

## **Awareness About Reconstructive Maxillofacial Surgery Options Following Resection Among Dental Students- A Questionnaire Survey**

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### **Abstract:**

#### **INTRODUCTION:**

Oral cancer is the most common cancer affecting people worldwide. It affects various anatomical structures which includes lips, oral cavity, pharynx, larynx, salivary glands etc. Anatomical and functional disturbances caused due to post surgical defects during the treatment of tumours determine the therapeutic needs of the patients.

#### **MATERIALS AND METHODS:**

A self designated 15 questions were created and it was circulated among 100 dental students. The results were collected and analyzed.

#### **RESULTS:**

In this study ,students were aware about the reconstructive surgery but they were not aware about the flaps used and their anatomy. In overall association , there was less awareness among students about reconstructive surgery.

#### **CONCLUSION:**

This study concludes that only post graduate students were aware about reconstructive surgery. The treatment, rehabilitation and follow up care of the patients should be carried out in an interdisciplinary team. Therefore there is a need for more research and studies about reconstructive surgery and the flaps used among undergraduate students which will help us to serve the patients in a better way.

**KEYWORDS:** Maxillofacial reconstruction, Resection , Cancer, flaps, innovative

### **INTRODUCTION:**

Head and neck cancers comprises about 10% of all malignant neoplasms recognised in human beings(1). 90% of neoplasms are of ectodermal origin and they are commonly squamous cell carcinoma. They have a distinct effect on the anatomical system. The deformity and defects due to neoplastic diseases and their surgical remedy cause a special range of disorders including basic vital functions like mastication, swallowing and speaking(2).

Reconstruction of head and neck defects after tumor resection continues to be a venture to reconstructive surgeons. These complicated defects result in loss of mucosa, bone, soft tissue and skin(2,3). Functional and aesthetic outcome should be achieved in an ideal reconstruction. The discipline of head and neck reconstructive surgical treatment is a dynamic one. In the last decade various advances have been made which are mostly secondary to expanded use of microvascular free flaps(4). Various flaps have been used for reconstructing various defects which includes anterolateral thigh, fibula osteo-cutaneous, and supra- fascial radial forearm fascio-cutaneous free flaps. As the anatomy of these flaps has turned out to be greater familiar, their reliability and versatility have increased. Reliable wound closure without exposing the vital structures is not the only priority. Preserving vital functions which include speech , swallowing and restoring appearance are the aim in every reconstruction(5).

The success rate of free flaps have exceeded 95% percent. Free flap achievement prices now routinely exceed 95 percent or higher at most centres. Above this, minimising flap donor site morbidity is a vital consideration(6,7).

Because of the high rate of recurrence in addition to long term complications following head and neck resection and reconstruction , protection of recipient vessels and flap donor sites should also be a consideration. Management of midfacial defects is the maximum complex region of head and neck oncologic reconstruction. There are various options which include obturators, pedicled flaps, free flaps, and combined with grafts or alloplasts. One of the essential issues with reconstructing the mid-face is that the defects caused through oncologic resection are exceptionally variable(8).

The post physical and psychological effects caused by oral cancer and its treatment lead to social isolation and affect the quality of life. Post resection management of surgical defects can be either by surgical closure or by reconstruction using a flap. Choosing these two treatment modalities is multifactorial and it requires a team approach(6). Various regional flaps have been proposed for soft tissue reconstruction of the oral cavity with varying success. The flaps used for soft tissue reconstruction includes pectoralis major myocutaneous flap, forehead flaps, skin flaps like buccal pad etc(9).

The successful outcome of maxillofacial reconstruction involves not only a broad range of reconstructive flaps but also in understanding their anatomy(10) . This article helps us to gain knowledge about awareness among dental students about reconstructive surgeries after resection. The aim of this study is to evaluate and create awareness among dental students about reconstructive surgery.

Our team has extensive knowledge and research experience that has translate into high publications (11–30)

### MATERIALS AND METHODS:

A self designated 15 questions were created and circulated among dental students. The questions regarding resection , reconstructive surgery, and flaps were created using Google forms . Responses were received , tabulated and were analysed using statistical software. The inclusion criteria to attend the survey include undergraduate and postgraduate dental students. Exclusion criteria includes the general practitioners.

All the statistics and analyses were done using SPSS software. A chi square test was used to establish correlation between categorical variables. P (<0.05) was set to be statistically significant.

### RESULTS AND DISCUSSION:

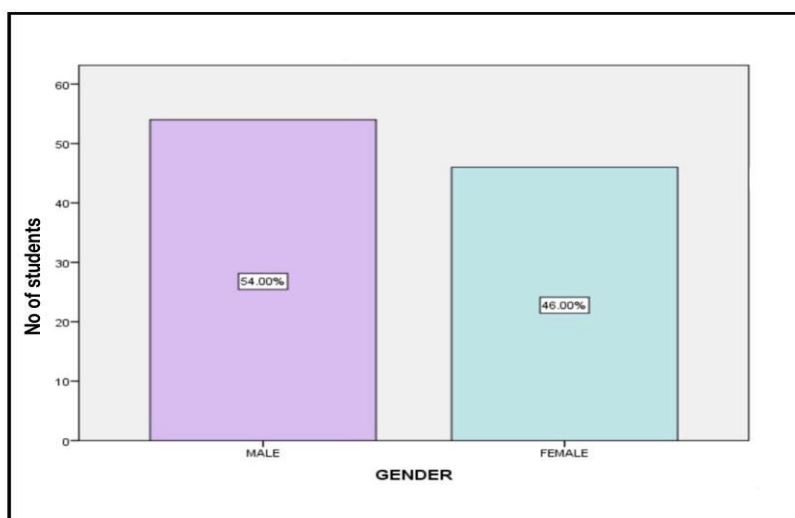


Figure 1: The bar graph represents the gender of the students. The X-axis represents the gender while Y-axis represents the number of students. In this study 52% of them were males and 48% of them were females.

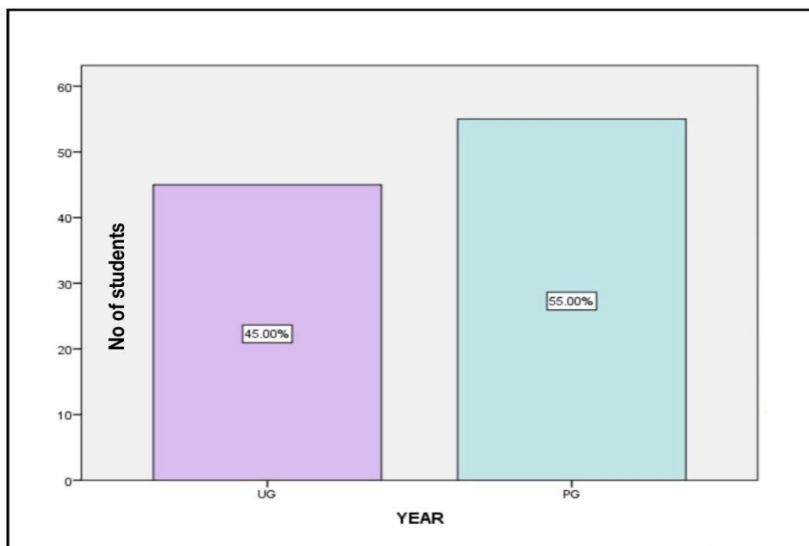


Figure 2: The bar graph represents the year of study of the students. The x-axis represents the year of the study and Y-axis represents the number of students. In this study, 45% of them were UG students and 55% of them were Pg students.

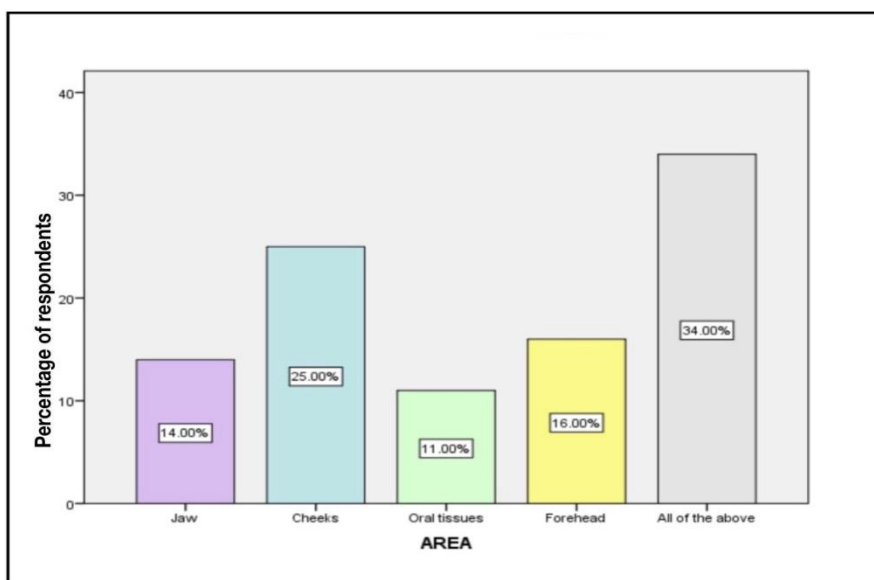


Figure 3: The bar graph represents the area that is commonly reconstructed in microvascular reconstructive surgery. The X-axis represents the area that is commonly reconstructed and the y-axis represents the percentage of the respondents. In this study 14% of the students said jaw was commonly reconstructed, 25% of them said cheeks, 11% of them said oral tissues, 16% of them said forehead and 34% of the students responded that all the above structures are commonly reconstructed.

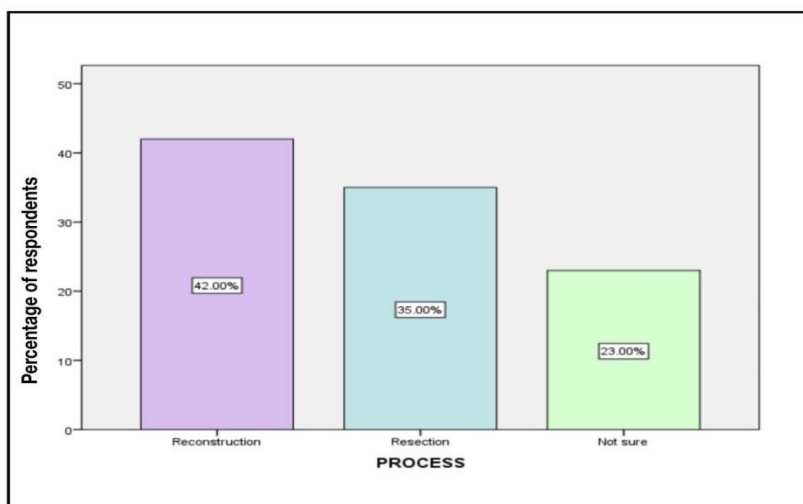


Figure 4: The bar graph represents the process of cutting tissue from an organ. The X-axis represents the process and Y axis represents the percentage of the respondents. In this study 42% of the students responded that the process is known as reconstruction, 35% said that it is known as resection and the remaining 23% were not sure or aware of the process.

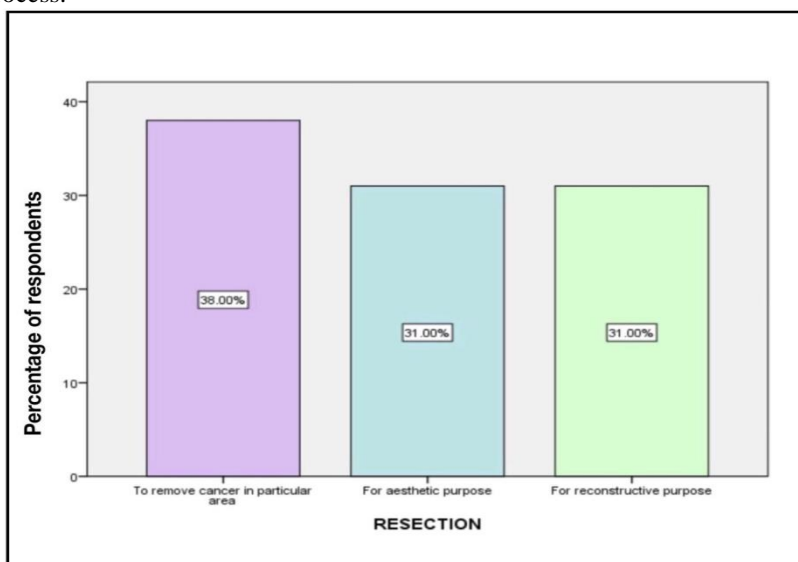


Figure 5: The bar graph represents the purpose of doing resection. The X axis represents the purpose and Y -axis represents the percentage of the respondents. In this study, 38% of the students responded that resection is done to remove cancer in a particular area and remaining 31% of the students said that resection has been done for aesthetic and reconstruction processes.

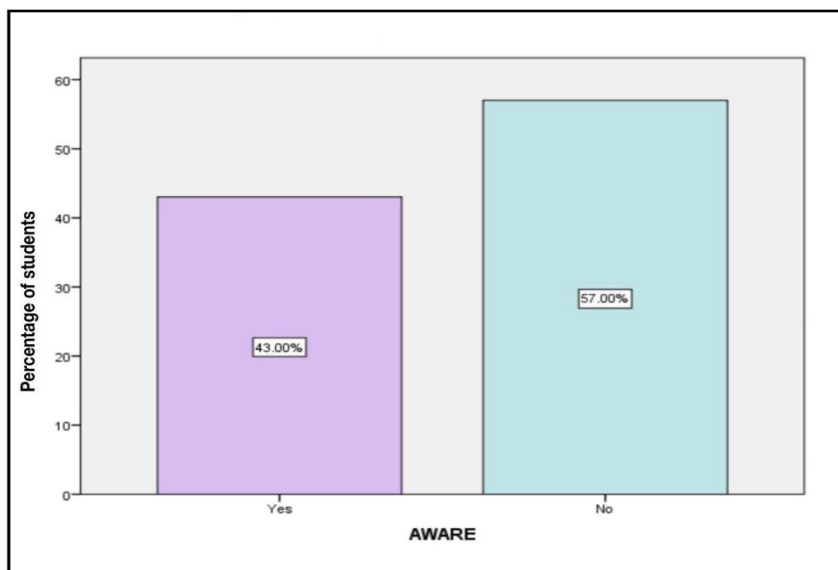


Figure 6: The bar graph represents the awareness of the students about maxillofacial reconstruction surgery and flaps used. The X -axis represents the awareness of the students and the Y-axis represents the number percentage of respondents . In this study, 43% of the students were aware about the reconstruction surgery and 57% of the students were not aware.

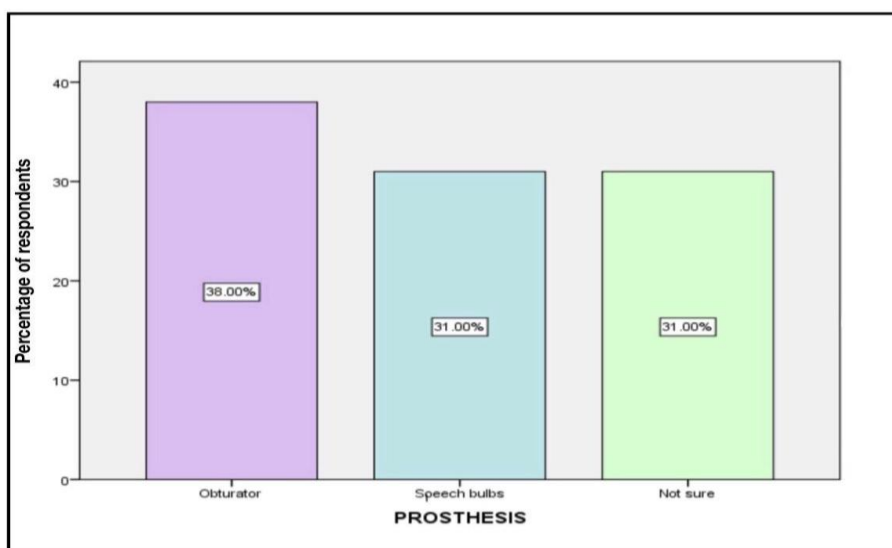


Figure 7: The bar graph represents the prosthetic device used for maxillofacial reconstruction. The X axis represents the prosthetic devices and the Y axis represents the percentage of respondents .In this study, 38% of the students said that the prosthetic device used for reconstruction was obturator, 31% said that speech bulbs were used and the remaining 31% of them were not sure

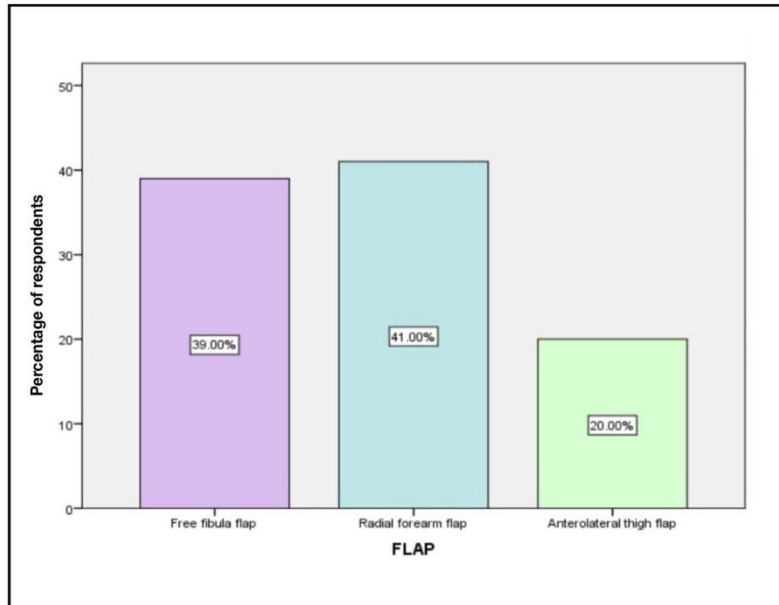


Figure 8: The bar graph represents the flap used for filling a bony hole. The X axis represents the flap used for filling a bony hole and Y axis represents the percentage of the respondents. Violet indicates free fibula flap. In this study 39% of the students responded that free fibula flap is used, 41% of them said radial forearm flap is used and remaining 20% said that arterolateral thigh flap is used.

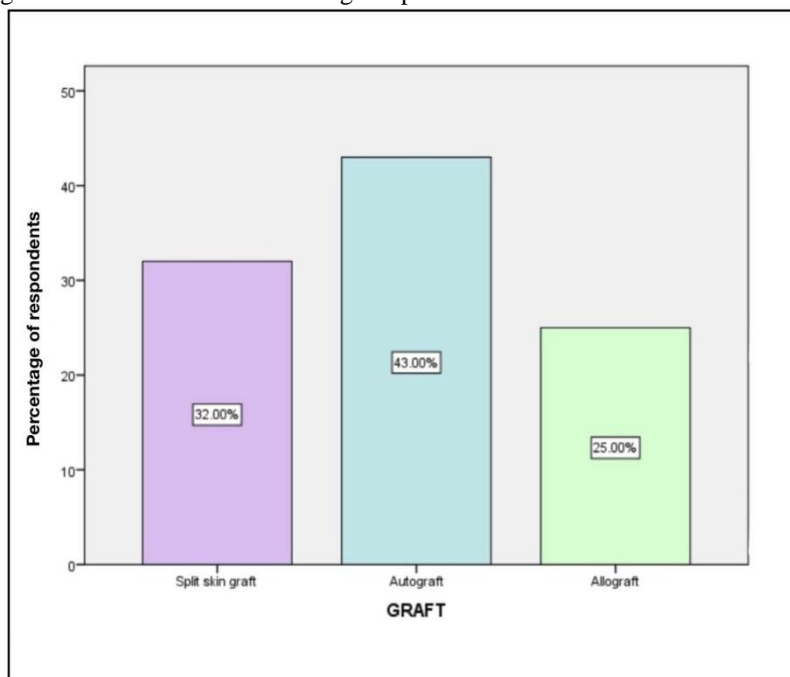


Figure 9: The bar graph represents the graft used to cover an area of skin which is non-healing or has been damaged. The X axis represents the grafts that have been used and the Y axis represents the percentage of the respondents. In this study, 32% of the students responded that split skin graft is used, 43% of them said autograft is used and remaining 25% of them responded that allograft has been used to cover a non-healing area of skin.

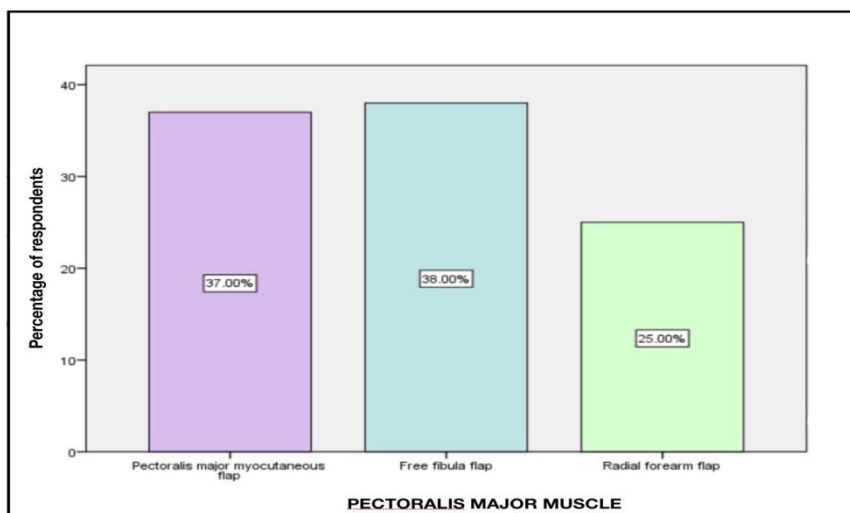


Figure 10: The bar graph represents the flap comprising pectoralis major muscle. The X axis represents the flap and the Y axis represents the percentage of respondents. In this study 37% of the students responded that pectoralis major myocutaneous flap comprises pectoralis major muscle, 38% said that it is free fibula flap and remaining 25% of them responded as radial forearm flap.

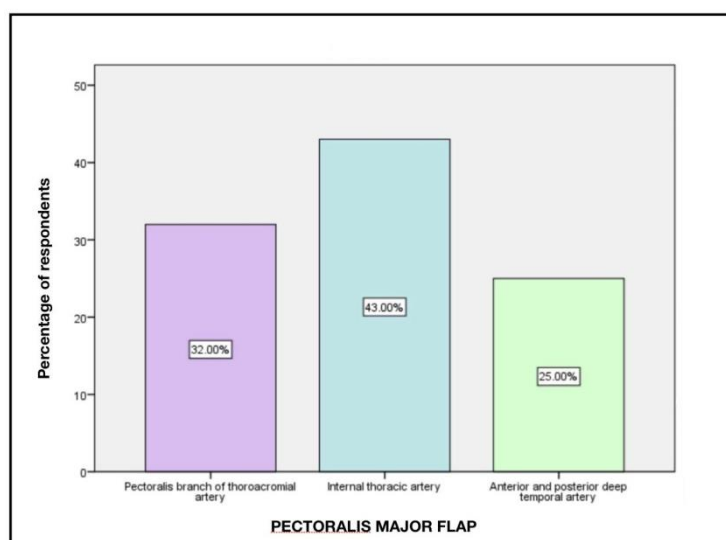


Figure 11: The bar graph represents the blood supply of pectoralis major flap. The X axis represents the artery supplying the pectoralis major flap and Y axis represents the percentage of the respondents. In this study, 32% of the students responded that an artery supplying pectoralis major flap is thoracoacromial artery, 43% of them said it is internal thoracic artery and remaining 25% said it is anterior and posterior deep temporal artery.

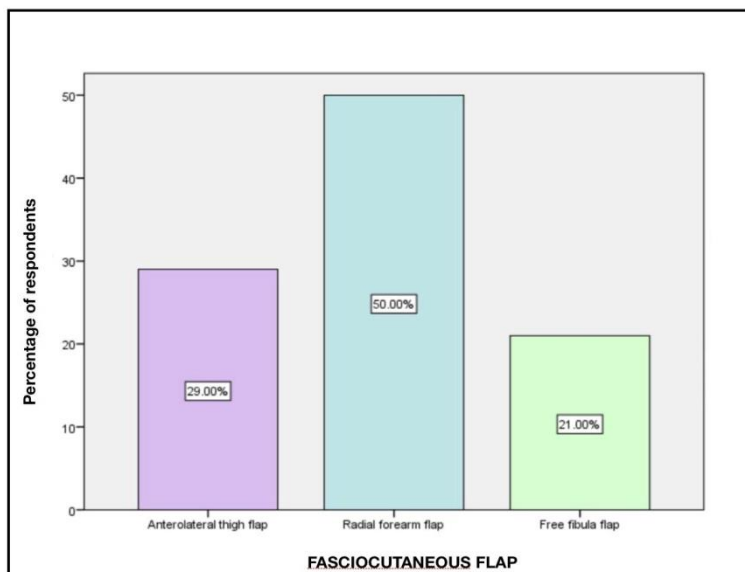


Figure 12: The bar graph represents the fasciocutaneous flap which is based on musculocutaneous and septocutaneous perforators. The X axis represents the various flaps and the Y axis represents the percentage of respondents. In this study 29% of the students responded that fasciocutaneous flap based on musculocutaneous and septocutaneous perforators was anterolateral thigh flap, 50% said it was radial forearm flap and remaining 21% responded as free fibula flap.

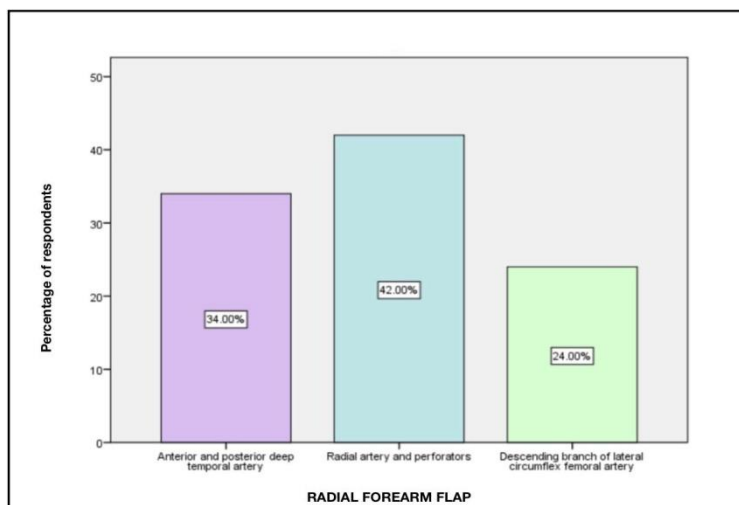


Figure 13: The bar graph represents the blood supply of the radial forearm flap. The X axis represents the various arteries and the Y axis represents the percentage of respondents. In this study 34% of the students responded that artery supplying radial forearm flap is anterior and posterior deep temporal artery, 42% of them said it was radial artery and its perforators and remaining 24% of them said it was descending branch of lateral circumflex femoral artery.



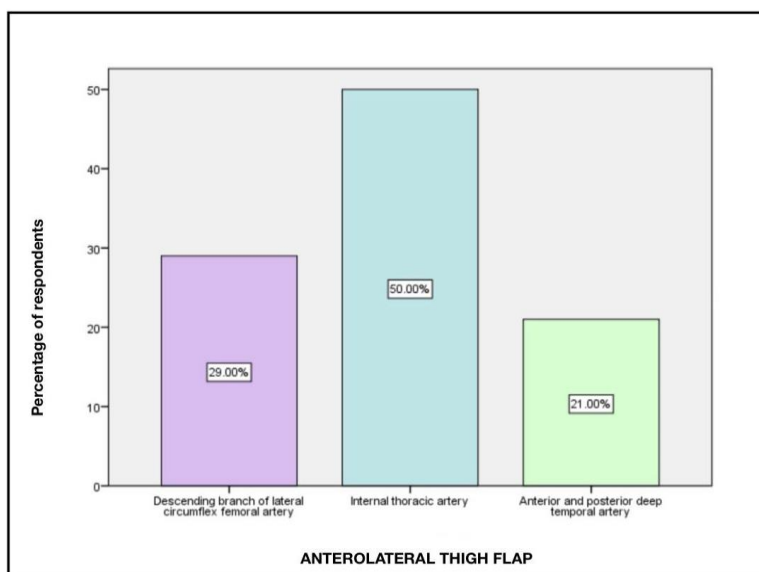


Figure 14: The bar graph represents the blood supply of anterolateral thigh flap . The X axis represents the artery supplying the flap and the Y axis represents the percentage of respondents. In this study 29% of the students said that the artery supplying the anterolateral thigh flap is descending branch of lateral circumflex femoral artery, 50% of them said it was internal thoracic artery and 21% said it was anterior and posterior deep temporal artery.

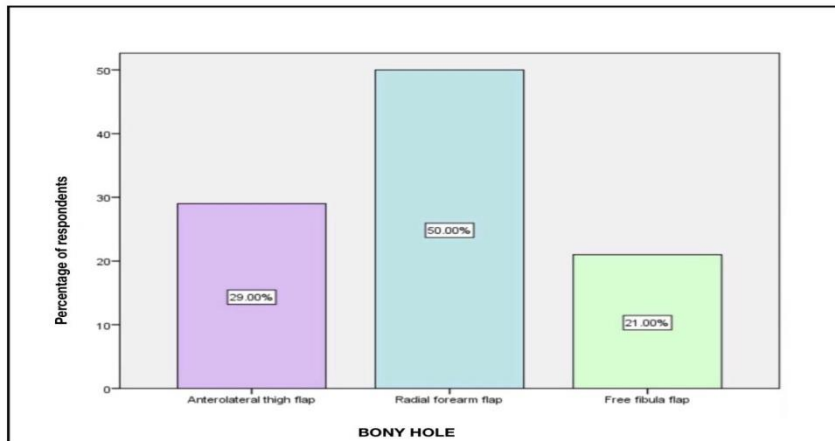


Figure 15: The bar graph represents the flap used for filling a bony hole when cancer is removed. The x axis represents the flaps used and the Y axis represents the percentage of respondents. In this study, 29% of the students said anterolateral thigh flap was used, 50% of them said it was radial forearm flap and 21% said it was free fibula flap.

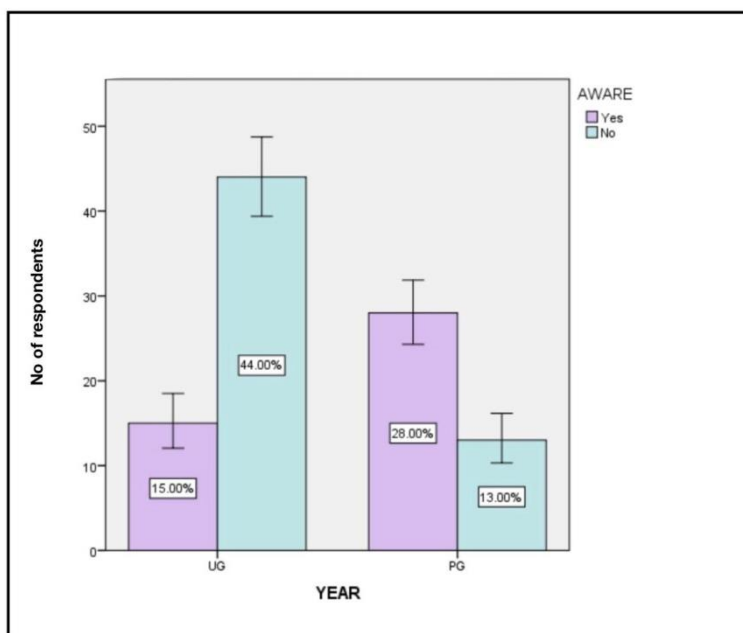


Figure 16: The bar graph represents the association between the year of study and awareness of the students about maxillofacial reconstruction surgery. The X axis represents the year of study and the Y axis represents the awareness about the surgery..On association it is seen that Pg students were more aware about the reconstruction surgery when compared to Ug students and the difference was also statistically significant. Pearson's chi square test showing  $p=0.00 (<0.05)$ .

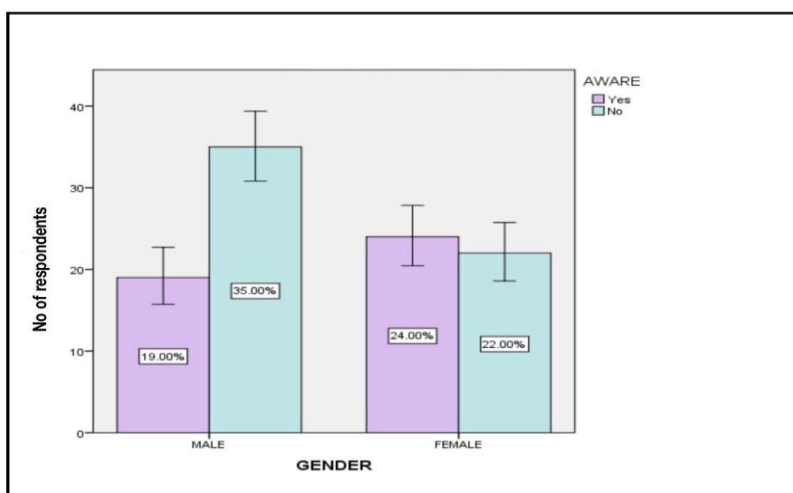


Figure 17: The bar graph represents the association between the gender and their awareness about the reconstructive surgery. The X axis represents the gender of the students and the Y axis represents their awareness. On association it is seen that females are more aware about the maxillofacial reconstruction surgery when compared to males and the difference was also statistically significant. Pearson's chi square test showing  $p=0.00 (<0.05)$ .

Cancer has become the leading cause of premature death in humans. If the overall prevalence of neoplasms increases, there is a wide increase in the number of patients with neoplasm in the head and neck region. The survival rate among patients with neoplasm in the head and neck region is 50% in spite of improvement in the therapeutic needs.

Surgical approaches play an important role in the management of head and neck neoplasms. Surgical treatment of tumours have saved the life of patients but it causes loss of hard and soft tissues within the maxillofacial

region. These defects cause morphological and functional disorders in the vital structures of the human body. It affects the mandibular bone, jaw, oral cavity, nose etc.

In this study, 52% of the students were males and 48% of the students were females [figure 1]. 45% of them were undergraduate students and 55% of them were postgraduate students [figure 2]. During surgical treatment all essential structures of the human body are affected. It includes oral cavity, jaw, cheeks etc. During reconstruction all these structures are reconstructed. In this study 14% of the students responded that only the jaw is reconstructed during surgery, 25% said cheeks, 11% of them said oral tissues, 16% said forehead and 34% of them said all of the above [Figure 3]. In this study only 43% of the students were aware about the maxillofacial reconstruction surgery and the flaps used whereas the remaining 57% of the students were not aware of it [Figure 6]. This shows that students are aware of the structures that are commonly reconstructed followed by surgery.

Surgical procedures should include not only resection but also reconstruction of lost tissues. The process of cutting out tissue or a part of an organ is called resection. In this study only 35% of the students were aware of the term resection, 42% of them said it was reconstruction and 23% of them were not sure [Figure 4]. Resection is done to remove cancer in a particular area. In this study only 38% of the students were aware of it, the remaining 31% of the students said that it has been done for aesthetic and reconstructive processes [Figure 5].

Due to trauma or post resection the changes in the anatomy of the face affect one's psychology and make it difficult for them to adapt. Simple split thickness flaps can be used for reconstructing smaller flaps whereas large defects need to be managed with extensive care. For reconstructing smaller areas of upper gums and palate there is rarely a need for major reconstruction. These defects can be reconstructed by a maxillofacial prosthetic device called obturator. These prostheses include an opening and they are similar to dental retainers but without front wire. In this study only 38% of the students were aware about the prosthetic device obturator, 31% students said the device was speech bulbs and the remaining 31% were not sure about the device [Figure 7].

Free fibula flap is commonly used for mandibular reconstruction. It can also be used for bony reconstruction of maxilla. Free fibula flap is used for filling a bony hole in the upper or lower jaw. In this study 39% of the students were aware that free fibula flap was used, 41% students said radial forearm flap was used and 20% students responded that anterolateral thigh flap was used [Figure 8]. Skin graft is a surgical procedure wherein one part of skin is removed from one area of the body and transported to another area and it is generally used to cover a large area of the skin. Split skin graft is used to cover an area of skin that has been damaged or cannot heal because of an injury. In this study only 32% of the students were aware about the split skin graft, 43% of them said it was autograft and 25% of the students said autograft is used to cover an area of non healing skin [Figure 9]. Autograft can be used for surgical reconstruction where a graft of tissue from one point to another of the same individual is done. Allograft tissue taken from another person usually takes longer to incorporate into the recipient's body.

Understanding the anatomy of the flaps is important. Pectoralis major myocutaneous flap is most commonly used for muscle skin transfer in soft tissue reconstruction of defects in the upper neck and jaw region which may include the underlying ribs. In this study only 37% of the students are aware about pectoralis major myocutaneous flap [Figure 10]. This flap has an axial blood supply and it is supplied by the pectoral branch of the thoracoacromial artery. In this study only 32% of the students were aware of it, 43% of them said it was supplied by the internal thoracic artery and remaining 25% said it was by anterior and posterior deep temporal artery [Figure 11].

Fasciocutaneous flaps are tissue flaps which include skin, subcutaneous tissue and underlying skin. Circulation to this flap is by prefascial and subfascial plexus. Fasciocutaneous flap usually based on musculocutaneous and septocutaneous perforators is anterolateral thigh flap. In this study only 29% of the students were aware of it [Figure 12]. Anterolateral thigh flap is supplied by the descending branch of the lateral circumflex femoral artery. In this study only 29% of the students were aware of it [Figure 14]. Radial forearm flap is known as the workhorse of oral reconstruction due to its versatility, reliability and flexibility. It plays an important role in reconstruction of the oral cavity, oropharyngeal defects etc. This flap is easy to raise and has reliable vasculature. This flap is supplied by radial arteries and perforators from the radial artery. In this study 42% of the students were aware of it, 34% of the students responded that it was supplied by anterior and posterior deep temporal artery remaining 24% of them said it was by descending branch of lateral circumflex femoral artery [Figure 13]. Radial free flap is one way of filling a hole which is left when a cancer has been removed. In this study 50% of the people knew that radial free flap was used whereas remaining 29% and 21% of the students said anterolateral thigh flap and free fibula flap were used respectively [Figure 15].

In association we can conclude that post graduate students are more aware about the reconstruction and flaps used when compared to undergraduates [Figure 16]. When compared to males, females were more aware about reconstructive surgery [Figure 17]. Dental students should be aware about the oral cancer resection and reconstruction. There are various techniques available for the reconstruction and it depends on various factors. Smaller defects can be reconstructed with smaller grafts like split skin graft and large defects can be dealt with temporalis flap, free fibula flap etc. Flaps must be used on their own or in combination with other flaps. Familiarity with common problems associated with reconstruction such as retention, excessive flap thickness is important. This knowledge will help in understanding the problems of reconstruction and planning the oral rehabilitation of the patient post convalescence. A small sample size, online questionnaire and its unreliability were the limitations of the study. Further studies into knowledge about reconstructive surgery and its flaps are required.

#### CONCLUSION:

Therefore this study concludes that there is a lack of knowledge and awareness among undergraduate students about oral cancer management and reconstruction. Post graduate students show better knowledge about reconstructive surgery. This shows that there is a need for better knowledge about oral cancer resection and reconstruction among undergraduate students which can change their perspective on oral cancer management. Further studies and surveys with large sample sizes are required in future.

#### CONFLICT OF INTEREST:

The present study is sponsored by Saveetha Institute of Medical and Technical Sciences, *Saveetha Dental College and Hospitals*, Saveetha University, Chennai

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