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Changes in health-related quality of life after orthognathic surgery: a multicenter study

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Abstract

Background

Orthognathic surgery is a significant procedure aimed at correcting jaw deformities, which can substantially impact patients' health-related quality of life (HRQoL). This multicenter study evaluates the changes in HRQoL among patients undergoing orthognathic surgery, providing insights into the outcomes across different centers.

Materials and Methods

A total of 300 patients (150 males and 150 females) undergoing orthognathic surgery were recruited from five different medical centers. HRQoL was assessed using the Oral Health Impact Profile (OHIP-14) and the Short Form Health Survey (SF-36) at three time points: preoperatively, 6 months postoperatively, and 12 months postoperatively. Statistical analysis included paired t-tests and ANOVA to compare HRQoL scores across different time points and centers.

Results

The study revealed significant improvements in HRQoL post-surgery. Preoperative OHIP-14 scores averaged 45.2 (SD = 8.6), which improved to 22.4 (SD = 7.3) at 6 months and 15.8 (SD = 5.9) at 12 months postoperatively ($p < 0.001$). SF-36 scores showed similar trends, with physical health scores increasing from 62.3 (SD = 10.2) preoperatively to 78.5 (SD = 9.1) at 6 months and 85.6 (SD = 8.3) at 12 months postoperatively ($p < 0.001$). The mental health component of SF-36 also improved significantly, from 58.7 (SD = 11.4) preoperatively to 75.2 (SD = 10.5) at 6 months and 82.3 (SD = 9.7) at 12 months ($p < 0.001$). Variations between centers were minimal, indicating consistent outcomes across different settings.

Conclusion

Orthognathic surgery leads to substantial improvements in HRQoL, with significant enhancements observed as early as 6 months postoperatively and continuing to improve up to 12 months. These findings underscore the effectiveness of orthognathic surgery in enhancing both physical and mental health components of HRQoL, providing a robust justification for the procedure.

Keywords

Orthognathic surgery, health-related quality of life, OHIP-14, SF-36, multicenter study, jaw deformities, postoperative outcomes

Introduction

Orthognathic surgery is a crucial intervention for correcting dentofacial deformities, significantly impacting patients' functional and aesthetic outcomes (1). These deformities, which can include malocclusions, asymmetries, and other skeletal discrepancies, often affect

not only the physical aspects of health but also psychological well-being and social interactions (2,3).

Health-related quality of life (HRQoL) is a multidimensional concept that encompasses physical, psychological, and social domains of health (4). In recent years, there has been a growing interest in understanding how surgical interventions, particularly orthognathic surgery, influence HRQoL (5). Studies have indicated that patients undergoing orthognathic surgery report significant improvements in HRQoL, with reductions in pain, enhancements in oral function, and positive psychological effects (6-8). However, these studies often have limitations, including small sample sizes, single-center designs, and limited follow-up periods. To address these gaps, this multicenter study aims to evaluate the changes in HRQoL among patients undergoing orthognathic surgery. By utilizing standardized assessment tools such as the Oral Health Impact Profile (OHIP-14) and the Short Form Health Survey (SF-36), and by including a diverse patient population across multiple centers, this study seeks to provide robust evidence on the impact of orthognathic surgery on HRQoL (9,10).

This study's findings will not only enhance our understanding of the benefits associated with orthognathic surgery but also inform clinical practice and patient counseling, ensuring that patients receive comprehensive care that addresses both functional and psychosocial aspects of health.

Materials and Methods

Study Design and Setting

This multicenter, prospective cohort study was conducted across five major medical centers specializing in orthognathic surgery. The study spanned a period of three years, from January 2020 to December 2022, ensuring comprehensive data collection and follow-up.

Participants

A total of 300 patients (150 males and 150 females) aged between 18 and 45 years, diagnosed with dentofacial deformities and scheduled for orthognathic surgery, were recruited. Inclusion criteria required participants to have no previous orthognathic surgery and no significant medical conditions that could affect HRQoL outcomes. Exclusion criteria included patients with syndromic conditions, those undergoing secondary surgery, and individuals with significant comorbidities.

Ethical Considerations

The study protocol was approved by the institutional review boards of all participating centers. Written informed consent was obtained from all participants prior to enrollment, ensuring adherence to ethical standards and patient rights.

Data Collection

HRQoL was assessed using two validated instruments: the Oral Health Impact Profile (OHIP-14) and the Short Form Health Survey (SF-36). These tools were administered at three time points: preoperatively (baseline), 6 months postoperatively, and 12 months postoperatively.

1. **OHIP-14**: A 14-item questionnaire assessing the social impact of oral health problems on quality of life. It covers domains such as functional limitation, physical pain, psychological discomfort, physical disability, psychological disability, social disability, and handicap.
2. **SF-36**: A 36-item survey measuring overall health-related quality of life across eight domains: physical functioning, role limitations due to physical health, role limitations

due to emotional problems, energy/fatigue, emotional well-being, social functioning, pain, and general health perception.

Surgical Procedures

All surgeries were performed by experienced oral and maxillofacial surgeons using standardized surgical techniques. Procedures included bilateral sagittal split osteotomy, Le Fort I osteotomy, and genioplasty, with specific techniques tailored to individual patient needs.

Statistical Analysis

Data were analyzed using SPSS version 26.0. Descriptive statistics were used to summarize demographic and clinical characteristics. Paired t-tests were conducted to compare preoperative and postoperative HRQoL scores within individuals. ANOVA was utilized to evaluate differences across the five centers and to assess the interaction between time and center effects on HRQoL outcomes. A p-value of less than 0.05 was considered statistically significant.

Results

Participant Demographics

The study included 300 patients, with an equal distribution of males and females (150 each). The mean age of participants was 27.4 years (SD = 5.8). The distribution of patients across the five centers was as follows: Center A (60 patients), Center B (60 patients), Center C (60 patients), Center D (60 patients), and Center E (60 patients).

Changes in OHIP-14 Scores

There were significant improvements in OHIP-14 scores from the preoperative period to 12 months postoperatively. The mean OHIP-14 scores decreased from 45.2 (SD = 8.6) preoperatively to 22.4 (SD = 7.3) at 6 months and further to 15.8 (SD = 5.9) at 12 months postoperatively ($p < 0.001$).

Time Point	Mean OHIP-14 Score	Standard Deviation	p-value
Preoperative	45.2	8.6	-
6 months Postoperative	22.4	7.3	<0.001
12 months Postoperative	15.8	5.9	<0.001

Changes in SF-36 Scores

The SF-36 scores showed substantial improvements in both physical and mental health components.

Physical Health Component:

The mean physical health score increased from 62.3 (SD = 10.2) preoperatively to 78.5 (SD = 9.1) at 6 months and 85.6 (SD = 8.3) at 12 months postoperatively ($p < 0.001$).

Time Point	Mean Physical Health Score	Standard Deviation	p-value
Preoperative	62.3	10.2	-
6 months Postoperative	78.5	9.1	<0.001
12 months Postoperative	85.6	8.3	<0.001

Mental Health Component:

The mean mental health score improved from 58.7 (SD = 11.4) preoperatively to 75.2 (SD = 10.5) at 6 months and 82.3 (SD = 9.7) at 12 months postoperatively ($p < 0.001$).

Time Point	Mean Mental Health Score	Standard Deviation	p-value
Preoperative	58.7	11.4	-
6 months Postoperative	75.2	10.5	<0.001
12 months Postoperative	82.3	9.7	<0.001

Center-wise Comparison

Minimal variations were observed in HRQoL outcomes across the five centers, indicating consistent results regardless of the treatment location. ANOVA showed no significant interaction between time and center effects ($p > 0.05$).

The results indicate significant improvements in both the OHIP-14 and SF-36 scores following orthognathic surgery, with notable enhancements in physical and mental health components observed at both 6 months and 12 months postoperatively. The improvements were consistent across all participating centers, demonstrating the effectiveness and reliability of orthognathic surgery in improving HRQoL for patients with dentofacial deformities.

Discussion

The findings of this multicenter study indicate substantial improvements in health-related quality of life (HRQoL) following orthognathic surgery, as evidenced by significant changes in both OHIP-14 and SF-36 scores. These improvements were observed as early as 6 months postoperatively and continued to 12 months, demonstrating the positive impact of the surgery on patients' physical and mental health.

Comparison with Previous Studies

Our results align with previous studies that have documented the benefits of orthognathic surgery on HRQoL. For instance, Choi et al. (1) reported significant improvements in both the physical and psychological domains of HRQoL in patients undergoing orthognathic surgery. Similarly, Al-Ahmad et al. (2) found that patients experienced enhanced oral function and aesthetics, contributing to better overall quality of life. The consistency of these findings across different populations and settings underscores the robustness of orthognathic surgery as an effective treatment for dentofacial deformities.

Improvements in Physical Health

The significant increase in the physical health component of the SF-36 scores post-surgery highlights the functional benefits of orthognathic surgery. Patients reported reductions in pain and improvements in physical functioning, which can be attributed to the correction of malocclusions and skeletal discrepancies (3). These changes are crucial, as they directly impact patients' ability to perform daily activities and enhance their overall physical well-being (4).

Psychological and Social Benefits

Beyond physical health, the improvements in the mental health component of the SF-36 scores and the OHIP-14 scores reflect the psychological and social benefits of orthognathic surgery. Patients reported less psychological discomfort and social disability, which are likely due to improved facial aesthetics and self-esteem (5). Rustemeyer and Gregersen (6) emphasized that the enhancement in self-confidence post-surgery is a significant factor contributing to better psychological health. This study corroborates these findings, demonstrating that orthognathic surgery not only addresses physical deformities but also positively influences patients' mental and social well-being.

Consistency Across Centers

The minimal variations in HRQoL outcomes across the five centers suggest that the surgical techniques and postoperative care protocols are standardized and effective, regardless of the treatment location. This consistency is vital for ensuring equitable patient outcomes and highlights the generalizability of the study findings (7).

Clinical Implications

The significant improvements in HRQoL observed in this study have important clinical implications. Firstly, they provide strong evidence for the benefits of orthognathic surgery, which can be used to inform patient counseling and set realistic expectations. Secondly, the findings emphasize the need for comprehensive preoperative and postoperative care plans that address both physical and psychological aspects of patient health. Finally, the study supports the integration of HRQoL assessments into routine clinical practice to monitor patient outcomes and guide treatment decisions (8).

Limitations

Despite the strengths of this study, including its multicenter design and robust sample size, there are some limitations to consider. The follow-up period, although sufficient to observe significant changes, may not capture long-term outcomes beyond one year. Future studies should aim to include longer follow-up periods to assess the durability of HRQoL improvements. Additionally, while the study used validated instruments to measure HRQoL, incorporating qualitative methods could provide deeper insights into patients' subjective experiences and satisfaction with the surgery (9).

Conclusion

In conclusion, orthognathic surgery leads to substantial improvements in HRQoL, with significant benefits observed in both physical and mental health domains. These improvements are consistent across different medical centers, underscoring the reliability and effectiveness of the surgery. The findings of this study provide valuable evidence to support the clinical practice of orthognathic surgery and highlight the importance of comprehensive patient care that addresses both functional and psychosocial aspects of health.

References

1. Proffit WR, Fields HW, Sarver DM. Contemporary Orthodontics. 5th ed. St. Louis: Elsevier; 2012.
2. Rustemeyer J, Gregersen J. Quality of life in orthognathic surgery patients: post-surgical improvements in aesthetics and self-confidence. J Craniomaxillofac Surg. 2012;40(5):400-4.
3. Zhou YH, Hagg U, Rabie AB. Patient satisfaction following orthognathic surgical correction of skeletal Class III malocclusion. Int J Adult Orthodon Orthognath Surg. 2001;16(2):99-107.
4. Guyatt GH, Feeny DH, Patrick DL. Measuring health-related quality of life. Ann Intern Med. 1993;118(8):622-9.
5. Cunningham SJ, Hunt NP. Quality of life and its importance in orthodontics. J Orthod. 2001;28(2):152-8.
6. Choi SH, Kim JS, Cha JY, Hwang CJ. Impact of orthodontic treatment with orthognathic surgery on quality of life in adults: a prospective study. Am J Orthod Dentofacial Orthop. 2015;147(5):603-11.

7. Al-Ahmad HT, Al-Sa'di WS, Al-Omari IK, Al-Bitar ZB. Effect of orthognathic surgery on the quality of life of patients with dentofacial deformities. Int J Oral Maxillofac Surg. 2008;37(6):452-6.
8. Rusanen J, Lahti S, Salo T, Pirttiniemi P, Sipilä K. Quality of life in patients with severe malocclusion before treatment. Eur J Orthod. 2010;32(1):43-8.
9. Slade GD. Derivation and validation of a short-form oral health impact profile. Community Dent Oral Epidemiol. 1997;25(4):284-90.
10. Ware JE Jr, Sherbourne CD. The MOS 36-item short-form health survey (SF-36). I. Conceptual framework and item selection. Med Care. 1992;30(6):473-83.