

# Factors Influencing Orthodontic Treatment Duration during COVID-19

Sally Raed Muhammed\*, D. Al Groosh

Department of Orthodontics, College of Dentistry, University of Baghdad, Baghdad, Iraq

## ABSTRACT

**Introduction:** Coronavirus had huge impact on different aspects of life and orthodontics was one of the medical entities affected by the virus consequences. It interfered with regular follow ups and may compromised the treatment.

**Aim of the study:** To assess the relationship between treatment duration and the extraction treatment plan in addition to the number of clinicians and/or supervisors during COVID-19 pandemic.

**Materials and methods:** The study sample consisted of two groups, pre-COVID-19 and COVID-19 groups with 88 and 62 patients respectively. Data was collected from the archived patient's records in college of dentistry/department of orthodontics. Statistical analysis was performed using SPSS version 26 (SPSS v. 26).

**Results:** There was a significant increase in treatment duration associated with extraction cases in the pre-COVID-19 group, with no significant difference in COVID-19 group. The treatment duration was not associated with the number of postgraduates and/or the clinical supervisors responsible for the case.

**Conclusion:** It is possible that the quarantine time compromised the treatment duration in pre COVID -19 and COVID-19 groups.

**Key words:** Orthodontic treatment duration, Extraction, COVID-19, Clinicians and supervisors

**HOW TO CITE THIS ARTICLE:** Sally Raed Muhammed, D. Al Groosh, Factors Influencing Orthodontic Treatment Duration during COVID-19, J Res Med Dent Sci, 2023, 11 (08): 058-062.

**Corresponding author:** Dr. Sally Raed Muhammed

**E-mail:** ali.mario28@yahoo.com

**Received:** 28-May-2022, Manuscript No. JRMDS-22-65205;

**Editor assigned:** 30-May-2022, PreQC No. JRMDS-22-65205 (PQ);

**Reviewed:** 10-Jun-2022, QC No. JRMDS-22-65205;

**Revised:** 03-Aug-2023, Manuscript No. JRMDS-22-65205 (R);

**Published:** 10-Aug-2023

## INTRODUCTION

Coronavirus disease (COVID-19), first named as the 2019 novel Coronavirus or 2019-nCoV, was caused by Severe Acute Respiratory Syndrome Coronavirus 2 (SARS-CoV-2). It has rapidly spread throughout the entire world and still has its unprecedented effects on health, humanitarian and financial crises [1].

In order to deal with the pandemic disease, all elective and routine dental treatment was suspended and that emergency dental treatment was provided as was stated by most authorities *i.e.* according to strict infection control protocol. In orthodontics, routine appointments were temporarily ceased as it is not considered as an emergency intervention [2] except in emergency cases such as severe pain and or infection due to orthodontic appliance embedment into the gingiva or oral mucosa [3]. Postponing the treatment due to quarantine led to compromised outcomes and sequential stress in addition to poor compliance which had put orthodontic patients in complicated situations and fear of delayed treatment [4].

Many factors control the orthodontic treatment duration and outcomes such as the experience of the clinician, practice management methods, complexity of treatment, technical skills and his educational background. It was suggested that success in orthodontic practice is affected by a proper anticipation of treatment duration [5].

Whether as planners of resources, as consumers or providers of treatment, or as patients the length of orthodontic treatment is of interest to all involved. All other factors being equal, shorter treatment times are favoured [6].

One of the advantages associated with short orthodontic treatment duration is lower exposure to possible harmful side effects such as root resorption in addition to cost efficiency of the treatment which is considered as an important concept in modern health care service [7-9]. On the other hand, longer duration has many drawbacks such as the rise of orthodontic emergencies that leads to different kinds of side effects with regard to treatment outcomes. In such cases, side effects are related to the stage of treatment which will determine the type of problem, whether in the phases of orthodontic treatment are active or passive and require an immediate intervention or can be postponed in that unprecedented situation [10].

This study was designed to evaluate orthodontic treatment duration in tertiary care unit (educational

hospital) in relation to extraction plan, number of clinical supervisors and number of trainees during COVID-19 pandemic and to compare that with pre COVID-19 treated cases.

**MATERIALS AND METHODS**

The sample of the current study consisted of the orthodontic records of 218 patients that were selected from the retrospectively treated patients and prospective patients who were treated by postgraduate students between April 2019 and November 2021 at the department of orthodontics/university of Baghdad.

Ethical approval was granted by the ethics board committee of the department of orthodontics/university of Baghdad (Ref.no. 328 in 2020).

One hundred and fifty records was chosen and divided into two groups; the pre-COVID-19 (88 patient's records with a mean age of 17.7) and COVID-19 groups (62 patient's records with a mean age of 19.1). The patient's records which fulfilled the following inclusion criteria was considered in the study. These include: Patients who were treated/under orthodontic treatment with upper and lower fixed orthodontic appliances using MBT bracket prescription (Ortho Technology Inc. 4614 Pct Lane, Sulte D-101 Lutz, FL 33559, USA), the availability of

high-quality pre-treatment and post-treatment records; and for the COVID-19 group, patients with good oral hygiene, patients must have finished their treatment during the pandemic period (October 2020 to November 2021).

Peer Assessment Rating (PAR) index was used to assess treatment outcome according to [11]. Patient's information sheets and consent form were reviewed before commencement of the study.

**Statistical analysis**

Statistical analysis was performed using SPSS version 26 (SPSS v. 26). Fisher's exact test was used to check the correlation between treatment duration and the number of students and clinical supervisors in both groups. Male and female distribution in both groups was tested using t-test.

**RESULTS**

Data showed that female patients dominated in both groups; however, there was no gender difference (Table 1). The age range of the pre-COVID group was 16-26 years and for COVID-19 group was 15-28 years.

**Table 1: Distribution of the study sample.**

Status	Patient no.	Male (%)	Female (%)	t-test
				p value
Pre-COVID-19	92	31.5	68.5	0.711
COVID-19	63	32	68	0.705

Table 2 illustrates the relationship between the treatment duration and the extraction treatment plan in the pre-COVID-19 and COVID-19 groups. There was a significant increase in the treatment duration for patients treated with first premolars extraction compared to non-extraction planning. More than two third (82%) of the

patients who underwent extraction planning finished their treatment in more than 15 months. However, there was no significant difference in treatment duration between patients treated with or without extraction during COVID-19 pandemic.

**Table 2: Comparison between extraction planning and treatment duration in pre-COVID-19 and COVID-19 groups using Fischer's exact test.**

Pre-COVID-19							
Duration	Extraction	%	Non extraction	%	Fischer's exact	df	p-value
≤ 15 months	3	18	38	54	7.094	1	0.007
>15 months	14	82	33	46			
Total	17	100	71	100			
COVID-20							
Duration	Extraction	%	Non extraction	%	Fischer's exact	df	p-value
≤ 15 months	1	5	4	10	0.57	1	0.45
>15 months	21	95	36	90			
Total	22	100	40	100			

The results reveals that there was no correlation between the treatment duration and the number of clinicians

responsible for treatment *i.e.* per patient, as shown in Table 3 in COVID-19 group.

**Table 3: The correlation between the treatment duration and the number of clinicians per single patient.**

Duration	Number of clinicians						Total	Test summery		
	1	%	2	%	3	%		Fischer's exact	df	p-value
≤ 15 months	6	13.9	0	0	0	0	6	2.935	4	0.57
>15 months	37	86.1	17	100	2	100	54			
Total	43	100	17	100	2	100	62			

Moreover, there was no correlation between the treatment duration and the number of clinical

supervisors who follow up the patient during the treatment course in COVID-19 group as shown in Table 4.

**Table 4: Relationship between treatment duration and number of supervisors who follow up the case.**

Duration	Number of supervisors								Total	Test summery		
	1	%	2	%	3	%	4	%		Fischer's exact	df	p-value
≤ 15 months	6	13.6	0	0	0	0	0	0	6	2.718	6	0.84
>15 months	38	86.4	9	100	7	100	2	100	56			
Total	44	100	9	100	7	100	2	100	62			

**DISCUSSION**

One of the major concern of patients undergo orthodontic treatment is the duration. Orthodontic treatment duration is affected by many factors such as patient's age, the type of orthodontic appliance, the care service *i.e.* public or private health care, the type of malocclusion, the complexity of the treatment and the extraction plan [12]. When the treatment plan involved extraction of teeth to correct the malocclusion, considerations must be taken whether treatment duration will be compromised.

The results of the current study revealed a significant correlation between patients treated with the extraction and the treatment duration; this was true for pre-COVID-19 group. This comes in agreement with many authors who reported that one of the most fundamental factors that prolong the treatment duration was extraction and the longest is the one involved extraction of four premolars with an average treatment time of 18.6 months [13]. Furthermore, Alger and Vig, et al. found that orthodontic treatment with extractions increased the treatment duration for 4.6 and 5 months respectively [14,15]. This was probably due to that treatment duration associated with non-extraction cases indicating treatment of simple problems without a need to close residual spaces which usually consumes extra time, whereas extraction indicates more complicated problems as proposed by [16]. Who reported that treatment duration and outcomes are affected by four premolar extractions during treatment? On the other hand,

Faruqui, et al. disagree with these finding as they reported a non-significant difference in treatment duration between class I extraction and non-extraction cases and class II div 1 extraction and non-extraction cases although extraction cases took 9 months longer treatment time than the non-extraction cases [17].

However, in the COVID-19 group, a non-significant difference was found in the treatment duration for extraction and non-extraction plan. This could be due to the quarantine time (about 9 months) imposed by the health care system marginalized the gap between the treatment time for extracted vs. non extracted cases. This comes in accordance with Morosan who found that one third of patients suffered from a delay in their treatment during quarantine time and missing 'check-ups' visits of two months period result in a delay in treatment time [18]. This was true regardless of extraction plan. Furthermore, the prolonged break in routine orthodontic follow up visits may result in an unwanted tooth movement that required rescheduling the proposed treatment plan which ultimately compromised the treatment duration whether case was extraction or not. This agrees with the finding reported by Umeh, et al. who find that missed routine appointments increased the cost of the treatment and had an impact on treatment duration *i.e.* delayed treatment.

The current study took place in training hospital where many factors could influence the treatment durations such as the study program duration, individual trainee's skills and the commitment of the clinical instructors. The

results showed that there is no significant relationship between the treatment duration and the number of students and or clinical supervisors. This comes in accordance with Gonzalez, et al. who found a non-significant relationship between the numbers of Trainees *i.e.* students and orthodontic treatment duration [19]. They justified that to their longer training course (3 years). However, the results disagreed with that reported by Schafe, et al. who found a significant increase in treatment time associated with a two-year training course, similar to that undertaken by the author's training institute [20]. Similarly, McQuinness and McDonald claimed that treatment duration of patients treated by multiple postgraduate students increased by 8.3 months [21]. The short training course is associated with almost 80% of patients transferred to another student with lower individual skills. This may complicate the treatment especially if multiple instructors were involved per single patient. It is possible that the quarantine period (9 months) resulted in reduce the difference in the treatment duration between the transferred and non-transferred cases *i.e.* the quarantine imposed its effect on treatment duration for both groups.

### CONCLUSION

Before COVID-19, the orthodontic treatment duration increased significantly when the extraction plan was imposed. However, there longtivity of the treatment was not associated with the number of postgraduate students or the clinical supervisors responsible for treatment. It is possible that the quarantine time compromised the treatment time in pre COVID-19 and COVID-19 groups.

### REFERENCES

1. Suri S, Vandersluis YR, Kochhar AS, et al. Clinical orthodontic management during the COVID-19 pandemic. *Angle Orthod* 2020; 90:473-484.
2. Umeh OD, Utomi IL, Isiekwe IG, et al. Impact of the Coronavirus disease 2019 pandemic on orthodontic patients and their attitude to orthodontic treatment. *Am J Orthod Dentofacial Orthop* 2021; 159:e399-409.
3. American Association Orthodontists (AAO). COVID-19 coverage information for you and your practice. 2020.
4. Bustati N, Rajeh N. The impact of COVID-19 pandemic on patients receiving orthodontic treatment: An online questionnaire cross-sectional study. *J World Fed Orthod* 2020; 9:159-163.
5. Shia GJ. Treatment overruns. *J Clin Orthod* 1986; 20:602-604.
6. Turbill EA, Richmond S, Wright JL. The time factor in orthodontics: What influences the duration of treatments in national health service practices. *Community Dent Oral Epidemiol* 2001; 29:62-72.
7. Graber TM, Eliades T, Athanasiou AE. Risk management in orthodontics: Experts' guide to malpractice. 2004.
8. Segal GR, Schiffman PH, Tuncay OC. Meta-analysis of the treatment related factors of external apical root resorption. *Orthod Craniofac Res* 2004; 7:71-78.
9. Fox N. Longer orthodontic treatment may result in greater external apical root resorption. *Evid Based Dent* 2005; 6:21.
10. Abed AL, Jawad F, Alhashimi N. Orthodontic treatment pause during COVID-19 outbreak: Are we overlooking potential harms to our patients and their treatment outcomes?. *Dental Press J Orthod* 2021; 26.
11. Abdaljawwad AA, Al-Groosh DH. Evaluation of treatment outcomes in orthodontic using the Peer Assessment Rating (PAR) index: A clinical audit. *Int Medical J* 2020; 27.
12. Mavreas D, Athanasiou AE. Factors affecting the duration of orthodontic treatment: A systematic review. *Eur J Orthod* 2008; 30:386-395.
13. Fink DF, Smith RJ. The duration of orthodontic treatment. *Am J Orthod Dentofacial Orthop* 1992; 102:45-51.
14. Alger DW. Appointment frequency versus treatment time. *Am J Orthod Dentofacial Orthop* 1988; 94:436-439.
15. Vig KW, Weyant R, Vayda D, et al. Orthodontic process and outcome: Efficacy studies strategies for developing process and outcome measures: A new era in orthodontics. *Clin Orthod Res* 1998; 1:147-155.
16. Papageorgiou SN, Hochli D, Eliades T. Outcomes of comprehensive fixed appliance orthodontic treatment: A systematic review with meta-analysis and methodological overview. *Korean J Orthod* 2017; 47:401-413.
17. Faruqui S, Fida M, Shaikh A. Factors affecting treatment duration a dilemma in orthodontics. *Abbottabad, J Ayub Med Coll* 2018; 30:16.
18. Morosan H. Orthodontic treatment in times of COVID-19. *J Med Life* 2021; 14:205.
19. Gonzalez Gil de Bernabe P, Bellot Arcis C, Montiel Company JM, et al. Evaluation of treatment outcomes in a 3 years post-graduate orthodontic program using the Peer Assessment Rating (PAR). *J Clin Exp Dent* 2014; 6:e364.
20. Schafer SM, Maupome G, Eckert GJ, et al. Discrepancy index relative to age, sex and the probability of completing treatment by one resident in a 2-year graduate orthodontics program. *Am J Orthod Dentofacial Orthop* 2011; 139:70-73.
21. McQuinness NJ, Mc Donald JP. The influence of operator changes on orthodontic treatment times and results in a postgraduate teaching environment. *Eur J Orthod* 1998; 20:159-167.