



Dr. Simonetta Meuli

Dr. Meuli graduated in Dentistry and Dental Prosthesis at the Catholic University of the Sacred Heart in Rome in 1994 and specialised in Orthodontics at the same university in 1998. She was awarded a scholarship at the Bambino Gesù Children's Hospital, Rome, in 1999. She has been Adjunct Professor at the School of Specialisation in Orthodontics at the Catholic University of the Sacred Heart in Rome since 1999. She attended the Lingual Orthodontics course of Dr. Fillion in Paris in 1999; she received the Article Award for: "The craniofacial architectural evolution in a unilateral cleft lip and palate subject: a longitudinal study", European Federation of Orthodontics (FEO), Sofia, Bulgaria, in 2002; she also received the First Place Prize - poster session of Orthodontics 2 "Adjustment of rotational typologies according to Petrovic in Italian patients" during the X National Congress of the Board of Professors of Odontology, Rome, Italy, 2003; the Rossana Alessio Award for the best clinical case in Tweed-Merrifield Technique presented in the Model Display Session, XVII International SIDO Congress, Rimini, in 2003. Invisalign certified since 2005, she is Diamond I and has been speaker for Align Technology since 2013.

New frontiers in the field of functional orthodontics: Efficiency of the invisalign mandibular advancer in the treatment of Class II mandibular retrusion

Summary

Invisalign treatment with mandibular advancement allows treating growing adolescents with Class II malocclusion due to mandibular retrusion that requires advancement of the jaw; the great advantage of the appliance compared with traditional functional appliances lies in the possibility of performing dental alignment at the same time as mandibular advancement movement, a factor that should not be underestimated especially considering that it can encourage and stimulate the compliance in the growing patient.

Introduction

The Invisalign MA mandibular advancer has been designed to be worn full time, even during sports activities but, unlike other functional devices which still require patient compliance, it is absolutely less cumbersome and less annoying for the small patient, thus compatible with the different activities of children today; as a result, it can be easily used also in children in the early growth phase, that is in early mixed dentition, to encourage development of the arches and begin sagittal correction, as demonstrated by the case reported here. Moreover, Clark stated in 1997 that full-time use of mandibular advancement devices produces light physiological forces that stimulate growth and encourage skeletal sagittal correction.

MA (Mandibular Advancement) is also able to remove occlusal interferences to mandibular advancement and is the only functional device that is able to guarantee alignment and development of the arches during the same phase of advancement.

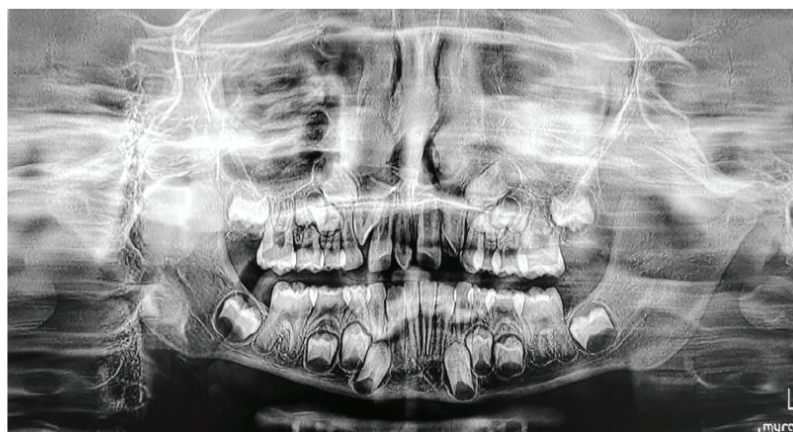
Patient context

The patient was 7 years and 11 months old at the time of treatment and the main problem was inclination of the upper central incisors, the presence of a supernumerary tooth (mesiodens) and deep bite.

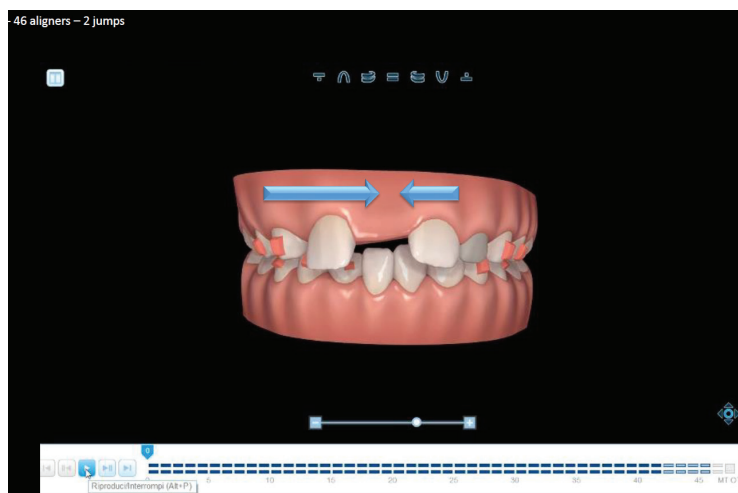
Diagnostic summary

- Class II molar and right canine
- Class I molar and left canine
- Overbite: moderate deep bite
- Upper arch: proclination of upper incisor, presence of mesiodens
- Lower arch: slight crowding
- Cephalometric summary: Class II skeletal ($ANB \sim 7$ degrees), proclination of upper incisor, mandibular retrusion





SNA 81°
 SNB 74°
 ANB 7°
 AoBo 4mm
 ML 24°
 IncSup/SN 105°
 IncInf/ML 96°



Treatment plan

The initial objective of the treatment was to extract the mesiodens, encouraging development of the arches simultaneously with the mandibular advancement phase without the use of Class II elastics; 46 aligners were envisaged, 4 of which for transition or maintenance and 2 jumps, each of 2 mm, were programmed; the PRE-MA phase was not necessary.

The last aligners to be worn at night were used as a restraint.

Photo at 4 months into therapy

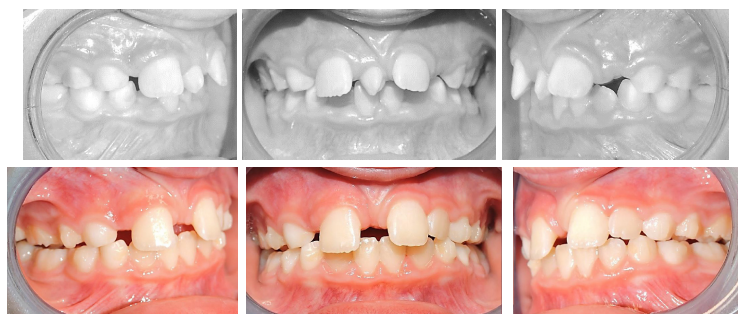


Photo at 4 months into therapy

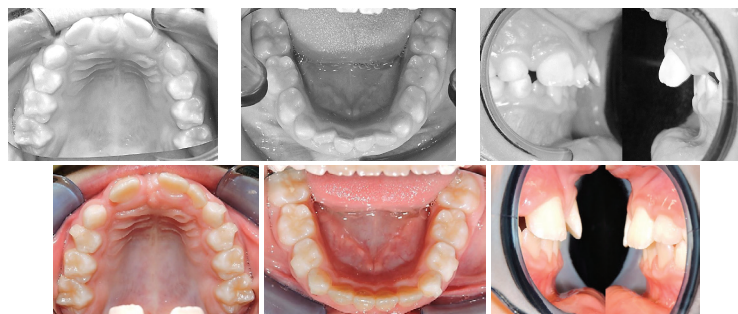


Photo at 6 months into therapy



Photo of the Invisalign mandibular advancement worn by the patient, at 6 months into therapy.



Photo at 6 months into therapy

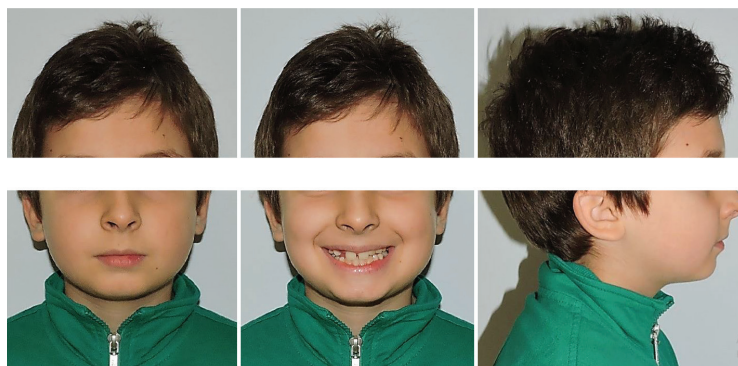
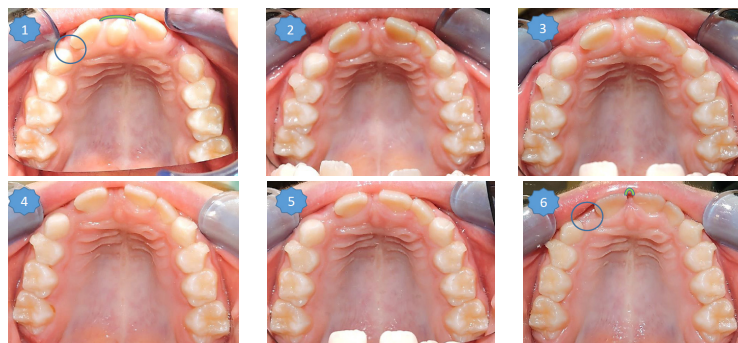


Photo at 6 months into therapy



Photos in progress at the initial phase (phase 0), at 5, at 6, at 7 and at 8 months into therapy.



Treatment summary

The treatment lasted about 11 months, including the transition aligners that serve to stabilise the sagittal correction obtained during the MA phase; the patient wore 46 aligners of which 42 with precision wings of the MA phase with two active jumps and 4 aligners with so-called passive precision wings for transition or maintenance of the advancement obtained; the aligners were worn with weekly changes. The last aligners were then used as a Restraint or retention?

Treatment results

The Class I molar and canine, both right and left, were reached; the upper diastema was completely closed.

Photo after using the Invisalign mandibular advancement, at 10 months into treatment

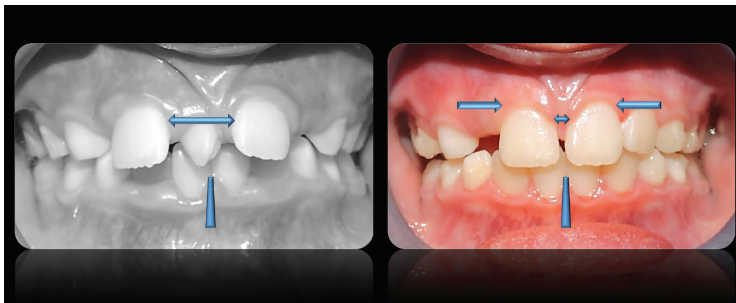


Photo after using the Invisalign mandibular advancement, at 10 months into treatment



Before:

After:



Before:



After:



Before:

After:

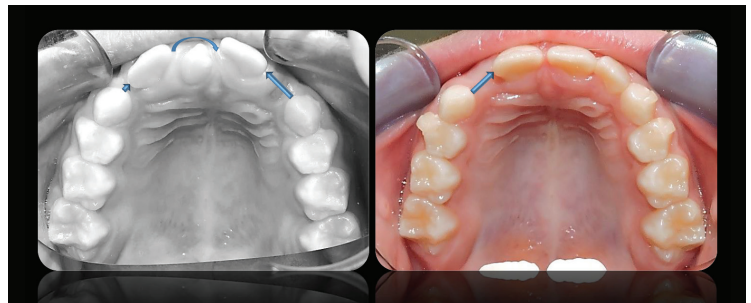
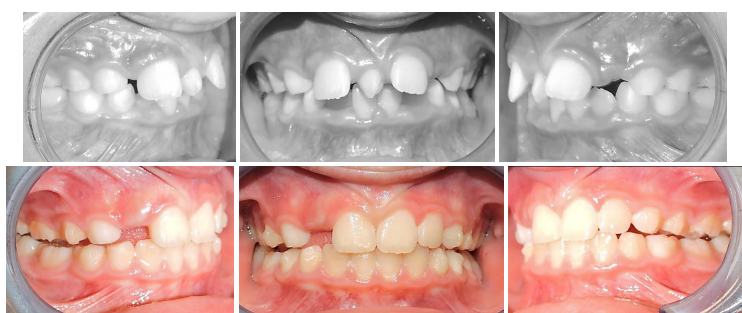


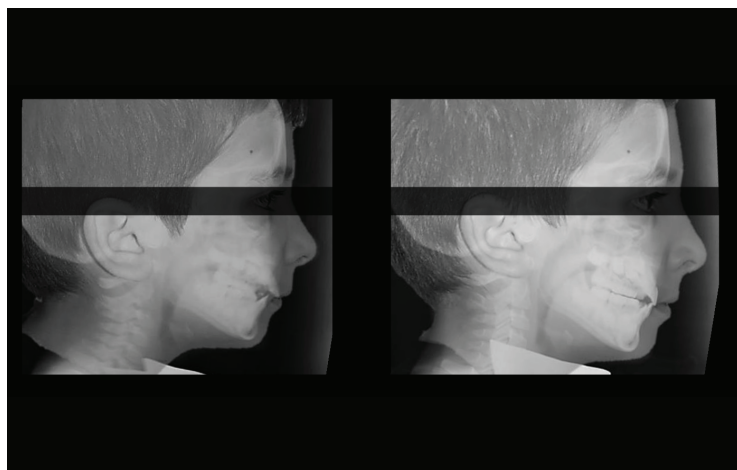
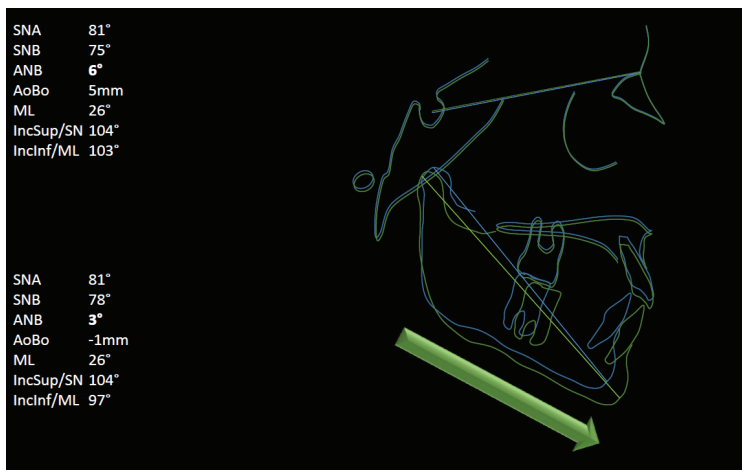
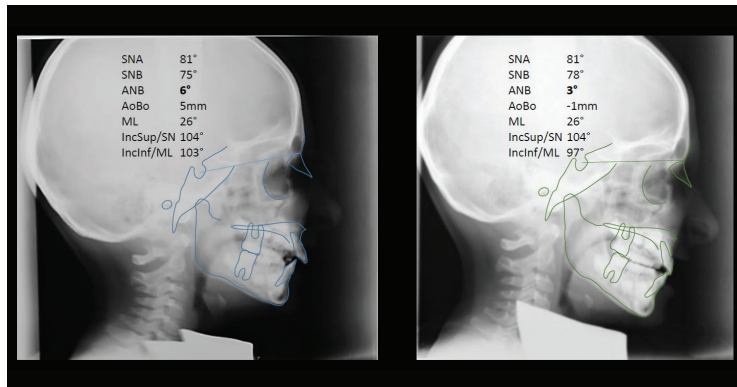
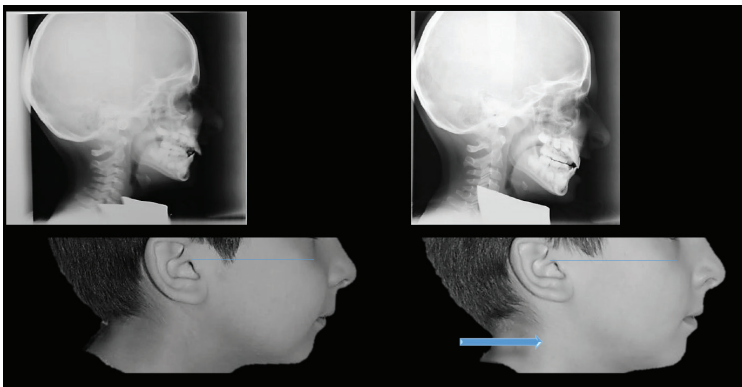
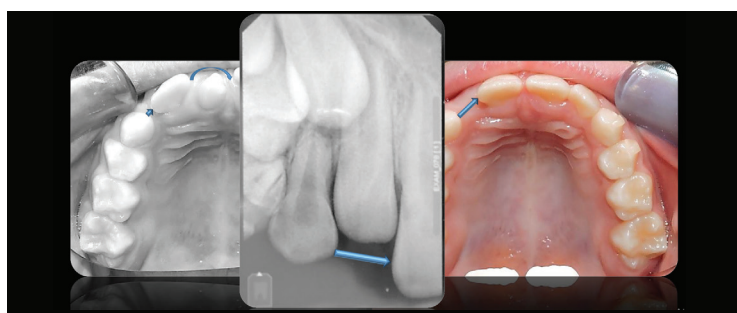
Photo at 11 months into therapy with MA

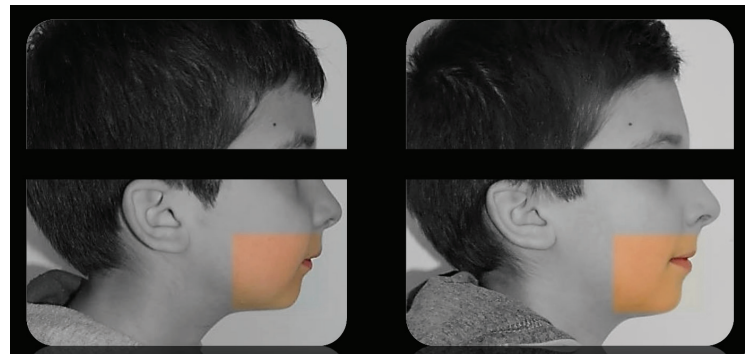
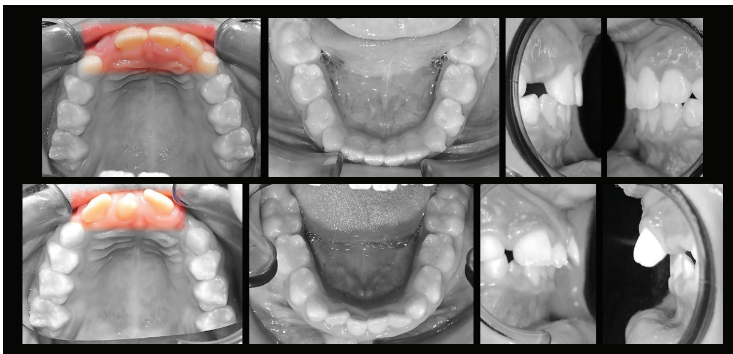
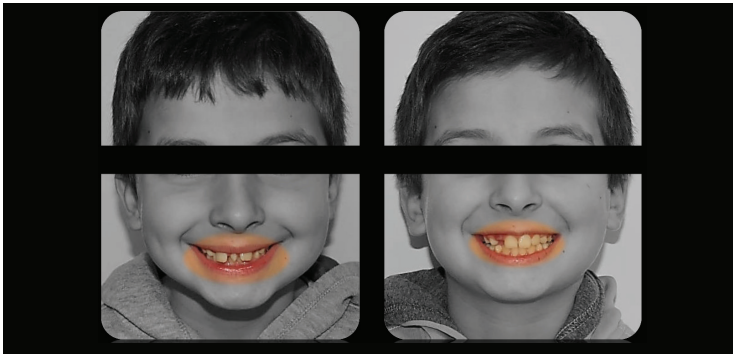


Photo at 11 months into therapy with MA



Body movement of 1.1 and recovery of space by eruption of 1.2





Discussion of treatment

Invisalign treatment with mandibular advancement can now be considered a routine treatment for the correction of Class II skeletal and/or dental from mandibular retrusion in growing patients; the treatment is in fact more effective the closer it is performed to the peak of puberty growth as now demonstrated by numerous articles in the scientific literature. This approach to treatment of Class 2 cases allows front alignment simultaneously with mandibular advancement and does not necessarily require the use of elastics. In this case, even if far from the pubertal phase, it was decided to proceed with orthodontic/functional treatment to improve the antero-posterior relationship already in the early phase and to reduce the possibility of occlusal trauma that could be encouraged by inclination of the upper incisors, as frequently reported in the literature; Should be a new sentence e.g reported in the literature. Once in the supernumary tooth was extracted, it was . . . tooth was extracted, it was possible to close the upper diastema by bodily movement of the central incisors at the same time as mandibular advancement and thus facilitate space for eruption of 1.2 and 2.2.

Teleradiography of the skull clearly shows a reduction of the ANB angle indicating the antero-posterior relationship between the upper and lower jaws and above all showing an advancement of the pogonion which indicates successful mandibular advancement. In this case it was not necessary to resort to the Pre-Ma phase, which aims to remove the occlusal interferences at mandibular advancement but in cases of overbite greater than 7 mm, in cases with strongly rotated upper molars and in all cases in which a retroclination of the upper incisors is present, this phase is absolutely recommended in order to make the subsequent mandibular advancement treatment more fluid and predictable by using MA aligners.

Three key points to remember

- 01 Training of the patient during the first MA delivery session: it is important to show the patient with mirror in hand the new position of the mandible in order to make him/her aware and how it is easier to handle the device at home.
- 02 Wear the appliance 1-2 hours before going to sleep to create a muscular memory of the new mandibular position during the waking hours and encourage maintenance of the same position during night hours.
- 03 ALWAYS use retention attachments on the palatal surface of the first permanent molars even when not envisaged by the software, in cases with short clinical crowns and in cases with lack of second premolars or second molars.

Conclusion

The Invisalign mandibular advancement device is comfortable, easy to use and easy to handle; it can therefore also be used by children in early or late mixed dentition with the aim of encouraging both dental and functional correction, reducing the possibility of dental trauma and thus guiding the growth of the bone bases to improve the antero-posterior relationship already at an early stage.

References

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