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# The impact of COVID-19 on cervicofacial infection of dental aetiology

I. Politi<sup>a,1</sup>, E. McParland<sup>a,1</sup>, R. Smith<sup>a</sup>, S. Crummey<sup>a</sup>, K. Fan<sup>b,\*</sup>

<sup>a</sup> Department of Oral & Maxillofacial Surgery, King's College Hospital, London, SE5 9RS

<sup>b</sup> King's College London, Faculty of Dentistry, Oral & Craniofacial Sciences

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## Abstract

Cervicofacial infections of dental aetiology can be life-threatening and with the closure of dental practices following the onset of the COVID-19, it would be anticipated that their prevalence presenting to maxillofacial surgery would increase and services may be overwhelmed, with patients presenting later with a potential subsequent increase in morbidity. A retrospective analysis of patients with cervicofacial infection of dental aetiology referred to maxillofacial surgery during the initial six weeks of COVID-19 lockdown in 2020 was carried out and compared with the equivalent period in the two preceding years. Unexpectedly, during COVID-19 lockdown, there was a reduction in patients seen with cervicofacial infection of dental aetiology. This may have resulted from patient adherence to government guidelines “Stay at home”, successful triaging of patients in primary care and emergency treatment provided by urgent dental care centres. Proportionally more patients who presented to hospital had received prior antibiotic therapy and required in-patient admission. All patients admitted received incision and drainage, with an increase extraoral drainage and an associated reduction in length of stay. During COVID-19 lockdown, maxillofacial managed a reduced number of patients with cervicofacial infection, likely resulting from primary and secondary dental care working together. The rate of incision and drainage of patients not admitted increased under local anaesthesia with increase of extraoral drainage and reduced length of stay for those admitted.

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## Introduction

The outbreak of COVID-19, a novel coronavirus, in the United Kingdom (UK) was first reported in January 2020 following an initial outbreak in China.<sup>1</sup> Since then there have been unprecedented changes to daily life due to the virulence of the pathogen, which has the ability to cause severe acute respiratory syndrome, which in turn carries a high risk of mortality.<sup>2</sup>

Cervicofacial infection of dental aetiology can still be life-threatening and can lead to complications such as airway obstruction, sepsis, spread of infection and ultimately death.<sup>3</sup> UK lockdown on the 23<sup>rd</sup> of March 2020 led to instruction from the Chief Dental Officer to close all primary dental practices. All practices commenced triaging emergency cases over the phone providing advice, analgesia and antibiotic (AAA) prescription as necessary.<sup>4</sup> When these measures fail, patients are subsequently referred to Local Urgent Dental Care Centres (UDCCs), established via NHS to treat patients that have not responded to antibiotics. This is a change from pre-COVID practice which consisted of the delivery of elective and emergency dental treatment, via private and NHS services predominantly in primary care settings. It was antici-

\* Corresponding author.

E-mail addresses: [kfan@nhs.net](mailto:kfan@nhs.net), [kathy.fan@kcl.ac.uk](mailto:kathy.fan@kcl.ac.uk) (K. Fan).

<sup>1</sup> Both equal contribution as first name author

Table 1  
Demographics of patients referred to OMFS at KCH via ED.

	2018	2019	2020
Total number of patients	317	410	111
Number patients with cervicofacial infection	46	93	22
Number of patients with cervicofacial infection with a comorbidity present	18 (39%)	35 (38%)	9 (41%)
Number of patients admitted	17 (37%)	29 (31%)	10 (45%)
Age Range (Years)	2 -84	6 - 76	6 -72
Median age (years)	40.5	37	42
Gender (percentage)			
	Female	46.0%	41%
	Male	54.0%	59%

pated that the prevalence of cervicofacial infection presenting to the emergency department would increase due to the inability to obtain dental care elsewhere and lead to concerns that services may be overwhelmed, with a potential subsequent increase in morbidity for patients.

During lockdown, there has been changes to our service provision, including redeployment of maxillofacial (OMFS) trainees to ICU and the provision of COVID tracheostomy service with a daily operating list to meet the demand.

King's College Hospital lies within the London borough of Lambeth, which has one of the highest number of confirmed COVID-19 cases (n = 1213) nationally.<sup>5</sup> Moreover, the hospital covers and takes referrals from neighbouring Southwark (1274 cases), Lewisham (989 cases), Greenwich (702 cases) and Bromley (1282 cases) which places the hospital at one of the epicentres of COVID-19 in the UK.<sup>5</sup> As a result of the pandemic there were >2500 cases admitted to the King's College Hospital trust and, there has been a several fold increase in intensive care beds with temporary conversion of operating theatres and recovery to critical care units. This challenges the management of non-COVID cases.

## Aims and objectives

The aim is to assess the impact of COVID-19 pandemic on the management of cervico-facial infections of dental aetiology seen by the Oral and Maxillofacial Department at King's College Hospital London (KCH).

Due to Government guidance to stay at home and public anxiety to prevent transmission of COVID-19 by avoiding unnecessary hospital visits, it is our assumption that there would be a decrease in the number of patients presenting to the NHS in accordance with advice to "Stay at home. Save lives. Protect the NHS". However, given the closure of primary dental care there is anticipation that those requiring secondary care input by OMFS will attend at a later stage of infection and will require more decisive management.

## Methods

A retrospective analysis of all patients referred to OMFS via the emergency department during the initial six weeks of

COVID-19 lockdown in 2020 was carried out and compared with cases seen over the same period in the two preceding years (2018 and 2019).

The six-week period studied was from the 23<sup>rd</sup> of March to the 4<sup>th</sup> of May. A list of all patients referred to OMFS from the emergency department during this period was obtained via "Symphony" (ED database). Subsequently, the Electronic Patient Records system was used to identify the cohort referred to OMFS with cervicofacial infections to capture further clinical details. The data were recorded on excel and included: patient demographics; source of referral; causative tooth; previous antibiotics consumption and comorbidities. For patients admitted to hospital, data recorded included the route of antibiotic administration, treatment provided, if under local or general anaesthetic; the surgical approach used for drainage; any extraction of teeth and the length of stay in hospital.

## Results

The total number of patients seen by OMFS in the ED during the six-week lockdown timeframe in 2020 was 111 patients. This represents a 65% reduction from 2018 where 317 patients were seen and a 72.9% reduction from 2019 where 410 patients were seen.

The number of patients seen with cervicofacial infection was also lower. In 2020, twenty-two patients presented with cervicofacial infection, a 52.1% and 76.3% reduction from 2018 (n = 46) and 2019 (n = 93) respectively. The demographics, in terms of age and gender, were similar across all three years with a slightly higher proportion of males to females and predominantly adult with a median age of around 40 years (Table 1).

Despite decreased numbers of patients presenting with infection during lockdown, the percentage of those requiring admission was higher. Of patients seen with cervicofacial infections in 2020, 45% were admitted (n = 10/22) compared with 37% (n = 17/46) in 2018 and 31% (n = 29/93) in 2019 (Table 1).

In all three years, the most common aetiology was lower molars. In 2020 there were no post extraction infections, unlike 2018 (17% n = 8) and in 2019 (8.6% n = 8).

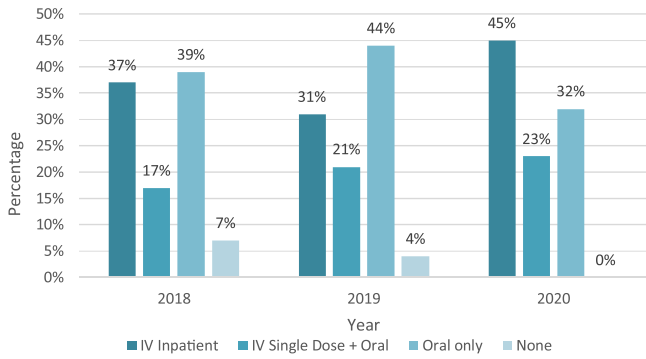


Fig. 1. Antibiotic management of patients referred with cervicofacial infection of dental aetiology.

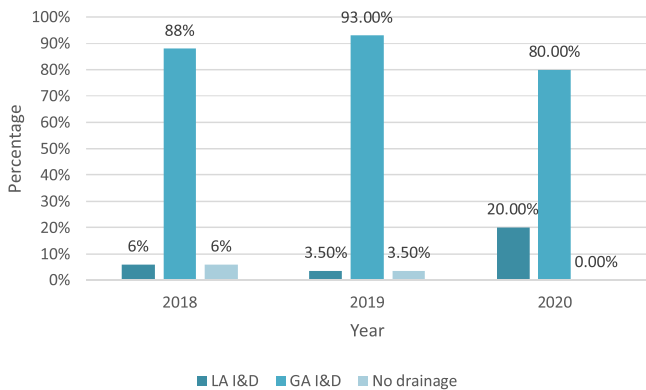


Fig. 2. Treatment received by patients admitted with cervico-facial infection of dental aetiology.

In 2020, all patients received antibiotics, compared with 7% ( $n = 3/46$ ) in 2018 and 4% ( $n = 4/93$ ) in 2019 who did not receive any form of antibiotics (Fig. 1). In 2020, 23% ( $n = 5/22$ ) of patients referred received a stat intravenous dose with subsequent oral antibiotics to take away, which is slightly higher than 2018 (17%  $n = 8/46$ ) and 2019 (19%  $n = 19/93$ ). More had antibiotic therapy prior to presentation to OMFS, in 2020 (55%), compared with 33% in 2018 and 34% in 2019.

There was an unexpectedly small decrease in patients undergoing incision and drainage (extraoral / intraoral) under general anaesthetic during lockdown (Fig. 2). Of admitted patients, 80% in 2020 ( $n = 8/10$ ) received general anaesthetic, compared with 88% ( $n = 15/17$ ) in 2018 and 93% ( $n = 27/29$ ) in 2019. In contrast, an increase in drainage under local anaesthetic for patients admitted in 2020 (20%) compared with 6% in 2018 and 3.5% in 2019 (Fig. 2). All patients admitted in 2020 ( $n = 10/10$ ) received incision and drainage, whilst in 2018 and 2019, 6% ( $n = 1/17$ ) and 3.5% ( $n = 1/29$ ) had IV antibiotics alone.

Reviewing the surgical approach, for patients admitted, during lockdown in 2020, there was a slight increase in extraoral drainage. Half of admitted patients ( $n = 5/10$ ) had extraoral incision and drainage in 2020 compared with 44% ( $n = 7/16$ ) and 43% ( $n = 12/28$ ) in 2018 and 2019 respectively (Fig. 3). For patients not admitted to hospital, there was an

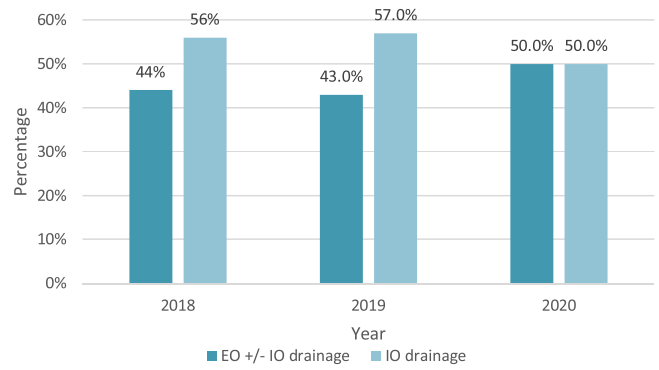


Fig. 3. Type of drainage carried out for patients admitted with cervicofacial infection of dental aetiology.

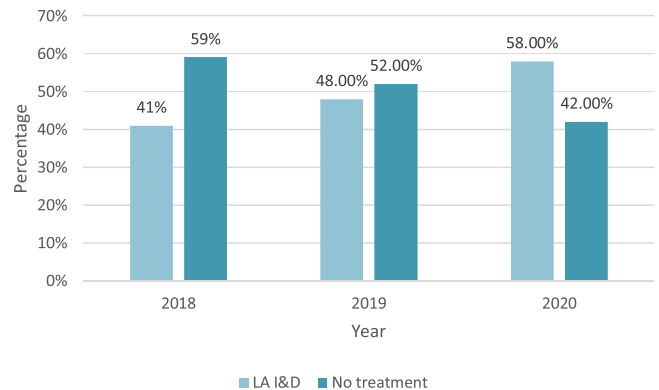


Fig. 4. Treatment received by patients with cervicofacial infection of dental aetiology that were not admitted.

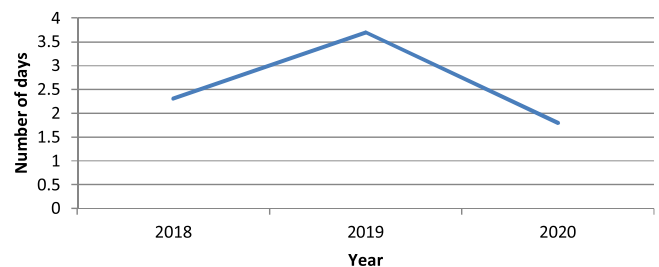


Fig. 5. Average days of stay for patients admitted with cervicofacial infection of dental aetiology.

increase in the proportions of incision and drainage under local anaesthesia (LA). In 2020, 58% ( $n = 7/12$ ) had an incision and drainage under LA in 2020, compared with 41% ( $n = 12/29$ ) and 48% ( $n = 31/64$ ) in 2018 and 2019 respectively (Fig. 4).

Our analysis revealed the average length of inpatient stay decreased in 2020 (1.8 days) compared to 2019 (3.7 days) and 2018 (2.3 days) (Fig. 5).

Despite the reduced length of inpatient stay during ‘lockdown’, there were no re-attendances or re-admissions of patients. In 2018, 1 patient was re-admitted and had a second drainage under LA. In 2019, there were no re-admissions, however, 3 patients re-attended. Two patients had postoperative pain related to prior incision and drainage under LA and

did not require admission. The other, who originally received oral antibiotics alone, required admission for IV antibiotics following extraction of the causative tooth as an outpatient.

## Discussion

Patients' anxiety to prevent the transmission of COVID-19, and public heeding government advice to "Stay at home. Save lives. Protect the NHS", led to a decrease in the total number of patients seen by OMFS in the emergency department during the first six weeks of lockdown in 2020, despite closure of primary dental care. It is likely that patients were dissuaded from attending with minor problems and only attended with more advanced infection.

In addition, Urgent Dental Centres (UDCCs), which were set up promptly following the COVID-19 outbreak, were treating dental emergencies that were not responding to advice, analgesics, and antibiotics (AAA) provided over the phone. The change in focus away from restorative rescue to extraction of the pathogenic tooth appears to have been successful.<sup>6</sup> This has taken the "load off" NHS hospitals and reduced the absolute numbers requiring inpatient admission. A decrease in attendances has also been reported by other OMFS departments for dental related issues, with UDCCs.<sup>7,8</sup>

Kings College Dental Institute already had an established acute dental care (ADC) and triaging system operating from Monday to Friday. Over the six-week period, ADC developed into a UDCC Monday-Saturday to allow triaging of up to 290 patients a day and emergency dental treatment.<sup>9</sup> The OMFS team also operates at a peripheral unit. Following the cessation of peripheral clinics and elective operating, the department was adapted to also become a UDCC, providing a service for the surrounding area including Bexley, Bromley, and Greenwich. Both of these UDCCs likely aided in reducing the number of cervicofacial infections seen in the emergency department by managing the less severe cases.

In all three years, the most common aetiology of cervicofacial infection seen was related to lower molars. During 2020 lockdown, no patients presented with a postextraction infection. This may relate to reduced numbers of extractions performed in primary dental care and UDCCs, or clinicians may have increased postextraction antibiotics to avoid postoperative infection to reduce the need for hospital admission.

Proportionally more patients were admitted with dental infections in 2020 when compared to 2018 and 2019. This likely reflects that only patients with severe cervicofacial infections attended hospital due to the guidance "Stay at home. Save lives. Protect the NHS", or that antibiotic prescribing is partially effective and patients present later with residual infection/collection.

The fact that during lockdown more severe cases attended requiring admission may also reflect the anecdotal patterns of increased antibiotic prescribing noted from the initial AAA provided over the telephone.<sup>8</sup> Our series confirmed an

increased number of patients who received antibiotic therapy prior to their presentation to OMFS. In 2018 and 2019, a small proportion of patients did not require antibiotics, in 2020 all patients were prescribed antibiotics. In addition, during lockdown more patients received a single dose of IV antibiotics prior to being discharged from the emergency department with oral antibiotics.

The surgical management of patients admitted also shows some different characteristics. All patients admitted in 2020 received incision and drainage, compared with 2018 and 2019 where a small proportion of inpatients received IV antibiotics only. Unexpectedly, there was a decrease in treatment under GA for patients admitted during lockdown. This is likely multifactorial; firstly clinicians performed more incision and drainage under LA in an attempt to control the infection at initial presentation. Patients seemed more accepting of procedures under LA, this may reflect clinicians', and patients' wishes to preserve resources for COVID-related admissions. The ability to avoid a GA is not only beneficial in reducing the potential risk of transmission of COVID-19 to patients, but also reduces the burden to hospitals in terms of; inpatient beds, theatres, theatre personnel, anaesthetists, anaesthetic equipment and drugs. Of those requiring GA treatment, a greater proportion had extraoral incision and drainage.

Analysis of our results demonstrated a reduction in average length of stay for those patients admitted with cervicofacial infection. This may reflect more decisive management of patients with an increase in extraoral drainage. Clinicians are keen to discharge patients as soon as it is safe to do so and patients' are keen to have as minimal inpatient stay as possible during the pandemic. This was aided by more frequent virtual follow up than outside of COVID.

Reviewing the patients not requiring admission, a greater proportion received incision and drainage under LA during lockdown. This may relate to patients having a greater severity of cervicofacial infection or the more proactive treatment to avoid progression of infection requiring representation and admission. Due to redeployment of the OMFS specialty trainees, seniors support was also more likely present in the emergency department. This may have led to more definitive plans made at the point of entry, which may have further influenced the treatment provided.

The aim of this article was to review the first six weeks of lockdown in 2020. It is important to note the small sample of patients seen within that period. While the initial results show interesting trends, longer study with larger numbers will be important as we progress through the COVID outbreak.

## Conclusion

This paper reviews the impact of COVID-19 pandemic had on the management of cervicofacial infections seen at a tertiary referral hospital in London. Unexpectedly there has been an overall decrease in the number of cases seen with cervicofacial infection of dental origin. This likely reflects the success

of dental professionals working together in primary care and Urgent Dental Care Centres to target dental disease earlier to avoid the need to burden secondary care. However, a high percentage of those seen required admission and it may be related to partial response to antibiotic prescribing resulting in partial resolution of the infection. Patients presenting during lockdown required more invasive treatment with an increase in intraoral drainage under LA and extraoral drainage under GA. Despite this, there was a decrease in the length of inpatient stay, which reflects the clinicians' effort to protect patients by reducing transmission risk of COVID-19 whilst maintaining hospital capacity for the increasing COVID burden.

### Conflict of interest

None

### Ethics statement/confirmation of patients' permission

Service evaluation project. Patients' permission not applicable.

### Acknowledgments

Contributor: Matthew Barker

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