

Health-Related Quality of Life After Maxillectomy: A Comparison Between Prosthetic Obturation and Free Flap

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Purpose: The purpose of this cross sectional study was to evaluate the health-related quality of life of patients following maxillectomy and to compare obturation and free flap reconstruction.

Patients and Methods: At the Regional Maxillofacial Unit in Liverpool, United Kingdom, between 1992 to 1996, 39 patients underwent maxillectomy for malignant pathology. Of these patients, 28 (10 underwent obturation and 18 underwent free tissue reconstruction) completed a postoperative semi-structured interview. Eight questionnaires were used to test aspects of health-related quality of life and function.

Results: The main findings were the associations between the size of maxillectomy defect and the University of Washington activity (-0.53 ; $P = .005$) and recreation (-0.70 ; $P < .001$) domains, and with the physical functioning (-0.58 ; $P = .001$) and quality of life (-0.51 ; $P = .007$) domains of the European Organization for Research and Treatment of Cancer questionnaire. No statistically significant differences were seen between the obturator and free flap groups. Borderline trends were for obturator patients to be more concerned about their appearance, to have more pain and soreness in their mouths, to be more aware of their upper teeth, more self-conscious and less satisfied with their upper dentures, and less satisfied with function.

Conclusion: Similar subjective outcomes were found for both groups, and a larger longitudinal study is needed to test these relationships more rigorously.

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The optimal reconstruction of the maxillectomy defect remains controversial.^{1,2} The reconstructive sur-

geon has various options including prosthetic obturators, nonvascularized grafts, local flaps, regional flaps, and free tissue transfer.³ Each technique has its advantages and disadvantages, although some surgical units advocate a particular method. Obturator prosthesis can provide a satisfactory reconstruction, and success is related in part to the extent of soft and hard palate resection.⁴ In recent decades, microvascular free tissue transfer techniques have become established.^{5,6} Free flaps provide the surgeon an opportunity to deal with the problems associated with prosthetic obturation: nasal leakage, cleaning, and constant prosthetic refinement. Dental status has an important bearing on patients' well-being,^{7,8} and the combination of vascularized bone and osteointegrated implants can provide the opportunity for effective oral rehabilitation.⁹

Despite an increase in the number of health-related quality of life (HRQOL) publications,¹⁰ we know of only 1 study⁴ that limited the enquiry to patients after maxillectomy. In this study, all patients were treated

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using prosthetic obturation, and a telephone survey was performed. Again, we are unaware of any studies that used HRQOL questionnaires to compare obturators and free flaps. Most HRQOL studies include a heterogeneous sample of head and neck sites, such as the larynx, oropharynx, and oral cavity. Therefore, it is impossible from these papers to identify the specific issues concerning maxillectomy. In the past, one of the main problems with assessing HRQOL has been the lack of validated questionnaires. Additionally, a maxillectomy is a relatively uncommon operation,¹ and this rarity inevitably leads to a paucity of data on subjective outcome.

The patients' perspective is extremely valuable, because there are various methods of reconstructing the defect. The goal of this pilot study was to compare HRQOL and subjective function after obturation or free flap reconstruction of the maxillectomy defect. This study does not attempt to give reasons for deciding on either technique but focuses on the patients' evaluation after surgery.

Patients and Methods

Patients who underwent maxillectomy at the Regional Maxillofacial Unit between 1992 and 1996 were identified from the head and neck database. Patients were excluded if only the tuberosity was removed as part of a wider soft tissue resection. Included patients were invited to a structured interview performed by a research clinical psychologist using validated questionnaires.

QUESTIONNAIRES

To explore the broad concepts of health-related quality of life and subjective outcome, we used the following questionnaires:

1. University of Washington Head and Neck questionnaire version 1¹¹: this UW-QOL questionnaire tests 9 specific areas relating to the patient with head and neck cancer. The areas are pain, appearance, activity, recreation-entertainment, employment, speech, chewing, swallowing, and shoulder disability. A composite score is calculated by adding together the scores for the 9 domains and dividing by 9 for a score from 0 (for poor health) to 100 (good health).
2. EORTC QLQ C30 (European Organization for Research and Treatment of Cancer Core QOL questionnaire, 30-item version)²: this questionnaire comprises multifunction scales for physical, role, cognitive, emotional, and social functioning and multi-item scales for QOL and the symptoms of fatigue, pain, and emesis. Addi-

tional single items measure dyspnea, sleep disturbance, and financial impact.

3. EORTC Head and Neck 35 (cancer-specific module)¹³: this questionnaire asks 35 questions about symptoms and side-effects of treatment. Most of these are scored on a 4-point response scale from 1 (not at all) to 4 (very much). The first 18 questions ask about symptoms such as pain, swallowing, taste, and appearance, and the next 12 questions ask about functions such as eating, talking, social contact, and sexuality. The last 5 "yes-no" questions are about analgesia, supplemental feeding, and weight.
4. Hospital Anxiety Depression (HAD)¹⁴: this questionnaire contains 7 questions relating to anxiety and 7 relating to depression. It was developed for patients with physical illness. Each item is scored from 0 (best) to 3 (worst), and each subscale is scored from 0 to 21. Patients scoring 9 or more in the anxiety and depression subscales are considered to have psychological morbidity.
5. Body Satisfaction Scale¹⁵: the body-satisfaction scale (BSS) of Slade et al¹⁵: this consists of 2 subscales, one that focuses on the head parts and one on other body parts. Only the 7-item subscale for head parts was used (BSS Head) for this study. Each item is scored from 1 to 7, with a scale range of 7 to 49. Higher scores imply greater dissatisfaction.
6. Oral symptom check list: this is a slightly modified checklist with 15 of the 17 items used by Kent and Johns.¹⁶ Higher scores imply more symptoms.
7. Denture Satisfaction: this 6-item questionnaire was developed by Vervoorn et al.¹⁷ Higher scores imply more problems.
8. Obturator Functioning Scale⁴: this questionnaire consists of 18 questions that measure patients' ability to eat and speak with the obturator prosthesis and their satisfaction with the restoration of lip position and cosmetic effects.

MAXILLECTOMY CLASSIFICATION

The classification published by Brown et al¹⁸ (Fig 1) was used in this study. This classification was chosen because it incorporates both functional and aesthetic issues and addresses surgical and prosthodontic considerations. The problems of successful obturation mount as the vertical and horizontal components of the resection increase.

STATISTICAL METHOD

Presentation is primarily descriptive, with means, medians, ranges, and percentages for each group. Analyses to compare the 2 patient groups included

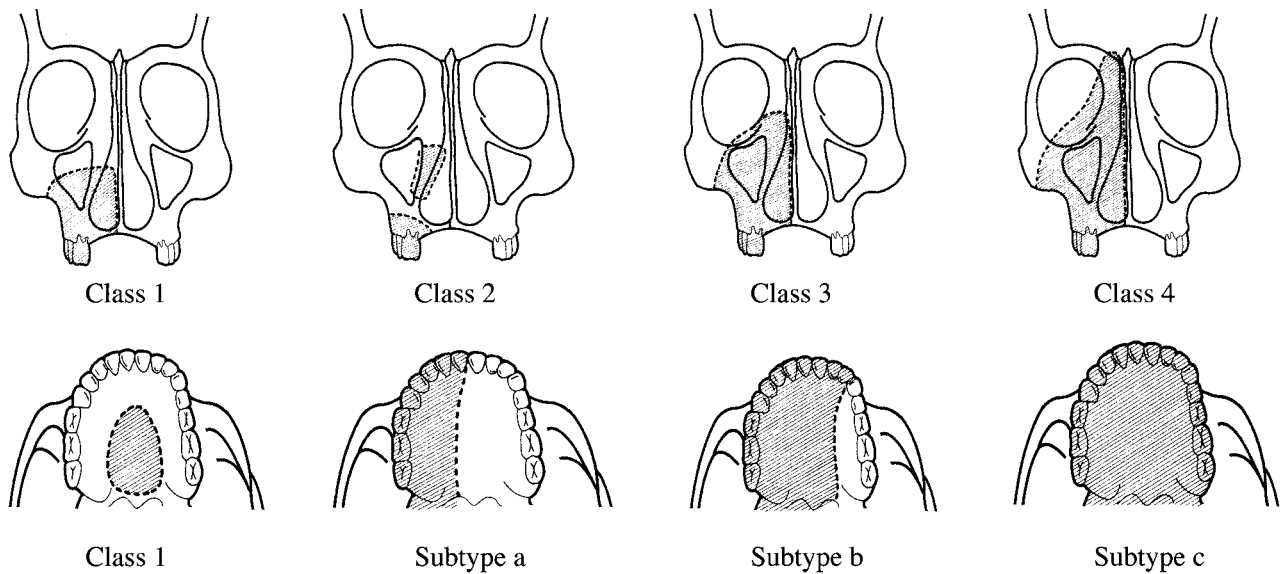


FIGURE 1. Maxillectomy classification. Class 1 has no subtypes. Classes 2, 3, and 4 can be subtyped as a, b, or c, depending on the transverse extent of the defect.

the Mann-Whitney (MW) test for ordered category data (UW-QOL, EORTC, HAD, Body Satisfaction, Dental Satisfaction), and Fishers Exact test for binary data (Oral Symptom Checklist). The size of the maxillectomy defect (1, 2a, 2b, 3a, 3b, 4a, 4b) is also an ordinal variable. Spearman's correlation was used to investigate associations between this and the other ordinal variables. Because of the amount of statistical analyses performed, P values under 1% ($P < .01$) were considered statistically significant. However, we regard this study as exploratory given the small number of patients. Therefore, we comment on trends in the data when comparative results were within the borderline of statistical significance ($.01 < P < .10$).

Results

From 1992 to 1996, 39 patients underwent maxillectomy. By April 1997, 7 patients had either died or experienced a recurrence. Of the 32 patients eligible for inclusion, 4 declined to participate in the study (1 obturator and 3 free flap). Twenty-eight patients attended the research session (10 patients who underwent obturation and 18 who underwent microvascular free tissue reconstruction).

The clinicodemographic details for the 2 groups are shown in Table 1. A similar majority proportion of both groups were men. Obturator patients were younger as a group, about 4 years younger on average at the interview. The main difference between the groups was in the time from operation to the time of the survey. A predominance of obturator surgery occurred in the earlier period. More larger defects (2b or more) were reconstructed in the free tissue transfer

patients (61%, 11 of 18) than in obturator patients (20%, 2 of 10).

For the University of Washington domains (Table 2), no statistically significant differences were found between the 2 groups, although there was a tendency for obturator patients to indicate more problems with appearance. Cumulative scores from the 2 groups were also remarkably similar.

Table 1. CLINICODEMOGRAPHIC CHARACTERISTICS OF OBTURATOR AND FREE FLAP TRANSFER PATIENTS

	Obturator Patients	Free Flap Transfer Patients
Men (% , n/n)	70% (7/10)	61% (11/18)
Age <65 years at operation (% , n/n)	80% (8/10)	39% (7/18)
Mean (SD) age at operation (yr)	57 (8)	63 (14)
Mean (SD) age at interview (yr)	62 (7)	66 (14)
Mean (SD) time to interview (yr)	4.7 (2.1)	2.7 (1.2)
Radiotherapy (% , n/n)	10% (1/10)	19% (3/16)
Maxillectomy classification (n)		
1	1	1
2a	7	6
2b	1	5
3a	—	1
3b	1	1
4a	—	2
4b	—	1
Missing	—	1

Abbreviation: SD, standard deviation.

Table 2. UNIVERSITY OF WASHINGTON QUALITY OF LIFE QUESTIONNAIRE RESULTS

	Obturation	Free Flap Transfer	Obturation	Free Flap Transfer	MW Test <i>P</i> value
	Mean (SD)		% Best*		
Pain	90 (13)	88 (21)	60	72	.86
Activity	73 (22)	71 (27)	30	28	.90
Recreation	80 (16)	75 (26)	30	33	.87
Employment	42 (22)	50 (26)	10	17	.37
Appearance	63 (21)	76 (18)	10	28	.09
Chewing	60 (21)	58 (31)	20	28	.95
Swallowing	91 (14)	88 (20)	70	67	.79
Speech	79 (14)	76 (24)	30	33	.98
Shoulder	91 (14)	95 (12)	70	83	.42
Cumulative score	74 (8)	75 (15)	0	6	.68
Patients (n)	10	18	10	18	

Abbreviations: SD, standard deviation; MW, Mann-Whitney.
*Percent of patients with the best score possible (=100).

On the general cancer questionnaire of the EORTC (Table 3), the obturator and free flap groups gave similar results. In addition, no significant differences were found between the 2 groups for any of the 35 EORTC head and neck cancer-specific module items (Table 4). Results of borderline significance included pain and soreness in the mouth (the obturation group had more problems), and weight gain (more in free flap patients).

Anxiety scores were slightly higher in the obturator patients (mean, 6.0; median, 4.5; range, 0 to 19; with 30% [3 of 10] scoring 9 or more) as compared with

the free flap transfer patients (mean, 4.2; median, 3.5; range, 0 to 12, with 22% [4 of 18] scoring 9 or more). However, no statistically significant difference was found between the groups (MW test, *P* = .55). Depression scores were more similar. In the obturator group, the mean was 4.1 and the median was 2.0 (range 0 to 12, with 20% [2 of 10] scoring 9 or more). In the free flap transfer group, the mean was 3.1; the median was 2.5 (range, 0 to 9, with 6% [1 of 18] scoring 9 or more; MW test, *P* = .77).

Regarding body satisfaction, analysis of the 7-item score pertaining to head and neck showed little dif-

Table 3. EORTC C30 QUESTIONNAIRE RESULTS

	Obturation	Free Flap Transfer	Obturation	Free Flap Transfer	MW Test <i>P</i> value
	Mean (SD)		% Best*		
Functional scales					
Physical functioning	76 (28)	69 (28)	50	22	.50
Role functioning	73 (31)	80 (29)	50	56	.58
Emotional functioning	73 (30)	85 (19)	30	50	.26
Cognitive functioning	83 (22)	93 (10)	60	61	.44
Social functioning	82 (17)	87 (23)	30	67	.16
Global health status	71 (23)	67 (27)	20	22	.83
Symptom scales					
Pain	15 (20)	9 (15)	60	67	.52
Fatigue	24 (23)	19 (17)	30	28	.57
Nausea and vomiting	3 (11)	4 (12)	90	89	.93
Symptom items					
Dyspnea	27 (38)	19 (20)	60	50	.87
Insomnia	20 (36)	26 (33)	70	56	.55
Appetite loss	13 (32)	11 (23)	80	78	.95
Diarrhea	3 (11)	2 (9)	90	94	.67
Constipation	10 (16)	11 (26)	70	83	.62
Financial difficulties	13 (32)	11 (20)	80	72	.75
Patients (n)	10	18	10	18	

Abbreviations: SD, standard deviation; MW, Mann-Whitney.
*Percent of patients with the best score possible for each domain.

Table 4. EORTC HEAD AND NECK 35 QUESTIONNAIRE SUMMARY STATISTICS

	Free Flap		Free Flap		MW Test <i>P</i> value
	Obturation	Transfer	Obturation	Transfer	
	Mean		% problem*		
During the past week, have you					
31. had pain in your mouth?	1.7	1.2	60	22	0.04
32. had pain in your jaw	1.1	1.3	10	28	0.28
33. had soreness in your mouth?	1.9	1.4	80	33	0.05
34. had a painful throat?	1.0	1.1	0	11	0.28
35. had problems swallowing liquids?	1.0	1.0	0	0	
36. had problems swallowing pureed food?	1.0	1.0	0	0	
37. had problems swallowing solid food?	1.5	1.7	30	41 (7/17)	0.56
38. choked when swallowing?	1.0	1.2	0	17	0.18
39. had problems with your teeth?	1.7	1.6	60	47 (8/17)	0.52
40. had problems opening mouth wide?	1.9	1.7	30	39	0.98
41. had a dry mouth?	2.5	1.8	60	44	0.22
42. had sticky saliva?	1.9	1.5	40	22	0.34
43. had problems with sense of smell?	1.8	1.4	30	28	0.67
44. had problems with sense of taste?	1.8	1.4	40	22	0.31
45. coughed?	1.8	1.6	40	39	0.70
46. been hoarse?	1.3	1.2	30	17	0.48
47. felt ill?	1.4	1.3	30	17	0.44
48. (Has your) appearance bothered you?	1.5	1.3	40	17	0.26
49. had trouble eating?	1.5	1.5	40	39	0.98
50. had trouble eating in front of family?	1.5	1.2	20	22	0.89
51. had trouble eating in front of other people?	1.8	1.7	40	50	0.94
52. had trouble enjoying your meals?	1.3	1.4	20	33	0.51
53. had trouble talking to other people?	1.4	1.5	30	33	0.84
54. had trouble talking on the telephone?	1.5	1.4	30	17	0.48
55. had trouble having social contact with family?	1.1	1.1	10	11	0.93
56. had trouble having social contact with friends?	1.2	1.3	10	17	0.94
57. had trouble going out in public?	1.1	1.2	10	11	0.89
58. had trouble with physical contact with family/friends?	1.4	1.2	20	11	0.53
59. felt less interest in sex?	2.5	1.5	60	25 (2/8)	0.13
60. felt less sexual enjoyment?	2.4	1.5	67 (6/9)	25 (2/8)	0.10
					Fishers Exact test
61. used pain-killers?	1.4	1.4	40	44	0.99
62. taken any nutritional supplements (exc vitamins)?	1.3	1.2	30	17	0.42
63. used a feeding tube?	1.0	1.0	0	0	
64. lost weight?	1.2	1.1	20	6	0.25
65. gained weight?	1.2	1.6	20	61	0.06
Total patients completing questionnaire (unless stated) (n)	10	18	10	18	

Abbreviation: MW, Mann-Whitney.

*Percent of patients stating "a little", "quite a bit", or "very much."

ference between the groups (MW test, $P = .87$). For obturator patients, the mean was 16.8; the median was 14.0 (range, 7 to 38); in free flap transfer patients, the mean was 15.9; the median was 16.5 (range, 7 to 30).

The oral symptom checklist was completed by all 10 obturator patients and by 12 of the 18 free flap transfer patients. Regarding denture satisfaction, only 8 of the 18 free flap patients were able to wear conventional dentures. The tendency in results of borderline statistical significance was for obturator patients to be more aware of their upper teeth, more

self-conscious, less satisfied with upper dentures, and less satisfied with function (Table 5).

Obturation function is described in Table 6. Most patients had no problems or few problems regarding each aspect measured. All of the instances of problems occurring "a lot" (7 instances) or "all of the time" (12) came from 4 patients. Most reported problems were about leakage into the nose on swallowing liquids, dryness of the mouth, difficulties in chewing food, and difficulties in pronouncing words.

The size of maxillectomy defect was strongly associated with the University of Washington activity and

Table 5. ORAL SYMPTOM CHECKLIST AND DENTAL SATISFACTION RESULTS BY PROSTHETIC OBTURATION AND FREE FLAP TRANSFER

Domain	Obturator (n = 10)*	Free-flap transfer (n = 16)†	Fishers Exact Test P Value
Oral Symptoms Checklist	Item Present % (n)	Item Present % (n)	
Pain, upper teeth	40 (4)	9 (1/11)	.15
Pain, lower jaw	11 (1/9)	18 (2/11)	1.00
Aware of upper teeth	90 (9)	40 (4/10)	.06
Aware of lower teeth	33 (3/9)	36 (4/11)	1.00
Concerned appearance of teeth	40 (4)	17 (2)	.35
Difficulty with some foods	80 (8)	50 (6)	.20
Loss of confidence	20 (2)	8 (1)	.57
Embarrassed	20 (2)	17 (2)	1.00
Different from others	30 (3)	17 (2)	.62
Diff sleeping	20 (2)	17 (2)	1.00
Ulcers, upper gums	20 (2)	8 (1)	.57
Ulcers, lower gums	10 (1)	8 (1)	1.00
Refused invite	0 (0)	17 (2)	.48
Self conscious	50 (5)	9 (1/11)	.06
Worried fall out	10 (1)	38 (3/8)	.28
Changed dentures	40 (4)	22 (2/9)	.63

	Obturator (n = 10)*		Free Flap Transfer (n = 8)‡		MW Test P Value
Denture Satisfaction	% Satisfied (n)	% Very Satisfied (n)	% Satisfied(n)	% VerySatisfied (n)	
With dentures	50 (5)	20 (2)	100 (8)	25 (2)	.10
With upper dentures	50 (5)	20 (2)	100 (8)	38 (3)	.07
With lower dentures	80 (4/5)	40 (2/5)	83 (5/6)	67 (4/6)	.48
With appearance	70 (7)	20 (2)	75 (6)	63 (5)	.11
With retention	70 (7)	20 (2)	75 (6)	25 (2)	.85
With function	40 (4)	20 (2)	100 (8)	50 (4)	.03

Abbreviation: MW, Mann-Whitney.

*Denominator equals 10 unless stated.

†Denominator equals 12 unless stated.

‡Denominator equals 8 unless stated.

recreation domains and with the physical functioning and quality of life domains of the EORTC (Table 7). Correlations with speech, chewing, appetite, and depression were also found.

Selection of smaller defects only (1 and 2a) included too few patients for a meaningful analysis (8 obturator patients and 7 free flap transfer patients). The mean age at surgery was 56 years for both groups; mean follow-up times were 5.1 years for the obturator group and 2.8 years for the free flap transfer patients. The trend between groups in respect of UW-QOL appearance was still there (obturator mean, 59; free flap mean, 82; MW, $P = .04$), as was the lack of association in other domains and scales (data not shown).

Discussion

The problems created by the maxillectomy defect are notably chewing, speech, and swallowing. Obturation has its place. Kornblith et al⁴ reported that satisfactory functioning of the obturator prosthesis significantly contributes to improved psychological

well being and quality of life for maxillectomy patients. The most significant predictor of better obturator functioning were extent of soft palate resection (one third or less; $P < .001$), and hard palate (one fourth or less; $P < .01$). It can be difficult to provide an acceptable prosthesis in large defects such as those that include the orbital content or facial skin. Also, patients with poor manual dexterity, visual impairments, or trismus may have difficulty with manipulating the appliance. Various methods have been described to surgically close the defect, such as alveolectomy and palatotomy after a low-level maxillectomy,¹⁹ buccal fat,²⁰ and free calvarial bone grafts with pedicled temporoparietal fascia flaps.²¹ With the emergence of microvascular free tissue transfer in recent years several algorithms and experiences after maxillectomy have been published.^{3,6,18,22} The options for microvascular free tissue transfer include the deep circumflex iliac artery with internal oblique muscle,⁵ rectus abdominis or radial,⁶ fibula,²³ or those supplied by the subscapular artery (latissimus dorsi, scapula, serratus anterior).²⁴ Osseointegrated implants can be inserted into vascularized bone as part

Table 6. OBTURATOR FUNCTION

	Not at All (n)	A Little (n)	Quite a Bit (n)	A Lot (n)	All the Time (n)	Quite a Bit/A Lot/ All the Time (%)
Had difficulties inserting your obturator	9	—	1	—	—	10
Had dryness of mouth	4	3	—	2	—	20
Avoided family and social events	10	—	—	—	—	—
Been dissatisfied with your looks	5	5	—	—	—	—
Had nasal leaking on swallowing liquids	3	3	1	1	2	40
Had nasal leaking on swallowing food	6	1	1	—	2	30
Had difficulties chewing food	3	4	2	—	1	30
Noticed nasal speech	7	1	1	—	1	20
Had difficulties being understood	6	4	—	—	—	—
Had difficulties talking in public	6	4	—	—	—	—
Had difficulties pronouncing words	4	4	2	—	—	20
Noticed a difference in your voice	6	3	—	1	—	10
Had numbness of the upper lip	5	3	—	1	1	20
Noticed clasps on the front teeth	6	1	1	1	1	30
Had difficulties in breathing while eating	7	2	—	—	1	10
Your upper lip looks funny	5	2	1	—	2	30
Had trouble with your hearing	5	3	—	1	1	20

of oral rehabilitation. However, in many cases the most appropriate methods of rehabilitation remain a choice between obturation and free tissue transfer.

As the debate regarding the relative merits of prosthetic versus surgical maxillectomy obturation

continues, the patient's subjective outcome should be considered. Unfortunately, the number of studies reporting HRQOL specific to maxillectomy is negligible. This may be partially due to the relatively small numbers of cases treated each year by individual units. In our study, it was necessary to perform a cross-sectional survey to have enough patients to make a comparison between obturator and free flap groups. Eight questionnaires were used to discover differences between the groups and to include the multidimensional construct of HRQOL. To ensure that all questionnaires were completed, we conducted a structured interview. Therefore, the study was limited to patients willing to attend a research clinic. Comparison between the 2 groups was difficult mainly because the larger maxillectomy defects tended to be reconstructed using free tissue transfer.

The groups were similar in age and gender; however, the free flap group had a relatively shorter follow-up, a mean of just over 3 years. This group also underwent more extensive resections involving the hard palate, soft palate, and orbital exenteration. The extent of the maxillectomy defect appears to make a difference. Patients with defects larger than 2a reported problems with activity and recreation (UW-QOL), and with the physical functioning and quality of life domains of the EORTC. Weaker correlations with speech, chewing, appetite, and depression were also found. No statistically significant differences were found between the obturator and free flap groups. However, the lack of difference may reflect the small sample size.

An attempt was made to control for the type of maxillectomy defect, 2a or less versus 2b or more.

Table 7. ASSOCIATIONS WITH SIZE OF MAXILLECTOMY DEFECT

	Spearman correlation (n = 27 patients)	
	Coefficient	P Value
University of Washington		
Activity	-0.53	.005
Recreation	-0.70	<.001
Employment	-0.40	.04
Speech	-0.44	.02
Chewing	-0.34	.09
Total	-0.48	.01
EORTC		
Physical function	-0.58	.001
Quality of Life	-0.51	.007
Appetite	0.44	.02
EORTC-35		
Problems with teeth	-0.35	.08
Talking on phone	0.40	.04
Social contact with family	0.36	.07
HAD		
Depression	0.47	.01
Clinicodemographic		
Age at operation	0.48	.01
Age at interview	0.45	.02
Years of Follow-up	-0.49	.01

NOTE. Maxillectomy defect 1, 2a, 2b, 3a, 3b, 4a, 4b is an ordered categorical variable. Correlations for which $P < .10$ are reported here.

Abbreviations: EORTC, European Organization for Research and Treatment of Cancer; HAD, Hospital Anxiety Depression questionnaire.

There was a trend for obturator patients to report more problems with appearance, pain, and soreness in the mouth, teeth, and upper dentures. Differences between the 2 groups were not due to poor prosthetic rehabilitation because the obturator functioning scale revealed that patients were generally satisfied with their prosthesis. Another explanation why there are no clear differences between the 2 groups could be due to the cross-sectional survey. The largest HRQOL changes for head and neck cancer patients are seen in the first year after diagnosis.²⁵ Thereafter, most variables return to pretreatment values.²⁶ Additionally, patients tend to adapt over time and under-report deficits.^{27,28} Thus, in a longitudinal study starting before treatment, bigger differences between groups may have been noted.

The debate regarding the relative merits of prosthetic versus surgical maxillectomy obturation continues. This study highlights the limitations of QOL assessment using a small number of patients. A larger longitudinal comparison is required. However, this study suggests that, in appropriate circumstances, patients should be offered the choice between free flap reconstruction and obturation.

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