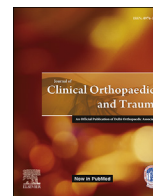




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Out Patient Department practices in orthopaedics amidst COVID-19: The evolving model



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ABSTRACT

Severe Acute Respiratory Syndrome COVID-19 was declared as a pandemic on 11th March 2020 by the World Health Organization and consequent lockdown imposed in several areas resulted in a marked reduction in orthopaedic practices. Although some guidelines for patient care in orthopaedic practice have been published, overall, publications focusing exclusively on guidelines on starting orthopaedic outpatient departments (OPD) after the COVID-19 lockdown amidst the on-going pandemic are lacking. We hereby propose the evolving knowledge in changes in OPD management practices for orthopaedic surgeons in the COVID-19 era. The emphasis on online registration (e-registration) should be given impetus and become the new norm supplemented by telephonic and spot registration for the uneducated patients. The review highlights the safety of patient and orthopaedic surgeons in OPD by screening and maintaining hygiene at various levels.

The article also mentions the duties of the help desk, OPD hall supervisor and the new norms of air conditioning, ventilation, safe use of elevators, sanitization of OPD premises and biomedical waste disposal. The optimum and safe utilization of human & material resources, DO's and DON'Ts for patients & health staff have also been proposed. The reorganization of plaster room, the precaution during plastering, fracture clinic, dressing and injection room services are discussed as per evolving guidelines. This article will also give deep insight into the OPD plan & telemedicine graphically.

The authors suggest updating and downward permeation of existing e-infrastructure of government health services that is up-gradation of existing tertiary level online registration services, a paperless model of OPD consultation & dispensation. The future updating of Aarogya Setu App (<https://mygov.in/aarogya-setu-app/>) for convenient online OPD registration and dispensation has been discussed and proposed. This review will help in containing the spread of COVID 19 and build upon the health gains achieved after lockdown. The easy concept of CCCATTT has been introduced, and the OPD Plan has also been suggested. We have endeavoured to holistically detail an orthopaedic OPD setup and its upkeep in COVID-19 pandemic, but since the knowledge of COVID 19 is ever-evolving it needs replenishment by regular education for health staff.

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1. Introduction

India and the rest of the world are going through a difficult,

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decisive and stressful phase of existence due to novel Severe Acute Respiratory Syndrome- SARS CoV2 (COVID-19) pandemic.^{1–3} In these unprecedented circumstances where COVID-19 pandemic has indiscriminately engulfed the world and as social distancing and limitation are essential tools to contain its spread; the outpatient healthcare model needs rebooting to prevent it from spreading further. In India, the number of active patients infected with novel coronavirus (COVID-19) is 41,472 with 2109 deaths.¹ Till

10th May 2020 total number of cases infected Worldwide with Corona virus is 4,122,994, out of which 1,451,630 recovered and 280,882 died of which 2019 deaths were reported from India with a death rate of 3.35%^{1,4} The high infectivity rate of COVID-19 has not only created a health emergency in most parts of the world but overwhelmed the existing health system of all countries alike. To avoid such a situation and to contain its spread, Social lockdown and physical distancing being practiced by India and most countries is probably the best prophylactic measure. The impact of the pandemic is so colossal that in these times all medical specialities have ceased to exist and there remains only one speciality and that is “COVID doctors”. In affirmation of the new role orthopaedic surgeons were and are manning frontline COVID-19 duties, but post easing of lockdown measures they will have to increase their outpatient dispensation (which are already running meagerly with limitations in time and census) to bring orthopaedic healthcare on track to pre-COVID era. Considering the fact that approximately 69% of COVID -19 patients are asymptomatic, its highly infectious nature and realizing that the disease may remain in society for a longer period of time, it is imperative that the Outpatient Department follows standard and universal operating protocols, so as not to lose the health gains of lockdown.^{1,5}

2. Method

A search on PubMed using advanced feature and using strategy: [#1 COVID 19, #2 Orthop*, #3 Outpatient, Final #4 (#1 AND #2 AND #3)] revealed only 13 papers. A similar search on Scopus and Cochrane library did not reveal any extra papers. After screening titles, abstracts and full texts, we selected 6 relevant papers for inclusion in this review.^{6–11} (Fig. 1). Besides these, we also considered guidelines provided by established Indian national (like Indian Council of Medical Research (ICMR), Emergency Medical Relief (EMR), National Centre for Disease Control (NCDC) and Ministry of Health & Family Welfare (MHFW), Government of India (GOI)) and International/External Bodies (like World Health Organization-WHO, Centers for Disease Control -CDC). Although some guidelines have been provided and experiences shared, overall, we could not find any paper focusing exclusively on guidelines/experience on starting OPD after the COVID-19 lockdown, amidst the ongoing pandemic. This issue has become even more important in the present time, as the lockdown opens. After reviewing all these papers and guidelines, we hereby outline the evolving knowledge regarding changes in outpatient practices for orthopaedic surgeons in tertiary care centers amidst COVID-19 pandemic but is versatile enough to be adapted for lower level centres with modifications (Fig. 2 & Fig. 3).

2.1. Returning orthopaedic OPD's functioning to the pre-COVID era

In order to gradually return orthopaedic practice to relative normalcy during COVID 19 Pandemic Pelt CE et al. have described four phases of response. Similarly, de Caro F et al. have reviewed the literature and guidelines by various bodies and proposed a multi-level gated approach for both the patient population and the orthopaedic team for safety.⁸ The approach describes different levels from 0 to 5 are as follows:

LEVEL 0: Screening of symptoms and testing of the orthopaedic team (Including physicians, nurses, administrative staff).

LEVEL 1: Routine self-questionnaire that routes the patients to the most convenient time slot.

LEVEL 2: Temperature screening before entering the clinic, symptomatic patients (cough, dyspnea) may be sent to the emergency; surgical masks should be provided to each patient.

LEVEL 3: Maintain social distancing, no crowded waiting rooms,

patients waiting in the car until they are called in.

LEVEL 4: Clinical visit made efficiently and swiftly; subjective history digitally recorded before entering the room.

LEVEL 5: Digital scheduling of follow-up visits and payment avoiding the exchange of documents.¹¹

3. Flow of Orthopaedics OPD (Fig. 2)

3.1. PRE-OPD/Clinic- (Decision to visit, registration and appointment)

First and foremost, the patient should decide that he/she has an orthopaedic problem significantly affecting lifestyle and locomotor function, and is not being relieved by rest. If one is not sure that the orthopaedic problem can be tackled at home or not, there are two options, one is to visit the hospital and the other better way is to contact the concerned telemedicine portal of the particular hospital for consultation. This will reaffirm his decision to visit the hospital in these times.

After the decision to visit the hospital has been made, the next step is to register; and the best way for the time being should be *Online Registration* at Hospital Portal. Patients should be encouraged to use this online facility by wide publicity on hospitals websites, hospital social welfare department and media. The hospital needs to *update its existing* online service or develop a *new* online registration portal which is convenient to use and multi-lingual. It should host basic services like:

- a) How to Fix an Appointment Online- Video presentation
- b) All in one basic FAQ (frequently asked questions) related to registration
- c) How to register and filling registration form (Table 1).
- d) Patients do's and don'ts while visiting the hospital (Table 2).

Even then there may be patients who are uneducated or have no access to a computer, smartphone or internet; the other options for these patients are:

- i) *Telephonic Registration*: Patients can register by phone advertised by the hospital or through the central helpline number. Patients will receive SMS replies for their registration.
- ii) A *Novel App* or *better*, the Existing Aarogya Setu App (<https://mygov.in/aarogya-setu-app/>) can be updated to allow for Hospital OPD Registration (like the online consultation facility for COVID patients/suspects already available on Aarogya Setu app via Aarogya Setu mitr)

2 C's must be followed by the patients while fixing an online appointment one should select a time which is '*Convenient*' so that he/she has ample time to follow safe anti-COVID measures, and the second most important is that the patient registers in the '*Correct; Out Patient Department (OPD)*' so as to avoid unnecessary intra-hospital/health care facility travel. The hospital portal may use artificial intelligence technology to automatically suggest to him the OPD he/she needs to visit for his complaint on filling the form, or a patient can take help from the General Toll-Free Helpline of the hospital to ask for the department he should visit.

4. Online OPD time slot allocation

We propose that the hospital should give Online Time Slots of 1 h each with a gap of 20 min; the time of which can vary from OPD to OPD as Physio-Therapy and Rehabilitation OPD will require more time for patient consultation and management. This avoids overcrowding and the buffer intervening time allows for some

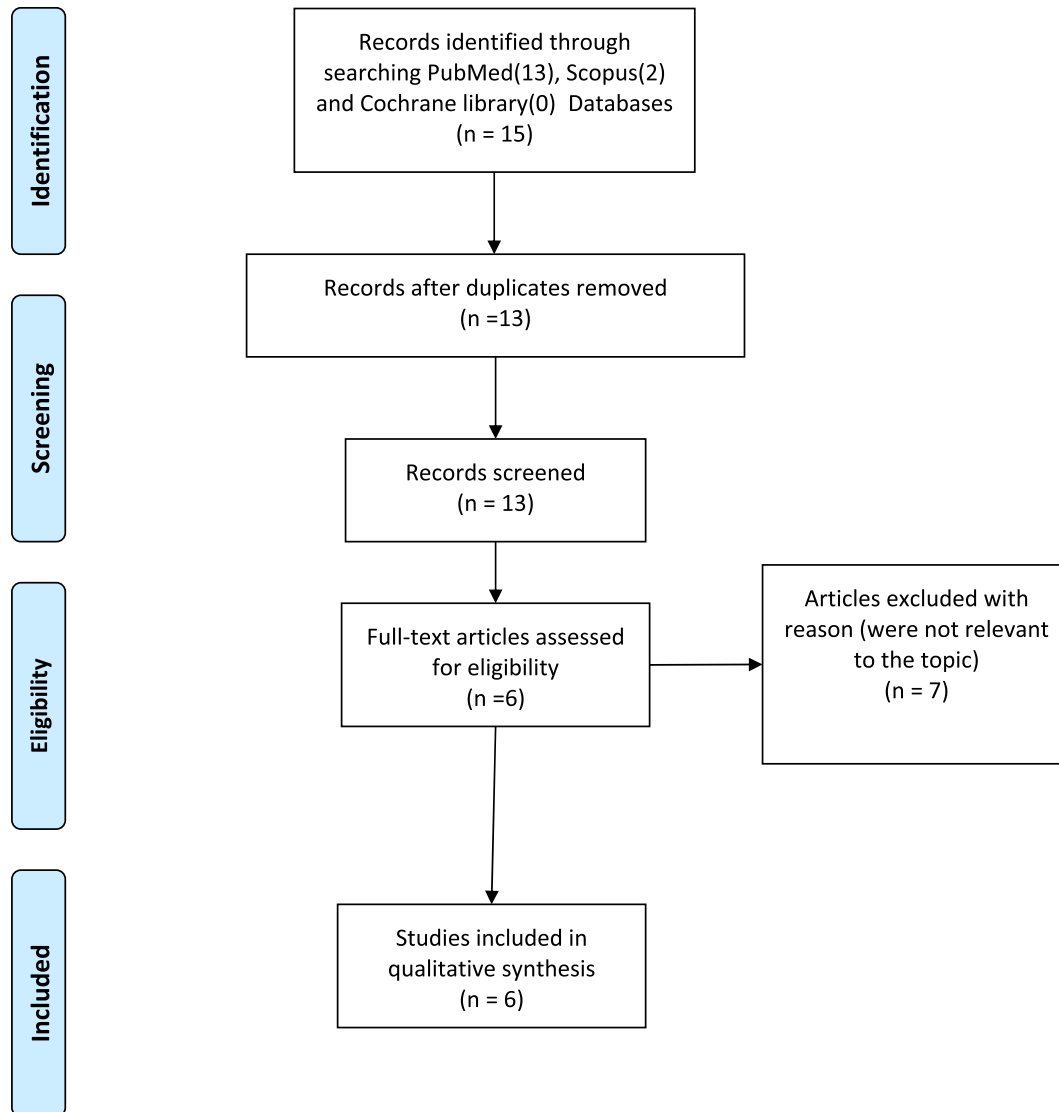


Fig. 1. Flowchart showing search and selection of articles.

overshooting of patient-doctor consultation and may be used for sterilizing the OPD premises. The number of patients should be restricted to 25 in a day per doctor (9 AM–3:30 p.m.), so the number of slots can vary according to the number of OPD Rooms and Doctors. (**Author perspective**)

[Each 12 by 10 feet OPD room that is approximately 3.65×3.04 square meter should allow 2 doctors (with computer tables) and 2 patients at a time maintaining a social distance of at least 1 m. At one end or better in the middle (dividing the room lengthwise) is stationed an examination table of 24–28 cms in a glass/aluminum/plastic sheet enclosure. (If rooms are smaller ($10 \times 10\text{ft} = 3.04 \times 3.04$ m) only one doctor and examination table or 2 doctors without an examination table are proposed as needed). So, if you have 6 rooms, keep 3 as buffers which are sanitized for next day use. 3 rooms will house 6 doctors, the number of patients to be seen per day is $6 \times 25 = 150$ patients. In an OPD from 9 am – 3 pm if consultation time is 8–10 min per patient – a doctor will spend $25 \times 10 = 250$ or approximate 4 hours of patient-doctor consultation. This with a 20 minutes interval after each hour for sanitization, nature call and lunch break equal to $20 \times 5 = 100$ minutes or 1 hour 40 min making a total of 5 hrs 50 minutes. This along with 20 minutes each

donning & doffing of mini PPE kit and sanitization protocol to be followed pre and post-OPD = 5 hrs 50 minutes + 40 min. equals 6 hours and 30 minutes of OPD timing from 9–4 PM]. (Fig. 4)

5. Online filling of OPD registration form pre-visit

The patient needs to fill a Registration Form as in (Table 1) correctly and follow the instructions given thereof when visiting hospital OPD. Every patient should upload his previous records (treatment and investigation) to the hospital site after taking an appointment. The site should unambiguously state which OPD of the hospital tackles to which health problem. It should inform the benefits of online registration over the physical system of registration at the hospital that is it maintains minimum contact with hospital staff, is faster, avoids fomite born spread of disease and will help in maintaining social distancing in crowded hospitals. Its duty of reception/help desk- OPD staff to arrange digital documents of the appointments for the day submitted online and transferred by central hospital portal (of registrations done through Aarogya Setu app and helpline).

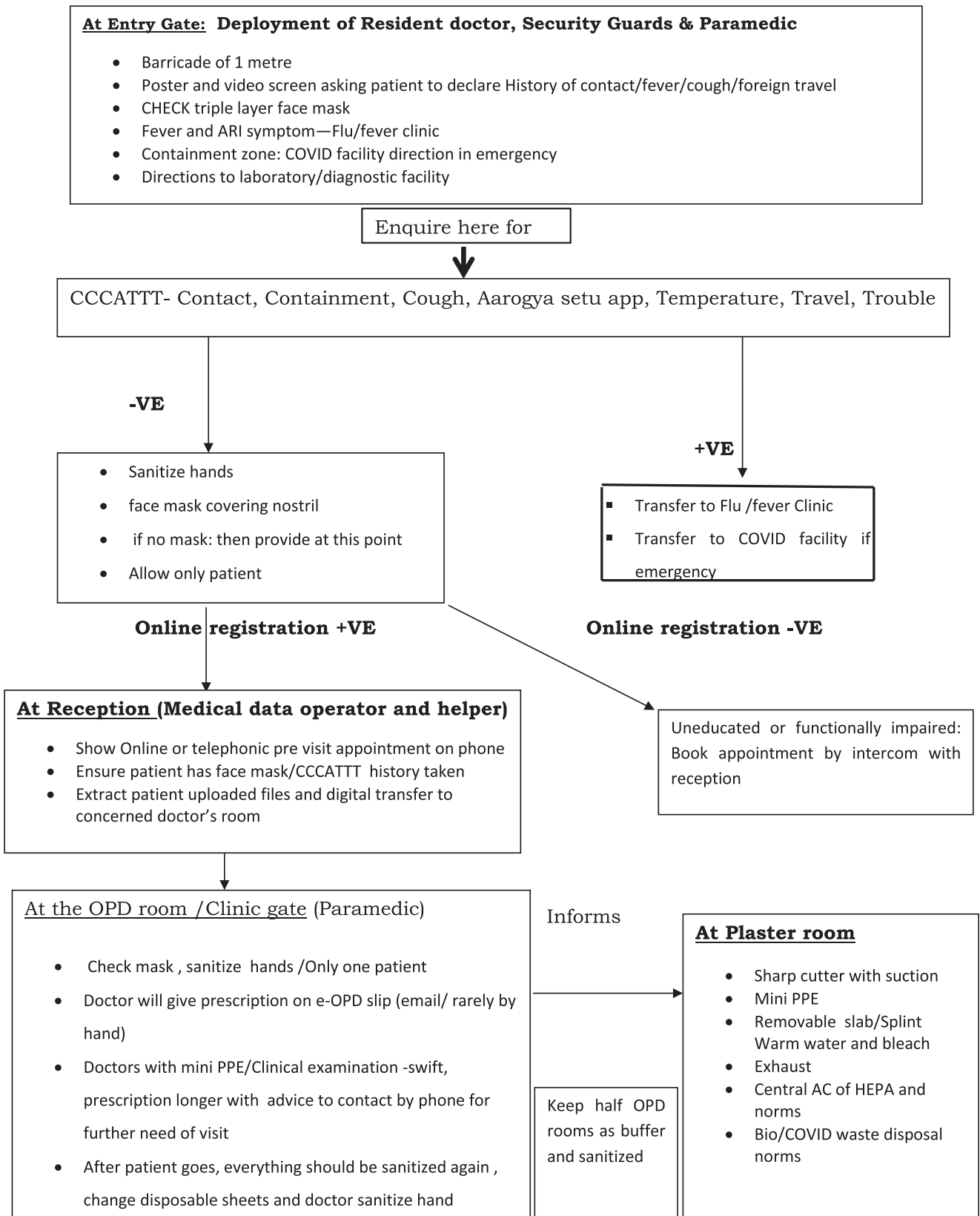


Fig. 2. The patient flowchart in the Outpatient department.

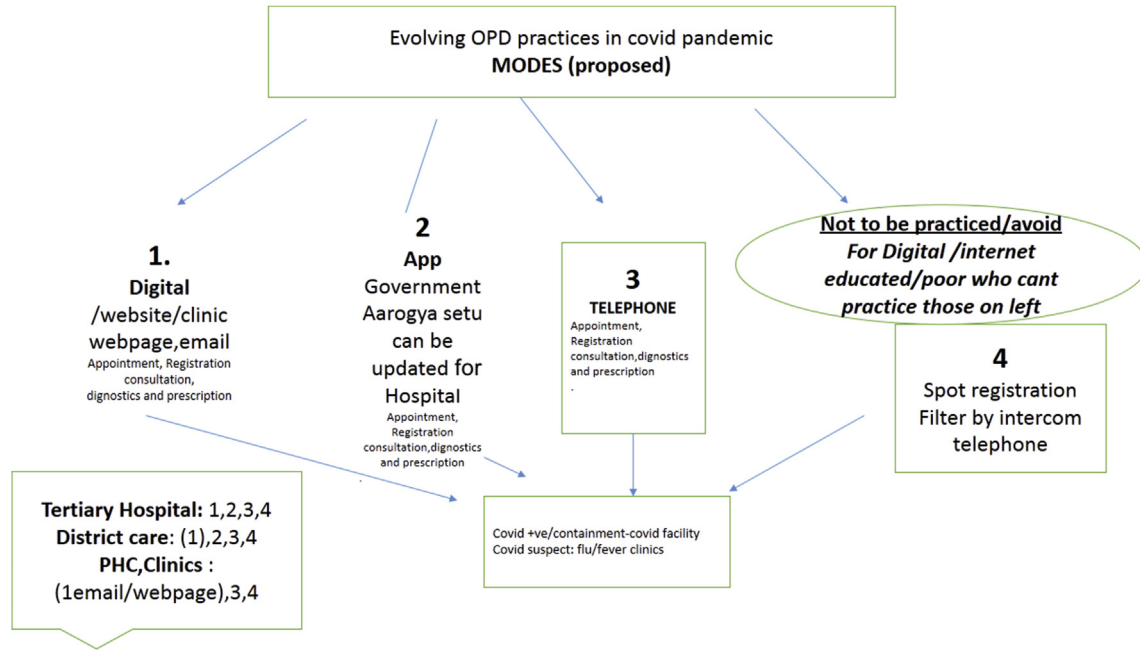


Fig. 3. Modes used in our evolving model –what fits which level of health care facility.

Table 1
Patient registration form.

Form to be filled online and uploaded at hospital web site at the time of booking an appointment

- 1) Name.....
- 2) Father,s name.....
- 3) Age.....
- 4) Sex.....
- 5) Address.....
- 6) Zone of covid stay as per government notification: Containment/Red/Orange/Green
- 7) Mobile no.....
- 8) Aarogya Setu Notification at home: Safe/Not safe
- 9) Department you want to visit.....
- 10) Have you consulted Telemedicine department of the hospital- Date/Advice
- 11) History of travel/contact with COVID-19 positive patient/coming from containment zone. (flu/fever clinic first).....yes/no (If yes please give detail)
- 12) Any history of severe constant chest pain or pressure, extreme difficulty breathing, severe constant light headedness serious disorientation or unresponsiveness—GO TO EMERGENCY
- 13) Fever, CHILLS sweating/difficulty breathing/new or worsening cough/sore throat/aching throughout the body/running nose/loss of smell/vomiting/diarrhoea or symptoms as notified..... yes/no. (if yes please give details -go to flu/fever clinic)
- 14) Whether your symptoms are such that it hampers your day today life. Yes/no
- 15) History of diabetes, high blood pressure, cancer, kidney disease or heart ailments.
- 16) Have you come in contact with COVID positive patient in last 14 days (flu/fever clinic consult)
- 17) Do you live in long-term care facility
- 18) Are you working in a medical facility in the last 14 days
- 19) Any previous investigation and treatment

(It is mandatory to download Arogya Setu app in your mobile before reaching to hospital)

6. Patient instructions on day of appointment

Each patient should visit the hospital after taking a hygienic bath, wears a triple-layered mask, disposable clean headgear/cap, preferably keep a handy(>70% alcohol) sanitizer, carry own food/ others medicines prescribed and come in clothes which can be sanitized & temporarily discarded for next 6 days (Table 2). They should be informed of the procedure of OPD visit by computer animation at the hospital website. Each hospital can customize their OPD animation according to their infrastructure for entry and safety measures. Patients must download the Aarogya Setu app. and check their status to be safe before visiting, in the queue and after leaving hospital premises. Containment zones and COVID

positive patients should attend hospital only in case of emergency and after the quarantine restriction of that area are lifted and that too at designated COVID points of the hospital, location of whose is made available by telephonic helpline and website.

7. Visit to the hospital

MAIN ENTRANCE – There should be a single separate entrance and exit (separated by at least 2 m for smooth patient flow, better to have them located diagonally or at ends of hall length or breadth) allowing one person at a time to the main OPD hall/Complex. The entrance should have installed thermal monitors, running video screens and posters on patient information – what health service

Table 2
DO'S AND DON'TS' of hospital OPD visit.

DO'S AND DON'TS for patients while visiting hospital
<ul style="list-style-type: none"> • Don't visit for minor ailments; use telehealth portal for consultation • Wear triple layer mask and preferably disposable head gear/cap • Bring registration e-slip number • Visit hospital only during time slot assigned for consultation • Check your date of appointment before coming to the hospital • Don't touch wall, door knob, shake hands, touching of elevator switch, power switch while visiting in hospital • Line up in queues at entry gate and follow social distancing • Bring your own food, essential medicine and water bottle and keep them in a plastic bag • Download and Use Arogya setu app before start and while in hospital premises • Visit with one attendant only if required. Hospital may not allow unnecessary attendant • Don't bring unnecessary file covers or paper • Upload previous diagnostic papers on hospital website at the time of registration • Make digital payments as far as possible • Carefully follow layout plan for hospital entry and exit gates • Don't make unnecessary travel in hospital premises • Don't lean over doctor while seeking consultation • Don't cough or sneeze over doctor. Maintain social distancing with your health care providers • Keep 1 m distance from doctor while consultation • Use health care facility number in case of an emergency • Keep your wallets and belt in private vehicles • Don't bring mobile phone or if necessary bring it in clean plastic wrap and keep it in silent/vibration mode • Sanitize mobile before and after hospital visit mobile phones (company guidelines) • Take hygienic bath before and after hospital visit • Wash clothes in bleaching powder solution after returning from hospital. Use the warmest possible water setting, as per items.(https://www.cdc.gov/coronavirus/2019-ncov/prevent-getting-sick/cleaning-disinfection.html) • Containment zones and COVID positive patient should attend hospital only in case of emergency and after the quarantine restriction of that area are lifted and that too at designated COVID points of the hospital, location of whose is made available by telephonic helpline and website • Patient with symptoms as in Table 1 should go to flu clinic/fever clinic first.

this OPD offers, it should clearly state in the bold form (bilingual) and audio format that patients with fever and Acute Respiratory Infection should visit the flu/designated fever clinic first.

The main gate is to be manned by security staff, trained paramedics and an MBBS resident with an erected fixed barricaded perimeter of 1 m by rope/removable tapes. It is proposed that personnel here should wear PPE consisting of water repellent surgical gown, triple-layer medical mask, headgear, face shield, waterproof shoe cover and gloves as they are *the first contact* and have to triage patients into COVID/suspect/non-COVID. This kit can be used for the whole day with proper repeated sanitization of gloves unless a mishap occurs. They will thermal scan each and every patient, ask for a basic history of CCCATT that is Containment zone, Contact with COVID positive patient, Cough, Arogya Setu app indication of himself and patients', Travel, health Trouble and Temperature.

Here they have to *filter patients into three* categories.

- a) *Containment zone and COVID positive patients* should have been directed to separate exclusive COVID facilities by helpline or telemedicine consultation and if still someone visits, they should be directed to it and reported immediately to local health authorities(Hospital management/CMO/Civil Surgeon-as per locality), as per EMR guidelines.
- b) *COVID suspected patients* with symptoms should be referred to designated flu/fever clinics.
- c) *the patients with no such history or symptoms*: These patients should stand/wait apart by (physical-social distance) 1 m in a queue, they should be allowed in the premises after they have shown their appointment -timing slot on mobile, are wearing proper three-layer mask above nostrils and have sanitized hand with foot operable wall-mounted hand sanitizer as per norms kept at the entrance. They should enter singularly to avoid overcrowding in the designated waiting hall/area. The entry of caregivers should be limited and the only patient is to be allowed into the OPD, but if needed one attendant (preferably

legal guardian in case of a minor and functionally impaired patient) be allowed to enter in the OPD with all precautions of wearing mask, proper hand sanitization and CCCATT clearance.

An intercom facility with the reception should be provided at the entry gate, this helps in case of digital-uneducated, functionally impaired or poor patients who have not been able to register online or by other means; they may be registered by the MBBS doctor on calling the reception. They can book a time slot of that day (if some appointment is cancelled) or some other day with the receptionist; hence a 2% buffer of such patients should be allowed without disturbing the load of the number of patients per doctor. This *should be rare rather than common*. The documents or investigation reports of such patients can be photo-digitized and transferred to reception with no touch technique by the doctor at the gate. No documents, folder or investigation should be allowed inside. (Patients in an hour will be approximately 30 of which 20 can be allowed as per the size of waiting hall maintaining 1-m social distance or 2–3 empty seats in between and the rest can wait outside in their private vehicle if possible).⁵

Two trolleys and wheelchair duly sanitized by 1% hypochlorite solution (a minimum 1 min contact time has been recommended by CDC for surface decontamination) with hospital attendant (PPE –as above since they may have to bring unscreened patients from the vehicle and be the first contacts) should be kept ready at the gate behind temporary glass/plastic partitions for non-ambulatory patients.

8. Reception

At the reception 2 medical data operator and a helper located 1 m apart, wearing a triple-layered medical mask and Latex examination gloves (termed "mini PPE" by us) are seated behind an easily cleaned smooth tabletop counter with glass partitions. At the OPD reception, the patient should first show his virtual time allotment/e-registration slip so that the reception staff can retrieve

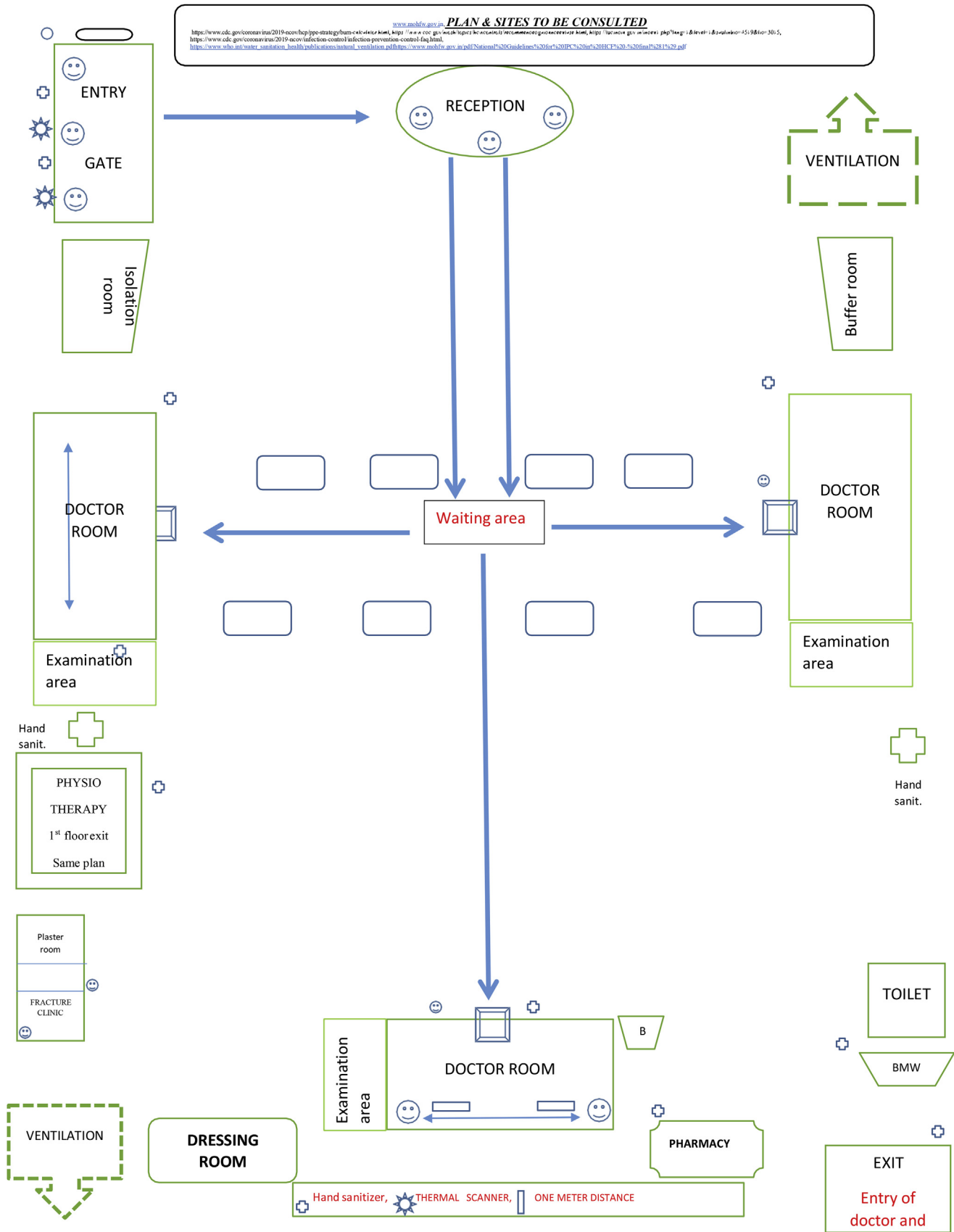


Fig. 4. OPD outlay.

his form and uploads for forwarding to the doctor. Besides this the receptionist have to complete and forward forms of patients who have done spot registration via intercom at the entry gate. Its duty of reception/help desk- OPD staff to arrange the digital documents of the online appointments and of registrations done through Aarogya Setu app and helpline(transferred by central hospital portal) a day in advance. After further ensuring that the patient is wearing a proper face mask above his nostrils, he/she should be directed to the designated OPD room/clinic or in the waiting hall.

9. Waiting outside OPD room/clinic

Each OPD room should *always* have a paramedical staff stationed at its door with mini PPE; these staff should be allowed to work in shifts of 6 h. The paramedic at this stage will check again the CCCATT status, and ensure that the patient is wearing a triple-layered mask. The patient's hand should be sanitized with 60–80 % alcohol solution for at least 20 seconds before entry in the room.¹² At this point only the patient should be allowed and in only exceptional circumstances (e.g. for non-ambulatory patients) one attendant may be allowed into the OPD with a face mask and hand sanitization. The patient and his attendant should be asked to maintain social distancing.¹³

10. OPD WAITING AREA- CENTRAL HALL

In OPD waiting area hand hygiene station should be installed, television (TV) screens should be installed to educate the people regarding signs and symptoms of COVID 19, hand hygiene, how to wear and make a homemade mask, social distancing, not to worry videos, and prevention & treatment of coronavirus, do's and don'ts and other health education videos. The OPD waiting hall should have a minimum number of furniture and instruments and that too should be adequately spaced. It is necessary to convert OPD air conditioner into a non-circulatory system this can be done by blocking off the return air vents of the air conditioner; additionally, an independent exhaust blower shall be installed to extract the room air¹⁴; the HEPA filter (HEPA filters shall be a minimum of H13 (EN1822-1) filter class or equivalent) of AC should be approved by the concerned authorities according to the norms. The OPD Hall should have a Trained floor supervisor (paramedic/support staff) who has two I's as duties (a) *infection control*-to ensure social distancing (1 m), no crowding, seats are properly spaced, and the OPD furniture and floor including computers, screens and keyboards are properly sanitized daily 3 hourly (twice in a shift of 6 h) or earlier in inadvertent spillage and (b) *Health Information-ensuring that patient information video and displays are running properly*.

There should be a security staff stationed in the OPD Hall for the help of patients and health staff. The toilets should be frequented one at a time, properly sanitized with 1% hypochlorite solution after every patient visit, and so should the drinking water facility by maintaining social distance¹The PPE for sanitary toilet cleaning is disposable rubber boots, gloves (heavy duty), and a triple layer mask¹.

11. Entry into doctor chamber

Doctors should have ready access to fill online forms and uploaded documents of patients on computer duly forwarded by receptionists. After seeing them the patient is called by a bell or patient digital display board or a single health staff operated token number system. The paramedic at doorstep should allow the patient whose consultation is complete to exit first and give an interval time of 3–5 min for doctors to get sanitized ready before

allowing the other patient inside the doctors' room. The bed sheet of the examination couch and anything contacted by a patient should be sanitized as per above norms.

Doctor and all staff in OPD must wear PPE kit (<https://www.mohfw.gov.in/orthopaedician>) consisting of triple-layer medical mask and Latex examination gloves. No aerosol-generating procedure (AGP) should be performed in OPD. Doctor and other staff should perform hand hygiene using proper technique¹⁵ and according to instruction known as My 5 moment of hand hygiene¹⁶ before donning and doffing of this mini PPE. Patients should be seated at a distance of 1 m and should be examined by a doctor swiftly behind a plastic curtain. The patients' body part may be cleaned by soap solution/spirit before examination at the table station discussed in the model above (Fig. 4). Before and after each patient's examination doctor should sanitize his hand with prescribed alcohol sanitizer and change gloves after every examination. The female patient may be examined in the presence of a sister with the above PPE. Only the digital-uneducated patients may be given OPD prescription slips by the doctor.

12. Diagnostics and prescription

The prescription and diagnostic test ordered may be paperless (as far as possible) with prescription emailed to the patient or sent by an app and to the hospital laboratory services. The investigations should be written which are essential for a particular patient. As the x rays & diagnostic films can be the source of infection it should not be handled. The hospital should have or develop a server/Picture Archive and Communication System (PACS) so that imaging and investigative procedures are available online to the orthopaedician. Teleradiology may be used for X rays, MRI and CT scan services. If PAC services are in developing stage, X Rays prescribed by doctors should be done hand to hand, this will limit the further visit of patients to the hospital for collection of films/reports and brought by staff (not patient) with due COVID precautions. *Entry to the diagnostic facilities in house* should be separate and all precautions as above in an OPD should be taken.

Patients should be prescribed a safe and longest possible period of medicine to avoid frequent visits to the hospital, with monitoring of adverse events to be done by teleconsultation as far as possible. Patients should be given health facility number in case of emergency and should be encouraged for teleconsultation for future problems. This all requires developing or updating an integrated hospital computer network with a fast server-broadband, robust secure bandwidth, enabling access to the patient investigations done in the hospital. Pharmacy in house should follow the same precautions as OPD and PPE recommended for pharmacists is triple layer medical mask, latex examination gloves and frequent sanitization over gloves.

13. Telemedicine

The World Health Organization defines telemedicine as *"The delivery of health-care services, where distance is a critical factor, by all health-care professionals using information and communications technologies for the exchange of valid information for diagnosis, treatment and prevention of disease and injuries, research and evaluation, and the continuing education of health-care workers, with the aim of advancing the health of individuals and communities."* A telemedicine visit has the advantage that it can be conducted without exposing the staff to COVID, and thus reducing the risks to both health care workers and patients. It can provide rapid access to medical practitioners, who are not immediately available, thus achieving the goal of quality care to all. In addition, it makes available extra working hands for providing physical care at the

respective health institutions. The CDC has also recommended changing outpatient practice patterns and specifically, they advise to “reduce unnecessary healthcare visits” and “explore alternatives to face-to-face triage and visits.” A major challenge during this crisis is to keep patients and the healthcare team safely distant while providing patients with effective and efficient care and Telemedicine is a logical solution to help address this challenge. Thus, health systems that are invested in telemedicine are well-positioned to ensure that with Covid-19 patients/suspects and those in containment zones also receive the timely care they need.^{7,9,17}

The basic details and an orthopaedic prototype teleconsultation has been depicted in Fig. 5 & Fig. 6 as per telemedicine practice guidelines, enabling registered medical practitioners to provide healthcare using telemedicine by the board of governors in super-session of the medical council of India.¹⁷ It is important to choose a telemedicine portal that is quite *simple* for the concerned health facility under the existing framework of law and medical ethics as: 1) for district-level hospitals it is patient to Registered Medical Practitioner (RMP) consult by audio/text and for tertiary care it is patient to RMP, RMP to specialist consultation via video/audio/text; alongwith the provision of teleradiology/telepathology/tele-orthopaedics services. There needs to be an efficient and well-connected telemedicine chamber (1–6 megabits/sec for video communications on phones and 25 megabits/sec for computers) with a recording facility for audio and video consultation at every hospital in the working hour.⁹ The main telemedicine chamber of the hospital should accommodate a general physician (MBBS or resident doctor/RMP) who can advise on general orthopedic problems (RMP to patient consult). If the patient's problems are beyond his medical capability, he can transfer the call to the concerned orthopaedic department which has its own local telemedicine facility manned by an orthopaedic surgeon (RMP to specialist consult). The patient should be explained clearly regarding the limitations of telemedicine and informed consent may be taken in this regard. The telemedicine will avoid overcrowding, unnecessary hospital visits and help in providing consultation to the COVID 19 positive cases & patients of containment zones. Recently the medical council of India has officially allowed and issued guidelines telemedicine practice in India.¹⁷ The technology used for telemedicine services carries the potential for abuse. Some of the risks, drawbacks and limitations can be mitigated through appropriate training, enforcement of standards, protocols, penalties and guidelines. It is suggested that initially, only audio or text can be used for telemedicine, and gradually as norms become clearer and get established, one can shift to video consultation. The field of teleradiology and telepathology services can be practiced from the beginning, under the hospital standard of care, as they are carried out in controlled environments by trained professionals, and therefore carry a lesser risk. Online consultation facility is already available for COVID patients/suspects on the Aarogya Setu app via Aarogya Setu mitr. It is suggested that a similar facility/app may be created to facilitate telemedicine in all specialities including Orthopaedics.

14. Fracture clinic & plaster room

In COVID era, more and more patients will be treated by old-established conservative methods; the number of plaster applications and removal will be more. All undisplaced fractures of the upper or lower limb should have proper plaster of Paris cast application and visit at the expected fracture union time. They should be instructed about the cast –precautions to be followed. Fractures which require reduction should be treated by standard orthopaedic conservative care and visit facilities at 3–5 days for

child and 7–10 days for adults for check reduction X-ray. The follow-up imaging should be performed *only* if it is likely to make a significant change to care. Next visit should be at 4–6 weeks in children and 6–8 weeks in adult, and then at the time of fracture union (thus a total of 3/4 hospital visits in displaced and 2 in undisplaced fracture). Stable spine fractures may be immobilized in a readymade spinal brace and spinal precautions explained. They may visit at 6–8 weeks at follow-up if need be and then at fracture healing. Unstable/spine fractures with increasing neurological deficit may need surgery and are not in the manuscript domain. Interim teleconsultation can be done when necessary.¹⁸ Relatively non-urgent plaster-like congenital talipes equinovarus cast can be avoided or delayed for long.¹⁹ Although guidelines are not specific the BOA has confirmed with NHS England that uses of a Plaster cutting cast oscillating saw is not considered an ‘AGP’ if used safely. The survival of the COVID-19 virus on casting materials has not been determined²⁰

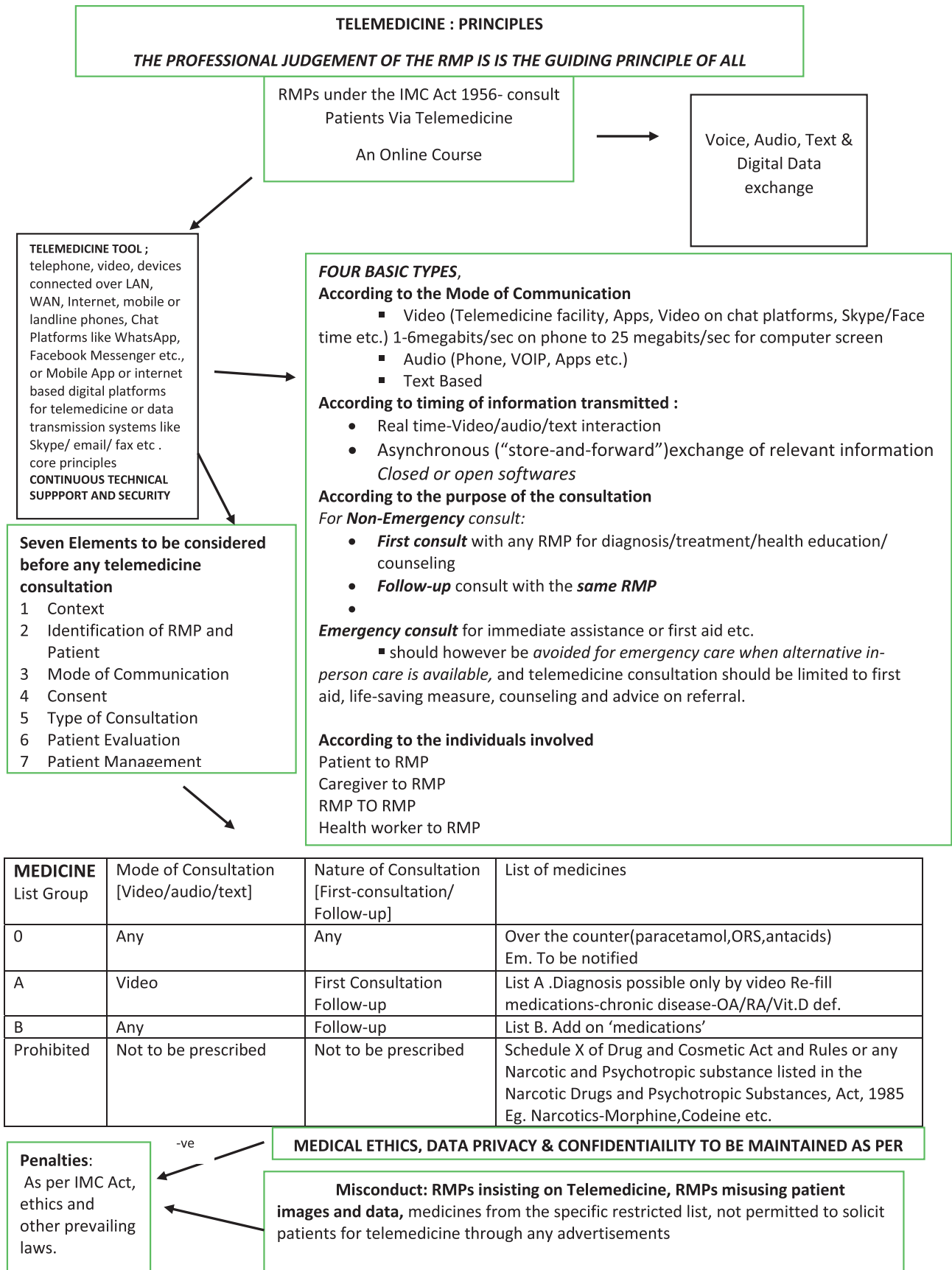
It is advisable to use methods which won't require the use of plaster saw for removal like removable splints, POP Slab and braces. POP should be the favourite material and fiber-resin cast may be avoided as they will need cutting with plaster cutting saw though a slab of synthetic material may be used. Warm water should be readily available for faster cast setting, the container holding it should be adequate in number and rinsed with a bleach solution after every plaster, *or better* it should be applied after wetting the POP bandage directly from faucet/tap. The paramedic standing out at the doctor's room can alert regarding the type of plaster advised by the doctor enabling him to be ready with raw materials before a patient visit.

Removal: As cast removal (both with and without a saw) is not considered an AGP, the Personal Protection Equipment (PPE) for cast removal should be recommended for patient encounters within 2 m. The guidance states that for both COVID positive and COVID unknown the plaster technician should wear Mask, (fluid resistant IIR type); Single-use apron and gloves & Protective eyewear. A POP cast can also be removed after soaking in water and unwinding, The British Society for Children's Orthopaedic Surgery (BSCOS) have created helpful videos on this.²⁰ The use of cast shears should be preferred oversaw. The removal of plaster should be done after donning of aforesaid PPE, the plaster blade should be efficient, heavy-duty, sharp for faster removal of cast and the system should have a suction mechanism to suck all cast-dust. The plaster room should have its own heavy-duty exhaust fan, a dedicated sanitation worker who sanitizes (1% hypochlorite solution for at least 1 min contact time) after every plaster and changes the disposable bed sheet. All dressing and pop are disposed of as per local biomedical waste norms after being sprayed by bleaching powder solution.²²

Cast removal in Covid-19 positive patients: Covid-19 positive patients or self-isolating patients should follow self-isolation guidelines (prevalent) and consult on the phone whether they can continue cast without any serious adverse/detrimental effects till they recover but while doing this it should be reemphasized upon them, the standard cast precautions they have to follow.

15. OPD infrastructure usage

It is suggested that only 50% OPD rooms may be utilized in a day. Every day when OPD is finished the hall, toilets and rooms should be sanitized with 1:9 dilution of 5% concentrated liquid bleach²¹ or 1% hypochlorite solution and closed for the next day and the next set of OPD rooms are utilized for the next day. A thorough cleaning should be done twice a day. Fogging is no longer recommended. Gloves and face shields should be disposed of in a red bag and disposable masks, gown, gloves and respirators in a yellow bag after use.^{1,22}



Penalties:
As per IMC Act, ethics and other prevailing laws.

←

MEDICAL ETHICS, DATA PRIVACY & CONFIDENTIALITY TO BE MAINTAINED AS PER

Misconduct: RMPs insisting on Telemedicine, RMPs misusing patient images and data, medicines from the specific restricted list, not permitted to solicit patients for telemedicine through any advertisements

Fig. 5. Telemedicine principles.

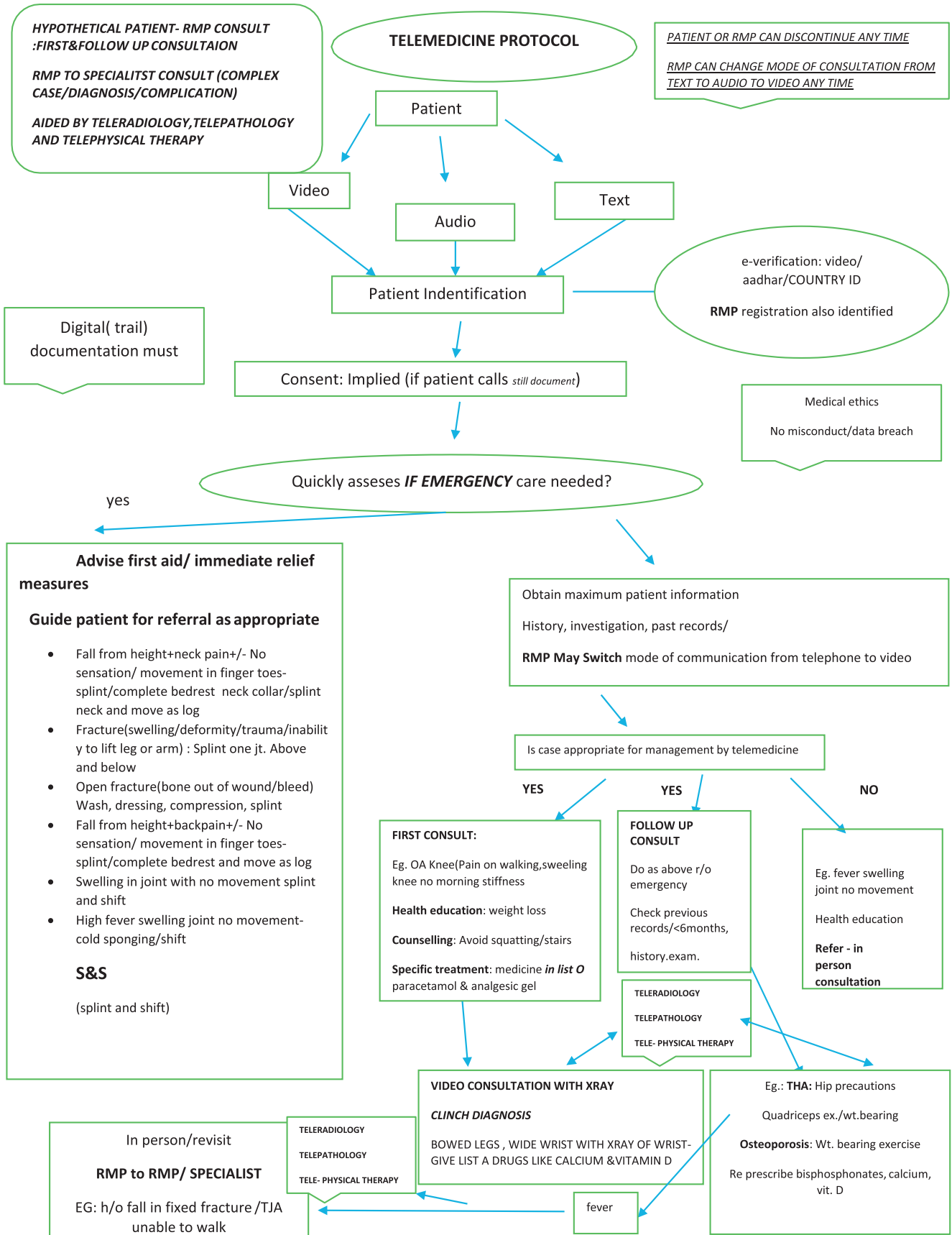


Fig. 6. Telemedicine protocol.

A roster may be made for doctors and staff, so that only 50% doctors and staff should be utilized to attend for OPD in the first 14 days. Remaining 50% should come to the hospital and be in reserve for any emergency, telemedicine, frontline duties (as some may be on leave, or quarantined) or backup. In the next 14 days, the backup team should attend OPD and the previous OPD team to remain for backup. The other alternative is to operate OPD in two shifts 9 a.m.–12 p.m. and 12:30–3:30 p.m. but it will expose all doctors of the center to risk at the same time in contrast to the above model.

The OPD hall should have ventilation of more than 6 air changes per hour and minimum hourly averaged ventilation rates of more than 40 liters/sec/patient with an adequate number of windows and exhaust fans.^{23,24}

16. Dressing and injection room

It should be sanitized as any operation theatre is, that is fumigated every night, each table should have disposable waterproof bed sheets, floor and table sanitized after each patient visit, the instrument and dressing autoclaved as per local hospital norms. The doctor/dresser should wear a mini PPE as at entry and patients should wear a gown and cap besides mask. The sister in charge should ask the patient CCCATT history and sanitize patient's hand. All staff should change dress and sanitize themselves and OT with 1% hypochlorite bleaching powder after every dressing. Intra-articular, soft tissue and perineural steroid injections should be avoided, whenever possible during the COVID-19 pandemic to reduce the risk of reduced immunity to viral exposure.²⁵

17. Physiotherapy

Lockdown period: Due to the ongoing shelter-in-place and stay-at-home restrictions in COVID pandemic the operational suggestions include:

1) To suspend all physical therapy treatments, except respiratory physical therapy in hospitalized patients; post-operative intervention to reestablish mobility and respiratory function; intervention after trauma with fractures; and intervention in the immediate post-acute phase of disabling heart disease and neurological patients (all with appropriate personal protective equipment as for doctor above); (2) to transform all non-essential treatments into a telerehabilitation modality (telephone or web-cam counselling) with the patient or caregiver.

Post lockdown: It is prudent to reassess in relation to the epidemiological evolution of the pandemic, the feasibility of reintroducing certain contact situations, but only in circumstances where the health of the patient could degenerate due to hypomobility or respiratory dysfunction. Guidelines by international professional bodies of physiotherapists are also available for further reference.²⁶

The OPD Set up and guidelines will remain the same as above for entry, reception and entry into the physiotherapy modality rooms. The physiotherapist should wear the same protection kit as worn above by an orthopaedician. Additional precautions that need to be followed are a) Patients coming for different physiotherapy modalities to be designated to specific rooms at reception to avoid crowding in the corridor/waiting hall. (b) In the physiotherapy section a maximum of 4–5 patients (1/cubicle/modality) may be allowed for electrotherapy, rehabilitation advice while ensuring adequate adequate personnel distancing. (c) Doctors may be encouraged to prescribe electrotherapy modalities selectively. (d) Physiotherapy protocols to be personalized and advised in such a way that repeat visits to the hospital can be avoided. Physiotherapy hand-outs for various conditions should be prepared. (e) Modalities need to be sanitized with 1% hypochlorite solution as per norms of

MoHFW after every use. (f) Home exercises are to be encouraged and patients should be guided to watch internet videos on a particular exercise. Disposable or easily sanitizable equipment and accessories should be used.

The above-proposed workflow if followed allows smooth functioning of OPD, but all may not go according to plan and there are bound to be *untoward* incidences and emergencies.

- 1) *Mask snaps*- Ready supply of face masks should be available.
- 2) *Cough and vomiting* – the ready availability of equipment & health sanitation worker trained in proper COVID19 sanitization technique
- 3) *Patient Behavior mismatch or dubious history* – A security guard and paramedic stationed to guide him to COVID facility or counsel him.
- 4) *Toilet/drain block*-trained plumber and sanitation worker ready with the kit.
- 5) *Oxygen supply and emergency tray* with trained anaesthesia residents of a pre-anaesthetic check-up room should be readily available in PPE Kit.
- 6) COVID19 positive/containment zones (*Red flag* patients) ingress despite all precautions: The patient should be immediately shifted to isolation room by an available resident who must be wearing a PPE kit (as proposed at entry and working in 2 shifts) all the time and immediately report to concerned local authorities (Hospital management/CMO/Civil Surgeon-as per locality), as per EMR guidelines. An alarm should be sounded or red light switched-on by the hall supervisor & the OPD should be immediately evacuated, sanitized and closed for the day. The future appointments should be informed of the local authority decision by the reception/help desks.

18. Mobile phones

The patient and health staff at the facility should minimize or avoid mobile phone use, use the intercom, perform handwashing after usage, and use of washable disposable covers/poly packs for mobiles should be encouraged. The mobile companies have recommended 70% isopropyl alcohol or Clorox disinfecting wipes for cleaning mobile phones in the off mode with mobile disconnected from all cables.²⁷

Elevator etiquettes(facing the wall inside the elevator, limiting the number of people to three in each elevator, waiting for the next elevator to avoid crowding, avoiding touching of the face after pressing the elevator buttons, washing or sanitizing hands after leaving the elevator, using the elbow to press buttons) should be followed.²⁸

Continuing Medical Education of staff and case review meetings with infectious disease specialists should be done regularly.

All mail and courier services being brought from outside is given to the Security I/C at the entrance and unnecessary footfall in the OPD is avoided.

Disclaimer

Knowledge and best practices about COVID-19 are rapidly evolving. This guideline is evolving and subjects to change with time with new evidence and guidelines. The guidelines here are being suggested as per recommendations of government and various national and global associations. International evidence-based holistic guidelines on resuming elective orthopaedic surgery are already available,²⁹ and also considerations for resuming orthopaedic surgery in the Indian scenario.³⁰ These guidelines offer suggestions to support and enhance care and safety of orthopaedic

outpatient and health staff at one place while reducing variation. All practicing orthopaedic surgeons are advised to read these guidelines carefully and follow updated health advisory available at government websites.

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Declaration of competing interest

No conflict of interest to be disclosed.

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