

Unorthodox orthodontics: incisor palatal root torque without torquing

Daniel CHILLÈS*

2 rue Metz-Juteau, 90000 Belfort, France

(Received 8th March 2013, accepted 27th May 2013)

1. Introduction

We have shown in a previous article [1] how a relatively simple unipoint system extemporaneously achieved the correction of tooth migration in cases of very advanced periodontal disease.

Here, we are going to show how the same attachments in conjunction with micro-screws placed on each side of the pyriform aperture and in both sides of the mandibular symphysis, made it possible to correct an extreme overbite in a similar deficient environment and achieve, in addition, retraction of the apices of the maxillary incisors.

2. Clinical case

This 53 year-old individual was referred by his general practitioner for the correction of his overbite (Fig. 1) within a periodontal environment made deficient by generalized bone loss.

During the clinical examination we noted that the excessive overbite extended from canines to canines and that the two dental arches are affected by excessive over-eruptions (Fig. 2a to 2c).

Generalized gingival recession allows us to view the incisal edges of the lower incisors along the line of the upper incisors where the upper gingival papillae have disappeared (Fig. 2b).

His anterior occlusion like “a lid on a can” is accompanied by a palatal tipping of the crowns of the upper incisors (Fig. 3, Tab. 1).

Given that the panoramic x-ray confirms the lack of available dental support, we have to to rely on

* Corresponding author: daniel.chilles@wanadoo.fr



Figure 1

Total overbite of the incisors and canines. Smiling view.

osseous anchorage in order to globally intrude the upper and lower incisor-canine groups *en masse*.

3. Technique employed

We use a 0.3 mm (.012) NiTi wire to level the dental arches and to apply intrusive forces. It can slide freely in the small attachments that are made extemporaneously using flowable composite resin around a 0.6 mm (.025) diameter elastomeric tubing (Fig. 5) following the method that we previously described [1].

Osseous anchorages are self-drilling micro-screws 5mm long and with a diameter of 2 mm placed equidistantly, sub-mucosally [2, 3] on each side of the pyriform aperture in the maxilla and on both sides of the mandibular symphysis. For the connection, we will use the CTO (Cortical TMA, terminating in the shape of an “0”) [3].

We perform the procedure using a simple local anesthetic and make a horizontal incision

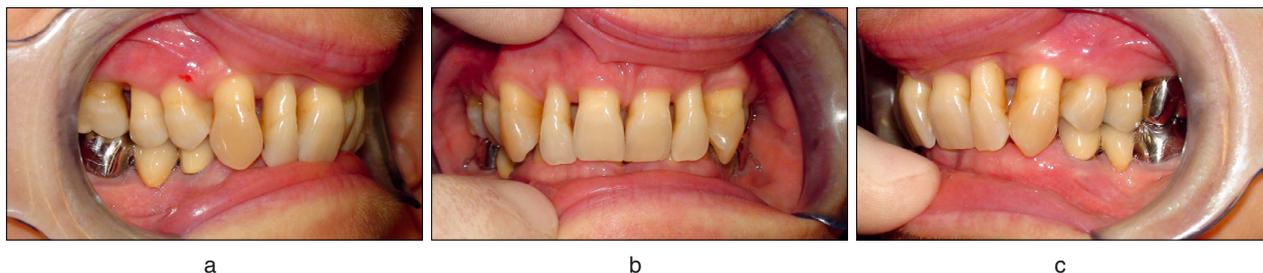


Figure 2

(a to c) The excess overbite extends from canine to canine. (b) The incisal edges of the lower incisors are visible along the line where the upper incisor papillae had been.

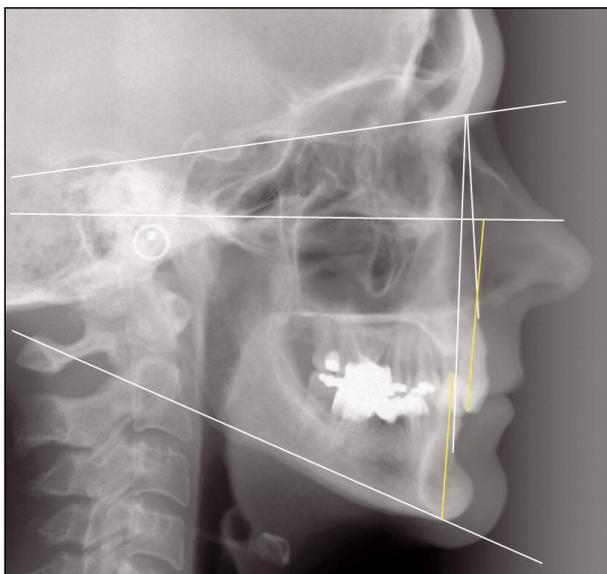


Figure 3

Deepbite accompanied by linguoversion of the crowns of the maxillary incisors.

Table 1
Cephalometric measurements before treatment.

Measure	Value	Norms
SNA	86°	82° ± 2°
SNB	80°	80° ± 2°
ANB	6°	
FMA	22°	25° ± 3°
Upper incisor/Frankfort Plane	85°	107° ± 3°
Lower incisor/mandibular plane	71°	85° - 92°
Upper incisor/lower incisor	181°	130° ± 5°

about 10 mm long at the depth of the vestibule, then expose the osseous surface with a periosteal elevator before inserting the micro-screw into the cortical bone. The buckle of the CTO [2, 3] was threaded around this micro-screw. This procedure is simple and it is unnecessary to use sutures because the

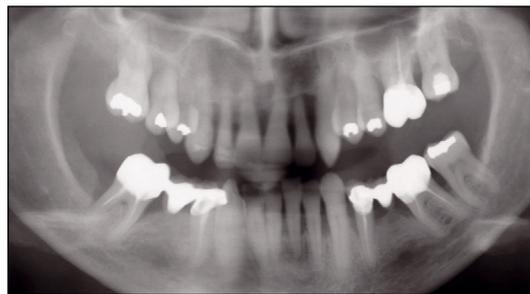


Figure 4

The panoramic radiograph confirms the lack of dental support available.



Figure 5

A .025 NiTi wire slides freely in the attachments made of composite resin.

muscular pressure from the lips is sufficient for the closure of the incision edges [2, 3].

The TMA wires that emerge then at the base of the vestibule are bent into the shape of a “dragonfly” spring [3] in the maxilla and a simple hook in the lower arch. Elastomeric chains attached to the ends of the wings of the spring allow simultaneous intrusion of the maxillary incisors and canines.

In the lower arch a unique elastomeric chain is attached (Fig. 6a and 6b).

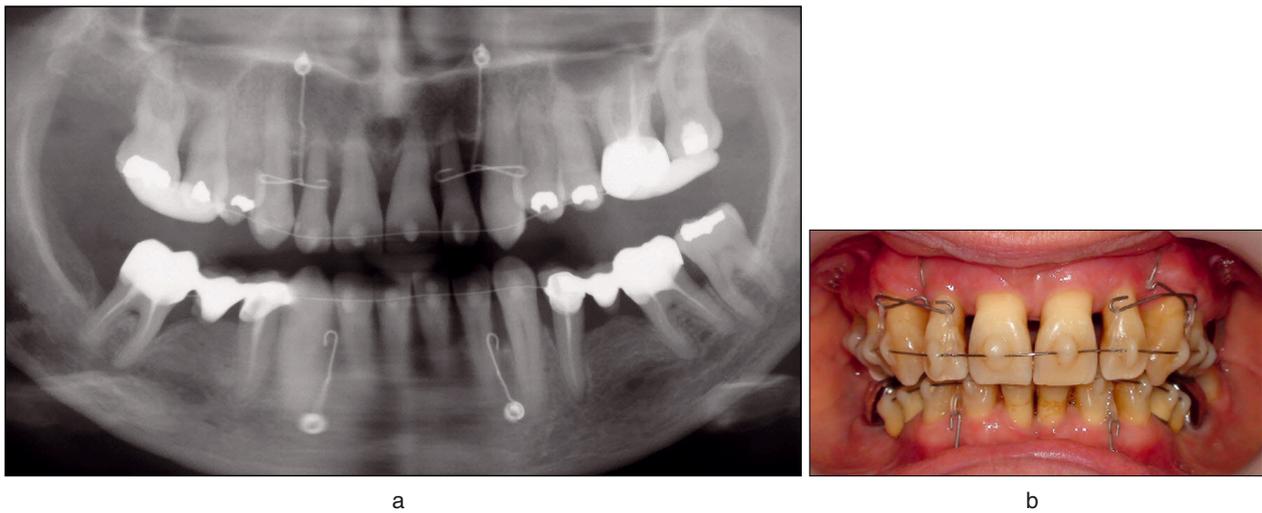


Figure 6

(a and b) A micro-screw at each side of the pyriform aperture and the mandibular symphysis, CTO formed as “dragonfly” springs in the maxillary arch and as simple hooks in the mandibular arch.

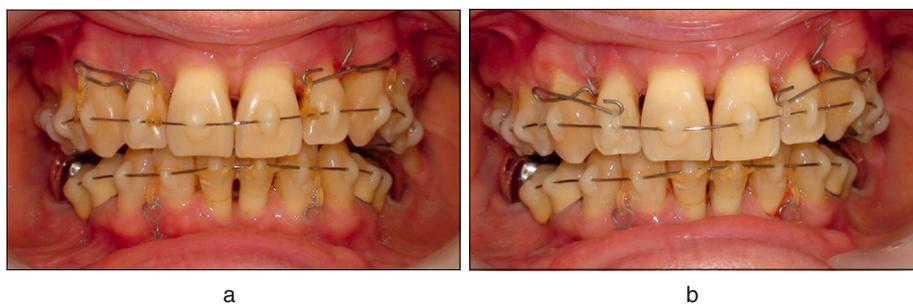


Figure 7

(a and b) In the maxillary arch, the activation is limited to replacing the chains.

The activation of this intrusion appliance will simply involve replacing the chains, and at the right time, shortening the lower CTO by moving the hooks lower in the vestibule when the crowns of the teeth get too close (Fig. 7a and 7b).

When the intrusion is deemed sufficient, fixed retention is placed on the palatal aspects of the teeth before removal of the system and the mini-screws.

4. Results

Comparison of the panoramic radiographs clearly shows the significant intrusion that was effected by simultaneous intrusion in the maxilla and the mandible. We find a significant increase in the height of the bone around the roots of the incisors. The slight root resorption observable at the root apices is small when compared to the gain of osseous support obtained elsewhere (Fig. 9).

Comparison of the lateral profile x-rays makes it possible to determine that the correction of the deep bite is entirely due to intrusion of the anterior teeth. This is accompanied by a labioversion of the lower incisors and retraction of the apices of the maxillary incisor roots which are now centered between the labial and palatal cortical plates leading to a normalization of the dental axes (Fig. 10a and 10b, Tab. 2).

5. Discussion

This case could not have been treated without the aid of osseous anchorage because of the very weak posterior dental support that was available. The lack of bone between the incisors did not allow us to place classic transmucous miniscrews here, only the microscrews inserted into the bottom of the upper and lower anterior vestibule having good bone quality made it possible to achieve satisfactory anchorage.



Figure 8

(a and b) When the intrusion is considered to be sufficient, the system is removed after retention is put into place.

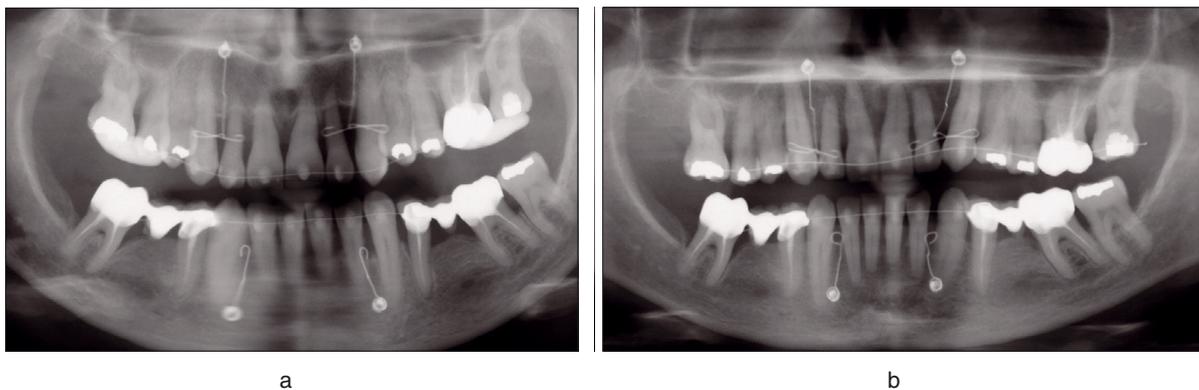


Figure 9

A comparison of the panoramic xrays shows the amount of intrusion achieved.

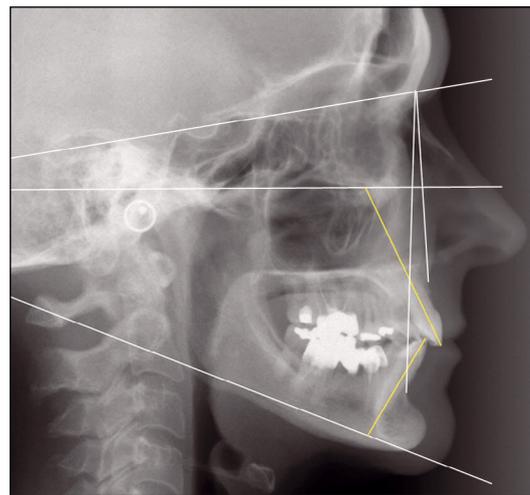
The intrusion of the upper canines was simplified by using a “dragonfly” spring that provided two lateral support points instead of one. Therefore, forces could be exerted at the same time distally to the canines and mesially to the lateral incisors. We think that this movement might have been harder to achieve with a single point of anchorage coming from the bone screw as was the case on the lower arch where an elastomeric chain was attached on a single hook shaped on the CTO.

On the upper arch, the intrusion forces were generated solely by the TMA spring, the elastomeric chains were only used as a connector. These chains were chosen for their ease of use. Similarly we even

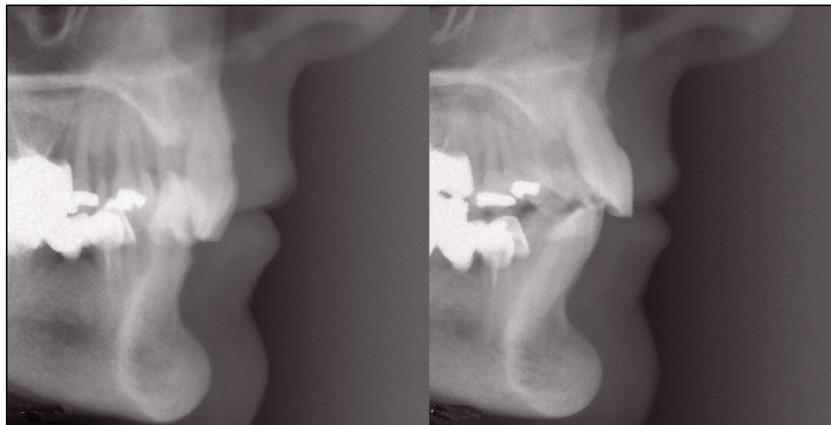
could have used metallic ligatures that we would have changed and shortened during the intrusion phase. The spring itself did not need to be reactivated. On the lower arch, the chains alone provided the intrusion forces.

The vestibuloversion of the mandibular incisors that coincided with the intrusion was entirely predictable, on the mandibular incisors, because of the force for movement created by the distance between the line of action of the force attached to the screw and the center of resistance of the teeth.

On the upper arch, however, we did not expect to achieve as much retraction of the apices of the incisors that led to a perfect recentering of



a



b

Figure 10

(a and b) The intrusion was accompanied by a labioversion of the mandibular incisors, a coronal labial inclination and a retraction of the roots of the maxillary incisors.

Table 2

Cephalometric measurements at the end of treatment and results achieved.

Measurement	Beginning	End	Difference
SNA	86°	86°	-1°
SNB	80°	80°	0°
ANB	6°	5°	-1°
FMA	22°	22°	0°
Maxillary incisors/ Frankfort plane	85°	115°	+30°
Mandibular incisors/ Mandibular plane	71°	97°	+26°
Maxillary incisors/ Mandibular incisors	181°	125°	+56°

root between their cortical plates. The force of intrusion was directed towards the mesial tip of the

wing of the “dragonfly” spring temporarily creating an anterior moment of force, and the achieved movement should have been limited, as on the lower arch, to a labial inclination around the center of resistance of the tooth (Fig. 11).

Of course we expected to achieve some minimal buccal displacement due to the natural muscular pressure of the lips, but not such an effect of torque (Fig. 12).

Since this radicular movement could not be attributed to the NiTi wire that was round, we had to look elsewhere for the cause.

We can suggest two hypotheses: the effectiveness of the pressure of the orbicularis oris muscle of the lips and, why not, a sliding effect of the root along the buccal cortical bone during its intrusive movement.

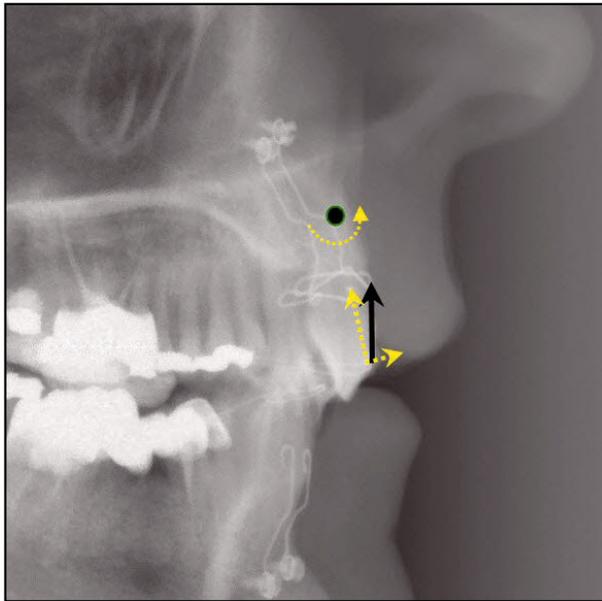


Figure 11

The line of force passes through the mesial tip of the “dragonfly” spring, forward of the center of resistance of the tooth that is very apical due to bone loss. There is no other factor that might have induced a radicular retraction.

In any case, these movements could only have been achieved by the great freedom of movement that the teeth had due to the minimal pressure exerted by the NiTi wires that slide very freely [1] in their composite channels, and we can also add to this, the constant light forces.

6. Conclusion

As we have already noted [1], this mechanism really seems to be interacting with the biology of the patient given the apparent ease with which the teeth yield to movement in the right direction. This “biosynergy” is in agreement with the concept of “autokinesis” suggested by Voudouris [4] who, even if it

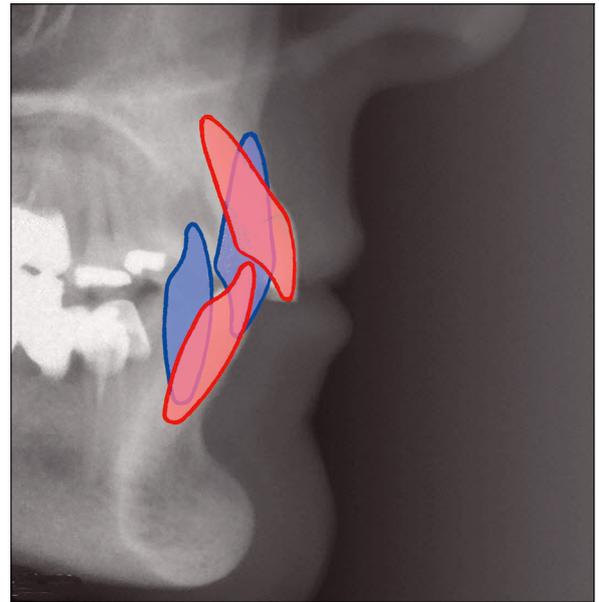


Figure 12

Comparison of the position of the incisors, in blue before treatment and red after.

has never been scientifically validated, seems to us to align once again with our clinical observations.

This indeed opens up interesting perspectives that in reality only rely on the imagination of the orthodontist.

Bibliography

- [1] Chillès D. L'Orthodontie autrement. Des attaches extemporanées réalisées en résine composite. *Orthod Fr* 2009;80:305–312.
- [2] Chillès D, Chillès J-G. Introduction à l'utilisation de vis de chirurgie maxillo-faciale comme ancrage orthodontique. *Rev Orthop Dento-Faciale* 2006;40:63–90.
- [3] Chillès J-G, Riemenschneider-Chillès S. Utilisation des minivis corticales courtes en orthodontie. *Orthod Fr* 2011;82:253–268.
- [4] Voudouris J. Entretien avec le Docteur John Voudouris. *Orthod Fr* 2008;79:143–150.