Original Article

The Comparison of Patient Satisfaction after "Surgery First" and Conventional Orthognathic Surgery: An Original Research

Abstract

Aims and Objectives: We evaluated the factors which affect patient satisfaction and their expectations toward "surgery first" and conventional orthognathic surgery. **Materials and Methods:** Questionnaires consisting of 17 questions were given to the subjects postoperatively who had undergone Le fort 1 maxillary superior impaction for skeletal gummy smile correction with conventional orthognathic surgery and "surgery first" approach. Eleven-point rating scale based on a (visual analog scale; 0 = poor; 10 = excellent) were used to answer six questions. Ten closed-form questions were also included as well as one open question for "further remarks." **Results:** Nineteen patients (12 females, 07 males; mean age, 23.4 ± 4.9 [standard deviation] years) gave their consent to participate in the study. The intention to undergo surgery only for esthetics was noted in 42.11% of patients; only improvement of chewing function in 21.05% and both in 36.84%. **Conclusion:** The most common factor for patient satisfaction after "surgery first" and conventional orthognathic surgery was facial esthetics, but masticatory function and even psychological aspects should be considered equally when planning surgery. The patient satisfaction was more in "surgery first" than conventional orthognathic surgery. The timing of treatment and immediate results are important factors toward patient satisfaction.

Keywords: *Esthetics, conventional orthognathic surgery, Le fort 1 osteotomy, patient satisfaction, "Surgery first"*

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Introduction

The conventional approach to orthognathic surgery involves a variable length of preoperative orthodontics, orthognathic surgery, and a relatively stable period of postoperative orthodontics.[1] The importance of presurgical orthodontics rests on the positioning of the skeletal component during surgery which may be limited by inappropriate dental alignment. However, orthodontic preparation lasts 15–24 months, which involves progressive deterioration of facial esthetics and dental function and thereby causes significant patient discomfort.[2,3]

An alternative methodology is the "surgery-first" approach (SFA). It was first proposed by Nagasaka *et al*. in 2009, this method proceeds with orthognathic surgery directly without presurgical orthodontics and is followed by regular postsurgical dental corrections.[4,5] The concept implies that the most of the orthodontic treatment is performed postoperatively and compared with the conventional approach. Thereby leading to a significant decrease in the overall total treatment time. This fact has a very positive influence on patients' satisfaction with treatment.[6,7] The high orthodontic efficiency observed in SFA cases is due to the combination of two factors. First, the correction of the skeletal base, the complexity of orthodontic treatment is decreased, and soft tissue imbalances that might interfere with certain orthodontic tooth movements are eliminated from the beginning. Second, tooth movement is accelerated owing to the greater postoperative metabolic turnover. The optimal esthetic results, the significant reduction in overall treatment duration, and patient satisfaction led to a reasonable, cost-effective method to manage skeletal discrepancies in selected cases and that it has the potential to become a standard approach to orthognathic surgery in the future.[8,9]

Dentofacial deformities have a negative impact on many aspects of life. These include social interactions, professional

How to cite this article: Mohanty P, Acharya SS, Sahoo N, Sah S, Sahu SK. The comparison of patient satisfaction after "surgery first" and conventional orthognathic surgery: An original research. APOS Trends Orthod 2017;7:123-9.

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Access this article online

Website: www.apospublications.com

DOI: 10.4103/apos.apos_18_17

Quick Response Code:

career, love life, and personality.[10] Patients with skeletal problems may have a lower quality of life. The perception and expectations of a patient are dependent on several factors. These may be not only esthetics and function but also psychological factors.[11-13]

Hence, evaluation of different subjective and objective factors regarding patient satisfaction after conventional orthognathic surgery and SFA is needed. The comparison of patient's satisfaction after SFA and conventional orthognathic surgery is also needed to be assessed. Keeping these things in mind, a questionnaire was constructed to assess patient's satisfaction toward facial appearance after SFA and conventional orthognathic surgery.

Materials and Methods

Nineteen patients (12 females, 7 males) agreed to participate in the study. Informed consent was obtained from all the participants, and the confidentiality of the subjects was guaranteed. The questionnaires were made by a group of orthodontists and their patients who discussed on the experience and expectations of a patient undergoing orthognathic surgery. The questionnaires were regarding different subjective and objective factors were given to the subjects postoperatively who had undergone Le Fort I maxillary superior impaction for skeletal gummy smile correction with conventional surgery and SFA. Questionnaires were explained to the patients regarding their perceptions for improvement of orthognathic surgery. The Six questions were answered using an 11-point rating scale based on a (visual analog scale; 0 = poor; 10 = excellent). Ten closed-form questions were included as well as one open question for "further remarks." [Figures 1-3].

QUESTIONNAIRE

Please read the following statements carefully. In order to find out how important each of the statements is to you.

1. **What was your primary intention to undergo orthognathic surgery? Please mark one of the four given answers:**
   a. Aesthetic improvement only
   b. improvement of chewing/masticatory function only
   c. both
   d. None/don't know
2. **What type of orthognathic surgery you have undergone?**
   a) Conventional orthognathic surgery (6-8 months later)
   b) Surgery first approach (immediate surgery).
   Please mark.
3. **Have you given two types of surgical options before the treatment** (conventional orthognathic surgery and surgery first approach)? (Yes or No)
4. **Are you satisfied with the overall treatment duration of orthognathic surgery?** (Yes or No)
5. **Which one is more important for you?**
   a. facial changes
   b. dental changes
   c. both
   d. none of the above

Figure 1: Questionaire

Patients stayed in the hospital for 5 days after surgery. Rigid fixation and an interocclusal splint were applied for 2 weeks, and patients wore light elastics for 2 weeks. Exclusion criteria were patients with mature cleft lip and palate with craniofacial syndromes and patients with orthognathic surgery without orthodontic treatment or with distractor devices. Institutional ethical approval was granted for this work by Kalinga Institute of Medical Sciences.

Statistical analysis

All the questionnaires responses were coded and then analyzed using SPSS version 20.0 (Version 20.0. Armonk, NY: IBM Corp). The significant values were taken at 95% confidence interval with a $P < 0.05$ value. Chi-square test was used to analyze the difference between the conventional and SFA mode of treatment**.**

Results

Nineteen patients gave their consent to participate in the study. Eleven had undergone conventional orthognathic surgery, and 8 had opted for SFA. The intention to undergo surgery only for esthetics was noted in 57.89% of the patients; only improvement of chewing function in 10.52% and both in 31.57% [Table 1 and Figure 4].

It was also noticed that all patients wanted to see immediate changes in their facial appearance and less treatment time to get the desired results.

When asked about the postoperative results; among the patients who had undergone conventional surgery, 18.18% saw esthetic improvement, 27.27% felt an improvement in their masticatory function, 18.18%

6. **Do you want immediate changes in facial appearance?** (Yes or No)
7. **How do you evaluate your postoperative overall result in immediate surgery / 6-8 months later surgery? Please mark one of the four given answers:**
   a. Aesthetic improvement only
   b. improvement of chewing/ masticatory function only
   c. both
   d. none/don't know
8. **How do you feel exactly about the surgical outcome after immediate surgical treatment/surgical outcome after 6-8 months? Please mark one grade of the scale from 0 (poor) to 10 (excellent).**
   0–1–2–3–4–5–6–7–8–9–10
9. **How do your family & friends feel about the surgical outcome of your treatement after immediate surgery/6-8 months post surgery? Please mark one grade of the scale from 0 (poor) to 10 (excellent)**
   0–1–2–3–4–5–6–7–8–9–10
10. **How would you assess your facial appearance before surgery? Please mark one grade of the scale from 0 (poor) to 10 (excellent).**
    0–1–2–3–4–5–6–7–8–9–10
11. **How would you assess your facial esthetics after immediate surgical treatment/surgical outcome after 6-8 months? Please mark one grade of the scale from 0 (poor) to 10 (excellent).**

Figure 2: Questionaire

felt an improvement in both, and 36.36% were unsure. [Table 2 and Figure 5].

Among patients who had undergone for SFA; 62.5% saw esthetic improvement, 12.5% felt an improvement in their masticatory function, and 25.0% felt an improvement in both [Table 2 and Figure 5].

There was a significant difference seen in the patient's perspective regarding pre- and post-surgical results in the case of patients who opted for SFA. The before and after results for patients undergone SFA was more appreciated [Table 3 and Figure 6].

When the outcome of both the surgeries was compared on an individual level and on peer level a significant value of *P* was obtained, suggesting a better response in case of SFA individuals [Tables 4, 5 and Figures 7, 8].

When the patients were asked about their comfortness after the surgery and on taking photographs. The patients who opted were more comfortable both immediately after the surgery and on taking photographs [Tables 6, 7 and Figures 9, 10].

When the patients were assessed on the satisfaction of the overall treatment effects, time and procedures, 81.81% of patients who had undergone conventional surgery were satisfied, and 63.63% recommended it. While 100% of the patients who had undergone SFA were satisfied and recommended it [Tables 8, 9 and Figures 11, 12].

Most of the patients in further remarks wrote about their confidence boost and increased self-esteem after the surgery. However, there were also a few who wrote about the disheartening experience during the decompensation period of the conventional treatment. One patient who had undergone SFA wrote: "Right after the surgery, I met my new self." It is the immediate effect of SFA that impresses the patient and help them to cooperate more.

Discussion

The definition of real success in our field first was initiated from the recognition of the problem and strong will power to overcome such problems by finding solutions. In this perspective, the SFA was successful in terms of focusing on the patients' chief problem.[14] "Accountability" which is defined as the orthodontist's ability to explain clearly the specific reason and course of treatment in a predictable way is yet another factor in our field. Orthognathic surgery has a certain amount of relapse, instability, and unpredictability.

0–1–2–3–4–5–6–7–8–9–10

12. **Are you satisfied with the effects of 'surgery first'/conventional orthognathic surgery?** (yes or no)

13. **Do you feel comfortable post immediate surgery /after 6-8 months post surgery to eat outside in public places, smile meeting others, take photographs and not cover your face?**

0–1–2–3–4–5–6–7–8–9–10

14. **How much you feel confident after surgery?**

0–1–2–3–4–5–6–7–8–9–10

15. **Assuming that orthognathic surgery is indicated, would you recommend it to others?**
(Yes or no.)

16. **If you recommending orthognathic surgery, then which one you would recommend to others?**
a- conventional orthognathic surgery b- surgery first approach

17. **Do you have further remarks concerning the orthognathic surgery service?**

Figure 3: Questionaire

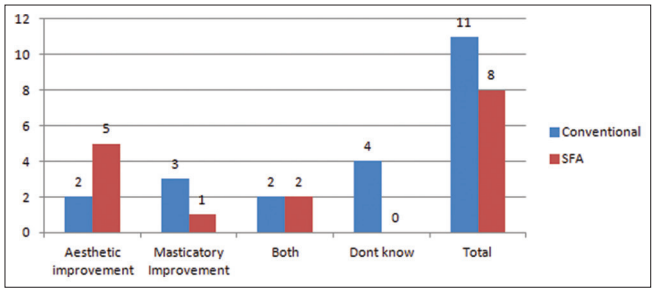

Figure 5: Postoperative overall result

Table 1: Primary Intention of Surgery

Primary Intention	Type of Surgery		Total	*P*
	Conventional	SFA		
Aesthetic Improvement	6	5	11	0.425
Mastication	1	1	2	
Both	4	2	6	
Total	11	8	19	

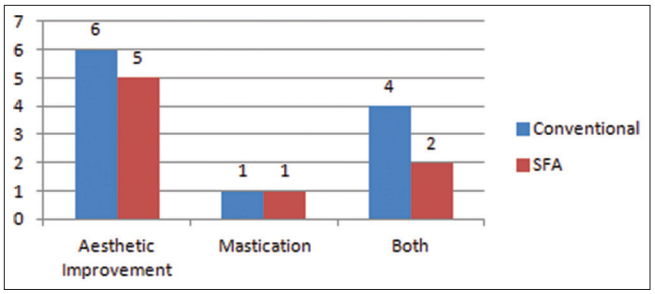

Figure 4: Primary intention of surgery

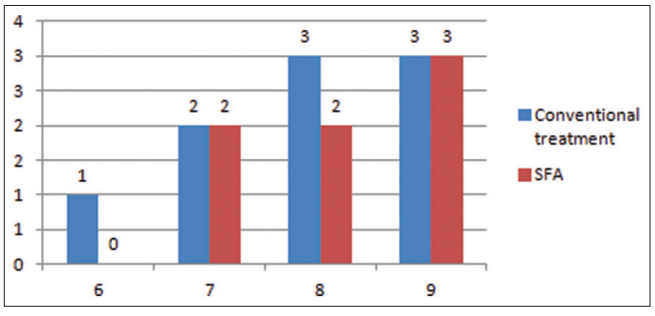

Figure 6: Appearance of face after surgery (visual analog scale)

Table 2: Postoperative Overall Result

Type of Surgery	Aesthetic Improvement	Masticatory Improvement	Both	Don't Know	Total	*P*
Conventional	2	3	2	4	11	0.114
SFA	5	1	2	0	8	
Total	7	4	4	4	19	

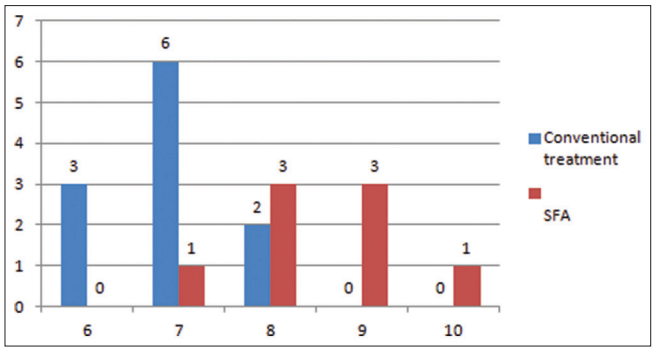

Figure 7: Outcome of surgery (visual analog scale) on individual level

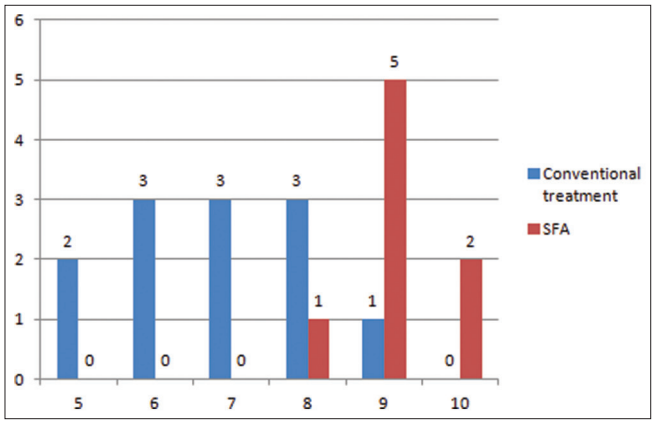

Figure 9: Comfortness postsurgery

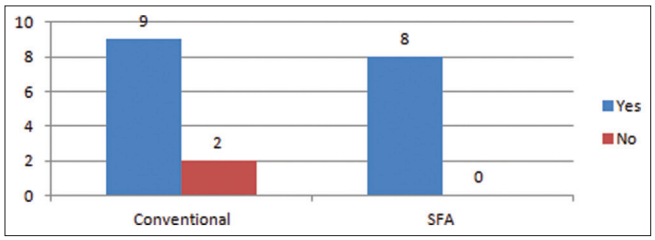

Figure 11: Patient's satisfaction with the effects

Almost all patients are satisfied with the surgical outcomes of orthognathic surgery. This fundamental dilemma concerning "accountability" as a factor can improve our practice and can make a new major progress in our field. In the case of the conventional orthognathic treatment procedure, SFA needs to show scientific evidence as to whether this procedure can have a definitive advantage in terms of accountability.[15-17] SFA is thus believed to be a paradigm shift in the world of orthognathic surgery.

Dental occlusion and facial esthetics can show immediate effects postsurgery when using an SFA.[17,18] The SFA

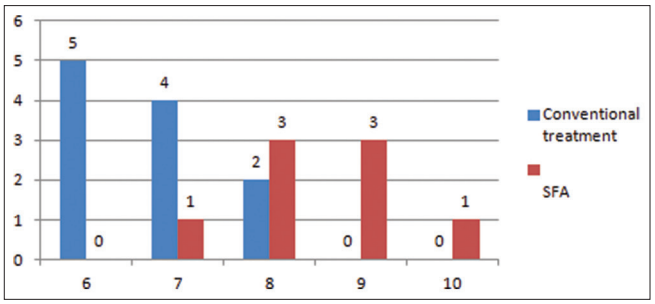

Figure 8: Outcome of surgery (visual analog scale) on peer review

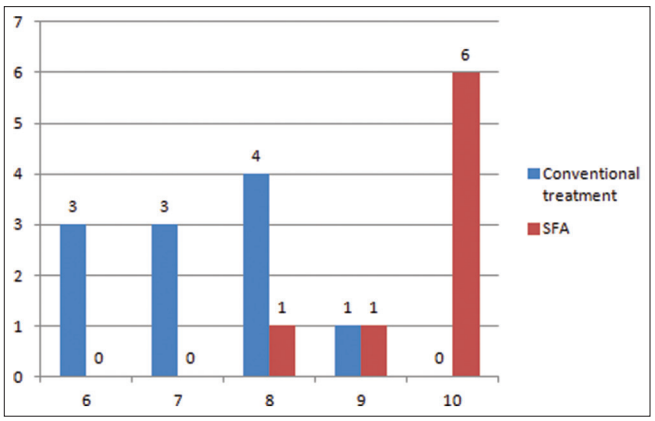

Figure 10: Confidence after surgery on taking photographs

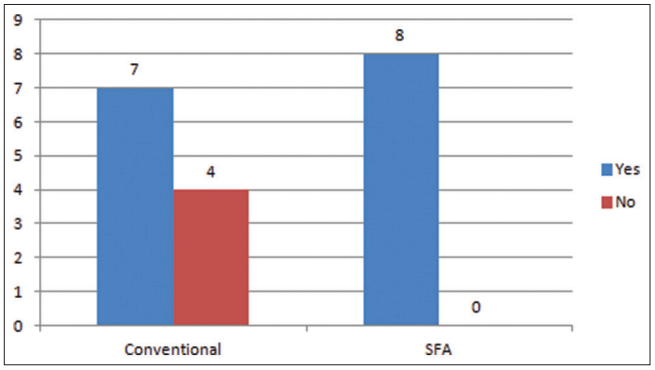

Figure 12: Recommendation of the treatment after surgery

offers an alternative to the orthodontics-first approach for correction of Dentofacial deformities. The advent of postoperatively accelerated orthodontic tooth movement also reduces the difficulties and complications associated with and the time spent on postoperative orthodontics. Both the orthodontist and the maxillofacial surgeon using an SFA should be well-experienced and should cooperate closely with each other to achieve predictable and satisfactory outcomes.[19-21] Orthodontists should be aware

Table 3 : Appearance of Face after the Surgery (VAS)

Score	Frequency			*P*
	Conventional	SFA	Total	
6	1	0	1	0.00
7	2	2	4	
8	3	2	5	
9	3	3	6	
	Median score=7	Median score=8.5	Median score=8	

Table 4: Outcome of the Surgery (VAS) on individual level

Satisfaction Score	Frequency			*P*
	Conventional	SFA	Total	
6	3	0	3	0.01
7	6	1	7	
8	2	3	5	
9	0	3	3	
10	0	1	1	
	Median score=7	Median score=8.5	Median score=7	

Table 5: Outcome of the Surgery (VAS) on peer views

Satisfaction Score	Frequency			*P*
	Conventional	SFA	Total	
6	5	0	3	0.00
7	4	1	5	
8	2	3	5	
9	0	3	3	
10	0	1	1	
	Median score=7	Median score=8.5	Median score=7	

Table 6: Comfortness Post-Surgery

Satisfaction Score	Frequency			*P*
	Conventional	SFA	Total	
5	2	0	2	0.00
6	3	0	3	
7	3	0	3	
8	3	1	4	
9	1	5	6	
10	0	2	2	
	Median score=7	Median score=8.5	Median score=8	

Table 7: Confidence after Surgery on taking Photographs

Satisfaction Score	Frequency			*P*
	Conventional	SFA	Total	
6	3	0	3	0.00
7	3	0	3	
8	4	1	5	
9	1	1	2	
10	0	6	6	
	Median score=7	Median score=10	Median score=8	

Table 8: Patient's Satisfaction with the Effects

	Type of Surgery			*P*
	Conventional	SFA	Total	
Yes	9	8	17	0.485
No	2	0	2	
	11	8	19	

Table 9: Recommendation of the Treatment by the Patients

	Type of Surgery			*P*
	Conventional	SFA	Total	
Yes	7	8	15	0.103
No	4	0	4	
	11	8	19	

of the orthognathic principles, limitations in orthodontic movement and plan postoperative orthodontic treatment to include alignment, incisor decompensation, arch coordination, and occlusal interdigitation. The maxillofacial surgeon should be experienced enough of performing designated osteotomy and intermaxillary fixation with occlusion bite plate on malaligned dental arches and providing the stability after skeletal reposition.

The reduction of the overall orthodontic treatment period and immediate facial changes would be the most significant advantages of this approach. Dentofacial deformity affects patient quality of life in our society.[22,23] The high satisfaction rate according to the questionnaire given to the patients was ranged between 70% and 87%. There was a marked improvement in self-confidence in 67.5% of patients as a result of an improved appearance and chewing function. Patients responded that immediate surgical treatment had a great impact on their friends and family.[24,25] Satisfaction of those correlated significantly with patients' satisfaction.[26] From the questions asked we get to know that patients' mental attitude about his/her postoperative appearance may be influenced by the support from family postsurgery. In contrast, the prevalence of postoperative complications such as numbness, prickle-sensations, pain in the temporomandibular joint area, or restrictions in mouth-opening had no overall effect on satisfaction.[27]

The primary factor of satisfaction with surgery first was whether or not the result was perceived to be an esthetic improvement. If there was an esthetic improvement in facial features immediately, the satisfaction was high in comparison to the conventional orthognathic surgery, regardless of functional problems.[28,29] An important result of this study was that a correlation between age, sex, and response to the questionnaire was not found. Young male

patients wanted functional improvement, and older male patients showed no alteration in self-esteem or depression with surgery first technique. Young females desired for improvement in self-confidence and older female patients displayed improved self-esteem and diminished depressive symptoms due to surgical intervention.

It is well-known that satisfaction and the perception of surgical outcome depend on two important factors, preoperative expectations and the degree to which the procedure is explained by the orthodontist or the maxillofacial surgeon. Patients who are psychologically depressed before surgery tend to report a higher recovery burden and experience more difficulty with symptoms with social/self-concerns in the initial months of the postsurgery. Various factors may change postoperative satisfaction of the patients like written data about the sequelae and the recovery period.[30]

During conservations, the previously operated patients talked about their experiences, which helped on the emotional preparation of the patients about to undergo orthognathic surgery. This activity did not create negative impressions in the patients because it did not cause distress or anxiety. Visualizing treatment simulation before surgery did not affect the perception of symptoms or satisfaction postsurgery. After surgery first approach, most patients report an improvement in self-confidence, body and facial image, and social adjustment, but some patients are only temporarily satisfied and become litigious or violent.[31,32] Patients who receive an inadequate explanation of the surgery are prone to be emotionally unprepared and anxious after surgery, but orthognathic surgery may not be beneficial for patients who assume that it will solve most of their problems.

A similar study was conducted by Huang *et al*.,[33] in which there was a comparison of oral health-related quality of life and satisfaction in SFA and conventional orthognathic surgery patients. The quality of life in orthodontic-first group was deteriorated before orthognathic surgery whereas, in surgery-first group, the quality of life was immediately improved which lead to better satisfaction.

The limitations of the study include convenience sampling and a nonvalidated questionnaire thus, making the findings of this study exclusive to a particular sector of population. The result may not have a quantitative accurateness, but qualitatively, it will remain the same as this study is basically the comparison of the SFA and Conventional orthognathic surgery on patient perceptiveness.

Conclusion

The most distinctive factors for patient satisfaction after orthognathic surgery and conventional orthognathic surgery were facial esthetics. The patient satisfaction was more in orthognathic surgery than conventional orthognathic surgery. The timing of treatment and immediate results are important factors toward patient satisfaction. Function, esthetics and even psychological aspects should be considered equally when planning surgery.

Financial support and sponsorship

Nil.

Conflicts of interest

There are no conflicts of interest.

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