

A new concept for Class II and Class III treatment

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Global approach:
Functional, physiological and orthopedic.

The PUL Concept

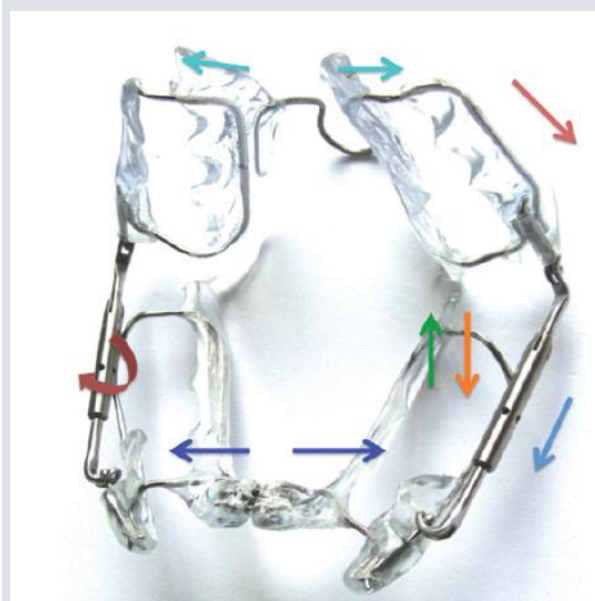
4D Harmonizer: functional, sagittal, transversal and vertical.

The PUL characteristics: "Propulseur Universel Light".

The PUL is a new-generation multi-tasking removable appliance:

- **Better compliance:** it has been lightened, thanks to its laser welded frame, its miniaturized mandibular advancing system and using TMA wire.
- **Comfortable, light, aesthetic:** It allows a good diction, can be worn at school.
- **Physiological:** gentle propulsion thanks to inserted coil springs (TMJ shocks absorbers).
- **Universal:** it is indicated to all Classes II, all facial typologies.
- **Multi actions:** thanks to its Laser welded frame, it allows several simultaneous actions, saving treatment time (Abb. 1-6).

Abb. 1



PUL multitasks with TMA loop

Abb. 2



PUL multitasks with anterior elastic and expansion screws

Abb. 3



Abb. 4



CLINICAL EFFECTS :

4D harmonization of malocclusions:

sagittal, transversal, vertical and functional.

1.

In young patients with hyperdivergent (dolychofacial) growth and multiple dysfunctions: oral breathing, deglutition and mastication (hypotonia).

a.

The mandibular propulsion helps bi-labial contact and increases the pharyngeal space, improving nasal breathing.

b.

The posterior occlusal contact induces a proprioceptive stimulation and contraction of the masseter temporal fibers, improving mastication.

c.

Improvement of the lingual function (position and deglutition) and natural correction of open-bites. This leads to a change in growth direction, from dolycho to mesofacial ([Abb. 7,8](#)).

2.

In patients with hypodivergent (brachyfacial) growth: the mandibular propulsion and posterior non-occlusion lead to a change in the direction and neutralization of the temporo-masseter muscles and a suppression of the occlusal forces.

Abb. 5



Abb. 6



Abb. 7



Before PUL

Abb. 8



After PUL

Abb. 8a



This video is available in our eMagazin for Tablets and shows how easy to wear the PUL appliance with upper anterior elastic by a female teenager of 14 years who understands well the benefit of this concept

This induces rapid Class II correction by distalizing upper lateral teeth (mandibular anchorage) and overbite correction by natural extrusion of the posterior teeth (Abb. 9).

Protocol of treatment:

Three phases:

1. PUL multitasking 4D harmonization of the malocclusion: sagittal (Class II), transversal (expansion), vertical (deep bite or open bite), and functional (nasal breathing, swallowing and chewing muscles). Duration: from 6 to 12 months.
2. Fixed appliance low friction without or with few elastics. Duration: 12 months.
3. 4D stabilization by PUL retainer. Night wearing (Abb. 10,11).

Abb. 9



Correction of Class II by mandibular anchorage

Abb. 10



Early Treatment: Hyperdivergent growth: before PUL, after PUL and after braces

Abb. 11



Teenagers Treatment: before PUL, after PUL and after braces

Clinical cases:

Class II malocclusions

Class II represent more than 75% of all malocclusions that orthodontist have to treat, about 30% of these patients have hyperdivergent facial growth.

Like every medical treatment, orthodontist began with a diagnosis. The aim is to treat the causes of malocclusion before or simultaneously treating symptoms.

Abb. 12



Abb. 13



Abb. 14



In almost all malocclusions, the cause of the malocclusion is the functional dysfunctions like oral breathing, thumb sucking, hypotonic muscle or atypical deglutition.

Clinical case 1: Class II division 1

Amandine, a young girl of 12 years old who complains from ectopic maxillary canines and lower crowding.

Functional diagnosis:

Oral breathing, snoring (sleep apnea), past thumb sucking, labial inoclusion, gummy smile and short upper lip (Abb. 12,13).

Dento-maxillary diagnosis:

Full Class II, crowding, mandibular retrognathic, hyperdivergent facial growth (Abb. 14,15).

Abb. 15



Abb. 16



Treatment objectives are to stop the hyperdivergent growth by improving the functions and mandibular growth, and avoid extractions.

Treatment plan:

1. PUL 4D harmonization: functional, sagittal, transversal and vertical. PUL multi-tasks with expansion screws, wearing 22 hours a day. Duration 9 months (Abb. 16-18).
2. Alignment and finition by multibraces self ligating low friction. Duration 13 months (Abb. 19-21).

Abb. 17



Abb. 19



Abb. 20



Abb. 18



Abb. 21



3.
4D stabilization by PUL retainer anti-relapse night wearing. Duration 12 months and decreasing (Abb. 22-24)

Abb. 22



Abb. 23



Abb. 24



Discussion:

“Changing the functions for changing the shape” Linder-Arronson

The advantage of combination of these three phases is to reduce time of treatment and improve patient’s comfort and compliance thanks to the lightness of the PUL appliance. The benefit for the patient is obvious: facial aesthetics and non-extraction short treatment (Abb. 25-27).

Abb. 25



Abb. 26



Abb. 27



Clinical Case 2: Syndrome of Class II subdivision

Louis, teenager, male of 14 years old who complains from upper incisors crowding.

Diagnosis:

Class II subdivision, hypodivergent growth, deep bite. Full Class II on right side due to disto-position of the mandible (Abb. 28,29).

Treatment plan:

After explaining to the patient and his relatives, the different options, we decided to treat in three phases :

1.

PUL 4D harmonization with a TMA maxillary loop to lighten it. Thanks to patient's compliance the duration was only 9 months (Abb. 30-33).

Abb. 28

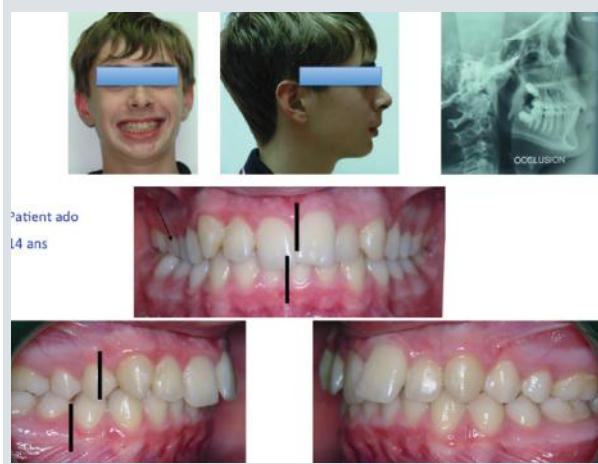


Abb. 29



Abb. 30



Abb. 31

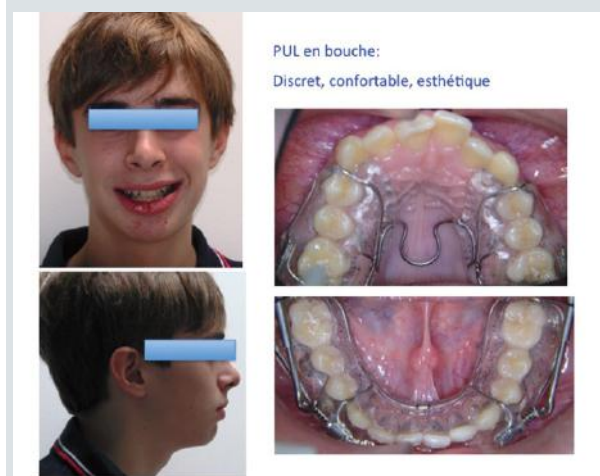


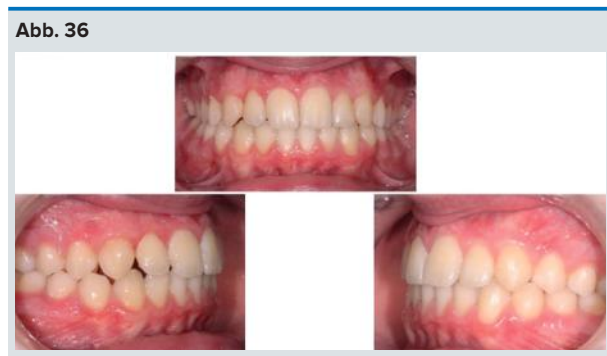
Abb. 32



Abb. 33



2. Alignment and finition with multibraces selfligating low friction. Duration 12 months (Abb. 34,35).



3. 4D Stabilization with PUL W retainer anti-relapse (Abb. 36,37).

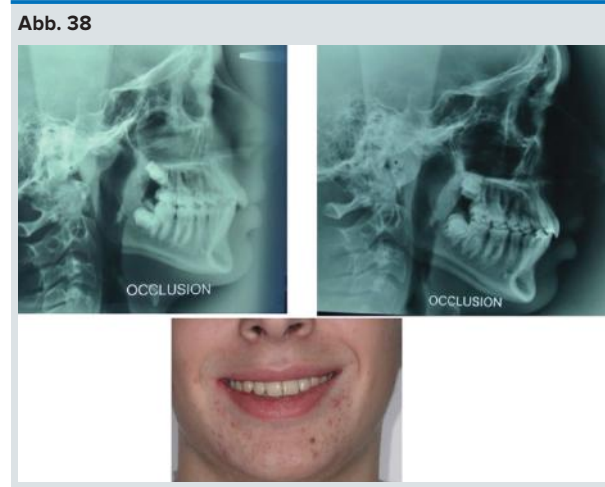
Discussion:

Teenager Class II subdivision is classified between most difficult clinical cases because the risk of non-compliance with classical functional appliances.

The advantage of the PUL appliance is its lightness and aesthetics that benefit for patient's better compliance, reducing time of treatment.

The other problem of these malocclusions is the risk of relapse. This problem is prevented by giving the patient the PUL W retainer anti-relapse appliance that is easy and comfortable to wear.

The most important for long-term stability is the patient's awareness of his treatment's difficulty and the risk of relapse (Abb. 38).



Class III malocclusions

Clinical case 3: Early treatment of a Class III.

This is a clinical case of a young 10 years old patient with an anterior asymmetrical cross-bite (Abb. 39-44).

Abb. 39

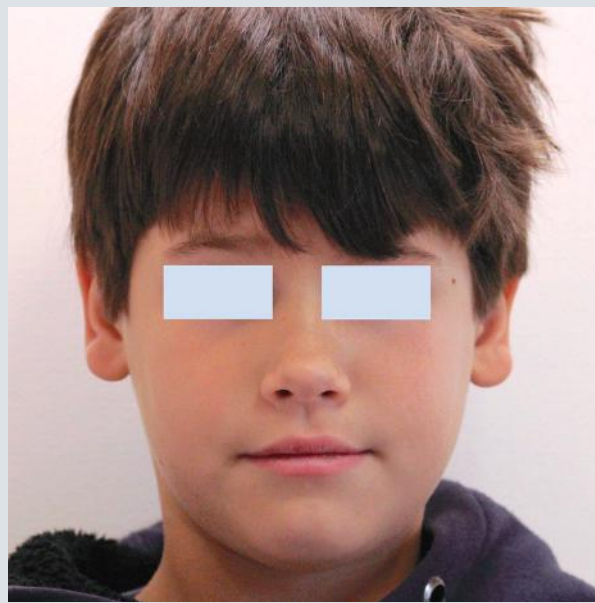


Abb. 40



Abb. 41



Abb. 42



Abb. 43



Abb. 44



Abb. 45



We prescribe a PUL 3 multi-actions (Abb. 45-48):

- At the upper: lateral and anterior expansion
- At the lower: expansion and incisors uprighting

The PUL 3 system that contains coil-springs, maintains the mandible posteriorly.

After 6 weeks of day and night wearing, we harmonize the patient who wears his PUL 6 months full time followed by 6 other months by night wearing (Abb. 49-54).

Abb. 46



Abb. 49



Abb. 47



Abb. 50



Abb. 48



Abb. 51



Abb. 52



Abb. 53

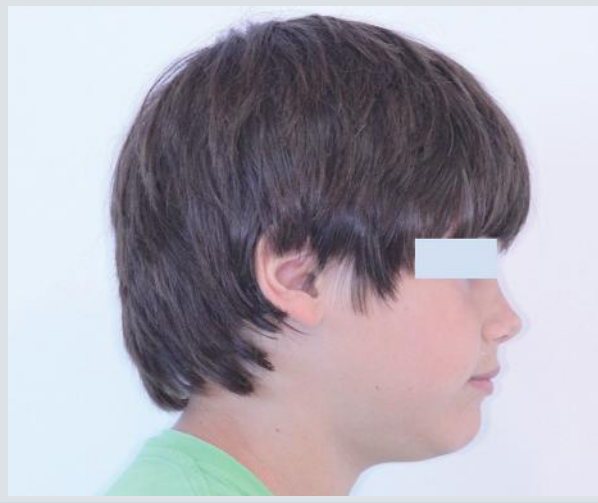


Abb. 54



The amount of PUL3 activation

Clinical case 4:

Harmonization of a Class III

This is a 10 years old patient with a Class III and anterior cross-bite due to a lower protrusive position of the tongue (Abb. 55-61).

Abb. 55



Abb. 56



Abb. 57



Abb. 58



Abb. 59



Abb. 60



Abb. 61



Treated by a PUL3 (Abb. 62-65) worn full time day and night, we harmonized the patient and correct his occlusion (Abb. 66-71). PUL3 has been worn 12 months.

Abb. 62



Abb. 63



Abb. 64



Abb. 65



Abb. 66



Abb. 67



Abb. 68



Abb. 69



Abb. 70



Abb. 71



Abb. Autor: Dr. Elie Callabe, Vineuil (F), Dr Elie CALLABE received his dental degree in 1982 from the "Université d'Odontologie de Reims" in France and completed his postgraduate education in Orthodontics in 1989 at the "University of Nantes" and the "University of Paris". Dr CALLABE is also a member of French orthodontic associations, such as SFODF and Bio-progressive Ricketts Society. He has a private orthodontic practice since 1985. He is an adept of early treatments and soft orthodontics, using functional light appliances.

References: www.pulconcept.com

(All informations and Clinical and technical e-learning on the website in 6 languages)