

How to Avoid Long Term Relapse in Early Orthodontic Treatment

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Julia Harfin

Open bite is one of the most difficult types of malocclusions to treat not only in early or mixed dentition but also in permanent dentition. The real issue is how to avoid long-term relapse.

There is no doubt that there is a close interrelationship between breathing, facial musculature, and the tongue that affects not only facial growth but also the position of the teeth and TMJ function.

The position of the tongue at rest and the normalization of breathing play an important role not only during treatment but also during the retention period. Additionally, they are responsible for all types of relapse (Fig. 16.1a, b).

Since these anomalies are not self-corrected and are the result of multifactorial issues, the advantages of early treatment cannot be denied.

Environmental factors during primary and mixed dentition play an important role in the development of this problem (Cozza et al. 2005). For this reason, the sooner these factors are controlled, the less relapse is present.

Early recognition of the etiology can prevent ongoing problems and the development of worse abnormalities in the future (Fig. 16.2a, b).

The most common local causes of anterior open bite in children are related to tongue thrusting, sucking habits, and mouth breathing (Hepper et al. 2005).

Normally, they are accompanied by a downrotation of the mandible with extrusion of the molars and intrusion of the upper and lower incisors (Fig. 16.3a, b).

All these habits could cause interferences with the circumoral musculature and, of course, cause the abnormal position of the tongue. The sooner they are corrected, the better the results (Castilho and Rocha 2009).

The main strategy is to eliminate these abnormalities as soon as possible (Ramirez Yañez and Paulo 2008).

Sometimes, the child's psychological state plays an important role during this whole process and the help of a specialist is invaluable. Different alternatives (removable or fixed appliances) can be used but the parents' help is priceless.

The frequency and duration of thumb-sucking and tongue thrust swallowing are determinants during deciduous and early mixed dentition. It is important to remember that finger-sucking is one of the worst oral habits present in children, and sometimes, it appears during the intrauterine life (English 2002). When it is prolonged, past the age of 2–3 years, it can alter the normal path of facial growth and dental occlusion (Torres et al. 2012) due to the abnormal force applied on the orofacial muscles and the frontal teeth.

Anterior open bite with maxillary incisor flaring and retrusion of the lower anterior teeth are the common characteristic clinical signs, in addition to a long anterior face, snoring, eye bags, and sleepiness.

The early elimination of these habits is fundamental to recover normal growth. For this reason, parents play an important role in this phase of treatment by accompanying children during this whole process.

There are several appliances that can be used to achieve good results, but it is important to recommend a child-friendly one to obtain the willingness of the child to stop the habit (Huang 2002). The orthodontist has the final decision.

The following examples describe the step-by-step treatment.

This 7-year, 6-month-old patient was sent to the office due to speech problems (Fig. 16.4a, b).

Adeno- and tonsillectomy was performed 8 months earlier, but tongue thrust and abnormal tongue posture were not self-corrected as was visible on the frontal and profile smile photographs.

During spring, she regularly suffered from asthma that was treated with corticoids.

The dental frontal photograph showed a significant open bite, with no midline dental deviation. The anterior position of the tongue is clearly visible. Negative overjet and overbite were present (Fig. 16.5a, b).

J. Harfin (✉)
 Department of Orthodontics, Maimonides University,
 Buenos Aires, Argentina
 Health Sciences Maimonides University,
 Buenos Aires, Argentina

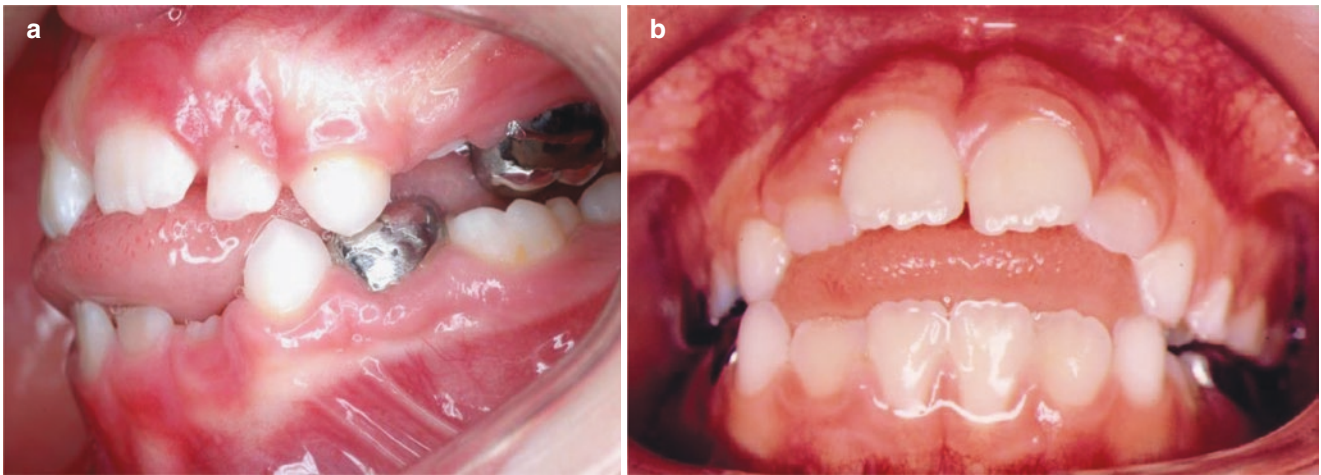


Fig. 16.1 (a, b) Position of the tongue at rest

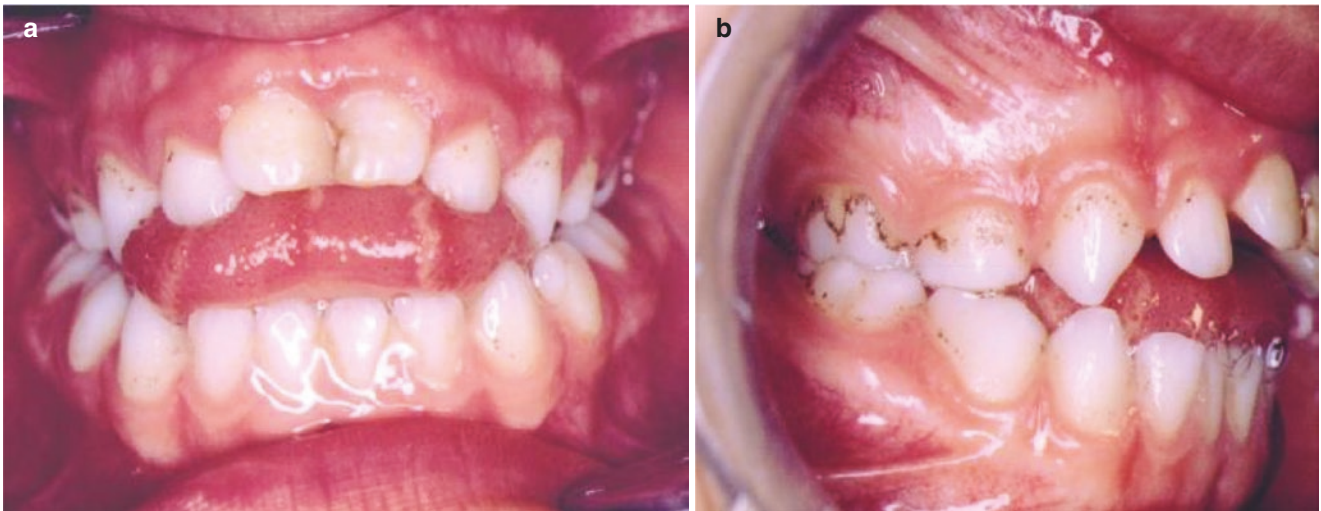


Fig. 16.2 (a, b) Anterior open bite in deciduous dentition (3 years old)

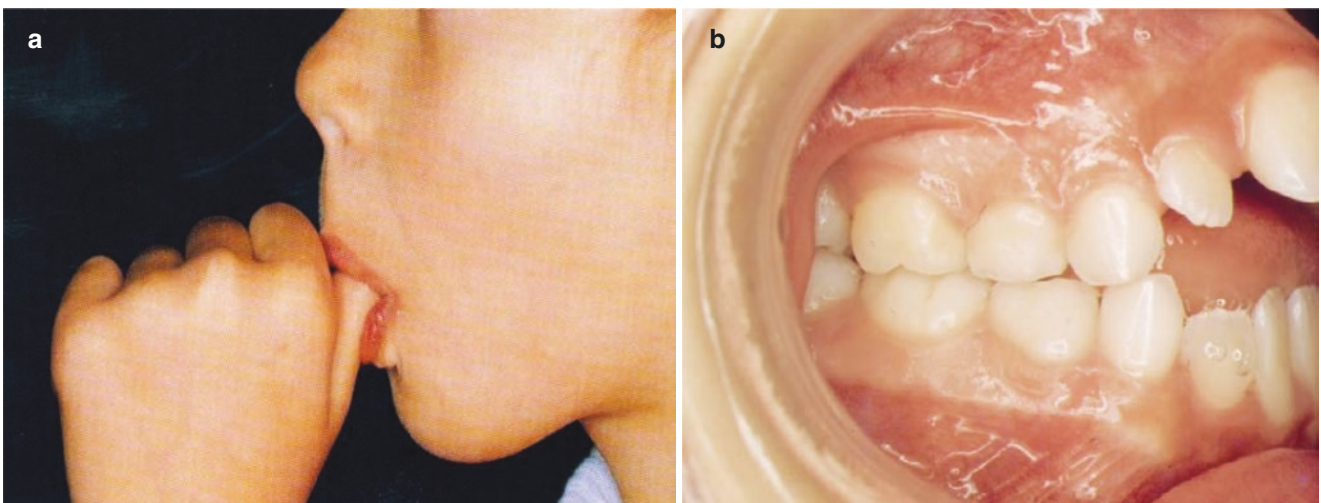


Fig. 16.3 (a, b) Severe open bite due to thumb sucking. Flaring of the upper incisors and retrusion of the lower incisors are clearly visible



Fig. 16.4 (a, b) Pretreatment frontal and profile smile photographs

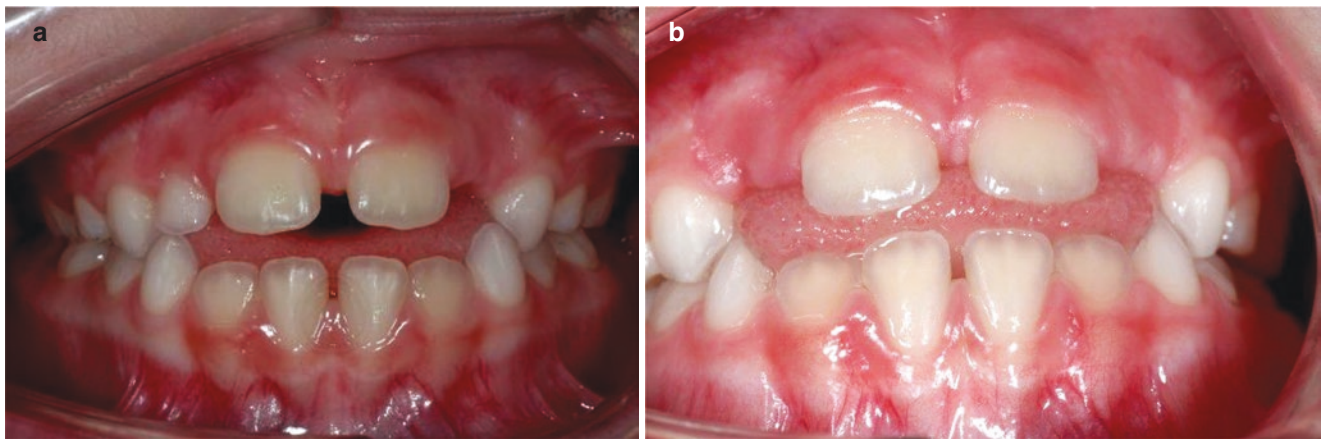


Fig. 16.5 (a, b) Pretreatment frontal dental photographs where the anterior position of the tongue is clearly visible

Class I molar and no posterior crossbite were observed on the lateral views (Fig. 16.6a, b).

The phase I treatment objective was to normalize overjet and overbite, maintain Class I molar, normalize tongue thrust, improve the activity of the lips, and enhance her profile (Torres et al. 2012).

To achieve this objective, the use of a functional appliance was decided. The Myobrace System (Myofunctional Research Co., Australia) was the best option for this patient.

It is fabricated with a special type of polyurethane and helps the correction and normalization of the muscular and tongue dysfunction (Fig. 16.7a, b). Since the material is soft, no major problems of adaptation were present.

It is recommended that the appliance be used 2–3 h during the day and then all night.

These were the results after 7 months of treatment. No more asthma attacks were reported by the mother 4 months prior to that checkup.

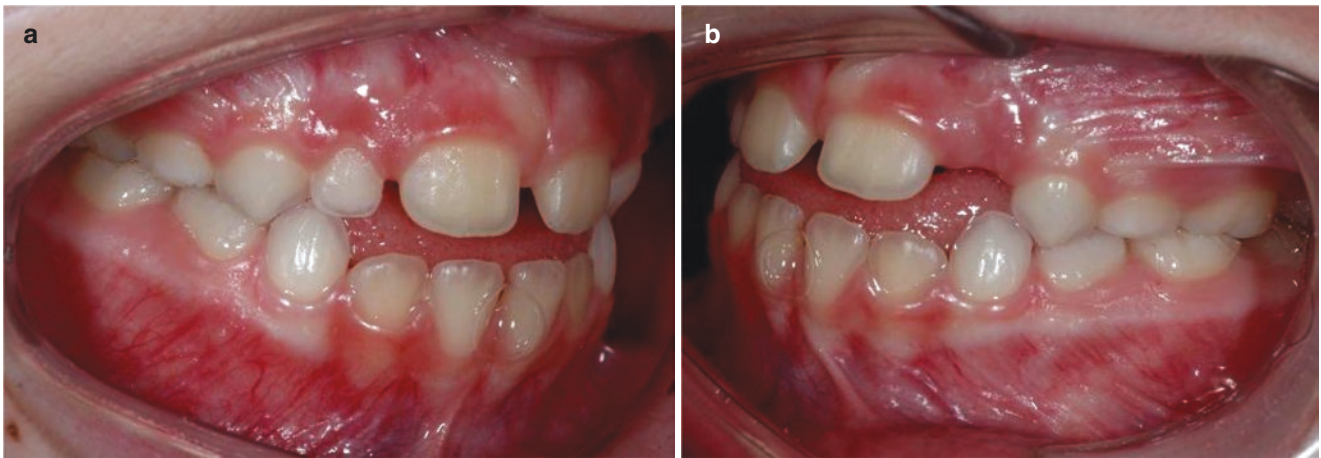


Fig. 16.6 (a, b) Pretreatment lateral views with no posterior crossbite

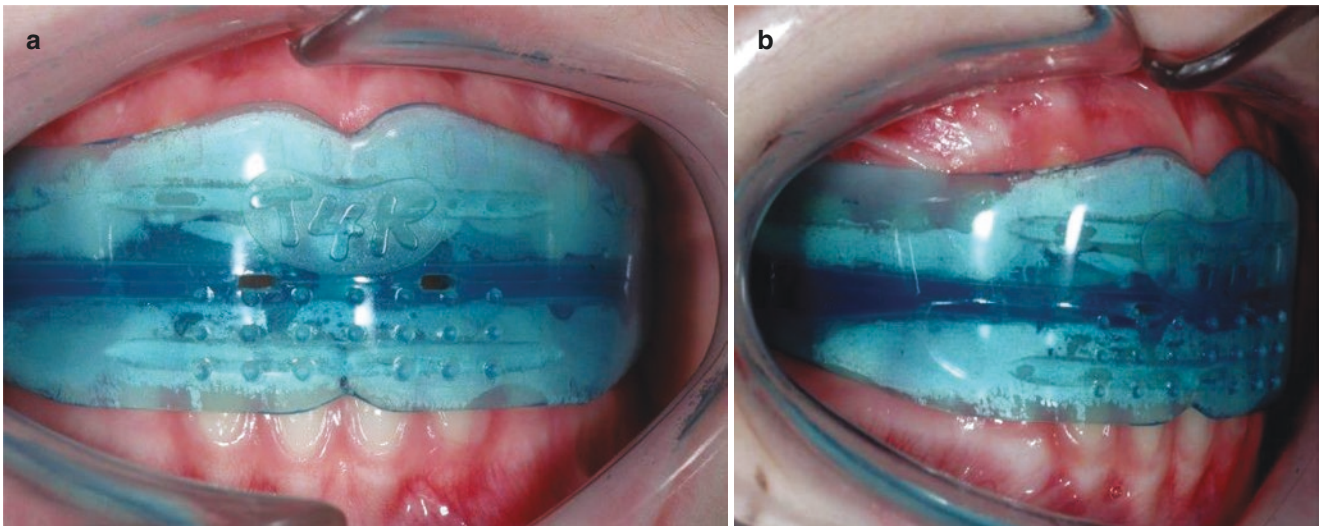


Fig. 16.7 (a, b) Myobrace System in place

The speech problems noticeably improved as well as the anterior position of the tongue during swallowing and in resting position.

These results were confirmed when the smile photograph was observed (Fig. 16.8a, b).

Class I molar and lateral occlusion were maintained. The anterior open bite had improved and midlines were coincident (Fig. 16.9a, b).

Four months later (11 months of treatment), less interincisal diastema was present. Overjet and overbite were improved and nasal breathing was totally recovered (Fig. 16.10a, b).

The patient continued using the functional appliance (Myobrace) for 2–3 h a day and all night plus respiratory and tongue exercises. This appliance is very child-friendly and the results are predictable (Fig. 16.11a, b). Class I molar was

maintained. No other orthodontic appliance was recommended during this phase of treatment.

Facial photographs taken 2 years after treatment during a follow-up appointment showed that the patient could close her lips without tension and a relaxed smile was present (Fig. 16.12a, b).

The profile and lateral smile photographs confirmed the results, and a double chin was not present (Fig. 16.13a, b).

It is important to highlight that all treatment goals were achieved: midlines were coincident with a beautiful smile. Oral hygiene was still good (Fig. 16.14a, b).

Gingival and occlusal planes were parallel and no gingival recessions were present (Fig. 16.15a, b). The treatment goals were totally achieved without the use of other appliances.

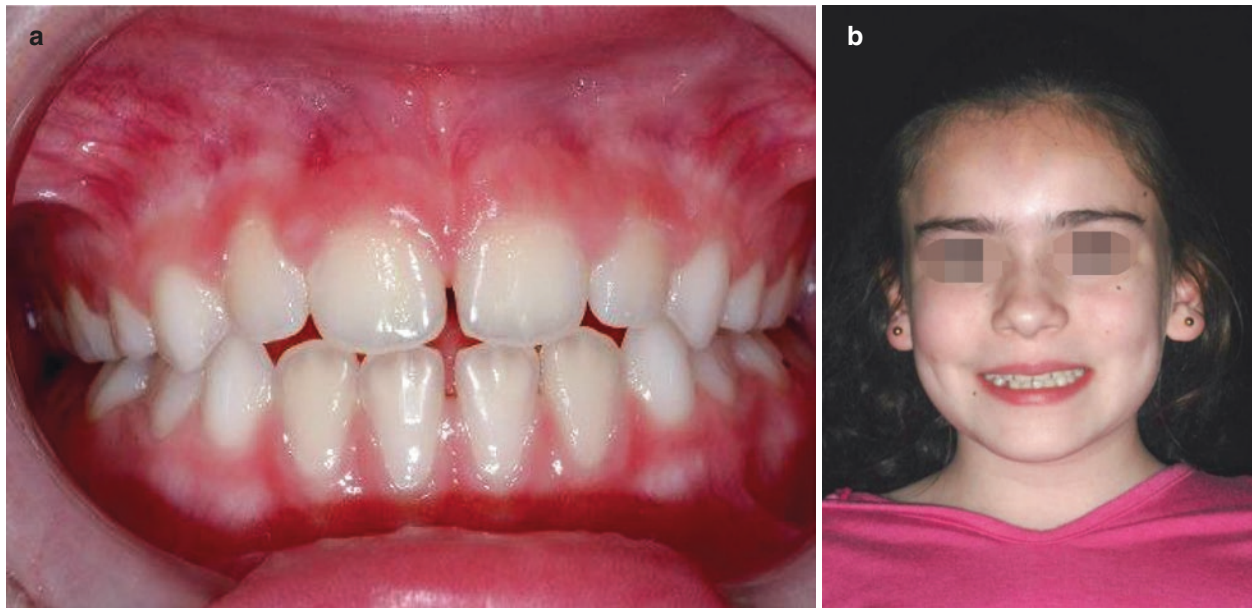


Fig. 16.8 (a, b) After 7 months of treatment



Fig. 16.9 (a, b) Lateral views after 7 months of treatment

All permanent teeth erupted in a normal position at the end of the treatment period (20 months). Upon analyzing the upper and lower occlusal photographs, rounded and normal arcades were confirmed. No cavities were present (Fig. 16.16a, b).

The comparison between the pre- and posttreatment frontal dental photographs demonstrates the normalization of the position of the tongue and the correction of the anterior open bite (Fig. 16.17a, b).

No other appliance or brackets were required to achieve the expected results. A similar appliance (Myobrace System)

was recommended during the whole retention period (Fig. 16.18a, b) (Ramirez Yañez and Paulo 2008).

The comparison between the pre- and posttreatment photographs clearly demonstrated that all objectives were obtained. The success achieved is based on the control and monitoring of the breathing difficulties and tongue position in concordance with the establishment of the neuromuscular function (Fig. 16.19a, b).

It is important to treat the causes of the malocclusion rather than only the symptoms. The patient and the parents must understand the real magnitude of the problem, and their

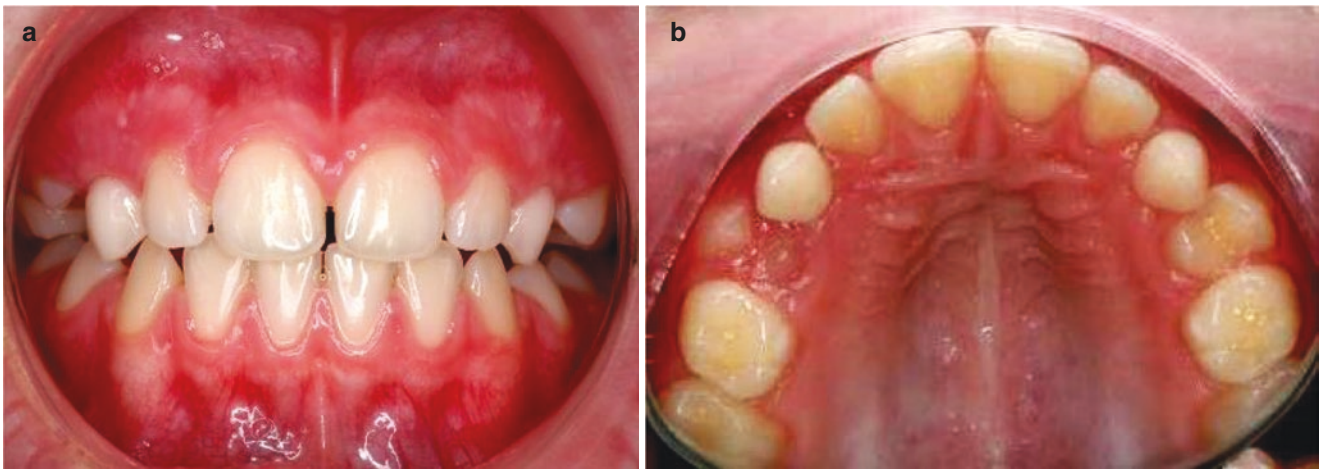


Fig. 16.10 (a, b) Frontal and upper occlusal views after 11 months of treatment

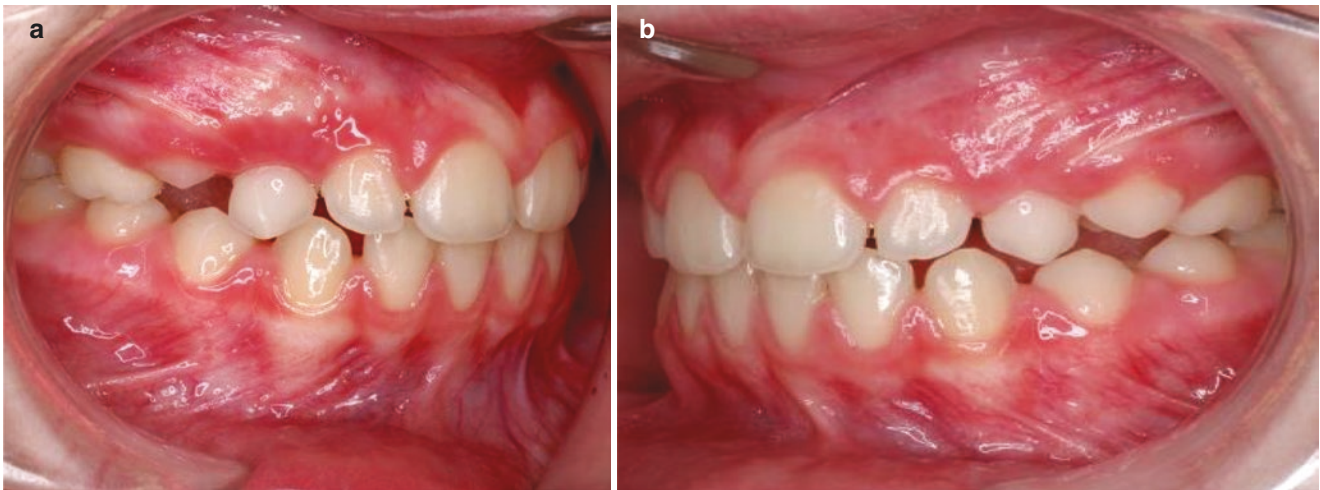


Fig. 16.11 (a, b) Lateral views at this time of treatment

cooperation is a key factor in obtaining stable results and a complete habit control.

In our everyday clinical practice, deep bites are other very common types of malocclusion. The relationship between significant deep bites in children with TMD disturbances is acknowledged worldwide. This cause-effect relationship might cause posterior and superior displacement of the condyle and, as a consequence, dysfunction and headaches, in conjunction with muscular and joint pain (Du and Hagg 2003).

The following patient is a clear example. He is a 7-year, 9-month-old boy who was sent to the office due to some pain and TMJ clicking.

The frontal and profile photographs confirmed a reduced lower third of the face compared to that in the middle side of the face. The right side of the face was wider than that on the left side. The chin seemed to be retruded (Fig. 16.20a, b).

The smile photograph confirmed a significant contraction of the masseter muscles, more evident on the right side. Overbite was almost 100% in the incisor area in conjunction with an uneven gingival line (Fig. 16.21a, b).

The pretreatment lateral views confirmed Class II molar and canine. Retrusion of the upper central incisors were clearly visible. The gingival line and occlusal plane were not parallel (Fig. 16.22a, b).

No crowding was present in the upper and lower arches, although some dental rotations were present in the upper arch (Fig. 16.23a, b).

The treatment objectives included different aspects. It is important to consider not only the position of the teeth but also the muscles and gingival and occlusal plane asymmetry. Since TMD disturbances have a multifactorial etiology, an exhaustive clinical exam is mandatory (Ramirez-Yañez et al. 2007).



Fig. 16.12 (a, b) Final facial frontal photographs



Fig. 16.13 (a, b) Profile and lateral smile photographs 2 years after treatment

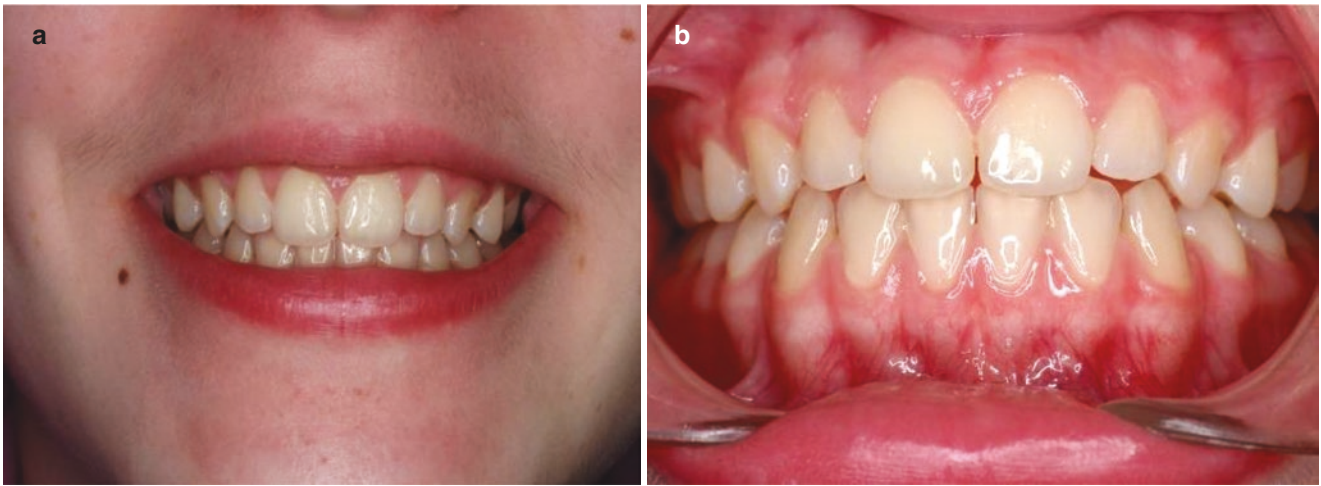


Fig. 16.14 (a, b) Smile and frontal dental photographs after 2 years in retention

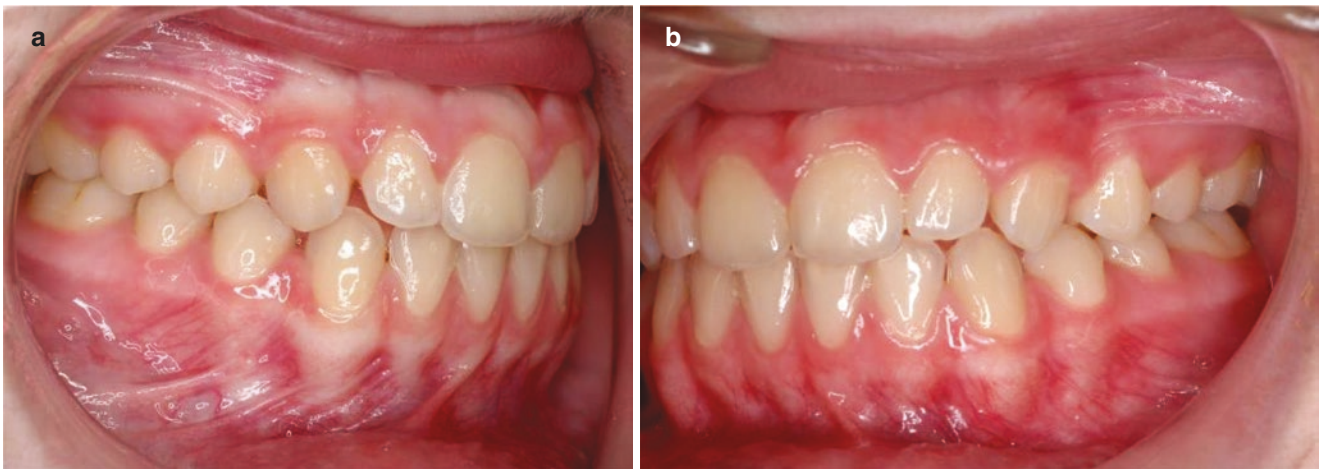


Fig. 16.15 (a, b) Lateral views at the end of treatment. Gingival and occlusal planes were parallel

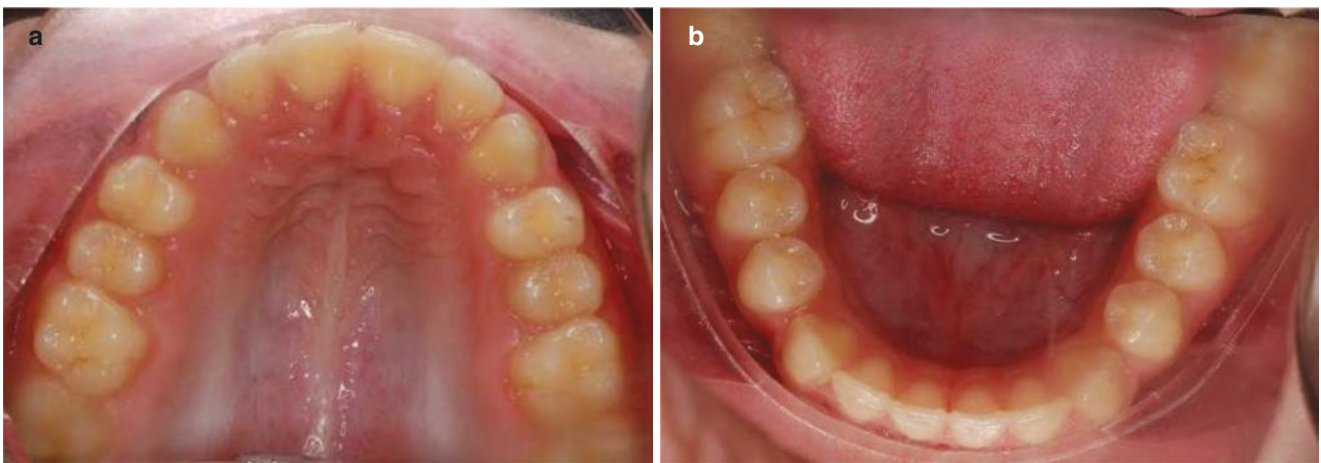


Fig. 16.16 (a, b) Occlusal photographs at the end of treatment

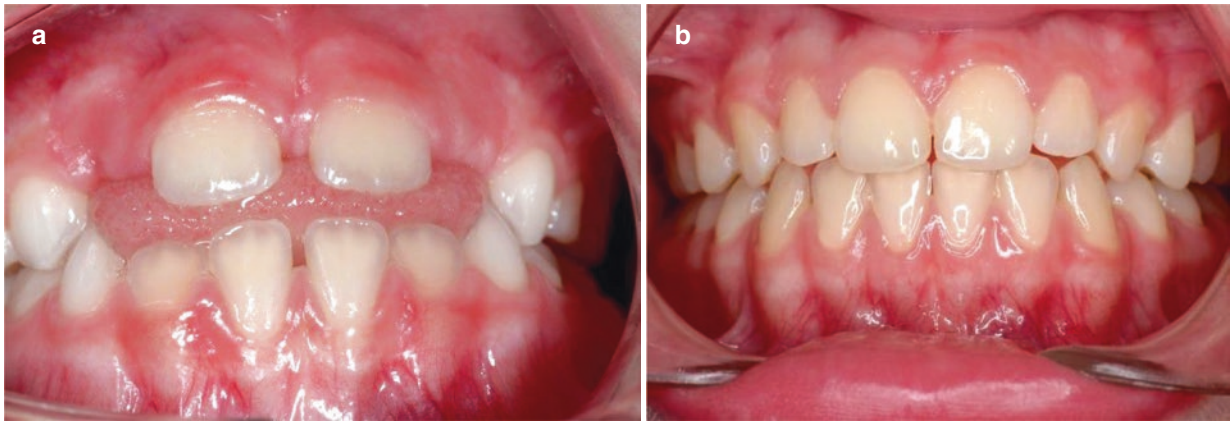


Fig. 16.17 (a, b) Comparison of frontal dental photograph pre- and posttreatment

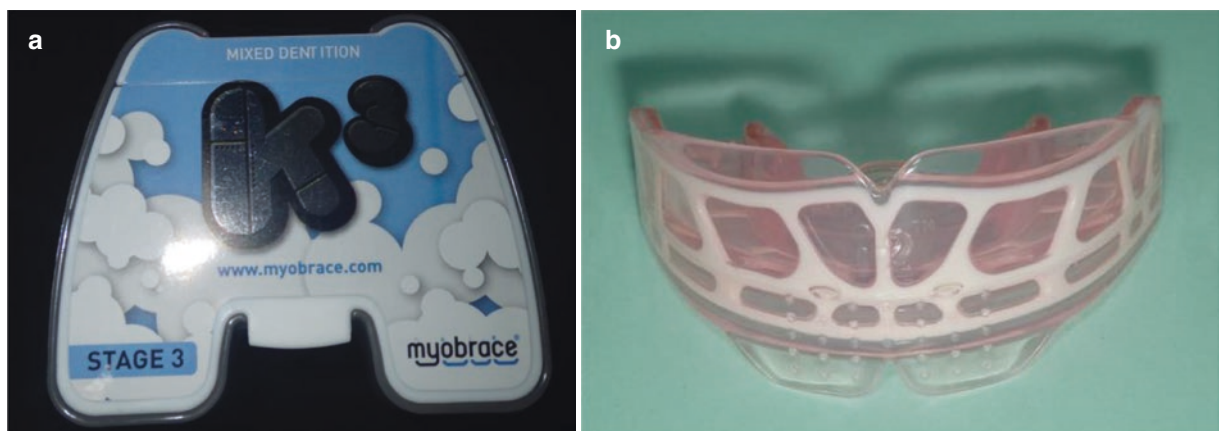


Fig. 16.18 (a, b) Myobrace System for the retention period

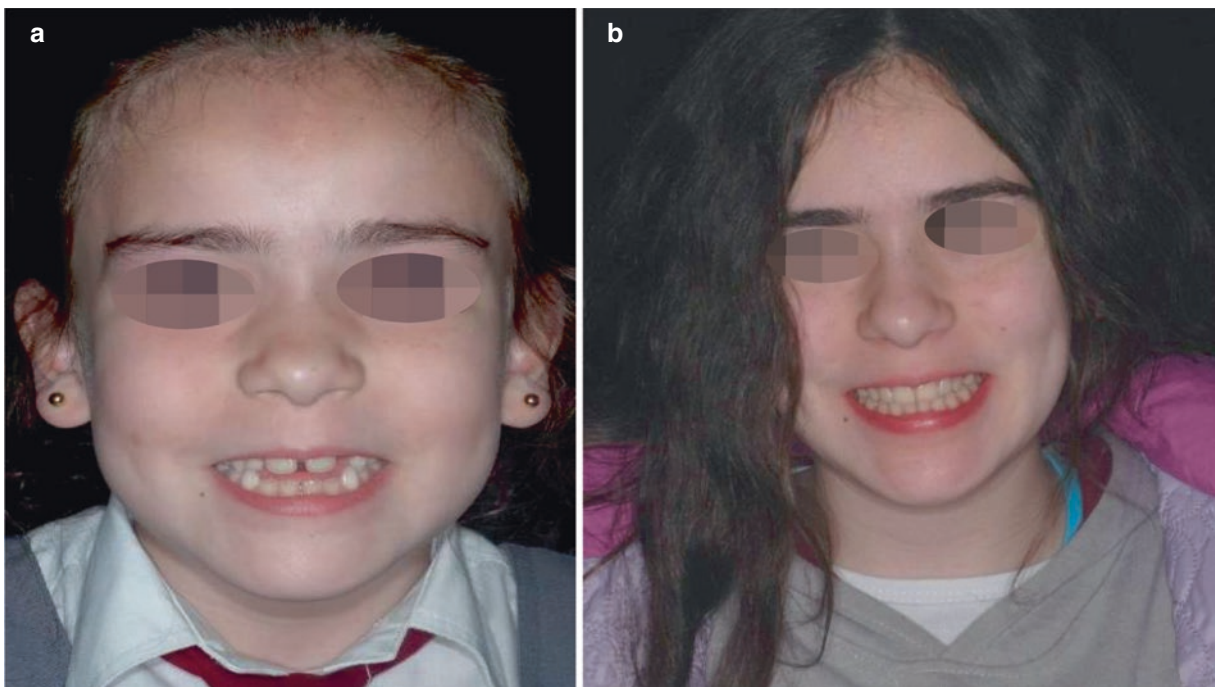


Fig. 16.19 (a, b) Comparison of pre- and posttreatment photographs



Fig. 16.20 (a, b) Pretreatment frontal and profile photographs

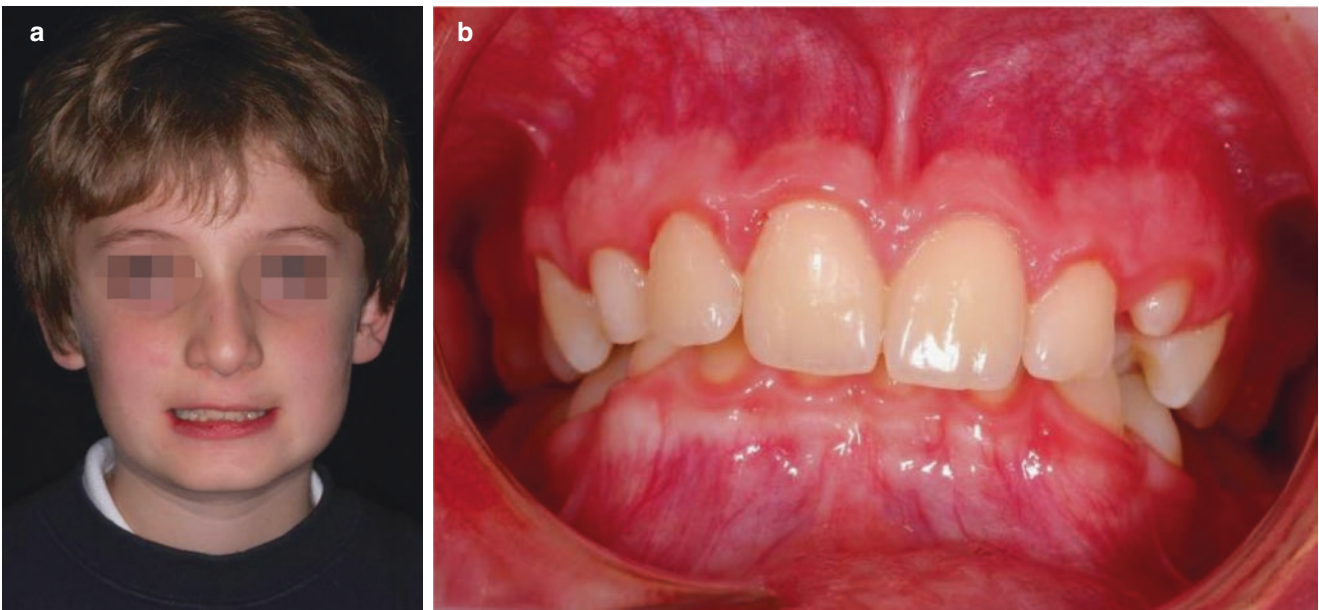


Fig. 16.21 (a, b) Smile and dental frontal photographs



Fig. 16.22 (a, b) Pre lateral views. Retrusion of the central upper incisors was remarkable

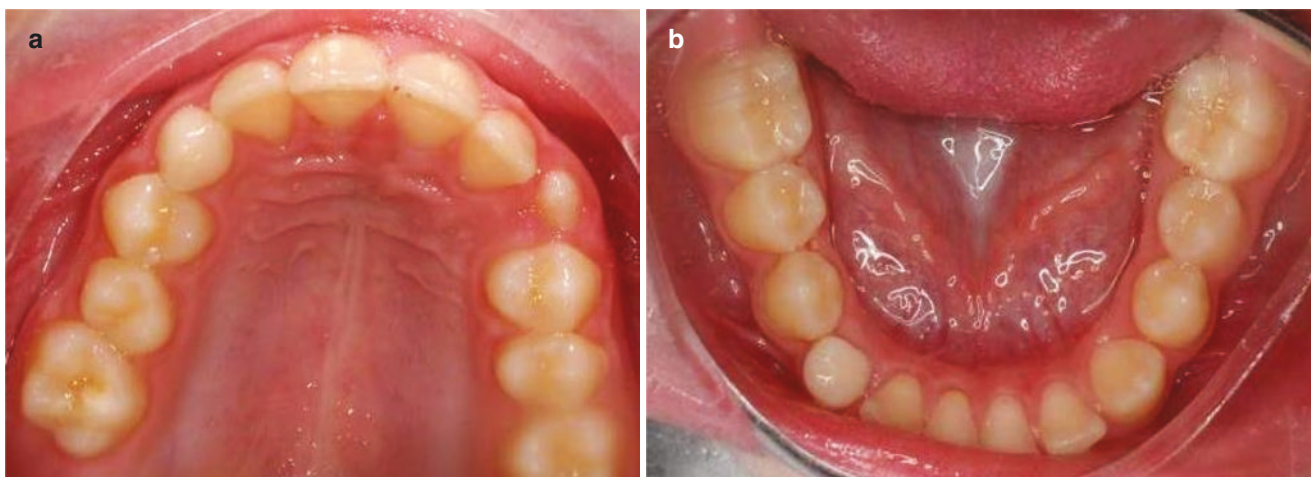


Fig. 16.23 (a, b) Pretreatment photographs of the upper and lower arches

Sometimes, the uneven occlusal plane is the consequence and not the cause of the dental and facial asymmetries.

The panoramic and lateral radiographs confirmed the clinical observations: The patient had a severe brachycephalic pattern with reduced lower anterior height (35 mm), Class II molar and canine, and significant overbite (7 mm) with no agenesis or supernumerary teeth (Fig. 16.24a, b).

In order to achieve the treatment objectives, a Myofunctional protocol was advisable. The use of the Myobrace System is highly recommended since it allows treatment of the main causes of these disorders.

The time schedule included 2 h during the day and all night. This type of appliance is very child-friendly for the patient (Fig. 16.25).

These are the results after 4 months of treatment: No more pain or TMJ disturbances were present. Improvement in the front area was clearly visible (Fig. 16.26a, b).

When analyzing the right and left sides, some modification in the molar and incisor areas were observed (Fig. 16.27a, b).

Some improvement was visible when the frontal and profile photos were analyzed (Fig. 16.28a, b).

In order to continue his dental alignment and to normalize his overjet and overbite, the Trainer for Alignment Phase 2 was recommended. The time of use was similar to that of the first case: 2–3 h a day and all night (Fig. 16.29a, b).

The following photographs explain how the appliance should be used very clearly. The frontal and lateral shields are useful to exercise the orofacial muscles and can improve the potential of growth (Fig. 16.30a, b).

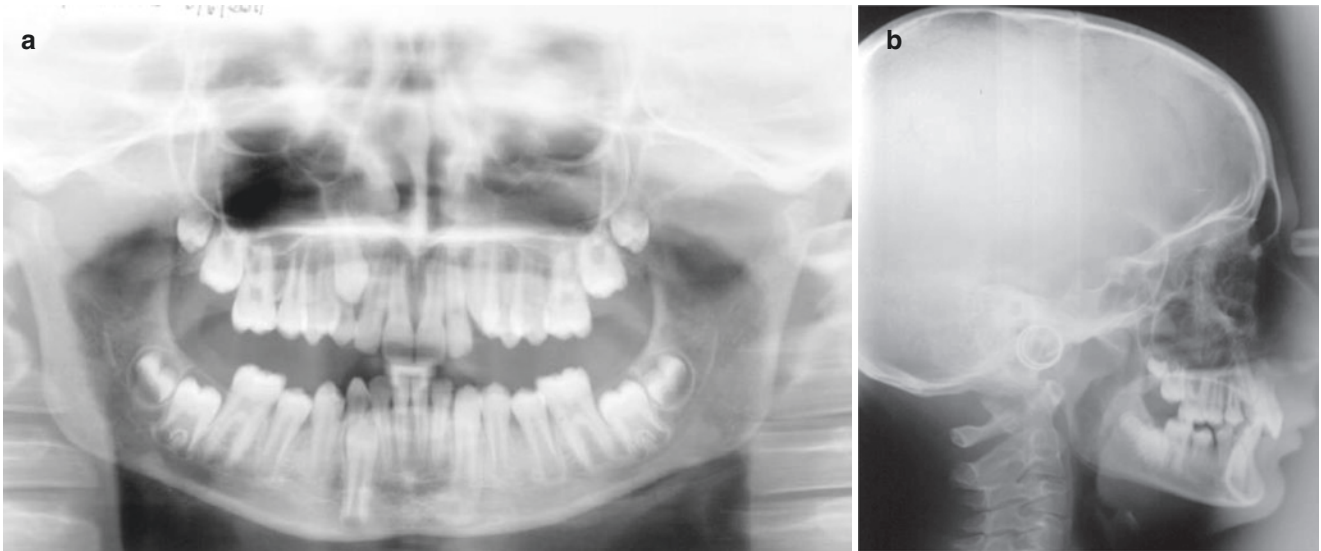


Fig. 16.24 (a, b) Pretreatment radiographic images



Fig. 16.25 Myobrace at the first stage

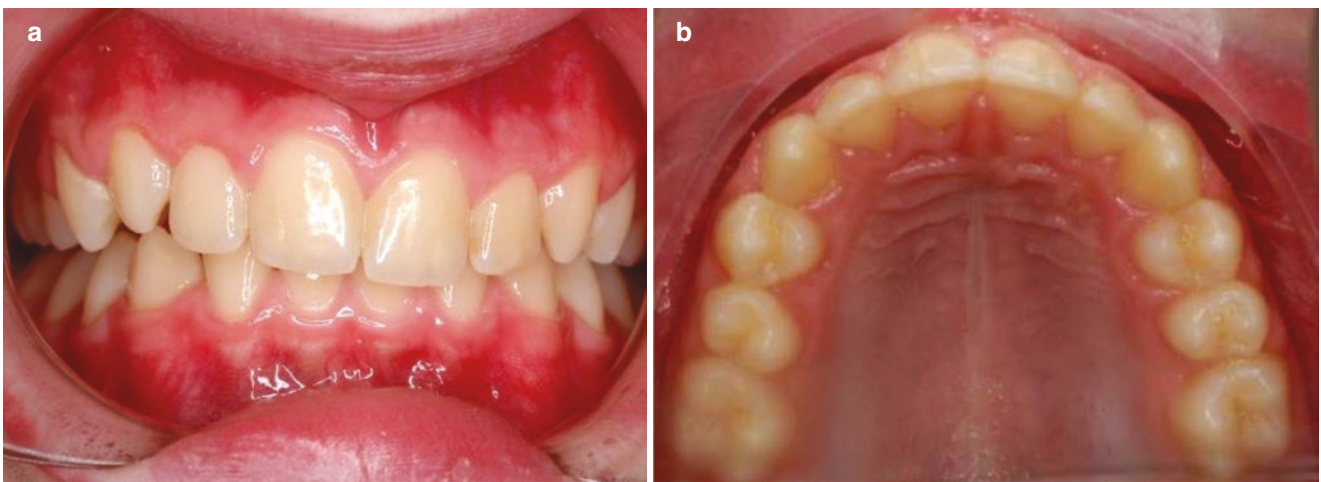


Fig. 16.26 (a, b) Frontal and occlusal photographs after 4 months of treatment

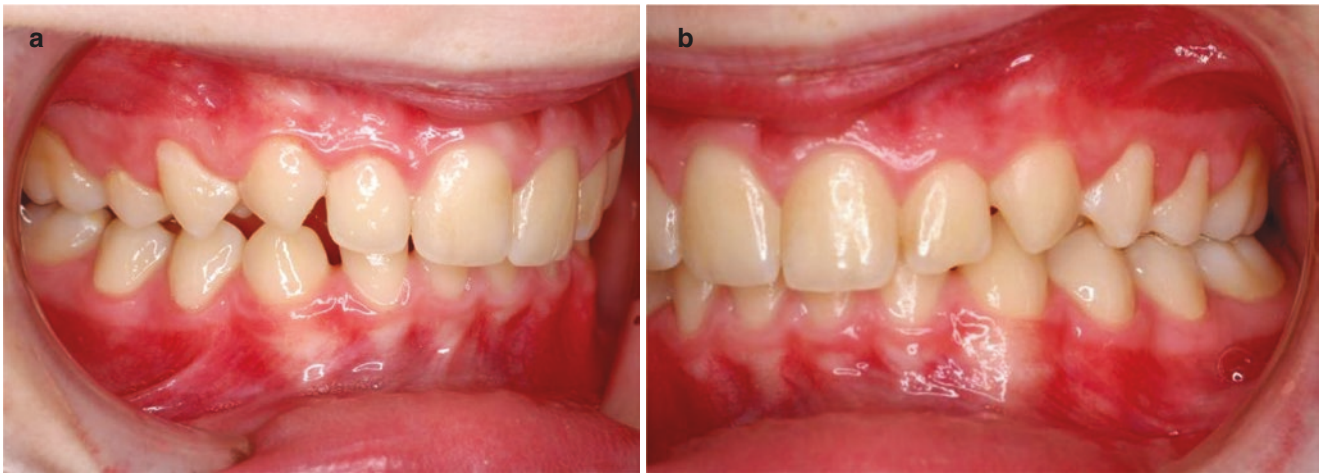


Fig. 16.27 (a, b) Lateral views after 4 months of treatment

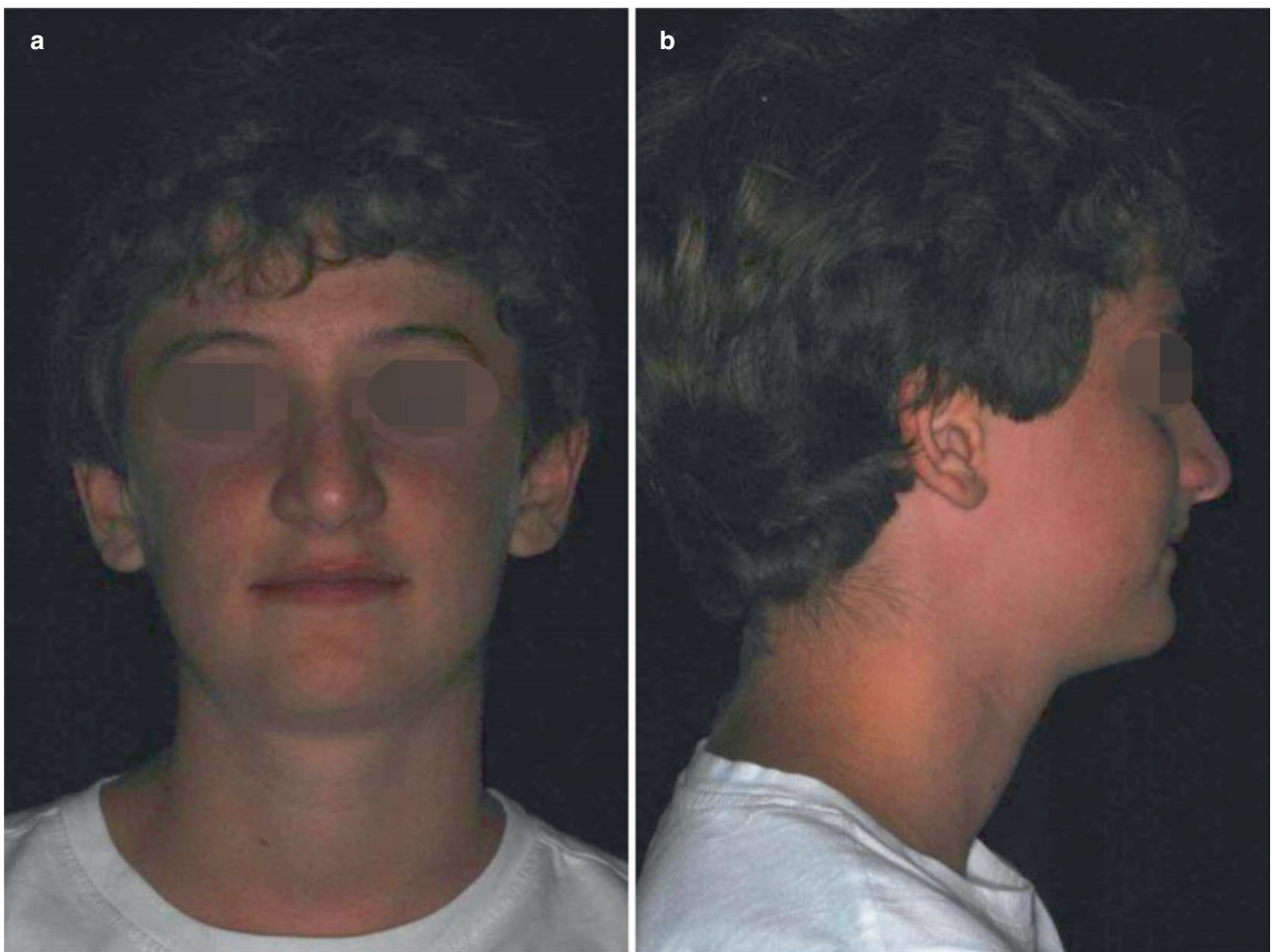


Fig. 16.28 (a, b) Frontal and profile photographs after 4 months of treatment

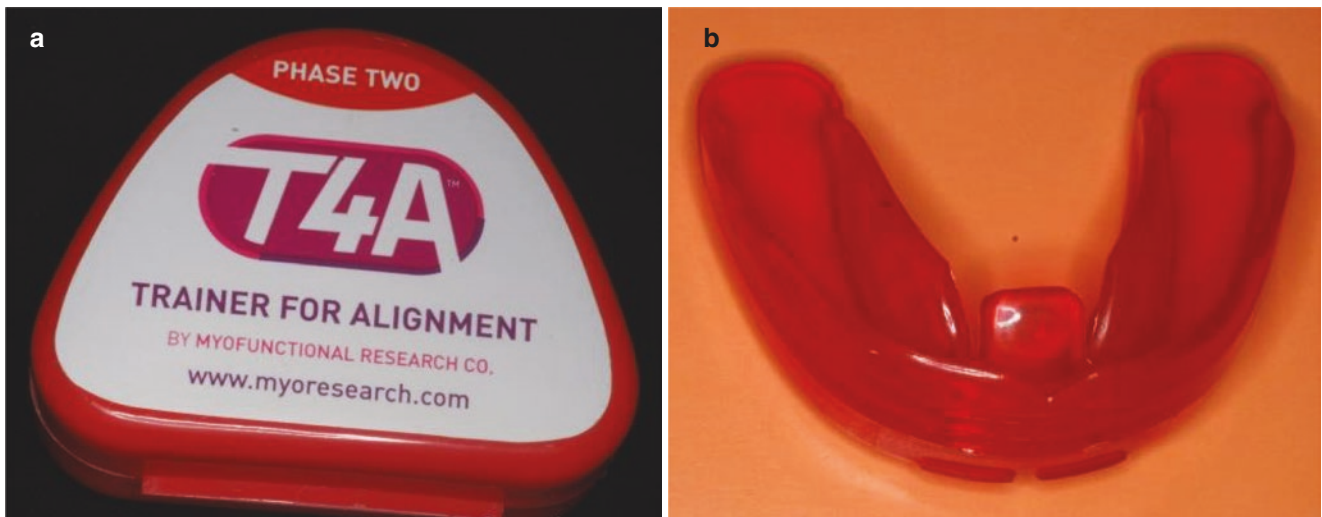


Fig. 16.29 (a, b) Trainer for Alignment (Myofunctional Research Co.)

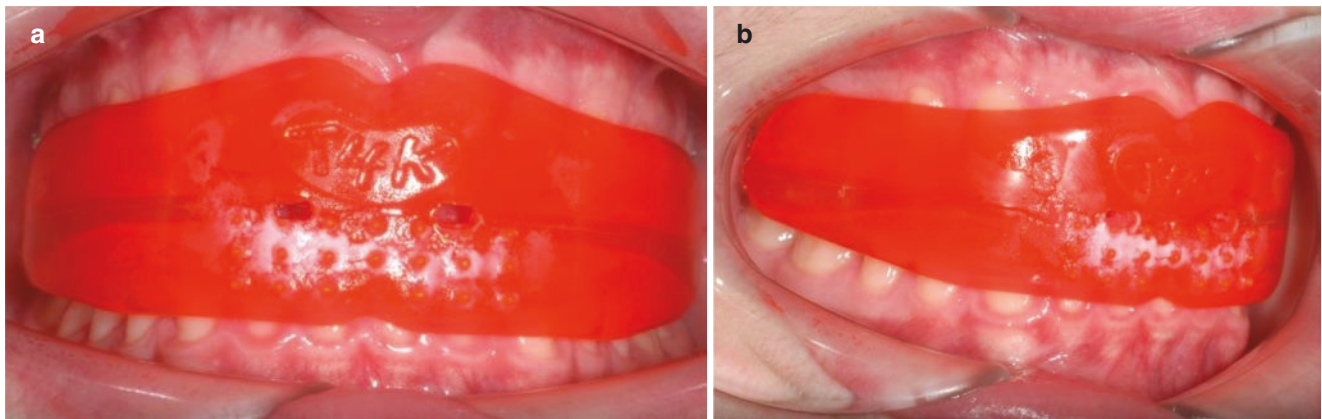


Fig. 16.30 (a, b) Frontal and lateral views with the T4A appliance in place

The following photographs showed the improvement after 12 months of treatment. Clinical enhancement of the vertical dimension was advisable (Fig. 16.31a, b).

The following photographs showed improvement after 20 months of treatment using the same time protocol: 2–3 h during the day and all night (including phase I and phase II). Complete normalization of the overjet and overbite was achieved (Fig. 16.31a, b).

Since his family had moved, the patient returned to the office 3 years later. He had lost his last appliance weeks earlier. Although mild asymmetry was visible, TMJ problems nor important headaches were not present (Fig. 16.32a, b). Normalization of the overjet and overbite was maintained. In order to maintain these positive results, a new Myobrace appliance was suggested (Bakke and Moller 1991) (Fig. 16.32a, b).

The lateral facial photographs showed a significantly concave profile with tension of the upper lip when the patient smiles. The lower third of the face was almost normal (Fig. 16.33a, b).

At this time, a new appliance was recommended in order to maintain the results and control the musculature. The occlusion was stable (Fig. 16.34a, b).

The lateral views confirmed that Class I canine and molar were maintained as well as a normal overjet and overbite (Fig. 16.35a, b).

The occlusal photographs showed a normal arch form with no cavities nor periodontal problems (Fig. 16.36a, b).

It is interesting when pre- and 3 years' posttreatment frontal photographs are analyzed. Complete correction of the uneven gingival line was achieved and a significant overbite and midlines were normalized with the use of the Myofunctional appliances (Fig. 16.37a, b).

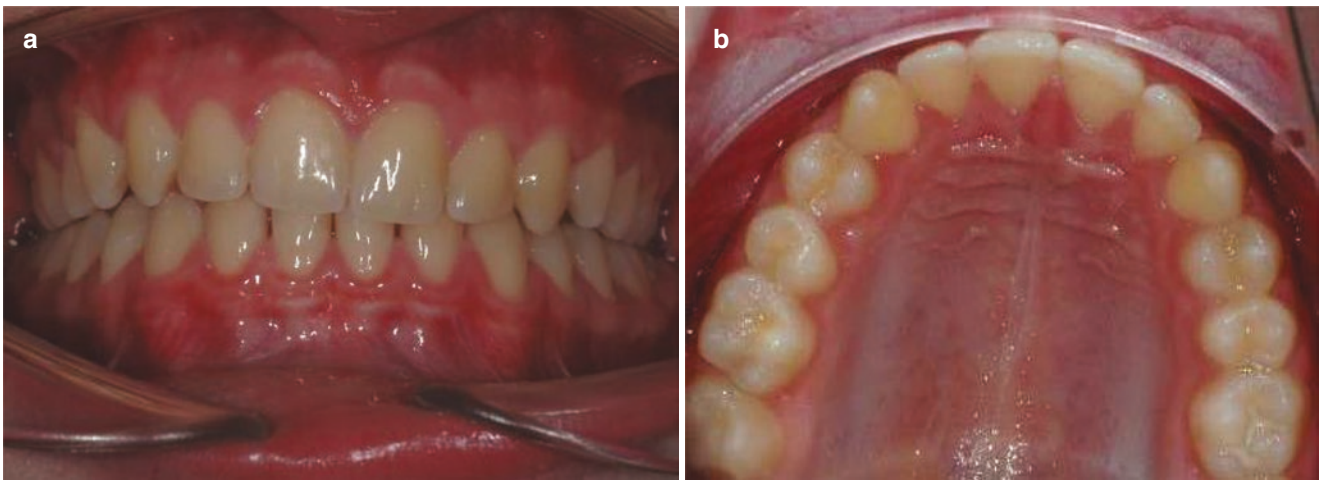


Fig. 16.31 (a, b) Posttreatment frontal and occlusal maxillary photographs

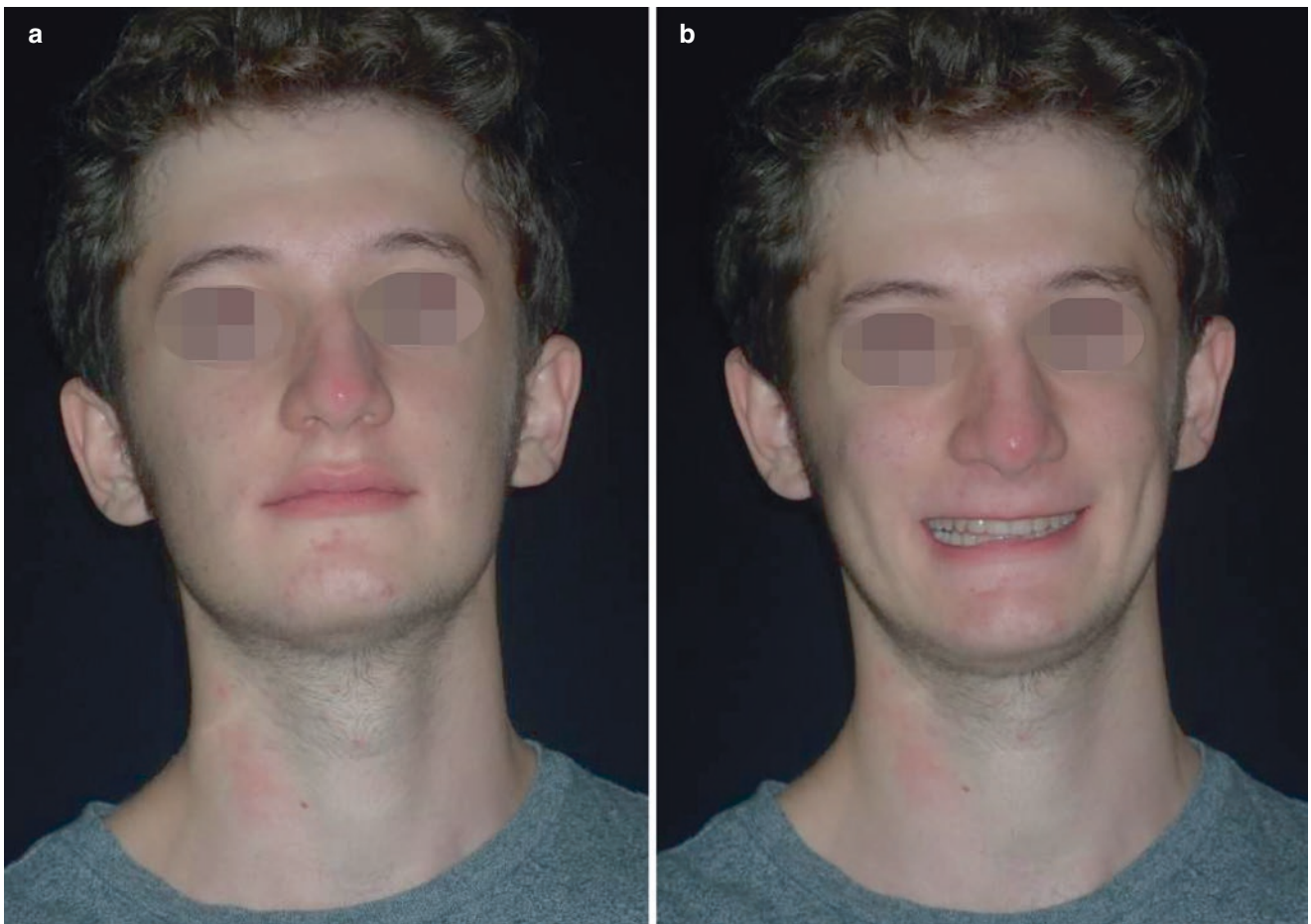


Fig. 16.32 (a, b) Front and smile photographs 3 years posttreatment



Fig. 16.33 (a, b) Lateral and smile photographs 3 years after treatment

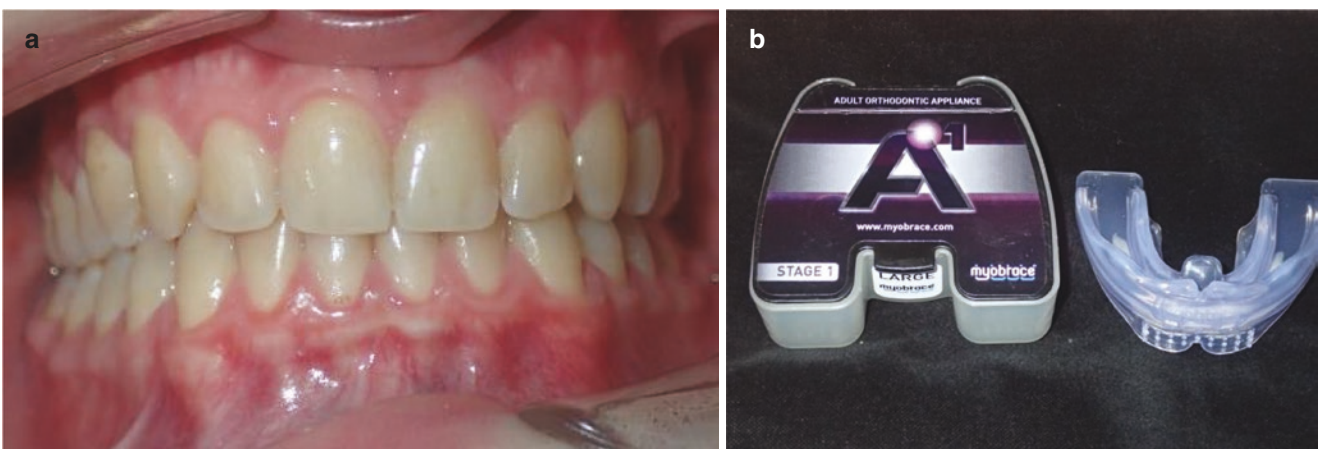


Fig. 16.34 (a, b) An adult Myobrace stage 1 was recommended to maintain the results



Fig. 16.35 (a, b) Follow-up 3 years later

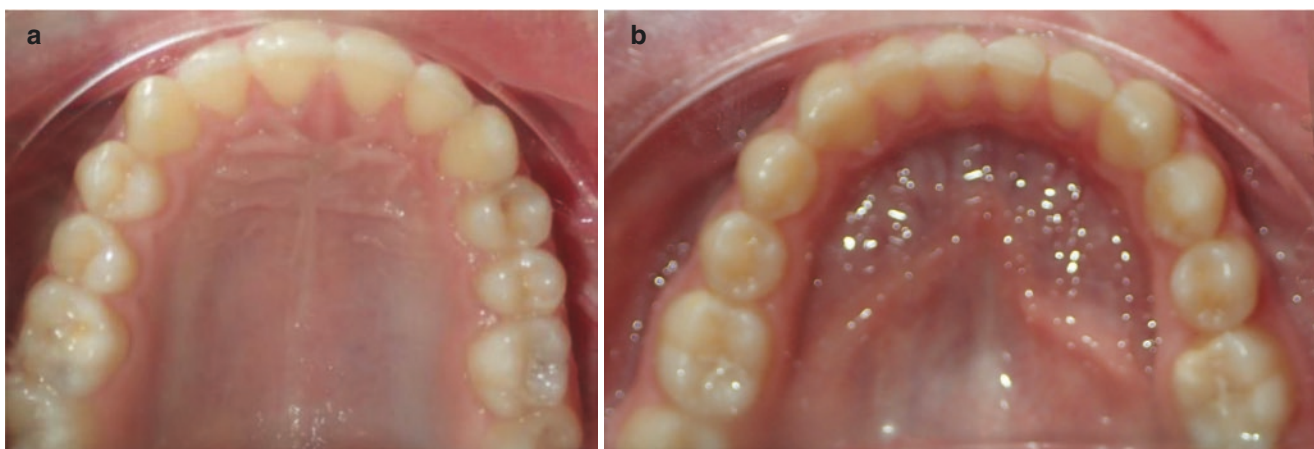


Fig. 16.36 (a, b) Upper and lower occlusal arches

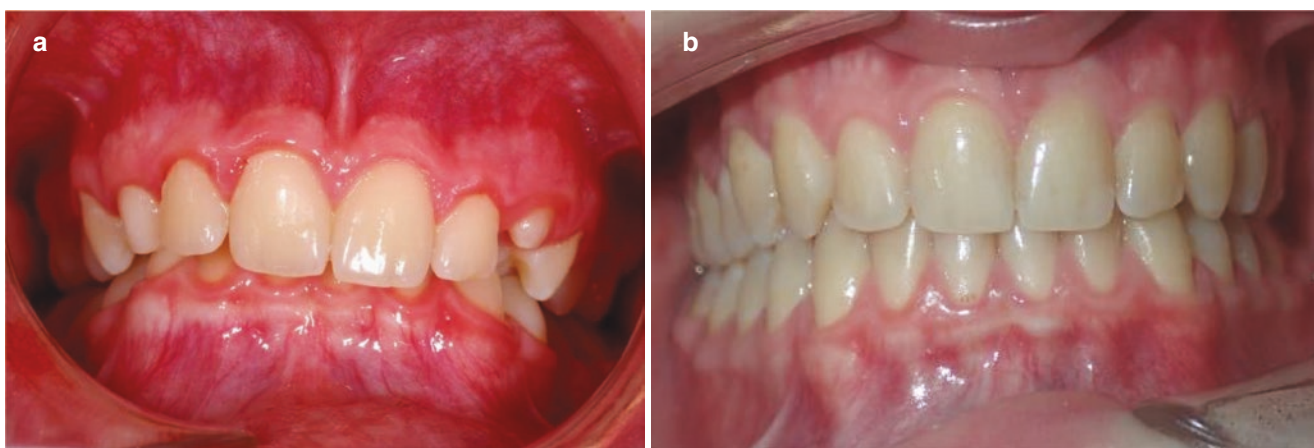


Fig. 16.37 (a, b) Comparison pre- and 3 years' posttreatment photographs

16.1 Conclusion

Ideally, open bite should be treated as early as possible. It is important to consider that reminder therapy has to be applied during the whole treatment and also during the retention period (Graber 1963).

Patients with open bite also have TMJ problems, episodes of snoring, and sleep apnea disorders. The child can stop breathing several times during the night (20–40 times per hour). As a consequence, he or she would feel daytime fatigue, sleepiness, headaches, changes in personality, lack of attention at school in the morning, etc.

Since sleep apnea is a progressive disorder, consultation with the specialist is very important from the first day in order to perform a multi- and interdisciplinary treatment and avoid relapse.

There is no doubt that early intervention of all oral habits can reduce or prevent major problems in the future. It is advisable that open bites be treated as soon as possible to reinstate normal breathing function and reduce the possibility of relapse (Urzal et al. 2013). The parents and the children have to be aware and cooperate to achieve excellent results. There is no complete evidence between the relationship of deepbite malocclusion and TMD problems, but clinical association is inevitable.

Despite the type of appliance used, the orthodontist has to bear in mind the importance of the multifactorial etiology of temporomandibular problems and to normalize its function to achieve long-term results (Posen 1972).

There is strong evidence that the earlier the open bite and deep bite problem is corrected, the better the prognosis will be.

Habit elimination is mandatory to prevent not only open bite but deep bite relapse (Ngan and Fields 1997). It is important to look for an effective protocol that should be individu-

alized for each patient. Long-term control is fundamental to confirm the achieved results (Ramirez Yañez and Paulo 2008).

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