

# The Impact of COVID-19 on Dental Hygiene, Health, and Esthetics

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## Abstract

The purpose of this research was to try and determine if one's perception of dentistry and dental habits had changed during the pandemic. A survey was created, promoted, and posted on an anonymous and confidential online platform. The survey consisted of four different sections that attempted to accurately portray participants' dental hygiene, health, and esthetic concerns before, during, and after the COVID-19 mask mandate. The study had 123 participants that varied in age, gender, education level, and area of residence. A paired samples t-test was run on the participants' responses and found no statistically significant results. Therefore, the results from this study do not accurately represent the impact of COVID-19 on dental hygiene, health, and esthetics.

## Introduction

The first case of SARS-CoV-2 (COVID-19) was reported in the United States on January 21, 2019. Since then, our world has changed vastly in efforts to combat COVID-19 by controlling the spread of the highly contagious virus. Towards the beginning of the pandemic, people were encouraged to isolate themselves as a result, many people communicated virtually. In April of 2020, 300 million people communicated daily by zoom [1]. As a result of people communicating virtually many people have become more self-aware during the pandemic as they are consistently seeing themselves on screens. As a result, cosmetic surgeries have increased by 10%, many attribute this increase to "Zoom face-envy" [2].

Dental practices like many businesses have struggled during the pandemic. In a survey by the American Dental Association close to 20% of all dental practices were closed, not seeing any patients, while 70% were closed but seeing emergency patients [3]. It must be noted that this was during a time when COVID-19 was peaking in the number of cases. However, another study noted that there is a reduction in the following dental activities: prevention, periodontics, prosthetics, and maxillofacial surgery [4].

The purpose of this research was to try and determine if one's perception of dentistry and dental habits had changed during the pandemic. The areas that were investigated in this study are health, hygiene, and esthetics. These were deemed important for different reasons. Dental health is important because if one is in poor dental health and goes untreated for an extended amount of time the damage could become irreversible and possibly cause problems elsewhere in the mouth or body. Dental hygiene was

important as poor hygiene oftentimes can lead to poor dental health over time which can cause issues previously mentioned. Finally, dental esthetics was important to investigate as it might show how one's self-perception has been impacted by new factors introduced during the pandemic such as masks and virtual meeting spaces. These three factors together may show future trends that may better allow dentists to predict and prepare for the future as practitioners and clinicians.

## Methods

Before research could begin the project had to be approved by the Hampden-Sydney Human Research Committee as the experiment involved human subjects. The research project was approved after the committee deemed the experiment ethical.

Once the project had approval a survey was created. The survey was broken into four different sections. The first section asked questions that portrayed an individual's background by asking one's age, gender, area of residence, education level, and dental history. The second section asked individuals to reflect on their dental habits and esthetic concerns before COVID-19. These questions asked how often one brushed, flossed, and used mouthwash as well as the importance of one's smile and seeing one's smile. The third section of the survey had participants answer questions about the effect of COVID-19 on their dental health. These questions asked to see if one had any dental problems such as cavities and root canals occurring during the mask mandate. This section also asked if participants had been unable to see the dentist during COVID-19 or if they had an appointment postponed. The final section then asked the same questions as the second section but asked individuals to answer according to their current dental habits and esthetic concerns. The survey was designed in efforts to think through the events of COVID-19 chronologically. Many answers on the survey were scaled 1-5; 1 - very important, 2 - important, 3 - neutral, 4 - somewhat not important, 5 - not important.

The survey was posted using Qualtrics, an online platform for surveys. Once the survey was posted on Qualtrics it was accessed by random anonymous people who received monetary compensation upon completion. The survey was also promoted via social media, however, the participants that accessed the survey from the social media link did not receive monetary compensation. Confidentiality of participants was ensured by keeping all data

anonymous, furthermore, there was no way to determine the identity of a participant from the survey questions.

A paired samples t-test was run to determine statistical significance. A paired samples t-test is the best test to determine statistical significance between two variables coming from the same individual. All data that was analyzed was standardized on a scale 1-5, thereby all variables were standardized. This allowed z-scores to be calculated. These standardized z-scores were then used in the paired samples t-test. Paired samples t-tests were run to test for significant differences between the pre-covid and post-covid brushing, flossing, and mouthwash behaviors of the participants in the study. These values and tests were calculated using SPSS software.

**Results**

There were 123 total participants in this study, however, 6 participants did not fully complete the survey and were therefore removed during the statistical analysis. Out of the 123 participants 66 were male, 55 were female, and 2 were non-binary. 50% of the participants lived in a suburban area, while 30% lived in an urban area, and 20% lived in a rural area. 91% of participants had either a high school or college diploma.

The study revealed that 69% of people had dental appointments postponed past their recommended return date because of COVID-19. This is a somewhat alarming statistic if true. This may be an alarming statistic because if dental hygiene is not kept in good condition it can lead to dental decay. This decay caused by the proliferation of biofilm can possibly lead to further health problems as the bacteria in the mouth can enter the bloodstream and travel to different parts of the body. If this were to occur there may be a correlation between these bacteria causing cardiovascular and neurodegenerative diseases. Therefore, if there is a large number of people as indicated in this study that has had appointments postponed, we may see an increase in these dangerous diseases within the population in the future.

The results from the survey saw that very little changed in participants' dental hygiene habits as well as esthetic perceptions (Fig. 1). This can lead one to believe that hygiene habits may be foundational in participants' daily routines. However, it must also be noted that the survey may not have accurately accounted for one's habits before COVID-19, as participants were asked to recall their habits from memory.

A paired samples t-test was run using 117 responses from the participants (Fig. 2). However, the paired samples t-test showed that the results were not

statistically significant (Fig. 3). Therefore, one cannot be led to believe that these results accurately represent the impact of COVID-19 on dental hygiene.

Brushing			Mouthwash		
	Before Masks	After Masks		Before Masks	After Masks
Not everyday	3 (2.45%)	4 (3.41%)	2 x day	21 (17.21%)	27 (26.73%)
1 x day	27 (22.13%)	26 (22.22%)	1 x day	44 (36.06%)	31 (30.69%)
2 x day	88 (72.13%)	82 (70.08%)	1 x week	15 (12.30%)	11 (10.89%)
3 x day	4 (3.27%)	5 (4.27%)	1 x month	14 (11.47%)	15 (14.85%)
3+ x day	0 (0%)	0 (0%)	only @ dentist	11 (9.01%)	8 (7.92%)
			Never	17 (13.93%)	9 (8.91%)

  

Flossing		
	Before Masks	After Masks
1 x day	35 (30.7%)	37 (34.25%)
every other day	16 (14.03%)	15 (13.88%)
1 x week	18 (15.79%)	18 (10.18%)
1 x month	11 (9.64%)	7 (6.48%)
only at dentist	8 (7.02%)	11 (10.18%)
Never	26 (22.80%)	20 (18.52%)

Figure 1: Results of Brushing, Flossing, and Mouthwash Habits

**Paired Samples Statistics**

		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	BrushPreZ	.0363	117	.96778	.08947
	BrushPostZ	.0036	117	.99972	.09242
Pair 2	FlossPreZ	.0090	117	1.02075	.09437
	FlossPostZ	-.0011	117	1.00014	.09246
Pair 3	MouthwashPreZ	-.0009	117	1.01573	.09390
	MouthwashPostZ	-.0018	117	1.00022	.09247

Figure 2: Paired samples t-test data values

**Paired Samples Test**

		Paired ...			
		95% Confidence Interval of the ...			
		Upper	t	df	Sig. (2-tailed)
Pair 1	BrushPreZ - BrushPostZ	.17340	.459	116	.647
Pair 2	FlossPreZ - FlossPostZ	.07431	.310	116	.757
Pair 3	MouthwashPreZ - MouthwashPostZ	.09368	.058	116	.954

Figure 3: Paired samples t-test statistical significance values

**Conclusions**

Given the results from the statistical analysis, one cannot be led to believe that these results accurately represent the impact of COVID-19 on dental hygiene. Although this study was not statistically significant, further research may be important to investigate the impact that closing dental offices due to COVID-19 may have on future health specifically pertaining to diseases related to poor oral hygiene. Further statistical tests may also be suggested for this study as the sample size and diversity within the sample may be able to produce statistically significant data from other statistical tests such as regressions. These regressions may be able to look at specific populations that might show which populations were most impacted due to COVID-19 in terms of dental health and hygiene.

**REFERENCES**

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