

# FACTORS INFLUENCING THE DECISION TO INITIATE ORTHODONTIC TREATMENT AND THE CHOICE OF APPLIANCE TYPE IN A LEBANESE SAMPLE DURING THE COVID-19 PANDEMIC AND THE ECONOMIC CRISIS. A CROSS-SECTIONAL STUDY.

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## Abstract

**Background:** The spread of Coronavirus Disease 2019 (COVID-19) has led to a major public health issue. This study aimed to assess the factors that influence the Lebanese people in undergoing an orthodontic treatment after the outbreak of COVID-19, as well as the factors that influence their choice of orthodontic appliance type.

**Methods:** 489 Lebanese participants (199 men and 290 women) were invited to fill a questionnaire developed on Google Forms. Eligible participants were simply Lebanese people including those who immigrated during the crisis. Dentists, dental students and foreigners were excluded from the study. The link for the questionnaire was sent to the patients via WhatsApp. It is a brief, structured 10-item questionnaire that assesses the relationship between the economic recession and the COVID-19 pandemic and the Lebanese participants' decision to initiate orthodontic treatment and their choice of appliance type.

**Results:** A total of 489 responses were obtained: 199 men (41%), 290 women (59%) with a mean age of 24 years  $\pm$  8.4 years (age range: 13 to 64 years). Half of the participants feel anxious in consulting for an orthodontic opinion during the pandemic. Almost half of the respondents are thinking of starting orthodontic treatment after the start of COVID-19. The responses showed that most participants (71%) believe that the current economic crisis in Lebanon influences their decision to start an orthodontic treatment. Regarding the choice of the type of orthodontic appliance, a higher number of respondents choose metal braces (traditional) than other appliances. In a normal situation, the aesthetic of the appliance is the most important factor in choosing the appliance.

**Conclusion:** The COVID-19 pandemic and the current economic crises in Lebanon had a negative impact on the financial and emotional well-being of the Lebanese people, on their decision to initiate an orthodontic treatment as well as on choosing the type of the appliance. However, despite the difficult circumstances facing the country, a big part of the respondents was not discouraged from initiating treatment.

**Key words:** COVID-19, economic crises, anxiety, orthodontic treatment, orthodontic appliances.

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# ***LES FACTEURS INFLUENÇANT LA DÉCISION D'ENTAMER UN TRAITEMENT ORTHODONTIQUE ET LE CHOIX DU TYPE D'APPAREILLAGE CHEZ UNE POPULATION LIBANAISE PENDANT LA PANDÉMIE DU COVID-19. UNE ÉTUDE TRANSVERSALE.***

## **Résumé**

**Contexte :** La pandémie du coronavirus 2019 (COVID-19) a conduit à un problème majeur de santé publique. Cette étude visait à évaluer les facteurs qui influencent les Libanais à suivre un traitement orthodontique après cette pandémie, aggravée par une crise économique, ainsi que les facteurs qui influencent leur choix du type d'appareils orthodontiques.

**Méthodes :** Il s'agit d'une étude descriptive transversale. Les participants ont été invités à remplir un questionnaire développé sur Google Forms. Le lien pour le questionnaire a été envoyé aux patients via WhatsApp Messenger.

**Résultats :** Un total de 489 réponses a été obtenu : 199 hommes (41%), 290 femmes (59%) avec un âge moyen de 24 ans. La moitié des participants se sentent anxieux en consultant pour un avis orthodontique à cause de la pandémie. Près de la moitié des répondants envisagent de commencer un traitement orthodontique après le début de COVID-19, malgré le taux élevé d'anxiété. Les réponses ont montré que la plupart des participants (71%) pensent que la crise économique actuelle au Liban, surtout après la pandémie, influence leur décision de commencer un traitement orthodontique. En ce qui concerne le choix du type d'appareils orthodontiques, un plus grand nombre de répondants choisissent les appareils métalliques (traditionnels) que les autres appareils. L'esthétique de l'appareil est le facteur le plus important dans le choix de l'appareil.

**Conclusion :** La pandémie de COVID-19 et la crise économique actuelle au Liban ont sûrement eu un impact négatif sur le bien-être financier et émotionnel des Libanais, et sur leur décision d'initier un traitement orthodontique ainsi que dans leur choix du type d'appareils. Pourtant, malgré les circonstances difficiles qu'affronte le pays, une grande partie des répondants n'étaient pas découragés d'entamer un traitement.

**Mots clés :** COVID-19, crise économique, anxiété, traitement orthodontique, appareils orthodontiques.

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## Introduction

Aesthetics and dental problems such as malocclusion and crowding of the teeth can affect the quality of life and well-being of individuals. Well-aligned teeth and a pleasant smile confer positive status at all social levels and ages, whereas crowded teeth bring negative status [1]. In general, patients are increasingly thinking of seeking orthodontic treatment to improve their appearance, dental health, social life, and even to have better opportunities at work [2, 3]. In addition, patient psychology may be among the indicators for orthodontic treatment [1].

On the other hand, socioeconomic status has been incriminated in the demand for orthodontic treatment as well as for the quality of the material and for the subsequent care.

The COVID-19 pandemic broke out in the city of Wuhan, China, in late December 2019 and has since spread rapidly around the world [4]. It causes a series of human respiratory tract infections ranging from a mild cold to severe respiratory distress syndrome [5]. The first documented case of infection with the new 2019 coronavirus in Lebanon was on February 21, 2020. Since then, various aspects of life in the country have been seriously or partially disrupted. Non-urgent dental appointments, such as orthodontics, have been postponed or canceled, due to the physical proximity between the orthodontists and patients increasing the risk of contamination and further spread.

The Lebanese population was about to face a new challenge. Will the financial recession and the fear of COVID-19 viral contamination affect the Lebanese demand for orthodontic care and for their choice of appliances? What about the quality of care?

The primary objective of this study was to investigate the factors that influence the Lebanese, in the present economic situation, and in the presence of COVID-19, to choose whether to initiate orthodontic treatment,

according to their needs and financial situation. The secondary objective was to investigate the factors that may influence the choice of appliance. The first hypothesis was that the factors influencing the Lebanese to start orthodontic treatment are independent of the current situation in Lebanon. The second hypothesis was that the current economic recession does not affect the choice of orthodontic appliances among the Lebanese.

## Materials and Methods

### Study design and population

The sample size calculation for a type I error  $\alpha = 5\%$  and a study power of 80% was 500 individuals. A questionnaire developed on Google Forms was sent to 550 individuals, and only 489 participated in the study. The link for the questionnaire was sent once to the participants via WhatsApp Messenger as it was an effective way to reach them during the confinement period.

The survey was kept open for a period of one month, and consisted of a brief, structured 10-item questionnaire that assessed the relationship between the economic recession and the COVID-19 pandemic on one side, and the Lebanese participants' decision to initiate orthodontic treatment as well as their choice of appliance type on the other side.

The responses were obtained and tabulated in Excel for descriptive statistical analysis.

### Inclusion and exclusion criteria

The study included adolescent and adult Lebanese who agreed to participate by completing the questionnaire. Eligible participants were also Lebanese living abroad for less than a year (Lebanese who immigrated during the crisis).

Dentists, dental students in their 3rd year and above, and non-Lebanese individuals were excluded from the study.

### Questionnaire and data Collection

Data were collected using an administered questionnaire. The questionnaire included sociodemographic characteristics such as age, gender, and region. Occupation was also classified into students (which included university, high school, or elementary school students), employees (which included employees of companies, employees of institutions), public officials, self-employed, and unemployed or inactive persons (doing housework). We asked participants if they ever had any orthodontic treatment before, and if consulting for orthodontic advice after the pandemic of COVID-19, makes them anxious. We also asked them if they think they will engage in orthodontic treatment after the pandemic and the reason for their response, and if the current economic crisis in Lebanon, especially after COVID-19, has an influence on their decision to engage in orthodontic treatment. Finally, the participants were asked to choose the orthodontic appliance they prefer the most. Their choice is based on photos of 4 people each wearing an orthodontic appliance with the price of each were presented in the questionnaire. The appliance in the 1st photo was metal/traditional braces, the 2nd appliance was ceramic/transparent braces, the 3rd was plastic aligners, and the last one was the lingual system.

For data analysis, the responses were automatically linked to a spreadsheet on Google Sheets. Then, the data was downloaded and analyzed on SPSS version 26 and descriptive results were presented in pie charts.

## Results

A total of 489 responses were obtained: 199 men (41%), 290 women (59%) with a mean age of 24 years  $\pm 8.4$  years (Age range: 13 to 64 years).

54% of the participants were from Beirut (Figure 1).

50% of the participants feel anxious about seeking orthodontic advice because of the pandemic.

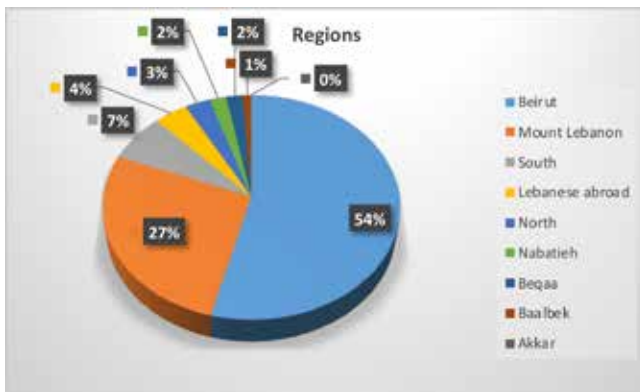


Figure 1: Distribution of participants over the different Lebanese regions. Regarding occupations, 60% of the participants were students (Figure 2).

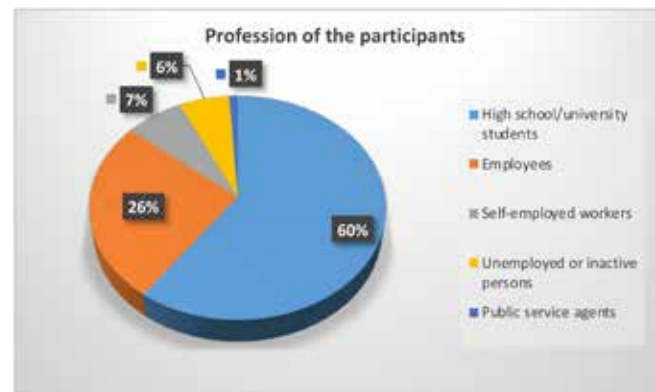


Figure 2: Distribution of participants by occupation. Half of the respondents had received orthodontic treatment in the past (50%).

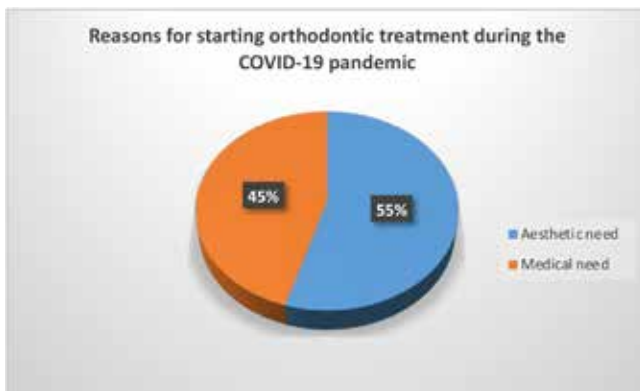


Figure 3: Distribution of participants based on different reasons for initiating orthodontic treatment during the pandemic.

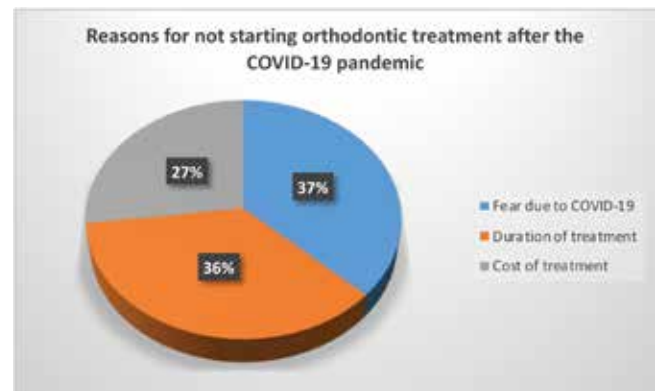


Figure 4: Distribution of participants based on different reasons for not starting orthodontic treatment during the pandemic.

48% of respondents were thinking about starting orthodontic treatment after starting COVID-19, with 55% of these respondents thinking about starting orthodontic treatment because of an aesthetic need (Figure 3). Among the respondents who were not thinking of starting orthodontic treatment after the start of COVID-19, their choice was based on the cost of the treatment, the length of the treatment, or because they were afraid of pandemic (Figure 4).

71% of the participants believe that the current economic crisis in Lebanon, especially after the pandemic, influences their decision to seek orthodontic treatment.

Regarding the choice of the type of orthodontic appliances, more respondents choose metal (traditional)

appliances than other appliances: 38% of the respondents chose metal braces (traditional), others chose ceramic braces, plastic aligners (trays), or the lingual system (hidden behind the teeth) (Figure 5).

Their choice of orthodontic appliance type on the price of the appliance, the aesthetics of the appliance, the final treatment outcome, or on the speed of treatment (Figure 6).

## Discussion

Globally, the COVID-19 pandemic has been the main concern of societies due to the drastic changes in daily life. Dentistry, including orthodontics, requires dentist/patient proximity, and

this increases the risk of COVID-19 transmission.

Therefore, it was necessary to examine the COVID-19 situation from the perspective of patients who are considering initiating orthodontic treatment. Studies such as these are useful because they raise clinically important information and a more nuanced understanding of the current situation, which helps clinicians provide much-needed intake and attention in addition to necessary dental care.

When the questionnaire for this study was sent to potential respondents, quarantine had been recommended in Lebanon in all cities. Through electronic and digital media, everyone is informed about the global situation and the risk of a major

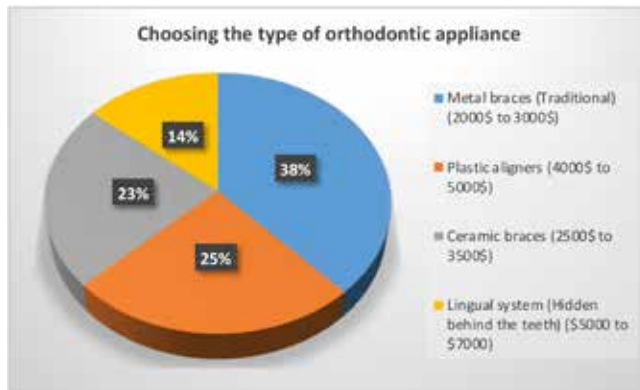


Figure 5: Distribution of participants according to their choice of orthodontic appliance type.

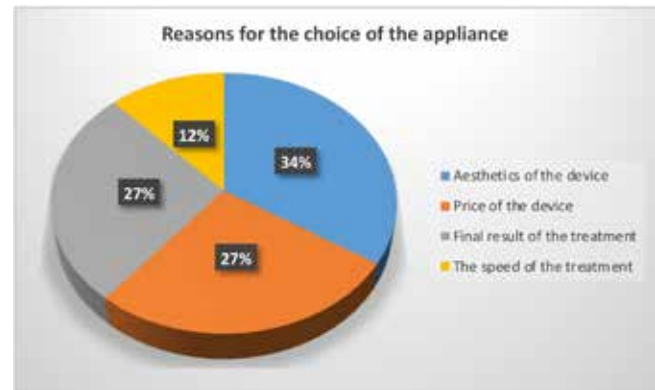


Figure 6: Distribution of participants based on different reasons for choosing a certain type of appliance.

epidemic with many deaths in our country, which may increase anxiety, since it is known that there is a relationship between social media use and anxiety [6]. The methodology of the online survey allows a quick overview of the problem, concerning so many doubts and uncertainties. We extended the sample to almost all Lebanese regions.

Umeh et al. showed that there is a statistically significant association between age, gender, and willingness to continue orthodontic treatment during the pandemic, with women and younger patients being more willing to continue treatment [7]. However, the results are not consistent with other studies that have not observed these associations; Cotrin et al. and Peloso et al. reported a greater willingness to access care in men [8, 9].

- The first objective of this study was to assess the factors that influence the decision of Lebanese to initiate orthodontic treatment after the pandemic.

Our study revealed that half of the participants are anxious for orthodontic advice because of the pandemic, and that a large proportion of the participants (37%) who are not thinking of starting orthodontic treatment at the present time was because of fear due to the virus. There is a strong relationship between the level of anxiety and fear due to COVID-19, and the willingness to start orthodontic treatment. This pandemic then

has an influence on the Lebanese population to start orthodontic treatment. However, it is interesting to note that almost half of the participants who were anxious to seek orthodontic advice after the pandemic were willing to start orthodontic treatment. The age of the Lebanese patients and the levels of anxiety to consult for orthodontic advice during the pandemic were almost similar, which may generate a lack of correlation in our sample. This result is contrary to the findings of a recent study that showed that younger people and those who spent too much time focusing on the epidemic reported a significantly higher prevalence of anxiety and depressive symptoms during the pandemic than older people [10]. Thus, the pandemic and anxiety affected all Lebanese and all age groups.

It is interesting to note that almost half of the respondents in the current study were willing to initiate treatment during this period, despite the high anxiety due to COVID-19, in order to satisfy their aesthetic and medical needs. This shows us that these two factors are important in the choice of the Lebanese population to start orthodontic treatment. The aesthetic factor was the dominant factor, which is in agreement with other studies that indicate that many patients seeking orthodontic treatment are motivated by dental aesthetics rather than by improving masticatory function [11]

and that the psychological and social benefits of orthodontic treatment began to be more important than those of oral health [12]. On the other hand, among the participants who were not thinking of starting orthodontic treatment, they based their choice on the inconvenience of the cost of the treatment (27%), as well as the long duration of the treatment (36%) and the fear due to COVID-19 (37%). The responses from this study indicate that there is a clear fear of contracting the virus during orthodontic appointments. This is consistent with previous studies [7, 8, 9]. Correlatively, COVID-19 appears to be a new influencing factor to start orthodontic treatment, as important as the duration of treatment since the first question of the patients, even before starting treatment, concerns the duration of treatment [13]. What is surprising is that these two factors are more decisive than the treatment cost factor, even with the current economic crisis in Lebanon. In addition, there is a statistically significant association between age, gender, occupation, and willingness to initiate treatment during the pandemic, which is consistent with recent studies already mentioned [7, 8, 9]. Other researchers have observed an increased willingness to access care by the younger population [7, 8, 9], which is similar to our results. We found that participants <20 years of age, but surprisingly also those whose age is between 40 and 49

years, are the most decided to initiate orthodontic treatment, whereas those who are the least decided were participants >50 years of age. This shows that age is a factor influencing the decision to start orthodontic treatment. It was found that among participants who are <20 years old and thinking of starting orthodontic treatment, 62% of them because of an aesthetic need, which is consistent with other studies; according to Pithon et al, younger people are more critical when evaluating aesthetics [14]. Relating to gender, it turns out that men are somewhat more willing to initiate orthodontic treatment after COVID-19 initiation than women. Similarly, to our results, other studies have reported a stronger willingness to access care in men [8, 9]. This may have a relationship to the higher anxiety level in women, but to report that women are more likely to initiate orthodontic treatment because of aesthetics than men. The percentages reveal that students and self-employed people are the most likely to start orthodontic treatment and that public servants are the least encouraged to do so. This may be explained by the current economic crisis in Lebanon. Therefore, the profession may be a factor influencing their decision. In addition to the above-mentioned key factors, it appears that the current economic crisis in Lebanon is a primary factor among the Lebanese population (71%) in the decision to undergo orthodontic treatment. This is evidenced by the fact that the increase in costs of orthodontic treatment is an effect of the current pandemic and economic recession, especially since orthodontic care in the country is not covered by the national health insurance scheme and most orthodontic patients must pay the cost of treatment themselves.

- The second objective of our study was to evaluate the factors that influence the choice of the type of orthodontic appliance.

Regarding the choice of braces, the results are in favor of metal braces. Half of the people who chose metal

braces did so because of the price of the appliance. This can be explained by the economic crisis and the increase in prices that probably played a role in influencing the choice of the participants. The result of the treatment was the second most important reason for choosing traditional appliances, this is explained in other recent studies where, although respondents consider the aesthetics of the appliances to be very important, almost all respondents are willing to compromise on the aesthetics of the appliances during treatment if it leads to a better result [15]. So, these 2 factors can influence the decision to choose a type of appliance, and to add that the treatment outcome is as important factor as the price of the appliance. While traditional braces remain the most commonly used or chosen appliance, it is not surprising that the more aesthetic treatment options of ceramic appliances, aligners and lingual appliances are gaining in popularity. It is worth noting in this context that, according to other studies, ceramic braces, plastic aligners and lingual systems are also likely to be chosen, and this is due to their aesthetic value [16]. This shows that the aesthetics of the appliance has a conclusive role in the choice of appliance type, being also the factor most chosen by the participants to select their appliance (36%). Despite the participants' concern about the duration of treatment, the speed of treatment, which is also a factor influencing the choice of the type of fitting, appears to be less important to the participants than the other factors. The results also show that the choice of appliance type varies between different age categories; older people prefer cosmetic appliances more than younger participants, which is similar with other studies where adolescents tend to prefer cosmetic appliances more than younger people [17]. Gender, and different occupations are also factors to consider, and this diversifies the factors influencing this choice.

The results of this study attempted to fill a gap in the stewardship of

daily orthodontic practice in Lebanon during the COVID-19 pandemic. To date, few studies have attempted to answer the research question, focusing on the emotional impact. Further studies are therefore recommended to validate the results and compare the impact of COVID-19 among different orthodontic populations.

## Conclusion

- The COVID-19 pandemic had an impact on orthodontic consultations and patient anxiety.

- Despite patient anxiety, half of the participants were thinking of starting orthodontic treatment after the coronavirus pandemic in Lebanon, with aesthetics being the most motivating factor, followed by medical need.

- Women were more anxious than men about the coronavirus pandemic and seeking orthodontic advice.

- In addition, this pandemic significantly influenced the initiation of orthodontic treatment; duration of treatment and cost of treatment were two other factors influencing the decision to start orthodontic treatment, as well as age, gender, and occupation of the participants.

- The current economic crisis in Lebanon, especially after the pandemic, really affects the decision of the Lebanese to start orthodontic treatment.

- The most chosen appliance was metal braces, because of its relatively lower price than other appliances, and also because of the feeling that they give better final results.

## Appendix

### The questionnaire (English version)

- Age:
  - Sex:
    - Male       Female
  - Region/City:
  - Occupation:
- If you are a student, specify institution/university:

#### 1. Have you ever had orthodontic treatment (braces)?

If yes, continue the questionnaire as if you were seeking to repeat the treatment.

- Yes       No

#### 2. After the outbreak of COVID-19; does the fact of consulting for an orthodontic opinion makes you anxious?

- Yes       No

#### 3. Are you thinking of starting orthodontic treatment after the outbreak of COVID-19?

- Yes       No

a) If yes, why?

- Cosmetic need       Medical need

b) If not, why not?

- Cost of treatment       Duration of treatment  
 Fear due to COVID-19

#### 4. Does the current economic crisis in Lebanon, especially after the COVID-19 pandemic, influence your decision to start orthodontic treatment?

- Yes       No

#### 5. What is your choice regarding the type of orthodontic appliances?

- Metallic Braces (Traditional) (\$2000 to \$3000)



- Ceramic Braces (Transparent) (\$2500 to \$3500)



- Clear Aligners (\$4000 to \$5000)



- Lingual system (Hidden behind the teeth) (\$5000 to \$7000)



#### 6. What is your choice based on?

- Price of the device
- Aesthetic of the device
- Final outcome of the treatment
- Speed of the treatment

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