



## EFFICACY OF OROMOTOR STIMULATION ON DROOLING AMONG ORAL CANCER PATIENTS.

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### ABSTRACT

**OBJECTIVES:** 1. To find out the percentage of drooling before Oromotor Stimulation among Oral cancer patients.

2. To find out the percentage of drooling after Oromotor Stimulation Among Oral Cancer patients.

**METHOD:** An Interventional study was carried out between February 2022 to April 2022 at Krishna Institute of Medical Sciences, Karad. 30 subjects who had Oral Cancer with drooling were taken into this study after the informed consent was obtained. The pre and post Assessment was done using Manual Muscle testing, Drooling Quotient, Thomas-Stonell and Greenberg's 1998 classification of drooling, Visual Analogue Scale, and Range of Motion and statistically analyzed. **RESULTS:** The severity of drooling during the pre-treatment protocol was mean of 27 and SD 12.07 and the post-treatment protocol was a mean of 15.55 and SD 4.973. Similarly, the frequency of drooling pre-intervention was mean of 6.1 SD 0.9, and post-intervention was 2.03 SD 0.13. After the intervention, we found that there was a much decrease in the percentage of drooling, an increase in ROM, a decrease in pain, and an increase in sensitivity. **CONCLUSION:** Oromotor Stimulation was found to be effective in a decrease in drooling among oral cancer patients.

**KEYWORDS :** Oromotor Stimulation, Oral Cancer, Drooling

### INTRODUCTION

Cancer is a group of diseases that occurs when abnormal cells grow uncontrollably or spread to other parts of the body. Oral Cancer is squamous cell carcinoma that arises on the lip or oral cavity. Ninety percent of it histologically originated from squamous cells. It includes lips, cheeks, sinuses, tongue, and hard and soft palate, the base of the mouth to the oropharynx. Worldwide oral cancer is at the sixth position among all the types of cancer.<sup>2</sup> Oral cancer is present with a poor prognosis, and delayed clinical presentation, without any specific disease-related biomarkers and expensive management. Since the risk factors of the disease are known it can be prevented easily.<sup>3</sup>

In India, around 77,000 new cases and 52,000 deaths are reported annually. These account for one-fourth of the incidence globally.<sup>4</sup> Altered salivary flow is a very common symptom seen in Head and Neck Cancer patients. Decreased salivation or xerostomia is a frequently occurring symptom as a consequence of radiotherapy. On the other hand, excessive drooling or salivation can also be troublesome to patients and caregivers. Complications related to altered salivary flow may lead to morbidity and low incidence of mortality.<sup>5</sup> Drooling, hypersalivation, sialorrhoea, and pyalism are commonly used for excess salivation.

The management of drooling following oral cancer is managed by the surgical or nonsurgical method. The surgery is planned according to the extent of drooling. The various surgical approaches are transplantation of parotid duct, removal of the salivary gland, sectioning of chorda tympani or tympanic nerve, or a combination of these procedures. And the nonsurgical methods include pharmacological therapy, radiotherapy, physiotherapy, and behavior therapy.<sup>6</sup>

Oromotor therapy facilitates the normal motor pattern. It uses different techniques like brushing, stroking, vibration, and taping which are intended to improve jaw mobility, closure of the mouth, increase tongue mobility, strength and sensory awareness, and decrease hypersensitivity. The exercises aim to decrease drooling and should be practiced several times daily in front of the mirror.<sup>7</sup>

Despite proper medications and care, there has been limited success to prevent drooling among oral cancer patients. The management of excessive salivary flow is less frequently discussed in medical research. The previous literature shows that oromotor therapy is effective in reducing drooling among cerebral palsy children. It is also effective in Parkinson's disease for various oromotor dysfunctions like swallowing, sucking, drooling, and chewing. Collectively it minimizes the usage of intra-oral devices.

### AIM AND OBJECTIVES

To find out the percentage of drooling before and after oromotor stimulation among oral cancer patients.

### METHODS AND METHODOLOGY

This interventional study was carried out between February 2022 to April 2022 in Krishna Institute of Medical Sciences Deemed to University, Karad. After informed consent patients who had to drool between the age group of 25-65 were taken into the study. 22 out of 30 were males and 8 were females. It was observed that 93% of subjects were consuming tobacco, 60% of the population were consuming alcohol and 46% and 40% of the population were taking misery and smoking respectively. It was observed that all the subjects were following the commands, had a good verbal response, and had independent feeding. No subjects had any uncontrolled seizures, uncorrected or untreated cleft lip or cleft palate, or open wounds around lips or face.

### Procedure

All the 30 cases underwent oromotor stimulation therapy for 12 weeks with 3 sessions per week. An assessment was performed by using Manual Muscle testing, Drooling Quotient, Thomas-Stonell and Greenberg's 1998 classification of drooling, Visual Analogue Scale, and Range of Motion.

The frequency and severity of drooling were assessed pre-and post-exercise using the scale described below.

#### A) Drooling Quotient

To assess the drooling quotient patient was asked to sit in a chair. It was assessed at rest and on activity. Drooling was

observed during trials of 5 minutes. In the first trial subject was asked to perform an activity in a sitting position (interaction/singing/playing) and in the second trial, the subject was at rest (listening to a story or reading a newspaper). During each trial of 5 minutes, the presence (score 1) or absence (score 0) of new saliva was recorded at every interval of 15 seconds. Then, DQ was expressed as the percentage of observed drooling episodes (interval with new saliva) and the total number of intervals.

$$\text{Formula: Total amount of intervals with new saliva} \times 100 / \text{Total Number of intervals (20)}$$

Then, the mean value of DQ during activity and at rest was calculated.

**B) Thomas Stonell and Greenberg's 1988 classification of drooling**

**1. Severity of drooling**

- Dry-1
- Mild, wet lips-2
- Moderate, wet lips and chin-3
- Severe Clothing Damp-4
- Profuse- clothing, hands, and objects wet-5

**2. Frequency of Drooling**

- Never-1
- Occasionally-2
- Frequently-3
- Constantly-4

**Data Analysis**

Data collected in terms of pain assessment using VAS, Range of motion, Drooling Quotient, Severity of drooling, Frequency of drooling, and MMT of the muscles were evaluated and analyzed using a t-test formula and tabulated in pre and post-exercise manner.

**DISCUSSION**

In this study, we found that due to oral cancer the patients suffered from pain, decrease ROM, increase drooling, decrease jaw stability, and less awareness of sensation. After the intervention, we found that there was a much decrease in the percentage of drooling, an increase in ROM, decrease in pain. To improve more strength, we added different types of exercises for the tongue like protrusion of the tongue between lips, retraction of tongue, tongue extension and retraction, tongue elevation along the palate, and sideways movement of the tongue. Then exercises of lip were given like lip retraction, lip protrusion, and lip retraction with protrusion. Plus, lip press, lip press with a tongue depressor, and puff cheeks were given. For bolus control gargles, blowing candles, blowing balloons, dry swallowing, squeezing all swallowing muscles, yawning, etc. were practiced.

An overall reduction in the percentage of drooling was reported. Along with that, the quality of muscles around the jaw was improved and functional independence was found to be better after the intervention. The more likely reason for it could be better treatment of choice, use of oromotor therapy, strength training, and early physiotherapeutic approach.

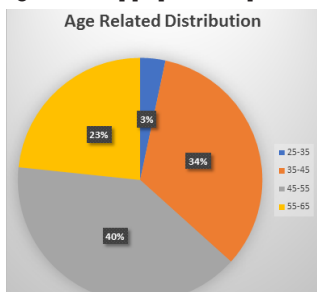


Figure 1: Graph showing age-related distribution

Age Group	Frequency	Percentage
25-35	1	3.33%
35-45	10	33.33%
45-55	12	40%
55-65	7	23.33%

Table 1: Mean, SD T value, and p-value of Pre and Post values of Visual Analogue Scale (VAS) At Rest and On Activity.

VAS (At Rest)	Pre-Intervention	Post Intervention	VAS (On Activity)	Pre-Intervention	Post Intervention
Mean +SD	0.766+1.455	0.4333+0.7739	Mean SD	4.2666±0.8683	2.1666±0.8743
N	30	30	N	30	30
T Value	1.108	1.108	T value	9.9334	9.9334
P value	0.2724	0.2724	P value	<0.0001	<0.0001

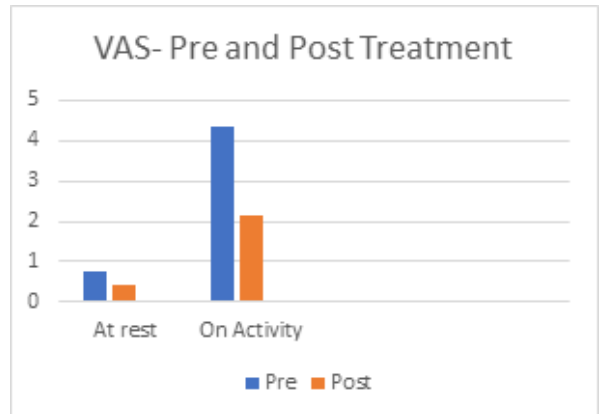


Table 2: Mean, SD, t value, and p-value of Pre and Post value Drooling Quotient (DQ) At Rest and On Activity.

DQ (At Rest)	Pre-Intervention	Post Intervention	DQ (On Activity)	Pre-Intervention	Post Intervention
Mean +SD	27±12.077	15.55±4.973	Mean SD	52.166±13.499	36.666±7.350
N	30	30	N	30	30
T Value	4.822	4.822	T value	5.524	5.524
P value	<0.0001	<0.0001	P value	<0.0001	<0.0001

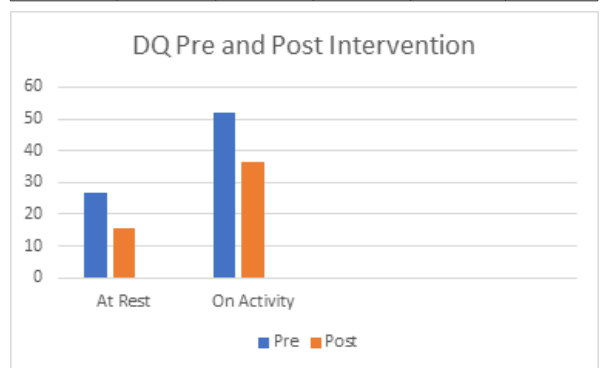
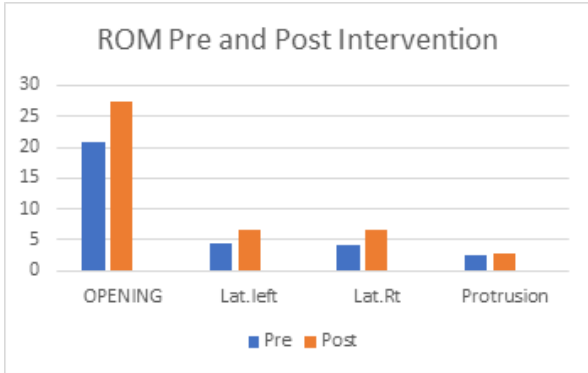


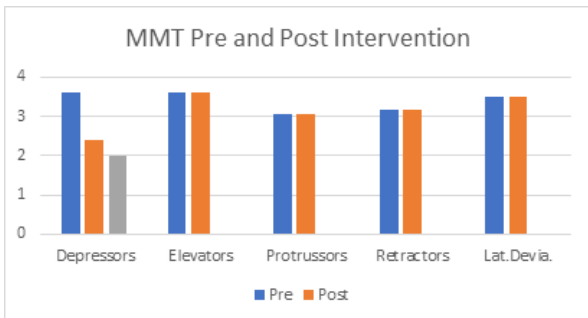
Table 3: Mean, SD, p value and t value of Pre and Post values Range of Motion (ROM).

	Pre-Intervention	Post Intervention	N	P value	T value
Mouth Opening (mm)	20.766±5.556	27.26±4.540	30	0.0001	4.958
Lat. Left (mm)	4.555±2.649	6.7±2.756	30	0.0029	3.104
Lat. Right(mm)	4.3±2.891	6.6±2.159	30	0.0009	3.492
Protrusion(mm)	2.433±1.357	3.266±1.048	30	0.0100	2.622



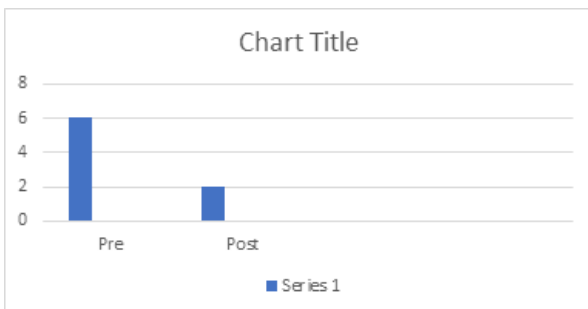
**Table 4: Mean, SD p-value, and t-value of Pre and Post value Manual Muscle Testing (MMT).**

	Pre-Intervention	Post Intervention	N	P value	T value
Depressors	3.6±0.6215	3.6±0.6215	30	>0.999	0.000
Elevators	3.6±0.6215	3.6±0.6215	30	>0.999	0.000
Protrusions	3.066±0.822	3.066±0.822	30	>0.999	0.000
Retractors	3.166±0.8339	3.166±0.8339	30	>0.999	0.000
Lat. Deviators	3.5±0.7311	3.5±0.7311	30	>0.999	0.000



**Table 5: Mean, SD, p-value score of Thomas-Stonell and Greenberg's 1988 classification for drooling**

	Mean	P value	N
Pre-intervention	6.1±0.95	<0.0001	30
Post Intervention	2.03±0.13	<0.0001	30



**CONCLUSION**

Oral Motor Stimulation is a therapy used in the present study to evaluate the level of drooling among oral cancer patients. The findings revealed that oromotor stimulation was significantly effective in reducing drooling. The therapy is nonpharmacological and cost-effective and can be easily practiced by caregivers. Hence, all healthcare workers should adopt this method of intervention in their clinical practice to reduce the level of drooling among oral cancer patients.

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