

## Management of Facial Asymmetry in Growing Patient: Case Report

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### ABSTRACT

9 years old patient presented to the orthodontic clinic with chief complaint of facial asymmetry and crowded teeth in both jaws. Early diagnosis, proper treatment plan; reasonable objectives and early intervention with best mechanics will result in a good smile and better facial esthetic in addition to good occlusion. Surgical intervention was avoided where most of the patients do not like it. Treatment plan and management were presented and discussed.

**Keywords:** Facial asymmetry, Class III malocclusion, Hybrid functional appliance

### INTRODUCTION

Facial asymmetry is a condition resulted from asymmetric growth of the mandible. It is reported in the literature that dentofacial deformities affect approximately 20% of the population, and patients with these discrepancies may present with several degrees of functional and esthetic involvement [1].

The etiology may be due to developmental, congenital, traumatic or neoplastic causes. A facial asymmetry could be a result of a mild skeletal discrepancy and this can be treated by orthodontics alone [2-4]. On the other hand, some conditions with skeletal asymmetries are considered to present difficult orthodontic treatment problems and require orthopedic treatment and/or surgical intervention [5-8].

Several treatment plans were offered in order to correct a specific cause and these plans may include; occlusal adjustments if there is minor deviation or orthodontic treatment combined with maxillary expansion if there is a need to correct a severe deviation. Further, some cases with displacement of the mandible caused by a habitual posture may require an initial need for using an occlusal splint for diagnosis and deprogramming [3].

Furthermore, the surgical intervention depends always on the timing of treatment which depends upon patient growth. It include various approaches; among these is the correction of occlusal can't deviation with asymmetrical impactions or down-grafting of maxilla, an asymmetrical rotation of mandible performing either bilateral sagittal split or ramus osteotomies and correction of residual chin deformity with a genioplasty [2-4].

One of the justifications of the higher prevalence of mandibular asymmetries; could be due to the longer period of mandibular growth when compared to the maxilla. This will increase the chances of mandibular deviation during development and also the mandible is a mobile bone, while the maxilla is rigidly connected to other bone structures through sutures and synchondroses [9].

To obtain a good result of such condition, a team approach including the orthodontist and the maxillofacial surgeon is required. The role of the orthodontist is to do all the pre-surgical and the postsurgical corrections. On the other hand the maxillofacial surgeon role is to select the right surgical procedure in order to achieve the best result. However, this will not be obtained unless there was close collaboration between the two specialties [2,4]. All this existing evidence led investigators to use innovative approaches for facial asymmetry diagnosis and treatment planning. However, various methods for qualitative and quantitative evaluations of both hard and soft-tissue changes have been described [3].

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The aim of this case report was to present the treatment plan and management of a growing patient presented with facial asymmetry to the left side and severe crowding in both jaws.

### CASE REPORT

9 years old male patient attended the dental clinic for orthodontic treatment with the chief complaint of facial asymmetry and crowded teeth in both jaws. The patient was born with hydrocephaly where he was treated earlier. Several years later he developed some complications that had resulted weakening of patient's left extremities for which he was receiving treatment.

#### Extraoral examination

The patient had an oval face with a convex profile and competent lips. The face revealed a left facial asymmetry in the lower third (**Figure 1**).



**Figure 1.** Extra-oral view before treatment. Patient showing oval face, convex profile, competent lips, an obtuse naso-labial angle and asymmetry of the face to the left side.

#### Intraoral examination

Patient was in the early mixed dentition stage. The sagittal relation indicates a Class III incisor's relationship with an overjet of -1 mm. The overbite opposite tooth 21 was -1 mm. and 3 mm midline deviation in the lower arch to the left. Early extraction of 53, 63, 64 and 65 and early eruption of their successor 24 and 25 and retained 54 and 55. The upper incisors were in anterior cross-bite. In the lower jaw all permanent lower incisors and both right and left permanent first molars were present. The 74 and 84 were crowned and both deciduous canines were badly decayed (**Figure 2**).

#### Radiographic findings

Orthopantomograph (OPG) exhibited that the patient was in the early mixed dentition stage. All permanent teeth were present including third molar crown calcifications. There was early eruption of 24 and 25 due to early extraction of 64 and 65 in addition to early extraction of 53 and 63. The 74 and 84 were crowned.



**Figure 2.** Intra-oral view before treatment. A 9 year old male patient with a Class III incisor relationship crowded upper and lower arches, lower midline deviation to the left and anterior cross bite.

Lateral skull radiograph revealed that the patient had skeletal Class III (ANB  $-0.5^\circ$ ); mild skeletal open basal configuration (maxillary/mandibular plane angle  $34^\circ$ ), increased jaw angle  $133^\circ$  retroclined upper incisors (UI to NA  $20^\circ$ ) and lower incisors (LI. to NB  $11^\circ$ ) and an obtuse naso-labial angle  $120^\circ$ .

Postero-anterior (PA view) radiographic demonstrated the significant deviation of the lower third of the face to the left side.

#### Treatment objective

Orthodontic treatment objectives include:

1. Correction of dental and facial asymmetry.
2. Correction of anterior cross bite.
3. Achieve Class I molar and canine relationship.
4. Achieve normal overjet and overbite.
5. Alignment of upper and lower arches.

#### TREATMENT

Since the patient was in the early mixed dentition, the treatment will be performed in two phases.

##### Phase 1 treatment

**Introductory treatment:** An upper and lower alginate impression was made with the upper and lower midline coincides when taking the registration bite. A removable Hybrid appliance was fabricated to guide the mandible in order to correct the facial asymmetry and the midline deviation.

Patient was followed and observed for a period of 6 months. A marked correction in facial asymmetry was observed.

Patient was referred for extraction of 53, 73 and 83 to give space for alignment of both upper and lower anterior teeth and correction of anterior cross bite whereas the extraction of 85, 84, 74 and 75 was postponed.

New hybrid appliance fabricated with screw opposite tooth 21 to correct the anterior cross bite to prevent mandibular displacement. Then; later the hybrid appliance was replaced by an upper removable appliance with screw to continue correcting the anterior cross bite.

After one year of treatment with the hybrid appliance and the active upper removable appliance; significant improvement in mandibular asymmetry was achieved. However, after the full eruption of most of the permanent teeth; the second phase of treatment started.

**Phase 2 treatment**

Fixed Orthodontic Appliance. (0.022 × 0.025 MBT systems).

The upper arch was bonded. The arch wires sequence was 0.014, 0.016. Nitinol arch wire for leveling and alignment; then followed by 0.020 Australian and 0.016 × 0.022 stainless steel arch wire.

Patient was referred for extraction of 14 and 24. This is in order to give enough space and guidance for the eruption of 13 and 23 to its correct position followed by distalization of 13 and 23 for alignment and correction of cross-bite of all anterior upper incisors. Hence; a positive overjet and overbite were achieved.

A lower lingual holding arch was cemented and the patient was referred for extraction of 74, 75, 84 and 85, to speed the eruption of 34, 35, 44, 45 and 35.

After full eruption of all remaining permanent teeth, the lower arch was bonded for leveling and alignment with 0.014, 0.016, Nitinol arch wires. This followed by 0.016 and 0.016 × 0.022 Stainless Steel arch wires.

Patient was referred for extraction of 44 and 34. This was followed by distalization of 33 and 43 to achieve a Class I relationship with the upper canine and correction of the lower midline deviation.

Upper and lower contraction arch was fabricated (0.016 × 0.022 SS) with activation of both loops in order to close the spaces distal to the lateral incisors. Then, this was replaced by 0.018 Stainless steel arch wires in both arches for re-leveling and alignment and finishing the occlusion with Class I molar and canine relationship, normal overjet and overbite with good intercuspation.

When all the treatment objectives were fulfilled; the patient was debonded and post-treatment records were taken. An upper and lower vacuum retainers were delivered for retention.

**TREATMENT RESULTS**

Extra oral photographs (Figure 3) show significant improvement in the facial front and profile and Class I facial characteristics after de-bonding.



**Figure 3.** Extraoral view. Patient showing significant improvement in the front and facial profile views after treatment.

Intraoral photographs (Figure 4) reveal Class I molar and canine relationship, normal overjet and overbite after de-bonding.



**Figure 4.** Intraoral view. Patient exhibiting Class I molar and canine relationship in addition to normal overjet and overbite after treatment.

Figure 5 shows intraoral photos after treatment showing stable results.



**Figure 5.** Extraoral views, five months after treatment showing improvement in the asymmetry of the lower third of the face.

**Figures 6 and 7** presents extra orally showed significant improved patient front and profile and intraorally stable occlusion four years post-retention.



**Figure 6.** Extraoral views four years after treatment.



**Figure 7.** Intraoral views four years after treatment.

The four years post retention orthopantomograph revealed orthodontic finishing with acceptable parallel root position (**Figure 8**).



**Figure 8.** Orthopantomograph four years after treatment.

The four years post retention posterior-anterior (PA view) radiographic demonstrated significant correction of the asymmetry of the lower third of the face (**Figure 9**).



**Figure 9.** Posterior-anterior radiograph four years after treatment.

The cephalometric analysis showed significant changes, presenting a final skeletal Class I pattern ( $ANB=-0.5^\circ$ ), maxillary/mandibular plane angle  $35^\circ$  within the acceptable range, slightly increased jaw angle  $132.5^\circ$ . Relatively proclined upper incisors (UI to NA  $29^\circ$ ) and retroclined lower incisors (LI. to NB  $13^\circ$ ) and improved naso-labial angle  $117^\circ$ .

**DISCUSSION**

Facial asymmetry may involve dental, skeletal and soft tissue components. The treatment may include orthodontic alone or a combination of orthodontic treatment and orthognathic surgery. However, the management of patients with facial and dentoalveolar asymmetry is considered as one of the challenging treatment planning decisions that was taken by the orthodontist.

Egermark and Thilander [10] classified cross-bite patients with lateral shifting of the mandibular midline into latero-occlusion or laterognathy. To differentiate between the two types; the midline shift can only be observed in the occlusal position in patients with latero-occlusion whereas patients presented with laterognathy, the midline shift can be noticed in both the occlusal and postural positions.

In growing patients with latero-occlusion; if not treated early and during the growth period; this may leads to asymmetric jaw growth and this is what had happened in our patient. However, to avoid worsening the condition, early diagnosis and intervention with functional appliance should be initiated.

In patients with laterognathy, some investigators believed that the surgical intervention is the only alternative [11]. However, others believed in using functional appliance during the early growth stages [12].

However, Uribe and Nanda [13] stated "Asymmetrical malocclusions, although commonly seen in orthodontic practices, are among the most difficult cases to treat. An ideal result can be achieved with minimal side effects in a relatively short time, as long as the clinician makes an appropriate diagnosis, sets reasonable objectives, and uses predictable and efficient mechanics".

In the present case report, the hybrid functional appliance plays a major role in the treatment of the mandibular deviation. This significant changes and correction was due to the early intervention during the early mixed dentition with the presence of good amount of favorable growth. Thus, early introductory treatment in selected cases is highly recommended in spite of the long treatment period.

As stated earlier [13], the appropriate diagnosis with reasonable objectives, and uses predictable and efficient mechanics; the final result of the present case report revealed good occlusion, with pleasant smile and facial esthetics in both frontal and lateral views. This was considered as one of the advantages of early intervention and treatment in spite of the long treatment duration. Further, the surgical intervention was avoided where most of the patients do not like it. Although there was still some degree of mild facial asymmetry, the patient is pleased with the dental and facial appearance.

## CONCLUSION

1. Early diagnosis a, proper treatment plan; reasonable objectives and early intervention with an efficient

mechanics will result in a pleasant smile and facial esthetic in addition to stable and good occlusion.

2. Surgical intervention was avoided where most of the patients do not like it.

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