

# Surgery first approach in orthodontics: An updated review

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## Abstract

Skeletal malocclusion appears to be one of the most commonly encountered problems in current orthodontics. SFA- surgical first approach in orthodontics, a fresh treatment concept has recently been seen trending in order to overcome dentofacial abnormalities. The sparking evidence of the quality treatment outcomes has created an appraisal in its use. Owing to its short-therapy time and prompt esthetic modification, SFA has turned out to be ideal treatment alternative for various complicated procedures. This article will provide an overview of the surgical first orthodontic approach.

## Introduction

The term “orthognathic surgery” was first coined in 1849 by Hullihen, back when surgical procedures in orthodontics were uncommon [1,2]. It wasn't until 1960, when clinicians started using the surgical approach due to its proven efficacy [1,3]. The increase in demand for flawless and fast esthetics has led to a rise in the use of the surgical approach. Conventional non-surgical procedures may be disadvantageous as they frequently result in caries, root resorption, gingival recession and many times the patient may be disheartened as often there is temporary worsening of facial esthetics [4-7]. The surgical line provides more bone turnover in a relatively shorter time span because of the regional acceleratory phenomenon which enables the patient to acknowledge the improved facial appearance speedily. SFA has commonly been used in Asian countries such as Japan and Korea.

## Surgical techniques

- Mandibular surgery
- Maxillary surgery
- Dentoalveolar surgery
- Distract osteogenesis
- Adjunctive facial procedures: rhinoplasty, lip procedures, chin modifications

## Goals of orthodontic surgery

- esthetics
- stability
- minimizing treatment time
- fixing structural deformities
- functional occlusion
- speech

## Indications and contraindications

The various indications for the surgical approach prior to orthodontic correction include mild crowding, flat curve of spee, slight proclination/retroclination of incisors, minimal transverse discrepancies, patients with facial asymmetries and patients that may be having a cleft lip or palate [8-10].

Contraindications for SFA include patients that needs definite decompression, patients with severe crowding, arch incoordination and patients with severe vertical or transverse discrepancies [10].

## RAP: Regional acceleratory phenomenon

It was introduced in 1983 by Frost [11] where he claimed that injury somehow accelerated the normal regional healing process and this acceleration is called regional acceleratory phenomenon. RAP is the tissue reaction to noxious stimuli that increases the healing capacity of tissues and causes increased rate of orthodontic movement, increased remodeling and transient osteopenia [12]. RAP is typically seen in hard tissues but it may be seen in soft tissues also [13,14].

Regional: demineralization occurs at both cut sites as well as the adjacent bone.

Acceleratory: exaggerated or intensified bone response in cuts that extend in the bone marrow.

## Treatment planning consideration

Careful treatment planning is the key to success of surgery [10].

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1. Molar relationship is taken as the starting point for temporary occlusion.
2. Inclination of incisors is important in determining the need for possible extractions, as rule of thumb, if the upper incisors are excessively proclined (angulation 53 to 55 degrees) then extraction must be done.
3. Midlines must coincide or be close to it with proper bilateral buccal overjet.
4. Final occlusion based on current position of the teeth will later help in splint fabrication and skeletal movement therefore three-point contact should be present between upper and lower models.

### Protocol variations

Although the lines of treatment may be similar, different protocols are generally used to prepare patients for the treatment [15]. In most cases brackets and wires are placed right before surgery [10]. Passive stainless wires are most commonly used to prevent tooth movement but some orthodontists have opted for nickel-titanium wires [10]. Furthermore, surgical splint can also be advocated during surgery or post surgically, i.e. around one to four weeks after surgery.

### Advantages of SFA

- immediate change in facial profile
- chief complaint of the patient is addressed since the beginning of treatment
- faster results
- future orthodontic treatment becomes less complicated
- easier to deal with relapses as compared to routine orthodontic treatment because decompensation is completed before surgery

### Disadvantages of SFA

- planning may be time consuming as it needs to be very accurate to prevent any errors
- predicting final occlusion is difficult
- ideal occlusion may be hard to achieve if there are multiple dental interferences
- patient selection is of utmost importance

### Post-surgical complications

- TMD
- Paraesthesia
- Decreased bite force
- Relapse
- Risk to patient due to complexity of osteotomy procedures

### Conclusion

SFA serves to be the present-day treatment archetype for dentofacial deformity management [16]. With its direct and rapid bony modification, it has proven to show satisfactory results and elevated acceptance [16,17]. The vital factor in achieving successful outcomes are the experienced surgeons and orthodontists that take into account the patients' well-being and needs [18]. The patients' needs and goals

should always be of first priority as even the slightest error can be very difficult to correct.

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