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The Role of Maxillofacial Prosthetics for the Surgically Treated Patient at NCI-Designated Comprehensive Cancer Centers

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Abstract

Importance—The current role of maxillofacial prosthetic care for head and neck cancer patients is not well understood. Additionally, perceived barriers for service provision are unknown.

Objective—The purpose of this study is to evaluate the current role of maxillofacial prosthetic care at NCI-Designated Comprehensive Cancer Centers and to identify perceived barriers to care.

Design—cross-sectional survey

Setting—Multicenter survey of Head and Neck Division leaders at NCI-Designated Comprehensive Cancer Centers

Participants—Each Head and Neck Division Leader from the 47 NCI-Designated Comprehensive Cancer Centers was invited to participate.

Main Outcome(s) and Measure(s)—The main outcomes of this study are: (1) to evaluate the current role of maxillofacial prosthetics for the surgically treated head and neck cancer patient within NCI-Designated Comprehensive Cancer Centers and (2) to identify perceived barriers to care. Measured outcomes were obtained from an anonymous online survey and reported.

Results—28 of the 47 Head and Neck Service Chiefs responded (60% response rate). Respondents expressed preference for prosthetic rehabilitation for hard palate/upper gum, auricular, and nasal defects. Local flap or free tissue transfer was preferred for lower gum and soft palate defects. Cost related factors were among the most reported perceived barriers to maxillofacial prosthetic care.

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Conflict of Interest Statement

The authors declare that there is no conflict of interest relevant to this study.

Level of Evidence: N/A

Conclusions and Relevance—Maxillofacial prosthetics have an important role in the rehabilitation of the head and neck cancer patient. Perceived barriers for services exist, particularly as it relates to cost. Providers should be aware that these issues are likely to be more severe in regional or community centers.

Keywords

maxillofacial prosthetics; head and neck cancer; surgical oncology; cancer center

INTRODUCTION

Malignancies of the head and neck region as well as the treatment associated with management of these malignancies require a multidisciplinary team to maximize survival and quality of life outcomes as well as to mitigate functional and aesthetic debilitation. This multidisciplinary team is comprised of professionals involved in acute management of the primary malignancy as well as the long term challenges associated with the disease and treatment sequelae.¹ Historically, maxillofacial prosthodontists have been contributing members of the multidisciplinary team to fabricate surgical or definitive prosthetics to restore defects of the head and neck region.² The ultimate aim and outcome of this contribution has been to improve patient esthetics and/or function as well as improve patient quality of life.³

Advances in surgical technique for the management of head and neck malignancies have evolved the role of maxillofacial prosthetics. Surgical reconstructive options may be selected based on surgeon preference as well as the available expertise of surgical and prosthetic colleagues in clinically equivalent situations. Currently the generalized role of maxillofacial prosthetics and the perceived barriers to care is unknown. As leaders in comprehensive cancer care, Head and Neck Surgery divisions at NCI-Designated Cancer Centers are ideally suited to provide feedback on the role of maxillofacial prosthetics for the surgically treated head and neck cancer patient. The purpose of this study was to evaluate the current role of maxillofacial prosthetics for the surgically treated head and neck cancer patient within NCI-designated Comprehensive Cancer Centers. Additionally, this study aims to identify perceived barriers to the provision of maxillofacial prosthetic services from the perspective of Head and Neck Surgery division leaders at these centers.

MATERIALS AND METHODS

The Human Research Protection Program at Memorial Sloan Kettering Cancer Center (MSK) reviewed this protocol and granted an exemption from Institutional Review Board oversight (X16-043). Chiefs or Directors of the Head and Neck Surgery divisions at NCI-Designated Comprehensive Cancer Centers were invited to participate in this survey. The sole inclusion criterion was to be a current Chief or Director of a Head and Neck division, service, or department at an NCI-Designated Comprehensive Cancer Center (n=47). An online survey using RedCap software (Vanderbilt University, Nashville, TN) was created. The survey questions were developed to understand the role of maxillofacial prosthetics as well as the perceived barriers to maxillofacial care within NCI-Designated Cancer Centers

from the perspectives of the Head and Neck Surgery directors. The final questions were reviewed by MSK Head and Neck and Dental Service faculty members and were assessed for face and content validity by consulting with faculty members with survey expertise [Figure 1].

A list of email addresses of the Head and Neck division Chiefs/Directors was obtained via public domain websites and compiled for this study. When there was ambiguity regarding the correct contact person, a phone call was made to the service to obtain a preferred contact and email address. An introductory email explaining the purpose of the research and inviting participation was then sent to Chief/Director via email. The Chiefs/Directors were advised that all data would be presented anonymously and in aggregate and that there would be no benefit or penalty for choosing to or deciding not to participate. A follow-up email with a link to the survey was then sent via email 24 hours later and completion of the survey constituted consent to participate. Two reminder emails were sent to all study participants in 2-week intervals. The emails were sent in January and February 2017.

The survey consisted of 26 questions on the center's surgical volume, rehabilitative preferences in clinically equivalent situations, involvement of dentists/prosthodontists during various phases of care, and perceived barriers to maxillofacial prosthetic rehabilitation. The final question was open-ended and asked Chiefs/Directors to comment on the role of maxillofacial prosthetics in the care of their center's patients in any capacity. A screening question was also asked at the beginning of the survey to identify the academic title of the person completing the survey. This was intended to verify the role of the person completing the survey and this information was removed from data after this verification was completed. Descriptive statistics using Microsoft Excel (2007; Redmond, WA) were generated from the de-identified data set and the open-ended responses were thematically grouped for reporting.

RESULTS

Responses were received from 28 of the 47 NCI-Designated Comprehensive Cancer Centers Head and Neck Service Chiefs (60% response rate). Out of the 28 respondents, partial responses were received from 6 respondents; all completed more than 25 out of the 28 questions. Table 1 describes the respondent Head and Neck division staff and service volume. All but one respondent stated their center has Fellows or Residents. The majority of respondents indicated that their center performs between 16-45 ablative oral and oropharyngeal tumor surgeries per month with the largest percentage indicating 16-30 ablative oral and oropharyngeal tumor surgeries per month (42.9%).

20 of the 28 respondents indicated that their center had a Dental Service. Most respondents indicated that a dentist is involved in the care of head and neck cancer patients "always" or "very often" before (68%) or after (79%) treatment. 37% reported involving dentists "always" or "very often" during treatment [Figure 2].

Rehabilitation preference in clinically equivalent situations is presented in Figure 3. The majority of respondents indicated preference for prosthetic rehabilitation for defects from neoplasms of the hard palate/upper gum (57%), rhinectomy (54%), and auriclectomy

(64%). Local flap or free tissue reconstruction was preferred by the majority of respondents for defects from neoplasms of the lower gum (79%) and soft palate (74%).

When asked about perceived barriers for dentist/prosthodontist involvement for maxillofacial prosthetic rehabilitation more than 50% of respondents indicated that they “agree” or “strongly agree” with each perceived barrier in our survey. The highest percentage of respondents indicated that they “strongly agreed” that “cost to patient” and “insurance” were barriers to dentist/prosthodontist involvement for maxillofacial prosthetic care [Table 2].

In response to the final open-ended question, respondents expressed the benefit to patients of having maxillofacial prosthodontic support but also expressed perceived barriers to service which include the cost to patients as well as the availability of trained providers. Examples of these responses that have been thematically grouped are presented in Table 3.

DISCUSSION

As suggested by our results, maxillofacial prosthetic rehabilitation continues to play an important role in the rehabilitation of head and neck cancer patients at NCI-Designated Cancer Centers. Maxillary defects can be predictably managed with maxillary obturator prostheses at the time of surgery⁴ and long-term rehabilitation can be accomplished with maxillary obturator prostheses that positively impact patient quality of life³. Additionally, extraoral prosthetics continue to be widely utilized due to the ease of faithful replication of pre-surgical anatomy without the need for additional surgical procedures. Conversely, the preference to rehabilitate soft palate and lower gum defects with local flap or free tissue reconstruction is expected with surgical advancements available with microvascular surgery. In cases of mandibular discontinuity, mandibular bone defects can be predictably reconstructed with osteocutaneous fibular free flaps, which have become the standard of rehabilitation at many centers.⁵ In contrast to historical ablative mandibular procedures that left patients with little prospect of mandibular rehabilitation⁶, microvascular surgery allows patients to achieve full mandibular rehabilitation, including functional implants to restore dentition and to improve the patient’s quality of life.⁷ Although this reconstructive advancement allows the primary defect to be restored with free tissue transfer, there is an increasing role for maxillofacial prosthodontists in this treatment paradigm for implant placement and dental rehabilitation, which may even be achieved at the time of primary surgery if planned preoperatively.⁸

The perceived barriers to maxillofacial prosthetic care, especially related to insurance and patient cost, have been previously reported.⁹ The cost effectiveness of providing maxillofacial prosthetic care has been questioned as the cost of performing the procedure and the subsequent non-billable global periods for completed procedures may result in diminished revenue from the perspective of the healthcare provider.¹⁰ Although suggestions for provider compensation such as relative value unit compensation have been provided¹¹, the additional cost to patients appears to be a persistent barrier to maxillofacial prosthetic care regardless of patient need for these services. Cost bundling, which has been successfully utilized in other sectors to provide medical services¹²⁻¹⁴, may ultimately be a

solution to facilitate patient access for maxillofacial prosthetic services within a comprehensive cancer center treatment team.

There were several limitations to this study. First, the sample size was limited by the response rate; however, the response rate was similar to a previous study of otolaryngology residency program directors.¹⁵ Second, the cross-sectional design of the study is not sensitive to changes in opinions over time which could be affected by evolving surgical techniques and changing access to care issues. Opportunities exist to evaluate the role of maxillofacial prosthetic care within regional cancer centers and the potential barriers to the provision of rehabilitative care services.

CONCLUSION

NCI-Designated Cancer Centers lead comprehensive cancer care in the United States, and the views expressed by Head and Neck division, service, and department leaders provide valuable insights into the current status of the provision of maxillofacial prosthetic care. This study reports that maxillofacial prosthetics offers an important contribution within present day comprehensive oncologic care. Additionally, there are persistent barriers within treatment workflows for this service, particularly as it relates to cost. Service leaders and trainees should be made aware of these benefits and barriers as they are likely to be more severe in regional or community centers.

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1. What is your position/academic title?
2. How many full-time Head and Neck surgeons does your cancer center currently have on staff?
3. Does your cancer center have Head and Neck Cancer surgical fellows/residents?
4. How many current fellows?
5. How many current residents?
6. Approximately how many ablative oral and oropharyngeal tumor surgeries does your cancer center perform per month?
7. In a clinically equivalent situation for the following head and neck resections, which rehabilitation does your service generally favor:
 - a. Neoplasm of hard palate/upper gum
 - b. Neoplasm of soft palate
 - c. Neoplasm of lower gum
 - d. Rhinectomy
 - e. Auriclectomy
8. Does your cancer center have a Dental Service?
9. How often does your service refer to a staff dentist (i.e. onsite/in network) for rehabilitation/restoration of defects of the head and neck?
10. How often does your service refer to a dentist outside of the Cancer Center (i.e. private dentist) for rehabilitation/restoration of defects of the head and neck?
11. At your center, how often is a dentist involved in the care of a head and neck cancer patient?
 - a. Before Treatment
 - b. During Treatment
 - c. After Treatment
12. Please indicate your level of agreement with the following perceived barriers as they pertain to referring head and neck cancer patients to a dentist for maxillofacial prosthetic rehabilitation:
 - a. Location of the dentist
 - b. Proximity/mobility of the patient to dentist
 - c. Timing of care
 - d. Dentist scheduling
 - e. Patient scheduling
 - f. Insurance
 - g. Cost to patient
 - h. Availability of dentists trained in maxillofacial prosthetics/oncology
 - i. Availability of dentists willing to treat H/N cancer patients
 - j. Hospital space available for dental care
13. We are trying to better understand the role of maxillofacial prosthetics within NCI-Designated Comprehensive Cancer Centers. Please tell us any other thoughts you may have about the role of maxillofacial prosthetics as it relates to the care of head and neck cancer patients.

Figure 1.
Survey questions sent to Head and Neck Service Leaders from NCI-Designated Comprehensive Cancer Centers

Figure 2.
Frequency dentist is involved in the care of head and neck cancer patient

Figure 3.
Reported rehabilitation preference in clinically equivalent situations

Table 1**Characteristics of Responding Services**

Response Rate % (n)	60% (28)
Full time surgeons, median, range (SD)	4; 2-14 (2.62)
Fellows/Residents, % (n)	
Yes	96.4% (27)
No	3.6% (1)
Residents, median, range (SD)	15; 3-25 (7.83)
Fellows, median, range (SD)	1; 0-5 (1.37)
Number of reported ablative oral and oropharyngeal tumor surgeries per month (%)	
15 or less	7
16-30	43
31-45	21
46-60	18
More than 60	12
Dental Service at Cancer Center % (n)	
Yes	71 (20)
No	29 (8)

Table 2
Perceived barriers to dentist/prosthodontist involvement for maxillofacial prosthetic rehabilitation

	SD	D	N	A	SA
Location of Dentist	0	7	14	61	18
Proximity Mobility of Dentist	0	11	18	64	7
Timing of Care ¹	4	4	11	67	15
Dentist Scheduling ¹	0	15	26	52	7
Patient Scheduling ²	0	12	31	50	8
Insurance	0	4	0	39	57
Cost to patient	0	0	7	25	68
Availability of dentists trained in Maxillofacial Prosthetics/Oncology	4	7	7	32	50
Availability of dentists willing to treat Head and Neck Cancer Patients	4	7	7	39	43
Hospital space available for dental care	7	4	39	36	14

¹ n=27,

² n=26; Data are %; SD, strongly disagree; D, disagree; N, neither agree nor disagree; A, agree; SA, strongly agree.

Table 3

Thematically Grouped Responses of Open-Ended Question

Themes	Examples
Benefit to patients	- "Needs to be integrated, present at tumor board and working well with the team. It becomes part of the culture and an invaluable part of the services provided"
Cost to patients	- "They are critical to the care of our patients and mandatory for irradiated patients. Getting reimbursed for their services is a challenge we always justify as their services are part of their medical care for cancer"
Availability of trained providers	- "I think that the use of maxillofacial prosthetics is currently underutilized, partially because of interest in free tissue transfer and also lack of general expertise and availability of trained maxillofacial experts." - "We currently do not have any dental services available on site at the cancer center. This is a significant barrier not just for the head and neck cancer program but for the cancer center as a whole."