

The effect of outpatient web-based online scheduling versus traditional staff scheduling systems on progression to surgery and no-show rates

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Background: This study aimed to compare the rate of scheduled surgery and no-show rates between online-scheduled appointments and traditionally scheduled appointments. **Materials and Methods:** All scheduled outpatient visits at a single large multi-subspecialty orthopedic practice in three U.S. states (PA, NJ, and NY) were collected from February 1, 2022, to February 28, 2022. Visits were categorized as "online-scheduled" or "traditionally scheduled" and then further grouped as "no-show," "canceled," or "visited." Finally, visits were categorized as either "new patient" or "follow-up." **Results:** There was no significant difference between scheduling systems for patient progression to any procedure within 3 months of the initial visit ($P = 0.97$) and patient progression for surgery only within 3 months of the initial visit ($P = 0.88$). However, we found a significant difference with a higher rate of progression to surgery in traditionally scheduled than online-scheduled visits when accounting for only new patient visits that progressed to surgery within 3 months of the initial encounter ($P = 0.036$). No-show rates between scheduling systems were not significant ($P = 0.79$), but no-show rates were significant when comparing the practice's subspecialties ($P < 0.001$). Finally, no-show rates for online-scheduled compared to traditionally scheduled patients for both new and follow-up appointments were not significantly different ($P = 0.28$ and $P = 0.94$, respectively). **Conclusion:** Orthopedic practices should utilize online-scheduling systems as there was a higher progression to surgery of traditionally scheduled appointments compared to online. Depending on the subspecialty, no-show rates differed. Furthermore, online-scheduling allows for more patient autonomy and less burden on office staff.

Key words: No-show rates, online scheduling, scheduling system, surgery progression, traditional-scheduling

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INTRODUCTION

Online booking is common in industries ranging from entertainment to utility services; however, it has not been rapidly adopted by the medical community secondary to privacy concerns and the cost required to start a system.^[1] This paradigm is changing as more medical practices are offering online scheduling for new patient appointments.^[1] Barriers to online scheduling include patient reluctance, with one study reporting that 89% of patients were reluctant to adopt an e-appointment

scheduling system because of low computer skills and a lack of awareness of the service.^[2]

Orthopedic surgeon clinics differ from primary care providers because much of the service provided by surgeons occurs through surgical cases booked following a clinic visit. There is concern regarding online scheduling in surgical clinics, as patients may not be appropriate candidates for surgical consultation. Medical practices often set up patient questionnaires and algorithms for schedulers to better define appropriate candidates for surgical consultation versus treatment

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by a nonoperative physician.^[3] Online scheduling systems have applied the defined algorithms to direct patients to the appropriate subspecialty. Few studies have evaluated the impact of patient online scheduling on the surgical scheduling yield, especially for orthopedic surgeons.^[4]

There are few studies with similar aims and the literature on comparing scheduling systems as utilized in the medical community is extremely limited. This study will add to the limited literature and is relevant as the use of technology for office scheduling purposes is expanding in the medical community.

We hypothesized that there is no difference in the rate of scheduled surgery within 3 months after the initial visit between patients who scheduled online appointments and those who use the call center to schedule their appointments. We secondarily hypothesized that there will be no difference in the no-show rate between the two groups.

MATERIALS AND METHODS

All scheduled outpatient visits at a single large multi-subspecialty orthopedic practice in three US states (PA, NJ, NY) were included in this study and collected from February 1, 2022 to February 28, 2022, including all operative and nonoperative divisions. There was no exclusion criteria. Scheduled visits were identified as "online-scheduled," indicating the patient scheduled their visit through the new patient portal system, or "traditionally scheduled," indicating that the visit was scheduled with office staff. Visits were categorized as either "cancelled" if the patient canceled before their appointment time or "visited" if the patient showed up for their appointment. Furthermore, any visit where the patient did not come to the office without a prior cancellation was considered a "no-show," and visits were further categorized as "new patient" or "follow-up." We included 71,673 traditionally scheduled and 3058 online-scheduled visits. Surgical records were reviewed to identify patients that underwent surgery within 3 months of their scheduled office visit. The primary outcome was the rate of surgery scheduled within 3 months after the new patient visit between the two groups. The secondary outcome was the no-show rate between the two groups. The clinical trial number for this study is IRB #13D.432.

Traditional scheduling

Traditional scheduling refers to when a potential patient calls a call center to speak with scheduling staff to set up their appointment. The scheduling staff and the patient speak over the phone and the patient is screened by the staff to be referred to the right subspecialty. Based on predefined algorithms, the patient is referred to the appropriate

provider based on their presenting problems. The purpose of utilizing traditional scheduling is to lessen the number of referrals and avoid referring a nonoperative patient to the operative service.

Online-scheduling

The online-scheduling system is an autonomous, automated service that follows the same defined algorithm as the traditional scheduling to direct the patient to the appropriate specialty. Online scheduling, contrary to traditional scheduling, allows the patient to schedule their own appointment without having to talk over the phone with scheduling staff. The online-scheduling service is also available 24/7, and there is no waiting time. Patients can schedule appointments after typical office hours and during the weekends. The scheduling can be done through the institute's website and clicking on "make an appointment."

Statistical analysis

The statistical software used for data analysis was SPSS version 28 (IBM®, Armonk, NY, USA). Continuous variables were the number of cases in both the online and traditionally scheduled groups and the number of patients who showed up and did not show up for their appointment. Percentages were also shown as continuous variables. Frequency was shown as a categorical variable. Progression to surgery, progression to any procedure, and no-show rates were all compared using Chi-square analysis. A $P < 0.05$ was considered a statistically significant difference.

RESULTS

In both online and traditional scheduling, 21% of all patients progressed to a type of intervention within 3 months after the initial visit [$P = 0.97$, Table 1]. For progression to only surgery, excluding injections and in-office interventions, we found no significant difference between the online-scheduled group and the traditionally scheduled group [$P = 0.88$, Table 2].

Accounting for only new patient visits that progressed to surgery within 3 months of their initial encounter with a surgeon, we found a significant difference with a higher rate of progression to surgery in the traditionally scheduled group than the online-scheduled group [$P = 0.036$, Table 3].

Table 1: Number of patients that did and did not have a procedure within 3 months of a follow-up or new visit based on scheduling type

| | Number of no procedure within 3 months (%) | Number of procedures within 3 months (%) | <i>P</i> |
|------------------------|--|--|----------|
| Online scheduling | 681 (79) | 177 (21) | 0.97 |
| Traditional scheduling | 16,233 (79) | 4205 (21) | |

The difference in no-show rates between the scheduling groups was found to not be significant ($P = 0.79$), as shown in Table 4, but when comparing the subspecialties of our orthopedic practice, we found a significant difference in patient no-show rates [$P < 0.001$, Table 5].

Finally, patient's no-show rates were compared between the traditionally scheduled and online-scheduled services through a subgroup analysis by separating participants as new patients and follow-up visits, but no significant difference between the groups was found [$P = 0.94$, Table 6].

DISCUSSION

Between February 1, 2022, and February 28, 2022, all online-scheduled and traditionally scheduled appointments were reviewed for our single large multi-subspecialty orthopedic practice. To the best of our knowledge, no study has previously compared progression to surgery between the two scheduling systems, which showed a small but significantly higher progression to surgery with traditional scheduling. Furthermore, there is extremely limited literature on online-scheduling systems in the medical community, especially in orthopedic practices. We found no significant difference in overall progression to any procedure (injection and surgery) and no difference in progression to surgery only. When separating new and follow-up patients for the subgroup analysis, we found a significant difference in progression to surgery between scheduling groups, with more traditionally scheduled patients progressing to surgery compared to online scheduled. A small but significant difference in the surgery rate with the traditional scheduling might be explained by the older generation having more confidence in traditional scheduling than in using electronic applications. Moreover, new office visits following urgent care referrals can be squeezed more rapidly into the schedule via traditional scheduling because it is impossible to haggle with the system.

No-show rates did not show a significant difference between the scheduling groups and there was no significant difference in no-show rates when comparing new patients and follow-up visits. However, there was a significant difference in no-show rates when comparing between the subspecialties of the orthopedic practice. A 2017 systematic review found two studies comparing web-based and traditional scheduling platforms.^[1] One study compared no-shows on ZocDoc.com for three dermatology clinics over a 6-month period and found a lower no-show rate with online scheduling than with traditional scheduling.^[5] Another study compared the no-show rate between the two platforms in an audiology clinic during a 6-month period and found a significantly lower no-show rate with the

Table 2: Number of patients who did and did not have surgery within 3 months of follow-up or visit based on scheduling type

| | Number of patients who did not have surgery within 3 months (%) | Number of patients who had surgery within 3 months (%) | <i>P</i> |
|------------------------|---|--|----------|
| Online scheduling | 705 (82) | 153 (18) | 0.88 |
| Traditional scheduling | 16,835 (82) | 3603 (18) | |

Table 3: Number of patients who did and did not have surgery within 3 months of only a new visit based on scheduling type

| | Number of patients who did not have surgery within 3 months (%) | Number of patients who had surgery within 3 months (%) | <i>P</i> |
|------------------------|---|--|----------|
| Online scheduling | 603 (81) | 128 (18) | 0.036* |
| Traditional scheduling | 3999 (79) | 1054 (21) | |

* $P < 0.05$ is considered a statistically significant difference

Table 4: Number of show and no-show appointments between scheduling types

| | Show (%) | No show (%) | <i>P</i> |
|-------------------------|---------------|-------------|----------|
| Online scheduled | 2921 (95.5) | 137 (4.5) | 0.79 |
| Traditionally scheduled | 68,534 (95.6) | 3139 (4.4) | |

Table 5: Number of show and no-show appointments between scheduling types among different subspecialties

| | Show (%) | No show (%) |
|--------------------------------------|-------------|-------------|
| Foot and ankle | 3284 (97) | 86 (3) |
| Foot and ankle nonoperative | 6404 (95) | 361 (5) |
| Generalist | 1746 (93) | 121 (7) |
| Hand and wrist | 9126 (96) | 405 (4) |
| Joint replacement | 9438 (97) | 275 (3) |
| Orthopedic oncology | 327 (93) | 26 (7) |
| Physical medicine and rehabilitation | 8108 (93) | 562 (7) |
| Shoulder and elbow | 4592 (97) | 131 (3) |
| Spine | 6626 (96) | 274 (4) |
| Sports medicine | 9242 (96) | 359 (4) |
| Sports medicine nonoperative | 11,736 (95) | 588 (5) |
| Trauma | 973 (92) | 83 (8) |

Table 6: Number of show and no-show appointments between scheduling types between new and follow-up patients

| | Online-scheduling | | | Traditional-scheduling | | |
|-----------------|-------------------|---------|----------|------------------------|---------|----------|
| | Show | No show | <i>P</i> | Show | No show | <i>P</i> |
| New visit | 17,198 | 761 | 0.28 | 2459 | 115 | 0.94 |
| Follow-up visit | 51,336 | 2378 | | 462 | 22 | |

online scheduling than the traditional system.^[6] A recent study on mammogram scheduling evaluated appointments

over 12 months and found a significantly higher no-show rate with the online scheduled than with the traditionally scheduled platform (5.7% vs. 4.6%).^[7] However, the majority of online-scheduled appointments were completed in a single step (93%), while 25% of the traditional scheduling was completed in multiple steps ($P < 0.001$).^[7] Moreover, 24% of the online-scheduled appointments were made after hours or over the weekends.^[7]

Being able to schedule appointments online allows for more patient autonomy.^[8] Patient-centeredness improves the overall quality of healthcare and grants patients the ability to browse appointments to fit their needs.^[1] Furthermore, it is less of a burden on a practice's office staff. Zhao *et al.* found that patients scheduling their own appointments also conveniently filled out their registration and prescreening forms, along with reviewing the practice's policies before they arrive.^[1] This gives office staff less of a workload when checking in patients.^[1] Finally, patients being able to schedule their appointments gives them greater access to their care through accessing the online-scheduling system after standard work hours and on the weekends.^[1]

Considering some limitations, data was collected electronically, which might include some data collection errors; however, our prior research on the data has shown a very small and negligible error that might be found in data entry. Most of the visits were scheduled traditionally as we have recently implemented the online-scheduling system in our practice; number of traditionally scheduled cases reviewed was 71,673 while there were only 3058 online-scheduled cases, which may have affected the results of the study. Moreover, we only looked at 1 month to compare the two systems. However, the data were robust enough with over 74,000 inputs to detect any significant difference between the two groups.

CONCLUSION

More orthopedic practices should utilize online-scheduling systems to schedule patient appointments. Depending

on the different subspecialties of our orthopedic practice, there were significant differences in patient no-show rates. Furthermore, online scheduling allows for more patient autonomy and less burden on office staff. Overall, more practices need to implement an online-scheduling system to obtain more data for comparisons to older, traditionally scheduled systems, but there are benefits in switching over to a newer, online-scheduling system.

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Conflicts of interest

There are no conflicts of interest.

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