Patients’ perception and postoperative expectations after orthognathic surgery

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Abstract
An important issue in orthognathic surgery is to ensure that patients are satisfied with the outcome of the treatment. The aim of the study was to determine if there are any differences in patient satisfaction, post operative pain, and other postoperative difficulties after orthognathic surgery treatment in men compared to women. Eighty-four patients subjected to various orthognathic surgery procedures were studied six months after their surgical treatment. The study was based on a questionnaire that patients filled out at their six month evaluation recall. Four (5%) patients found the pain as a severe problem, four out of five found the swelling as a problem. All patients except one were satisfied with the treatment. Both genders ranked the difference in facial appearance after surgery as the most important improvement. The second improvement that resulted in patient satisfaction was improvements of dental alignment. Three (4%) patients would not recommend orthognathic surgery to another person. The average weight loss was three kilograms post operative. No differences could be discovered between the sexes in any of the nine questions. This study indicates that men and women are reacting similarly, and that there are high patient satisfaction rates after orthognathic treatment.

Introduction
In today’s Odontology many specialties can be found, for example Orthodontics and Oral and Maxillofacial surgery. The orthodontist’s part is to take care of different kinds of malocclusions. Often this is enough, but in some occasions the malocclusion is so great, that an oral and maxillofacial surgeon has to be involved. According to the American national research council 5% of the population has such severe malocclusion that it can be called a handicap. These are mainly the patients that need orthodontic and later a possible orthognathic treatment. Approximately 10% of the American population has Class II malocclusions which around 1% of these require surgical correction of the deficiency. Class III malocclusion on the other hand occurs in only 2.5% of the population of which 40% are so severe that a surgical treatment is required to obtain optimal results. The reasons to the malocclusions are genetically influenced, but it can also be environmental, a reason is intrauterine moulding of the developing foetal head that could result in mandibular deficiency. Other reasons for environmental influences are abnormal function and tongue positioning, respiratory problems, mouth breathing and trauma. All these factors can contribute to developing abnormalities. (1, 2)

Presurgical treatment
The orthodontic part of the treatment can start relatively early. During the orthodontic part the dental compensation that has developed has to be decompensated, which means that the teeth
has to be moved to a position that will give the best aligned teeth. This part of the treatment can be hard for the patient to accept, which can make their malocclusions more pronounced. During the presurgical treatment a periodontal and restorative examination should be performed. The first step is to treat the gingival inflammation. If the patient is unable to have a good oral hygiene he/she will have even greater problems with the orthodontic bands and brackets placement, so all patients should be instructed and motivated in oral hygiene routines. All teeth are then evaluated. Everything has to be examined endodontically, caries lesions, faulty restorations and extractions. The final restorative treatment should be delayed to after surgery, when proper skeletal relationships are achieved.

When the teeth are aligned after the presurgical orthodontic treatment, an impression is taken, new radiographs and registration with face bow are made. The patient’s malocclusion and facial appearance is re-examined. Then a model surgery is performed with the new impressions. Here the Oral and Maxillofacial Surgeon is able to see and determine the exact surgical movements that are necessary to obtain the desired occlusion. With help of these an intraocclusal wafer is constructed that fits both upper and lower jaw; this will help the surgeon to align osteotomies and dental segments into desired positions during surgery. (2)

Orthognathic surgery

There are several different osteotomies that can be made to obtain desired results. The most used osteotomies are A) sagittal split osteotomy, were the lateral cortex of the mandible is separated from the medial aspect, and the mandible can be protruded or retruded for mandibular corrections. B) Dentoalveolar segment osteotomy, were the dentoalveolar part of the jaw is separated (usually after an extraction) and protruded or set back, then fixed in the new position. C) Vertical ramus osteotomy. Lateral aspects of ramus are exposed, the ramus is then sectioned vertically and the distal segment moved posteriorly. The anterior part of the ramus will then overlap the posterior part of the mandible and then fixed in this position with intermaxillary fixation. D) Le fort 1 osteotomy. This osteotomy can be used when advancement, elongation of the lower third of the face, and small rotations of the maxilla is necessary. The maxilla is then loosened from the facial skeleton and moved in the direction wanted. In fig 1 illustrations of different osteotomies can be seen. (2)

![Fig 1: A-C. A) Vertical ramus osteotomy, B) Bilateral sagital split osteotomy and C) Le Fort I osteotomy.](image-url)
Psychological aspects of treatment:
In orthognathic surgery it is important to ensure that patients are happy with the outcome of the treatment. To be able to satisfy the patient, he/she has to have realistic expectations (3). In the past decades it has been an increasing interest of factors that can influence the outcome of the surgery, for example patient expectations and neuroticism. There are always patients that are not satisfied with the outcome of an operation. The dissatisfaction rate after orthognathic surgery appears to be less than 5%. Much of the dissatisfaction with the result of orthognathic surgery may be a result from disturbances in body image and how we see ourselves. A reason for the high satisfaction rate in orthognathic surgery may be the long preoperative contact between the patient, the Oral and Maxillofacial Surgeon and the Orthodontist, which normally leads to good information about the surgery. This will lead to a good preoperative preparation of the patient.
Orthognathic surgery are performed on functional reasons compared to plastic surgery that is mostly done of cosmetic reasons, and more often leads to a less satisfied patient because it was not the result that the patient had in mind. (4)

Most of the dissatisfied patient that find orthognathic surgery as difficult, finds specifically the post surgical orthodontic treatment that is required as the hardest part of the treatment.(5) According to Cunningham et al 60-80% of the treated patients will undergo some kind of depression after the surgical part and during the last orthodontic treatment.(6)

A patient’s satisfaction is influenced by their presurgical expectations and psychological wellbeing. Negative expectations, anxiety and stress can slow down the recovery process. (7) Chen et al noticed that patients with higher education and more severe deformities reported greater satisfaction. (8) Kiyak et al discovered that even after 9 months 58 % still reported numbness after surgery. This number was a decrease from 90% immediately after surgery. Almost one third of the participant in the study reported that they had multiple problems after 9 months. The problems were mainly pain, paresthesia and scars. Still 92.3 % answered that they would recommend the treatment to others. In the same study they discovered that patients who had their orthodontic appliance in their mouth (up to 9 months) after surgery had significant decrease in overall self-esteem. These patients were significantly less satisfied at 9 months than the control group that had the brackets removed earlier than 9 months. (9)

Gender differences
Aesthetic improvement has been suggested to be the major goal of women undergoing orthognathic surgery. Women put greater importance on physical attractiveness, and women can more easily distinguish what they like and dislike about their bodies than men can. Because of more global acceptance of cosmetic surgery one may think that men and women are more similar today in the attention that they give to physical attractiveness. (10) There are few significant differences in personality between the genders. Women tend to score higher on tests of neuroticism, but both men and women still score in the normal range. Men tend to be more positive when evaluating their facial profiles. (10) Age and gender has very little effect on patient response. Surgery types and complications after surgery do not influence patients’ postoperative satisfaction. The rank order of patient motives before surgery is also similar between the sexes. One significant difference between men and women is that women are less likely to report oral function discomfort postoperatively. (11)
According to Nurminen et al problems in biting and chewing is one of the major reasons for seeking orthognathic surgery, but the next reason after that is the dissatisfaction with the facial appearance. Both Nurminen and Kiyak saw surprising similarities between men and women, in personal motives and outcome of the surgery. (5, 10) Garvil et al found that the effect of the surgery had influenced the patient as individuals, as well as their social relations, in a positive matter. (12)

**Aims of the study**
The aim of the study was to determine if there are any differences in patient satisfaction, pain sensation, other postoperative problems after orthognathic surgery in men compared to women, also to see what the patients are most satisfied with after an operation and to see approximately how much a patient loose in weight, after an orthognathic treatment.

**Materials and Methods**
The study was based on 149 patients who underwent orthognathic surgery from the years 2000-2005 at the Oral and Maxillofacial Surgery department at Karolinska Institute, Huddinge, Sweden. The study was limited to osteotomies such as, a) Vertical ramus osteotomy, b) Le fort 1 osteotomy, c) Bilateral sagital split osteotomy (BSSO), d) Le fort I + BSSO e) Le fort I + vertical ramus osteotomy. Fig 1 illustrates more detailed information. None of the treatments was performed by the author.
The study was based on a questionnaire which was filled out 6 months after an orthognathic surgery treatment. The questionnaires were designed to be relatively quick to fill out, with a total of 20 questions. In this study the focus was put on nine of the questions. The questions can be read in fig 2.
The questions were mostly designed with ranked answers, such as no problems, moderate problems, a lot of problems or simply yes and no questions. The questionnaires were voluntarily filled out as the patients came for their 6 month postoperative recall.
Out of 149, eighty four (56 %) patients finished the questionnaires in a matter that the questionnaires could be used.
There were 59 (70 %) women and 25 (30 %) men between 15 and 45 years of age. Mean age of the participants were 22 years in total. The mean age among women was 21 years, and among men 23 years.
5) How did you experience the pain the first days after surgery?
A) Not such a problem  B) Moderate problem  C) Severe problem

6) How was your experience about swelling the days after your operation?
A) Not such a problem  B) Moderate problem  C) Severe problem

7a) How was your experience about numbness the days after surgery?
A) Not such a problem  B) Moderate problem  C) Severe problem

Were these symptoms as you had expected them to be?
a) The pain was
A) Less than expected  B) As expected  C) Worse than expected

b) The swelling was
A) Less than expected  B) As expected  C) Worse than expected

c) The numbness was
A) Less than expected  B) As expected  C) Worse than expected

8) Which of the following alternative has been the most important improvement for you?
A) Chewing and biting difficulties  B) uncomfortable positioning while biting together.
C) The looks and alignment of the teeth  D) Facial appearance
E) Pain from the jaw  F) Pain from temporomandibular joint
G) Speech improvements  H) Confidence
I) Other.................................................

10) How do you feel about the results from the treatment?
A) Bad  B) Good  C) Very good

11) Do you regret the surgical treatment?
A) Yes  B) No

12) Would you recommend the surgical procedure to other patients in the same position?
A) Yes  B) No

13) Did you get sufficient information before surgery?
A) To little  B) Enough  C) To much

17) Have you lost any weight? If yes how much?
A).................................

Fig 2: questions that were used in the questionnaire. Not all the questions in the original questionnaire were used in this study.
Results
Surgical treatments that were made were A) vertical ramus osteotomy  B) Le fort 1  C) Bilateral sagital split osteotomy D) Le fort 1 + bilateral sagital split osteotomy E) Le fort + vertical osteotomy. The amounts of osteotomies made can be seen in Table 1.

| Table 1 Different orthognathic surgeries that were made. |
|-----------------|-----------------|
| Osteotomies     | Number Patients (%) |
| A) Vertical ramus | 9 (11 %)        |
| B) Le fort 1     | 20 (24 %)       |
| C) Bilateral sagital split | 16 (19 %)       |
| D) Le fort + Bilateral sagital split | 24 (29 %)       |
| E) Le fort + vertical ramus | 18 (21 %)       |

As table 2 illustrates 25 (30 %) men and 59 (70 %) women participated in the study. Comparisons between the sexes were made in all the questions in the questionnaires. No differences emerged. Men and women gave similar answers to all questions in the questionnaire. Out of 84 patients 75 (89 %) were very satisfied with the results six months after surgery and eight (10 %) patients were satisfied with the results. Only one (1 %) patient was not sure of the outcome of the treatment.

| Table 2: Gender and age among the participants. |
|-----------------|-----------------|
| Gender          | Number of Patients (%) |
| Men             | 25 (30 %)       |
| Women           | 59 (70 %)       |

<table>
<thead>
<tr>
<th>Age</th>
<th>Number of patients (%)</th>
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<tbody>
<tr>
<td>15-20</td>
<td>57 (68 %)</td>
</tr>
<tr>
<td>21-30</td>
<td>18 (21%)</td>
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<tr>
<td>31-</td>
<td>9 (11%)</td>
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On the question if they had any problems with pain the first days after surgery, 38 (45 %) patients did not find the pain as any problem. Only four (5 %) patients found pain as very difficult, ten (12 %) patients thought that the pain was worse than they had expected it to be. How ever 25 (30 %) patients found the swelling as
a severe problem, 43 (51%) patients found swelling as moderate problem and 33 (39%) patients thought that the swelling was worse than they had expected.

Fig 3: Answers on the question about severity in pain after surgery. Only four (5%) patients found the postoperative pain as very severe. 38 (46%) patients had no problem and 41 (49%) patients had only moderate problem with the postoperative pain.

Fig 4: Expectations and outcome of the postoperative pain. Ten (12%) patients thought that the pain was worse than they had expected, and 40 (50%) patients had less pain than they had expected.
Seven (8%) patients stated that the problems with numbness were severe, but 16 (19%) patients found the numbness worse than expected. Both men and women answered similar to the question about what they thought of changes that were made after surgery. Both sexes ranked the differences in facial appearance as the most important improvement, after that improvement of dental alignment was the second factor that led to patient satisfaction.

Of all patients that answered the question if they regretted their treatment, only one patient regretted the operation. The reason was that the patient refused to go through the operation as the surgeon had recommended it. Recommendation was both an operation in the maxilla and in the mandible, but the patient had refused to do both and did only one jaw. Majority of the patients except three (4%) would recommend another patient in the same situation to undergo similar procedure.

Fig 5: Number of patients who would recommend others to undergo the same procedure if they had the same problem. 77 (96%) patients would recommend others to undergo the same procedure, while three (4%) patients would not recommend the treatment to others.

Majority of patients wrote that they received enough information before surgery except three (4%) who wrote that they got too much information. The average weight loss was three kg for both men and women postoperatively. The postoperative pain was the same no matter what kind of operation the patients went through. No significant differences could be discovered if the operation was made in the maxilla or in the mandible. Neither could any differences be found if an intermaxillary fixation were used or not.

Discussion:
It is encouraging to notice such a generally high levels of satisfaction among orthognathic surgery patients. 96% of the patients were very satisfied or satisfied with the outcome of the operation. Further they reported improvements in facial appearance as the most important improvement. The second best improvement that resulted in patient satisfaction was improvements of dental alignment. Reasons for such a good results after orthognathic surgery can be drawn to earlier studies by Kiyak et al. They also found that most of the patients who underwent orthognathic surgery, received the information about their problem from his/her dentist. This is normally not the case of patients undergoing plastic surgery who normally seeks treatments by them selves. Plastic surgery patients are normally more focused on the procedure and have higher expectations of the outcome of the surgery. (10) Many of the orthognathic surgeries that patients undergo are done because of speech, masticatory
difficulties and temporal-mandibular joint problems. These are some of the reasons why patient are more satisfied after an orthognathic surgery procedure. (10, 12)

The results from this study are similar with results from earlier studies made on differences between men and women undergoing surgical treatments. Lots of similarities can be seen between men and women in personality, expectations and outcome after an orthognathic surgery treatment. Not even age does seem to be an important factor in satisfaction level after an orthognathic surgery treatment. (11) Earlier studies of Cunningham et al showed that 25 % of the patients felt that the effects after surgery were badly explained and that counselling preoperatively should be improved. (6) This was nothing that could be seen in this study. Majority of the patients wrote that they had received enough information before the procedure and some even wrote that the received to much information about the procedure. If patients receive enough information before surgery, they will be better prepared for post operative problems and ability to handle them.

Orthognathic surgery performed on the Maxilla generally has less postoperative pain compared to orthognathic surgery to the mandible. There are more complains of breathing difficulties and sinus complication after maxillary procedures. Patients tend to forget the degree of postoperative pain. (13) We could not confirm any differences in postoperative pain and swelling after procedures made in the maxilla compared with procedures made in the mandible. This indicates that pain control at the wards works well, and that patients can be held there without felling pain as a problem. The main problem that many of patients feel is the swelling. This is a difficult task to manage, though it is impossible to do a surgical procedure without swelling. Today corticosteroids are used to keep down the swelling.

The incidence of postoperative numbness problem was only seven (8) patients but one out of five found the numbness as severer than they had expected it. Still the majority of the patients were satisfied with the operation. This shows that choosing the right patients that are motivated enough is a very important factor. Patients must have realistic expectations and follow the surgeon’s preoperative presentation. This study indicates that men and women are reacting similarly, and that there are high patient satisfaction rates after orthognathic treatment.

Acknowledgments
I would like to thank Mrs M. Modig (Department of Oral and Maxillofacial Surgery at Karolinska Institute, Huddinge, Sweden) for her help and support during this study. I would also like to thank all the employees at the same department who allowed me access to all the materials that I needed.
References


