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Physiotherapy rehabilitation, a key element in the success of a patient undergone hemi-mandibulectomy: A case report

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ABSTRACT

India has one of the highest rates of mouth cancer in the world among which gingivobuccal cancer (GBC) is the most prevalent. A 45-year-old man was reported to the hospital on November 23rd, 2021, with symptoms of difficulties eating and swallowing meals and pain when executing facial movements for 6 months. Six months ago, the patient was diagnosed with well-differentiated squamous cell carcinoma of the upper right gingivobuccal sulcus after a series of tests, and he has now finished three cycles of neoadjuvant treatment. On December 1, 2021, a right hemi-mandibulectomy with ipsilateral modified radical neck dissection and pectoralis major myocutaneous flap repair was done. Key indicators include pulmonary function, appropriate mouth opening, discomfort alleviation, and wellbeing. The Oral Rehabilitation Program is beneficial, as evidenced by statistically significant improvements in exercise capacity and well-being. This case study represents a comprehensive rehab strategy for people who have had oral surgery.

Keywords: Oral Surgery, Gingivobuccal cancer, Physiotherapy treatment, Oral cancer rehabilitation, Quality of life

1. INTRODUCTION

India has one of the highest rates of mouth cancer in the world, with Gingivobuccal cancer (GBC) being the most prevalent. More than 90% of all malignant tumors inside the mouth are squamous cell carcinomas (SCC) (Cabral et al., 2010; Mandlik et al., 2018). Although the cause of SCC is uncertain, predisposing factors like smoking, high alcohol consumption, a habit of chewing betel leaves, and inversion smoking, are all of which, are popular in India (Cabral et al., 2010). Troubles trying to swallow, injury to the joints and muscles of the jaw and neck (trismus), loosening of teeth, speech errors (dysarthria) are the most prevalent postsurgical oral errors that arise after chemotherapy or radiation therapy (Pattanshetty and Mathias, 2019).

Based on the area & substance of the tumour, surgical procedures such as partial or complete maxillectomy, segmental, hemi-, subtotal, or total mandibulectomy can be done.

Segmental excision usually results in mandibular deviation to the faulty side and disruptions in the maxillomandibular connection, other troubles include difficulty with mastication, swallowing, speaking, mandibular movement, respiration, aesthetics, and psychic functioning (Gagneja et al., 2020; Tandukar et al., 2021). Trapezius muscle denervation causes pain, spinal accessory nerve failure, muscular weakness, shoulder mobility limitations, deformities, & difficulty in executing upper-limb abduction over 90°. Shoulder impairment is characterized by physical abnormalities including muscle wasting, capsular adhesions, fibrosis, & joint damage (Pattanshetty and Mathias, 2019).

We present a case of a 45-year-old male who has undergone oral surgery requiring efficient physiotherapy rehabilitation to speed up recovery by preventing or resolving post-operative complications and providing physical rehabilitation to help patients restore to their premorbid level. Key measurements involve respiratory function, adequate mouth opening, pain reduction, and quality of life.

2. PATIENT INFORMATION

On November 23rd, 2021, a 45-year-old male, presented to the multispecialty hospital with complaints of difficulty chewing and consuming meals, as well as pain when performing facial movements for 6 months. The patient appeared to be in good health until 6 months ago when he developed a painful non-healing ulcer above the angle of his mouth, which began small and steadily grew to its current size of 3 x 2 cm accompanied by pain that is gradual in onset, dull aching, intermittent, and localized in nature, that worsens with mastication and improves when analgesics are used. History of burning sensation on the consumption of hot and spicy food for 3 years approx., change in quality or consistency of saliva from thin to thick and ropy for 1-month approx., difficulty in mastication in the last 3 months approx.

Following a series of tests, the patient was diagnosed with well-differentiated squamous cell carcinoma of the upper right gingivobuccal sulcus on 26th June 2021 and has since completed three cycles of neoadjuvant chemotherapy on 10th August, 29th August, and 4th October 2021. He has now returned for an additional examination. For the past 20 years, the patient has chewed tobacco and consumed kharra. When the patient arrived at the hospital on November 23rd, 2021, he was subjected to many investigations like a CT scan of the neck and thorax which confirmed the diagnosis and was admitted and told to undergo surgery. On admission, a single 2x2 cm swelling on the right gingivobuccal sulcus was visible.

On December 1, 2021, right Hemi-mandibulectomy with ipsilateral modified radical neck dissection (MRND) and pectoralis major myocutaneous flap (PMMC) repair was performed (Figure 1A). Pathological (Tumour, Nodes, and Metastases) T.N.M staging: pT2pN0pMx. The foley catheter, as well as Ryle's, has been implanted. On 28th December 2021, the patient was discharged with advice to follow up after a week on 3rd January 2022 in the surgical outpatient department.

3. CLINICAL FINDINGS

On a postoperative day 4 i.e., on 4th December 2021, with the patient's agreement, for the clinical examination, he was positioned in a half-lying position with sufficient back support. Throughout the inspection, the mobility of the chest wall was noticed to be reduced. The patient used the accessory muscles of inspiration to breathe. Cardiovascular (CVS) data were found to be normal on palpation, with a heart rate of 70 beats per minute and blood pressure of 140/90 mm Hg, respectively. Breathing was normal and abdomino-thoracic an average rate of 18 breaths per minute.

Palpation verified the examination findings: decreased chest excursion on both the right and left sides due to pain over the incision site on the chest. Chest expansion demonstrated differences of 2 cm, 2 cm, and 1 cm at the axillary, nipple, and xiphisternum phases, respectively. An 18-cm-long lip angle split incision with neck dissection through an apron incision was observed for cancer of the buccal mucosa, and it was tender to the touch (Figure 1B). Sutures were used to close the incision, and the wound was carefully dressed. Auscultation revealed decreased air entry in both lung areas. The patient was having respiratory muscle weakness, early exhaustion on minor exercise, positional dependency, and mental anguish as a result of tenderness at the incision site and a lengthy hospital stay following oral surgery.

Figure 1 A) Displays a myocutaneous flap of the pectoralis major was obtained from the right side. B) For carcinoma of the buccal mucosa on the right side, an 18-cm-long lip angle split incision with neck dissection through an apron incision was provided

Therapeutic Interventions

Physiotherapy interventions were provided to the patient for 3 weeks (Table 1).

Table 1 Summarizes physiotherapy management provided to the patient.

Sr. no.	Physiotherapy treatment goals	Therapeutic intervention	Treatment regimen
Summary of the interventions provided in week 1			
1.	To provide awareness of the condition, gain co-operation & consent of the patient and his family members.	Patient and caregiver education and counselling about exercise regimen and the importance of adherence to it.	Patients and caregivers were educated about importance of positioning every 2 hours, early ambulation, and activity of daily living.
2.	To promote airway clearance	1) Manual Chest Percussion & Vibrations 2) Manually assisted cough	1) 1-3 days initially 2) for 4-8 days
3.	To improve breathing patterns, reduce dyspnoea & respiratory rate	Breathing exercises: 1)Diaphragmatic breathing 2)Pursed lip breathing	Initially ten Reps x 1 set 2 times a day. Later ten Reps x 2 sets 3-4 times a day.
4.	To improve and maintain mouth opening range	Mouth opening and closing exercises with proper splinting (Figure 2B)	
5.	To improve lung volumes and capacities and to maintain chest mobility	1)Thoracic Expansion Exercises-Shoulder flexion with deep inspiration and extension with expiration (Figure 2A)	

6.	To improve neck and shoulder muscles strength	Isometric exercises for neck and shoulder muscles	
7.	To maintain joint integrity & mobility and prevent joint stiffness	Active Range of Motion exercises of Upper and Lower limbs bilaterally.	
8.	To bring back to normal ADLs	Self-paced walking in 30 meters hallway	Begin on post-op day 3, initially, 5 min, progressing up to 15-20 min.
Summary of the interventions provided in week 2			
Treatment from Week 1 was continued, along with additional interventions, in Week 2.			
1.	To improve temporomandibular joint (TMJ) mobility and forward neck posture	Rocabado exercises: tongue resting posture, temporomandibular rotational stabilization, cyclic stabilizing method, cervical joints release, cervical column vertical extension, & Scapular retraction	6 different exercises, 6 reps of every activity are repeated, 6 times each day till the complaints diminish.
Summary of the interventions provided in week 3			
Treatment from Week 1 and 2 were continued, along with additional interventions, in Week 3.			
1.	To hasten recuperation, enhance the flexibility of collagen fibers, & alleviate pain.	Ultrasound therapy	3 MHz for 7 minutes, once a day
2.	To enhance strength of underlying fibrous tissues & mobilize scars	Scar mobilization along with kneading and facial massage	
3.	To enhance TMJ movement and mouth opening	Forceful passive motions and manipulations.	Once a day post suture removal

Figure 2 Interventions provided in week 1: A) the patient is performing thoracic expansion exercise B) the patient is performing mouth opening and closing exercise.

Follow-up and outcome of interventions

Table 2 Depicts pre-and post-treatment outcome measure response after 3 weeks of physiotherapy rehabilitation.

Table 2 Depicts pre-and post-treatment outcome measures.

Sr.no.	Outcome measures	Pre-physiotherapy treatment score		Post-physiotherapy treatment score	
1.	NPRS	9		4	
2.	Maximal inter-incisal mouth opening (Finger method)	1 finger, 10mm		3 fingers, 35mm	
3.	Tongue movements (Grading scale- functional classification of ankyloglossia)	Grade 4 (<25%)		Grade 2 (50-80%)	
4.	Cervical range of motion	Right	Left	Right	Left
	lateral flexion	10^0	10^0	30^0	40^0
	rotation	40^0	50^0	70^0	80^0
	flexion	50^0		80^0	
	extension	30^0		50^0	
6.	Chest expansion (In cms)	Axillary	1	Axillary	2
		Nipple	1	Nipple	3
		Xiphisternum	3	Xiphisternum	5
7.	Oral health impact profile- 14 questionnaire	46/56		30/56	

4. DISCUSSION

The current case report details the patient's total physical therapy requirements and interventions addressed for cancer with a commando excision. Victims of buccal mucosa cancer suffer from significant morbidity as a result of numerous therapies such as chemo, irradiation, and surgeries. Rehabilitation after surgery activities offers excellent effects that have the potential to improve the quality of life in such patients (Pattanshetty and Mathias, 2019). Shone and Yardley (1991) discovered that 46 percent of patients recuperating from head and neck cancer surgery, involving neck dissection, we're unable to function owing to shoulder impairment (Lauchlan et al., 2008; Patil1 et al., 2021).

Ultrasound has been widely and successfully used in physical medicine. Gadbail et al., (2019) proposed that the most effective "heat and stretch" therapy for scar healing and preventing contractures at the suture site would be to heat the thick connective tissue before straining as well as to keep the temperature elevated throughout lengthening. As a result, a higher tissue temperature would be attained if the US had been supplied at a maximum concentration and for a prolonged period. Although slightly successful, this might have increased the mouth opening and therefore the location for the tongue to protrude. Ultrasonic treatment aims to accelerate healing, increase the flexibility of collagen fibres, and ease the pain. Considering such conditions for any therapy used to treat oral surgery, therapeutic ultrasound as a treatment technique merits further attention. Kneading is an excellent massage therapy method for enhancing fibrous tissue suppleness & moving scar tissue. Mild soft tissue manipulations are widely used in physical therapy to enhance their mobility (Gadbail et al., 2019; Kumar, 2013).

Additional physiotherapeutic techniques have been used to address particular deficits, reduce pain, and enhance the health and wellbeing of people. Muscle lengthening, strength training, chest therapy, flexibility exercises, as well as other movements have been identified as the most beneficial rehabilitation approaches. Physical therapy has been demonstrated to assist in releasing muscles, promoting joint mobility, minimizing tiredness, raising awareness of changed posture, walking, and breathing patterns, managing swallowing and mouth opening difficulties, and ultimately enhancing aesthetic and functional health. The health outcomes of physical therapy and pain therapeutic options in palliative care have indeed been extensively researched. Physical therapy has been demonstrated to be useful in cancer patients for symptom alleviation and enhancing their quality of life. The use of physical therapy in surgical patients with squamous cell carcinoma suggests that interdisciplinary rehab must be integrated into the overall treatment of cancer survivors (Pattanshetty and Mathias, 2019).

5. CONCLUSION

The Oral Rehabilitation Program is effective, with statistically significant gains in exercise tolerance and well-being. This case study provides an integrated plan for the rehabilitation of individuals who have had oral surgery. The patient's full recovery was not achieved during the rehabilitation program, but the majority of the therapeutic objectives were met, including improved breathing pattern, steadily increasing mouth opening, increased functional vital capacity, pain reduction, improved chest expansion, muscular strength, and ADLs of the patient after 3 weeks of intensive physiotherapeutic intervention.

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Authors' contributions

SSL has made the original manuscript, and SP, RT, SSHS, and TML have read and approved the manuscript.

Informed consent

Written & oral informed consent was obtained from the patient.

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Conflicts of interest

The authors declare that there are no conflicts of interests.

Data and materials availability

All data associated with this study are present in the paper.

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