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


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 contraindications to the SFA could be overcome via accelerated preoperative 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 preoperative 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 preoperative 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


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