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Impact of Mandatory Masking during COVID Pandemic in Head and Neck Cancer Patients

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Abstract

With a global incidence of 350.000 new cases per year, Oral Squamous Cell Carcinoma (OSCC) is the most common cancer in the oral cavity accounting for 90% of oral cancer. Curative resection with or without adjuvant radiation therapy or chemoradiotherapy remains the gold standard in treating OSCC, with patients often undergoing extensive resections resulting in facial dysmorphisms or speech impairment. It has been shown that physical, social, and role functioning deteriorate soon after therapy, resulting in reduced quality of life. Facial expressions are an important part of communication and emotional connection, so that the surgical aesthetic outcome may affect patients' social interaction. The negative effects of face masks on communication have already been described. Still, the benefit of masks, especially for tumor patients with OSCC relating to self-acceptance and well-being, has not been studied yet. Therefore this study aimed to investigate the mask-wearing behavior and side effects of mandatory masking in head and neck tumor patients.

Patients and Methods: 40 patients treated in our Department from 2020 to May, 2022 due to a diagnosis of an OSCC received a questionnaire regarding face-mask-wearing behavior. The study started on September, 2021. Mask-wearing began 3 days–5 days after surgery. Patients with radiation therapy, breathing problems, and permanent tracheostomy have been excluded. Statistical analysis was conducted using the software SPSS Statistics 26. Normally distributed data were presented using mean ± standard deviation (SD). Non-normal distributed data was illustrated by depicting median and interquartile ranges. Statistical relations have been shown using 'Pearson's correlation.

Results: 6 (15%) patients complained about frequent breathing problems, and dry mouth (xerostomia) was reported from 14 patients (35%). Overall, 32 patients (80%) preferred wearing a facemask when meeting others. Overall, 77.5% of patients were thankful for wearing masks in public, and 77.5% received more self-confidence in public while wearing the mask. A total of 33 patients (82.5%) were satisfied with the postoperative aesthetic result. Eight patients (20%) stated that the postoperative appearance had an impact on their psychological state.

Conclusion: In this study, we pointed out the positive effect of face masks for patients with OSCC after surgical treatment. The majority of patients reported greater self-confidence in public as a result of wearing the mask after surgery. The masking requirement certainly offers patients with defects in the head and neck area advantages in public life, as they are not immediately noticeable to their counterparts at first glance. In addition, the mask protects

against infection, improving safety for immune-compromised tumor patients.

Introduction

Oral Squamous Cell Carcinoma is the most typical malignant tumor of the oral cavity (OSCC). Surgery, including tumor resection and neck dissection with an appropriate reconstruction, remains the first line of treatment [1]. Patients with head and neck tumors in advanced stages of the disease often must undergo extensive or disfiguring resections. In contrast, for the treatment of early-stage tumors, prevention, and minimally invasive interventions reduce the aesthetic impact of head and neck surgery [2,3]. This results in soft tissue defects, compound defects of bone and soft tissue, extensive volume resections, or resections of nerves that are important for social interaction (e.g., the sublingual and/or facial nerves).

Furthermore, even after plastic reconstruction of such defects, there may be aesthetic limitations due to a significant color discrepancy between the graft and the original facial skin. Therefore patients undergoing free flap reconstruction are at high risk of not satisfying aesthetic outcomes, which may result in significant facial disfigurement [4]. In addition, most patients develop speech impairment or swallowing limitations, facial dysmorphisms, and psychological dysfunctions after surgical resection [5,6]. Even more physical as well as social and role functioning deteriorates soon after therapy – resulting in a reduced quality of life [7]. Facial expressions are important in communication and emotional connection [8]; therefore, the surgical aesthetic outcome may affect patients' social interaction.

As part of the efforts to contain the COVID pandemic, the national authorities in many countries have introduced mandatory masking. Faces play a prominent role in social cognition [9] as they are stimuli that can be used to assess various characteristics of a person. Several studies have pointed out the negative effects of face masks on communication [10], but the possible benefits of masks have been of little interest [11]. Previous research focused only slightly on the influence of change in aesthetic appearance caused by facial masks. In this study, we wanted to investigate the mask-wearing behavior and side effects of mandatory masking in operated head and neck tumor patients.

Material and Methods

This prospective cohort study was approved by the institutional Ethics Committee of the University Hospital of Munich, Germany (Munich, Germany; 22-0062). The patients surgically treated in our Department from 2020 to May, 2022 due to an OSCC diagnosis received a questionnaire regarding face-mask-wearing behavior. The time between surgery and the questionnaire amounted to 4 months–8 months after surgery, five months on average. The questionnaire is presented in (Table 1). The questionnaire used in the manuscript is not a standardized questionnaire and was created by the authors. Requirements for inclusion were treatment due to an OSCC with tumor resection and uni- or bilateral neck dissection during the corona-pandemic. On average, all patients began wearing the mask 3 days–5 days after primary surgery. Patients who refused participation in this study have been excluded. In addition, patients with permanent tracheostomy and breathing disorders like asthma or COPD have been excluded from the study, as well as patients with other lung diseases. Patients with irradiation were excluded, too. Overall, 40 patients were included in this study. For further examination, we split all patients into three groups considering surgical treatment. Group 1 received tumor resection, neck dissection, and primary wound closure. Group 2 received tumor resection, neck dissection, and radial forearm flap; group 3 received tumor resection, neck dissection, and an osseous transplant.

In group 1, 14 patients (35%) could be included; in group 2, 15 patients (37.5%) and in group 3, 11 patients (27.5%).

Outcome measures: Demographic, medical, and oncological data were collected for all patients.

Statistical analysis: Statistical analysis was conducted using the software SPSS Statistics 26 (IBM, Armonk, New York). We used a descriptive design with tables and figures to demonstrate the survey results. Afterwards, the data were tested for normal distribution with the Shapiro-Wilk-Test. Normally distributed data were presented using mean ± Standard Deviation (SD). Non-normal distributed data was illustrated by depicting median and interquartile ranges. To show statistical relations, we used 'Pearson's correlation. Statistical significance was defined as $p < 0.05$. A comparison of the mean values of the two groups was made by performing the t-test. For further statistical analysis, the Mann-Whitney-U-Test and the Chi-Square-test were used.

Results

Overall, 40 patients could be included in this study. The average age amounted to 62,4 years (± 14.5 years); there were 21 (52.5%) male patients and 19 (47.5%) female patients. All patients underwent tumor resection with intraoral resection sites and neck dissection. Thirty patients (82.5%) had general insurance, and ten patients (17%) had private insurance. Oncological characteristics and details about the performed surgical procedures for groups 1, 2, and 3 are shown in (Table 1).

Pearson's correlation test comparing all variables against each other showed no statistically significant results. In 34 patients (85%), no breathing problems while wearing a face mask were reported. Six (15%) patients complained about regular breathing problems. Four of them had problems with breathing while wearing an FFP2 mask, and two patients with the surgical and FFP2 mask. There were no statistically significant differences between groups 1–3 ($p = 0.366$) regarding breathing problems while wearing the face mask.

Table 1: Demographics and oncological data of patients.

	Groups		
	Group 1	**Group 2**	**Group 3**
Median age (years)	67.2	58.3	62.8
Gender			
Male	6	7	3
Female	8	8	8
Tumor Localization			
Mouthfloor	4	1	0
Tongue	3	13	0
Planum bu.	0	0	0
Maxilla	5	0	2
Alveolar	7	0	9
Neck dissection			
One-sided	6	2	0
Both-sided	8	13	11
Metastases	2	2	5
T-Stadium			
T1	2	2	0
T2	8	4	1
T3	2	8	1
T4	2	2	9

Dry mouth (xerostomia) was reported from 14 patients (35%), and none of the patients had the impression that was wearing a facemask influenced postoperative wound healing. Thirty-four patients (85%) preferred wearing FFP2 masks during hospitalization, and six patients (15%) surgical masks. In private, 33 patients (82.5%) preferred wearing FFP2 masks and seven (17.5%) surgical masks. Overall, 32 patients (80%) preferred wearing a facemask when meeting other people, even if they did not have to.

Overall, 77.5% of patients were happy to wear a mask in public to hide their defect (means thankful in public in Table 2), and 77.5% received more self-confidence in public while wearing the mask (Table 2).

To detect whether there are statistically significant parameters between demographic data and survey results, both the $\chi 2$-test and the Mann-Whitney-U tests were applied.

All results are shown in (Table 3). Gender distribution of the questionnaire considering the parameter, thankful in public, inconvenience, insecurity, and self-confidence are provided in (Table 4).

A total of 33 patients (82.5%) were satisfied with the postoperative aesthetic result. Eight patients (20%) stated that the postoperative appearance had an impact on their psychological state.

Discussion

The potential side effects of wearing face masks are of great importance in times of the Sars-CoV-2 pandemic [12]. In particular, it is interesting to study the wearing behavior after surgery in patients with tumors in the head and neck region. Furthermore, the need to wear a mask in public and the medical side effects of masking are frequently discussed topics in the news and media [13].

Table 2: Effects of mask-wearing.

	Very often	**Often**	**Sometimes**	**Barely**	**Never**
Thankful in public	20 (50%)	9 (22.5%)	4 (10%)	2 (5%)	5 (12.5%)
Inconvenience	4 (10%)	5 (12.5%)	12 (30%)	7 (17.5%)	12 (30%)
Insecurity	12 (30%)	5 (12.5%)	7 (17.5%)	5 (12.5%)	11 (27.5%)
Self-confidence	20 (50%)	9 (22.5%)	4 (10%)	3 (7.5%)	4 (10%)

Table 3: Demographics and survey results.

Parameters Examined	**Thankful public**	**Inconvenience**	**Insecurity**	**Self-confidence**
Age	p = 0.163	p = 0.308	p = 0.179	p = 0.386
Gender	p = 0.063	p = 0.874	p = 0.126	p = 0.627
Localization	p = 0.783	p = 0.198	p = 0.932	p = 0.912

Table 4: Gender distribution in the survey.

		Very often	Often	Sometimes	Seldom	Never
Thankful	Male	7 (17.5%)	6 (15%)	4 (10%)	2 (5%)	2 (5%)
	Female	13 (32.5%)	3 (7.5%)	0 (0%)	0 (0%)	3 (7.5%)
Inconvenience	Male	17 (42.5%)	0 (0%)	0 (0%)	0 (0%)	4 (10%)
	Female	15 (37.5%)	0 (0%)	0 (0%)	0 (0%)	4 (10%)
Insecurity	Male	13 (32.5%)	3 (7.5%)	0 (0%)	0 (0%)	3 (7.5%)
	Female	4 (10%)	1 (4%)	6 (15%)	4 (10%)	4 (10%)
Self-Confidence	Male	4 (10%)	3 (7.5%)	4 (10%)	3 (7.5%)	7 (17.5%)
	Female	8 (20%)	2 (5%)	3 (7.5%)	2 (5%)	4 (10%)

This study shows the wearing behavior of patients with oral squamous cell carcinoma after tumor surgery, the influence of masking on social behavior, and the impact on psyche and self-esteem.

Problems with breathing are often discussed as a possible side effect of wearing a medical face mask. An Italian study showed that wearing a medical face mask did not affect oxygen saturation and $petCO_2$ levels in healthy subjects [14]. On the other hand, Matuschek et al. found evidence of significant respiratory impairment in patients with severe obstructive pulmonary disease due to the development of hypercapnia when wearing a face mask [15]. Kyung et al. also found that respiratory rate, blood oxygen saturation, and exhaled carbon dioxide levels showed significant differences before and after N95 wearing [16]. Of our patients, all of whom had major surgery in the particularly sensitive head and neck region, only 15% reported subjective respiratory problems while wearing the mask, four patients while wearing FFP2, and two patients while wearing FFP2 or the surgical mask. No patient in our cohort was tracheotomized at the time of the survey.

A dry mouth is often a major problem for patients after surgery or radiation in the head and neck region and affects the postoperative quality of life [17]. Major surgery in the oral cavity, head, and neck can affect saliva production. For example, the submandibular glands are removed during neck dissection during surgery. However, Altuntas et al. demonstrated that this had no effect on saliva production [18]. Although none of the patients had been irradiated at the time of the study, 35% of the patients reported dry mouth. Kanzow et al. studied the effect of masking on dry mouth and halitosis. In their study, using face masks resulted in a significant increase in self-perceived dry mouth and halitosis ($p < 0.001$). In this study, self-perceived dry mouth and halitosis increased with increasing duration of wearing [19]. Despite subjective dry mouth, 85% of patients in our study preferred to wear the FFP2 mask during their hospital stay. Furthermore, 82% of the patients continued wearing masks in their private environment after the inpatient stay, even if they did not have to. This goes along with the report of Cartaud et al. observing that social distancing reduces while wearing face masks [20].

However, in addition to the described side effects, such as breathing problems and dry mouth, this study also shows the positive effects of masking in patients with OSCC on the patients' psyche and self-confidence after extensive tumor surgery.

Overall, 77.5% of all patients were grateful for wearing face masks in public after tumor resection. They reported greater self-confidence in public as a result of wearing the mask after surgery. This could be due to the fact that wearing the mask often hides disfiguring defects and scars on the face. Accordingly, we also asked the patients whether the mask removal led to insecurity or embarrassment. There was no clear tendency. However, about the same number of patients stated that they often felt insecure without the mask.

A mask is only useful if user compliance is high. Unfortunately, it has been shown that mask discomfort is the primary source of non-compliance in mask-wearing [21].

There is a mixed picture among the patients surveyed with regard to perceived wearing comfort. 47.5% of the patients felt not at all or hardly affected. In contrast, 22.5% of patients often or very often felt uncomfortable with the mask. In addition, 30% stated that they occasionally felt impaired by wearing the mask. However, similar to dry mouth, the lack of wearing comfort does not seem to significantly influence the 'patient's decision not to wear a mask.

The masking requirement certainly offers patients with defects in the head and neck area advantages in public life, as they are not immediately noticeable to their counterparts at first glance [22]. At the same time, protection against infection plays an even more important role for tumor patients than for patients without previous immunosuppressive diseases. Abouesheia et al. 2021 report that the hospitalization in cancer patients suffering from COVID-19 increased statistically significantly, as well as the number of reintubations after surgery and intensive care unit [23]. Wearing masks can therefore prevent not only flu infections but also COVID-19 infections. However, this study has limitations due to the small patient cohort. This is due to the fact that fewer patients were operated on during the pandemic. Overall this study should give an overview of mask-wearing behavior in patients with OSCC during the hospital stay and after surgery and its influence on social life and interactions.

Conclusion

In this study, we pointed out the positive effect of face masks for patients with OSCC after surgical treatment. The majority of patients reported greater self-confidence in public as a result of wearing the mask after surgery. The masking requirement certainly offers patients with defects in the head and neck area advantages in public life, as they are not immediately noticeable to their counterparts at first glance. In addition, the mask protects against infection, improving safety for immune-compromised tumor patients. The outcome of any head and neck tumor resection and reconstruction should always be as close to normal, both functional and aesthetic, so that no patient has to hide their face under a mask. However, due to extensive surgery, function and aesthetics are often a compromise for patients, and the mask can help people become more confident after surgery.

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Conflict of Interest

The author declares no potential conflicts of interest with respect to the research, authorship, and/or publication of this article. Informed consent was obtained for this publication.

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