Class III orthopedics and maxillary growth

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Introduction

Heavy orthopedic treatments and surgery are often proposed as the sole therapeutic outcome for the resolution of mandibular prognathies and maxillary hypoplasias. Inverted articulations are detectable very early in infancy as early as lacteal dentition.

Many authors, including Miyama and Mc Namara [1], have shown that in the absence of treatment, maxillary retrusions do not improve over time, while mandibular protrusion increases. The set always leads to the aggravation of the skeletal disharmony of departure.

In general, parents realize early on that there is a problem with their child's jaws, and from that moment on, we need to intervene.

A loss of the vertical dimension of occlusion by posterior bilateral edentation generates class III intermaxillary reports, as is often the case in the old man who no longer has growth.

In growing children, increasing the occlusion height by raising the posterior teeth will slow the mandibular advancement and promote maxillary growth.

History

The French school of functionalists, initially essentially composed of stomatologic doctors, has since been attached to Robin to treat skeletal disharmonies from a medical point of view.

For many years, Professor Deffez led the pediatric stomatology department of Bretonneau Hospitals, then Robert Debré, where Dento-Facial Orthopedic treatments were only performed using strictly amoevable functional devices [2-4]. The role of the tongue and soft tissues being essential for the shaping of bone and dental structures, these treatments were part of a global medical approach: orthophonic, ENT, psy-chological, osteopathic ...

These functional treatments without multi-attachment give excellent results in lacteal dentition.

Based on the work of Lepoivre5, Deffez [2-4] and Fellus[6] treated maxillary insufficiency by using only removable devices that, by increasing the vertical dimension of occlusion, showed their action of a point neuromuscular view8. Delaire[9,10] and Planas[11] also explained the architectonic and craniofacial dynamics as well as the functional development of the face by adding the role of occlusal stroking and chewing.

An antagonism between the teeth and the tongue makes the bridge between the different functional approaches:

The tongue recedes so as not to be "eaten" when the masticatory dynamics starts, or persists between the teeth because of sucking-swallowing or oral breathing7.

The combination of mechanical techniques with functional concepts allows us to go further in the therapeutic possibilities [8].

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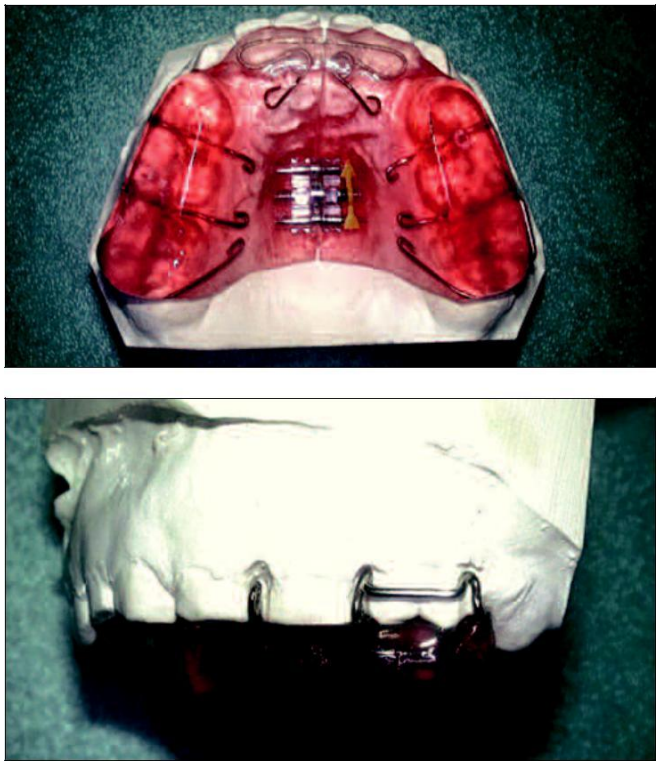
The device *(fig. 1 a and b)*

We use a removable plate provided with molar overelements, and an activation cylinder. The key factor is the molar elevation, of significant height, always greater than the free space of inocclusion.

The single-maxillary device must be worn continuously even during meals which eliminates proprioceptive memory of the crossed articulated and prevents premature contact at the origin of the deviations of the closure. There is no more proglis, nor latero-deviation.



Figures 1 a and b

The molar elevation stimulates maxillary growth in the three directions of space: anteroposterior, transverse and vertical.

In the anteroposterior direction

When the upper teeth are occluded by the antagonists, any possibility of natural expansion is prevented at their level. At each closure, they undergo a concentric force opposing the blooming of the arcade.

A thickness of resin interposed between the posterior teeth will release the teeth in articulated cross

The high height of the shims changes the orientation of the forces of chewing:

They were vertical and oblique with a postero-anterior component that pushes the maxillary, comparable to the mask of Delaire pulling it.

As the resin is in contact with the lingual surface of the upper incisors, the functional stresses of the occlusal strike (Deffez [2-4]) and the chewing friction (Planas [11]) will be transmitted to these teeth, giving energy and causing expansion of this arch.

In order to advance the pre-maxillary, the height is effective when the mandible is lowered and thus retracted sufficiently to simulate normal incisor ratios in the anteroposterior direction.

The more a maxillary advance effect is sought after, the higher the resin height must be.
The advancement and descent of the condyle into the glenoid cavity changes the orientation of the ligaments and muscles, particularly that of the lateral pterygoids. Their axis is transformed, initially horizontal, it becomes oblique; and by being upright, the muscles then lose some of their propulsive action which acts on the mandible.

The soft tissues have their action modified.

The tongue in general very powerful in these patients can exert its centrifugal action on the upper incisors, which are no longer retained by the occlusion. Lateral resin shims will increase its available volume inside the dental arches, which will undergo its thrust. As their thickness is greater.
Inocclusion free space, lateral lingual interposition between the arches is prevented and the tooth proprioception is stimulated because the posterior teeth find contact through the molar planes.
The resin palate can, coming into contact with the tongue, recreate a tactile proprioception of the lingual dome, causing the elevation thereof.
The inferior orbicularis will no longer have stresses on the upper incisors released, but rather on the mandibular teeth.
The lower orbicularis less tonic, will offer less resistance to lingual thrust on the maxillary incisors.

In the transverse direction

As the upper lateral teeth are embedded in the resin, the activations of the expansion cylindersion do not generate a coronal version of these teeth but a movement in gression. The

intermaxillary suture is actively solicited and there is a homothetic displacement in expansion of the alveolo-dental processes, giving the necessary place to the definitive teeth which it is enough to align.

In the vertical direction

The molar elevation helps to close the vertical direction by ingressing the posterior covered resin areas and allowing the spontaneous egression of the anterior teeth to express themselves.

The grinding of the canine contacts that will be obtained before the incisal recovery, increases this effect.

The molar planes operate on the same principle as the retro-incisal elevations.

Presentation of clinical cases

Clinical case n ° 1 *(fig. 2 à 15)*

Little girl of 5 years and 3 months, she has a marked deficit of the average floor of the face. Its upper lip, very set back, has its red edge not very visible.

Her lower lip is everted, her smile discovers her mandibular incisors (Fig. 2 a to c).
She is in lacteal dentition, her 6-year-old teeth are not yet evolved (Fig. 3 a to c).

On panoramic radiography, as in all maxillary hypoplasias, there is a foreseeable lack of space for definitive teeth

a *b* *c*

Figures 2 a to c

a *b* *c*

Figures 3 a to c

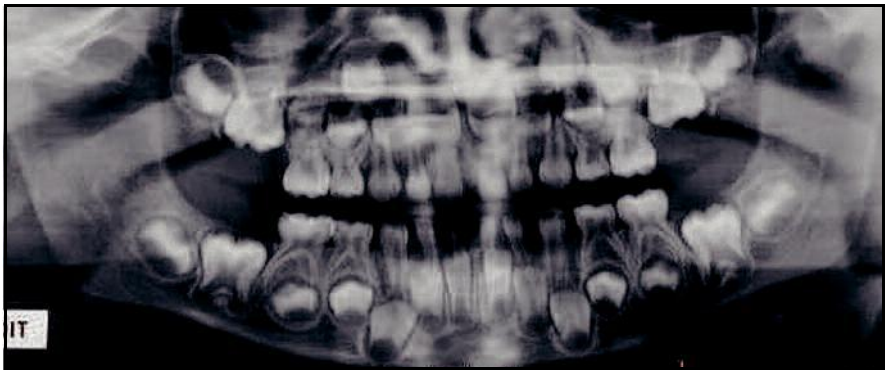
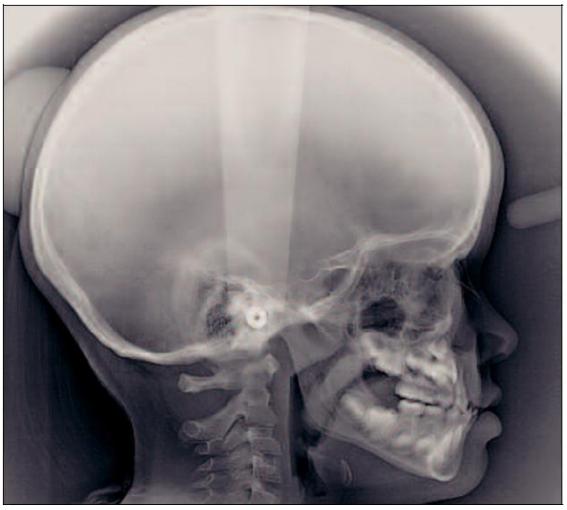
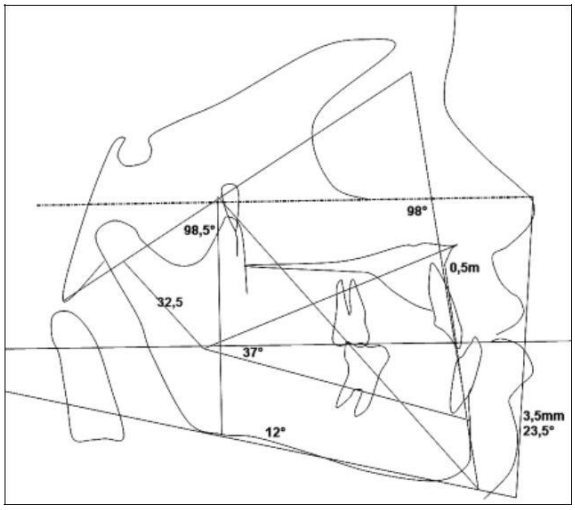


Figure 4





Figures 5 a and b

a *b*

of the maxillary arch, while they are well spaced.

The hyper-developed mandibular arch (Fig. 4).

The teleradiography shows a class III aggravated by the proalveoli of the lower incisors (fig 5 a and b).

We used a machine with molar elevations and very quickly, the maxilla was advanced. The effective height to cross the occlusion was obtained in two stages by adding resin to the chair (Fig. 6 a to c).

When the incisal overhang is obtained, the height of the planes is progressively diminished by keeping the lower incisors by an elastic nocturnal port (Figs 7 to 10).

a *b* *c*

Figures 6 a to c

a *b* *c*

d *e* *f*

Figures 7 a to f

a *b* *c*

Figures 8 a to c

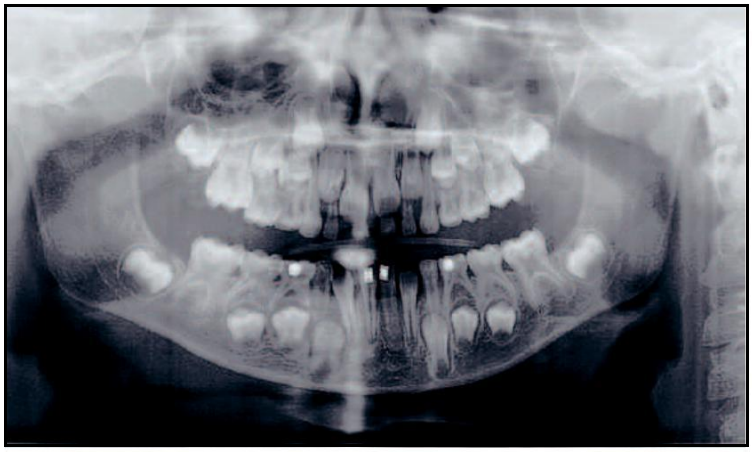


Figure 9

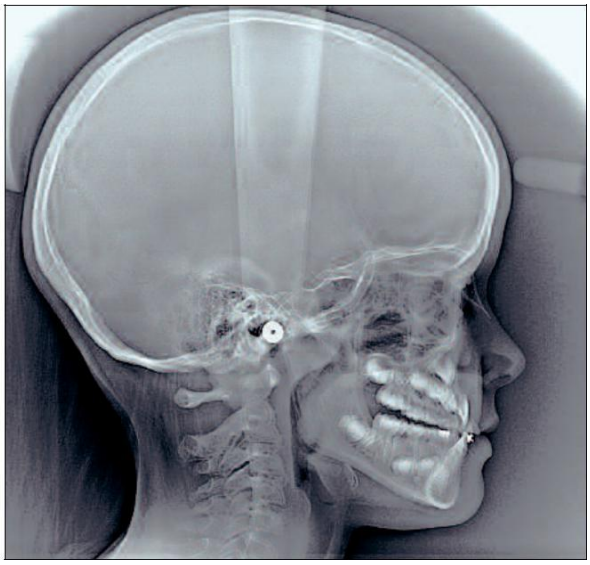


Figure 10

> ***Superpositions*** *(fig. 11)*

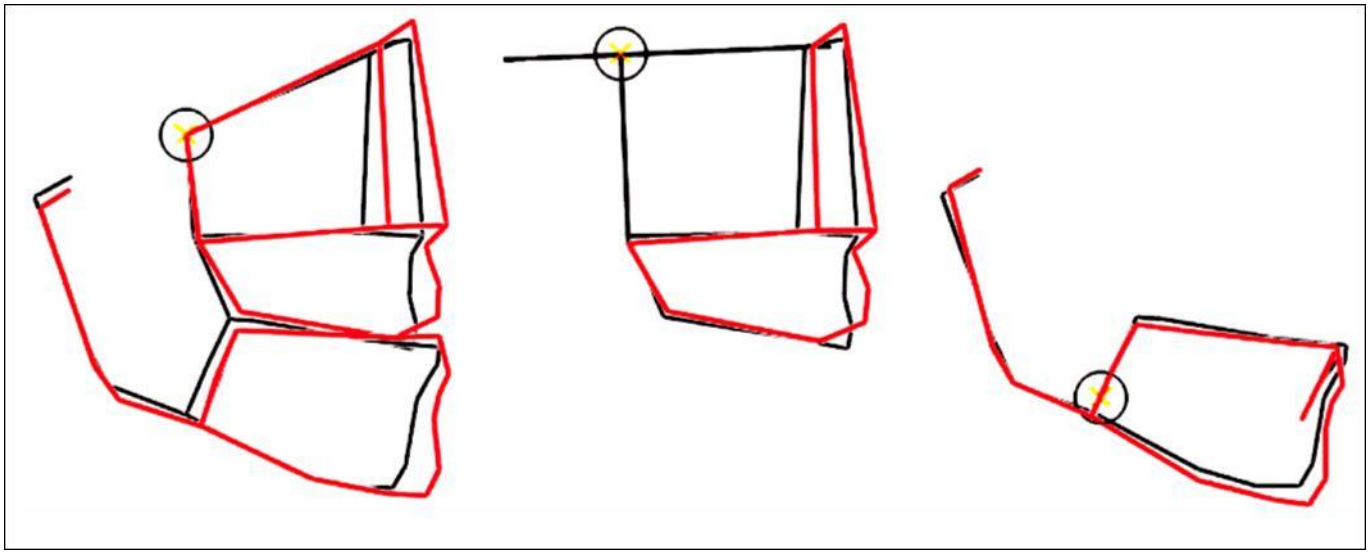


Figure 11

> *Discussion*

The superimpositions show marked maxillary growth, while the mandible is maintained. The forward tilting of the anterior pillars of the face around the fronto-maxillary suture led to the anteriorization of the premaxilla (Fig. 11).

His face is harmonized, the improvement concerns all the middle floor of the face: his lips are on the same vertical plane and have a balanced relief. The cervico-chin angle is more marked with the disappearance of the double chin, corresponding to an ascent of the lingual body, the back of the tongue is now at the palate, and the elevation of the hyoid bone is visible on the teleradiography.

The patient smiles with the maxillary incisors (Figs 12 to 15).

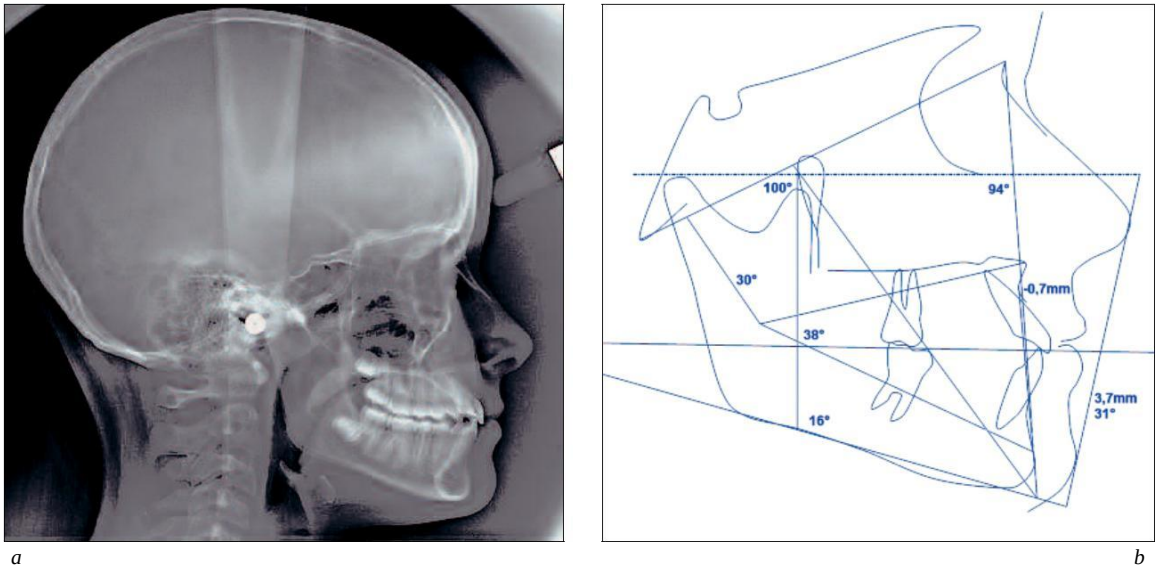
The examination of his face, his occlusion and his radio-graphies 5 years after the end of the treatment, before achieving the multi-joint finishing, the acquired results were maintained.

a *b* *c*

Figures 12 a to c

a *b* *c*

Figures 13 a to c



a *b*

Figures 14 a and b

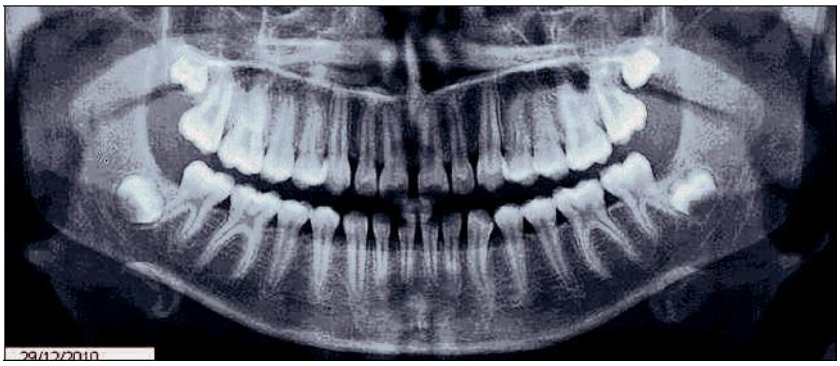


Figure 15

Clinical case n ° 2 *(fig. 16 to 24)*

A little girl of 5 years and 3 months, she presents a marked deficit of the middle area of the face. Her lip superior, very indented, has a red edge which is barely visible.

a *b* *c*

Figures 16 a to c

a *b* *c*

Figures 17 a to c

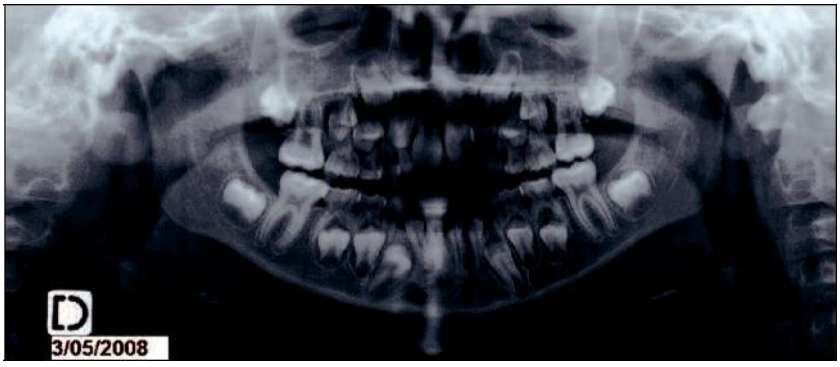
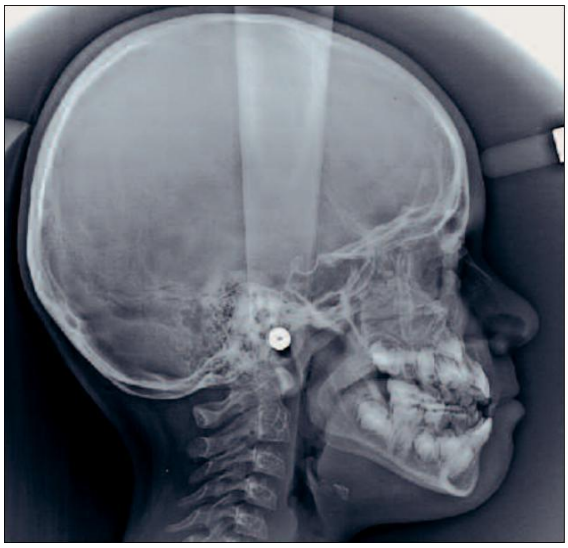
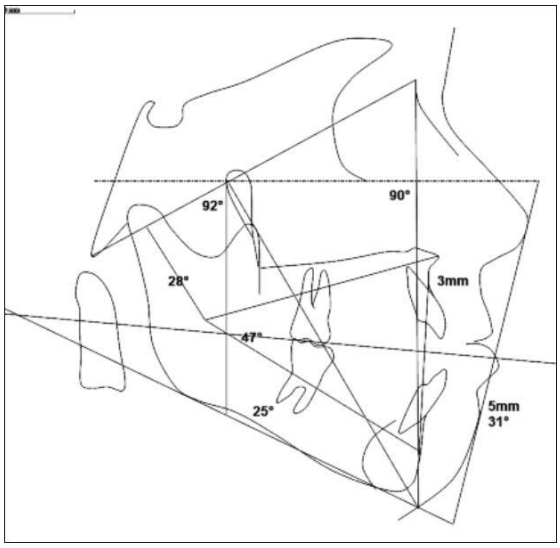


Figure 18



a



b

Figures 19 a and b

a

b

c

Figures 20 a to c

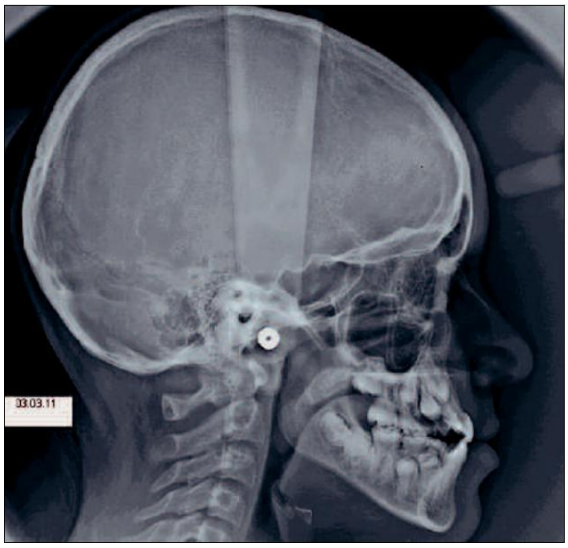
a

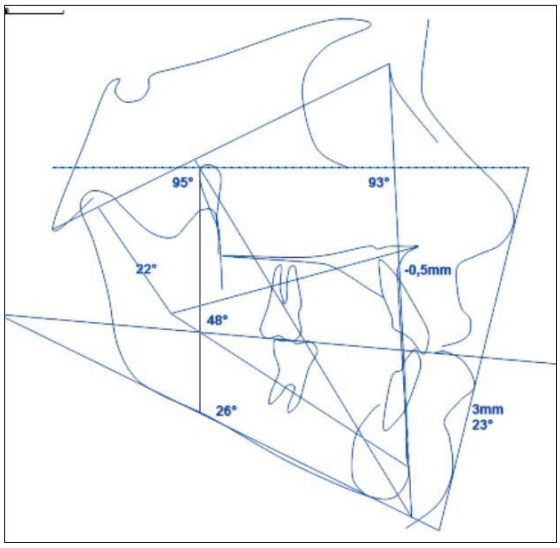
b

c

Figures 21 a to c

Figure 22





Figures 23 a and b

a *b*

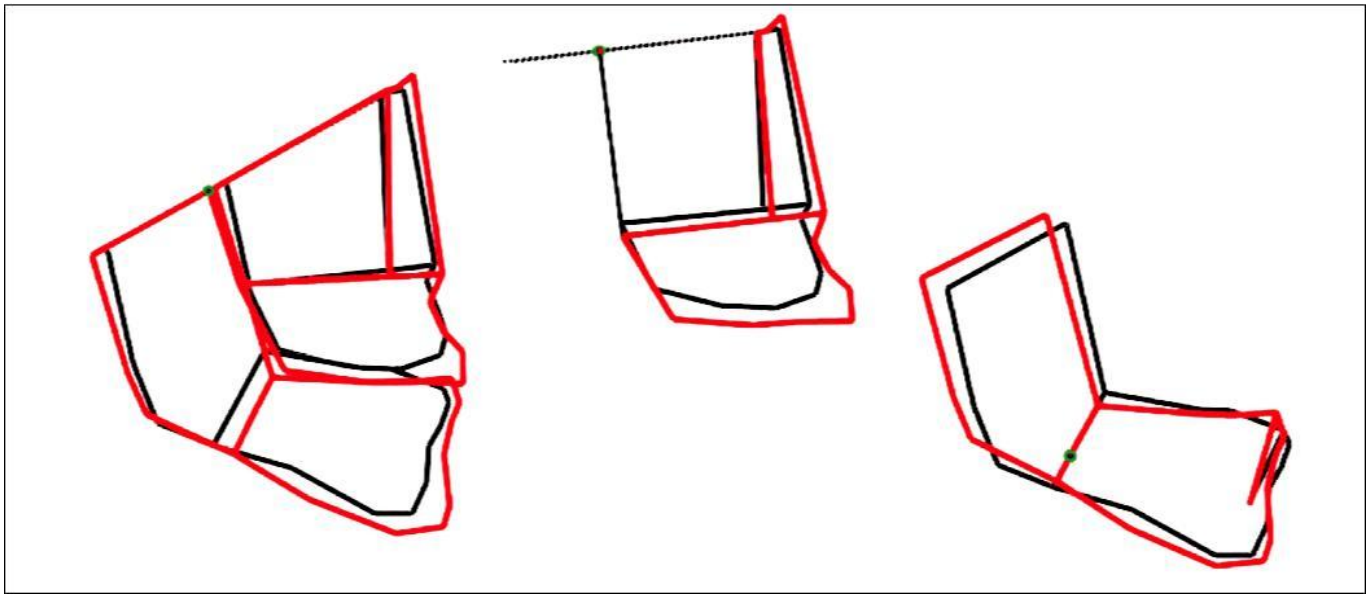


Figure 24

Clinical case n ° 3 *(fig. 25 to 36)*

Hyperdivergent facial patterns are more difficult

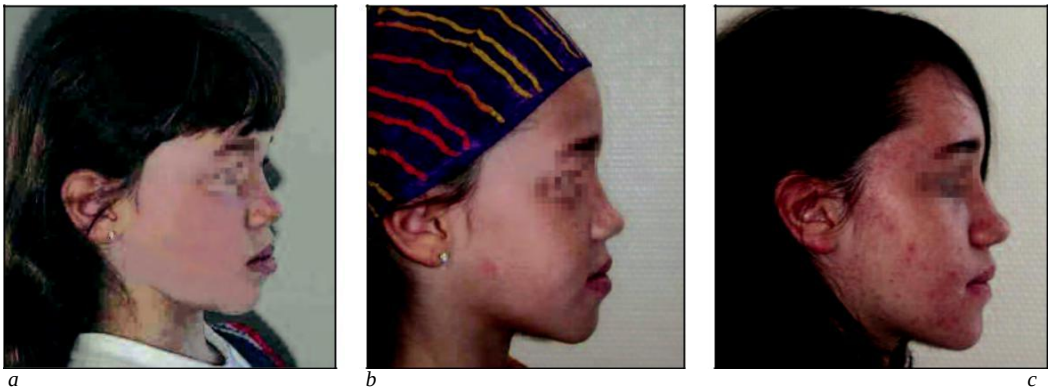
Control and stabilization, functional difficulties are often present: usual oral breathing problem, difficult to master because our spring, lingual posture, swallowing, phonation ...

In these cases, obtaining an incisive recovery is essential to the sustainability of the results.

If the tilting movement of the mandibular arch to help close the open bite is in the direction of class III compensation, the movement induced by the molar plane device at the maxillary arch in the clockwise direction, contrary to compensations, exerts a truly orthopedic action.

Canine relationships are increasing in Class III as incisal contact is established.

The study of the superimpositions confirms that we had a descent and an advance of the maxillary, testifying to the vertical and anteroposterior growth of the middle stage of the face, while we have a previous rotation of the mandible, for a facial pattern of initial hyperdivergent, in posterior rotation.



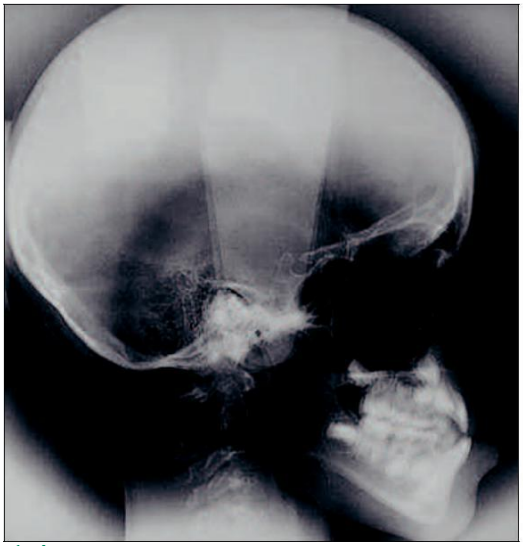
a *b* *c*

Figures 25 a to c

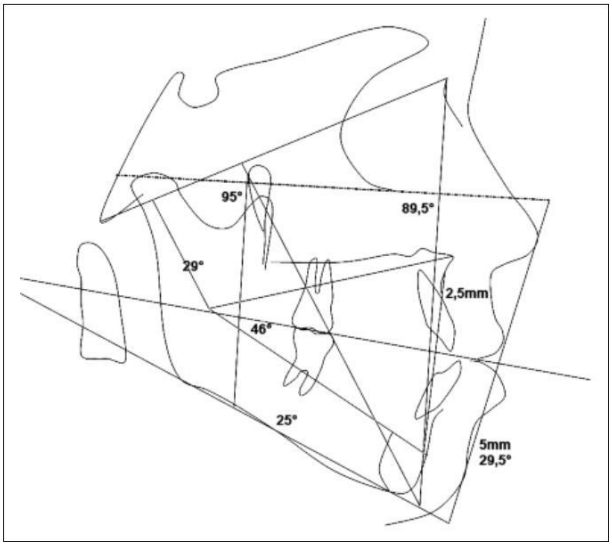
a *b* *c*

Figures 26 a to c

Figure 27



a



b

Figures 28 a and b

a *b* *c*

d *e* *f*

Figures 29 a to f

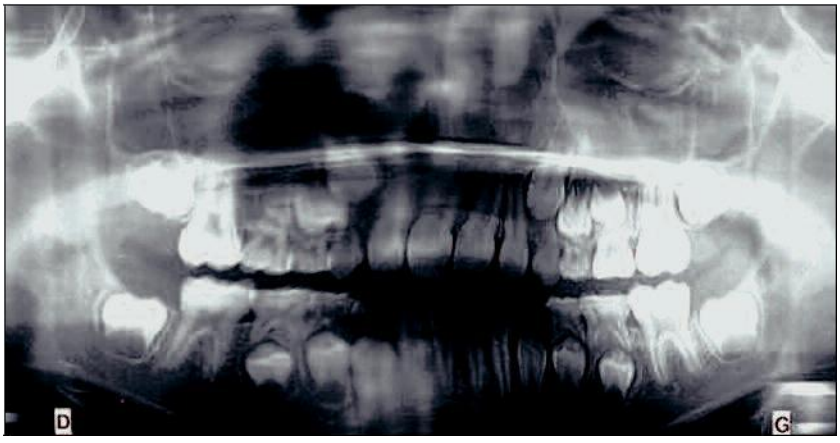
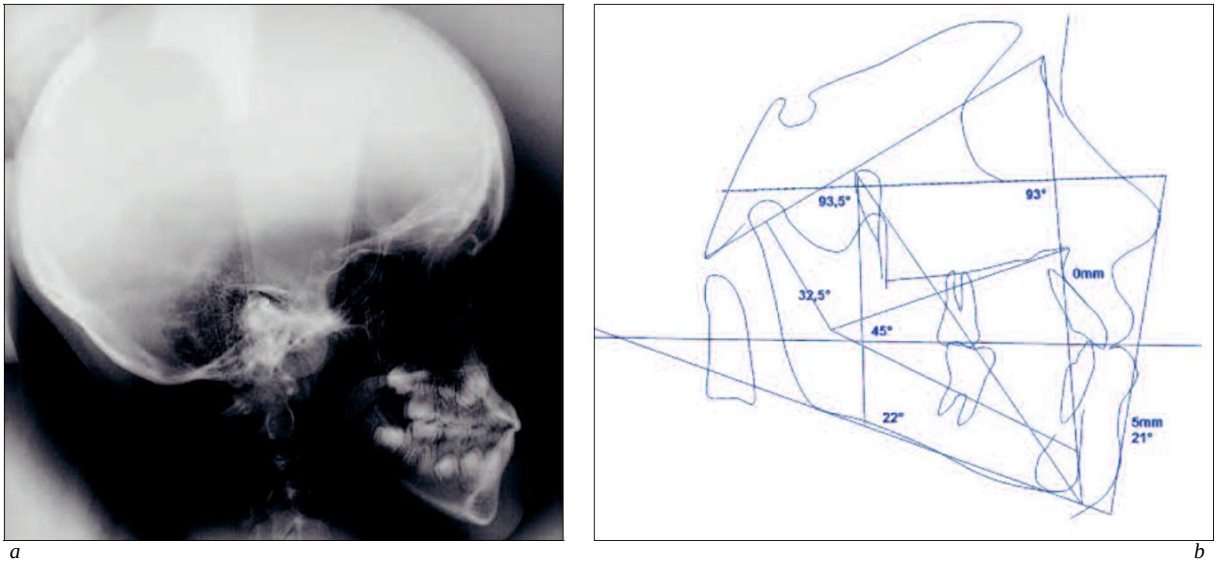


Figure 30



a *b*

Figures 31 a and b

After several years of interruption, the patient is banded in the mandibular arch only to use the E-space and move the anterior teeth forward (Figures 33 to 35). Four years after the removal, an elastic in a criss/cross design will give the 15 which appeared late on the panning and having a delay of maturation, will make an extremely late eruption in palatal position (figs 36 a to c).

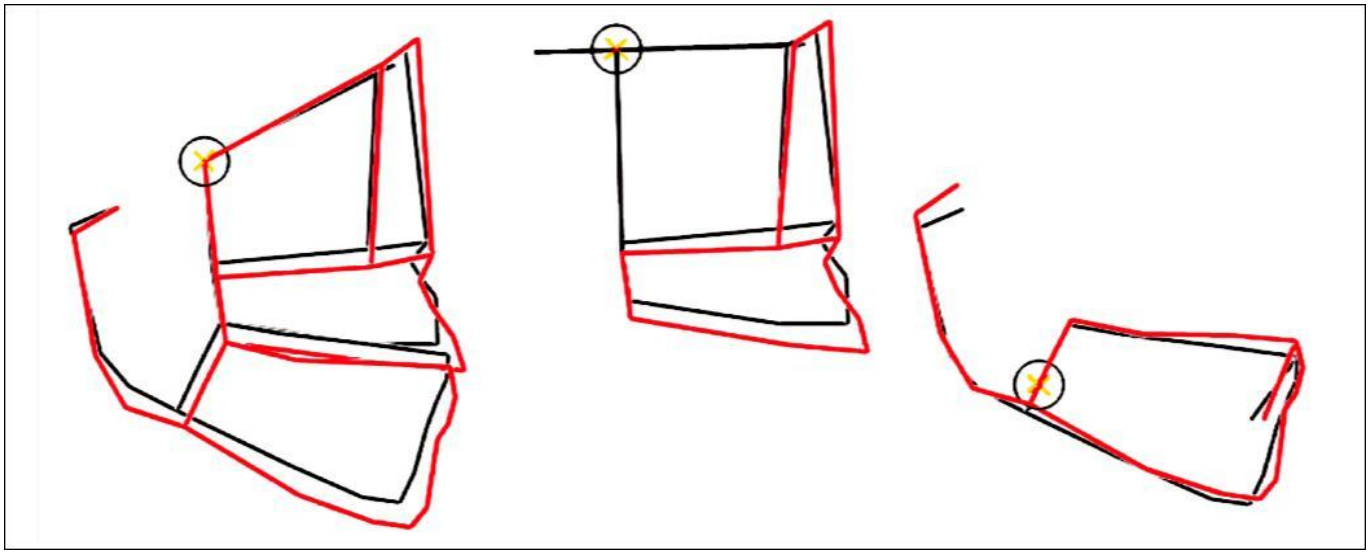


Figure 32

a

b

c

Figures 33 a to c

Figure 34

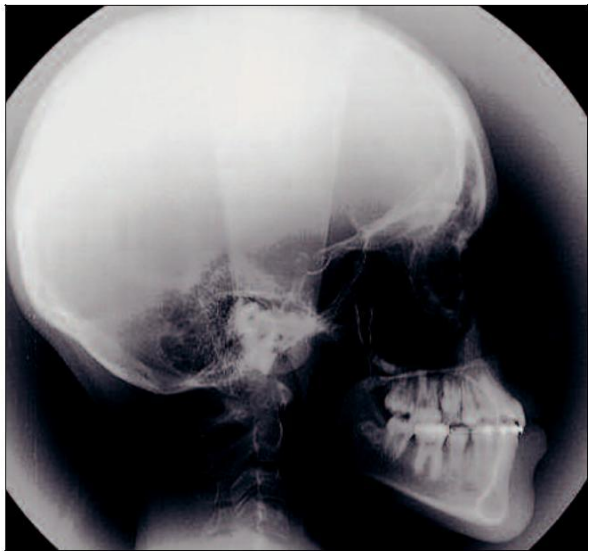


Figure 35

a *b* *c*

Figures 36 a to c

The contention

Speech therapy is an excellent means of restraint by curbing dyspositions and lingual dysfunctions. But the device itself is a system of rehabilitation of the functions: by widening-the palate, one widens the base of the nasal passages, one improves the breathing. At the end of the treatment, an elevation of the hyoid bone was noted, indicating lingual base as- tension.

Osteopathy limits blockages and encourages the mobility of bone structures, which is consistent with our treatments.

Among the various restraint systems we used: the night-time class III activator with an Eschler band starting from the maxillary plate to cover the mandibular incisors, the maxillary incisor elongation to the composite which is the equivalent of Eschler spring fixed and which increases the incisal recovery obtained, the maintenance of the lower incisors and especially the increase in the vertical dimension of occlusion which may or may not be associated with the previous systems.

A raised composite glued on the last teeth in the mouth will maintain non-binding results acquired. The milk teeth can be reconstituted in composite to increase their height. In cases of molar decay, which is common in HMIs, reconstruction with pedodontic caps will firmly consolidate maxillary advancement.

Conclusion

The three senses of space are interdependent, acting on the vertical direction and the transverse direction, one acts on the anteroposterior sense, and vice versa. The study of these cases of mandibular prognathia and maxillary hypoplasia treated by molar elevation associated or not with other orthodontic systems, gives satisfactory results. The removable and simple device replaces very bulky face masks and avoids mutilating surgeries. It allows early management whose consequences go beyond the scope of occlusion and dental function. From an early age, we have an overall improvement in facial aesthetics that has a positive impact on the psychology and self-image of the small patient. But increasing the vertical dimension of occlusion also gives the possibility of later treatments.

■

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