Original Article

# Quality of Life Assessment of Oral Cancer Patients after Mandibular Resections Using the University of Washington Quality of Life (Version 4) Questionnaire: Reconstruction with Pectoralis Major Myocutaneous Flap

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## Abstract

**Objectives:** Mandibular resection for oral cancer is a mainstay and prime requirement to achieve an acceptable boundary of tumor removal. Mandibular resection has been related with a poor health-related quality of life (HRQOL). The objective of this study was to evaluate the HRQOL in patients who have undergone mandibular resections of oral cancer and reconstructed with pectoralis major myocutaneous flap (PMMF). **Patients and Methods:** There were 192 consecutive patients between 2011 and 2014 who were treated for head and neck cancer; among them, 65 patients having oral cancer were treated with mandibular resections. HRQOL was assessed by the University of Washington QOL (UWQOL) questionnaire version 4 after 3–12 months postoperatively. **Study Designs and Results:** In the UWQOL, the best-scoring domains were shoulder, recreation, and pain, whereas the lowest scores were for speech, chewing, and swallowing. **Conclusions:** Mandible reconstruction with PMMF would have significant influence on patients' QOL and oral functions. The societal and literary data show a low level of education and low economic status for the majority of patients.

**Keywords:** *Domain, health-related quality of life, pectoralis major myocutaneous flap, swallowing, University of Washington Quality of Life version 4*

## Introduction

Myocutaneous flap has gained a widespread use since its first description by Quillen in 1978 for head and neck reconstruction. In addition, description of using flaps for reconstruction is mentioned in the ancient Indian literature Sushrut Samhita. The advantages of myocutaneous flap compared to other flaps include that this flap provides a large cutaneous island that can be used for defects involving two epithelial surfaces, and it offers one-stage reconstruction without the need to change patient's position intraoperatively. In addition, in 1979, Dr. Ariyan first described the use of pectoralis major myocutaneous flap (PMMF) for head and neck reconstruction, and after that, PMMF has been recognized as a landmark for head and neck cancer reconstruction.[1] It is agreed that patients with mandibular invasion by oral squamous cell carcinoma (SCC) should be treated surgically. A mandibular resection is prerequisite in patients with remarkable mandibular invasion. However, mandibular resection has long been associated with a poor quality of life (QOL).[2] Health-related QOL (HRQOL) has become an increasingly important outcome measure for patients undergoing treatment for various cancers and other ailments. Little information exists in the literature regarding the patients' HRQOL after mandibular resections. Hence, the main aim of our study was to assess the HRQOL of patients by using the University of Washington QOL (UWQOL) questionnaire who have undergone mandibular resections of oral cancer and reconstructions with PMMF.[3-6]

## Patients and Methods

This was a prospective single-centric study and it was approved by the Institutional Ethical Committee of Nirma University. The study comprised 192 patients treated with head and neck cancer between 2011 and 2014; among them, 65 cases were of oral cancer which were taken into consideration. These patients were treated by primary surgery for oral SCC with



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mandibular resections. Informed consent was given and signed by the patients or their relatives, and information brochure was given to them in which details of the entire study and its purpose were mentioned in vernacular language (Gujarati). Patients having critical comorbid diseased condition, age below 18 years, patients having any other cancer except that of oral cancer, and patients with recurrence tumors and extensively progressed tumors were excluded. Inclusion criteria of the study were adults from age 19 to 70 years, patients diagnosed and survived from oral cancer reconstructed with PMMF, and have disease free survival at least 3–12 months after reconstruction were included in the study.

### Questionnaires and data collection

The UWQOL questionnaire version 4 was used in this study. The UWQOL forms were given to the patients to fill during the time they came for follow-up and it provides a broad measure of QOL for patients with head and neck cancer with good acceptability, practicality, validity, reliability, and responsiveness. The questionnaire is composed of 15 domains: twelve are disease-specific items (pain, appearance, activity, recreation, swallowing, chewing, speech, shoulder, taste, saliva, mood, and anxiety) and three are global questions. The domains are scored on a scale varying from 0 (worst)[7-12] to 100 (best). Apart from the 15 questions, the patients were asked to select no more than 3 of the 12 disease-specific domains that had been the most important to them in the preceding 7 days. The scoring was calculated according to the standard scores for individual domains mentioned in UWQOL guidelines. The validated UWQOL questionnaire available in vernacular language (Gujarati) was used. Patients' pro forma was prepared by asking them or from hospital databases about their employment status, educational status, addiction, stage of tumor, and marital status.[13-17]

### Statistical analysis

The data were recorded and then assessed with the help of the Statistical Package for the Social Sciences software (SPSS version 16.0, SPSS Inc., IBM). Univariate analysis of variance was carried out, and $P < 0.005$ was accepted as statistically significant.

## Results

Sixty-five patients with oral cancer were considered in this study; all patients completed the questionnaire during their visit to the hospital for follow-up. Of the 65 patients who completed questionnaires, there were 55 men and 10 women with a median age of 50.5 years (range: 30–60); the buccal mucosa ($n$ = 42, 64.61%) and tongue ($n$ = 12, 18.46%) were the most common sites [Table 1] followed by alveolus ($n$ = 7, 10.76%) and retromolar trigon ($n$ = 4, 6.15%). Forty-nine of the 65 patients (75.38%) were classified as T1–T2, while 16 patients (24.61%) were classified as T3–T4. The postoperative follow-up period ranged from 3 months to 2 years, and the mean follow-up period was 2.5 years. Forty-six patients were between 1 and 3 years after treatment and the remaining 19 patients had been treated before 3 months. It was observed that buccal mucosa cancer is more prevalent among other cancers in Indian ethnicity.

### The University of Washington Quality of Life questionnaire

The scores for 12 disease-specific domains and the importance of each domain are shown in Table 2. The best-scoring domain was shoulder and recreation, with the main scores of 79.53 and 73.84, respectively. The worst score domains are chewing, swallowing, and speech, with the main scores of 46.15, 48.69, and 53.23, respectively.

Among selection of the three domains over the past 7 days, chewing was considered the most important aspect followed by speech and swallowing. Domains such as recreation, shoulder, and mood were considered least important to the patients.

About 60% of the patients had a low education level. Twenty-two (33.84%) patients did not complete education above 12$^{th}$ standard. Forty-three patients (66.15%) were having education below 12$^{th}$ standard. Consumption of pan, gutkha, beedi, tobacco, and smoking were highly seen among male patients. QOL was negatively affected in higher tumor stages. Some patients were unable to read

**Table 1: Patient's pro forma**

| Variables | *n* (%) |
|---|---|
| Age (years) | |
| <50 | 36 (55.38) |
| ≥50 | 29 (44.61) |
| Gender | |
| Male | 55 (84.61) |
| Female | 10 (15.38) |
| Primary tumor sites | |
| Buccal mucosa | 42 (64.61) |
| Tongue | 7 (10.76) |
| Alveolus | 12 (18.46) |
| Retromolar trigon | 4 (6.15) |
| Treatment method | |
| Postoperative radiation | 46 (70.76) |
| Postoperative radiation and chemotherapy | 19 (29.23) |
| Tumor classification | |
| T1N0 | 13 (20) |
| T1N1 | 1 (1.53) |
| T2N0 | 25 (38.46) |
| T2N1 | 3 (4.61) |
| T2N2 | 7 (10.76) |
| T3N0 | 2 (3.07) |
| T3N2 | 1 (1.53) |
| T4N0 | 8 (12.30) |
| T4N1 | 1 (1.53) |
| T4N2 | 4 (6.15) |

**Table 2: Mean of scores of domains of the University of Washington Quality of Life (version 4) questionnaire**

| UWQOL(version 4) domains | Mean±SD | Median | Rank order |
|---|---|---|---|
| Pain | 68.84±28.30 | 75 | 10 |
| Appearance | 63±19.78 | 75 | 7 |
| Activity | 55.38±21.87 | 50 | 4 |
| Recreation | 73.84±22.72 | 75 | 11 |
| Swallowing | 48.69±22.50 | 30 | 2 |
| Chewing | 46.15±22.19 | 50 | 1 |
| Speech | 53.23±27.50 | 70 | 3 |
| Shoulder | 79.53±22.46 | 70 | 12 |
| Taste | 56.61±29.22 | 70 | 5 |
| Saliva | 58.30±34.39 | 70 | 6 |
| Mood | 64.30±29.08 | 75 | 8 |
| Anxiety | 64.53±25.07 | 70 | 9 |

UWQOL: University of Washington Quality of Life, SD: Standard deviation

**Table 3: Mean of scores of general questions**

| Variables | *n* (%) |
|---|---|
| Employment status | |
| Employed | 34 (52.30) |
| Homemaker | 10 (15.38) |
| Medical leave | 5 (7.69) |
| Retired | 11 (16.92) |
| Unemployed | 5 (7.69) |
| Educational status | |
| Above 12$^{th}$ | 22 (33.84) |
| Below 12$^{th}$ | 43 (66.16) |
| Addiction | |
| Smoking | 2 (3.07) |
| Tobacco | 49 (75.38) |
| No addiction | 14 (21.53) |
| Marital status | |
| Married | 56 (86.15) |
| Unmarried | 2 (3.07) |
| Widow/widower | 7 (10.76) |

and write and they need help to complete the questionnaire [Table 3].

## Discussion

HRQOL is an integrated process for the overall treatment of oral cancer patients. The impact of cancer and its later consequences affects the quality of patient's life and their families as well. Mandibular resections have their own drawbacks such as unevenness, facial asymmetry, and loss of teeth due to which chewing is compromised. Mandible is involved in crucial activities such as protection of airway passage, support to the tongue and lower dentition. Furthermore, it is involved in functions such as speech, mastication, and deglutition. Reconstruction of mandibular defects after tumor resection is mainly one of the most difficult problems faced by the plastic surgeons. In addition, donor–recipient compatibility is very important for the entire reconstruction method.[18-20]

The myocutaneous flap as a source of vascularized bone in reconstructive surgery is in wide use.

As it ensures more durable blood supply, also defect at the donor site can be primarily closed and provides tissue bulk to cover large defects.

HRQOL has nowadays become a constant provoking question in the assessment of any therapy in oncology. It is time-consuming and a challenging task to ensure patients' self-complete questionnaires before treatment and at regular intervals subsequently, thus a reliable method should be adopted for obtaining complete details of the patients' treatment with ease. Our research is using the UW QOL head and neck questionnaire version 4. In the original description, Hassan and Weymuller *et al*. stated the advantages of the UWQOL head and neck questionnaire as follows: (1) It is brief and self-administered, (2) it is multi-factorial, allowing sufficient detail to identify subtle change, (3) it provides questions specific to head and neck cancer, and (4) it allows no input from the health provider. In addition, UWQOL is a widely used questionnaire because it is short and easy for patients to complete themselves, thus making it perfect in a hectic outpatient setup. The current version 4 of the UWQOL questionnaire consists of 12 single question domains, these having different response options that are scaled evenly from 0 (worst) to 100 (best) according to the hierarchy of response. We carried out this study to determine the postoperative HRQOL of these patients and the possible relationship of reconstruction surgery.[20-26]

The oral specific questionnaire was able to better demonstrate the changes in QOL due to surgery. We can see that the highest score of UWQOL subscale in the present study was in recreation and shoulder domains. The average score was 73.84 ± 22.72 and 79.53 ± 22.46, respectively, and the patients scored high in pain (68.84 ± 28.30) and appearance (63 ± 19.78) domains, this indicates that mandible reconstruction with myocutaneous flap has little effect on pain domain. A noteworthy outcome was the relatively low scores of UWQOL subscales in this study which were in speech and swallowing domains. The average scores were 53.23 ± 27.50 and 48.69 ± 22.50, respectively, which indicated that mandible reconstruction with myocutaneous flap has a bad effect on speech and swallowing domains. At the same time, we found that patients satisfied with the appearance domains. This may be due to the PMMF as it provides comparatively satisfactory esthetic as well as functional reconstruction of mandible defects and thereby obtaining a better esthetic contour. Although a noteworthy result was that the lowest score of UWQOL was in chewing (46.15 ± 22.19) domain. This may be due to mandible defects have caused some teeth lost, thus resulting in disorientation of chewing function.[27-30]

Patients believe that surgery has altered their oral functions to a larger extent. In the present study, questionnaires do not contain a section on the effect of the myocutaneous flap donor site on HRQOL and function. However, majority of the patients reported no serious or any complications in wound healing. A bit strain in shoulder was observed till the wound healing fully completed, after that no complaints were reported for donor site complications.[31-33] In addition, as the donor site is covered under clothes, it is well acceptable by the patients. The immediate postoperative donor site morbidity is measured less and is reported to be in a range between 15% and 55%. In our study, 21.42% of the patients, specifically males, reported problem of hairs at the defect site as hirsute chest skin is placed intraorally. Some studies have mentioned that apart from only surgery, the adjuvant radiotherapy and chemotherapy resulted in reduced weight, altered salivary and physical functions. Furthermore, functions such as swallowing and chewing were not as same as before and problems of coughing and dry mouth increased. Of the 65 patients in our study, 46 (70.76%) were given radiotherapy and 19 patients (29.23%) were given both radiation and chemotherapy. Among them, 38 patients (58.46%) complained about loss of appetite, dry mouth, and weight loss after chemotherapy/radiotherapy or both. There were several limitations of this study. First, the sample size was limited and may not have had sufficient power to find more valid and proofed data. Second, we collected data after patient's treatment during their follow-up, the entire pre- and post-operative period was not precisely evaluated and so, we could not fully assess its impact on patient HRQOL over the entire treatment period.[34-37]

## Conclusions

Oral cancer patients after mandible reconstruction with myocutaneous flap would have a significant influence on the patients' condition of life, particularly in patients' oral functions. In future oral cancer treatment, HRQOL should be accepted as an important outcome parameter, along with the conventional medical conclusions. Clinically, HRQOL should be used as part of oral cancer treatment. The societal and literary data showed a rather low education level, low economic condition, and low standard of living for most of the patients.[38]

### Recent advances

Osteo myocutaneous flaps and free flaps are widely used nowadays for better esthetic appearance because of its thickness and bone uniformity, and to overcome the major bone defects as these flaps provide vascular bridge and soft tissue cover for intraoral defects.[38]

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### Conflicts of interest

There are no conflicts of interest.

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