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## Short Communication

## A Brazilian multicenter pilot case series on the efficacy of photobiomodulation therapy for COVID-19-related taste dysfunction

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## ABSTRACT

**Background and aim:** Among the most common symptoms of COVID-19 is taste dysfunction, which has a ranging clinical presentation. As well as its pathophysiology remains to be unclear, there is not enough information about the efficacy and safety of the available treatments. This study aims to report a series of cases using PBMT for the management of COVID-19-related taste impairment.

**Case series:** 8 female and 2 male patients sought medical help for taste impairment (either partially or completely) after COVID-19 infection. Photobiomodulation therapy (PBMT) on the tongue mucosa was then proposed but with 3 different protocols. Taste perception at baseline and before every laser session was evaluated using a visual analog scale. Irrespective of the PBMT protocol, taste recovery was noted in all cases but with varying degrees of improvement.

**Conclusion:** given the high prevalence rates of taste dysfunction in COVID-19 patients and the lack of information about the available treatments, PBMT seems to be a promising therapeutic modality but not dependent on the total number of laser sessions and the interval between them. The choice of the most suitable laser protocol as well as the knowledge of the exact photonic mechanisms, however, need to be better studied.

### 1. Background

Among the most common symptoms of COVID-19 is taste dysfunction, which has a range of clinical presentation [1,2]. Although its pathophysiology remains unclear [3,4], indirect damage to taste receptors by the viral infection of epithelial cells of the tongue and subsequent local inflammation seems to be the key factor [5]. Likewise, several treatments are proposed for COVID-19-related taste dysfunction; however, there is not enough information about efficacy and safety [3].

Thus, it was hypothesized that photobiomodulation therapy (PBMT)

would be beneficial for taste recovery since it has already been successfully applied in COVID-19 patients for treating orofacial lesions [6, 7] and smell dysfunction [8].

#### 1.1. AIMS

This study aims to report a series of cases using PBMT for the management of COVID-19-related taste impairment.

Running title: "PBMT for taste dysfunction in COVID-19"

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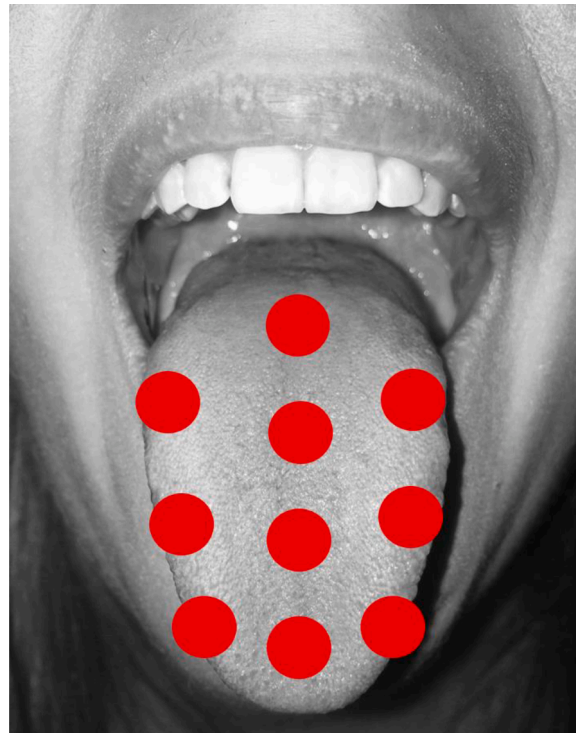


Fig. 1. Irradiation points for photobiomodulation therapy.

## 2. Methods – case series

Eight female (mean: 40.1 years; range: 21-59 years) and two male patients (mean: 31 years; range: 25 to 37 years) from five different Brazilian Health Centers were included in this study. They sought medical help for taste impairment (either partially or completely) after COVID-19 infection, which was confirmed by biomolecular assay (RT-PCR).

PBMT on the tongue mucosa was then proposed to the patients. Therapy EC® (DMC, São Carlos, SP, Brazil) or Laser DUO® (MM Optics Ltda São Carlos, SP, Brazil) devices were used at 660 nm, on contact mode, with 100 mW of power, and 2 J per point. A total of 7 points were illuminated on the dorsum and 3 points on each lateral edge of the tongue (Fig. 1). Regarding the frequency of laser treatment, 3 protocols were considered:

- Group (1) 10 laser sessions, with a 24-hour;
- Group (2) 10 laser sessions, twice a week and with a 48-hour interval;
- Group (3) 5 laser sessions, interval twice a week and with a 48-hour interval.

At the first clinical appointment (baseline) and before the subsequent ones, taste perception was evaluated using a visual analog scale ranging from 0 (normal taste) to 10 (complete absence of taste).

## 3. Results – case series

Fig. 2 depicts the scores obtained at baseline and before every laser session, which were grouped according to the PBMT protocols. It was noted improvements in taste impairment for all the patients, regardless

of the protocol used.

## 4. Conclusion

Given the high prevalence rates of taste dysfunction in COVID-19 patients and the lack of information about the available treatments, PBMT seems to be a promising therapeutic modality but not dependent on the total number of laser sessions and the interval between them. The choice of the most suitable laser protocol as well as the knowledge of the exact photonic mechanisms, however, need to be better studied.

## Funding

nothing to declare.

## Ethics approval

not applicable.

## Consent to participate

written informed consent was obtained from all the patients.

## Consent for publication

written informed consent was obtained from all the patients.

## Declaration of Competing Interest

nothing to declare.

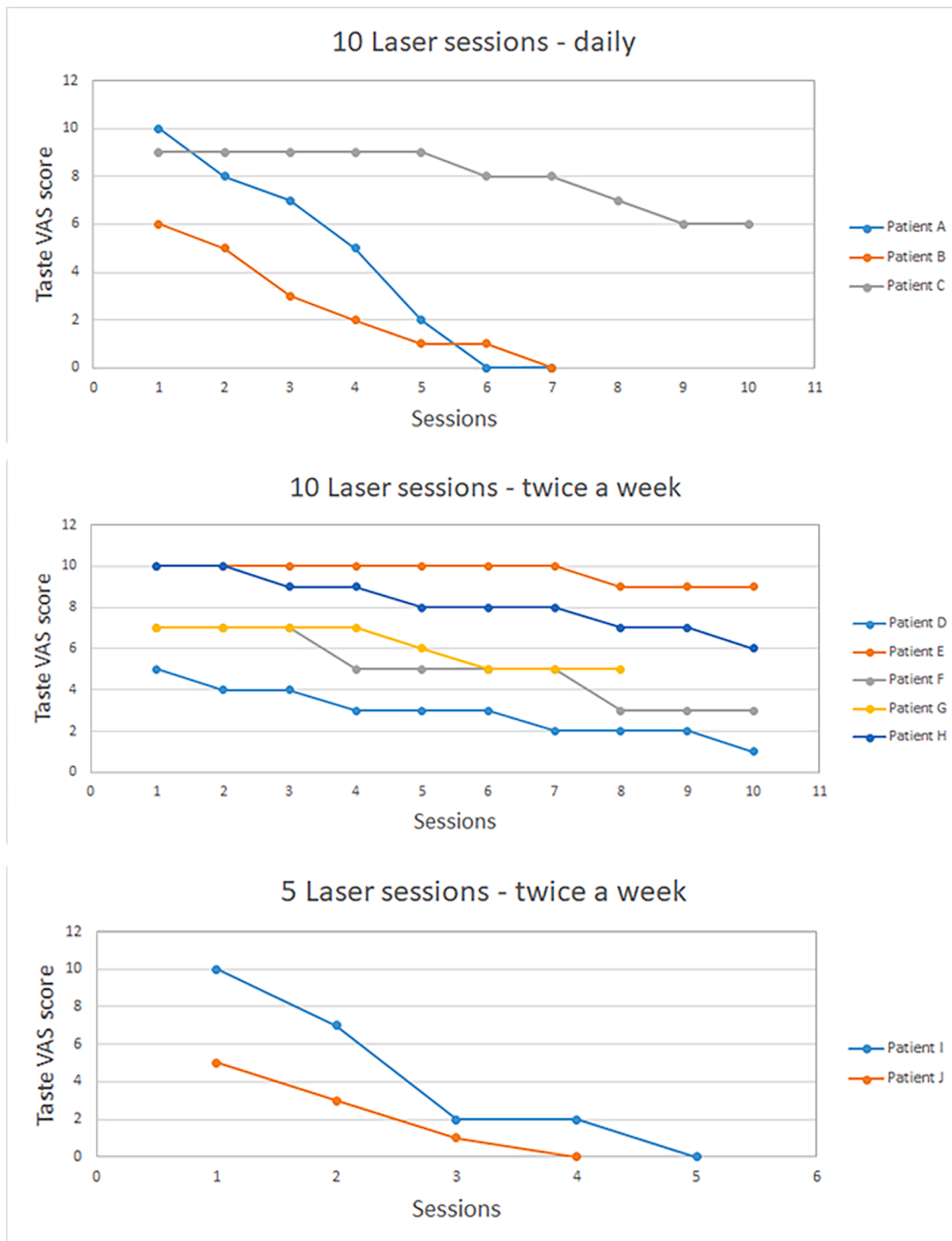


Fig. 2. Taste scores at baseline and before every laser session, according to the photobiomodulation therapy protocols.

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