

Taste loss in COVID-19 – psychophysical evidence supporting a low prevalence*

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Dear Editor:

Much – possibly even too much – has been published about chemosensory dysfunction as a consequence of COVID-19. Studies have reported prevalence of taste loss in up to 89.9%⁽¹⁾, which is in a similar range as COVID-19 related smell loss. However, most of these publications rely solely on patients' self-reports. Only few studies used validated psychophysical tests to specifically address olfaction and gustation. Especially for gustation, it is evident that subjective reporting does not correlate well with more objective psychophysical findings, often leading to an overestimation of subjectively impaired taste.

Here, we present evidence based on psychophysical studies that gustatory dysfunction is much less frequent than previously suggested⁽¹⁾. We conducted a retrospective analysis of data from four centers, some of which had been previously published^(2–4). The study included non-hospitalized COVID patients who underwent psychophysical assessment using the validated "Taste Strips" test within one month following a positive PCR.

Our analysis comprises a cohort of 150 patients, with an average age of 41.1 ± 13.9 years, of whom 63% were female. Based on the subjective gustatory function at the time of the assessment, the cohort was divided in two subcohorts which did not differ significantly in age ($p=0.29$) or sex ($p=0.18$). Sixty-eight patients (45.3%) reported an acute gustatory dysfunction, while the remaining 82 patients (54.7%) subjectively perceived their gustation as normal. Among those subjectively impaired patients (mean Taste Strips score: 10.9 ± 3.5), hypogeusia was psychophysically confirmed in only 14 cases (20.6%; Figure 1). Within the subset of individuals reporting subjectively normal taste

perception (mean Taste Strips score: 11.3 ± 3.3), 15 individuals (18.3%) exhibited hypogeusia when assessed with Taste Strips. Across all patients (mean Taste Strips score: 11.1 ± 3.4), the prevalence of psychophysically confirmed impairment in taste was 19.3%. On the contrary, olfactory impairment was established through psychophysical smell tests in 59.3% of the total cohort.

Subjective taste impairment and psychophysically confirmed hypogeusia were not significantly associated ($\chi^2=0.13$, $p=0.72$; Figure 1). However, most interestingly, a significant association between subjective taste impairment and psychophysically confirmed hyposmia was seen ($\chi^2=4.94$, $p=0.026$; Figure 1). Moreover, we observed a weak but significant positive correlation between Taste Strips score and the interval between the diagnosis of COVID-19 and the psychophysical testing ($r=0.23$, $p=0.019$).

These data show that gustatory impairment in COVID-19 is far less frequent than suggested by many individual studies including a recent meta-analysis^(1,5). In COVID-19, psychophysically confirmed hypogeusia appears to be less prevalent than confirmed hyposmia, occurring less than half as often (in our sample, hyposmia was present in 59.3% and hypogeusia in 19.3%) – although a minor segment of these high ratings of taste loss may also be due to the presence of parageusia/phantogeusia which may be – erroneously – self-rated as decreased taste function. However, this rate of self-rated taste loss is still considerably higher than the 5% hypogeusia observed in the general population. This is most likely due to the patient's misinterpretation of the concepts of "taste" and "flavor". Particularly, the correlation

between the subjective rating of gustatory function and the psychophysical results of the smell test, but not the taste test, underscores that this overestimation is likely due to the patient's confusion between taste and retronasal olfaction/ flavor ^(6,7). Moreover, the correlation between Taste Strips scores and the interval between the diagnosis of COVID-19 and the psychophysical testing indicates that gustatory impairment improves rapidly (see also Boscolo-Rizzo et al. ⁽⁸⁾).

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Acquisition of data: CAH, SLB, ET, SS; statistical analysis and interpretation of data: CAH, TH; drafting of the manuscript: CAH; critical revision of the manuscript: SLB, ET, SS, TH.

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Conflict of interest

The authors declare no conflicts of interest.

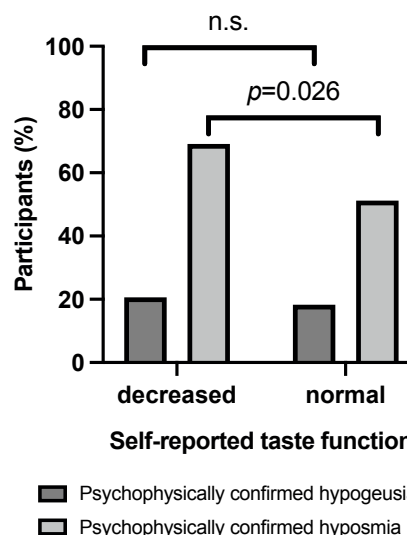


Figure 1. Psychophysical testing confirms chemosensitive dysfunction far more often in olfaction than gustation. Interestingly no difference in the prevalence of hypogeusia can be seen between patients with subjectively normal taste function and those who self-report a taste function. In contrast, these two groups show a significant difference in prevalence of psychophysically confirmed hyposmia (hypogeusia: $\chi^2=0.13$, $p=0.72$; hyposmia: $\chi^2=4.94$, $p=0.026$).

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