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### **Opinion**

## **A review of respiratory protection measures recommended in Europe for dental procedures during the COVID-19 pandemic**

### **Authors**

Ilona F. Persoon, DDS, PhD ([0000-0002-9773-3774](#))<sup>1,3</sup>, Nikolai Stankiewicz BDS Sc MSc Infection Control ([0000-0003-4771-9840](#))<sup>2,3</sup>, Andrew Smith, PhD, BDS, FDS, RCS, FRCPath ([0000-0003-0580-4078](#))<sup>4</sup>, Hans (J.J.) de Soet, PhD ([0000-0002-9964-0205](#))<sup>1</sup>, Catherine M.C. Volgenant, DDS, PhD ([0000-0002-4049-2914](#))<sup>1</sup>

### **Affiliations**

1. Department of Preventive Dentistry, Academic Centre of Dentistry Amsterdam (ACTA), University of Amsterdam and Vrije Universiteit Amsterdam, Amsterdam, The Netherlands
2. General dental practitioner, Somerset, United Kingdom
3. These authors contributed equally to this article and share first authorship
4. College of Medical, Veterinary & Life Sciences, Glasgow Dental Hospital & School, University of Glasgow, Glasgow, United Kingdom

**Corresponding author:** Team Infection Prevention ACTA: Ilona Persoon / Catherine Volgenant

**Corresponding author contact details:** [infectioncontrol@acta.nl](mailto:infectioncontrol@acta.nl)

Department of Preventive Dentistry

Gustav Mahlerlaan 3004, 1081 LA Amsterdam

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The main mode of transmission of the SARS-CoV-2 virus is via respiratory droplets and aerosols<sup>1</sup>. During the COVID-19 pandemic period, the World Health Organisation (WHO) recommends wearing respiratory protection when undertaking aerosol generating procedures (AGP) to reduce the risks of cross-infection between patients and healthcare worker (HCW) and vice versa<sup>2</sup>. Patients who tested positive for this virus are known to carry high numbers of virus particles in their saliva and on their tongue<sup>3</sup>. Dentistry poses a particular challenge due to the large number of aerosol and droplet generating procedures undertaken in the oral cavity and the very close proximity (<0.5m) of dental HCWs to the plume of aerosolised respiratory secretions. The availability of healthcare personal protective equipment (PPE) has been put under considerable strain due to the COVID-19 pandemic<sup>4</sup>. In some countries, shortages of PPE have necessitated sessional use of equipment that was previously deemed single patient use<sup>2</sup>. Therefore, facemask recommendations may not be based solely on maximum protection, but also on pragmatism including availability and areas of priority within a region's healthcare system.

A review of protocols for dentistry during the peak of the COVID-19 epidemic was undertaken, focussing on respiratory protection measures during dental procedures for the European continent. European dental association web sites were screened for information on guidance or protocols regarding SARS-CoV-2 and PPE. Documents in languages other than English or Dutch were translated into English using Google Translate. After obtaining the data, the results were presented to experts involved in dentistry and oral microbiology within Europe for verification. Three categories of respiratory protection measures were identified within the protocols; medical (surgical) facemasks, filtering facepiece particles (FFP)2 and FFP3.

Of the 24 included European countries, 75% recommend respiratory protection FFP2 / FFP3 when performing AGP in patients with symptoms of COVID-19, and 25% recommend referral or postponing treatment (results per country are available upon request). These practices are in accordance with the WHO guidance<sup>2</sup>. The potential for transmission from asymptomatic or pre-symptomatic carriers was identified as a concern in many of the countries, especially if an AGP was necessary. When patients do not show symptoms of COVID-19, 54% of countries recommend

respiratory protection FFP2 / FFP3 when performing AGP. A considerable number of countries also recommend respiratory protection FFP2 / FFP3 when performing non AGPs, both in patients with (63%) and without symptoms of COVID-19 (33%). These masks filter significantly more effectively and have a better fit compared to medical facemasks; studies showed 9% total leakage of fine particles when using FFP2-equivalent respirators, whereas the leakage for medical facemasks was 22-35%<sup>8</sup>. However, the effectiveness of these respirators to prevent transmission of pathogens highly depends on proper fit and use of the equipment<sup>9</sup>. The clinical effectiveness of the protection of HCWs using respirators compared to medical facemasks against transmission of respiratory infections during AGPs is controversial<sup>10</sup>.

Infection prevention can be a challenge to assess risk across competing interests of patient safety, medico-legal implications, occupational health, resource availability, practicality and cost. When attempting to reduce the risk of infection whilst continuing to provide healthcare, there is a level of uncertainty about safety, for both clinicians and patients. Risk of infection has always been present within dental healthcare, although the risk of infection is currently elevated and the consequences of infection are severe. It remains unclear what levels of respiratory PPE are required for providing dental healthcare during the pandemic. The differences in respiratory PPE recommendations in Europe reflect different approaches to risk assessment. The wide variation in recommendations raises concerns about the hazards to both patients and dental HCWs when providing dental healthcare. The variation in the application of respiratory protection among dental HCWs may adversely influence the spread of COVID-19 between countries.

In conclusion, the recommendations on respiratory protection when undertaking dental healthcare in European countries vary considerably. This highlights the need for a task force to re-examine the evidence base for respiratory viral transmission during dental procedures and support closer alignment of guidelines throughout the dental healthcare sectors.

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**IF Persoon:** Contributed to conception and design, Contributed to acquisition, analysis and interpretation, Drafted the manuscript. Gave final approval, Agrees to be accountable for all aspects of work ensuring integrity and accuracy.

**N Stankiewicz:** Contributed to conception and design, Contributed to acquisition, analysis and interpretation, Drafted the manuscript. Gave final approval, Agrees to be accountable for all aspects of work ensuring integrity and accuracy.

**A Smith:** Contributed to conception and design, Contributed to acquisition, analysis and interpretation, Critically revised the manuscript, Gave final approval, Agrees to be accountable for all aspects of work ensuring integrity and accuracy.

**JJ de Soet:** Contributed to conception and design, Contributed to acquisition, analysis and interpretation, Critically revised the manuscript, Gave final approval, Agrees to be accountable for all aspects of work ensuring integrity and accuracy.

**CMC Volgenant:** Contributed to conception and design, Contributed to acquisition, analysis and interpretation, Drafted the manuscript. Gave final approval, Agrees to be accountable for all aspects of work ensuring integrity and accuracy.

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