

# Orthodontic Diagnosis and Planning: Creating links between Facial Analysis and Cephalometric Analysis in vertical cases.

## PART 1



**KLEBER  
MEIRELES**  
orthodontic innovations

## DIAGNOSIS AND TREATMENT PLANNING VERTICAL PROBLEMS

Over the past 25 years, I have dedicated myself extensively to studying clinical diagnostic protocols in the field of orthodontics. This tireless pursuit has led me to develop comprehensive protocols that combine facial, smile, cephalometric, and occlusal analyses. The result of this dedicated effort is the ability to create precise treatment plans that significantly accelerate the overall treatment process.

In this eBook, I am excited to share a portion of these protocols with you. We will dive into cases with decreased Lower Anterior Facial Height, exploring how the interplay between facial and cephalometric analyses can play a crucial role in making informed decisions with confidence. By understanding the intricacies of these analyses and their relationship, orthodontists can approach treatment planning with greater efficiency and effectiveness.

Throughout this eBook, you will gain valuable insights into leveraging these protocols to achieve optimal outcomes for your patients. By embracing this approach, you will not only streamline the treatment timeline but also enhance patient satisfaction and overall treatment success.

So, let's embark on this enlightening journey together, unraveling the significance of integrating facial, smile, cephalometric, and occlusal analyses in orthodontic diagnosis and planning. Prepare to witness the power of evidence-based decision-making and how it empowers orthodontists to transform smiles and lives with confidence and precision.

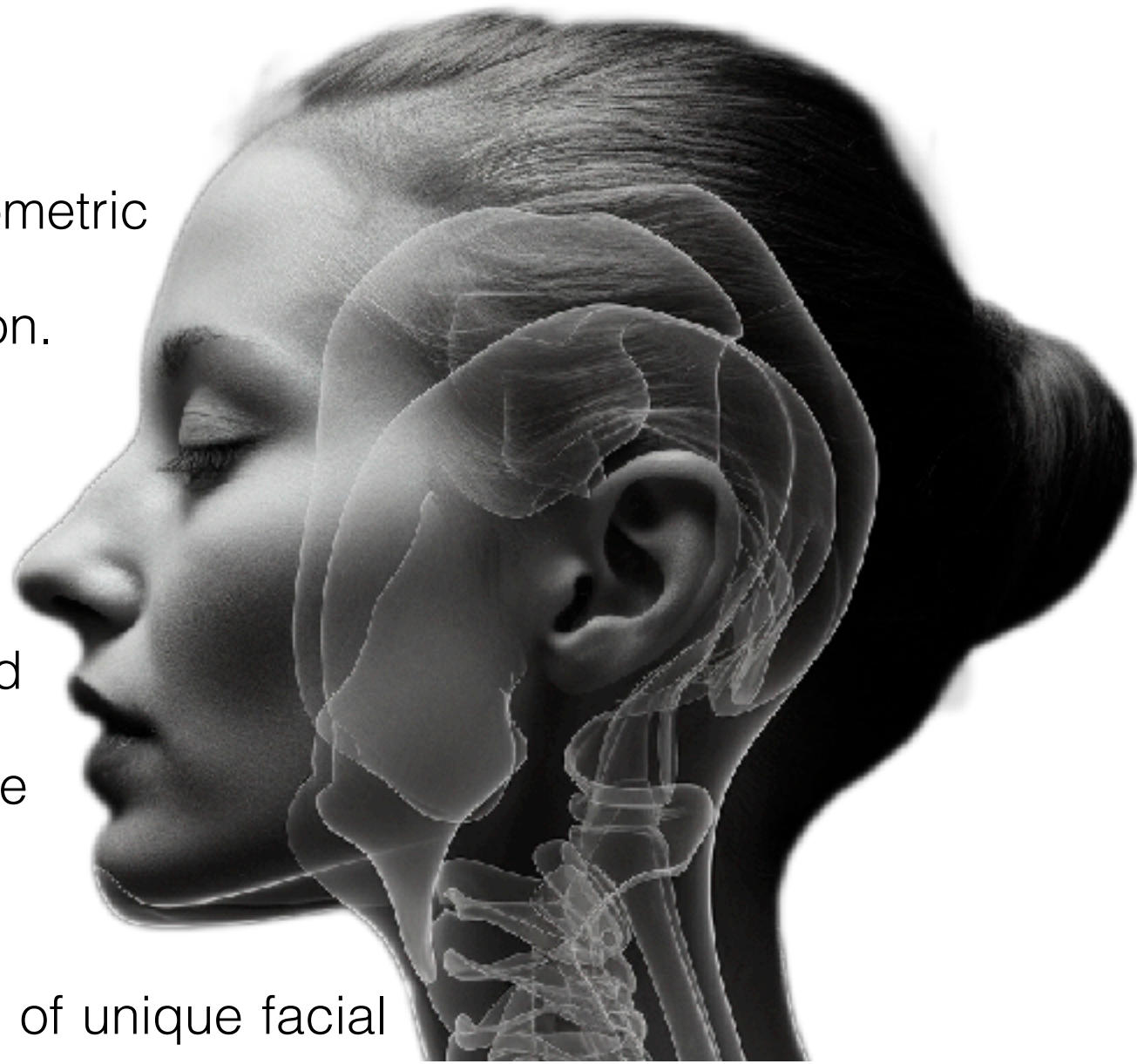


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## Introduction:

The relationship between facial and cephalometric analysis is fundamental in orthodontic evaluation. Combining aesthetic and structural information enables the orthodontist to create a personalized and precise treatment plan. This integrated approach helps anticipate problems, minimize complications, and achieve satisfactory results.



Each patient presents a complex combination of unique facial and dento-skeletal characteristics, requiring a meticulous analysis to determine an accurate diagnosis and the most appropriate treatment plan. In this context, knowledge of ideal cephalometric measurements plays a fundamental role.

Cephalometric measurements provide detailed information about the patient's skeletal, dental, and facial relationships, allowing orthodontists to assess the magnitude and nature of existing discrepancies. This information is essential for understanding the underlying causes of malocclusions, identifying growth patterns, and directing personalized treatment.

Throughout this ebook, we will explore the importance of knowing the ideal cephalometric measurements for each case during the crucial stage of orthodontic planning, with a focus on vertical malocclusions (in this ebook we'll focus on short face problems). We will see how these measurements correlate with facial analysis, enabling a comprehensive and integrated view of the patient, and how they are applied to establish realistic and achievable treatment goals.

We hope that, by the end of this reading, readers will be able to utilize this knowledge to optimize their clinical practices, improve the quality of treatments offered, and enhance patient satisfaction.

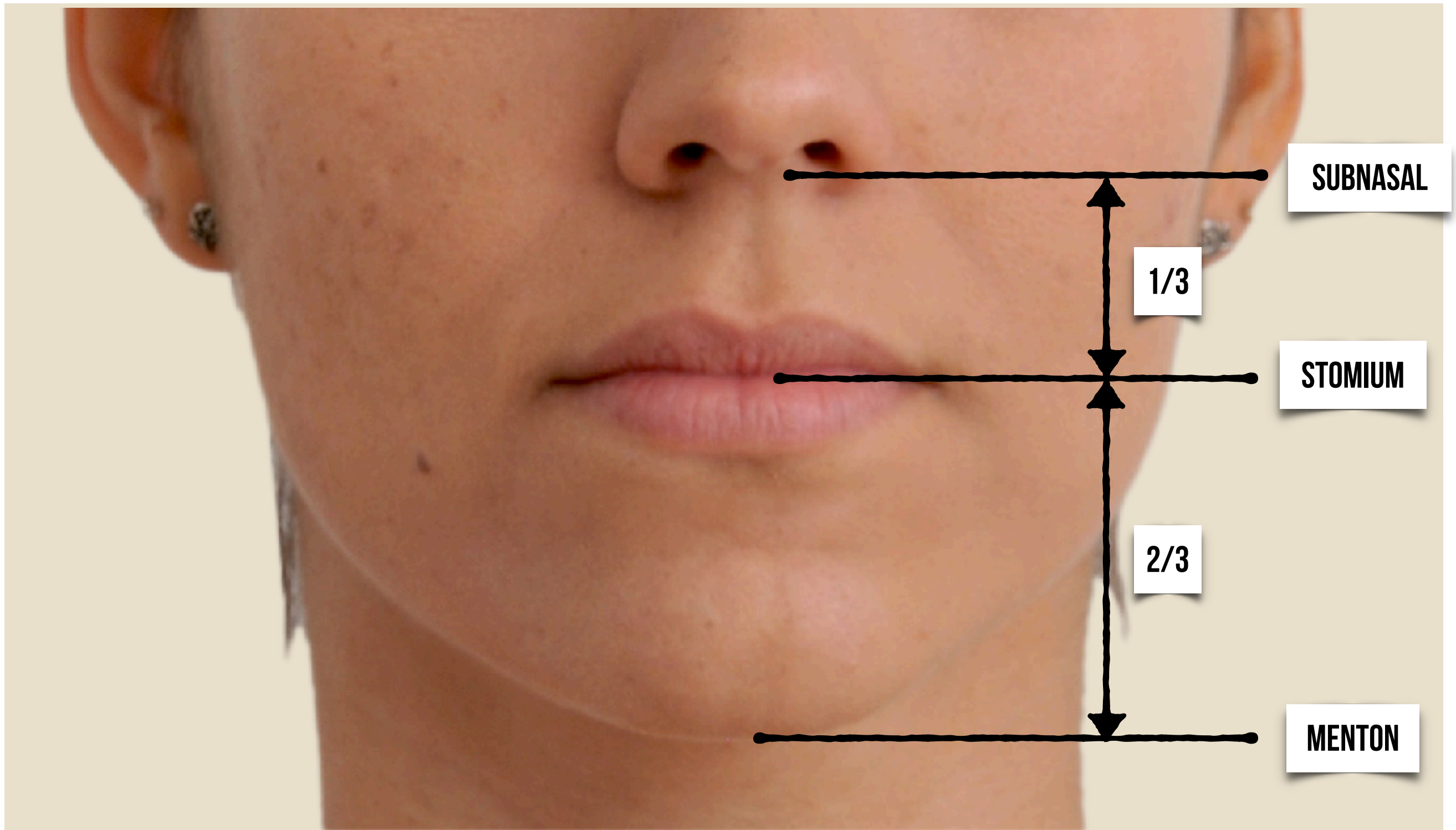
### Lower Third of the Face

The lower third of the face is an area of extreme importance in facial analysis, playing a significant role in therapeutic decision-making in orthodontics. A harmonious balance between the facial thirds is a highly valued characteristic in facial aesthetics, often sought after by patients seeking improvements in their appearance.

Facial harmony is achieved when the upper, middle, and lower thirds complement each other in a balanced way. However, the lower third, being associated with the lips, chin, and dental exposure, can significantly influence the perception of facial beauty and balance. Patients with discrepancies in this region may present specific aesthetic complaints, such as elongated chin, shortened facial height, absence of passive lip sealing, excessive or insufficient exposure of teeth at rest, during speech and smiling, among other issues.

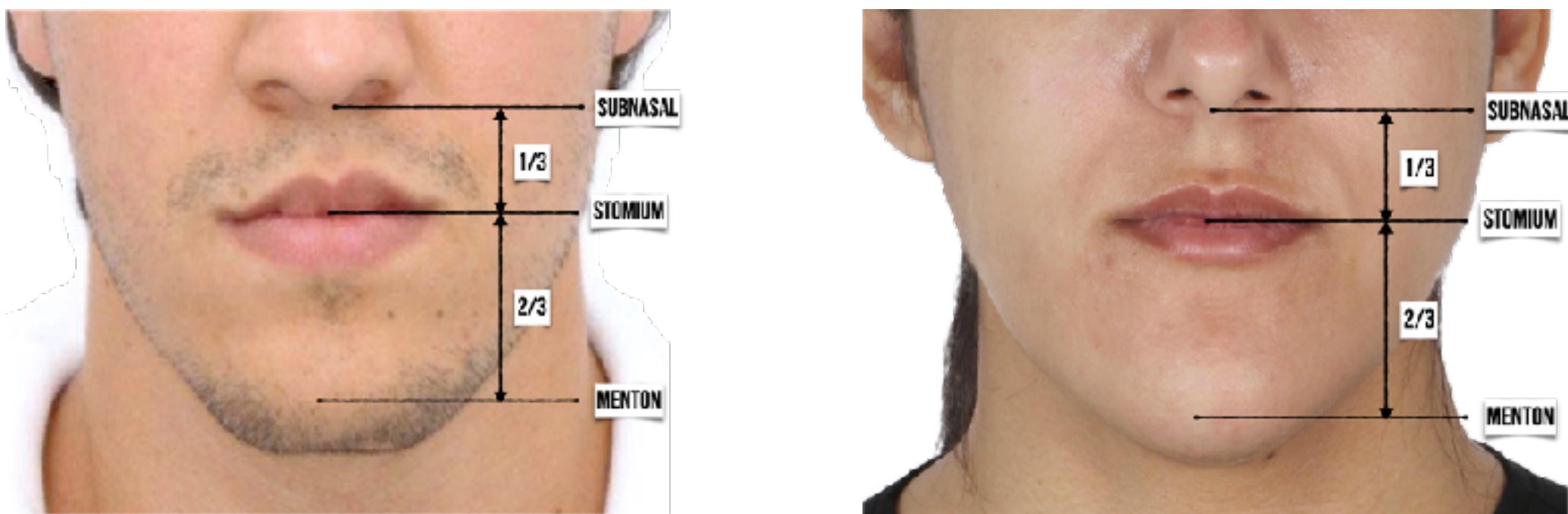
A detailed analysis of the lower third of the face is essential for orthodontists in identifying imbalances and anomalies. This segment is subdivided into three parts, with the first third being between the subnasal point and stomion, and the other two thirds from stomion to menton point (Figure 1).



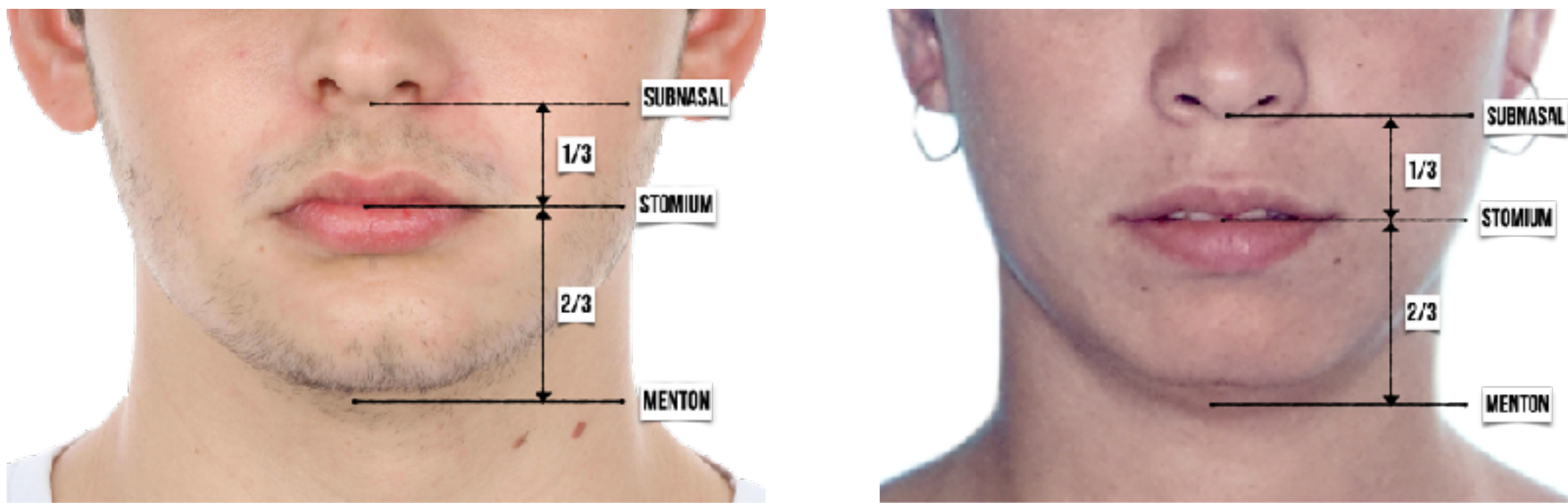


**Figure1** - Division of the thirds of the lower third of the face.

Discrepancies in the proportions of these thirds may indicate distinct needs for orthodontic treatment. For instance, an excessive lower third may be related to mandibular prognathism (figure 2), and require more invasive therapeutic approaches, such as surgical intervention. On the other hand, a reduced lower third may result from insufficient mandibular growth (mandibular retrognathism) and necessitate treatments that promote mandibular volume augmentation.



**Figure 2-** Excessive length of the two thirds of the lower third of the face associated with true prognathism.



**Figure 3** - Decreased length of the two thirds of the lower third in relation to the first third, in a case of true mandibular deficiency.



**Figure 4** - Evaluate the images above, presenting different relationships between the thirds of the lower third of the face. As an exercise, choose the one that you like the most.

The analysis of the lower third of the face can also be performed in lateral view, allowing for a detailed evaluation of facial structures from this perspective. Figure 5 exemplifies this analysis in profile.



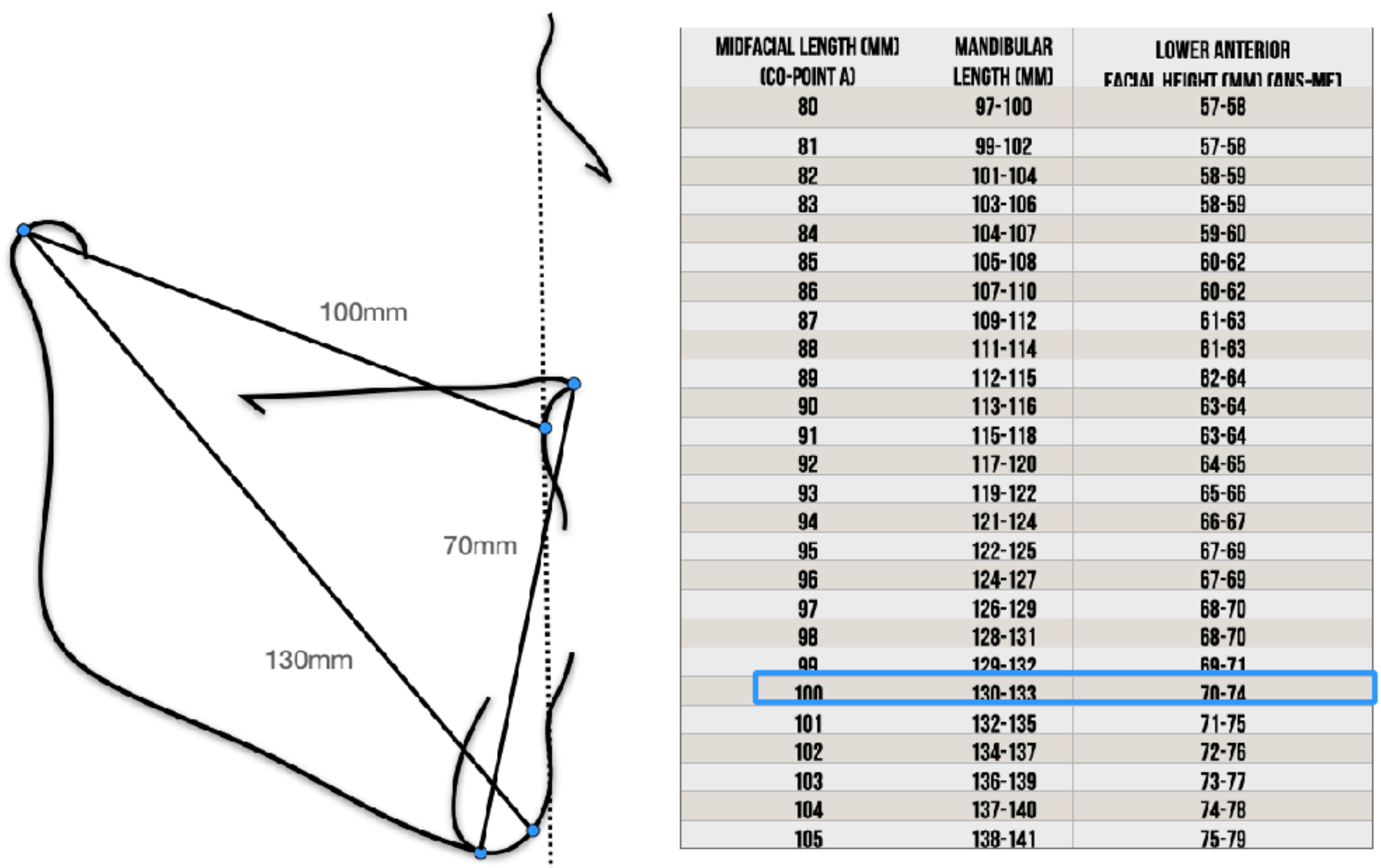
**Figure 5** - Analysis of the three thirds of the lower third in lateral view. In the second image, one can see the improvement in the relationship between the upper lip and the lower lip.

### **Link between cephalometric and facial analysis in the evaluation of the lower third of the face**

Cephalometric analysis provides crucial information about the position, size, and relationship between facial structures, being essential for the diagnosis and planning of orthodontic treatments. Understanding the intricate relationship between cephalometry and facial analysis is fundamental, as it allows the orthodontist to gain a comprehensive view of the patient, evaluating both aesthetic and structural characteristics. Combining facial analysis data with cephalometric measurements enables more accurate and personalized planning, resulting in more efficient treatments.

## DIAGNOSIS AND TREATMENT PLANNING VERTICAL PROBLEMS

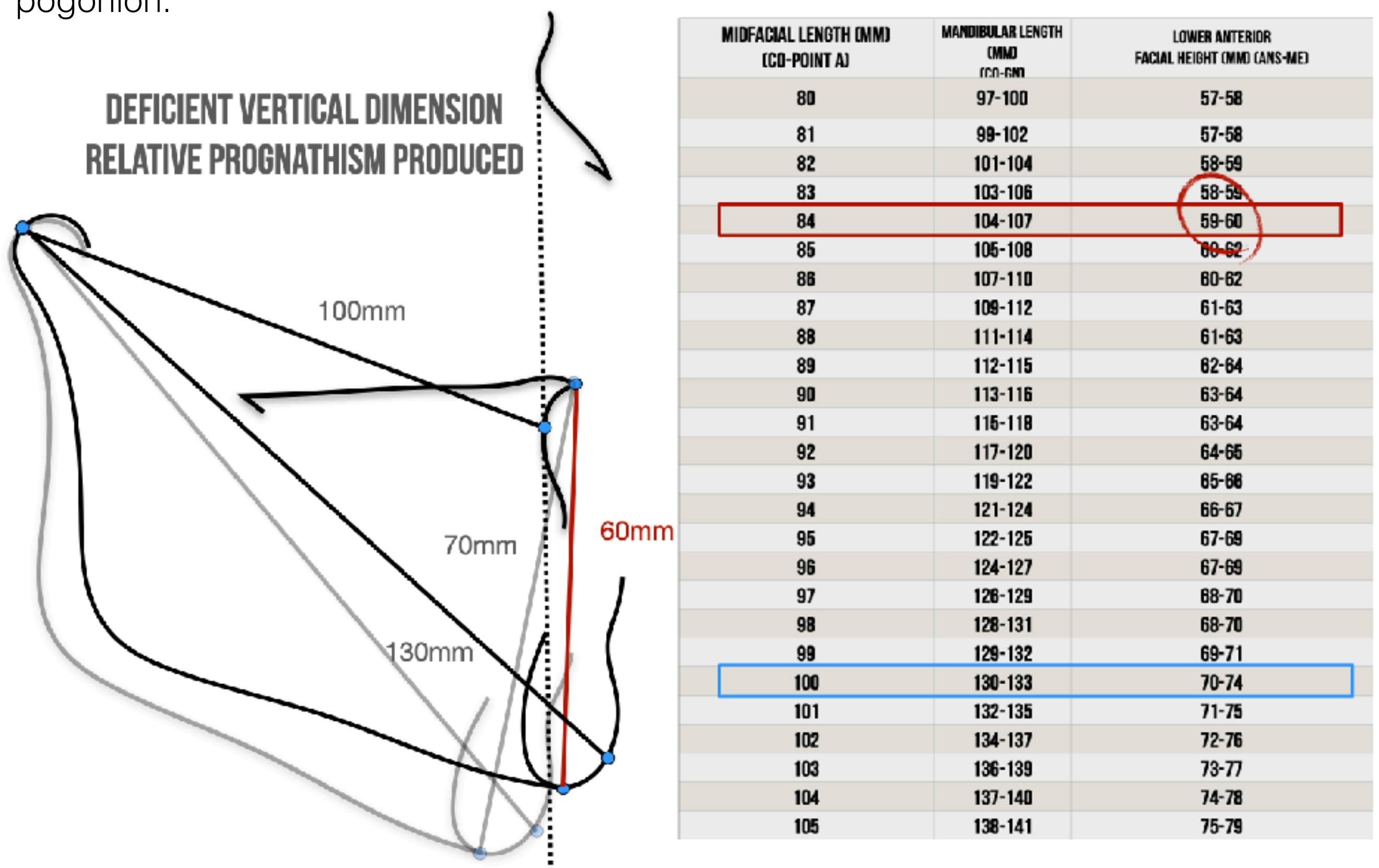
One of the analyses that I consider most important regarding the three-dimensional relationships involving the dimensions of the maxilla, mandible, and Lower Anterior Facial Height is the McNamara triangle. It is a subjective evaluation that does not require absolute measurements, but rather relative ones. The three structures are proportional to each other, implying that they should be assessed together. In the example from Figure 6 it can be observed that the measurements in millimeters from the cephalometric points Co (Condyle) to point A (maxillary size), from Co to point Gn (Gnathion) (mandibular size), and from ANS (anterior nasal spine) to Me (Menton) (LAFH) show compatibility (see the table on the side), resulting in a balanced profile compatible with a Class I relationship.



**Figure 6** - Ideal measurements of a given maxillo-mandibular-lower anterior facial height relationship.

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If the same millimetric measurements of the maxilla and mandible are maintained, and only the LAFH is modified, there will be a change in the sagittal positioning of the mandible in relation to the maxilla, prompted by the mandibular rotation centered on the mandibular fossa-condyle complex. In the example from Figure 7, a decreased LAFH leads to relative prognathism, not due to an increased size of the mandible itself, but rather due to the anterior displacement of the pogonion.

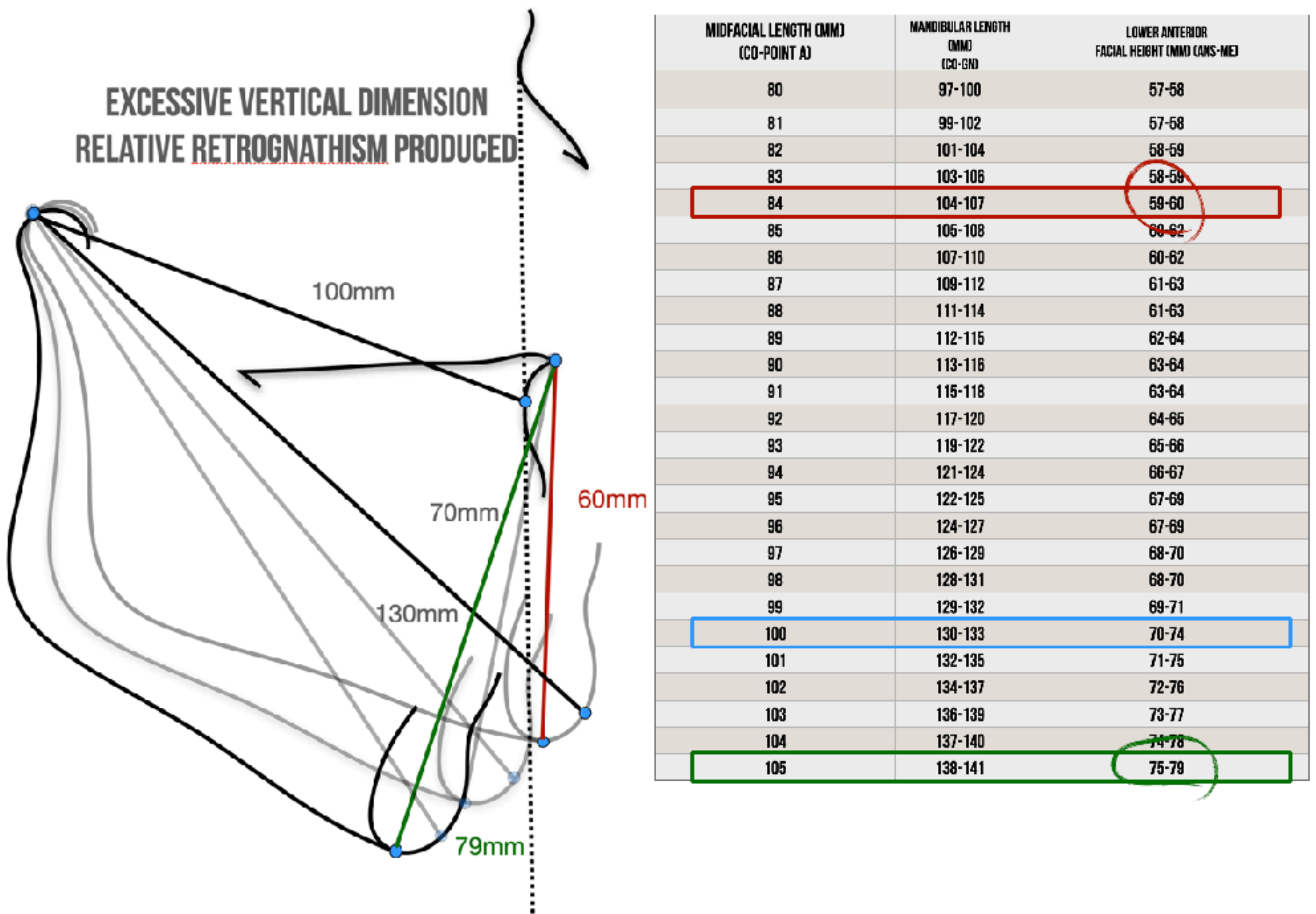


**Figure 7** - Decreased lower anterior facial height (LAFH), resulting in relative prognathism.

In the opposite sense, if the LAFH is increased, leading to a clockwise mandibular rotation, it will result in a relative mandibular deficiency. It is crucial to emphasize that this has a direct implication in making decisions about the treatment plan since, despite increased facial convexity in these cases,

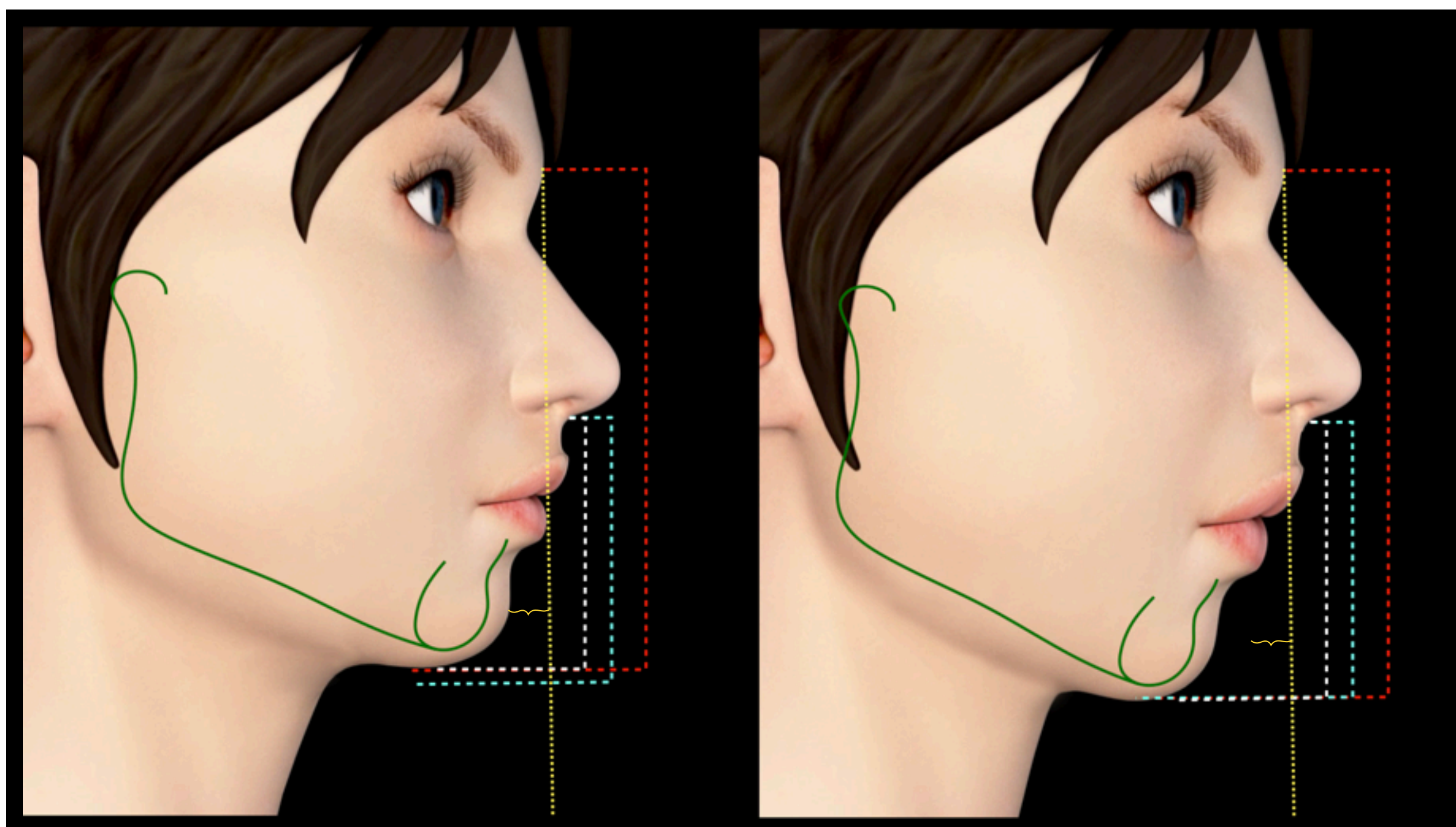
# DIAGNOSIS AND TREATMENT PLANNING VERTICAL PROBLEMS

the mandible should not be increased in size, as it would cause a vertical (and volumetric) discrepancy with an excess in the lower third. In these cases, maxillary impaction would be a desirable option to produce a counterclockwise mandibular rotation, resulting in an improvement in facial convexity.



**Figure 8** - Increased lower anterior facial height (LAFH), resulting in relative retrognathism.

Depending on certain skeletal and dental characteristics, many patients can be treated more quickly with appropriate management of LAFH (lower anterior facial height). For this, it is imperative to know how to interpret the patients' facial features. For example, an individual with decreased LAFH but increased facial convexity should not be treated with further LAFH increase, as it could worsen their facial convexity. On the other hand, if the decreased LAFH is accompanied by relative prognathism, this individual would benefit from orthodontic increase in the lower facial volume, achieved through clockwise rotation of the mandible. See these examples in the images below.



**Figure 9** -The increase of LAFH in cases of true mandibular deficiency can be detrimental to the face, as it increases facial convexity.

If the treatment planning involves increasing the LAFH of mandibular deficient patients, surgical planning may be the best option. Below, a case will be shown in which this surgical planning was carried out.

### **CASE 1**

Patient M.L., 24 years old, sought orthodontic treatment with the main complaint of not liking her retrognathic profile. Having some knowledge of orthodontic diagnosis, she could recognize her mandibular deficiency, which bothered her.

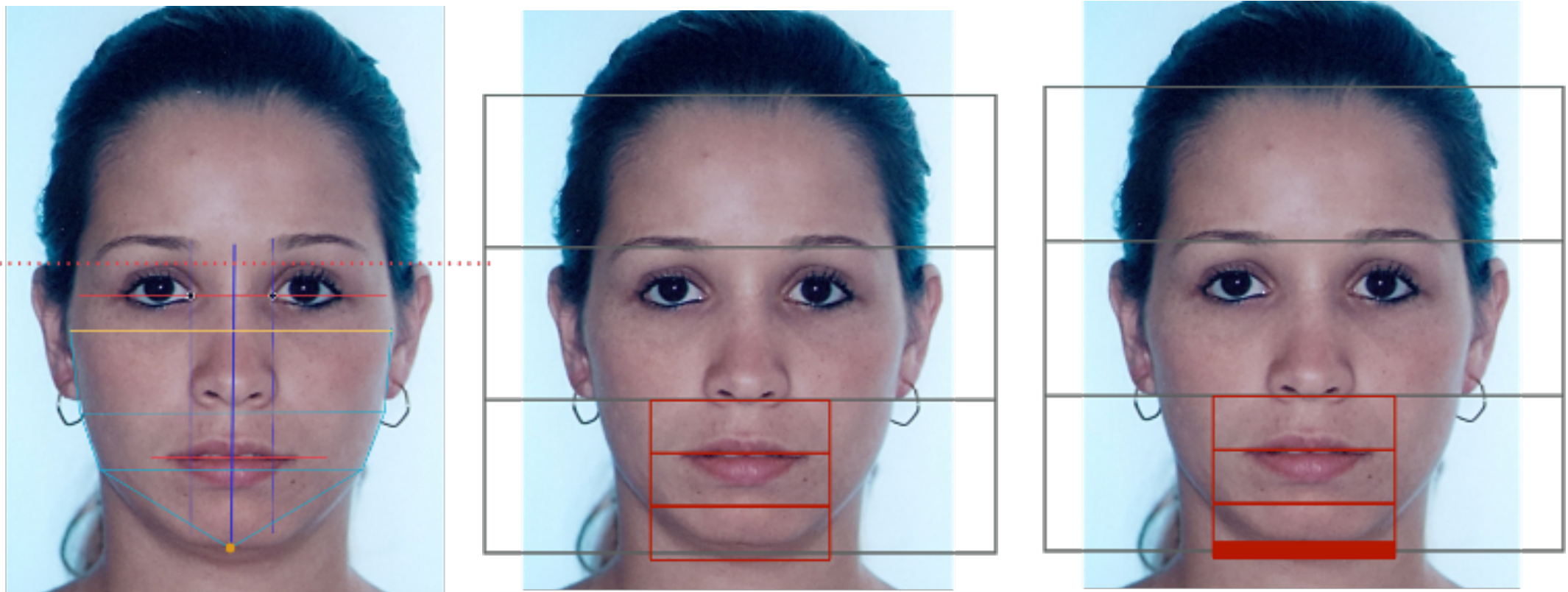
She had already undergone compensatory orthodontic treatment for a Class II malocclusion, which led to increased inclination of the lower incisors. However, the facial features of mandibular deficiency remained, prompting her to seek re-treatment.

There were no complaints, signs, or symptoms of temporomandibular disorder (TMD). Third molars were extracted after the completion of the previous orthodontic treatment.

### DIAGNOSIS

#### Frontal View

In the frontal evaluation, the patient presented a brachycephalic pattern, good symmetry, absence of passive lip sealing, and reduced LAFH (Lower Anterior Facial Height). Additionally, the two thirds of the lower third of the face also showed deficiency (Figure 10).



**Figure 10** - The frontal analysis showed good facial symmetry and a moderate reduction in the LAFH. The red bar in c indicates the amount of height lacking in the 2/3 of the lower third for achieving a good balance in this facial third.

#### Facial Analysis

#### Smile

In the smile evaluation, the patient had dental midlines coinciding with the facial midline, proper filling of the buccal corridors, symmetrical positioning of the upper canines, absence of gingival exposure in the social smile, and a harmonious smile arc. There was no "cant" (unevenness) in the occlusal plane in the frontal view (Figure 11).

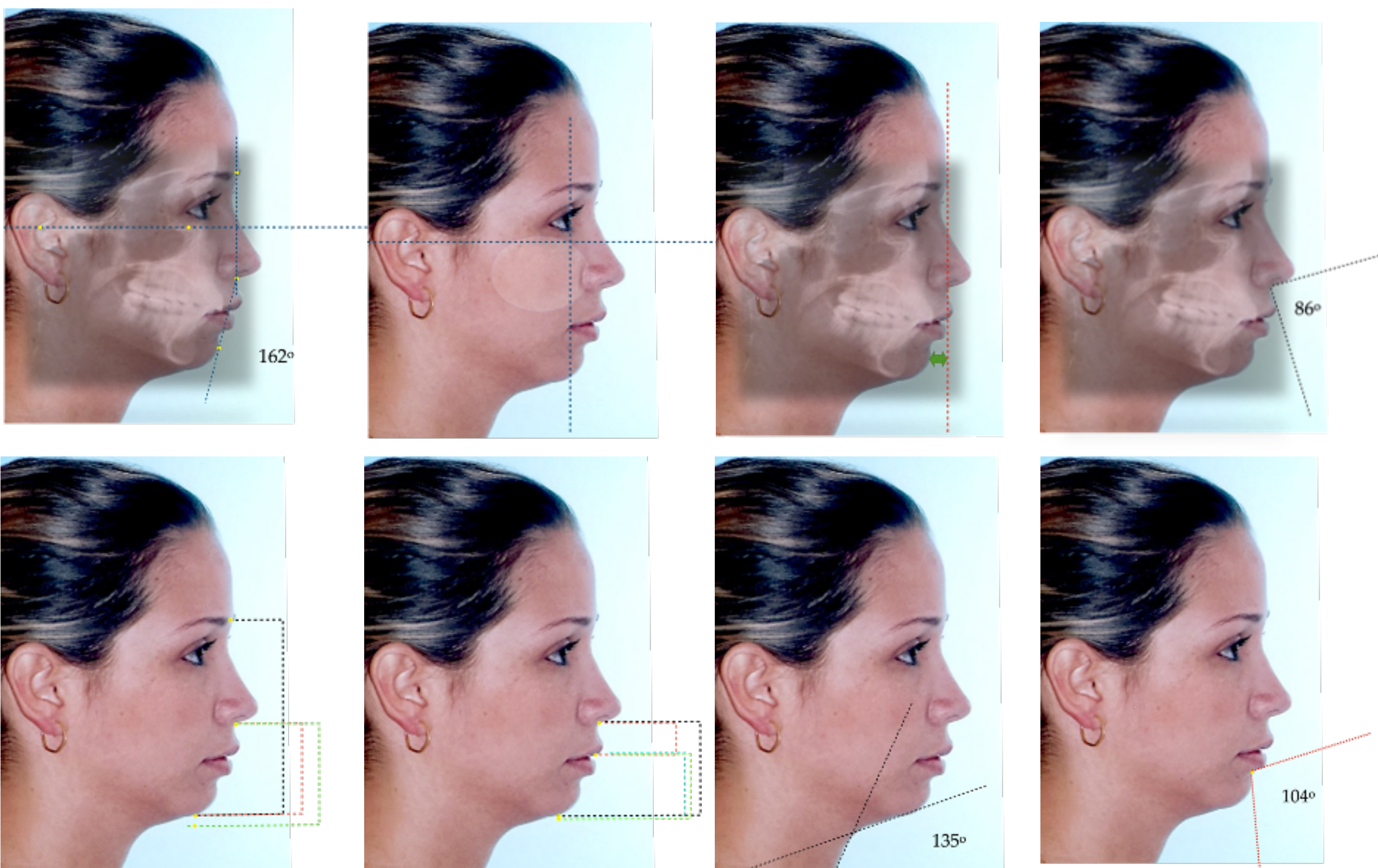


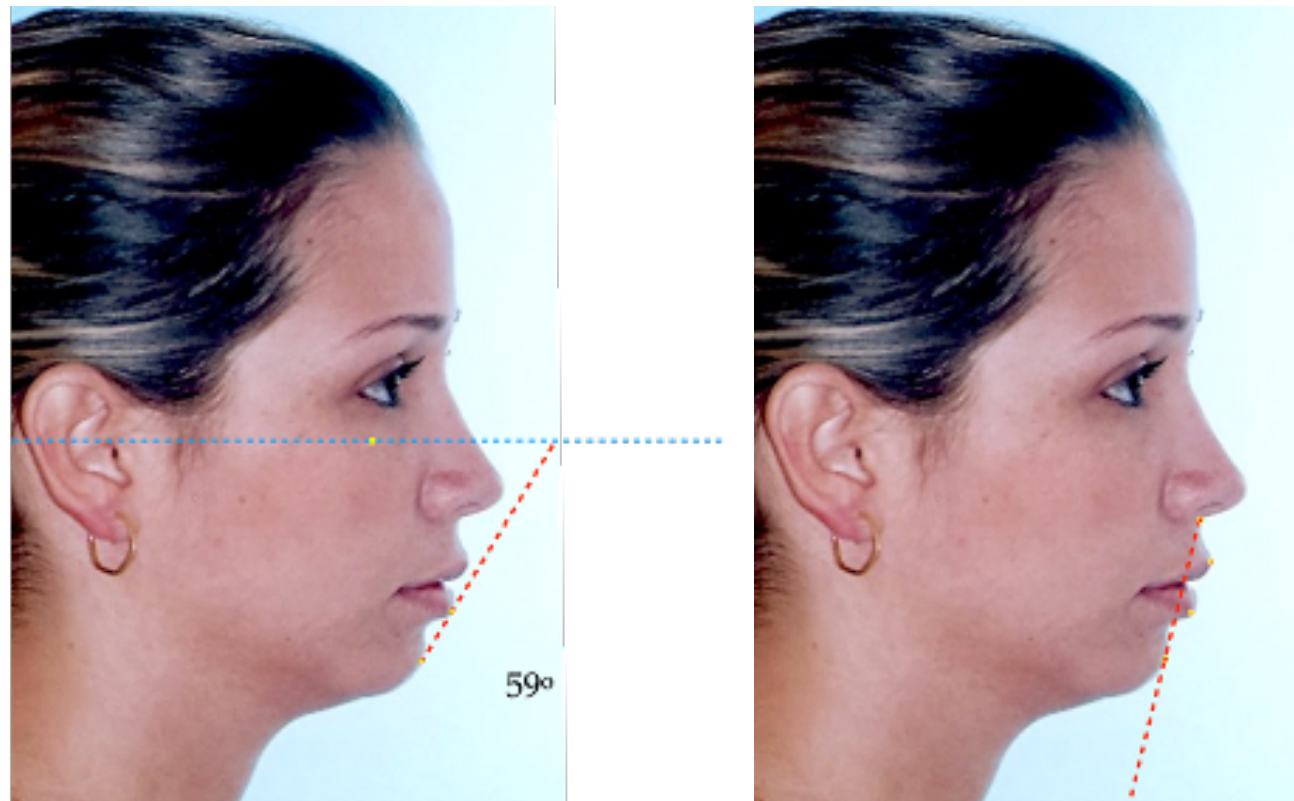
**Figure 11** - Macro-analysis of the smile is essential in making therapeutic decisions.

## Facial Analysis

### Profile

The profile analysis revealed an increased facial convexity, good maxillary positioning, and a deficient mandible in the sagittal direction, as evidenced, among other things, by the short chin-neck line and obtuse cervical angle. There was also a vertical deficiency in the lower third of the face, as previously observed in the frontal analysis. The pogonion was retracted relative to the lower lip (Figure 12).





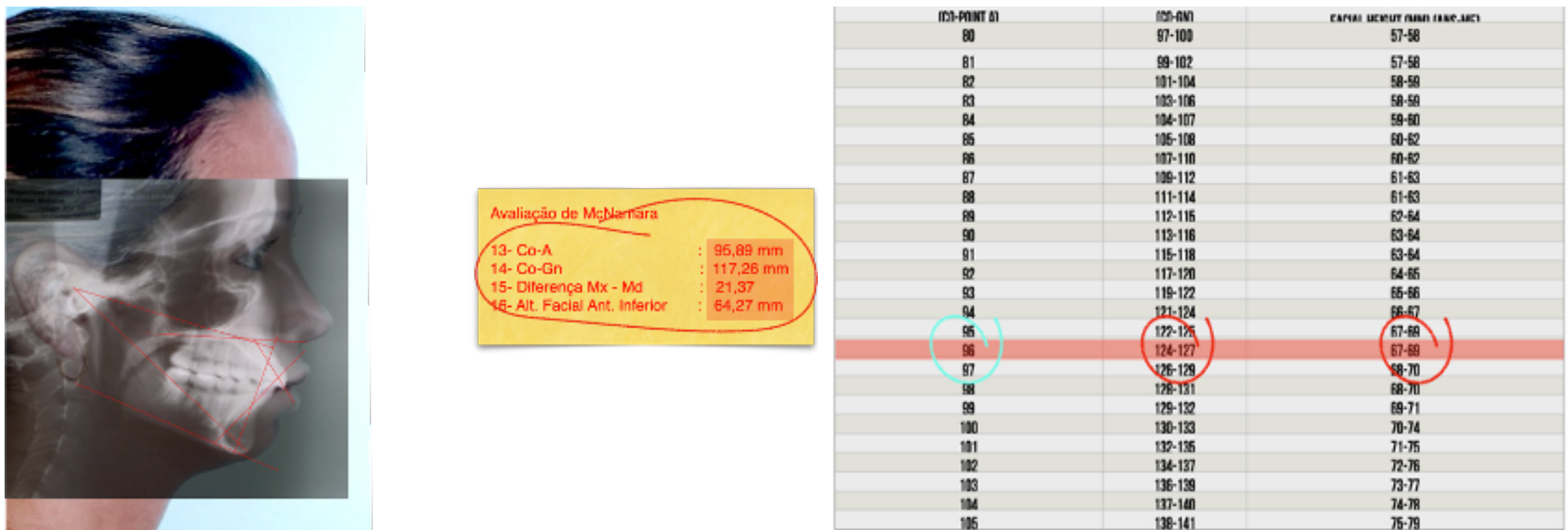
**Figure 12** - The profile analysis revealed that the mandibular deficiency and pogonion projection were responsible for the increased facial convexity.

### Cephalometric Analysis

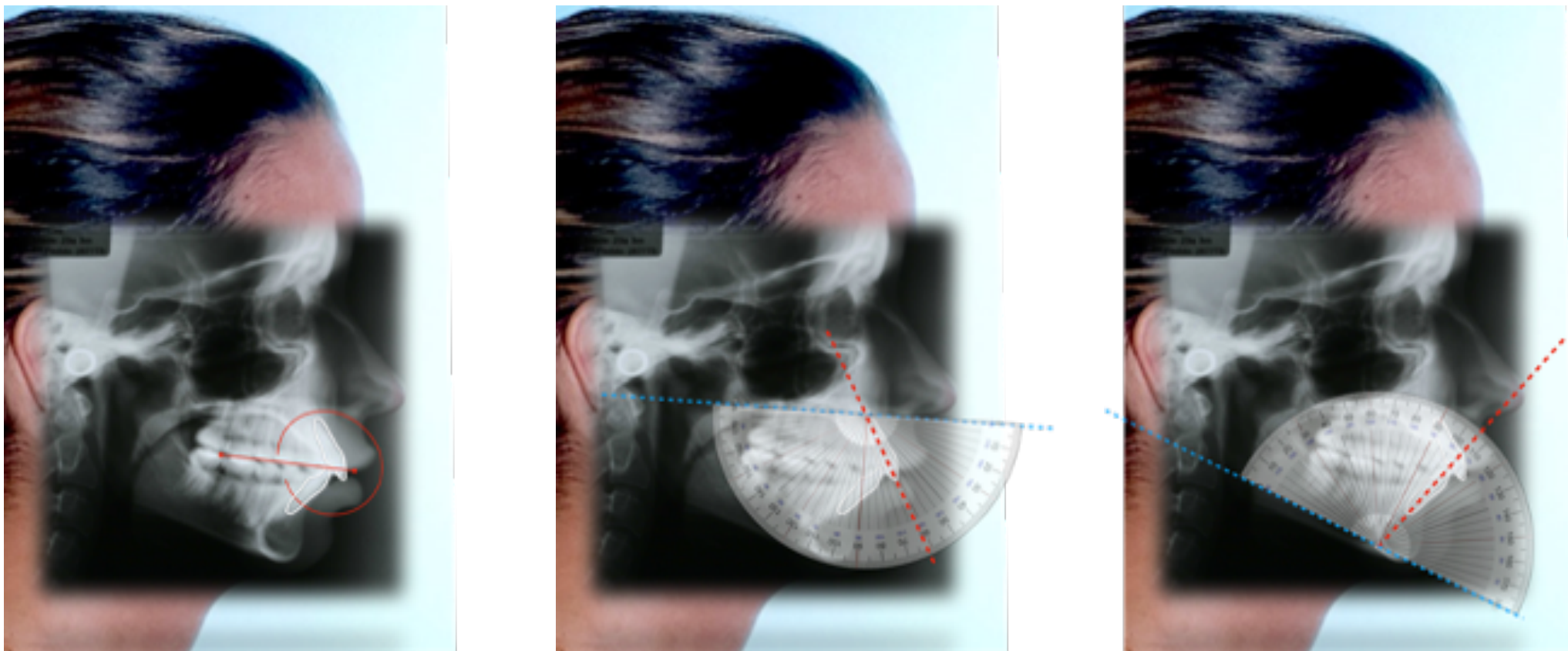
Assuming that the maxilla presented good sagittal positioning, considering primarily its volume, malar projection (growth equivalent), and nasolabial angle, as well as a good vertical relationship, as seen in the smile analysis, we used McNamara's triangle to get an approximate idea of the magnitude of the error, in millimeters. The idea is to use the Co-A measurement (maxillary length) as a reference to look up in the equivalence table what the ideal size of the mandible (Co-Gn) and LAFH (ANS-Me) should be. According to the table, there would be a deficiency of approximately 7 mm in mandibular length, in addition to a 3 mm LAFH deficiency, to achieve a triangle balance (Figure 13).

Another crucial point in the cephalometric analysis, related to planning, is the angular and vertical relationship of the upper and lower incisors. There was an adequate vertical positioning of the incisors concerning the superior stomion, but an excessive inclination of both the upper and lower incisors, as evidenced by measurements 1.PP and IMPA. It is important to mention that I have reservations about adopting absolute numerical averages. It is preferable to evaluate the anatomical positioning of the incisors in relation to their bases, but these numbers will serve as a reference for now.

# DIAGNOSIS AND TREATMENT PLANNING VERTICAL PROBLEMS



**Figure 13** - Linear measurements of maxillary length, mandibular length, and LAFH, along with the compatibility table for the triangle.



**Figure 14** - The upper incisors showed a good vertical positioning in relation to the upper lip. However, the measurements of the upper (1.PP - 118°) and lower incisor inclinations (IMPA - 105°) revealed an excessive inclination of these teeth.

## Occlusal Analysis

There was a Class I sagittal relationship, with coincident midlines in the face and between them, as well as good overbite and overjet. A slight dental constriction, evidenced by the occlusal analysis, was noticeable.

There was a 2X2 lingual retainer in the lower arch. The third molars had been extracted at the end of the previous orthodontic treatment.



**Figure 15** - Occlusal Analysis. Good dental compensations were achieved in the previous orthodontic treatment.

### Planning

The proposed treatment, considering the patient's complaint and the evaluation of the problem list, involved orthodontic preparation for orthognathic surgery with mandibular advancement, along with vertical and sagittal pogonion displacement. No maxillary surgery was performed in this case.



**Figure 16** - Images from the phase of pre-surgical decompensation before orthognathic surgery.



**Figure 17** - Final photographs, already without braces, after surgery and orthodontic finishing.

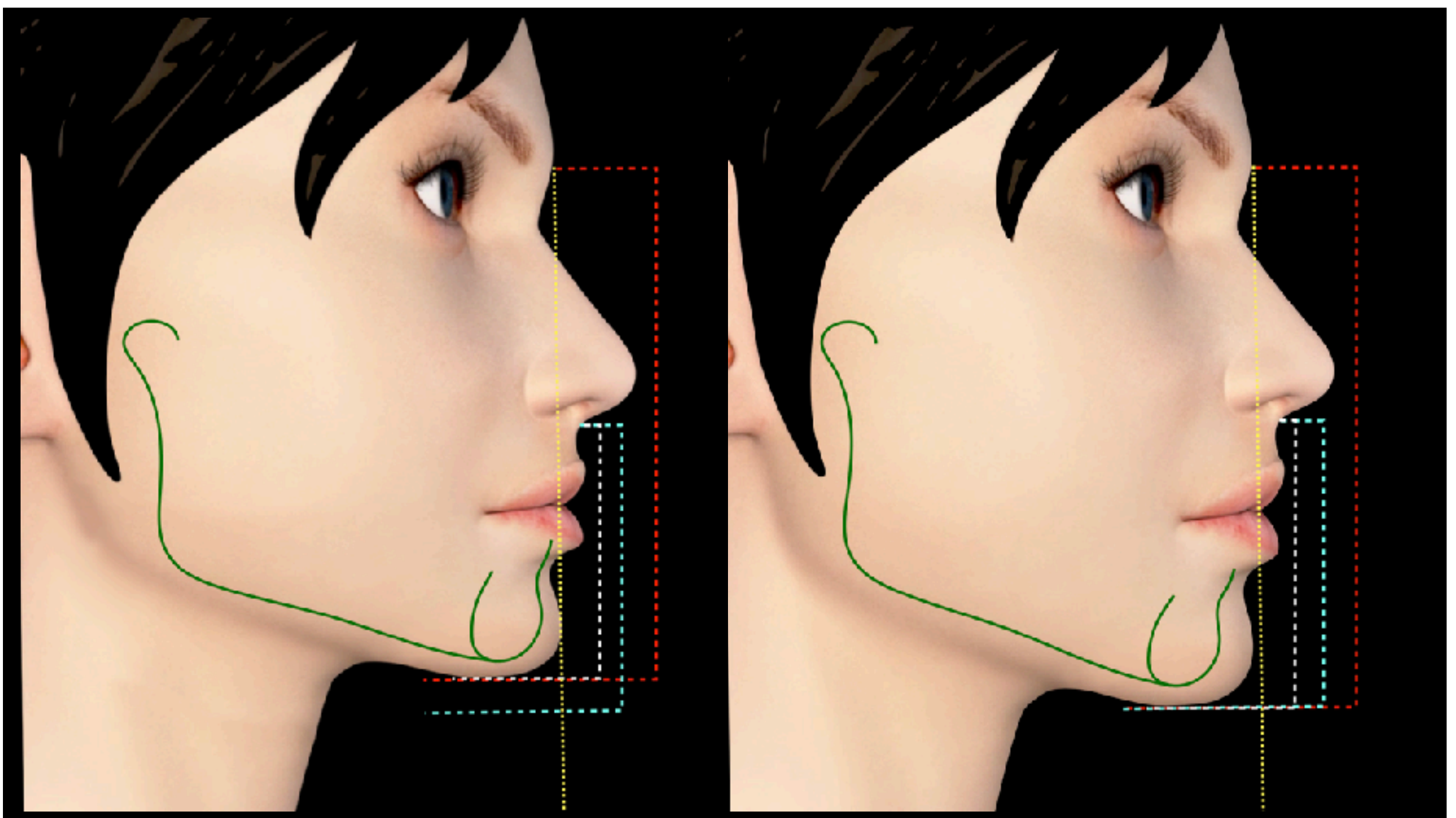
## Results

It is possible to observe an improvement in facial balance when comparing before and after the surgery (Figure 14). It is important to highlight that the planning, based on a careful analysis of facial issues, identifying and measuring skeletal discrepancies, allowed the interventions to be carried out in the appropriate locations and magnitudes for the desired change.



**Figure 18** - Comparison between pre and post-treatment, highlighting the changes in the necessary parameters and the maintenance of what was balanced before the surgery. Notice the improvement in the harmony of the lower third of the face, both in frontal and profile views.

Some patients who have Class II malocclusion can benefit from an increase in LAFH, but for this, facial convexity should be close to ideal, as seen in cases of Class II Division 2. In such situations, it is common for these individuals to have a deficiency of upper incisor exposure during speech, rest, and smiling. In these cases, increasing facial height improves the balance of facial thirds and also leads to an improvement in the exposure of the upper anterior teeth, resulting in a positive effect on facial youthfulness.



**Figure 19** - The decreased LAFH associated with counterclockwise mandibular rotation conceals the mandibular deficiency in profile. Orthodontic treatment can be focused on increasing LAFH with positive effects on both facial volumes and the smile.

The next case exemplifies a situation in which the goal was to increase the Lower Anterior Facial Height (LAFH) using a protocol of upper teeth extrusion from the beginning of the treatment.

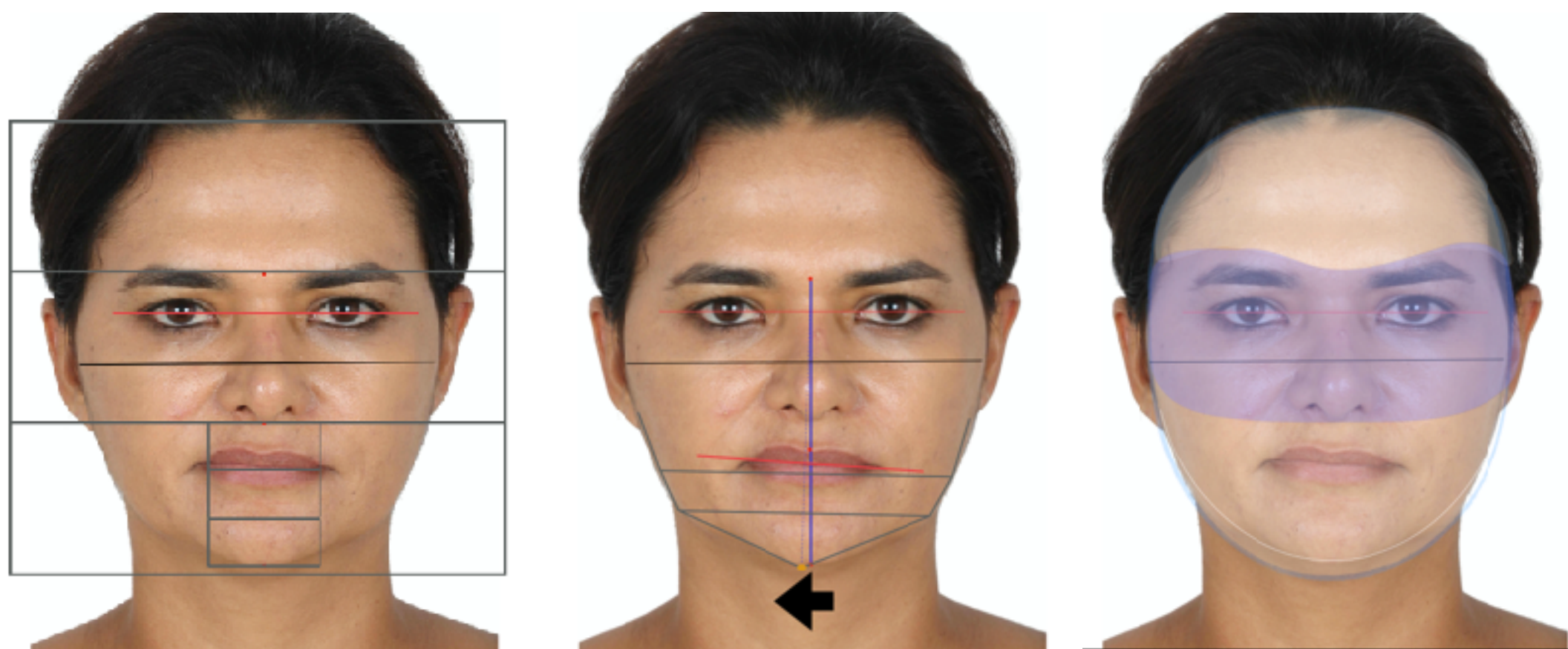
## CASE 2

Patient A.D.A, 37 years old, sought orthodontic treatment with the complaint of a "lack of expression in the smile," in addition to a request from the implantologist for space opening in the lower arch, in the region of the first molars, for implant placement. There were no complaints, signs, or symptoms of temporomandibular disorder (TMD).

### DIAGNOSIS

#### Frontal View

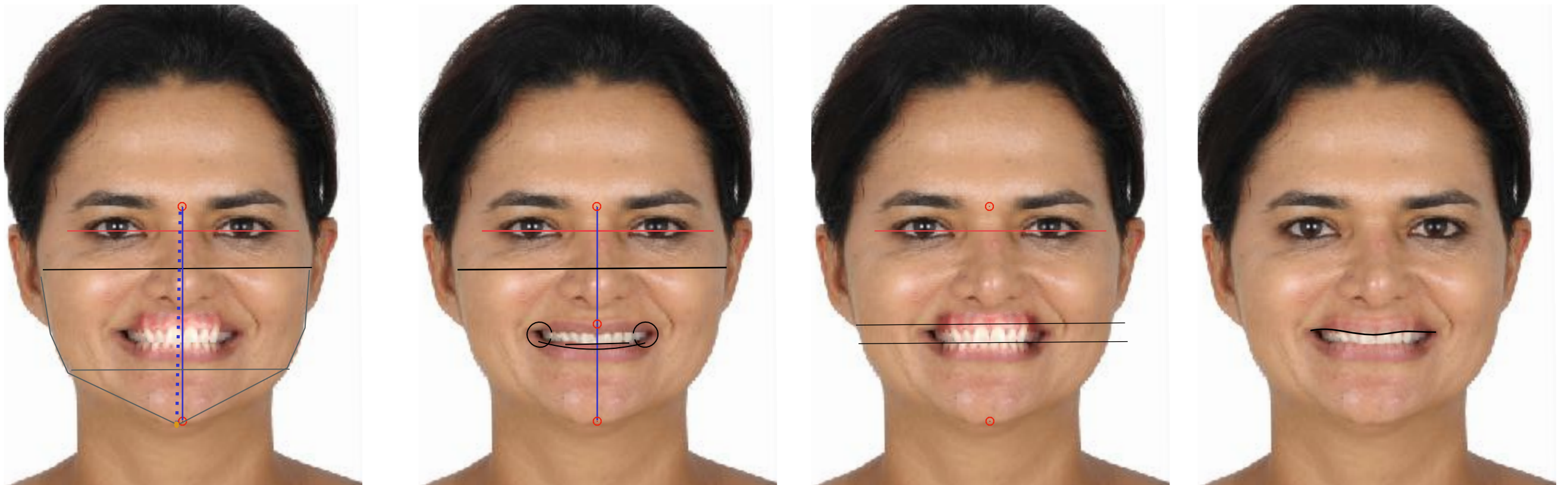
In the frontal evaluation, the patient presented a brachycephalic pattern, mild asymmetry, passive lip sealing, and decreased LAFH.



**Figure 20** - The frontal analysis showed mild facial asymmetry with the deviation of the chin to her right and a moderate reduction in the LAFH. The volume of the lower third of the face was also moderately decreased.

## Smile

In the smile analysis, the following issues were detected: deviation of the lower midline, posterior teeth with excessively negative inclinations, wide buccal corridors, and poor exposure of the upper anterior teeth.. There was no "cant" in the occlusal plane in the frontal view (Figure 21).



**Figure 21** - Macro-analysis of the smile.

## Profile

The patient had an almost concave profile due to counterclockwise mandibular rotation, a good maxillary sagittal position, decreased LAFH, a short upper lip and poor upper and lower lip projection.



# DIAGNOSIS AND TREATMENT PLANNING VERTICAL PROBLEMS



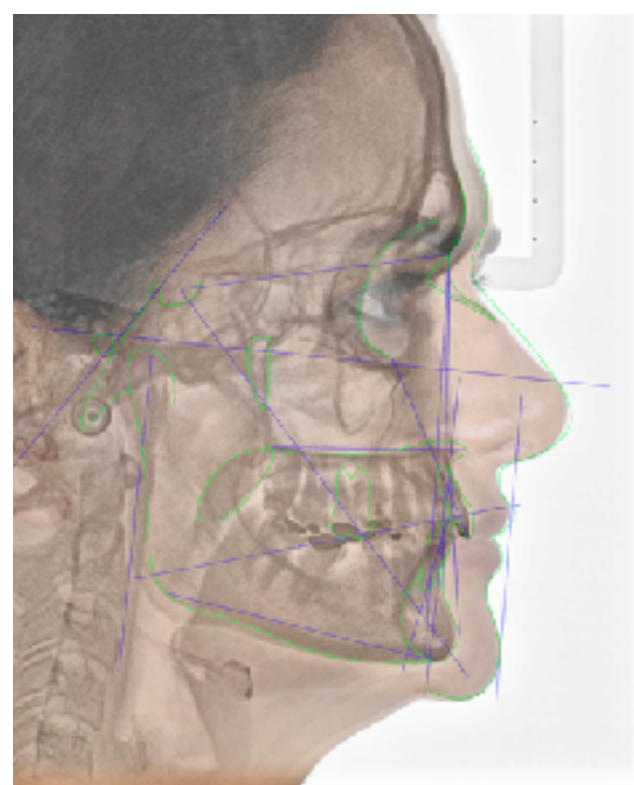
**Figure 22** - Profile analysis. Classical Class II Division 2 profile, with almost no apparent mandibular deficiency.

## Cephalometric Analysis

The negative facial convexity is an interesting finding in this facial pattern. Since the LAFH was moderately decreased, increasing it could benefit the patient in two ways: firstly, by correcting the concavity and secondly elongating the profile.

The extreme hypodivergent pattern is evident in the (Go-Gn).(S-N) measurement ( $19,6^\circ$ ). Considering the McNamara triangle, taking into account that the maxilla has an adequate size (as observed in the facial analysis), it can be noted that the mandible has a size compatible with the desirable, but the LAFH is moderately reduced. Regarding the vertical positioning of the upper incisors in relation to the upper lip, a vertical deficiency is noticeable.

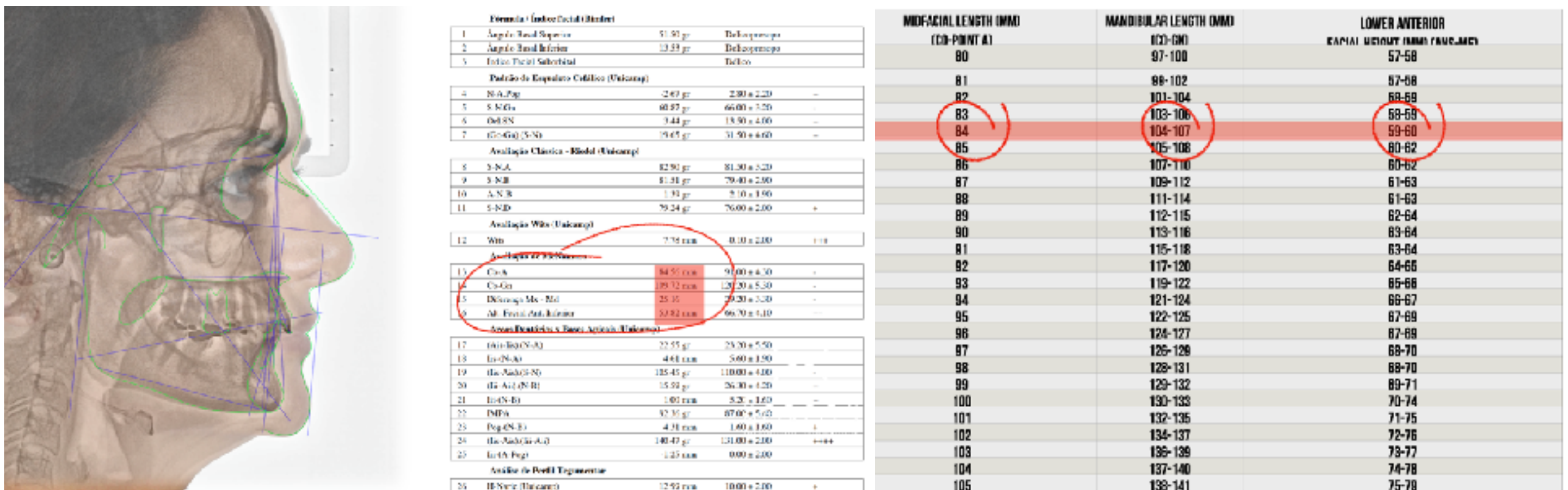
The upper and lower incisors were retroclined.



Pontreux / Índice Facial (Pontreux)			
1	Apoda: Esmal Superior	51,59 mm	Dolicocefalo
2	Apoda: Esmal Inferior	42,59 mm	Dolicocefalo
3	Índice Facial (Schwarz)	122,00	Dolico
Índice de Espessura Labial (Unicamp)			
4	S-A-Pog	-2,63 mm	-2,80 ± 7,30
5	S-S-Ce	62,02 mm	60,00 ± 4,30
6	Or-S24	-4,44 mm	-5,50 ± 4,00
7	Go-Gn(S-N)	19,66 mm	31,50 ± 4,50
Análise de Cinesia - Riolal (Unicamp)			
8	S-S-A	82,59 mm	81,50 ± 5,20
9	S-S-B	83,5 mm	79,40 ± 2,80
10	A-S-B	1,59 mm	-2,10 ± 1,80
11	S-S-D	79,21 mm	76,00 ± 2,00
Análise de Wits (Unicamp)			
12	Wits	-7,78 mm	-0,10 ± 2,80
Análise de McNamara			
13	Co-A	66,56 mm	91,00 ± 4,50
14	Co-Ce	107,72 mm	120,20 ± 5,50
15	Dolicho-Me - Me	35,16 mm	30,30 ± 4,50
16	Me-Facial A + Inferior	53,82 mm	66,70 ± 4,10
Áreas Dentárias e Base Apical (Unicamp)			
17	Or-In (S-A)	22,53 mm	23,20 ± 5,50
18	In-Or (A)	0,6 mm	2,60 ± 1,80
19	In-Or (S-N)	105,43 mm	110,00 ± 4,00
20	In-Or (S-B)	15,59 mm	26,30 ± 4,20
21	In-Or (B)	1,00 mm	-2,20 ± 1,80
22	IMPA	92,56 mm	87,00 ± 5,00
23	Pog-Or (B)	4,5 mm	1,60 ± 1,80
24	Or-Or (L + R)	145,47 mm	131,00 ± 2,00
25	In-A-Pog	-1,25 mm	0,00 ± 2,00
Análise de Perfil Logocéfalo			
26	U-S-N (Unicamp)	12,97 mm	10,00 ± 2,00

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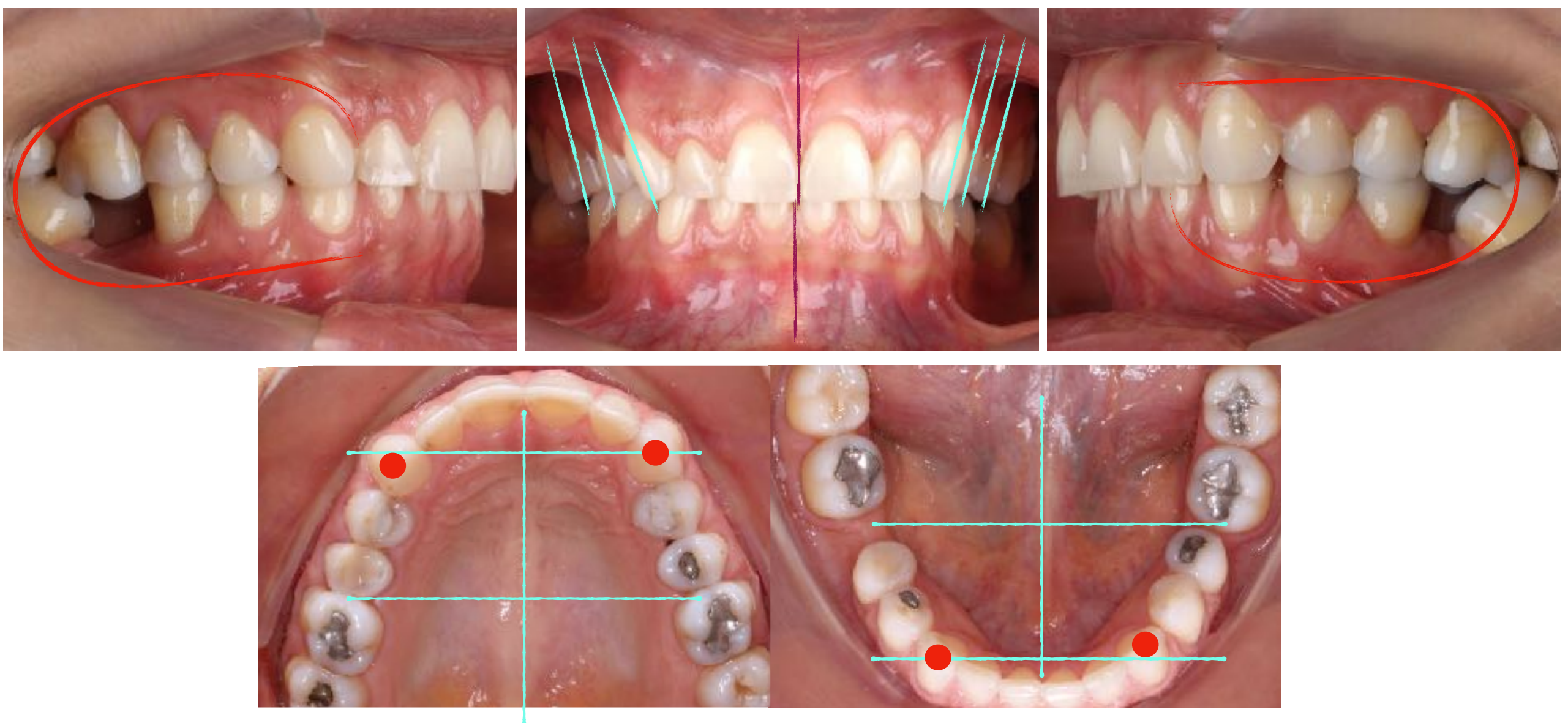
**Figure 23** - The facial pattern measurements indicate a counterclockwise mandibular rotation associated with vertical maxillary deficiency.



**Figure 24** - Linear measurements of maxillary length, mandibular length, and LAFH, along with the compatibility table for the triangle.

## Occlusal Analysis

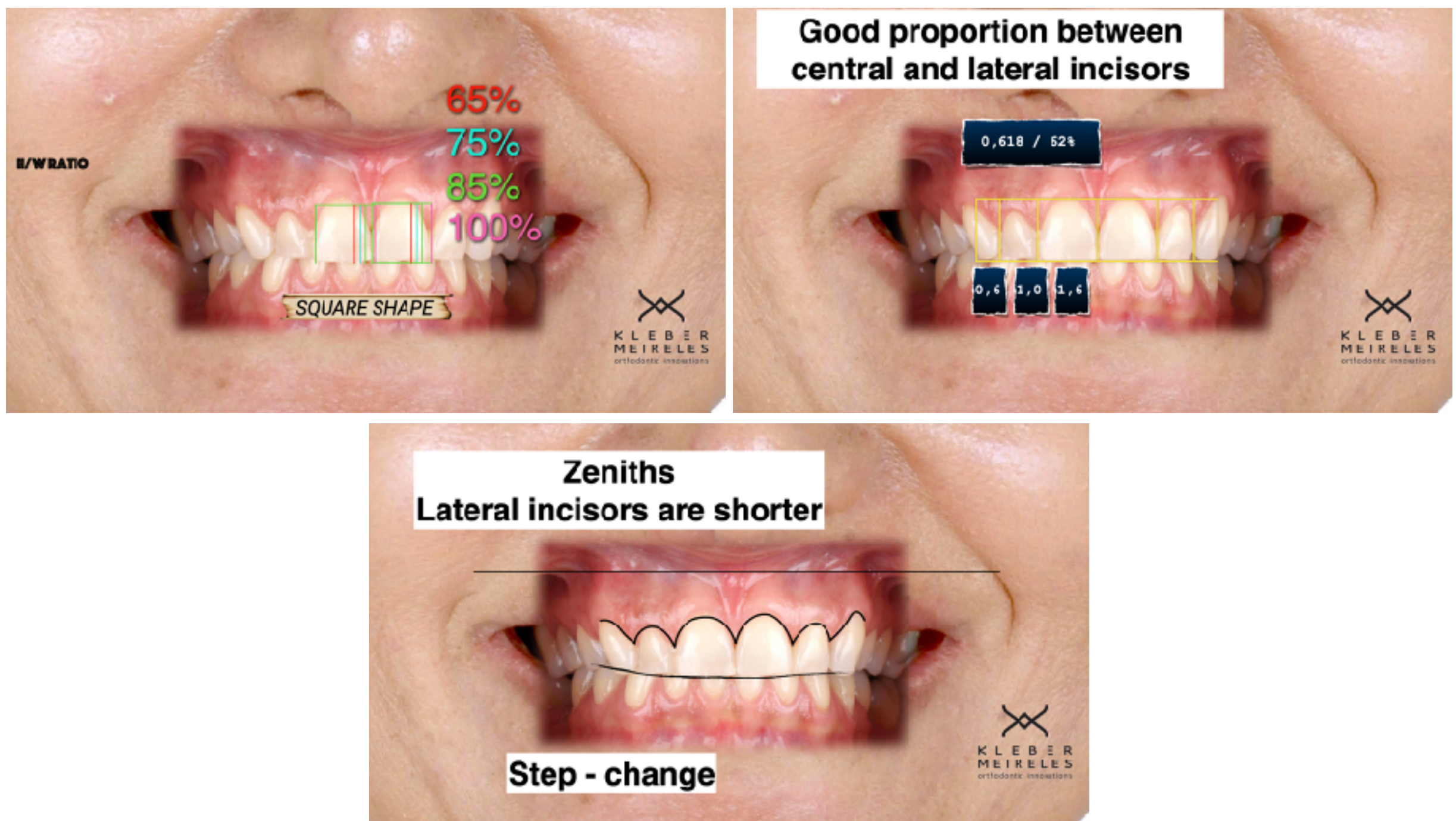
In the occlusal analysis, a Class II (2/3) relationship is observed with retroclined anterior teeth, increased overbite, normal overjet, and absence of teeth 36 and 46 (which probably contributed to the worsening of the Class II relationship). The lower midline is deviated to the right (by 2 mm), and the posterior teeth exhibit extremely negative inclinations.



**Figure 25** - Occlusal analysis

## DIAGNOSIS AND TREATMENT PLANNING VERTICAL PROBLEMS

The microanalysis of the smile must be linked to the previous analyses. Notice the importance of determining the proposed changes now, already considering the finalization. The proportion between the height and width of the upper central incisors is of great relevance in the smile, and in this case, due to the limited gingival exposure, the chosen option was an increase towards the incisal direction, using ceramic veneers.



**Figure 26** - The microevaluation of the smile takes into consideration, among other things, the height-to-width proportion of the incisors, the ratio between the six anterior teeth, the height and positioning of the gingival zeniths, the steps between central and lateral incisors, etc.

**Figure 27** - Panoramic x ray



# DIAGNOSIS AND TREATMENT PLANNING VERTICAL PROBLEMS

After completing the data collection and filling the templates with information on facial, smile, occlusal, and cephalometric analyses, we create the problem-solution chart to outline the individualized treatment plan.

## FRONTAL ANALYSIS

		Keep	Change	Solution
Facial type	Brachyfacial	X		
Symmetry	Asymmetric	X		Propose surgery
Facial Thirds	LAFH decreased	X		Propose surgery



## PROFILE ANALYSIS

		Keep	Change	Solution
Facial Convexity	179°		X	Surgery/ Protocol for LAFH
Maxillary Sagittal Positioning	Good	X		
Nasolabial Angle	Acute		X	Surgery/ Protocol for LAFH
Lower Face Ratio	LAFH decreased		X	Surgery/ Protocol for LAFH
Lower Third Ratio	Short upper Lip	X		Surgery/ Protocol for LAFH
True Vertical Line	Straight profile		X	Surgery/ Protocol for LAFH
Submental-Cervical Angle/Line	Good	X		
Mandibular Sulcus Contour	Good	X		
Upper lip to Pg-Sn	Both upper and lower lip projection - less than ideal		X	Surgery/ Protocol for LAFH
Z Angle (Merrfield)	Good	X		



## SMILE ANALYSIS

		Keep	Change	Solution
Smile type	Low		X	Surgery/ Protocol for LAFH
Gingival Exposure	Not exposing		X	Surgery/ Protocol for LAFH
Upper Midline	Coincident	X		
Lower Midline	Slightly shifted to the right in relation to upper mid and to the left in relation to the pogonion		X	Correct during mechanical in the lower arch
Canines (symmetry)	Asymmetric		X	Expansion
Buccal Corridors	Narrow		X	Expansion
Smile Arc	Non-Convex		X	Prepare the steps to Resin/Veneers
Gait	No	X		
H/W Ratio	Square shape		X	Veneers
Anterior Teeth Proportion	Good	X		
Scap C/U	No step		X	Prepare the steps to Resin/Veneers
Upper incisors tip exposure (rest)	Negative		X	Surgery/ Protocol for LAFH
Gingival Zeniths	Good	X		



## OCCUSAL ANALYSIS

		Keep	Change	Solution
Interarch relationship (Andrews)	Class II		X	Surgery/ Protocol for LAFH - Missalignment in lower arch
Overjet	Good	X		
Overbite	Increased		X	Surgery/ Protocol for LAFH
Spacing	36/46 absent		X	Open space for implants
Crowding	No	X		
Transversal	Maxillary deficiency		X	Dental Expansion
Curve of Spee	Increased		X	Aligning sequence
Bolton's discrepancy	No	X		
Other				



## DEPTH ANALYSIS

		Keep	Change	Solution
FAOP	Vertical deficiency - Maxilla		X	Surgery/ Protocol for LAFH
Horizontal Planes	Hypodivergent	X		
I.J.P.	Good	X		
IMPA	Good	X		Will probably increase
McNamara Triangle	LAFH deficiency		X	Surgery/ Protocol for LAFH
Other Measurements	NAP - Negative		X	Surgery/ Protocol for LAFH



**Figure 28** - The problem-solution charts are filled out after establishing the diagnostic templates.

### Treatment Planning

The proposed treatment plan, considering the patient's complaints, involved increasing the LAFH through the extrusion of upper teeth. The spaces of the lower first molars were opened by the patient's choice, as she was informed that closing the space could take a long time, as it would require moving the anterior teeth adjacent to the spaces mesially to correct the Class II dental relationship before mesializing the molars. Due to the unpredictability of the treatment duration, the patient opted for space opening and implant placement.

### Treatment Progress



**Figure 29** - From the first day, bite turbos were installed on the upper incisors to allow for the extrusion of the posterior teeth, resulting in an increase in the Lower Anterior Facial Height (LAFH).



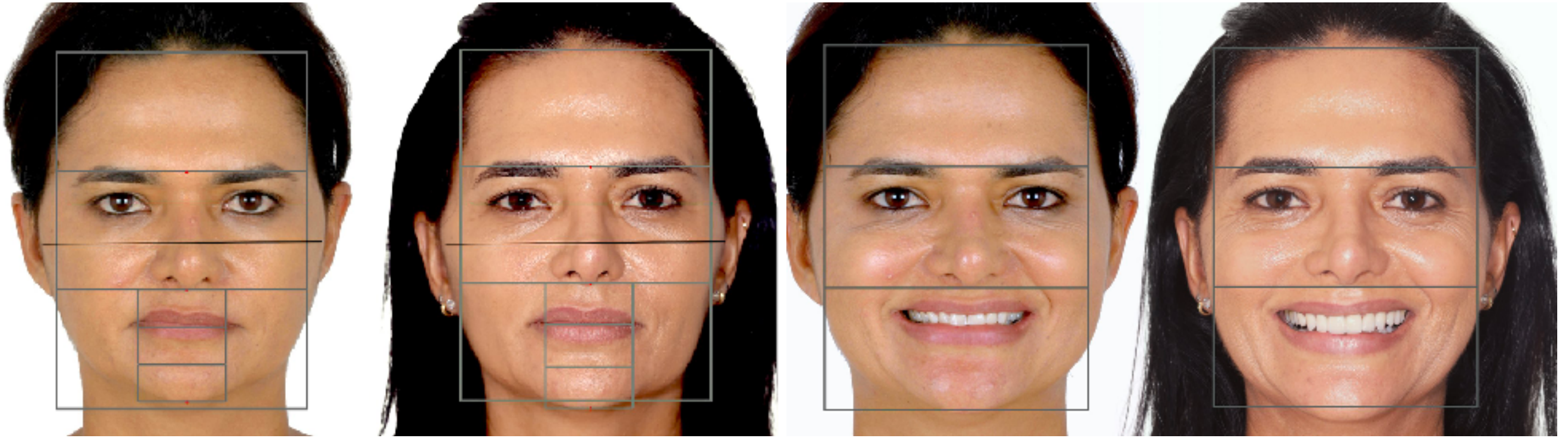
**Figure 30** - The space in the lower posterior region could be quickly opened by using rectangular wires and compressive loops.



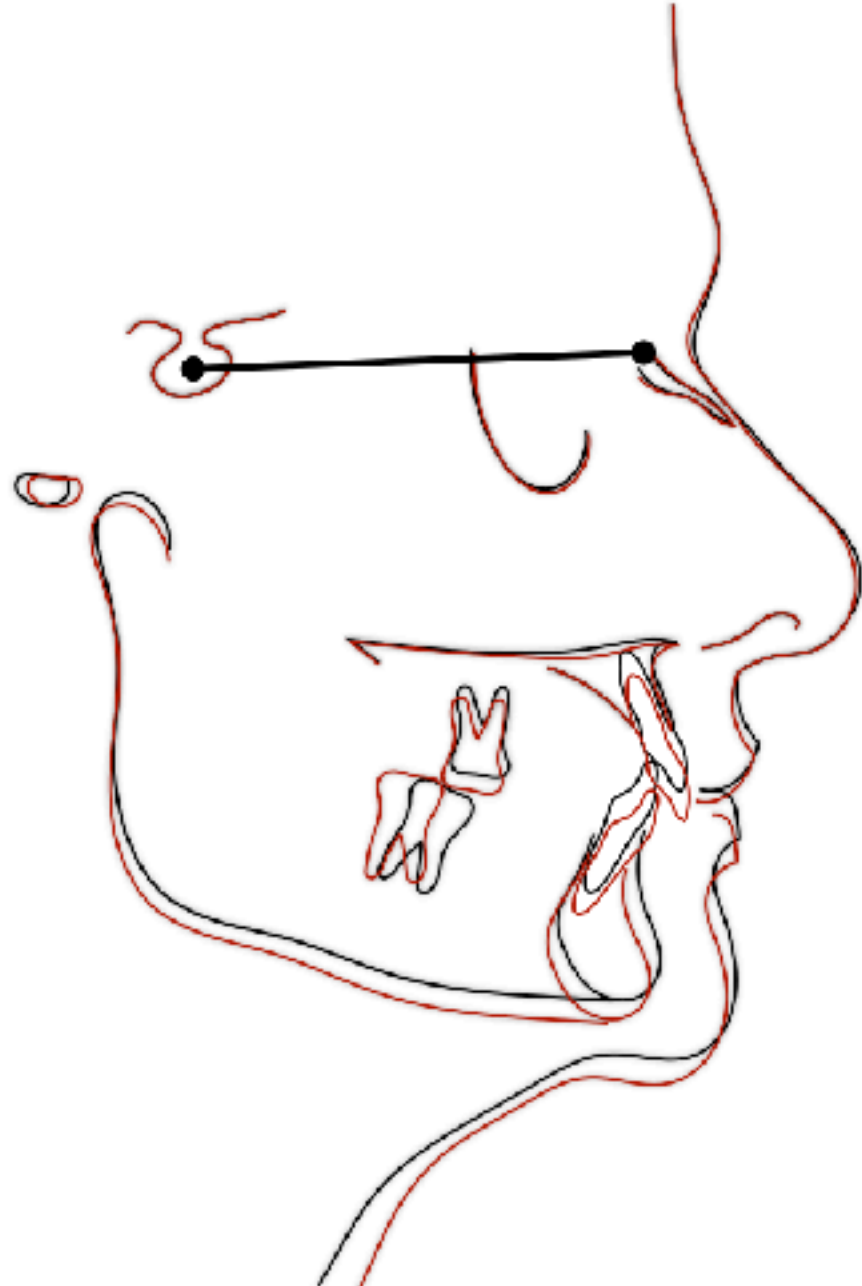
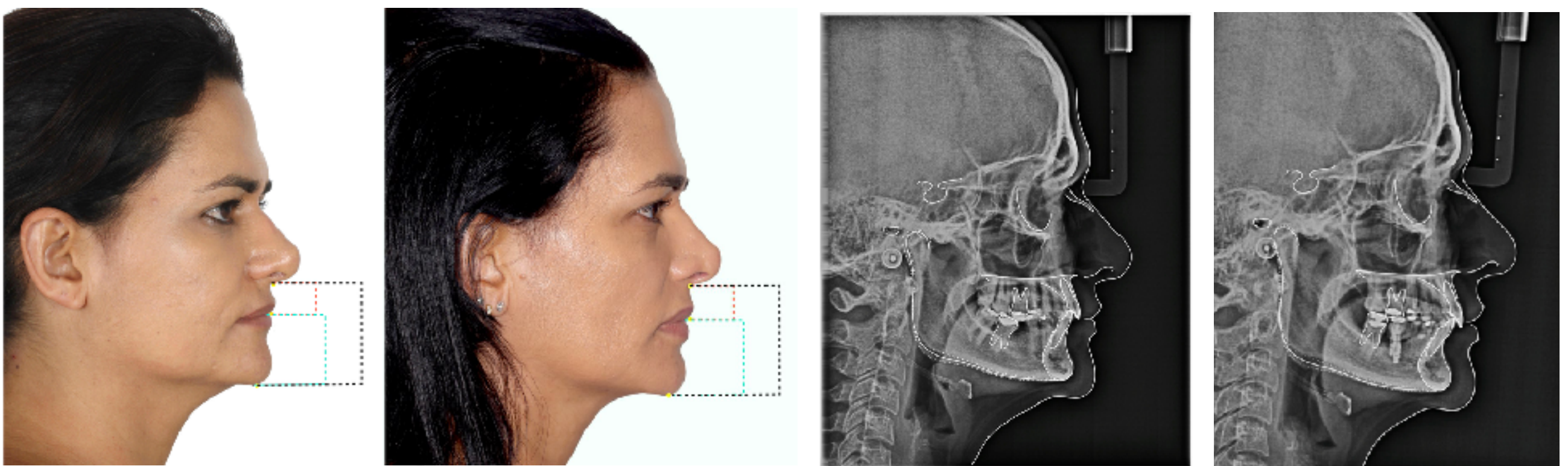
**Figura 31** - End of orthodontic treatment with complete correction of Class II and overbite. Midlines are coincident, and implants/prostheses were placed in the lower molars.



**Figura 32** - According to the proposed planning, based on the macro-analysis and micro-analysis of the smile, the increase of the teeth to restore the ideal height-to-width proportions was achieved through the use of ceramic veneers.



**Figura 33** -The increase in LAFH represents a volumetric gain in the lower third of the face, with a positive impact on balance and the perception of youthfulness. The smile, with the correction of inclinations and the extrusion of maxillary teeth, also contributes to this feeling of youthfulness.

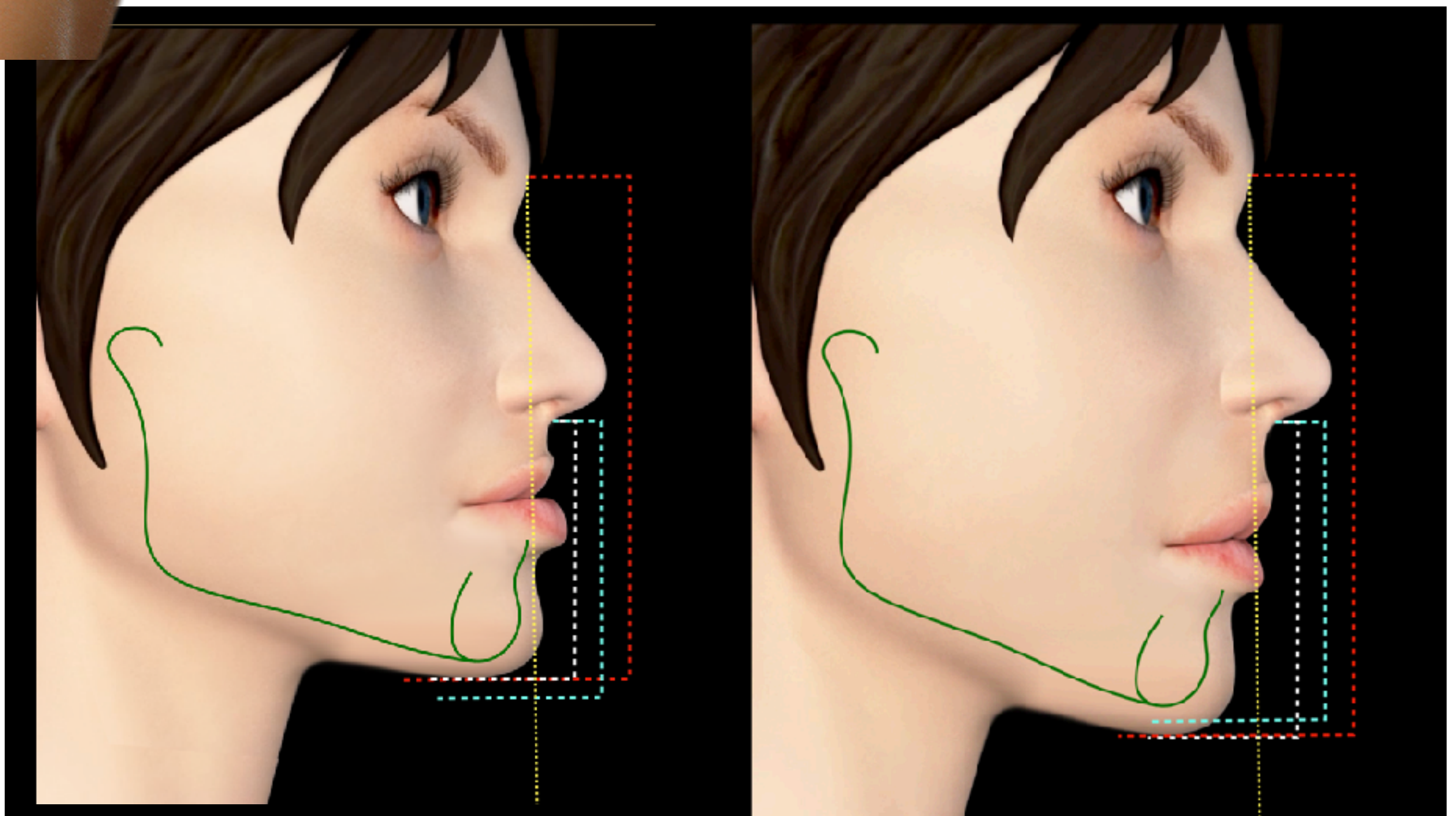


**Figura 34** - In profile, it is possible to observe the improvement in the Upper Lip/Lower Lip ratio with the elongation of the lower third of the face. Radiographic control through pre and post-cephs, along with superimposed tracings, highlights the increase in the LAFH with improvement, among other things, in the relationship between the upper lip and upper incisors.





Undoubtedly, one of the profiles that benefit the most from the correct management of Lower Anterior Facial Height (LAFH) is the Class III pattern, especially when the maxilla is primarily responsible for the facial concavity. In these circumstances, these patients tend to have a vertical deficiency in the lower third, which can be significantly improved with the elongation of this region.



**Figure 35** - The impact of counterclockwise mandibular rotation on the profile can be eliminated with the correct orthodontic management using extrusive mechanics, stimulating clockwise mandibular rotation and improving facial convexity.

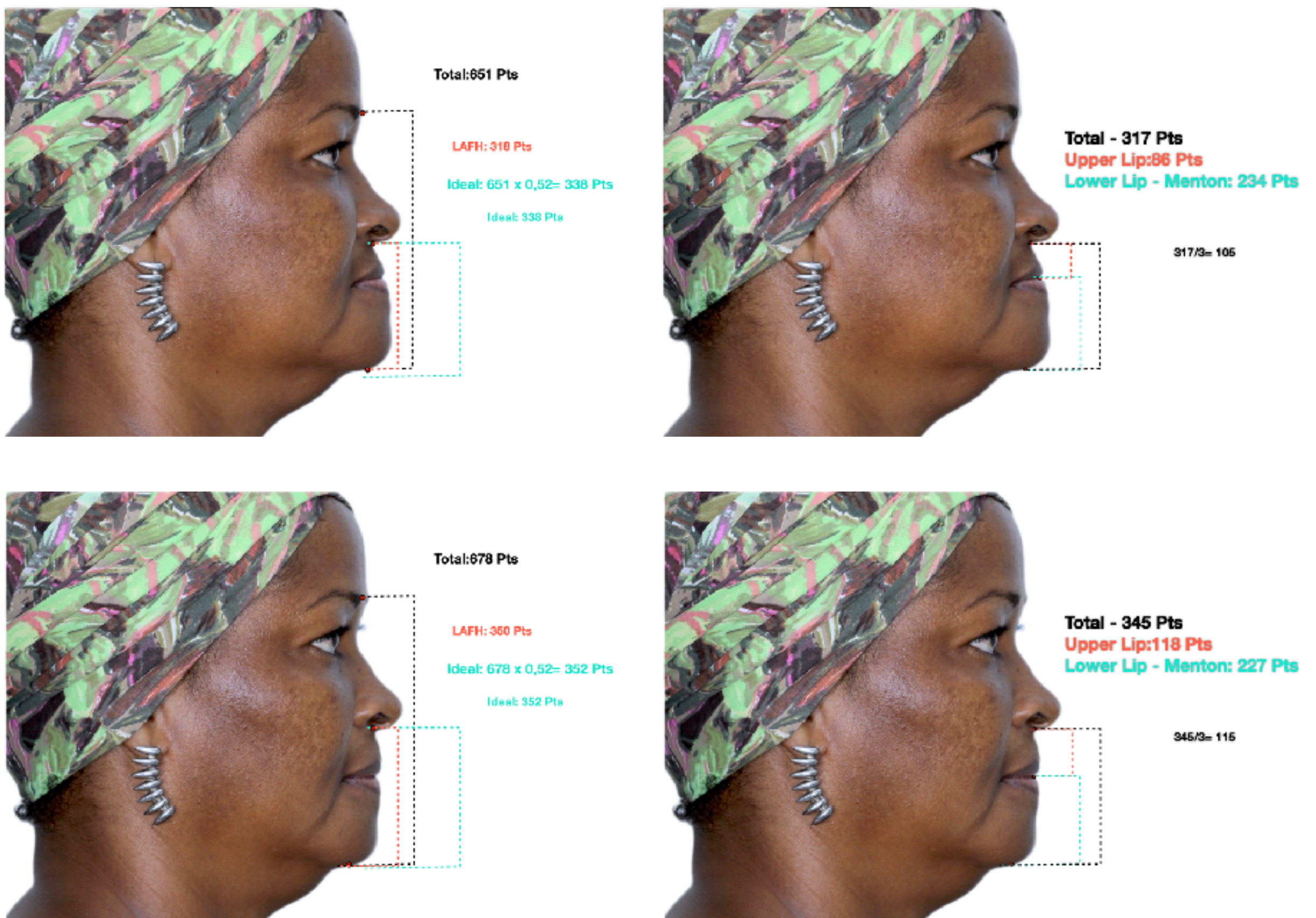
## DIAGNOSIS AND TREATMENT PLANNING VERTICAL PROBLEMS

An interesting example of how increasing Lower Anterior Facial Height (LAFH) can be beneficial for patients with a concave facial pattern can be seen in the images of the case presented below. This patient sought treatment to address an anterior crossbite. She mentioned having visited other orthodontists who deemed her case as surgical.

During the functional evaluation, when attempting to position her mandible in CO (centric occlusion), we noticed that the anterior crossbite had a predominantly functional nature. The idea is to increase the volume of the lower face through an extrusive protocol. Observe how her face gains greater balance when there is anterior contact in an edge to edge relationship.



**Figure 36** - Manipulating the patient's mandible into centric occlusion positively changes her facial convexity.



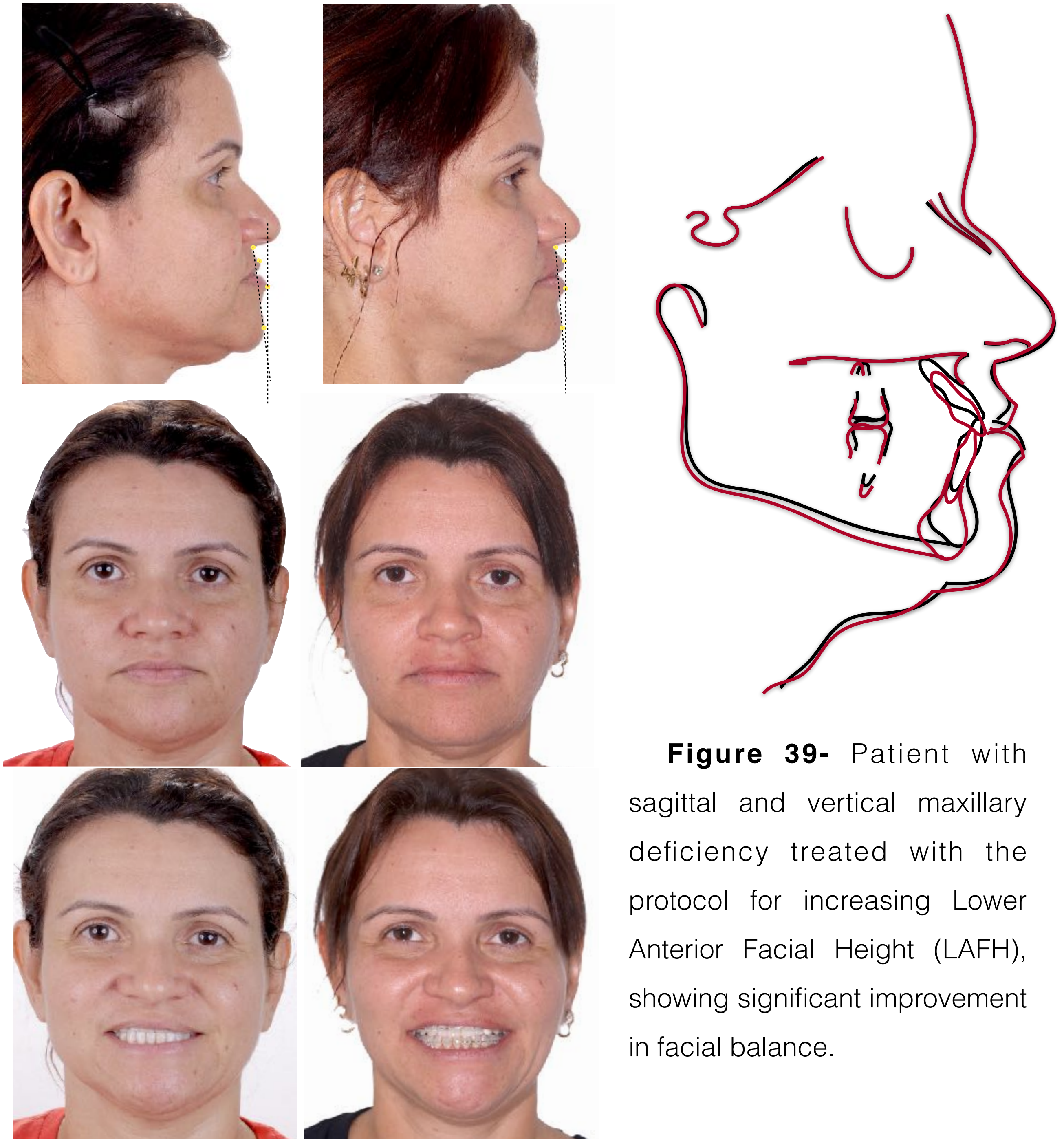
**Figure 37-** The proportions of the lower third show a significant improvement when the mandible is rotated downwards and backward (clockwise rotation).



**Figure 38-** Comparison between maximum intercuspitation and centric occlusion positions.

## DIAGNOSIS AND TREATMENT PLANNING VERTICAL PROBLEMS

In this last example, the patient underwent a protocol for increasing facial height using springs and elastics, resulting in a significant gain in both lower facial volume and facial convexity. Notice the mandibular rotation in the superimposition of cephalometric tracings.



**Figure 39-** Patient with sagittal and vertical maxillary deficiency treated with the protocol for increasing Lower Anterior Facial Height (LAFH), showing significant improvement in facial balance.

## Final considerations

To achieve successful orthodontic outcomes, it is essential to comprehend the intricate relationship between facial and cephalometric analyses, while also considering the nuances of smile analysis. The interplay between these diagnostic components allows orthodontists to have a comprehensive understanding of the patient's facial features, dental proportions, and functional aspects. By integrating facial analysis, we can assess soft tissue characteristics, lip dynamics, and facial aesthetics, which greatly influence treatment planning and overall patient satisfaction. Simultaneously, cephalometric analysis provides critical insights into skeletal relationships and dental positions, allowing for the assessment of occlusal and growth patterns. Combining these assessments with a detailed smile analysis enables orthodontists to tailor treatment plans that address both functional and aesthetic aspects, resulting in optimal and harmonious treatment outcomes.

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