3M℠ Health Care Academy

A reliable way to correct a Skeletal and Dental Class II, Div. I malocclusion with the 3M™ Incognito™ Lingual Appliance System.

Non-compliance biomechanics and precise 3D control used to accomplish the planned outcome.

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Dr. Stradi received his post-graduation degree in Orthodontics in 2001 in Italy. He received his Master of Science in Lingual Orthodontics in 2016. He has been a clinical instructor in Lingual Orthodontics since 2001 and in charge of managing and teaching the Level II Master of Lingual Orthodontics at the University of Naples "Federico II" 2012-2017.

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In recent years, invisible orthodontic appliances have gained a lot of interest among both orthodontists and patients. In this respect, lingual appliances have proven to be potentially capable of correcting any type of malocclusion, regardless of the intrinsic difficulty.

The 3M™ Incognito™ Appliance System is a completely digital and customized lingual appliance, designed and manufactured for each single patient, customized in every single component, according to the doctor's requirements. It has been my only lingual appliance in the last 10 years and I've used it to treat many different types of malocclusion.

This case presentation shows a skeletal and dental Class II malocclusion treated with the Incognito System, in combination with Herbst appliance. Similar treatment options are reported in scientific papers, where this approach was used to treat skeletal and dental Class II patients, showing a very precise 3D control[1,2].

Case Report: Female, 15 years old
After the clinical examination and the evaluation of all the records, the patient was diagnosed as follows:

Skeletal and dental full cusp Class II, Div. I malocclusion, in a female patient, 15 years old, at stage CS4/CS5 of cervical vertebral maturation[3].

The esthetic evaluation of the patient's profile evidenced a retruded mandible, confirmed by the S.N.Pg value (76°).

Sagittal discrepancy (A.N.Pg) was 8° confirming, also under a radiographic point of view, the skeletal nature of the malocclusion.

The mandible growing direction was clockwise (S.N./Go.Gn=39°), thus not favorable for this kind of discrepancy.

Lower incisors resulted proclined in respect to the mandibular plane (-1/Go.Gn=104°).

Overjet value was high (8mm) with a slight open bite tendency (ovb=0/-1 mm).

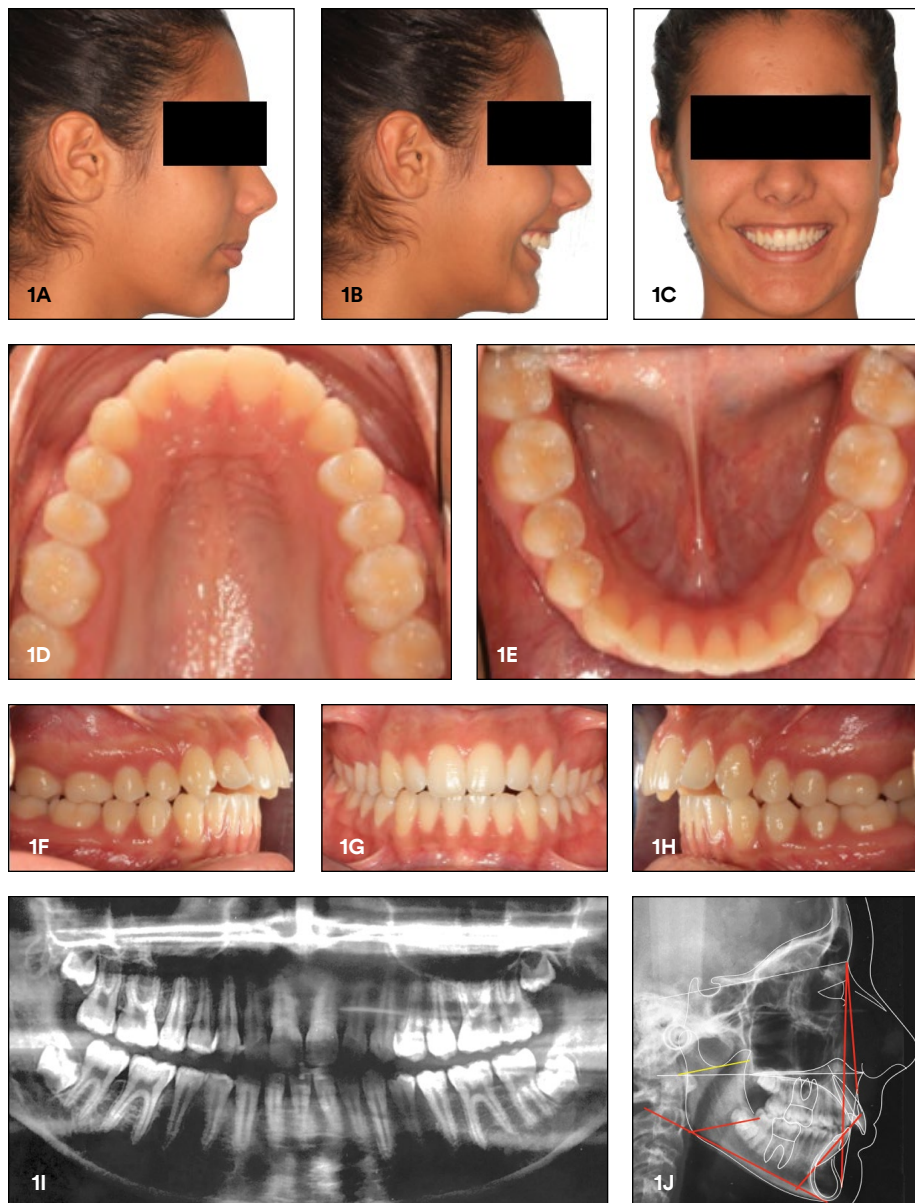Interincisal angle was markedly reduced (-1/+1=111°).

Figure 1A-J: Extra and intraoral pictures. Radiographs, tracing and values.

Initial Cephalometric Analysis		
Sagittal Sk. Relations	V.N.	Pre-Treatment
S.N./A	82° -/+ 3.5°	84°
S.N./Pg	80° -/+ 3.5°	76°
A.N./Pg	2° -/+ 2.5°	8°
Vertical Sk. Relations		
S.N./ANS-PNS	8° -/+ 3.0°	11°
S.N./Go.Gn	33° -/+ 2.5°	39°
ANS.PNS/Go.Gn	25° -/+ 6.0°	28°
Dento-Basal Relations		
+1/ANS.PNS	110° -/+ 6.0°	118°
-1/GoGn	94° -/+ 7.0°	104°
-1/A.Pg (mm)	2 -/+ 2 mm	0
Dental Relations		
OVJ (mm)	3.5 -/+ 2.5	8
OVB (mm)	3.5 -/+ 2.5	0
-1/+1	132° -/+ 6°	111°

Table 1:
Initial cephalometric analysis.

Treatment Plan

In agreement with the patient's expectations and according to the diagnosis and clinical evaluation, the therapy was planned to correct the sagittal skeletal and dental discrepancy, without tooth extractions.

Using the 3M™ Unitek™ Treatment Management Portal (TMP) software interface, I planned my patient's Incognito appliance. A CAD-CAM procedure in the laboratory in Bad Essen, Germany was used to customize the appliances according to the specific needs and requirements.

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The target setup was realized in order to reach the planned final molar and canine Class I relationship (Figure 2A-E).
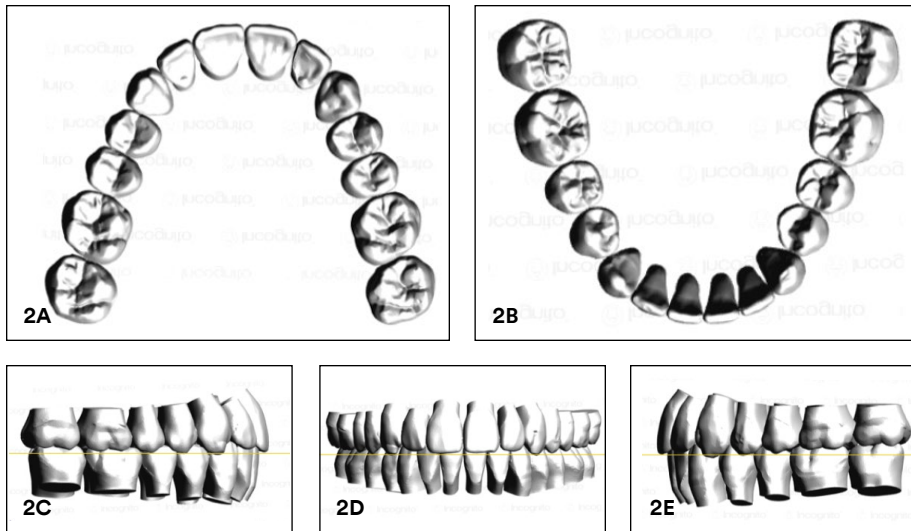

Figure 2A-E: Target setup.

The archwire sequence was chosen according to the treatment needs, in order to achieve the highest 3D control of the teeth position.

All the arches were individually designed by a specific software and shaped using a bending machine.

The archwires were ribbonwise, flat, and of the "Non-extraction" series (straight in the lateral section).

Three archwire materials and different sizes were ordered:
- Nickel Titanium
    - Upper and Lower: 0.014 in. round, 0.016×0.022 in., 0.018×0.025 in.
- Stainless steel
    - Upper and Lower: 0.018×0.025 in.
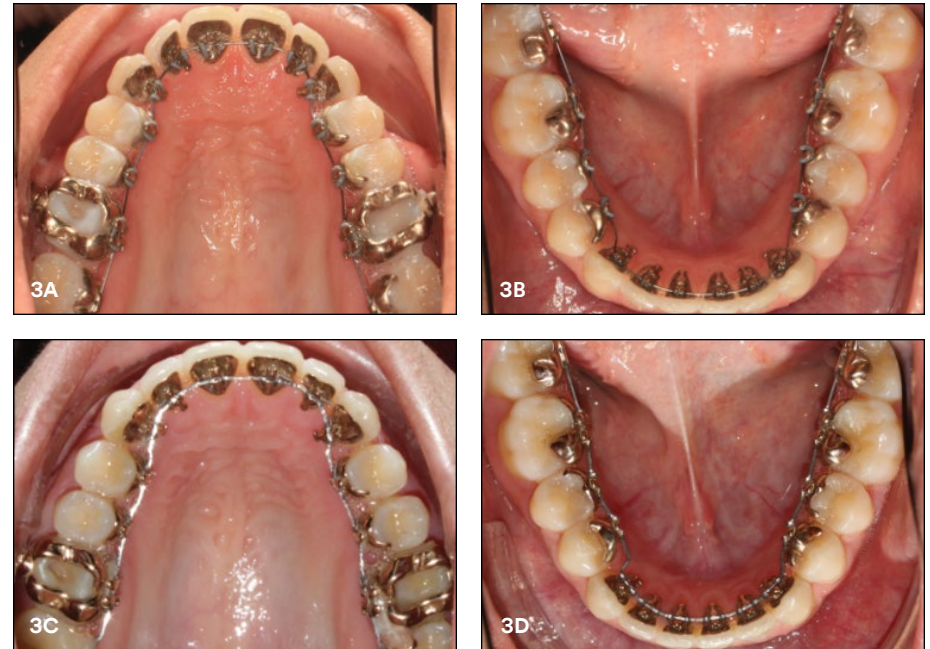- Beta III Titanium
    - Upper and Lower: 0.0182×0.0182 in.

Figure 3A-D: Intraoral photographs with appliance.

The NiTi archwires were used to level, align, reshape the patient's arches and set the right value of torque.

After the Nickel Titanium step, full size upper and lower SS archwires were inserted, in order to start the Herbst phase with maximum control (Figure 4A-C).

Figure 4A-C: Herbst in.

Progressively, with a step-by-step activation, the sagittal discrepancy was corrected and finally over-corrected, (Figure 5A-B) by inserting single, 2 mm activation rings, about every 2-3 months, 3 each side, in total. Then, the Herbst appliance was removed, after about nine months of use.
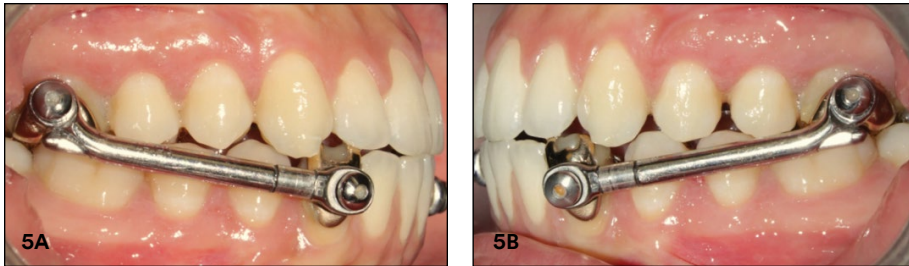

Figure 5A-B: Lateral intraoral photos.

Afterwards, about two months of Class II elastics (3/16", 4.5 oz) were used, from labial lower 6s, to lingual upper 3s.

Finishing and detailing procedures were accomplished by means of Beta III Titanium 0.182×0.182 in. archwires.

Final occlusal pictures show the outcome that was achieved. (Figure 6A-J).

Final Cephalometric Analysis			
Sagittal Sk. Relations	**V.N.**	**Pre-Treatment**	**Post-Treatment**
S.N./A	82° -/+ 3.5°	84°	85°
S.N./Pg	80° -/+ 3.5°	76°	83°
A.N./Pg	2° -/+ 2.5°	8°	2°
Vertical Sk. Relations			
S.N./ANS-PNS	8° -/+ 3.0°	11°	12°
S.N./Go.Gn	33° -/+ 2.5°	39°	36°
ANS.PNS/Go.Gn	25° -/+ 6.0°	28°	24°
Dento-Basal Relations			
+1/ANS.PNS	110° -/+ 6.0°	118°	113°
-1/GoGn	94° -/+ 7.0°	104°	101°
-1/A.Pg (mm)	2 -/+ 2 mm	0	2
Dental Relations			
OVJ (mm)	3.5 -/+ 2.5	8	1
OVB (mm)	3.5 -/+ 2.5	0	1
-1/+1	132° -/+ 6°	111°	126°

Table 2:
Final cephalometric analysis.

Figure 6A-J: Final intraoral photos, final lateral X-ray and tracing confirm the corrections accomplished.

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Extraoral photos, and the comparison "before and after" show the big change in the patient's face, mainly evident in the frontal smile and from the lateral point of view (Figure 7A-B).

Figure 7A-B: Before and after.

In detail:

S.N.Pg value was increased from 76° to 83°, showing the advancement of Pg point.

Before treatment postero-anterior skeletal discrepancy (A.N.Pg) was 8°. It was reduced at 2°.

The mandible growing direction was not worsened during the treatment, rather the final value showed a slight reduction (S.N./Go.Gn went from 39° to 36°).

Due to the initial proclination (-1/Go.Gn=104°) and to the use of Class II biomechanics, lower incisor control was a very important target to achieve, as stated in literature.[4]

In this case, IMPA was very well controlled, and at the end it resulted even slightly reduced (101°).

Sagittal dental relations were all corrected, particularly the overjet was drastically reduced to 1 mm (8 mm at the beginning).

Conclusions

The use of Incognito Lingual System in combination with Herbst appliance to correct Class II malocclusions has been widely used and published in literature.

The corrections achieved in this patient are in accordance with the data published in the main orthodontic scientific journals[5, 6, 7].

In this specific clinical case, this combination proved to be very effective, with a very strict and precise control over all the teeth.

References
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Case photos provided by Dr. Roberto Stradi.

▶▶ *Learn more about Incognito Appliances*

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