

TELEMEDICINE FOR HIP PRESERVATION PATIENTS: ACCESS, ABILITY AND PREFERENCE

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ABSTRACT

Background: Recent events have resulted in rapid rises in the use of telemedicine in orthopaedic surgery, despite limited evidence regarding patient preferences or concerns. The purpose of this study is to determine access to and, ability to use telemedicine technology in an adult hip preservation patient population, as well as determine associations with patient characteristics. Additionally, we seek to understand patients' perceived benefits, risks and preferences of telemedicine.

Methods: We performed a cross-sectional survey administered on patients scheduled to undergo joint preservation surgery by one of three surgeons at a single academic institution. Both preoperative and postoperative established patients were included and called for a telephone administered survey if a date of surgery was scheduled between October 1, 2019 and March 30, 2020 and were 18 years or older. The survey had seven sections with 45 questions relating to demographics, technology access, videoconferencing capability, confidence using technology, telehealth experiences, perceptions.

Results: 101 patients completed the survey (48% response rate, 101/212). Overall, 99% of participants reported using the internet, 94% reporting owning a device capable of videoconferencing, and 86% of patients had participated in a video call in the past year. When asked for their preferred method for a physician visit: 79% ranked in-person as their first choice and 16% ranked a videoconference visit as their first choice. Perceived benefits of telemedicine visits included reduced travel to appointments (97% agree) and

reduced cost of attending appointments (69% agree). However, patients were concerned that they would not establish the same patient-physician connection (51% agree) and would not receive the same level of care (38% agree) through telemedicine visits versus in person visits.

Conclusion: The majority of hip preservation patients have access to and are capable of using the technology required for telemedicine visits. However, patients still prefer to have in person visits over concerns that they will not establish the same patient-physician connection and will not receive the same level of care. Telemedicine visits in hip preservation patients may be most attractive to return patients with an established doctor-patient relationship, particularly those with concerns for long distances of travel and associated costs.

Level of Evidence: III

Keywords: telemedicine, joint preservation, technology, access, hip, ability, preference, videoconferencing

INTRODUCTION

Telemedicine is increasingly utilized in all medical specialties including orthopaedics. Using telemedicine can augment or replace traditional in-person office visits.¹ Potential benefits of telemedicine include reduction of cost for patients, society and the healthcare system.² Telemedicine has been successful in multiple surgical and medical specialties including urology, neurology and pediatrics.³ The COVID-19 pandemic has accelerated the growth of telemedicine utilization in orthopedics in response to social distancing practices. However, there are inherent limitations associated with telemedicine such as a detailed physical examination, and accessibility to patients.⁴ Additionally, telemedicine visits require both the patient and the physician to have internet access along with a device capable of videoconferencing.⁵

There is limited literature regarding the use of telemedicine as well as patient perceptions regarding telemedicine in the hip preservation patient population.^{3,6,7} These patients may have varying access to and experience with the technology required to perform telemedicine visits. The recent atypical time period as-

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Table 1. Survey Completion

| Factor | Yes (N=101) | No (N=117) | p-value |
|------------------------------|-------------|------------|-------------------|
| Age | 35.4±16.1 | 34.8±16.4 | 0.77 ^a |
| Race* | | | 0.57 ^d |
| Black or African American | 2(2.0) | 6(5.2) | |
| Non-white Hispanic or Latino | 1(1.0) | 1(0.86) | |
| White | 96(97.0) | 109(94.0) | |
| Gender | | | 0.18 ^c |
| Female | 75(74.3) | 77(65.8) | |
| Male | 26(25.7) | 40(34.2) | |

*Data not available for all subjects. Missing values: Race = 3. Values presented as Mean ± SD, Median [P25, P75], Median (min, max) or N (column %). p-values: a=ANOVA, b=Kruskal-Wallis test, c=Pearson’s chi-square test, d=Fisher’s Exact test.

sociated with the COVID 19 pandemic provided a unique opportunity to examine a large group of telemedicine visits in a short period of time.

The purpose of our study is to determine access to and, ability to use telemedicine technology in an adult joint preservation patient population, as well as determine associations with patient demographic characteristics (age, sex, race/ethnicity). Additionally, we sought to understand patients’ perceived benefits, risks and preferences of telemedicine.

METHODS

We performed a cross-sectional survey on patients scheduled to undergo hip preservation surgery (hip arthroscopy, periacetabular osteotomy, surgical hip dislocation, or proximal femoral osteotomy) between October 1, 2019 and March 30, 2020 by one of three surgeons at a single academic institution. Institutional review board approval was obtained prior to initiation of the study. All patients were established patients with one of the three surgeons. Patients were excluded if they were under the age of 18 years old. A total of 212 patients met inclusion criteria for the study. All eligible patients were individually called, either preoperatively or postoperatively, to participate in the telephone administered survey and three contact attempts were made for each potential participant. Patients were verbally consented prior to administration of the survey (see appendix for full survey). The survey had seven sections with 45 questions relating to demographics, technology access, videoconferencing capability, confidence using technology, telehealth experiences and preferences, telehealth perceptions, and app use for remote monitoring. The survey typically took five to ten minutes to complete. 127 eligible patients (59%) were reached via telephone,

of those, 101 (80%) agreed to participate for an overall response rate of 48% (101/212).

Chi-square tests were used to explore if a relationship exists between the demographic data and the telemedicine related outcomes. Fisher’s Exact test used wherever there were fewer than 5 responses within a group. For the sole continuous predictor age, ANOVA were used to test for differences across grouping. A p-value less than 0.05 was considered significant.

RESULTS

A total of 101 patients completed the survey. There was no significant difference in age (both 35 years old, p=0.77), gender (75% female vs 66% female, p=0.18) or race (97% white vs 85% white, p=0.57) among those who completed versus those who did not complete the survey (Table 1). Overall, 85% of participants had at least some college education with 15% having a high school degree or less.

Our study found that patients largely had access to technology with 99% of participants reporting using the internet, 98% reporting owning a device capable of videoconferencing and 86% of patients had participated in a video call in the past year. The majority of patients were employed full or part-time (54%) while 23% were students, 10% retired and 8% unemployed.

A total of 63% of participants had done a telehealth visit with a physician. Participants who have had a previous telemedicine visit had statistically higher access to some forms of technology [ownership of a laptop (94% vs 79%, p<0.001)]. However, there were no differences in preferences or perceptions of telemedicine compared to those who had not had a telemedicine visit. Participants with a higher level of education (some college or greater) had statistically higher access to some forms of technology [ownership of a laptop (97% vs 67%, p<0.001), tablet (66% vs 20%, p<0.001), and smartwatch (64% vs 27%, p<0.001)]. Similarly, those with higher level of education reported higher rates of prior use of telehealth platforms [use of online portal to check test results/labs (88% vs 67%, p=0.029) or communicate with healthcare team (85% vs 60%, p=0.023)] (Table 2). There were no differences in reported confidence using technology and perceptions of telemedicine in participants with a higher level of education.

When asked for their preferred method for a physician visit, 79% ranked in-person as their first choice, followed by 16% preferring a video visit. Perceived benefits of telemedicine visits included reduced travel to appointments (97% agree or strongly agree), easier to attend appointments (83% agree or strongly agree), and reduced cost of attending appointments (69% agree or strongly agree). However, patients were concerned that they would not

Table 2. Patient Demographics of Respondents vs Non-Respondents

| Factor | High School or Less (N=15) | Some College or Greater (N=86) | p-value |
|--|----------------------------|--------------------------------|---------------------|
| Age | 33.5±20.7 | 35.8±15.3 | 0.61 ^a |
| Own Laptop | | | <0.001 ^c |
| no | 5(33.3) | 3(3.5) | |
| yes | 10(66.7) | 83(96.5) | |
| Own Tablet | | | <0.001 ^c |
| no | 12(80.0) | 29(33.7) | |
| yes | 3(20.0) | 57(66.3) | |
| Own Smartwatch | | | 0.007 ^c |
| no | 11(73.3) | 31(36.0) | |
| yes | 4(26.7) | 55(64.0) | |
| Used online portal to view test results | | | 0.029 ^c |
| no | 5(33.3) | 10(11.6) | |
| yes | 10(66.7) | 76(88.4) | |
| Used online portal to communicate with healthcare team | | | 0.023 ^c |
| no | 6(40.0) | 13(15.1) | |
| yes | 9(60.0) | 73(84.9) | |

Values presented as Mean ± SD, Median [P25, P75], Median (min, max) or N (column %).
 p-values: a=ANOVA, b=Kruskal-Wallis test, c=Pearson’s chi-square test, d=Fisher’s Exact test.

establish the same patient-physician connection (51% agree or strongly agree), would not receive the same level of care (38% agree or strongly agree), and believed their physician would not spend the same amount of time with them (24% agree or strongly agree) through telemedicine visits versus in person visits.

We also wanted to identify future uses of telemedicine with the hip preservation population. When asked if they would feel comfortable installing a secure app onto their smartphone that would allow their physician to perform remote monitoring of recovery and long-term function, 85% said “yes”. Of those that said “yes”, 95% would be comfortable receiving surveys sent through the app, 98% would be comfortable with activity data (heart rate, steps) collected and sent to their physician after their review, 95% would be comfortable with activity data (heart rate, steps) collected and sent to their physician during approved intervals, and 71% would be comfortable with activity data (heart rate, steps) collected and sent to their physician without notifying them first. Additionally, of those that said “yes”, 94% and 98% would feel comfortable with activity data (heart rate, step count) being collected on their smart phone and smart watch/wearable activity monitor, respectively. 95% stated they would be comfortable wearing a smart brace capable of monitoring activity and function for short periods of time, however,

only 59% would be comfortable with an implanted device at the time of surgery capable of continuous monitoring of joint activity and device function.

DISCUSSION

The utilization of telemedicine continues to increase throughout all fields of medicine, including orthopaedics. The COVID-19 pandemic has led to a recent rise in the use of telemedicine, which gave a unique opportunity to examine a large group of telemedicine visits and understand the feasibility of this technology within specific orthopedic patient populations. Our study found the majority of hip preservation patients in our practice have access to and are capable of using the technology required for telemedicine visits. Participants recognized the potential benefits of telemedicine as less time spent traveling to and lower cost of attending appointments. Although our patients have the ability to use technology and appreciate the potential benefits of telemedicine, patients still prefer in-person visits over concerns that they will not establish the same patient-physician connection and will not receive the same level of care.

Participants with a higher level of education (some college or greater) had statistically higher access to some forms of technology but no differences in preferences or perceptions of telemedicine. Additionally,

patients who had previously done a telemedicine visit with any physician did not have significant differences in preferences or perceptions of telemedicine compared to those who had not had a telemedicine visit with a physician. In the hip preservation patient population, this highlights that patients with an established physician-patient relationship who have concerns over long travel distances and associated cost may be most interested in continued telemedicine care.

There are similarities and differences in the literature in comparison to our study. Similar to our study Soegaard et al. found that patients identified convenience, reduced travel and time as associated benefits of telemedicine.⁸ However, unlike in our study, 98% opted to have telehealth postoperative visits. In another study 71% of patients were concerned with the lack of personal contact with the orthopaedic surgeon via telemedicine.¹ Manz et al. determined patient satisfaction in a foot and ankle orthopedic practice was significantly lower for telemedicine visits than for in-person visits.⁶ A randomized controlled trial found that 86% of remote consultation patients preferred video-assisted consultation as the next visit.⁹ Additionally, no difference was observed in patient-reported health after 12-months between the groups randomized between video-assisted remote consultation and standard in-person consultation.⁹ Nikolian et al. found telemedicine to be safe and efficient for postoperative management as an alternative to in-person visits with 85% of patients satisfied with their telemedicine visit.¹⁰ However, Barrack et al. found routine postoperative visits provide little practical value and represent a time and cost burden for both patients and surgeons, however, patients reported high satisfaction and found the visits worthwhile.¹¹

Travel time to medical care is particularly relevant to the application of telemedicine. Manz et al. found that patients living within 50 miles of the clinic had lower satisfaction with telemedicine than those greater than 50 miles from the clinic.¹² Previous research has demonstrated that telemedicine has the potential to increase healthcare access to patients. The patients in our study travel from various locations and did recognize reduction in cost as a benefit of telemedicine visits.

Telemedicine has been shown to reduce health care costs by decreased staffing, maintenance and travel burden.¹³ Buvik et al. found that the video-assisted orthopaedic consultations were cost-effective provided that the number of consultations performed per year was greater than 183.¹⁴ Harno et al. also found that telemedicine reduced direct costs by 45%.¹³

There are still many challenges associated with telemedicine. Prior to policy changes at the onset of the COVID-19 pandemic, Medicare only paid for video

consultation if the patient lived in a designated rural Health Professional Shortage Area and reimbursement by private insurance varied.¹⁵ Technical difficulties such as loss of camera control, nonfunctional audio and being unable to connect to the videoconference serve as another challenge associated with telemedicine. Additionally, there is concern regarding reliable physical examination that is critical to orthopaedics.¹⁶ Some physicians will only evaluate orthopaedic patients through telemedicine when high-quality audio-video or imaging technology is not critical for diagnosis and treatment.⁴ The standardization of virtual examinations and measurements are necessary to improve generalizability of telehealth in the field of orthopaedic surgery. Additional research is needed to assess and determine the reliability of virtual joint assessment.

Our study has several limitations. First, this study was performed during a very atypical time period on which to draw conclusions and may have biased responses in favor of telemedicine. However, study participants largely preferred in-person visits even though telemedicine reduced the risk of exposure to COVID-19. Additionally, our response rate was only 48%, and therefore we may have had selection bias as a result of our methods. Furthermore, some of the survey questions were subjective which may allow varied interpretation. As this is the first report performed using this survey, it has not been validated for inter- or intra-observer reliability. Lastly, this study was done at a single academic institution with a wide geographic catchment area, encompassing both urban and rural populations. Future studies are necessary to assess for differences identifying complications through telemedicine in comparison to in-person visits and to assess the cost-benefit ratio for the doctor and staff in the joint preservation population.

In conclusion, the majority of joint preservation patients reported having access to and ability to use technology required for telemedicine visits and identified the perceived benefits of reducing the time spent traveling to and cost of attending appointments, and being easier to attend appointments. Despite these benefits and access to technology, patients' concerns that they will not establish the same patient-physician connection and will not receive the same level of care influenced their preference towards having in-person visits. Telemedicine visits in hip preservation patients may be most attractive to return patients with an established doctor-patient relationship, particularly those with concerns for long distances of travel and associated costs.

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