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COMBINED ORTHODONTIC AND SURGICAL TREATMENT OF SEVERE MANDIBULAR LATEROGNATHIE WITH BIMAXILLARY PROTRUSION: CASE REPORT

This article summarizes the treatment progress for a patient with a severe dolichofacial pattern with a convex profile, severe lip incompetency, and concomitant mouth breathing. Her maxillary occlusal plane had a cant and the maxillary and mandibular midlines were shifted 2 and 4 mm to the left side, respectively. The treatment plan summary was as follows: (1) maxillary rapid expansion for the elimination of maxillary constriction; (2) extraction of maxillary right first molar; (3) extraction of mandibular first premolars; (4) preoperative orthodontic treatment to correct dental protrusions; (5) surgical repositioning of the maxilla and mandible; and (6) postoperative orthodontic treatment and retention. Orthodontic treatment lasted a total of 28 months, with a good intercuspation and significantly improved facial esthetics at the end of treatment. The 1-year postretention lateral cephalometric measurements did not indicate any significant relapse. Dental protrusion and crowding in both jaws were eliminated. Facial and dental asymmetry was resolved and the profile was improved. The cant of the occlusal plane and the lips were corrected. Evaluation of pre- and posttreatment profiles revealed a decrease in convexity. Dentally, Class I canine and Class III molar relationships were present at the end of the treatment. Maxillary and mandibular incisors were uprighted, improving the interincisal angle and the bite relationship. World J Orthod 2007;8:65–71.

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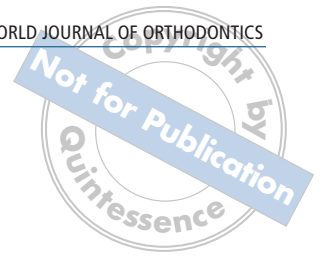
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Proportions of facial asymmetry have been documented as being more common in the lower third of the face, having a frequency of 25% to 34% in the United States and 25% in China.^{1–3} The prevalence of lateral malocclusions, on the other hand, usually ranges from 5% to 21%, depending on age and the population studied.^{4–6}

It has been reported that in patients showing dentofacial deformity, including

jaw deviation, laterality toward the left side was present in more than 85% of the sample.³ From these findings, it can be hypothesized that there is a potential, inherent in humans, which induces dominant growth of the right side or hypo-growth of the left side of the face.⁷ The dominance of left-side laterality is generally seen in subjects without any discernible postnatal factor, as with the patient in this case report.



Today, clinicians can capably handle asymmetric and dysfunctional patients in an interdisciplinary approach that achieves beneficial results structurally, dentally, emotionally, and esthetically.⁸

This paper describes the improvement achieved through a multidisciplinary team approach in a patient with laterognathie.

CASE REPORT

Clinical and radiographic examination

The patient was a healthy woman, 19 years 4 months of age, referred to the orthodontic clinic with a complaint of facial asymmetry and dental crowding. The patient history revealed that her aunt and cousins had the same facial anomaly tendency, but only to a minor extent. She had no history of trauma.

Extraorally, the patient had a severe dolicofacial pattern with a convex profile (Figs 1a and 1b). She had severe lip incompetency, with concomitant mouth breathing. Distinct mentalis muscle contraction was observed even at rest. With the lips in rest position, the patient showed almost 100% of the maxillary central incisors. The cant of the occlusal plane resulted in a cant of the lips relative to the face. During smiling, approximately 4 mm of gingival display was noted (Fig 1c). Intraorally, a Class I molar relationship was noted on the right side and a Class III on the left (Figs 2a to 2c). The maxillary arch form was narrow and tapered (Fig 2d). The maxillary occlusal plane had a cant, and the maxillary and mandibular midlines were shifted 2 and 4 mm to the left side, respectively. There was approximately 3 mm of crowding in the mandibular arch (Fig 2e). The patient had previously lost her maxillary left first molar because of caries.

Cephalometric findings

The lateral and posteroanterior cephalometric films obtained before treatment, before surgery, after treatment, and 1-year postretention were digitized using

Dolphin Imaging 9.0 (Dolphin, Chatsworth, CA, USA). The cephalometric findings of the patient are given in Table 1. These findings revealed that the patient had a high-angle vertical pattern with a sagittal Class I skeletal relationship and bimaxillary protrusion.

The posteroanterior film analysis confirmed the clinical judgment of midline discrepancies and the mandibular deviation, revealing that the mandibular dental midline coincided with the mandibular skeletal midline.

Treatment plan

Surgical repositioning of the maxilla and the mandible, combined with a rapid maxillary expansion procedure, was planned to correct the abnormality. To compensate for the loss of the maxillary left first molar, to eliminate protrusion of maxillary teeth, and to allow for a symmetrical arch form, extraction of a tooth from the maxillary right region was planned. The tooth of choice was the first molar because it had a large restoration and had received root canal therapy. The extraction of the mandibular first premolar teeth was also planned, to achieve correction of dental crowding and incisor protrusion in the mandibular arch.

The treatment plan summary was as follows: (1) maxillary rapid expansion for the elimination of maxillary constriction; (2) extraction of maxillary right first molar tooth; (3) extraction of mandibular first premolar teeth; (4) preoperative orthodontic treatment to correct dental protrusions; (5) surgical repositioning of the maxilla and mandible; and (6) postoperative orthodontic treatment and retention.

Progress of treatment

The rapid maxillary expansion procedure was carried out with a full-coverage acrylic cap expansion appliance, with a hyrax screw. An adequate amount of expansion was obtained after 2 weeks, turning the screw 2 times per day (a half-turn per day). Following retention for 6 months, extractions were carried out, and 0.018-

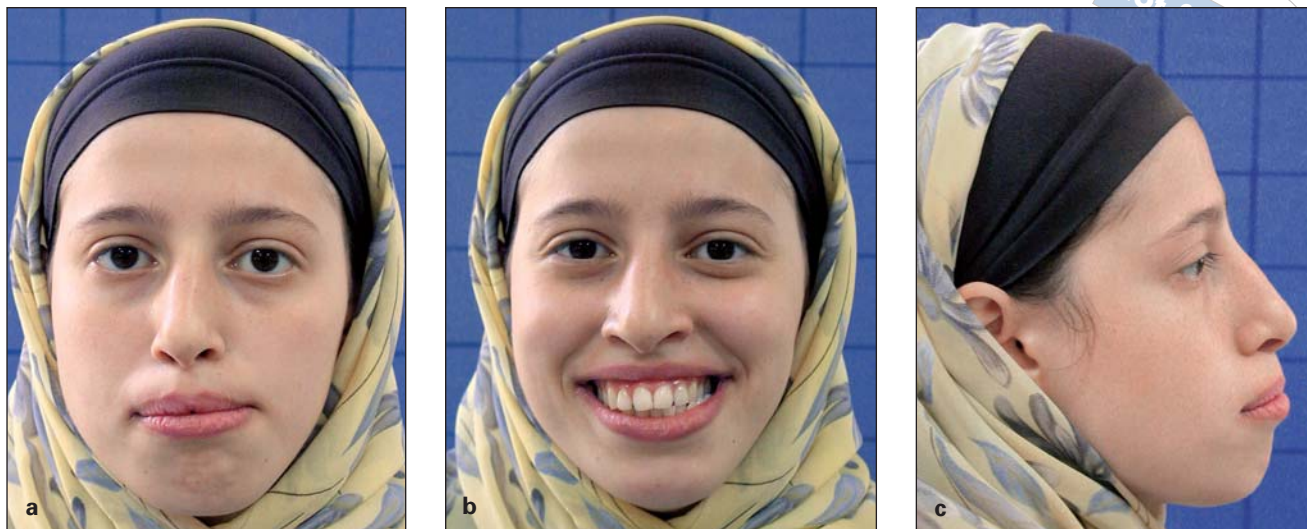
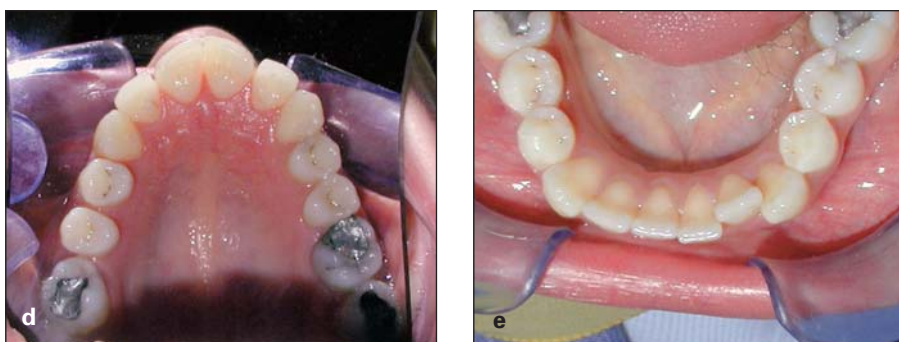


Fig 1 Extraoral views of the patient before treatment.



Fig 2 Intraoral views of the patient before treatment.



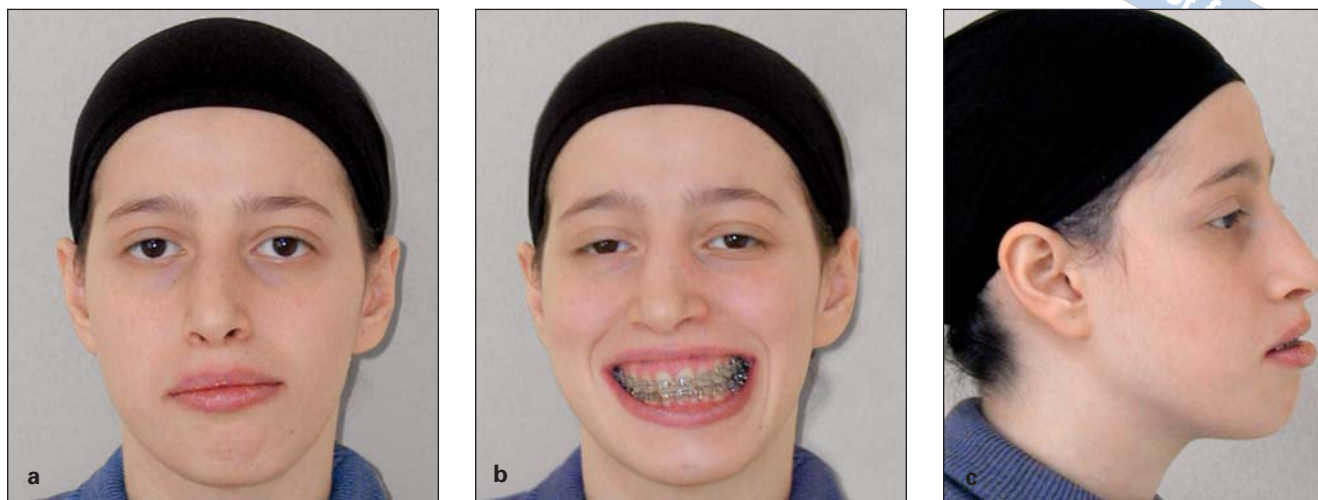


Fig 3 Extraoral views of the patient before surgery.

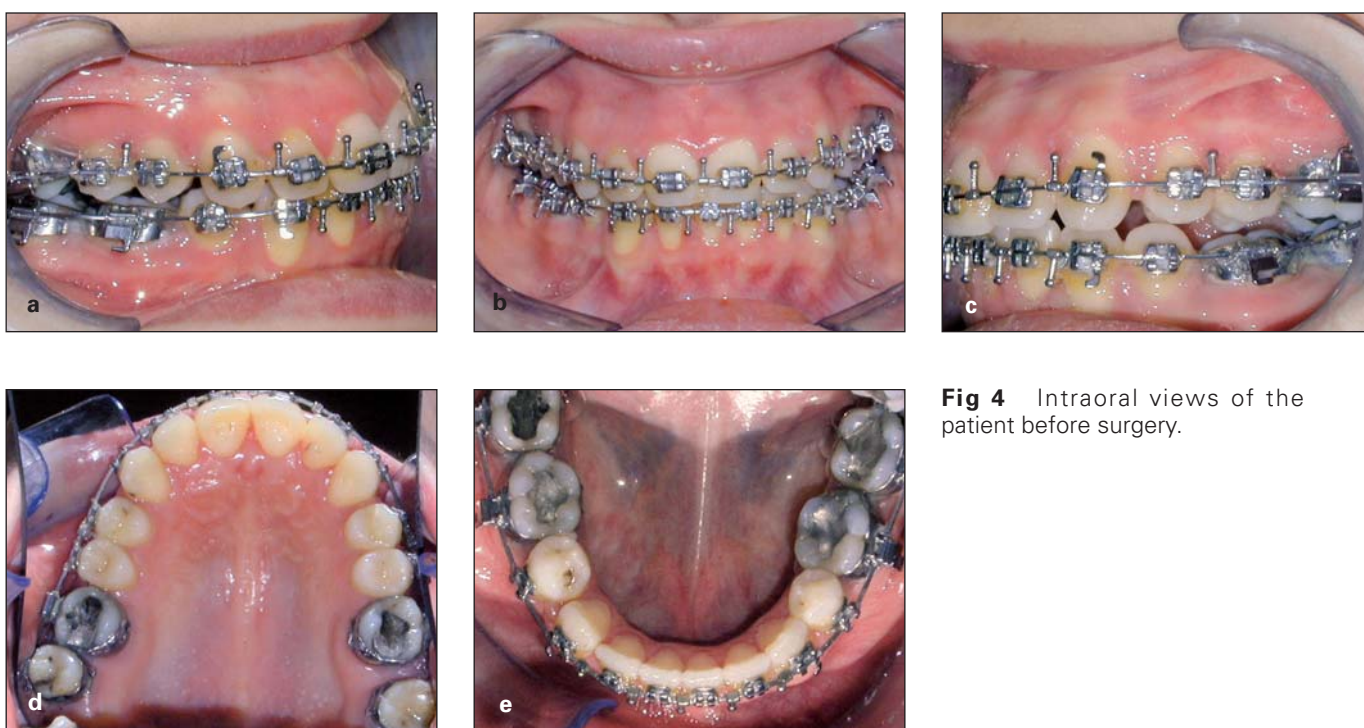


Fig 4 Intraoral views of the patient before surgery.

inch edgewise slot, Roth prescription full fixed appliances were placed in both arches. The presurgical orthodontic phase lasted approximately 14 months, until the presurgical goals were achieved (Figs 3 and 4), confirmed by progress panoramic, lateral cephalometric, and posteroanterior radiography. At the time of surgery, 0.017 × 0.025-inch stainless steel archwires with soldered surgical hooks were inserted in both arches.

Surgical planning was executed with the Dolphin Imaging 9.0 (Dolphin) on the presurgical lateral cephalogram. A Le Fort I and a sagittal split osteotomy were planned to reposition the maxilla and the mandible, respectively. The surgical plan was to move the maxilla superiorly 5 mm on the right side and 2 mm on the left. The authors also planned to move the maxilla posteriorly 3 mm, to decrease the convexity of the profile. The mandibu-



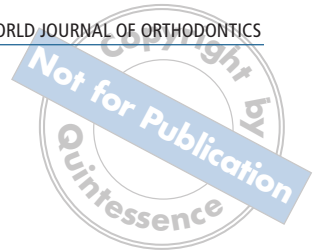
Fig 5 Extraoral views of the patient after treatment.



Fig 6 Intraoral views of the patient after treatment.

lar midline was to be corrected by sagittal split osteotomy. After facebow transfer and cast surgery, a sandwich splint was fabricated for use during the surgery. The patient had the surgical procedure without complications. The maxillomandibular fixation was released 7 days after the surgery. The patient continued to wear the surgical splint for an additional 2 months. During the first month, the patient took the splint out

only for meals. During the second, she wore the splint only at night. Orthodontic treatment lasted a total of 28 months, with a resulting good intercuspation and significantly improved esthetics (Figs 5 and 6). The favorable clinical changes were confirmed by the lateral cephalometric, posteroanterior, and panoramic films. Canine-to-canine fixed retainers were used for retention. The 1-year postretention lateral cephalometric

**Table 1 Cephalometric data for the patient**

	Initial	Progress	Final	Postretention
Skeletal				
MP-SN (degrees)	41.0	41.7	39.2	39.0
Saddle angle (SN-Ar) (degrees)	117.4	118.4	117.2	116.8
Articular angle (degrees)	158.0	154.0	154.6	155.9
Gonial angle (Ar-Go-Me) (degrees)	125.6	129.3	127.4	126.3
Sum of angles (degrees)	401.0	401.7	399.2	399.0
Jarabak ratio (%)	57.0	57.2	58.5	58.2
ANS-Me/Na-Me (%)	58.3	58.3	61.2	60.5
Maxillary height (N-CF-A) (degrees)	56.4	56.2	52.3	53.9
Facial axis-Ricketts (NaBa-PtGn)(degrees)	87.5	87.2	89.2	88.5
S-Ar/Ar-Go (%)	81.3	77.5	77.2	84.2
Gonial ratio (%)	59.8	61.0	64.5	64.5
FMA (MP-FH) (degrees)	33.2	36.3	32.9	32.3
Y-axis (degrees)	61.2	63.7	61.1	60.9
Occlusal plane to SN (degrees)	16.8	21.5	16.2	17.5
Mandibular plane to Occlusal plane (degrees)	24.2	20.2	23.0	21.5
SN-Palatal plane (degrees)	5.8	6.8	0.3	0.6
Palatal-Mandibular angle (degrees)	35.2	34.9	38.9	38.4
Occlusal plane to FH (degrees)	9.0	16.1	9.9	10.9
SNA (degrees)	85.2	86.2	80.5	79.8
SNB (degrees)	80.0	80.4	79.6	79.4
ANB (degrees)	5.1	5.9	0.9	0.4
Wits (FOP) (mm)	-3.4	-5.5	-5.2	-6.2
Mandibular length (Go-Gn) (mm)	82.9	84.9	84.7	85.1
Anterior cranial base (SN) (mm)	69.8	69.9	72.6	73.3
Posterior cranial base (S-Ar) (mm)	32.3	32.0	32.0	33.7
S-L (mm)	50.1	50.7	53.4	54.2
S-E (mm)	15.1	15.2	14.6	15.2
A-Na Perp (mm)	3.0	1.7	-3.0	-3.4
Maxillary depth (FH-NA) (degrees)	93.0	91.6	86.8	86.4
Dental				
U1-SN (degrees)	109.5	97.1	104.7	105.1
U1-NA (degrees)	24.3	10.9	24.2	25.3
U1-NA (mm)	7.8	2.5	9.0	9.9
U1-FH (degrees)	117.3	102.5	111.0	111.7
IMPA (L1-MP) (degrees)	94.5	86.0	82.2	84.4
L1-NB (degrees)	35.5	28.0	20.9	22.8
L1-NB (mm)	10.5	7.0	6.7	7.0
Pog-NB (mm)	0.8	0.6	2.1	2.4
Holdaway ratio (L1-NB:Pg-NB) (%)	14.1	11.5	3.2	2.9
Interincisal angle (U1-L1) (degrees)	115.1	135.2	134.0	131.5
Overjet (mm)	4.4	4.7	4.0	3.9
Overbite (mm)	0.1	1.9	3.2	2.9
Soft tissue				
Convexity (NA-APo) (degrees)	9.5	11.3	-0.3	-1.5
Convexity (A-NPo) (mm)	4.9	5.9	-0.1	-0.7
Lower lip to E-plane (mm)	4.1	5.3	1.1	0.8
Upper lip to E-plane (mm)	0.6	-0.3	-3.1	-2.0
Soft tissue convexity (degrees)	131.2	130.2	127.2	127.6
H-angle (Pg'UL-Pg'Na') (degrees)	21.6	20.4	19.1	19.9

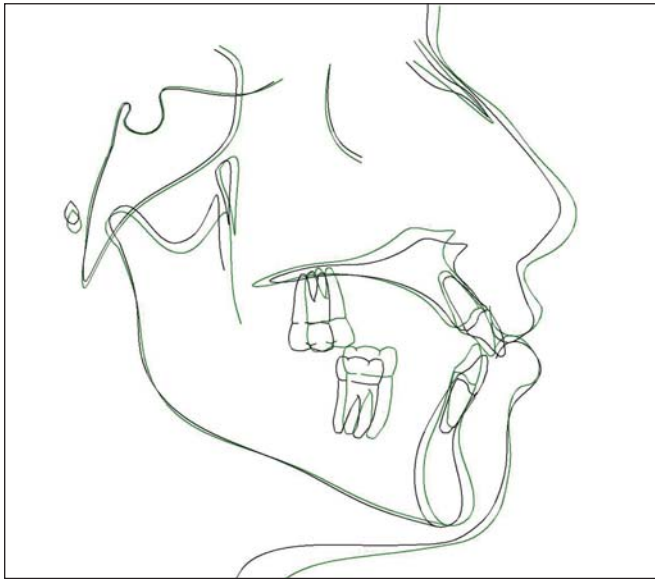


Fig 7 Superimposition of pretreatment (*black*) and post-treatment (*green*) lateral cephalometric films.

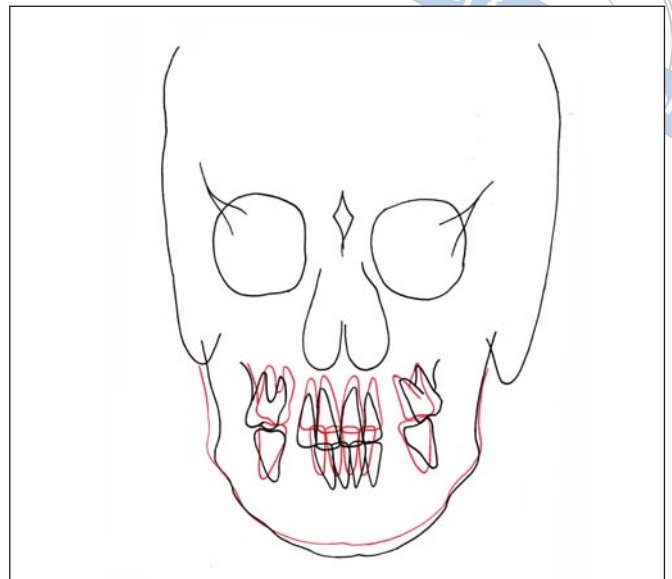


Fig 8 Superimposition of pretreatment (*black*) and post-treatment (*red*) posteroanterior cephalometric films.

measurements did not indicate any significant relapse (Figs 7 and 8, Table 1).

CONCLUSIONS

Dental protrusion and crowding in both jaws were eliminated. Facial and dental asymmetry was resolved and the profile was improved. The cant of the occlusal plane and the lips was corrected. Evaluation of pre- and posttreatment profiles revealed a decrease in convexity. Dentally, Class I canine and Class III molar relationships were present at the end of the treatment. Maxillary and mandibular incisors were uprighted, improving the interincisal angle and the bite relationship.

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