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Feedback of Patients Regarding Orthodontic Treatment During the COVID-19 Pandemic on Twitter: a Qualitative Study

Arash Farzan[1*], Niki Farrokhi[2], Kamyar Mansori[3]

[1.]Department of Orthodontics, School of Dentistry, Zanjan University of Medical Sciences, Zanjan, Iran
[2] DDS, Private Practice, Tehran, Iran
[3.]Department of Epidemiology and Biostatistics, School of Medicine, Zanjan University of Medical Sciences, Zanjan, Iran

***Corresponding author:** Arash Farzan. Department of Orthodontics, School of Dentistry, Zanjan University of Medical Sciences, Zanjan, Iran.

Email: dr.arash.farzan@gmail.com

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Abstract

Aim: This study aimed to assess the feedback of patients regarding orthodontic treatment during the coronavirus pandemic of 2019 (COVID-19).
Methods: In this observational study, keywords related to orthodontic treatment along with either "corona" or "COVID" were searched in Twitter during a two-month period from 2 October 2020 to 12 October 2021. The retrieved tweets were categorized into five themes of pain, getting braces, limitations due to COVID-19, seeking information, and delayed treatment based on content, and were then manually categorized into three groups of positive, neutral, and negative tweets. Next, a coding system was designed by the software MAXQDA, and the tweets were coded. Data were analyzed by the analysis feature of MAXQDA.
Results: Of a total of 424 tweets retrieved, 95 were excluded. The majority of the tweets were about limitations due to COVID-19 (n=156) and were negative (n=213). Also, the majority of the tweets were posted by female users (67.5%). The most common reason for the negative tweets of patients was delayed treatment (43.9%). Also, poor performance of orthodontic clinics and orthodontists with regard to informing and reassuring the patients about protective measures was another reason for the negative tweets of patients (12.5%).
Conclusion: Delayed treatment was the most common cause of patient dissatisfaction followed by poor awareness and reassurance of patients regarding adherence to the preventive measures and hygienic protocols during the COVID-19 pandemic.

Keywords: Behavioral science, Covid-19, Orthodontics, Practice management.

1. Background

The coronavirus disease of 2019 (COVID-19) was first detected in Wuhan, China, in 2019 and soon turned into a pandemic. Since it is a respiratory disease, all individuals are at risk of contracting COVID-19. However, the risk of contraction is higher for healthcare workers especially dental clinicians because of close contact with patients, aerosol generation in most dental procedures, and contact with infected instruments and surfaces. Dental patients are also at high risk of cross-contamination (1,2). Evidence shows that saliva of infected patients has a high viral load, and the generated aerosols in dental clinics can serve as a source of infection spread, and cross-infection (3). Since standard conventional protective measures are not effective enough against the COVID-19 transmission, provision and receipt of dental care during the COVID-19 pandemic were a challenge.

Despite greater emphasis placed on infection control and protective measures, many national dental agencies worldwide recommended lockdowns and temporary suspension of elective dental procedures during the disease peaks, and recommended the provision of emergency services only during this period (4). Hence, mandatory lockdowns led to cancellations and temporary suspension of many orthodontic treatments (5) that caused many problems for orthodontic patients that lead to a negative physical and even psychological impact on them (6). In general , most

orthodontic patients and their parents often have high levels of stress and anxiety at the onset of treatment (7) and with the emergence of the COVID-19 pandemic, prolongation of lockdowns, and social isolation further increased the stress and anxiety of these patients (8,9).

On the other hand, evidence shows that natural disasters and pandemics, such as the COVID-19 pandemic, often increase the duration of television watching and Internet use to obtain information and to pass time (10). A significant rise was also reported in using videogames, and using social media during the COVID-19 pandemic (11) . Verizon Wireless reported a 20% increase in web traffic during 8-15 March 2020, which was attributed to greater use of social media to become updated on information regarding the pandemic and to pass time (12). The lockdowns and strict rules and regulations set in place to control disease transmission led to the increasing use of social media platforms as well. Using Facebook (13), Twitter (14), Instagram (15), Snapchat (16), and other social media is currently a part of the daily activity of people in most parts of the world (17).

In modern healthcare systems, social media is increasingly used by both patients and healthcare workers. Patients often share their personal experiences regarding their disease and treatments (18–20). Also, people often ask their questions from other users or consult physicians online. Henzell et al. (21) reported that of every seven orthodontic patients, one makes a post via social media regarding his/her braces, and 25% of his/her followers react to this post. Thus, it appears that these platforms can serve as a reliable data source regarding experiences, emotions, and attitudes of patients towards orthodontic treatment, and can be used to acquire some information in this regard (17). The traditional data collection tools such as questionnaires limit the emergence of new approaches and question contents, and qualitative methods may be more suitable to discover complex concepts, and enable the researchers to better understand patient opinions through an unbiased approach (22). Face-to-face interviews also have shortcomings. Many patients are reluctant to honestly share their experiences and beliefs in person. Use of social media platforms such as Twitter can eliminate these shortcomings considering their increasing popularity. Recently, a number of studies have used social media platforms to obtain information regarding orthodontic treatment and pain experiences of patients (21,23–25).

During the lockdown periods of COVID-19 pandemic, many patients communicated with their orthodontist from home through their smartphones (2,26). Many patients with loose brackets or wires could not be visited promptly, and it had a negative impact on their treatment course and psychological status (5). Due to the existing limitations, many patients expressed their concerns in social media or asked their questions from other users by tweeting (17). Such posts can truly reflect the experiences, attitude, and behavior of orthodontic patients during the COVID-19 pandemic.

Twitter is a well-known social networking platform introduced in 2006, which had over 300 million active users in 2016 (27). It is commonly used as a safe environment by people to share their real experiences and communicate with others, and is used by approximately one-fourth of orthodontists and orthodontic patients (28). Furthermore, two-thirds of orthodontists and orthodontic patients use social media to share their information and experiences (29,30).

Considering all the above, this study aimed to qualitatively and quantitatively analyze the tweets of orthodontic patients on Twitter to acquire a better understanding of their attitude and experiences during the COVID-19 pandemic.

2. Methods

This observational study was conducted on orthodontic patients who posted on Twitter in English regarding their experiences, feelings, or problems related to orthodontic treatment during a two-month period. The study was approved by the ethics committee of ***University of Medical Sciences, Zanjan, IR.ZUMS.REC.1400.128 (***).

A pilot study was first conducted to find the main topics. Accordingly, the following topics were identified: getting braces, getting braces off, pain, delayed treatment, seeking information, and limitations due to COVID-19. The search engine of Twitter allows searching for multiple keywords simultaneously. Thus, the following keywords “retainer, orthodontics, orthodontist, dentist, pain, wire, braces, bracket, getting braces, orthodontic appointment” were searched along with one of the two keywords of “corona” or “COVID”. Presence of one of these two keywords along with one of the other keywords was imperative. The keywords were searched and the relevant tweets from 2 October 2020 to 12 October 2021 were collected. A screen shot was obtained from each tweet. To achieve thematic saturation, the search was continued until no new data were obtained, and no new topic emerged. For this purpose, the search period was extended 10 more days to ensure absence of a new topic. The collected data included

the searched tweets using the abovementioned keywords, time of posting the tweets, and sex of user. To find out about the sex of user, the profile of each user was checked.

The inclusion criteria were English tweets related to orthodontic treatment published during the COVID-19 pandemic and presence of one of the two keywords of "corona" or "COVID".

The exclusion criteria were advertisements, and tweets published by professionals or for commercial purposes.

After data collection, the Mayring's qualitative content analysis was used to categorize the tweets (31) .All tweets were read by two researchers independently, and based on their perception, each tweet was assigned to one of the following topics: getting braces, getting braces off, pain, delayed treatment, seeking information, and limitations due to COVID-19. To reach a consensus, the data were once again categorized by the two researchers by brain storming. The final topics, their coding rules and examples are presented in Table 1. Next, the tweets were categorized into three groups of positive, negative, and neutral as shown in Table 2.

After manual classification of tweets, MAXQDA (MAXQDA Standard 12; Release 12.3.3; VERBI GmbH, Berlin, Germany) software was used for qualitative analysis and coding of the contents of the tweets. The screenshots of the tweets were transferred to the software based on five topics. This software is capable of coding of images (Fig. 1).

Table 1. Final category, their coding rules, and examples regarding tweets of orthodontic patients during a two-month period from 2 October 2020 to 12 October 2021

Category	Definition	Examples	Coding Rules
Getting braces	Opinions and feelings of users regarding: Placement of orthodontic brackets Removal of orthodontic brackets	"Once this corona is over I'm getting braces" "When you're not getting the braces put on yet because of corona"	Presence of any of the criteria mentioned in definition
Delayed treatment	Opinions and feelings of users regarding any delay in: Continuation of orthodontic treatment Onset of orthodontic treatment Bracket removal	"Hahah I would have been getting my braces off tomorrow morning but corona said: NO. I'm so sad"	Presence of any of the criteria mentioned in the definition
Pain	Tweets regarding any pain in patients under orthodontic treatment during the COVID-19 pandemic	"I've had a wire poking my cheek now for about a week and my ortho office is still closed due to corona"	Pain expressed by the users
Seeking information	Any tweet regarding: Seeking information by the users regarding orthodontic treatment User questions Responses and comments of users regarding hygienic measures and protocols during the COVID-19 pandemic	"Anyone know how to fit a broken bracket? I don't wanna go to the ortho during corona"	Presence of any of the criteria mentioned in the definition
Limitations due to COVID-19	Tweets of orthodontic patients regarding problems experienced due to COVID-19 pandemic	"When ur wire comes out of bracket but ur orthodontist is closed bc of COVID"	Effect of COVID-19 on different aspects of life of orthodontic patients

Table 2. Positive, negative, and neutral tweets regarding orthodontic treatment by patients.

Category	Definition	Examples	Coding Rules
Positive	Positive comments, feelings, and feedback of patients	"One thing good about this corona is delaying me getting braces! YESSSS"	According to the definition
Negative	Negative comments, feelings, and feedback of patients	"All I know is.. if this corona stops me from getting my braces off, I'm gonna have to rip them by myself. I'M MAD ☹"	According to the definition
Neutral	Neutral comments, feelings, and feedback of patients	"Today, my son had an appointment at the orthodontist. Had to take a survey, agree to tell them if he tested + for COVID. Gave him mask. Checked our temp. a whole lot of protocol."	According to the definition

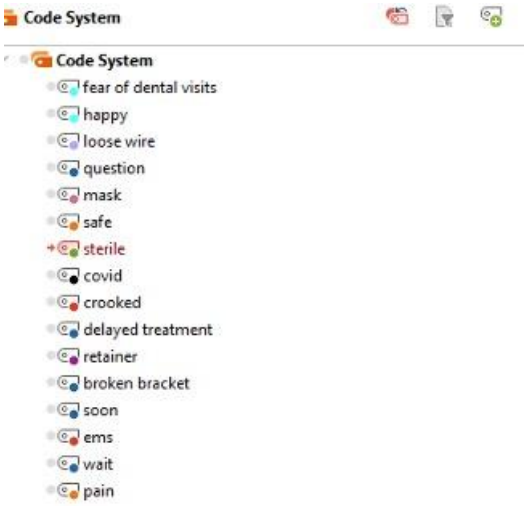

Figure 1. Coding system of the MAXQDA software

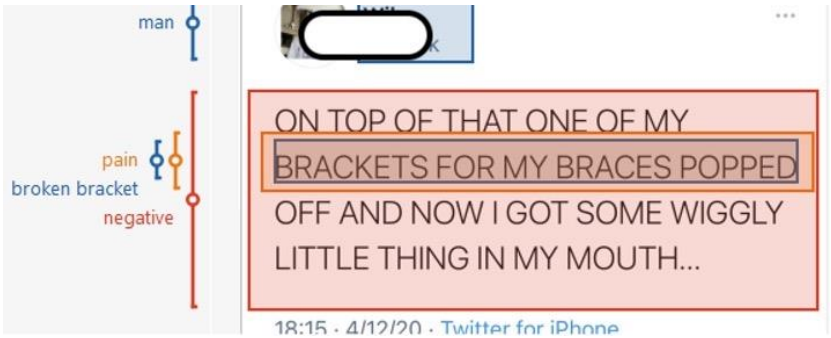

Figure 2. An example of a tweet coding. In this tweet, the profile of the user was checked, showing that the user was male. Next, the keywords were coded (broken bracket code). After reading the tweet, it was found that the user had pain. Thus, pain was also coded. Finally, based on the tweet content, it was classified as a negative tweet.

First, the sex of each user was recorded according to their profile information, and coded as male, female, or unknown. Next, each tweet was read, and the keywords and clauses that could best reveal the content of the tweet were coded. After initial coding, all tweets were read again to ensure that the coding system was correct and complete. The software provided information regarding the frequency of repetition of keywords in the entire tweets. All keywords in each tweet were coded. Figure 2 shows an example of coding of a tweet.

To assess the validity and reliability of the classification of the tweets, two researchers independently determined the topic of each tweet as described by Graf et al. (32) and Henzell et al. (21). The same was done for the classification of tweets into three groups of positive, negative, and neutral by the use of MAXQDA. In this software, positive, negative, and neutral codes were defined. For instance, the term "orthodontist" was defined to be neutral. Thus, each tweet containing this term was categorized as neutral. In case of disagreement between the two researchers regarding coding, the third researcher who was an English literature expert was consulted for final decision making. After coding, all data were analyzed by the analysis feature of the MAXQDA software.

3. Results

Of 424 tweets collected from the first and second searchers, 95 were excluded based on the study's exclusion criteria (adds, and tweets published by professional or for commercial purposes). Assessment of the remaining tweets by the Mayring's analysis revealed the frequency of tweets in each topic to be as follows: limitations due to COVID-19 pandemic (n=156, 47.4%), delayed treatment (n=106, 32.2%), pain (n=30, 9.1%), getting braces (n=24, 7.2%), and seeking information (n=13, 3.9%) (Fig. 3). All tweets were reclassified based on the concept of positive, negative, and neutral. Of all, 213 (65%) tweets were negative, 78 (24%) were neutral, and 38 (11%) were

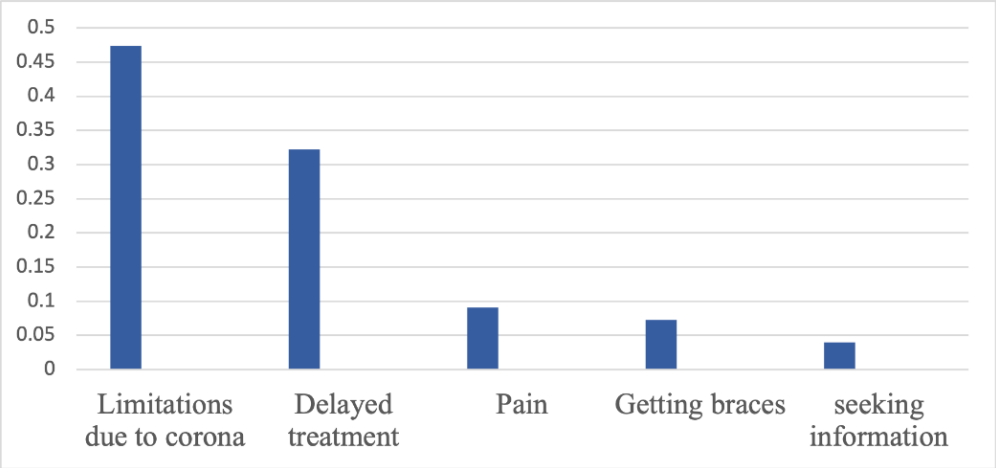

Figure 3. Percentage of tweets in five main topics of getting braces, getting braces off, pain, delayed treatment, seeking information, and limitations due to COVID-19

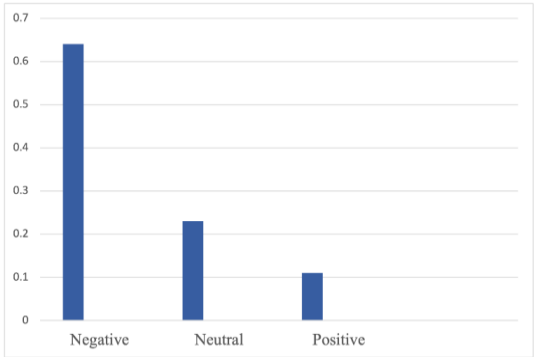

Figure 4. Percentage of tweets in the three main topics of negative, neutral, and positive

positive (Fig. 4). The majority of tweets were by female patients. Also, females had more negative feelings such as sadness, anger, anxiety, and restlessness compared with males. The majority of retweets were related to limitations due to COVID-19. Also, negative feelings had five times higher frequency than that of positive feelings. Figures 5 and 6 are word clouds of the most commonly used words in the negative and positive categories respectively.

In 329 tweets, the most commonly used codes were corona (n=218, 14.23%), COVID (n=213, 13.90%), and then negative/hate (n=197, 12.86%). A lower percentage of tweets mentioned the code "pain" (n=37, 2.42%) while the code "broken bracket" (n=105, 6.85%), and "loose wire" (n=24, 1.57%) were found in a higher percentage of tweets. A very small percentage of tweets included the code "happy" (n=11, 0.72%).

According to the capabilities of the MAXQDA software, frequency and percentage of all used codes were calculated in the analysis section of the software. Table 3 provides frequency of all codes (positive, negative and neutral comments). The reasons for negative feelings included delayed treatment in 43.9%, pain in 41.1%, insufficient information regarding the protective measures in 12.5%, and other reasons in 2.5% of tweets.

Figure 5. Word cloud of negative tweets

Figure 6. Word cloud of positive tweets

Table 3. Frequency of each code in tweets of orthodontic patients during a two-month period from 10.12.2020 to 10.2.2021

CODES	Frequency	Percentage
Corona	218	14.23
COVID	213	13.90
Negative/hate	197	12.86
Delayed treatment	149	9.73
Broken bracket	105	6.85
Appointment	73	4.77
Neutral	70	4.57
Male	65	4.24
Insufficient information	59	3.85
Unknown	40	2.61
Positive	38	2.48
Pain	37	2.42
Retainer	33	2.15
Getting braces	30	1.96
Negative/anxiety	25	1.63
Negative/tired	24	1.57
loose wire	24	1.57
Negative/angry	17	1.11
Ems	17	1.11
Question	17	1.11
Sterile	12	0.78
Stress	11	0.72
Happy	11	0.72
Negative/sad	9	0.59
Mask	9	0.59
Safe	8	0.52
Crooked	5	0.33
Negative/scared	5	0.33
Negative	4	0.26
Soon	3	0.20
Concern	2	0.13
wait	2	0.13
TOTAL (valid)	1532	100.00
Missing	0	0.00

4. Discussion

This study assessed the feedback of patients in Twitter regarding seeking or resuming orthodontic treatment during the COVID-19 pandemic. The qualitative analytical approach was adopted in this study, similar to that of Alansari (17) for social media data. Use of Twitter for this purpose has several advantages. Users often tweet immediately after an event, which decreases recall bias and improves the accuracy of data (25). Also, smartphones and tablets can all be used for tweeting, enabling tweeting at almost anywhere and anytime. This increases the frequency of timely tweets (21). In the healthcare field, data can be collected through social media irrespective of age, sex, time, level of education, location, nationality, or religion of patients (33). This approach does not change the behavioral pattern of patients and does not decrease their social desirability. Also, it prevents bias by the researcher (21,34). In present study, all English tweets, irrespective of the country of residence of the user, were evaluated using the searched keywords.

In the study by Alansari (17) done in Saudi Arabia on Arabic tweets, one main reason for the anxiety of patients was the effect of the pandemic and lockdown on the fee they had already paid for their orthodontic treatment. Many patients were uncertain about continuing their treatment, while in the English tweets evaluated in the present study, the most common cause of patient dissatisfaction was found to be delayed treatment. This difference may be due to differences in the healthcare and insurance systems of different countries (35). Occurrence of complications and their management were among the main concerns of patients in both studies. Graf et al. (32) evaluated the German tweets of patients residing in New Zealand with a methodology similar to that of the present study. Similar to the present study, they showed that bracket placement and removal had a great psychological impact on patients, and the main concerns of patients were related to the time of bracket removal and limitations and complications caused by brackets. They also emphasized on the increasing use of social media by patients to seek information regarding orthodontic treatment and to benefit from the experiences of other patients.

Although patients acquire information from their orthodontist, they also seek information online because they want to know about the experiences of their peers, and the Internet is the easiest way to find such information (34). Thus, assessment of these tweets by the healthcare

providers can help them to provide educational content and promote public knowledge in this regard (36,37). Moreover, social media can enhance the communication of patients with their orthodontists especially during the lockdowns (11).

The preset study revealed that the majority of tweets were negative. Patients were dissatisfied with the limitations due to COVID-19, such as the closure of offices and clinics, delayed treatment, changed appointments, having to wait outside the clinic, inability to easily communicate with their orthodontist, and in emergency situations such as pain, bracket fracture, or loose wire, and so they experienced different negative feelings. Negative feelings were mainly due to delayed treatment, concerns regarding the lost appointments, and discomfort due to complications. Many orthodontic patients did not have any pain or complication but were still worried about the possible complications that could occur due to delayed appointments. A recent study showed that the COVID-19 pandemic affected orthodontic appointments and caused anxiety in patients. It reported that the main concerns of over half of the patients were due to delayed treatment (38).

Pain and not receiving adequate information from the orthodontic clinics and orthodontists regarding adherence to the protective protocols were among other reasons for negative feelings of patients. Pain was mainly due to bracket fracture, loose wire, or trauma. Patients described their pain and its reason, and asked for the opinion of other patients on how to resolve the pain. They also shared their own solutions. This finding points to the significance of providing patients with sufficient information regarding possible complications and their management, which is the responsibility of orthodontists. Asking the opinion of other users in this regard may bring about adverse consequences because some users may recommend unorthodox solutions for a problem. On the other hand, healthcare workers can help the patients to access accurate sources of information (39) and orthodontists can prevent such complications by providing patients with accurate scientific information as well.

Another problem was related to poor knowledge of patients regarding the level of adherence to the hygiene protocols in dental offices. Resultantly, many patients were reluctant to visit their orthodontist even in case of emergency. Others sought information regarding the level of adherence to the protocols in dental offices. Patients had different opinions regarding the implementation of protective measures in dental clinics. Some of them complained of insufficient protocols, poor management, and long waiting times outside the clinic while others were highly satisfied with the protocols. Considering the existing controversy in the opinion of patients, the clinics must inform the patients regarding the protocols and reassure them about adherence to the guidelines in the office. Also, patient appointments should be precisely scheduled, and the number of patients scheduled daily should be decreased to prevent long waiting times (40).

Sadness, anxiety, and anger were the most commonly found words in negative tweets. Females had more negative feelings than males, which highlights the significance of correct scheduling of appointments and resolving patient problems as the first priorities after the pandemic.

This study had some limitations, which were mainly due to bias and limited generalization of results. Twitter provides data regarding online users, and does not necessarily represent the general population (41). Also, Emojis were not included in the analyses even though they are a powerful way of expressing emotions. However, since the interpretation of Emojis can be widely variable, they were not included. Also, only English tweets were evaluated since the keywords were in English. It was both a strength and a limitation of this study, since it limited the generalization of results to different geographical areas and to populations with different cultures and languages.

Further studies are required to find the best method of communication between orthodontists and patients via social media. The efficacy of educational videos, video chats, educational photographs, and reminder messages for the use of appliances and so forth should be evaluated to minimize patient concerns and improve communication and their compliance.

Conclusion

Delayed treatment was the most common cause of patient dissatisfaction followed by poor awareness and reassurance of patients regarding adherence to COVID-19 preventive measures and hygienic protocols.

Conflict of interest

The authors have no conflict of interest to declare.

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