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## Improving quality of life with a team approach: A case report

*An adolescent female who presented amelogenesis imperfecta with severe anterior open bite, long face, facial asymmetry, high angle, and Class III skeletal pattern was treated with an interdisciplinary (orthodontics, orthognathic surgery, and prosthodontics) treatment approach. Presurgical orthodontic treatment was followed by surgical maxillary posterior impaction with anterior advancement and mandibular setback operation with vertical chin reduction and genioplasty. After the surgery, anterior ceramic laminate veneers and posterior full ceramic onlay-crowns were performed. The results showed that function and esthetics were achieved successfully with interdisciplinary collaboration. (Int J Adult Orthod Orthognath Surg 2001;16: 293–299)*

Skeletal anterior open bite is one of the most difficult malocclusions to treat in orthodontics. Retention of bite closure after the treatment frequently proves to be the major difficulty. If the skeletal malocclusion is diagnosed after the growth spurt, and if the closure of anterior open bite is accomplished with the orthodontic extrusion of anterior teeth, relapse is unavoidable.<sup>1–5</sup> From the stability point of view, surgical impaction of the maxilla is considered to be the most effective treatment alternative in nongrowing patients who have skeletal anterior open bite.<sup>6–8</sup> Various studies demonstrated that anterior open bite is associated with maxillary constriction,<sup>9–11</sup> high angle skeletal pattern,<sup>9–13</sup> and long lower face height.<sup>9–16</sup> It has been reported that surgical impaction of the maxilla would allow for autorotation of the mandible in a counterclockwise direction, which would reduce the length of the lower anterior face height.<sup>17–19</sup>

### Case history

S.K. was a 17-year-old female patient. She did not present any abnormal medical history or systemic problems except for amelogenesis imperfecta, which is a hereditary type of enamel dysplasia in which the

teeth have either thin enamel or none at all. Hypoplastic type amelogenesis imperfecta is generally transmitted as an X-linked dominant trait and affects both deciduous and permanent dentition; most of the enamel on all of the teeth is involved.<sup>20,21</sup>

She presented a straight profile with long lower-face height and facial asymmetry with a chin deviation to the left side (Fig 1). She had a Class III and high angle skeletal pattern (ANB = 0°) and SN-GoMe = 48°. Her maxillary dental midline with the face and mandibular midline was deviated 1mm to the left; the lower incisors were retroclined (IMPA = 71°). She presented an 8-mm anterior open bite, constricted maxilla, and posterior crossbite. When smiling, she presented 50% incisor display. She had 5.6 mm maxillary and 2.7 mm mandibular crowding and 3.6 mm maxillary Bolton excess (Fig 2).

### Treatment objectives

The aims of treatment were to improve function and facial and dental esthetics. Skeletal goals were to correct the facial asymmetry, Class III skeletal pattern, anterior open bite, maxillary constriction, and improve the vertical relationship; dental goals were to correct the anterior open bite



**Fig 1** Extraoral photographs of the patient at the beginning of treatment.



**Fig 2** Intraoral photographs of the patient at the beginning of treatment.

and the midlines, achieve ideal overbite and overjet, and improve the dental structure esthetics and smile with prosthetic restorations.

### **Orthodontic and orthognathic treatment synopsis**

Initially, the maxilla was expanded with acrylic cap, splint-type rapid palatal expansion (RPE) (Figs 3a and 3b). Three months after the stabilization period, the acrylic cap splint was removed and a transpalatal bar (TPA) was placed. Fixed bonded and banded orthodontic treatment was started, and leveling and alignment of dentition was completed in 16 months prior to the surgery (Fig 4).

Double-jaw surgery was conducted. A 3-mm posterior impaction and 3-mm anterior advancement was planned in the maxilla. A setback of 3 mm was planned in the mandible, and a 3-mm vertical reduction, 2-

mm advancement, and 2-mm right shift was planned for the chin. After the surgery, the profile, facial asymmetry, and vertical and sagittal relationship were improved and the anterior open bite was corrected. Class I molar and canine relationship was achieved, midlines were corrected, and an ideal overbite and overjet relationship was achieved. Six months after the surgery, appliances were removed and active orthodontic treatment was completed (Figs 5 and 6).

### **Prosthetic treatment synopsis**

Twelve months after the retention period of orthodontic treatment and orthognathic surgery, the developmental abnormality of enamel due to amelogenesis imperfecta required prosthetic treatment of all existing natural teeth. Removal of defective hypoplastic enamel, which had a yellowish brown color, revealed the existence of an unaffected dentin layer. The intact dentinal

**Fig 3** After rapid palatal expansion (RPE).



**Fig 3a** Occlusal view (diastema opened up between the central incisors).



**Fig 3b** (Right) Occlusal radiograph (sutural separation of the maxilla).



**Fig 4** Intraoral photographs of the patient before the double-jaw surgery.



**Fig 5** Extraoral photographs of the patient at the end of orthodontic treatment.



**Fig 6** Intraoral photographs of the patient at the end of orthodontic treatment.



**Fig 7** Extraoral photographs of the patient at the end of prosthodontic treatment.



**Fig 8** Intraoral photographs of the patient at the end of prosthodontic treatment.

layer existing on the affected teeth enabled the use of minimally invasive restorations. Ceramic laminate veneers that covered the labial, proximal, and incisal surfaces were used for restoring the anterior teeth, whereas full ceramic onlay-crowns were used to restore the posterior teeth. Mounting of the articulators following tooth preparation and impression making were performed with face-bow on a semi-adjustable articulator. The ceramic veneers and onlays were luted under rubber-dam isolation using a dual-cure resin luting agent (Variolink II high viscosity, Vivadent) in combina-

tion with a dentin adhesive (Syntac Classic, Vivadent). Finally, the occlusion was adjusted to ensure that no functional interferences existed while the group function was present simultaneously in canines and the premolars. The smile was significantly improved. Final extraoral and intraoral photographs are presented in Figs 7 and 8. Initial lateral cephalometric radiographs, presurgical and postsurgical—after the removal of braces and 12 months after the treatment—are shown in Fig 9. Cephalometric measurements and superimposition are presented in Table 1 and Fig 10.

**Fig 9** Lateral cephalometric radiographs.



**Fig 9a** Initial.



**Fig 9b** Before double-jaw surgery.



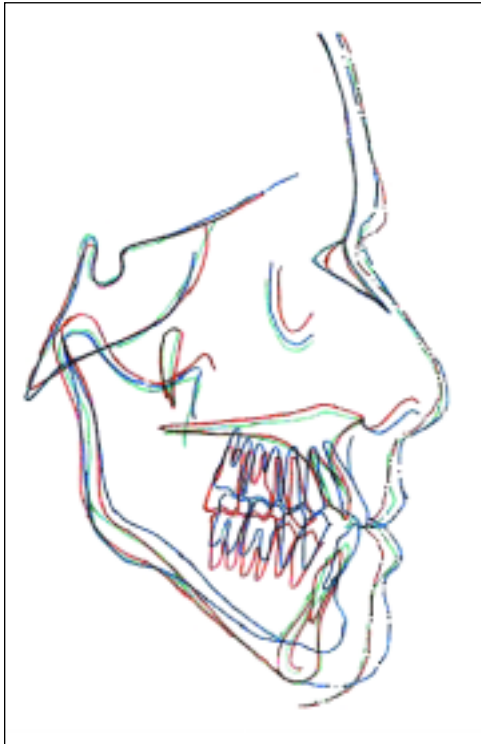
**Fig 9c** After double-jaw surgery.



**Fig 9d** At the end of orthodontic treatment.



**Fig 9e** One year in retention (prosthodontic restorations were completed).



**Fig 10** Cephalometric superimposition. Red = initial; green = progress; blue = final.

Table 1 Cephalometric analysis of the patient					
	Normal	Initial	Presurgical	Postsurgical	Final
Go-Me-Sn	32 ± 8°	48	46	35	35
Saddle angle	123 ± 5°	119	118	118	118
Articular angle	143 ± 6°	145	146	145	146
Gonial angle	130 ± 7°	143	141	134	134
Σ	396 ± 3°	407	405	397	398
Jarabak	59–62	56	56	62	63
ANSMe/NM	55	57	60	55	56
Maximum height	60°	61	64	61	59
Facial axis angle	90°	87	85	92	91
FMA	25°	41	33	26	28
Y-axis angle	59.4°	66	59	55	58
SNA	82 ± 2°	80	80	85	86
SNB	80 ± 2°	79	80	82	83
ANB	2°	0	0	3	3
Witt's appraisal	-1.0 mm	-5	-5	-1	-2
SL	51 mm	47	48	55	55
SE	22 mm	14	15	15	14
Nper-PA	-1 mm	-5	-1	4	3
Maxillary depth	90°	85	91	95	95
U1-SN	103°	111	110	109	110
U1-NA	22°	31	27	22	23
U1-NA	4 mm	5	6	3	4
U1-FH	112°	116	121	119	118
IMPA	90°	71	81	85	85
U1-NB	25°	18	26	24	23
U1-NB	4 mm	4	6	4	5
Pog-NB	4 mm	1	1	2	3
Holdaway ratio	1/1	4/1	6/1	4/2	5/3
U1-L1	131°	132	124	130	128

## Conclusion

A case was presented and treated with the contribution of 3 different dental specialties. The orthodontist's role in this treatment was to act as the coordinator of the interdisciplinary care. A team approach enabled the young patient to receive better function and esthetics and increased her quality of life.

Eight millimeters of anterior open bite and a Class III skeletal pattern were corrected; furthermore, asymmetric long facial appearance was improved. Final dental esthetics was achieved successfully with the contribution of prosthetic treatment. The records showed that the results were stable 12 months after the orthodontic treatment.

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