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Oral Rehabilitation in the Face of Thoracic Challenges: Prosthodontics Unveiling New Frontiers in Healthcare

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Abstract

Objective: The objectives were to determine problems unique to oral rehabilitation, patient compliance with prosthetic rehabilitation, the impact of radiation therapy on prosthetic recovery, to attain significant differences over time prior to and following prosthetic intervention, and to conduct and record specific patient-deprived problem solving. The study was carried out at Department of Prosthodontics, Dental college HITEC-IMS taxilla cantt from June 2021 to December 2021. Total 90 patients with oral cancer were examined. Using the LORQv3 and OHIP-14, patients were asked to score their experience with dental difficulties both before and after the prosthesis was fabricated. A Likert scale was used to compare the responses. All of the data were analysed using SPSS 24.0. Before receiving dental rehabilitation, patients with head and neck cancer experienced severe issues. All domains of LORQ-v3 and OHIP-14 showed improvement after a year of prosthetic therapy. For the duration of the one-year trial period, there was complete compliance with using prosthetic appliances. The LORQ-v3 showed a 12-40% improvement in function across all elements. OHIP-14 revealed gains ranging from 14% to 230% across all domains. According to the lower Likert scale values following prosthetic treatment, patients with head and neck cancer fared better thanks to prosthetic rehabilitation. We concluded in this

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study that following prosthodontic rehabilitation, the oral health-related quality of life increased for patients with head and neck cancer.

Keywords: Rehabilitation, Head and neck cancer, Obturators, Quality of life, Denture

1 Introduction

Head and neck cancers include those of the tongue, lips, as well as oral cavity (ICD10: C00-06), the voice box, oral cavity, or hypopharynx (ICD10: C09-C10), the saliva gland (ICD10: C07-08), the larynx, and the sinuses in the paranasal region (ICD10: C11-C13) have been linked to significant morbidity rates (James et al., 2018; Kalavrezos & Scully, 2015). When a condition has an impact on a person's physical, psychological, and emotional well-being, it can be challenging for them to adjust and deal (Stanbouly et al., 2024). In an effort to increase longevity, managing such instances might present an equal challenge for physicians, as they must not only provide effective therapy but also help the survivors regain their functioning capacities (Morton, 1995).

Mastication, speech, communication, expressions, and other processes are made possible by the important structures of the head and neck (Hanna et al., 2024). An individual's overall well-being can be negatively impacted by pathophysiological changes brought on by cancers, which can significantly impair these functions and induce social isolation and nutritional deficits. This raises more questions than it answers about the quality of life (QoL) of these individuals (Tari et al., 2024). The author contends that although quality of life (QoL) is often employed in head and neck malignancies, its precise definition remains unclear in a seminal work that was first published in 1995 (Shiraz et al., 2014). Oral health care professionals' and oral epidemiologists' methods have gradually changed since then, resulting in the development of condition-specific and customised constructs known as oral health-related quality of life (OHRQoL) (Black, 2013).

The term "OHRQoL" refers to a multifaceted notion that encompasses issues with eating, sleeping, social contact, and emotional routines, among other aspects of daily life that are impacted by oral diseases (Boyce et al., 2014). The quality of life (QoL) of patients with head and neck malignancies has long been assessed using generic QoL constructs. Notwithstanding the fact that patients with head and neck cancer may be more susceptible to diminished oral health-related everyday performances, these questionnaires frequently do not address specific oral health issues that impact the OHRQoL (Shiraz et al., 2014) . Even those who have received treatment have been noted to have speech difficulties, swallowing issues, and voice impairment. According to a recent study, head and neck cancer patients' oral functions are significantly worse than those of people without the disease (Sulaiman et al., 2003).

Significant tissue impairments, including variable degrees of tooth loss, can result from oral cancer, facial trauma, and numerous disorders (Ferreira et al., 2024). The affected individuals frequently have functional problems and aesthetic concerns as a result of this. In order to prevent osteoradionecrosis, patients with oral cancer usually have teeth extractions prior to radiation therapy (Heran et al., 2024). Patients with head and neck cancer have not followed protocols for tooth extraction; instead, the prognosis and symptoms are used to make more stringent decisions about the necessity of extractions (Beumer et al., 1983).

Even with a possible decrease in extractions, patients nonetheless often become partially or completely edentate. Beumer et al. recommend that before beginning radiation therapy, mandibular molars that are located in the designated radiation zone and indicate a significant amount of chronic periodontal bone loss should be considered for extraction (Cosola et al., 2018). While extraction rates vary, most clinics remove teeth that have a poor prognosis (Savastano, 2023).

For patients who are partially or fully edentate, prosthetic rehabilitation has been shown to be

crucial in enhancing their quality of life (Jones, 2024). In terms of oral rehabilitation for edentulous jaws, the total scores did not show statistically significant differences between the two groups when assessing the effects of immediate versus delayed loaded implants on oral-health-related quality of life (OHRQoL) and clinical results. Patients in the delayed loaded group, however, showed notably greater degrees of physical disability and functional restriction (Mäntynen et al., 2023).

Providing enough bone mass to enable dental implant implantation is the main goal in situations of severe face injuries, such as those brought on by ballistic trauma. Oncology reconstruction techniques are comparable to this strategy (Alberga et al., 2021).

A dependable option for individuals with significant tissue impairments is implant-retained prostheses. The quality of life for these individuals could be significantly enhanced by the ongoing developments in soft tissue repair, prosthetic technology, and implant dentistry (Crane et al., 2024). For example, when individuals who have cleft lip and palate (CLP) have significant tissue deficits that necessitate complex oral rehabilitation, using a CAD/CAM bar supported by dental implants and featuring a removable telescopes suprastructure offers a practical and easily maintained solution for their rehabilitation needs. Removable dentures frequently turn out to be an unfeasible course of treatment for patients with complicated oral diseases. Individuals receiving treatment for oral cancer, especially radiotherapy, which affects the mucosa and salivary glands, face difficulties with their facial tissues, including decreased retention of dentures that are removable and dry mouth (Slade & Spencer, 1994).

People's perceptions of how oral illnesses affect their welfare socially are measured by the Oral Health Influence Profile (OHIP) (Kornblith et al., 1996).This index aims to give a thorough assessment of the dysfunction, discomfort, and incapacity that people report having as a result of oral problems. Although it is a condensed version of the OHIP-49, the OHIP-14 keeps the same basic framework (Peker et al., 2014).

The purpose of this research is to evaluate the effects of oral rehabilitation using the liverpool oral rehab question (LORQv3) and the oral wellness impact profile (OHIP-14) on one hundred patients diagnosed with head and neck cancer.

2 Materials and Methods

This retrospective study was conducted at Department of Prosthodontics, Dental college HITEC-IMS taxilla cantt and comprised of 90 patients. Participants in this study were patients who had not received dental rehabilitation both prior to the development of carcinoma and following the conclusion of therapy for head and neck cancers. Following six months of surgery and a year of radiation therapy, these patients underwent prosthetic rehabilitation, specifically definitive obturators. After a year of cancer treatment concluded, these patients received additional therapies, such as full or partial dentures. The purpose of this study was to compare QOL before and after prosthetic rehabilitation without accounting for the cancer's stage or course of treatment.

Since every item in the OHIP-14 and LORQv3 applied to the Indian people, no attempt was made to modify the questionnaires for the local populace. The study omitted participants who were uncooperative and those with serious comorbidities, such as trismus, that reduced their potential for rehabilitation. Details of the patient's care and general information were noted. After providing a brief explanation of the study methodology to the participants, informed consent was acquired. Both during the follow-up appointment one year later and before the prosthesis was fabricated, participants were asked to score their experiences with dental issues using two questionnaires: the OHIP-14 and the LORQv3. A single investigator conducted the administration and recording of the two questions.

There are 40 components in all, separated into two main portions of the LORQv3. Oral function, orofacial attractiveness, and social interaction are evaluated in the first seventeen items. The subsequent topics pertain to prosthesis and patient satisfaction with dentures and prosthetics. Participants were given the opportunity to address any concerns they considered were crucial to their oral rehabilitation but were not included in the LORQv3 questionnaire's closing comment section. Items are graded on a Likert scale of 1 to 4, with 1 denoting never, 2 occasionally, 3 frequently, and 4 always referring to issues or symptoms observed during the preceding week. The patients' percentage (%) who indicated "often" or "always" was determined.

The seven aspects that the OHIP-14 evaluates are functional limitations, physical pain, mental discomfort, physical or psychological disability, social impairment, and handicap. These are the effects of oral conditions on people's oral health-associated quality of life (OHRQOL). The responses were formatted as follows on a Likert-type frequency scale: very often = 4, moderately often = 3, seldom ever = 1, never = 0 [4]. The patients' percentage (%) who indicated "fairly often" or "very often" was determined.

The following variables were displayed: frequency (%), mean (S.D.), and median when applicable for demographic, clinical, and disease-related variables. We compared the two groups using the Mann-Whitney U test. For group comparisons involving three or more, the test known as the Kruskal-Wallis test was used. The the Wilcoxon sign ranking sum test was employed to examine variations in scores. Friedman test was used to analyse the variation in the outcome variable reported at various time points. Statistical significance was defined as a P value <.05.

3 Results

There were 52 (57.8%) males and 38 (42.2%) females with mean age 47.6±4.42 years. Mostly rehabilitated with obturators 50 (55.6%), 22 (24.4%) had partial dentures and complete dentures in 18 (20%). Oral cavity was the most common malignant lesion in 71 (78.9%) cases followed by pharynx in 10 (11.1%), larynx 7 (7.8%) and maxillary antrum 2 (2.2%).(table 1)

Table 1: Demographics of the enrolled cases

Variables	Frequency (90)	Percentage
Gender		
Male	52	57.8
Female	38	42.2
Mean age (years)	47.6±4.42	
Site of Malignancy		
obturators	50	55.6
partial dentures	22	24.4
complete dentures	18	20
Type of Malignancy		
Oral cavity	71	78.9
pharynx	10	11.1
larynx	7	7.8
maxillary antrum	2	2.2

As per histopathological findings, most common was squamous cell carcinoma followed by adenoid cystic carcinoma, mucoepidermoid carcinoma, Non-Hodgkin’s Lymphoma, myo-epithelial cell carcinoma and PNET (figure 1).

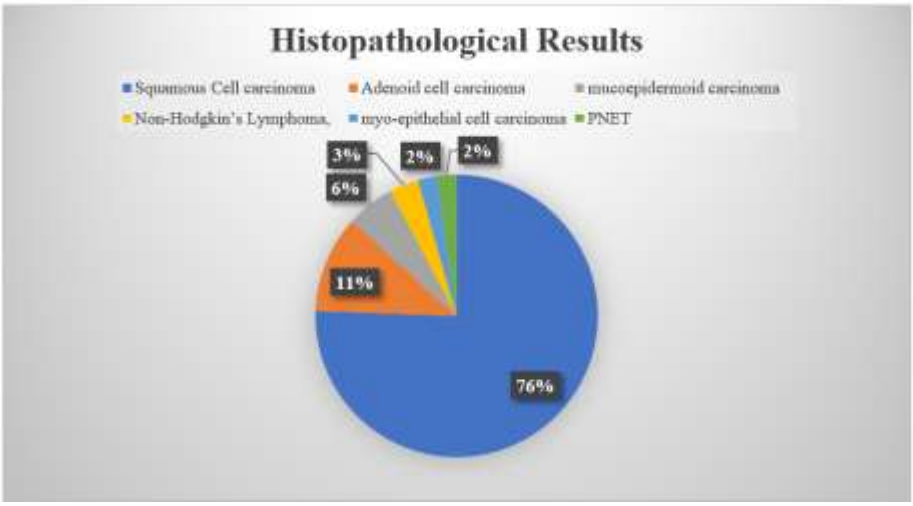

Figure 1: Histopathological results of all cases

Majority of the cases had tumor stage T2 in 41 cases, followed by T3 in 33 cases and T1 in 16 cases (table 2).

Table 2: Association of tumor stage

Variables	Frequency (90)	Percentage
Tumor Stage		
T1	16	17.8
T2	41	45.6
T3	33	36.7

Prior to therapy, the majority reported difficulties with speech (36.7%), chewing (34.8%), oro-facial appearance (27.8%), and social interaction (50%). There was a 12–40% improvement in oral functions following prosthetic rehabilitation, including speech (30%), orofacial appearance (25.6%%), chewing (26.7%), swallow (22.2%), salivation (7.8%), opening the mouth (11.1%), and social interaction (32.2%). With a p value of less than 0.05, every LORQv3 domain displayed statistically significant differences.(table 3)

Table 3: Prior to and following evaluation of participants' ratings of the LORQv3 questionnaire scores

Variables	Prior to Therapy	Post Therapy	Difference
LORQv3 questionnaire			
Speech	36.7%	6.7%	30%
Chewing	34.8%	8.1%	26.7%
Oro-facial	27.8%	2.2%	25.6%
Social Interaction	50%	17.8%	32.2%
Swallow	34.8%	12.6	22.2%
Salivation	30%	22.2%	7.8%
Opening of mouth	36.7%	25.6%	11.1%

It was not possible to evaluate the experience or level of satisfaction with earlier prosthetic therapies because none of the subjects had received a prosthesis prior to therapy. As a result, the pre-assessment interview did not include questions 22 through 41. Following prosthetic rehabilitation, the patient's happiness and prosthesis showed no signs of malfunction.(table 4)

Table 4: presenting LORQv3 items 22 through 41, which address prosthesis and patient satisfaction following a year of prosthodontic therapy

Variables	Frequency	Percentage	Difference
LORQv3 questionnaire			
Satisfaction of cases (21-27)	90	3%	3
Satisfaction of Maxillary prosthetic (28-33)	70	0	0
Satisfaction of Mandibular prosthetic	42	0	0

4 Discussion

For the physical, mental, and social well-being of patients with head and neck cancer, an improvement in OHRQOL is crucial following prosthodontic rehabilitation (Phasuk & Haug, 2018). The studies have been published before in assessing the HRQOL after oral rehabilitation for individuals with head and neck cancer, despite the fact that they were site-specific or had small sample numbers (Korn et al., 2021).

Patients with oral cancer who require prosthetic rehabilitation face many obstacles and necessitate a comprehensive approach (Said et al., 2017). The ensuing flaws may cause problems for patients after surgery, including speech difficulties, eating difficulty, and oro-nasal communication problems. Moreover, additional difficulties could occur when implanting during the rehabilitation phase, such as those related to the free flap's blood supply (Petrovic et al., 2018). Given the potential substantial limitations brought on by cancer of the head and neck treatment, as demonstrated by the patients in this case series, conventional detachable prostheses may not be feasible for oral prosthetic rehabilitation (So et al., 2012). Compared to traditional prostheses, patients with cancer of the head and neck have shown better levels of satisfaction using implant-retained prostheses (Murphy et al., 2007) .

This is the first study of its kind to assess how head and neck cancer patients' OHRQoL is affected by prosthetic rehabilitation. The results derived from the 90 patients who had at least a one-year follow-up, however, are inconclusive in favour of the theory. In this regard, a previous study that was published and used the QoL construct revealed that following treatment, the majority of treatment-related morbidities of cancer of the head and neck patients never go back to baseline (Patel et al., 1996).

Nonetheless, an additional investigation determined that it typically requires over a year to fully reinstate the abilities and consequently enhance the quality of life for those who have survived (Stellingsma et al., 2005). One could argue that a prosthetic rehabilitation's success can be influenced by a number of additional complicating circumstances. Such factors include implant support, the size of the reconstruction site, the involved anatomical structures, the existence of other severe systemic disorders, etc. (Sato et al., 2019).

According to a 2005 study by Stellingsma et al., implant-retained prostheses were superior to conventional detachable prostheses (Pace-Balzan et al., 2004). This may be related to the disparity in stability between the two prostheses, and the OHRQoL may be negatively impacted by removable unit rehabilitations that result in functional limitations and physical discomfort.

100% of the respondents in the current study completed the questionnaire-based interviews that were carried out by the study's single investigator. The item 17 (difficulty opening lips) was shown to be the most commonly ignored in prior studies, most likely as a result of its placement at the top of page 2 of the LORQv3 questionnaire. Because the Pace-Balzan studies were mail surveys, a lower response rate was thereby attained (Pace-Balzan et al., 2006).

The Oral Health Impact Profile (OHIP) gauges how individuals view the social toll that oral health issues have on their quality of life (Chandu et al., 2006).

This score aims to give an all-encompassing assessment of self-reported dysfunction, discomfort, and impairment related to oral diseases (Rogers, 2010). After a year of prosthetic therapy, the OHIP-14 assessment revealed no issues in the areas of handicap, social impairment, or psychological disability. Each of the following dimensions showed improvement: handicap, mental discomfort, functional limitation, impairment, psychological impairment, physical pain, and social disability.

4.1 Conclusion

We came to the conclusion in this study that following prosthodontic rehabilitation, the oral health-related quality of life increased for patients with head and neck cancer.

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