in small, medium, and large. You may also purchase a combination package of all three sizes. Slide ligature samples are available upon request by calling toll free 800-242-9986.

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- Using Mini Implants for Extra-Dental Anchorage
- A New Low Friction Ligature System