

Comparison of the First Period of the COVID-19 Pandemic and the Current Situation in Ankara and İstanbul in Terms of Dentistry: Descriptive Research

Diş Hekimliği Yönünden Ankara ve İstanbul'da COVID-19 Salgınlarının İlk Dönemi ile Güncel Durumun Karşılaştırılması: Betimsel Araştırma

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ABSTRACT Objective: The purpose of this study is to examine the effect of the pandemic and the control measures implemented to contain it on the dentistry. The study also aims to identify the changes that have occurred in the field of dentistry and to compare the initial period of the coronavirus disease-2019 (COVID-19) pandemic in Türkiye with the present situation. **Material and Methods:** The study assessed a total of 424 patients, with the first group being evaluated in May 2020 and the second group being evaluated in November 2022. A record was taken of the patients, detailing when they were admitted, the reason for admission, their history of systemic disease, the number of people accompanying them, and whether they had any symptoms such as cough, respiratory distress, or nasal discharge. The information from both batches was then compared. **Results:** During the early stages of the COVID-19 pandemic, endodontic pain was the most prevalent complaint, followed by restorative issues such as tooth decay or tooth fracture. However, in the final stages of the pandemic, the most common complaint was about restorative issues. Temporomandibular joint disease was the second most frequent condition among the patients. **Conclusion:** While the number of patients who applied for dental care was low in the first period of the pandemic, the number started to increase again in the last period. It is thought that the COVID-19 pandemic may have caused an increase in temporomandibular joint disorders in individuals.

Keywords: COVID-19; dentistry; diagnosis; infection control; symptoms

ÖZET Amaç: Bu çalışmanın amacı, pandeminin ve kontrol altına almak için uygulanan önlemlerinin diş hekimliği üzerindeki etkisini incelemektir. Çalışma ayrıca diş hekimliği alanında meydana gelen değişimleri tespit etmeyi ve Türkiye'de koronavirüs has talığı-2019 [coronavirus disease-2019 (COVID-19)] salgınının başlangıç dönemini mevcut durumla karşılaştırmayı amaçlamaktadır. **Gereç ve Yöntemler:** Çalışmada 1. grup Mayıs 2020 yılında, 2. grup Kasım 2022 yılında olmak üzere toplam 424 hasta değerlendirildi. Hastaların hastaneye başvuru zamanı, hastaneye başvuru nedeni, sistemik hastalık öyküsü, hastaya eşlik eden kişi sayısı, öksürük/solunum sıkıntısı/burun akıntısı semptomlarından herhangi birinin olup olmadığı öğrenildi. Her iki gruptan gelen bilgiler daha sonra karşılaştırıldı. **Bulgular:** COVID-19 ilk döneminde en yaygın şikâyet endodontik kaynaklı ağrı idi ve bunu diş çürüğü veya diş kırığı gibi restoratif sorunlar izledi. Ancak COVID-19 salgınının son döneminde en sık şikâyet restoratif problemler iken, en sık 2. geliş sebebi temporomandibular eklem rahatsızlıklarıydı. **Sonuç:** Pandeminin ilk döneminde diş tedavisi için başvuran hasta sayısı az iken, son dönemde bu sayı yeniden artmaya başladı. COVID-19 pandemisinin bireylerde temporomandibular eklem rahatsızlıklarında artışa neden olmuş olabileceği düşünülmektedir.

Anahtar Kelimeler: COVID-19; diş hekimliği; tanı; enfeksiyon kontrolü; bulgular

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The coronavirus disease-2019 (COVID-19) is a recent infectious disease rapidly spreading worldwide. In December 2019, the Chinese authorities announced that the outbreak started in Wuhan, China.¹ On January 8, 2020, the Chinese Center for Disease Control and Prevention officially declared a coronavirus variant as the causative agent of COVID-19. The coronavirus disease was officially named COVID-19 by the World Health Organization (WHO) on February 11, 2020. On March 11, 2020, the WHO proclaimed this global pneumonia an international public health emergency.² Countries, such as Italy, the United Kingdom, and Spain, recorded high fatality rates, ranging from 4% to 8%.³ In Türkiye, the first COVID-19 patient was announced on March 9, 2020.⁴ By September 2022, the total number of confirmed cases of the virus was 643,875,406; including 6,630,082 deaths worldwide. In Türkiye, these numbers were 16,919,638 for active cases and 101,203 deaths, which were reported to the WHO.⁵ Severe acute respiratory syndrome-coronavirus-2 (SARS-CoV-2), a member of the coronavirus family, is the etiological agent of COVID-19. It is an enveloped RNA virus that causes severe respiratory insufficiency. This virus is different from SARS-CoV, although it does not target the same host receptor, angiotensin-converting enzyme 2.⁶

Different variants of the coronavirus have emerged.⁷ The increase in active cases and deaths has resulted in mandatory quarantine and home isolation in many countries, which have greatly affected the daily and working lives of the population.

The COVID-19 virus primarily affects the respiratory system and then the gastrointestinal tract. The main clinical signs appear after five days.⁸ Most patients experience a dry cough, fever, shortness of breath, myalgia, and/or fatigue.^{8,9} The severity of the disease is higher in patients with underlying conditions, especially hypertension, diabetes, and ischemic heart disease.¹⁰

The virus is known to be transmitted through direct contact of the mucosa with saliva droplets, aerosol production from the mouth and nose (i.e., sneezing or coughing), inhalation, swallowing, or spatter.¹¹ The

virus can easily spread, as it can survive on hands, objects, or surfaces for up to nine days.^{12,13}

Individuals who work in dentistry or visit dentists may have a higher risk of contracting the coronavirus. Dentists are advised to take various personal protection measures and avoid or minimize procedures that produce droplets or aerosols. Apart from the close contact involved in dental practice, the characteristics of the dental environment further enhance the risk of infection among dentists and patients. Therefore, there is a need for strict and effective infection control protocols for dental applications.¹⁴ On March 17, 2020, the Ministry of Health of the Republic of Türkiye recommended that non-emergency dental procedures be postponed as much as possible. For a long time, most dental clinics in Türkiye offered only emergency dental treatment such as root canal treatment, tooth extraction, and abscess drainage. In the first period of the COVID-19 pandemic, fewer patients visited clinics because of restrictions on going out and concerns about contracting the virus. However, due to the prolongation of the process, routine dentistry procedures were resumed in dental clinics.

The goal of this study is to examine how the COVID-19 pandemic and its control measures have affected the field of dentistry. It also investigates the changes in dentistry and compares the first period of the COVID-19 pandemic in Ankara and İstanbul to the current state of dentistry. This is one of the first descriptive studies conducted on dental patients during the COVID-19 outbreak.

MATERIAL AND METHODS

Patients from the Faculty of Dentistry at Başkent University Hospitals in İstanbul and Ankara, Türkiye, were involved in this study. This study was approved by the Institutional Review Board and Ethics Committee of Başkent University (date: April 13, no: 20/58). All procedures for this research followed the provisions of the Helsinki Declaration and national law. Explicit informed consent was obtained from all patients who participated in the study.

The data for this research was collected and recorded at two distinct stages during the COVID-19

pandemic. The first batch of data was taken during the initial stage of the COVID-19 pandemic in May 2020. While the second batch was taken in November 2022. After the collection, the data from these two periods were compared.

In the first period of the pandemic, an examination was carried out for the complaints of the patients who applied to the hospital. Radiographs were taken if needed. Afterwards, symptom-oriented treatment was given. In the last period of the pandemic, routine clinical and radiographic examination was performed. Panoramic and intraoral radiographs were started to be taken.

A form containing the information to be recorded for this study was created. This form was filled by the doctors who first examined the patients who applied to the Oral Diagnosis and Radiology Department in both hospitals. Afterward, all forms were collected and evaluated for this study.

The data recorded in the form was as follows: The arrival times of the patients to the hospital and admission to the departments; patients' fever measurements before entering the hospital; the reason for admission; history of systemic diseases; number of people accompanying the patient; history of travel abroad in the previous 14 days; contact with COVID-19 cases in the previous 14 days; signs of COVID-19 (such as fever, cough, fatigue, vomiting, dry mouth, and dysfunction of the sense of taste); pain score; a procedure performed; and end time. All patients were contacted by phone after 5 to 7 days, and their dental complaints after treatment and any COVID-19-related complaints were recorded.

The arrival times of the patients at the hospital and admissions to the departments were recorded in the Nucleus system (Monad, Turkey).

The obtained data were analyzed using descriptive statistics with a statistical software program (SPSS 21; IBM Corp., Armonk, NY, USA).

RESULTS

During the initial phase of the COVID-19 pandemic, 112 patients participated in the study, 54.5% female and 45.5% male. Their average age was 44.97±16.89

years, ranging from 18 to 84 years. Of the 112 patients, 15.2% were aged 65 or older. Of all the patients, 19.6% had a systemic disease such as diabetes mellitus, cardiovascular disease, or rheumatological disease. Additionally, among patients 65 years of age or older, 52.9% had a systemic disease.

During the last period of the pandemic, 312 patients participated in the study, 43.9% female and 56.1% male. Out of them, 30.4% were aged 65 or older.

Age-related application numbers of patients aged 65 are shown in Figure 1 for May 2020 and November 2022.

During the initial phase of the COVID-19 pandemic, at least one person accompanied 35% of all patients, and 58.8% were 65 or older. At least one companion accompanied 49% of the patients in the last period.

During the initial phase of the COVID-19 pandemic, most (90.3%) patients without a companion were under 65. The complaints reported by 79.5% of the patients met the criteria of emergency cases (American Dental Association).¹⁵ Most (91.3%) patients referred to the dental clinic for non-urgent reasons were under 65.

During the initial phase of the COVID-19 pandemic, the most common complaint (50.9%) was endodontic pain in nature. The other reasons for admission were restorative, periodontal, and temporomandibular problems, respectively, from high to low. Following these, dry socket and orthodontic complaints were equally common. 1% of the patients had no complaints. In Figure 2, the reasons for the

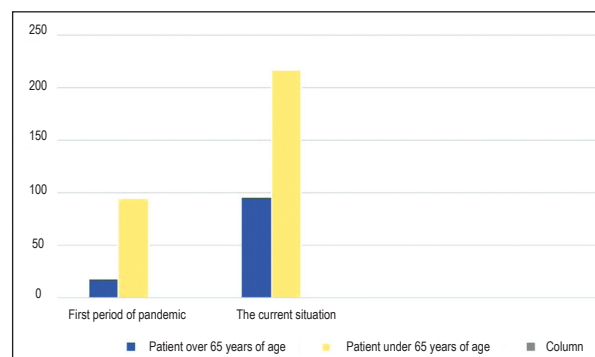


FIGURE 1: Age distribution by age 65.

admission of the patients are shown with their percentages.

Of the patients with endodontic complaints, 50.9% were female and 49.1% were male. Furthermore, patients referred to the dental clinic for urgent reasons were 53.9% female and 46.1% male. The median treatment duration was 15 minutes (9-147 minutes). After the treatment procedures, 89.3% of patients reported that they no longer had any complaints.

Fever (>37.2 °C) was not identified in any patients. None of the patients had complaints of symptoms such as dry mouth or dysfunction of the sense of taste. Two patients reported complaints of coughing and shortness of breath and were referred to the COVID-19 department of Başkent University Hospital with no dental procedures performed. During the follow-up evaluations by phone, one patient, a health-care worker known to have had possible contact with suspected COVID-19 cases, was reported to have tested positive for SARS-CoV-2.

In the last period of pandemic, restorative issues were the most frequently reported complaint in the data collected during this period. Temporomandibular joint disease was the second-most frequent condition among the patients. In ascending order, the other reasons for admission to hospital were endodontic, periodontal, prosthetic, and malocclusion. The median treatment duration was 22 minutes.

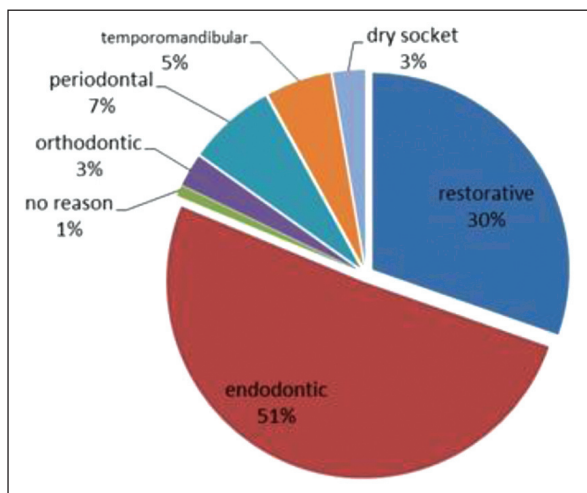


FIGURE 2: Rates of patient complaints admitted in May 2020.

TABLE 1: Comparison of the complaints of patients admitted to the hospital.

Complaints of patients	May 2020 (n=112)	November 2022 (n=312)
Restorative problems	34	96
Temporomandibular joint disorders	6	77
Endodontic problems	57	63
Periodontal problems	8	39
Prosthetic problems	-	25
Malocclusion	3	12
Dry socket	3	-
No complaint	1	-

Table 1 shows patients' complaints in the first period of the COVID-19 pandemic and the last period. In the follow-up evaluations by phone, it was discovered that the SARS-CoV-2 test of 19 patients was positive.

DISCUSSION

Current information suggests that people of all ages can become infected with this new infectious disease. However, it is known that the mortality rate among older adults is much higher due to underlying chronic diseases and drug use.¹⁶ When the first and last period of the pandemic were compared, it was observed that there was a change even in the patient age profile. Although all these risks exist, in this study, the patient's average age was 44.97±16.89 years for the first period of the COVID-19 pandemic. Also, 15.2% of patients were 65 years of age or older. When the first and last period of the pandemic were compared, it was observed that there was a change even in the patient age profile. In the last phase of the pandemic, the number of patients over 65 who applied to our hospital increased. This could be because people over 65 were ordered to stay home in Türkiye in the first phase.¹⁷ An analysis of the relationship between systemic diseases and age showed that 19.6% of all patients had at least one systemic disease, such as diabetes mellitus, cardiovascular disease, or rheumatic disease. This rate rose to 52.9% in patients aged ≥65 years. In addition, in this study, 54.5% of the patients referred to the dental hospital were female, and 45.5% were male, which is

consistent with Yu et al.¹⁸ However, the number of male patients who applied to the clinic in the last period of the pandemic was higher.

SARS-CoV-2 is so contagious that, on average, one infected individual can transmit the virus to 2 to 3 other individuals (reproduction number R_0 2-3).^{19,20} Researchers have suggested that to reduce the R_0 , infected individuals should be isolated, and adequate infection control measures should be taken.²¹ However, asymptomatic cases are likely to be missed, which poses a significant problem. Because there is a long incubation period during which the infected person remains asymptomatic. The incubation period of SARS-CoV-2 is estimated to be between 2 and 14 days.²²

Waiting areas in dental hospitals are fields with a high probability of contamination between the patient and their attendants. Therefore, it is considered necessary to minimize the number of people in or around the waiting areas and take physical distancing measures. In our study, 35% of the patients were accompanied by at least one companion. This percentage rose to 58.8% in patients aged 65 years and older. But in the last period, at least one companion accompanied 49% of the patients. This increase was thought to be due to the number of young people who applied for the last term. Because the number of companions was high among young and old individuals, given that older patients often need someone to help them, their companions should be asked to wait outside, or younger patients should be encouraged to come to dental appointments alone. Because of the prolonged survival of SARS-CoV-2 on surfaces, special modifications to the design and setup of holding areas are required to reduce cross-contamination.²³ All unnecessary items must be removed from the waiting rooms, including nonessential furniture and magazines. Physical distancing must also be ensured with spaces of 2 m between seats in the waiting area.

A previous study reported that fever was the most common clinical symptom, observed in 98% of patients diagnosed with COVID-19.²⁴ Other studies have shown that a loss of taste and taste alteration are common in COVID-19.²⁵⁻²⁷ The American Centers for

Disease Control and Prevention have included ageusia/dysgeusia as an early symptom of COVID-19.²⁹ Fever was not discovered in any of the patients in our study; hence, there were no patients who were not admitted for treatment due to fever. There was also no change in taste in any of the patients.

In line with the findings of Yu et al., symptomatic irreversible pulpitis was the most common emergency condition in this study during the first phase of the COVID-19 pandemic.¹⁸ Endodontic treatments during the pandemic were risky because inhalation of airborne particles and aerosols produced during dental treatments in patients with COVID-19 could potentially expose dentists to the virus. Therefore, most patients with non-urgent conditions were advised to use medications and postpone treatment until the COVID-19 pandemic was contained if, in the meantime, their complaints subsided in the first term of the pandemic. Only 6 patients were referred to our hospitals again due to persistent complaints.

Similar to this study, Ergüven et al. reported that although a prominent decrease was noticed in the number of general dental treatments, there was a major increase in the prescribing rate during the quarantine period.²⁹

A study in the United Kingdom reported that simple extraction (49.1%), advice only (12.4%), extraction (12%), surgical extraction (5.9%), prescription only (9.4%), and other methods (11.2%) were used for the management of patients when COVID-19 was at its peak.³¹ Ergüven et al. study, which supports this study, also showed that most dental procedures are related to surgery.^{29,30}

In the first and last period of the pandemic, dental procedures have also changed. After the recommendations of the Ministry of Health of the Republic of Türkiye regarding the postponement of non-emergency dental procedures, the importance of triaging patients increased. Only 79.5% of the patients referred to our hospitals met the urgent or emergency care criteria established by the American Dental Association.¹⁶ Majority (91.3%) of patients referred to our hospitals for non-emergency reasons were under the age of 65. This might be due to the curfew imposed on people over 65 in Türkiye.

In the last period of the COVID-19 pandemic, we examined patients who had urgent and non-urgent dental complaints. All dental procedures were performed in both of our hospitals.

However, recently, the most prevalent application complaint has evolved into restorative issues. In addition, the number of patients presenting with temporomandibular disorders has increased considerably in the last period compared to the first period of the COVID-19 pandemic. The change was thought to be caused by bruxism, which is a result of increased stress due to factors such as quarantine and reduced socialization during the pandemic.

Another surprising result was that while no one applied for prosthetic reasons such as prosthesis fracture or tooth deficiency in the first period, this number was high in the last period.

Studies have shown that aerosols with a particle size of $<5 \mu\text{m}$ can be borne over distances of up to 1 m.³¹ One study reported that SARS-CoV-2 could survive in aerosol particles for up to three hours, increasing the possibility of airborne contamination.²⁴ However, another study found no viruses in air samples collected from a real clinical setting treating symptomatic patients.³² Therefore, more studies are needed to ascertain how long a virus suspended in the air is viable.¹² In any case, healthcare workers in close contact with symptomatic and asymptomatic COVID-19 patients are at a higher risk of SARS-CoV-2 infection. A clinical study showed that 29% of 138 hospitalized patients with COVID-19-related pneumonia in Wuhan, China, were healthcare workers.³³ Particularly, dentists are at high risk because several dental procedures involve the production of large volumes of aerosols, which may be directly inhaled. The risk is particularly high because dentists may care for patients who have been infected but are asymptomatic. Therefore, dentists and other dental care workers must take extra precautions during the COVID-19 pandemic. Dentists must implement preventive strategies, perform appropriate patient placement, and practice scrupulous hand hygiene. It is also important to shorten the treatment time as much as possible and work with 4 hands to reduce the production of aerosols. In our study, the me-

dian treatment duration was 15 minutes during the first period. The duration increased in the last period of the pandemic. We thought this was because there were fewer patients in the first period, and no intraoral radiographs were taken. Another reason for this might be that while prescribing was very common in the first period of the pandemic, dental treatments were scarce.

As previously stated, the patient who tested positive for SARS-CoV-2 was a healthcare worker known to have been in contact with suspected COVID-19 cases. No aerosol-producing procedure was performed on this patient; the total examination time was under 10 minutes. No COVID-19 findings were observed within the next 14 days in the dentist or his assistant, who performed the treatment in the first period. However, thirteen COVID-19 findings were observed within the next 14 days in the dentist and his assistant, who performed the treatment during the last period of the pandemic.

To reduce the risk of infection, sufficient ventilation, appropriate personal protective equipment, such as masks, gloves, goggles, face shields, gowns, coveralls, head covers, and rubber boots, advanced filtration, purification, and decontamination systems, and antimicrobial mouth rinses before procedures are recommended. As respiratory droplets are the main transmission route, particulate respirators (e.g., N-95 masks, FFP2 standard) are advised for routine dental practice.¹⁴ Infection isolation rooms, such as negative pressure rooms, should be used. It is also important to provide clear and easy-to-follow instructions to manage dental patients and protect dentists and other personnel.

During the COVID-19 pandemic, all dentists in our hospital were equipped with face shields, masks, goggles, gloves, and gowns. Dentists performing periodontal, surgical, and aerosol-producing procedures used disposable N95 masks, caps, and shoe covers. Additionally, hydrogen peroxide and iodine are the most recommended preoperative mouth rinses during the pandemic.³⁴ We asked patients to gargle before examinations or treatments to reduce the number of microbes in the oral cavity and the aerosols produced during dental procedures.

The measures implemented during the first period of the COVID-19 pandemic are still in place. Since the pandemic, using mouthwash and N95 masks has become a regular part of our daily routine.

The COVID-19 vaccination is one of the methods of combating the pandemic in our country as well as globally. Exactly what percentage of individuals need to be vaccinated to achieve social immunity against COVID-19 has not yet been revealed. Community immunity refers to the decreased likelihood of disease transmission among individuals when a significant portion of a vulnerable group has become immune to an infection, whether through previous infections or vaccination. As a result, people lacking immunity are less likely to become infected.

Protection against the disease typically takes a few weeks to develop after receiving the vaccine. It is now known that a vaccinated individual can transmit the virus to others if they are infected. Therefore, it is important to continue taking precautions even after getting vaccinated.³⁴

The present study has potential limitations. First, the sample size was relatively small. As we compared patient admissions during a specific period, the number of clinic applications was lower in the pandemic's first period than in the last period. Second, data from only 2 hospitals was used in this study. Thus, further studies with larger samples and data from different cities and hospitals in Türkiye must compare the situation during and after the pandemic.

CONCLUSION

In dentistry, there have been changes in both the patient profile and the procedures during the pandemic. Working conditions of dental staff have improved. The number of patients who applied to be part of the

study in the first period of the pandemic was less than in the current period. The COVID-19 pandemic may have caused an increase in temporomandibular joint disorders in individuals.

Dental treatments during the COVID-19 outbreak pose a particularly high risk. Attention should be paid to appointments with older, high-risk patients. Their appointments should be arranged if possible, when they are less likely to encounter other patients and their relatives. It is also important to keep examination and treatment times short and rearrange waiting rooms. Moreover, teledentistry should be used for patient triage and follow-ups. It is necessary to prepare for other waves of COVID-19 and to expand the measures taken in the current waves until most of the populations are vaccinated, and new measures should be taken based on scientific data.

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Conflict of Interest

No conflicts of interest between the authors and / or family members of the scientific and medical committee members or members of the potential conflicts of interest, counseling, expertise, working conditions, share holding and similar situations in any firm.

Authorship Contributions

Idea/Concept: Reşat Batuhan Çetiner; **Design:** Reşat Batuhan Çetiner; **Control/Supervision:** Hazal Karşoğlu; **Data Collection and/or Processing:** Reşat Batuhan Çetiner, Hazal Karşoğlu, Kağan Deniz; **Analysis and/or Interpretation:** Hazal Karşoğlu; **Literature Review:** Hazal Karşoğlu; **Writing the Article:** Hazal Karşoğlu, Kağan Deniz, Mehmet Özgür Özemre; **Critical Review:** Kaan Orhan, Mehmet Emre Özemre; **References and Fundings:** Kaan Orhan; **Materials:** Hazal Karşoğlu.

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