

The Treatment of Class II Division 1 Malocclusion in Stages

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The treatment of Class II Division I malocclusion is a multifactorial event whose factories should be analyzed and treated. It has high clinical prevalence, about 40%. This anomaly is considered acquired during the growth and development stages by general dysfunction of the neuromuscular epigenetic factors (Enlow 1968; Moyers 1988; Korkhaus 1940).

The orthopedic diagnosis shows the prevalent of 80% of mandible retrognathism and 20% of maxillary prognathism. The treatment protocol for both categories must be totally different.

First of all, we must have very clear priorities of the neuro-functional, orthopedic, and orthodontic aspects which are individually determined by accurate diagnosis protocols (Björk 1955).

The most important priority, as the first stage to be considered, is the maxillary transverse deficiency. It is absolutely necessary that the maxilla and upper dental arch be prepared to receive mandible in facial harmony, providing a normal Class I occlusion (Faltin Jr. et al. 2003).

The Bionator was develop by Prof. W. Balters in Germany in the 1960s, which is still being used today.

3.1 The Mandibular Retrognathism Treatment

The first example represents a case with a pronounced mandible retrognathic posture without dental arch discrepancies. The treatment protocol was Balters' Bionator to normalize facial harmony in anterior and vertical directions (Balters 1964) (Figs. 3.1 and 3.2).

During follow-up, after finishing treatment, the patient used the last Bionator 6 full days during 6 months and nighttime for another 6 months. The results can be observed in Fig. 3.3a–e.

It is to be convinced that the functional orthopedic intervention normalizing development factors and correcting neurophysiologic impuete, through the central neuron system, promote a very balance and stable development and excellent result (Petrovic and Stutzmann 1977) (Figs. 3.4, 3.5, 3.6, 3.7, 3.8, 3.9 and 3.10).

We must consider that only a few patients can be treated exclusively with Balters' Bionator, Frankel's functional regulator, or other functional therapies. Both therapies are similar and considered the only totally functional jaw orthopedic devices (Bishara and Ziara 1989).

The great majority of Class II Division I is patients with retrognathic mandible, transverse discrepancy of the maxilla, upper incisor protrusion, lower dental crowding, total Class II distal occlusion, and general dysfunctions. They need to be prepared before being submitted to a functional orthopedic treatment like the Bionator therapy.

RME is the first recommended intervention. The Schwarz plate or Ricketts lower utility arch may be indicated.

The next step of treatment will be the functional orthopedic stage with Balters' Bionator, respecting all aspects from the construction bite to the adjustment in the patient's mouth and instruction and during treatment control.

Unfortunately, a small percentage of cases can be treated only using Bionators.

Patient 3: J.D.S., 9 years 3 months. at the beginning of treatment (Fig. 3.11).

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Fig. 3.1 (a–e) Patient 1: M.S., 9 years 3 months. at the beginning of treatment

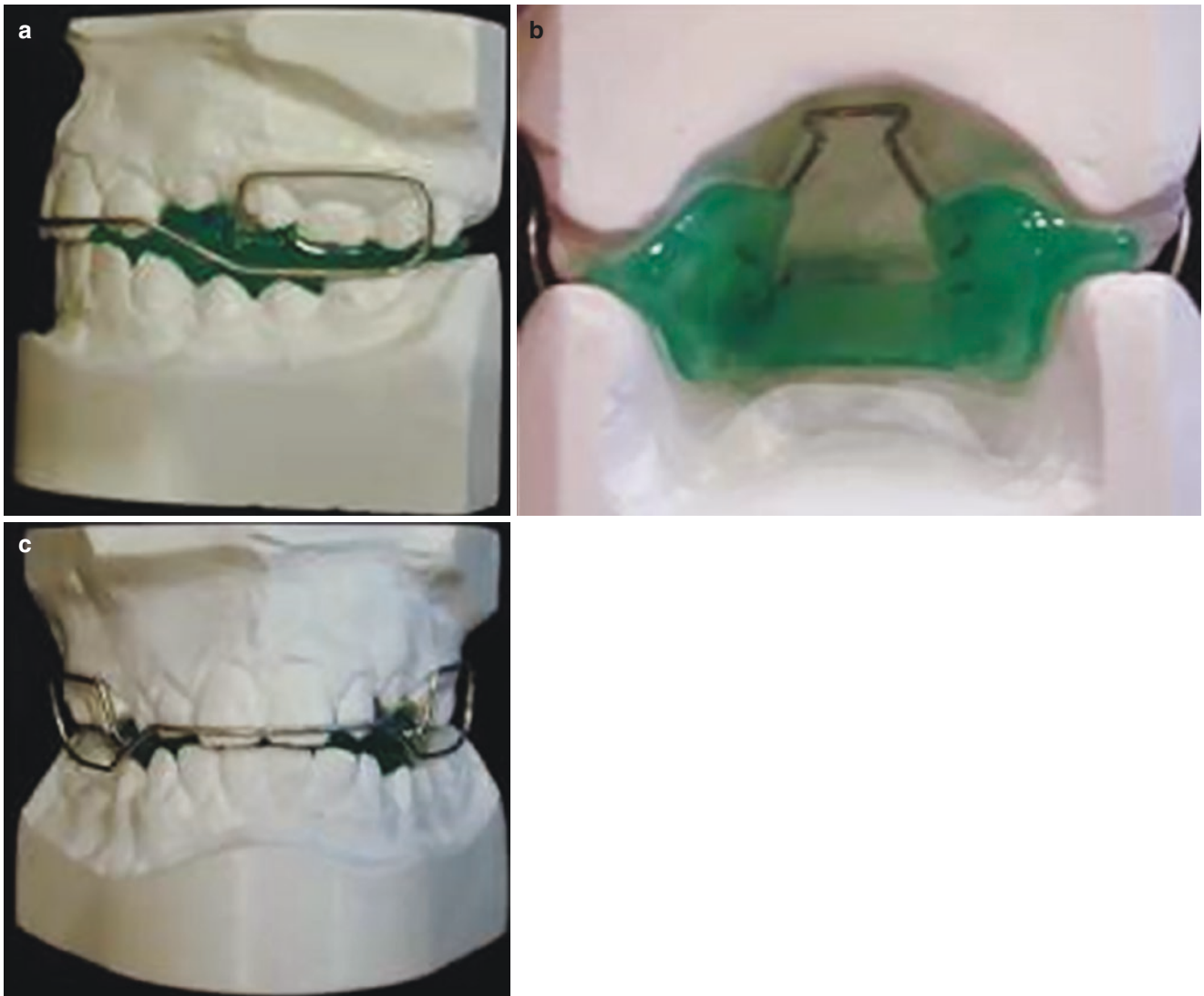


Fig. 3.2 (a–c) During 3 years 2 months, the patient used three Balter's Bionators



Fig. 3.3 (a–e) With no use of any other fixed appliance. He got a normal occlusion, an excellent facial harmony (divine proportion), and balanced neuromuscular functions

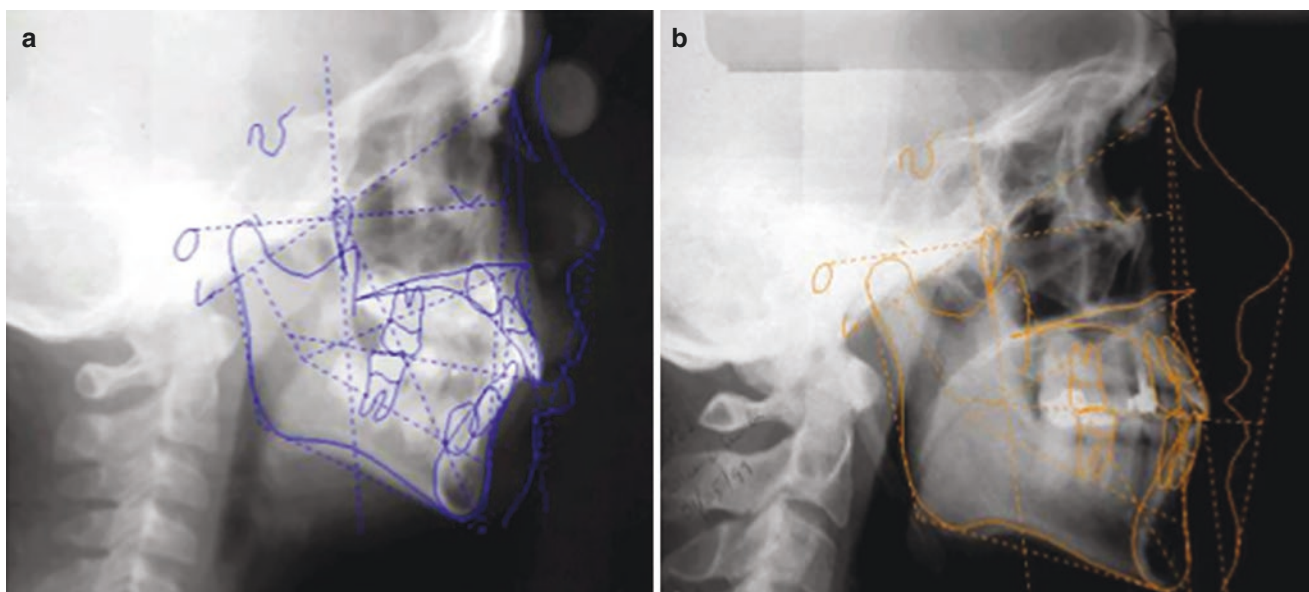


Fig. 3.4 (a, b) Illustrate a lateral cephalometric study before and after the treatment

After a total analysis of the various complementary examinations and appropriate analysis, the diagnosis will demonstrate upper transverse discrepancy in comparison with the lower one, a deep bite, or an open bite, dental crowding, and respiratory dysfunction (van der Linden 1986) (Fig. 3.12).

The patient must be prepared before being submitted to functional therapy like Balters' Bionator (Fig. 3.11).

Sequence of the first stage: rapid maxillary expansion and simultaneously lower utility arch were indicated to correct the lower incisors' implantation. This phase took 8 months.

The second stage started immediately and was related with the facial harmony. She must be treated with an appropriated protocol in vertical, latero-lateral, and antero-posterior directions. In this stage, the patient used a modified Balters' Bionator.

Balters' Bionator was installed without removing the lower utility arch in place. The use of Balters' Bionator took 1 year.

The purpose of the third stage is to correct teeth alignment and implantation and finally achieve functional normal occlusion.

The retention was upper plate and lower lingual fixed (Fig. 3.13 shows the final case and Fig. 3.14 lateral cephalometric image). There has been an absolutely excellent facial result. Facial dimensions are according to Fibonacci's divine proportion.

In cases like this, orthopedic and orthodontic treatment must be started very soon in order to be able to correct facial harmony, normal occlusion, and neuromuscular behavior.

G. Sander (2001) developed a new appliance—the SII. It consists of two plates with expansion screws and the upper one with a metallic guide that contacts the lower plate in the anterior region.

SII appliance is a mandible protractor with transverse expansion of the maxilla and up righting of molar posterior teeth. The advantage of SII treatment is the possibility to widen the maxilla, correct deep bite, and open space for dental orthodontic treatment and mandible advance at the same time. In these cases, it is recommended to use Sander's plate (SII).



Fig. 3.5 (a–e) The long-term evaluation after 7 years was performed and demonstrates the stability and even a better situation after orthopedic mandible Class II treatment



Fig. 3.6 (a–c) Fränkel's functional regulator (FR2) is another orthopedic appliance that can be used in the treatment of Class II Division I malocclusion with mandible retrognathism, in growing prepubertal period (Fränkel 1989)



Fig. 3.7 (a–e) The next clinical case: **Patient 2: P.H.L., 8y** at the beginning of treatment is similar to the first patient, but this case has some orthodontic problems such as crowding, upper arch protruded teeth, narrow maxilla arch, deep vertical bite, and dysfunctions



Fig. 3.8 (a–e) The patient used three FR2 over 5 years of treatment, progress situation at 12 years 7 months



Fig. 3.9 (a–e) The stability posttreatment over 2 years with no retention

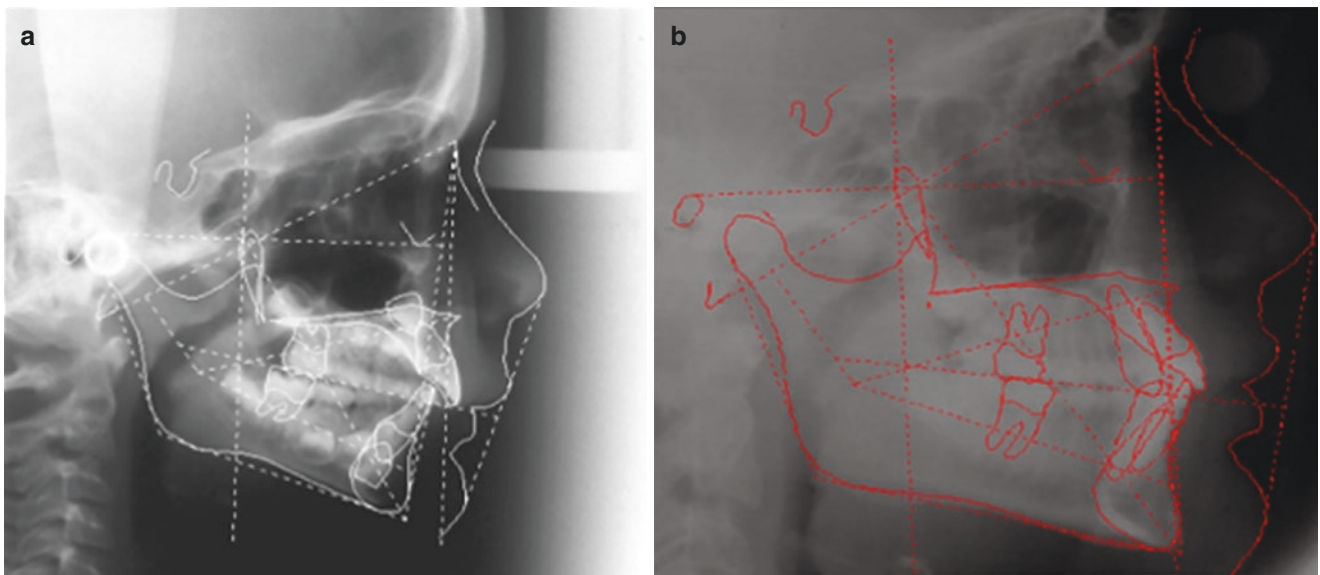


Fig. 3.10 (a, b) Illustrate a lateral cephalometric study before and after the treatment and the excellent quality of mandibular development



Fig. 3.11 Initial records



Fig. 3.12 The sequence before Balters' Bionator use



Fig. 3.13 Shows the final case

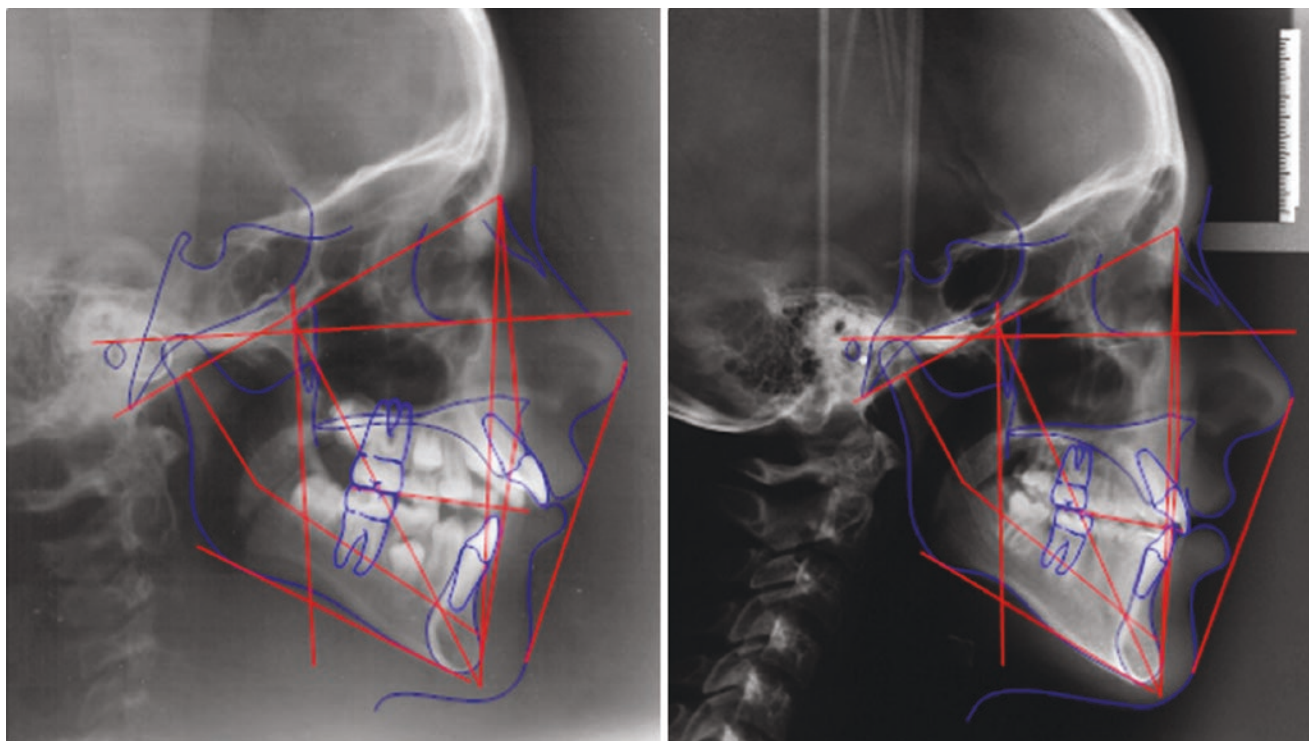


Fig. 3.14 Lateral cephalometric study before and 5 years after

Sander's SII and Clark's Twin Block have a similar action (Fig. 3.15).

The first stage of treatment which lasted 1 year and 6 months shows the evolution and complete treatment with SII. The next stage was with fix appliance and included a retention of 15 months (Sander 2001) (Fig. 3.16).

Figs. 3.17 (a–e) present the end of treatment.

Cases of patients with pronounced Class II Division I with severe retrognathic mandible, upper protrusion, deep bite, and dysfunctions but without lower crowding must be treated immediately, even in the deciduous dentition (Figs. 3.18 and 3.19).

The biological reason is that the development of the dental facial complex under such reverse epigenetic factors will get worse with time.

All priorities could be normalized and have facial orthopedic harmony, balanced occlusion, and balanced neuromus-

cular function. That is the real stimulation for normal functional adaptation including form, size, and shape of the masticator system.

The advanced of SII treatment is the possibility to wide maxilla, correct deep bite, open space for dental orthodontic treatment and advanced mandible.

Patient 5: L.M., 4 years 6 months. at the beginning of treatment. The treatment will take a long time using the Balters' Bionator during the first stage and Sander's double plates (SII) during the second stage (Figs. 3.20, 3.21, 3.22 and 3.23).

The observed result is very important taking in mind that he has a long development future. (Fig. 3.22)

These excellent results could only be obtained when the treatment starts at a very young age (Figs. 3.24, 3.25, 3.26, 3.27 and 3.28).



Fig. 3.15 (a–e) Patient 4: R.L.B.H., 12y at the beginning of treatment



Fig. 3.15 (continued)



Fig. 3.16 The next stage with fixed appliance including retention took 15 months in retention with stable results



Fig. 3.17 (a–e) Represent the result of patient who finished treatment with an excellent result



Fig. 3.18 (a–e) The long-term evaluation confirms a very stable result

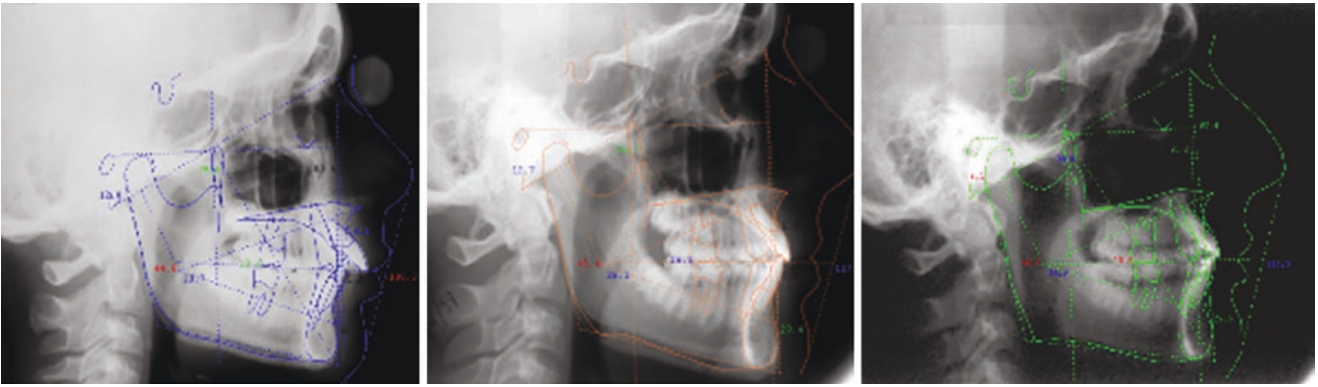


Fig. 3.19 Lateral cephalometric: before, immediate after, and a long-term treatment



Fig. 3.20 Pre treatment photographs



Fig. 3.21 The patient used upper expansion removable plate with superelastic screws, SII, and Bionator from November 2001 to March 2005



Fig. 3.22 From June 2010 to June 2013, the second stage, the patient was treated with fixed appliance and retention



Fig. 3.23 After long-term treatment

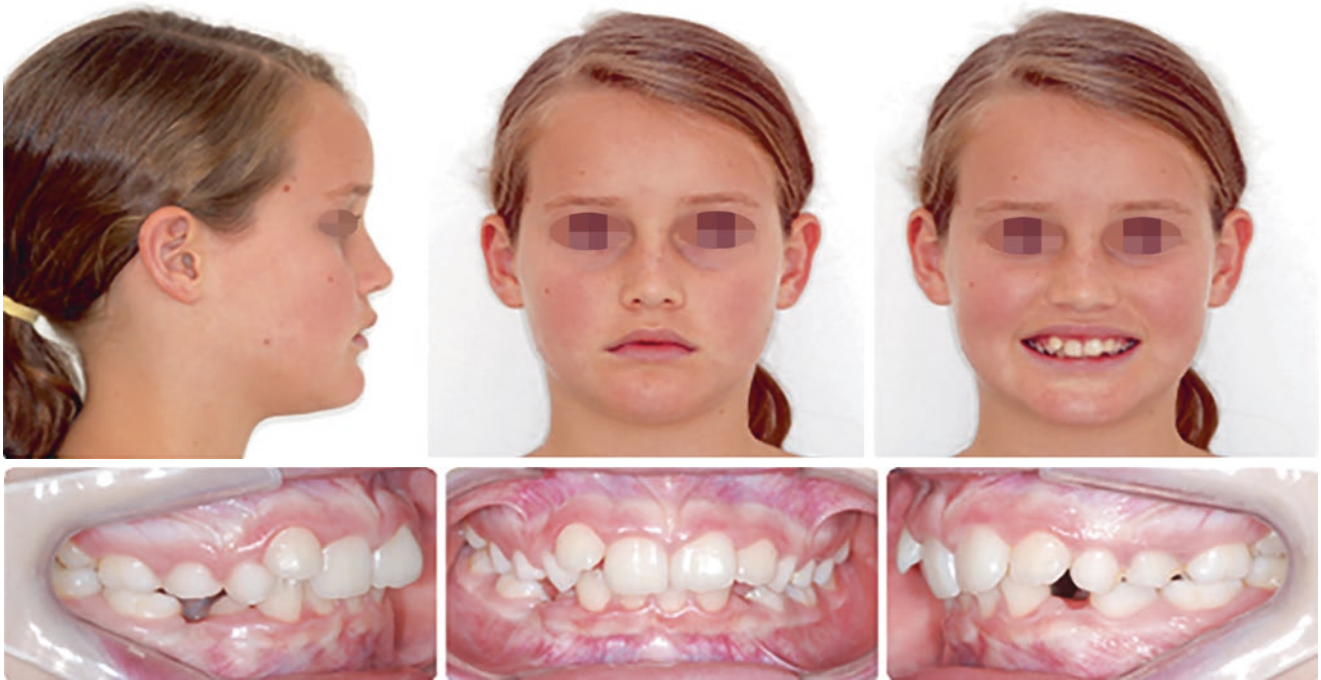


Fig. 3.24 Patient 6: K.B., 10y at the beginning of treatment

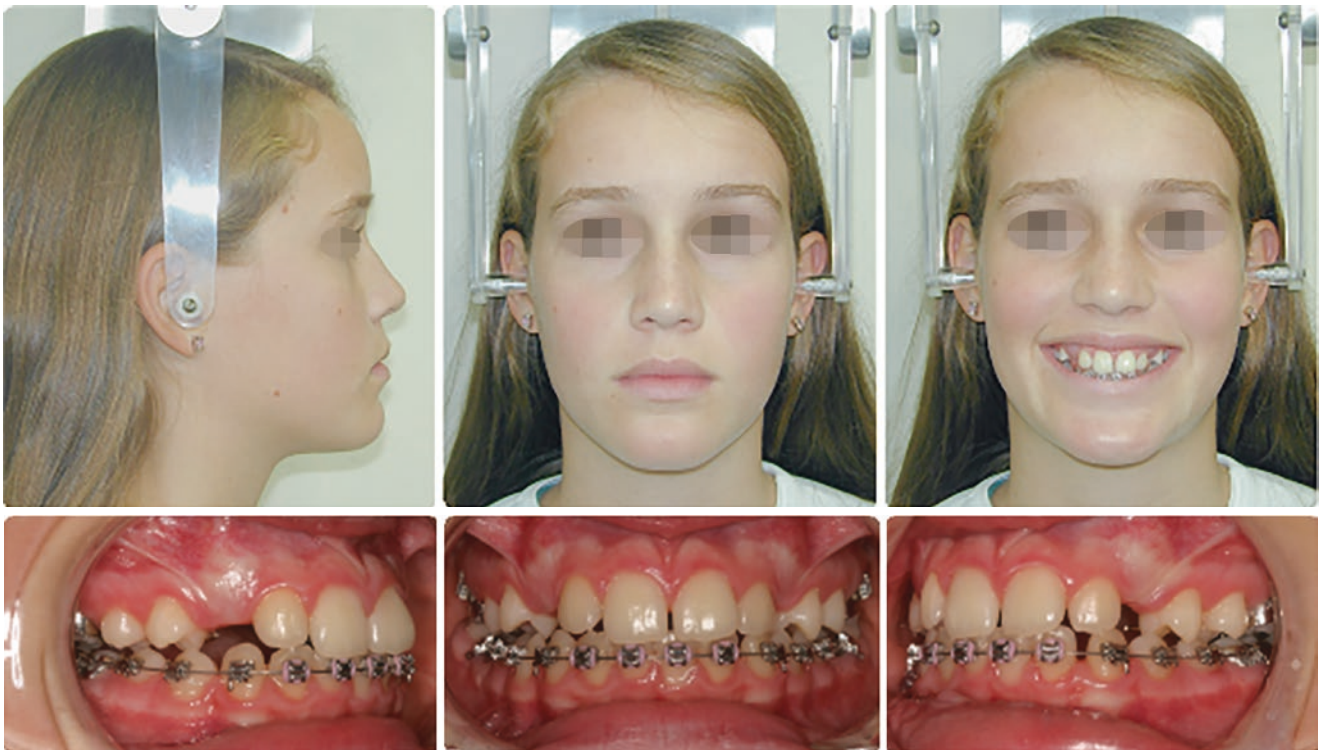


Fig. 3.25 Balters' Bionator result



Fig. 3.26 Then fixed appliance, and quadri-helix



Fig. 3.27 The end of treatment

The patient was treated in a unique stage. The priority was to achieve first the facial harmony because of the poor vertical dimensions. In sequence she was treated with biomechanics-fixed therapy.

The treatment sequence:

In this case because of the advanced stage of development, we decided to treat first the facial harmony with

Balters' Bionator philosophy and then fix appliance according to Ricketts' philosophy.

Patient 7: F.A., 10 years 2 months. at the beginning of treatment. Another typical case of mandible retrognathism (Figs. 3.29a–c and 3.30a–c), again priority number 1 facial harmony (Figs. 3.31, 3.32, 3.33 and 3.34).

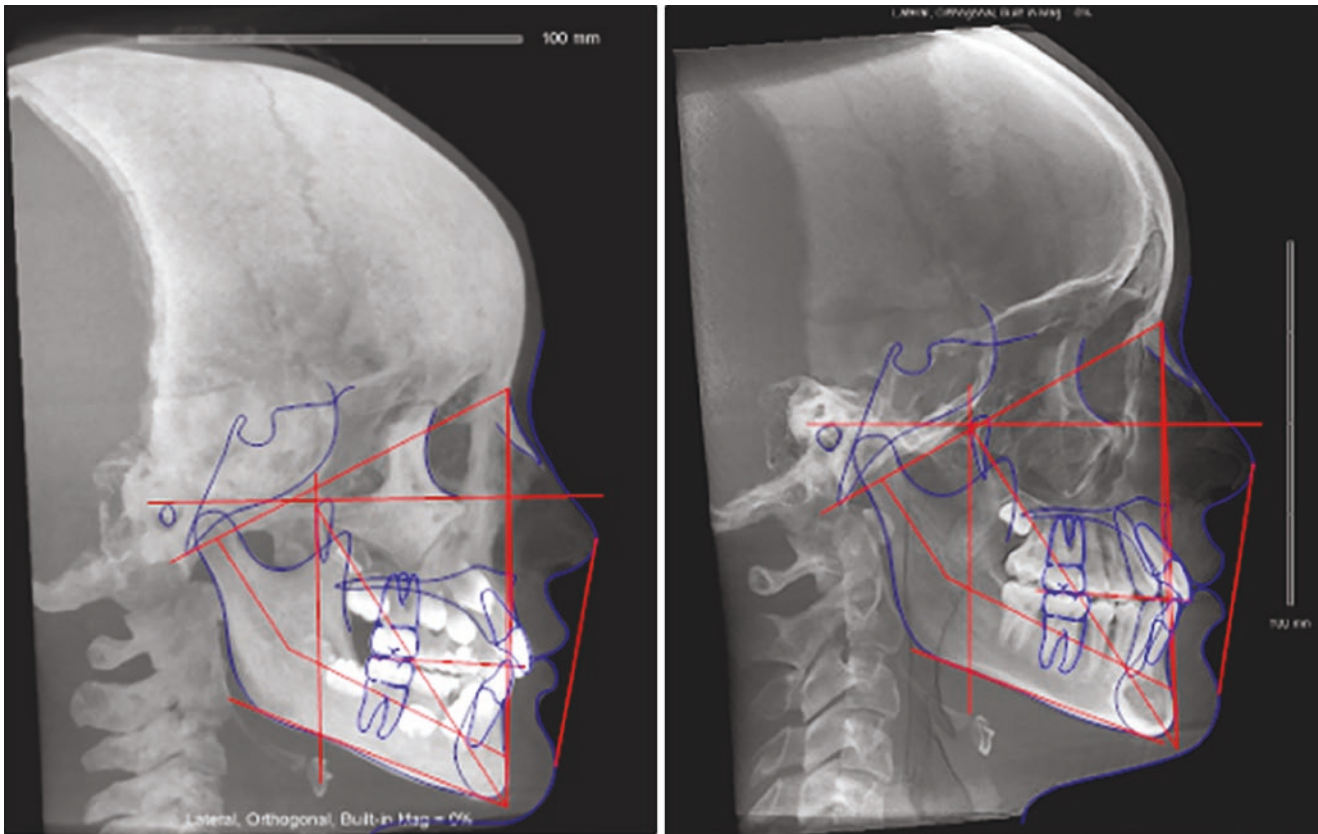


Fig. 3.28 Lateral cephalometric study: before and immediate after and a long term

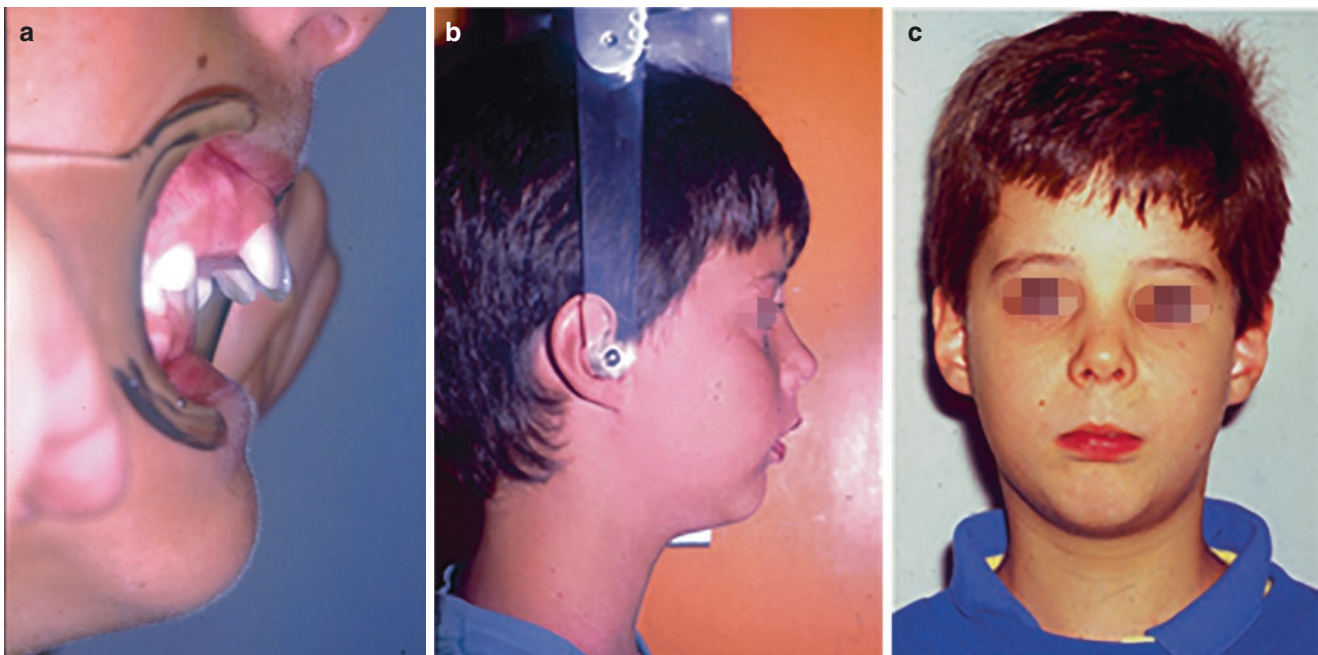


Fig. 3.29 Pre treatment photographs



Fig. 3.30 Frontal and lateral photographs at the beginning of the treatment

Figures 3.35 (a, b) are images from helicoidal tomography, before and after the treatment, demonstrating the functional adaptation on TMJs, relocating the condyles in glenoid cavities.

3.2 The Maxillary Prognathism Treatment

When Class II division I is characterized as maxillary protrusion, the treatment protocol must be realized and indicated extraoral traction, developed by G. Sander (Fig. 3.36). This special extraoral traction appliance has constant cervical force of 4–5 Newtons. The appliance should be used for 18 h/day.

The traction is always cervical. If the patient has a horizontal growth tendency, it is necessary to associate with an upper anterior bite plate. If the patient has a vertical growth tendency, it is indicated a lower posterior bite plate.

After the orthopedic correction, the treatment is finalized with biomechanics-fixed appliances and finale retention.

Patient 8: S.C.W., 11y at the beginning of treatment (Figs. 3.37a, b and 3.38a–c).

The first stage of treatment was maxillary expansion with upper removable expansion plate, and the treatment time was 8 months (Fig. 3.39).

The second stage of treatment was extraoral traction for 12 months, fixed orthodontic, and retention. The treatment time was a total of 2 years and 11 months (Fig. 3.39).

The long treatment evaluation is shown in Fig. 3.40.

Lateral cephalometric evaluation (Fig. 3.41) before, during, and long-term control shows a total stable situation.

Patient 9: C.P., 9y 10 m. at the beginning of treatment (Fig. 3.42). This case illustrates a combined treatment of extraoral appliance and Balters' Bionator.



Fig. 3.31 The occlusion with and without the Balters' Bionator when the class I was achieved. The patient used five Balters' Bionator during 2 years and 3 months and completed the treatment using fixed appliance

The sequence was as follows:

1. Maxilla transverse correction.
2. Balters' Bionator therapy during 2y and 10 m. (Fig. 3.43).
3. Extraoral appliance (1 year) and total fixed appliance (Fig. 3.44), shows the case at the end of the treatment.
4. Long-term control (Fig. 3.45).
5. Lateral cephalometric images before and after the treatment (Fig. 3.46).



Fig. 3.32 Present end of the treatment time was 4 years 3 months



Fig. 3.33 The stability of the treatment in long-term observation 6 years after retention

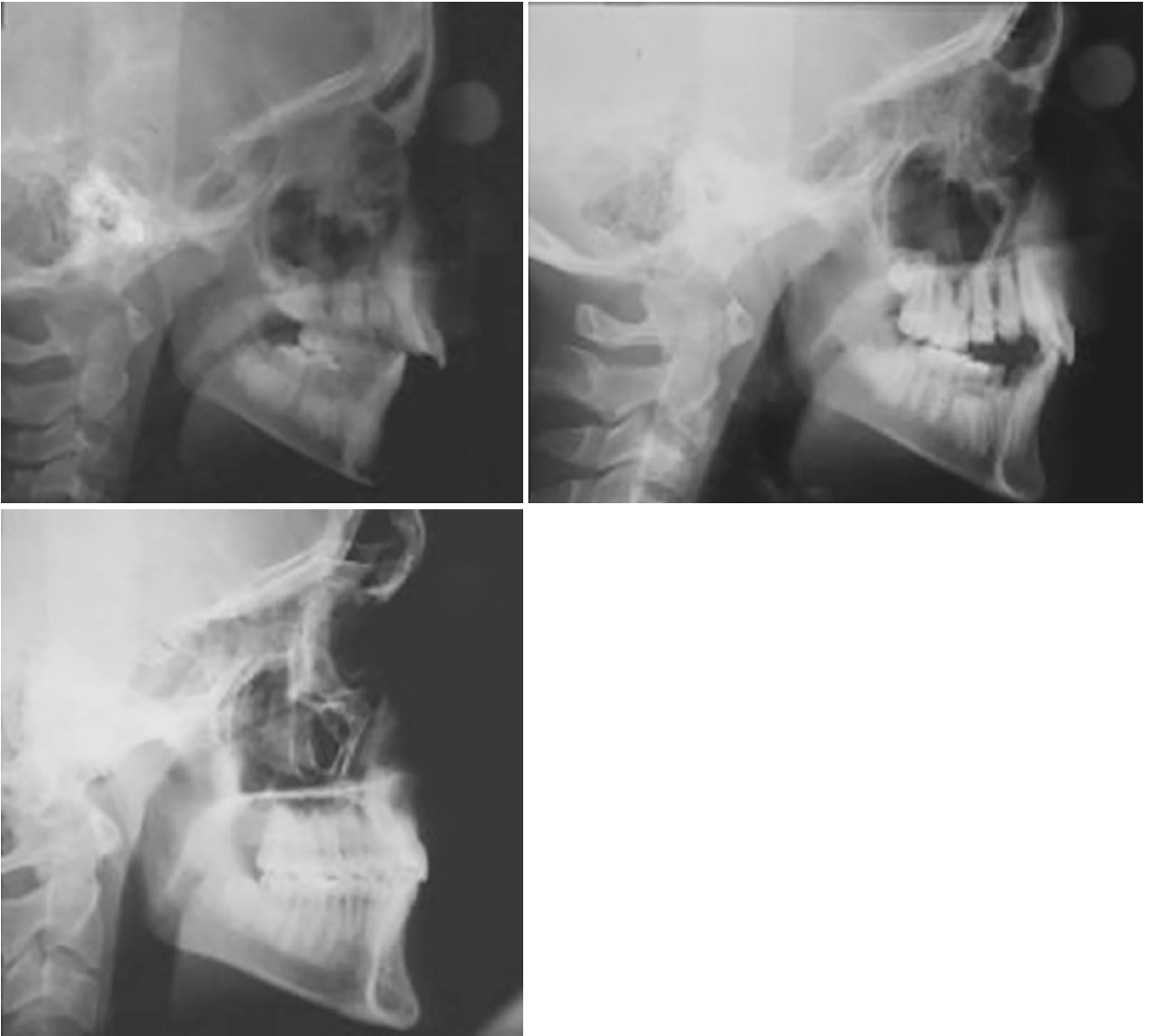


Fig. 3.34 The lateral Rx where it is possible to observe very clear the development of the face and recognize the mandible growth

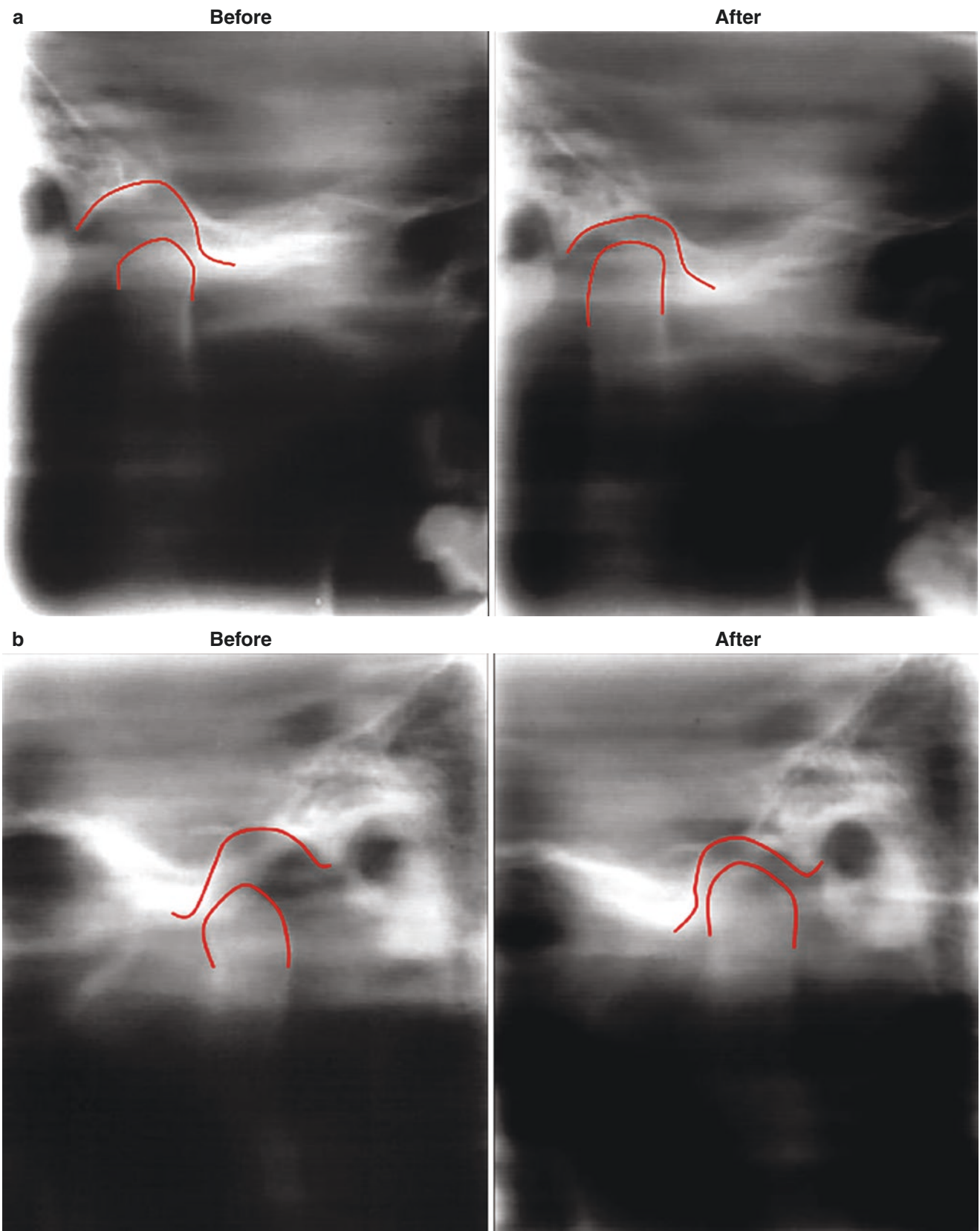


Fig. 3.35 (a) Right condyle. (b) Left condyle

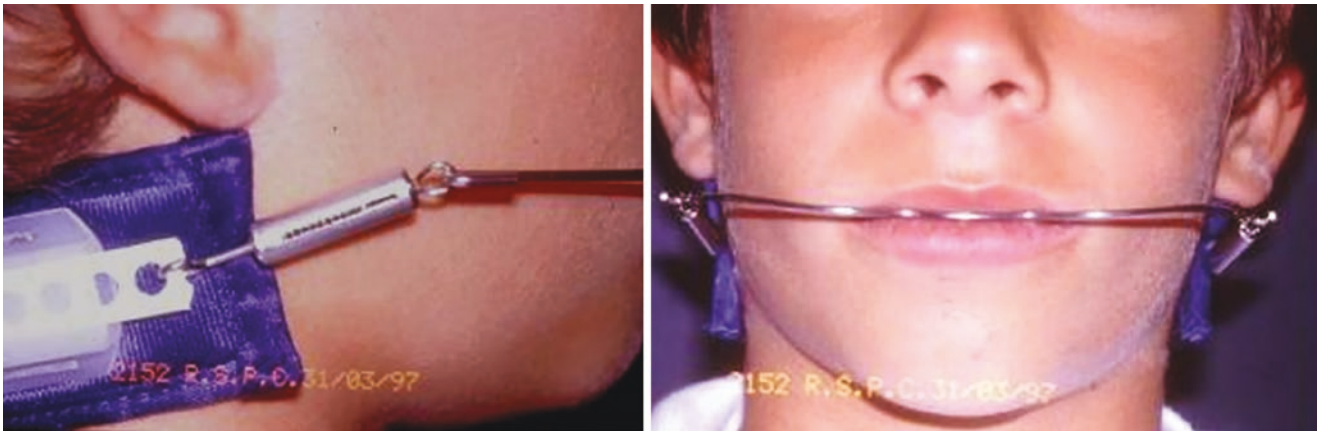


Fig. 3.36 Cervical extraoral appliance in place

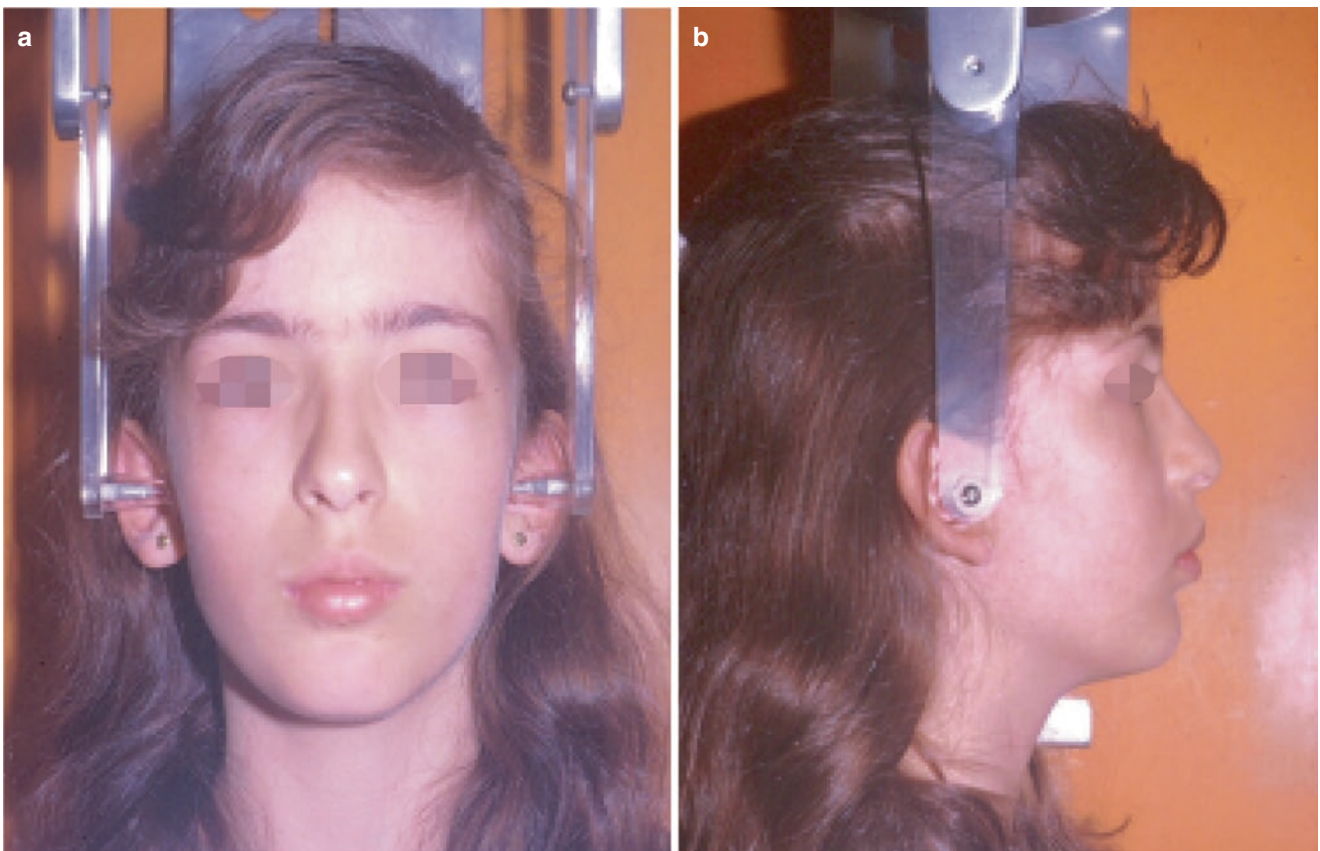


Fig. 3.37 Photographs at the beginning of the treatment



Fig. 3.38 Frontal and lateral pre treatment photographs



Fig. 3.39 Second stage of treatment



Fig. 3.40 Final photographs

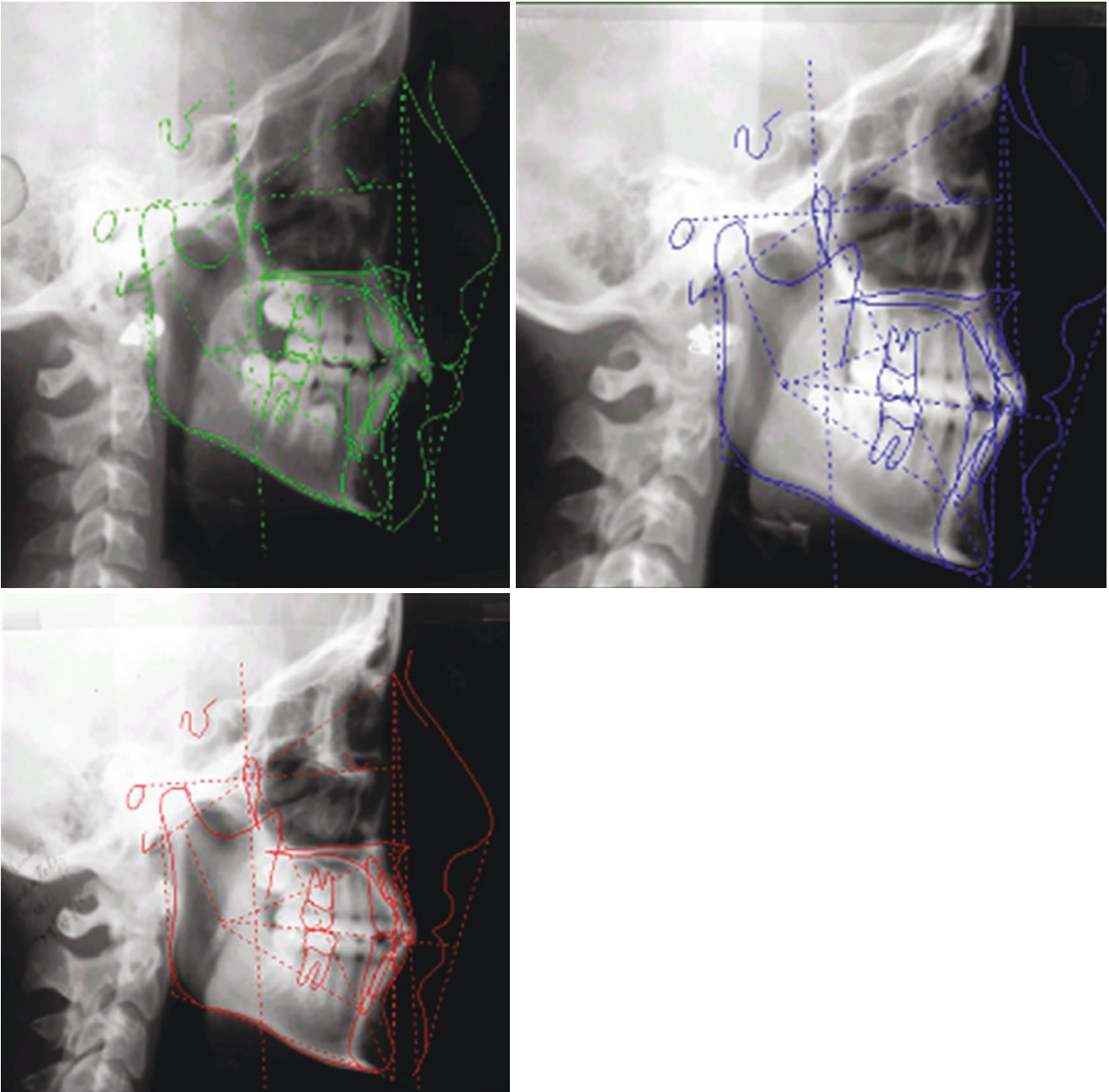


Fig. 3.41 Comparison pre and post lateral radiographs



Fig. 3.42 Initial photographs



Fig. 3.43 A bionator was indicated. An important improvement was observed.

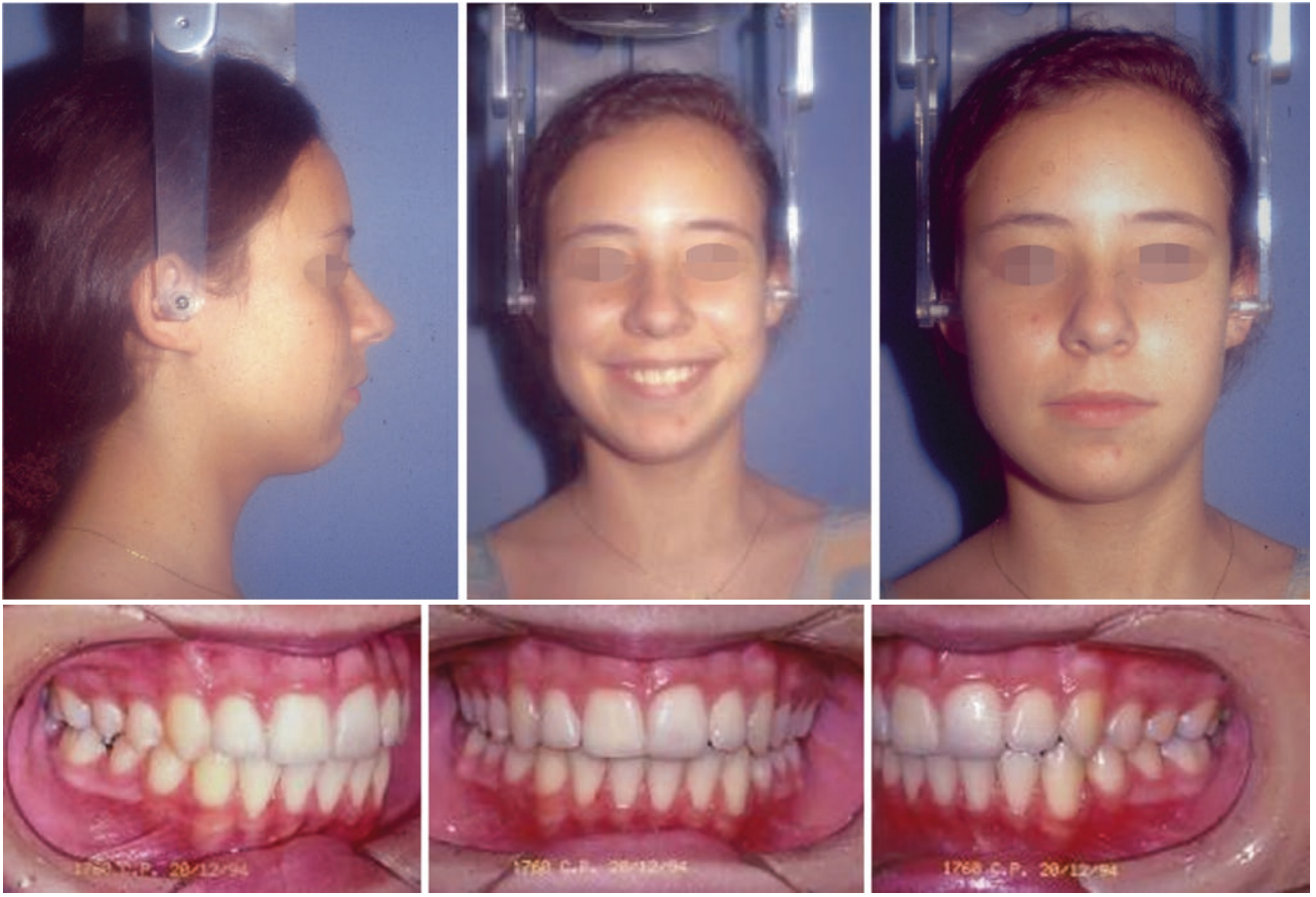


Fig. 3.44 Final photos



Fig. 3.45 Control 5 years later

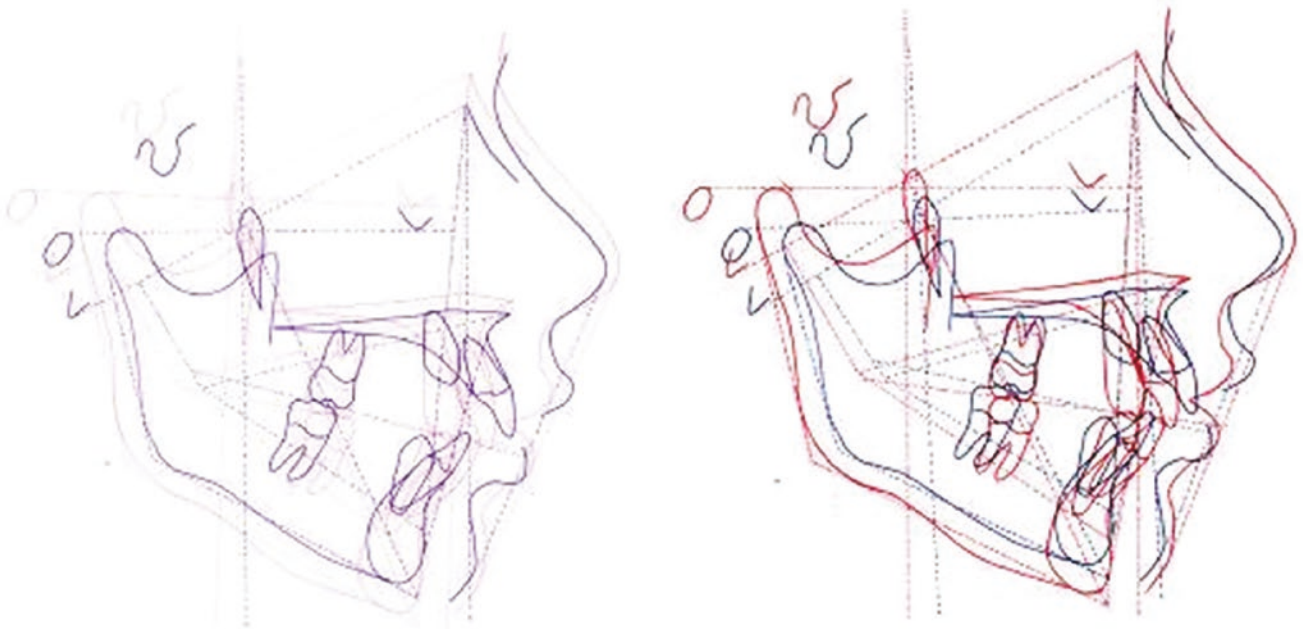


Fig. 3.46 Comparison Pre and post treatment cephalograms

3.3 Conclusion

According to the knowledge of the biological process involved in the dental masticatory system, such as the use of methods to individualize diagnosis and to create and correspond treatment planning, using the most efficient and appropriate therapeutic appliances, we certainly achieved facial harmony, normal occlusion, and neurophysiological corrections which provided a homodynamic activity.

The future tendency of science philosophy of our professional activity encourages us to recognize that facial orthopedics is the first priority before orthodontics every time. The neuromuscular balance gives the long-term stability and the maintenance of the normal occlusion.

The orthodontists must be prepared to understand the permanent evolution of our specialty respecting the basic principles.

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