

## FUNCTIONAL ASSESSMENT AFTER ORAL CANCER RESECTIONS IS OBJECTIVE ASSESSMENT MANDATORY

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### ABSTRACT

Oral cavity is an aesthetically and functionally important area which serves form and many important functions including speech and swallowing. About two thirds of patients with oral cavity cancer present with locally advanced disease, necessitating multimodality management in the form of surgery, radiation and chemotherapy. Surgery often has to be extensive in nature requiring complex reconstructive procedures. This in turn results not only in disfigurement but also interference with essential functions like speech, swallowing, mastication, mouth opening and oral competence. Functional assessment of 51 patients with oral cavity SCC undergoing surgery either upfront or post neoadjuvant therapy was done both subjectively [institution based scoring system] and objectively [Objective methods]. It has been found that both assessment methods correlated well with each other. It has also been observed that there is a trend towards decline in the functions in the post therapy period.

**KEYWORDS :** Quality of life, Oral cancers, Functional Outcomes

Quality of life (QOL) is an important aspect in the assessment of health status and the impact of therapies in patients with oral cavity cancers. The important functions affected after oral cavity resections include speech, swallowing, mastication, mouth opening and oral competence. The impact of aggressive surgery to acquire oncologically safe margins adversely affects these functions

Assessment of quality of life has the following advantages (Suarez-Cunqueiro et al; 2008)

1. It provides important information about the psychosocial well being of the patients.
2. The effects of disease and its treatment on function can be evaluated.
3. Aids in decision making about the type of treatment.
4. Helps in planning rehabilitation methods.

The limitations of such studies include (Villaret et al; 2008, Borggreven et al; 2007)

1. Heterogenous patient population in many of the analyzed studies with different sites and stages of the disease precluding comparison of results between the studies.
2. There is no universally standardised methods for measurements of outcome with various studies employing different assessment instruments and different methodologies (subjective and objective).

Our aim is to determine the correlation between subjective and objective assessments of the functional outcome of patients after oral cancer resections.

### MATERIALS AND METHODS

This prospective study was done at a tertiary care centre in South India. All Patients undergoing surgery for oral cavity squamous cell cancers primarily or after neoadjuvant chemo or RT or chemoRT were included in the study. Patients with pretreatment cognitive impairment and speech problems and those requiring revision surgery were excluded.

All the patients were assessed preoperatively, 6months and 1 year after treatment for the following parameters which includes pain, mouth opening, oral competence, occlusion, speech, swallowing, social acceptance.

#### Subjective Assessment

This is done by using "Royapettah Scoring System" (Table 1) devised in our institution which assesses the above said parameters. Assessment is done by interacting with the patient and sometimes with the attendants.

#### Objective Assessment

Assessment of pain and social acceptance was done subjectively while the other parameters were examined objectively also as follows

#### Mouth Opening

Assessed by measuring the inter incissal distance and in edentulous patients with inter alveolar distance. A measurement of >3.5cm is considered normal. Patients were categorized into grade 1, grade 2 and grade 3 trismus if the

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**Table 1 : Royapettah Scoring System (RSS)**

Scores	Excellent(5)	Good(3)	Fair(1)	Poor(0)
Pain	Nil	Rare	Modest	severe
Mouth opening	Normal	Trismus +	Trismus++	Trismus +++
Oral competence	Blows	Holds food	Rare spill	Drooling of saliva
Occlusion	Hard bite	Chews solid	Soft solids	Liquids only
Swallowing	Normal	Avoids certain food	regurgitation	aspiration
Speech	Normal	Few syllables	Audible	Not audible
Cosmetic/social acceptance	Resumes work Enthusiastically	Adapts to work	Socializes and accepts	Confines & dislikes

measured distances are 2.5-3.5cm, 1.5-2.5cm and <1.5cm respectively.

### Oral Competence

Evaluated by asking the patient to hold a maximum amount of water and this volume was then measured and compared with a standard volume (measured from 20 normal patients) and graded.

### Speech

Speech evaluation was done by speech pathologist for both articulation and intelligibility. Standard articulation tests were used for assessment where the patient is asked to read and was observed for substitution, addition, distortion and omission errors. Intelligibility was assessed from patient's spontaneous speech. Combining these two factors speech was scored as <50%,51-75%,>75% with >75% being the best score.

### Swallowing

Swallowing was assessed by subjecting the patient to videofluoroscopic examination and the images were recorded both in anteroposterior and lateral views in a videotape. The material used was barium either in paste or liquid form whichever the patient was able to consume. The recordings were observed for oropharyngeal delay, retention of barium in vallecula, penetration and aspiration and the patients were grouped accordingly for ease of

statistical analysis.

Scoring by videofluoroscopy is as follows

- 5 - normal
- 3 - retention of barium
- 1 - laryngeal penetration
- 0 - aspiration or unable to swallow

For comparison with the subjective version of RSS the corresponding scoring categories for the objective version is as follows (Table 2). Statistical analysis was done with SPSS for Windows 17.0 (@ SPSS Inc, USA). Quantitative data are described as mean and standard deviations. Comparison of groups was carried out for various categorical variables using Chi-square test of association. A p-value (two-tailed) < 0.05 was taken as significant.

## RESULTS

The numbers of patients included in the study were 51. 67% were males (n= 34) and 33% were females (n=17). Age ranged from 25 - 75 years with a mean age of 50. The commonest subsite involved in our study group was buccal mucosa (n=18) followed by tongue (n=16), upper and lower alveolus (n= 8), lip (n=3), retromolar trigone (n=3) floor of mouth (n=2) and hard palate (n=1). The clinical T stage of our patients were as follows T1 in 11, T2 in 21, T3 in 4, T4

**Table 2 : Scoring of Objective Assessment**

S. No	Parameters	Score 5	Score 3	Score 1	Score 0
1	Mouth Opening	>3.5cm	3.5-2.5cm	2.5-1.5cm	<1.5cm
2	Oral Competence	Normal	50ml	25ml	Drooling at Rest
3	Occlusion	Normal	Mild	Moderate	Severe
4	Speech	Normal	<25%	25-50%	>50%
5	Swallowing	Normal	Retention of Barium	Penetration	Aspiration

**Table 3: Trend of Functional Outcomes from Preop to Postop Period**

Parameters	Preop Vs 6 Months P value	Preop Vs 1 Year P value	6 Months Vs 1 Year P value
Pain	0.322	< 0.01**	< 0.01**
Mouth Opening	<0.01**	< 0.01**	0.322
Oral Competence	< 0.01**	< 0.01**	1.000
Occlusion	< 0.01**	< 0.01**	1.000
Speech	< 0.01**	< 0.01**	1.000
Swallowing	< 0.01**	< 0.01**	1.000
Social Acceptance	< 0.01**	< 0.01**	0.322

**Table 4: Paired Sample Test Comparing Subjective Versus Objective Methods**

Outcome Parameters	Preop (P Value)	6 Months (P Value)	1 Year (P Value)
Mouth Opening	0.322	1.000	1.000
Oral Competence	0.159	1.000	1.000
Occlusion	0.322	1.000	1.000
Speech	0.322	0.322	0.322
Swallowing	0.322	0.322	1.000

in 15 patients . Nodal staging was N0 in 38 and N+ in 13 patients. The type of resections included wide local excision (n=19), hemiglossectomy (n=7), palatoalveolar resection (n=4) and composite resection (n=21). 39 patients had neck dissections in their treatment protocol in the form of selective neck dissection (n=18), modified radical neck dissection (n=15) and radical neck dissection (n=6).

31% (n=16) of patients had primary closure after resection of the tumour whereas the remaining 69% had reconstruction in various forms. The reconstruction techniques used were SSG in 8% (n=4), local flaps in 12% (n=6) which included tongue flap in two patients, nasolabial flap in two patients and mucosal advancement flap in two patients .37% (n=20) of patients were reconstructed with pedicled flaps. The pedicled flaps employed in our group of patients were pectoralis major myocutaneous flap (PMMC) only in 11 patients, bipaddled PMMC flap in one patient, both PMMC and deltopectoral flap for lining and cover respectively in 7 patients and forehead flap in one patient. Two patients had their reconstruction with microvascular free flap one with free anterolateral thigh flap and another with fibular osteocutaneous flap. Three of our patients had prosthetic reconstruction with obturators. 20% (n=10) of patients received adjuvant radiotherapy.

Preoperative assessment of the parameters revealed the following findings, pain in 22%(n=11), trismus in 14% (n=7), oral incompetence in 6% (n=3), speech problems in 8% (n=4) and swallowing impairment in 2% .In the present study, it has been found that the pain has improved in the postoperative period both at 6 months and one year when compared to the preoperative level. Whereas statistically significant worsening of functions in terms of mouth opening , oral competence , occlusion , speech and swallowing were found at 6 months after surgery when compared to preoperative levels and the corresponding p values have been shown in the (Table 3). The social acceptance and quality of life was also deteriorated in the post operative period. There is no significant differences in the outcomes between 6 months and one year implying that there is no improvement in the recovery of functions after 6 months. Except for the pain and social acceptance which are mainly subjective and cannot be assessed objectively, the assessment of other parameters with subjective and objective methods was compared using the assessment data at 6 months post treatment. In the present study, there was no difference between the two assessment methods in terms of statistical significance and are found to correlate well with each other (Table 4).

## DISCUSSION

Assessment of oral functions after radical surgery is complex due to involvement of numerous interaction variables (Suarez-Cunqueiro et al; 2008). Most of the studies done on this aspect are mainly subjective where the outcomes can be either overestimated or underestimated. Studies comparing subjective and objective methods of assessments are very limited in number and the current study is one among these.

Except for the pain which improved in the postoperative period, the other functions like mouth opening, occlusion, oral competence, speech and swallowing were found to be impacted negatively 6 months after treatment and no improvement in the functions from 6 months to one year implying that the recovery of functions is only modest after 6 months.

Villaret et al, (Villaret et al ;2008) in his study on 92 patients with oral cavity cancers treated with surgical resection and reconstruction, evaluated the quality of life domains (mastication, speech, swallowing and disfigurement) using UW-QOL and H&N performance status scale at preop, 3, 6 and 12 months postoperatively. The trend was similar to the present study where the functions worsened at 3 months and the postoperative scores never reached the preoperative scores.

Another study by Borggreven et al (Borggreven et al 2007) on 80 patients with oral and oropharyngeal carcinoma (stage II IV) treated with composite resection with free flap reconstruction with or without RT evaluated the swallowing function. This study revealed no significant differences on any of the swallowing parameters at 6 months and one year indicating that the status of swallowing remained the same in that time period.

Roger et al's (Roger et al 2002) study on oral cancer patients also revealed a trend similar to the present study (number of patients 132 ) that there was a fall from preoperative levels at 6 months. The study also concluded that functional impairments persisted following treatment.

Regarding the assessments methods, the present study revealed no significant differences between the subjective and objective methods. This finding was confirmed in a study by Campbell et al (Campbell et al

2000) on quality of life in head and neck cancer survivors ( number of patients =62), reported that the swallowing difficulties perceived by the patients subjectively were correlated with objective finding of aspiration on videofluoroscopy.

A similar study by Agarwal et al (Agarwal et al 2011), in 47 patients with head and neck cancer treated with definitive chemoradiation evaluated the swallowing function and revealed that subjective dysphagia (PSSHN scores) correlated well (Pearson's correlation coefficient 0.97) with objective swallowing dysfunction.

Matsui et al (Matsui et al 2007) on the study of factors influencing post operative speech function of tongue cancer patients (number of patients = 81), with the both subjective questionnaires (three self reported questionnaires and objective tests (speech intelligibility test and conversational understandability test ) found significant correlation between the two.

Study by Scott et al (Scott et al 2008), on 100 head and neck cancer patients for mouth opening revealed that subjective problems perceived by the patients were related to actual measurement of mouth opening where mouth opening was measured using Willis bite gauge. The questionnaire used in the study include the University of Washington quality of lifescale (UWQOL) v4, the Liverpool oral rehabilitation questionnaire (LORQ) v3, and the performance status scale. There was found to be a significant association for impaired speech and oral function between self reported global HRQOL and objective assessment methods in a study by Roger et al (Roger et al., 2002).

Though there are no significant differences in between these methods of assessments in determining the magnitude of problem, there exists a qualitative difference and the exact nature of the problem was well made out with objective methods. For example considering the swallowing function, patients who had subjective perception of dysphagia also had reduced scores with objective evaluation whereas one patient with complained of delayed swallowing was found to have penetration in the videofluoroscopy which would have gone undetected if videofluoroscopy was not employed.

Moreover videofluoroscopy reveal the nature of impairment like reduced lingual palatal contact, decreased tongue base retraction, retention of food material in the vallecula and reduced hyolaryngeal elevation which in turn can aid in tailoring the rehabilitation needs. For example palatal augmentation prosthesis will be helpful for patients with reduced linguo palatine contact and range of motion exercises and compensatory strategies for others.

## CONCLUSION

There is a decline in the important functions of oral cavity in the post treatment period which do not get restored in the later periods. In the present study, subjective and objective assessment methods correlated well with all the parameters except for swallowing where more qualitative data regarding the nature of the impairment was obtained from objective studies which further aid in tailoring rehabilitation measures pertaining to the need.

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