

# Assessment of Quality of Life in Oral Cancer Patients Following Pectoralis Major Myocutaneous Flap Reconstruction

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## ABSTRACT

**Introduction:** The aim of modern-day onco-surgical therapy is now centered on the overall Quality of Life of the cancer survivor. The final outcome following primary surgery for oral and oropharyngeal cancer and long-term effects need to be evaluated and kept in mind before taking therapeutic treatment decisions. A study was undertaken to evaluate the Quality of Life of oral cancer patients who had undergone surgical reconstruction with pectoralis major myocutaneous flap.

**Material and Methods:** 65 oral cancer survivors over a span of three years, who had undergone reconstruction with pectoralis major myocutaneous flap, were assessed after 12 months utilizing University of Washington questionnaire. Physical function, social-emotional sub-score, composite scores and global scores were compared between the subgroups created using unpaired t-Test.

**Result:** Average physical function ( $74.6 \pm 18.2$ ), social-emotional sub-score ( $65.2 \pm 17.6$ ) and composite scores ( $69.9 \pm 16.6$ ) were good and within acceptable range. Mood ( $46.5 \pm 23.7$ ) and anxiety ( $56.6 \pm 26.9$ ) scored poorly among 12 domains. Statistically significant difference ( $P < 0.05$ ) was found in the domain score in relation to age, sex, tumour size, neck dissection, radiotherapy and recurrence. There was no significant difference in quality of life scores in relation to postoperative complications of pectoralis major myocutaneous flap, which supports enhanced utilization of this flap.

**Conclusion:** The study emphasizes the importance of counselling to counteract fear and anxiety among cancer survivors. The outcome of the study reinforces the belief that the pectoralis major myocutaneous flap has excellent functionality and may be increasingly utilized in the reconstruction of maxillofacial region, especially in the low socio-economic group of patients.

**Key words:** Quality of life, mouth neoplasms, pectoralis muscles, myocutaneous flap

## INTRODUCTION

Patients who have been diagnosed with cancer of oral and maxillofacial region, face a variety of physical, functional, social and psychological challenges. This consequence is not merely from the diagnosis but as a result of the overall treatment outcomes.<sup>1</sup> It is a well-accepted reality that surgical removal of the tumour and the reconstruction of the resulting defect is not the end but rather the beginning of the rehabilitation process. The focus of all onco-surgical therapy is now based on the overall Quality of Life (QOL) of the cancer survivors. The patients' outcome following primary surgery for oral and oropharyngeal cancer and the long-term effects need to be evaluated and kept in mind before advising them of a particular treatment decision.

The published data on QOL studies have shown varying differences correlating to tumour size, flap reconstruction

and adjuvant radiotherapy. Swallowing, speech, and saliva are regarded as other important issues. Other factors that significantly affect domain scores are stage of the disease, neck dissection, reconstruction, complications, radiotherapy and time since operation.<sup>2</sup>

A QOL study was undertaken to evaluate the oral cancer patients who had undergone surgical reconstruction by using pectoralis major myocutaneous flap following resection of the primary tumour.

## MATERIAL AND METHODS

A retrospective, cohort study was carried out to assess the Quality of Life of patients of oral cancer who had undergone post-resectional reconstruction with Pectoralis Major Myocutaneous (PMMC) Flap. The study was conducted in the Department of Oral and Maxillofacial Surgery of a Dental College. Ethical clearance from Institutional Ethical Committee was obtained prior to conduct of the study. All oral cancer patients, who had undergone reconstruction of onco-surgical defect with PMMC flap and reporting to the maxillofacial surgery OPD were considered as the cohort group for the study.

The inclusion criteria of the study group were: Oral cancer patients, who had completed 12 months of postoperative period, with history of resective surgery (with or without adjuvant radiation), followed by immediate reconstruction using Pectoralis major myocutaneous flap.

The exclusion criteria were: Those who were unwilling to be the part of the study; Patients with insufficient retrospective data regarding the following: tumor characteristics; treatment received (extent of surgery, etc); and complications encountered in post-operative period. These patients were excluded as this information were the essential criteria used in the comparative study.

The study was conducted by means of personal interviews with the subjects, 12 months following the primary surgery, when patients reported for regular follow up. They were interviewed using a local language translated and validated

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version of University of Washington Quality of Life (UW-QOL-ver 4) questionnaire, by trained nursing staff, who were not directly involved in the patient care. The verbal response to each question were recorded in the score sheet by the interviewer. All patients were then separately interviewed by at least one of the investigators and the recorded responses cross-checked and verified. The data regarding demographic particulars, cancer stage, site of primary lesion and treatment history were tabulated from the patients' existing medical history records. A total of 65 patients; 56 male and 9 female patients participated in the study.

#### **UW-QOL questionnaire**

UW-QOL (Version 4)<sup>3</sup> is a well-validated questionnaire to analyze physical, functional, and emotional quality of life of head and neck cancer patients. It records various aspects related to patient comfort and quality of life, during preceding 7 days under 12 different domains namely: pain, appearance, activity, recreation, swallowing, chewing, speech, shoulder function, taste, saliva, mood and anxiety. Individual domain score is determined by the graded response from the patient in Likert scale. Each response is later given a score ranging from 0 to 100 as described in the UW-QOL table. This score is not revealed to the patient or interviewer. Higher scores under each heading indicate better quality of life.

The composite score was calculated as arithmetic mean of 12 domains. Physical function sub-score and social-emotional sub-score were computed following the criteria of Rogers et al<sup>4</sup> (2010). Physical function sub-score consisted of arithmetic mean of 06 domains – chewing, swallowing, speech, taste, saliva, and appearance. The social-emotional sub-score was determined on the mean of scores of the other 06 domains – anxiety, mood, pain, activity, recreation, and shoulder function.

The questionnaire also included a separate section where the same domains could be graded as 'most important' issues over preceding 7 days, and upto 3 fields could be chosen. The third section consisted of a general questionnaire which contained 03 questions measuring overall status and well-being of the patient. Here one question measured QOL as compared to before the surgery in a five point Likert scale

and other two scales graded Health related QOL and overall QOL in a six point Likert scale.

#### **Statistical Analysis**

All the primary data was initially recorded in the format of MS Excel worksheets (Excel 2010; Microsoft Corp, Washington). The mean and standard deviations for each of the domains were then calculated. Further to this, statistical analysis of the results obtained was carried out using Statistical Package for Social Sciences software 10.0 (SPSS Inc, Chicago version III). The Physical function, Social-Emotional sub-score, composite scores and global scores obtained from UW-QOL (version 4) were compared between the subgroups created according to patient demographics, tumour characteristics and treatment variable using unpaired t-Test. Outcome was considered to be significant when *P* value was less than 0.05.

#### **RESULTS**

Total 65 completed questionnaires were collected from 56 males and 9 female patients in a span of three years. Age range of the patients was from 21 years to 65 years with a mean of  $50 \pm 9$  yrs (Figure1). Most common site (Figure 1) of tumor was buccal mucosa (44.6%), followed by alveolus (32.3%) and tongue and floor-of-mouth (13.8 %). Majority of the patients presented in high stage of the lesion (TNM classification: UICC 2002) that is Stage III and Stage IV (83%), and stage II (17 %). Wide excision of the primary lesion along with radical neck dissection (RND) or modified radical neck dissection (MRND) in continuity was done in 42 patients (64.6 %); rest of the patients had selective neck dissection (SND) upto supra-omohyoid level. Postoperative radiotherapy was given in 43 patients (66.1%). In 07 patients with T4 lesion, Delto-pectoral flap (03) and Forehead flap (04) was used along with PMMC flap for reconstruction at the primary site. Recurrence of disease was observed in 6 patients (9.2%), who were undergoing palliative therapy. In the immediate postoperative period, 19 patients (29.2%) suffered flap related complications.

Average score in 12 domains of UW-QOL is presented in Table-1. Average physical function sub-score was  $74.6 \pm 18.2$

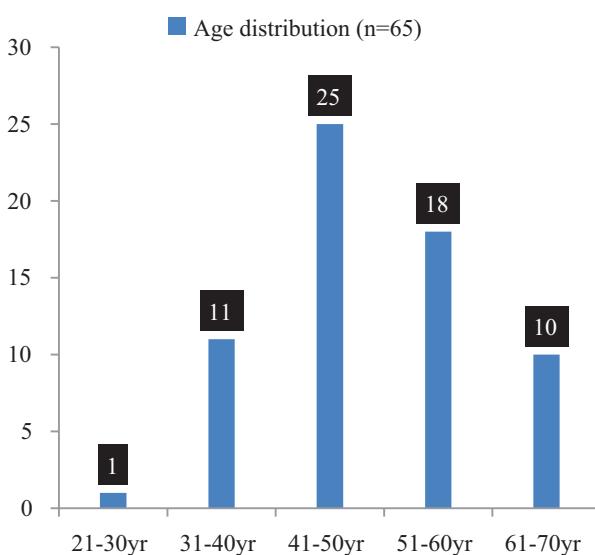
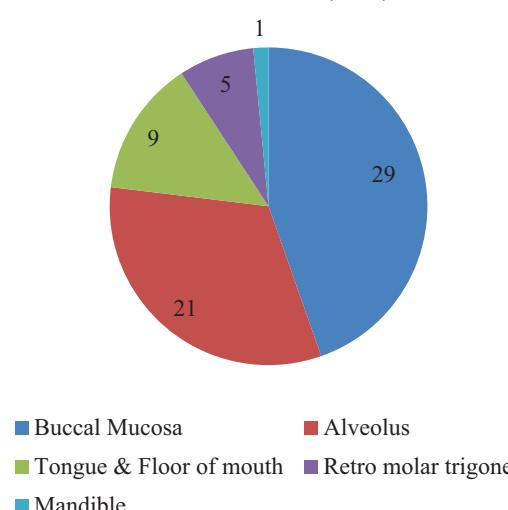


Figure-1: Age wise distribution of patients and site wise distribution of lesion

Site wise Distribution(n=65)



and social-emotional sub-score was  $65.2 \pm 17.6$ . Mean composite score of our study sample was  $69.9 \pm 16.6$ . Patients scored well in speech ( $91.7 \pm 24$ ), taste ( $87.4 \pm 23$ ) and pain ( $81.5 \pm 18.4$ ) domains. In comparison, mood ( $46.5 \pm 23.7$ ), anxiety ( $56.6 \pm 26.9$ ) and saliva ( $59.5 \pm 33.2$ ) domains scored poorly. In most important domain section (Figure 2), however, patients chose saliva (44.6%), chewing (36.9%), shoulder (27.7%) and activity (26.1%) domains.

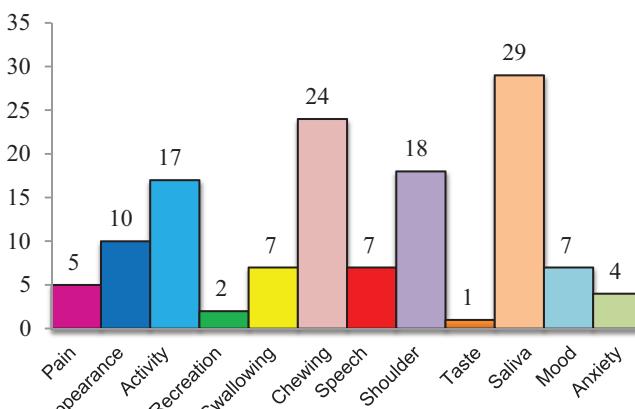
#### **UW-QOL and variable (Demographic, tumor, treatment):**

##### **Table-2**

Statistically significant ( $P < 0.05$ ) difference was found in relation to age, sex, tumour size, extent of neck dissection, presence or absence of postoperative radiation, recurrence of cancer and flap use in physical functional, social-emotional subscore and composite scores of UW-QOL. The difference ( $P < 0.05$ ) was also found to be significant in the activity score in relation to age; in the appearance score between male and female; in the shoulder function between SND and RND/MRND subgroups and also in the saliva score between patients with or without radiotherapy.

However, flap related complications did not produce any significant difference in physical functional ( $P=0.06$ ), social emotional ( $P=0.19$ ) and composite score ( $P=0.08$ ) at the end of 12 months.

In Health Related Quality of Life (HR-QOL) and Overall



**Figure-2:** ‘Most important’ domain UW-QOL (v4)

| UW-QOL v4                  | 0 | 25 | 30 | 50 | 70 | 75 | 100  | Mean | SD   | Best Score% | Best Rank |
|----------------------------|---|----|----|----|----|----|------|------|------|-------------|-----------|
| 1. Pain                    |   | 1  | *  | 8  | *  | 29 | 27   | 81.5 | 18.4 | 41.5        | 3         |
| 2. Appearance              |   | 6  | *  | 7  | *  | 45 | 7    | 70.4 | 18.7 | 10.7        | 6         |
| 3. Activity                |   |    | *  | 25 | *  | 30 | 10   | 69.2 | 17.5 | 15.4        | 7         |
| 4. Recreation              |   | 2  | *  | 31 | *  | 22 | 10   | 65.4 | 19.6 | 15.4        | 8         |
| 5. Swallowing              | 1 | *  | 5  | *  | 37 | *  | 22   | 76.0 | 21.8 | 33.8        | 4         |
| 6. Chewing                 | 4 | *  | *  | 41 | *  | *  | 20   | 62.3 | 28.0 | 30.8        | 9         |
| 7. Speech                  | 2 | *  | 4  | *  | 2  | *  | 57   | 91.7 | 24.0 | 87.7        | 1         |
| 8. Shoulder                |   | *  | 13 | *  | 30 | *  | 22   | 72.2 | 25.1 | 33.8        | 5         |
| 9. Taste                   |   | *  | 7  | *  | 11 | *  | 47   | 87.4 | 23.0 | 72.3        | 2         |
| 10. Saliva                 | 2 | *  | 30 | *  | 11 | *  | 22   | 59.5 | 33.2 | 33.8        | 10        |
| 11. Mood                   | 6 | 14 | *  | 30 | *  | 13 | 2    | 46.5 | 23.7 | 3.1         | 12        |
| 12. Anxiety                | 6 | *  | 15 | *  | 39 | *  | 5    | 56.6 | 26.9 | 7.7         | 11        |
| Physical function subscore |   |    |    |    |    |    | 74.6 | 18.2 |      |             |           |
| Social-emotional subscore  |   |    |    |    |    |    | 65.2 | 17.6 |      |             |           |
| Total composite Score      |   |    |    |    |    |    | 69.9 | 16.6 |      |             |           |

\* denotes values do not exist for that domain

**Table 1:** Mean domain scores, sub-scores and composite scores UW-QOL (v4)

Quality of Life (OR-QOL), significant ( $P < 0.05$ ) difference was found in relation to age, tumour size, neck dissection, post operative radiotherapy, recurrence and flap use. However, difference was insignificant in HR-QOL ( $P=0.15$ ) and OR-QOL ( $P=0.13$ ) score in relation to sex. Flap related complication also failed to produce any significant difference in HR-QOL ( $P=0.72$ ) and OR-QOL ( $P=0.65$ ) score.

#### **DISCUSSION**

Treatment of oral and oro-pharyngeal cancer has a significant effect on the physical, psychological and social well-being of patients. While providing a disease-free life to a cancer patient is definitely an important goal; however the ultimate aim is to provide an acceptable quality of life for the comprehensive physical, emotional and social well-being of all patients.<sup>5</sup>

The oral and maxillofacial region plays a vital role as it not only serves as the primary identification of a person but also is associated with important life-maintaining functions like, breathing, mastication, speech, etc. The surgical resection of oral cancer often results in disfigurement of face, alteration of speech, decreased ability of mastication, change in taste etc. Shoulder dysfunction can be the result of radical neck dissection due to sacrifice of spinal accessory nerve. Adjuvant radiation has got known adverse effects of reduced salivation and increased fibrosis with resultant decrease in mouth opening and poor retention of maxillofacial prosthesis. So, assessment of quality of life is an important issue for obvious reasons.<sup>6</sup>

“Quality of life” (QOL) is presently considered as the most important parameter and is being increasingly used to assess health status and the impact of therapeutics especially in cases of cancer. WHO has defined it as “the individuals perception of his or her position in life, within the cultural context and value system he or she lives in, and in relation to his or her goals, expectations, parameters and social relations”.<sup>7</sup>

Several survey instruments exists for measuring quality of life in head and neck cancer patients.<sup>2</sup> Among those, UW-QOL questionnaire is a well accepted instrument for its psychometric validity and reliability.<sup>8</sup> The simple questions,

| Factors: n                        | Physical functional |         | Social emotional |         | Composite |         | HR-QOL |         | OR-QOL |         |
|-----------------------------------|---------------------|---------|------------------|---------|-----------|---------|--------|---------|--------|---------|
|                                   | Mean                | P value | Mean             | P value | Mean      | P value | Mean   | P value | Mean   | P value |
| 1. Age                            |                     |         |                  |         |           |         |        |         |        |         |
| <50:37                            | 79.8                | .007    | 73.3             | < 0.001 | 76.5      | < 0.001 | 36.8   | <0.001  | 36.8   | <0.001  |
| >50:28                            | 67.7                |         | 54.6             |         | 61.1      |         | 20     |         | 20.7   |         |
| 2. Sex                            |                     |         |                  |         |           |         |        |         |        |         |
| Male: 56                          | 76.7                | .02     | 67.3             | .02     | 72.0      | .01     | 30.7   | .15     | 31.1   | .13     |
| Female: 09                        | 61.1                |         | 52.7             |         | 56.9      |         | 22.2   |         | 22.2   |         |
| 3. Tumour Size                    |                     |         |                  |         |           |         |        |         |        |         |
| T2: 22                            | 91.1                | <0.001  | 79.9             | <0.001  | 85.5      | <0.001  | 38.2   | .002    | 37.3   | .007    |
| T3/T4: 43                         | 66.1                |         | 57.8             |         | 61.9      |         | 25.1   |         | 26     |         |
| 4. Neck Dissection                |                     |         |                  |         |           |         |        |         |        |         |
| SND: 23                           | 83.2                | .004    | 79.6             | <0.001  | 81.4      | <0.001  | 39.1   | .002    | 40.0   | <0.001  |
| RND/MRND: 42                      | 69.8                |         | 57.4             |         | 63.6      |         | 24.3   |         | 24.3   |         |
| 5. Post operative Radiotherapy    |                     |         |                  |         |           |         |        |         |        |         |
| No: 22                            | 92.3                | <0.001  | 81.4             | <0.001  | 86.9      | <0.001  | 41.8   | <0.001  | 40.9   | <0.001  |
| Yes: 43                           | 65.4                |         | 57               |         | 61.2      |         | 23.3   |         | 24.2   |         |
| 6. Recurrence                     |                     |         |                  |         |           |         |        |         |        |         |
| No: 59                            | 78.8                | <0.001  | 68.5             | <0.001  | 73.6      | <0.001  | 32.2   | <0.001  | 32.5   | <0.001  |
| Yes: 06                           | 32.8                |         | 33.3             |         | 33.1      |         | 3.3    |         | 3.3    |         |
| 7. Flap use (single vs. multiple) |                     |         |                  |         |           |         |        |         |        |         |
| PMMC: 58                          | 77                  | .002    | 67               | .02     | 72        | .003    | 31     | .03     | 31.4   | .03     |
| PMMC+ other flap: 07              | 54.6                |         | 50.7             |         | 52.7      |         | 17.1   |         | 17.1   |         |
| 8. Flap related complication      |                     |         |                  |         |           |         |        |         |        |         |
| No: 46                            | 67.9                | .06     | 60.8             | .19     | 64.3      | .08     | 28.4   | .72     | 28.4   | .65     |
| Yes: 19                           | 77.3                |         | 67.1             |         | 72.2      |         | 30     |         | 30.4   |         |

**Table-2:** Mean score of factors influencing Physical function, social-emotional, composite scores along with global health scores of UW-QOL (v4)

self-answerable by the patients and uncomplicated scoring methods make it easy to administer.<sup>6,9</sup> It is also designed to specifically assess, impacts of post-surgical treatment of the maxillofacial region. Almost all of our patients came from very poor socio-economic strata with a high illiteracy rate. In order to gauge the responses accurately the questionnaire was first translated into the local language. Thereafter the questionnaire was verbally read out to the patient, one by one and individual response was recorded by a healthcare worker who was blinded as to the purpose of collection of the data to eliminate any bias.

Several studies have been done regarding QOL in head and neck cancer patients. Vartanian et al<sup>16</sup> in 2004 showed, chewing and swallowing function was more affected in oral cancer than in patients with laryngeal cancer. Patients with advanced tumors also scored poorly in composite score, than primary stage tumors. Zuydam et al<sup>10</sup> in 2005 demonstrated that clinical parameters like tumour size, site, staging, radiation, type of surgery and extent of resection of posterior tongue and soft palate determined speech and swallowing scores. A study by Millsopp et al<sup>11</sup> in 2006, on disfigurement after oral cancer surgery, among 278 patients reported that 41% were concerned about facial appearance and a positive correlation was found with the clinical parameters. In a similar study by Katre et al<sup>12</sup> in 2008, younger age group, higher primary stage and radiotherapy were the key factors determining appearance domain. Kazi et al<sup>5</sup> in 2008 evaluated QOL in 38 patients with partial glossectomy and found swallowing (47.1%), speech (44.1%) and saliva (44.1%)

were the most frequently cited domain and majority (71.8%) quoted their overall QOL as good or very good. However patients with neck dissection, radiotherapy, reconstruction and complications demonstrated poor outcomes. Gabriela et al<sup>7</sup> (2010) studied QOL after 1 year in Brazilian population and reported that survivors reflected overall poor QOL and significantly ( $P<0.05$ ) reduced score in activity, recreation, chewing, swallowing, speech, shoulder and saliva domains. In a recent study, Efunkoya et al<sup>13</sup> (2015) in a Nigerian tertiary hospital, showed appearance, recreation and chewing were most important determinant in their study group of 68 patients which comprised higher percentage of females as compared to our study group.

QOL assessment studies in oral cancer patients with pectoralis major myocutaneous flap reconstruction are very few<sup>14,15</sup> and to the best of our knowledge ours is the first study being reported from the Eastern region of the country. We have compared physical functional, social-emotional sub-score, composite score, HR-QOL, OR-QOL across our cohort of 65 patients between various sub-groups determined by patient demographic, tumour characteristics and treatment variables. In our study, the average physical function, social-emotional subscore and composite score was good and in the acceptable range. Mean scores were excellent in speech, taste and pain domains. However the domains of mood and anxiety scored poorly among 12 domains. This is in contrast to most of the earlier studies where post-operative mood and anxiety scores improved. The explanation for this finding may be attributed to the fact that all of our patients belonged to

very poor socio-economic status. For this group of daily wage earners, the 'fear factor' associated with this dreadful disease coupled with the economic burden of treatment, loss of regular monthly income etc. results in higher degrees of depression and anxiety which is the outcome as depicted in our findings. This is also similar to the findings of Humphris et al<sup>16</sup> (2003) who showed high prevalence (72% at 7 month) of fear of recurrence and depression among oro-facial cancer patients. Reisine et al<sup>17</sup> (2005) and Chen et al<sup>18</sup> (2013) identified sociodemographic risk factors for depression among cancer survivors and stressed on early management and supportive care to provide assurance. Gritz et al<sup>19</sup> (1999) showed although head and neck cancer survivors had improved scores in other physical domains, the score had declined in marital ( $P = .002$ ) and sexual functioning ( $P = .017$ ), with an increase in scores of alcohol abuse ( $P < .001$ ). It is therefore imperative that all healthcare workers be aware of these issues and ensure that the patients and relatives are adequately counselled regarding all aspects of the disease and treatment outcomes.

In our study, in the 'most important' domain section of UW-QOL, patients chose saliva, chewing, shoulder and activity domains. This also reflects the importance to the daily functions of mastication and those related to the capacity to return to their occupation as manual labourers.

We found statistically significant ( $P < 0.05$ ) difference in scoring, in relation to age, sex (M/F), tumour size (T2/T3 and T4), extent of neck dissection (SND/RND and MRND); with or without radiation; recurrence; flap use (single vs multiple). This shows the relative importance of each of these parameters that healthcare professionals have to keep in mind when deciding on the future treatment options for the oral cancer survivors under their care.

However Health Related QOL and Overall QOL failed to show statistically significant difference between male and female patients. This again could be due to the fact of the economic status of the cohort wherein the concerns of both male and female patients would be fairly similar. Another important finding of our study is the absence of statistically significant difference between subgroups created on the basis of flap-related complication. This finding highlights the fact that, despite the fact that higher initial flap related complication (16% - 63%) have been reported<sup>20</sup> with PMMC flaps the overall QOL after 01 year is independent of any initial complication. This would encourage maxillofacial surgeons to continue to use this 'workhorse flap' for reconstruction of defects in the head and neck region.

## CONCLUSION

"Quality of life" (QOL) can arguably be considered to be the most significant parameter to assess the rehabilitation and evaluate the therapeutic options for patients being treated for head and neck cancers. A detailed study was carried out in economically backward cohort of patients who are oral cancer survivors to evaluate their long-term outcome after rehabilitation using the PMMC flap for defect reconstruction. In our study, the average physical function, social-emotional sub-score and composite scores were good and in the acceptable range. Mood and anxiety scored poorly among

12 domains. Statistically significant difference was found in the domain score in relation to age, sex, tumour size, neck dissection, radiotherapy, recurrence. Our finding emphasizes the importance of counselling to combat the fear and anxiety associated with the disease among cancer survivors. The outcome of the study is indeed heartening as it reinforces the literature that the PMMC flap has excellent utility and plays an integral role in the comprehensive rehabilitation in the maxillofacial region.

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