Functional treatment of transverse hypoplasia of the maxilla

Summary

How to act on growth and functions with elevations?

In this first part, the transversal sense!

Description

Introduction

Young doctors learn during boarding school that "offering the child a pacifier when falling asleep" is part of the preventive measures for sudden newborn death (4). The use of the pacifier is thus almost generalized from motherhood, and often prolonged in early childhood well after the eruption of the first teeth.

The pacifier, the durability of the bottle, a very short lingual frenulum, or the usual frequent mouth breathing in allergic populations, anything that obliges or requires a lowered position of the tongue, to create a space for the passage of liquid or air, has a share of responsibility in the maxillary hypoplasias of our “civilized” populations of the XXIst century.

As the tongue does not fill the palate, it cannot exert its expansive action on the upper arch which is collapsed. Dento-dental proprioception, which should set in as soon as the first baby teeth erupt, is the real antagonist of suction (2,3) and lingual interposition between the teeth. The persistence of suction or any hindrance to the installation of chewing, to exclusive nasal breathing, or in general to the correct positioning of the tongue against the palatal arch, will generate poor development of the jaws, with hypodevelopment of the maxillary.

When the maxilla cannot overhang the mandible, it does not receive the proprioceptive stimuli of dental friction generating the growth, which must exist from the primary dentition while the mandible which is uncovered and not controlled by the occlusion can hyperdevelop , trained by the tongue (1).

This uncontrolled growth of the mandible not subject to occlusal overlap often due to maxillary hypoplasia can occur in 3 spatial planes (3):

- transverse with lateral displacement of the mandible, when the cross joint is uni-lateral, without mandatory mandibular deviation on one side when it is bi-lateral

- anteroposterior: a class III with anterior inverted joint, will eventually lead to mandibular prognathy

- vertical: an untreated open bite can give skeletal hyperdivergence, "long face syndrome".

Maxillary endognathia and mandibular latero-deviation

In the transverse direction, depending on the importance of the relative insufficiency of the maxilla with respect to the antagonist, one can have a uni or bilateral inverted joint.

In children, the slight maxillary narrowness is not visible in the rest position, and in occlusion, the premature contact of the canines generates a lateral sliding with deviation to the side of the mandible. It is only visible in the resting position in the frontal photos, when the maxilla is extremely narrow to be included in the mandible before lateral deviation.

These pathologies are progressive, they worsen over time: a cross joint of a hemi-arch and even a single tooth will generate a functional asymmetry in the grasping of food (always on the side of the cross joint) and the 'masticatory crushing, which will give, over time, an asymmetrical volume of the jaws, having consequences on the whole face. A strictly dental reverse joint in children will result in skeletal bone deformity in adults, this worsening in scalability justifies early treatment.

Interest of early expansion

The early functional orthopedic management of a child with an inverted joint will bring the structures back into balance to move into a virtuous circle where growth will continue to improve the results obtained, preventing the malocclusion from feeding on itself. (7).

As no structure has reached its mature size in the child, the treatment will necessarily have to grow the hypoplastic structure which is the most "late" and not hinder the natural growth of the child (2).

Maxillary development will give way to permanent teeth and will often avoid impacted canines and the need for extractions.

Once the occlusion is normalized, chewing may be performed in an alternating unilateral physiological manner (10). Since the roof of the mouth is the base of the nose, the palatal expansion mechanically gives more space to the passage of air and thus promotes nasal breathing (7).

The improvement obtained goes beyond the framework of the occlusion, by allowing an overall improvement in the posture which is straightened, the centered occlusion avoids scoliosis attitudes.

Device used

For transverse deficits, the apparatus used is a Hawley plate with molar elevations and a median ram.

The elevations cover the palatal and occlusal surfaces of the teeth posterior to the canines, their height should be sufficient to eliminate interference and cross the crossbones, it will be greater in the event of an injury and class III (6).

The device should be worn at all times, with the exception of cleaning, to allow a total loss of pathological proprioception generating a dysfunctional position by displacement due to interference during closure.

The mandible can move bilaterally without hindrance, and alternate unilateral chewing is possible.

The resin elevations are easily adjustable and readjustable according to therapeutic needs, the vertical direction and the anteroposterior direction and the design of the device is modifiable and adaptable according to the malocclusions.

Principle of treatment

The appliance described here does not require waiting for the eruption of the 6-year-old tooth (9).

It will make all the maxillary teeth functional, even those in malocclusion, cross-joint or inocclusion. Due to the fact that the lateral teeth are covered with resin and the anterior teeth in contact with it, we will have a global function, all the upper teeth receiving the mandibular masticatory stimuli and allowing a response according to the laws of Planas development (10).

When the resin wedges are thicker than the free space of occlusion, dental proprioception will take over through the resin, lingual interposition, allowing passive lingual rehabilitation (2).

Since the lateral teeth are embedded in the resin, the activation of the median cylinder will resolve the transverse hypoplasia by stressing the palatal suture and allowing the homothetic displacement in gression of the expanding dental organs.

In the first intention, the jack will be positioned in a median way to have a symmetrical action, even if one wishes a greater jaw action on the side of the cross joint which before the treatment did not receive the functional stresses. As the maxilla is attached to the base of the skull and the mandible is mobile, upon closure the mandible will seek canine proprioception and increased expansion on the crossbite side would generate ipso-lateral mandibular displacement. So we want to widen the maxilla on the hypoplastic side and on the side towards which we want mandibular displacement: we therefore need a symmetrical expansion.

The resin palate is an effective and quick aid to get rid of the thumb when the child is in habit-sucking; it also makes it possible to make the differential diagnosis with sucking-necessity in which the child needs to suck the finger and which is a symptom of a difficulty related to orality (9).

The perfectly adapted palatal resin makes it possible to restore proprioception to the back of the tongue, which can regain a high position, without it undergoing pathological support. The underside of the resin will be ground down as it expands to restore the palate to a shape suitable for the lingual dome.

This is a functional treatment because the device allows the expression of physiological movements of chewing, and anti-dysfunctional because when the teeth chew the tongue moves back due to the antagonism of the tongue and the teeth, chewing versus sucking (5).

At each session, the device will be removed to simply assess the progress, the resin can be ground or modified very simply outside the mouth.

The milk teeth can also be ground or enhanced to modify a pathological OVD or guide masticatory functioning, it is however essential to maintain a lateral overlap to maintain the mandible on the side which was in a cross joint.

This device makes it possible to carry out early treatments before the eruption of permanent teeth, however later, it can be used in combination with conventional mechanical orthodontics.

Conclusion

Devices equipped with molar elevations are the tools of choice for treating hypoplasia of the jaw which, without treatment, would be complicated by mandibular hyperdevelopment in the 3 planes of space.

They make it possible to increase the growth of the maxilla, to orient the mandibular growth, to restore a normalized dental and lingual proprioception.

They can be used very early from primary teeth and are also suitable later in association with mechanical orthodontics.

In this 1st article we have approached the transversal meaning.