

Surgery First Approach in Orthodontics

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Abstract The surgery-first approach (SFA) is a term used between orthodontists and surgeons for orthognathic surgery without presurgical orthodontic treatment. Over the past few decades, SFA has rapidly gained popularity since many young people undergo cosmetic surgery. Numerous articles and studies dealing with SFA concepts have been published globally in recent years. Nevertheless, many surgeons continue to use slightly different concepts and protocols since SFA is yet to be standardized. This literature review discusses current issues around SFA, including indication, contraindication, and limitation, compared with conventional treatment.

Keywords: surgery first approach, orthognathic surgery, orthodontic treatment

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1. Introduction

Orthognathic surgery is vital in the skeletal discrepancies' treatment alongside orthodontic treatment to improve malocclusion, facial function, and smile esthetics. Initially, orthognathic surgery was performed without orthodontic treatment, which limited maxillary or mandibular movement [1,2]. Therefore, surgeons realized the need for orthodontic alignment of misaligned teeth before surgery to have good facial and occlusal esthetics and achieve an appropriate setback. In the 1970s, many surgeons began combining orthognathic surgery with orthodontic treatment. The main aim of presurgical orthodontic treatment is to overcome the natural compensation forces [3,4]. In the last decade, SFA has increasingly gained popularity in many centers, which has created research interest. The first phase of SFA is typically done without orthodontic preparation. However, surgeons conduct orthodontic treatment after orthognathic surgery [5].

2. Indications and Limitations

Previous works have proposed indications for the SFA, but no consensus exists among orthodontists and surgeons. Fundamentally, the selection criteria for the SFA are hugely dependent on the preference and experience of the orthodontist and the surgeon. From initial studies on SFA, the SFA is considered when no extractions are involved, no transverse discrepancy, and at least three occlusal contact points between the arches [6]. Uribe & Farrell (2020) claimed that vertical problems or

retroclined/proclined incisors would be contraindicated for SFA [7]. According to Choi et al. (2019), surgeons who experience SFA cannot treat difficulties in determining whether patients with facial asymmetry can be treated [8]. However, there has yet to be a consensus on how much transverse or asymmetry discrepancy can be indicated for SFA.

According to Kwon & Han (2019), the SFA was developed and implemented to enhance patient care. Therefore, patient demand should be the first indication for the SFA. Studies have indicated that patients do not prefer or like going through presurgical orthodontic treatment [9]. The main objective of presurgical orthodontics is occlusal stability and decompensation after orthognathic surgery [10]. Typically, presurgical occlusion and facial esthetics are put less emphasis during presurgical orthodontic treatment. Since SFA is a team approach between surgeons and orthodontists, patients are only advised to go through an operation with consultations between the two medical professionals [8,11]. Therefore, patients who do not need extensive presurgical orthodontics are indicated for SFA based on consultations between surgeons and orthodontists. Pradhan et al. (2021) & Yu et al. (2015) suggest that most patients suffering from mandibular prognathism are indicated for SFA [12,13]. Patients with mandibular prognathism often have less compensation and mild crowding; therefore, they are indicated for SFA. The limitation of the SFA is connected to occlusion at the time of operation. Notably, surgeons cannot use a patient's occlusion as a surgical movement during the SFA [10]. Furthermore, the current limitations to SFA use are skeletal malocclusion with severe arch incoordination and extreme crowding. As such, consideration should be given to the intended transitional occlusion in SFA [5].

3. Contraindications

According to Mirhashemi et al. (2022), the contradictions to the SFA could be overcome via accelerated preoperational orthodontic treatment – less than three months [8,13]. Severe upper anterior crowding is the first contraindication of the SFA. Blockage caused by crowding in the upper lateral incisor on the palatal side may lead to excessive interference during surgical occlusion. Bhattacharya et al. (2021) suggest that aesthetic satisfaction may not be immediately experienced after surgery in patients with severely compensated upper incisors due to excessive overjet. Significant interference may occur if the level of extrusion is extreme [9,15]. Discord of the lower and upper intercanine width is another contraindication to the SFA. Functional tongue displacement may occur due to mandibular prognathism [16]. Spacing of the lower incisors occurs when the position of the tongue falls. Consequently, the discord between the lower and upper intercanine widths in the surgical occlusion may lead to undue presurgical interference. Other contraindications to the SFA include severe horizontal symmetry in individuals with facial asymmetry and anterior crossbite post-surgery [16].

4. Comparison of SFA to Conventional Treatment

Until today, conventional treatment has been an orthodontics-first approach. The conventional approach dictates that the preoperational phase should always precede orthognathic surgery [3,17]. On the other hand, the SFA approach dictates that a patient should first undergo a facial esthetic before surgical occlusion. Existing literature suggests that the SFA and conventional treatment have similar outcomes in dentofacial relationships. However, studies have indicated that despite the SFA having a greater relapse tendency than the conventional approach, the total treatment duration is relatively shorter. While the SFA ensures minimal interference during orthognathic surgery, patients often experience discomfort and soreness during mastication in the conventional approach [18,19,20,21,22]. Compared with the conventional approach, the SFA creates a semi-stable postsurgical occlusion because of its disposition without preoperational orthodontic surgery.

5. Conclusion

Since its introduction, the SFA has rapidly improved since the concepts involved when using this approach are often implemented to meet the distinct requirements of each case. While conventional treatment is quite time-consuming, the SFA's primary objective is to reduce the amount of time in attaining the ideal presurgical alignment, leveling, and decompensation [23-28]. The advancements in medical technology have widened the indications for the SFA. Nevertheless, SFA's limitations should be considered. Overall, a team approach

between orthodontists and surgeons is critical to successful treatment [29,30,31].

References

- [1] Ince-Bingol, S., & Arman-Ozcirpici, A. (2020). Treatment of an adult skeletal class II patient with a modified surgery-first approach. *International Orthodontics*, 18(3), 569-575.
- [2] Kim, C. S., Lee, S. C., Kyung, H. M., Park, H. S., & Kwon, T. G. (2014). Stability of mandibular setback surgery with and without presurgical orthodontics. *Journal of Oral and Maxillofacial Surgery: Official Journal of the American Association of Oral and Maxillofacial Surgeons*, 72(4), 779-787.
- [3] Seifi, M., Matini, N. S., Motabar, A. R., & Motabar, M. (2018). dentoskeletal stability in conventional orthognathic surgery, presurgical orthodontic treatment and surgery-first approach in class-III patients. *World Journal of Plastic Surgery*, 7(3), 283-293.
- [4] Choi, J. W., & Lee, J. Y. (2021). Current concept of the surgery-first orthognathic approach. *Archives of Plastic Surgery*, 48(2), 199-207.
- [5] Hosseinzadeh Nik, T., Gholamrezaei, E., & Keshvad, M. A. (2019). Facial asymmetry correction: From conventional orthognathic treatment to surgery-first approach. *Journal of Dental Research, Dental Clinics, Dental Prospects*, 13(4), 311-320.
- [6] Mahmood, H. T., Ahmed, M., Fida, M., Kamal, A. T., & Fatima, F. (2018). Concepts, protocol, variations and current trends in surgery first orthognathic approach: A literature review. *Dental Press Journal Of Orthodontics*, 23(3), 36.e1-36.e6.
- [7] Uribe, F. A., & Farrell, B. (2020). Surgery-first approach in the orthognathic patient. *Oral and Maxillofacial Surgery Clinics of North America*, 32(1), 89-103.
- [8] Choi, D.S., Garagiola, U. & Kim, S.G. (2019). Current status of the surgery-first approach (part I): Concepts and orthodontic protocols. *Maxillofac Plast Reconstr Surg* 41, 10.
- [9] Kwon, T. G., & Han, M. D. (2019). Current status of surgery first approach (part II): precautions and complications. *Maxillofacial Plastic and Reconstructive Surgery*, 41(1), 23.
- [10] Park, Y. W., Kwon, K. J., Kang, Y. J., & Jang, I. S. (2021). Surgery-first approach reduces the overall treatment time without damaging long-term stability in the skeletal class III correction: a preliminary study. *Maxillofacial Plastic and Reconstructive Surgery*, 43(1), 27.
- [11] Feu, D., de Oliveira, B. H., Palomares, N. B., Celeste, R. K., & Miguel, J. A. M. (2017). Oral health-related quality of life changes in patients with severe Class III malocclusion treated with the 2-jaw surgery-first approach. *American journal of orthodontics and dentofacial orthopedics: official publication of the American Association of Orthodontists, its constituent societies, and the American Board of Orthodontics*, 151(6), 1048-1057.
- [12] Pradhan, T., Gowda, A. R., Jayade, V., Gopalkrishnan, K., & Patil, A. K. (2021). Treatment effect of combined surgical maxillary expansion and mandibular setback in skeletal class III. *Contemporary Clinical Dentistry*, 12(2), 169-173.
- [13] Yu, H. B., Mao, L. X., Wang, X. D., Fang, B., & Shen, S. G. (2015). The surgery-first approach in orthognathic surgery: a retrospective study of 50 cases. *International Journal of Oral and Maxillofacial Surgery*, 44(12), 1463-1467.
- [14] Mirhashemi, A. H., Ghadirian, H., & Samimi, S. M. (2022). Surgery-first approach; from claims to evidence: A comprehensive review. *Frontiers in Dentistry*, 19, 23.
- [15] Bhattacharya, P., Chandana, A. K., Bhandari, R., Singh, S., Tiwari, D. K., & Sah, S. (2021). Case report on surgery-first approach. *Annals of Maxillofacial Surgery*, 11(2), 352-355.
- [16] Jeong, W. S., Lee, J. Y., & Choi, J. W. (2018). Large-scale study of long-term vertical skeletal stability in a surgery-first orthognathic approach without presurgical orthodontic treatment: Part II. *The Journal of Craniofacial Surgery*, 29(4), 953-958.
- [17] Jeyaraj, P., & Chakranarayan, A. (2019). Rationale, relevance, and efficacy of "surgery first, orthodontics later" approach in the management of cases of severe malocclusion with skeletal discrepancy. *Annals of Maxillofacial Surgery*, 9(1), 57-71.

- [18] Seo, H. J., & Choi, Y. K. (2021). Current trends in orthognathic surgery. *Archives of Craniofacial Surgery*, 22(6), 287-295.
- [19] Borges, T. M., Sol, I., de Castro Rodrigues, C. M., Peres Lima, F. G. G., Silva, C. J., & Furtado, L. M. (2021). Surgery first approach in orthognathic surgery - considerations and clinical case report. *Annals of Maxillofacial Surgery*, 11(2), 349-351.
- [20] Choi, J. W., Lee, J. Y., Yang, S. J., & Koh, K. S. (2015). The reliability of a surgery-first orthognathic approach without presurgical orthodontic treatment for skeletal class III dentofacial deformity. *Annals of Plastic Surgery*, 74(3), 333-341.
- [21] Chou, J. I., Fong, H. J., Kuang, S. H., Gi, L. Y., Hwang, F. Y., Lai, Y. C., Chang, R. C., & Kao, S. Y. (2005). A retrospective analysis of the stability and relapse of soft and hard tissue change after bilateral sagittal split osteotomy for mandibular setback of 64 Taiwanese patients. *Journal of Oral and Maxillofacial Surgery: Official Journal of the American Association of Oral and Maxillofacial Surgeons*, 63(3), 355-361.
- [22] Gandedkar, N. H., Chng, C. K., & Tan, W. (2016). Surgery-first orthognathic approach case series: Salient features and guidelines. *Journal of Orthodontic Science*, 5(1), 35-42.
- [23] He, X., He, J., Yuan, H., Chen, W., Jiang, H., & Cheng, J. (2019). Surgery-first and orthodontic-first approaches produce similar patterns of condylar displacement and remodeling in patients with skeletal class iii malocclusion. *Journal of Oral and Maxillofacial Surgery: Official Journal Of the American Association of Oral and Maxillofacial Surgeons*, 77(7), 1446-1456.
- [24] Huang, C. S., & Chen, Y. R. (2015). Orthodontic principles and guidelines for the surgery-first approach to orthognathic surgery. *International Journal of Oral And Maxillofacial Surgery*, 44(12), 1457-1462.
- [25] Joh, B., Bayome, M., Park, J. H., Park, J. U., Kim, Y., & Kook, Y. A. (2013). Evaluation of minimal versus conventional presurgical orthodontics in skeletal class III patients treated with two-jaw surgery. *Journal of Oral and Maxillofacial Surgery: Official Journal Of The American Association of Oral and Maxillofacial Surgeons*, 71(10), 1733-1741.
- [26] Ko, E. W., Lin, S. C., Chen, Y. R., & Huang, C. S. (2013). Skeletal and dental variables related to the stability of orthognathic surgery in skeletal Class III malocclusion with a surgery-first approach. *Journal of Oral and Maxillofacial Surgery: Official Journal of the American Association of Oral and Maxillofacial Surgeons*, 71(5), e215-e223.
- [27] Leelasinjaroen, P., Godfrey, K., Manosudpravit, M., Wangsrimongkol, T., Surakunprapha, P., & Pisek, P. (2012). Surgery first orthognathic approach for skeletal Class III malocclusion corrections--a literature review. *Journal of the Medical Association of Thailand = Chotmaihet thangsphaet*, 95 Suppl 11, S172-S180.
- [28] Liou, E. J., Chen, P. H., Wang, Y. C., Yu, C. C., Huang, C. S., & Chen, Y. R. (2011). Surgery-first accelerated orthognathic surgery: orthodontic guidelines and setup for model surgery. *Journal of Oral and Maxillofacial Surgery: Official Journal of the American Association of Oral and Maxillofacial Surgeons*, 69(3), 771-780.
- [29] Sharma, V. K., Yadav, K., & Tandon, P. (2015). An overview of surgery-first approach: Recent advances in orthognathic surgery. *Journal of Orthodontic Science*, 4(1), 9-12.
- [30] Tsai, I. M., Lin, C. H., & Wang, Y. C. (2012). Correction of skeletal Class III malocclusion with clockwise rotation of the maxillomandibular complex. *American Journal of Orthodontics and Dentofacial Orthopedics: Official Publication of the American Association of Orthodontists, Its Constituent Societies, and the American Board of Orthodontics*, 141(2), 219-227.
- [31] Yang, L., Xiao, Y. D., Liang, Y. J., Wang, X., Li, J. Y., & Liao, G. Q. (2017). Does the surgery-first approach produce better outcomes in orthognathic surgery? A systematic review and meta-analysis. *Journal of Oral and Maxillofacial Surgery: Official Journal of the American Association of Oral and Maxillofacial Surgeons*, 75(11), 2422-2429.

