Prevalence and persistence of smell and taste dysfunction in COVID-19; how should dental practices apply diagnostic criteria?

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Introduction

There is now abundant evidence that loss of sense of smell is one of the most common symptoms of COVID-19 infection and in some cases the only symptom.[1] It is the best predictor of COVID-19 status of all the associated symptoms.[2] Some months after the first reports of the potential value of loss of smell as a diagnostic marker,[3] loss of, or change in, normal sense of smell (anosmia) or taste (ageusia) were included in the UK case definition, allowing patients access to testing and prompting self-isolation.

These criteria are now widely used as screening questions to identify potential COVID-19 cases prior to attending for medical and dental care in an attempt to reduce the risk of transmission. However, care must be taken in applying these criteria. We were contacted by a mother who had been refused permission to accompany her 10-year-old son for an extraction. She had lost her sense of smell due to COVID-19 in March, and like many patients, was still suffering with ongoing olfactory dysfunction nine months later. Patients are not thought to be infectious beyond a period of 14 days, and in those patients with olfactory dysfunction beyond two weeks, this is thought to be due to damage to the olfactory epithelium and olfactory sensory neurones rather than ongoing direct effects of viral infection – there was no need to exclude her on this basis. Sadly, the extraction could not be completed as the child suffered significant pain, which itself caused significant distress to a mother who had been prevented from comforting her child. We therefore hope to provide a brief overview of the prevalence, recovery rates and advice on how to apply the criteria.

Prevalence of olfactory loss in the general population and following COVID-19 infection

Olfactory dysfunction is common. Population estimates suggest that 19.1% of adults suffer from loss of smell, a figure that rises to 80% in patients over the age of 75.[4]

A meta-analysis reveals that the overall prevalence of alteration of the sense of smell or taste following COVID-19 infection is 47%, ranging between 31% and 67% in severe and mild-to-moderate symptomatic patients, respectively. The loss of smell and taste preceded other symptoms in 20% of cases and was concomitant in 28%.[1] Patients typically report a sudden onset of profound loss in the absence of typical symptoms of an upper respiratory tract infection, such as a blocked or runny nose.[5]

Recovery rates

We prospectively followed a cohort of patients who reported loss of smell and taste in the last week of March 2020.[6] Patients were contacted one week later,[7] and then six months after onset, with a 71% response rate.

At the time of the first survey, 87% reported complete anosmia and a further 12% a very severe loss of smell. At a follow up survey only one week later 80% reported lower severity scores, 18% were unchanged and 2% were worse; 17% reported persistent complete loss of smell, while 12% reported having already fully regained their sense of smell. At six months, 41% reported having regained their sense of smell fully, while only 2% reported no improvement at all. Other studies looking at recovery rates also show progressive reduction in those reporting no improvement – at four weeks Boscolo-Rizzo *et al*. reported that 49% had recovered completely, 41% partially while 11% had noticed no improvement.[8] In a different

study, at 60 days 7% were found to have severe deficits on psychophysical testing.[9] While the high recovery rate is encouraging, given the very high prevalence of COVID-19 worldwide, if nearly 3% of those with OD are left anosmic, this represents a significant number of patients with ongoing olfactory dysfunction.

As for taste, the prevalence of self-reported reduction in sense of taste reduced from 95% in the first survey to 35% in the last. It is difficult to interpret self-reported taste dysfunction as patients may instead report loss of flavour perception, mediated by retronasal olfaction, as loss of taste. This is consistent with the finding that at six months, only 3% of the subjects reported that they were still unable to discriminate between primary tastes or sweet, sour, salty, bitter and umami. The recovery of gustatory function seems to be faster than olfaction, occurring, on average, within the first ten days.[10] In a recent prospective psychophysical study,[11] persistence of gustatory disturbance was detected in 37% of patients at 30 days and in 8.% of cases at 60 days. In this last two-month follow-up, 4% of patients were unable to discriminate the four primary tastes, suggesting our finding of 3% persisting taste disturbance is in keeping with the observed ongoing recovery, but highlights that a small number of patients do have ongoing taste loss.

Additional symptoms

Parosmia, an altered or distorted sense of smell in response to odorants, has previously been reported to affect a high proportion of patients with post-infectious loss, with 56% cases reporting parosmia in one study,[11] although this is not widely recognised. We found that nearly half of our COVID-19 cohort reported parosmia, with a median interval of 2.5 months from the onset of loss of smell, and this was persistent at 6 months in the majority of cases. The presence of parosmia has previously been reported as a positive predictor associated with a lower chance of anosmia as the long term outcome following post-viral olfactory loss,[12] and it's thought to reflect recovery of olfactory sensory neurones. The 'COVID smell', or parosmia, is often reported as a foul smelling, rancid odour, sometimes like rotting flesh. Patients may present for dental care believing that this is caused by a dental issue.

Headache/sinus pain was also a common symptom in our cohort, reported by 67 patients (15.4%). The authors have seen many patients who have received repeated courses of antibiotics for presumed sinusitis prior to referral, but endoscopic and radiological assessment have revealed no evidence of infection.

Advice to patients

Patients who report recent onset loss or change in sense of smell should be advised to self-isolate and seek testing. For those with ongoing loss or alteration in sense of smell, advice may be found at AbScent.org/Nosewell, a resource created as a result of a collaboration between AbScent and the British Rhinological Society.

Conclusions

This summary highlights that while screening for loss or alteration of sense of smell is an important marker for COVID-19 infection, patients may have persistent deficits more than six months after onset. In addition, pre-existing smell disorders are common, particularly in elderly patients. Therefore, a recent onset or change in sense of smell should be considered as a marker, while pre-existing loss should not lead to exclusion. ◆

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