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ORIGINAL RESEARCH

To study role of surgery first approach in orthodontic concepts and protocol

Alok Chourasia¹, Awanindra Kumar Jha², Aditi Sinha³, Nishant Kumar Tewari⁴, Sushmita Tiwari⁵, Pankaj Kumar¹
¹Orthodontist, Private Practitioner, Maihar, Madhya Pradesh, India; ²Lecturer, Department of Orthodontics, Dental Institute, Rajendra Institute of Medical Sciences, Ranchi, Jharkhand, India; ³Prosthodontist, Private Practitioner, Gaya, Bihar, India; ⁴Oral & Maxillofacial Surgeon, Nalanda Medical College & Hospital, Patna, Bihar, India; ⁵General Practitioner, Patna, Bihar, India; ⁶Physiotherapist, Nalanda Medical College & Hospital, Patna, Bihar, India;

ABSTRACT:

Background: The conventional orthognathic surgery, also named as conventional three-stage method, generally consists of pre-surgical orthodontic treatment, surgery treatment, and postoperative orthodontic adjustment. The combination of orthodontics and orthognathic surgery began later on with the aim of straightening the anterior teeth on the basal bone before surgery, to prevent their inclination from limiting surgical movements. Hence; the present study was conducted for assessing the role of surgery first approach in orthodontic concepts and protocol. **Materials & methods:** Data records of a total of 20 patients with skeletal malocclusions who were treated with orthognathic surgery and orthodontic treatment with the surgery-first approach (SFA) were enrolled in the present study. Treatment planning was done after complete clinical and radiographic examination and suitability for SFA was decided. Model surgery was done and a splint was made. The patient then underwent orthognathic surgery under general anaesthesia. Surgical procedures were carried out in patients depending upon the treatment protocol. After postoperative healing period of two to three weeks, orthodontic treatment was started. The duration of postoperative orthodontic treatment was recorded. All the results were recorded in Microsoft excel sheet and were analysed by SPSS software. Chi-square test was used for assessment of level of significance. **Results:** Mean age of the patients was 26.3 years. 60 percent of the patients were females while the remaining were males. Mean treatment time among the patients with bi-maxillary protrusion, skeletal class III malocclusion and facial asymmetry was 18.36 months, 13.22 months and 14.39 months respectively. **Conclusion:** Doing orthognathic surgery before orthodontic treatment has numerous advantages. However; it is thus recommended that only experienced teams should perform this approach.

Key words: Orthodontic concept, Protocol

Corresponding author: Dr. Nishant Kumar Tewari, Oral & Maxillofacial Surgeon, Nalanda Medical College & Hospital, Patna, Bihar, India

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INTRODUCTION

The conventional orthognathic surgery, also named as conventional three-stage method (CTM) generally consists of presurgical orthodontic treatment, surgery treatment and postoperative orthodontic adjustment. According to this protocol, presurgical orthodontic treatment which is essential to the final stable surgical results, will focus on removing dental decompensation, aligning and leveling the teeth and coordinating dental arches. This process, however, can hardly contribute to the changes of vertical and transverse plane. It was indicated that the correction of transverse discrepancy could be addressed with surgery without presurgical orthodontic treatment.¹⁻³

Until recently, the conventional approach to orthognathic surgery involving preoperative orthodontics, followed by surgery and postoperative orthodontics was the sole recognized approach to orthognathic surgery. The first

orthognathic surgeons realized that the amount of mandibular setback was limited by the magnitude of overjet between the maxillary and mandibular incisors.^{4,5}

The combination of orthodontics and orthognathic surgery began later on with the aim of straightening the anterior teeth on the basal bone before surgery to prevent their inclination from limiting surgical movements.⁶ Hence; the present study was conducted for assessing the role of surgery first approach in orthodontic concepts and protocol.

MATERIALS & METHODS

The present study was conducted in the department of orthodontic of the dental institute and it included assessing the role of surgery first approach in orthodontic concepts and protocol. Ethical approval was obtained from institutional ethical committee before the starting of the

study. Data records of a total of 20 patients with skeletal malocclusions who were treated with orthognathic and orthodontic treatment with the surgery-first approach (SFA) were enrolled in the present study. Complete data record files of all the patients were obtained. Chief complaint of the patient included malocclusion, facial asymmetry, and protrusion of the mouth. Treatment planning was done after complete clinical and radiographic examination and suitability for SFA was decided. Model surgery was done and a splint was made. The patient then underwent orthognathic surgery under general anaesthesia. Following surgical procedures were carried out in patients depending upon the treatment protocol:

- Le Fort I maxillary osteotomy,
- Sagittal split ramus osteotomy,
- Condylectomy,
- Subapical osteotomy,
- Genioplasty, and
- Mandibular recontouring

After postoperative healing period of two to three weeks, orthodontic treatment was started. The duration of postoperative orthodontic treatment was recorded. All the results were recorded in Microsoft excel sheet and were analysed by SPSS software. Chi- square test was used for assessment of level of significance.

RESULTS

In the present study, data of a total of 20 patients were enrolled. Out of these 20 patients, 25 percent of the patients had bi-maxillary protrusion, 40 percent of the patients had skeletal class III malocclusion and the remaining 35 percent of the patients had facial asymmetry. Out of these 20 patients, 45 percent of the patients belonged to the age group of 25 to 30 years. 35 percent of the patients belonged to the age group of less than 25 years. Mean age of the patients was 26.3 years. 60 percent of the patients were females while the remaining were males. Mean treatment time among the patients with bi-maxillary protrusion, skeletal class III malocclusion and facial asymmetry was 18.36 months, 13.22 months and 14.39 months respectively.

Table 1: Distribution of patients according to malocclusion

Type of malocclusion	Number of patients	Percentage of patients
Bi-maxillary protrusion	5	25
Skeletal class III	8	40
Facial asymmetry	7	35

Graph 1: Age and gender-wise distribution

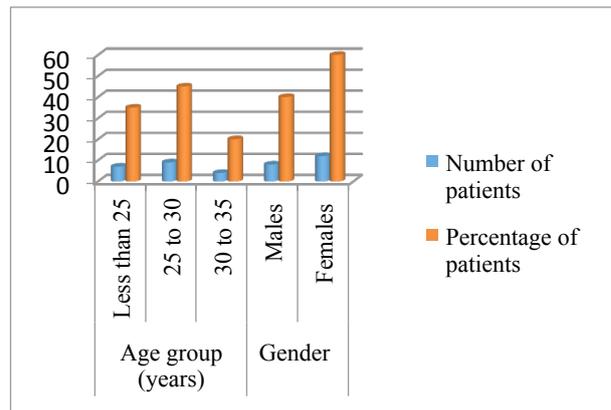


Table 2: Distribution of the patients according to treatment time

Type of malocclusion	Mean treatment time (months)	SD
Bi-maxillary protrusion	18.36	6.32
Skeletal class III	13.22	4.12
Facial asymmetry	14.39	4.82
Overall	15.36	5.17

DISCUSSION

When orthognathic surgery was introduced, every surgery was a surgery-first approach or surgery after completing orthodontic treatment. This type of treatment had many problems such as postoperative occlusal instability and relapse. Postoperative unstable occlusion results in serious problems in masticatory function. Accordingly, a three-stage approach (preoperative orthodontics, surgery, and postoperative orthodontics) has been set up and is considered to be the standard protocol.⁷ The “orthodontics-first” concept became a widely acknowledged dogma. It emphasized that optimal surgical repositioning of the jaw was possible only after the removal of all dental compensations before surgery. Over the years, acceptable levels of stability and satisfaction with post-treatment outcomes have validated this approach.⁸ Hence; the present study was conducted for assessing the role of surgery first approach in orthodontic concepts and protocol.

In the present study, data of a total of 20 patients were enrolled. Out of these 20 patients, 25 percent of the patients had bi-maxillary protrusion, 40 percent of the patients had skeletal class III malocclusion and the remaining 35 percent of the patients had facial asymmetry. Out of these 20 patients, 45 percent of the patients belonged to the age group of 25 to 30 years. 35 percent of the patients belonged to the age group of less than 25 years. Mean age of the patients was 26.3 years. 60 percent of the patients were females while the remaining were males. The objectives of comprehensive orthodontic treatment are summarized as to achieve good alignment of dentition, to harmonize upper and lower dentition in three dimensions, and to improve occlusal interdigitation and dentofacial esthetics. In orthodontic camouflage treatment of skeletal malocclusion, the treatment objectives are compromised, and consequently, teeth positioning to the basal bone and facial esthetics may worsen. Therefore, the combination of orthodontic treatment for the dental malocclusion and surgical correction for the skeletal discrepancy would be the best choice in skeletal malocclusion.^{9, 10}

In the present study, mean treatment time among the patients with bi-maxillary protrusion, skeletal class III malocclusion and facial asymmetry was 18.36 months, 13.22 months and 14.39 months respectively. In most cases, patients who receive orthognathic surgery in order to correct a dento-skeletal deformity present to the orthodontist's office with a chief complaint that includes dissatisfaction with their facial appearance. Hence, the main concern of the patient must be addressed during the course of treatment. The conventional three-stage approach in orthognathic surgery requires decompensation of the teeth which often results in worsening of the facial profile especially in patients with Class III malocclusion. The improvement in facial aesthetics in these patients does not occur until months later when the actual surgery is performed. Having surgery first eliminates the unsightly pre-surgical profile and allows the chief complaint of the patient to be addressed at the beginning of treatment.¹¹⁻¹⁴

Baek et al, Choi et al and Yang et al have found no statistically significant differences in the stability of surgery last and surgery first orthognathic approach (SFOA) and Conventional orthognathic surgery (COS). For transverse problems, Wang et al have reported that the final treatment outcome in both SFOA and COS were similar. In the vertical plane, Liao et al have reported increased counterclockwise rotation while Kim et al found clockwise rotation of mandible in SFOA group as compared to COS group. For sagittal plane, Kim et al have found greater relapse of around 2.4 mm in SFOA as compared to 1.6 mm in COS.⁹⁻¹⁴

CONCLUSION

From the above results, the authors conclude that doing orthognathic surgery before orthodontic treatment has numerous advantages. However; it is thus recommended that only experienced teams should perform this approach.

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