Correction of Hemifacial Microsomia in the Growing Child: A Follow-up Study

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Based on longitudinal observation of more than 80 patients, we concluded that mandibular hypoplasia is the earliest skeletal manifestation of hemifacial microsomia. The clinical defect becomes worse with time as a result of continued asymmetric growth and progressive secondary deformation of the midface. We hypothesize that midface growth is restricted by the hypoplastic mandible. Therefore, early elongation of the mandible should result in a more symmetrical growth pattern by eliminating mandibular restriction and creating a space for vertical midface growth.

The material presented here is part of a follow-up study of 20 patients who underwent elongation and rotation of the mandible and creation of an open bite on the affected side while they were still actively growing. The results have been presented, in part, previously (Kaban et al, 1981; Murray et al, 1984). We asked the following questions:

1. Will the midface grow inferiorly into the open bite created by mandibular lengthening and rotation, thus producing a level occlusal plane?
2. Is the levelling of the occlusal plane that occurs postoperatively the result of alveolar bone growth (i.e. tooth eruption) or midface growth or a combination of both?
3. Will early lengthening of the mandible prevent the need for midface surgery in teenagers and adults?
4. Does the bone graft in the elongated mandible grow and remodel?

MATERIALS AND METHODS

Of the 20 patients who had early correction of hemifacial microsomia, 17 had sufficient data and follow-up to be included in this study. They were divided into two treatment groups based on the skeletal classification of their hemifacial microsomia defect.

Patients in study group I (skeletal type I, N=5 and skeletal type IIA, N=5) had an adequate temporomandibular joint and were treated with osteotomy with or without bone graft to lengthen the mandibular ramus and rotate the mandible to the midline. An open bite was created on the affected side as a result of the lengthening and was maintained by an acrylic appliance. The open bite, tooth eruption, and maxillary growth were regulated by the orthodontist who adjusted the appliance.

Patients in study group II (skeletal type IIB, N=3 and type III, N=4) had elongation and rotation of the mandible by total construction of the temporomandibular joint and ramus with rib and costochondral junction or a combination of iliac crest and costochondral junction. All patients had at least 1 year follow-up and were evaluated by clinical examination, photographs, and superimposed serial A-P cephalograms and panoramic radiographs.

RESULTS

Our analysis revealed that all patients had downward growth of the midface into the surgically created open bite (Fig. 1). This resulted in a level occlusal plane and a symmetrical maxilla. Those patients treated in the early mixed dentition had levelling of the occlusal plane with both midface and alveolar growth. This was demonstrated by simultaneous levelling of the piriform apertures. In those patients treated in the late
FIGURE 1  Patient with type IIA hemifacial microsomia who had vertical osteotomy of the mandibular ramus, without compensatory osteotomy of the normal side, at age 6 years: A, immediate postoperative intraoral view demonstrating upward tilting of the maxillary occlusal plane and the surgically created open bite on the left side; B, one year postoperatively, the open bite is narrowed, and an orthodontic appliance is in place; C, two years postoperatively, the open bite is closed, and the maxillary and mandibular dental midlines coincide with each other and the facial midline; D, tracings of the preoperative and 4-year postoperative A-P cephalograms. Note the horizontal piriform apertures, the occlusal plane, and the skeletal symmetry.
mixed dentition, levelling of the occlusal plane occurred with predominantly alveolar growth and little change in the piriform apertures.

In study group I, four patients have completed growth and have maintained their facial symmetry without any further mandibular surgery and no operation on the maxilla. Only one patient in group II has completed growth and remains symmetrical with no surgery on the midface. The other patients in this group are in effect converted to skeletal type IIA and may require treatment as such in the late mixed dentition.

**DISCUSSION**

This follow-up study has shown that early correction of the mandibular hypoplasia in hemifacial microsomia can improve maxillary growth and decrease the endstage deformity. Vertical growth of the maxilla can be improved by controlling maxillary tooth eruption into a surgically created open bite. Levelling of the occlusal plane occurs by a combination of alveolar and midfacial growth. A maxillary procedure has been unnecessary in all the patients followed to the completion of growth. To date, the majority of patients followed to skeletal maturity have been in study group I (4/5 patients followed until growth has been completed). The patients in group II are, in effect, converted to skeletal type IIA by early surgery and may need second mandibular lengthening procedures in the late mixed dentition. However, it is hoped that they will not require maxillary surgery. The bone grafts used in both study groups became incorporated and remodeled to form a more normally shaped mandible.

**REFERENCES**

