Transforming facial and dental asymmetry

into aesthetic and functional harmony

Abstract:

Recently, the demand for correcting facial asymmetry has been increasing, even when the extent of asymmetry is small. This case report describes nonsurgical ortodontic treatment for facial asymmetry in a 21-year-old femele pacient, facilitated by the correction of relevant malocclusion and dental compensation of the facial asymmetry ,using microimplants and fixed appliances. After 26 months of ortodontic treatment, facial symmetry, with favorable occlusion and jaw function , was achieved. These satisfactory results, including a well-balanced face and good occlusal interdigitation, were well maintained at the 1-year follow-up.

Introducere:

Facial asymmetry is defined as a status of unequal facial features between the left and the right sides relative to the mid-sagital plane. The perception of facial asymmetry is mainly affected by the extent of chin deviation , and with regard to this issue, orthodontists were most sensitive to the asymmetry, followed by general dentists and laypersons. However, recently, patients have become highly interested in correcting facial asymmetry for esthetics, even when the extent of asymmetry is small. For adult patients with moderate to severe facial asymmetry, improving facial asymmetry usually requires orthognatic surgery. In the case of mild asymmetry, surgery is typically not accepted by patients, hence, an orthodontic approach should be sought.

Dental compensation occurs even in patients with mild facial asymmetry and should be resolved when treating facial asymmetries. Correction of the transverse occlusal cant and inclination of the posterior teeth is mandatory before correcting the deviant mandible by moving it to the nondeviated side applying intermaxillary elastics. Importantly, the movements should be implemented taking jaw function and condylar position into consideration.

Patient D. R. , female, 21 year-old
Chief complaint : concerned about maxillary dental crowding


Facial analysis- frontal view

- good facial proportions
- lip canted-down toward the deviated side
- Chin deviated to the left and the chin contour mentonier bazilar is inclined cranially to the left
- mandibular contour on the left side is shorter and closer to the medial than on the right side
- maxillary occlusal plane canted-down toward the deviated side

Facial analysis- lateral view
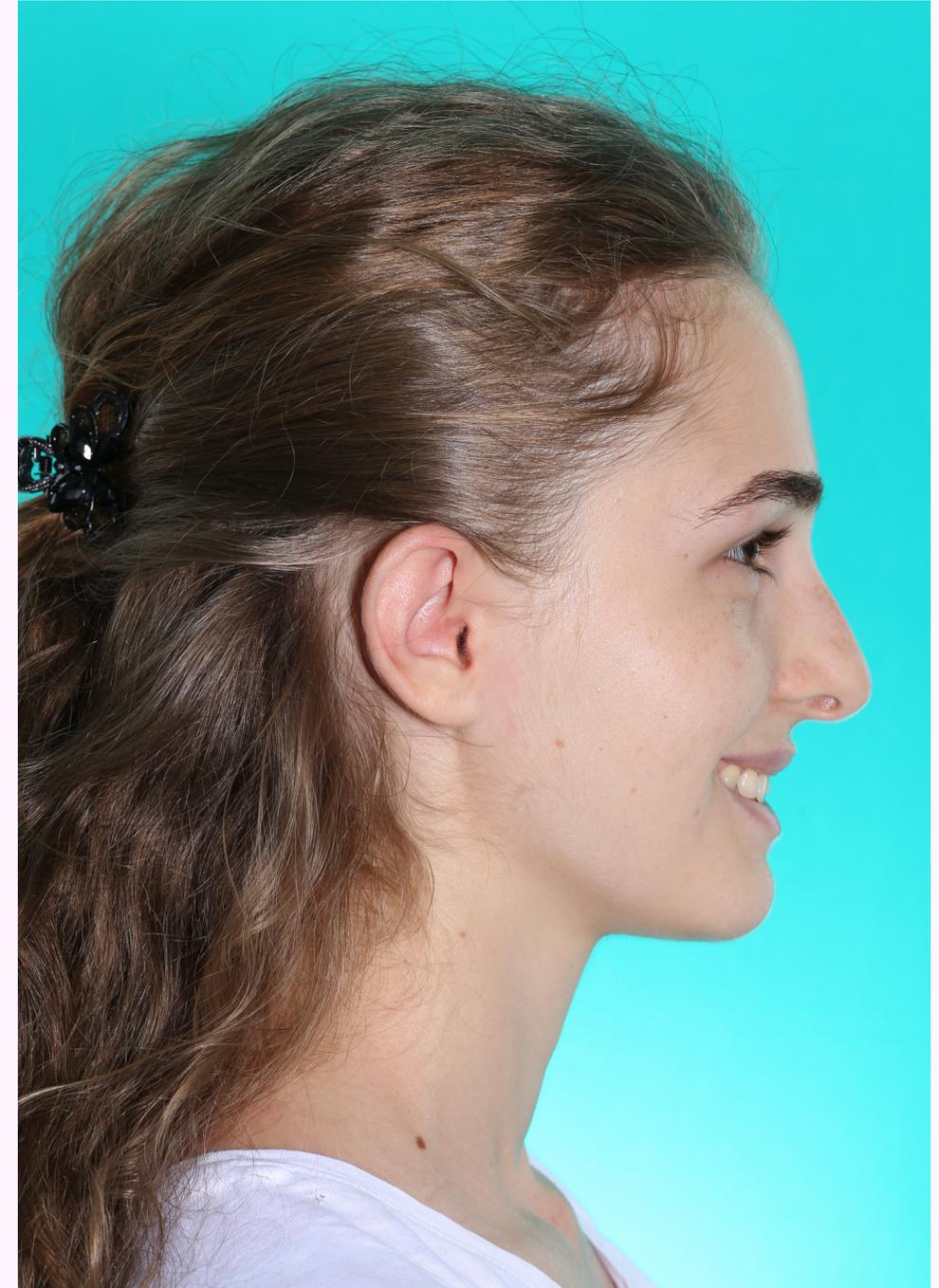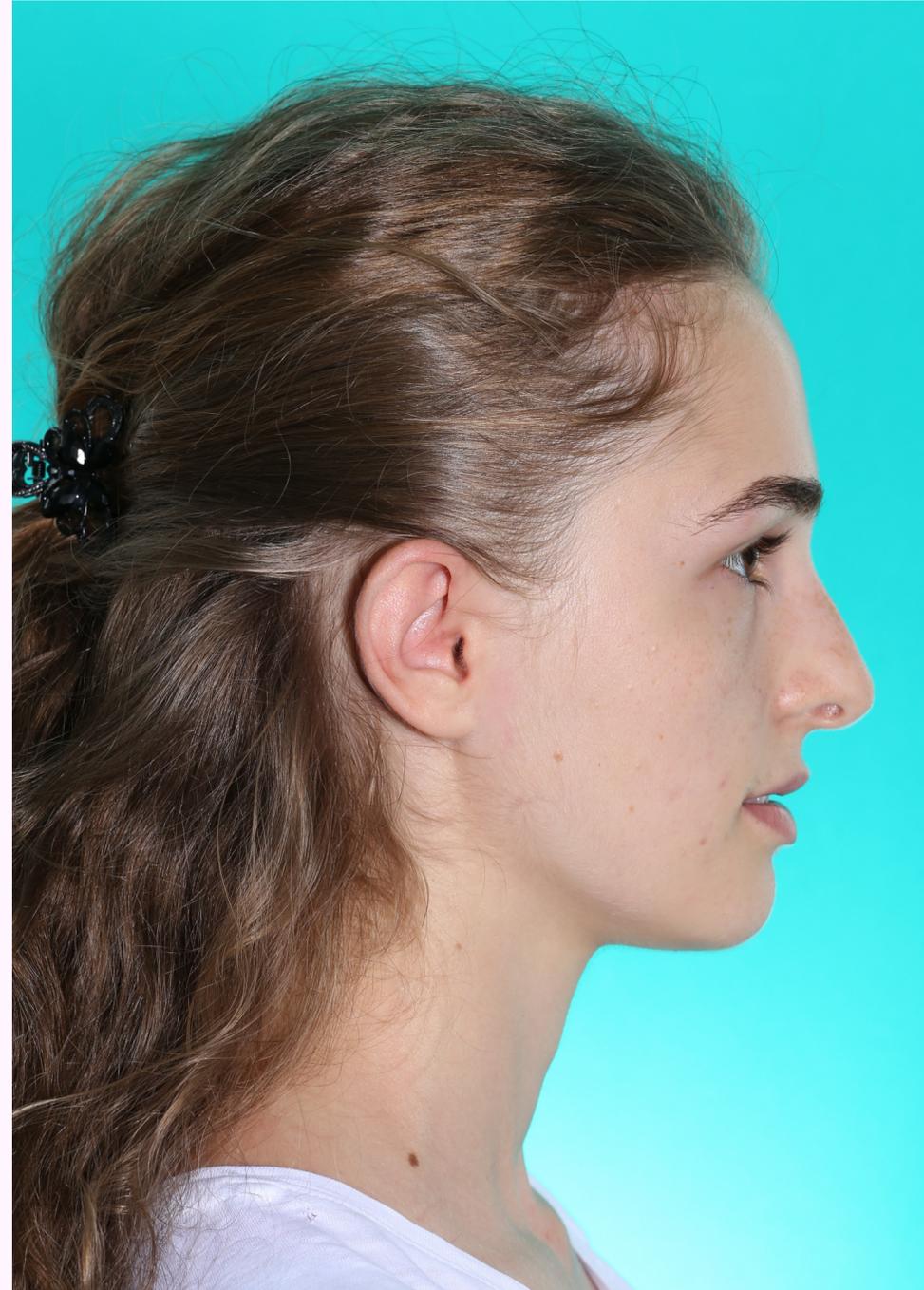
- Balanced profile
- Slightly biretrusive
- Slightly upright upper incisor

Smile analysis

The upper midline is inclined to the right
13- îs properly exposed, unlike
23- which is extruded
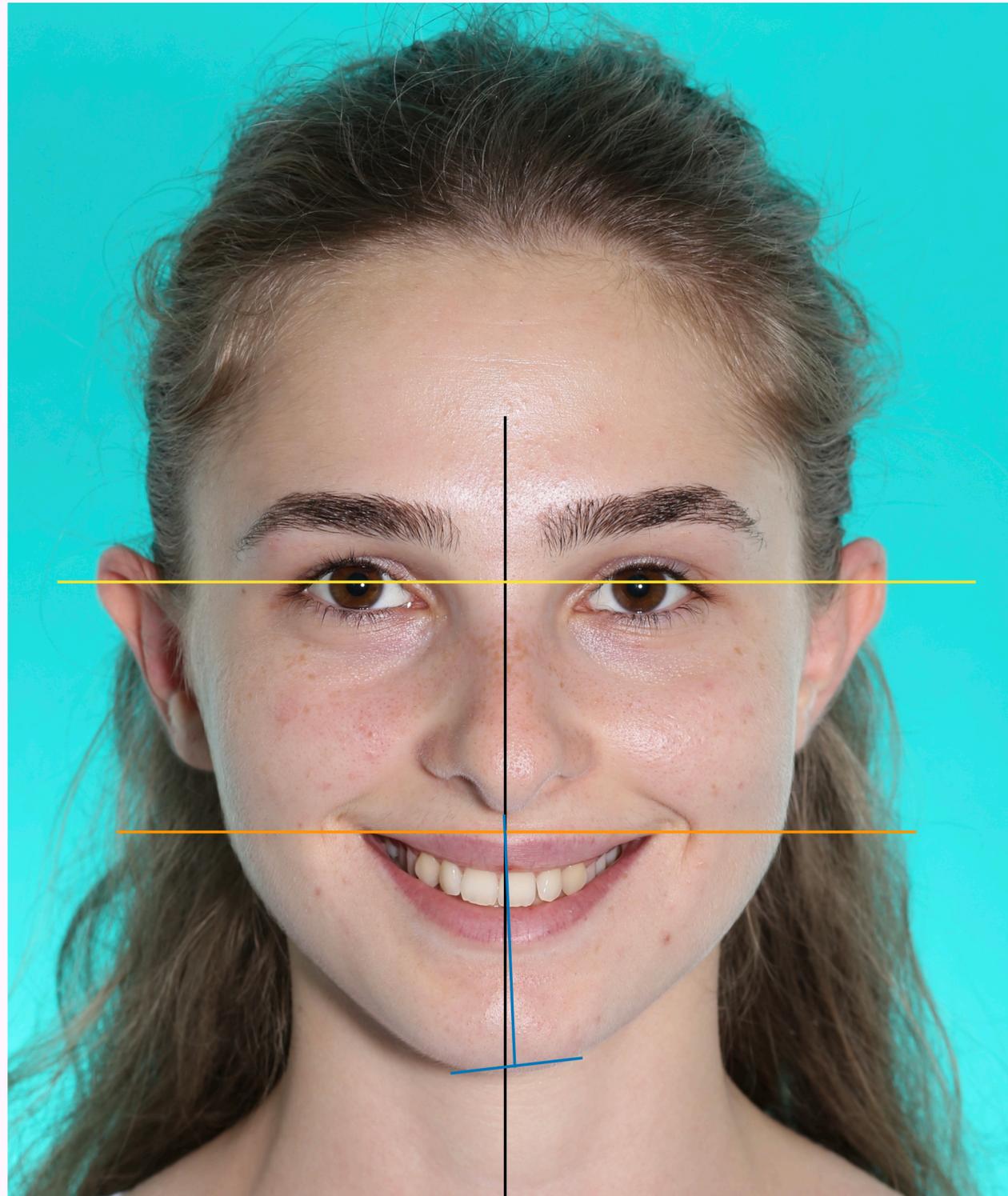
Mandibular lateral deviationo bserved by chin deviation of 8 °, suc as evaluated by the angle formed by the ANS-Me line and the mid-sagital reference plane (MSRP; N-ANS-Ba)
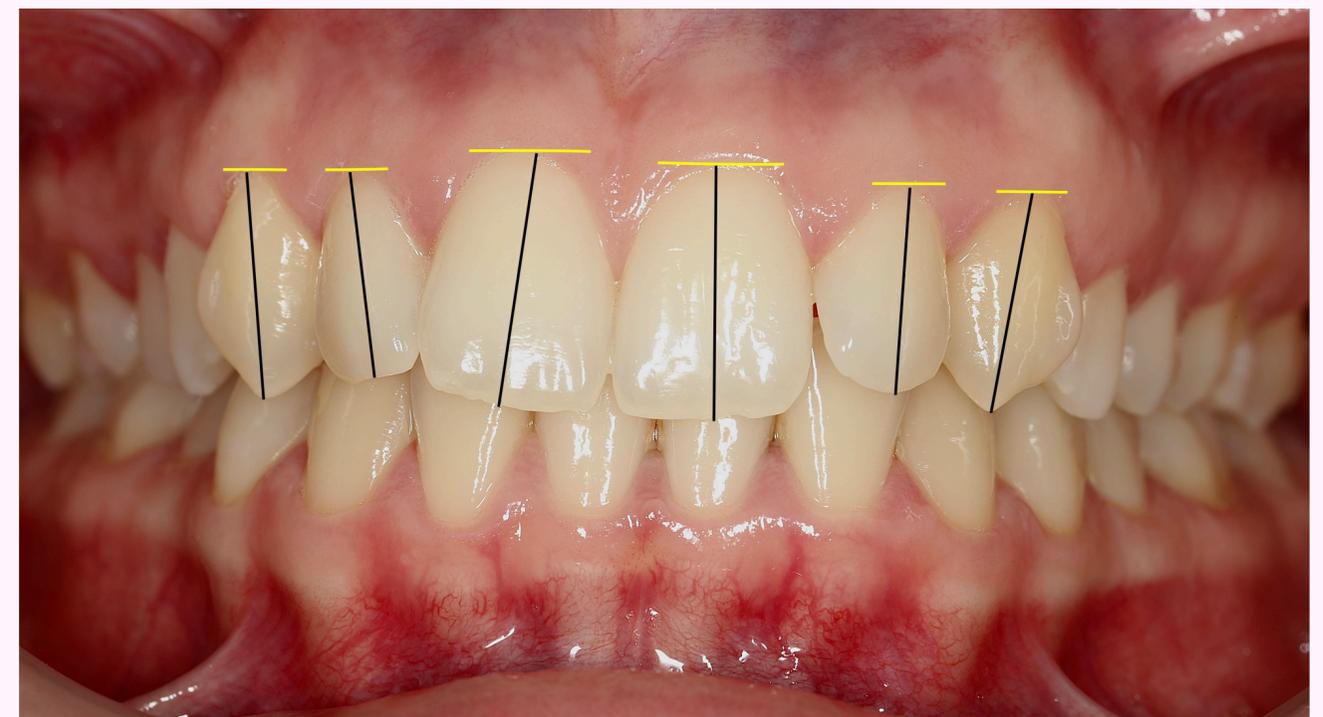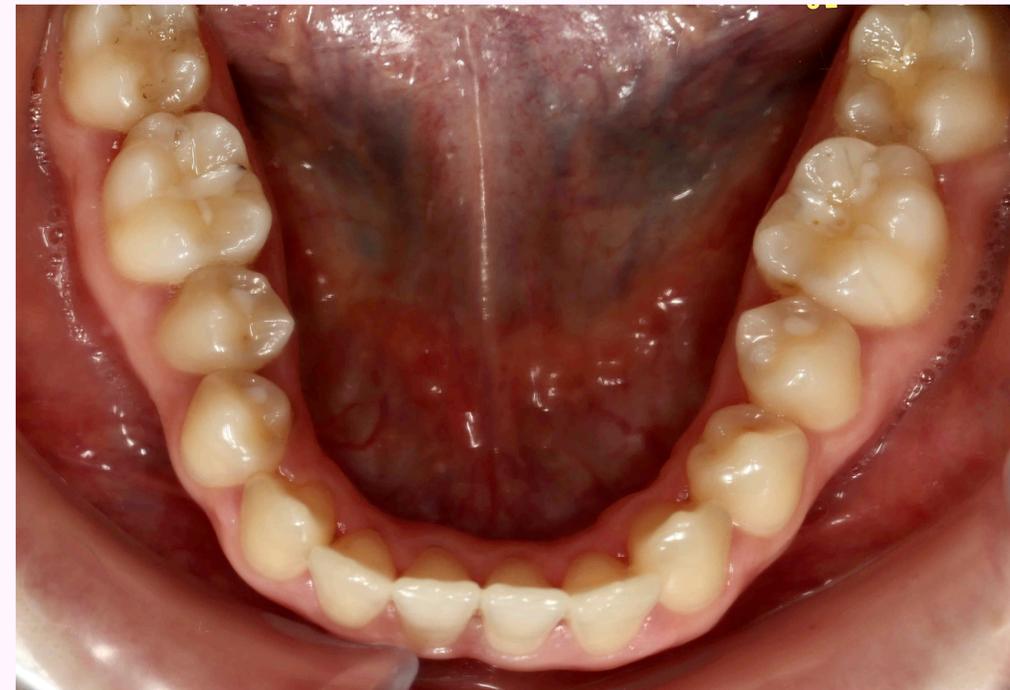
Noncoincinding dental midlines, irregular dental axis and gingival margine

Static occlusal analysis, intraoral photos

- class I right canine and molar relationship
- class II left canine and molar relationship
- group mesialisation on the maxillary left side
- overbite 5mm
- maxillary arch discrepancy of 6 mm
- mandibular arch discrepancy of 2 mm
- upper midline inclined to the right
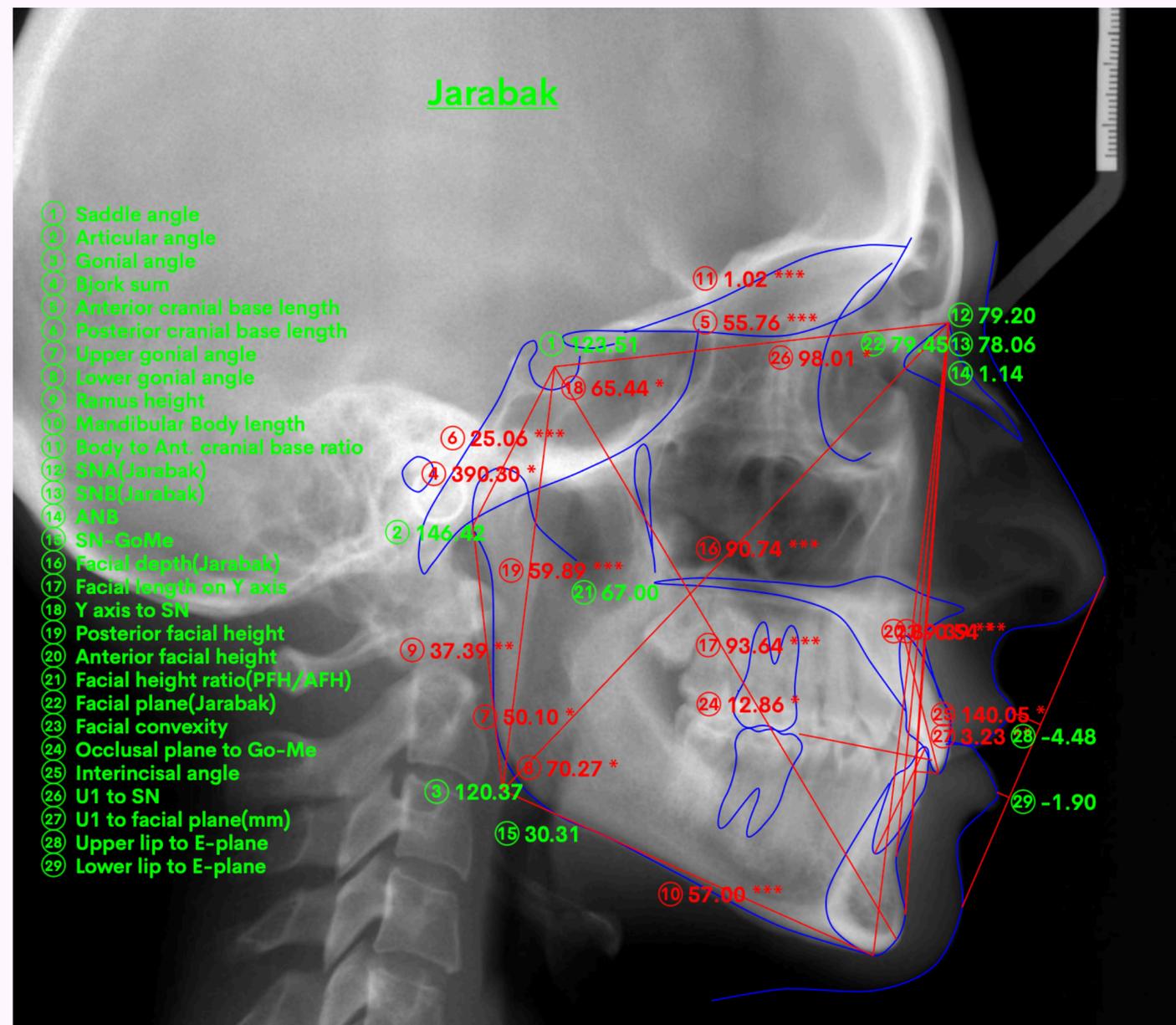- lower midline deviated 2 mm left

X-ray analysis - panoramic and ceph

Full permanent dentition
Tooth 18 impacted, submucosal
Good periodontal status
Mandibular contur appears symmetric, with no anatomical asymmetries detected

Cephalometric analysis

Jarabak

① Saddle angle
② Articular angle
③ Gonial angle
④ Bjork sum
⑤ Anterior cranial base length
⑥ Posterior cranial base length
⑦ Upper gonial angle
⑧ Lower gonial angle
⑨ Ramus height
⑩ Mandibular Body length
⑪ Body to Ant. cranial base ratio
⑫ SNA(Jarabak)
⑬ SNB(Jarabak)
⑭ ANB
⑮ SN-GoMe
⑯ Facial depth(Jarabak)
⑰ Facial length on Y axis
⑱ Y axis to SN
⑲ Posterior facial height
⑳ Anterior facial height
㉑ Facial height ratio(PFH/AFH)
㉒ Facial plane(Jarabak)
㉓ Facial convexity
㉔ Occlusal plane to Go-Me
㉕ Interincisal angle
㉖ U1 to SN
㉗ U1 to facial plane(mm)
㉘ Upper lip to E-plane
㉙ Lower lip to E-plane

Cephalometric analysis indicated: Skeletal class I relationship (SNA 79,20°, SNB 78°)
Normodivergent FMA 23 °
Upper incisor slightly retroinclined   U1 to SN 98°
Upper incisor slightly retropositioned U1 to facial plane 3,2
Lower incisor well positioned IMPA 91,6°

Functional analysis- Articulator mounting
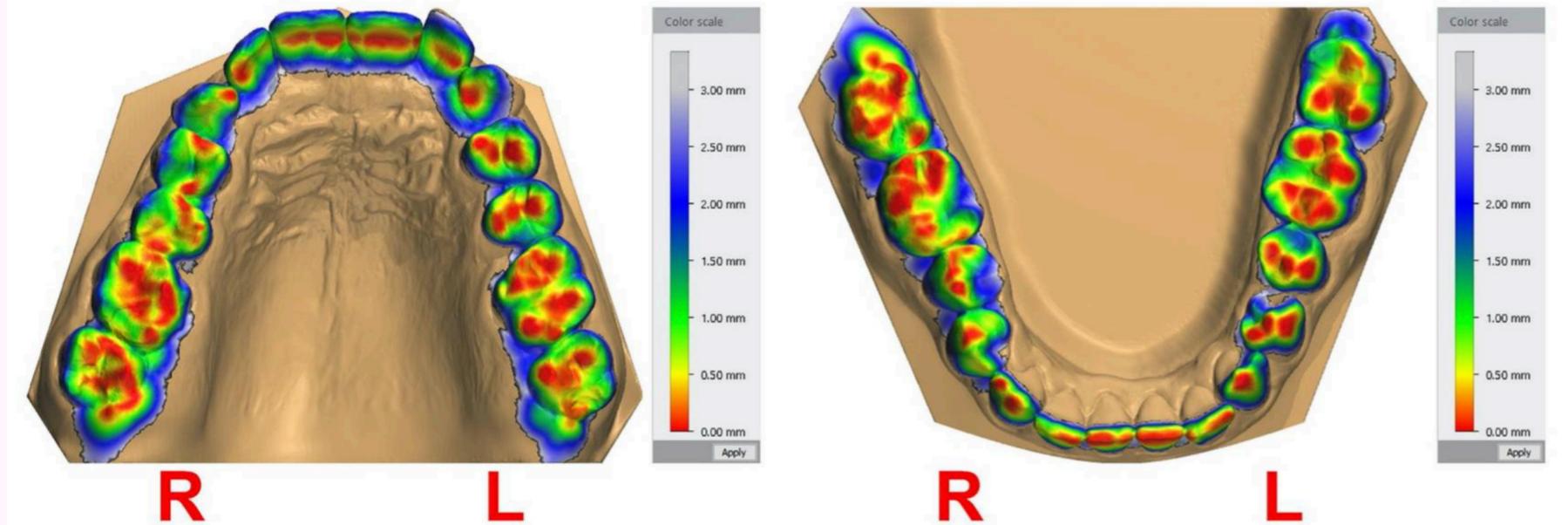
Interdental arch contact in MI

Upon mouth opening, the lower dental midline deviates to a greater extend

Articulator mounting shows the degere of the occlusal maxillary cant

Functional analysis- Articulator mounting
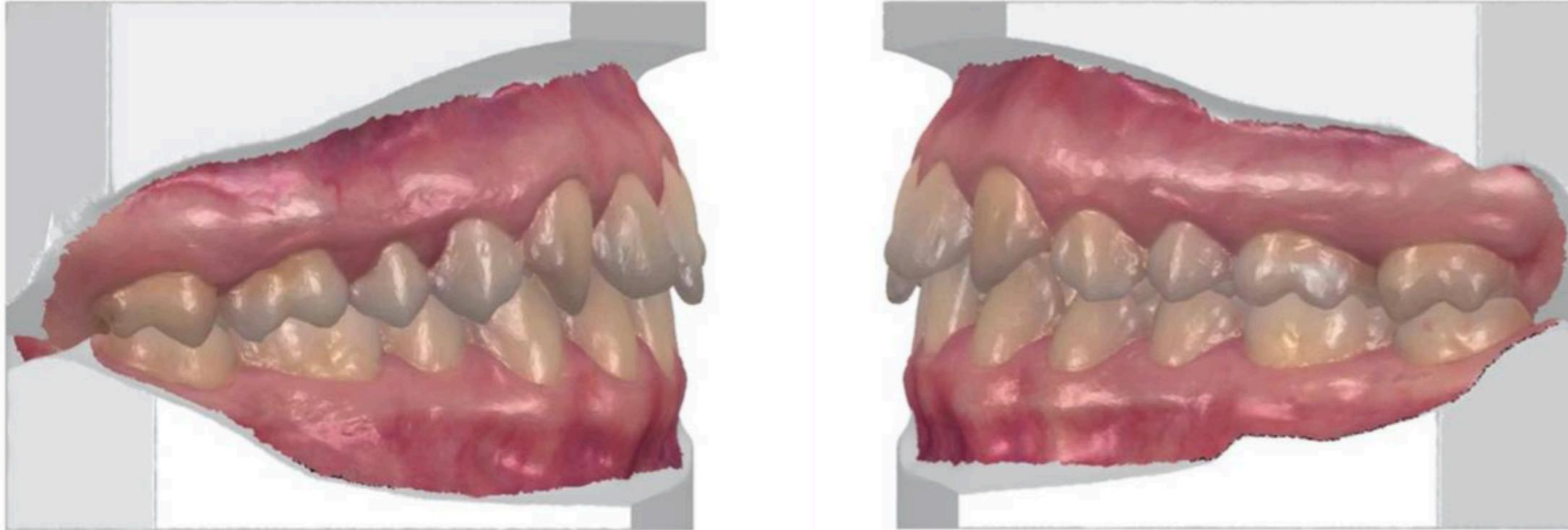
Articulator mounting shows an even greater class II molar relationship on the left side and a new class II molar relationship on theright side un raport
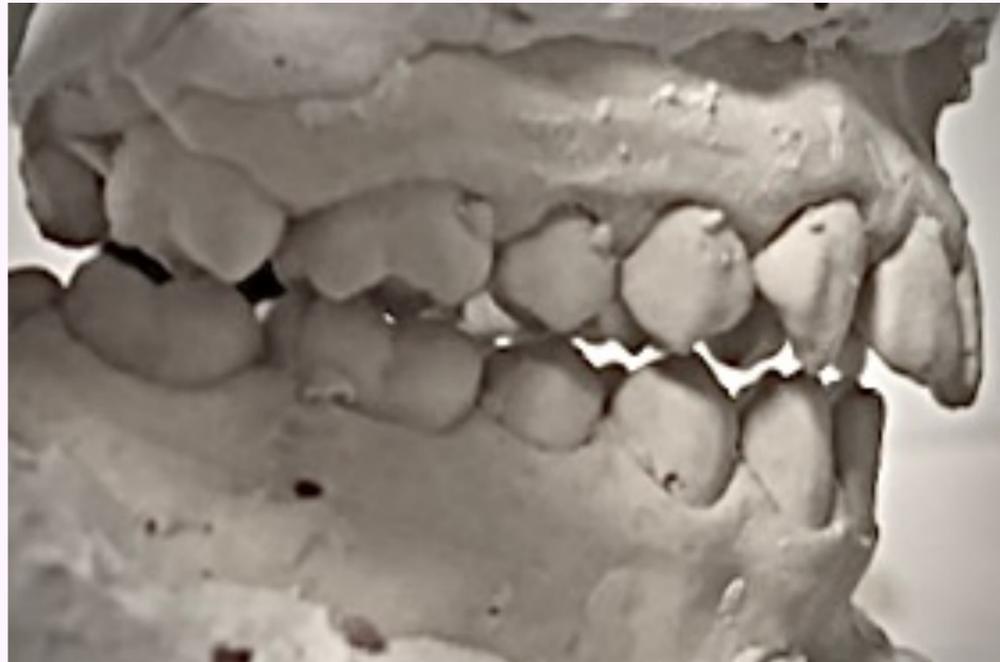
Detailed functional analysis revealed a lateral mandibular shift during closure (determined by first contact)

Several studies have addressed the relationship between occlusion and TMDFushima et al. showed that in patients with MLD and TMD, significant occlusal characteristics included a more distal occlusal relationship of the first molar on the mandibular shifted side as compared with that on the contralateral side (the opposite side of the laterally displaced bony chin), a midline discrepancy, and a right-left difference in the molar relationship.

Relevanta cazului si importanta obiectivului funcțional in tratamentul ortodontic
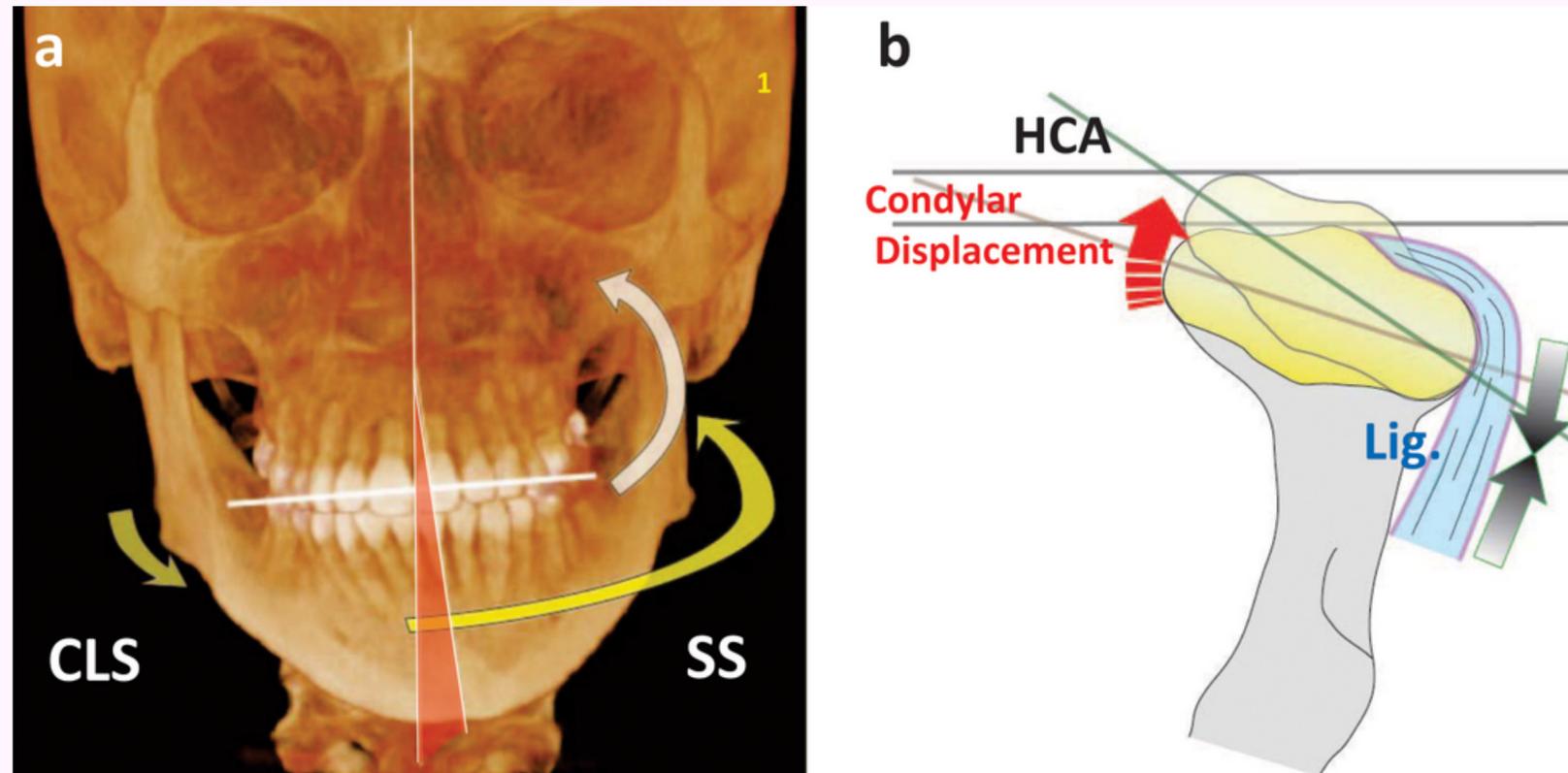
The results of a previous study noted that MLD was accompanied by three-dimensional (3D) rotation of the mandible and that load was applied to the joint on the shifted side. These findings might provide information regarding the developmental mechanism of TMD and degeneration of the condyles by examining differences between the shifted side and contralateral side of HCA in patients with MLD.

Previous studies of the morphological characteristics of mandibular lateral displacement (MLD) found that they were commonly characterized as having a deviation of the chin from the facial midline because of a mandibular shift to one side that caused both skeletal asymmetry and dental midline discrepancies,mandibular rotational displacement, condylar lateral displacement, and postural changes. Studies have reported that among all malocclusions, MLD has the highest probability to develop temporomandibular joint disorders (TMD) and that symptoms are more likely to develop on the shifted side (ie, the side of the laterally displaced bony chin) of the temporomandibular joint
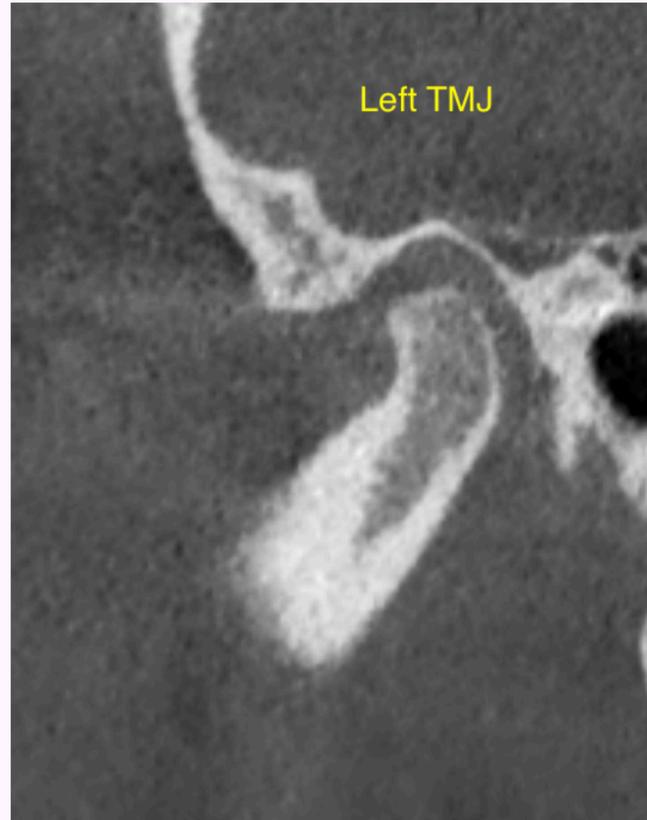
CBCT TMJ analysis
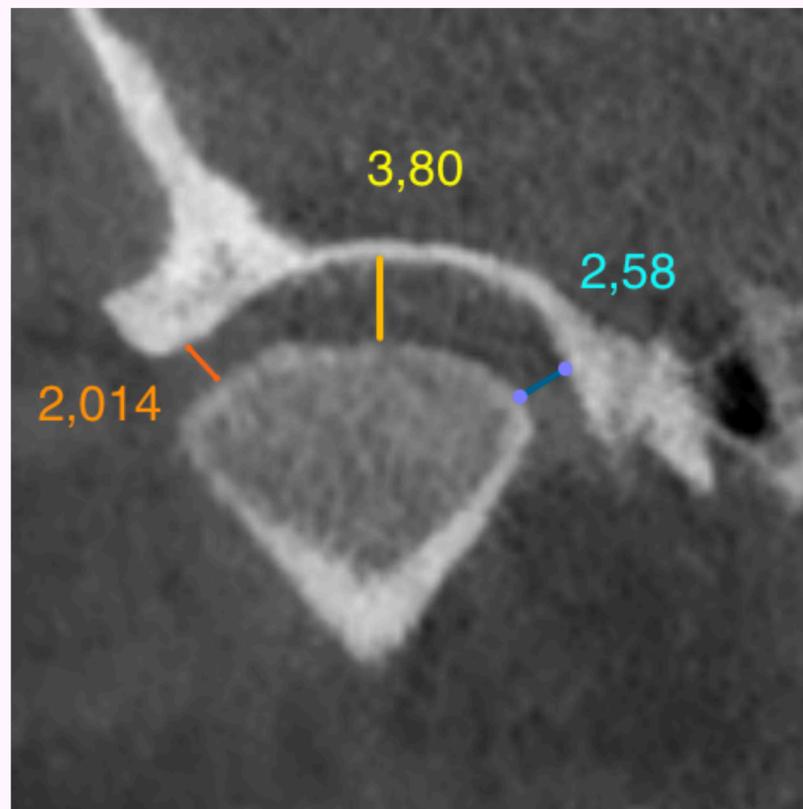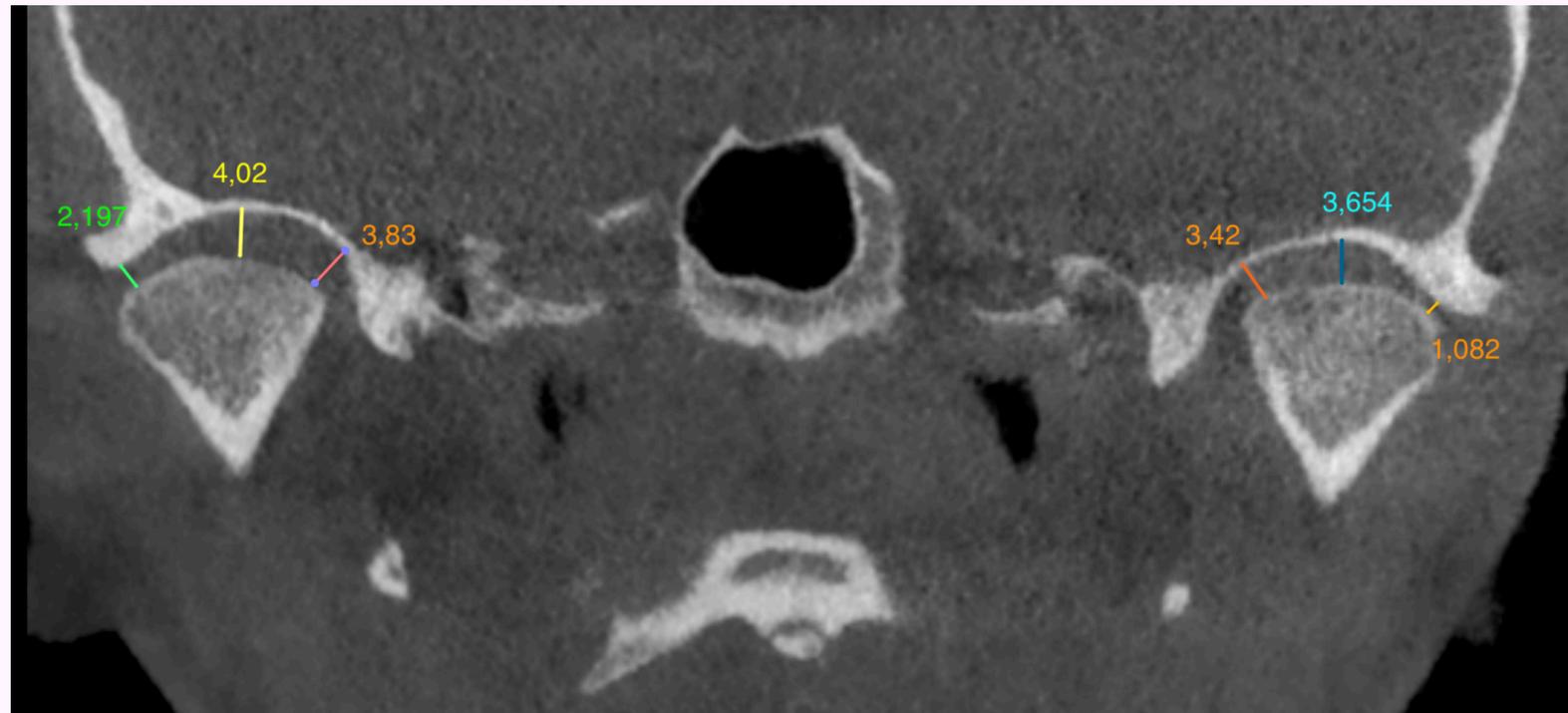
On the frontal view :

- enlarged upper space
- condyles displaced downwards
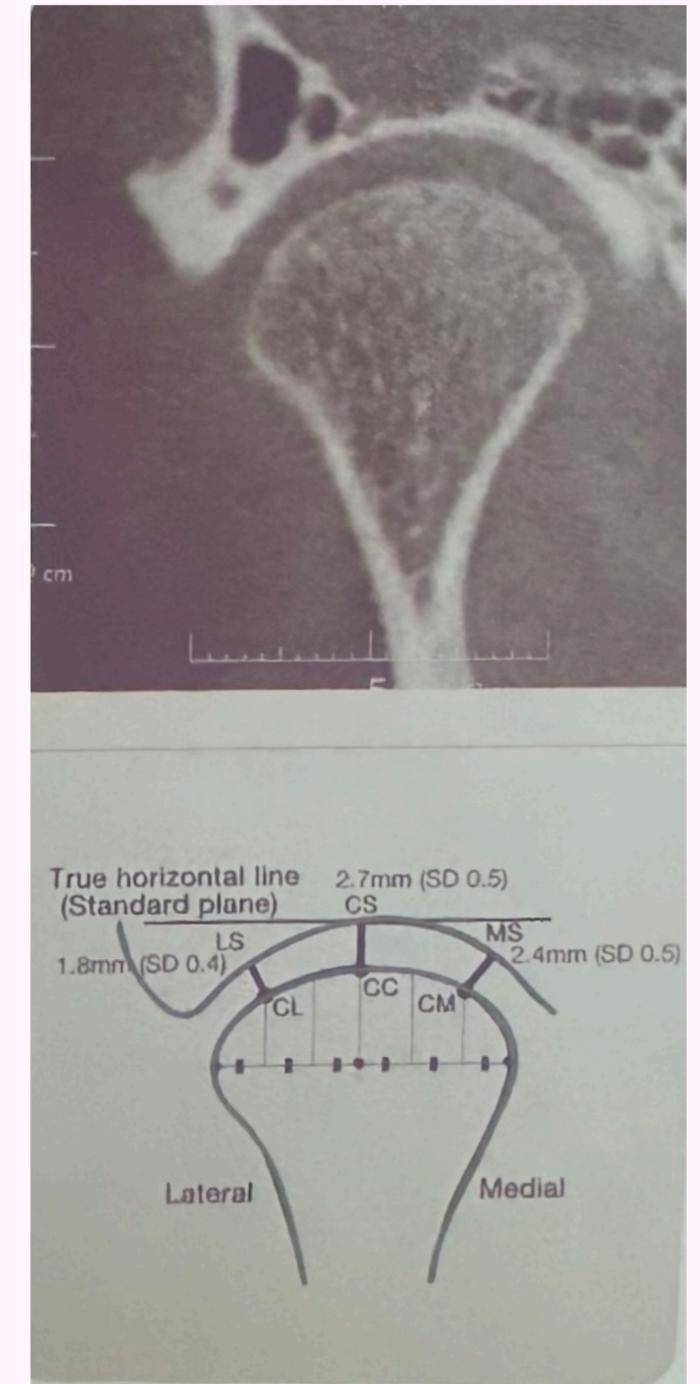
Schematic illustration of the
physiological articular sape dimensions

CBCT TMJ analysis

Left TMJ

Left TMJ

3,6

2,37

2,61

Right TMJ

Right TMJ

4,75

2,45

2,57
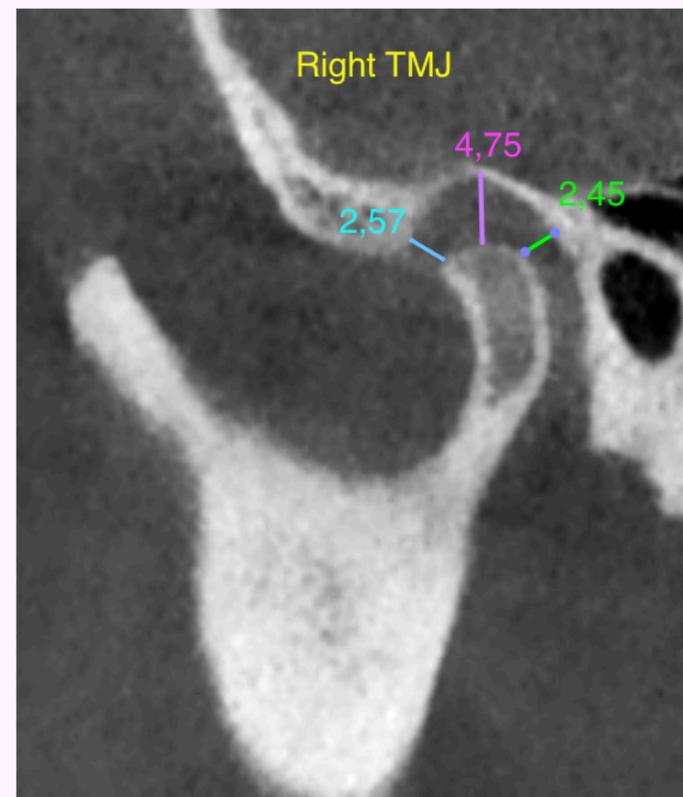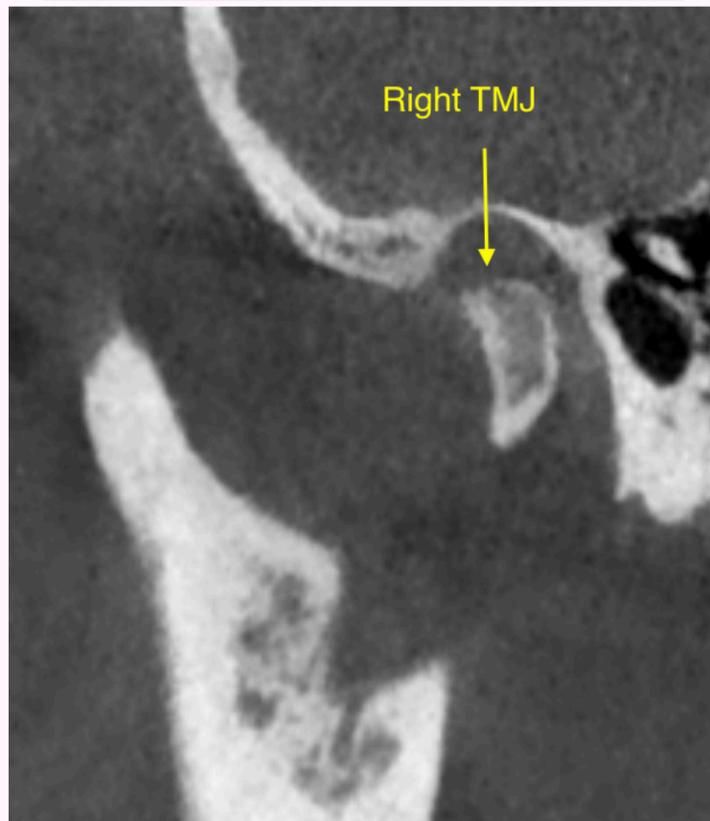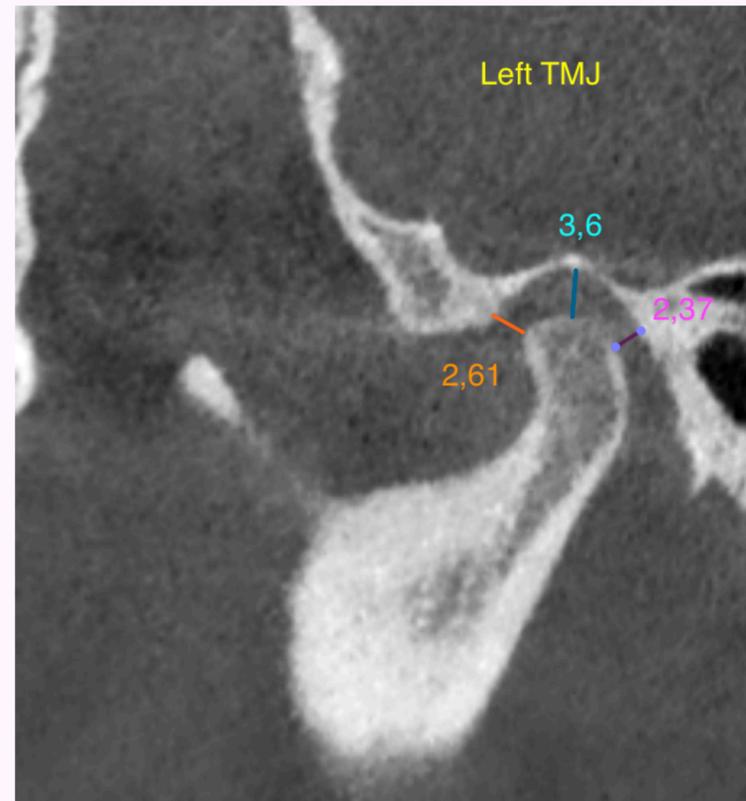
On the sagital view :

- enlarged upper space
- Left condyle displaced downwards more than the right condyle

True horizontal line (Standard plane)

2.5 mm (SD 0.5) SS

2.1 mm (SD 0.3) PS

1.3 mm (SD 0.2) AS

SC

PC   AC

Auditory meatus

Posterior

Anterior
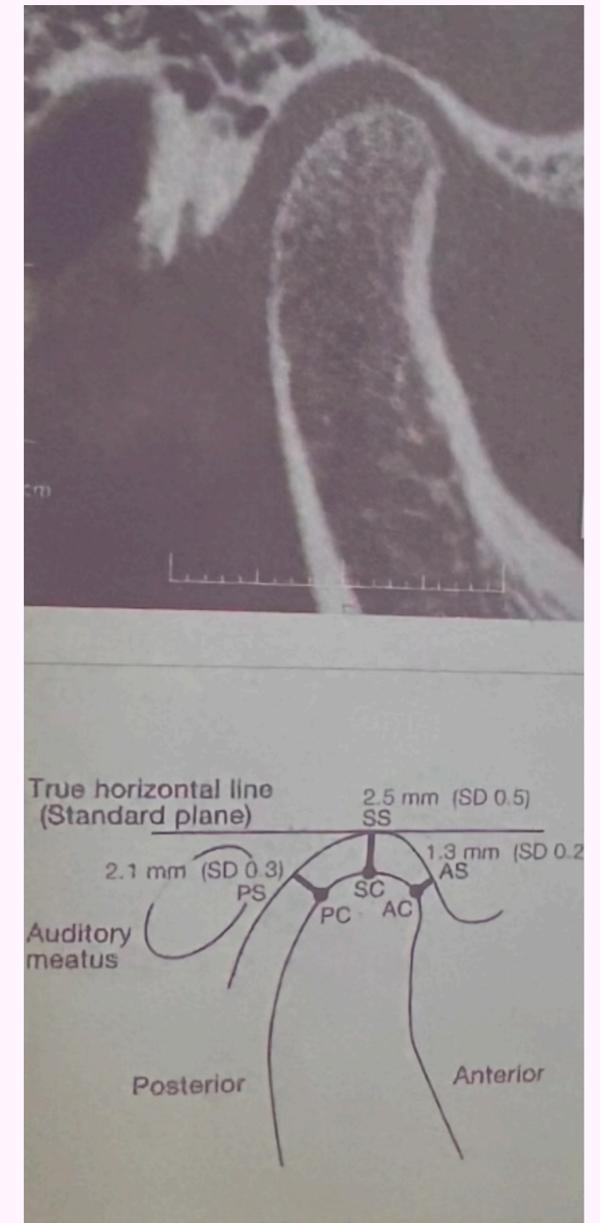
Schematic illustration of the physiological articular sape dimensions

Problem list

- facial asimmetry with chin deviated to the left
- maxillary and mandibular arch discrepancies of 6 mm and of 2 mm
- class II canine and molar relationship
- overbite,
- Upper incisor retroclined
- Upper midline inclined to the right, maxillary occlusal cant
- Mandibular lateral deviation
- RC - MI discrepancy

Treatment objectives

- accomplish appropriate tooth alignment
- Correct overbite and overjet
- Corection of the occlusal cant
- improve the degree of facial asymmetry
- Improve the smile aesthetics
- well-interdigitated and functional occlusion

Schematic ilustration of the orthodontic biomechanic

I.
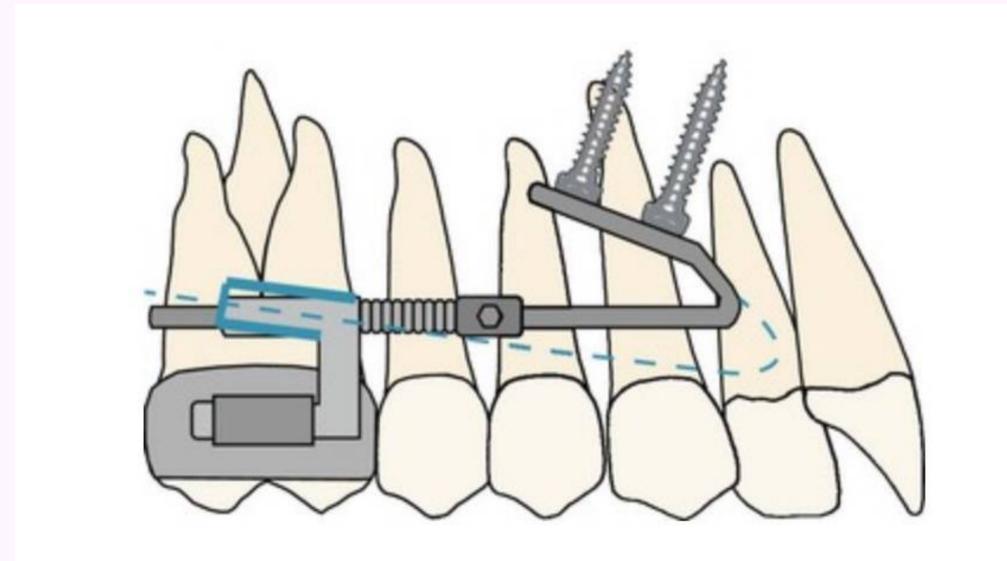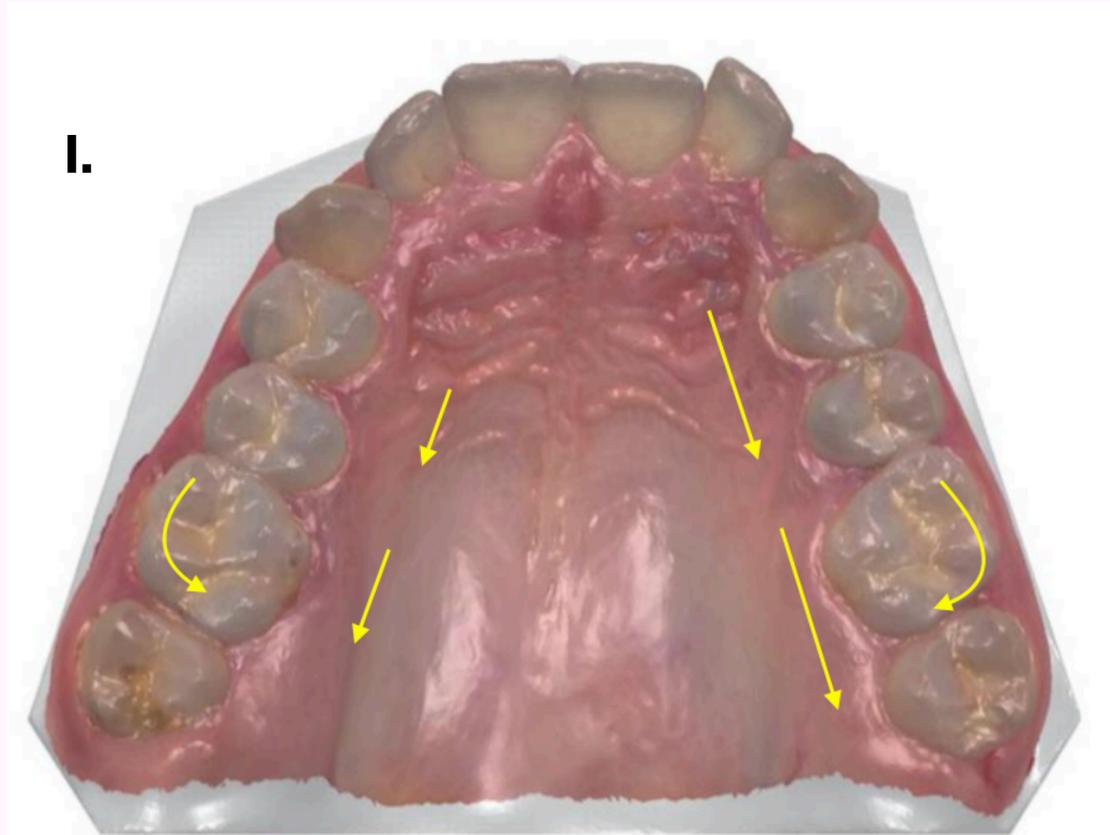
I. Distalisation using microimplants

II.

III.
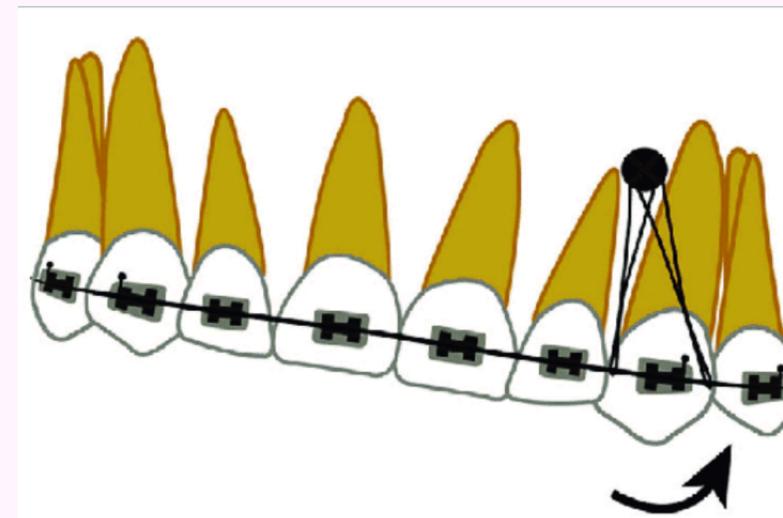
II. Correction of the occlusal cant using a vestibular microimplant
III. Repositioning of the mandible using intermaxillary elastics, after the corection of dental compensations
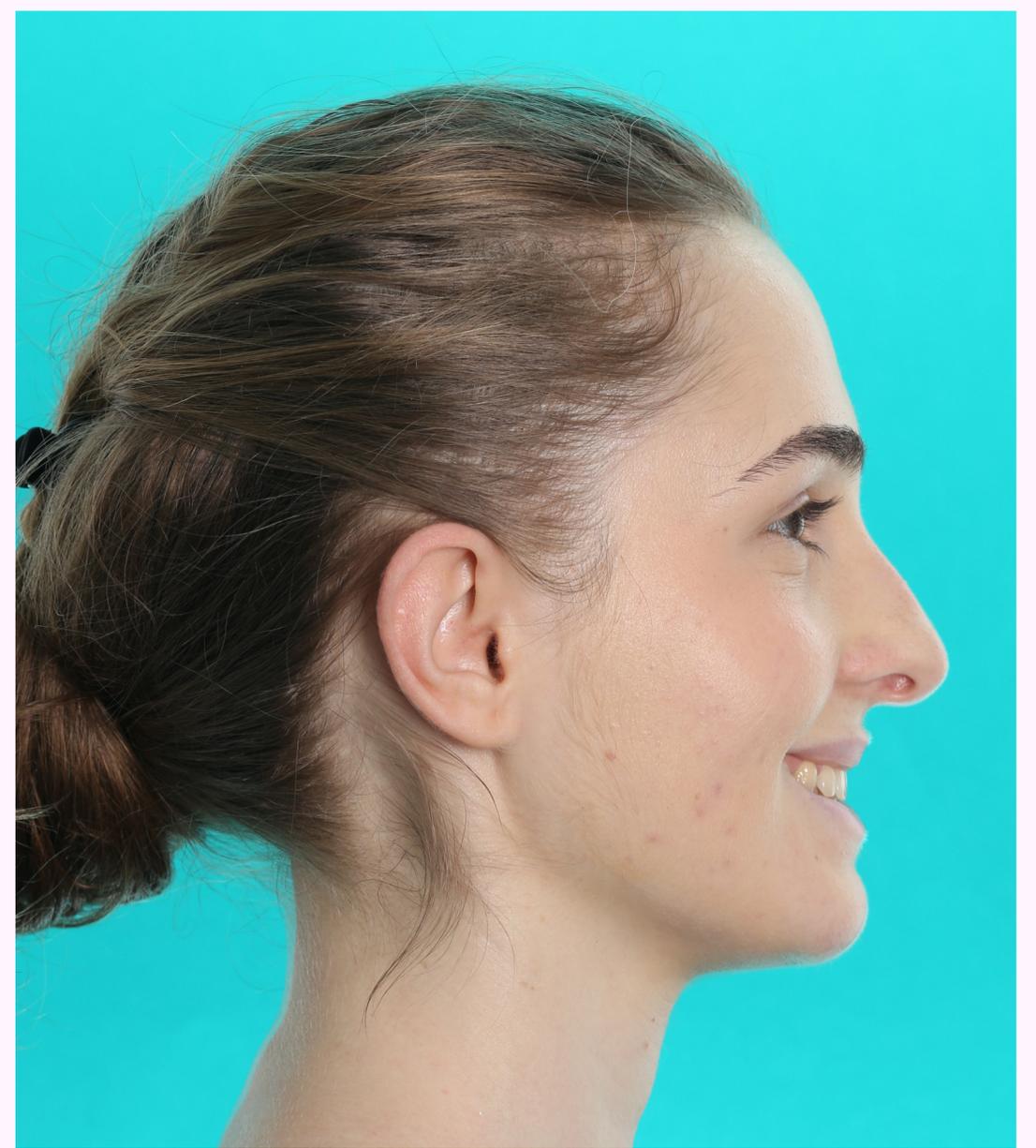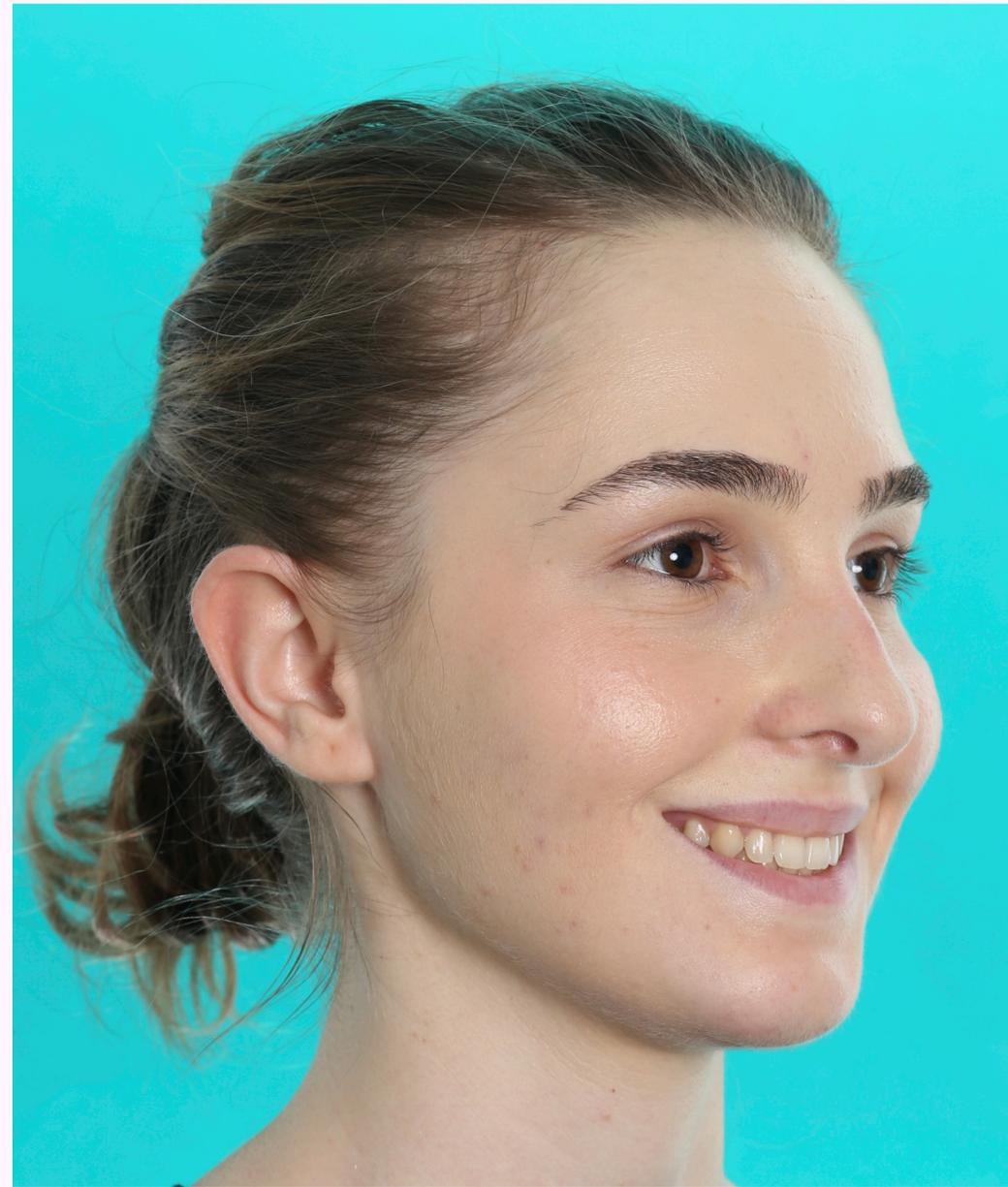
Treatment progress- palatal distalizer, digitally planed

1st QUADRANT	2nd QUADRANT

OVERVIEW
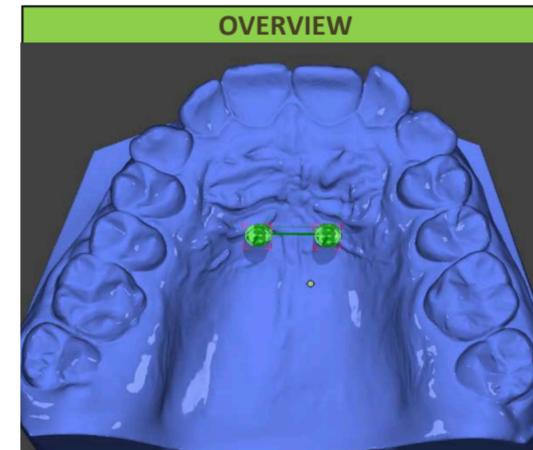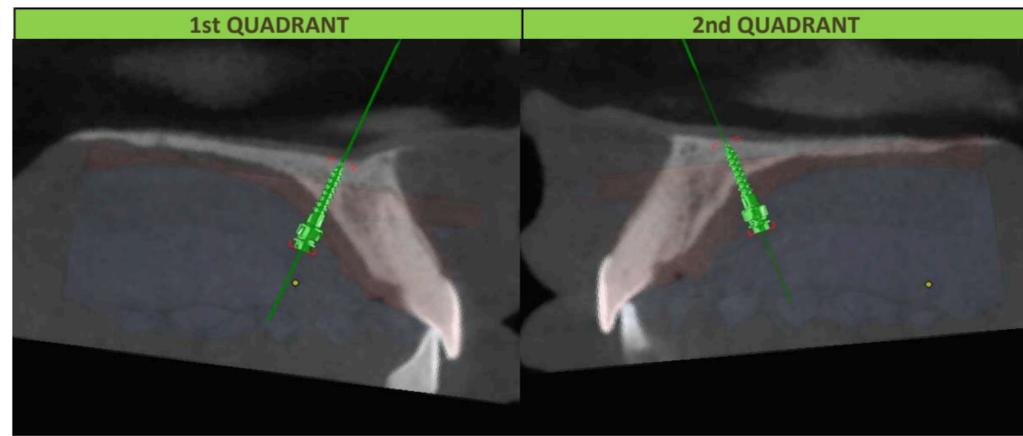
SYSTEM:	FD-OrthoEasyPal
NO & TYPE	1 = 1,7x8 mm
	1 = 1,7x8 mm
DISTANCE	8 mm
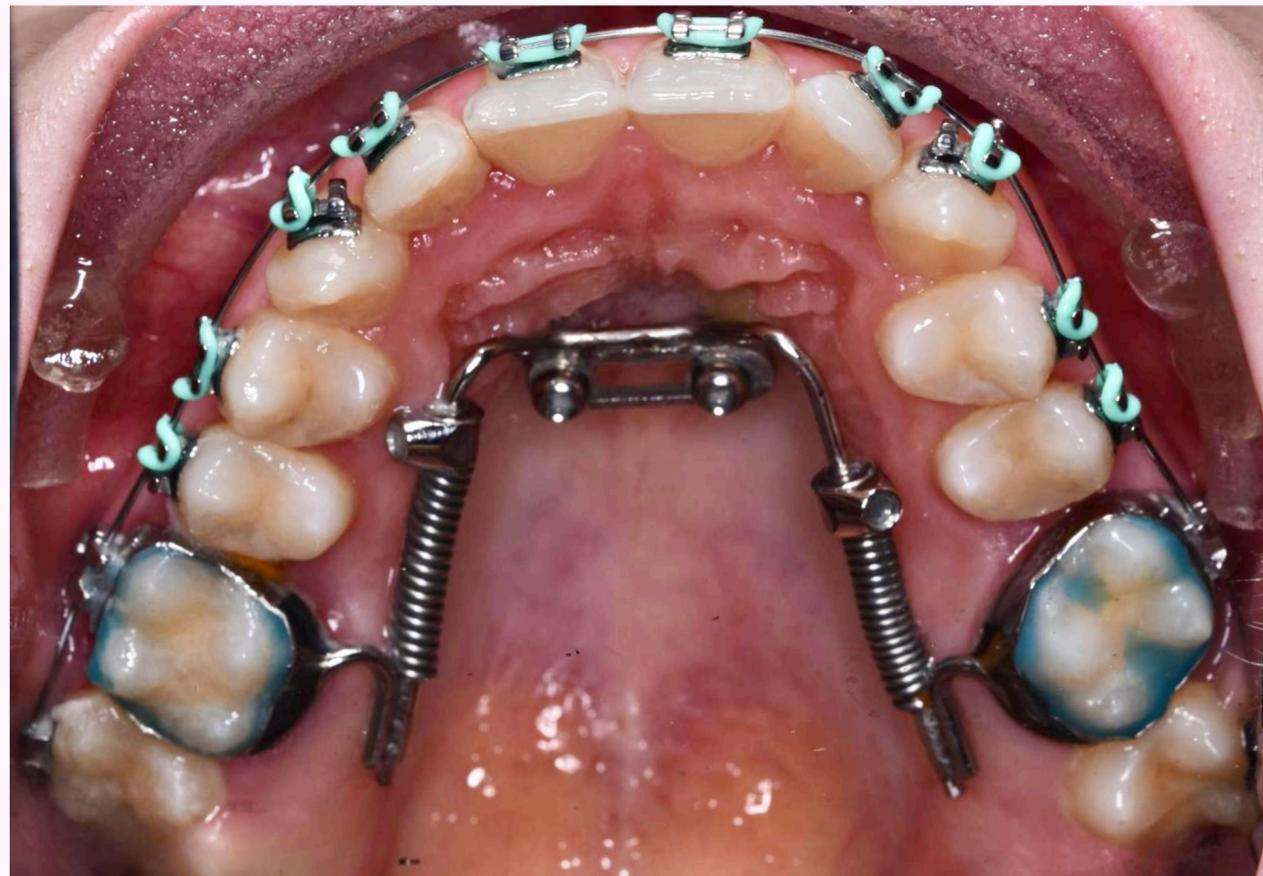
Treatment progess- bimaxillary fixed appliance 022 MBT
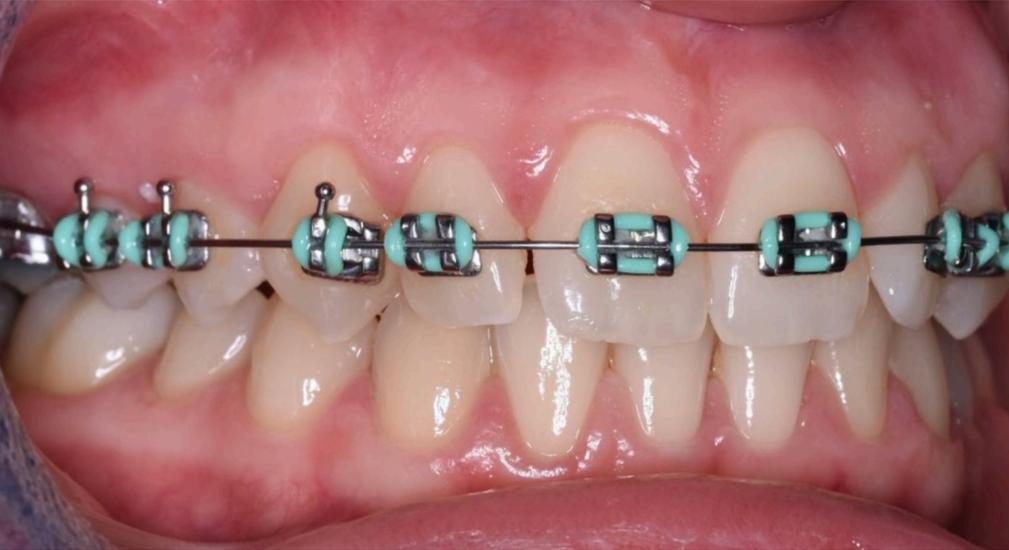
Post treatment facial photos

After completing the comprehensive treatment, the facial asymmetry of the patient significantly improved.
 A well-balanced chin was visible, and the resting lip cant relative to the interpupillary line was alleviated
Additionally, the dental midline matched the facial midline.

Post tx- smile analysis
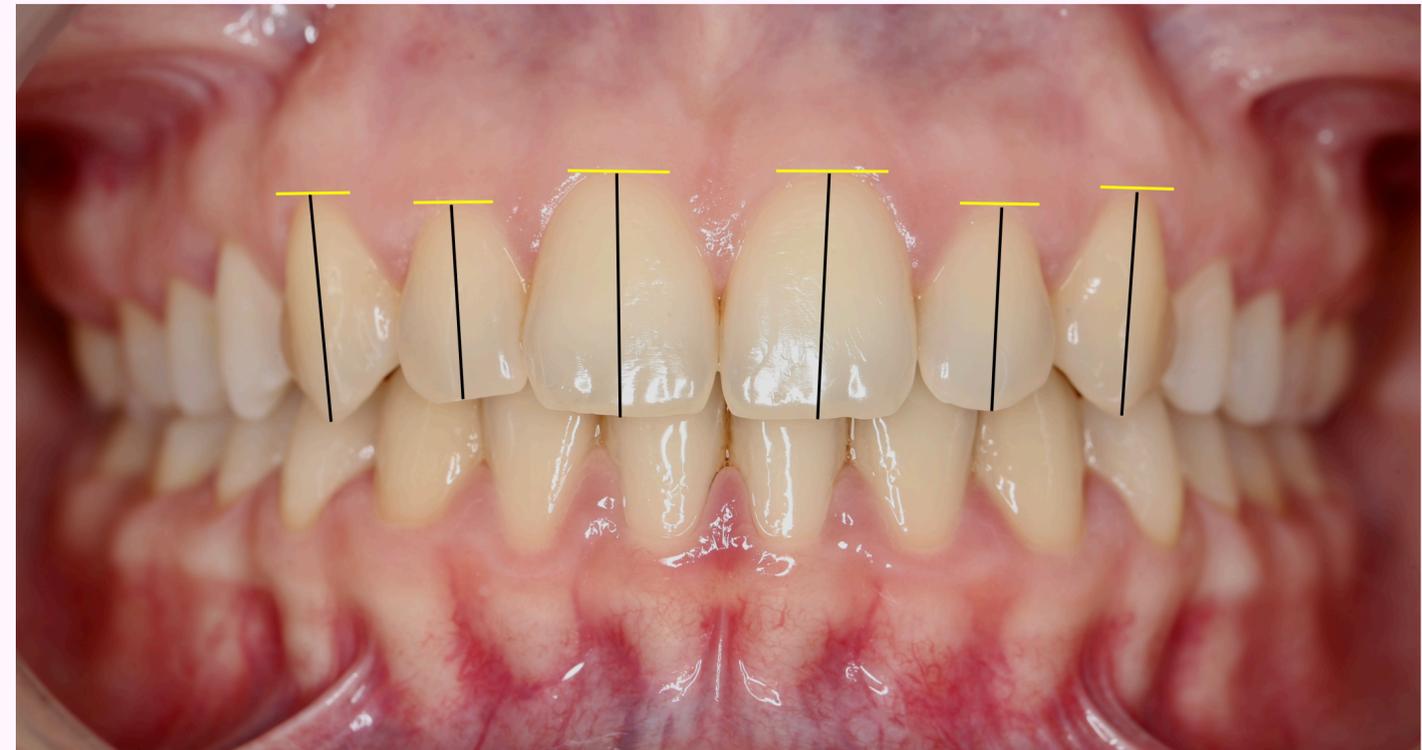
Post-treatment records showed an improvement in dental axis, gingival contours, dental midlines

Before
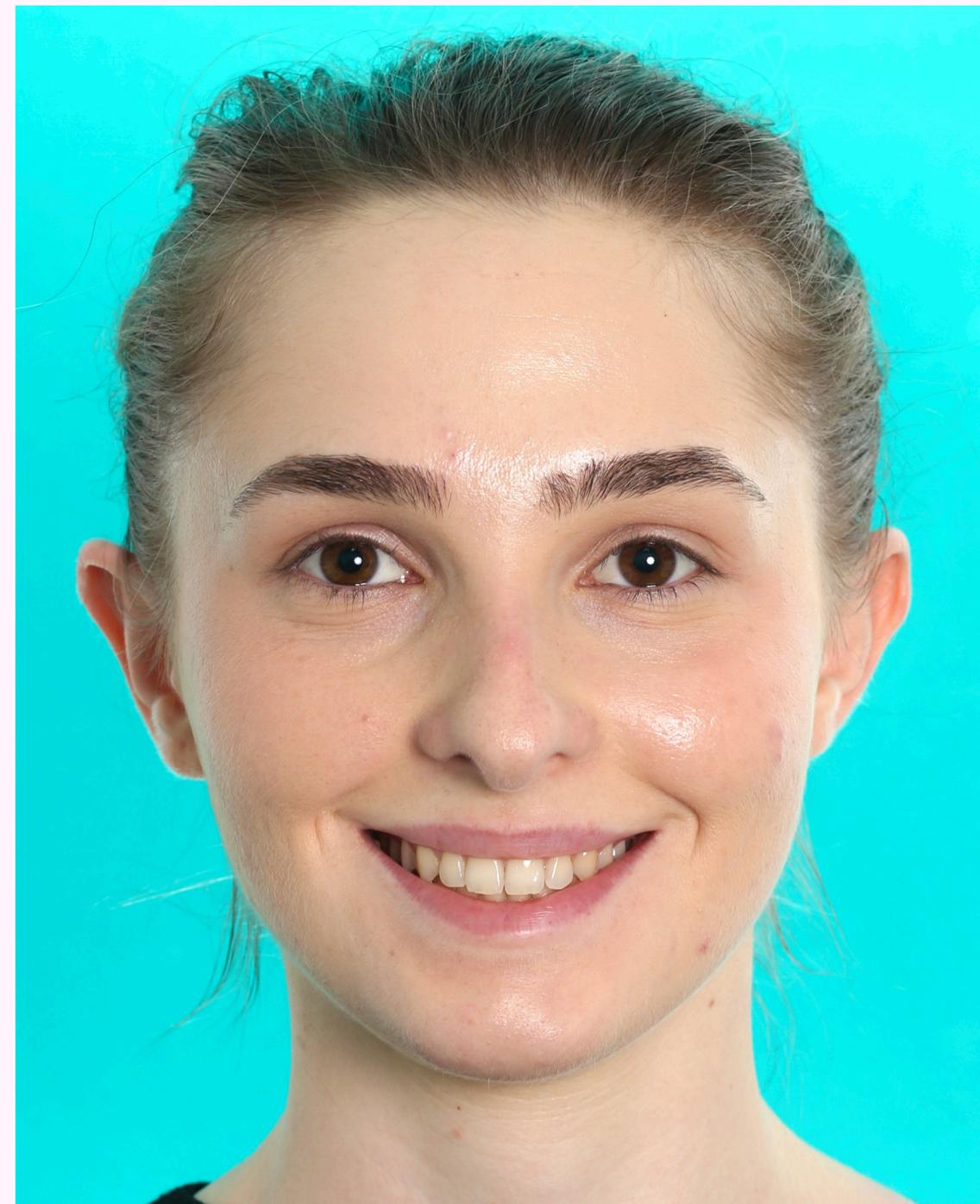
After ortho treatment

Intraoral photographs- post ortho treatment

Normal overbite and overjet were achieved.
Proper occlusal interdigitation with Class I canine and Class II molar relationships was observed.
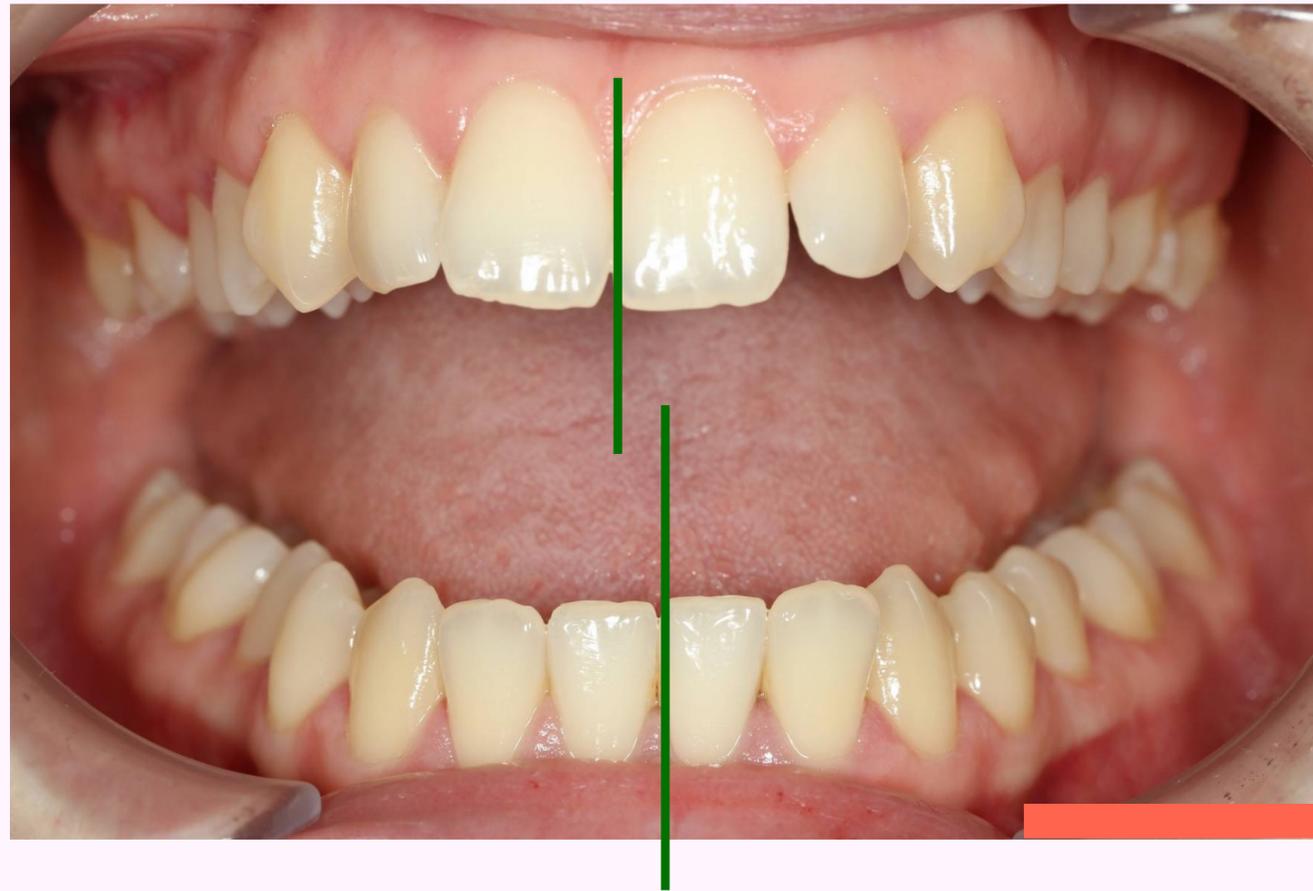
Occlusal view, before and after treatment
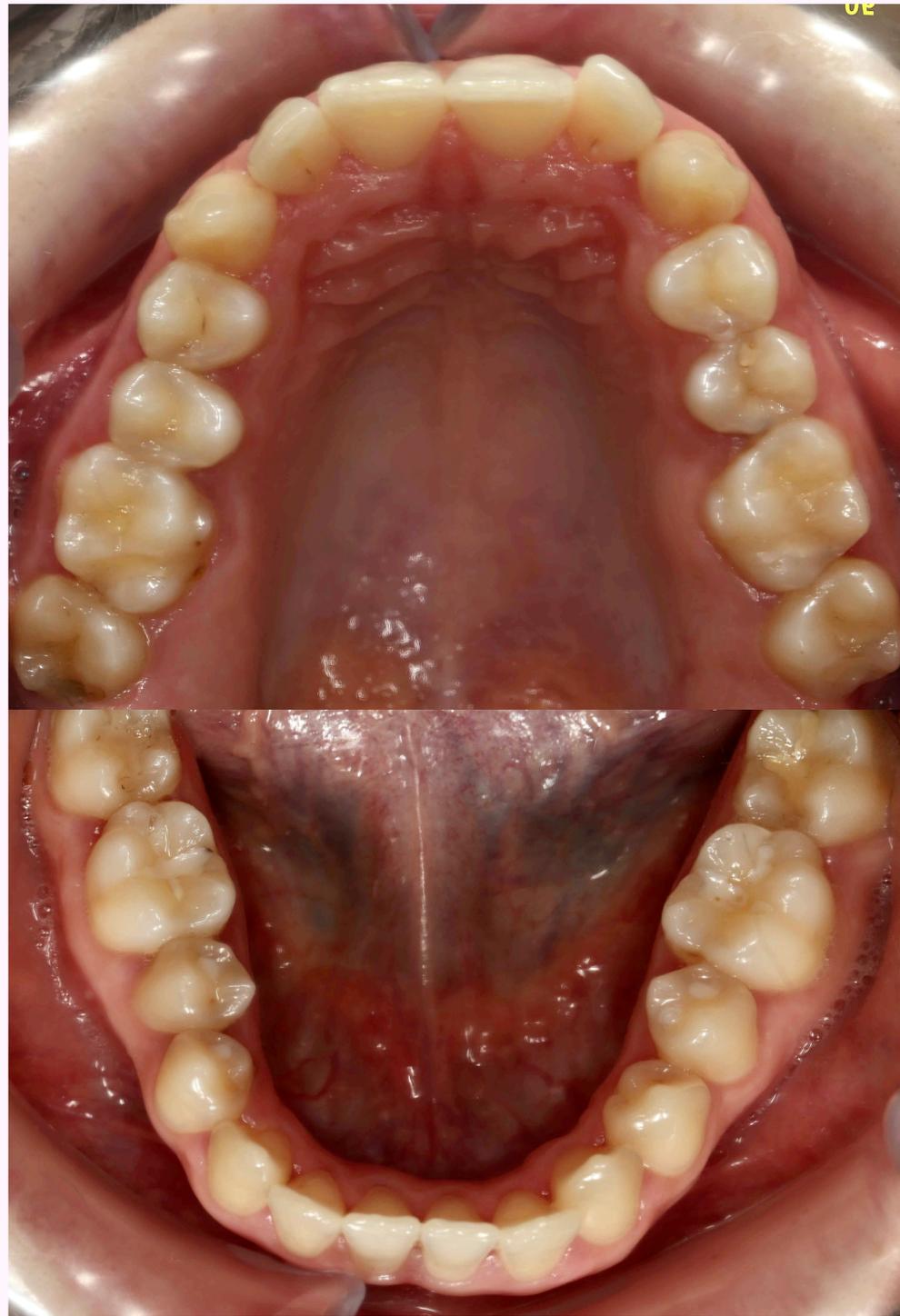
For retention, anterior lingual bonded retainer and an upper wraparound retainers were provided.

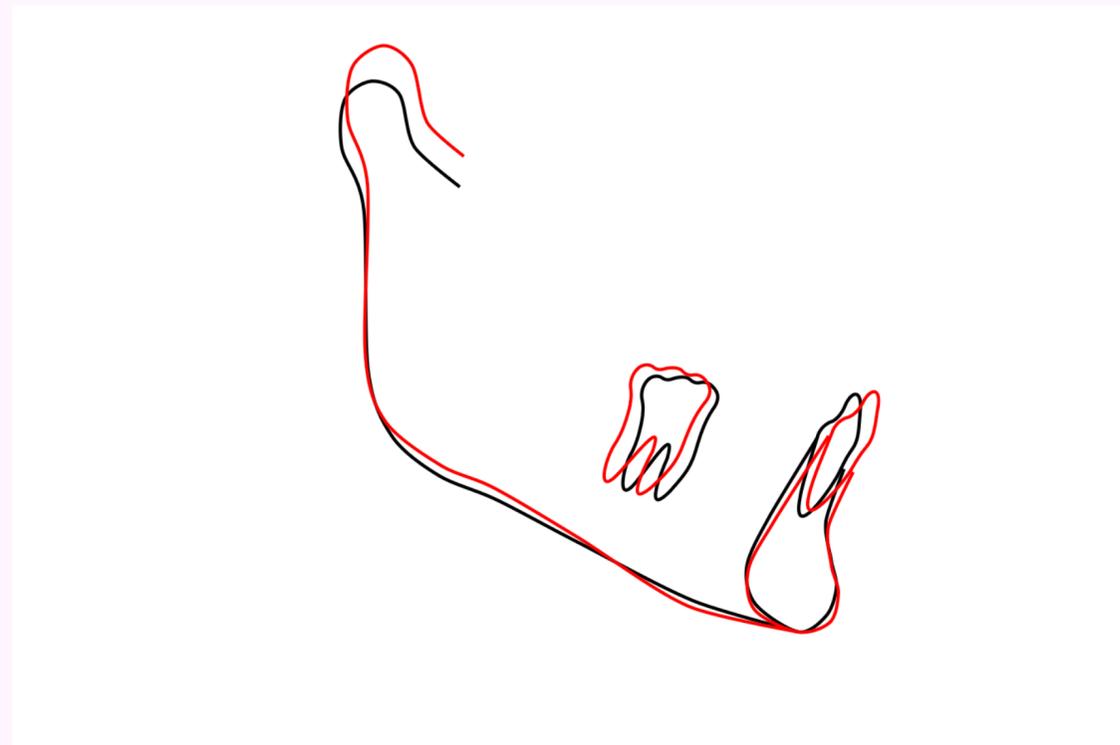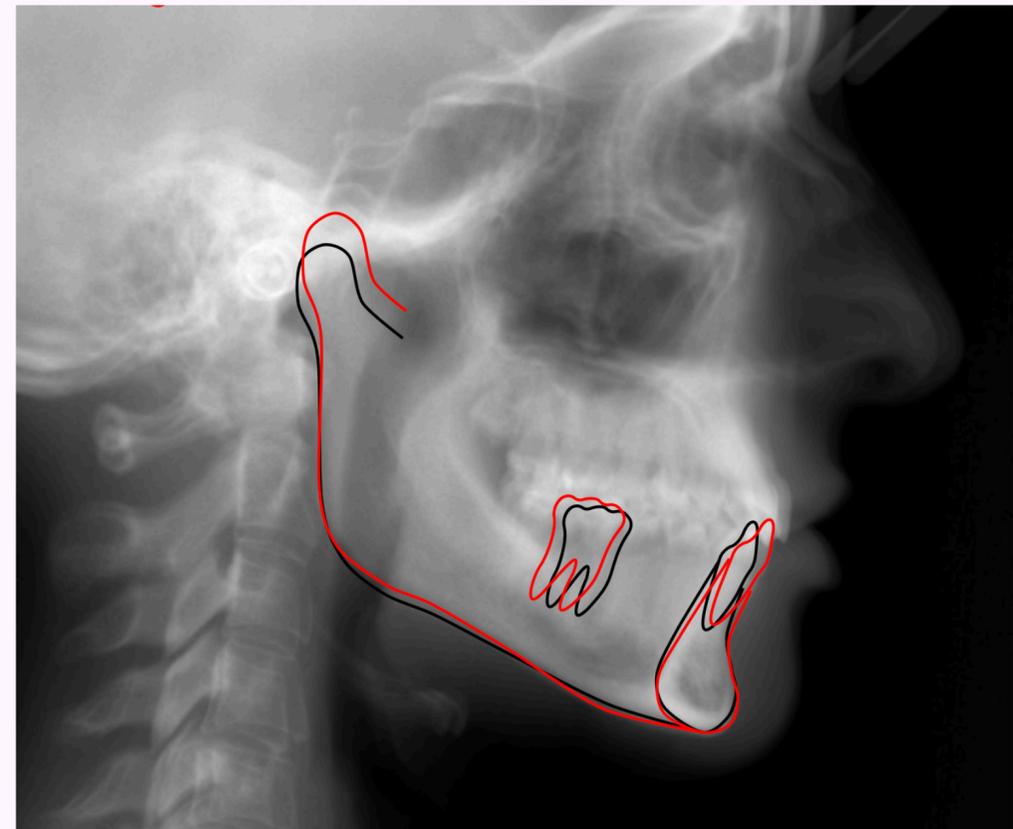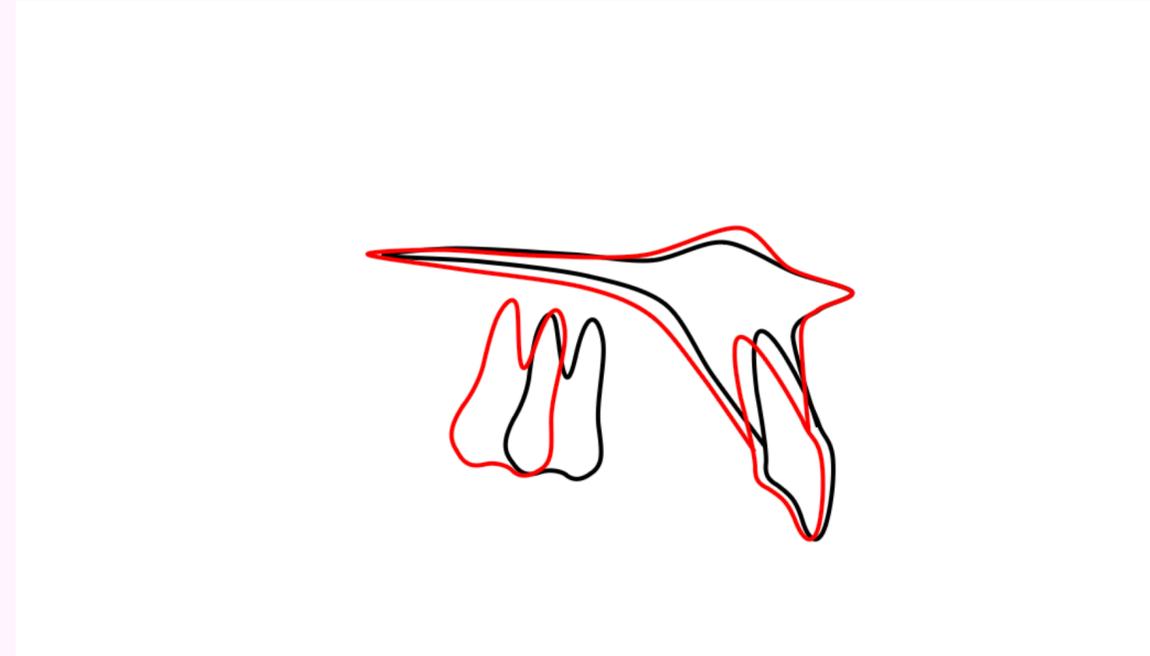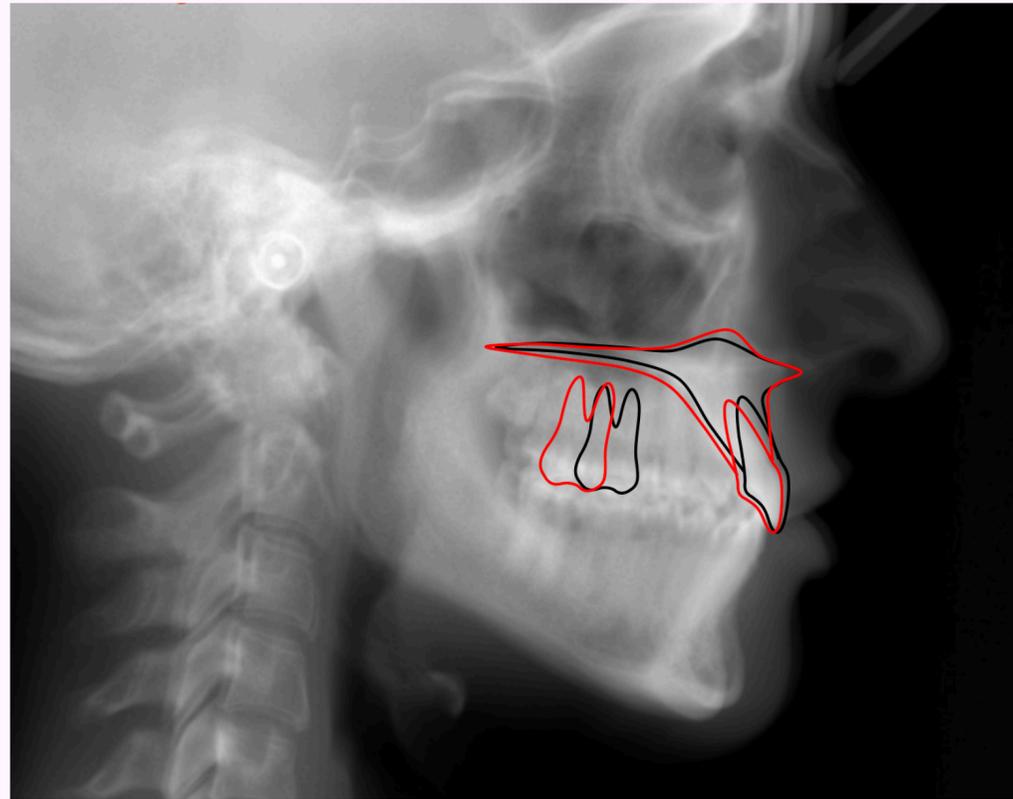# Functional analysis- after treatment

X-ray analysis after treatment

Jarabak

① Saddle angle
② Articular angle
③ Gonial angle
④ Bjork sum
⑤ Anterior cranial base length
⑥ Posterior cranial base length
⑦ Upper gonial angle
⑧ Lower gonial angle
⑨ Ramus height
⑩ Mandibular Body length
⑪ Body to Ant. cranial base ratio
⑫ SNA(Jarabak)
⑬ SNB(Jarabak)
⑭ ANB
⑮ SN-GoMe
⑯ Facial depth(Jarabak)
⑰ Facial length on Y axis
⑱ Y axis to SN
⑲ Posterior facial height
⑳ Anterior facial height
㉑ Facial height ratio(PFH/AFH)
㉒ Facial plane(Jarabak)
㉓ Facial convexity
㉔ Occlusal plane to Go-Me
㉕ Interincisal angle
㉖ U1 to SN
㉗ U1 to facial plane(mm)
㉘ Upper lip to E-plane
㉙ Lower lip to E-plane

⑪ 1.01 ***
⑤ 57.84 ***
① 123.87
⑱ 65.75 *
⑥ 25.43 ***
④ 390.07 *
② 146.94
⑲ 61.60 ***
㉑ 47.18
⑨ 38.71 **
㉔ 15.73
⑦ 49.69 *
⑧ 69.57 *
③ 119.26
⑮ 30.07
⑩ 58.17 ***
⑫ 80.05
⑬ 77.22
⑭ 2.84
㉒ 79.78
⑯ 93.04 ***
⑳ 2.76 **
⑰ 96.62 ***
㉕ 129.62
㉗ 4.21
㉘ -5.86
㉙ -2.62
㉖ 105.41

The cephalometric analysis revealed slight proclination of the upper incisors. This was desirable
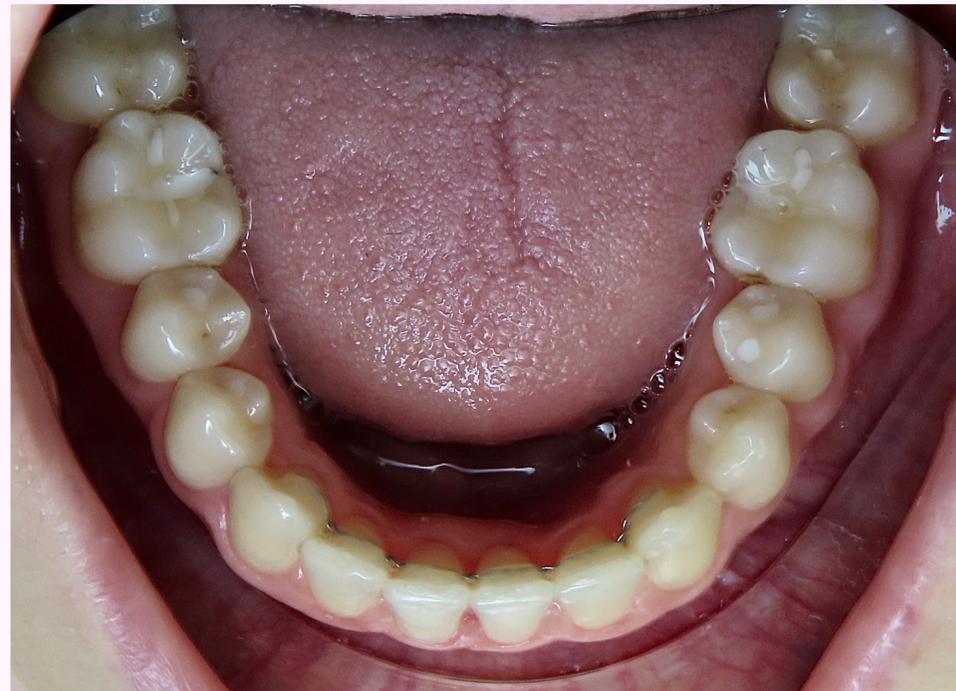

The post-treatment panoramic view depicted proper root paralleling at the end of the treatment, without any signs of adverse treatment effects
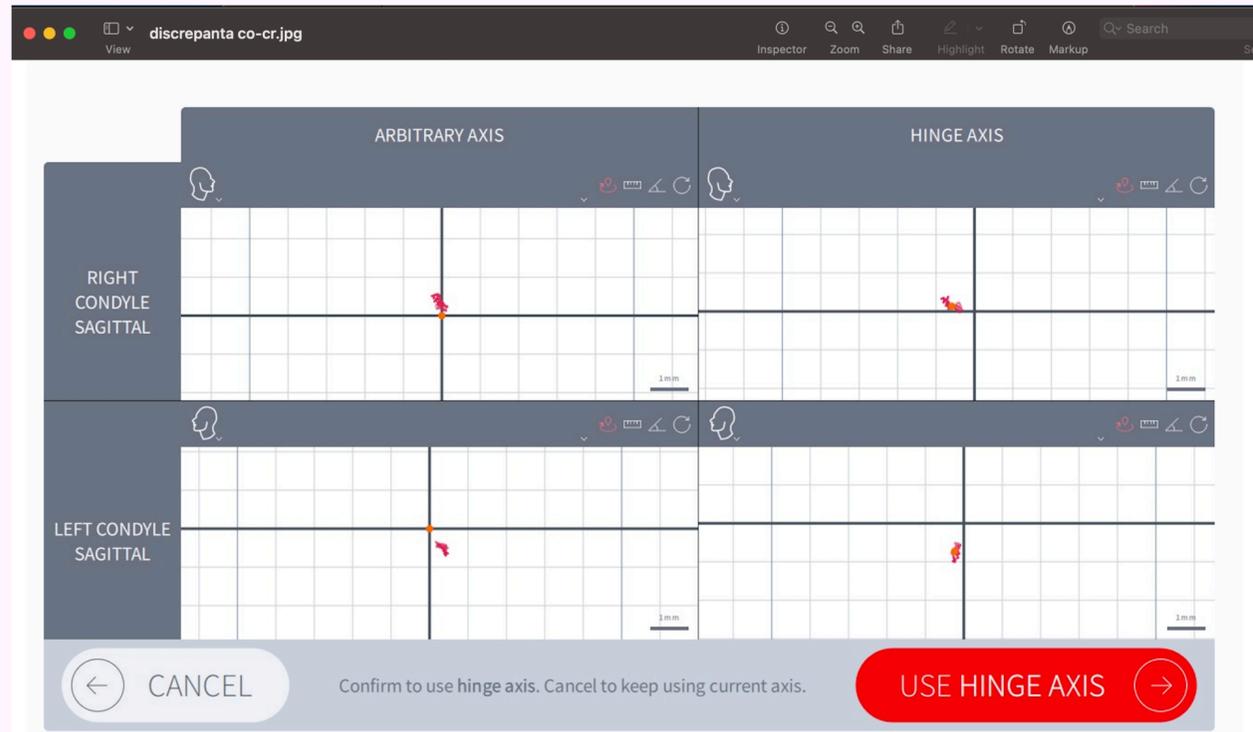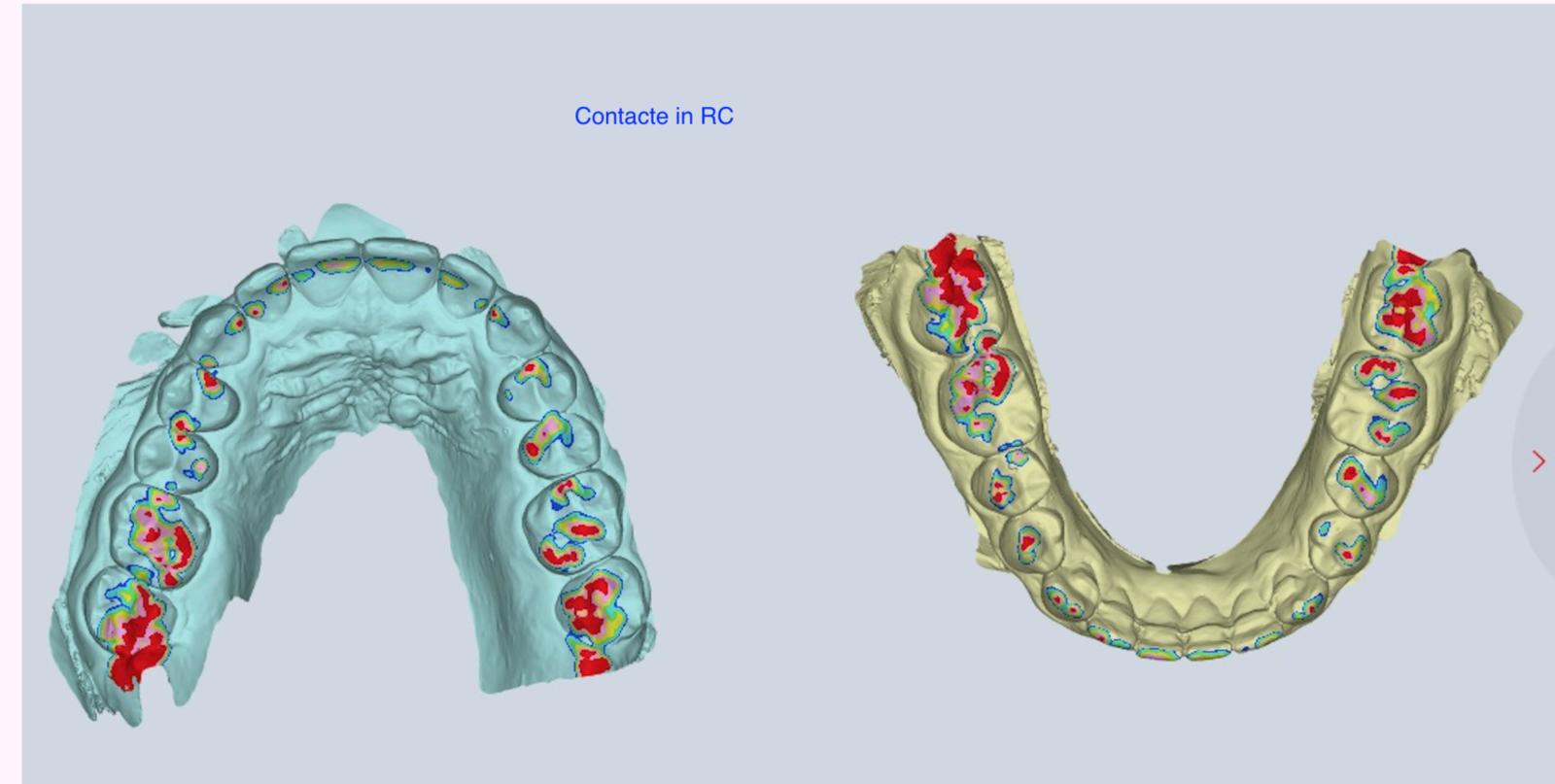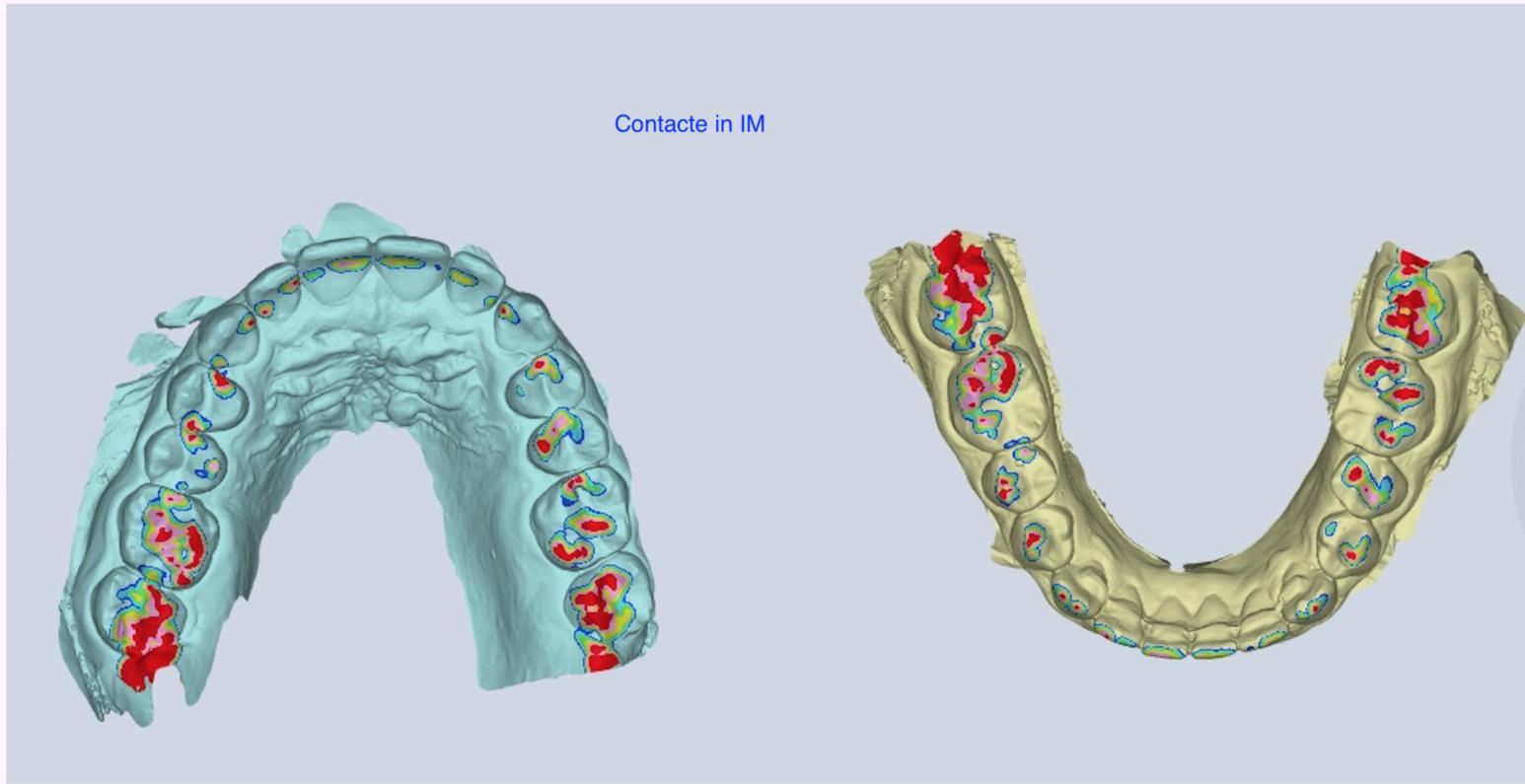
Cephalometric superimpositions

Follow-up 1 year post ortodontic treatment

The facial symmetry and tooth position were well maintained, with favorable occlusal interdigitation

Follow-up functional analysis

Contacte in IM

Contacte in RC

During the maintenance check-up, the patient showed good functional movements of the jaw, without any adverse signs or symptoms.

Open and closed mouth

Right laterotrusion

Left laterotrusion
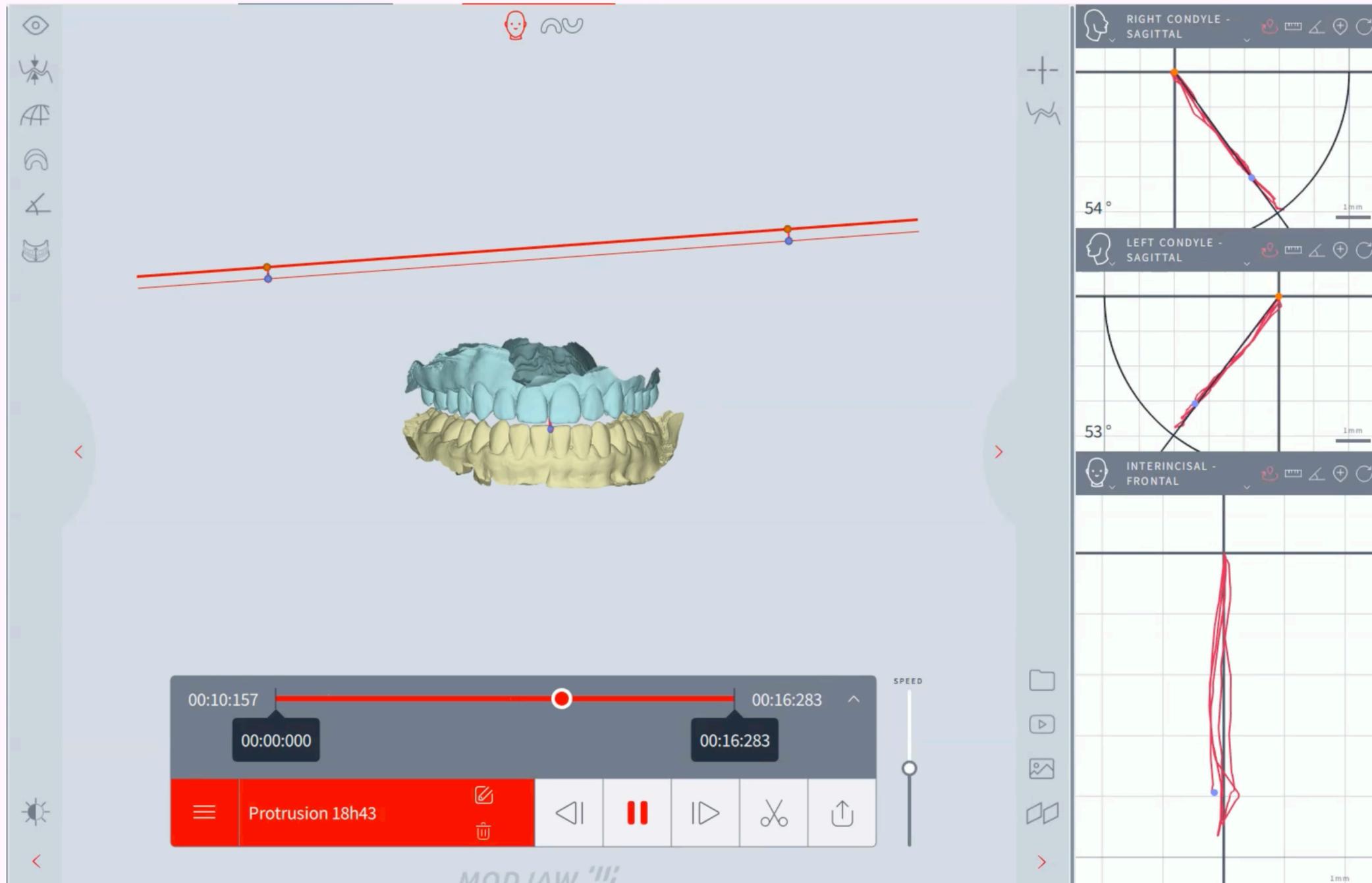
Protrusion

Conclusions

This presentation shows a noteworthy treatment modality using microimplants, without surgical intervention, in a patient with facial asymmetry. Although the chief complaint was the upper arch crowding, the thorough diagnosis protocol was able to identify also the mandibular lateral deviation that the pacient was at first, unaware of. Aesthetics and long ferm stabilty and patient satisafction were achieved.

With the continuous technological transformation in diagnostic tools and newer innovations in orthodontic appliances, treatment options have become more effective as well as patient-friendly, such as the use of temporary skeletal anchorage devices and digital planning.

Combining all these, aesthetics and long ferm stability and patient satisafction were achieved.