RELATIONSHIP BETWEEN SUBJECTIVE AND OBJECTIVE ASSESSMENTS OF ORAL FUNCTION AFTER ORAL CANCER TREATMENT: A SINGLE-CENTER CROSS-SECTIONAL STUDY

Yuhei Matsuda[1], Yusuke Nouchi[2], Hiroto Tatsumi[1], Takahiro Kanno[1]
[1]Shimane University Faculty of Medicine, Department of Oral and Maxillofacial Surgery/Oral Care Center, Japan
[2]Shimane University Faculty of Medicine School, Japan

ABSTRACT

Introduction
Postoperative oral dysfunction in patients with oral cancer can occur after treatment. This study aimed to elucidate the relationship between subjective and objective assessments of oral function after oral cancer treatment using single-center cross-sectional data.

Methods
Patients with oral cancer who were treated at the Department of Oral and Maxillofacial Surgery/Oral Care Center of Shimane University Hospital from September 2019 to March 2023 were included in this study. Informed consent for study participation was obtained from the patients. All the patients underwent subjective assessment (improved, unchanged, or worse) and comprehensive oral function measurement at the end of primary treatment for oral cancer. Data on background factors were also obtained from medical records. Multiple logistic regression analysis with subjective assessment of oral function as the objective variable was performed. This study protocol was approved by the Medical Research Ethics Committee, Shimane University Faculty of Medicine (number 4041).

Results
Altogether, 102 patients with oral cancer (74 men [72.5%] and 28 women [27.5%], with a median age of 72.0 years [25th–75th percentile: 63.0–78.0]) were enrolled. The most common primary tumor site was the tongue in 45 cases (44.1%), and the cancer stage was advanced in 64 cases (62.7%). Surgery alone was the most common treatment method, with neck dissection performed in 64 cases (62.7%) and reconstructive surgery in 58 cases (56.9%). Multiple logistic regression analysis showed that performance status (odds ratio = 3.87, P = 0.03) and tongue pressure (odds ratio = 0.85, P = 0.02) were significantly correlated with patients' subjective worsening.

Conclusions
To improve patients' subjective assessment of oral function after oral cancer treatment, treatment modalities that can maintain tongue pressure should be considered.

INTRODUCTION

■ **Discrepancies between subjective and objective assessments in medical staff and patients**

- Discrepancy in quality of life (QoL) ratings in patients with prostate cancer
- Discrepancy in assessment of peripheral neuropathy in patients with breast cancer
- Discrepancy in QoL assessment in patients receiving palliative care

Sonn GA et al. J Urol. 189:S59–65, 2013
Shimozuma K et al. Support Care Cancer. 17:1483–91, 2009
Petersen MA et al. Eur J Cancer. 42:1159–66, 2006

■ Postoperative oral dysfunction occurs after oral cancer treatment


Pre-treatment


Post-treatment


3 months postoperatively

Table 1. Classification of postoperative oral dysfunction (Matsuda–Kanno classification)

Type	Definition
Transport type	A condition in which dysfunction occurs during the oral preparatory and transit phases of swallowing owing to treatment-induced damage to the tongue, palate, buccal mucosa, or oral floor.
Oral hygiene type	Conditions in which occlusion is impaired because of loss of maxilla and mandibular or teeth from treatment.
Occlusion type	Conditions in which the self-cleaning and antibacterial moisturizing functions of the oral cavity are impaired by treatment.

Matsuda Y, T Kanno et al. Oral Oncol. 2021;121:105468.

This study aims to investigate the influence of postoperative oral dysfunction on patients' subjective evaluation

METHODS AND MATERIALS

■ **Study design**
Single-center cross-sectional study

■ **Participants**
102 patients with oral cancer who completed standard treatment (National Comprehensive Cancer Network guidelines) at the Department of Oral and Maxillofacial Surgery of Shimane University Hospital between April 2019 and March 2023.

■ **Inclusion criteria**
1. Diagnosis of oral squamous cell carcinoma
2. Admission to Shimane University Hospital Oral Surgery and Oral Care Center for oral cancer treatment
3. Age of >20 years and ability to provide own informed consent
4. Ability to understand the intent of a question and answer independently

■ **Exclusion criterion**
1. Missing data

■ **Data collection**

Background data
- Sex
- Age (years)
- Body mass index (BMI; kg/m^2)
- Regular drinking (yes/no)
- Brinkman index
- Performance status

Cancer-related data
- Primary tumor site
- Clinical cancer stage
- Treatment method
- Neck dissection (yes/no)
- Reconstruct surgery (yes/no)
- Systemic disease

■ **Oral function measurement**


Bacterial counter (Panasonic Healthcare Co., Ltd.)
Oral moisture checker (Mucus, Life Co., Ltd.)
JMS tongue pressure measuring instrument TPM-01 (JMS Co., Ltd.)
Masticatory ability testing system (Gluco Sensor GS- II, GC Corporation)
Dental Prescale Occluzer (GC Co., Ltd.)
Eating assessment tool (EAT-10)

■ **Subjective question for patients**
How did your mouth feel before and after treatment?
Better / no change / worse

■ **Statistical analysis**

Descriptive statistics
- Number of patients (%) or median (25th–75th percentile)

Group comparison
- Chi-squared test
- Kruskal–Wallis test
- Jonckheere–Terpstra test

Multivariate analysis
•Multinomial logistic regression analysis
The SPSS version 27.0 (SPSS Japan K.K., Tokyo, Japan) was used. The significance level was set at P < 0.05.

RESULTS

Table 2. Patient characteristics and group comparison

		N(%), median [25th–75th percentile]			
		Worse (n=12)	No change (n=41)	Better (n=49)	P-value
Sex	Male	9 (75.0)	34 (82.9)	31 (63.3)	0.11
	Female	3 (25.0)	7 (17.1)	18 (36.7)	
Age (years)		73.0 [63.5–85.0]	70.0 [61.0–74.0]	73.0 [65.0–78.5]	0.31
Primary tumor site	Tongue	5 (41.7)	18 (43.9)	22 (44.9)	0.98
	Gingiva	4 (33.3)	19 (46.3)	16 (32.7)	0.39
	Others	3 (25.0)	4 (9.8)	11 (22.4)	0.23
Clinical cancer stage		2.5 [1.0–4.0]	4.0 [2.5–4.0]	3.0 [1.0–4.0]	0.15
Treatment method	Surgery	5 (41.7)	18 (43.9)	30 (61.2)	0.20
	Surgery + RT	7 (58.3)	20 (48.8)	18 (36.7)	0.30
	Surgery + CRT	4 (33.3)	19 (46.3)	8 (16.3)	0.01
Neck dissection (yes)		5 (41.7)	29 (70.7)	30 (61.2)	0.18
Reconstruct surgery (yes)		4 (33.3)	27 (65.9)	27 (55.1)	0.13
Body mass index		21.2 [19.3–22.5]	20.5 [17.9–22.5]	22.4 [19.0–24.6]	0.15
Performance status		0.0 [0.0–2.0]	0.0 [0.0–0.0]	0.0 [0.0–0.0]	0.10
Microorganisms (grade)		3.5 [2.3–4.0]	4.0 [2.0–5.0]	3.0 [2.0–4.0]	0.07
Oral dryness		25.8 [23.6–27.2]	24.2 [19.6–26.6]	24.8 [21.1–26.5]	0.59
Occlusal force (N)		329.5[26.6–464.3]	269.7 [38.7–444.4]	169.8 [12.8–454.5]	0.76
Tongue pressure (kPa)		9.0 [3.5–14.4]	13.9 [3.4–22.7]	18.8 [11.2–24.4]	0.01*
Masticatory function (mg/dL)		54.0 [16.5–146.3]	92.0 [12.0–172.0]	77.0 [38.0–160.0]	0.69
EAT-10		22.5 [8.5–33.8]	15.0 [6.5–22.5]	9.0 [3.0–22.0]	0.13

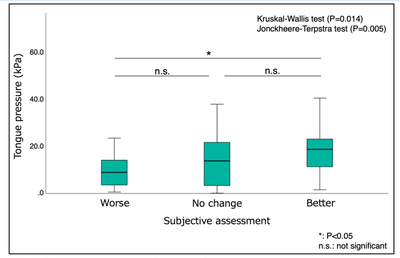


Figure 1. Group comparison of tongue pressure and patient subjective assessment

Table 3. Multinomial logistic regression analysis of postoperative oral function and subjective assessments

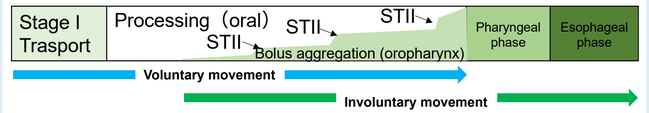
	Multinominal logistic regression analysis (Reference category: no change)			
	Worse (n=12)		Better (n=49)	
	Adjusted odds ratio (95% confidence interval)	P-value	Adjusted odds ratio (95% confidence interval)	P-value
Performance status	3.87 (1.12–13.40)	0.03*	1.02 (0.49–2.14)	0.95
Tongue pressure	0.85 (0.74–0.97)	0.02*	1.01 (0.96–1.06)	0.72

Adjusted variables: age, sex, clinical cancer stage, body mass index, primary tumor site, treatment method, neck dissection, and reconstructive surgery. *P<0.05.

DISCUSSION

■ **Postoperative oral dysfunction (Matsuda–Kanno classification transport type)**

Swallowing process model



Palmer JB et al. Arch Phys Med Rehabil, 79:691–6, 1998

Because the tongue performs both voluntary and involuntary movements for sensory and motor functions such as feeding, swallowing, and articulation, loss of tongue function can strongly impair a patient's sense of physical function.

Sasegbon A et al. Neurogastroenterol Motil, 29, 2017

CONCLUSIONS

- The subjective assessment after oral cancer treatment may be strongly influenced by decreased tongue pressure.
- In preserving patient QoL after oral cancer treatment, maintaining tongue pressure through reconstructive surgery, prosthetic treatment such as palatal augmentation prosthesis, and swallowing rehabilitation should be considered.