

A further plot twist: will 'long COVID' have an impact on dentistry and the dental workforce?

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Key points

The COVID-19 pandemic has caused an increased demand on dental services, pressure to catch up on the backlog of patients and new dental disease as a direct consequence of the national lockdown. This is complicated by capacity constraints due to changes in the way dental services now operate.

The continuing impact of COVID-19 is complicated by long COVID and its debilitating symptoms, affecting both patients and the dental workforce.

We must protect our workforce from the impact of long COVID, supporting those who are living with the disease and trying to recover, taking personal and collective responsibility for our own wellbeing and the welfare of those around us.

Abstract

COVID-19 has dominated our lives since the start of the pandemic in 2020, as well as greatly impacting dentistry, its patients and the dental profession. A new and potentially further problematic phenomenon is that of long COVID, a term used to describe the effects of COVID-19 that continue for weeks, or even months, beyond the initial illness. It is characterised by debilitating symptoms including extreme fatigue, shortness of breath, insomnia, heart palpitations and prolonged high temperature. With one in ten people in the UK suffering from long COVID, there will undoubtedly be a considerable impact on dentistry provision; there will be ramifications not only for patients, but also the workforce, both physically and mentally. The aim of this article is to explore the obstacles we will face due to long COVID, examining possible challenges but also possible solutions.

Introduction

There is no doubt that COVID-19 has had a colossal impact on dentistry, its patients and the dental profession as a whole, from the day it first stormed onto the scene, uninvited, in early 2020. Dental services were suspended across the UK and new Urgent Dental Centres (UDCs) were set up. However, many UDCs encountered supply chain issues for appropriate personal protective equipment (PPE), with the added challenge of limited PPE stocks. UDCs pulled off an impressive delivery of services, but difficult decisions had to be made about what qualified as a 'dental emergency'; patients with profound toothache often required cycles of advice, analgesia and antibiotics before a

UDC referral being appropriate. When dental services resumed, providers had to secure a continuous supply of sought-after PPE. The introduction of fallow times meant it was ever more challenging to accommodate all those who had appointments cancelled during the national lockdown.

A new and potentially further problematic phenomenon for dentists is that of long COVID, also referred to as post-COVID-19 syndrome. Long COVID is a term used to describe the effects of COVID-19 that continue for weeks, or even months, beyond the initial illness. The National Institute for Health and Care Excellence (NICE) have developed the clinical definitions for COVID-19 and its timeframes, as shown in Table 1.¹

The Office for National Statistics (ONS) researched the prevalence of and risk factors for long COVID symptoms utilising the

'Coronavirus (COVID-19) infection survey'; the data from this survey included data from COVID-19 test results and respondent-reported data on symptoms.² As of December 2020, it was estimated that one in ten people in the UK were suffering from long COVID, meaning they were exhibiting symptoms for a period of 12 weeks or longer;² this will undoubtedly have a considerable impact on dentistry provision. There will be ramifications not only for patients, but also our workforce, both physically and mentally.

What are the long-term effects of coronavirus (long COVID)?

Long COVID is believed to be caused by the effects of the immune system, which continue beyond the initial illness.³ Emerging evidence and patient testimony are showing there is

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Table 1 NICE clinical definitions of COVID-19 based on its timeframes¹

| Term | Definition |
|-----------------------------------|--|
| Acute COVID-19 | Signs and symptoms of COVID-19 for up to four weeks |
| Ongoing symptomatic COVID-19 | Signs and symptoms of COVID-19 from 4–12 weeks |
| Post-COVID-19 syndrome/long COVID | Signs and symptoms that develop during or after an infection consistent with COVID-19, continue for more than 12 weeks and are not explained by an alternative diagnosis |

an increasing number of people who cannot unburden themselves from the effects of COVID-19, with symptoms continuing for months after initially falling ill. The chances of developing long-term symptoms does not seem to be linked to the severity of the initial illness; those with mild symptoms at first can still have long-term problems.³ NICE defines the condition as presenting with clusters of symptoms which may change over time and can affect any system within the body.¹ Common, recognised symptoms of long COVID are listed in Box 1.

While we have learnt a lot about COVID-19 with advances in treatment and vaccination programmes, there is no doubt that the long-term burden of the illness can be debilitating for all individuals, including our patients and the dental team. The exact number of people who experience long COVID symptoms is unclear, with research into its prevalence ongoing; NHS England and the ONS estimate that during the week commencing 22 December 2020, around 186,000 people in the UK had long COVID symptoms, with this figure expected to rise as coronavirus infection rates increase.^{2,4}

The impact of long COVID

Patients

There is currently no research or evidence available showing the direct impact that long COVID has on oral health; however, a relationship has been suggested, with many long COVID sufferers reporting tooth loss. There could, of course, be a mechanism for COVID-19 to exacerbate dental problems or even tooth loss, with one of these being that coronavirus could damage blood vessels supplying teeth;⁵ however, there is currently no data to support these theories. Several online forums have been set up to support those who have symptoms of long COVID, with numerous individuals self-reporting tooth loss, often without pain or blood. An example of such online forums and discussion is that available from Survivor Corps, a not-for-profit movement educating and mobilising COVID-19 survivors and connecting them with the medical, scientific and academic research community.⁶

It is unclear whether long COVID is directly linked to premature tooth loss; it may be suggested that individuals with debilitating symptoms, such as fatigue, are not able to maintain their oral health or tend to their oral health needs. Symptoms of breathlessness,

Box 1 The symptoms of long COVID

- Extreme tiredness (fatigue)
- Shortness of breath
- Chest pain or tightness
- Problems with memory and concentration ('brain fog')
- Difficulty sleeping (insomnia)
- Heart palpitations
- Dizziness
- Feeling sick, diarrhoea, stomach aches, loss of appetite
- Pins and needles
- Joint pain
- Depression and anxiety
- Tinnitus, earaches
- A high temperature, cough, headaches, sore throat, changes to sense of smell or taste
- Rashes.

brain fog and chest pain have meant that previously healthy individuals now struggle to complete basic tasks, such as climbing stairs or getting dressed. However, poor oral health practices are unlikely to lead to tooth loss on a previously healthy dentition in a short period of weeks to months. Caries rates may, however, increase, complicated by poor oral hygiene in individuals altering their dietary habits due to illness and anosmia. Combining this with increased challenges in obtaining a dental appointment for routine dental examination may well result in caries progression, which could ultimately render a tooth unrestorable, resulting in loss. Patient comorbidities are more likely to explain the association between COVID-19 and tooth loss; more vulnerable individuals who have underlying health conditions are recognised as being more vulnerable to COVID-19 and a number of comorbidities can also increase the chances of developing oral disease, such as diabetes with periodontal disease.

In addition to this, the British Dental Association estimates that around 19 million dental appointments have been missed because of the pandemic between March 2020 and November 2020.⁷ That is 19 million dental appointments where oral hygiene advice, tooth brushing instruction, dietary advice and fluoride application were not utilised, with severe delays in dental treatment provision.

It therefore cannot be commented on whether long COVID results in tooth loss – there arguably could be a mechanism that exists; however, there is no data or research to support this. As dental professionals, we must work with patients to re-establish preventative

mouth care to promote good oral health, even if done remotely or as part of recovery of dental treatment in practice through face-to-face examinations. Consideration should be given to reducing recall intervals for long COVID patients, as poor preventative mouth care will undoubtedly increase caries and periodontal risks. Three-month recalls, in addition to regular hygienist review, should be utilised while patients have long COVID symptoms, as well as prescription for high-fluoride-containing toothpastes.

Service provision

It is undeniable that long COVID will impact on the future provision of dental services and treatment to patients. Many people with post-COVID-19 syndrome can also experience generalised pain, fatigue, persisting high temperature and psychiatric problems, meaning encouraging such patients to attend dental appointments could prove to be an arduous task. Consequently, there may even be an increase in the demand for more specialist care for this group of patients.

An added dilemma of long COVID comes as we are screening patients for COVID-19 symptoms before attending for dental treatment. How can we, as dental care professionals, confidently deduce from a patient's symptoms what stage of COVID-19 infection they are at? This is of huge relevance to all those working in healthcare as the COVID-19 stage directly correlates to how contagious that individual is and is therefore critical to protecting our workforce. Studies published in *The Lancet Microbe* confirm that COVID-19 is most contagious in the first five

days after symptom onset; however, people with COVID-19 can infect others for around nine days.⁸ The extensive guidance published on the UK government website confirms that individuals can return to their normal routine and stop self-isolating after ten full days if their symptoms have gone, or if the only symptoms they have are a cough or anosmia.⁹ However, if they still have a high temperature after ten days or are otherwise unwell, they must continue to stay at home and isolate. It has been published on numerous occasions that a persistent high temperature is a symptom of long COVID, so at what point can we safely say that a patient isn't contagious based on symptoms alone?

There must therefore be a consideration of retesting for the virus to confirm whether a patient's symptoms (assessed by pre-attendance screening) are because of active COVID-19 infection or as a result of long COVID. However, we face another dilemma here, as patients can continue to test positive for COVID-19 even after recovery, with the average time to viral clearance being 31 days from the first positive swab test. On this basis, and with confirmation from a positive PCR test, does this mean that all such patients should be treated at UDC 'hot sites' despite recovering from coronavirus?¹⁰

Another question that will be raised, and remains unanswered, is that of COVID-19 re-infection. Can you get COVID-19 more than once? The answer appears to be yes, sometimes; many studies show some patients could be re-infected within a year. Research led by Public Health England shows most people who have had the virus are protected from catching it again for at least five months.¹¹ However, people can become re-infected, subsequently harbouring high levels of the virus in their noses and mouths, which can be passed on to others. Again, this complicates our role as health professionals in screening of patients for their dental appointments. Those with long COVID will communicate this with us, sharing their experiences of the symptoms they face; however, we are not able to confidently say that they may not have been re-infected, with many symptoms being common to both acute COVID-19 and post-COVID-19 syndrome. This perhaps highlights the crucial role our UDCs will have in the near and distant future, not only to provide necessary and emergency treatment to such patients, but also to protect the wider dental workforce from potential COVID-19 transmission from patients.

We cannot explore the potential impact of long COVID without discussing its potential

implications for both inhalation and intravenous sedation. Recently published guidance by the NHS lays out the likely aftercare needs of patients recovering from COVID-19 and identifies potential respiratory problems including chronic cough, fibrotic lung disease, bronchiectasis and pulmonary vascular disease, conditions of importance when considering appropriateness of sedation.¹² However, there is no evidence or research exploring the appropriateness of providing sedation on long COVID patients, with no mention in the literature of it being a contraindication. However, the associated respiratory complications of coronavirus for many patients will of course resultantly increase potential complications for clinicians utilising intravenous sedation, which already produces a state of depression of the respiratory system.

Dental workforce

We cannot, and must not, overlook the potential catastrophic impact long COVID could have on our dental workforce. The COVID-19 pandemic has been devastating for dentistry and those who work tirelessly to provide its services. There is no question about the severe financial impact on dental practices and professionals, many of whom are self-employed and therefore unable to access government support, such as furlough schemes, when practice closure was forced in March 2020. Furthermore, the continuing need for infection control measures will continue to constrain capacity as well as budgets and limit the pace of recovery. The Dental Defence Union reports that almost 70% of dental professionals feel they are experiencing higher stress and anxiety levels because of the pandemic, stress levels that are likely to continue to rise as we continue to carry the burden of COVID-19.¹³ Now, let us consider the added stress, strain and debilitation that long COVID would add to an already stressed and burnt out profession.

Access to dental care has been severely affected and this is likely to continue for some time; dental professionals told the General Dental Council of their uncertainty about the demand for services and their ability to meet it.¹⁴ This is complicated by long COVID, with the debilitating symptoms meaning that impacted staff members simply won't be able to keep up with the demanding conditions they now face trying to evolve with the pandemic. Symptoms of extreme tiredness, shortness of breath and chest pain or tightness are likely to be exacerbated by the wearing of FFP3 masks or equivalent, meaning provision of simple

aerosol generating procedures would likely feel like a marathon to the wearer. Employers should consider phased returns to work for long COVID sufferers and modification of duties if required; this may include shorter working days and altered working patterns. This will of course leave gaps in available staff to provide ongoing services as part of dentistry's attempts to recover normal service, which undoubtedly will put additional stress and strain on those still able to work clinically. There will also likely be more of a demand on locum dentists and bank dental nurses.

Mental health of our workforce cannot be taken for granted either and we all have a responsibility to recognise the huge toll COVID-19 will have taken on all of us, be it for those who have suffered from it, are in a process of recovery, or those still working on the frontline to continue providing dental services. Long COVID therefore has the potential to impair not only the dental workforce who are currently living with its debilitating symptoms, but also those who are left in its wake, trying to continue providing to patients with reduced human resources. The key will be having regular contact and team meetings involving all team members, inviting suggestions for improvements in service provisions, and opening discussions regarding stress and strains being felt within that service. Having an overall action plan that is well communicated with honesty and empathy will help create certainty and alleviate fears for all members of the practice.

Several resources are available to the population that are specifically designed to provide guidance and support for COVID-19 recovery. One example of such a resource is that from <https://www.yourcovidrecovery.nhs.uk/> which provides invaluable information to help patients recovering from COVID-19, delivery guidance on managing daily activities and returning to work.¹⁵

Conclusions

As of January 2021, it was estimated that as many as one in five people have had COVID-19 in the UK, which equates to approximately 1 in 50 people experiencing symptoms of long COVID (based on early experimental results from the ONS for long COVID prevalence; there is yet to be an update on these results initially published in December 2020).^{2,16} We cannot ignore the progress that is being made nationally with our COVID-19 response; national lockdowns, NHS test and trace, as well

as hugely successful vaccination programmes have already proven to reduce the prevalence of COVID-19 and hopefully virus rates will remain at low levels. As of 25 February 2021, over 18 million people in the UK had received their first COVID-19 vaccination.¹⁷ With such advancements, it is hoped that those experiencing long COVID will recover, and reducing infection rates will hopefully mean that fewer people are contracting the virus and therefore fewer are at risk of exhibiting symptoms for a period of 12 weeks or longer, as found with long COVID.

COVID-19 is not only our past; it is now our present and is likely to be our future for a very long time. Therefore, we must not ignore long COVID and all its potential implications on our patients, our service provision and our workforce. The impact of long COVID in dentistry is still hypothetical at this stage, with no evidence or research into this area. However, it is something that must continue to be reviewed and explored, being an ongoing process with regular update and reflection. As a profession, we will continue to learn and build from our experiences of COVID-19, likely seeing its impact for years to come. To tackle the many challenges imposed by long COVID, more biomedical research is needed to assess the epidemiology, symptoms, risk factors and pathology, and the impact on dental and oral health.

Conflict of interest

The authors declare no conflicts of interest.

Author contributions

All authors made substantial contributions in the conception of this article and in designing layout and areas for discussion with equal contribution. SA drafted the work and then all authors contributed equally to revising it critically. All authors contributed equally to the final approval of the version to be published.

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