

Duration of hospital stay following Orthognathic Surgery - a single institution study

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ABSTRACT:

Aim: The aim of the study was to estimate the length of hospital stay (LOS) and identify factors associated with LOS in orthognathic surgery patients.

Materials and methods: This was a retrospective study where all the data of the patients who reported to the department of Oral and Maxillofacial surgery in a single institution was obtained from the dental information archiving software (DIAS). Patient record was collected between March 2020 and March 2021. Data was collected and tabulated. The collected data was further analysed, recorded in Microsoft Excel software and was subjected to statistical analysis using IBM SPSS statistics analyser v.23.0.

Results: The total sample size of the study was 57 patients. In this study, the data was analysed for the length of hospital stay in patients undergoing orthognathic surgery. The highest prevalence was seen in males and in the age group of 17-21 years. The most common procedures performed was bimaxillary surgery. The overall mean Length of hospital stay was 3.2 days.

Conclusion: Reduction in the length of stay after surgery can result in improved allocation and use of health care resources and a substantial reduction in the cost of healthcare delivery.

Keywords: Hospital stay, Innovative technology, maxillofacial surgery, Orthognathic surgery, Osteotomy

INTRODUCTION:

Orthognathic surgery is a surgical intervention that alters relationships of the jaws and dental arches. The treatment involves a combination of orthodontics and maxillofacial surgery. It is used to correct dentofacial deformities that cannot be treated with acceptable results by conventional orthodontics^{1,2}. The need for surgical intervention to correct a malocclusion was first described by Hüllihen. The various surgical interventions which aim at correcting the maxillomandibular relation include; Le Fort I osteotomy and sagittal ramus split osteotomy, vertical ramus osteotomy, inverted L osteotomy, variations and combinations of the above^{3,4}.

Orthognathic surgery aims to correct dentofacial deformities which includes skeletal class II malocclusions, skeletal class III malocclusions, anterior open bite, deep bite, facial asymmetry, Temporomandibular joint disorder, obstructive sleep apnea, cleft lip/palate, hemifacial microsomia and post traumatic jaw deformities^{5,6}. Generally, high satisfaction and significant functional improvements following Orthognathic Surgery are described in the literature^{7,8}. Furthermore, various benefits including improvements in facial aesthetics, psychosocial well-being, physiological health, regression of pain, etc. are reported. In Orthognathic surgery, improvement in facial aesthetics is described as one of the main indications for the same^{2,4}.

These procedures are performed on an inpatient basis and the following factors essentially influence the length of the hospital stay -Recovery from anesthesia, potent airway stabilization, achieve homeostasis, to prevent/ treat any unpredictable morbidity and resumption of oral intake⁹. Earlier, a bimaxillary osteotomy surgery would take up a full day's operation with post-operative admission in Intensive Care Unit and prolonged hospital stay. In modern times, we expect lesser intraoperative time and avoid admission in the Intensive Care Unit. We now expect fewer complications which in turn decreases the length of stay (LOS) in the hospital¹⁰.

Prolonged Length of hospital stay increases resource consumption. Patient length of stay (LOS) is one of the biggest issues hospitals are facing today. The longer a patient stays in the hospital, the greater the risk they will develop a healthcare-acquired infection that they can become vulnerable to. In addition, hospitals face lower patient capacities and increased costs. Healthcare system makes every effort to reduce cost while maintaining and improving the quality of care and clinical outcome¹¹.

Our team has extensive knowledge and research experience that has translate into high quality publications^{12, 13, 14, 15, 16-25, 26, 27-29, 30, 31}

Hence, the aim of the study is to estimate the length of hospital stay (LOS) and identify factors associated with LOS in Orthognathic Surgery patients.

MATERIALS AND METHODS:

This research study was defined as a retrospective study where all the patient's data who reported to the department of Maxillofacial Surgery and were diagnosed with skeletal malocclusion were obtained from the dental information archiving software (DIAS).

This study setting was a university setting and the research study was conducted in the department of maxillofacial surgery. This setting came with various pros and cons. The pros included the presence of a larger population and an abundant availability of data. Some of the cons included the study taking place in an uncentred setting and possessing a very limited demographic. This population was selected from the patients who visited the undergraduate and postgraduate dental clinics in a single institution. The approval to undertake this research study had been approved by the Ethical Board of Saveetha University (applied). Among a total data of 71 patients with skeletal malocclusion, n = 57 cases were included and cross verification was performed by an additional reviewer. The minimisation of sample bias was performed by an additional reviewer, acquiring all the data from within the university and as an additional measure, simple random sampling was performed. There was a presence of high internal and low external validity. Sample collection was performed from march 2020 to march 2021.

The data was then arranged in a methodical manner using Microsoft Excel software and was tabulated on the basis of 4 parameters namely, age of subject, gender of subject, Length of hospital stay, type of procedure done. The data was validated by an additional reviewer. Any incomplete or censored data that was present in the collected data was excluded from the study.

Statistical analysis of the compiled data was performed using IBM SPSS statistical analyzer V.23.0. Chi square test was done for statistical analysis. The inclusion criteria for this study were patients who underwent orthognathic surgery. The exclusion criteria included patients who underwent camouflage orthodontic treatment for correction of skeletal malocclusion without any surgery.

RESULTS:

The final dataset consisted of n=57 patients of Indian origin who underwent Orthognathic surgery during the study interval. The mean age was 26.98 years (SD ± 7.75 years) and ranged between 17 to 50 years. The male patients constituted 52.63% of the total population. (Graph 1) From our findings we understood that young aged adults have preferred orthognathic surgeries more than the other age groups. As we all know that aesthetics plays a major part in every individual's life especially in the younger ones, orthognathic surgeries are performed more on them as it will improve the person's appearance and occlusal function significantly. Hence from our current study it is found that, around 29.8% of the patients are between 17-21 years which is a majority. (Graph 2) And also we found that older patients, particularly men of 40 or above, tend to have longer hospital stays and an increased rate of postoperative hardware removal³². 45.6% of surgeries involved both jaws, 33.33% of the surgeries involved only the lower jaw and 21.05% involved the upper jaw. (Graph 3) The average Length of Hospital stay was 3.2 days (SD ± 1.28 days) (Graph 4) The association between the Length Of Stay and arch involved was found to be statistically insignificant p value = 0.3 > 0.05 (Graph 5)

In the current study, males and females showed equal prevalence in orthognathic procedures which contradicted with another study where it was observed that females had higher prevalence of orthognathic surgeries due to their concern with facial esthetics⁹ There was no statistical relationship between the age and the gender of patients to the length of hospital stay which was in concordance with other studies.^{9,33}

DISCUSSION:

The reason for variation in the length of stay post-surgery was dependent on the type of surgical procedures that were required. For example, any minor cosmetic surgical procedure did not require more than 2 days on an average. However, major surgeries which involved segmental osteotomies, bilateral sagittal split osteotomies required longer postoperative stays which is about 4 days. It is evident that the complexity of the procedure had a direct influence on the length of hospital stay³⁴.

From the study done by previous authors it was noted that the procedure type reporting the longest LOS was bimaxillary procedures followed by maxillary procedures and then mandibular procedures^{8,35}. The present study had concordant findings although it was not statistically significant (graph 5). This finding was contradicted by Panula et al, who surprisingly found longer LOS in patients with single-jaw maxillary discrepancies compared with those with bimaxillary discrepancies³⁶.

In the present study, the longest hospital stay was found to be 6 days in one patient. (Graph 4) The reason for the longer hospital stay was attributed to the complexity of the procedure (Bimaxillary surgery). Although, no statistical significance was found between the length of stay and the arch involved. (graph 5)

In the present study, mean length of stay was 3.2 days (SD ± 1.7 days) whereas in the study done by Jarab et al, the mean length of stay for hospitalization for Orthognathic procedure was 4.2 days³⁴. A few other studies have reported the average stay period post surgical therapy to be in the range between 1.5 days to 6 days.^{8,37,38}. Another study by Huama'n

et al, indicated that the mean length of stay for hospitalizations for orthognathic procedures was 1.7 days (standard deviation ± 1.2). Reported hospital length of stay (LOS) for patients undergoing orthognathic surgery ranges from 1.3 to 8.5 days^{8, 9,35,36,39-43}.

From 1975 Tornes and Lyberg found that the average hospital stay was 8.5 days for surgical correction of mandibular prognathism. Current literature shows that there was a significant reduction in time, which was almost certainly the result of improved surgical and anesthetic techniques, as well as the increase in the use of rigid intermaxillary fixation (IMF) and perioperative steroids⁴².

Further studies with a large study population should be carried out to find out any possible correlations between the length of hospital stay and the arches involved for the surgery.

CONCLUSION:

Within the limits of the study, the average length of hospital stay was found to be 3.2 days. Reduction in the length of stay after surgery can result in improved allocation and use of health care resources and a substantial reduction in the cost of healthcare delivery.

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CONFLICT OF INTEREST:

Authors declare no potential conflicts of interest.

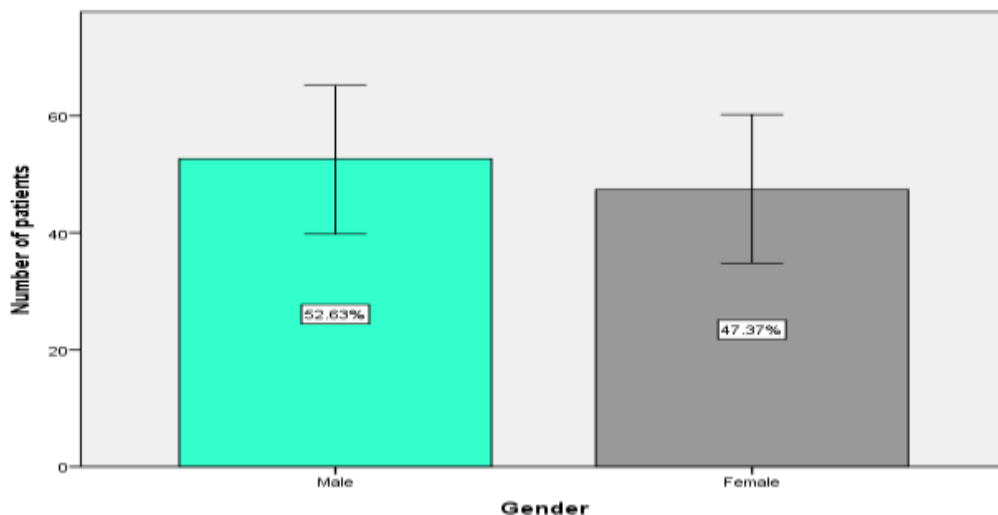
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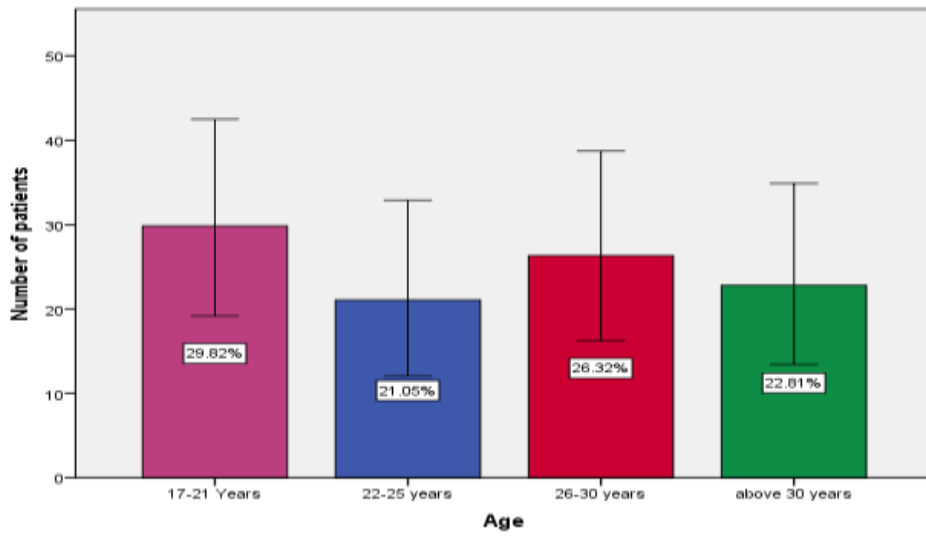
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Graph 1:



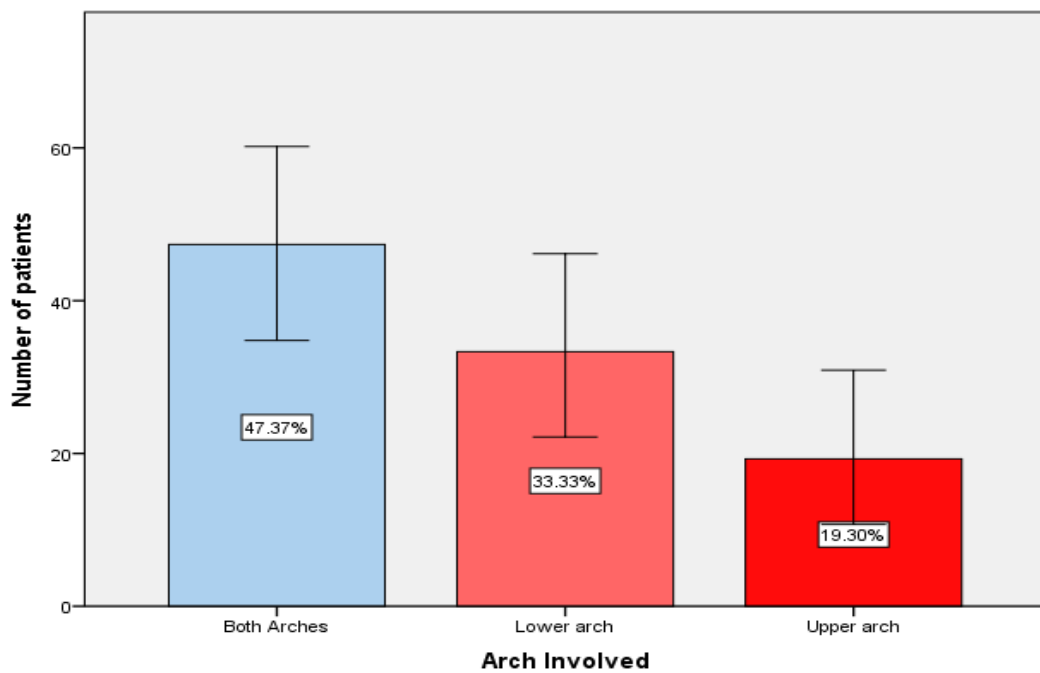
The bar graph showing the gender wise distribution of the study population. X axis represents the gender and the y axis represents the percentage of the population. 52.63% were males and 47.37% were females.

Graph 2:



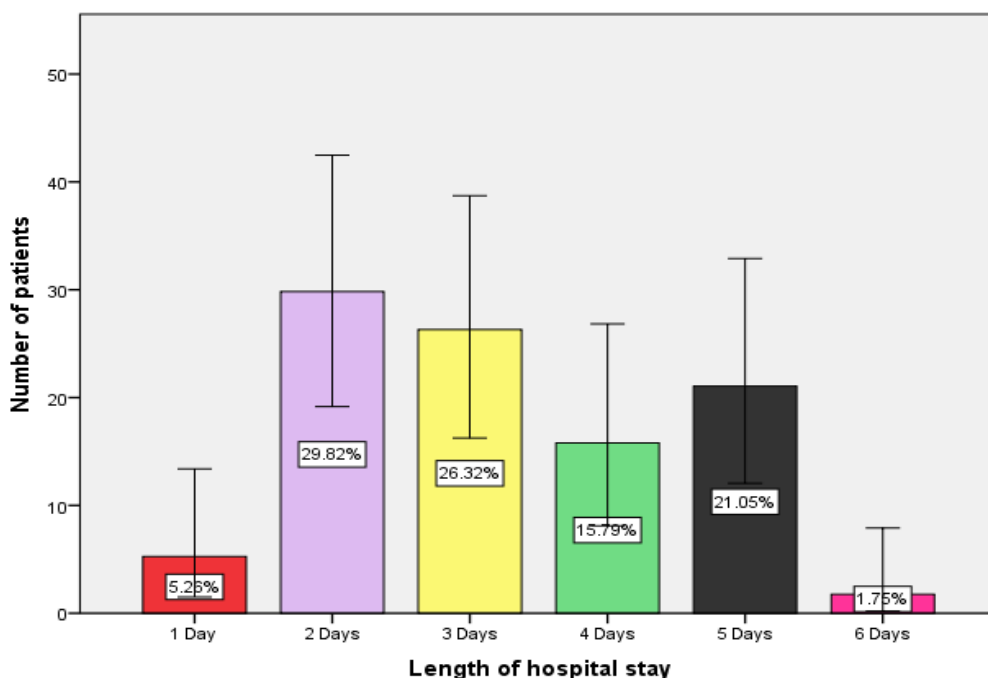
Bar graph showing the age wise distribution of the study. X axis represents the age groups and y axis represents the percentage of study population. 29.82% were of the ages between 17-21 years, followed by 26-30 years with 26.32%, above 30 years with 22.81% and 22-25 years with 21.06%

Graph 3:



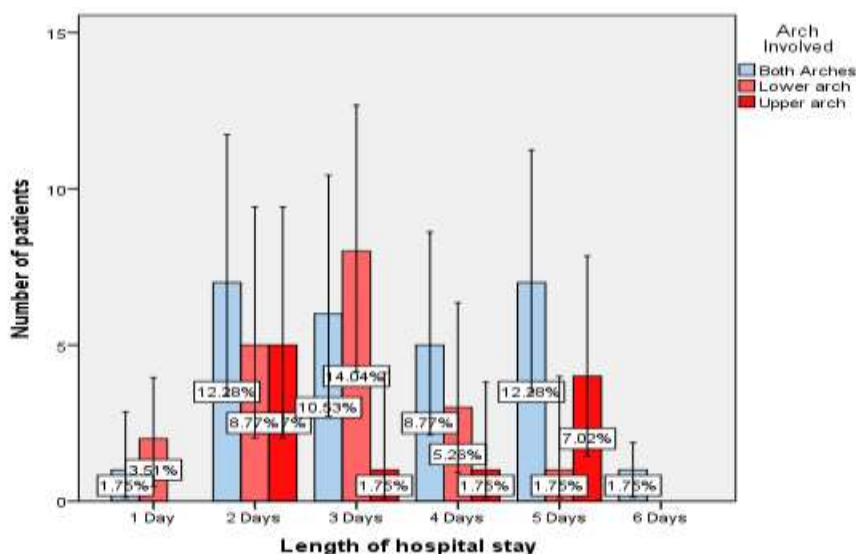
Bar graph showing the arch involved in orthognathic surgery among the study population. X axis represents the arches involved and the y axis represents Percentage of the study population. In 47.37% of the population, both arches were involved, followed by lower arch with 33.33% and upper arch with 19.30%

Graph 4:



Bar graph represents the length of hospital stay following orthognathic surgery among the study population. The X axis represents the length of hospital stay and the Y axis represents the percentage of the study population. 29.82% of the population were hospitalized for 2 days, followed by 3 days with 23.32%, 5 days with 21.05%, 4 days with 15.79%, 1 day with 5.26% and 6 days with 1.75%.

Graph-5:



Bar graph showing the association between length of hospital stay in patients following Orthognathic surgery. The X axis represents the length of hospital stay and the Y axis represents the arch involved. Correlation between Length of hospital stay and Arches involved were done. Chi square analysis was done and P value was found to be $0.3 > 0.05$, which is statistically not significant.