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Short Communication

A new framework to identify dental emergencies in the COVID-19 era

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Abstract: In order to reduce the spread of COVID-19 (Coronavirus Disease 2019), it is crucial to take extraordinary prevention and safety measures in dental offices, and to defer all elective and non-urgent procedures. Dental emergencies are defined through oral symptoms but, the systemic and psychological conditions of each patient should be considered. The present short communication proposes a multilevel evaluation (oral, systemic and psychological) and risk assessment score for the management of dental emergencies following the SARS-CoV-2 (severe acute respiratory syndrome coronavirus-2) outbreak. A comprehensive categorization and score scale assessment for dental emergencies allows a better identification of patient's treatment needs and avoids unnecessary contact between dental health care providers and patients during the SARS-CoV-2 pandemic.

Keywords; dental emergencies, risk assessment, SARS-CoV-2

Introduction

The theory that there is a correlation between high viral load exposure of frontline health care providers (HCP) and severe clinical manifestation of the disease (including death) was reported by the media, but never corroborated by scientific evidence. If this were true, dental health care personnel (DHCP) would be at high risk due to the high number of patients they come into close contact with. In the initial phase of a pandemic, during which a preventive vaccine is not available, a pivotal role is played by personal protective equipment (PPE), especially when aerosol-generating procedures are performed [Gawn J, Clayton M, Makison, Crook B. Evaluating the protection afforded by surgical masks against influenza bioaerosols: Gross protection of surgical masks compared to filtering facepiece respirators. Prepared by the Health and Safety Laboratory for the Health and Safety Executive, HSE Books 2008].

In order to tackle the COVID-19 (Coronavirus Disease 2019) pandemic efficiently, it is crucial to reduce the spread of the infection by carrying out extraordinary prevention and safety measures in hospitals and dental offices [1].

Guidelines are constantly updating, but there is a general consensus that all elective procedures, surgeries and non-urgent visits should be postponed; instead, priority should be given to urgent procedures and emergencies.

Recent ADA (American Dental Association) recommendations make it clear which conditions can be considered as dental emergencies [American Dental Association interim guidance for minimizing risk of COVID-19 transmission. Last updated April 2020]. According to ADA guidelines, dental emergencies are "potentially life threatening and require immediate treatment to stop ongoing tissue bleeding [or to] alleviate severe pain or infection".

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Dental emergencies are obviously determined through oral symptoms but, the systemic and psychological conditions of each patient should be taken into account. In fact, the extent to which a procedure is not deferrable should be based on clinical case-by-case judgement. In this regard, no attempt has ever been made to classify dental emergencies by integrating information regarding the systemic and psychological condition of patients.

The present short communication proposes a multilevel evaluation (oral, systemic, psychological) and risk assessment score for the management of dental emergencies following the SARS-CoV-2 outbreak.

Oral status evaluation

In order to better define emergency dental care, ADA defined it as focusing "on the management of conditions that require immediate attention to relieve severe pain and/or risk of infection and to alleviate the burden on hospital emergency departments". Dental emergencies not representing a threat for severe local/systemic complications should be handled with the least invasive treatments.

Confirmed or suspected COVID-19 patients requiring urgent treatments (i.e. pain and/or swelling) can be managed through the prescription of antibiotics and painkillers. This approach can offer pain relief for symptomatic patients and at the same time provides DHCP with enough time to refer patients to a specialist or decide all appropriate prevention and safety measures before performing treatment [2].

Following the COVID-19 outbreak, a phone triage before accessing medical/dental offices was deemed necessary in order to formulate epidemiological evaluations [3] and then to establish oral conditions related to the dental emergency:

-Presence/absence of pain; type of pain
-Presence/absence of swelling; localization and characteristics of swelling
-Presence/absence of bleeding
-Systemic diseases/medications
-Psychiatric/neurological disorders

Table 1a proposes a classification for oral risk assessment based on the severity of oral conditions and on the potential risk for local/systemic complications.

A recent study by Ather et al. [2] provided recommendations for the clinical management of dental emergencies during the SARS-CoV-2 pandemic.

Surgical Evaluation

Oral, periodontal and implant surgeries sometimes determine postoperative complications such as pain, swelling, bleeding, and surgical site infection [4].

Table 1b shows surgical risk assessment modified criteria, based on those proposed by Askar et al. [5] (range I-VI; low to high risk). Intervention is strongly suggested when postoperative complications impair patient's oral functions and before encountering more severe local/systemic complications that could require hospitalization.

Orthodontic evaluation

Identification and management of orthodontic emergencies is not always

Table 1 Generic (a), surgical (b), and orthodontic (c) risk assessment scores

a) Generic emergencies		
Risk level	Severity of oral conditions	Score
I	Patients without urgent oral conditions leading to local and/or systemic complications (i.e. check-up; debridement; broken mobile prosthesis causing no functional impairment; decementation of dental crowns on non-vital teeth, etc.)	0
II	Patient with mild oral conditions (i.e. dentinal hypersensitivity; enamel fracture without dentinal tissue involvement; decementation of dental crowns on vital teeth etc.) where the evolution into local and/or systemic complications is not foreseeable	1
III	Patients with moderate oral conditions (i.e. fracture involving dentinal tissue; mobility of prostheses on dental implants; dental abscess responding to pharmacological treatment etc.) where the evolution into local but not systemic complications is foreseeable	2
IV	Patients with severe oral conditions (i.e. fracture involving pulpal tissue; penetrating caries; dental abscess partially responding to pharmacological treatment; unstable or broken fixed/removable prothesis causing pain, mucosal injury and/or functional impairment etc.) where an evolution into local and systemic complications is foreseeable	3
V	Patients with very severe oral conditions (i.e. dental/oro-facial trauma; dental abscess not responding to pharmacological treatment; severe vesciculobullous disorders; systemic infection etc.) where an evolution into local and systemic complications is highly likely	4
b) Surgical emergencies		
Risk level	Severity of oral conditions	Score
I	Localized complication/s accompanied by no adverse effects on the success of the surgery (pain VAS <2, which resolves with regularly administrated analgesic agents, localized swelling, hematoma)	1
II	Localized complication/s accompanied by adverse effects on the success of the surgery (pain VAS<4, which resolves with regularly administrated painkillers, localized swelling, hematoma)	2
III	Localized or systemic complication/s that impairs the patient's daily routine but does not require hospitalization surgery (pain VAS> 4, which does not resolve with regularly administrated painkillers, extended swelling, flap dehiscence with/without suture detachment, functional reduction, implant mobility)	3
IV	Localized or systemic complication/s that impairs the patient's daily routine and requires hospitalization (pus, subcutaneous emphysema, fever with chills, lockjaw, cervical oral facialspace infection, severe or persistent hemorrage, functional impediment, osteitis, fever, oral-sinus communication)	4
V	Localized or systemic complication/s that inflicts irreversible damage to ≥1 anatomical structures	4
VI	Localized or systemic complication/s that lead to death	4
c) Orthodontic emergecies		
Type of orthodontic appliance/device	Management	Score
	Functional appliance	Suspend the use	0
Removable appliances	Aligner	Use the previous/next one	0
	Retainer	<6 months	3
		6-12 months	2
		>12 months	1
	Activated by the patient (RPE/HG/Delaire/elastic bands)	Photo/video check and appointment if necessary	1
Fixed appliances	Pre-activated (transpalatal arch/distalizer/mandibular advancer)	Photo/video check and removal/passivization/reactivation if necessary	2
	Multibracket	Active arch, TADs: photo/video check and replacement/reactivation if necessary	2
		Archwire/metallic ligature causing soft tissue trauma/pain, bracket decementation (if it seems to fall from archwire, phone instructions to remove it with eyebrow tweezers; appointment only if deemed necessary)	3

VAS, visual analog scale; RPE, rapid palatal expander; HG, headgear; TADs, temporary anchorage devices

Table 2 Systemic risk assessment based on ASA physical status classification system and dental care modifications according to PARS

ASA	Classification	Definition	Dental care modifications (PARS)	Score
I	A normal healthy patient	Healthy, non-smoking, no or minimal alcohol use	None	0
II	A patient with mild systemic disease	Mild diseases only without substantial functional limitations. Examples include (but not limited to): current smoker, social alcohol drinker, pregnancy, obesity, well controlled DM/HTN etc.	Elimination of acute infection before medical/surgical procedure.	1
III	A patient with severe systemic disease limiting activity but not incapacitating	Substantive functional limitations; One or more moderate to severe diseases. Examples include (but not limited to): poorly controlled DM or HTN, COPD, morbid obesity (BMI ≥40), active hepatitis, alcohol dependence or abuse, implanted pacemaker etc.	Elimination of acute infection and chronic disease before medical/surgical procedure.	2
IV	A patient with incapacitating systemic disease that is a constant threat to life	Examples include (but not limited to): recent (<3 months) MI, CVA, TIA, or CAD/stents, ongoing cardiac ischemia or severe valve dysfunction, sepsis, cancer disease, radiotherapy, chemotherapy etc.	All potential dental problems should be corrected before medical/surgical procedure.	3
V	A moribund patient who is not expected to survive with or without treatment	Examples include (but not limited to): ruptured abdominal/thoracic aneurysm, massive trauma, intracranial bleed with mass effect, ischemic bowel in the face of significant cardiac pathology or multiple organ/system dysfunction etc.	Management of dental pain and infection only.	4

ASA, American society of anesthesiologists; DM/HTN, diabetes mellitus/hypertension; COPD, chronic obstructive pulmonary disease; BMI, body mass index; MI, myocardial infarction; CVA, cerebrovascular accident; TIA, transient ischemic attack; CAD, coronary artery disease; PARS, prognosis and assessment risk scale

easy to handle. Orthodontic problems do not always require immediate intervention.

A recent study [6] defined an orthodontic emergency as "a problem arising from an orthodontic appliance, where an unscheduled appointment is required to resolve the issue" and suggests, consistently with CMS guidelines, monitoring conditions on a case-by-case basis through videocalls or photos. Risk assessment for the management of orthodontic emergencies following the COVID-19 outbreak is shown in Table 1c.

Systemic evaluation

Recent scientific literature focused on the relationship between oral conditions and systemic diseases. It is therefore deemed necessary to integrate oral problems with the systemic conditions of each patient. The most accurate and comprehensive systemic risk assessment was proposed about 60 years ago by ASA (American Society of Anesthesiologists). Systemic risk assessment and dental care adjustment according to patients' systemic conditions are shown in Table 2.

Table 3 Calculation of the anxiety risk score (A)

	Questionnaire	A
1.	Are you worried about your oral health status during the day?	
	A great deal of the time	3
	A lot of the time	2
	From time to time, but not too often	1
	Only occasionally	0
2.	Does your oral health status cause you sudden feelings of panic?	
	Very often indeed	3
	Quite often	2
	Not very often	1
	Not at all	0
3.	Are you still enjoying the things you used to enjoy in this situation of oral discomfort?	
	Hardly at all	3
	Only a little	2
	Not quite so much	1
	Definitely as much	0
4.	Does your oral health status cause you sadness?	
	Very often indeed	3
	Quite often	2
	Not very often	1
	Not at all	0
	Total score	
Risk level	Sum of the scores obtained from the questionnaire	Final Score
Low	0-4	0
Intermediate	5-7	1
High	8-12	2

Table 4 Definition of the type and time of intervention according to the total sum of scores

Final score	Risk	Time of intervention	Type of intervention
-	Unacceptable	Immediate	Immediate therapeutic action required
≥5	High	Short term	Therapeutic action should be programmed and carried out in the short term
3-4	Moderate	Medium term	Corrective treatments should be programmed and carried out in the medium term
1-2	Low	Long term	Corrective treatments should be programmed and carried out in the long term
<1	Acceptable	Risks too low to be quantifiable (interventions are impossible to plan)	

Psychological evaluation

The World Health Organization (WHO) defined the concept of health as "a state of complete physical, mental and social well-being and not merely the absence of disease". It is possible to assume that the psychological aspect should not be overlooked as it is closely intertwined with overall health and quality of life. As a consequence, many patients seek dental assistance because of the psychological discomfort caused by their oral issues and yet, the same oral clinical condition can impact life differently according to each patient's mindset and psychological state. Sudden public health emergencies are regarded as being a consistent stress trigger and most patients tend to be more vulnerable than others, especially from a psychological standpoint. Table 3 shows the proposed psychological risk evaluation carried out through a questionnaire based on the Hospital Anxiety and Depression Scale (HADS) and modified in relation to oral conditions.

Assessment score scale applicability

Oral emergency detection should take place through phone triage; dental emergencies should be categorized into generic, surgical or orthodontic emergencies, following the criteria in Table 1. Information resulting from the "oral cavity level" should be integrated with systemic and psychological evaluations (Tables 2 and 3, respectively).

If a score ≥3 is reached through only one level (oral or systemic), the patient should be immediately visited by a dental specialist; in particular, score 3 corresponds to an emergency condition, not yet involving severe local/systemic complications, but requiring prompt therapeutic intervention; score 4 corresponds to an undeferrable emergency, requiring immediate therapeutic intervention as it represents a threat for severe complications. Therefore, all patients with a score ≥3 in only one of the two proposed tables should be visited and treated according to the recommended prevention and safety measures following the COVID-19 outbreak [3].

If a score ≥3 is not detected in any of the tables (oral or systemic level), a dental emergency can be identified by adding up the scores obtained from the three levels (oral, systemic, psychological). Overall risk can be defined according to Table 4.

By adding up all the scores (<3) obtained in each table, the maximum attainable final score is 6. A final score of 6 corresponds to "Patients with moderate dental problems where the evolution into local but not systemic complications is foreseeable" and "A patient with severe systemic disease, limiting activity but not incapacitating" and "high risk anxiety"; the combination of the 3 levels could lead to the definition of a dental emergency requiring therapeutic intervention in the short term, but it cannot be defined as an undeferrable emergency as it does not constitute a threat for systemic complications, permanent damage to anatomical structures, or functional impairment. During the COVID-19 epidemic, emergency procedures only (score ≥3 in either oral or systemic level, or a total sum score of ≥5) are allowed.

Discussion

The relevance of discriminating emergency from non-emergency dental care is clear, especially when referring to acute oral infections; dental abscesses require immediate intervention particularly when they respond partially or not at all to pharmacological therapy (score 3 or 4).

Patient's anxiety evaluation cannot indicate a dental emergency itself using this score system, since the maximum score does not reach the critical threshold of 3; nonetheless, patients' anxiety state (score 0-2) influences the overall sum of scores and constitutes a determinant for the definition of a dental emergency.

Anxiety can alter pain perception as well as cause or exacerbate hypertension through a variety of pathways; moreover, anxious patients are at higher risk for vasovagal syncope [7]. Consequenctly, it is necessary to regard as "emergencies" individuals with high-risk psychological profiles, especially when associated with systemic diseases (at least a score of 2 on the systemic level) and symptomatic, yet not severe, oral conditions.

In order to slow down the spread of SARS-CoV-2, DHCP are required to guarantee emergency treatments only. Moreover, whenever conditions

do not require immediate intervention, they should be handled through painkillers and/or antibiotics in the first place [2]; the need for intervention will be evaluated in relation to the patient's response to pharmacological therapy.

"Telemedicine" (i.e. phone calls, video calls, pictures, text messages etc.) can be considered as an effective and useful alternative for managing non-emergency dental care [6] and for monitoring patients over time. Telephone follow-up allows the early detection of wound healing complications after oral surgeries; and is also feasible and largely accepted by patients [8].

Oral-related aspects are not always sufficient to discriminate emergency from non-emergency dental care, hence requiring a multilevel evaluation. A comprehensive categorization and score scale assessment of dental emergencies allows a better identification of patient's treatment need and avoids unnecessary contact between DHCP and patients during SARS-CoV-2 pandemic.

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Conflict of interest
The authors deny any conflict of interest related to this study.

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