Original Article

Spectrum of Dentofacial Deformities: A Retrospective Survey

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Abstract

Introduction: This retrospective study investigates the spectrum of dentofacial deformities, demographic profile, management and surgical outcomes of orthognathic patients treated in the University Hospital in Malaysia. Materials and Methods: Over a period of 10 years (1989 to 1999), 34 patients with dentofacial deformities who had orthognathic surgery were reviewed; patients with cleft lip and palate or syndromes were excluded. Results: The mean age (range, 17 to 35 years) of the patients was 24.3 years and the ratio of female to male was 2.4:1. The predominant ethnic group was Chinese, with females (47.1%) forming the largest group. The main reason for seeking surgery was aesthetic improvement (41%). The majority of the patients had skeletal class III pattern (91%) and bilateral sagittal split osteotomy was the most common surgery done (82%). Postoperative complications were mainly paraesthesia/numbness (56%) and infection (15%). In long-term review, 2 (6%) patients had persistent numbness of the inferior alveolar nerve. Conclusion: The findings suggest that the majority of the patients are young adult female students with skeletal class III pattern and treated for mandibular prognathism. The complication of persistent numbness and higher rate of postoperative infection indicate that long-term reviews and good antibiotic prophylaxis/therapy are necessary.

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Key words: Complications, Demographic characteristics, Management, Mandibular prognathism, Skeletal class III

Introduction

Deformity refers to distortion of any part of the body. The term dentofacial is related to the dental arches and their effects on facial contours.[1] Dentofacial deformity has been described as a deformity that affects primarily the jaws and dentition, although the mid and lower faces are also affected. Dentofacial deformities may be isolated to one jaw or may extend to multiple craniofacial structures. Studies indicate that they affect about 20% of the population.[2]

Facial deformity ranges from a dental malocclusion to a cleft lip and palate, including other disfiguring craniofacial syndromes, to trauma-induced deformities.[3] Facial deformities involve the entire facial structure, including the jaws and dentition, but major effects are exhibited on the upper or midface. They are less common than dentofacial deformities, affecting only about 0.1% of the population. Examples include patients with various facial syndromes, such as Treacher Collins, Crouzon and Aperts syndromes, cleft lip and hypertelorism.[4] As Malaysia is a multi-racial country comprising the Malays, Chinese, Indians and others of mixed origins with various ethnic differences, a retrospective review of patients with dentofacial deformities who had undergone orthognathic surgery will benefit patients from the aesthetic and/or functional viewpoint. This study will also help surgeons to address patients' needs and expectations to provide better care for dentofacial deformity patients in the region.

This paper aims to assess the spectrum of dentofacial deformities and to investigate the demographic profile, reasons for surgery, management and surgical outcomes of orthognathic patients treated in the University Hospital in Kuala Lumpur, Malaysia.

Materials and Methods

The clinical records of 34 orthognathic patients with dentofacial anomalies treated in the hospital over a 10-year (1989 to 1999) period were reviewed. Patients with cleft lip and palate or syndromes and those lost from follow-up were excluded. The age, sex, race and occupation of the patients were recorded. The occupation of patients was classified according to various groups. They were students, professionals (such as engineer or accountant), non-

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professionals (such as clerk or hairdresser) and non-working groups.

The reasons for surgery, spectrum of diagnosis and skeletal pattern, types of surgical procedures and postoperative complications were also noted. The patients' reasons for seeking surgery were classified as: functional, aesthetic, temporomandibular joint problems, social (self-confidence), advice from dentist/dental professionals, family and friends or others. The spectrum of diagnosis for dentofacial deformities were classified as: mandibular prognathism or asymmetry for mandibular deformities; macrogenia or microgenia for chin deformities; midfacial hypoplasia, malar deficiency or vertical maxillary excess for maxillary deformities; and bimaxillary protrusion for maxillary-mandibular deformities. The skeletal patterns were categorised as class I, II or III based on cephalometric radiographs.

Types of surgical procedure for osteotomies include: bilateral sagittal split osteotomy or subsigmoid osteotomy involving the ramus, anterior subapical mandibular osteotomy (Kole) and genioplasty for mandibular osteotomies; anterior segmental maxillary osteotomy (Wunderer) for maxillary osteotomies; Le Fort I, II or III for total maxillary surgery; and other procedures.

The postoperative complications included obstructed airway, haemorrhage, numbness or neurological complication, fracture, relapse, poor bone healing, temporomandibular joint complications, infections and damage to the teeth or periodontium. All data collected were analysed using Microsoft Excel and the Statistical Package for Social Sciences (SPSS) 11.0 version.

Results

The mean age of the patients (range, 17 to 35 years) was 24.3 years. The ratio of female to male patients was 2.4:1. The ethnic distribution of patients in this study was 25 (73.5%) Chinese, 6 (17.6%) Malays and 3 (8.8%) Indians. There were more Chinese females (47.1%) than males (26.5%); the Chinese formed the largest ethnic group of this review. There were also more Malay females (14.7%) than males (2.9%), but only Indian females (8.8%) were noted in the distribution by race and gender of the patients.

The occupations of the patients comprised 19 (55.9%) students, 7 (20.6%) professionals, 6 (17.6%) non-professionals (n = 6) and 2 (5.9%) from the non-working group. More females than males requested for surgery in the student [13 (38.2%) females and 6 (17.7%) males], professional [5 (14.7%) females and 2 (5.9%) males] and non-professional groups [5 (14.7%) females and 1 (2.9%) male]. There was no difference in the non-working group [1 (2.9%) female and 1 (2.9%) male].

The main reason for seeking orthognathic surgery in 14 (41.2%) cases was aesthetics. Nine of these cases were females and 5 cases were males. Other reasons included functional and aesthetics in 8 (23.5%) cases; functional in 5 (14.7%) cases; social, functional and aesthetics in 3 (8.8%) cases; temporomandibular joint problems and functional in 3 (8.8%) cases and 1 (2.9%) case of temporo-mandibular joint problems, functional and aesthetics. Females also formed a larger group compared to males for the other cases, such as functional and aesthetics (5 females, 0 male); functional (4 females, 1 male); social, aesthetics and functional (3 females, 0 male); temporomandibular joint problems and functional (2 females, 1 male); and temporomandibular joint problems, functional and aesthetics (1 female, 0 male).

Mandibular prognathism was the most common diagnosis in 20 (58.8%) patients with skeletal class III pattern. This was followed by mandibular asymmetry with prognathism in 8 (23.5%) patients with skeletal class III, midface hypoplasia with prognathism in 1 (2.9%) patient with skeletal class III, bimaxillary protrusion in 3 (8.8%) patients comprising 2 skeletal class III cases and 1 class II case, mandibular asymmetry in 1 (2.9%) patient with skeletal class I and vertical maxillary excess in 1 (2.9%) patient with skeletal class II. The skeletal patterns of the patients included 31 (91.2%) with class III, 2 (5.9%) with class II and 1 (2.9%) with class I. Females comprised 67.7% of class III and 2.95% of class II pattern, while males comprised 23.5% of class III, 2.95% of class II and 2.9% of class I pattern.

The types of surgical osteotomies performed were 41.2% (n = 14) bilateral sagittal split, 38.2% (n = 13) bilateral sagittal split with Le Fort I, 5.9% (n = 2) Kole and Wunderer, 5.9% (n = 2) Kole, 2.9% (n = 1) Le Fort I, 2.9% (n = 1) bilateral sagittal split with genioplasty and 2.9% (n = 1) Le Fort I with genioplasty.

Postoperative complications included numbness/paraesthesia in 19 (55.9%) patients, infection in 5 (14.7%) patients, relapse in 4 (11.8%) patients, loose teeth in 3 (8.8%) patients, damage to periodontium in 2 (5.9%) patients, temporomandibular joint complications in 2 (5.9%) patients, minor haemorrhage/ecchymosis in 1 (2.9%) patient and poor bone healing in another (2.9%) patient.

Discussion

In our study, more than half (56%) of the patients with a mean age of 24.3 years were young adult students and more females than males sought orthographic surgery, the ratio being 2.4:1. In their study on the demographic profile of patients with dentofacial deformity, Mayo et al[5] showed a slightly higher mean age of 26.7 years; and more females than males sought treatment, the ratio was 3:2. Other studies for example by Ouellette[6] reported a similar mean age to Mayo et al,[5] but with a female to male ratio of 7:2.

About 64% of orthognathic patients reviewed were aged between 17 and 25 years; this is consistent with the mean ages of 24.5 years for females and 23.7 years for males in our study. It has been described that the younger age group tends to express a greater concern with aesthetics[7] while the older age group is less inclined to have surgery and is more concerned with surgical risk.[5,8]

In this study, the Chinese was the predominant ethnic group that requested surgery, forming 73.5% of the total patients. Chinese females (47.1%) formed the largest group that had undergone orthognathic surgery compared to Chinese males (26.5%) or other ethnic groups.

Our results showed that aesthetic improvement or change in appearance was the reason most frequently cited for undergoing orthognathic surgery, followed by functional and aesthetics. These results are similar to the study by Rivera et al,[9] who indicated that females reported significantly more aesthetic reasons for undergoing surgery. In our sample, more females than males (ratio of 1.8:1) also cited aesthetics as a reason for seeking orthognathic surgery. In contrast, Kiyak et al[10] stated that patients seeking orthognathic surgery were concerned about functional problems, with aesthetics, such as appearances, having secondary roles.

Women and men are usually judged negatively if their faces belong to skeletal class III and II, respectively.[11] A higher number of severe class III and/or long-faced subjects sought treatment compared to those with severe mandibular deficiency.[12] Research on dentofacial deformities and motivation has shown that patients with severe sagittal class II deformities are more inclined towards orthodontics rather than surgery.[13] Our study revealed that more than 90% of patients who had undergone orthognathic surgery were from skeletal class III and comprised mostly (68%) females.

Two common techniques of surgical osteotomies of the jaws are bilateral sagittal split for mandible and Le Fort I for maxilla.[14] Paulus and Steinhauser[15] used bilateral sagittal split osteotomy for mandibular setbacks and noted a decreased incidence in relapse following rigid fixation compared to wire osteosynthesis. It is, therefore, not surprising that the most common operation performed in this study is bilateral sagittal split osteotomy for the treatment of mandibular prognathism, followed by bilateral sagittal split with Le Fort I osteotomy for a two-jaw surgery.

The common postoperative complications noted in this study were numbness or paraesthesia, infection and relapse. Stewart and Sexton[16] indicated that paraesthesia might reduce the overall satisfaction with the outcome of the surgical treatment. Since the inferior alveolar nerve is exposed to significant risk in a mandibular ramus osteotomy, immediate postoperative paraesthesia of the nerve is common with a reported incidence of 85% to 87%.[17] However, the majority of patients recover sensation.[18] Long-term paraesthesia of this nerve is shown to vary from 0% to 24%.[17,19] In comparison, the incidence of long-term infraorbital paraesthesia following Le Fort I osteotomy is about 1.5% to 2%.[20] Other injuries, such as those to the facial nerve following mandibular osteotomies, are rare.[21] In our study, about 56% of patients had numbness or paraesthesia of the face after surgery. The common sites included the upper and lower lips, mental and chin areas. However, there were also complaints of persistent numbness of the inferior alveolar nerve in 2 (5.9%) cases 18 months later.

The risk factors for postoperative surgical infection include the duration and type of surgery, degree of surgical trauma, ischaemia, use of alloplastic implants and bacterial contamination.[22] According to Gallagher and Epker,[23] factors that influenced an infection included bacterial contamination during surgery, potentially dirty operations, advanced age of patients, length of surgical procedures and placement of patients in a large ward after surgery. In intraoral orthognathic surgery, postoperative infection is uncommon[19] with an incidence of less than 1%.[17,24] In our study, an incidence of 15% was reported. They included wound dehiscence, abscess, infection of bone plates and bone graft. Therefore, the use of prophylactic antibiotics is advocated prior to surgery to ensure good therapeutic levels during surgery. The international standard for aseptic techniques should also be constantly enforced to ensure good clinical practice and surgical results.

Most reports on postoperative complications in cases of relapse indicated that mandibular setback is less of a problem compared to advancement of the mandible. Mandibular advancement relapses with a rate of 20% to 50% and it increases with larger advancement of the mandible.[25] According to Welch,[26] the mandible had a greater tendency to relapse compared to the maxilla, which is relatively more stable after bimaxillary surgery. In our study, the incidence of relapse was 11.8%.

Our findings are consistent with that of other studies, except for a higher rate of postoperative infection. This interesting finding emphasises the importance of reviewing local studies in the region and increasing the awareness of patients' needs and environmental conditions for orthognathic surgery. Patients should also be advised on possible complications, such as persistent numbness for certain procedures, to avoid dissatisfaction with the outcome of the surgery. When in doubt, psychological measurements such as the General Health Questionnaire, which is available to test psychiatric morbidity, and Eysenck Personality

Inventory are helpful to assess or prepare patients adequately for surgery.[27,28]

Conclusion

This preliminary study suggests that the majority of orthognathic patients with dentofacial deformities treated in the University Hospital in Kuala Lumpur, Malaysia, are for mandibular prognathism with skeletal class III pattern. More than half of the patients are young adult students who are mainly Chinese females. The reason for seeking orthognathic surgery is aesthetics followed by function and aesthetics. More females than males, however, cited only aesthetics as a reason for surgery. Bilateral sagittal split osteotomy is the most common surgical procedure performed for a single jaw surgery; Le Fort I osteotomy is the procedure of choice for a two-jaw surgery. The most common postoperative complications are numbness, infection and relapse. Persistent numbness of the inferior alveolar nerve and a higher incidence of postoperative infection suggest that long-term reviews and good antibiotic prophylaxis/therapy are necessary for orthognathic surgery.

Further prospective studies on the correction of dentofacial deformities in multi-racial countries, such as Malaysia, should be evaluated to confirm local patients' perceptions and expectations; and to achieve better postoperative results following surgery.

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