

Review

Effect of Orthognathic Surgery on the Quality of Life

Mazin Alsaadi ^{1*}, Mohammed Alyousif ², Somaya Alwathnani ³, Shaima Alhazemi ⁴, Haytham Ulhaqban ⁵, Abdulbari Aleidan ⁶, Abdullah Alshehri ⁷, Mohammed Befle ⁸, Turki Alotaibi ⁹, Mohammad Altorkestani ¹⁰, Albatool Alabbas ¹¹

¹ North Jeddah Specialist Dental Center, King Abdullah Medical Complex, Jeddah, Saudi Arabia

² College of Dentistry, Majmaah University, Buraydah, Saudi Arabia

³ Dental Department, Armed Forces Hospital, Al-Kharj, Saudi Arabia

⁴ Staff Dentist, Sabya General Hospital, Jazan, Saudi Arabia

⁵ Dental Department, Maternity and Children Hospital, Khamis Mushait, Saudi Arabia

⁶ General Dentist, Ministry of Health, Riyadh, Saudi Arabia

⁷ Department of Maxillofacial Surgery, Aseer Central Hospital, Abha, Saudi Arabia

⁸ College of Dentistry, Umm Al-Qura University, Mecca, Saudi Arabia

⁹ General Dentist, Ministry of Health, Hail, Saudi Arabia

¹⁰ Dental Department, Taymaa General Hospital, Taymaa, Saudi Arabia

¹¹ College of Dentistry, King Abdulaziz University, Jeddah, Saudi Arabia

Correspondence should be addressed to **Mazin Alsaadi**, North Jeddah Specialist Dental Center, King Abdullah Medical Complex, Jeddah, Saudi Arabia. Email: malsaddi@moh.gov.sa

Copyright © 2022 **Alsaadi**, this is an open-access article distributed under the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.

Received: 4 January 2023, Accepted: 8 January 2023, Published: 11 January 2023

Abstract

Dentofacial deformities have an effect on the quality of life (QoL) by affecting numerous elements of an individual's life and oral health. Orthognathic surgery is generally performed to correct facial abnormalities related to the maxilla and/or mandible. Several observational studies have looked at how orthognathic surgery and other factors affect the QoL of adults. The reported overall satisfaction in observational studies is high, ranging from 70% to 87%. Satisfaction in terms of aesthetic outcome is higher compared to functional improvement, especially in female patients. Additionally, orthodontic surgery resulted in remarkable improvements in social adjustment, social functioning, self-esteem, self-confidence, and facial appearance changes, as well as positive life improvement. Finally, it has been determined that orthognathic surgery results in physical and psychosocial quality of life improvements after surgery and is connected with high patient satisfaction ratings. Psychological variables and aesthetics exerted a considerable influence on the patient's QoL and were more influential in determining large changes than functional considerations.

Keywords: *Quality of life, orthognathic surgery, satisfaction, psychological effect, psychosocial*

Introduction

Dentofacial deformities refer to alterations in the face from the normal tooth, jawline, and facial structure, which are associated with malocclusion. Patients with dentofacial deformities exhibit a range of symptoms, and these deformities tend to affect the person negatively, often contributing to difficulties swallowing, speech problems, lip posture, breathing problems, and chewing issues. All of this contributes to a disadvantage for the individual, resulting in decreased well-being and, consequently, the whole spectrum of quality of life (QoL).

Currently, orthognathic surgery is one of the most important treatments for moderate to severe malocclusion and facial deformities (1). In orthognathic surgery patients, improving facial aesthetics, as well as functional benefits, be strong motivators. However, it is important to consider that patients may suffer from social and psychological disabilities and that such surgical intervention can influence the patient's psychosocial aspects. Therefore, it is necessary to check the psychological effects that surgical interventions may have on patients. Several studies have reported the impacts of orthognathic surgery on the psychological, social, physical, functional, and aesthetic aspects of QoL among patients both before and after surgery. World Health Organisation (WHO) defines QoL as an individual's view of his or her place in life within the context of the culture and value systems in which he or she resides and in connection to his or her aims, expectations, standards, and worries (2). Even though the number of studies on the link between the QoL and oral surgery has grown significantly, no one has yet agreed on the best way to measure the results of orthognathic surgery.

Literature and other pieces of evidence have reported a positive impact on the QoL of patients with a dentofacial deformity. Based on this, the goal of this review study was to evaluate the assessment of QoL in individuals with dentofacial deformities who underwent orthognathic surgery.

Methods

This review's references were found by searching PubMed, Science Direct, and Google Scholar with the keywords from any period until December 2022. The following keywords were searched with the Boolean operators 'AND' and 'OR' used to combine terms: 'dentofacial deformity', 'orthognathic surgery', 'quality

of life', and 'psychosocial'. Articles that assessed motivations, perceptions, or postsurgical changes in quality of life were included in this review. Articles that used both qualitative and quantitative measures were included. The rationale behind the inclusion of all articles was to objectively assess all methods of evaluating quality of life. Only English-language reports were included. We discovered a huge number of search results, and the listed references represent our selection of the most informative works.

Discussion

The decision to have orthognathic surgery was influenced by health, social, and personal factors. Several observational studies have reported the effects of orthognathic surgery on the psychological, social, physical, functional, and aesthetic dimensions of patient's QoL both pre-and post-surgery. The findings show that orthognathic surgery has a positive impact even when the studies differ greatly in terms of study design, follow-up duration, and the instruments used to assess the quality of life. However, it is essential to mention that, regardless of the characteristics associated with dentofacial deformities, such as temporomandibular dysfunction, anxiety, depression, and/or chronic pain, the operation results in an overall increase in quality of life.

Functionality, aesthetic satisfaction, and psychosocial impact of orthognathic surgery

In terms of patients' expressed expectations, the majority of patients who underwent orthognathic surgery were satisfied with the outcomes, regardless of whether their motivations were aesthetic or functional. In addition to that, surgical orthodontic therapy should prioritise the patient's psychological health, and it is essential to analyse the influence on the quality of life at various stages of treatment.

The reason behind the treatment background may be multicausal; some explanations were external to the patient (such as the orthodontist's recommendation), while others were internal and centred on function (such as appearance, speech, and chewing). Attaining one or more of the targeted improvements is satisfying to the patient for a variety of reasons. These diverse motives allow the patient to find satisfaction in having achieved one or more of the desired improvements. When patients who reported being extremely satisfied or satisfied were combined, the reported satisfaction rates in the studies were high, ranging from 70% to 87% (3, 4). More

patients achieved aesthetic (up to 93%) than functional (up to 70%) improvement (5). In contrast to Western studies, however, early Japanese investigations (6, 7) found a greater proportion of functional satisfaction than aesthetic improvement. It may be because, in the past, residents actively sought out patients for treatment and placed a premium on functional progress. Also, some researchers noticed that their patients were twisting their consciences by pretending to desire a functional gain to justify a covert desire for an aesthetic transformation (8). Thus, favorable improvements occurred in the patient's personality characteristics. As a result of their enhanced appearance and chewing function, 67.5% of patients experienced a significant boost in self-esteem (9). Female preponderance has been observed in the majority of research since the majority of patients with jaw deformities who contact orthognathic departments for surgical treatment to achieve normal occlusion also expect to improve their facial appearance (10). More male patients (89%) reported functional improvement than female patients (59%); alternatively, more females (77%) than males (44%) reported self-confidence satisfaction (5).

Patients said that surgical treatment had a significant impact on their loved ones. Orthognathic procedures have a profoundly uplifting influence on the patient's disposition. In particular, Cariati et al. discovered that when patients considered their improved physical appearance as a result of surgery, they displayed a low degree of negative emotions (anxiety, anger, hostility, unhappiness, or depression). In contrast, they reported experiencing more happiness. Moreover, their study revealed that patients felt a great sense of control and authority over their lives (11). In longitudinal studies, a range of techniques was employed, including validated or unvalidated questionnaires, semi-structured interviews, or both. The outcomes of many longitudinal studies demonstrate that orthognathic surgery may provide patients with a multitude of psychosocial benefits. According to these longitudinal data, patients who undergo orthognathic surgery have significantly improved psychosocial adjustment (12), social functioning, self-esteem (13-15), self-concept (8, 13, 16), self-confidence (13), body image (15), and facial profile attractiveness (17), emotional (18) as well as positive life improvements (15). Females seek orthognathic surgery for more aesthetic reasons than males. A patient's social life is negatively affected by skeletal deformities since they have a strong impression of their body image and the concept of appearing nice. The most prevalent reasons cited by patients for pursuing

cosmetic surgery are the desire for social acceptance, the enhancement of professional prospects, the correction of unfavourable facial traits that create self-consciousness undesired attention, and a life-altering event (19-22). The results of a systematic review reveal that orthognathic surgery has psychosocial benefits for patients, including enhanced self-confidence, social adjustment, and the appearance of the body and face (23).

Dissatisfaction with surgical outcome

A modest percentage of patients expressed dissatisfaction with the surgical outcomes. Murphy et al. (24) reported a 7% decline in function, a 15% decline in overall comfort attributable to postoperative side effects, and a 4% decline in speaking. Orthognathic surgery is frequently reported as a source of dissatisfaction due to post-operative problems. Neurosensory disruption is one of the most significant complications of the surgery (25). Most individuals can experience persistent paraesthesia for six months following the treatment. The fact that patients' QoL improved despite sensory changes demonstrates that the advantages of the therapy outweigh its downsides. Based on the study results, there was a correlation between dissatisfaction and the occurrence of postoperative problems, knowledge before surgery, false expectations regarding postoperative discomfort and recovery, weight loss, psychological changes before and after surgery, neuroticism, and external motivation (26-28). After 2–5 years, the permanent consequences of face modifications should be reviewed so that the patient's personality can accept and integrate the new characteristics into their psychology and function. This could be one explanation for the disappointment with treatment outcomes, given that the majority of studies only followed patients for six months.

Quality of life

Quality of life measurement is a mandatory part of the evaluation of surgical intervention. Life satisfaction is an individual's self-evaluation of their quality of life, determined using their own rules (29). Dental-facial deformities lead to lower QoL compared to individuals without dental-facial deformities. It is evident from prior studies that how patients' post-surgery physical appearance affected their evaluation of the quality of their lives. Our review study revealed that patients' cognitive evaluations of their lives after surgery were extremely optimistic. Consequently, it is not surprising that patients have reported that their social, familial, and professional connections have improved after surgery. In other words, surgery affects not just the mental and

physical aspects of the patient's life but also their social context. Bellucci *et al.* (30) note that a combination of orthodontic treatment along with reconstructive surgery is frequently required to restore function in terms of the airway, speech, oral-motor development, and psychological well-being in terms of quality of life and social context.

Most of the studies conducted on this topic have been limited to observational studies. These results are impressive; however, many of the studies lacked a prospective design and long-term follow-up. There is still not enough evidence from randomized control trials and prospective cohort studies with a control group. The randomized controlled trial conducted by Motegi *et al.* (31) provides convincing evidence. This was the study with the longest subject follow-up (5 years) and the most data collection (7 times); however, only the 2- and 5-year outcomes were published. The authors documented enhancements in general quality of life, quality of life-related to oral health, psychological function, and overall patient satisfaction. The results were statistically significant at five years and remained constant between two and five years.

Prospective cohort studies utilising a comparison or control group reveal that postoperatively there was an overall improvement in QoL, including changes in personality characteristics, accompanied by an increase in satisfaction (32-34). When looking into the previous systematic reviews and meta-analysis the final results are almost synonymous, with overall data pointing towards an improvement in QoL and psychosocial components (35-37).

Studies used a Short Form Health Survey (SF-36) to obtain a holistic view of the quality of life among respondents's demonstrated significant improvements in mental health six months following surgery as well as physical elements six weeks after surgery (38). During this time, a change in the functioning of the oral cavity is achieved, and the patient returns to full social functioning. Thus, after orthognathic surgery patients had better QoL in the domains of physical functioning, health transition, and physical component summary. In a survey by Al-Asfour *et al.* (39), they conducted a study among 66 patients after orthognathic surgery using the survey tool of visual analogue scales (VAS) and the Quality-of-Life Questionnaire (OQLQ). The VAS score for QoL was considerably increased from pre- to post-surgery (73% to 93.6%; $p = 0.0001$). The OQLQ score also reduced significantly following surgery, demonstrating improvements in the social elements of

dentofacial deformity, oral function, facial aesthetics, and knowledge of dentofacial aesthetic domains. A recent study that examined the immediate postoperative period until at least one year using the *Oral Health Impact Profile-14 questionnaire* (OHIP-14NL) questionnaire (40) discovered that oral health related QoL declines from baseline in the early postoperative period but improves over time. One year after undergoing orthognathic surgery, the oral health-related QoL of patients with dentofacial abnormalities considerably improves. Their finding was consistent with another Chinese study that used the same QoL measuring tool in Class III skeletal patients after bimaxillary osteotomies. They found that two years after surgery, both OQLQ and OHIP-14 scores were significantly lower ($p = 0.001$), and all OHIP-14 domains were significantly lower when compared to pre-surgical scores. However, certain studies have reported QoL deterioration in the immediate postoperative period in patients who suffer from pain, swelling, limited mouth opening, reduced masticatory efficiency, and numbness of the lower lip. A high proportion of patients experience discomfort and need more self-care in the immediate postoperative period.

Conclusion

It has been determined that orthognathic surgery results in physical and psychosocial quality of life improvements after surgery and is connected with high patient satisfaction ratings. Psychological variables and aesthetics exerted a considerable influence on the patient's QoL and were more influential in determining large changes than functional considerations.

Disclosure

Conflict of interest

There is no conflict of interest

Funding

No funding

Ethical consideration

Non applicable

Data availability

Data that support the findings of this study are embedded within the manuscript.

Author contribution

All authors contributed to conceptualizing, data drafting, collection and final writing of the manuscript.

References

1. Ni J, Song S, Zhou N. Impact of surgical orthodontic treatment on quality of life in Chinese young adults with class III malocclusion: a longitudinal study. *BMC Oral Health*. 2019;19(1):109.
2. Vahedi S. World Health Organization Quality-of-Life Scale (WHOQOL-BREF): Analyses of Their Item Response Theory Properties Based on the Graded Responses Model. *Iranian journal of psychiatry*. 2010;5(4):140-53.
3. Türker N, Varol A, Ögel K, Basa S. Perceptions of preoperative expectations and postoperative outcomes from orthognathic surgery: part I: Turkish female patients. *International journal of oral and maxillofacial surgery*. 2008;37(8):710-5.
4. De Clercq CA, Neyt LF, Mommaerts MY, Abeloos JS. Orthognathic surgery: patients' subjective findings with focus on the temporomandibular joint. *Journal of Cranio-Maxillofacial Surgery*. 1998;26(1):29-34.
5. Siow KK, Ong ST, Lian CB, Ngeow WC. Satisfaction of orthognathic surgical patients in a Malaysian population. *Journal of oral science*. 2002;44(3-4):165-71.
6. Tomizawa M, Nakajima T, Ueda K, Azumi T, Hanada K. Evaluation by patients of surgical orthodontic correction of skeletal Class III malocclusion: survey of 41 patients. *Journal of oral surgery (American Dental Association : 1965)*. 1981;39(8):590-6.
7. Nagamine T, Kobayashi T, Hanada K, Nakajima T. Satisfaction of patients following surgical-orthodontic correction of skeletal Class III malocclusions. *Journal of oral and maxillofacial surgery : official journal of the American Association of Oral and Maxillofacial Surgeons*. 1986;44(12):944-8.
8. Olson RE, Laskin DM. Expectations of patients from orthognathic surgery. *Journal of oral surgery (American Dental Association : 1965)*. 1980;38(4):283-5.
9. Rustemeyer J, Eke Z, Bremerich A. Perception of improvement after orthognathic surgery: the important variables affecting patient satisfaction. *Oral and maxillofacial surgery*. 2010;14(3):155-62.
10. Hasebe D, Suda D, Asai Y, Kojima T, Kato Y, Kobayashi M. A Clinical Analysis of Orthognathic Surgery for the Last 48 Years in the Division of Reconstructive Surgery for Oral and Maxillofacial Region, Department of Tissue Regeneration and Reconstruction, Niigata University Graduate School of Medical and Dental Sciences. *Jpn J Jaw Deform*. 2016;26:266-74.
11. Cariati P, Martínez R, Martínez-Lara I. Psycho-social impact of orthognathic surgery. *Journal of clinical and experimental dentistry*. 2016;8(5):e540-e5.
12. Barbosa AL, Marcantonio E, Barbosa CE, Gabrielli MF, Gabrielli MA. Psychological evaluation of patients scheduled for orthognathic surgery. *The Journal of Nihon University School of Dentistry*. 1993;35(1):1-9.
13. Flanary CM, Barnwell GM, VanSickels JE, Littlefield JH, Rugh AL. Impact of orthognathic surgery on normal and abnormal personality dimensions: a 2-year follow-up study of 61 patients. *American journal of orthodontics and dentofacial orthopedics : official publication of the American Association of Orthodontists, its constituent societies, and the American Board of Orthodontics*. 1990;98(4):313-22.
14. Ağırnaslıgıl MO, Gul Amuk N, Kılıç E, Kutuk N, Demırbas AE, Alkan A. The changes of self-esteem, sensitivity to criticism, and social appearance anxiety in orthognathic surgery patients: A controlled study. *American journal of orthodontics and dentofacial orthopedics : official publication of the American Association of Orthodontists, its constituent societies, and the American Board of Orthodontics*. 2019;155(4):482-9.e2.
15. Bertolini F, Russo V, Sansebastiano G. Pre- and postsurgical psycho-emotional aspects of the orthognathic surgery patient. *The International journal of adult orthodontics and orthognathic surgery*. 2000;15(1):16-23.
16. Ostler S, Kiyak HA. Treatment expectations versus outcomes among orthognathic surgery patients. *The International journal of adult orthodontics and orthognathic surgery*. 1991;6(4):247-55.
17. Kämäräinen M, Savolainen J, Tynkkynen J, Kellokoski J, Pakkala R. Long-term patient satisfaction and the sense of coherence - a longitudinal study 10-15 years after orthognathic surgery. *Acta odontologica Scandinavica*. 2021;79(5):377-82.

18. Nicodemo D, Pereira MD, Ferreira LM. Effect of orthognathic surgery for class III correction on quality of life as measured by SF-36. *International journal of oral and maxillofacial surgery*. 2008;37(2):131-4.
19. Heldt L, Haffke EA, Davis LF. The psychological and social aspects of orthognathic treatment. *American journal of orthodontics*. 1982;82(4):318-28.
20. Huse-Kleinstoll G, Jipp H, K uchler T, Rudelt HG, Schultz F, Kerekjarto MV, et al. [Psychological effect of corrective surgery in female patients with structural and functional abnormalities of the jaws]. *Deutsche Zeitschrift fur Mund-, Kiefer- und Gesichts-Chirurgie*. 1990;14(2):147-53.
21. Hutton CE. Patients' evaluation of surgical correction of prognathism: survey of 32 patients. *Journal of oral surgery (American Dental Association : 1965)*. 1967;25(3):225-8.
22. Jensen SH. The psychosocial dimensions of oral and maxillofacial surgery: a critical review of the literature. *Journal of oral surgery (American Dental Association : 1965)*. 1978;36(6):447-53.
23. Hunt OT, Johnston CD, Hepper PG, Burden DJ. The psychosocial impact of orthognathic surgery: a systematic review. *American journal of orthodontics and dentofacial orthopedics : official publication of the American Association of Orthodontists, its constituent societies, and the American Board of Orthodontics*. 2001;120(5):490-7.
24. Murphy C, Kearns G, Sleeman D, Cronin M, Allen P. The clinical relevance of orthognathic surgery on quality of life. *International journal of oral and maxillofacial surgery*. 2011;40(9):926-30.
25. Degala S, Shetty SK, Bhanumathi M. Evaluation of neurosensory disturbance following orthognathic surgery: a prospective study. *J Maxillofac Oral Surg*. 2015;14(1):24-31.
26. Khattak ZG, Benington PC, Khambay BS, Green L, Walker F, Ayoub AF. An assessment of the quality of care provided to orthognathic surgery patients through a multidisciplinary clinic. *Journal of cranio-maxillo-facial surgery : official publication of the European Association for Cranio-Maxillo-Facial Surgery*. 2012;40(3):243-7.
27. Rustemeyer J, Gregersen J. Quality of Life in orthognathic surgery patients: post-surgical improvements in aesthetics and self-confidence. *Journal of cranio-maxillo-facial surgery : official publication of the European Association for Cranio-Maxillo-Facial Surgery*. 2012;40(5):400-4.
28. Posnick JC, Wallace J. Complex orthognathic surgery: assessment of patient satisfaction. *Journal of oral and maxillofacial surgery : official journal of the American Association of Oral and Maxillofacial Surgeons*. 2008;66(5):934-42.
29. Shin DC, Johnson DM. Avowed happiness as an overall assessment of the quality of life. *Social indicators research*. 1978;5(1):475-92.
30. Bellucci CC, Kapp-Simon KA. Psychological considerations in orthognathic surgery. *Clinics in plastic surgery*. 2007;34(3):e11-6.
31. Motegi E, Hatch JP, Rugh JD, Yamaguchi H. Health-related quality of life and psychosocial function 5 years after orthognathic surgery. *American journal of orthodontics and dentofacial orthopedics : official publication of the American Association of Orthodontists, its constituent societies, and the American Board of Orthodontics*. 2003;124(2):138-43.
32. Kim S-J, Kim M-R, Shin S-W, Chun Y-S, Kim E-J. Evaluation on the psychosocial status of orthognathic surgery patients. *Oral Surgery, Oral Medicine, Oral Pathology, Oral Radiology, and Endodontology*. 2009;108(6):828-32.
33.  oland J, Jensen J, Elklit A, Melsen B. Motives for surgical-orthodontic treatment and effect of treatment on psychosocial well-being and satisfaction: a prospective study of 118 patients. *Journal of oral and maxillofacial surgery*. 2011;69(1):104-13.
34. Khadka A, Liu Y, Li J, Zhu S, Luo E, Feng G, et al. Changes in quality of life after orthognathic surgery: a comparison based on the involvement of the occlusion. *Oral Surgery, Oral Medicine, Oral Pathology, Oral Radiology, and Endodontology*. 2011;112(6):719-25.
35. Meger MN, Fatturi AL, Gerber JT, Weiss SG, Rocha JS, Scariot R, et al. Impact of orthognathic surgery on quality of life of patients with dentofacial deformity: a systematic review and meta-analysis. *The British journal of oral & maxillofacial surgery*. 2021;59(3):265-71.
36. Zamboni R, de Moura FRR, Brew MC, Rivaldo EG, Braz MA, Grossmann E, et al. Impacts of Orthognathic Surgery on Patient Satisfaction, Overall Quality of Life, and Oral Health-Related Quality of Life: A Systematic

Literature Review. *International journal of dentistry*. 2019;2019:2864216.

37. de Araujo CM, Schroder AGD, de Araujo BMM, Cavalcante-Leão BL, Stechman-Neto J, Zeigelboim BS, et al. Impact of orthodontic-surgical treatment on quality of life: a meta-analysis. *European journal of orthodontics*. 2020;42(3):281-9.

38. Miguel JA, Palomares NB, Feu D. Life-quality of orthognathic surgery patients: the search for an integral diagnosis. *Dental press journal of orthodontics*. 2014;19(1):123-37.

39. Al-Asfour A, Waheedi M, Koshy S. Survey of patient experiences of orthognathic surgery: health-related quality of life and satisfaction. *International journal of oral and maxillofacial surgery*. 2018;47(6):726-31.

40. Tuk JG, Lindeboom JA, Tan ML, de Lange J. Impact of orthognathic surgery on quality of life in patients with different dentofacial deformities: longitudinal study of the Oral Health Impact Profile (OHIP-14) with at least 1 year of follow-up. *Oral and maxillofacial surgery*. 2022;26(2):281-9.