

COVID-19: Review of European recommendations and experts' opinion on dental care. Summary and consensus statements of group 5. The 6th EAO Consensus Conference 2021

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Abstract

Objectives: The present work reports the EAO workshop group 5 and consensus plenary discussions and statements based on two reviews summarising European guidelines and experts' opinion on infection control and prevention (ICP) in dentistry during the pandemic.

Material: Two manuscripts were presented at the 6th EAO Consensus Conference. The first study compared the most recent national guidelines/recommendations of European countries. The second paper was an experts' opinion-based survey on application of ICP regulation during the second wave. The outcome of COVID-19 group discussion was presented to all participants of the consensus to come to an agreement about the consensus statements and clinical recommendation.

Results: The dynamic of the pandemic had an impact on rapidly published and frequently updated national guidelines in Europe. As guidelines were not based on solid evidence, they were supplemented by experts' opinion on ICP in dentistry. The dental care should be guaranteed during the pandemic; however, in case of suspected or confirmed COVID-19 disease, the treatment should be postponed if possible. Remote triage and patient-related measures (i.e., social distancing, hand hygiene and mask wearing) were recommended to be the most efficient to reduce SARS-CoV-2 transmission. The type of personal protective equipment for dental staff should be adequate to the procedure and infection risk.

Conclusions: Adequate infection control protocols have to be followed by healthcare professionals and patients to minimise the spreading of COVID-19. We foresee the importance of continuously updating the national dental guidelines, considering the evolution of the pandemic and new scientific evidence becoming available.

KEYWORDS

COVID-19, infection control, personal protective equipment, SARS-CoV-2

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1 | INTRODUCTION

1.1 | Background

The need to provide safe dental care during pandemic has been widely recognised and emphasised by national and international organisations and authorities. However, a lack of scientific evidence addressing adequate infection control and prevention (ICP) measures to reduce coronavirus disease 2019 (COVID-19) spreading in dental setting has also been highlighted (Gurzawska-Comis et al., 2020).

Guidelines were published mostly during the first wave of pandemic, mainly based on recommendations from previous epidemics such as severe acute respiratory syndrome (SARS) and Middle East respiratory syndrome (MERS) (Meng et al., 2020). Due to the lack of solid evidence related to COVID-19, European academic experts involved in emergency dental care were interviewed, to supplement the missing knowledge with experience-based recommendations (Becker et al., 2020).

Some European countries and global organisations have been frequently updating their guidelines to the dynamics of the pandemic. However, it is still not clear to what extent they were uniform and based on the available scientific evidence.

As COVID-19 still represents a challenge in dentistry, the EAO recognised the need to summarise the most recent European dental guidelines and to perform a follow-up experts' opinion-based study.

1.2 | Aims

The main aims were:

- To collect, summarise and assess the homogeneity of national guidelines/recommendations on COVID-19 from European countries published during the course of the pandemic (Becker et al., 2021).
- To collect, summarise and compare experts' opinion-based recommendations on ICP during the first and second wave of the pandemic (Becker et al., 2020; Brunello et al., 2021).

In addition, the level of agreement was assessed between recommendations from official European national guidelines and those provided by experts, in order to offer the most relevant clinical recommendations.

1.3 | Material and methods

The COVID-19 national dental European guidelines and recommendations on ICP were collected up to 15 January 2021. To identify the relevant documents, hand search was performed and included the screening of the websites from European governments, national dental organisations and World Dental Federation. In addition, data were also collected with the support from the secretary

of the European Chief Dental Officers as well as by word-of-mouth communication with an international network of colleagues. No language restriction was applied. In case of multiple versions of guidelines published by the same national organisation, the most recent one was selected. Official documents released by medical or dental societies, or national authorities (e.g., Ministry of Health) were included. Guidelines from 27 European Union (EU) countries and Switzerland, United Kingdom (UK), Scotland were then compared with the ones published by European Centre for Disease Prevention and Control (ECDC), World Health Organization (WHO) and the United States (US). The following information was retrieved from the selected documents: triage, patients' measures, air ventilation, type of treatment provided based on COVID-19 risk assessment, personal protective equipment (PPE) for dental staff based on type of procedure, that is aerosol free procedures (non-AGP) or aerosol generation procedures (AGP), and patients' COVID-19 risk assessment, location and conditions for high-risk/COVID-positive (COVID+) patients (Becker et al., 2021; Brunello et al., 2021).

To investigate the changes in experts' opinion between the first and second wave of the pandemic, 27 academic experts in Oral and Maxillofacial Surgery or Oral Surgery from different EU countries and Iceland, Norway, Moldova, Switzerland and UK who had responded to our previous survey were asked to reply to a follow-up survey. Data collection for the first survey took place in April 2020-May 2020 (Becker et al., 2020) and for the second survey in November 2020-February 2021 (Brunello et al., 2021). Overlapping topics between the two studies (guidelines and experts' opinion) were identified (Becker et al., 2021; Brunello et al., 2021) and the level of agreement was assessed. Clinical recommendations emerging from the present EAO Consensus Conference are supported by the strength of the agreement (* agreement: [50–75]%; ** agreement: [75–95]%; *** agreement: > 95%) (Arbeitsgemeinschaft Wissenschaftlicher Fachgesellschaften e.V., 2013; Sanz et al., 2020). In case of differences in the frequencies of recommendation between guidelines and experts' survey (*, **, ***), the lower value was applied.

2 | MAJOR FINDINGS

All 27 European Union countries and Switzerland, UK and Scotland published adapted dental guidelines on ICP during course of COVID-19 pandemic (Figure 1). A lack of quality control of cited literature in analysed national guidelines was observed.

Twenty-six out of 27 contacted European experts responded to the follow-up survey. The overall transmission risk in dental settings was scored/graded to be significantly lower by the experts during the second wave compared with first wave. However, the risk associated with AGP was still considered to be high.

Significant differences in experts' opinion were registered between the initial and the follow-up survey regarding the relevance of minimising AGP, the use of extraoral radiographs, postponing elective treatments and the use of headwear for non-AGP.

Adequate PPE for dental health professionals is essential to prevent COVID-19 transmission in dental environment. As shown in Table 1, for performing non-AGP in low-risk patients, the guidelines and experts recommended the use of FFP2/FFP3 (* agreement), surgical masks (*) and face shields (*). While for AGP in low-risk patients, the guidelines and experts advised the use of FFP2/FFP3 (**), face shields (**), body protection (*) and headwear (*). Maximum protection is necessary for the treatment of high-risk/COVID+patients regardless the type of the procedure (non-AGP and AGP). Indeed,

the guidelines and experts strongly recommended the use of FFP2/FFP3 (***), face shields (***), body protection (***) and headwear (**).

Additional topics presented in both manuscripts are reported in Table 2 (Becker et al., 2021; Brunello et al., 2021).

Remote triage was recommended by European guidelines and experts' opinion (*). Regarding the provision of dental care, urgent treatment should be guaranteed to high-risk/COVID+patients (**), while all types of treatment should be provided to low-risk patients (**).

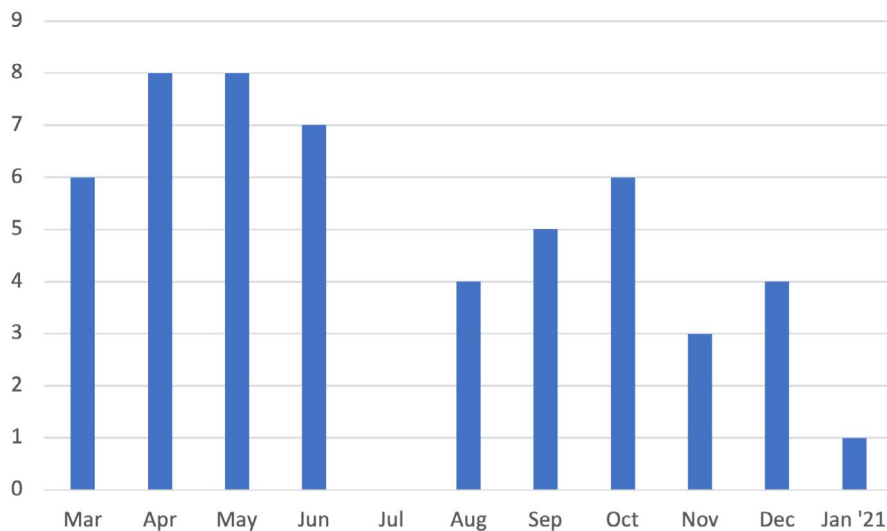


FIGURE 1 Date of release of dental European national guidelines (most recent version) in 27 EU countries and Switzerland, UK and Scotland

TABLE 1 Major findings regarding the use of different PPE by dental health professionals during pandemic

Type of PPE	Area of application	Guideline homogeneity	Experts' opinion	Summary	ECDC, WHO, US guidelines
FFP2/FFP3	Non-AGP	53% (16/30)	62% (16/26)	*	67% (2/3)
	AGP	83% (25/30)	81% (21/26)	**	100% (3/3)
	High-risk/COVID+	100% (27/27) ^a	100% (26/26)	***	100% (3/3)
Surgical mask	Non-AGP	70% (21/30)	N/A	*	0% (1/3)
	AGP	30% (9/30)	N/A		0% (0/3)
	High-risk/COVID+	0% (0/27) ^a	N/A		0% (0/3)
Face shields	Non-AGP	73% (22/30)	73% (19/26)	*	100% (3/3)
	AGP	80% (24/30)	89% (24/30)	**	100% (3/3)
	risk/COVID+	100% (27/27) ^a	100% (27/27)	***	100% (3/3)
Body protection	Non-AGP	50% (15/30)	46% (12/26)		100% (3/3)
	AGP	87% (26/30)	62% (16/26)	*	100% (3/3)
	risk/COVID+	100% (27/27) ^a	100% (24/26)	***	100% (3/3)
Headwear	Non-AGP	43% (13/30)	46% (12/26)		0% (0/3)
	AGP	60% (18/30)	58% (15/26)	*	0% (0/3)
	risk/COVID+	81% (22/27) ^a	96% (25/26)	**	0% (0/3)

Note: Adopted from AWMF guideline development (Arbeitsgemeinschaft Wissenschaftlicher Fachgesellschaften e.V. (AWMF)) and EFP workshop (Sanz et al., 2020). In case of differences in the frequencies of recommendation between guidelines and experts' survey (*, **, ***), the lower value was reported in the summary.

^aPPE for the treatment of high-risk/ COVID+ was not specified in the guidelines of three European countries.

*Agreement: [50–75]%; **Agreement: [75–95]%; ***Agreement: 95%

TABLE 2 Major findings regarding several measures adopted in dental settings to minimise the risk of COVID-19 transmission

Type of PPE	Area of application	Guideline homogeneity	Experts' opinion	Summary	ECDC, WHO, US guidelines
Phone triage	COVID-19 risk assessment	100% (30/30)	73% (19/26)	*	100% (3/3)
Provision of urgent and elective dental care	Low-risk patients	93% (28/30)	77% (20/26)	**	100% (3/3)
Provision of urgent treatment	High-risk patients	87% (25/30)	N/A	**	100% (3/3)
Pre-/post-procedural mask wearing	Patient-related measure	97% (29/30)	92% (24/26)	**	100% (3/3)
Hand hygiene	Patient-related measure	80% (24/30)	96% (25/26)	**	100% (3/3)
Social distancing	Patient-related measure	97% (29/30)	100% (26/26)	***	100% (3/3)
Temperature check	Patient-related measure	43% (13/30)	58% (15/26)		0% (0/3)
Testing of patients	Patient-related measure	10% (3/30)	42% (11/26)		0% (0/3)
Pre-procedural mouth rinse	Patient-related measure	83% (24/30)	73% (19/26)	*	33% (1/3)
Air ventilation	Natural	93% (28/30)	81% (21/26)	**	100% (3/3)
	Filtration systems		66% (17/26)	*	
	Air disinfection		50% (13/26)	*	

Note: Adopted from AWMF guideline development (Arbeitsgemeinschaft Wissenschaftlicher Fachgesellschaften e.V. (AWMF), 2013) and EFP workshop (Sanz et al., 2020). In case of differences in the frequencies of recommendation between guidelines and experts' survey ('', '**', ''***'), the lower value was reported in the summary.

*Agreement: [50–75]%; **Agreement: [75–95]%; ***Agreement: > 95%.

Among patient-related measures, pre-/post-procedural mask wearing, hand hygiene and social distancing in waiting areas were highly recommended (***), while pre-procedural mouth rinse was less frequently recommended, especially by experts (*). Temperature check and testing of asymptomatic patients for COVID-19 were not considered relevant.

Although adequate air ventilation was frequently mentioned, in particular referring to natural ventilation (**), they were overall vaguely described in the guidelines.

3 | CONSENSUS STATEMENTS

3.1 | Despite the lack of solid scientific evidence, there is a need to provide safe dental care during the pandemic. Therefore, the EAO recognised the need to provide recommendations on infection control and prevention (ICP), based on currently available guidelines and experts' opinion

Dental treatments were postponed except for emergency/urgent care in several European countries during the first wave of the pandemic (Coulthard, 2020). It was recognised that dental care could not be suspended for longer time and relevant recommendations for the safe re-opening of dental services were developed since March 2020 (Gurzawska-Comis et al., 2020; The COVID-19 Dental Services Evidence Review Working Group, 2020). Dental guidelines/recommendations had been published addressing COVID-19 concerns in all the 27 EU countries, as well as UK, Scotland and Switzerland, by 15 January 2021. However, the guidelines were not based on solid evidence and were found to be

frequently not uniform (Becker et al., 2021). Therefore, experts' opinion was also collected to supplement the lack of evidence (Brunello et al., 2021).

3.2 | It should be noted that the COVID-19 pandemic and treatment requirements are constantly evolving as more research is conducted and scientific data becomes available, guidelines must be updated on an ongoing basis

Numerous studies related to COVID-19 are constantly published, and the new evidence may fill research gaps that currently exist. Additionally, new virus variants are emerging (Fontanet et al., 2021; Zhou et al., 2020), and current ICP protocols may have to be adapted in the near future. Thus, regular search for new evidence and updating of recommendations is strongly advised.

3.3 | Dental care should be provided in case of suspected or confirmed covid-19, the treatment should be postponed if justifiable based on treatment prioritisation and national recommendations

Over the last decades, emphasis has been imposed on oral health and is not limited to the absence of disease but has been extended to the well-being of the patients (Lee et al., 2017). In fact, oral health has a considerable impact on the individual's general health and quality of life. In addition, dental treatments and review appointments could prevent the occurrence of serious local and systemic diseases (Li et al., 2000).

In line with WHO recommendations (WHO, 2020), the urgent/emergency treatments should be guaranteed also to high-risk/COVID+patients (recommended in the guidelines of 87% of European countries). According to the majority of guidelines and experts' opinions, non-urgent treatments should be provided to low-risk patients.

However, it has to be stressed that recommendations from local authorities, which are based on the epidemiological situation, have to be followed by dental health professionals (WHO, 2020).

3.4 | COVID-19 risk assessment has low sensitivity and specificity. However, remote triage is considered the most effective measure to identify potentially infectious patients

The term "triage" describes the process of separating patients into groups based on their needs and possible benefit for treatment. The rationale behind telephone triage is to identify patients with the highest priority for treatment and/or the patients with high risk of COVID-19 transmission. This process is based on risk assessment, including epidemiological history and clinical symptoms, often followed by patient questionnaire (Gurzawska-Comis et al., 2020). The remote triage should be based on a detailed algorithm, clinical judgement and shared decision-making by the dental team (Programme, 2007). The low sensitivity and specificity of the risk assessment is related to a large proportion (Yanes-Lane et al., 2020) of asymptomatic or pre-symptomatic patients that can only be identify as infectious by real-time PCR or lateral-flow test. However, the testing of asymptomatic patients was recommended only by 10% of the European countries and 42% of the experts. Therefore, dentists should be aware that each patient has to be considered as potentially infectious.

3.5 | There is evidence that aerosol-generating procedures (AGP) involve higher risk of spreading of contaminated fluids compared with non-AGP. However, it is unclear to what extent airborne particles resulting from dental treatments are infectious and capable of inducing COVID-19

The aerosol particles generated during AGP might be associated with higher risk of transmission and nosocomial infection according to recent studies. Allison et al. (2021) reported that surface contamination was remaining high within a radius of 1–1.5 m from patient and operator. The study by Sergis et al. (2020) investigated the air contamination and the results suggested that avoidance of pre-mixing (mixing of coolant water and air prior to burr contact) might reduce the spreading of small droplets from high-speed hand pieces. However, there is still a lack of evidence as to what extent aerosol generated particles are infectious once diluted in water.

3.6 | Patient-related measures should include social distancing, hand hygiene and pre-/post-procedural mask wearing

Social distancing, hand hygiene and pre-/post-procedural mask wearing are the measures present in our daily life since beginning of the pandemic. The WHO emphasised the importance of these measures to reduce risk of SARS-CoV-2 transmission in dental environment (WHO, 2020). This is also reflected in national guidelines of European countries, where 97% recommended social distancing, 80% hand hygiene and 92% pre-/post-procedural mask wearing. The experts' opinion was in line with guidelines, as the vast majority of the experts found these measures crucial. In addition, these measures were found to be the most effective in hospital and social environment to reduce SARS-CoV-2 transmission.

3.7 | PPE for dental health professionals treating patients with low COVID-19 risk should include the FFP2/FFP3 (or equivalent) masks, eye/face protection and gloves. For AGP, it should also include body protection and headwear

Personal protective equipment (PPE) plays an integral role in prevention of COVID-19 transmission in dental settings. Dental healthcare professionals use PPE to shield themselves from droplets from body fluids and aerosol particles produced by dental procedures involving potentially infectious patients (Verbeek et al., 2020). PPE recommended by national and international guidelines, and experts from Europe included FFP2/FFP3 and surgical masks, eye and face protection, and additional body protection and headwear for AGP. PPE must be put on correctly (donning) and removed (doffing) to avoid self-contamination.

Adequate use of PPE might have contributed to the low number of COVID-19 cases observed among dental healthcare professionals (Estrich et al., 2020; Jungo et al., 2021).

4 | CLINICAL RECOMMENDATIONS

Although no strong evidence is available on ICP to minimise COVID-19 in dental environment, the following recommendations are proposed based on the relevance of different measures emerged from the comparison of the summary of the European national guidelines and experts' opinion (Tables 1 and 2).

- If triage suggests low risk of COVID-19, all types of dental treatments can be provided.
- Clinicians should be aware that pre-symptomatic and asymptomatic patients may not be detected through risk assessment.
- Rubber dam and high-volume suction might reduce spreading of virus-laden airborne particles. Pre-procedural mouth rinse might further decrease viral load in saliva. However, there is limited

evidence to support this measure. Air ventilation (natural, mechanical or hybrid) must be adequate.

- Dental practices and clinics should enable social distancing, hand hygiene and pre-/post-procedural mask wearing.
- Training on adequate selection and use of PPE for AGP and non-AGP should be ensured.

5 | RECOMMENDATIONS FOR FUTURE RESEARCH

Future studies should investigate:

- Infection/transmission risk in dental settings during AGP/non-AGP.
- Infection prevention in relation to different types of PPE and suitability for new virus variants.
- Effectiveness of mouth rinse on the reduction in viral load in saliva.
- Impact of air ventilation and air cleaning systems on the elimination of virus-laden airborne particles.
- Usefulness of regular rapid antigen/real-time PCR testing of staff and patients.
- Individuals suffering from systemic diseases were reported to be more susceptible to severe COVID-19 progression. Recent research has indicated a link between oral health and COVID-19 (Marouf et al., 2021), and future research is required to further investigate this association.
- Development of high-quality guidelines on ICP in dental settings based on solid evidence.

DATA AVAILABILITY STATEMENT

The data that support the findings of this study are available in reference list. These data were derived from the following resources available in the public domain: national guidelines of European countries.

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