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## The effect of COVID-19 outbreak on hospital admissions for dental infections



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### ABSTRACT

Cervicofacial infections of dental origin can cause life threatening emergency and we were anticipating that the prevalence of hospital admissions for this reason between the 26<sup>th</sup> of March 2020 until the 8<sup>th</sup> of June 2020 that the dental practices were closed would increase. We conducted a retrospective analysis of the hospital admissions for cervicofacial infections of dental origin during this period and the results were compared with the admissions the same period last year. Surprisingly there were less admissions in 2020 compared to 2019 which can be attributed to the government guidance to “Stay at home”, “Save lives”, “Protect the NHS” and the treatment provided by the Urgent Dental Care Centers that reduced the pressure on the country’s health care system. Proportionately more admissions in 2020 were attributed to dental abscess from mandibular teeth compared to 2019 but there was a small decrease in the incision and drainage under general anesthetic and a small increase in the length of the hospital stay in 2020.

### 1. Introduction

In December 2019, the first cases of pneumonia of unknown aetiology were reported in Wuhan, China and the WHO named it 2019 novel coronavirus (2019-nCoV) or COVID-19 [1,2]. Subsequently, the outbreak of COVID-19 in the United Kingdom was reported in January 2020 and it was on the 9<sup>th</sup> of March 2020 that the WHO declared COVID-19 a global pandemic and became a ‘public health emergency of international concern’ [3].

In the UK, 40,597 deaths were reported at the 8<sup>th</sup> of June and up till the time that this article is written there is a total of 63,082 deaths reported secondary to COVID-19 [4]. The increasing number of patients with the virus requiring hospitalization and care in the ICU units has been putting increased pressure on the country’s health care system [5].

Due to the virulence of the pathogen and its immediate effect in the respiratory system it has a high risk of mortality. Patients who have been tested positive for COVID-19 are considered the main source of infection. On the other hand asymptomatic patients are extremely contagious, with a strong infectivity during the period of incubation that ranges between 1 and 14 days [3]. The person-to-person transmission routes include direct transmission such as coughing, sneezing, droplet inhalation and contact

transmission [3]. The risk of COVID-19 infection during the diagnosis and treatment of dental diseases was deemed to be high [3] and all face to face non-urgent outpatient oral/dental treatments were suspended in the 26<sup>th</sup> of March 2020 [6].

The Scottish Dental Clinical effectiveness Programme (SDCEP) issued the management of Acute Dental Problems guidance which described a modified management of commonly presenting oral conditions during the COVID-19 pandemic. The aim was to encourage a consistent approach to the management of acute dental problems, during the challenging COVID-19 pandemic. Primary care dental triage should focus on the provision of the three As: Advice; Analgesia; Antimicrobials (where appropriate) [7]. Emergency care was provided by some dental centers and serious infections requiring hospitalization were seen by oral and maxillofacial units across the country.

Cervicofacial infections of dental origin can be life threatening as they can progress rapidly, spread to other diastemas obstructing the airway, cause sepsis and death [8–11].

On the other hand, patients may have early infections but because of complex barriers to dental treatment they are unable to have outpatient dental care [9]. Therefore, during the period from the 23<sup>rd</sup> of March till the 8<sup>th</sup> of June that the dental practices were closed and the dentists

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were unable to provide any aerosol generating procedures, there was a concern that dental abscesses would increase and subsequently infections would progress rapidly needing treatment in secondary care [11].

The aim of this paper is to assess the hospital admissions with a main diagnosis of dental abscess during the period of COVID-19 pandemic from the 26<sup>th</sup> of March 2020 (the date that dental practices were instructed to close) until the 8<sup>th</sup> of June 2020 (when practices were allowed to reopen) at Northampton General Hospital in the UK. Due to the guidance “Stay home. Save lives. Protect the NHS” we felt that there would be a decrease in the number of patients presenting to the emergency department. Also, the inability of the patients to access care would increase the severity of the infections presenting in the Emergency Department that required hospitalization. We compared the results with the hospital admissions for cervicofacial infections of dental origin the same time of the year in 2019.

## 2. Materials and methods

A retrospective review was conducted for all the patients that were referred to the Oral and Maxillofacial Surgery team via the Emergency Department and were subsequently admitted for cervicofacial infection of dental origin between the 26<sup>th</sup> of March 2020 and the 8<sup>th</sup> of June 2020 and between the 26<sup>th</sup> of March 2019 and the 8<sup>th</sup> of June 2019.

During the period of lockdown there was a change in service provision and evaluation for any COVID-19 related symptoms (cough, recent visit abroad and high temperature) of all the patients presenting to the emergency department was conducted first. Moreover, all the patients needing admission were reviewed by a senior member of the Maxillofacial team in order to reduce unnecessary admissions that would put the patients at risk and place more pressure to an already overstretched service.

Patients were identified from the hospital's inpatient database (“Symphony ED database”) and only the ones with dental infection of odontogenic origin were included in this study. All patients' records were assigned codes in order to preserve anonymity during the analysis. Data of five key clinical areas were collated on excel document and included: patients demographics including comorbidities, initial consultation with general dental practitioner with prescription of antibiotics, treatment provided during the admission, length of hospital stay and inflammatory marker (CRP).

The data was entered into Excel spreadsheets (Microsoft) and statistical analyses conducted with the help of IBM SPSS Statistics for Windows Version 24.0.0 (IBM Corp). Descriptive statistics were performed to compare the data for the two years.

## 3. Results

A total of 11 patients were admitted with cervicofacial infections during the period of lockdown compared to the total of 17 admissions for the same reason during the same period in 2019 which showed a 35% reduction in hospital admissions. The demographics in terms of age and gender were similar between the two years of study with a slightly higher proportion of female patients admitted in both years. Significant comorbidities such as asthma and diabetes mellitus were noted in 5 out of the 11 cases (45%) during the period of lockdown. During the same period in 2019 only 5 out of the 17 patients (29,4%) had comorbidities such as asthma, pulmonary embolism, atrial fibrillation, history of stroke, cervical and breast cancer. (Table 1).

During the period of COVID -19 emergency, the main pathology (90,9%) was dental abscess with carious mandibular teeth being the main cause of infection with only 1 admission associated with post extraction infection (9%). The same period in 2019, 13 out of the 17 cases (76,4%) were attributed to dental infection from mandibular teeth.

With regards to previous consultation with a general dental practitioner and prescription of antibiotics four out of the eleven patients (36,3%) admitted during the period of lockdown had previously

**Table 1**  
Demographics of patients admitted with a cervicofacial infection.

	2020	2019
Number of patients admitted	11	17
Age Range (Years)	4–56	5–83
Median Age (Years)	34	41
Gender (percentage)		
Female	54%	71%
Male	46%	29%
Patients with a comorbidity present (percentage)	45%	29%

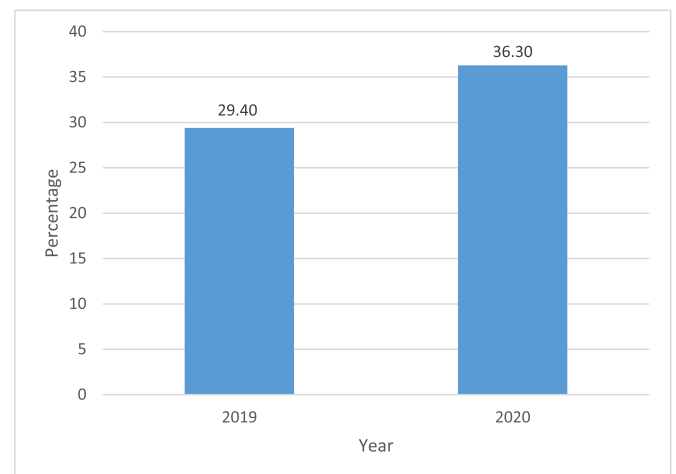
contacted their dentist and they were given antibiotics compared to 29,4% (five out of the seventeen cases) admitted in 2019 (Fig. 1).

There was a small decrease in patients undergoing incision and drainage under general anesthetic. In 2020, 81,8% (n = 9/11) of the patients were treated under general anesthesia with extraction of the associated teeth and exploration of the spaces compared to 88,2% (=15/17) in 2019. With regards to treatment under local anesthetic, there was an increase in the cases treated with intravenous antibiotics and extraction under local anesthetic in 2020 (n = 1/9) compared to 2019 were 5.8% of the patients admitted were treated similarly (Fig. 2). There was no significant difference between the two years in the mean number of teeth that required extraction as the main aetiology of cervicofacial infection (2020 mean number 2.1 compared to 1,9 in 2019) (Fig. 3).

Finally, our analysis reveal that the average length of hospital stay during the period of lockdown (mean 2.6 days) was slightly higher compared to 2019 (mean hospital in stay 2,5 days) (Fig. 4). In regards to inflammatory marker CRP, it was significantly higher in all hospital admissions in 2020 (mean 137) compared to the admissions in 2019 (mean 111) (Fig. 5).

## 4. Discussion

This paper shows that the number of hospital admissions for cervicofacial infections decreased by approximately 35% during the COVID-19 pandemic when dental practices were closed. The reduction in hospital attendance and subsequently admission may be attributed to the patients' fear of COVID-19 transmission and the compliance with Government's advice to ‘Stay home. Save lives. Protect the NHS’. Furthermore, the prompt establishment of the AAA protocol and the treatments provided by the Urgent Dental Care Centers may have successfully arrested the progression of dental infections requiring admissions. This may have reduced the amount of referrals to the oral and maxillofacial surgery department and relieved the workload for the NHS hospitals [11]. Our findings are in consistency with Politi et al. who also found a



**Fig. 1.** Number of patients that had a previous consultation with their gdp and were prescribed antibiotics.

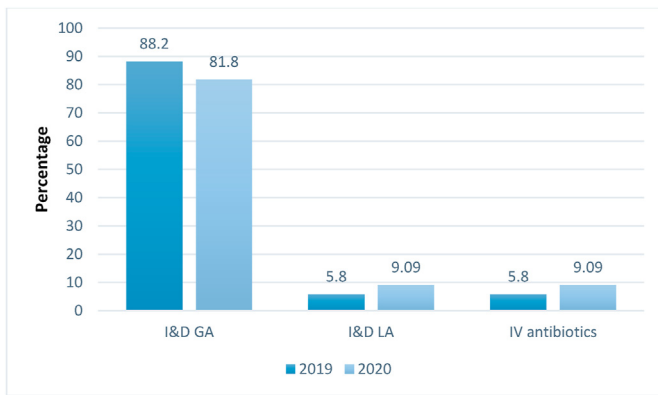


Fig. 2. Treatment provided to the patients admitted with cervicofacial infections of dental origin.

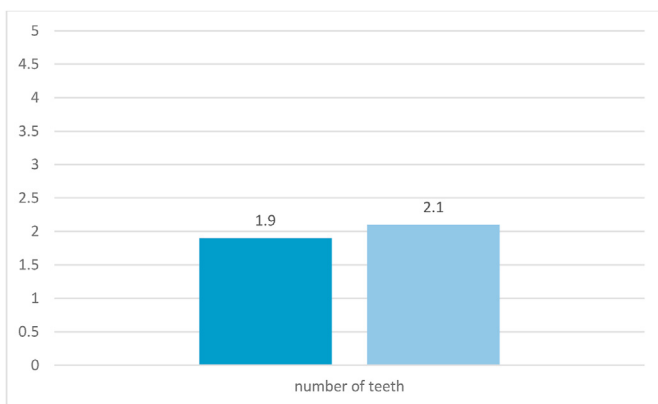


Fig. 3. Average number of teeth extracted.

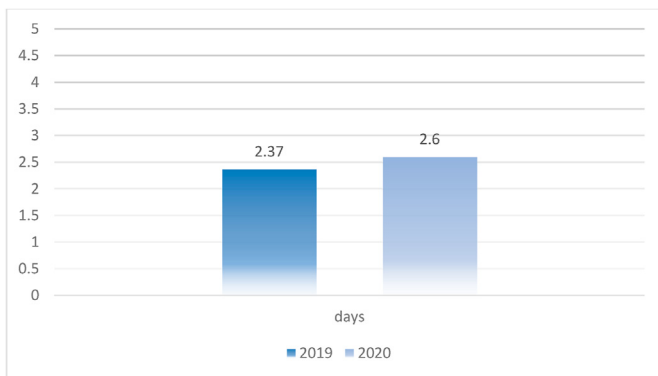


Fig. 4. Average length of hospital stay in days.

reduction in the hospital admissions at King's College Hospital for cervicofacial infections during the first six weeks of lockdown compared to the same period last year [11]. On the other hand Long et al. found that there were more hospital admissions at The Mid Yorkshire Hospital during the first two weeks of lockdown compared to the same period last year [12].

Data from both years shows that the most common aetiology for cervicofacial infection remains the lower molars and only one case during the 2020 lockdown was attributed to post extraction infection. The latter may reflect to the reduced number of extractions performed by UDCs and the primary care during this time.

We assessed the number of patients who contacted their dentist for advice and were prescribed antibiotics prior to their presentation in the

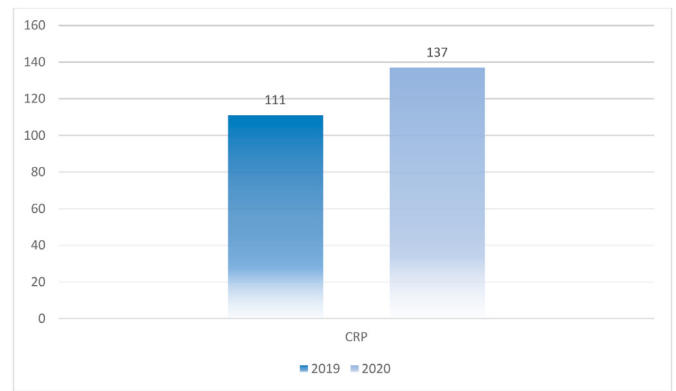


Fig. 5. Mean CRP of patients admitted with cervicofacial infections.

Accident and Emergency Department and we found that only one third of the cases admitted in 2019 were previously seen by their general dental practitioner and were prescribed antibiotics compared to two third of the patients admitted for this reason in 2020. Our findings are in line with Politi et al. who also found a significant increase in patients who received antibiotics prior to their presentation at the Accident and Emergency Department [10].

With regards to inpatient management, nearly all of the cases (94%) in 2019 needed incision and drainage under general anesthetic compared to nearly 80% of the patients admitted in 2020. A small proportion received treatment under local anesthetic and intravenous antibiotics whilst some received a intravenous antibiotics only. Therefore, there was a decrease in treatment under general anesthetic during the period of lockdown. This was beneficial for the potential risk of transmission of COVID-19 and also reduced the burden to hospitals in regards to theatre time, theatre personnel and availability of beds and drugs.

Analysis of the results demonstrated a slight increase in the number of teeth extracted during the period of lockdown and an increase in the length of hospital stay. This finding was unexpected considering the clinicians being keen to discharge the patients as soon as it is safe in order to minimize the risks of covid-19 infection from in hospital stay.

The mean CRP during the period of lockdown was significantly higher compared to the same period 1 year ago. One reason for that may be that patients with localized abscesses may have avoided attendance to the hospital until symptoms have become more severe. Another reason would be that patients were possibly trying to treat the initial symptoms of the infection with analgesics over the counter and therefore avoiding attendance to the hospital. Finally reviewing the patients' complications following surgery, we noticed that the number of patients requiring unplanned return to theatre for further treatment was three times more during the period of lockdown compared to the patients admitted during the same period in 2019.

Moreover, there was a significant difference between the profile of the patients admitted during the COVID-19 pandemic with the vast majority of the patients admitted had 1 or more comorbidities including asthma compared to the admissions in 2019.

## 5. Conclusions

This paper reviews the effect of COVID-19 pandemic on hospital admissions with main diagnosis of cervicofacial infection in Northampton General Hospital. Although there was an overall decrease in the number of hospital admissions which proves the effectiveness of urgent dental care centers the patients admitted had more than one comorbidity and the infections during this time seemed more persistent requiring further invasive treatment under general anesthetic. Furthermore the inflammatory marker CRP for the patients admitted was higher on presentation during the period of lockdown which could possibly be attributed to their late presentation at the hospital and patients' fear of

acquiring the virus. Therefore there was an increase in the length of hospital stay during this period.

#### Ethics statement/confirmation of patient permission

Ethics approval yes. Service evaluation project. Patient permission not applicable.

#### Declaration of competing interest

The authors have no conflicts of interest to declare.

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