

The impact of the masticatory system on functional rehabilitation and quality of life in patients with head and neck cancer

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Impact

The scientific knowledge in the development, diagnosis and treatment of oropharyngeal squamous cell carcinoma has expanded significantly over the last 15 years. New insights into the importance and role of the immune system in carcinogenesis, the response of the immune system to cancer, and aspects of the growth and recurrence behavior of malignant tumors of the oral cavity have led to new therapeutic approaches on a molecular basis. In the near future, imaging will also keep up with biological elements in tumor visualization. Our knowledge is growing, but still surgical resection of the tumor and appropriate reconstructive measures remain the first choice of treatment.

The patient population with HNC is changing. First, the patient population developing HNC is changing, with traditional risk factors such as tobacco and alcohol use taking a back seat and a greater proportion of HNC being caused by human papillomavirus (HPV), especially in young people. At the same time, overall life expectancy is increasing, so there is also a group of patients who do not develop HNC until they are older, which in turn again is related to HPV infections. Second, care in the field of HNC is changing. Known reconstruction methods and radiation techniques are evolving and being refined. In dentistry, prophylaxis efforts at all levels have greatly improved oral health over the past 50 years. As a result, a growing number of patients still have most of their own teeth when diagnosed with HNC.

Patients who have recovered from HNC regularly cite teeth and dental health as a major concern when asked about the side effects of treatment. These side effects greatly impact quality of life, which has become an essential part of the treatment goal for HNC treatment. In order to adequately inform the patient of all options prior to treatment, it is important to critically review existing treatment options in addition to developing new treatments. In this work, we addressed the following two fundamental questions: a) we evaluated masticatory function and oral health-related quality of life (OHRQoL) after prosthodontic rehabilitation of edentulous patients with HNC, and b) we evaluated the accuracy and potential consequences of tooth removal prior to radiation therapy (RT).

Our results showed that implant-retained prostheses in both jaws improve masticatory function and significantly increase patient satisfaction over a long period of time. In particular, we studied a group of edentulous patients with maxillary defects who had been rehabilitated with obturator prostheses. In half of

this group, the prostheses were implant-retained, resulting in significantly better masticatory performance. The statistical power calculation of this study showed the strength of our results. We would therefore strongly recommend that any edentulous patient with a maxillary defect who is rehabilitated with an obturator prosthesis consider implant placement. This recommendation is opposed to surgical reconstruction of maxillary defects as well. Surgical reconstruction of maxillary defects is morbidity prone, costs time, resources and leads to masticatory functional rehabilitation much later than the recommendation we make.

Chewing is the prerequisite for being able to swallow and digest adequately. Future research should not be limited to chewing. The inclusion of other functions, such as swallowing and speech, as well as the maintenance of healthy nutrition through peroral food intake should be the focus of masticatory functional rehabilitation. The combination of objective testing methods supplemented by subjective research through questionnaires or interviews will provide a more complete picture.

Questionnaires should be available and validated in different languages to facilitate subjective multinational studies. By translating the Liverpool Oral Rehabilitation Questionnaire Version 3 (LORQv3) into Dutch and adapting it to Dutch conditions, we made this questionnaire available to the Dutch population. This questionnaire was developed to provide a more sophisticated measurement of the impact of prosthetic treatment on the quality of life of patients with HNC. Together with the validated Turkish and German versions and the original English version, international research with the same questionnaire on the effects of prosthetic care is now possible.

Reducing tooth extractions prior to HNC-induced RT results in improved quality of life. With 61% (based on maximum dose) to 74% (based on mean dose) of teeth removed at sites that ultimately received a dose of <40Gy, we limited the chewing ability of the 358 patients more than absolutely necessary. We provided tools for initial de-escalation steps in patients with tumors in the head and neck region. However, further research is needed to de-escalate current guidelines based on valid data without increasing other risks to patients. Future research should preferably be directed to the threshold RT dose for dental extractions prior to RT to prevent ORN to gain evidence-based data.