tissue profile and in the skeletal region.

The parameters indicated a mesio-basal jaw relationship and a growth pattern with an anterior course; the vertical grouping of the soft-tissue profile showed a disharmony between the mid-face and the lower face (G’-Sn:Sm-Me’; 47.53 percent). This was relatively weakly expressed in the bony structures (N-Sna:Sna-Me; 44.56 percent).

In the region of the lower face there was also mild disharmony (Sn-Stm:Stm-Me’; 51.69 percent). Complementary assessment of the mandible showed that the area from the subnasal-labral inferior to the soft-tissue chin (Li-Me’), which should have been 1:0.9, was shifted in favor of the Li-Me’ part (0.9:1; Fig. 4). The panoramic image showed a lucency of teeth 31 and 41. A root canal procedure followed by root apex resection was thus performed (Fig. 5).

Therapeutic objectives and treatment planning

The objectives of this combined orthodontic maxillofacial surgical treatment were:

• the establishment of neutral, stable and functional occlusion with physiological condylar positioning;
• the optimization of the facial esthetics;
• the optimization of the dental esthetics, considering the periodontal situation;
• the assurance of the stability of the results achieved;
• meeting the patient’s expectations.

The improvement of the facial esthetics not only in the sagittal axis in the region of the lower face (the mandibular region), but also in the region of the mid-face (hypoplasia) and in the transverse axis should be noted as specific treatment objectives. The change in the region of the mid-face was intended to affect the upper lip and the upper-lip vermillion.

These treatment objectives were achieved by two procedures:

• a dorsal extension of the mandible with lateral sweep to the left for correction of the sagittal and transverse defects, as well as occlusion and the soft-tissue profile;
• bone augmentation in the midface for harmonization of the face.

It would not have been possible to achieve the desired treatment objectives with respect to function and esthetics using orthodontic procedures alone.27

Therapeutic procedure

Correction of the pronounced dysgnathia was achieved in six phases:26,27

• Splint therapy: a flat bite guard splint was installed for six weeks in order to determine the physiological condylar position or centrics before the final treatment planning. By doing this, the forced bite could be demonstrated to its full extent.
• Orthodontics for forming and adjusting the dental arches relative to each other and decompensation of the skeletal dysgnathia (Figs. 6a–c);
• bone augmentation in the midfacial region was completed using autologous bone.
• Orthodontics for forming and adjusting the dental arches relative to each other and decompensation of the skeletal dysgnathia (Figs. 6a–c);
• Splint therapy for determining the condylar position. This was performed in the four to six weeks prior to the surgical procedure. The objective was registration of the jaw joint in a physiological position (centrics).
• Oral surgery for correction of the skeletal dysgnathia: after model operation, determination of the transposition path and production of the splint in the target occlusion, the surgical mandibular translocation using sagittal split according to Obwegeser–Dal Pont was performed. Augmentation in the mid-facial region was completed using autologous bone.
• Orthodontics for fine adjustment of occlusion.
• Retention: 3-3 retainers were cemented in the mandible.

Mandibular and maxillary plates were used as the retention appliance. Prosthetic care was provided after six months.

Results

Figures 7a to 7e show the situation after the conclusion of treatment, and after extraction of tooth 31 and subsequent prosthetic treatment: neutral occlusion and correct midline with physiological sagittal and vertical bite.

The extraoral images show a harmonious profile in the vertical as well as in the sagittal axis (Figs. 8a, b). The oral profile is harmoni-
Figs. 6a–c: Situation after orthodontic preparation for the surgical procedure.

Figs. 7a–e: Occlusion at the end of treatment; there is a neutral stable occlusion with physiological anterior bite in the sagittal and vertical axes and a correct midline (a–c). Monitoring images of the upper and lower jaws. A ceramic bridge was made in the lower jaw (d, e).

Table I: Proportions of soft-tissue structures before and after treatment.

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Mean</th>
<th>Before Treatment</th>
<th>After Treatment</th>
</tr>
</thead>
<tbody>
<tr>
<td>G'-Sn/G'-Me'</td>
<td>50%</td>
<td>47%</td>
<td>50%</td>
</tr>
<tr>
<td>Sn-Me'/G'-Me'</td>
<td>50%</td>
<td>55%</td>
<td>50%</td>
</tr>
<tr>
<td>Sn-Stm/Stm-Me'</td>
<td>55:67%</td>
<td>51:69%</td>
<td>55:67%</td>
</tr>
<tr>
<td>Sn-Li/Li-Me'</td>
<td>1:0.9</td>
<td>0.9:1</td>
<td>1:1</td>
</tr>
</tbody>
</table>

Parameter  Mean  Before Treatment  After Treatment
G'-Sn/G'-Me'  50%  47%  50%
Sn-Me'/G'-Me'  50%  55%  50%
Sn-Stm/Stm-Me'  55:67%  51:69%  55:67%
Sn-Li/Li-Me'  1:0.9  0.9:1  1:1

Table I: Proportions of soft-tissue structures before and after treatment.

**continued**