Orthopaedic Surgery Residency Program Website Content and Accessibility During the COVID-19 Pandemic: Observational Study

Muhammad El Shatanofy, Lauryn Brown, Peter Berger, Alex Gu, Abhinav Sharma, Joshua Campbell, Sean Tabaie

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Abstract

Background: The exceptional competitiveness of the orthopaedic surgery specialty, combined with the unclear impact of the COVID-19 pandemic on residency recruitment, has presented significant challenges to applicants and residency program directors.1 With limited in-person opportunities in the 2020-2021 application cycle, applicants have been pressed to gauge chances and best fit by browsing program websites.

Objective: The objective of the study was to assess the accessibility and content of accredited orthopaedic surgery residency program websites during the COVID-19 pandemic.

Methods: Using the online database of the Electronic Residency Application Series (ERAS), we compiled a list of accredited orthopaedic residency programs in the United States. Program websites were evaluated across four domains: program overview, education, research opportunities, and application details. Each website was assessed twice in July, during a period of adjustment to the COVID-19 pandemic, and twice in November, following the October ERAS application deadline.

Results: 189 accredited orthopaedic surgery residency programs were identified through ERAS. Three programs did not have a website and were not evaluated for content. Data analysis of content in each domain revealed that most websites included program details, a description of the didactic curriculum, and sample rotation schedules. Between the two evaluation periods in July and November, the percentage of program websites containing informative videos and virtual tours rose from 12% to 48% and 1% to 13%, respectively ($p<0.005$). However, the number of programs that included information about a virtual sub-internship or virtual interview to their websites did not change.

Conclusions: Most residency program websites offered program details and an overview of educational and research opportunities; however, few addressed the virtual transition of interviews and sub-internships during the COVID-19 pandemic.

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Conclusions: Most residency program websites offered program details and an overview of educational and research opportunities; however, few addressed the virtual transition of interviews and sub-internships during the COVID-19 pandemic.

Keywords: Orthopaedic surgery residency programs; COVID-19; website; residency applicants; residency; medical student; content; accessibility; observational; surgery

Introduction

Applicants to orthopaedic surgery residencies spend significant time and resources gathering

information about potential programs [1-7]. A valuable resource that has been shown to influence application decisions across specialties is program websites [8]. Multiple studies have found that applicants heavily utilize residency websites when deciding where to apply and interview, and subsequently how to rank programs [7,9-11]. In orthopaedics specifically, Yong et al. surveyed 610 applicants to an orthopaedic surgery residency program and found that 98% of students used program websites to gather information [9].

Despite the clear utility of websites for residency applicants and programs alike, content is inconsistent and often severely lacking. In a recent review of orthopaedic surgery residency websites, Oladeji et al. found widespread inconsistencies and noted a scarcity of information desired by prospective applicants [12]. Yong et al. also found that, although applicants referenced websites frequently, the quality of information was ranked lower than that provided by medical school advisors or orthopaedic surgery residents at home programs [9]. While it was possible to supplement inadequate information found on websites with in-person experiences in previous years, the COVID-19 pandemic has limited this year's applicants to mostly virtual experiences. Consequently, applicants have been forced to rely more heavily on websites in the 2020-2021 application cycle [9,13-15].

The purpose of this study was to assess the content and quality of orthopaedic surgery residency program websites and to evaluate adaptations made in response to the COVID-19 pandemic. We hypothesized that, despite the evolving pandemic, updates to program websites, videos, and virtual tours would be limited. This study aims to both describe how orthopeadic surgery programs adapted their websites in light of unprecedented circumstances and provide actionable items for programs to improve their online presence during future application cycles.

Methods

The Electronic Residency Application Series (ERAS) website contains an updated list of all accredited orthopaedic surgery residency programs in the United States [16]. Upon accessing this website in July 2020, 189 accredited programs were identified and included in this study. A hyperlink to each programs' website and accreditation IDs were gathered from the ERAS website. The hyperlinks were then accessed and classified as functional, indirect (functional link but required navigation to reach the orthopaedic surgery residency page), or direct. Two authors independently gathered information from each website at two separate time periods of the application cycle. The first data collection occurred in the first 2 weeks of July 2020, a period of relative adjustment to COVID-19, and the second data collection occurred within the first 2 weeks of November 2020, a period shortly after the ERAS application deadline.

Information gathered from the orthopaedic surgery websites fell into 4 broad domains: program overview, education, research opportunities, and application details.

Program Overview

Program overview included program director name, contact information including email, phone number, and address, fellowship match lists, wellness opportunities, and salary/benefits information. Efforts to promote diversity were also reported for programs that mentioned

underrepresented minorities or gender diversity in their mission statements.

Education

The education domain included the mention of extra-curricular meetings and courses (i.e., travel conferences), didactic sessions, a journal club, sample rotation schedules, clinic and call responsibilities, and educational support such as funding for loupes and leads.

Research

Research opportunities were identified by scanning websites for evidence of a research requirement, publication lists, lab spaces, or funding for national presentations and conferences.

Application details

Application details gathered from the websites included the number of residents accepted into each program per year, a sub-internship description, and guidelines for STEP 2 score and Electronic Standardized Letter of Recommendation (eSLOR) submission.

Virtual Updates

Due to the nature of this virtual application cycle, websites were also assessed for the inclusion of program videos, video lengths if applicable, virtual tours, remote opportunities such as virtual sub-internships, and details about virtual interviews.

All data collected from this study were analyzed after the second website review in November 2020. Data from July 2020 was compared to data from November 2020 to assess how programs have modified their websites in response to the virtual application cycle. Unless otherwise noted, statistics were reported on data obtained in July 2020. Analyses were performed using paired sample t-tests, Pearson Chi Square tests, and Fisher Exact tests. Significance was established at a *P*-value of .05.

Results

Program Overview

Overall, 189 residency programs were identified on ERAS in July 2020. All but 3 residency programs listed a link to the program website. Most programs listed the program director's name in July 2020 (87%, n=164, Table 1). Contact information such as email and phone

number were included in 86% (n=162) and 84% (n=159) of websites, respectively, while address was included in 65% (n=123) of websites. Only 22% (n=42) of websites addressed underrepresented minorities and 21% (n=39) mentioned gender diversity. Efforts to promote wellness or engagement in social events were identified among 50% (n=95) of websites. Only 56% (n=106) of programs included a fellowship match list. Benefits and salary information was included in 63% (n=120) of websites.

Education

Of the program websites, 84% (n=159) noted didactic sessions, 68% (n=129) mentioned a journal club, and 70% (n=132) included a sample rotation schedule (Table 1). Less commonly reported metrics included mention of meetings and courses outside of the traditional program curriculum (56%, n=106), call responsibilities (51%, n=96), international opportunities (17%, n=32), and educational support (49%, n=92).

Research

Most program websites noted a research requirement (73%, n=138) and demonstrated research support (74%, n=139) such as funding for residents (Table 1). Research output, such as a list of resident publications, was less commonly included among websites (36%, n=68).

Application details

The average number of residents accepted into each program ranged from 4 to 5 residents per year with a standard deviation of 2.1. Upon reviewing application requirements, only 28% (n=53) of websites mentioned a STEP 2 score requirement and 14% (n=27) requested an eSLOR.

Table 1. Orthopaedic Surgery Residency Program Websites Content, July 2020 (n=189)

Category	Value
Program Overview, n(%)	
Program director	164 (87)
Address	123 (65)
Phone	159 (84)
Email	162 (86)
Address underrepresented minorities	42 (22)
Address gender diversity	39 (21)
Wellness	95 (50)
Fellowship match list	106 (56)
Salary & benefits	120 (63)
Education, n(%)	
Didactics	159 (84)
Journal club	129 (68)

Rotation schedule	132 (70)
Call responsibility	96 (51)
Educational support	92 (49)
Meetings & courses	106 (56)
International opportunities	32 (17)
Research, n(%)	
Research requirement	138 (73)
Research output	68 (36)
Research support	139 (74)
Application Details, n(%)	
eSLOR	27 (14)
STEP 2	53 (28)
Residents per year, mean(SD)	4.6 (2.1)

Virtual Updates

Between July 2020 and November 2020, the number of program websites that mentioned a virtual sub-internship experience remained unchanged at 7% (n=13, *P*=1.000, Figure 1). The percentage of websites including a program video rose from 12% (n=23) to 48% (n=91, *P*<.001) and the percentage of websites including a virtual tour increased from 1% (n=1) to 13% (n=25, *P*<.001, Table 2). A total of 71 program videos were identified across all 186 programs with functional websites in November 2020. The length of the videos ranged from 57 seconds to 24 minutes and 40 seconds.

Figure 1. Percentage of Orthopaedic Surgery Residency Program Websites with Updated Virtual Information Between July 2020 and November 2020
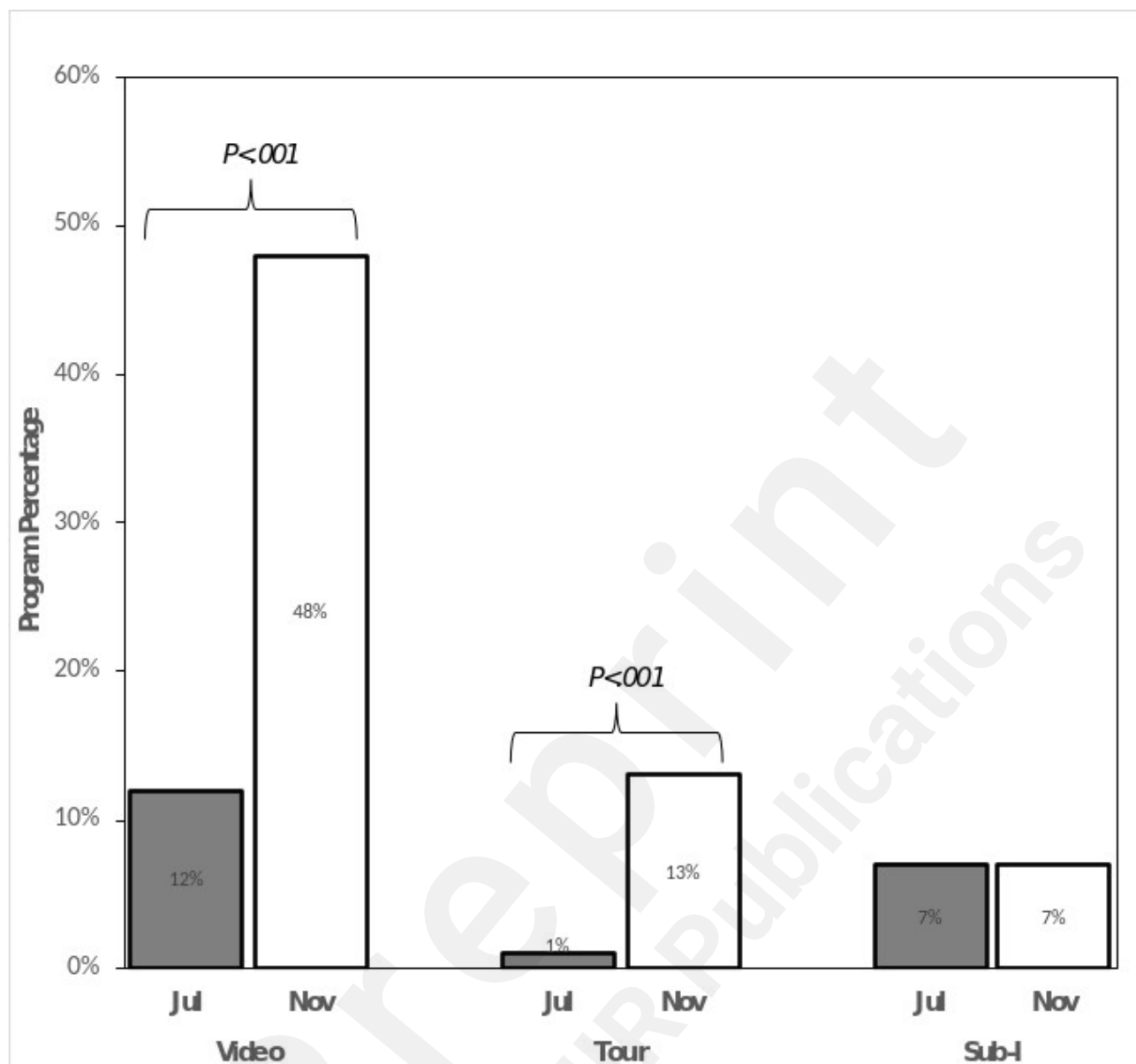
Table 2. Virtual Offerings Identified on Program Websites in July 2020 and November 2020 (n=189)

Category	Jul 2020 Value, (n%)	Nov 2020 Value, (n%)	*P* value
Program video	23 (12)	91 (48)	< .001
Virtual tour	1 (1)	25 (13)	< .001
Sub-I	13 (7)	13 (7)	1.000

[a.] Significance was established at *P*<.05.

A chi-squared analysis was performed to gauge whether larger programs, characterized as having 5 or more residents per year, were more likely than smaller programs to add program

videos or virtual tours by November 2020 (Table 3). Of the 94 larger programs, 48% (n=45) added videos compared to only 32% (n=30) of the 95 smaller programs (*P*<.001, Multimedia Appendix 1). Larger programs (21%, n=20) were also more likely than smaller programs (4%, n=4) to add virtual tours by November 2020 (*P*<.001, Multimedia Appendix 2).

Table 3. Orthopaedic Residency Program Websites with Added Virtual Content Between July 2020 and November 2020 Compared by Program Size (n=189)

Category	Small programs (<5 residents/year) Value, n(%)	Large programs (>=5 residents/year) Value, n(%)	*P* value
Added program video	23 (24)	45 (48)	.001
Added virtual tour	4 (4)	20 (21)	< .001

a. Significance was established at *P*<.05.

Discussion

Principal Results

The exceptional competitiveness of the orthopaedic surgery specialty, compounded with the unclear impact of COVID-19 on residency recruitment, has presented significant challenges to both applicants and programs. Since most in-person opportunities and interviews in the 2020-2021 match cycle were cancelled due to COVID-19, we anticipated that applicants would increasingly rely on residency websites to gain insight into programs and cultural fit [13,17-19]. The purpose of this study was to explore the extent to which orthopaedic surgery residency websites were updated throughout the pandemic.

In our study, we accounted for 98% (n=186) of the existing 189 orthopaedic surgery residency programs through either hyperlinks provided by ERAS or via Google search. We reasoned that programs would prioritize making COVID-19 related adjustments to websites prior to the ERAS application deadline in October 2020. Therefore, we recorded data once in July 2020, and again in November 2020 once the ERAS deadline expired. Our analyses mostly supported our original hypothesis. While the percentage of program videos rose significantly from 12% (n=23) to 48% (n=91, *P*<.001) and the percentage of virtual tours rose significantly from 1% (n=1) to 13% (n=25, *P*<.001) from July 2020 to November 2020, the percentage of websites that mentioned a virtual sub-internship experience remained stagnant at 7% (n=13). This is concerning because, historically, the role of the sub-internship in pursuing orthopaedic surgery residencies has been to provide both visiting students and programs an opportunity to assess fit based on personal skills, clinical aptitude, and the ability to integrate into program culture [5].

While our results suggest applicants would struggle to find updated information on websites regardless of program characteristics, virtual offerings were also evaluated by program size. Large programs with 5 or more residents were significantly more likely to add a program video ($P<.001$) and a virtual tour ($P<.001$) to their websites between July 2020 and November 2020. Further, with less than half (48%, n=45) of larger residency programs and less than a quarter (24%, n=23) of smaller programs adding a program video during the application season, applicants have been tasked with learning more about orthopaedic surgery residency programs using dated videos and online information. Additionally, with only 21% (n=20) of larger programs and 4% (n=4) of smaller programs adding a virtual tour, applicants have limited representations of the physical environment surrounding their potential residency placements. Collectively, these findings indicate that smaller programs were at a potential disadvantage for recruiting applicants since they were less likely than larger programs to have information that applicants would find critical in lieu of in-person interaction.

Comparison with Prior Work

Consistent with previous research, this study identified gaps in the quantity and quality of information on orthopaedic surgery residency websites. Rozental et al. completed the first review of orthopaedic program websites at a time when only 40% of the United States had access to the internet and discovered that only 113 of 154 programs (73%) had working websites [20]. In a follow-up study conducted by Oladeji et al., 97% of programs had websites, but less than 50% provided information about call schedules, resident benefits, and resident research [12]. All of these factors have been ranked as important to residents [7,21]. Between the shared categories with Oladeji et al., we found that more programs mentioned resident salary, resident research requirements, publications, research and educational support, journal clubs, and didactics [12]. Information on call responsibility rose slightly to 51% (n=96), and resident wellness activities remained at 50% (n=95). Only information regarding rotation schedules dropped between studies (70%, n=132).

For data collection unique to our study, we found that international opportunities were listed in 17% (n=32) of websites and fellowship match lists were included in 56% (n=106). While the mention of international opportunities was scarce, the low percentage of fellowship match lists was particularly concerning given that over 90% of residents choose to complete an orthopaedic surgery fellowship following graduation [22]. We also found that, despite the anticipated changes to application metrics (including scoring changes to USMLE Step 1), only 28% (n=53) of websites mentioned USMLE Step 2 application requirements and 14% (n=27) indicated preferences for an eSLOR [22].

Perhaps the most concerning of our findings was the low effort to promote racial and gender diversity on websites. Less than 25% of programs addressed either underrepresented minorities (22%, n=42) or gender diversity (21%, n=39). Over the past 10 years, racial and gender diversity among orthopaedic surgery residency programs has remained stagnant compared to the rise observed in medical schools [24]. Despite feedback provided by faculty and residents, orthopaedic surgery residency programs continue to have the lowest ratio of female to male residents than any other specialty [19,24].

Limitations

Several limitations to this study exist. Since this study started in July 2020, we could not capture COVID-related changes prior to this period. Additionally, authors only documented if variables were mentioned on the websites and did not assess the quality of the information. Although collecting data by two authors added to the internal validity of the study, we could not control for inter-rater variability. This study also did not include potential items of interest such as interview dates, cases performed and their volumes, and operative approaches.

Proposals

The data for this study were collected within a five-month period from July 2020 to November 2020. Although traffic metrics are unavailable, it is reasonable to assume that most applicants visited sites during this time to prepare for ERAS deadlines. This study identified an overall paucity of information on program sites and an inadequate response to the COVID-19 pandemic. Further, websites were difficult to navigate, and important information was dispersed across several tabs. This may have led applicants to overlook time-sensitive application requirements and miss deadlines.

We propose several recommendations to improve website quality and quantity of information during the current pandemic and future states of emergency. First, we encourage the ERAS directory of programs to include hyperlinks for all orthopaedic surgery residency programs. If a hyperlink to a program cannot be found, ERAS should contact the program and encourage it to either provide a link or create a new one if unavailable. Second, all programs should be made aware of standardized information and organization that applicants find useful, such as the ones described in this study. It will ultimately be left to the discretion of the programs whether or not to adjust.

Due to the evolving situation of the COVID-19 pandemic, ERAS should encourage and potentially require websites to upload monthly updates. Uploading information about the program's response to COVID-19 not only has implications for recruitment, but also addresses concerns about safety [8, 25]. Since travel restrictions have limited applicants from physically visiting programs, programs should also be encouraged to include at least one virtual tour and one program video on their websites. Additional videos should be uploaded to highlight program diversity and wellness. To make the application process more personable, applicants should also have the option to schedule video meetings with current residents and faculty via program websites [26]. The COVID-19 pandemic has drastically altered the virtual arena. Making the changes proposed in this study will undeniably facilitate the application process for future residents.

Conclusions

This study highlights the inadequate response of orthopaedic surgery residency programs to update their websites during this entirely virtual application cycle. As a competitive specialty with the third-lowest specialty match rate, orthopaedic surgery programs still have a lot of work to do to improve their online presence, promote diversity, and enhance opportunities for

virtual applicants [1,19]. With limited information, applicants must identify unique ways to learn about residency programs and gauge their chances for a successful match.

Conflicts of Interest

None declared

Abbreviations

Electronic Residency Application Series (ERAS); Electronic Standardized Letter of Recommendation (eSLOR)

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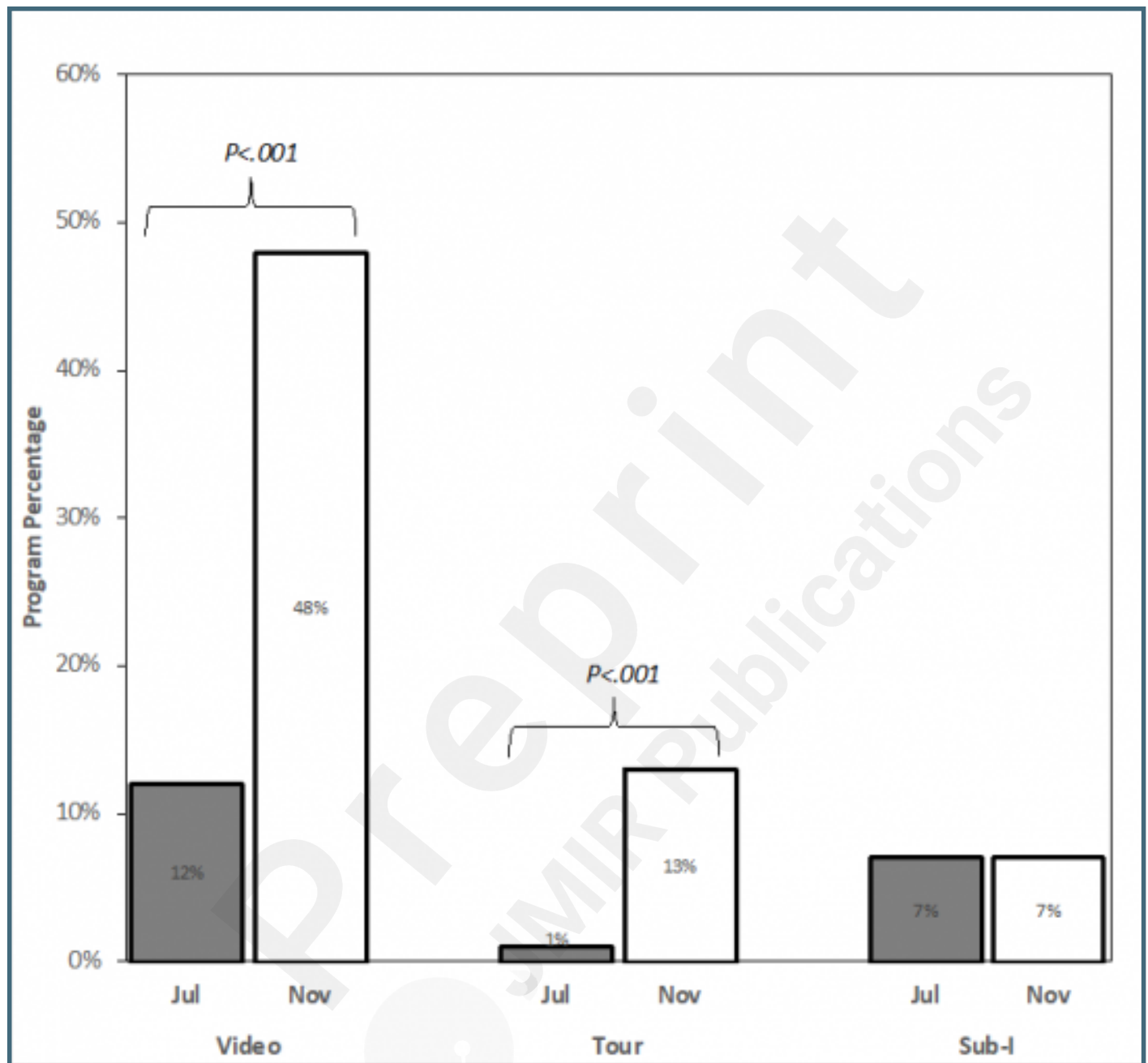
Supplementary Files

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URL: http://asset.jmir.pub/assets/5c14689e14a9f454a153b84000ec1c2e.docx

Figures

Percentage of Orthopaedic Surgery Residency Program Websites with Updated Virtual Information Between July 2020 and November 2020.

Multimedia Appendixes

Orthopaedic Surgery Residency Program Websites with Added Videos Between July 2020 and November 2020 Compared by Program Size.
URL: http://asset.jmir.pub/assets/25465f7e3b25f1feedf31053ca61274b.png

Figures

Orthopaedic Surgery Residency Program Websites with Added Virtual Tours Between July 2020 and November 2020 Compared by Program Size.
URL: http://asset.jmir.pub/assets/0b98a12cace799af2fe895ecd6c3cd78.png