



TO STUDY THE INFLUENCE OF MANDIBULAR EXERCISE ON PAIN, MOUTH OPENING AND QUALITY OF LIFE IN POST-SURGICAL ORAL CAVITY CANCER INDIVIDUALS WITH TRISMUS

Dr. Rathnakumari, Dr. K. Madhavi, Dr. S. Raghava Krishna

ABSTRACT

Trismus is defined as restricted mouth opening of 35 mm or less. Normal full opening is 40-50- millimeters. Trismus is not a disease it is well known complication of cancer in the oral cavity region(1). The prevalence of trismus ranges from 5 to 38%. It can result in problems with speech, oral hygiene dental treatment and mastication. Trismus impacts negatively on quality of life(2) Many stretching devices were adopted to enhance mouth opening like sledge hammer, surgical mouthprop, a tapered screw, a screw-type mouth gag fingers, tongue depressor, interarch springs, intra operatively fabricated self-curing bite block, has been used(3,4). All the above studies has given little information about mouth opening, conventional exercise therapy using tongue depressors, fingers, rubber plugs had minimal effect. Hence, the aim of the study is to find out the influence of exercise with tongue depressors on pain and mouth opening, in post surgical oral cavity cancer individuals with trismus. **Results:** The pre and post experimental mean value, t-test and p values of all the three outcomes that is pain (VAS), mouth opening, quality of life shows statistically highly significant values then the control group. **Conclusion:** There is increase in mouth opening and decreased in VAS with mandibular exercises in experimental group than conventional exercises in control group.

KEYWORDS: Trismus cancer, Tongue depressors, VAS scale, QOL questionnaire.

INTRODUCTION:

Trismus is defined as restricted mouth opening of 35 mm or less. Normal full opening is 40-50- millimeters.(1) Trismus is not a disease it is well known complication of cancer in the oral cavity region. The word Trismus is Latin term derived from the Greek word "Trismos" which means grinding / rasping. In lay terms Trismus means limitation of mouth opening due to reduced mandible mobility.(2) Two bones form the boundaries of oral cavity (maxilla and mandible). Out of these two maxilla is fixed and is not mobile, whereas mandible is capable of upwards and downwards mobility with a limited forward and backward mobility too.(3)

Trismus, that is, limited mouth opening, is a common complaint after oral cancer surgery. Postoperative healing, including fibrosis and scar contraction, often results in restricted interocclusal opening of less than 35 mm between the maxillary and mandibular incisors. Procedures that may lead to trismus commonly include maxillary surgery involving the origin of medial and lateral pterygoid muscles from the pterygoid plates and mandibulectomy involving any of the muscles of mastication (the temporalis insertion to the coronoid process, the masseter insertion to the angle and ramus, and the pterygoid insertions to the medial ramus and condylar neck).(4)

The incidence of trismus ranges from 5 to 38%. According to Nina Pauli et al the incidence of trismus during the study year at the different measurement points were 9% pre-treatment and 33%,38%,28% at three ,six and 12 month post-treatment, respectively. It can result in problems with speech, oral hygiene dental treatment and mastication. Trismus impacts negatively on quality of life(5) .Many stretching devices were adopted to enhance mouth opening like sledge hammer, surgical mouthprop, a tapered screw, a screw-type mouth gag fingers, tongue depressor, interarch springs, intra operatively fabricated self-curing bite block, has been used(2). All the above studies has given little information about mouth opening, conventional exercise therapy using tongue depressors, fingers, rubber plugs had minimal effect. However, in order to explain the pathogenesis of trismus, the aetiology of oral cancer is well established in most instances with consumption of tobacco in any form and alcohol being the most common etiologic agents. Recently, however, exposure to the human papilloma virus has been implicated in young patients with oral carcinoma.

OUTCOME MEASURES:

VAS scale to assess pain, mouth opening (interincisal) is recorded with inch scale in mm. QOL is recorded using OHRQOL questionnaire. Hence, the aim of the study is to find out the influence of exercise with tongue depressors on pain and mouth opening, in post surgical oral cavity cancer individuals with trismus.

Need of the study The Few studies were done to find out the efficacy of various equipments on trismus only minimal mouth opening could be achieved and therapy could not be prolonged for longer duration and could not assess quality of life. Hence, to evaluate the use of effectiveness of exercise with tongue depressors on pain, mouth opening and quality of life in oral cavity cancer individuals.

The aim of the study is to find out the influence of exercise with tongue depressors on pain, mouth opening and quality of life in post surgical oral cavity cancer individuals with trismus.

OBJECTIVES:

- To find out the efficacy of exercise with Tongue depressors.
- To find out the efficacy of exercise with Tongue depressors on physical factors mouth opening through steel scale(mm).
- To find out the efficacy of exercise with Tongue depressors on physiological factors pain through VAS scale in post-surgical oral cavity cancer individuals with trismus.
- To find the efficacy of exercise with Tongue depressors on quality of life through QOL questionnaire in post-surgical oral cavity cancer individual with trismus.

MATERIALS AND METHODOLOGY:

- Study set-up:** Surgical oncology department, and department of physiotherapy, SVIMS
- Study duration:** 12 weeks
- Study design:** Experimental design.
- Sampling method:** Simple random sampling using lottery method
- Sample size:** 15 patients in control group and 15 patients in experimental group.

Materials:

- Tongue depressors for mouth opening exercises.
- VAS scale to assess pain.
- Mouth opening is measured as the maximal interincisal distance with inch scale.
- UW-QOL questionnaire to assess QOL.

Inclusive Criteria:

- Post-operative Oral Cavity cancer oncology patients with trismus less than 35 mm.
- Both genders are included in this study
- Age 30yrs-60yrs.
- Improvement is done Unilateral side(rt or lt).

Exclusive Criteria:

- Post-radiotherapy patients, chemotherapy patients.
- Hemodynamically unstable subjects.
- Wry neck patients

Methodology:

At baseline, recruited patients were underwent a detailed clinical examination as per the proforma. Patients were randomly divided into two groups control and experimental group. Base line values like pain using VAS scale, mouth opening measured with inch scale and QOL with were recorded before and after the intervention. Conventional physiotherapy like mouth opening exercises are given to control group for 12 weeks and exercises with tongue depressors are given for experimental group for 3 months. After 12 weeks of intervention the outcome measures like pain, mouth opening and quality of life are again recorded. TMJ joint is stabilized during isometric exercises and teeth clenching exercises is done to reduce pain.

A detailed assessment including measurement of Pain intensity is assess using a 10-level visual analog scale (VAS) with the patient placing a mark on the scale to indicate an intensity range from no pain (0) to severe/unbearable pain (10). In patients, with complete frontal dentition, mouth opening was measured as the maximal interincisal distance. In edentulous patients wearing dentures, distance between the incisors of the upper and lower dentures was measured. In edentulous patients not wearing dentures, maximal distance between the two alveolar ridges was measured. In patients with one edentulous and one jaw with frontal dentition wearing dentures, distance between the incisor of denture and the incisor was measured. In patients with one edentulous on one jaw with frontal dentition not wearing dentures, distance between the alveolar ridge and the incisor was measured with steel scale in mm will be taken and QOL assessment is made for every patient using university of washington QOL questionnaire (UW-QOL) is a well-validated questionnaire to analyse physical, functional and emotional quality of life of head and neck cancer patients. After recording the baseline values for experimental group-1, who met the inclusive criteria, underwent exercises with tongue depressors, intensity-6 repetitions, frequency-6sets, and duration-6minutes for 6times in a day for 3 months. For control group-2 underwent abdominal exercises with intensity-6 repetitions, frequency-6sets, and duration-6minutes for 6 times in a day for 3 months.

RESULTS OF STATISTICAL ANALYSES:

The statistical analysis were performed using SPSS 20.0 for windows software. The statistical values of mouth opening and pain, of experimental group and control group both the groups showed improvement but experimental group showed more improvement than control group. Within group comparison between baseline vs 12 weeks pre and post -intervention values done by the paired t-test. The total sample (n=30) has randomly divided into two groups that is control and experimental; and in each group consists 15 subjects. All the subjects completed the protocol for 12 weeks without any interruption.

The outcome of this study are:

Pain- Assessed through VAS scale, Mouth opening - Measured through steel scale in mm, Quality of life - Assessed through UW-QOL

To compare the pre and post therapeutic effects within the groups, the sample t-test was performed. Then the paired t-test has performed between the outcomes values of control and experimental groups. Pre and post values of pain (VAS) in experimental and control groups showed in table 1. pre and post values of mouth opening in both experimental and control groups showed in table 2. pre and post values of QOL in both experimental and control groups showed in table 3. overall score of QOL in control and experimental groups showed in table 4 and 5.

Table 1: Pre and post mean values of pain (VAS) in experimental and control groups.

Groups	N	Intervention	Mean $\pm$ SD	df	t-value	P-value
VAS Experimental	15	Pre	10.26 $\pm$ 3.6	14	6.92	0.000
		Post	6.41 $\pm$ 2.27			
VAS Conventional	15	Pre	10.08 $\pm$ 2.11	14	3.51	0.000
		Post	7.67 $\pm$ 1.96			

Results: The results shows that pre and post mean values of pain(VAS) are significant in both experimental and control groups. The post experimental mean value is highly significant than the control group.

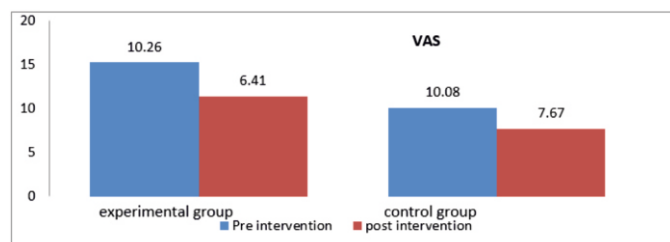


Figure 1: Analysis of pre and post mean values of VAS in experimental and control groups

The graphical representation shows that the pre and post mean values of VAS are significant in both experimental and control groups but the post mean value is highly significant than the control group.

Table 2: pre and post mean values of mouth opening(mm) in control and experimental groups.

Groups	N	Intervention	Mean $\pm$ SD	df	t-value	P-value
Control group	15	Pre	25.46 $\pm$ 5.31	14	7.66	0.000
		Post	33.62 $\pm$ 6.20			
Experimental group	15	Pre	28.93 $\pm$ 6.11	14	9.71	0.000
		Post	39.42 $\pm$ 7.66			

Results: The results shows that pre and post mean values of mouth opening are significant in both experimental and control groups. The post experimental mean value is highly significant than the control group.

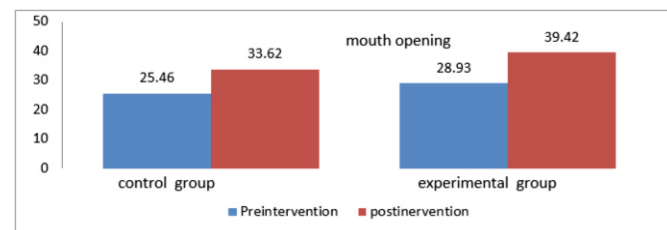


Figure 2: Analysis of pre and post mean values of mouth opening in experimental and control groups.

The graphical representation shows that the pre and post mean values mouth opening are significant in both experimental and control groups but the post mean value is highly significant than the control group.

Table 3: pre and post mean values of QOL in control and experimental groups.

Groups	N	Intervention	Mean $\pm$ SD	df	t-value	P-value
QOL Control group	15	Pre	30.80 $\pm$ 6.52	14	6.58	0.000
		Post	27.41 $\pm$ 5.74			
QOL Experimental group	15	Pre	33.53 $\pm$ 7.11	14	8.94	0.000
		Post	29.42 $\pm$ 5.60			

Results: The results shows that pre and post mean values of QOL are significant in both experimental and control groups. The post experimental mean value is highly significant than the control group.

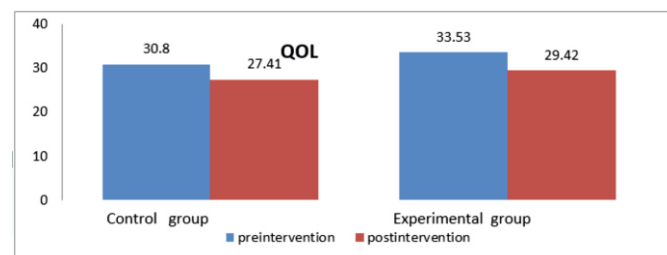


Figure 3: Analysis of pre and post mean values of QOL in experimental and control groups.

The graphical representation shows that the pre and post mean values of QOL are significant in both experimental and control groups but the post mean value is highly significant than the control group.

RESULTS:

The pre and post experimental mean value, t-test and p values of all the three outcomes that is pain (VAS), mouth opening, quality of life shows statistically highly significant values then the control group.

DISCUSSION:

In the present study total 30 samples were taken up for the study and is randomly allocated into 2 groups, Group 1 underwent structured exercises, group 2 : underwent conventional exercises pain, mouth opening and QOL are the outcome measures recorded pre(day-1) and post(3 months) therapeutically in both groups.

Pre and post mean values of pain using VAS scale in control and experimental groups

The Pre and post mean values of pain using VAS control group showed mean value of 10.08 $\pm$ 2.11(pre) to 7.67 $\pm$ 1.96 (post). Where as in the experimental group, mean values of pain is showed 10.26 $\pm$ 3.6 (pre) to 6.41 $\pm$ 2.27 (post). The

mean percentage change of pain VAS scale is 6.92% in control group, whereas 3.5% in experimental group values are significant at $p=0.001$

In the study Patria A Hume et al massage involves the application of mechanical pressure on the muscle tissue which decrease tissue adhesion and increases muscle-tendon compliance.(6) Stretching and mobilizing the muscle elongates the shortened adhered connective tissue, which in turn improves muscle compliance. Endorphins are responsible for variety of physiological response include sense of response stretching a trigger releases endocrine factors. Thus, the massage therapy and stretching exercises helps to elevate pain and decreased stiffness of the muscle.(21) According to Eesensmith (2007), massage therapy stimulates parasympathetic activity, which in turn reduces stress and anxiety. It alleviates numerous musculoskeletal pain conditions involving myofascial trigger points. Deep massage can assist in mobilizing tissue, increasing blood flow to the area and eliminating trigger points. In a nutshell, massage is the manual manipulation and kneading of soft tissues, particularly of muscles which improved blood circulation, relaxation of tense muscles, improves range of motion and increased endorphin levels, all of which may benefit people with pain.(7) In the study Jigna shah et al revealed that massage is manipulation and kneading of soft tissues, particularly of muscles which improve blood circulation, relaxation of tense muscles, improve range of motion and increase endorphin levels all of which benefit people with chronic pain.(8) In the study Rogerio Eduardo tacani et al. revealed that massage therapy and stretchings is effective in reducing pain in post-treatment complications of head and neck cancer.(9) In the study Karthikeyan et al revealed that massage therapy is effective in reducing pain in head and neck cancer.(10) All the above studies reveal that exercise is effective in regular pain, which supports the experimental group of present study.

Pre and post mean values of mouth opening in control and experiment groups

The Pre and post mean values of mouth opening in control group showed mean values from 25.46 ± 5.31 (pre) to 33.62 ± 6.20 (post). Whereas in the experimental group showed mean values of mouth opening from 28.93 ± 6.11 (pre) to 39.42 ± 7.66 (post). The mean percentage change of mouth opening values 7.66% in control group to 9.71% in experimental group values are significant at $p=0.001$.

In the study milind Naphade et al revealed that implementation of postoperative physiotherapy exercises in oral cancer patients enhanced free mouth opening with minimal functional and cosmetic deformities.(11) In the study P.U Dijkstra et al concluded that increase in mouth opening of patients with trismus related to head and neck cancers was similar to that by means of wooden tongue blades and manual stretching with trismus related to head and neck cancer.(12) In the study Alberto da Rocha Moraes et al revealed that exercises prescribed with specific duration and frequency was effective in treating cases with trismus in temporomandibular disorders.(13) In the study Ana pauladall et al indicated that mouth opening increases significantly after physical therapy in patients with trismus and results remain sustain after therapy.(14) In the study Jolanda et al revealed that mouth opening can be increased with therabite exercise therapy in head and neck cancer individuals.(15) The studies by Atios medical stated that therabite jaw motion rehabilitation system and therabite active band, Clinically proves to be effective in treating trismus, and enhancing muscle strength and endurance of muscles of mastication which supports the present study where tongue blades the altered form of therabite helps in achieving mouth opening in post-surgical oral cancer patients.(16)

All the above studies reveal that exercise is effective to improve mouth opening, which supports the experimental group of present study.

Pre and post mean values of quality of life in control and experimental groups

The Pre and post mean values of control group showed decreased mean value of 30.80 ± 6.52 (pre) to 27.41 ± 5.74 (post). Whereas in experimental group have showed an decreased mean value of 33.53 ± 7.11 (pre) to 29.42 ± 5.60 (post). The mean percentage change of values QOL has decreased from 6.58% in control group to 8.94% in experimental group values are significant at $p=0.001$.

Several studies have been done regarding QOL in head and neck cancer patients.

Carnaby et al concluded that implementation of swallowing exercises in head and neck cancer individuals has led to enhanced functional swallowing ability, which supports the present study stating that practice of oral exercises helps to improve functional ability and QOL.(17) The study conducted by Rocio barrios et al indicated that implementation of rehabilitation programs for oropharyngeal cancer patients improve the quality of life of the patients which supports the present study.(18) In the study Amruth et al concluded that early rehabilitation measures are useful in preventing trismus and improving quality of life in patients with head and neck cancers.(19) In the study Ragnarsson et al. defined physical therapy relating to cancer rehabilitation as including therapeutic exercises, active or passive mobilization techniques, graded and purposeful activity, massage therapy. All these interventions through physical therapy are useful to improve quality of life in head and neck cancer patients.(20) All the above studies reveal that mouth opening exercise, stretching's and massage is

effective to improve quality of life which supports the experimental group of present study.

CONCLUSION:

In the present study alternate hypothesis is accepted, null hypothesis is rejected. The results of this retrospective study indicate that mouth opening increases significantly after exercise therapy in patients with trismus. The increase in mouth opening is significantly larger in tongue depressor group than conventional exercises in patients with trismus related to post surgical oral cancer. The present study concluded that improve in mouth opening, QOL and decrease in pain, in patients with trismus by mouth opening exercises with tongue depressors than conventional exercises. The study was undertaken to assess the effect of physiotherapy interventions in the treatment of oral submucous fibrosis. The results show statistically significant improvement when measured at baseline and after 3 months in all 3 outcome measures in experimental group than control group.

LIMITATIONS AND RECOMMENDATIONS:

Limitations of the present study is across all studies which should be addressed in future studies. In terms of participant selection, the sample size and duration of the study needs to be larger.

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