

INCIDENCE OF MAXILLARY PROTRUSION IN PATIENTS UNDERGOING ORTHOGNATHIC SURGERY - A RETROSPECTIVE STUDY

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ABSTRACT

Background: Any deviation in the normal position of maxilla and mandible leads to skeletal malocclusion. Analyzing the Maxillary and Mandibular skeletal positions in a person is essential when planning orthognathic treatment. It involves surgically correcting the relationship of the maxilla and mandible to restore ideal occlusion. When the maxilla lies ahead of the mandible with reference to the anterior cranial base it is classified as Class II skeletal malocclusion or Maxillary Protrusion.

Aim: This study aims at determining the incidence of maxillary protrusion in patients that undergo orthognathic surgery.

Methodology: In this study we evaluated the records of different patients that

Under went orthognathic surgery in Saveetha dental college and hospitals to determine the incidence of maxillary protrusion among the patients. The sample consisted of 59 patients. Statistical analysis was done using SPSS software. Descriptive statistics and Cross tabulations were done.

Results: Majority of the patients that reported for orthognathic surgery were from the age group of 21-30 years. Among the other skeletal defects, prognathic maxilla with prognathic mandible showed the highest prevalence among the patients.

Conclusion: Males were more prone to undergoing orthognathic surgeries. Mandibular arch is mostly affected in males and maxillary arch is mostly affected in females. We can conclude that prognathic maxilla is more prominently found in females.

Keywords: Skeletal malocclusion, Maxillary Protrusion, Class II malocclusion, Orthognathic surgery.

INTRODUCTION

The chances of defects occurring in orofacial tissues are much higher due to the structural and developmental complexity of the face. Skeletal defects result from distortion in the mandibular and maxillary growth during fetal development. If left untreated patients with skeletal defects may suffer from dental deformities, trismus, mastication problems, breathing obstruction etc. Cleft lip and palate is one of the most common defects with a prevalence of 1 in 500 live births in the Asian population (1).

Skeletal malocclusion is another common birth defect that occurs due to the abnormal relationship between maxilla and mandible. Macrognathia involves the overgrowth of the mandible or maxilla beyond the normal values. It becomes more prominent around the age of 12.2 years in females and 14 years in males (2). Skeletal malocclusion in accordance to Angle's classification is represented as class II and class III depending on the position of the upper first molar to the lower first molar. In class II malocclusion, the mesiobuccal cusp of the upper first molar is anteriorly positioned in relation to the buccal groove of the lower first molar. In class III malocclusion, the mesiobuccal cusp of the upper first molar is posteriorly positioned in relation to the buccal groove of lower first molar (3,4).

Various studies report that skeletal malocclusion can affect the general wellbeing of patients by causing airway obstructions, sleep apnea, gastric problems and delayed developmental growth (3,5,6). Skeletal malocclusion can also lead to adverse effects on the intellectual wellbeing, social skills and psychological status of a patient (6,7). About 65% of the general population in the US have some sort of malocclusion. The definite cause however for this majority of cases is unknown. Recently the etiology of skeletal malocclusions have been largely linked to genetic risk factors. A study conducted by Harris and Johnson in 1991 reported that the inheritance of craniofacial characteristics is higher in comparison to dental characteristics (8). Another study showed that the prevalence of classes I and II malocclusion are very high when compared to class III malocclusion (9). Thus determining the etiological risk factors and the prevalence of various skeletal and dental defects will immensely help in the prevention, intervention and treatment of these cases.

This study aims to evaluate the incidence of maxillary protrusion or Class II malocclusion in patients that underwent orthognathic surgery in Saveetha Dental college.

MATERIALS AND METHOD

Study design: Hospital based retrospective study

Study setting: Department of Oral and Maxillofacial surgery in a Private dental institution.

Study size: Sample size of 59 patients that underwent orthognathic surgery

Sampling: The sample consisted of different patients between the ages 17 to 60 years that underwent orthognathic surgery in Saveetha dental college and hospitals between July 2019 to February 2021.

Data collection: The records of patients that willingly underwent orthognathic surgery between July 2019 to February 2021 was taken from the DIAS (Dental Information Archiving Software). The patient data collected included parameters like Hospital record number, Name, Gender, Age, Arch affected and Type of skeletal defect . Data collected was exported into Microsoft Excel 2010.

Data analysis: The acquired data was statistically analysed using Statistical Package for Social Sciences (SPSS version 20.0) for Windows. Descriptive statistics and Chi-square tests were applied. The data was presented as bar graphs.

RESULTS

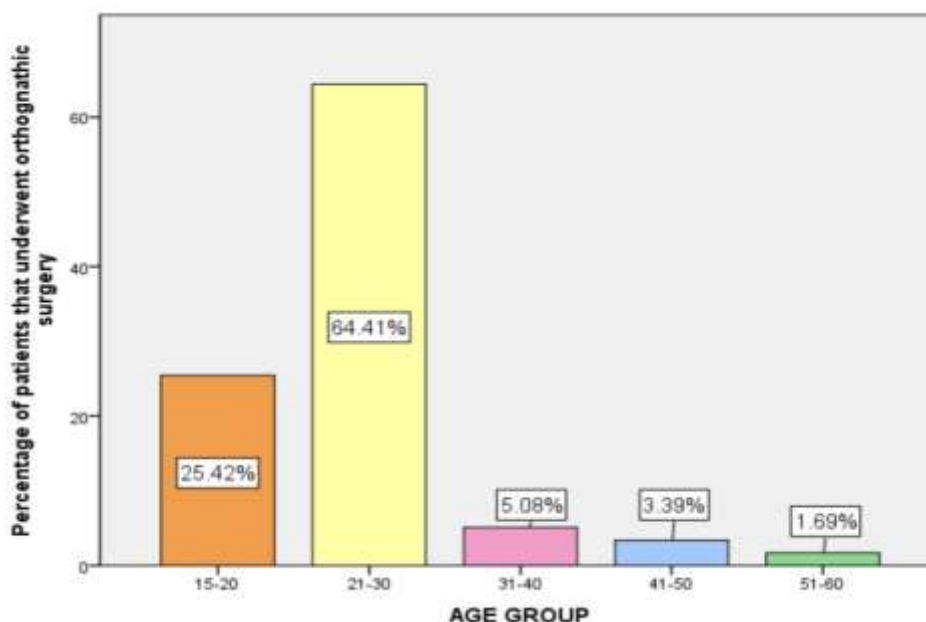


Fig 1: The bar graph shows the percentage of patients belonging to each age group that underwent orthognathic surgery. Orange depicts the age group 15-20 years (25.42%) , yellow depicts 21-30 years (64.41%), pink depicts 31-40 years (5.08%), blue depicts 41-50 years (3.39%) and green depicts 51-60 years (1.69%). It was observed that the highest number of patients that underwent orthognathic surgery were from the age group 21-30 years.

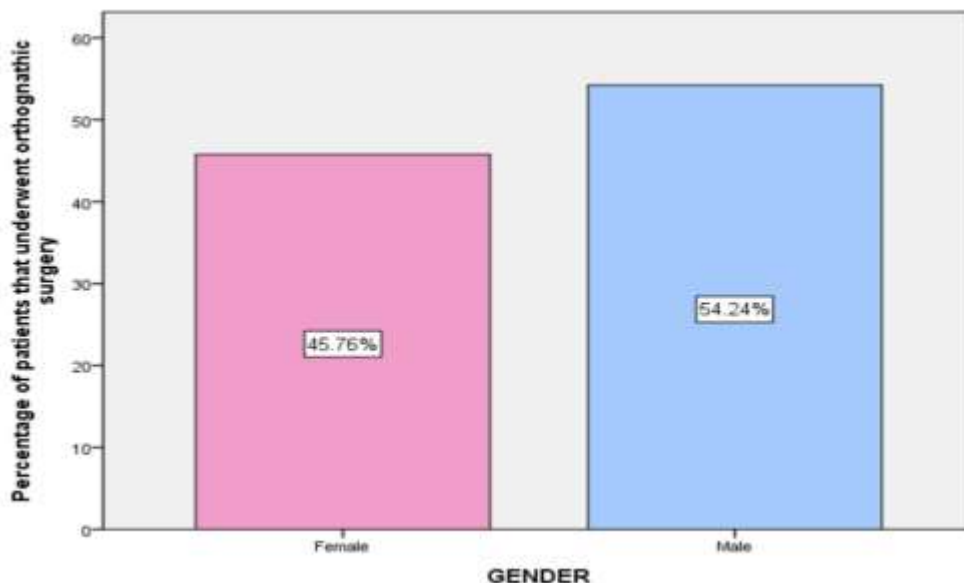


Fig 2: The bar graph shows the percentage of males and females that underwent orthognathic surgery. Pink depicts females (45.76%) and blue depicts males (54.24%). It was observed that the number of males that underwent orthognathic surgery were higher than females.

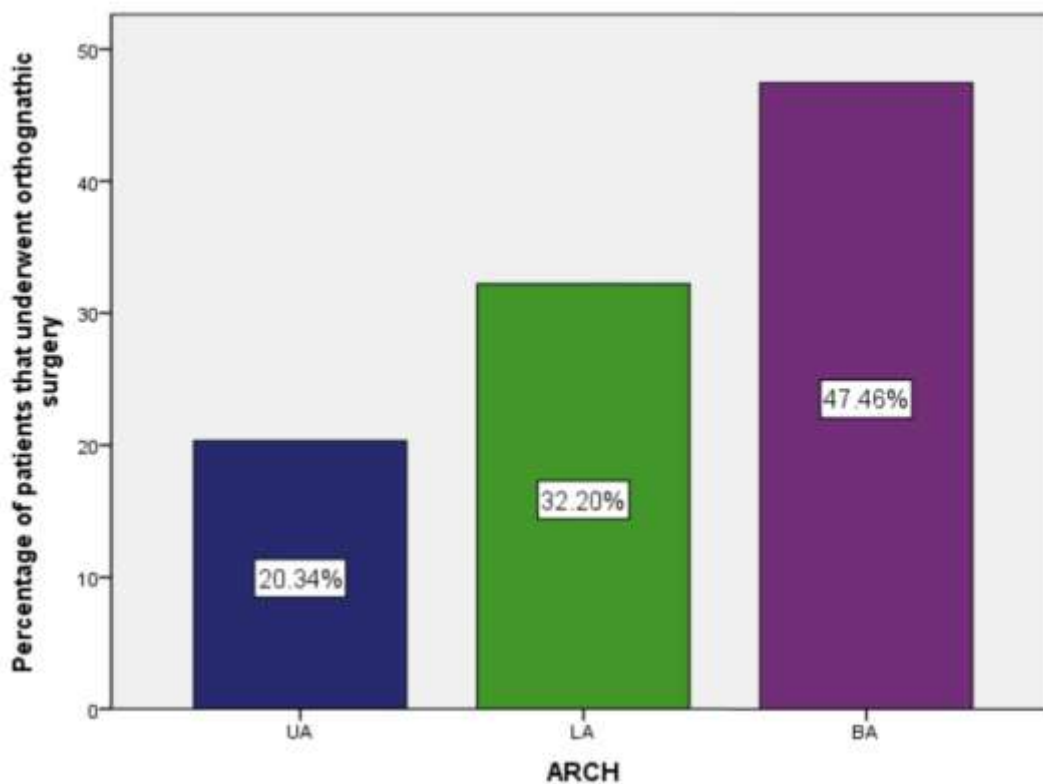


Fig 3: The bar graph shows the frequency of arches that underwent orthognathic surgery. Blue depicts the upper arch (20.34%), green depicts the lower arch (32.20%) and purple depicts both the arches (47.46%). It was observed that most of the surgical procedures involved both the arches, followed by the lower arch and lastly the upper arch.

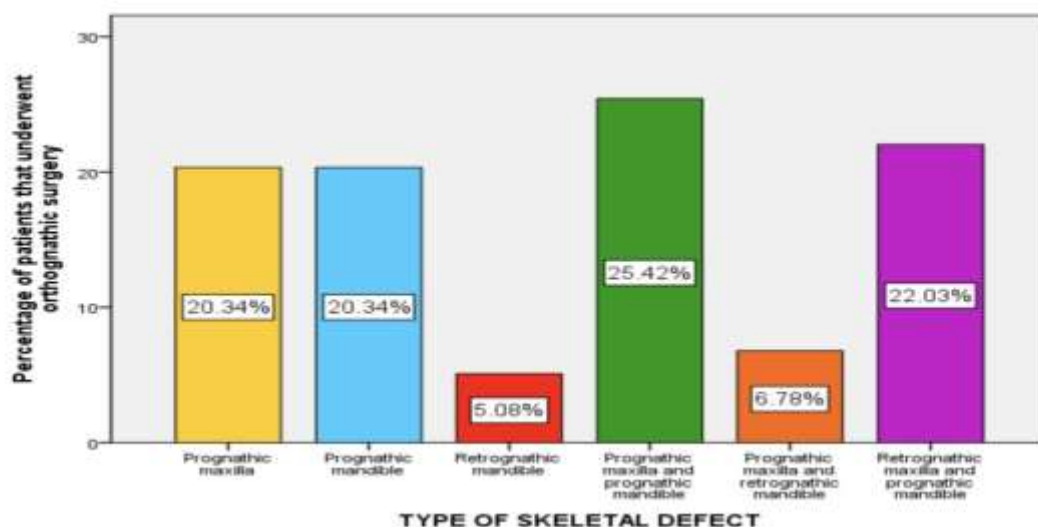


Fig 4: The bar graph shows the frequency of various skeletal defects observed in the patients who underwent orthognathic surgery. Yellow depicts prognathic maxilla (20.34%), blue depicts prognathic mandible (20.34%), red depicts retrognathic mandible (5.08%), green depicts prognathic maxilla with prognathic mandible (25.42%), orange depicts prognathic maxilla with retrognathic mandible (6.78%) and purple depicts retrognathic maxilla with prognathic mandible (22.03%). It was observed that prognathic maxilla with prognathic mandible had the highest prevalence among the patients.

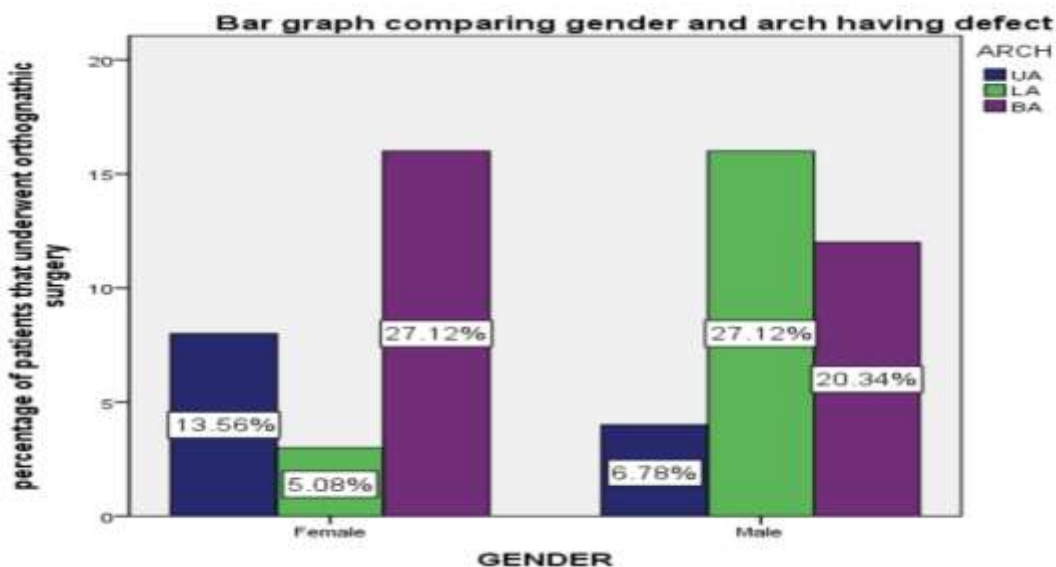


Fig 5: The bar graph shows the comparison between the arch involved and the gender of the patients. Blue depicts the upper arch, green depicts the lower arch and purple depicts both the arches. It is observed that the Mandibular arch is mostly affected in males (27.12%) and maxillary arch is mostly affected in females (13.56%). The chi-square test reveals that $p = 0.005$ ($p < 0.05$), hence the data is significant.

Arch and Gender Cross tabulation

ARCH /GENDER	Upper arch	Lower arch	Both arches	Total	Level of significance
Male	4	16	12	32	0.005
Female	8	3	16	27	
Total				59	

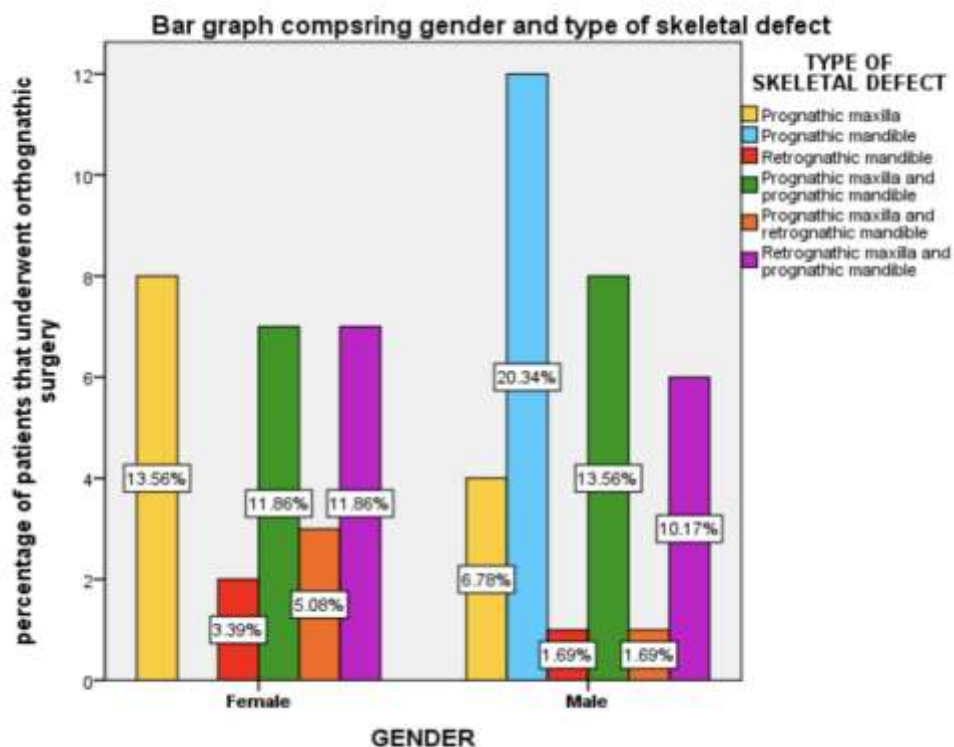


Fig 6: The bar graph shows the comparison between the type of skeletal defects and the gender of the patients. Yellow depicts prognathic maxilla, blue depicts prognathic mandible, red depicts retrognathic mandible, green depicts prognathic maxilla with prognathic mandible, orange depicts prognathic maxilla with retrognathic mandible and purple depicts retrognathic maxilla with prognathic mandible. It is observed that prognathic mandible is seen only in males (20.34%) while prognathic maxilla (13.56%) and retrognathic mandible (5.08%) is more prominently found in females. The chi-square test reveals that $p = 0.013$ ($p < 0.05$), hence the data is significant.

Type of skeletal defects and Gender Cross tabulation

SKELETAL DEFECTS /GENDER	Prognathic maxilla	Prognathic mandible	Retrognathic mandible	Prognathic maxilla with prognathic mandible	Prognathic maxilla with retrognathic mandible	Retrognathic maxilla with prognathic mandible		Level of significance
Male	4	12	1	8	1	6	32	0.013
Female	8	0	2	7	3	7	27	
Total				59				

DISCUSSION

It was observed that the highest number of patients that underwent orthognathic surgery were from the age group 21-30 years (fig1). We also found that the number of males that underwent orthognathic surgery were higher than females (fig 2). It was found that most of the surgical procedures involved both the arches, followed by the lower arch and lastly the upper arch (fig 3). Among the other skeletal defects, prognathic maxilla with prognathic mandible showed the highest prevalence among the patients (fig 4).

On cross comparison we observed that the Mandibular arch is mostly affected in males (27.12%) and maxillary arch is mostly affected in females (13.56%) (fig 5). We also observed that prognathic mandible is seen only in males (20.34%) while prognathic maxilla (13.56%) and retrognathic mandible (5.08%) is more prominently found in females (fig 6).

CONCLUSION

Within the limits of the study we find that the majority of the patients that reported for orthognathic surgery were from the age group of 21-30 years. Among the other skeletal defects, prognathic maxilla with prognathic mandible showed the highest prevalence among the patients. Males were more prone to undergoing orthognathic surgeries. Mandibular arch is mostly affected in males and maxillary arch is mostly affected in females. We can also conclude that prognathic maxilla is more prominently found in females.

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CONFLICTS OF INTEREST

Nil

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