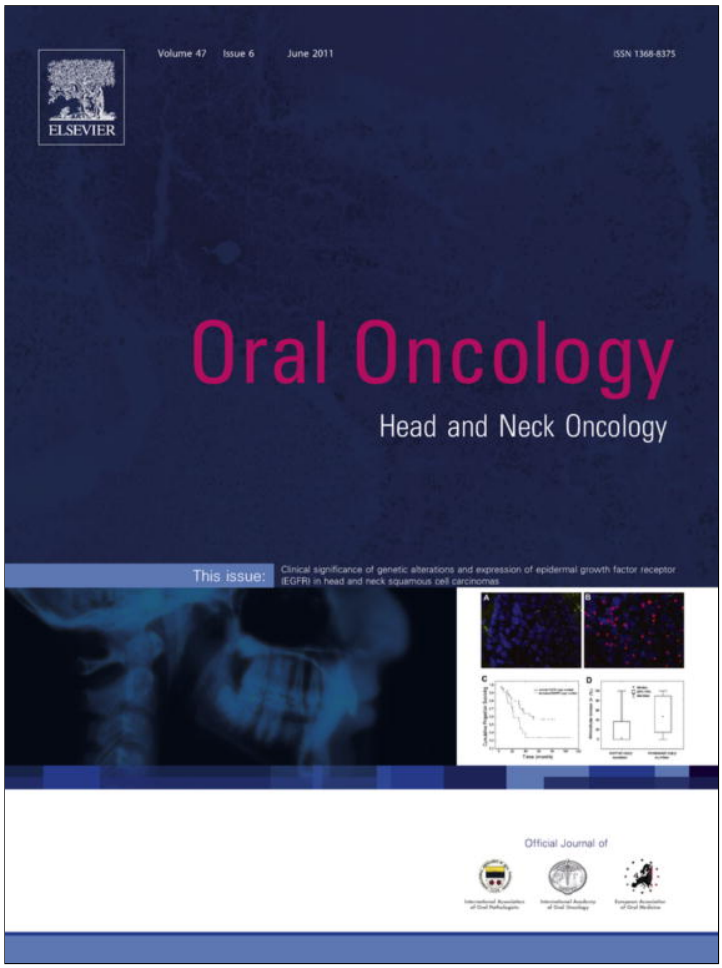

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Comparison between free flap and pectoralis major pedicled flap for reconstruction in oral cavity cancer patients – A quality of life analysis

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SUMMARY

We aimed to compare the differences between free flap and pectoralis major myocutaneous flap (PMMF) for reconstruction in oral cavity cancer patients. Patients who received free flap or PMMF reconstruction after ablation surgeries were eligible for the current study. The patients' demographic data, medical history, and quality of life scores were collected and analyzed. A total of 491 patients' records were obtained. Among them, 100 patients completed a quality of life questionnaire. No significant differences could be found in age, morbidity, stage, and hospitalization between the free flap and PMMF groups. However, there were significant differences between both groups in gender, primary site, peri-operative blood loss, and operation duration. Patients reconstructed with free flap had better speech and shoulder functions as well as better mood status. Data from this study provide useful information for physicians and patients during their discussion of treatment modalities for oral cancers.

Introduction

Oral cancer is currently a major global health issue. In developing countries, oral cavity cancer is estimated to be the third most common malignancy after cancer of the cervix and stomach.[1] Surgical excision plays a major role in the treatment of oral cavity cancer patients.[2] Significant soft tissue, bone, and skin defects are anticipated after tumor extirpation in locally advanced oral cavity cancer. Therefore, reconstruction is required to promote wound healing and optimize function along with cosmetic appearance. The pectoralis major myocutaneous flap (PMMF), based on the thoracoacromial artery, was described in 1979 by Ariyan.[3] PMMF is well established as one of the most important reconstructive methods in major head and neck cancer surgery due to its simple technical aspects, versatility, and proximity to the head and neck region.[4] Although microsurgically vascularized skin flaps to the head and neck were introduced earlier than pedicled flap, they did not reach immediate popularity, and pedicled flaps predominated in the head and neck reconstruction surgery for over a decade.[5]

During the past decade, revascularized free flap has been performed more frequently in an attempt to enhance the functional and aesthetic results in head and neck cancer patients.[6] Mallet et al. in their study on reconstruction of tongue cancer patients found that the reliability of free flaps was higher than that of PMMF.[7] Another study comparing free tissue transfer and pedicled flap reconstruction in head and neck malignancy defect showed that PMMF remained an enduring and safe flap, yet the free flap had markedly improved speech performance over the PMMF.[8] Tsue et al. indicated that free flap reconstruction generally resulted in a better swallowing function when compared with that of PMMF.[9] A previous study found that patients underwent reconstruction with PMMF had a significantly higher minor complication rate, a higher rate of gastrostomy tube dependence, and longer hospitalization than those who underwent reconstruction with free flap.[6] However, few studies have compared free flap and PMMF for reconstruction of the oral cavity. In addition, few studies have evaluated the differences in quality of life between patients with oral cavity cancers reconstructed with free flap compared with those who underwent PMMF. Therefore, the aim of this study was to compare the differences between free flap and PMMF for the reconstruction of the oral cavity in oral cancer patients. Quality of life was also evaluated in patients who underwent reconstruction with free flap or PMMF.

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Table 1
Descriptive and bivariate analyses of oral cavity cancer patients who underwent free flap or PMMF reconstruction.

Variables	Total no. of patients (% in column)	No. of patients (%)		*p* value
		Free flap group (*n* = 186)	PMMF group (*n* = 305)	
Age (yr)				0.290
<50 years	245 (49.9%)	99 (40.4%)	146 (59.6%)	
>= 50 years	246 (50.1%)	87 (35.4%)	159 (64.6%)	
Gender				0.024[†]
Female	11 (2.2%)	8 (72.7%)	3 (27.3%)	
Male	480 (97.8%)	178 (37.1%)	302 (62.9%)	
Primary tumor sites				<0.001
Lip	18 (3.7%)	17 (94.4%)	1 (5.6%)	
Gum	43 (8.8%)	15 (34.9%)	28 (65.1%)	
Floor of mouth	13 (2.6%)	7 (53.8%)	6 (46.2%)	
Tongue	121 (24.6%)	35 (28.9%)	86 (71.1%)	
Buccal	274 (55.8%)	101 (36.9%)	173 (63.1%)	
Palate	12 (2.4%)	7 (58.1%)	5 (41.7%)	
Retromolar trigone	10 (2.0%)	4 (40%)	6 (60%)	
Stage				0.684
I	13 (2.6%)	3 (23.1%)	10 (76.9%)	
II	37 (7.5%)	14 (37.8%)	23 (62.2%)	
III	62 (12.6%)	22 (35.5%)	40 (64.5%)	
IV	379 (77.2%)	147 (38.8%)	232 (61.2%)	
T stage				0.621
T1	109 (22.3%)	46 (42.2%)	63 (57.8%)	
T2	255 (51.9%)	90 (35.3%)	165 (64.7%)	
T3	95 (19.3%)	38 (40.0%)	57 (60.0%)	
T4	32 (6.5%)	12 (37.5%)	20 (62.5%)	
Operation duration				<0.001
<720 min	303 (62.1%)	53 (17.5%)	250 (82.5%)	
>=720 min	185 (32.9%)	132 (71.4%)	53 (28.6%)	
Surgical margin				0.194
Negative	430 (87.6%)	168 (39.1%)	262 (60.9%)	
Positive	61 (12.4%)	18 (29.5%)	43 (70.5%)	
Flap necrosis				0.266
No	464 (94.5%)	179 (38.6%)	285 (61.4%)	
Yes	27 (5.5%)	7 (25.9%)	20 (74.1%)	
Surgical site infection				0.430
No	326 (66.4%)	128 (39.3%)	198 (60.7%)	
Yes	165 (33.6%)	58 (35.2%)	107 (64.8%)	
Diabetes mellitus				0.875
No	463 (94.3%)	175 (37.8%)	288 (62.2%)	
Yes	28 (5.7%)	11 (39.3%)	17 (60.7%)	

Abbreviation: PMMF, pectoralis major myocutaneous flap.
[†] Fisher's exact test.

Materials and methods

This study protocol was approved by the Institutional Review Board of Taichung Veterans General Hospital. We retrospectively reviewed over 2000 chart records of oral cavity cancer patients undergoing surgical intervention in the studied hospital from March 1994 to December 2008. Those who received free flap or PMMF reconstruction were eligible for the current study. Those who had received surgery due to a recurrent or a second primary disease, had been irradiated before surgery, or had inadequate chart records were excluded. The selection of free flap or pedicled flap was not randomized. It was depended both on the availability of plastic surgeon and the decision of head and neck surgeon.

All patients were restaged according to the guidelines of the American Joint Committee on Cancer. Basic demographic data including age, gender, and tumor-related features were collected. In addition, type of surgical intervention and relevant data were recorded. The definition of surgical site infection was purulent discharge either spontaneously or by incision and drainage from head and neck region, or presence of an orocutaneous fistula regardless of etiology within 30 days after operation.[10]

Patients who underwent free flap or PMMF and who were regularly followed up at our clinic were administered a quality of life questionnaire. All patients signed informed consent forms and were interviewed by a trained nurse. The most recent modified version of the University of Washington Quality of Life (UW-QOL) questionnaires, version 4, was used to evaluate the functional outcome of patients who underwent free flap or PMMF reconstruction.[11] The questionnaire is composed of 12 domains: pain, appearance, activity, recreation, swallowing, chewing, speech, shoulder, taste, saliva, mood, and anxiety. The domains are scored on a scale ranging from 0 (worst) to 100 (best). There are also two "global quality-of-life" items. An UW-QOL composite score from 0 to 100 was obtained by averaging the scores of the domains. We scored the individual domains according to the UW-QOL guidelines.

We used descriptive statistics for general data presentation. Comparisons of nominal or ordinal variables between patients who underwent free flap or PMMF were analyzed by chi-square test or Fisher's exact test, whereas continuous variables were examined by Student's *t* test. The UW-QOL scores were compared for each domain using the nonparametric Mann–Whitney tests. Spearman's correlation coefficients were used to assess the association between two ordinal domain scores. All statistical analyses

Table 2
Descriptive and bivariate analyses of oral cavity cancer patients who underwent free flap or PMMF reconstruction and completed a quality of life questionnaire.

Variables	Total no. of patients (% in column)	No. of patients (%) or Mean (Standard deviation)		*p* value
		Free flap group ($n = 42$)	PMMF group ($n = 58$)	
Age (year)	100	54.1 (9.6)	54.5 (12.5)	0.839
Gender				0.071[†]
Female	3 (3%)	3 (100%)	0 (0%)	
Male	97 (97%)	39 (40.2%)	58 (59.8%)	
Primary tumor sites				0.745
Lip	5 (5.0%)	2 (40.0%)	3 (60.0%)	
Gum	8 (8.0%)	3 (37.5%)	5 (62.5%)	
Floor of mouth	4 (4.0%)	1 (25.0%)	3 (75.0%)	
Tongue	24 (24.0%)	8 (33.3%)	16 (66.7%)	
Buccal	44 (44.0%)	19 (43.2%)	25 (56.8%)	
Palate	9 (9.0%)	5 (55.6%)	4 (44.4%)	
Retromolar trigone	6 (6.0%)	4 (66.7%)	2 (33.3%)	
Stage				0.763
II	10 (10.0%)	5 (50.0%)	5 (50.0%)	
III	9 (9.0%)	3 (33.3%)	6 (66.7%)	
IV	81 (81.0%)	34 (42.0%)	47 (58.0%)	
T stage				0.904
T1	3 (3.0%)	1 (33.3%)	2 (66.7%)	
T2	32 (32.0%)	15 (46.9%)	17 (53.1%)	
T3	16 (16.0%)	6 (37.5%)	10 (62.5%)	
T4	49 (49.0%)	20 (40.8%)	29 (59.2%)	
Concurrent neck dissection				0.999
No	9 (9.0%)	4 (44.4%)	5 (55.6%)	
Yes	91 (91.0%)	38 (41.8%)	53 (58.2%)	
Mandibulectomy				0.205
No	45 (45%)	14 (31.1%)	31 (68.9%)	
Marginal	34 (34%)	16 (47.1%)	18 (52.9%)	
Segmental	11 (11%)	6 (54.5%)	5 (45.5%)	
Hemi	10 (10%)	6 (60.0%)	4 (40.0%)	
Post-operative radiotherapy				0.687
No	37 (37.0%)	17 (45.9%)	20 (54.1%)	
Yes	63 (63.0%)	25 (39.7%)	38 (60.3%)	
Diabetes mellitus				0.986[†]
No	94 (94.0%)	40 (42.6%)	54 (57.4%)	
Yes	6 (6.0%)	2 (33.3%)	4 (66.7%)	

Abbreviation: PMMF, pectoralis major myocutaneous flap.
[†] Fisher's exact test.

were performed using SPSS for Windows, version 10.1 (SPSS, Chicago, IL), and a $p < 0.05$ was regarded as statistically significant.

Results

From March 1994 to December 2008, a total of 491 patients with oral cavity cancer underwent ablation surgery followed by either free flap or PMMF reconstruction. One hundred and eighty six patients (37.9%) received free flaps whereas 305 patients (62.1%) received pedicled flaps reconstruction. Almost all the free flaps were fascio-cutaneous flap and bony flaps only accounted for 3.8% (7 out of 186). The majority of patients were male ($N = 480$, 97.8%) and the average age was 50 years (range, 27–83 years). Over half of the primary tumor sites were buccal mucosa ($N = 274$, 55.8%) followed by tongue ($N = 121$, 24.6%), and gum ($N = 43$, 8.8%). One hundred and sixty-five patients (33.6%) developed surgical site infection, while 27 patients (5.5%) experienced partial flap necrosis. The average operation time was 669 ± 211 min and the average peri-operative blood loss was 1074 ± 614 ml. The average hospital stay was 24.7 ± 18.7 days and the average follow up period was 38.1 ± 40.1 months.

There was no significant statistical difference between the free flap and PMMF groups in age (49.3 ± 9.0 vs. 51.0 ± 10.6 years, $p = 0.068$), surgical site infection rate (31.2% vs. 35.1%, $p = 0.430$), flap partial necrosis rate (3.8% vs. 6.6%, $p = 0.266$), stage ($p = 0.684$), T-stage ($p = 0.621$), positive surgical margin rate (9.7% vs. 14.1%, $p = 0.194$), hospital stay (23.8 ± 13.9 vs. 25.2 ± 21.1 days, $p = 0.403$), and diabetes mellitus (5.9% vs. 5.6%, $p = 0.875$). However, a greater proportion of female patients received free flap than did male patients (72.7% vs. 37.1%, $p = 0.024$). Furthermore, there were significant differences between the free flap and PMMF groups in the primary tumor site ($p < 0.001$), operation time (793 ± 248 vs. 593 ± 138 min, $p < 0.001$), and peri-operative blood loss (971 ± 587 vs. 1135 ± 622 ml, $p = 0.004$). Detailed data are presented in Table 1.

From January 2010 to November 2010, patients who had been reconstructed with free flap or PMMF were interviewed during their regular visit at the clinic. UW-QOL questionnaires were completed by 100 patients. Forty-two of the interviewed patients (42%) were reconstructed with free flap while the remaining 58 patients (58%) were reconstructed with PMMF. Male patients accounted for 97% of the patients who completed the QOL questionnaire and the average age was 54 years old. There was no significant difference between the free flap and PMMF groups in age (54.1 ± 9.6 vs. 54.5 ± 12.5, $p = 0.839$), gender ($p = 0.071$), stage ($p = 0.763$), T-stage ($p = 0.904$), and the average follow up period after operation (31.4 ± 34.1 vs. 38.7 ± 43.0 months, $p = 0.349$). The proportions of neck dissection (90.5% vs. 91.4%, $p = 0.999$), mandibulectomy ($p = 0.205$), post-operative radiotherapy (59.5% vs. 65.5%, $p = 0.687$), and diabetes mellitus (4.8% vs. 6.9%, $p = 0.986$) were also similar in both groups. The data are presented in Table 2.

Global quality of life was considered good to excellent by 33 patients (33%), and 36 patients (36%) reported that their health status was the same or worse than that before treatment. No significant

Table 3
Quality of life scores of oral cavity cancer patients underwent different type of reconstruction.

Domains	Mean score ± standard deviation		*p* value
	Free flap group ($n = 42$)	PMMF group ($n = 58$)	
Pain	76.8 ± 23.0	68.1 ± 27.2	0.138
Appearance	67.3 ± 25.0	69.8 ± 25.5	0.535
Activity	67.9 ± 24.2	66.8 ± 27.9	0.760
Recreation	69.1 ± 32.6	62.5 ± 32.2	0.221
Swallowing	49.3 ± 37.2	48.6 ± 32.7	0.962
Chewing	34.5 ± 39.0	33.6 ± 36.7	0.973
Speech	66.7 ± 27.2	44.7 ± 35.0	0.002
Shoulder	81.4 ± 14.7	50.5 ± 29.8	<0.001
Taste	55.0 ± 43.2	45.9 ± 39.6	0.226
Saliva	71.7 ± 34.8	73.8 ± 28.1	0.964
Mood	76.2 ± 24.7	60.8 ± 32.8	0.022
Anxiety	75.9 ± 26.3	68.9 ± 33.9	0.423
Global quality of life	41.9 ± 15.2	41.4 ± 22.4	0.808
UW-QOL composite scare	66.0 ± 18.5	57.8 ± 18.2	0.090

Abbreviation: PMMF, pectoralis major myocutaneous flap; UW-QOL, University of Washington Quality of Life.

difference was found in the average score of global quality of life between the free flap and PMMF groups (41.9 ± 15.2 vs. 41.4 ± 22.4, $p = 0.808$) (Table 3). There were also no significant differences between the two groups in the pain, appearance, activity, recreation, swallowing, chewing, taste, saliva, and anxiety domains. However, there were significant differences between the free flap and PMMF flap groups in the speech (66.7 ± 27.2 vs. 44.7 ± 35.0, $p = 0.002$), shoulder (81.4 ± 14.7 vs. 50.5 ± 29.8, $p < 0.001$), and mood (76.2 ± 24.7 vs. 60.8 ± 32.8, $p = 0.022$) domains (Fig. 1). The Spearman's correlation between the mood and speech domains was $r = 0.444$ ($p < 0.01$), whereas the correlation between the mood and shoulder domains was $r = 0.398$ ($p < 0.01$). With the importance rating of domains, chewing was considered most important issue over the past 7 days followed by swallowing, speech, and pain after allowing for patients to choose up to three domains. Anxiety about cancer was considered least important to patients.

Discussion

This study was a pilot trial which compared the quality of life of patients in an East Asian population who underwent free flap or PMMF reconstruction after oral cavity cancer extirpation. Presently, it is generally acknowledged that free tissue transfer with micro-vascular anastomosis is the favored method for reconstruction after major head and neck cancer surgery.[3,5] However,

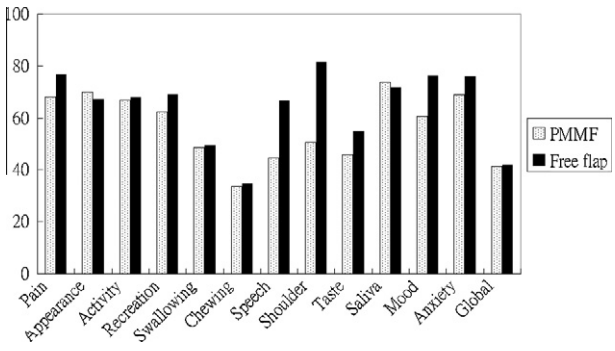

Figure 1 UW-QOL scores in PMMF and free flap groups (mean). Scores in PMMF group and free flap group differed significantly ($p < 0.05$) in speech, shoulder, and mood domains.

microsurgical reconstructions are not without potential morbidities, require specialized surgical skills, and are often lengthy procedures. These requisites are not available in many head and neck centers and the cost involved in this type of procedure has been a matter of debate in the literature.[3,9,12] To the best of our knowledge, this study is the largest series to compare the differences between patients who have undergone PMMF and free flap reconstruction after ablation of oral cavity cancer.

Several previous studies found no significant difference in the gender distribution between free flap and PMMF.[6–9,12] However, there was a higher proportion of female patients who underwent free flap reconstruction in the current study. This could be explained by the small number of female patients which might have skewed the results. Another possible explanation might be presumed greater importance placed on cosmetic outcome (deformity of breast) among female patients resulting in a preference for free flap reconstruction in female.

We found that patients who received reconstruction with free flap had a longer operative duration when compared with those who were reconstructed with PMMF, which was a similar finding to that reported in previous studies.[7,9,12] The need for microvascular anastomosis is likely the main reason for the longer duration of procedure. We also found a higher proportion of patients with tumors located over lip, mouth floor, and palate underwent free flap reconstruction. One reason might be that those structures are thinner when compared with other subsites of the oral cavity and are thus reconstruction with bulky PMMF would be more challenging. Another explanation could be that mouth floor and palate tumors only accounted for a small proportion of the studied population, which may have confounded the final results. The average perioperative blood loss was abundant in the PMMF group when compared with that of the free flap group in this study. Smeele et al. in their study comparing morbidity and cost differences between pedicled flap and free flap reconstruction had similar results (1345 vs. 1168 ml) yet no statistically significant difference was found.[12] The possible explanation is the surgeon's factor as other variables between patients reconstructed with free flaps and pedicled flaps were comparable. The pedicled flaps were performed by head and neck surgeon whereas the free flap were performed by plastic surgeon in our study.

There were no significant differences between free flap and PMMF groups in age, surgical site infection rate, flap partial necrosis rate, tumor stage, positive surgical margin rate, and hospital stay in this study. Although most previous studies also reported similar results, some disparity existed among different studies.[6–9,12,13] Chepeha et al. found that the minor complication rate was higher in the PMMF group when compared with that of the free flap group (51% vs. 21%, $p < 0.001$). Also, hospitalization was longer in the PMMF group when compared with that of free flap group.[6] de Bree et al. in their study about free radial forearm flap versus pedicled flap reconstruction of oral and oropharyngeal defect indicated that the wound healing problems were more frequently observed in the pedicled flap group when compared with the free flap group. The mean hospital stay was significantly shorter in the free flap group than in the pedicled flap group (24 vs. 28 days, $p = 0.005$).[13] The reason might be the different definition of complication between the aforementioned studies and that used in our study. In addition, the studied populations were different as the abovementioned studies included patients who underwent a second extirpation as well as those whose primary tumor originated other than oral cavity, whereas our study only included patients with cancer of the oral cavity which was treated primarily with surgery. A lower rate of positive margins was found in patients who underwent free flap reconstruction when compared with that of patients who received PMMF reconstruction (9.4% vs. 15.7%). The authors propose that free flap reconstruction allowed the abla-

tive surgeon more freedom to take wider margins.[12] Although a higher proportion of patients who underwent PMMF had positive margins in our study, the statistical difference was not significant.

The reported complication rates after free flap or PMMF reconstruction after head and neck cancer extirpation ranged from 13% to 36.1%.[3,4,6,7,12,13] These results are comparable with those of our study. A previous study found that the gastrostomy tube dependent rate was higher in the PMMF group when compared with that of the free flap group.[6] However, Mallet et al. did not find a significant difference between the free flap and the PMMF group in the duration of use of a feeding tube. As our study did not collect these data, no comparison could be made.

A previous study reported that global quality of life was considered good to excellent by 59.3% of patients with advanced head and neck cancers who underwent major surgical procedures and the mean UW-QOL composite score was 79.3.[14] Rogers et al. in their study about patients treated by primary surgery for oral and oropharyngeal cancer also found global quality of life was rated good to excellent in 58.1% of participants.[15] Conversely, our study found only 33% of patients rated their global quality of life as good or very good and no one rated his/her global quality of life as excellent. The disparity might be due to the different studied population as the aforementioned studies consisted of a variety of tumor that included locations other than the oral cavity. In addition, previous studies included a variety of patients who underwent various surgical treatments, while our study enrolled only patients with oral cavity cancers reconstructed with free flap or PMMF. Other explanations could involve cultural, ethnic, and environmental factors as most of the aforementioned studies concerning quality of life were conducted in Western countries while our study was conducted in East Asia.

Although most of our patients with oral cavity cancers underwent PMMF reconstruction, not all patients completed the second phase of the study which was concerned with quality of life. The reason for this is that the timeframe of the first phase included patients who were followed for over 14 years, whereas the second phase of the study only enrolled patients who were followed at our clinic for a duration of just 11 months. However, the patients' demographic data were similar in the free flap and PMMF groups. Even though there was no significant difference between the free flap and PMMF groups in their average UW-QOL composite scores, patients who underwent free flap reconstruction reported better average scores than those who underwent PMMF reconstruction in the speech, shoulder, and mood domains. Su et al. in their study on functional comparison after reconstruction of the tongue found that patients who underwent free flap reconstruction had better speech function when compared with that of patients who underwent PMMF reconstruction.[16] A possible explanation is that reconstruction of intra-oral defect with thin and supple tissue using free flap might allow the residual tongue to maintain maximum mobility and pliability, which in turn facilitates articulation. As 16 out of 58 patients underwent pedicled flaps reconstruction in our study had defects over tongue region, there is no doubt that the average UW-QOL score for the speech domain was worse in patients received pedicled flaps when compared with that of patients received free flaps. Theoretically, a free flap is more superior in tongue than buccal mucosa defects as compared to pedicled flap. When we compare the average score for the speech domain in tongue cancer patients in our study, the average score in patients reconstructed with free flap was 50 whereas that in patients reconstructed with pedicled flap was 28 ($p = 0.046$). Conversely, when it comes to the buccal cancer patients, the average score for speech domain in patients reconstructed with free flap was 69 whereas that in patients reconstructed with pedicled flap was 55.6 ($p = 0.153$).

Moukarbel et al. in their study about shoulder disability following PMMF reconstruction found that PMMF was associated with objectively detectable limitation in shoulder function. PMMF not only reduced the range of motion but also reduced the strength across more than one domain.[17] This could explain why the average score in the shoulder domain in the PMMF group was worse than that of the free flap group. The average score in the mood domain in the PMMF group was also worse than that of the free flap group. Impaired speech and shoulder function in the PMMF group may explain why more patients reported depressed status as indicated by the strong correlation between scores in the mood and speech domains as well as between the mood and shoulder domains in our study.

We found that the average scores for the swallow domain were similar in both groups. A previous study found out that the tongue provided the major driving force for swallowing liquid. Therefore, if more residual tongue can be preserved, greater improvements in oral manipulation and swallowing will be obtained.[16] The lack of a significant difference between free flap and PMMF in the UW-QOL swallow scores may be explained in part by the small proportion of tongue cancer patients who completed the quality of life questionnaire. A previous study found that the type of reconstruction was an independent factor that influenced the UW-QOL composite score.[18] However, our study did not demonstrate such results. One reason might be due to the different method used to evaluate outcomes as the aforementioned study subdivided participants into three major categories according to their total UW-QOL scores for comparison, while our study compared absolute UW-QOL composite scores. In addition, the aforementioned study used UW-QOL version 2 questionnaire while we used UW-QOL version 4 in the present study.

Rogers et al. in their study on importance-rating using the UW-QOL questionnaire in patients treated by primary surgery for oral and oro-pharyngeal cancer found that patients tended to rate speech, chewing, and swallowing as more important than the other UW-QOL domains.[15] Our study found the same results. This finding highlights the crucial impact of the capacity to communicate and eat on patients' overall sense of well-being. This also draws attention to the need for a multidisciplinary team which can explain the possible functional changes after reconstruction and their impacts on the patient's life when presenting the patient with treatment options.[19] Data from this study may provide useful information for physicians and patients which may be of value during discussion of treatment modalities for oral cavity cancers.

There were some limitations in our study. First, this was not a randomized study. Selection bias inevitably existed. Second, this study included various subsites of oral cavity tumors, which may have different characteristics. Third, although the treatment guidelines are standardized at the studied institute, individual variations among surgeons certainly exist. Finally, the time from treatment to questionnaire was not uniform for each patient. Some patients' quality of life results may have been affected by chemotherapy or radiotherapy treatment that may last 3–6 months after completion of treatment (6 out of 100 of patients completed the questionnaires within 6 months after the end of the treatment).

Conclusion

Patients with oral cavity cancers who underwent major ablation surgery followed by reconstruction with PMMF had comparable morbidity when compared with patients reconstructed with free flap. However, patients reconstructed with free flap had better speech and shoulder function as well as better mood status when compared with those of patients reconstructed with PMMF. It is important to emphasize the need for a multidisciplinary team

which can explain the possible functional changes that patients may experience and their impact on well-being when presenting the patient with treatment modality options.

Conflicts of interest statement

None declared.

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