

# Covid-19 and its impact on Maxillofacial Services at University Hospitals of Morecambe Bay NHS Trust

Miles Duncan, Consultant Oral and Maxillofacial Surgeon BMSc (Hons), BDS, FDS RCS, MBBS, MRCS, FRCS (OMFS)

## ABSTRACT

At the time of submitting this article, we are entering our second week of the second national lockdown, due to the Coronavirus Pandemic. All our lives have been adversely affected by this insidious disease, both professionally and personally, and it is unlikely that our working environment will ever return to the 'normal' that we once knew. The first part of this article is intended to shed some light on our specialty of Oral and Maxillofacial Surgery and how this pandemic has impacted upon our services at University Hospitals of Morecambe Bay NHS Foundation Trust (UHMB). The second part will be a series of cases, to corroborate the difficulties encountered as a direct result of Covid-19.

## INTRODUCTION

How did we get to this unique point in history? Well, if we wind the clocks back to December 2019, a novel human Coronavirus was first reported in a cluster of patients in the district of Wuhan, the Capital of Hubei Province, central China, suffering from an atypical type of viral pneumonia. Symptoms from these patients included fever, malaise, dry cough and dyspnoea.<sup>1</sup> Within six weeks, the virus had spread across 25 countries in Asia, Europe, and the Americas. At the beginning of February 2020, the World Health Organisation (WHO) called this disease **Coronavirus Disease 2019** hence the acronym Covid-19.<sup>2</sup> The virus was subsequently classified as "Severe Acute Respiratory Syndrome Coronavirus 2 (SARS-Cov-2). On March 11th 2020, the WHO designated this disease as the fifth documented pandemic<sup>2</sup> following the 1918 Spanish flu (H1N1), 1957 Asian flu (H2N2), 1968 Hong Kong flu (H3N2) and 2009 Pandemic flu (H1N1), killing an estimated 50 million, 1.5 million, 1 million and 300,000 humans respectively. As of 12th November 2020, Covid-19 has claimed 1.25 million lives globally. In the United Kingdom (UK) over 50,365 lives have been lost, the highest of all the European countries. The only other countries to pass the 50,000 milestone are the United States, Brazil, India and Mexico.<sup>3</sup>

Like most, if not all surgical specialties, Oral and Maxillofacial Services (OMFS) at UHMB have been affected in parallel with OMFS services nationally. Since Boris Johnson imposed the first national lockdown on 23rd March 2020, we have seen a drastic decline in the number of facial injuries coming into the emergency department (ED). This is multifactorial, but the predominant cause is inevitably a reduction in alcohol-related trauma as a direct result of pubs, clubs and restaurants being forced to close. 40% of facial injuries presenting to ED are alcohol related.<sup>4, 5</sup> Self-inflicted injuries due to intoxication and falling, or the inevitable Friday/Saturday night fights at closing time, account for the vast majority of these injuries.<sup>4, 5</sup>

Also, as lockdown restrictions prevented non-essential travel, road traffic accidents were down to below 20% of their normal level. Conversely, cycling accidents were increasingly reported, as more people heeded the government's advice of daily exercise.<sup>4</sup>

Sadly, the incidence of domestic violence related facial injuries had increased through the initial lockdown.<sup>6</sup> Many of us would value spending that additional time at home with family members and loved ones, however, for the already strained family situations in pre-Covid times, the prolonged self-isolation and financial hardship that people have been subjected to, in conjunction with increased home alcohol consumption, has led to an increase in interpersonal violence within families.<sup>6</sup>

Interestingly, there has been very little change in the number of facial injuries reported in young children. However, there has been an increase in facial trauma within the frail elderly population, consistently falling secondary to balance problems and an unsteady gait.<sup>7</sup> Most of these injuries were facial lacerations, which could be closed under local anaesthetic in the elderly and general anaesthetic in the much younger population.

Severe head and neck fascial infections were also considerably reduced compared to pre-pandemic times. The reason for this is two-fold – firstly given the increased number of Covid positive patients attending the emergency departments across Morecambe Bay, was such that attendances for non-Covid emergencies was reduced significantly, due to the anxiety of attending such departments for fear of acquiring the infection. Secondly, from early May 2020, the Clinical Commissioning Groups began to formulate Urgent Dental Care Centres (UDCCs) across Morecambe Bay in line with national guidelines. Shortly after lockdown was imposed, primary dental care services were advised to radically reduce and eventually cease face-to-face patient contact. Concerns at that time, within the secondary care setting, were that OMFS departments nationwide would be inundated with the full range of infections ranging from simple toothaches with a small 'gum boil' to fulminant head and neck infections with life-threatening airway compromise and sepsis. Fortunately, this trend was not witnessed at UHMB, and we are indebted to the local dental practices in Barrow, Kendal and Lancaster, who offered their services as a UDCC during the lockdown period.

## WHAT IMPACT DID COVID-19 HAVE ON OUR LOCAL OMFS SERVICES?

For the first few weeks of lockdown, our services continued as normal but patient numbers on clinics and theatre lists dwindled as the fear of 'the unknown' began to close in. Like other specialties, we were all given a directive to relocate to other departments where clinical need was greatest – namely the intensive care unit (ICU). The

plan was to help out with ward rounds and respiratory assessments of Covid patients, taking bloods and drug prescribing. This was all under the watchful gaze of the ICU consultant staff. We would basically be acting as junior doctors once again, which filled many of the senior clinicians, myself included, with that dreaded 'churning stomach' feeling of being completely out of one's comfort zone.

As the wave of infection spread to the North West, several weeks behind the southern outbreak, the Nightingale Hospitals already primed for action, never really experienced the mass flood of patients that was forecast. Consequently, we spent less than 2 weeks in ICU, and our work rotas were altered accordingly to the 'Covid timetable'. Having a relatively small surgical unit, with only four senior clinicians, three middle-grade staff and two junior staff (Dental Core Trainees), we could not adequately self-isolate for the recommended two weeks and still provide round the clock on-call cover. Our new timetable consisted of the following:

- All junior staff to remain on the Covid positive sites – Lancaster and Barrow
- Senior staff would rotate 1 in 4 as the below 'Covid timetable'
  - Week 1 – On call (24/7) at Royal Lancaster Infirmary
  - Week 2 – Admin – telephone clinics, all Microsoft Teams meetings/MDTs/revalidation
  - Week 3 – Self-isolating and then Covid tested Friday prior to Mondays operating week
  - Week 4 – Operating Monday-Friday everyday on Covid negative site – Westmorland General Hospital

Admittedly, I am sure my colleagues would concur, the workload was marginally easier than our normal pre-Covid timetable that we are used to. However, week four took its toll, due to all day operating five days a week and, paradoxically, the OMFS surgeon treating facial injuries/cancers, wearing tight-fitting FFP3 masks, would frequently end up with facial sores by the end of the week!

From very early on in the pandemic, all specialties were requested to revalidate patients and clinically prioritise according to the Federation of Specialty Surgical Associations. The important document entitled 'Clinical guide to surgical prioritisation during the Coronavirus Pandemic', that disseminated nationally from the FSSA was to become the tool with which patients were subsequently listed for theatre (see below categories and OMFS specific criteria).<sup>8</sup>

### Priority 1a – Emergency procedures performed < 24 hrs

- Haemorrhage from maxillary/mandibular trauma not responsive to conservative Rx
- Dental sepsis – not responding to conservative Rx and threat to life/airway/sight/brain
- Orbital Compartment Syndrome/Muscle entrapment – threat to sight
- Jaw dislocation – not responding to conservative Rx

### Priority 1b – Procedures to be performed < 72 hrs

- Facial fractures – not suitable for conservative Rx (eg mandibles)

### Priority 2 – Procedures to be performed < 1 month

- MDT directed oropharyngeal/tonsil/tongue cancer resection +/- reconstruction
- MDT directed resection of skin cancer – melanoma, Merkel Cell Carcinoma, poorly differentiated SCC, any tumour with metastases
- Facial fractures causing diplopia/ occlusal problems
- Mandibular/maxillary orthognathic surgery – airway compromise unresponsive to conservative Rx AND unsuitable for tracheostomy – adults and children
- Dental extractions – adult and paediatric if unresponsive to conservative Rx (severe pain/ infection)
- Craniofacial – ocular complication/raised intracranial pressure

### Priority 3 – Procedures to be performed < 3 months

- MDT directed resection of head and neck skin cancer – moderately/well differentiated SCCs with no metastases, and all BCCs
- MDT directed salivary gland tumours (low grade)
- Cleft lip – alveolar bone grafting (prior to canine eruption)

### Priority 4 – Procedures to be performed > 3 months

- All orthognathic surgery
- Dental extractions – adult and paediatric
- MDT directed salivary gland tumours – benign
- Facial deformity – post-traumatic/cancer treatment
- Benign dental lesions – mandible/maxilla
- Temporomandibular joint surgery

Following further guidance from the British Association of Oral and Maxillofacial Surgeons and the British Association of Oral Surgeons, it soon became clear that all elective surgery would have to be deferred for 3-6 months.<sup>14</sup>

Clearly, as a specialty, we had to defer all elective cases that were triaged P4 – namely all simple dental extractions, wisdom teeth removal and orthognathic surgery (jaw corrective surgery – the authors main subspecialty) for six months. As a result, the only patients treated throughout lockdown, were emergency, trauma and cutaneous malignancy cases (non-melanoma skin cancers). In light of these criteria, we decided as a department to upgrade all squamous cell carcinomas (SCC) into group P2, in line with the Plastic and Reconstructive Surgical guidelines,<sup>8</sup> which left all the basal cell carcinomas (BCC) in P3. The British Association of Dermatology guidelines suggested deferring BCCs from 3-6 months, with the exception of 'highly symptomatic' lesions.<sup>9</sup>

**THE FOLLOWING WERE JUST SOME OF THE CASES THAT WERE ADVERSELY AFFECTED BY THE PANDEMIC**

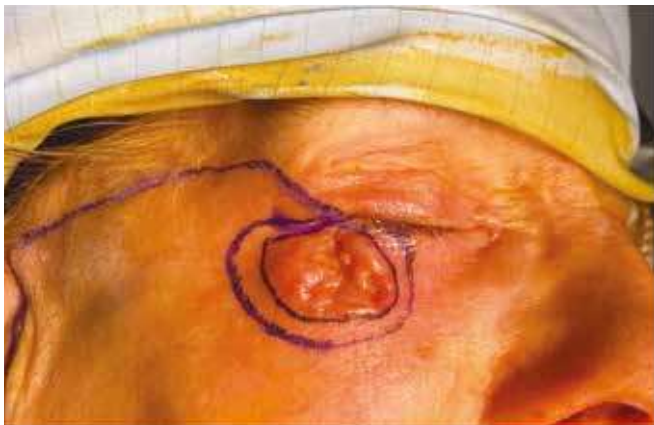
**Case 1: Right peri-orbital Basal Cell Carcinoma**

A 67 year old lady was referred urgently to OMFS by Dermatology in March (1 week prior to lockdown) with an 8mm diameter, biopsy-confirmed infiltrative BCC right lower eyelid. Due to prioritisation, she was eventually seen

in clinic in June, but the lesion had advanced considerably since the referral date (fig. 1a). Clinically, the lesion was involving the full thickness of the lower eyelid, which meant surgical reconstruction was more complex than simple excision and closure. More importantly, the deep margin was positive on definitive histology, compelling the patient to further treatment with radiotherapy in order to eradicate residual tumour cells and gain clearance. She currently remains tumour free and has healed well. Due to targeted radiotherapy (IMRT) there was no xerophthalmia (dry eye) and no reduction in visual acuity, as a result of the potential radiotherapy cytotoxicity to the lacrimal gland and optic nerve respectively.



**Figure 1a:** Infiltrative BCC involving full thickness of right lower lid.



**Figure 1b:** Tumour marked out with 5mm margins and local Mustarde rotational flap.

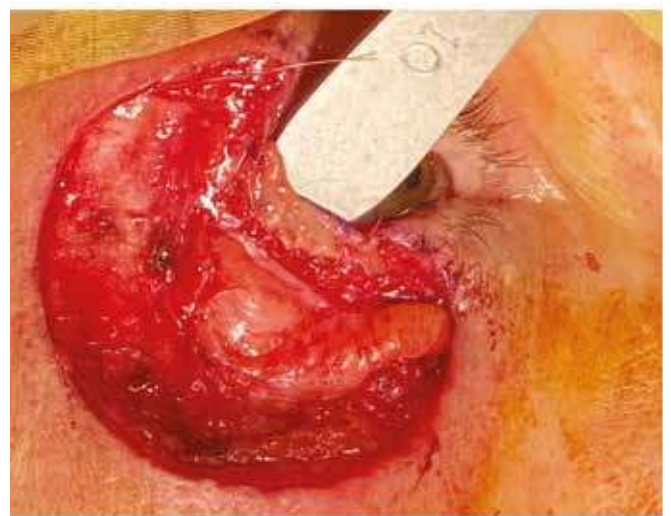


**Figure 1c:** BCC excised showing defect through lateral half of lower conjunctiva.



**Figure 1d:** Lower lip – labial mucosal graft to reconstruct conjunctiva.

Reconstruction involved a mucosal graft from the lower lip (fig. 1d), which was inserted into the lateral aspect of the lower eyelid to reconstitute the missing conjunctiva (fig. 1e) followed by an auricular cartilage graft to replace the tarsal plate and provide some structural support. Finally a Mustarde flap was elevated (fig. 1f) and rotated into the defect to reconstruct the anterior lamella (fig. 1g).



**Figure 1e:** Mucosal graft sutured into lateral half of conjunctival defect – labial surface facing the sclera.



Figure 1f: Mustarde rotational flap elevated and undermined.



Figure 1g: Insetting Mustarde flap over mucosal graft and cartilage support.

### Case 2 – Solid Ameloblastoma of left mandible

A 70 year old fit and well male referred in February 2020 by his dentist, with a two month history of numbness of lower anterior teeth and lower lip on left side. He was seen in the clinic in May 2020, and examination revealed an expansile mass in the body of the left mandible with mobile molar teeth and objective sensory loss in the lower lip and the left lower incisor teeth.

Orthopantomogram (OPT) radiograph (fig. 2a) revealed extensive radiolucency occupying left mandible and an erosive lesion involving roots of the lower left molars. A subsequent magnetic resonance image (MRI) (fig. 2b) and computerized tomograph (CT) scan revealed a suspicious lesion eroding the lower border of the mandible and biopsy confirmed an ameloblastoma.

This is a benign but locally invasive epithelial neoplasm of dental origin, and causes a slow, painless expansion of the jaw, thinning the cortical plates. Root resorption, tooth mobility and paraesthesia (numbness)

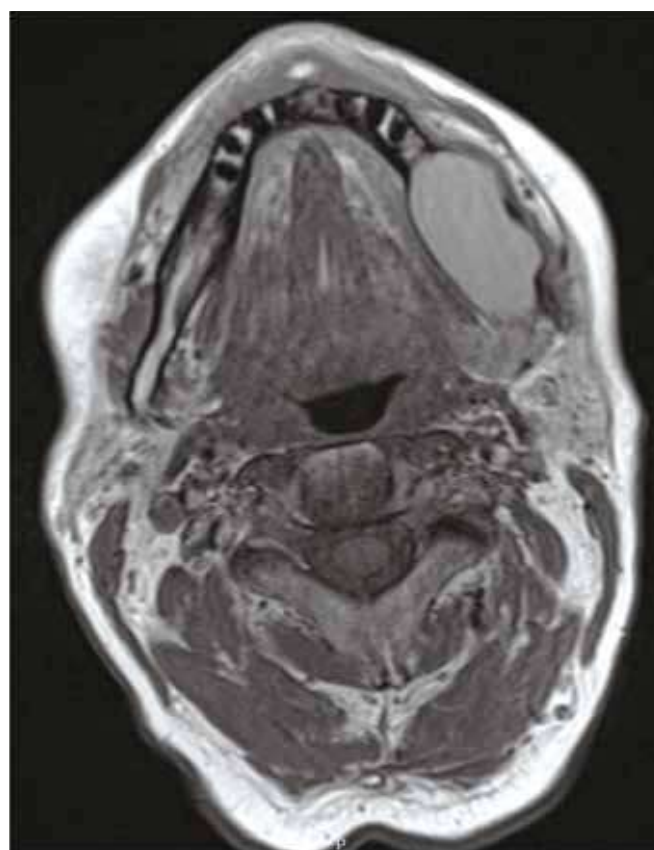


Figure 2b: Axial MRI showing lesion left body of mandible.



Figure 2a: Large radiolucency left body of mandible with resorption of roots of mandibular molars (LL6 and LL7).

are all features of advanced cases of ameloblastoma. Radiographically it can be unicystic, multicystic or solid and peripheral. Multicystic or solid type is prevalent in 85% of cases. Treatment of choice for solid ameloblastomas is controversial but for the majority of these tumours, involves en-bloc resection of the jaw with a clear margin of 1.0 – 1.5cm, as recurrence is 9-10%.<sup>10</sup>



**Figure 2c:** Exposure of mandible from an intra-oral and left submandibular approach and resection margins marked out.



**Figure 2d:** Resection of tumour after pre-plating with reconstruction plate, to maintain patients normal occlusion (bite).



**Figure 2e:** Lingual aspect of resected specimen showing IDN nerve 'pushed' through cortical bone in centre – hence the numbness experienced in the lower lip and teeth left side.



**Figure 2f:** Non-vascularised bone graft from right iliac crest (hip).



**Figure 2g:** Iliac crest graft secured to reconstruction plate to recreate neomandible left side and cancellous bone chips from intramedullary pelvis, packed around the margins of the graft to encourage osseointegration.



**Figure 2h:** Post-op radiographs showing reconstruction plate securing iliac crest graft left neomandible.

Due to his definitive diagnosis the patient was categorized as P4, and hence the delay to treatment meant a more extensive tumour, requiring more radical surgery. Also, in an ideal non-Covid world, the hemimandibular reconstructive option of choice, as first described by Hidalgo (1989), would be a vascularised microvascular fibula free flap – a procedure which can take 6 – 8 hours.<sup>11</sup>

Given the national guidance mentioned previously to minimise surgical treatment times during Covid,<sup>8</sup> it was felt the compromised option would be a shorter procedure, and to harvest a non-vascularised iliac crest graft, with the unfavourable sequelae of increased bone resorption (up to 40% of non-vascularised grafts). Ideal clinical decision making has been sacrificed for a second best alternative during such a crisis. However, the patient has recovered well, is pleased with the result, and has remained Covid-free.



**Figure 3a:** Axial CT showing displaced anterior wall of frontal sinus on left forehead. Note that the posterior wall of the frontal sinus remained intact.

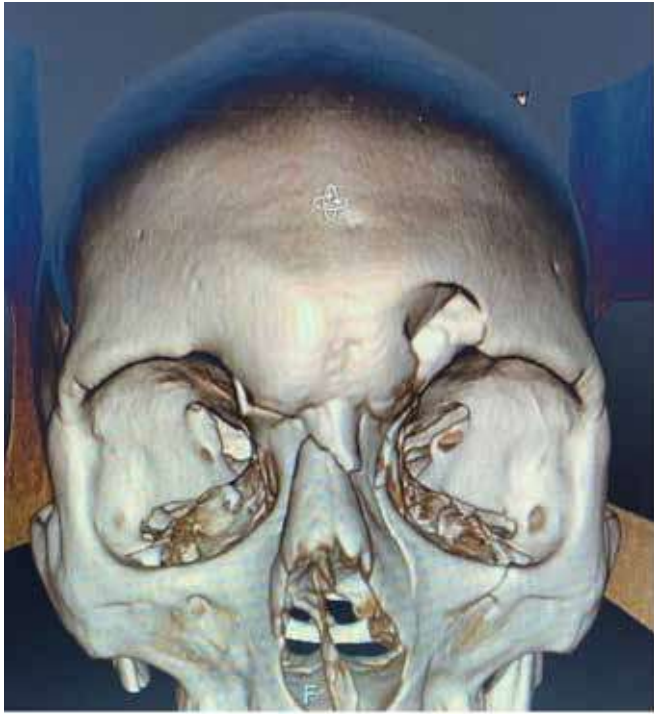
### Case 3 – Severe mid-facial and frontal fractures

A 23 year old male was allegedly assaulted after consuming excess alcohol. A single punch to the face resulted in a brief loss of consciousness, and the victim fell flat on his face onto concrete. The mechanism of injury would suggest that the fall onto concrete, whilst briefly unconscious, caused the frontal fractures; it is highly unlikely that a single punch resulted in these facial fractures. He sustained a displaced fracture to the anterior wall of the frontal sinus in addition to an impacted naso-orbito-ethmoidal fracture (fig. 3a). Note from the CT scan, the posterior wall of the frontal sinus remained intact; otherwise this would have been a joint procedure with the neurosurgeons at Preston Hospital.

The surgical approach to midfacial and frontal fractures,<sup>12</sup> involves a combination of incisions: the frontal and naso-orbito-ethmoid fractures are accessed via a bicoronal incision (see figs 3c-3f) – across the vertex of the scalp from ear to ear, and elevating a scalp flap to the forehead and nasal regions. The midfacial fractures are accessed via the bicoronal approach and an additional incision within the mouth – upper labial sulcus from first molar on one side around to the first molar on the opposite side. Titanium miniplates were used to reduce the fractures in a sequential manner, plating from a solid frontal base downwards, so as to stabilize the maxilla and correct the deformities and malocclusion (bite).

Due to limited theatre capacity, pre-operative investigations and self-isolation protocol/testing, there were considerable delays in getting this patient to the appropriate site and theatre slot. We eventually managed to admit him 3½ weeks post injury for surgery, not ideal

timing for complex facial fracture reduction. In a young, fit and well 23 year old male, facial fractures will begin to heal between 3-4 weeks post-injury. Consequently, the reduction of this patients fractures proved much more difficult, as the midfacial fractures had to be osteotomised and mobilized (due to early bone callous formation, secondary to the delays), in order to achieve adequate anatomical reduction. Fracture reduction at this late stage, is far less predictable, and almost always impacts on the clinical outcome.<sup>13</sup> The patient recovered well from this procedure, but still has some supra-orbital neuropraxia (numbness) in a strip of scalp and the left side of the forehead, which is steadily improving at each follow up.



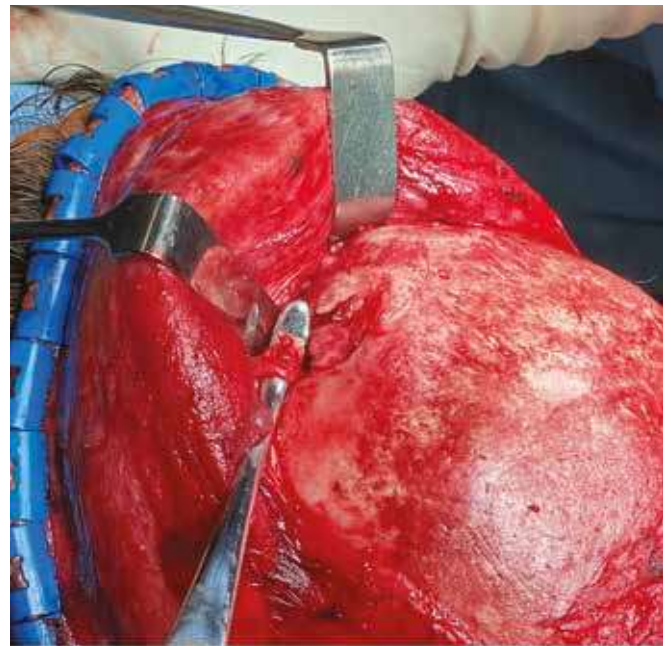
**Figure 3b:** 3D image of upper midface and frontal fractures quite evident on the left side of the forehead.



**Figure 3d:** Haemostatic Raney clips applied to anterior and posterior skin flap edges to aid haemostasis.



**Figure 3c:** Bicoronal incision extending from ear to ear across the vertex of the scalp, following appropriate local anaesthetic with vasoconstrictor to minimize blood loss.



**Figure 3e:** Frontal fracture site exposed, supra-orbital nerves identified bilaterally and freed from their canals with osteotomes to allow full access to the supra-orbital rim for reconstruction.



**Figure 3f:** fractures reduced and plated with titanium mini-plates and screws.

## CONCLUSIONS

There is no doubt that Covid-19 has impacted on everyone's lives. Some families will sadly have experienced the terrible loss of loved ones and our thoughts go out to the relatives of thousands of patients who have succumbed to this illness. For those survivors of the virus, many may well be dealing with chronic conditions related to Covid. There are the other groups of patients, with non-Covid pathologies, which may well have been exacerbated by delays to treatment, prioritisation, or simply shortfalls within the already overstretched NHS. I hope this article has highlighted some of these pitfalls, in one of the smaller surgical specialties within UHMB.

As a member of the largest workforce in the UK I feel proud, as every other worker within the NHS should, to have been part of an institution that has encountered its most demanding, unprecedented period since its commencement in 1948.

At the time of writing Covid-19 vaccines, being developed by Pfizer, AstraZeneca and BioNtech, are awaiting emergency approval and a limited number of people may get the vaccine before the end of the year. This may prove crucial in order to deflect a predicted third peak in spring of 2021. In the meantime, I would strongly urge everyone to adhere to the government mantra of 'Hands, Face, Space', in order to 'protect the NHS and save further lives'.

## ACKNOWLEDGEMENTS

I would like to thank my maxillofacial colleagues, Rory Molloy, Indu Sanjaya, Nick Hampton, David Fisher and Jack Colclough for their hard work throughout the

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I would also like to thank the three patients who readily consented for their images to be used in the case reports.

**Correspondence to:**  
miles.duncan@mbht.nhs.uk

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