

ASSESSMENT OF THE INTRAOPERATIVE BLOOD LOSS IN PATIENTS UNDERGOING ORTHOGNATHIC SURGERY: A RETROSPECTIVE STUDY

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ABSTRACT:

Background: Orthognathic surgery is a unique endeavor in facial surgery. Orthognathic surgery to reposition the maxilla, mandible, or chin is the mainstay treatment for patients who are too old for growth modification. The aim of the study was to assess the intraoperative blood loss and the need for blood transfusion in association with individuals undergoing orthognathic surgery.

Materials and Methodology: Study performed under a university setting. Data procured from dental information archiving software. The obtained data was sorted and statistically analyzed using IBM SPSS version 23. The results were interpreted as graphs and tables

Results: The study showed a female predilection with Le fort 1 being the most common type of orthognathic surgery as observed in this study. Blood loss was found to be present in 5% of the study population while there was no record of blood transfusion required. Association between blood loss with the type of orthognathic surgery and gender of the patients was not statistically significant.

Conclusion: In our study, the intraoperative blood loss was minimal and none of the study population who underwent orthognathic surgery required blood transfusion. Oral and maxillofacial surgeons, orthodontists and the surgical team must understand the possibility of blood loss and the need to prevent blood loss during preoperative, intraoperative and postoperative periods to increase the safety of orthognathic surgery.

Keywords: association; blood loss; blood transfusion; innovative technique; repositioning; orthognathic surgery

INTRODUCTION:

Orthognathic surgery is a unique endeavor in facial surgery, successful outcomes in modern orthognathic surgery rely on close collaboration between the surgeon and orthodontist across all stages of the treatment. Orthognathic surgery to reposition the maxilla, mandible or chin is the mainstay treatment for patients who are too old for growth modification and for dentofacial condition that are too severe for either surgical or orthodontic camouflage. [1–3]

Key principles of surgical care include psychological preparation of the patient, good preoperative and postoperative nutrition, preservation of blood supply to the mobilized teeth and jaw segments, protection of bone, neurovascular structures, teeth, appropriate post operative wound management, fixation of bony segments, proper control of occlusion and rehabilitation to full jaw function. [4–6]

The orthognathic surgical procedures may include maxillary or mandibular surgery or both. Concomitant intranasal surgery with septoplasty and reduction of the inferior turbinate may be required to improve nasal airflow dynamics. [7,8] Genioplasty and liposuction may also be considered in patients to improve overall aesthetic outcome. Patient management at surgery comprises preservation of blood supply, protection of teeth bone and neurovascular structures, nutrition. [9,10] Since orthognathic surgery is done to correct facial disproportion, it is performed as an elective procedure, the surgical team must make every attempt to control blood loss and reduce the need for blood transfusion. [11,12] A blood transfusion is rarely necessary for routine single jaw procedures. [13–15]

Our team has extensive knowledge and research experience that has translated into high quality publications [16],[17],[18],[19],[20–29][30],[31–33],[34,35]. The current study aims to assess the blood loss associated with individuals undergoing orthognathic surgery and the need for blood transfusion in a private dental institution.

MATERIALS AND METHODS:

The study was performed under a university setting. Data required for the study was procured from the dental information archiving software. The pros of the study include ready availability of data, similar ethnicity while cons include the study being unicentric and geographic trends not assessed. The sample for the study was assessed from June 2019 to February 2021. Sampling bias was minimized by simple random sampling. The sample size of the study was 50 patients who had undergone orthognathic surgery. Data was analyzed for following parameters:

1) Age

- 2) Gender
- 3) Amount of blood loss
- 4) Blood transfusion done- Yes/No
- 5) Type of orthognathic surgery

The procured data was sorted in MS Excel and statistical analysis done using IBM SPSS software version 23. Results interpreted in the form of graphs and tables.

RESULTS:

There was a total of 50 patients who underwent orthognathic surgery for the correction of a dento-facial deformity. 23 of the 50 patients were males (46%) and 27 of the 50 patients were females (54%), The study shows a female predilection. The site of orthognathic surgery as observed in this study showed that both the arch involvement was found in 23 (46%) individuals, 13 (26%) individuals underwent surgery of only the upper arch, while 14 (28%) of them underwent surgery of the lower arch only [Figure 1].

The various orthognathic surgeries assessed in this study show that, LeFort 1 to be of 34%, AMO to be of 32%, PMO to be of 6%, Genioplasty to be of 6%, subapical osteotomy to be 6% and BSSO to be of 16% in prevalence. Le Fort 1 was found to be the predominantly performed surgery as observed in this study [Figure 2].

The study reports that blood loss was more in females [80.4%] than males [19.6%] [Figure 3]. The mean quantity of blood loss observed in the various surgical procedures showed that maximum blood loss was observed in Le Fort 1 surgery (118mL), followed by genioplasty (60mL), BSSO (25mL) [Figure 3].

Association between the quantity of intraoperative blood loss against the various orthognathic surgeries and gender of the patients was done. It was found that Le fort 1 was the highest in prevalence among females and blood loss was found to be maximum in le fort 1 surgery for females, while for males the predominantly performed surgery was genioplasty and the mean blood loss was found to be 60ml in this study. Thus, association between intraoperative blood loss with type of orthognathic surgery and the gender of the patients on Chi-square analysis yielded to be statistically not significant in this study ($p=0.367$) [Figure 4].

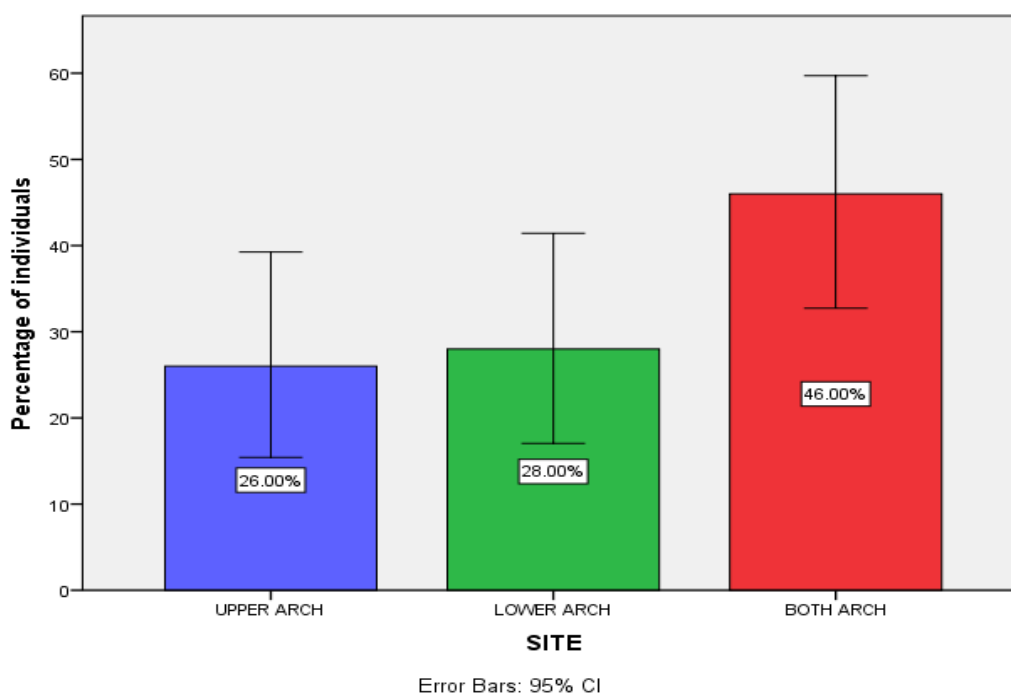


Figure 1: Bar chart depicting the distribution of the site involved in orthognathic surgery as observed in this study.

The X axis represents the site involved, the blue bar depicts upper arch which is of 26% while the green bar depicts lower arch to be of 28% in prevalence, the red bar depicts that both arches were found to be 46% in prevalence. The Y axis depicts the percentage of individuals assessed. Both arches were found to have the highest prevalence with regard to site involved with orthognathic surgery as observed in this study.

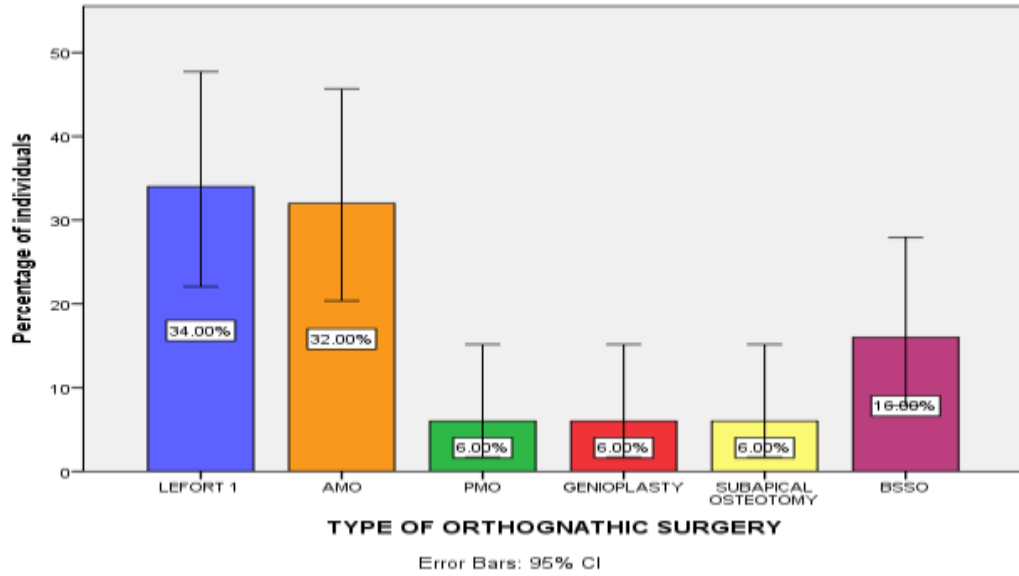


Figure 2: Bar chart depicting the distribution of the various orthognathic procedures assessed in this study. The Y axis depicts the percentage of individuals assessed. The X-axis depicts the various orthognathic surgeries assessed, the blue bar represents LeFort 1 to be of 34%, the orange bar depicts AMO to be of 32%, the green bar depicts PMO to be of 6% while the red bar represents Genioplasty to be of 6%, the yellow bar represents subapical osteotomy to be 6% in prevalence and the purple bar depicts BSSO to be of 16% in prevalence. Le Fort 1 was found to be the predominantly performed surgery as observed in this study.

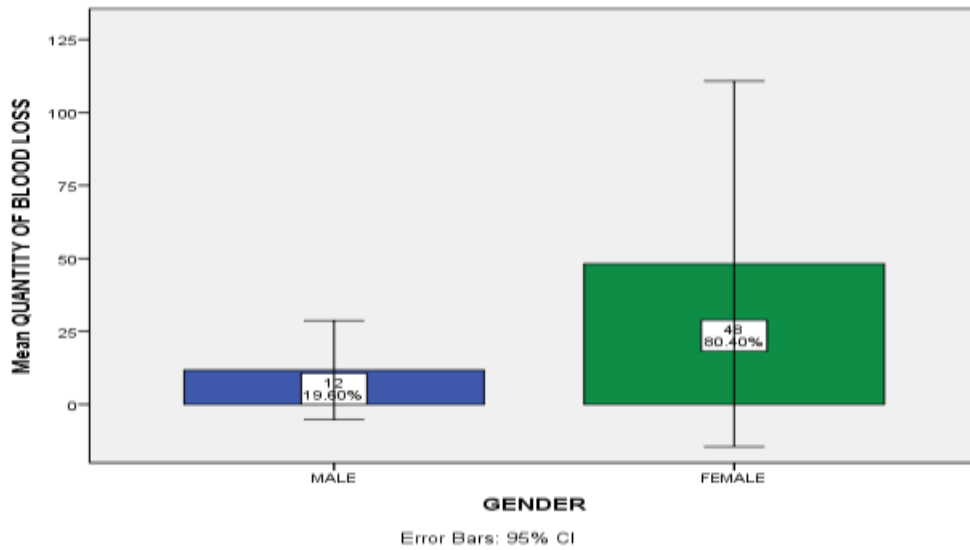


Figure 3: Bar chart depicting the mean quantity of blood loss observed in both the genders. The X axis depicts male and female while Y axis depicts the mean quantity of blood loss. The study reports that blood loss was more in females [80.4%] than males [19.6%].

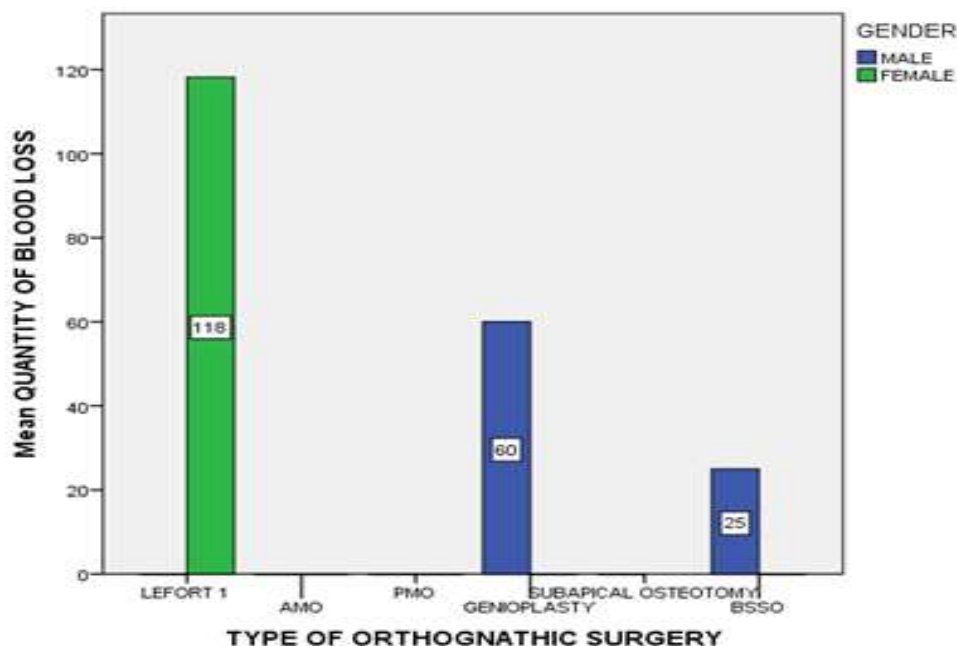


Figure 4: Bar chart depicting the association between mean quantity of blood loss and the orthognathic surgery performed in both the genders.

The X axis represents the various orthognathic surgeries performed. The Y axis represents the mean quantity of blood loss. The blue bar depicts males, while the green bar depicts females. It was found that Le fort 1 was the highest in prevalence among females and blood loss was found to be maximum in le fort 1 surgery for females, while for males the predominantly performed surgery was genioplasty and the mean blood loss was found to be 60ml in this study. Association between intraoperative blood loss with type of orthognathic surgery and the gender of the patients on Chi-square analysis yielded to be statistically not significant in this study($p=0.367$).

DISCUSSION:

Orthognathic procedures for the correction of dentofacial deformities are complex surgical procedures for which a considerable amount of blood loss has to be anticipated due to the vascularity of the maxillary and mandibular structures. Pre-operative assessments should evaluate ASA status and pre-operative hemoglobin levels.

Intraoperative blood loss during orthognathic surgery is frequently abundant and sometimes requires blood transfusion. Maximum blood loss was observed in patients undergoing Le fort 1 surgery in the upper arch. Our study results are in concordance with previous literature [36–38], wherein intraoperative bleeding observed in patients during LeFort 1 or mandibular ramus osteotomies or both combined was less than the limits set for blood transfusion.

Patients undergoing orthognathic surgery can require blood transfusion. However, in our study, none of the study population who underwent orthognathic surgery required blood transfusion. Our study results are not in concordance with previous literature [39–41]. This can be attributed to the fact that unicentric study, small sample size of the study.

The mean age of this study was observed to be 24 years, this can be attributed to the fact that young adults are more concerned about aesthetics and undergo orthognathic surgery. Previous literature cite that neither age nor sex influenced blood loss, whereas factors such as the operating time, systemic condition of the patient, hemoglobin concentration and packed cell volume can influence the requirement of a transfusion as well as blood loss rate [42].

Our study results have shown that on assessment of intraoperative blood loss observed in patients during LeFort 1 or mandibular osteotomies or both combined was less than the limits set for blood transfusion. However, bleeding can become heavier, severe bleeding can be managed by the use of the hemostatic matrix with thrombin and this hemostatic agent can be used to control bleedings in orthognathic surgery however extensive bleeding can cause complications, hence surgeons should be prepared for heavy bleeding by reserving blood at a blood bank or by preparing an autotransfusion

CONCLUSION:

There are many complications of orthognathic surgery including blood loss being a major complication. Oral and maxillofacial surgeons, orthodontists and the surgical team need to prevent such complications during preoperative, intraoperative and postoperative periods to increase the safety of orthognathic surgery.

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CONFLICT OF INTEREST:

None declared

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