

# Role of Telemedicine for Oral and Maxillofacial Surgeons: In the Phase of COVID-19 Pandemic

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**Abstract:** *The COVID-19 pandemic has changed conventional medical practice patterns across all health disciplines including oral and maxillofacial surgery practices. Telemedicine adoption has rapidly accelerated since the onset of the COVID-19 pandemic. Telemedicine provides increased access to medical care and helps to mitigate risk by conserving personal protective equipment and providing for social/physical distancing and disease transmission reduction while maintaining uninterrupted care of patients. To date, there are no specific guidelines to optimize telemedicine encounters in the oral and maxillofacial surgery practice. The goal of this paper is to provide best practices for both oral and maxillofacial surgeons and their patients to effectively utilize telemedicine during and beyond the Corona pandemic from Indian outlook.*

**Keywords:** Telemedicine, Oral, Maxillofacial Surgeon, COVID-19, Pandemic

## 1. Introduction

The COVID-19 pandemic has disrupted society in a multitude of ways. Healthcare is no exception; the SARS-CoV-2 virus rapid transmission and high hospitalization rate have strained the availability of medical resources including personal protective equipment (PPE), respiratory ventilators, and hospital beds.<sup>1-4</sup> The virus also poses a major threat to healthcare personnel, whose risk of exposure are compounded by the aforementioned PPE shortages.<sup>5-7</sup> In response, the American Association of Oral and Maxillofacial Surgeons (AAOMS) recommended delaying elective surgeries, in accordance with the Centers for Disease Control and Prevention's calls to postpone elective medical and dental procedures.<sup>8-10</sup> In the face of these challenges, the medical and dental communities have remained steadfast in caring for patients with non-elective health needs and innovating alternate ways to deliver care. One of the most important and popular alterations in the delivery of care is the increased utilization of telemedicine, which allows surgeons and patients to connect virtually.<sup>11,12</sup> This has enabled patients to access much-needed medical care while preserving PPE and minimizing exposure to pathogens. Though studies have found telemedicine to decrease costs and save time without compromising patient satisfaction, it was not widely used in healthcare before the COVID-19 pandemic.<sup>13,14</sup> Similarly, teledentistry was deemed to be "in its infancy" by the founder of the American Teledentistry Association in 2019.<sup>15-17</sup> Nevertheless, telemedicine has shown promise and has been incorporated into the workflow of various oral and maxillofacial surgery institutions and practices across the country. Virtual visits are particularly useful in triaging patients. For example, patients with dentoalveolar infections can meet virtually with surgeons and receive prescriptions for appropriate analgesics and antibiotics without going to the emergency department.

Also, patients with oral lesions can take images and show their surgeon before their in-person visit to expedite the diagnosis and treatment planning workflow. This enables patients to access timely attention of providers while lightening the load on the healthcare system by reducing the number of in-person visits.

## 2. What is Telemedicine?

As per WHO telemedicine is, "the delivery of healthcare services, where distance is a critical factor, by all healthcare professionals using information and communication technologies for the exchange of valid information for diagnosis, treatment and prevention of disease and injuries, research and evaluation, and for the continuing education of healthcare providers, all in the interests of advancing the health of individuals and their communities."<sup>18</sup> Advances in digital communication, telecommunication, and wide use of broadband internet provide a pathway for unprecedented opportunity to remote medical care. it comprises of following subunits:

### 1) Teleconsultation

The patients or local healthcare provider seeks consultation from specialists using telecommunication<sup>19</sup>. It has been valuable for the consultation of patients who are physically and intellectually challenged, and patients from aged care facilities and prisons<sup>20-22</sup>. In the current COVID-19 pandemic it may aid the patients in continuing their therapy during quarantine and lockdown.

### 2) Telediagnosis

Telediagnosis makes use of technology to exchange images and data to make a diagnosis of an oral lesion<sup>23,24</sup>. With the use of smartphones for detection of dental caries is well advocated<sup>25,26</sup>; it has also served as a reliable adjunct for

screening of oral potentially malignant lesions<sup>27</sup>. An addition to telediagnosis is telecytology, a system for early detection of oral potentially malignant or malignant lesions<sup>28</sup>. Haron et al. developed Mobile Mouth Screening Anywhere (MeMoSA®) to facilitate early detection of oral cancer and found it to be beneficial for patients with limited access to specialists.<sup>29</sup> Skandarajah et al. evaluated a tablet-based mobile microscope (CellScope device) as an adjunct for screening of oral cancer.<sup>30</sup> During the current COVID-19 pandemic investigators from Brazil recently illustrated the use of WhatsApp and telemedicine in making a differential diagnosis of oral lesions.<sup>31</sup> As most of the oral lesion are often directly evident telediagnosis can be made by dental photography thus reducing the need of close clinical examination.<sup>32</sup>

### 3) *Teletriage*

Teletriage involves the safe, appropriate and timely disposition of patient symptoms via smartphone by specialists. It has been used for remote assessment of school children and prioritize those requiring oral care without unnecessary travel regardless of socio-economic and geographical difficulties in many places.<sup>33,34</sup> Bruccoli et al. suggested use of teleradiology as a useful tool in triaging of maxillofacial trauma patients from peripheral centers to their main trauma center.<sup>35</sup>

### 4) *Telemonitoring*

Monitoring of dental patients require frequent visits of patients to their dentist to monitor the progress of treatment. The use of telemonitoring can replace the frequent physical visits by virtual visits for regular monitoring of treatment outcomes and disease progression.<sup>19</sup> In a recent pilot study during this pandemic, telemonitoring appeared to be a promising tool in the remote monitoring of surgical and non-surgical dental patients, especially reducing costs and waiting times.<sup>36</sup>

## 3. Problem Accounts

India is the land of diversity and before implementation of any health care system one has to consider the myriad language barriers, access to technology, social prejudices, basic education level of the mass, rich –poor divide, urban – rural distribution and so on. To add to the problem there exists gigantic disparity between treatment facilities in metros and rural setups. About 75% of doctor population is city centric whereas 68.84% of Indian society stays in rural belt.<sup>37,38</sup> The Center for Disease Control and Prevention (CDC) has even proposed to minimise avoidable hospital visits and redefine the outpatient services along with exploration of newer alternatives to reduce face to face interactions.<sup>39</sup>

In telemedicine practice there are two main cruxes first a human factor and technology being the second one. Human factor consists of three key players, the medical team (surgeon and his assistant, physiotherapist, nurses, physicians) and the patient at two ends bridged by a moderator/liason person to connect between them On the receiver's end, especially in Indian masses the patient may have questionable education and gadget literacy, language barrier, reluctance to learn newer methods due to over

adherence to traditional healthcare compounded with high expectations and over leniency towards in touch consultation. Data privacy and autonomy, poor IT interface design, inadequate coverage and quality of internet services, lack of electronic device at disposal also remains the technological shortcomings. Most of the 620 million rural Indians lack access to basic health care facilities. The Indian government spends just 0.9% of the country's annual gross domestic product on health, and little of this spending reaches remote rural areas. The poor infrastructure of rural health centers makes it impossible to retain doctors in villages, who feel that they become professionally isolated and outdated if stationed in remote areas. In addition, poor Indian villagers spend most of their out-of-pocket health expenses on travel to the specialty hospitals in the city and for staying in the city along with their escorts.<sup>40</sup> A recent study conducted by the Indian Institute of Public Opinion found that 89% of rural Indian patients have to travel about 8 km to access basic medical treatment, and the rest have to travel even farther.<sup>41</sup>

## 4. The Virtual History and Physical Evaluation

Thorough patient assessment, proper medical documentation, and appropriate diagnostic testing are critical components of Oral and Maxillofacial Surgery (OMS) practice that enable proper diagnosis and treatment planning. OMS should obtain patients' medical histories in a similar manner as they would in their offices. New patients must be asked for comprehensive histories that include chief complaint, history of present illness, past medical history, past surgical history, dental history, medications, allergies, pertinent family history, social history, and complete review of systems. For patients of record, their medical histories should be updated to reflect their current chief complaint. All patients should also be screened with an up to date COVID-19 questionnaire. If an infection is suspected, OMS should refer patients to their primary care physicians or local emergency department depending on the severity of symptoms for appropriate work-up. Vitals should be obtained if the patient has access to a thermometer, blood pressure cuff, pulse oximeter, or weighing scale. Even without any of these devices, patients can still measure their pulse by applying two fingers on the patient's carotid counting the number of beats per minute. Also, patients can calculate their respiratory rate by observing the number of times chest rises in one minute. Finally, oxygen saturation can be measured with certain mobile health applications, though OMS should not solely rely on their results for major medical decisions. Finally, patients with fever (body temperature > 100.4 F) warrants further work up in an emergency setting for a differential diagnosis that includes COVID-19 infection.

The virtual physical examinations will be limited to a head and neck exam and a cranial nerve examination. While inspection and palpation are the basis of a focused physical examination in oral and maxillofacial surgery, OMS must learn to work together with patients to achieve the same goals virtually. Patients must perform maneuvers on themselves with the OMS's guidance. To this end, a printed step-by-step schematic, as illustrated in Figure 1, can be helpful for patients to receive before the visit. During the visit, the OMS can reinforce the diagram with clear verbal

instructions that avoids medical jargon. The exam itself must be conducted systematically, with a top-down, outside-in approach as is typical in an oral and maxillofacial surgery practice. The exam can be further divided into head and neck subsites. The OMS should ask for specific symptoms related

to each subsite and carefully inspect for any abnormalities while guiding the patient or the patient's assistant through the exam. The following section offers additional details and considerations for each subsite.

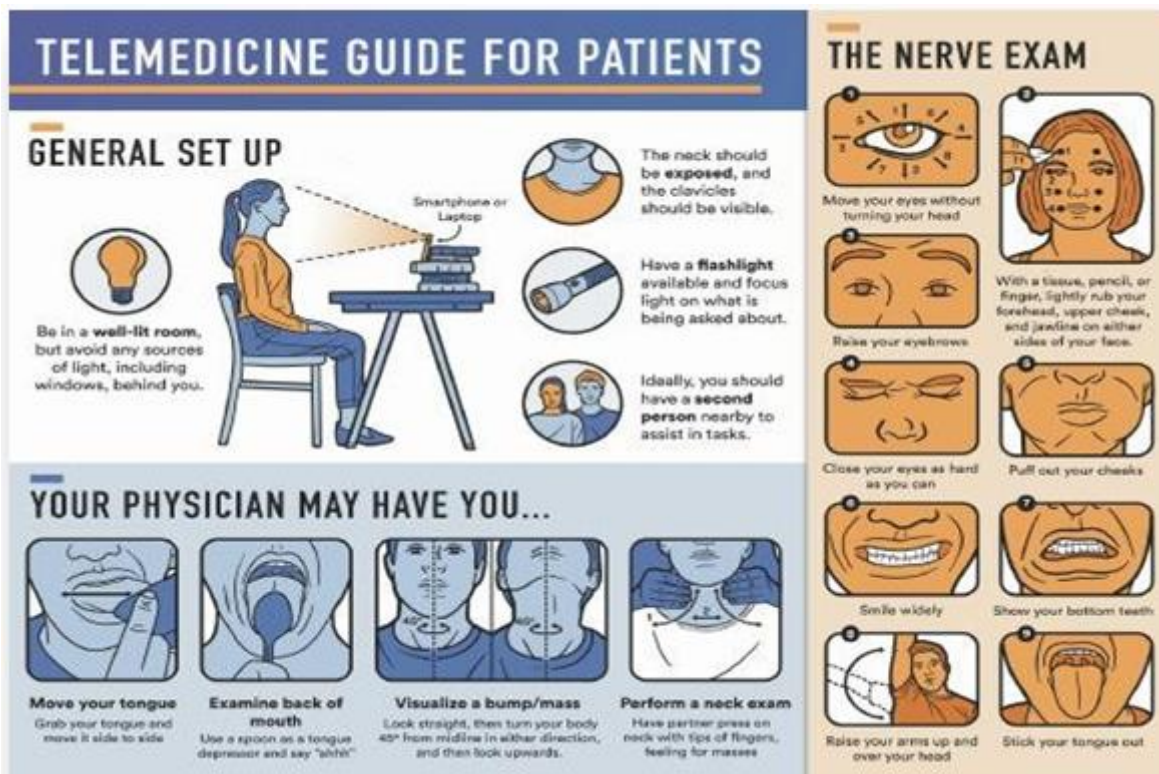


Figure 1

**Head:** The OMS should ask about any history of head trauma. The head is assessed to ensure that it is normocephalic and atraumatic.

**Face:** The OMS should ask the patient about any facial pain, swelling, weakness, numbness, or history of trauma to the region. Then, OMS can start the facial exam by asking the patient to lean close to the camera. First, the face is examined for any skin lesions along the forehead, eyelids, external ears, nose, malar region, vermilion of the lips, and the chin. Patients' left and right sides of the face should be compared for any gross asymmetry or deformities. OMS can then guide patients through palpating their own face for any bony discontinuity or soft tissue swelling. Patients can also tap their own face with two fingers to reveal any tenderness in the sinuses. Regarding the eyes, OMS can assess if the pupils are equal. The extraocular muscles along with the oculomotor, supratrochlear, and the abducens nerves can be tested by having the patient look up, down, left and right without moving the head. The sensory portion of the trigeminal nerve can be tested by asking patients to close their eyes and slide both of their index fingers horizontally along the ipsilateral forehead (ophthalmic branch), cheek (maxillary branch), lip and chin (mandibular branch). The branches of the facial nerves can be tested by asking patients to raise their eyebrows, close their eyes tightly, puff out their cheeks, smile widely, and show their bottom teeth.

**Temporomandibular joint (TMJ):** The OMS should ask the patient about any facial, jaw or ear pain, trismus, difficulty

mastication, clicking or locking of the joint. Then, the TMJ exam begins by asking patients to palpate their mandibular condyles and muscles of mastication to look for any tender spots. Providers can ask patients to open and close their mouth while palpating the condyles to feel for any clicks or crepitus. Also, maximal interincisal opening can be roughly estimated by the number of fingerbreadth or precisely measured using a ruler. The mandibular range of motion can be assessed or measured in protrusive and lateral excursive positions.

**Neck:** The OMS should ask for any difficulty breathing, dysphagia, sore throat,odynophagia, hoarseness, or new neck swelling. The neck exam begins with inspection, looking for any asymmetry or tracheal deviation. Patients can be asked to turn the head from side to side, look upwards, and shrug the shoulders to assess the spinal accessory nerves. OMS should ask the patient's assistant, if possible, to stand right behind the patient and palpate the patient's neck. Using their fingertips on both hands, the assistant can palpate the neck in a unidirectional manner from superior to inferior and then from lateral to medial. Ask them to note any palpable bumps or tender spots. It is particularly important to palpate the lateral neck for enlarged lymph nodes. Lastly, OMS can identify the thyroid by asking patients to swallow while palpating the appropriate area on the neck to rule out thyromegaly.

**Oral cavity and oropharynx:** The OMS should ask for any oral pain, oral swelling or sores, tongue numbness, difficulty

with tongue movement or dry mouth. Examination of the oral cavity exam can be challenging because intraoral structures can be difficult to retract and illuminate. The cheek retractors, whether from a board game or makeshift spoons, can be helpful for retraction of soft tissue and intraoral camera for visualization (Figure 2). In addition, patients' friends and family can help a great deal by adjusting the camera while also properly angling an additional light source.



**Figure 2**

For each intraoral structure, the OMS must carefully inspect for ulcers, raised lesions, abnormal white (leukoplakic) or bright red (erythroplakic) lesions. In general, OMS can best visualize structures near or at the level of the maxilla when patients lift their heads up to 45 degrees. Likewise, structures near or at level of the mandible are best observed with the patient dropping the chin approximately 30 degrees. OMS may find it useful to practice these examination techniques on their own cameras before the visit. Patients should be recommended to wash their hands or to use gloves before touching any intraoral landmarks. The exam begins by sliding the patient's index finger along the maxillary and mandibular vestibule to look for any swelling or fluctuance. With the cheeks retracted, the patient can palpate their buccal and labial mucosa using the thumb and index finger with one finger compressing along the face extra-orally. When possible, palpation should be bi-digital. Next, the patient can use their index figures to palpate the tuberosity, retromolar trigone, and the hard palate for tenderness or irregularities.

The tongue is the most common site for oral cancer and must be thoroughly examined. The dorsal surface of the tongue should be examined by asking the patient to fully protrude their tongue. Providers should also ask patients to move their protruded tongues to the left and right to inspect the lateral tongue and ensure the function of the hypoglossal nerves. The ventral tongue and the floor of the mouth can be observed by asking patients to touch the tip of their tongue to their hard palate. The tongue can then be palpated for lumps or masses. Next, the sublingual and submandibular glands can be palpated for symmetry and lack of elevation by the

patient with their extended index fingers on the floor of the mouth.

The examination of the oropharynx is mostly limited in virtual encounters. Nevertheless, the soft palate, tonsils and uvula can be partially visualized with the patient's mouth wide open and using a spoon to depress the tongue. Although unpleasant, the glossopharyngeal and vagus nerves can be tested by gently touching the soft palate using a spoon to induce a gag reflex.

*Dentition:* If the patient is dentate, the provider should ask about dental pain, sensitivity, loosening of teeth, bleeding or sore gums, or malocclusion. The patient's dentition can be evaluated after retracting soft tissue as described previously. Dental caries, missing teeth, periodontal disease, gingival lesions or swelling can be readily identified. Mobility of teeth can be assessed by using the patient's thumb and index finger. In edentulous patients, the alveolar ridge should be examined for any abnormalities as part of the aforementioned oral soft tissue examinations.

## 5. Recommendations

We would like to recommend the below stated steps before embracing telemedicine in a wider scale:

- 1) There should be strict protocols and uniform laws across the states as regards to practitioner and online platform sites licensure requirements before initiating treatment to categorically selected group of patients.
- 2) Government health services (WBHS and CGHS) and private sector insurances should have transparent and well-coordinated policies making reimbursement and financial settlement convenient to the patients for telemedicine practice to succeed.
- 3) A comprehensive telemedicine training module encompassing its different facets such as its components, workflow process, software training for documentation maintaining data confidentiality, the pros and cons, cost efficiency, legal bindings and so on should be formulated considering all the stakeholders before launching it on mass scale.
- 4) The main pillar, patient needs to be educated first regarding the advantages of this practice. Their active participation and eagerness to accept it as a viable alternative to "in touch patient care" especially during natural calamity or pandemic holds the key for this novel care to prosper.
- 5) Proper selection of the fittest platform for teleconsultation should be tailored according to the gadget convenience and tech skills of the patient.
- 6) The video consultation should be scheduled in non-official hours avoiding the online traffic jamming for better connectivity experience.
- 7) The India Inc should formulate laws at the earliest before legalizing online medical sites
- 8) e.g. DocsApp, mfine, Practo etc. considering data privacy and confidentiality, end to end encryption as per HIPAA guidelines to make telemedicine a safe and sustainable practice.
- 9) Further studies are required mainly in the domain of patient reported satisfactory scores and cost effectiveness keeping in mind the Indian diversity.

- 10) India being a multi-linguistic country, language barriers can become a substantial matter in implementing this modality. Role of interpreters and its availability at remote places can become a plausible concern.

## 6. Conclusion

The COVID-19 pandemic has catalyzed an exponential increase in telemedicine usage. Telemedicine helps patients maintain access to care, conserves limited medical resources, and protects both OMS and patients from pathogen exposure especially to India's smaller towns and rural areas where there is a severe shortfall of doctors. Nevertheless, there is an expected learning curve that accompanies such a paradigm shift in the delivery of care. As such, this paper provides a guide of best practices to aid both OMS and patients to navigate this promising electronic tool in India. In addition, we provide an accessible schematic handout that can be given to patients before a telehealth appointment to help them prepare for the visit, for both setting up and performing physical exam procedures. Because telemedicine may have a role in oral and maxillofacial surgical care even after this pandemic, we are optimistic that these best practices can be helpful and relevant for the present situation and beyond.

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