

Invited Clinical Paper
The William Bell Series

The surgery-first approach in orthognathic surgery: a retrospective study of 50 cases

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H. B. Yu, L. X. Mao, X. D. Wang, B. Fang, S. G. Shen: *The surgery-first approach in orthognathic surgery: a retrospective study of 50 cases. Int. J. Oral Maxillofac. Surg. 2015; 44: 1463–1467.* © 2015 The Authors. Published by Elsevier Ltd on behalf of International Association of Oral and Maxillofacial Surgeons. This is an open access article under the CC BY-NC-ND license (<http://creativecommons.org/licenses/by-nc-nd/4.0/>).

Abstract. The surgery-first approach (SFA), without presurgical orthodontic treatment, has become favoured in the treatment of dentomaxillofacial deformities. This approach has been applied in our institution since 2012. The purpose of this study was to report our experience with the SFA for skeletal malocclusion. Fifty patients with skeletal malocclusions were enrolled in this study (11 bimaxillary protrusion, 27 skeletal class III malocclusion, and 12 facial asymmetry). After orthognathic–orthodontic consultation, suitability for SFA was determined and a treatment plan drawn up. Patients then underwent orthognathic surgery, which included Le Fort I maxillary osteotomy, bilateral sagittal split ramus osteotomy, subapical osteotomy, and genioplasty. Postoperative orthodontic treatment was started after a healing period of 2 weeks. The mean postoperative orthodontic treatment duration was 14.9 months, which is shorter than that of traditional joint orthognathic–orthodontic treatment. In the bimaxillary protrusion group, this was about 19 months, which was longer than for the other groups. After joint orthognathic–orthodontic treatment, a good facial profile and ideal occlusion were achieved. With the advantages of earlier improvements in patient facial aesthetics and dental function, the reduction in difficulty and treatment duration of orthodontic management, and increasing patient acceptance, SFA is regarded as an ideal and valuable alternative for this potentially complicated procedure.

Key words: orthognathic surgery; surgery-first; dentomaxillofacial deformity; malocclusion.

Accepted for publication 7 May 2015

For patients with a skeletal malocclusion, traditional orthognathic treatment consists of a variable length of preoperative orthodontic preparation, surgery itself, and a relatively constant period of postoperative orthodontics.¹ Through joint orthognathic–orthodontic treatment, an ideal facial profile and stable occlusion can be achieved.

However, the treatment duration is long, usually lasting more than 2 years. Some patients will complain of preoperative profile worsening due to incisor decompensation, the visibility of the appliances, the pain caused, and the duration.²

Recently, orthognathic surgery followed by postsurgical orthodontics without

presurgical orthodontic treatment, known as the surgery-first approach (SFA), has become favoured. Proposed by Nagasaka et al., it is a new concept in the combined orthodontic–orthognathic treatment for jaw

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deformities.³ Patients with mild to moderate crowding and acceptable arch coordination can undergo orthognathic surgery without preoperative orthodontic treatment. With considerable preoperative planning and precise surgery, the postoperative orthodontic procedure is direct and rapid; patients obtain the desired facial profile and occlusion in a much shorter period of time. This approach has been applied in our institution since 2012. The purpose of the present study was to report our experience with the SFA in the treatment of skeletal malocclusion.

Patients and methods

This retrospective cohort study examined a consecutive series of patients who were treated with orthognathic and orthodontic treatment with the SFA. Fifty patients with skeletal malocclusions treated between January 2012 and December 2013 were enrolled in this study: 11 with bimaxillary protrusion, 27 with a skeletal class III malocclusion, and 12 with a facial asymmetry (Table 1). The patients (23 males and 27 females) had a mean age of 22.2 years (range 16–37 years). The chief complaints for surgery included malocclusion, facial asymmetry, and protrusion of the mouth.

After patient consultation and examination by the surgeon and orthodontist, suitability for SFA was decided and a treatment plan drawn up based on clinical data, dental models, and cephalometric analysis. No presurgical orthodontic alignment was performed in any patient. Model surgery was performed and a splint was made. The patient then underwent orthognathic surgery under general anaesthesia. Surgery included Le Fort I maxillary osteotomy, sagittal split ramus osteotomy, condylectomy, subapical osteotomy, genioplasty, and mandibular recontouring (Tables 2–4). For patients with a segmental osteotomy, the teeth were extracted intraoperatively. Orthodontic treatment was started after a postoperative healing period of 2 weeks. The duration of postoperative orthodontic treatment was recorded.

One-way analysis of variance (ANOVA) was used for comparisons among the different groups. The statistical analysis was performed using SPSS 13.0 software package (SPSS Inc., Chicago, IL, USA).

Results

For the patients with bimaxillary protrusion, a segmental Le Fort I maxillary osteotomy and a subapical osteotomy of the mandibular anterior teeth were

Table 1. Summary of patient data.

Category	Number of patients	Male	Female	Age, years (mean ± SD)	Treatment time, months (mean ± SD)
Bimaxillary protrusion	11	1	10	27.74 ± 4.43	19.09 ± 5.52 ^a
Skeletal class III	27	16	11	21.20 ± 4.16	14.22 ± 4.46
Facial asymmetry	12	6	6	21.24 ± 3.58	13.25 ± 4.61
Total	50	23	27	22.17 ± 3.97	14.90 ± 4.92

SD, standard deviation.

^a $P < 0.05$.

Table 2. Surgical modalities for bimaxillary protrusion.

Surgical modalities	Number of patients
Segmental Le Fort I maxillary osteotomy + mandibular subapical osteotomy	7
Segmental Le Fort I maxillary osteotomy + mandibular subapical osteotomy + BSSRO	2
Segmental Le Fort I maxillary osteotomy + mandibular subapical osteotomy + genioplasty	2
Total	11

BSSRO, bilateral sagittal split ramus osteotomy.

Table 3. Surgical modalities for skeletal class III malocclusion.

Surgical modalities	Number of patients
Le Fort I maxillary osteotomy + BSSRO	14
Le Fort I maxillary osteotomy + BSSRO + genioplasty	3
Le Fort I maxillary osteotomy	1
BSSRO	8
BSSRO + genioplasty	1
Total	27

BSSRO, bilateral sagittal split ramus osteotomy.

Table 4. Surgical modalities for facial asymmetry.

Surgical modalities	Number of patients
Le Fort I maxillary osteotomy + BSSRO	7
Le Fort I maxillary osteotomy + BSSRO + genioplasty	2
Le Fort I maxillary osteotomy + SSRO (R) + condylectomy (L) + mandibular recontouring	1
BSSRO	1
BSSRO + genioplasty	1
Total	12

BSSRO, bilateral sagittal split ramus osteotomy; SSRO (R), sagittal split ramus osteotomy on the right side; condylectomy (L), condylectomy on the left side.

performed. The premolars were extracted intraoperatively. For one patient with facial asymmetry secondary to condylar osteochondroma, a condylectomy and mandibular recontouring were carried out. All patients healed uneventfully. Most patients considered their facial profile and occlusion to be greatly improved after surgery (Fig. 1). Orthodontic treatment was started 2 weeks after surgery.

The mean duration of postoperative orthodontic treatment was 14.9 months, which is shorter than that of traditional joint orthognathic–orthodontic treatment. The presurgical orthodontic procedure

usually takes 12–24 months depending on the complexity. In the bimaxillary protrusion group, this took about 19 months, which was longer than for the other groups. The statistical analysis showed this difference between the groups to be significant ($P < 0.05$) (Table 1). This was due in part to the required closure of the space caused by tooth extraction.

After orthodontic treatment, a good facial profile and ideal occlusion were achieved (Fig. 2). Patients were satisfied with the results of treatment. No relapse was recorded during 6–12 months of follow-up.

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