FREQUENCY OF ORTHOGNATHIC SURGERY TREATMENT IN A UNIVERSITY HOSPITAL SETTING - RETROSPECTIVE STUDY

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ABSTRACT:

Background: Orthognathic surgery is an 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.

Aim: To assess the frequency of orthognathic surgery in a university hospital setting.

Materials and Methodology: Data required for the study was procured by reviewing patient records and analysed data of 86000 patients between June 2019 to March 2020. The data was sorted in excel and statistically analysed using the IBM SPSS software analysis and the results tabulated.

Results: The frequency of orthognathic surgery in this study was found to be 22.4%.

Conclusion: 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.

Keywords: Orthognathic surgery; prevalence; dentofacial deformities; occlusal function; facial appearance

I. INTRODUCTION

Orthognathic surgery refers to repositioning of the maxilla and mandible or the chin as commonly referred as, which is the 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 (Khechoyan, 2013; Krishnan, Pandian and Kumar S, 2015; Samantha, 2017). The gonial angle and lower gonial angle can be used as an indicator for growth (Rubika, SumathiFelicitia and Sivambiga, 2015). The anterior and posterior maxilla, the cranial floor, ramus vertical composite are all in dimensional balance in individuals with normal occlusion and facial harmony (Felicitia, Chandrasekar and Shanthasundari, 2012; Kamisetty et al., 2015). The objective of orthodontic surgery is based on the repositioning of the basal bone framework to correct the maxillo-mandibular deformities (Jain, 2014; Felicitia and SumathiFelicitia, 2018). A collaborative approach between the orthodontist and the surgeon is imperative to successfully devise and execute a comprehensive treatment plan with predictable outcomes (Precious, Splinter and Bosco, 1996; Dinesh and Saravana Dinesh, 2013; 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; Krishnan, Pandian and Kumar, 2018). Patients with dentofacial deformity and malocclusion
have a higher incidence of temporomandibular joint (TMJ) derangements than compared to the general population (Viswanath et al., 2015; Felicita, 2017b; S et al., 2017)

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 the 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, Jagadesan and Venkataraman, 2012). The main indications for an orthognathic surgery include malocclusion, TMJ disorders, esthetics, pre prosthetics (Charrier, 2012). Functional importance in regard with 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 wellbeing of the individual (Reyneke, 2003).

Variant procedures can be opted based on the discrepancy, its extent and the patient’s condition (Kumar et al., 2011; Felicita, 2017a; Vikram et al., 2017). In dire situations where there is 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 (Ghai and Sikes, 2000; Chang et al., 2001; Magalhães et al., 2010).

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 approachability and management of patients, enlighten them regarding orthognathic surgeries (Elmouden and Ousehal, 2018). Previously our team has a rich experience in working on various research projects across multiple disciplines((Neelakantanet al., 2015; Ramamoorthi, Nivedhitha and Divyanand, 2015; Abdul Wahabet al., 2017; Eapen, Baig and Avinash, 2017; Manivannanet al., 2017; Patilet et al., 2017; Ezhilarasan, Sokal and Najimi, 2018; Jeevanandanand Govindaraju, 2018; Ravindiran and Praveenkumar, 2018; Wahabet et al., 2018; MalliSureshbabuet al., 2019; Mehta et al., 2019; Rajeshkumatet al., 2019; Samuel, Acharya and Rao, 2020; Sathish and Karthick, 2020).

The aim of this study is to find the frequency of orthognathic surgery in a university hospital setting.

II. MATERIALS AND METHODOLOGY:

The study was performed under a university hospital setting. Data required for the study was procured by reviewing patient records and analysed 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 randomisation was done to minimize sampling error. Incomplete data was excluded. The obtained data was tabulated in excel and the following parameters were assessed:

Age
Gender
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.

III. RESULTS AND DISCUSSION:

The frequency of orthognathic surgery in this study was observed to be 22.4%. (table.1, fig.1). The SPSS analysis was done and the mean age group of the study was obtained to be 26years. (table.2). The gender distribution of the study shows equal proportions of both male and female participants in this study. (fig.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). (fig.3).
Table 1: frequency of orthognathic surgery as observed in this study. Table 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%.

| TOPIC                                                      | COUNT  |
|------------------------------------------------------------|--------|
| Total number of cases                                      | 107    |
| No. of individuals who underwent orthognathic surgery       | 24     |
| treatment                                                  |        |
| No. of individuals who refused treatment                    | 83     |
| PREVALENCE RATE                                            | 22.4%  |

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

| Cumulative percentage (%) | AGE (in yrs) |
|---------------------------|--------------|
| 8.3                       | 17           |
| 4.2                       | 19           |
| 12.5                      | 20           |
Table 2: Age Distribution. Table depicting the mean age of the study, the mean age of this study was found to be around 26yrs.

|   |   |
|---|---|
| 4.2 | 46 |
| 8.3 | 50 |
| 8.3 | 26.8 yrs |

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

The gender distribution 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 to have 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. X-axis represents the gender distribution of the study. Y-axis represents the mean age of the study group. Red colour denotes males and Blue colour 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 averagely of 25yrs of age. Chi square statistical analysis was performed, p 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 unicentric, 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 by patients suggests that awareness among patients regarding the pros and cons of orthognathic surgery have to 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 inclination of young aged patients towards orthognathic surgery can account due to its primary feature of esthetic transformation (Irby, 2016; Brecher et al., 2019). The average patient who undergoes orthognathic treatment is usually in their second or third decade of life (Sarver, 1998). Previous literature also cite findings in concordance to that obtained in our study that patients aged between 25-30yrs 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, Peacock and Kaban, 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 male ratio observed in previous studies are mostly 1.5:1 (Suen, no date;
Castro et al., 2013). This difference in gender distribution can be due to varying reasons like the trivia of 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). Our institution is passionate about high quality evidence based research and has excelled in various fields (Pc, Marimuthu and Devadoss, 2018; Ramesh et al., 2018; Ezhilarasan, Apoorva and Ashok Vardhan, 2019; Ramadurai et al., 2019; Sridharan et al., 2019; Vijayashree Priyadharsini, 2019; Mathew et al., 2020). We hope this study adds to this rich legacy. 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 a small sample size. Incomplete data was 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 hard and soft tissues contours. 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.

![PRE - OPERATIVE](image1)

![POST - OPERATIVE](image2)
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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