



THE IMPACT OF THE COVID-19 PANDEMIC DISEASE ON ORTHODONTIC PATIENTS AMONG SAUDI ARABIA POPULATION: A REVIEW.

*Abdulaziz Serar A. Alyami, Yazeed Ali Alsanie, Abdulaziz Mohammed Bushnaq,
Mohammad Misfer Mohammad Alkhathami, Fahad Naji Salem Almutlaq, Hadia Mohammed Alshammery,
Alotaibi, Shahanez Awed H., Reema Ali Alamri, Hezam Mohammed Mubarak Alqahtani,
Sulaiman Mughim Almughim

*Corresponding Author: Abdulaziz Serar A. Alyami

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ABSTRACT

Population quarantine and curfews were extreme measures that governments around the world had to implement along with a general context of preventive measures and policies to fight the COVID-19 pandemic. Governments focused on various public health policies such as social distancing, wearing a mask, frequent hand wash, and city lockdown as the only solution to contain the virus until the vaccine's availability. Dental practice is classified as a high-risk method of transmission and cross-infection because it involves close contact with the patient while examining the nose and pharynx, so the dental clinics were closed during COVID-19 pandemic. Dentistry forms an important part of our healthcare system, which has been severely compromised during the last COVID-19 pandemic, so appear the need of apply telemedicine into routine dental practice. Telemedicine of dental services is the remote facilitation of dental care especially orthodontic services. Telemedicine can be integrated into routine dental practice as it offers a wide range of applications such as remote triage of suspected COVID-19 patients for orthodontic following up and reducing unnecessary exposure to healthy or uninfected patients by reducing their visits to already overburdened dental offices. Telemedicine had significant effect on following up and assessment the orthodontic state among orthodontic patients under the COVID-19 pandemic disease.

KEYWORDS: COVID-19; Pandemic; Orthodontic; Saudi Arabia; Review.

BACKGROUND

In late 2019, an outbreak of a pandemic occurred in Wuhan, China and subsequently gained worldwide attention. During the epidemics like coronavirus and other infectious diseases, execution of infection control and prevention strategies becomes very important in the healthcare industry (Wang et al., 2019; Chughtai et al., 2020), particularly more important for worker's personal protection in health care settings (Chang et al., 2020). Workers in the health setting face a higher risk of exposing to infectious disease, including COVID-19. Therefore, it is necessary to ensure healthcare workers safety not only to protect persistent patient care but also to make sure that health workers do not transmit this virus. Spread of COVID-19 is expected through respiratory or cough droplets, from contaminated surfaces or with contact with bodily fluids.

World Health Organization (WHO, 2020) revealed that the SARS outbreak in 2002 had confirmed 8098 cases with 774 deaths in total. Among which workers in

healthcare settings accounted for 1707 (21%) cases (Chang et al., 2020). Along with other countries, Saudi Arabia is facing similar problems regarding the protection of healthcare workers.

As the coronavirus spreads globally becoming a worldwide pandemic, it is signaling the nations like the United States and the European countries that were badly prepared for the protection of healthcare workers. This lack of preparation is threatening in light of the inevitability that this global pandemic would emerge and the availability of guidelines past pandemics and outbreaks. In other hand, the hospitals were received a huge number of COVID-19 patients in different age stage and different of severity symptoms from asymptomatic to endotracheal incubate needing and Intensive care services, so the government was applied the quarantine in all the life aspect. So, the current review aimed to assessment the impact of the COVID-19 pandemic disease on orthodontic patients in quarantine period.

Dentistry forms an important part of our healthcare system, which has been severely compromised during the last COVID-19 pandemic. The need of apply telemedicine into routine dental practice.

Pandemic of COVID-19

In China country specially in Wuhan city the COVID-19 was identified in last month of year 2019. There 66.7 million cases were confirmed, and 1.53 million deaths was recorded as 6th December 2020 are worldwide, so there is no country in the world without COVID-19 cases were recorded. In many countries advertised the high emergency state and apply closing in all the vital field as marketing and education fields, as well as the COVID-19 is considered recent global pandemic according the World Health Organization (WHO) recently recommendations, as well as its classification as high spread virus infected disease from human to human by direct contact face to face especially by cough or indirect contact by solid surface especially metal and steel surfaces (Bernheim *et al.*, 2020).

COVID-19 is virus belong to corona family, so it is similar as severe acute respiratory syndrome (SARS) and Middle Eastern respiratory syndrome (MERS) which appeared in middle east area as Saudi Arabia (Cao *et al.*, 2020).

Primary COVID-19 was infected respiratory system in patients, which consider a vital system in patients, so its lead to death especially of patients with chronic disease as asthma condition. COVID-19 in patients with low immunity system cause respiratory system dysfunction and respiratory failure (Lee *et al.*, 2020).

All the scientific and research centers around the world start the hard research to collect information about novel infection disease can find a suitable treatment or vaccine (Huanget *al.*, 2020).

Today, different of literature studies and research of COVID-19 were recorded different characterize of COVID-19 clinical manifestation, between silent signs and symptoms up to fetal signs and symptoms such as who need endotracheal intubation (WHO, 2020; Thomas, Winning and Dickman. 2020).

In the Chinese Center of Disease Control and Prevention center that located in capital of China (Peking), the center reported there is 80 % of patients with mild signs and symptoms were appeared and don't need to admitted to hospital, but 15 % of patients were developed to moderate signs and symptoms such as pneumonia and respiratory dysfunction who need to admitted to hospital and 5% of patients with severe signs and symptoms who need to admitted to Intensive Care Unit (ICU) and used endotracheal intubation due to severe lung dysfunction, in addition to extrapulmonary organ failure and shock (Wu and McGoogan. 2020).

Also, the Chinese Center of Disease Control and Prevention center was reported the high mortality rate in the patients who admitted to ICU ranges between 30 to 70% (Thomas, Winning and Dickmann. 2020).

Many authors have studied that positive impact of effective policies and use of mask and respiratory on the safety and protection of healthcare professionals (Chughtai & Khan, 2020; Offeddu *et al.*, 2017).

Adams and Walls (2020) recommended the use of precautions like a mask, eye wears, gloves, and gowns while taking care of patients with respiratory symptoms for the protection of the healthcare providers. Also, Chughtai *et al.* (2020) observed the positive impact of using masks in protecting healthcare personnel from COVID-19.

Also, an Indian study assessed the efficacy the face mask/shield for protection against COVID-19 comparing to personal protection equipment (PPT) among the Indian hospital staff, the results showed the face mask/shield was effectiveness for protection against COVID-19 infection and can instead to PPT (Khan and Parab, 2020).

The Iranian cross-section study aimed to assessment the factors impacting on the personal preventive behaviors against COVID-19 among hospital staff (n= 761) based on protection motivation theory, the results the personal knowledge was direct effect on the staff awareness about protection behaviors (Bashirian *et al.*, 2020).

As the coronavirus spreads globally becoming a worldwide pandemic, it is signaling the nations like the United States and the European countries that were badly prepared for the protection of healthcare workers. This lack of preparation is threatening in light of the inevitability that this global pandemic would emerge and the availability of guidelines past pandemics and outbreaks. Reports suggested that doctors, nurses, and healthcare personnel were using damaged mask while taking care of patients (Mason & Friese, 2020). It was estimated that 3300 healthcare personnel were infected and 22 faced death because of inadequate protective equipment in China (Mason & Friese, 2020).

During pandemics and epidemics, healthcare workers were extendedly using and reusing respiratory and masks due to the shortage of products. However, this practice was criticized and recommend the single use of masks and respirators by healthcare personnel. Policies and guidelines must be developed to implement a robust respiratory protection program that ensures the use of respirator and masks. This would include selecting certified respirators, training and fit checks, inspection, and maintenance (Chughtai *et al.*, 2020).

Finally, a systematic review and meta-analysis study about effectiveness of used face mask for prevention of

spread of COVID-19 infection, by reviewed 84 articles from five main electronic data bases (CINAHL, Embase, Medline, PsycINFO and Global Health), the authors concluded the wearing of face mask was limited the spread of COVID-19 infection regardless the type, setting and who wears the face mask (Offei *et al.*, 2021).

Quarantine period

The ongoing spread of COVID-19 around the world shows a pivotal challenge for many nations. SARS-CoV-2 reached most countries around the world. While preventing the spread exhibits extreme challenges according to the world's health organizations, many regions had to develop and impose strict measures to control the virus's impact. Since the outbreak of COVID-19 discovered in Wuhan, the Chinese authorities had implemented historical tight and strict preventive measures, which included the shutdown of businesses and schools, mass lockdown of people and cities, restrictions on transportation and travel, building hospitals and health centers in few days, and testing modern technologies to trace all discovered cases in China. These massive responses and extreme measures applied with innovative and rigorous methods have caused a slow spread of COVID-19, which helped in decreasing infected cases considerably in China (Islam *et al.*, 2020).

Population quarantine and curfews were extreme measures that governments around the world had to implement along with a general context of preventive measures and policies to fight the COVID-19 pandemic. These measures were also implemented in Saudi Arabia; where a 24-hour curfew was taken place in the first months of 2020 in cities such as Jeddah (Salama, 2020).

Leaving China, the outbreak continues its rapid spread in other countries around the world, especially in the Kingdom of Saudi Arabia, the second biggest nation in the Arab world with a population of more than 35 million individuals. (Xiao and Torok, 2020). The Kingdom's healthcare services are generally offered for free to the public through the Ministry of Health (MoH), government-sponsored centers and hospitals, and military hospitals. In addition, the private sector has several networks and structures of for-profit healthcare establishments throughout the country. These establishments and the Kingdom's improved healthcare infrastructure helped in the preparation efforts (Algaissi *et al.*, 2020).

The Kingdom was among the first nations to implement unprecedented and early precautionary measures to stop the spread of COVID-19 into the Kingdom or control its impact in worst scenarios. These measures were followed before reporting the initial cases in the Kingdom in March 2020. The government established a national committee to follow the international updates and make preparations for the potential spread of COVID-19 from the first month of 2020. The committee hosted government ministers for Education, Health, the Interior, and other branches, and

sectors (Alkhalidi *et al.*, 2021).

In February, a month before the first case of COVID-19 in the Kingdom, the first response of the Kingdom's government toward the spread of the COVID-19 outbreak included canceling all flights between China and the Kingdom. The 27th of February witnessed the Kingdom's government suspension of all flight entries from international tourists and pilgrims, as well as monitoring all points of entry to Madinah and Makkah in the Hajj and Umrah season. By the 28th, the Kingdom banned inbound transportation from SARS-CoV-2 affected regions; these regions included even the citizens of Gulf Cooperation Council (GCC) who have been to affected regions. These early decisions helped to minimize the possibilities of SARS-CoV-2 spread into the Kingdom and prevented the spread of cases significantly to other nations. Nevertheless, despite these measures, the 2nd of March reported the Kingdom's first COVID-19 case in an individual coming through Bahrain back from Iran without stating the history of travel to Iran. The Kingdom's persistence in minimizing the devastating impact of this outbreak; as to curb this impact, the Kingdom completely suspended the two holy mosques in Madinah and Makkah and shifted universities and schools to virtual classrooms and remote learning (Algaissi *et al.*, 2020).

Digital and virtual health structures were rapidly activated and applied for many services including the "my health" application that allows individuals to seek medical assistance and receive prescriptions without having to go see a doctor or go to a medical center. These digital applications have been following the Saudi Vision 2030, which considers fundamental changes in the structure of healthcare services to meet the increasing demand for these services in Saudi Arabia. The Kingdom is among the countries that can be critically affected during the international outbreak due to the millions of Muslims visiting the Kingdom for Hajj and Umrah from all over the world (Saudi Vision 2030, 2016).

The Kingdom also began a widespread, local campaign of awareness in the early days of February; followed by calculated system-level suppressive procedures such as contact tracing and locking down once the first COVID-19 case was reported on March 2020 (Alkhalidi *et al.*, 2021).

Currently, the Kingdom uses the studies into individuals' perception of risk which is required to comprehend their behavior, response, and their application of individual-level steps like washing hands and wearing masks in case of a similar pandemic and its repercussions. Identifying the perception of risk helps to mitigate the devastating burden of morbidity and mortality and mitigate the Kingdom's economic losses. With the long preparations and time required for the population to be vaccinated against the virus and its emerging variants, addressing, and understanding individuals' behavior to decrease the

virus transmission and spread is fundamental to avoid the unavoidable lockdown enforcement and more spikes of new COVID-19 cases (Williams and Burgers, 2021).

Telemedicine

During COVID 19, community-wide mitigations were used by many countries. Companies were still working to obtain a vaccine. Governments focused on various public health policies such as social distancing, wearing a mask, frequent hand wash, and city lockdown as the only solution to contain the virus until the vaccine's availability. Also, COVID 19 has placed unmatched medical resources reduction and increased risk for occupational exposure for medical practitioners (Bokolo, 2020; Shokri & Lighthall, 2020). These extreme measures have led to the importance of using technology to maintain all life aspects (Hassounah *et al.*, 2020) such as information and communications technology (ICT) which will aid the best care delivery and reduce the risk of human to human exposure (Bokolo, 2020; Chauhan *et al.*, 2020).

Telehealth is a composition of information and communications technology that will ensure that the exposure is minimized, and at the same time, the delivery of the healthcare will be digitalized. Telehealth will provide safe, fast, and high-quality care; at the same time, it is beneficial for accessing the treatment under extreme circumstances such as crises in healthcare, disaster, and in outlying areas with no access to healthcare. The application of Telehealth provides patient consultation and advice regarding their health issues during the whole day using a webcam or smartphone with no need for physical contact, leading to avoiding the risk of infection and relieving congested clinical services along with the reduction in the use of medical resources such as the personal protective equipment (PPE). Telehealth can provide a remote assessment to conformed and suspicious COVID 19 patients. Additionally, it can provide care to non-infected patients, especially patients at high risk of infection, such as elderly patients with pre-existing comorbidities. So, the telemedicine is very important diagnosis tool through pandemic period as the COVID-19 (Bokolo, 2021; Kapoor *et al.*, 2020; Torous *et al.*, 2020).

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Telehealth is defined as “an application which is used to transfer medical data and information from one location to another using a communication medium (ICT), and it aims to provide expert-based medical care anywhere

health care is needed” (Hsu, 2019). The application of Telehealth provides patient consultation and advice regarding their health issues during the whole day using a webcam or smartphone with no need for physical contact, leading to avoiding the risk of infection and relieving congested clinical services along with the reduction in the use of medical resources such as the personal protective equipment (PPE) (Bokolo, 2021; Kapoor *et al.*, 2020; Torous *et al.*, 2020).

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Due to the transmission of viruses and increasing outpatient demands in health care settings, the need of developing an innovation strategy has become crucial (Alghamdi *et al.*, 2020; Rahman & Al-Borie, 2020). Thus, Centers for Disease Control and Prevention (2020) claimed that switching from direct patient services into virtual health care delivery might assist in managing effectively such contingencies. Taking the Covid-19 pandemic as an example, although the telehealth services in Saudi Arabia contribute effectively to care coordination during the pandemic; however, this service still does not meet the Saudi health care delivery expectation. Further studies are recommended on evaluating the telehealth use (Alghamdi *et al.*, 2020; Alsulame *et al.*, 2016).

Orthodontics

Orthodontics is a field of dentistry that is concerned with the study and treatment of dental malocclusions and jaw problems (malocclusion), diagnosis, prevention, and correction of misaligned bite patterns, which may be a result of tooth irregularity, or disproportionate jaw relationships (between the upper jaws). and lower), or both. He may also focus on modifying facial growth, known as orthopedic and dental surgery (Johnston *et al.*, 2015).

Abnormal alignment of the teeth and jaws is common. Approximately 50% of the population, according to the American Orthodontic Association, has a malocclusion severe enough to benefit from orthodontic treatment. : Although this number has been reduced to less than 10% according to the same AAO statement when referring to medically necessary orthodontics. There is a lack of solid scientific evidence for the health benefits of orthodontic treatment - a fact that academic journals and professional societies in the field of orthodontics have been slow to acknowledge. Treatment can take anywhere from several months to a few years and involves the use of braces and other devices to slowly move the teeth and jaws. If the malocclusion is very severe, jaw surgery may be used. Treatment usually begins before a person reaches adulthood as the bones can be moved more easily in

children (Al-Jewair *et al.*, 2018; Johnston *et al.*, 2015). Orthodontic treatment can only deal with the alignment of the teeth, or it can be by monitoring and adjusting the growth of the face and jaws. In the latter case it is better defined as "Dentofacial Orthopedics". Orthodontic treatment can be for purely aesthetic reasons in terms of improving the general appearance of patients' teeth, and it can be to rebuild and change the external appearance of the face (orthodontics changes the lower two-thirds of the face). Orthodontic treatment may be aimed at re-organizing oral functions such as speech, chewing and speech (Zhou *et al.*, 2014).

Orthodontic treatment: It is one of the fields of dentistry that is concerned with the study and treatment of dental malocclusions (malocclusions), which may be the result of irregular teeth, disproportionate jaw relationships (between the upper and lower jaws), or both. The duration of the traditional treatment ranges from six months to two and a half years, depending on the problems that the case suffers from. For difficult cases, jaw surgery may be required. Or, in some cases, dental retainers may be required to be worn two weeks prior to orthodontic placement, in order to create sufficient spaces between the back teeth for the placement of ligaments (Zhou *et al.*, 2014; Al-Jewair *et al.*, 2018; Johnston *et al.*, 2015).

Orthodontic appliances are divided into several sections as the following.

- **Fixed Braces**

Braces are usually placed on the front side of the teeth, but they can also be placed on the side facing the tongue (called lingual braces). Braces made of stainless steel or porcelain are attached to the center of the teeth using an adhesive. The wires are placed in a slot in the brackets allowing movement control in all three dimensions. Aside from wires, forces can be applied using elastic bands, and springs can be used to separate teeth or bridge a gap. Several teeth can be joined together using laces and different types of hooks can be positioned to allow an elastic band to be attached. Clear braces are an alternative to orthodontics, but there is not enough evidence to determine their effectiveness. It is the most widely used among the orthodontic devices, and a person cannot remove it on his own. It consists of brackets that stick to the outer surface of each tooth, and the abutments are connected to each other using wires (Wang *et al.*, 2018).

Fixed braces are often made of metal, but there may be other options, such as: transparent metal, ceramic braces made of ceramic, or metal braces fixed to the inner surfaces of the teeth. The time required to perform orthodontics varies from person to person, depending on the severity of the problem. the amount of room available the distance the teeth must travel; healthy teeth, gums and supporting bones; And the extent of the patient's commitment to follow the instructions. On average, however, once the braces are in place, they usually stay in place for one to three years. After the clasps

are removed, most patients will need to wear the retainer all the time for the first six months, and then while sleeping for many years (Yu *et al.*, 2013).

- **Mobile Orthodontic Device**

This brace treats small problems, such as: slight warping of the teeth and the problem of thumb sucking. This brace is not allowed to be removed except when eating or the need to clean the teeth or clean the device itself. Examples include straightening regulators, stabilizers, palatine expanders (Matei *et al.*, 2020).

- **Headgear**

An orthodontic headgear - sometimes referred to as an "out-of-mouth device" - is a treatment technique that requires the patient to attach a device to his or her head to help correct a malocclusion - usually used when the teeth are not aligned properly. Headgear is often used in conjunction with braces or other orthodontic appliances. While braces correct the position of the teeth, orthodontic headgear - worn or strapped as the name suggests - is often added to orthodontic treatment to help change jaw alignment, although there are some situations in which such a device can help move the teeth. Teeth, especially molars (Alharbiet *et al.*, 2019).

Whatever the purpose, orthodontic headgear works by applying pressure to clips through hooks, face brackets, coils, elastic bands, orthodontic metal bands, and other devices that fit directly into the patient's mouth. It is most effective for children and teens because their jaws are still developing and can be easily manipulated. (If an adult is provided with a headgear, this is usually to help correct the position of a tooth that has shifted after other teeth have been extracted.) Thus, a cap is commonly used to treat a number of jaw alignment or bite problems such as underbite (Li *et al.*, 2011).

The head gear or head belt is used outside the mouth, and this is often done in conjunction with the orthodontic to correct the problem of malocclusion, whose principle of operation is to generate pressure on the orthodontic through coils, hooks, orthodontic ties, etc., and gives the best results when the jaw is restricted. Growth for children and adolescents is no longer as common as it used to be, but it is not non-existent (Alharbi *et al.*, 2019).

- **Jaw Surgery**

Some cases of orthodontics require surgical intervention, which is to present or return the jaw (upper or lower) or both. So that the primary jaw surgery purpose is to repair severe malocclusion. The bone is broken during surgery and secured with titanium plates and screws (or bioabsorbable) to allow healing to occur. After surgery, regular orthodontic treatment is used to move the teeth into their final position (Olate *et al.*, 2018).

The most important disadvantages of orthodontic

treatment are the long treatment period, which sometimes extends to three years or more. So, orthodontic patients need several face-to-face sessions to following the development of teeth positions.

Effect of Pandemic Period on Dental appointment

Dental practice is classified as a high-risk method of transmission and cross-infection because it involves close contact with the patient while examining the nose and pharynx (Guidance for Dental Settings, 2020).

The World Health Organization (WHO) in a directive dated August 3, 2020 recommends prioritizing essential dental care and delaying non-essential dental procedures until there is a sufficient reduction in transmission rates of COVID-19. He also recommends that patients should be counseled on oral health through teleconsultation during a pandemic (Meng, Hua and Bian, 2020). Aerosols generated during dental procedures can settle to a distance of up to 100 cm with subsequent emergence of viruses ranging from 3 hours to several days, increasing the risk of disease. Therefore, dental services were limited to urgent and emergency procedures, with routine suspended Dental Care (Chuang *et al.*, 2014)

Patients who underwent dental treatment when the closure was announced were the hardest hit due to treatment interruptions and ongoing dental problems. Those who missed routine dental exams or neglected minor oral health problems had to either turn to home remedies or continue with previously prescribed medications (Ather *et al.*, 2020).

Telemedicine and Orthodontics

Telemedicine of dental services is the remote facilitation of dental care especially orthodontic services, guidance, education, or treatment by the use of information technology rather than direct face-to-face contact with any patient (Khan and Omar, 2013). Telemedicine is not a new concept and in 1994 the US Army started one of the oldest telemedicine projects to serve US forces around the world (Rocca *et al.*, 1999). Over the years, telemedicine has proven useful for remote dental examination, diagnosis, consultation, treatment plan suggestion, and following up orthodontic cases. It is found to be comparable to real-time consultations in areas with limited access to facilities, in school children, and in long-term health care facilities (Estai *et al.*, 2018).

Telemedicine therefore addresses the need for social distancing as called for by health authorities around the world to contain the spread of the SARS-COV-2 virus. Telemedicine can be integrated into routine dental practice as it offers a wide range of applications such as remote triage of suspected COVID-19 patients for orthodontic following up and reducing unnecessary exposure to healthy or uninfected patients by reducing their visits to already overburdened dental offices (Alabdullah and Daniel, 2018).

Telemedicine Subunits

1. Teleconsultation

Teleconsultation where patients or an orthodontic care provider seek advice from dental professionals using communications (Mariño and Ghanim, 2013). It has been useful for counseling patients with physical and intellectual disabilities, patients from aged care facilities and prisons (Spivack, 2020). It has been shown that teleconsultation reduces the number of referrals from primary health centers to senior centers by >45% (Bavaresco *et al.*, 2020). In the current COVID-19 pandemic, it may help patients continue their orthodontic during quarantine and lockdown.

2. Teliagnosis

Teliagnosis uses technology to exchange images and data for orthodontic (Lee and English). Using the EstomatoNet remote diagnostic software, patient referral to specialists decreased from 96.9% to 35.1% (Carrard *et al.*, 2018). Whereas the use of smartphones to orthodontic problem is good (Kohara *et al.*, 2018); It also serves as a reliable adjunct to screening for potentially orthodontic complications (Vinayagamoorthy *et al.*, 2019). The Mobile Oral Screen Anywhere (MeMoSA®) has been developed to facilitate assessment the orthodontic and has been found to be beneficial for patients with limited access to specialists (Haron *et al.*, 2020). Skandragah *et al.* evaluated a mobile tablet-based microscope (CellScope device) as an orthodontic screening. During the current COVID-19 pandemic, researchers from Brazil recently demonstrated the use of WhatsApp and telemedicine in performing the diagnosis of orthodontic state (Machado *et al.*, 2020). Since most orthodontic state are often directly evident, remote diagnosis can be made by dental photography thus reducing the need for careful clinical examination (Maret *et al.*, 2020).

3. Telecommunication

Telecommunication involves the safe, appropriate, and timely disposal of a patient's symptoms via a smartphone by specialists. It has been used for remote assessment of patients who require orthodontic care without unnecessary travel regardless of socioeconomic and geographic difficulties in many places (Estai *et al.*, 2020). Brucoli *et al.* The use of teleradiology has been suggested as a useful tool diagnosis the complications among orthodontic patients.

4. Telemonitoring

Telemonitoring of dental patients requires frequent visits of patients to the dentist to monitor the orthodontic improvement. The use of remote monitoring can replace frequent physical visits with virtual visits for regular monitoring of orthodontic outcomes and progression (Mariño and Ghanim, 2013). In a recent pilot study during this epidemic, telemonitoring appeared to be a promising tool in remote monitoring of surgical and non-surgical dental orthodontic patients, especially reducing costs and waiting times (Giudice *et al.*, 2020).

CONCLUSION

In the light of pandemic disease as COVID-19, the healthy quarantine and lockdown is an effective tool to prevent spread of COVID-19 virus infection, all the healthcare system was change results this lockdown includes the dental clinics, so the dentists used the telemedicine to management the oral and dental disorders. Orthodontic care depend on continues following up to assess the progression and improvement the teeth movement, telemedicine had significant effect on following up and assessment the orthodontic state among orthodontic patients under the COVID-19 pandemic disease.

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