



Frequency of orthognathic surgery treatment in a university hospital setting - A retrospective study

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ABSTRACT

Orthognathic surgery is a unique endeavour in facial surgery, a patient's appearance and occlusal function can be improved significantly, which has a great impact on the patient's sense of self and well-being. Successful outcomes in modern orthognathic surgery rely on a close collaboration between the surgeon and the orthodontist across all stages of treatment. To assess the frequency of orthognathic surgery in a university hospital setting. Data required for the study was procured by reviewing patient records and analyzed data of 86000 patients between June 2019 to March 2020. The data was sorted in excel and statistically analyzed using the IBM SPSS software analysis and the results tabulated. The frequency of orthognathic surgery in this study was found to be 22.4%. Orthognathic surgery improves the quality of life for all age groups of dentofacial deformities and hence it is imperative to educate people regarding the same.



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INTRODUCTION

Orthognathic surgery refers to repositioning of the maxilla and mandible or the chin commonly referred as mainstay treatment for patients who are too old for growth modifications and for any dentofacial conditions that are too severe for either surgical or orthodontic camouflage. The gonial angle and lower gonial angle can be used as an indicator of growth.

The anterior and posterior maxilla, ramus vertical composite are all in dimensional balance in individuals with normal occlusion and facial harmony. The objective of orthodontic surgery is based on the repositioning of the basal bone framework to correct the maxillomandibular deformities. Collaborative approach between the orthodontist and the surgeon is imperative to successfully devise and execute a comprehensive treatment plan with predictable outcomes (Precious *et al.*, 1996; Sivamurthy and Sundari, 2016). Key principles of surgical care and overall patient care include psychologically preparing the patient, adequate preoperative and postoperative nutrition, protection of bone and neurovascular structures, appropriate postoperative instructions and wound management, proper control of occlusion and rehabilitation to full jaw function (Bell, 1973; Manoj *et al.*, 2017). Patients with dentofacial deformity and malocclusion have a higher incidence of temporomandibular joint (TMJ) derangements compared to the general population.

The results of orthognathic surgeries are esthetic oriented than function in the patient's point of view. Some patients mainly seek esthetic amelioration and not a functional one. In adults, it has become of greater importance, mainly owing to it, although being an invasive procedure, highly improves an individual's esthetics (Kavin *et al.*, 2012). The main indications for orthognathic surgery include malocclusion, TMJ disorders, esthetics, pre-prosthetics (Charrier, 2012).

Functional importance in regard to orthognathic surgeries is that discrepancies between dental arches, i.e., between maxilla and mandible can cause functional disorders that hinder the phonetics and masticatory mechanisms of the individual. Severe discrepancies can also lead to affecting the psychological well-being of the individual (Reyneke, 2003). Variant procedures can be opted based on the discrepancy, its extent and the patient's condition. In dire situations where there is a significant risk of relapse, a combination of maxillary and mandibular procedures are a requisite, due to the relation between the magnitude of movement and the stability after surgery (Ghali and Sikes, 2000; Chang *et al.*, 2001; Magalhães *et al.*, 2010).

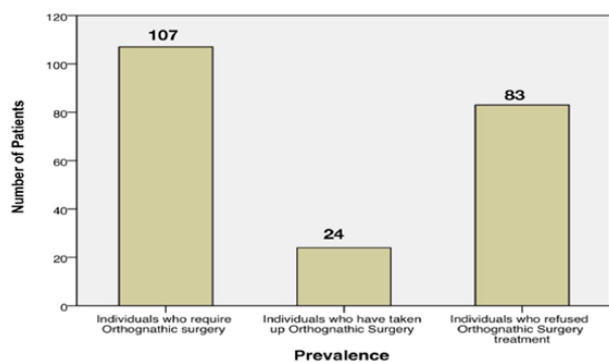


Figure 1: Bar chart depicting the frequency of orthognathic surgery in this study.

The patient's perspective regarding the decision to take up orthognathic surgery or not relies on various factors. These factors include their anxiety, satisfaction with self, facial appearance, financial situation, past medical/surgical/dental experiences and the complications post-surgery (Posnick, 2014). The risk levels of postoperative complications of orthognathic surgeries have been found to be associated more with increasing age (Kim, 2017). It is to be stressed that awareness of orthognathic surgery is not much prevalent, and dental professionals enhance the approachability and management of patients, enlighten them regarding orthognathic surgeries (Elmouden and Ousehal, 2018). The aim of this study is to find the frequency of orthognathic surgery in a university hospital setting.

MATERIALS AND METHODS

The study was performed under a university hospital setting. Data required for the study was procured by reviewing patient records and analyzed data of 86000 patients between June 2019 to March 2020, for the number of people who require orthognathic surgery and the number of people who took up the surgery. Ethical approval was obtained from the institutional committee (ethical approval number: SDC/SIHEC/DIASDATA/0619-0320). The sample size of the study is n=107. Verification of the data was done with the presence of additional reviewers, procedure notes and photographs. Stratification and randomization were done to minimize sampling error. Incomplete data were excluded. The obtained data were tabulated in excel and the following parameters were assessed.

1. Age
2. Gender
3. Orthognathic surgery - Yes / No

The data was then entered in the IBM SPSS software and descriptive statistical analysis performed. The obtained results were interpreted in tabulations and graphs.

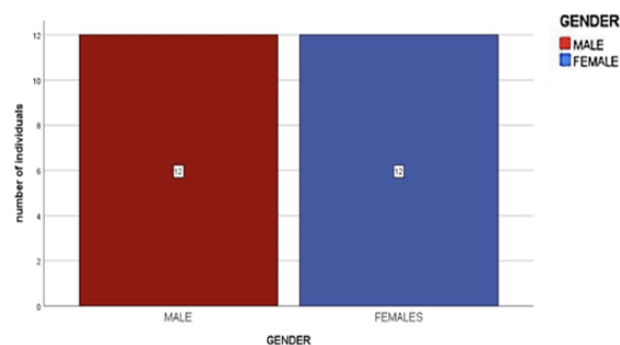


Figure 2: Bar graph representing the gender distribution as observed in this study.

RESULTS AND DISCUSSION

The frequency of orthognathic surgery in this study was observed to be 22.4% Table 1 and Figure 1. The SPSS analysis was done, and the mean age group of the study was obtained to be 26 years Table 2. The gender distribution of the study shows equal proportions of both male and female participants in this study Figure 2. The chi-square test was performed, and the results show that there does not exist a statistical significance between age and gender in individuals undergoing orthognathic surgery, in this study ($p > 0.05$) Figure 3.

Table 1: Frequency of orthognathic surgery.

Topic	Count
Total number of cases	107
No. of individuals who underwent orthognathic surgery treatment	24
No. of individuals who refused treatment	83
Prevalence rate	22.4%

Table 1 depicting the prevalence rate of orthognathic surgery as observed in this study, out of 107 patients who required the treatment, only 24 individuals underwent surgery while the remaining 83 individuals refused to undergo treatment. The frequency rate in this study was observed to be 22.4%.

of this study was found to be having equal distribution of males and females who opted for orthognathic surgery treatment. 12 males and 12 females each have reported having undergone orthognathic surgery as observed in this study. Blue half depicts males, while the red half depicts the females.

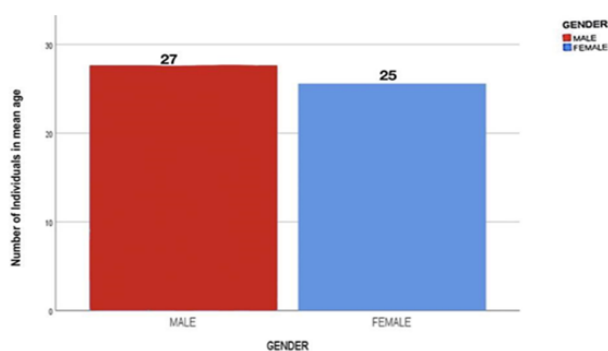


Figure 3: Association between age and gender of the study population undergoing orthognathic surgery.

Figure 1 shows that the X-axis represents the status of the frequency of orthognathic surgery, as observed in this study. Y-axis represents the count of the number of individuals who required orthognathic surgery, underwent orthognathic surgery to be and refused treatment in a scale of 0-120. Out of the total study population, the majority refused to undergo orthognathic surgery.



Figure 5: Corresponds to the presurgical and post-surgical right profile picture of an individual who underwent orthognathic surgery.

Figure 3 shows that the X-axis represents the gender distribution of the study. Y-axis represents the mean age of the study group. Red color denotes males and Blue color denotes females. The graph depicts the association of the age and gender wherein mean age of males (Red) who underwent orthognathic surgery in this study are to be of 27yrs of age, while females (Blue) who underwent orthognathic surgery in this study are found to be average of 25 yrs of age. Chi-square statistical analysis was performed, $p\text{-value} = 0.283$ ($p < 0.05$), hence statistically not significant. Frequency of Orthognathic surgery was 22.4%, indicating a low-frequency condition. This may be due to factors like the study being uni-centric, unequal distribution and a smaller sample size taken for study. Previous literature citations were found to be in concordance with the results obtained in this study, and these may be attributed to various factors including, the patient’s perception towards the procedure, their economic background, anxiousness towards treatment, emotional stress etc. (Stirling et al., 2007). The low rate of acceptance



Figure 4: Corresponds to the pre-surgical and post-surgical frontal picture of an individual who underwent orthognathic surgery.

Table 2 depicting the mean age of the study, the mean age of this study was found to be around 26yrs. Figure 2 shows that the gender distribution

by patients suggests that awareness among patients regarding the pros and cons of orthognathic surgery must be reached out effectively. Assessing the factors of shortcoming and effective management of the same is to be processed. The mean age, as observed in our results of the patients taking up the surgery, is 26 years. Causes for the inclination of young aged patients towards orthognathic surgery can account due to its primary feature of esthetic transformation Figures 4 and 5 (Irby, 2016; Brecher et al., 2019).

Table 2: Age Distribution.

Cumulative percentage (%)	Age (in yrs)
8.3	17
4.2	19
12.5	20
4.2	22
8.3	23
8.3	24
4.2	25
8.3	27
8.3	28
16.7	29
8.3	31
4.2	46
4.2	50
Mean age	26.8 yrs

The average patient who undergoes orthognathic treatment is usually in their second or third decade of life (Sarver, 1998). Previous literature also cites findings in concordance to that obtained in our study that patients aged between 25-30 yrs opt more willingly for orthognathic treatment (Andrup, 2015; Vega et al., 2015). This can also be attributed to the fact that some studies do imply that the complications of orthognathic surgery increase with an increase in age (Naini, 2013; Cunningham, 2018). However, over the past decade, there have been some studies which report orthognathic surgery acceptance in patients over 40yrs of age (Peacock et al., 2014; Lee et al., 2015). The results obtained in our study with respect to any gender predilection for orthognathic cases show equal proportions of male and female participants. This is attributed to the facts that the study was done in a unicentric setup, geographic variation, unequal distribution, and sample size. Previous literature is not in concordance with our study results. Female predilection has been reported for taking up orthognathic surgery in previous studies (Scariot et al., 2010). The female to the male ratio observed in previous studies is mostly 1.5:1 (Suen, 2013; Cas-

tro et al., 2013). This difference in gender distribution can be due to varying reasons like the trivia of the psychological impact of appearance is more in females than males, females show more discrepancies with respect to dentofacial features compared to males (Swennen, 2017; Posnick and Kinard, 2019). A female predilection for orthognathic surgery also implies that esthetics majorly influences the willingness to take up orthognathic surgery or not.

The chi-square test was performed using the IBM SPSS software analysis and the interpreted results show that there does not exist a statistical significance between age and gender in individuals undergoing orthognathic surgery, as observed in this study ($p > 0.05$). The limitations of this study mainly include the study being unicentric, unequal distribution, geographical variation, and small sample size. Incomplete data were excluded. A study performed on a large scale with a variant geographical distribution, thereby a greater sample size including different ethnicities can procure better results. The treatment for dentofacial deformities involves quality orthognathic procedures to correct jaw deformity, along with adjunctive therapy to improve the contours of the hard and soft tissue. Awareness and effective concepts of management of orthognathic surgery to be brought to the public. It is an invaluable aid in providing comprehensive patient education. Orthognathic surgery improves the quality of life for all groups of dentofacial abnormalities. Orthognathic surgery eliminates severe esthetic and functional deformities and proves to be a life-changing event for the individual.

CONCLUSIONS

Within the limitations of this study, the majority of the patients refused to undergo orthognathic surgery. Hence it is imperative to educate people in requisite of it and address issues regarding the factors leading to the individual's decision to or not take up the surgery.

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Conflict of Interest

The authors declare that they have no conflict of interest for this study.

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