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Clinical Paper
TMJ Disorders

A surgical strategy for severe facial asymmetry due to unilateral condylar overgrowth

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Abstract. Unilateral condylar overgrowth induces severe facial asymmetry. Therefore, treatment focuses on both elimination of the condyle lesion and correction of the facial asymmetry. The aim of this report is to present three patient cases, introducing a simpler surgical method, the indications for this surgical method, and a treatment planning flow that is consistently applicable regardless of the origin of the condylar lesion. Condylectomy was performed simultaneously with orthognathic surgery, with the vertical ramus osteotomy selected as the method of ramus surgery; ipsilateral ramus surgery was not performed on the condylectomy side. This method is applicable in cases in which facial asymmetry originates solely from unilateral condylar overgrowth, and the maxilla and mandible are presumed to have been in the normal class I anteroposterior position before the onset of condylar lesion growth. After surgery, temporomandibular joint pain and/or mouth limitations were resolved, the new condyle showed satisfactory bone remodelling, and favourable facial symmetry was attained. The postoperative results were maintained long-term and there was no recurrence on the condylectomy side. This simply modified surgical strategy for facial asymmetry due to unilateral condylar overgrowth may be used in selected patients, regardless of the origin of the condylar lesion.

Key words: osteochondroma; mandibular condyle; facial asymmetry; orthognathic surgical procedures.

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The extent of condylar growth affects the shape and size of the condyle and the whole facial skeletal shape. Unilateral condylar overgrowth results in severe facial asymmetry. The clinical appearance and treatment plan for this problem differ from those of general facial asymmetry. Simple condylectomy, reconstruction of the condyle using a costochondral graft, total joint prosthesis, and advanced simultaneous condylectomy in combination with orthognathic surgery have been introduced as treatments.[1] The use of simultaneous conservative condylectomy combined with orthognathic surgery to correct facial asymmetry and attain favourable jaw function is reported here. Ramus surgery on the condylectomy side to correct the three-dimensional (3D) position change is the general surgical approach for simultaneous surgery.[2,3] However, in the cases presented here, ramus surgery was performed only on the contralateral side, not on the condylectomy side. Three patient cases are reported, along with a review of the literature on the surgical approaches performed to date. The aim of this report

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is to introduce a modified surgical procedure, describe the indications for this method, and suggest a treatment planning flow.

Patients and methods

Patients older than 20 years (i.e., whose growth was complete) with severe facial asymmetry and diagnosed as having condylar hyperplasia, osteochondroma, or hemimandibular hyperplasia of the unilateral condyle, were selected from among patients visiting the study clinic between 2009 and 2013. A total of 16 patients received surgical treatment. Among these, 10 patients underwent only condylectomy of the affected side, one patient underwent only orthognathic surgery, two patients underwent orthognathic surgery combined with temporomandibular joint (TMJ) reconstruction, and three patients underwent simultaneous condylectomy and orthognathic surgery. The cases of the three patients who underwent simultaneous condylectomy and orthognathic surgery are presented here, along with the suggested surgical protocol and its indications. This study was approved by the institutional review board of the study institution.

Facial asymmetry was analyzed and the detailed orthognathic surgical plan was determined based on clinical facial examination and radiographic analysis. Single photon emission computed tomography (SPECT) using technetium-99m was performed to check whether the lesion on the affected condyle was active. This procedure quantitatively determines the percentage of absorption by the affected condyle in comparison to the contralateral side.[4] To evaluate jaw function before and after condylectomy, maximum mouth opening, protrusive and lateral movements, and joint pain were measured and compared. The amount of condylectomy and the exact surgical plan for the correction of facial asymmetry, which were assessed by radiographic diagnosis, were confirmed by simulated surgery using stereolithographic models.

Patient selection criteria were as follows: (1) facial asymmetry originating solely from condylar lesion growth with no contributing cause of asymmetry in the maxilla or mandibular body; (2) normal class I occlusion anteroposteriorly in both dentition and skeletal profile based on the unaffected side (i.e., the patient is assumed to have had normal class I anteroposterior positioning before the onset of condylar lesion growth); (3) severe facial asymmetry with compensatory growth of the maxilla due to slow growth of the affected condyle. In order to achieve both the therapeutic goal of condylar lesion treatment and the aesthetic goal of correcting facial asymmetry for the cases meeting these criteria, the surgical sequence performed was as follows (Fig. 1):

(1) Maxilla: Le Fort I wedge osteotomy and intermaxillary fixation with an intermediate splint.
(2) The affected condyle: conservative or low condylectomy via a pre-auricular approach.
(3) Mandible:
    (i) contralateral side: intraoral vertical ramus osteotomy (IVRO) and intermaxillary fixation with final splint;
    (ii) ipsilateral side: inferior border shaving (intraorally).

Results

Tables 1 and 2 summarize the detailed surgical plan and jaw function of each patient before and after the operation.

Case 1

A 30-year-old woman presented with chief complaints of pain in both TMJs, neck, and shoulders, especially in the right joint, and severe facial asymmetry. Clinical examination showed deviation to the right side on mouth opening and pain in the right masseter. Radiographic examination showed severe facial asymmetry due to condyle overgrowth on the right side. On SPECT examination, the uptake of technetium-99m was not very evident on the right side. The patient was diagnosed as having right condyle hyperplasia in an inactive state.

Stereolithographic model surgery showed that facial symmetry would be obtainable only by condylectomy using auto-rotation of the mandible without ramus surgery on the contralateral side. Therefore, the patient underwent condylectomy combined with one jaw surgery – a Le Fort I osteotomy – without preoperative orthodontic treatment. Unfortunately, because a biopsy of the condyle lesion was not performed, the lesion was not confirmed histologically. However, SPECT revealed minimal hot uptake, and computed tomography (CT) showed the affected overgrown condyle to be maintaining its own shape. The lesion was thus assumed to be unilateral condylar hyperplasia or osteochondroma without exophytic tumour development. X-ray follow-up performed after the condylectomy showed that

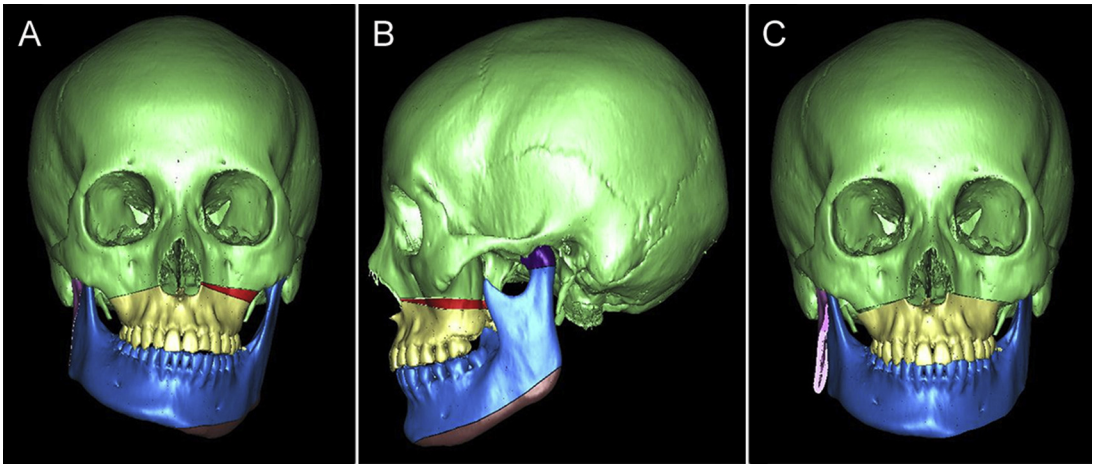

Fig. 1. Case 2. Surgical protocol for patients with facial asymmetry due to unilateral condylar overgrowth. (A) and (B) Le Fort I wedge osteotomy to re-level the canted occlusal plane, condylectomy and inferior border shaving on the side of overgrowth, and vertical ramus osteotomy (VRO) on the contralateral side. (C) Facial symmetry was gained after surgery (SimPlant three-dimensional planning software; Materialise, Leuven, Belgium).