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2021-04-01

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### Repository Citation

Chan JJ, Chen KK, Choi P, Rojas EO, Schipper ON, Aiyer A, de Cesar Netto C, Haleem AM, Kadakia AR, Vulcano E. (2021). Impact of COVID-19 Pandemic on Patients' Perceptions of Safety and Need for Elective Foot and Ankle Surgery in the United States. COVID-19 Publications by UMass Chan Authors.

<https://doi.org/10.1177/24730114211013788>. Retrieved from <https://escholarship.umassmed.edu/covid19/370>

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# Impact of COVID-19 Pandemic on Patients' Perceptions of Safety and Need for Elective Foot and Ankle Surgery in the United States

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## Abstract

**Background:** With the development of the COVID-19 pandemic, elective foot and ankle surgeries were delayed throughout the United States to divert health care resources and limit exposure. Little is known about the impact of COVID-19 on patient's willingness to proceed with elective procedures once restrictions are lifted and factors contributing to such decision.

**Methods:** Patients across 6 US orthopedic institutions who had their elective foot and ankle surgeries cancelled secondary to the pandemic were given a questionnaire. Specifically, patients were asked about their willingness to move forward with surgery once restrictions were lifted and if not why. Pain-level and pain medication use were also assessed. Univariate analysis was used to identify factors that contribute to patient's decisions.

**Results:** A total of 150 patients participated in this study. Twenty-one (14%) opted not to proceed with surgery once restrictions were lifted. Forty-three percent (n = 9) listed concern for COVID infection as the reason; however, 14% of them would proceed if procedures were performed in surgery center. Twenty-nine (19% of the total cohort) patients had increased pain and 11% of patients were taking more pain meds because of the delay to their procedure. Patients who decided not to proceed with surgery reported pain reduction (3% vs 14%) and lower increase in pain medication used (5% vs 12%).

**Conclusion:** COVID-19 has made a significant impact on the health care system. Delay of elective foot and ankle procedures impact patient quality of life and outcomes. Access to surgery centers may provide a partial solution during the pandemic

**Level of Evidence:** Level III.

**Keywords:** COVID-19, elective surgery, ambulatory surgery, foot and ankle

## Introduction

Since its first diagnosis in January of 2020 in the United States,<sup>16</sup> the novel coronavirus SARS-CoV-2 (COVID-19) has had an unprecedented societal effect, upending economies and health systems throughout the country and around the world.<sup>11-13,15</sup> Owing to its high infectivity and wide range of symptoms (from asymptomatic carriers to respiratory failure), COVID-19 quickly overwhelmed hospital systems, with many patients requiring intensive care unit (ICU) admissions and rapid respiratory support.<sup>5,11,13,15,7</sup> In an effort to limit the exponential increase in the number of

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1. Are you still planning on moving forward with your surgery within the next 3 months once COVID restrictions have been lifted?  
No (0). Yes (1).
2. If not, why:  
I lost/will lose my insurance (0)  
Financial reasons (1)  
I cannot take off from work (2)  
I am afraid of going to a hospital and get COVID infection (3)  
Other (4)
3. If afraid of going to a hospital, would you having access to an outpatient surgery center change your mind?  
No. (0) Yes. (1)
4. Has the delay of surgery affected your pain levels?  
Pain is same (0)  
Pain is worse (1)  
Pain is better (2)
5. Are you taking more pain medication due to the postponed surgery  
No. (0) Yes (1)
6. If yes, what are you taking  
NSAIDs (0)  
Narcotics (dilaudid, Percocet, etc) (1)  
Both (2)

**Figure 1.**

confirmed cases, stay-at-home orders, travel restrictions, and social distancing requirements were enforced. Elective procedures across multiple specialties were halted or postponed as resources had to be diverted to COVID-19 care following national health and World Health Organization (WHO) and American College of Surgeons (ACS) guidelines.<sup>12,14,19,2</sup> But despite being considered nonurgent, many elective orthopedic procedures are performed to improve pain, function, and quality of life. As restrictions on elective procedures begin to loosen, patients and their physicians are now forced to weigh the benefits of these procedures with new concerns over potential added risk of exposure to COVID-19.

Elective foot and ankle surgeries encompass a wide range of surgeries performed in the United States and account for a significant amount of health care spending.<sup>4</sup> A study published in 2014 reported that approximately \$11 billion of health care spending was used for foot and ankle surgeries in 2011 in the Medicare patient population alone.<sup>4</sup> It is expected that as these procedures are delayed, patients awaiting these procedures may suffer from continued pain and/or require more analgesic medications. In addition, as no consensus vaccine has been approved for COVID-19, patients may avoid elective procedures in fear of further exposure to health care professionals and environments. Although the anxiety induced by the pandemic has been documented in frontline health care providers,<sup>3,20</sup> the impact on patients awaiting elective procedures is not well understood. A previous study has shown that patients awaiting hip and knee arthroplasty showed increased patient anxiety as a

**Table 1.** Participating Institutions and Number of Responses by Region/Institution.

Institution	Region	Numbers of Survey Responses (n)
Icahn School of Medicine at Mount Sinai	Northeast	63
University of Miami	Southeast	16
University of Iowa	Midwestern	10
Anderson Clinic	Southeast	43
Northwestern University	Midwestern	11
University of Oklahoma	South Central	7
Total		150

result of unknown timing for rescheduled procedures, with younger patients significantly more concerned with financial security.<sup>6</sup> The aim of the current study was to identify elective patients from 6 different health care institutions who had their scheduled foot and ankle procedures postponed or canceled because of the COVID-19 pandemic guidelines for elective surgery. Further, we sought to determine the effect the pandemic has had on patient willingness and ability to proceed with the procedure once COVID-19 restrictions have been lifted and assess the impact the delays have had on pain and pain management.

## Methods

In the spring of 2020, a questionnaire was developed and administered to foot and ankle patients whose elective procedures were postponed due to the COVID-19 pandemic. Six institutions participated in the study (Table 1). Each institution submitted and obtained individual institutional review board approval or exemption for the study, and all sites signed a standardized data use and transfer agreement with the host institution (Icahn School of Medicine at Mount Sinai).

Inclusion criteria for the study were as follows: patients originally scheduled for primary elective foot or ankle procedures in the month of April of 2020 but subsequently had their surgeries canceled because of the outbreak of the COVID-19 pandemic.

No protected health information (PHI) was collected from any patient. The survey (Figure 1) was conducted to patients electronically or over the telephone. The survey contained 6 questions that focused on patient receptiveness to proceed with their procedure at a later time, reason behind change in plan, changes in pain level, and changes in pain management. Data were collected from April 1 to April 30, 2020, and only complete surveys with all questions answered were included in the study. Categorical responses were tabulated and reported as a proportion of the total population.

Univariate analysis was performed to compare the impact of gender on decision making using a chi-square analysis with *P* value significance at  $P \leq .05$ . All data were collected and

**Table 2.** Impact of Gender on Decision to Proceed or Cancel Elective Procedure.

Q1	Count	%
Male		
Cancel	6	13
Continue	40	87
Female		
Cancel	15	14
Continue	89	86

stored in a deidentified manner on Excel software (Microsoft Corporation, Redmond, WA). All statistical analysis was performed with Excel software as well and reported as below.

## Results

A total of 150 patients were identified, who completed the survey at 6 different orthopedic institutions across the United States. The mean age of patients was 51 years (15-94 years), and 104 (69%) were female (Table 1). Twenty-one (14%) of patients indicated that they did not plan to proceed with their surgery within the next 3 months should COVID-19 restrictions be lifted (Table 2). Of these patients, 43% (n = 9) indicated the reason for not proceeding with their surgery was due to fear of contracting COVID-19; 5% (n = 1) cited loss of health insurance, 19% (n = 4) cited financial reasons, 14% (n = 3) cited an inability to take time off from work, and 19% cited "other" for reasons not to continue with the planned surgeries. Of the 43% of patients who did not reschedule their surgeries because of concerns over contracting COVID-19, 33% (n = 3) stated they would go ahead with their planned surgeries if they were able to have access to an outpatient surgery center. There was no significant difference in gender among patients who canceled their procedures (13% male vs 14% female,  $P = .82$ ; Table 2).

### Changes in Pain and Pain Management Due to Surgery Postponement

Of the 150 participants, 76% (n = 114) stated that their pain levels had remained the same, 19% (n = 29) complained of an increase in pain, and 5% (n = 7) reported improvement in their pain levels. Of the 14% of patients who decided to cancel their procedure, 76% reported no change in pain, 10% reported worsening pain, and 14% reported improvement in pain (Table 3). In those continuing with their planned surgery, 76% reported no change in pain, 21% reported worsening pain, and 3% reported improvement in their pain. In patients reporting no change in pain (n = 114), 86% planned to proceed with surgery; in patients reporting worsening pain (n = 29), 93% planned to proceed with surgery; and in patients reporting improvement in pain (n = 7), only 57% decided to proceed with their surgery (Table 4).

**Table 3.** Perception of Pain as Patients Wait for Procedure During COVID-19 Related Delay in Elective Foot and Ankle Procedures.

Q1	Q4	Count	%
Cancel	Same pain	16	76
	Worse pain	2	10
	Better pain	3	14
Continue	Same pain	98	76
	Worse pain	27	21
	Better pain	4	3

**Table 4.** Impact of Pain and Patient's Desire to Proceed With Elective Procedure..

Q4	Q1	Count	%
Same pain	Cancel	16	14
	Continue	98	86
Worse pain	Cancel	2	7
	Continue	27	93
Better pain	Cancel	3	43
	Continue	4	57

**Table 5.** Need for Increased Analgesics During COVID-19 Related Delay in Elective Foot and Ankle Procedures..

Q5	Count	%
Canceled surgery		
No	20	
Pain meds	1 <sup>a</sup>	5
Continued surgery		
No	114	
Pain meds	15	12

<sup>a</sup>Nonsteroidal anti-inflammatory drugs.

**Table 6.** Pain Medication Use and Patient's Reported Level of Pain..

Q4	Q5	Count	%
Same pain	No	109	96
	Pain meds	5	4
Worse pain	No	18	62
	Pain meds	11	38
Better pain	No	7	100
	Pain meds	0	0

Eighty-nine percent (n = 134) of patients reported no changes in their pain medication regimen due to the postponement of their procedures, whereas 11% (n = 16) reported an increase in medication dosage to help manage pain. Of the 11% increasing their pain medication dosage, 81% (n = 13) take nonsteroidal anti-inflammatory drugs, 6% (n = 1) take opioids, and 12.5% (n = 2) take both. Of patients who planned on canceling their procedure, only 1 reported increasing their pain medicine regimen. Of those

continuing with surgery, 12% reported increasing pain medication use (Table 5). Of those reporting similar pain to pre-COVID-19 levels, only 4% increased their medication use; of those with worse pain, 38% increased their medication use; and of those with better pain, there was no increase in medication usage (Table 6).

## Discussion

As the number of COVID-19 cases in the United States has surged over 3.5 million as of July 17, 2020,<sup>8</sup> health care systems across the country have taken measures to stem the spread of infection, ration PPE, and allocate hospital resources.<sup>11,12,14,19</sup> Simultaneously, elective foot and ankle procedures were canceled in an effort to focus on COVID-19 care and to limit exposure to both patients and health care providers. Multiple articles<sup>9,10,19</sup> have been published to address the ambiguity as to what procedures were considered medically necessary, and how to best navigate the management of these “nonurgent procedures”; however, to the authors’ knowledge, no studies have looked closely at the impact of COVID-19 on patients’ willingness to return for elective foot and ankle procedures in the United States.

In this study, we recorded patient responses from 6 different health care institutions who had a foot and ankle procedure delayed. COVID-19 appears to be affecting the overall volume of elective procedures being performed as 14% of our population opted not to continue with planned surgery even if the government lifted the restriction. Of these, nearly half cited concern over contracting COVID-19 as their reason for canceling. With an increasing number of cases currently seen across the United States and uncertainty surrounding the definitive containment of COVID-19, it is not surprising that patients may feel uncomfortable exposing themselves to health care environments. Interestingly, of the patients who canceled their procedures for fear of contracting COVID-19, one-third expressed willingness to continue with their planned procedure if performed at an outpatient surgery center. It is apparent that patients may perceive their risk of exposure to be significantly less in these operative settings that do not require inpatient admission and are limited to the perioperative exposure. Accordingly, it may be increasingly important to recognize these centers as potential outlets for more elective procedures. Despite this, there continues to be debate on the optimal usage of these centers as outflow centers when COVID-19 admissions overwhelm hospital systems, or as an alternate pathway for these nonurgent procedures.<sup>1,17,18</sup> It would seem that as COVID-19 numbers decrease, and elective procedures become more prevalent, the latter may be more feasible.

Delay of elective procedures has also appeared to have a direct impact on patient quality of life and outcomes; 19% of patients reported worsening pain as a result of the delay in operative treatment. Consistent with the reported increase in pain, many of these patients also reported an increased requirement of pain medication.

There also appears to be a link between willingness to continue with the planned procedure and changes in pain level since the start of the pandemic. Many orthopedic foot and ankle procedures are often performed with the goal of alleviated pain and improving quality of life. Stratification analysis showed that 93% of patients who noted worsening pain planned to continue with surgery once restrictions are lifted, but only 57% of patients reporting improvement in pain planned to continue with surgery. Of patients experiencing similar levels of pain since the start of the pandemic, 86% planned on continuing with surgery. This makes sense as patients who continue to feel pain, or even have worsening pain would likely be motivated to proceed in hopes of alleviating these symptoms. Interestingly, we also noted that only 1 patient who elected to cancel their procedure reported an increased use of pain medication compared with 12% in the cohort who chose to continue with plan for procedure. Although this supports our theory that need for increased pain medication and increasing pain may be related to a patient’s willingness to risk potential COVID-19 exposure, the sample size was likely not large enough to establish a statistically significant difference ( $P = .32$ ). Similarly, patients who note improvement in pain may feel that the risk of exposure may outweigh the potential benefit, and hope to avoid a procedure that they may no longer deem urgent given the current health care climate.

This study is not without limitations. First, to simplify analysis and to provide a larger sample size, all elective foot and ankle procedures were considered together as one group. This may be somewhat problematic as some procedures may have a greater outcome on patient quality of life, ability to perform daily activities, and have larger potential for long-term sequelae if delayed. However, different procedures and their associated indications may differently impact a patient’s decision to proceed with surgery despite fears of COVID-19. Despite this, there remained a relatively small amount of patients as the COVID-19 pandemic restrictions were a relatively novel experience and many patients were either unreachable or did not wish to complete the survey. Finally, as surveys were filled either electronically or over the phone, bias due to the method of survey cannot be excluded.

## Conclusion

The COVID-19 pandemic has already had a profound impact on the life of Americans, including the delay of thousands of elective foot and ankle surgeries in order to preserve hospital resources. It appears that the ongoing pandemic will continue to affect the volume of elective procedures, with many patients expressing concerns over contracting COVID-19. Patient quality of life has also been negatively affected, with increases in reported pain and pain medication requirements as they continue to delay their procedures. Accordingly, we note that pain level and changes in pain remains a key factor in the decision to move forward with

surgery once surgeries are resumed completely. Access to outpatient surgical centers appears to help ease patient concern over potential infection with COVID-19 and may provide a possible avenue of care delivery to patients.

### Ethics Approval

Ethical approval for this study was waived by Mount Sinai Medical Center (NYC) because only deidentified patient info was used and during COVID-19 pandemic.

### Declaration of Conflicting Interests

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article. ICMJE forms for all authors are available online.

### Funding

The author(s) received no financial support for the research, authorship, and/or publication of this article.

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