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Research Article

Neuro-Occlusal Rehabilitation: Therapeutic by Direct and Indirect Tracks

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Abstract

Six patients with class I and class II malocclusions are shown in this article. They are treated with the neuro-occlusal rehabilitation and restoration of the masticatory function, previously pathological, and the use of direct and indirect tracks (Planas tracks). Patients of different ages will present a balanced occlusion, with double swing, at the end of the treatment.

Keywords: *Neuro-Occlusal Rehabilitation; Direct and Indirect Tracks; Restoration*

Introduction

The principle of Claude Bernard (1813-1878) "*The function creates the organ and the organ adapts to the function*" is the basis of much of the philosophy of Pedro Planas. The latter has fully described the impact of mastication on maxillo-mandibular morphology in its developmental laws [4].

The function of mastication is fully involved in the development of the jawbones only under the condition that it is made in right-left alternative lateral.

Studies [5] have shown that patients with malocclusions have, for the most part, pathological mastication (dominant unilateral or open-close).

Pedro Planas, proposes its neuro-occlusal rehabilitation (N.O.R.) by means of its direct and indirect tracks which allow, in addition to the treatment of certain malocclusions, to release the movements of laterality and to increase the activity of the masticatory muscles.

For Jacqueline KOLF, President of the French Association Pedro Planas (F.A.P.P.), «*N.O.R. is not only dento-facial orthopedics, it is the restoration of the physiology of the manducatory apparatus as a whole*».

The aim of this article is to show the effectiveness of the tracks in the treatment of malocclusions and in the restoration of a function of physiological mastication.

Materials and Methods

Six patients were selected from the Orthodontic Department in the hospital Of Blida. All had malocclusions and underwent neuro-occlusal rehabilitation treatment, using Planas tracks. The inclusion criteria were Class I and Class II skeletal malocclusions (based on the ANB angle and the Witts Jacobson evaluation) with unequal masticatory ability to the right and left. The exclusion criteria were: skeletal

asymmetries, craniofacial abnormalities, Temporomandibular joints dysfunctions, diseases affecting neuromuscular performance and [6,8] previous orthodontic treatments.

Patients were evaluated before and after orthodontic treatment.

Patients were informed about the characteristics of the study and agreed to participate. The orthodontic appliances used for this study are commonly used in neuro-occlusal rehabilitation: upper and lower removable plates (Figure 1) made of resin with or without median cylinders, stabilizing hooks and resin tracks class I (tracks parallel to the Camper plane) [2,4].

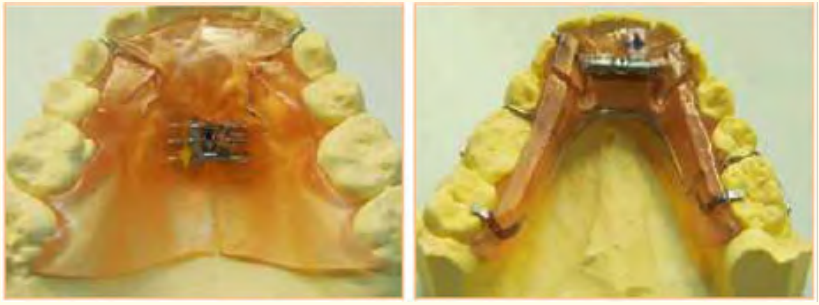

Figure 1: *Plates with tracks or indirect tracks of Planas.*

We have also used direct tracks [3] which consist of a composite addition to certain teeth in order to increase the height and to change the orientation of the occlusal plane to make it parallel to the Camper plane (Figure 2).

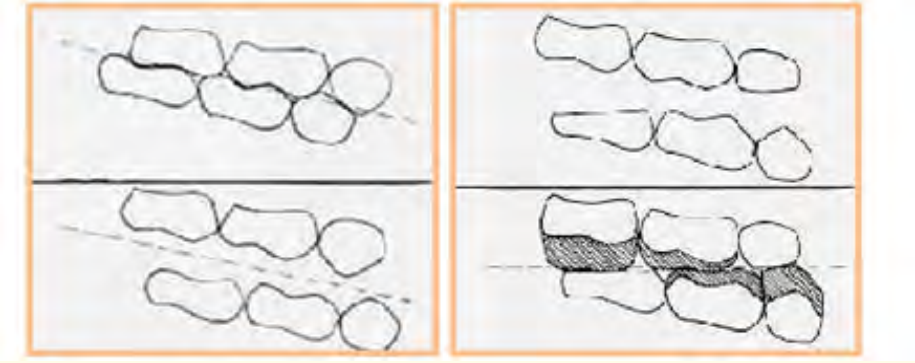

Figure 2: *Direct tracks of Planas.*

The masticatory capacity must be the same on both sides, which is verified by an equal increase in the vertical dimension to the right and to the left during the lateral movements (law of the vertical dimension Of Planas).

To study the masticatory capacity of the subject, we studied the functional masticatory angles of Planas or FMAP.

Starting from the maximum intercuspidal position, the FMAP is the angle formed in the frontal plane by the horizontal (the free edge

line of the upper incisors for Kolf [1]) and the more or less oblique line, Materializing the displacement of the lower inter-incisal point during a mandibular lateral movement.

In daily practice, the application of the tip of the tweezer [4] on the inter-incisal point facilitates the visualization of these angles (Figure 3).

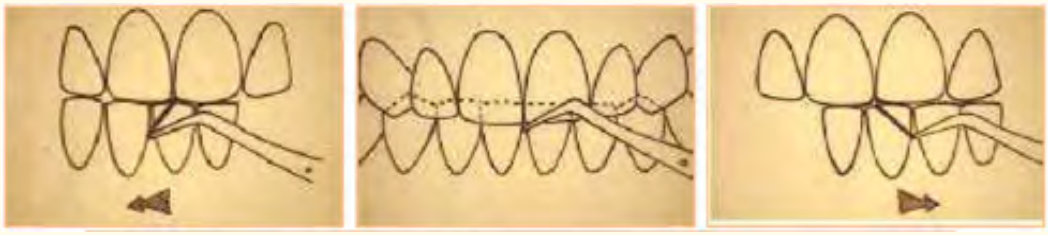

Figure 3: *Visualization of the FMAP using the tweezer.*

But we can also compare the FMAP, by decomposing the movements of laterality on slides (Figure 4).

Figure 4: *Viewing FMAP on Slides.*

Normally, in the case of a balanced and alternate mastication, the FMAP are equal and decrease together with time with the physiological abrasion of the toothing (Figure 5a). A difference between right an d left FMAP signs a dominant, even exclusive, one-sided mastication on the side of the weakest angle (Figure 5b).

Figure 5: *a: equal FMAP; b: unequal FMAP.*

Cases

Case No 1

It is a patient aged 8 years and 1/2, presenting a class I malocclusion that resides in right unilateral cross occlusion. During exploration, a mandibular lateral gliding to the right side and a one-sided chewing on the side of the inversion of the articulation are shown (Figure 6).

Figure 6: *a: right lateral showing right FMAP; b: reverse occlusion on the right side; c: left lateral showing left FMAP (in left lateral, mandible must lower more, FMAP is larger).*

Direct tracking and selective grinding was carried out by applying a polymerisable photo composite on the cusp of the canine and the vestibular cusps of the upper molars on the cross side, so as to equalize the FMAP and allow chewing One-sided operation (Figure 7).

Figure 7: *Examination after application of composite on teeth. a: right lateral showing right FMAP; b: centric occlusion; c: left lateral showing left FMAP (FMAP R = FMAP L).*

Case No 2

Patient aged 4 years and ½, with retromandibulia associated with supraclusion. In the sagittal plane, the plane of occlusion is tilted down and forward (Figure 8).

Figure 8: *a: right side: distoclusion; b: left side: distoclusion; c: right laterality; d: left lateral (significant contralateral dislocations: suprraclusia).*

For this patient, the occlusion was unlocked by the addition on the dental occlusal surfaces of varying composite thicknesses. Selective grinding was associated with the direct tracks in order to change the orientation and position of the occlusal plane to make it parallel to the Camper plane (Figure 9).

Figure 9: *a: right side: composite application on the upper (55) and inf (84) molars; b: left side: composite application at 65 and 74; c and d: grinding the composite so as to have an occlusal plane parallel to the plane of Camper.*

If the child tries to close his mouth, he stumbles on the tracks. Only the mandibular propulsion makes it possible to obtain an earlier "occlusion", where the vertical dimension may be the weakest.

The modification of the inclination of the occlusal plane makes it possible to change the function of chewing and to liberate lateral movements [7].

Case No 3

The third patient is a young teen ager, aged 15 years, presenting a left upper canine in vestibulo position and a dominant chewing on the left side (Figure 10).

Figure 10: *Figure 10: a: right lateral showing right FM AP; b: arches in occlusion with exoclusia of the 23; c: left lateral showing left FMAP (in left lateral, mandible must lower less, FMAP is smaller).*

Plates with tracks without cylinders, with S loop on the 23 have been laid. The left tracks were higher tha n the straight tracks to increase the FMAP, thus favoring the right chewing.

Case No 4

A young adult with bi maxillary dento-maxillary disharmony (DMD) and dominant chewing on the right (Figure 11).

Figure 11: *a: right lateral showing right FMAP; b: occlusal arches bimaxillary DMD; c: left lateral showing left FMAP (FMAP R <FMAP L).*

Track plates with cylinders were used to allow balanced lateral movements, expansion of the maxillary and mandibular arches and correction of dental malposition (thus avoiding extractions).

Case No 5

A 12-year-old child with bimaxillary DMD and FMAP inequality. Indirect tracks were used to treat this patient (Figure 12).

Figure 12: *a: right lateral showing right FMaP; b: occlusal arches bimaxillary DMD; c : left lateral showing left FMaP (FMAP L <FMAP R).*

Case No 6

A 5-year-old patient with an endoalveolia with mandibular lateral gliding and preferential chewing on the left (Figure 13).

Figure 13: *a: right lateral showing right FMAP; b: arches in occlusion; c: left lateral showing left FMAP (FMAP L <FMAP R).*

Plates with tracks with upper cylinder were used to allow balanced lateral movements, expansion of the maxillary arch (Figure 14).

Figure 14: *Plate plates of Planas a: right lateral showing right FMAP; b: arches in occlusion; c: left lateral showing left FMAP.*

Results

For the first clinical case: Direct track treatment and selective grinding, we obtained a correction of the reversed occlusion and of the mandibular lateral sliding as well as an equality of the FMAP (Figure 15).

Figure 15: *Examination after correction of reverse occlusion a: right lateral showing right FMAP; b: centric occlusion; c: left lateral showing left FMAP (FMAP R = FMAP L).*

For the second case: We can appreciate the effectiveness of the tracks which favored the correction of the distoclusion. This confirms the work of Petrovic which concluded that the direct tracks induce a stimulation of the growth of the condylar cartilage and consequently an elongation of the mandible. These tracks also allowed a good inclination of the occlusal plane, a reduction of the supraclusion and an alternating one-sided chewing (Figure 16).

Figure 16: *a: correction of the distoclusion b: right laterality; c: left lateral. (Less significant contralateral dislocations: correction of the supraclusia).*

For the third case: Treated by indirect tracks, we had a correct dental organization and a rehabilitation of the mastication (Figure 17).

Figure 17: *Examination after correction by Planas indirect tracks. a: right lateral showing righ t FMAP; b: centric occlusion; c: left lateral showing left F MAP (FMAP R = FMAP L).*

For the 4th and 5th cases: Thanks to the indirect tracks of Planas, we had a correct dental alignment and a correction of the DMD by expansion of the dental arches. The rehabilitated mouths can be observed (Figure 18 and Figure19), in maximal intercuspidation and in lateral movements, alternating one-sided chewing.

Figure 18: *Examination after correction by Planas runway plates. a: right lateral showing right FMAP; b: centric occlusion; c: left lateral showing left FMAP (FMAP R = FMAP L).*

Figure 19: *Examination after correction by Planas runway plates. a: right lateral showing right FMAP; b: centric occlusion; c: left lateral showing left FMAP (FMAP R = FMAP L).*

For the last case: Treated by plates with tracks, obtaining an expansion of the maxillary arch allowing the correction of the articulation and the lateral gliding of the mandible. In addition, the patient can chew on both sides (Figure 20).

Figure 20: *Examination after correction by plane plates of Planas. a: right lateral showing right FMAP; b: centric occlusion; c: left lateral showing left FMAP (FMAP R = FMAP L).*

Comments and Conclusions

The masticatory function constitutes the basis of the prevention and the therapeutics of the pathology of the masticatory system. When the masticatory function is pathological, it is possible to diagnose its etiology and to make a rational plan of effective re habilitation, all the more easy and effective as it will be introduced sooner. When malocclusions exist, devices such as direct and indirect tracks can be used and consequently a stimulus of development of the masticatory apparatus, similar to that of natural chewing, can be used, breaking the vicious circle; Hypo-function-underdevelopment. Thanks to these objectives of restoration of the function, the development of the jaws can be directed and harmonized. The occlusal organization can be established with a perfect intercuspidation and an inclination of the occlusal plane appropriate and dependent on the condylar inclinations of each TMJ, which makes it possible to naturally establish a balanced occlusion.

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