

# Impact of COVID-19 pandemic on pediatric dentistry treatment procedures

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## Abstract

**Aim:** The SARS-CoV-2 (COVID-19) pandemic has forced pediatric dentistry to limit clinical procedures due to children's role in spread of the virus and transmission routes in pediatric patients. In order to minimize contamination and cross-infection risk, dental examinations and treatments had been postponed and patient admission protocols rearranged. This study aimed to evaluate the effects of pandemic on the number of patients admitted and treated in the pediatric dentistry clinic of a university hospital in the one-year period following the March 2020 global pandemic declaration.

**Methodology:** The study included pediatric patients aged 0-14 years admitted to a pediatric dentistry clinic of a faculty of dentistry between March 2019 and March 2021 in order to compare and make a retrospective evaluation of the one-year time intervals before and after the pandemic announcement in March 2020. Children were divided into the age groups 2-6 and 7-14. Evaluation parameters were chosen as examination, radiograph (panoramic and periapical), fissure sealing or topical fluoride application, compomer, composite filling, pulpotomy, root canal treatment, prefabricated crown, tooth extraction, and space maintainer.

**Results:** The results of the study showed a statistically significant decrease in monthly average number of examinations after the declaration of the pandemic regardless of age and gender ( $p < 0.001$ ). In both age groups, there is a proportional decrease in pulpotomy, composite filling, fissure sealant or topical fluoride application, root canal treatment, compomer filling, prefabricated crown procedures during the pandemic compared to the pre-pandemic, while the number of filming procedures increased proportionally ( $p < 0.001$ ).

**Conclusion:** Dental clinicians were advised to take on more radical treatment options during the pandemic. Further studies are needed to examine the effects of the statistical decrease in the number of procedures in the field of pediatric dentistry and treatment services on long-term community oral health.

**Keywords:** COVID-19 pandemic, dental treatment, pediatric dentistry, retrospective study

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## Introduction

On January 30, 2020, the World Health Organization (WHO) called the novel coronavirus (2019-n-CoV) a public health emergency of international

concern after the rapid global spread the deadly virus and on March 11, 2020, the organization declared a pandemic which has had devastating consequences all over the globe ever since (1-3). The virus is transmitted by direct inhalation of droplets in close contact with

infected people who have respiratory symptoms such as coughing and sneezing, droplet contact with mouth and nose mucosae or eyes (2, 4, 5), and by indirect contact with surfaces in close proximity of the infected person or with objects used on her/him (6). Considering the transmission modes, it is accepted that the specific procedures of dental treatment services, which include face-to-face contact with patients, frequent exposure to saliva, blood, and other body fluids, and the use of sharp instruments may lead to an elevated infection risk (2, 4, 5). It has been reported that since the first confirmed case in the pediatric age group, a clearly-defined pediatric transmission pattern in children has not been established (7, 8). However, it is accepted that the disease often progressed asymptotically in children who, as silent spreaders, may thus play a major role in viral transmission (7).

After the declaration of pandemic, institutions providing oral and dental health services in some of the affected countries were completely closed, while in others, minimum treatment, and only for emergency cases, were provided (9). However, certain countries continued offering routine dental services even during lockdown periods. In Turkey, after a period of full lockdown, dental emergency classifications were developed, and services resumed under heightened safety measures.

All national and international guidelines and reviews have urged that dental treatment services during lockdown be provided only in emergencies defined by authorized institutions (1, 10-21). In all pediatric dentistry guidelines, emergency cases include severe toothache, abscess causing localized pain and swelling, dentoalveolar trauma, and patients receiving radiotherapy and chemotherapy. In the triage stage, it was recommended that symptoms associated with emergency dental incidents should be alleviated first by the use of analgesics and antibiotics (22). When symptoms cannot be contained without further action, treatment procedures that require minimal intervention and minimum time with the least aerosol generation and number of sessions are recommended (7, 23-28). In pediatric dentistry, alternative treatments that offer non-invasive and minimally-invasive methods have been used for quite a long time. It is generally accepted that such alternative treatments technically produce minimum aerosol and are more suitable during the pandemic.

In the literature, there are studies reporting a significant decrease in inpatient admissions due to strained hospital capacity during the pandemic, transmission risk, and the cancelation of appointments by health institutions (29-32). However, few sources have been found in this regard in the field of dentistry and especially in pediatric dentistry (26, 33).

Therefore, the aim of this study was to present an evaluation of patient visits and treatment procedures provided at the Department of Pediatric Dentistry, Ankara University Faculty of Dentistry, between March 2020 and March 2021, and a comparison of data from a year earlier and an assessment of the changes. The null hypothesis was there would be no differences before

and during pandemic in terms of preferred treatment procedures in pediatric dentistry.

## Materials and Methods

The ethical board approval required for the study was obtained from Ankara University, Faculty of Dentistry, Institutional Review Board (No:14/05, 2020).

The present retrospective study makes a comparative investigation of patients 0 to 14 years of age who visited the pediatric dentistry clinic of a faculty of dentistry between March 2019 and March 2020, and March 2020 and March 2021, and the numbers of treatment they had received.

Children were divided into two groups for the ages of 2 to 6 and 7 to 14. The treatment procedures are determined as pulpotomy, composite restoration, glass ionomer cement, tooth extraction, fissure sealant, topical fluoride, root canal treatment, compomer restoration, mineral trioxide aggregate (MTA) application, prefabricated crown, space maintainer, and radiography.

## Statistical analysis

Data analysis was performed using IBM SPSS Statistics (IBM Corp. IBM SPSS Statistics for Windows, Version 25.0. Armonk, NY, USA) Parametric test assumptions (i.e., normal distribution and homogeneity of variances) were investigated using Kolmogorov-Smirnov, and Levene tests, respectively. Descriptive statistics for continuous variables were shown as mean  $\pm$  SD. Differences in continuous variables between groups were examined by the Mann-Whitney U test. A p-value less than 0.05 was considered statistically significant. However, the Bonferroni correction was applied for each possible multiple comparisons in order to control Type I error.

## Results

The total number of examinations by age, gender, and time periods are given in Table 1. Table 2 shows the average number of examinations per month in terms of age, gender, and time intervals and the comparison of the related data. The results showed a statistically significant decrease in the monthly average number of examinations during the pandemic compared to the pre-pandemic figures, regardless of age and gender ( $p < 0.001$ ). There was no statistically significant difference between boys and girls in terms of the number of average monthly examinations, regardless of age and time periods ( $p > 0.05$ ). In addition, regardless of gender and time periods, the monthly mean number of examinations was found to be statistically significantly higher in children aged 7-14 compared to children aged 2-6 ( $p < 0.01$ ).

Table 1. Total number of examinations regarding age, gender, and time periods

	Girls	Boys	Total
<b>2-6 years</b>			
Before pandemic	2606	2676	5282
During pandemic	1177	1280	2457
Total	3783	3956	7739
<b>7-14 years</b>			
Before pandemic	7499	7574	15073
During pandemic	3156	2938	6094
Total	10655	10512	21167
<b>Overall</b>			
Before pandemic	10105	10250	20355
During pandemic	4333	4218	8551
Total	14438	14468	28906

Table 2. Average number of examinations per month adjusted for age and gender

	Girls	Boys	p-value †
<b>2-6 years</b>			
Before pandemic	40.1±26.4	41.2±23.8	0.692
During pandemic	19.6±26.8	21.3±28.5	0.939
p-value ‡	<0.001	<0.001	
<b>7-14 years</b>			
Before pandemic	72.1±24.8	72.8±25.4	0.684
During pandemic	32.9±34.9	30.6±35.5	0.455
p-value ‡	<0.001	<0.001	
<b>Multiple comparisons ¶</b>			
Before pandemic	<0.001	<0.001	
During pandemic	<0.001	0.006	

Data were shown as mean ± SD. † The comparisons between the girls and the boys within each age and period subgroups. ‡ The comparisons between before- and during the pandemic within each age and gender subgroups. ¶ The comparisons between age groups within each gender and period subgroups. § Mann Whitney U test, according to the Bonferroni Correction a p-value less than 0.0125 was considered as statistically significant.

Table 3 presents comparisons of the proportion of each procedure to all procedures made before and during the pandemic. Figure 1 shows the proportions of treatment procedures to all procedures administered before and during the pandemic in age groups in the

form of a cumulative column chart. In the 2-6 age group, a proportional decrease was observed during the pandemic period in topical fluoride, fissure sealant, MTA application, pulpotomy, compomer restoration, composite restoration, root canal treatment,

prefabricated crown procedures, while the proportion of radiographs increased ( $p < 0.001$ ). In the 7-14 age group, there was a proportional decrease during the pandemic period in topical fluoride, fissure sealant, MTA application, pulpotomy, compomer restoration, composite restoration, root canal treatment, prefabricated crown, space maintainer procedures, while the proportion of tooth extractions and

radiographs increased ( $p < 0.001$ ). Pre-pandemic tooth extraction in the 2-6-year-old group was higher than the 7-14-year-old group ( $p < 0.001$ ), whereas during the pandemic tooth extraction was higher in the 7-14-year-old group than the 2-6-year-old group. There was no statistically significant difference between the two groups ( $p = 0.159$ ).

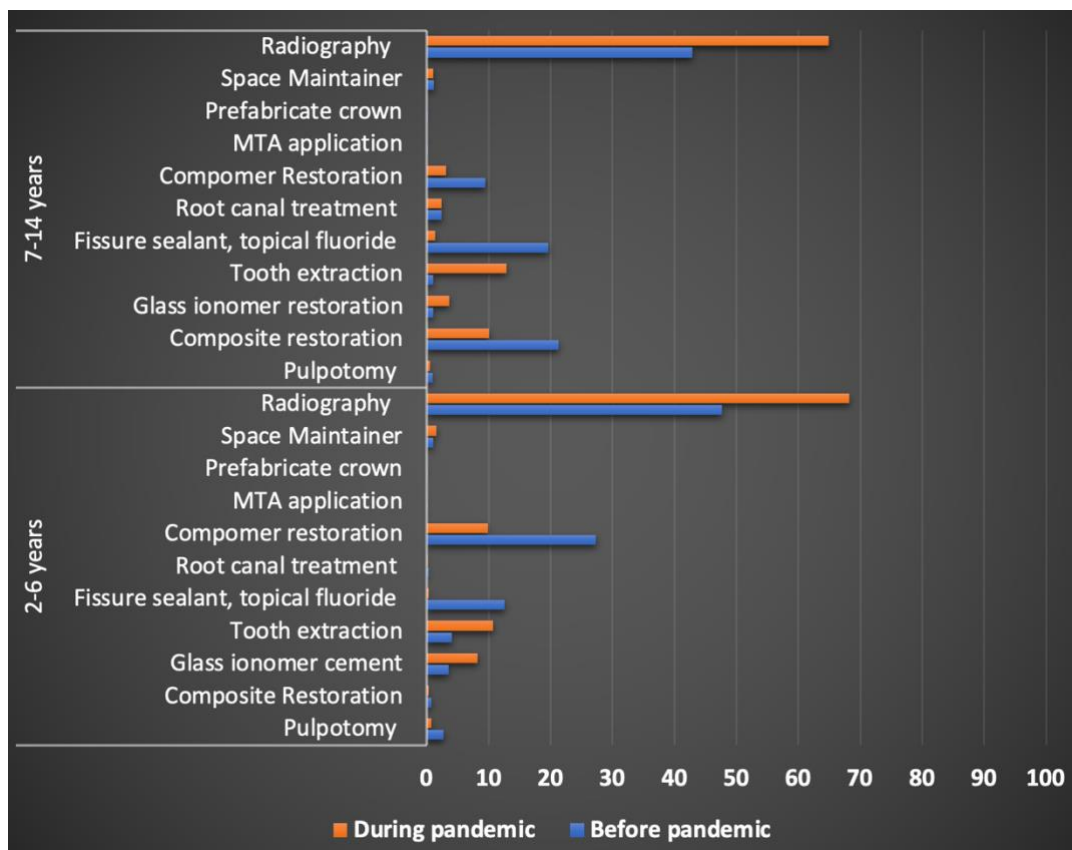


Figure 1. The proportion of each procedure to all procedures made before and during the pandemic

Table 3. The rates of each procedure by age and period in total procedures

	Before pandemic	During pandemic	p-value †¶
<b>Pulpotomy</b>			
2-6 years	2.66±2.10	0.70±1.72	<0.001
7-14 years	0.96±1.26	0.49±2.17	<0.001
p-value †¶	<0.001	0.282	
<b>Composite restoration</b>			
2-6 years	0.72±1.47	0.36±1.66	<0.001
7-14 years	21.31±12.94	10.13±11.30	<0.001
p-value †¶	<0.001	<0.001	

<b>Glass ionomer cement restoration</b>			
2-6 years	3.53±6.32	8.17±16.97	0.206
7-14 years	1.09±1.42	3.65±11.42	0.020
p-value †¶	<0.001	0.044	
<b>Tooth extraction</b>			
2-6 years	4.04±5.23	10.74±14.99	0.115
7-14 years	1.08±1.00	12.92±15.77	<0.001
p-value †¶	<0.001	0.159	
<b>Fissure sealant, topical fluoride</b>			
2-6 years	12.56±14.41	0.31±1.63	<0.001
7-14 years	19.59±10.97	1.40±3.27	<0.001
p-value †¶	<0.001	<0.001	
<b>Root canal treatment</b>			
2-6 years	0.34±0.51	0.10±0.46	<0.001
7-14 years	2.43±2.54	2.38±4.21	<0.001
p-value †¶	<0.001	<0.001	
<b>Compomer restoration</b>			
2-6 years	27.30±14.17	9.88±15.70	<0.001
7-14 years	9.46±10.75	3.15±6.05	<0.001
p-value †¶	<0.001	0.024	
<b>MTA usage</b>			
2-6 years	0.02±0.13	0.00±0.00	0.102
7-14 years	0.04±0.15	0.00±0.00	<0.001
p-value †¶	0.075	N/A	
<b>Prefabricated crown</b>			
2-6 years	0.10±0.22	0.00±0.00	<0.001
7-14 years	0.04±0.14	0.00±0.00	<0.001
p-value †¶	0.029	N/A	
<b>Space maintainer</b>			
2-6 years	1.03±1.32	1.53±3.71	0.074
7-14 years	1.10±1.28	1.02±2.17	<0.001
p-value †¶	0.412	0.971	
<b>Radiography</b>			
2-6 years	47.69±20.91	68.22±25.48	<0.001
7-14 years	42.88±20.96	64.86±17.83	<0.001
p-value †¶	0.068	0.464	

Data were shown as mean ± SD. † The comparisons between before- and during pandemic within each age group. ‡ The comparisons between age groups within each period. ¶ Mann Whitney U test, according to the Bonferroni Correction a p-value less than 0.0023 was considered as statistically significant.

Table 4 shows the comparisons of the ratios of panoramic films taken before and during the pandemic among the age groups. A statistically significant rise

was observed in the rate of panoramic films taken during the pandemic compared to the pre-pandemic period for both age groups ( $p < 0.001$ ) (Fig. 2).

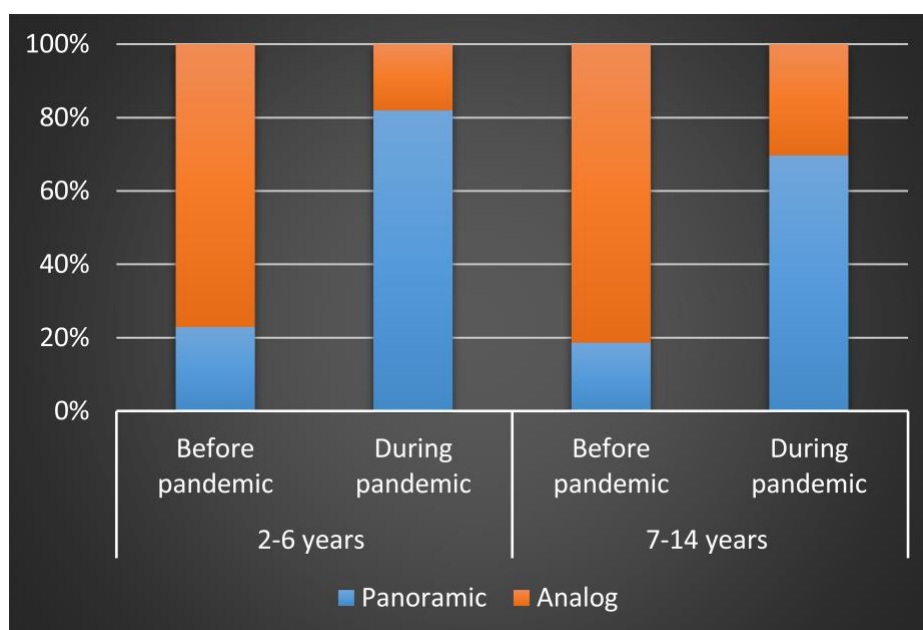


Figure 2. The rates of panoramic radiograph by age and period in total radiograph

Table 4. The rates of panoramic radiograph by age and period in the total radiograph

	Before pandemic	During pandemic	p-value †‡
2-6 years	22.86±27.22	81.95±18.13	<0.001
7-14 years	18.60±27.04	69.64±22.13	<0.001
p-value ‡¶	<0.001	<0.001	

Data were shown as mean ± SD. † The comparisons between before- and during pandemic within each age group. ‡ The comparisons between age groups within each period. ¶ Mann Whitney U test, according to the Bonferroni Correction a p-value less than 0.025 was considered as statistically significant.

## Discussion

This study showed significant differences in the preferred treatment procedures before and during pandemics in pediatric dentistry. Therefore, the null hypothesis was rejected.

As in every field, the "new normal" had to be defined to adapt to the pandemic in Pediatric Dentistry. In this sense, there has been a need for revision and improvement in many areas that constitute the continuation of the clinical process, such as patient admission protocols, treatment practices, and dental education (11, 12, 17, 18, 21). It is reported that patients' parents should be informed about risks involved in dental practices during the pandemic (close contact, aerosol scattering, contamination, etc.) before making a new appointment or they set foot in the clinic in case of previously booked appointments (11, 12, 34). In order to regulate patient admission protocols, it is recommended that both the first visits

and later appointments should be booked in longer time windows to avoid overlap and maintain social distancing in the waiting areas and within the clinic, considering the fact that pediatric patients are almost accompanied by their parents. It also is recommended that patients' complaints should be first classified in the triage stage over the phone and that only genuine emergencies should be allowed to visit the clinics. For this purpose, a new appointment protocol has been developed by taking into account the time needed for disinfecting and ventilating the space between appointments. Patient visits and the number of treatment procedures in the pediatric dentistry clinic of our faculty significantly dropped after the declaration of the pandemic when compared to the one-year preceding the pandemic. The decrease in the number of patient visits can be explained by the pandemic's effect and the introduction of the new appointment protocol (29-32).

Considering the working principles of instruments, air-water sprays and ultrasonic instruments, which work with air and water pressure and rotate at high speed, are routinely used and indispensable tools in dental practice; it is known that some of the air and water mixture hitting the tooth surface scatters back into the air in the environment and produces aerosols (35). In this respect, all national and international guidelines advise that aerosol-generating procedures should be avoided, especially during the pandemic (10-16). Figures during the pandemic show a statistically significant decrease in restorative procedures such as pulp capping, pulpotomy, compomer/composite restorations, and root canal treatment, which generate excessive amounts of aerosols due to the technical nature of the treatment process. These results are considered to be consistent with the radical treatment options deployed in line with all national and international guidelines during the extraordinary conditions forced by the pandemic.

Another reason for the reduced number of restorative procedures in pediatric dentistry may be due to negative behaviour patterns developed by younger pediatric patients' vis-a-vis the physical appearance of clinicians donned with personal protective equipment and hence rejecting treatment (7,17).

Panoramic radiographs are recommended during the pandemic over periapical and bitewing radiographs, which are normally the primary tools for diagnosis and treatment planning but can generate excessive salivation and gag reflex (12). The rise in the number of panoramic x-rays in both age groups compared to the pre-pandemic period seems to be congruous this recommendation. However, it should be noted that other imaging techniques can be used by considering the emergency treatment needed by the patient, provided that the necessary precautions are taken (11, 12, 34).

The importance of preventive treatments in the field of pediatric dentistry has been demonstrated by many evidence-based studies (36-38). In order to avoid aerosol-generating procedures, it is noted that non-invasive and minimally-invasive techniques for dental caries treatment will be a suitable option, especially during the pandemic (24). It is reported that treatment options based on non-invasive and minimally-invasive treatment philosophy and remineralization treatment such as silver diamine fluoride application, fissure sealant applications, resin infiltration methods, Hall technique, and Atraumatic Restorative Treatment (ART) should be preferred (7, 24, 28). It is reported that they are suitable alternatives during the pandemic, with the advantages of short chair-time and quick application as well as avoidance of rotating tools (24, 36).

The basic rationale behind non-invasive treatments is to make sure that the active lesions, either cavitated or not, are treated without any restoration and stop them by using remineralization agents (36-38). Therapeutic fissure sealants and resin infiltration methods in interface caries are also cited as examples of non-invasive treatment options. These

treatment methods can also be applied to permanent teeth in pediatric patients with high anxiety levels or those requiring special care, as well as primary teeth. These treatment options are presented as ethically appropriate alternatives as invasive methods can still be applied in case of failure (24, 36). It is reported that they are suitable alternatives during the pandemic, with the advantages of short chair-time and quick application as well as avoidance of rotating tools. However, according to the results of this study, there was a statistically significant decrease in the number of fissure sealant and topical fluoride applications performed during the pandemic. The decrease in the 2-6 age range was more significant compared to the 7-14 age range. When these results are evaluated, it is thought to support the idea that only the emergency treatment approach gains importance during the pandemic. Moreover, the statistically significant decrease in hospital admissions, particularly in younger age groups during the pandemic, is consistent with the drop in the number of treatments, which is an expected result considering the protective attitude observed by the parents under pandemic measures.

In addition to non-invasive methods, minimally-invasive methods can also be planned specifically for the caries risk of the individual with the aim of preserving as much dental tissue as possible. This approach includes Atraumatic Restorative Treatment (ART) applications (24, 37). Although there is no consensus in the literature regarding the clinical life of ART applications, there are data showing that survival is better in carious cavities that cover a small number of surfaces (24, 38). Apart from non-invasive and minimally-invasive approaches, the Hall technique is also a method applied as the direct cementation of prefabricated stainless steel crowns (SSCs) in primary molars with deep dentin caries. All the aforementioned methods present reasonable alternatives during the pandemic, offering shorter clinic sessions and lesser aerosol scattering (7, 17, 18, 24, 36). This study found that the application rate of glass ionomer cement used as a restorative material in ART applications increased, but the pre- and during-pandemic difference was not statistically significant.

On the contrary, a statistically significant decrease was detected in the use of prefabricated crowns. This finding shows that the Hall technique, which is a non-invasive and successful treatment method, is not applied as much as desired. Considering the fewer patient visits and the conditions in which more radical treatment options are applied during the pandemic, this reduction is considered acceptable. More radical treatment options have been exhausted in line with suggested pandemic measures. In this context, tooth extraction was widely used. It was statistically significantly higher in the 7-14 age group when compared to the 2-6 age group during the pandemic over the pre-pandemic period. It was also seen that the statistical decrease in hospital admissions, especially in the younger age groups (2-6 age group), compared to the pre-pandemic period, is reflected in the number of tooth extraction applications. However, the number of space maintainer

applications decreased in the 7-14 age group. Considering that tooth extraction is performed as an emergency procedure and other procedures postponed for later, it is expected that the number of space maintainer practice will increase when the health services of the faculty resume in full capacity. In the light of these findings, malocclusion incidence may increase in the near future.

Emergency algorithms recommend that dental treatment services can be provided after all necessary personal protective measures are taken for the physicians, patients, and all auxiliary personnel. However, it is suggested that in cases where algorithms do not fully cover all possible contingencies, the safety of all members of the team should be fully ensured, and a treatment decision should be made by making professional call (19). It is thought that the description of pain in pediatric patients may be relative, so the diagnosis and treatment decision should be made with a careful anamnesis in cooperation with the parents. In order to reduce the risk of transmission under these extraordinary conditions, it was suggested that all treatments should be postponed, except for emergencies. In order to make up for measures providing only temporary symptom relief, postponed procedures under pandemic conditions and the need for extra treatment will require rescheduling of appointments. The lack of a pre-arranged universal protocol or directive regulating oral and dental care during a pandemic is shown as the reason for these setbacks and differences in practice. In line with the recommendations made in the national guidelines; more intensive studies were proposed in the public sector on preventive medicine practices and the implementation of urgent projects in cooperation with the public, university and professional associations in this regard.

The limitations of this study were to evaluate only one university hospital clinic's results. There is a need to evaluate both government and private clinic patient referrals. However, considering that the same procedure is followed as a nationwide policy, it is believed that similar results will emerge in different regions. Further studies will be needed to evaluate the effects of full or partial lockdown policies during the pandemic, online education practices, and changes in nutrition and oral hygiene habits during confinement on the number of patient referrals and on treatment procedures.

## Conclusions

The circumstances under which this study was conducted suggested that all treatments should be postponed, except for emergencies, in order to reduce the risk of transmission. From this point of view, it is believed that the aforementioned treatment practices should be evaluated in comparison with the data of the new period, taking into account the dynamic information flow and the developments related to vaccines, as well as the period when health services were reorganized.

Moreover, there is a need for further studies examining the long-term effects of the statistical decrease seen in treatment services over the course of one year on public oral and dental health.

**Ethical Approval:** Ethics committee approval was received for this study from Ankara University, Faculty of Dentistry, Institutional Review Board in accordance with the World Medical Association Declaration of Helsinki, with the approval number: 2020-14/05).

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## References

1. World Health Organization. Coronavirus disease 2019 (COVID-19): situation report, 72. 2020; Available from: [https://www.who.int/docs/defaultsource/coronaviruse/situation-reports/20200401-sitrep-72-covid-19.pdf?sfvrsn=3dd8971b\\_2](https://www.who.int/docs/defaultsource/coronaviruse/situation-reports/20200401-sitrep-72-covid-19.pdf?sfvrsn=3dd8971b_2).
2. Peng X, Xu X, Li Y, Cheng L, Zhou X, Ren B. Transmission routes of 2019-nCoV and controls in dental practice. *Int J Oral Sci* 2020;12:1-6. ([Crossref](#))
3. World Health Organization Statement on the second meeting of the International Health Regulations (2005) Emergency Committee regarding the outbreak of novel coronavirus (2019-nCoV). 2020 [cited 2020 09/05/2021]; Available from: [https://www.who.int/news-room/detail/30-01-2020-statement-on-the-second-meeting-of-the-international-health-regulations-\(2005\)-emergency-committee-regarding-the-outbreak-of-novel-coronavirus-\(2019-ncov\)](https://www.who.int/news-room/detail/30-01-2020-statement-on-the-second-meeting-of-the-international-health-regulations-(2005)-emergency-committee-regarding-the-outbreak-of-novel-coronavirus-(2019-ncov)).
4. Coronaviridae Study Group of the International Committee on Taxonomy of Viruses. The species Severe acute respiratory syndrome-related coronavirus: classifying 2019-nCoV and naming it SARS-CoV-2. *Nat Microbiol* 2020;5:536-44. ([Crossref](#))
5. Rothe C, Schunk M, Sothmann P, et al. Transmission of 2019-nCoV infection from an asymptomatic contact in Germany. *N Engl J Med* 382;10:970-71. ([Crossref](#))
6. Ong SWX, Tan YK, Chia PY, et al. Air, surface environmental, and personal protective equipment contamination by severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) from a symptomatic patient. *JAMA* 2020;323:1610-12. ([Crossref](#))
7. Balasubramanian S, Kalaskar R, Kalaskar A. The new normal of pediatric dental practice post COVID-19: A review. *Int J Appl Dent Sci* 2021;7:106-10. ([Crossref](#))
8. Chan JFW, Yuan S, Kok KH, et al. A familial cluster of pneumonia associated with the 2019 novel coronavirus indicating person-to-person transmission: a study of a family cluster. *The Lancet*, 2020;395:514-23. ([Crossref](#))
9. Alharbi A, Alharbi S, Alqaidi S. Guidelines for dental care provision during the COVID-19 pandemic. *Saudi Dent J* 2020;32:181-6([Crossref](#))
10. Türk Diş Hekimleri Birliği. Covid-19 salgını döneminde diş hekimliğinde acil durum ve acil servis ihtiyacı için durum



- yönetimi rehberi. 2020 [cited 09/05/2021] Available from: [http://www.tdb.org.tr/tdb/v2/yayinlar/Cesitli/Covid\\_Done\\_minde\\_Acil\\_Durum\\_Yonetimi\\_Rehberi\\_06.pdf](http://www.tdb.org.tr/tdb/v2/yayinlar/Cesitli/Covid_Done_minde_Acil_Durum_Yonetimi_Rehberi_06.pdf).
11. Türk Diş Hekimleri Birliği. Covid-19 salgını nedeniyle kliniklerde uyulması gereken dental işlemler prosedürü. 2020 [cited 09/05/2021]; Available from: [http://www.tdb.org.tr/icerik\\_goster.php?id=3422](http://www.tdb.org.tr/icerik_goster.php?id=3422).
  12. Türk Pedodonti Derneği. Corona (Covid-19) salgını sırasında çocuk diş hekimlerinin dikkat etmesi gereken önemli noktalar. 2020 [cited 09/05/2020]; Available from: <http://turkpedo.org/wp-content/uploads/2020/03/corona-salg%C4%B1n%C4%B1-cocuk-dis-hekimligi-onlemler.pdf>.
  13. American Academy of Pediatric Dentistry. COVID-19 Update/Coronavirus Update. 2020 [cited 09/05/2021]; Available from: <https://www.aapd.org/about/about-aapd/news-room/covid-19/>.
  14. Center for Disease Control and Prevention. interim infection prevention and control guidance for dental settings during the Covid-19 response. 2020 [cited 09/05/2021]; Available from: <https://www.cdc.gov/coronavirus/2019-ncov/hcp/dental-settings.html>.
  15. European Academy of Pediatric Dentistry Information about COVID-19. 2020 09/05/2020]; Available from: <https://www.eapd.eu/index.php/subpost/information-about-covid-19>.
  16. The British Society of Pediatric Dentistry. Covid-19 dental resources for children. 2020 [cited 09/05/2021]; Available from: <https://www.bspd.co.uk/Resources/COVID-19/COVID-19-Dental-Resources-for-Children>.
  17. Casamassimo PS, Townsend JA, Litch CS. Pediatric dentistry during and after Covid-19. *Pediatr Dent* 2020; 42: 87-90.
  18. Mallineni SK, Innes NP, Raggio DP, et al. Coronavirus disease (Covid-19): Characteristics in children and considerations for dentists providing their care. *Int J Paediatr Dent* 2020; 30:245-50. (Crossref)
  19. Shamszadeh S, Parhizkar A, Mardani M, et al. Dental considerations after the outbreak of 2019 novel coronavirus disease: a review of literature. *Arch Clin Infect Dis* 2020; 15: e103257. (Crossref)
  20. Tiwari RVC. Dental considerations in Corona virus infections: first review in literature. *Adv Med Dental Sci* 2020; 8:100-3.
  21. Yüksel BN, Özalp N. SARS-CoV-2 (COVID-19) pandemisinin çocuk diş hekimliği klinik uygulamaları üzerine yarattığı etkiler. [Effects of SARS-CoV-2 (COVID-19) Pandemic on Clinical Practices of Pediatric Dentistry], in *Çocuk Sağlığında SARS-CoV-2 (COVID-19)*, Bostancı İ, Editor. 2020, Türkiye Klinikleri: Ankara. p. 144-50.
  22. Dental Council of India. Advisory. 2020 [cited 2021 7.05.2021]; Available from: <https://dciindia.gov.in/Admin/NewsArchives/Dental%20Clinical%20Protocols%20Final.pdf>.
  23. Türk Diş Hekimleri Birliği. Covid-19 pandemisi ve kamu ağız diş sağlığı tedavi hizmetleri. 2020 [cited 2021 4.05.2021]; Available from: [http://www.tdb.org.tr/icerik\\_goster.php?id=3480](http://www.tdb.org.tr/icerik_goster.php?id=3480).
  24. Gagetti MG, Angelino E. Could SARS-CoV-2 burst the use of non-invasive and minimally Invasive treatments in pediatric dentistry? *Int J Paediatr Dent* 2021; 31: 27-30. (Crossref)
  25. Checchi V, Bellini P, Bencivenni D, Consolo U. COVID-19 dentistry-related aspects: a literature overview. *Int Dent J* 2021, 71:21-6. (Crossref)
  26. Ağmaz O, Ozer H, Abaklı İnci M. Çocuk diş hekimliği kliniğine yapılan başvuruların retrospektif değerlendirilmesi: 5 yıl karşısında Covid-19 pandemisiyle 3 ay.[ Retrospective evaluation of applications to the pediatric dentistry clinic: 3 months with Covid-19 pandemic vs. 5 years] *Neu Dent* 2020; 2: 9-13.
  27. Nassani MZ, Shamsy E, Tarakji B. A call for more utilization of laser dentistry at the time of coronavirus pandemic. *Oral Dis.* 2021 27: 783-4. (Crossref)
  28. Nassani MZ, Shamsy E, Tarakji B, Kujan O. Planning the restorative dental treatment at the time of coronavirus pandemic: a two-arm strategy. *J Contemp Dent Pract* 2021;22:1-3. (Crossref)
  29. Cengiz AB, Tansuker HD, Oktay MF. Türkiye'deki Covid-19 salgınının ilk günlerinde kulak burun boğaz polikliniğine başvuran hastaların özellikleri.[The features of the patients who attend to otorhinolaryngology outpatient clinics in the first days of the Covid-19 outbreak in Turkey]. *KBB ve BBC Dergisi* 2020; 28:543-8. (Crossref)
  30. Dinmohamed AG, Visser O, Verhoeven RHA, et al. Fewer cancer diagnoses during the COVID-19 epidemic in the Netherlands. *Lancet Oncol* 2020; 21: 750-1. (Crossref)
  31. Kaltofen T, Hagemann F, Harbeck N, et al. Changes in gynecologic and breast cancer diagnoses during the first wave of the COVID-19 pandemic: analysis from a tertiary academic gynecological center in Germany. *Arch Gynecol Obstet* 2021; 7:1-6. (Crossref)
  32. Ghai S. Teledentistry during Covid-19 pandemic. *Diabetes Metab Syndr* 2020;14:933-5. (Crossref)
  33. Schwendicke F, Krois J, Gomez J. Impact of SARS-CoV2 (Covid-19) on dental practices: Economic analysis. *J Dent* 2020; 99:103387. (Crossref)
  34. Türk Diş Hekimleri Birliği. Covid-19 pandemi döneminde acil diş tedavisi uygulamaları ve onam formu. 2020 [cited 09/05/2021]; Available from: [http://www.tdb.org.tr/icerik\\_goster.php?id=3466](http://www.tdb.org.tr/icerik_goster.php?id=3466).
  35. Harrel SK, Molinari J. Aerosols and splatter in dentistry: a brief review of the literature and infection control implications. *J Am Dent Assoc* 2004;135:429-37. (Crossref)
  36. Gruythuysen RJ. Non-restorative cavity treatment: should this be the treatment of choice? Reflections of a teacher in pediatric dentistry. *Dent Update* 2019; 46: p. 220-8. (Crossref)
  37. Frencken JE, Peters MC, Manton DJ, Leal SC, Gordan VV, Eden E. Minimal intervention dentistry for managing dental caries - a review: report of a FDI task group. *Int Dent J* 2012;62:223-43. (Crossref)
  38. de Amorim RG, Frencken JE, Raggio DP, Chen X, Hu X, Leal SC. Survival percentages of atraumatic restorative treatment (ART) restorations and sealants in posterior teeth: an updated systematic review and meta-analysis. *Clin Oral Investig* 2018;22:2703-2725. (Crossref)