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# Quality of life after different oncologic interventions in head and neck cancer patients

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ABSTRACT

Patient reported outcomes following head and neck cancer are of great importance, given the functional, psychological, and social impacts of the disease and its treatment. In addition, not only is the number of publications on health-related quality of life (HRQOL) increasing in a variety of specialties, but there is also a growing awareness of the potential role of HRQOL in practice. Therefore, we aimed to investigate the HRQOL of head and neck cancer patients following different oncologic interventions, using an internationally established test. In this cross-sectional study, we included three different groups of 32 patients each. Participants had histologically confirmed invasive oral squamous cell carcinoma (OSCC) in the anterior floor of the mouth. Group allocation was based on treatment modality, as follows: only surgery (group 1), operation and adjuvant radiotherapy (XRT) (group 2), and the additional presence of osteoradionecrosis (ORN) (group 3). All patients were questioned about their HRQOL, using the standardized University of Washington Quality of Life Questionnaire (UW-QOL). Surveys for groups 1 and 2 were conducted at least 24 months after the end of tumor-related treatment, in cases of ORN (group 3) 12 months after completion of disease-related treatment. A total of 96 patients were included into this study. The mean age was 62.79 ± 8.93 years. The patients in groups 1 and 2 revealed a reduced quality of life, of a greater magnitude after radiation therapy. Patients felt that radiotherapy was much worse than surgery; however, half of the patients stated that they would repeat radiation therapy if necessary. The subjective evaluation of the HRQOL after surgery and radiotherapy was a valuable instrument for assessing the rehabilitation of patients in the context of their function and quality of life. Radiation therapy can be considered a trigger of functional limitations and emotional distress that contributes to decreased HRQOL in patients with head and neck cancer.



## 1. Introduction

According to current European cancer statistics reports, the estimated number for new cancer cases of the oral cavity and pharynx in Europe was 99,600 in 2012. The estimated total number of deaths by cancer of this type was 43,700 (Ferlay et al., 2013). The type and extent of therapy for squamous cell carcinoma (SCC) of the oral cavity and oropharynx are determined by tumor size, tumorous infiltration of adjacent tissues, lymph node status, and the presence of distant metastases according to the TNM classification of the Union Internationale Contre le Cancer (UICC). The cooperation of various medical disciplines—oncologists, craniomaxillofacial surgeons, otolaryngologists, pathologists, dentists, and radiotherapists—is necessary to provide interdisciplinary high-standard treatment (Yao et al., 2007).

As with other specialties, evidence-based guidelines provide comprehensive recommendations and standards for the diagnosis and treatment of oral SCC (OSCC) (Wolff et al., 2012). Provided the tumor is resectable and the general condition of the patient permits surgery, curative treatment for OSCC is founded on radical tumor resection, with a safety margin of at least 5 mm, and elective or therapeutic cervical lymphadenectomy. In addition, preference should also be given to primary reconstruction of the defect, and adjuvant radiotherapy is recommended for

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advanced tumor stages. However, the local resectability of the tumor is no longer the only consideration during therapeutic decision-making, with postoperative quality of life being given increasing weight.

This study aimed to investigate health-related quality of life (HRQOL) following treatment for OSCC. The impact of different therapeutic interventions on HRQOL was investigated, using a standardized patient survey.

## 2. Material and methods

We performed a cross-sectional study that compared three groups of 32 patients each. Patients were then subdivided into those undergoing surgery for resection of OSCC (group 1), those undergoing surgery and adjuvant radiotherapy (XRT) who did not develop osteoradionecrosis (ORN) (group 2), and those undergoing surgery and adjuvant XRT who later developed ORN (group 3).

Although any patient with histologically confirmed invasive OSCC was eligible, only those with cancer of the anterior floor of the mouth were included, which enabled comparisons to be made. Computed tomography (CT) or magnetic resonance imaging (MRI) was conducted for staging, and T1–4, N1–3, and M0 tumors were eligible. Normal or near-normal hematological and biochemical parameters were necessary for inclusion. We excluded patients with a history of XRT or chemotherapy, as well as those with recurrent disease within 6 months of completing treatment (Mücke et al., 2009).

The postoperative radiation therapy technique has been described earlier (Mücke et al., 2011; Poulsen et al., 2001). The dose was prescribed and delivered according to the International Commission on Radiation Units and Measurement, Report 50. Macroscopically involved nodes and uninvolved neck node regions adjacent to the primary tumor received a total dose of 60 Gy; uninvolved nodes at low risk received a total dose of 50 Gy. Patients received one fraction per day and five fractions per week for 7 weeks. The final dose was delivered to the tumor bed with a $\geq$1.5-cm margin up to a total dose of 70 Gy.

Investigations were performed at least 24 months after the end of tumor-related treatment. In cases of ORN, investigations were performed 12 months after completion of disease-related treatment. Patients were asked to complete a modified version 4 of the University of Washington Quality of Life Questionnaire (UW-QOL) (German translation, H. Schliephake), which covers the topics of pain, speech, chewing, swallowing, saliva, taste, mouth opening, appearance, activity, mood, anxiety, and overall well-being. Patients were requested to differentiate between the operation and the XRT. High test scores indicated a high degree of dissatisfaction and a low quality of life. Patients were also asked to compare their pre- and post-therapeutic HRQOL and to decide whether they would give their consent for further operation or XRT if necessary.

### 2.1. Data analysis

Data for the study were collected and analyzed in a single department. Descriptive statistics for quantitative variables are given as the mean ± standard deviation. If appropriate, medians and ranges are also presented. Group data were compared by analysis of variance (ANOVA). All $p$ values are two-sided and subject to a global significance level of 0.05. The data were analyzed with PASW Statistics for Windows, Version 21.0 (SPSS Inc., Chicago, IL, USA). Figures were generated with SPSS and Microsoft Office Excel for Windows, release 11.0 (Microsoft Corporation, Redmond, WA, USA).

## 3. Results

A total of 96 patients were included into this study, of which 58 were men (60.4%) and 38 were women (39.6%). The mean age was 62.79 ± 8.93 years (range 41–82 years). All patients who underwent surgery had immediate free flap reconstruction for comparability (Mücke et al., 2010). The mean postoperative XRT dosage was 63.3 ± 7.9 Gy.

The tumor stages were equally distributed between the groups receiving postoperative XRT. The tumor stage was T1, T2, T3, and T4 in 11 (11.4%), 24 (25%), 4 (4.2%), and 57 (59.4%) patients, respectively. The nodal stage was N0, N1, and N2 in 35 (36.5%), 14 (14.6%), and 47 (48.9%) patients, respectively. Finally, the tumor grade was found to be G1 in 4 patients (4.2%), G2 in 63 patients (65.6%), and G3 in 29 patients (30.2%). All tumors were completely resected (R0), but the resection margin was <5 mm in 12 patients, which was an indication for postoperative XRT. At the time of examination, all patients were tumor-free, and at least two CT or MRI scans had been performed as part of the postoperative aftercare.

### 3.1. HRQOL

The results of the UW-QOL questionnaires are listed in Table 1. Scores for all parameters were higher or at least equally high for group 2 compared to group 1. When comparing total scores for group 1, significant differences were found between the non-irradiated and the radiated patients: groups 1 and 2 ($p < 0.001$) and groups 1 and 3 ($p < 0.001$). There were no significant differences between the irradiated patients in groups 2 and 3, either for the operation ($p = 0.941$) or for the XRT ($p = 0.343$). When asked to compare their pre- and post-therapeutic HRQOL, 21.9% of patients in group 1 stated that there were no differences, whereas 46.9% stated there was a moderate deterioration, and 31.3% stated that deterioration was marked. Furthermore, 53.1% of patients in group 2 and 56.3% of patients in group 3 reported a marked deterioration of their QOL after treatment. Consent to further operation would be granted if necessary by 68.8%, 59.4%, and 53.1% of patients in groups 1, 2, and 3, respectively (no significant differences between groups). However, only 34.4% (group 2) and 53.1% (group 3) of irradiated patients would consent to further XRT if necessary (no significant differences between groups). When directly comparing operation and XRT, 59.4% of patients in groups 2 and 3 assessed XRT to be worse than operation (significant for both groups).

## 4. Discussion

According to the World Health Organization, HRQOL is defined as an individual's perception of their position in life in the context of the culture and value systems they live in and in relation to their goals, expectations, standards, and concerns (study protocol for the World Health Organization project to develop a quality of life assessment instrument [WHOQOL, 1993]). The term “quality of life” covers different factors relating to life conditions and subjective reflections of an individual's degree of well-being. Although scientific research on QOL started about 40 years ago, it was only recently that the topic of QOL gained ground in clinical oncology (Morton, 1995). This was based on the realization that a patient profile consists not only of objective criteria, such as surgical techniques, therapeutic regimens, and complication rates, but also of more individual psychological and social aspects. Beyond that, HRQOL is regarded as an independent predictor of survival (Goldstein et al., 2007; Hammerlid et al., 1998). Because it is subjective by definition and cannot be measured directly, HRQOL research is particularly challenging (Murphy et al., 2007; Ringash and Bezjak, 2001). Therefore, numerous investigation techniques