Strategic use of obturator prostheses for the rehabilitation of oral cancer patients during the COVID-19 pandemic

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Received: 22 April 2020 / Accepted: 19 August 2020
Published online: 28 August 2020
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Abstract
During the current pandemic scenario, maxillofacial rehabilitation specialists involved with supportive care in cancer must transform its practice to cope with COVID-19 and improve protocols that could quickly return the oral function of complex cancer patients who cannot wait for surgical complex rehabilitation. This includes the role of the maxillofacial prosthetist for the rehabilitation of surgically treated patients with maxillary cancers by the means of filling obturator prostheses that are considered an optimal scientific-based strategy to reduce hospital stay with excellent pain control, oral function (speech, swallowing, mastication, and facial esthetics), psychologic and quality of life outcomes for the patients following intraoral cancer resection. Therefore, the aim of this commentary was to bring new lights to the strategic use of obturator prostheses for the rehabilitation of oral cancer patients during the COVID-19 pandemic as well as to present a protocol for managing such cases.

Keywords COVID-19 · Oral cancer · Rehabilitation · Obturator prosthesis

From the initial identification of the novel coronavirus 2019 disease (COVID-19) passing through the World Health Organization (WHO) recognition as a pandemic to the current chaotic world scenario, specialists discuss criteria for prioritizing surgical treatment for head and neck aggressive malignant tumors [1–3]. Several head and neck surgery services have prioritized less complex surgical procedures, avoiding longer surgical time for tumor resections and microsurgical reconstructions aiming to reduce the exposure of the patients and team members to the risk of contagion [4]. These decisions were also based on the need for reducing the period of hospitalization and on the fact that microsurgical reconstructions often require long-standing patient monitoring in intensive care units, which may not be currently available due to the pandemic.

In this scenario, when the medical teams consider the surgical procedure unavoidable (weighing the risks of contamination of the patient/team and prognosis of the oncological disease), the multidisciplinary teams must be involved to allow the best possible results. This includes the role of the maxillofacial prosthetist for the rehabilitation of surgically treated patients with maxillary cancers by the means of filling obturator prostheses that are considered an optimal scientific-based strategy to reduce hospital stay with excellent pain control, reestablishment of oral function (speech, swallowing, mastication, and facial esthetics), and the improvement of psychological and quality of life outcomes for the patients following intraoral cancer resection (Fig. 1) [5–7].

The strategic use of obturator prostheses for the rehabilitation of oral cancer patients has the potential to reduce the professional burden of head and neck surgical oncology staff.
member during the COVID-19 pandemic. Potential benefits include a reduction in the number of patients’ visits by the surgeons because of improved control of pain and oral infections and decreased risk of bacteremia. Also, the reestablishment of oral function immediately following wide surgical resections will help the patient’s nutritional status and weight maintenance. In addition, the protocol allows for a prompt surgical recover and hospital discharge. Our team observed a similar number of obturators for oral cancer patients when comparing this same period of time (March to June) between the years 2019 and 2020, 8 versus 6, respectively; however, the number of microsurgical reconstructions dropped from 7 to 0 cases in this same period of time between 2019 and 2020. This may be considered an additional evidence that the use of obturator prostheses for oral cancer patients improves not only the overall quality of life of patients but also the professional workflow of head and neck surgical oncology teams.

In addition, the protocol proposed in this commentary allows for a prompt surgical recovery and hospital discharge. Our team confirmed a similar number of delivered obturators for oral cancer patients between March and June of 2019 and 2020, 8 versus 6, respectively. However, the number of microsurgical reconstructions dropped from 7 to 0 cases in this same period of time. This may be considered an additional evidence that the use of obturator prostheses for oral cancer patients improves not only the overall quality of life of patients but also the professional workflow of the head and neck surgical oncology teams.

In our center, the prosthodontic rehabilitation of oral cancer patients is divided into three phases, as follows:

1. Immediate surgical obturation: impressions by using arbitrary extended trays and altered casts are obtained before surgery, and the prosthesis is placed during surgical procedure and packed by using circum-zygomatic wires, when necessary
2. Delayed surgical obturation: impressions of the defect are generally performed at ≥ 7 days after surgery and prosthesis is fabricated with an obturator by using a non-altered working cast
3. Definitive obturation: involves definitive prostheses after 3 to 4 months post surgically or 6 to 12 months after radiotherapy

Table 1 and Fig. 2 summarize the impact of the COVID-19 pandemic in the workflow of the fabrication of obturator prostheses for the rehabilitation of oral cancer patients.

Following the guidelines to avoid unnecessary consultations, molding for the fabrication of the surgical obturator prosthesis must be performed at the same time of hospitalization, followed by intraoperative installation. In order to reduce follow-up for necessary adjustments, a reline or an impression and installation of a new prosthesis (interim obturator) must be performed on the day of hospital discharge—reducing the ideal time of this phase transition from 7 days to approximately 3 days [10]. Obviously, this is a desirable outcome during the pandemic of COVID-19. In addition, such procedure will

Fig. 1 Step-by-step procedure for fabricating immediate obturator. a Initial clinical aspect. Note the cancer lesion under the prosthetic reconstruction on the left side of maxilla. b Cement-retained multiple implant crowns were removed before partial maxillectomy. c Postoperative aspect 3 days after surgery showing the oronasal communication. Note that the crown of tooth no. 22 was re-cemented before impression. d Conventional impression with irreversible hydrocolloid (Cavex Colorchange Type 1; Cavex Holland BV, The Netherlands) after the individualization of the stock tray by using polysiloxane impression material (Zetaplus, Zhermack SpA, Italy). e Immediate obturator was fabricated with autopolymerizing acrylic resin and stainless steel clips. f Prosthesis in position. No escape of fluids was observed and speech was restored satisfactorily
ensure a longer period of time until the need for a replacement or relining of the prosthesis. Also, with these protective measures, telephone calls, and, mainly, video calls are considered reliable strategies for patients’ guidance and functional assessments [11]. When consultation is unavoidable, breaks in appointments are allowed for proper time of environment disinfection between patients. Of importance is the education of the patient to arrive at the scheduled time, minimizing long waiting. Whenever possible, the patient’s family member or carer should not enter the dental office.

The COVID-19 pandemic presented time-sensitive challenges and urgent issues that require developing new and rapid solutions as alternatives to routine standard evidence-based protocols which require substantial time and interactions

Table 1 Differences between traditional versus COVID-19 workflow for obturator prostheses

|                      | Traditional workflow (≈ days/local) | COVID-19 workflow (≈ days/local) |
|----------------------|-------------------------------------|----------------------------------|
| Consultations and molding for surgical obturator prosthesis fabrication | At least 7 days before surgery/dental clinic | 1 day before surgery/surgical admission at the hospital |
| Installation of surgical obturator prosthesis | During the surgery/operative room | During the surgery/operative room |
| New impression and installation of interim obturator prosthesis | 7 days after the surgery/dental clinic | 3 days after the surgery or at the day of hospital discharge/surgical admission at the hospital |
| First control consultation of interim obturator prosthesis | 14 days after the surgery/dental clinic | 10 days after the surgery/video or telephone calls |
| Second control consultation of interim obturator prosthesis | 21 days after the surgery/dental clinic | 23 days after the surgery/dental clinic |

The present figure also illustrates the hospitalization burden of the COVID-19 pandemic, in which tertiary hospitals had to implement new strategies of care in order to reduce the PPE intake and hospital resources, support the high demand for IUC beds, and also to prevent COVID-19 dissemination and infection of patients and health professionals [8, 9]. Observe that the proposed workflow for obturator prostheses is not inserted in the well-known situations for COVID-19 contagion (Δ) and screening moments, reducing the risk of health professional infection.
between provider and patient. Therefore, the dissemination of this information to health care professionals worldwide can help prevent COVID-19 dissemination. Dentists can be exposed to all common routes for COVID-19 infection on a single dental appointment (aerosols and droplets, contact with materials, dental sharp instruments, or contaminated surfaces) [2], even when a procedure is finished, due to the long period that pathogenic microorganisms remain suspended in the air [12, 13].

Facing a pandemic scenario, maxillofacial rehabilitation specialists involved in supportive care in cancer must adapt dental practice to allow for continuation of care of patients infected with COVID-19 who require prosthodontic appliances. Alternative and improved protocols such as the one described above could help patients with complex cases to quickly return to normal function, without the need to delay surgery of complex cancer cases. By strategically altering the prosthodontic rehabilitation protocol, patients can receive necessary cancer care and avoid the need to go through long hospitalization, frequent follow-up visits for obturator adjustments, and still maintain adequate oral function and trauma control [14].

As an integral part of the described protocol, proper COVID-19 professional protective equipment (PPE) use (disposable working cap, isolation gown, goggles or face shield, disposable N95 mask, and disposable gloves, among others) is a must. Hand-washing techniques (water and soap or ≈ 70% alcohol gel) must be consistent with World Health Organization protocols designed for health care workers [2].

To facilitate the visualization of the protocol described in the commentary, we present a workflow suggestion based on our experience developed in three different cancer care...
reference centers covering from public to private facilities in São Paulo, Brazil (Fig. 3).

Data availability Not applicable.

Compliance with ethical standards

Conflict of interest The authors declare that they have no conflict of interest.

Code availability Not applicable.

References

1. Givi B, Schiff BA, Chinn SB, Clayburgh D, Iyer NG, Jalisi S, Moore MG, Nathan CA, Orloff LA, O’Neill JP, Parker N, Zender C, Morris LGT, Davies L (2020) Safety recommendations for evaluation and surgery of the head and neck during the COVID-19 pandemic. JAMA Otolaryngol Head Neck Surg 146:579. https://doi.org/10.1001/jamaoto.2020.0780

2. Kowalski LP, Sanabria A, Ridge JA, Ng WT, Bree R, Rinaldo A, Takes RP, Mäkitie AA, Bradford CR, Paleri V, Hartl DM, Vander Poorten V, Nixon JJ, Piazza C, Lacy PD, Rodrigo JP, Guntinas-Lichius O, Mendenhall WM, D’Cruz A, Lee AWM, Ferlito A (2020) COVID-19 pandemic: effects and evidence-based recommendations for otolaryngology and head and neck surgery practice. Head Neck 42:1259–1267. https://doi.org/10.1002/hed.26164

3. Cai YC, Wang W, Li C, Zeng DF, Zhou YQ, Sun RH, Jiang H, Guo H, Wang SX, Jiang J (2020) Treating head and neck tumors during the SARS-CoV-2 epidemic, 2019-2020: Sichuan Cancer Hospital. Head Neck 42:1153–1158. https://doi.org/10.1002/hed.26161

4. Yang Y, Soh HY, Cai ZG et al (2020) Experience of diagnosing and managing patients in oral maxillofacial surgery during the prevention and control period of the new coronavirus pneumonia. Chin J Dent Res 23:57–62. https://doi.org/10.3290/j.cjdr.a44339

5. Phasuk K, Haug SP (2018) Maxillofacial prosthetics. Oral Maxillofac Surg Clin North Am 30:487–497. https://doi.org/10.1016/j.coms.2018.06.009

6. Cao Y, Yu C, Liu W, Miao C, Han B, Yang J, Li L, Li C (2018) Obturators versus flaps after maxillary oncolgical ablation: a systematic review and best evidence synthesis. Oral Oncol 82:152–161. https://doi.org/10.1016/j.oraloncology.2018.05.019

7. Brandão TB, Vecchiato Filho AJ, Batista VE et al (2016) Obturator prostheses versus free tissue transfers: a systematic review of the optimal approach to improving the quality of life for patients with maxillary defects. J Prosthet Dent 115:247–53.e4. https://doi.org/10.1016/j.prosdent.2015.08.002

8. Smith SR, Jenq G, Clain T, Magnant C, Haig AJ, Hurvitz E (2020) Proposed workflow for rehabilitation in a field hospital setting during the COVID-19 pandemic. PM R 12:823–828. https://doi.org/10.1002/pmrj.12405

9. Wong J, Goh QY, Tan Z, Lie SA, Tay YC, Ng SY, Soh CR (2020) Preparing for a COVID-19 pandemic: a review of operating room outbreak response measures in a large tertiary Hospital in Singapore. Can J Anaesth 67:732–745. https://doi.org/10.1007/s12630-020-01620-9

10. Acharya V, Chambers MS (2015) Maxillofacial prosthetic rehabilitation of a patient with oral complications during and after multimodality therapy for the management of oral squamous cell carcinoma. J Prosthet Dent 113:651–655. https://doi.org/10.1016/j.prosdent.2014.12.010

11. Ignatius E, Perälä S, Mäkelä K (2010) Use of videoconferencing for consultation in dental prosthetics and oral rehabilitation. J Telemed Telecare 16:467–470. https://doi.org/10.1258/jtt.2010.100303

12. Kampf G, Todt D, Pfänder S, Steimann E (2020) Persistence of coronaviruses on inanimate surfaces and its inactivation with biocidal agents. J Hosp Infect 104:246–251. https://doi.org/10.1016/j.jhin.2020.01.022

13. Peng X, Xu X, Li Y, Cheng L, Zhou X, Ren B (2020) Transmission routes of 2019-nCoV and controls in dental practice. Int J Oral Sci 12:9. https://doi.org/10.1038/s41368-020-0075-9

14. Kampf G, Todt D, Pfänder S, Steimann E (2020) Persistence of coronaviruses on inanimate surfaces and their inactivation with biocidal agents. J Hosp Infect 104:246–251. https://doi.org/10.1016/j.jhin.2020.01.022

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