Effectiveness of Myofascial Release on Mouth Opening in Subjects with Post Operative Buccal Mucosa Carcinoma

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Abstract

Background: Patient treatment after surgical excision of buccal mucosal carcinoma should prioritise symptom relief and cancer prevention. Mouth exercise physiotherapy is widely regarded as a staple for expanding the mouth, either on its own or in conjunction with other modalities. In order to better understand the manufacture and clinical effectiveness of Triscare mouth exercising devices in subjects with CA buccal mucosa, the current study was conducted.

Purpose: This study aims to evaluate the effectiveness of Myofascial release for postoperative buccal cancer patients.

Materials and Methods: Subjects with buccal mucosa carcinoma were recruited from Saveetha Dental College and Hospital for an experimental research using inclusion and exclusion criteria. Two week postoperative Buccal Mucosa Carcinoma subject volunteer. The participants were secretly separated into two groups using envelopes. Before and after treatment, jaw exercise and Myofascial release groups had their mouth opening and quality of life evaluated. Statistical analysis was performed on the collected data, and conclusions were drawn.

Results: At the 4-week follow-up, the intervention group’s mean MO (48.06mm) was significantly higher than the control group’s (44.66 mm) (p 0.002), and the intervention group also reported significantly higher GTQ scores and higher health-related quality of life scores across all domains and items.

Conclusion: We concluded that Participants in the intervention group improved more than those in the control group, and they also reported higher levels of engagement with and satisfaction with their therapy.

Key word: Jaw Exercises, Triscare device, Squamous Cell Carcinoma, Oral Cancer,Trismus.

Introduction

Patients who have cancer of the buccal mucosa often suffer from trismus, which is the inability to completely open the mouth. Because trismus restricts mouth opening, eating, chewing, swallowing, oral hygiene, and dental examinations may all be affected by the condition. When a patient’s quality of life declines, their mental health suffers as a direct result. One of these complications is trismus, which is characterized by a mouth opening of 35 millimetres or less¹
India has 30% of the world’s mouth cancer cases. Female oral cancer rates in India and internationally is higher in the south. India is frequently called the “oral cancer capital of the world” since it accounts for one-third of all cases worldwide. Oral cancer is more common in southern Indian women and worldwide. India’s oral cancer fatality rate is higher than that of developed countries because 60–80% of patients are diagnosed late.

These factors explain why 30–40% of these individuals experience depression after therapy. Additionally, a multidisciplinary team including speech and language therapists, nutritionists, physiotherapists, counsellors, orthodontist experts, and dentists may be necessary for their rehabilitation. Exercise therapy may help patients with head and neck cancer who are experiencing trismus. The mouth size was raised by 18 mm after using a sledgehammer on the jaw for two minutes twice daily. Trismus may be treated using rubber plugs, tongue depressors, and corkscrews. The Dynasplint Trismus System® (DTS) and other jaw stretching devices may help cure trismus. To permanently lengthen injured connective tissue, DTS slowly and gently stretches it with a little torque. To achieve the goal, this is done. Research conducted on animals has shown that low-torque, long-duration techniques for stretching have superior efficacy in restoring range of motion compared to high-torque, short-duration stretching methods. The use of conventional training instruments, such as tongue depressors, fingers, and rubber plugs, has shown a moderate level of efficacy, as evidenced by patients experiencing an average increase in mouth opening of 5.5 mm. Evidence of this effect was supplied by historical cohort studies.

Patients with oral cancer were reported to have trismus at a rate of 4%-50% at the time of diagnosis, 44%-86% immediately after surgery and radiation, and 31%-65% six months after treatments. There have only been a total of four studies conducted to evaluate the impact that interventions have on trismus. Randomised clinical trials found that therabite was superior to wooden tongue blade exercises and manual stretching for increasing mouth opening.

Deep pressure kneading and dry needling are two therapeutic techniques used for trigger point release, which have shown efficacy in pain reduction. Myofascial release of the restricted fascia around the head and neck may help alleviate facial and neck pain. Studies on its cost-effectiveness have revealed that the recently designed workout equipment for mouth opening may deliver better outcomes than more traditional methods. As a result, no one is absolutely certain how to treat the trismus that is brought on by buccal mucosa carcinoma. Some people are advised to participate in physical therapy, while others are given prescription drugs to use for their condition. A number of clinical tests have shown that the treatment of trismus using open mouth exercise devices is effective.

AIM

The aim of the study is to investigate Effectiveness of Myofascial Release in subjects with post-operative buccal carcinoma.

Material and Method

An experimental study, Total of 30 Buccal Mucosa Carcinoma subjects were screened for study. 30 samples were selected according to the inclusion and exclusion criteria. Patients were provided with a consent form with assurance of treatment. This study was done from September 2022 till December 2022.

Inclusion Criteria

Post-operative of Buccal Mucosa Carcinoma subject after 2 weeks, both genders volunteer.

Exclusion Criteria

- Unhealed Sutures
- Drainage tube
- flap failure
- Patient who going undergo radiation therapy immediately were excluded.

Outcome Measures:

Assessment was performed at baseline and after 4 weeks of study.

- Triscare device,
- Gothenburg trismus questionnaire (GTQ),
- Health-Related Quality of Life Scale.
**Procedure**

An experimental study with a total of 30 Buccal Mucosa Carcinoma subjects were selected from Saveetha dental college and hospital based on the inclusion, the selected subjects were allotted into two groups with the help of concealed envelope method. Both groups were given jaw exercises, but the intervention group included before receiving myofascial release, a patient’s mouth opening and quality of life were assessed as a baseline. The mouth opening was measured by Triscare device and Quality of life was measured with the help of Quality of life questionnaire. After taking the baseline values, interventions will be given for four weeks. At the end of the four weeks post-test values were taken. The obtained data were analysed statistically and results were obtained.

**Triscare Mouth opening device**

MIO, the greatest vertical distance between the maxillary and mandibular incisors, was the main outcome measure. The individual was seated upright in the Triscare Mouth opening device while the MIO was measured. Subjects were diagnosed with trismus if their MIO was less than 35 mm. Males should have a MIO of 50–60 mm and females of 45–55 mm, whereas a MIO of 30–35 mm is considered trismus. Each person in the intervention group saw the same physiotherapist for a demonstration and training on how to use the device. Using a jaw mobilisation device, patients began each session with a 30-second warm-up and stretching routine five times a day. Active motions included biting against resistance, while passive actions included jaw stretches. The same physiotherapist assessed MIO before treatment, immediately after treatment, and again 4 weeks later. After the first 4-week exercise programme, patients were encouraged to keep up their exercise routine by doing so at least three times a week, or more often if necessary.

**Myofascial Release (MFR)**

Myofascial release techniques like kneading are helpful for increasing range of motion and reducing pain caused by scar tissue build up. To increase the flexibility of soft tissues, physiotherapists often utilize moderate manual manipulation. Forced passive movements & manipulations mobilise the temporomandibular joint to increase mouth opening. They received MFR, (based on the thickness of their fibrous bands), by having their fingers and thumbs knead the skin in the buccal area on a daily basis for 4 weeks.

**Jaw Exercises**

The fingers were gently stretched across the oral cavity to release tension. Mandibular deviation and jaw depression were treated with lateral glides and joint distraction at the temporomandibular joint. To avoid jaw stiffness, do these exercises for your jaw muscles. Seven times a day, repeat the complete procedure.

1. Maximise the width of your mouth opening. Keep your grip at its widest point for seven seconds before letting go. Seven times over.

2. Widen your grin, then shift your jaw to the left and relax. Five times over.

3. Relax your jaw by opening your mouth wide and then moving it to the right. Five times over.

**Statistical Procedures**

The intervention and control groups’ pre- and post-test results were evaluated. Pairwise T-tests are used to compare mouth opening data within groups. For group investigations, the unpaired t-test has been used. The Wilcoxon test and Mann-Whitney U test have been used to analyse quality of life within and across groups, respectively. All analyses were performed using SPSS 27.0 for Windows.

**Data Analysis**

Among 15 subjects in control group 8 were females and 7 were male candidates. Whereas, in the intervention group 9 were females and 6 were male candidates. Thus, total 17 subjects were females and 13 subjects were male. From table 1 we conclude that females are most commonly affected than male. (See a table: 1)
Table 1: Descriptive data on subjects

<table>
<thead>
<tr>
<th>Years of Age</th>
<th>Intervention group</th>
<th></th>
<th>Control Group</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Male</td>
<td>Female</td>
<td>Total</td>
<td>Male</td>
</tr>
<tr>
<td>37–75</td>
<td>6</td>
<td>9</td>
<td>15</td>
<td>7</td>
</tr>
</tbody>
</table>

Graph: 1 paired t-test Analyses of differences between the groups for Mouth Opening using MFR
(TMOD- Triscare Mouth opening device, GTQ- Gothenburg trismus questionnaire, HRQOLS- Health-Related Quality of Life Scale)

Table 2: Analyses of differences between the groups for Mouth Opening using MFR

<table>
<thead>
<tr>
<th>Statistical analysis</th>
<th>Group</th>
<th>Mean ± SD</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Pre-test</td>
<td>Post-test</td>
</tr>
<tr>
<td>Triscare Mouth Opening Device (TMOD)</td>
<td>intervention group (n=15)</td>
<td>27.13±3.56</td>
<td>48.06±4.55</td>
</tr>
<tr>
<td></td>
<td>control group (n=15)</td>
<td>28.13±2.23</td>
<td>44.66±2.78</td>
</tr>
<tr>
<td>Gothenburg trismus questionnaire (GTQ)</td>
<td>intervention group (n=15)</td>
<td>81.86±5.99</td>
<td>52.13±3.37</td>
</tr>
<tr>
<td></td>
<td>control group (n=15)</td>
<td>85.46±6.45</td>
<td>64.73±3.34</td>
</tr>
<tr>
<td>Health-Related Quality of Life Scale(HRQOLS)</td>
<td>intervention group (n=15)</td>
<td>26.13±1.99</td>
<td>10.2±2.04</td>
</tr>
<tr>
<td></td>
<td>control group (n=15)</td>
<td>27±2.03</td>
<td>13.13±1.80</td>
</tr>
</tbody>
</table>

* = Statistically significant

Table 3: Test statistics for HRQOLS

<table>
<thead>
<tr>
<th>Test</th>
<th>Statistic</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mann-Whitney U</td>
<td>33.00</td>
<td></td>
</tr>
<tr>
<td>Wilcoxon W</td>
<td>153.0</td>
<td></td>
</tr>
<tr>
<td>Z</td>
<td>-3.325</td>
<td>&lt;0.001</td>
</tr>
</tbody>
</table>

Results

30 individuals, 53.8 ± 12.53 years in the intervention group and 53.46 ± 11.59 years in the control group. The Shapiro-Wilk test showed that age was regularly distributed. Paired t test compared baseline characteristics across groups. The age p value was 0.161, showing that the baseline characteristics were statistically similar across groups (p>0.05).
Table 2 displays the interventional and control groups’ outcome parameter mean and SD values.

This study found that the mean TMOD was 27.13 ± 3.56 at baseline and 48.06 ± 4.55 post intervention in intervention group, and in control group 28.13 ± 2.23 at baseline and 44.66 ± 2.87 as tabulated in TABLE-2 and Graph-1. The mean GTQ was 81.86 ± 5.99 at baseline and 52.13 ± 3.77 post treatment in the intervention group, while it was 85.46 ± 6.45 pre intervention and 64.73 ± 3.34 in the control group. As shown in TABLE-2 and Graph-1, the intervention group’s mean HRQOLS was 26.13 ± 1.99 pre-intervention and 10.20 ± 2.04 post-intervention, whereas the control group was 27 ± 2.03 pre-intervention and 13.13 ± 1.807 post-intervention.

The TMOD, GTQ, and HRQOLS improved for both groups. Intervention group improved much more than the control group. The intervention group’s mean ± SD of the three variables was significantly higher than the control group.

Table 3 shows the analysis of non-parametric tests (Mann Whitney U test and Wilcoxon test). The Z score of the variables post intervention HRQOLS was -3.325 indicating the statistical significance of hypothesis.

Discussion

The treatment of post-cancer treatment difficulties might include a variety of different treatments, including speech and swallowing therapy, manual therapy and therapeutic modalities, and vocational rehabilitation. Patients with head and neck cancer often have trismus and shoulder dysfunction as a consequence of radiation-induced fibrosis and paralysis of the spinal accessory nerve. Muscular fibrosis of the neck, trismus, neuropathy, inactivity, myofascial restriction, frozen shoulder, and postural dysfunction all call for medical attention.

Trismus is distinguished by a tonic contraction of the mastication muscles, such as the masseter, temporalis, or pterygoid, which limits mouth expansion. A reflex contraction might be caused by a tumour that grows into or near the muscles that close the mouth. Because these mouth-closing muscles are prevented from extending as a consequence of this reflex contraction, trismus might develop. Scar tissue may be caused by surgery, which can result in a smaller mouth opening owing to muscular tightness caused by the scar tissue. Examining the maximum inter-incisal distance and determining that it is less than 30-45 mm, which is caused by contracture, is how trismus is clinically diagnosed.

In a perfect world, one would be able to measure this with a millimetre scale while the patient was sitting in an upright position. In a study conducted by L. J. Melchers and colleagues, the researchers came to the conclusion that It has been shown that patients with radiation-induced trismus can benefit greatly from therapeutic massage, which is said to increase blood flow and relax the masticatory muscles, as well as exercises to break down myofascial adhesions and fibrosis, and jaw-mobilizing devices, especially in the first six weeks of treatment.

L B Calixtre et al., concluded that the mobilisation of the temporomandibular joint and the application of myofascial release to the muscles of the neck have both been shown to be effective. A method called myofascial release, which is used in manual therapy, has been found to improve head and neck posture and has an effect on how postural alignments are maintained. Prathap L et al., suggested that the dermal ridges serve as a useful diagnostic of genetic instability in breast cancer. Our research participants also reported short-arm force, which makes using one’s hands challenging. Ergonomics must be considered in future studies. First, the Myofascial Release (MFR) with the device significantly improved the participants’ MIO and HRQLS; second, our device is five times cheaper than the Triscare device; and third, our device reduced participants’ pain levels. Thus, one of our aims is to expand the number of patients who use the Myofascial Release with Triscare device to improve treatment results.

Conclusion

The intervention group made more progress and showed more augmentation and enthusiasm than the standard exercises throughout therapy. Myofascial release improves quality of life and prognosis on the Health-Related Quality of Life Scale. Thus, buccal mucosa carcinoma patients benefit from myofascial release and mouth-opening devices. Oral cancer patients’ quality of life and oral function improved.
ISRB approval: This research work has been approved by the ISRB committee.
(ISRB NO: 01/057/2022/ISRB/PGSR/SCPT)

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References


