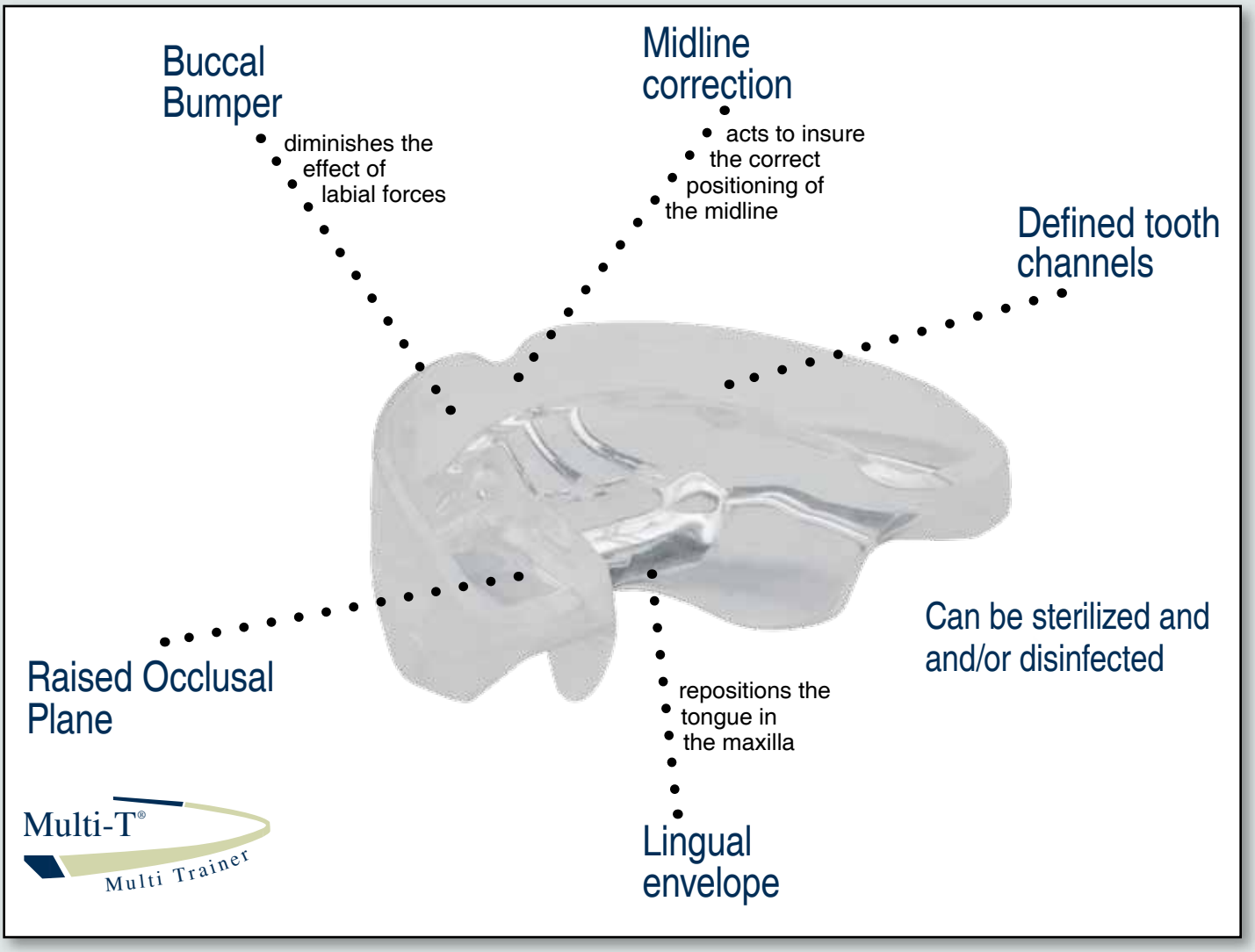
Multi-Family

Functional Education

The **Multi-Family** Appliances are an integrated system of appliances that allow the orthodontists to choose the ideal appliance according to the age and the malocclusion of the patient.



Multi-S™ Multi Start

Multi-T® Multi Trainer

Multi-P® Multi Purpose

Multi-TB™ Multi Trainer for Braces

Dr. Franco Bruno received his Medical Degree from the University of Pavia, Italy. His Orthodontic Specialty degree was awarded at the University of Cagliari, Italy. Postgraduate Degrees include Straight Wire Therapy and and TMJ Therapy from the University of Milan and Lingual Orthodontics from the University of Varese.

Dr. Bruno completed the 2 year Zerobase Bioprogressive Course and is the Chair of Bioprogressive Philosophy at the University of Cagliari. He is also Head of the Bioprogressive Department, Dental Clinic, at the same institution.

Dr. Bruno has a Private Practice Limited to Orthodontics, which he opened in 1986.

THE FUNCTIONAL MATRIX: *a practical solution using The Multi-Family*

By Dr. Franco Bruno
Italy

INTRODUCTION

A long-term goal in orthodontics has been to understand the interaction between the Functional Matrix and malocclusion. Research in this area began in the early 19th century and, to date, there is no definitive understanding. Contemporary orthodontics recognizes two opposing views. The "functionalists" believe that the Functional Matrix, especially that of a muscular nature, is the determinant principle of malocclusion. Contrary to this belief is the "mechanistics" view, whose proponents say that muscular dysfunctions are a result of malocclusion. Unfortunately, the latter have yet to submit a theory on the etiology of malocclusion. There are various positions between these two extremes that, to a greater or lesser degree, recognize the influence of the functional matrix on malocclusion. It is difficult for the clinician to address malocclusion both in etiological terms and long-term stability. A primary issue is the probability of relapse after orthodontic treatment. If the Functional Matrix is the cause of malocclusion, and it is not neutralized during treatment, there will be a greater possibility of relapse. However, if the dysfunction is a result of the malocclusion, only its complete resolution will guarantee stability of the case. From our perspective, this ideological dualism is irrelevant.

The philosophy of "Self Confident Orthodontics" views the interaction between the Functional Matrix and malocclusion as a continuous exchange of information between the two components and, therefore, foresees a therapeutic protocol that aims at correcting both parts of the system in order to find the most appropriate solution for long-term stability. The main therapeutic idea is to work on each component at different treatment times. In the absence of definitive scientific evidence, the clinician must develop his/her own viewpoint and objectives to best resolve the patient's problems and reach a clinical outcome that will be stable over time.

Our therapeutic protocol calls for a three-step treatment sequence to address the Functional Matrix:

1. Preparation Stage: use myofunctional orthodontics at an early age, from 4-5 up to 10-12 years of age, while waiting for the appropriate time to start treatment with conventional orthodontic mechanics.

2. Treatment Stage: use myofunctional appliances in association with conventional fixed appliance therapy.

3. Retention Stage: use myofunctional orthodontics at the end of treatment to promote adaptation of the Functional Matrix to the new occlusion.

This approach is based on simple considerations. If alterations of the Functional Matrix are the cause of malocclusions, its neutralization guarantees simpler active treatment. If, however, the dysfunctions are the result of a malocclusion its treatment will be more complex; therefore, neutralization of the Functional Matrix would allow faster and more simplified treatment. Lastly, if the resolution of the malocclusion is decisive for correction of the dysfunction, control during active treatment allows a quicker adaptation of the Functional Matrix to the new occlusion. Therefore, the guideline is to act on both components without certain knowledge of which is the cause and effect. Simplified therapeutic protocols will produce a better and more stable result.

Based on these concepts we have tried to find a solution to patient treatment with a simple, economical, and easy to use myofunctional approach that can be utilized at any age and at all stages of orthodontic treatment.

The appliances of the MULTI SYSTEM respond very well to these characteristics and therefore are included in the "Self Confident Orthodontics" philosophy of treatment.

THE MULTI SYSTEM OF ORTHODONTICS

The MULTI SYSTEM of Orthodontics represents an integrated series of myofunctional appliances that allow the orthodontist to utilize the device that is most suitable based on the age and characteristics of the patient's malocclusion.

The MULTI series of appliances are primarily myofunctional in nature and, as such, each appliance is designed for specific functions. All appliances in the series have various characteristics in common, although each has unique features rendering them case specific for various stages of treatment.

Type	Age	Sizes	Holes	Lip-Bumper Effect
Multi- S	5-8	1	yes	yes
Multi-T	6-10	1	yes	yes
Multi-P	9-13	multiple	yes	no
Multi-TB	all	1	no	yes

THE COMMON CHARACTERISTICS OF MULTI SYSTEM APPLIANCES

Like all myofunctional devices, these appliances have a monoblock shape in order to simultaneously work on both dental arches. The mandibular position protrudes with respect to a edge to edge incisor position. Moreover, the appliances have a raised occlusal plane. This positioning promotes an immediate mechanical unlocking of the TMJ in association with the functional unlocking of muscles.

In addition, all of the appliances have a large vestibular shield which serves to activate the perioral muscles; the shield is adequately extended in order to provoke stretching and activation of the musculature although not arriving up to the fornix given that it is preformed and not customized for the patient. Lingually, the appliance has a frontal lingual ramp for the re-teaching of lingual posture and two lateral wings which increase the re-education effect of the frontal elevator.

In summary, the specific design characteristics of the MULTI SYSTEM are:

a. Vestibular Shield

b. Lingual Elevator

c. Lateral Wings

d. Occlusal Plane

e. Mandibular Protrusion

SPECIFIC CHARACTERISTICS OF THE MULTI SYSTEM APPLIANCES

The MULTI appliances, MULTI-S, MULTI-T, MULTI-P, are designed to be used independent of other orthodontic devices. As part of their design, dental tooth eruption/positioning guides are included as innovative additions to myofunctional therapy. The extent of the guides vary among the appliances to follow the development of tooth eruption with age. MULTI-S contains a guide only for the incisors; MULTI-T contains guides for the incisors and canines; MULTI-P has additional guides for premolars. MULTI-TB, was designed to be used in combination with conventional orthodontic treatment, and therefore does not have any dental guides.

Type	Guidance
Multi- S	Incisors
Multi-T	Incisors and Canines
Multi-P	Incisors, Canines and Bicuspids
Multi-TB	No guidance

All of the appliances, with the exception of the MULTI-TB, have 3 holes in the front of the appliance to allow for partial oral respiration. These holes, which have the effect of increasing the elasticity of the frontal plane, permit a greater elastic response during closing exercises and, therefore, a more effective intervention on anterior teeth in cases of deep-bite.

MULTI-S, MULTI-T and MULTI-TB utilize the shield to create a thickening in the anterior segment designed to increase the effect of the lip-bumper.

MULTI-S, MULTI-T and MULTI-TB are available only in one size.

MULTI-P is available in two models: low and high volume, that is, with a different frontal thickness of the occlusal lift.

The low volume MULTI-P is available in 13 different sizes.

The high volume MULTI-P is available in 11 different sizes.

The sizes, easily identified by a special measuring instrument, differ in the mesial thickness of the incisors.

BASIC INSTRUCTIONS FOR USE

Based on the specific characteristics of the malocclusions, it is relatively easy for the orthodontist to make an accurate determination as to what appliance is appropriate for the case at hand.

MULTI-S is indicated for younger patients and is applicable starting from 5 up to 7-8 years of age.

Multi-S

Following eruption of the first permanent molars it is often preferable to utilize MULTI-T that is applicable from 6 to 9-10 years of age.

Multi-T

MULTI-P is used after the exchange of the lower canines or first upper bicuspids (depending on the patient's pattern of exchange) up to 13-14 years of age with braces/myofunctional orthodontics.

MULTI-P has specific indications for use for each of its two models. The low volume model is designed for mesofacial or brachyfacial patients; the high volume method is designed for a dolichofacial patients.

Multi-P

Beyond age 13-14, it is advisable to use MULTI-TB in association with conventional orthodontics.

Multi-TB

When should the MULTI series of appliances be used? As previously discussed, these are primarily myofunctional devices. They are designed to stretch the lateral and periodontal muscles to generate strength in order to modify the skeletal and/or dental relationship. As per classical myofunctional therapy, their main use is in Class II and certain Class I cases and they possess three principal functions:

a. UPPER RIDGE: Dental tipping and guide for tooth eruption.

b. SKELETAL: Possible interference with the growth of the jaw bone; increase of lower jaw growth; remodelling and modification of the TMJ.

c. MODIFICATION OF THE FUNCTIONAL MATRIX ACTIVITY: MULTI family appliances do not require impressions or the need for a dental laboratory. This is very important because most patients would prefer to avoid having impressions taken, and initiating orthodontic treatment without the need for impressions may incline the patient and parents to be more comfortable with their orthodontist. In addition, when the dental laboratory is by-passed, the MULTI SYSTEM becomes exclusively an in-office procedure without a costly laboratory fee.

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CASE # 1:
Roberto; age 7

Class 1, Crowding upper and lower, Cross-Bite, Deep-Bite

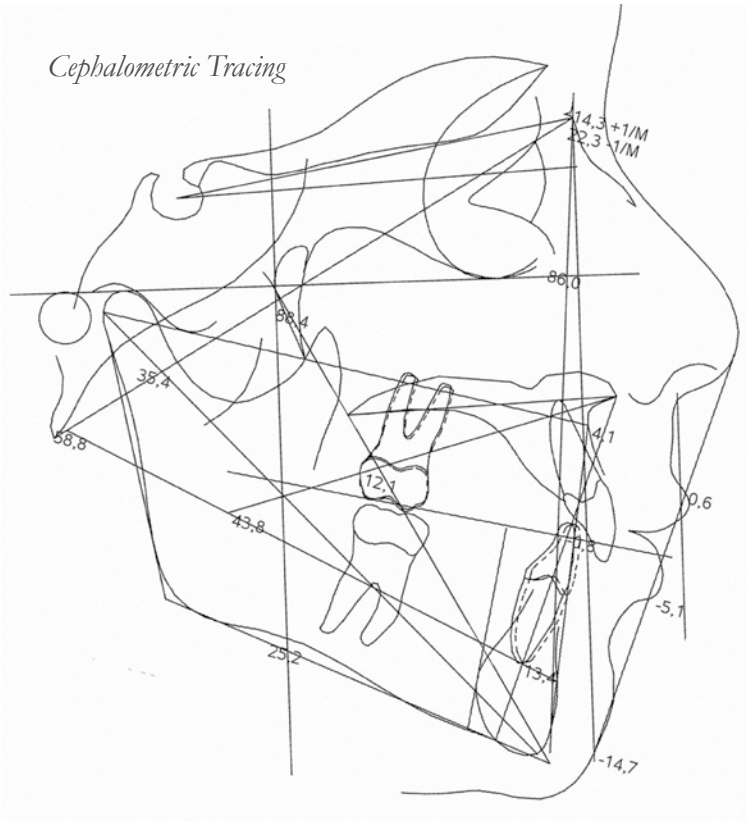
Treatment Plan: Multi-T for correcting the cross-bite, reshaping the arches, and correcting the deep-bite. Quad-Helix for gaining space and mesio-distal rotation of upper first molars.



BEFORE



Before treatment

After 7 months of Multi-T, ready for Quad-Helix phase

In summary, the specific design characteristics of the MULTI SYSTEM are:

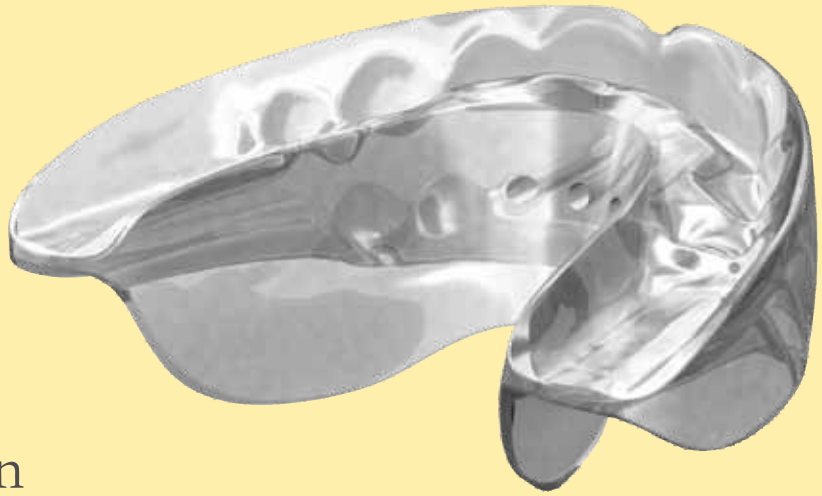
a. Vestibular Shield

b. Lingual Elevator

c. Lateral Wings

d. Occlusal Plane

e. Mandibular Protrusion



CASE # 2:
Ivan; age 6

Class II, Open-Bite, Thumb Sucking

Treatment Plan: 2 Phase Treatment

Phase # 1: Habit correction, Facial Axis Control: Multi-S and Re-education

Phase #2: Class II Correction, smile analysis and gummy smile correction: Fixed Appliances

Figure 1

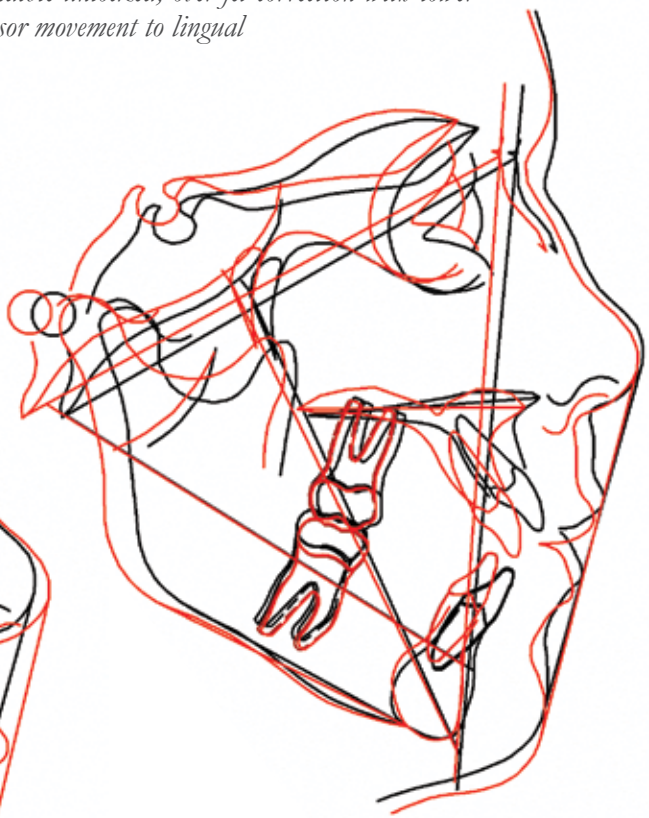
Before treatment

Our therapeutic protocol calls for a three-step treatment sequence to address the Functional Matrix:

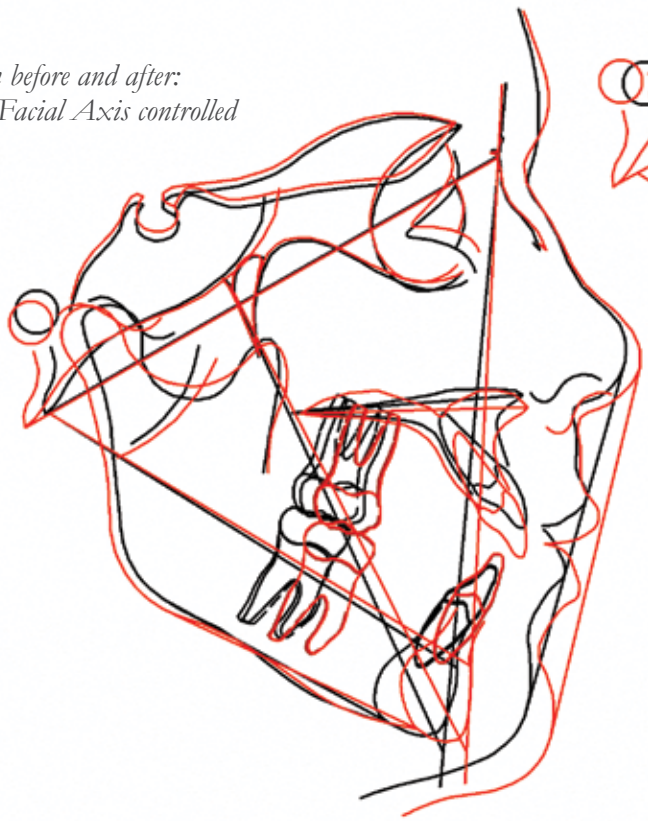
1. Preparation Stage: use myofunctional orthodontics at an early age, from 4-5 up to 10-12 years of age, while waiting for the appropriate time to start treatment with conventional mechanical orthodontics.
2. Mechanical Stage: use myofunctional appliances in association with conventional fixed appliance therapy.
3. Retentive Stage: use myofunctional orthodontics at the end of mechanical treatment to promote adaptation of the Functional Matrix to the new occlusion.

After phase 1 treatment

Superimposition before and after: Xi-Pm on Pm mandible unlocked, over-jet correction with lower incisor movement to lingual



Superimposition before and after: Ba-Na on CC Facial Axis controlled



CASE # 3 : Erica; age 7

Class II, Upper and Lower anterior crowding, Deep-Bite

Treatment Plan: 2 Phase Treatment

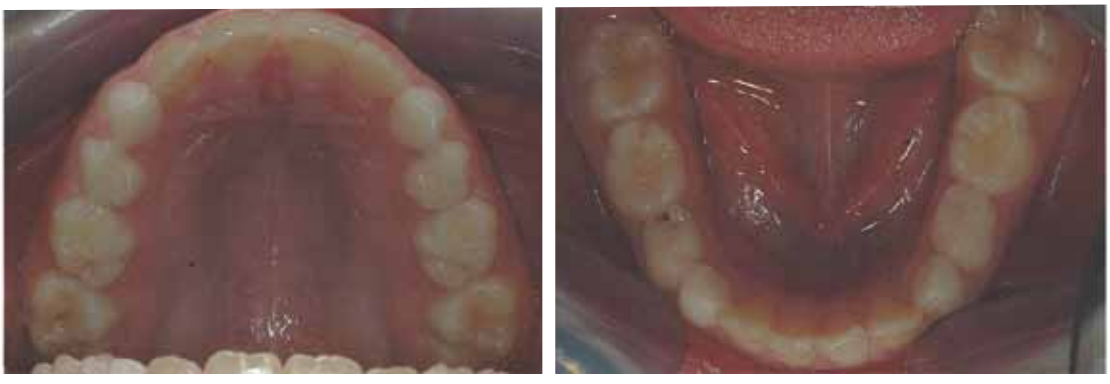
Phase # 1: Deep-Bite correction, crowding correction, Facial Axis control: Multi-P Low Volume for 13 months

Phase #2: Class II correction, Occlusal Plane inclination correction: Fixed Appliances

Before treatment

Before treatment

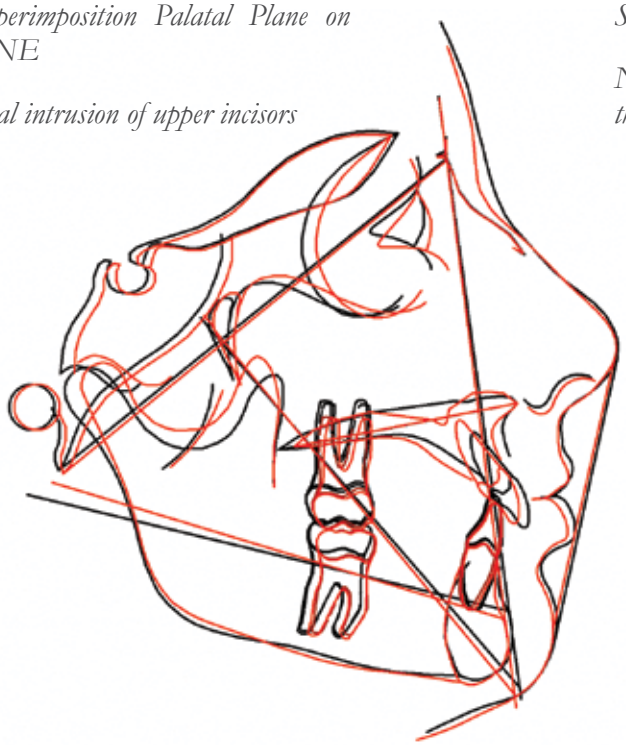
After treatment



10 Months after treatment without any retention: the case is stable

Superimposition Palatal Plane on ANE

Real intrusion of upper incisors



Superimposition Xi-Pm on Pm

No advancement or inclination of the lower incisors