

EVALUATION OF THE CHANGE OF ONLINE SEARCH TREND REGARDING ORTHODONTIC TREATMENT BEFORE AND AFTER THE COVID-19 PANDEMIC IN EGYPT

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KEYWORDS

COVID-19 pandemic, Google Trends, orthodontic treatment, Invisalign.

ABSTRACT

Background: COVID-19, a highly infectious disease, has rapidly spread throughout the world in a short span of time and led to a major public health issue. And most dental clinics were closed. Regular orthodontic visits were strongly and widely interrupted. Millions of orthodontic patients were unable to complete their treatment and missed their monthly visits during this period. Orthodontic patients tend to receive information by using numerous social media platforms and applications to source health information, look for solutions, and communicate and share experiences. **Aim:** To evaluate the change in the online search trend regarding orthodontic treatment terms before and after the Covid-19 pandemic using google trend data from the Google search engine in Egypt. **Materials and methods:** Google Trends application was searched for orthodontic treatment terms on Google for the last years from September 2018 to December 2021. Then Save the graphs and Excel table for each English and Arabic orthodontic term. Search results were recorded separately for all English orthodontic keywords (Orthodontic, Braces, Braces get, Braces removal, Braces pain, Clear aligners). **Results:** An increase in all orthodontic English and Arabic term searches was observed before covid- 19, and a large decrease in the quantity of orthodontic term searches was noted during and after the lockdown in 2020/2021. **Conclusion:** The COVID-19 pandemic has had an effect on orthodontic- related search queries. English and Arabic terms searches was noted to be increased in quantity before COVID-19 than during and after COVID-19.

INTRODUCTION

COVID-19 is also known as Coronavirus disease. Initially, reported in the Chinese state of Wuhan in late December 2019, the highly infectious disease caused by severe acute respiratory syndrome has rapidly spread throughout the world in a short span of time and led to a major public health issue⁽¹⁾. Scheduled orthodontic appointments, and most orthodontic problems were deemed nonemergent. Millions of orthodontic patients were unable to complete their treatment and missed appointments during this period⁽²⁾. Since orthodontic treatment is a long and continuous process, there are millions of patients who were already undergoing orthodontic treatment and faced problems with the orthodontic appliance when scheduled care was abruptly suspended⁽³⁾. Orthodontic patients turn to the internet and social media platforms to source health information, look for solutions, communicate, and share

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experiences due to the volume of resources, ease of access, and convenience of ‘surfing the Internet’ whenever and wherever they desire⁽⁴⁾. Social media is a form of electronic communication that has been proven to be an effective way to increase patients’ understanding of orthodontic treatment since it may be interesting, accessible, and flexible. As such, it could be a useful tool for educating and motivating orthodontic patients⁽⁵⁾. The orthodontic trends changing with socioeconomic status, the internet is a very important source of health information. Therefore, doctors should be aware of the health information available online to help guide patients to reliable websites⁽⁶⁾. The most popular tool for examining online behavior is Google Trends, an open tool that provides information on trends and the variations of online interest in selected keywords and topics over time⁽⁷⁾. Therefore, in the present study, the change in online searches regarding orthodontic treatment before and after the Covid-19 pandemic in Egypt was evaluated.

MATERIAL AND METHOD

This study was carried out with the Google Trend application⁽⁸⁾, which was used to collect data on internet searches for orthodontic treatment terms. The target population was patients undergoing orthodontic treatment who used Google searches to find solutions for their problems on the internet. Google Trend Engine (GT) is an open database and online search tool that was used to collect data on Internet search interest among anonymous users. Google search engine that analyses a specific search term entered Google Trend (figure 1). The interest over time was represented by numbers in the graph that reflect how many searches have been carried out for a search term relative to the total number of searches done on Google over a specific period of time. To explain further, those numbers do not

represent the absolute search volume. The data is normalized and presented on a graph ranging from 0 to 100, where 100 means the maximum number of searches in a stated period of time. When there is not enough data, the result is zero.

Google Trends application was searched for orthodontic treatment terms on Google for the last years from September 2018 to December 2021. Then the graphs and Excel table for each English and Arabic orthodontic term were saved. Search results were recorded separately for all English orthodontic keywords as the following (Orthodontic, Braces, Braces get, Braces removal, Braces pain, Clear aligners).

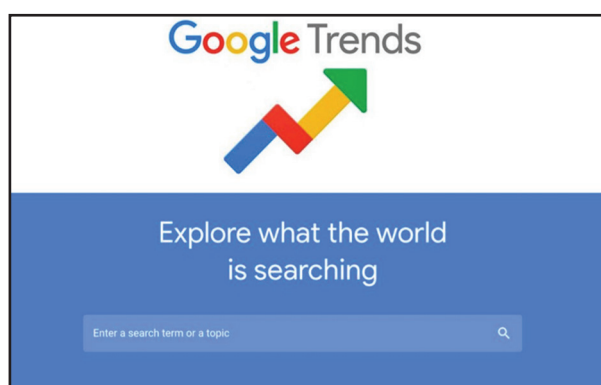


Fig. (1) Google Trends application.

Grouping of the data

The data was provided in the form of a monthly time series covering the period from September 2018 to December 2021. The time period was dissected into three different phases:

The first phase (Before COVID-19) which covers the year from September 2018 to October 2019.

The second phase (During COVID-19) is the one that witnessed the peak of the pandemic from November 2019 to December 2020.

The third phase (After COVID-19) is that of 2021 in which the pandemic's first phase has receded.

Statistical analysis

Graphical, tabular, and numerical comparisons were conducted to determine whether there were statistically significant differences between the expressions used within the three phases of the study. Excel 2016 and SPSS version 23 were used for the data analysis. The level of statistical significance was set at $\alpha = 0.05$. To test the relationship between the standardized number of searches between the terms within selected time periods, the Pearson correlation coefficient was used. Relative search volume (RSV) charts were used to show changes in time for the investigated terms.

RESULTS

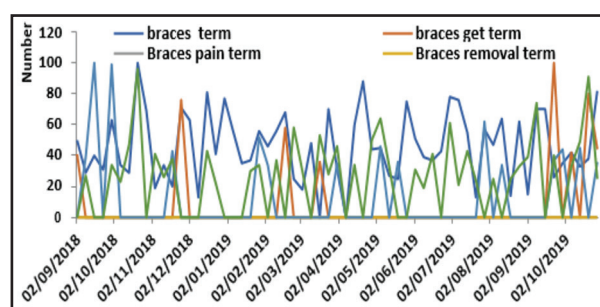
Table (1) The English search terms before Covid-19 in the first phase (September 2018 to October 2019)

Terms	N	%
Orthodontic	1568	28.0
Braces	2821	50.3
Braces get	477	8.5
Braces pain	0	0.0
Braces removal	0	0.0
Clear aligners	742	13.2
Total	5608	

Table.1 and Relative Search Volume.1 (RSV.1): showed the English search terms before COVID-19 in the first phase (September 2018 to October 2019):

The number of searches frequented for each term and the percentage of each term compared to the

total searches during the specified period. The orthodontic term was 1568 (28.0), the Braces term was 2821 (50.3%), the Braces get term was 477 (8.5%), and the clear aligners were 742 (13.2%). While we did not find any results for the search for the terms Braces pain term and Braces removal term.



RSV. (1) English search terms before Covid-19 in the first phase

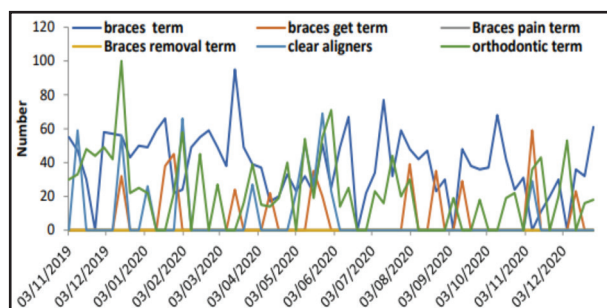
Table (2) The English search terms during Covid-19 in the second phase (November 2019 to December 2020)

Terms	N	%
Orthodontic	1345	29.5
Braces	2353	51.7
Braces get	401	8.8
Braces pain	0	0.0
Braces removal	0	0.0
Clear aligners	454	10.0
Total	4553	

Table.2 and Relative Search Volume.2 (RSV.2) showed the English search terms during COVID-19 in the second phase (November 2019 to December 2020):

The number of searches frequented for each term and the percentage of each compared to the total

searches during the specified period. “Orthodontic term was 1345 (29.5%), Braces term was 2353 (51.7%), Braces get term was 401 (8.8%), clear aligners were 454 (10%), and while we did not find any results for the search about terms Braces pain and Braces removal terms.



RSV. (2) English search terms during Covid -19 in the second phase

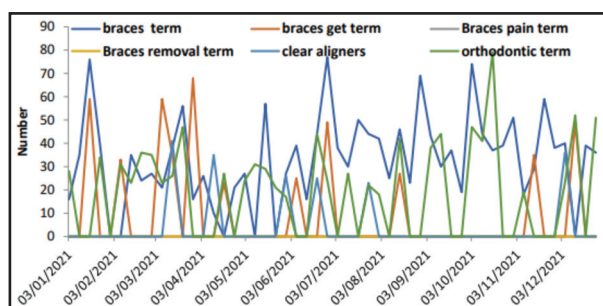
Table (3) The English search terms after Covid-19 in the third phase (2021).

Terms	N	%
Orthodontic	1003	29.7
Braces	1727	51.1
Braces get	462	13.7
Braces removal	0	0.0
Braces pain	0	0.0
Clear aligners	186	5.5
Total	3378	

Table.3 and Relative Search Volume.3 (RSV.3) showed the English search terms after Covid-19 in the third phase (2021):

The number of searches frequented for each term and the percentage of each term compared to the total searches during the specified period. “Orthodontic” was 1003 (29.7), “Braces” was 1727 (51.1%), “Braces get” was 462 (13.7%), and “clear aligners” were 186 (5.5%). While we did not find

any results for the search about the terms “Braces pain and Braces removal”



RSV. (3) English search terms after Covid-19 in the third phase (2021)

Groups comparison

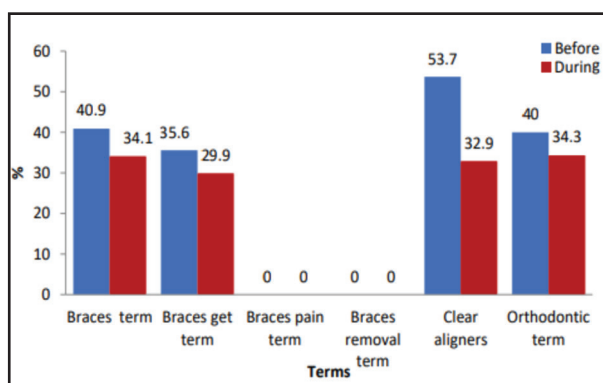


Chart (1) Comparison between before and during covid-19 search regarding orthodontic terms

Chart 1: showed a Comparison between before and during covid-19 searches regarding orthodontic terms:

The orthodontic terms searched before covid-19 were higher than during covid-19. The highest RSV of the “orthodontic” term was observed in October 2018. The highest RSV of the “Braces” term was in October 2018. The peak of the “Braces get” term was observed in September 2019. The highest RSV of the “Clear aligners” term was in September 2019.

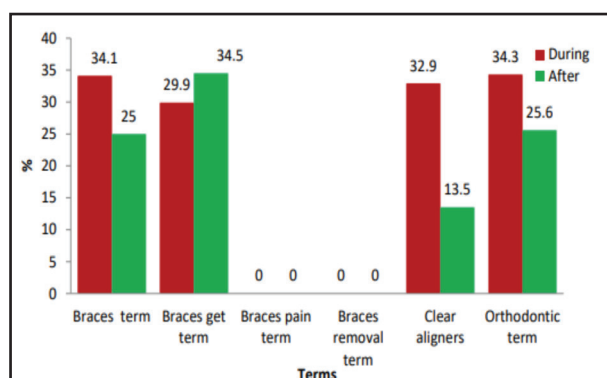


Chart (2) Comparison chart between during and after covid-19 search regarding orthodontic terms

Chart 2: showed comparison between during and after covid-19 searches regarding orthodontic terms:

The orthodontic terms “Orthodontic, Braces, & Clear aligners” were increased in search volume during covid-19 than after covid-19.

The highest RSV of the “Orthodontic” term was observed in December 2019. The highest RSV of the “Braces” term was observed in March 2020. The highest RSV of the “Clear aligners” term was in July 2020.

The orthodontic term “Braces get” was more frequently searched after covid-19 than during covid-19. The highest RSV of the “Braces Get” term was in March 2021.

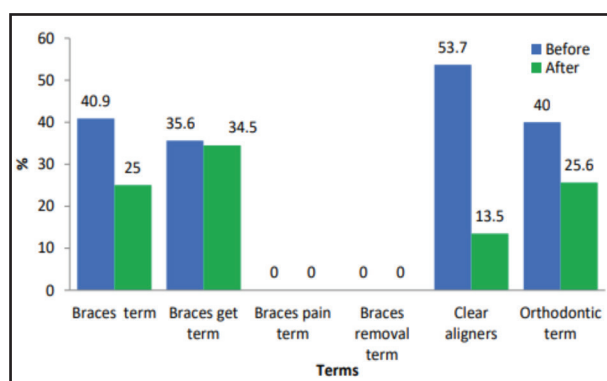


Chart (3) omparison chart between before and after covid-19 search regarding orthodontic terms

Chart.3 showed a comparison between before and after covid-19 searches regarding orthodontic terms:

The orthodontics terms searches before covid-19 were greater than after covid-19. The highest

RSV for the “Orthodontic” term was observed in October 2018. The highest RSV for the

“Braces” term was observed in September 2019. The highest RSV of the “Clear aligners” term was observed in September 2019.

DISCUSSION

The COVID-19 pandemic has severely limited dental care, most dental clinics were closed particularly procedures such as orthodontic practice, which requires a regular return visit for active adjustment. The course of the COVID-19 pandemic has had a large impact on orthodontic-related search queries⁽⁹⁾.

The reason Google Search Trends is used to identify keywords is that it helps to find popular keywords. Google Trends is an open tool that provides information on trends and the variations of online interest in selected keywords and topics over time⁽¹⁰⁾. Google Trends is the most popular and important tool that provides both real-time and archived information on Googlequeries from 2004⁽¹¹⁾.

Since the internet is a source where people frequently seek information, the reliability and content of the information contained are important, due to orthodontic patients obtain information by using various social media platforms and applications to find information regarding orthodontic treatment. Some authors reported the important quality of the web-based information about orthodontic treatment⁽¹²⁻¹⁴⁾.

The first noticeable value of the research is the increase in all orthodontic English and Arabic term searches before covid-19, and a large decrease in the quantity of orthodontic term searches was noted during and after the lockdown in 2020/2021.

In line with the conducted study, the highest search term was “braces”, it was frequented 6901 times overall during the period of study, and in comparison, with other terms, more interest in the “braces” term was observed in the first phase before Covid-19 in the first phase (September 2018 to October 2019) about 2821 times with 40.9%

In line with the conducted study, more interest in the “Clear aligners” term was observed before covid-19 in the first phase (September 2018 to October 2019) about 742 times with 53.7%. These findings were not similar to the findings of *Sycińska-Dziarnowska et al*⁽¹⁴⁾. observed and estimated aligner treatment interest among Google Search users by Google Trends data analyzed for the search term, “Invisalign” for the year 2022 for three European Union countries. The results predict an increase in “Invisalign” in Google Trends queries in the coming year, increasing by around 6%, 9% and 13% by the end of 2022 compared to 2021 for France, Italy, and Germany, respectively.

Thus, in the challenging times of the pandemic, the use of aligners can ensure treatment progress. The most commonly reported urgent need is bracket breakage, which may explain growing interest in Invisalign treatment during the COVID-19 pandemic, as fewer emergency visits were needed with aligners (5.1%) compared to fixed appliances (74.7%)⁽¹⁵⁾.

In the present study, there was no interest search observed according to the phrase “braces pain” or “braces removal” overall during the period under study. This finding Quite unexpectedly, especially during the Covid-19 lockdown period, because

there were the two most common problems facing orthodontic patients. These findings were similar to the findings of *Sycińska-Dziarnowska et al*⁽¹¹⁾. who evaluated the data regarding orthodontic expression in real-time surveillance using Google Trends. They concluded that there was a lower interest in the “braces pain” query during the first lockdown in 2020.

CONCLUSION

The COVID-19 pandemic has had an effect on orthodontic-related search queries. The quality of the Google Trend information about orthodontic phrases was good, and the readability of the data was sufficient. English and Arabic terms searches was noted to be increased in quantity before COVID-19 and during and after COVID-19.

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