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Use of Telemedicine in a Sports Medicine Clinic: An Investigation of Patient Satisfaction

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Use of Telemedicine in a Sports Medicine Clinic: An Investigation of Patient Satisfaction

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Objective: Compare patient satisfaction between telemedicine and in-office visits and between providers post-operatively in an orthopedics setting with athletic trainers and physicians. **Design:** Cross-sectional study **Methods:** Patients from a Sports Medicine Clinic that received an orthopedic surgical intervention from March 2020-September 2021, and engaged in telemedicine, or an in-office visit post-operatively. Provider type included full-time athletic trainers, resident athletic trainers, physician (MD) resident/fellows, and float athletic trainers. Press-Ganey Patient Experience Surveys were collected at the time of follow up visit, with focus on items, "likelihood to recommend" and "how well staff worked together." **Results:** There was a total of 255 patients (age=50±17 years). Providers included the attending physician with full-time athletic trainers (n=134, 52.3%), resident athletic trainers (n=77, 30.1%), MD residents/fellows (n=38, 14.8%), or float athletic trainers (n=6, 2.3%). No significant difference was found with patient satisfaction between in-office (n=175, 68.4%), or telemedicine visits (n=80, 31.3%), ($p>.44$). Patients were more satisfied with care provided by the full-time athletic trainers compared to MD residents/fellows ($p.18$). **Conclusions:** This study demonstrates no significant differences with patient satisfaction between in-office or telemedicine visits. Patients seeing full-time athletic trainers had the highest patient satisfaction, demonstrating the capability of athletic trainers to effectively use telemedicine in a physician practice. **Key Words:** *telemedicine, post-operative, patient satisfaction, athletic trainer*

INTRODUCTION

Telemedicine is defined as "the use of electronic information and communication technologies to provide and support health care when distance separates participants."¹ With the widespread use of technology, the electronic arsenal available to the medical field has continued to rise, and now has a broad clinical scope with the general purpose of providing convenient, safe, and time- and cost-efficient care.^{1,2} In recent years, telemedicine has been adopted in several domains of surgical care, including postoperative care.² Along with excellent clinical outcomes and increased accessibility, telemedicine has also demonstrated enhanced patient satisfaction.^{2,3}

Telemedicine is a service that is rapidly evolving to provide increased access to high-quality healthcare, especially in the midst of the SARS COVID-19 pandemic.⁴ This pandemic

caused significant change to healthcare in the United States, as well as across the globe, requiring a quick adoption and integration of telemedicine. In some cases, face-to-face consultation interactions may be preferred by patients and/or clinicians, but telemedicine has saved lost time at home, work, travel, and missed and rescheduled appointments, even outside of the SARS COVID-19 pandemic.^{3,4} Telemedicine has helped to overcome barriers to services, such as long distance travel and provision of specialty care in rural or medical shortage areas.⁵ The use of telemedicine in healthcare could be considered a positive change that has come from the SARS-COVID-19 pandemic. As telemedicine continues to emerge in many fields of medicine, there is limited evidence of its role in sports medicine.⁶ With widespread availability of communication technology, notably in specialty care, providers will need to continue the exploration of different modes

of communication for clinical encounters and visits.⁷ If health care professionals can better understand the perceived value of telemedicine in a postoperative orthopedic and sports medicine setting, we will be able to better shape the future use of technology and policies in this setting and other healthcare departments.^{8,9}

Telemedicine can greatly improve access to quality, affordable care for patients while maintaining physical distancing for the safety of both patients and providers.⁴ In addition, collaboration between physicians and athletic trainers can help facilitate continuity of care and improved patient outcomes.⁶ This can help to improve the competence of healthcare delivery, such as providing patient centered care through shared decision-making, working in interdisciplinary teams, and supporting decision-making using informatics.⁶ The current climate requires more healthcare providers, including athletic trainers, to interact with telemedicine. Previous studies have investigated patients' perceptions of their health care provider and how this relates to the perceived quality of care delivered, though few in an orthopedic setting.¹⁰ Therefore, the purpose of this investigation is to compare patient satisfaction between telemedicine and in-office visits, as well as between providers, postoperatively in an orthopedic setting with athletic trainers and physicians. We hypothesize there will be congruent patient satisfaction with athletic trainers utilizing telemedicine and no difference in patient satisfaction between telemedicine and in-office visits.

METHODS

This study was performed as a collaboration between a mid-sized, regional University in the Midwest and a large Sports Medicine Clinic in the Southeast United States. This is a point-of-care study in a postoperative orthopedic clinical setting that we acquired 12 months of data from telemedicine and in-

office patient-reported outcomes and patient satisfaction reported outcomes. Institutional Review Board (IRB) approval was not required for this study. Analysis was focused on standard operating procedures that the clinic and hospital system already had in place. Comparisons were made between telemedicine and in-office visits and between providers. Two items from the Press-Ganey Patient Experience Survey, "how well the staff worked together" and "likelihood to recommend" were chosen to investigate comparisons between providers and to encompass the global patient experience, with in-office and telemedicine visits.

Participants

All participants are patients at Emory Orthopedic and Sports Medicine Center in Atlanta, Georgia. Participants that received a surgical intervention by an Orthopedic or Sports Medicine surgeon at Emory Hospital from March 2020 through September 2021 and answered the questions "how well the staff worked together" and "likelihood to recommend" were included in this study. Participants received the Press-Ganey Patient Experience Survey and completed the survey after their visit, either in-office or electronically, dependent on visit type. A sample of 255-participants (age = 50 ± 17 years) were included in the statistical analysis. All data were labeled with the patient's medical record number, age, sex, service date, and visit provider, then de-identified for analysis.

Instrumentation

The Sports Medicine Clinic collected two items from the previously validated and commonly used Press-Ganey Patient Experience Survey following a telemedicine or in-office visit with an identified post-operative date (Table 1.). The Press-Ganey Patient Experience Survey helps evaluate a patient's perception of different aspects of health care delivery in an outpatient setting, such as access, moving through the visit, nurse/assistant, care

provider, personal issues, and overall assessment.¹⁰ The survey asked patients to rate the provider and answer the questions on a Likert Scale, with a higher score indicating a higher level of patient satisfaction.¹⁰ The Patients were able to respond to all or none of the questions, however to align with the aim of this study, we analyzed the two items: “how well the staff worked together” and “likelihood to recommend”, as these two questions were global to the patient experience due to their action, rather than sections of health care delivery. These two items were global reflections that could be compared between telemedicine and in-office visits. Only those who answered the questions “how well the staff worked together” and “likelihood to recommend,” at this specific outpatient clinic, were included in the results. Responses from the two questions based on the Likert Scale 0-10 were averaged. The Likert Scale, or rating scale, is a psychometric scale used to measure responses with 10/10 being the most positive response.

Press Ganey Survey Questions
Rate provider 0-10 (10 being the highest satisfaction rating)
Ease of scheduling appointments
Ease of contacting office
Information about delays
Wait time at clinic
Concern of nurse/assistant for problem
Nurses' follow-up care instructions
How well nurse/assistant listened
Provider explanations of problem/condition
Provider concern for questions/worries
Provider efforts to include patient in decisions
Likelihood of recommending provider
Provider discussed treatments
How well staff protected safety
Concern for patients' privacy
Cleanliness of practice
Addressed concerns for safety
Staff working together to care for you
Likelihood of recommending clinic
Ease of talking with provider over video
Video connecting during visit
Audio connecting during visit
Comments (free typing)

Table 1. Press Ganey Patient Experience Survey Questions. *Likert Scale Rating 0-100 at intervals of 25.*

Procedures

Patient satisfaction data were collected at multiple time points between 3-4 days and 12 months post-operative, depending on specific surgical intervention (Figure 1. Surgical Intervention Timeline & Table 2.). Each specific surgical intervention has a protocol for follow up timeline; patients completed a survey at each visit depending on specific surgical intervention timeline. The visit provider, which includes full-time athletic trainer, resident athletic trainer (currently enrolled in the Orthopedic Technologist program), float (PRN – pro re nata) athletic trainer (working as needed), or resident physician/fellow, was identified during each videoconferencing software telemedicine visit, standardized across all visits, or in-office visit.

Surgical Interventions	Symbol
Anterior Cruciate Ligament	*
Tibial Tubercle Transfer	+
Medial Patellofemoral Ligament Reconstruction	+
Rotator Cuff Repair	●
Bankart Repair	μ
Knee Arthroscopy	∞
Manipulation Under Anesthesia	β
Subacromial Decompression	α
Shoulder Arthroscopy	α
Humerus Open Reduction Internal Fixation	≠
Ankle Arthroscopy	≠
Plantar Fascia Release	≠
Tarsal Tunnel Release	≠
Ankle Open Reduction Internal Fixation	≠
Hardware Removal	¥
Metatarsal Phalangeal Joint Fusion	≠
Subtalar Fusion	≠
Bunionectomy	≠
Bromstrom-Gould Reconstruction	≠
Peroneal Debridement and/or Repair	≠
Hallux Valgus Correction	≠
Exertional Compartment Release (Fasciotomy)	±
Total Ankle Replacement	£

Table 2. Surgical Interventions

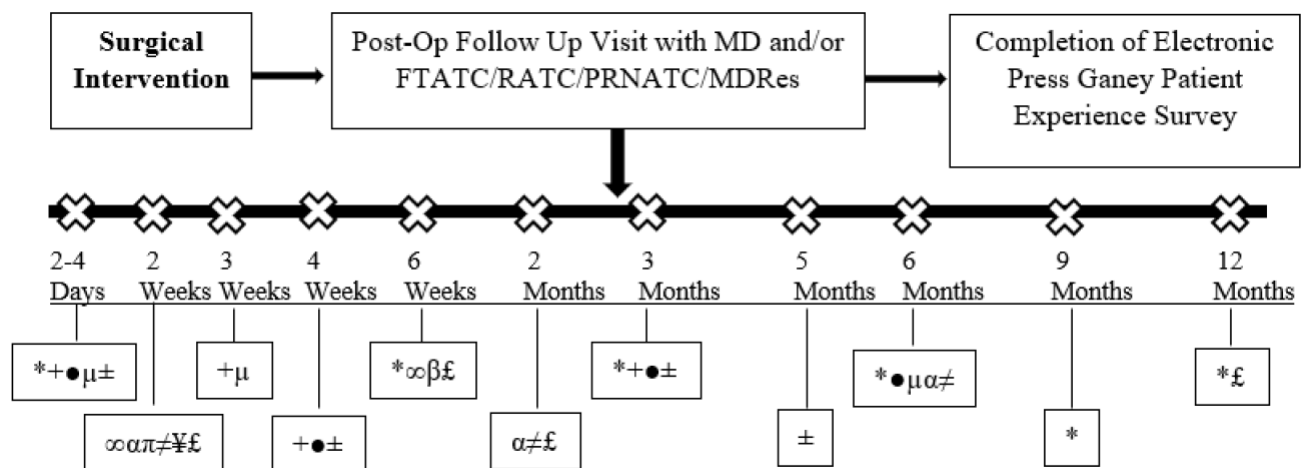


Figure 1. Surgical Intervention Timeline

Data was retrospectively collected via the patient's electronic medical record (EMR) beginning in March 2020 through September 2021. An Excel spreadsheet with the variables was created to store the data and track both independent and dependent variables that were included in the statistical analysis. Data were secured in a password protected computer and only those at the point-of-care accessed de-identified data to ensure privacy of the patients.

Statistical Analysis

Quantitative data was transferred from an Excel spreadsheet to the SPSS software for analysis. Descriptive and inferential analyses were completed. Descriptive analysis was performed on both independent and dependent variables and includes means, standard deviations, and frequency of visit type (telemedicine or in-office), frequency of provider seen by, and a breakdown of specific Press-Ganey questions, such as "likelihood to recommend", regarding the specific outpatient clinic, and "how well the staff worked together."

Frequencies of independent variables, such as patient type, visit type, and provider type were conducted. Hypothesis testing was performed using the nonparametric Mann-

Whitney test comparing visit type (telemedicine or in-office) with Press-Ganey patient satisfaction scores across the study period, specifically "likelihood to recommend" and "how well the staff worked together." Additionally, a Kruskal Wallis analysis was used to evaluate differences between provider type and patient satisfaction. When significant differences were present, a Mann-Whitney testing comparing provider (full-time athletic trainer, resident athletic trainer, PRN athletic trainer, MD resident/fellow) with Press-Ganey patient satisfaction scores was conducted. Significance was established at $P < .05$. Statistical analysis was performed with IBM SPSS Statistics Version.

RESULTS

This study included 255 patients (age=50±17 years) who engaged in a telemedicine (n=80, 31.3%) or an in-office visit (n=175, 68.4%) over the study period (Table 3.). All patients were seen by the attending physician and an additional provider (Table 3.).

Patient satisfaction regarding "how well staff worked together" and "likelihood to recommend" was variable across the comparison groups (Table 4.). No significant difference was found with patient satisfaction between in-office or telemedicine visits

$p > .44$). There was a significant difference with patient satisfaction and provider type ($p < .001$). Upon further breakdown of provider type, patients were more satisfied with care provided by the full-time athletic trainers compared to MD residents/fellows ($p < .001$), and more satisfied with full-time athletic trainers compared to resident athletic trainers ($p < .01$). No significant difference in patient satisfaction was found between the other identified providers.

	Frequency (f)	Percent (%)	Mean
Visit Type			
Telemedicine	80	31.3	
In-Office	175	68.4	
Provider Type			
FTATC	134	52.3	
RATC	77	30.1	
PRNATC	6	2.3	
MDRes	38	14.8	
Sex			
Male		48.4	
Female		51.6	
Age			50.2

Table 3. Patient Demographic Data

	Worked together ($p < .05$)	Likelihood to Recommend ($p < .05$)
Visit Type (telemedicine vs. in office)	0.63	0.44
Provider Type		
FTATC & RATC	0.01	0.21
FTATC & MDRes	0.001	0.01
FTATC & PRNATC	0.63	0.63
RATC & MDRes	0.18	0.17
RATC & PRNATC	0.32	0.48
MDRes & PRNATC	0.37	0.55

Table 4. Patient Satisfaction. FTATC = Full-time ATC; RATC = Resident ATC; PRNATC = Float ATC; MDRes = MD Resident/Fellow

DISCUSSION

In our study, patient satisfaction according to the Press Ganey Patient Experience Survey did not indicate a difference between

satisfaction of telemedicine versus in-office visits. Commonly, health care encounters occur between provider and patient, face-to-face. However, in the past two decades, the internet and technology have helped change health care encounters to a digital experience.¹¹ We believe this indicates that though health care encounters are changing, providers are also adapting, and patients continue to be satisfied with the care received from their providers. Telemedicine is a useful tool by helping provide health care for patients in remote and rural areas, save time for patients and providers, but also still provide for patients needing high-demand specialty care, such as orthopedics or sports medicine.⁶ When viewing telemedicine from an orthopedics or sports medicine lens, from this study, we are finding that there is no loss of patient satisfaction within this specialty care, or when telemedicine is being provided by athletic trainers in conjunction with physicians.

The greatest area of patient satisfaction, from our study, was “how well the staff works together,” demonstrating increased patient satisfaction with provider collaboration, especially with full-time athletic trainers, regardless of telemedicine or in-office visits. Though this was not the goal of the study, it was a significant finding. Patients were seen by both the physician and either a full-time athletic trainer, resident athletic trainer, PRN athletic trainer, or medical resident or fellow. Collaboration between the providers facilitates continuity of care, along with providing patient-centered care through shared decision making, whether via telemedicine or in-office visits.⁶ When evaluating inter-professional collaborative practice (IPCP), it requires health care professionals to work together in a coordinated approach to clinical decision making.¹² Inter-professional collaborative practice is grounded in communication, teamwork, and the merging of knowledge and skills of each health care team member.¹²

Athletic training has an innate structure for working with other healthcare providers, including physicians, pharmacists, physical therapists, nurses, and other allied health care professionals, emphasized by the Inter-professional Education and Practice in Athletic Training Working Group, as well the Commission on Accreditation of Athletic Training Education.¹² We believe the significant findings in this study indicate athletic trainers are valuable providers when IPCP is being utilized.

Regarding overall efficiency, telemedicine in a post-operative setting has been shown to decrease time spent traveling for the patient; the physician can complete their visit in less time due to decreased non-clinical aspects, and most importantly, there is no change to clinical outcomes.¹¹ Research has shown that families can save an average of 85 miles driving and \$50 in cost per telemedicine visit.³ It has also been found that having clinical athletic trainers who can perform both clinical and administrative tasks under the guidance of the attending physician can improve efficiency.¹⁴ The partnership of telemedicine, with athletic trainers in a physician practice, can increase efficiency in a post-operative setting, and as our study shows, there is no loss of patient satisfaction, even between providers. As technology continues to develop at a rapid pace, it is important for health care providers to have an understanding and basic skills necessary to use information technology to strengthen the delivery of patient care.¹⁵ Moreover, post-professional education and residency/fellowship training can reinforce concepts of IPCP and health care informatics.¹⁵

In this study, full-time athletic trainers not only had greater levels of patient satisfaction regarding their collaboration with the physician, but patients also scored them highest relative to “likelihood to recommend,” indicating overall increased patient satisfaction. The use of athletic trainers in

physician practice has been previously studied and their presence has optimized orthopedic medicine.¹⁴ When looking at previous research, there was no evidence that patients’ perception is different when comparing athletic trainers and orthopedic medical residents in orthopedic knowledge and clinical care.¹⁰ It could be proposed that this implies patient satisfaction comes from other aspects of care, such as inter-professional collaboration. Our data shows increased patient satisfaction in the domain of “how well the staff works together” when comparing athletic trainers and medical residents, indicating collaboration as a reason for patient satisfaction, as the athletic trainers were working in conjunction with the physician. In an outpatient clinic setting, such as the one our study took place at, athletic trainers will work in conjunction with a physician, and “how well the staff works together” is indicative of athletic trainers’ ability to perform inter-professional collaboration, whether this is utilizing telemedicine or an in-office visit.

Telemedicine as a means for patient care used by athletic trainers has not been widely studied but shows potential benefits. Our study indicates there is no loss of patient satisfaction with using telemedicine, and telemedicine being used by athletic trainers. Athletic trainers have identified the benefit of using telemedicine for patients that cannot attend traditional in-person visits due to work schedules, childcare, being homebound, or not having access to transportation.¹⁶ Utilizing telemedicine could increase follow-up adherence, thus improving patient outcomes. As mentioned previously, telemedicine is safe, improves accessibility, and is cost-efficient, along with not lacking in patient-centered care. Telemedicine should be considered as a valuable tool to be utilized by athletic trainers in physician practice.

With the rapid adoption of telemedicine during the SARS COVID-19 pandemic, there is a question if the use of telemedicine persists

in the post-pandemic period. A current study found that between March and November 2022, thirty-nine percent of their participants had utilized telemedicine, whether that be video visits or telephone-based telecare, while most patients still indicated a preference for in-office or in-person visits post-pandemic.¹⁹ Other research also finds that though patient's indicate liking telemedicine, most still prefer in-office visits post-pandemic.²⁰ Despite the likelihood of telemedicine availability since the onset of the SARS COVID-19 pandemic, some barriers could still exist for patients utilizing telemedicine, such as limited access, privacy concerns, technological difficulties, or demographic disparities.¹⁹ Future research could continue to investigate these barriers, as patient satisfaction, from this study, indicates that there is no loss in patient satisfaction when patients are able to utilize telemedicine.

This research focused on athletic trainers working in a physician practice utilizing telemedicine, and future research could also begin to look at adoption of telemedicine by athletic trainers in different athletic training settings. Further investigation into formal education on adopting telemedicine would also be warranted, though federal and state specific telemedicine acts should be taken into consideration. Continued research into the adoption of telemedicine by athletic trainers in different settings, possible barriers, and appropriate formal training in the delivery and use of telemedicine, along with legality, should be considered.

This study had limitations. There were a wide range of post-operative follow-up dates from three to four days to twelve months. This could affect the nature of the patient satisfaction depending on where the patient was in their post-operative recovery timeline at the time of the follow up visit and the subsequent Press Ganey survey. Patients were asked to complete a Press Ganey survey at the end of each visit, whether it be telemedicine or

in-office, and patients were able to complete this for all follow up visits, indicating a single patient could have completed multiple surveys with different visit types that were included in this data. As all patients would have multiple follow up dates depending on their specific surgical intervention protocol, it is likely most patients did complete the survey more than once, but there is also a possibility a patient did not follow up more than once, depending on their specific surgical intervention.

Another limitation to consider for this study is the response rate of the Press Ganey Patient Experience Survey. Our study included 255 patients that responded to the survey and completed the questions "likelihood to recommend" and "how well the staff worked together" but does not include all patients that were seen at the outpatient clinic from March 2020 to September 2021. Though research indicates the Press Ganey Patient Experience Survey has suitable psychometric properties, studies have shown that when using the Press Ganey Patient Experience Survey in an American orthopedic setting, there was a low response rate, and this exhibited a non-response bias.^{17,18} As mentioned previously, not all patients included in this study answered every question on the Press Ganey Patient Experience Survey, but only those that answered, "likelihood to recommend" and "how well staff worked together", were included in the results. It should also be noted that patients interacted more frequently with the full-time athletic trainers (52.3%) compared to the MD residents/fellows (14.8%), and increased exposure could have affected the responses.

The clinical implications of this study are that athletic trainers are an appropriate health care provider to utilize telemedicine in patient care, specifically in a post-operative setting. With the expansion of telemedicine and its demonstrated positive clinical outcomes, increased access for patients, decreased cost,

and increased efficiency, its adoption by athletic trainers is necessary for patient centered care, patient education, and patient satisfaction. As a profession, athletic trainers should continue to advocate for telemedicine legislature that includes them, along with potential insurance reimbursement. Future research into other areas of athletic training using telemedicine, such as rehabilitation or side-line care, with validated techniques, should be conducted.

Key Points

There is no difference in patient satisfaction with telemedicine or in-office visits. There is appropriate patient satisfaction with athletic trainers using telemedicine post-operatively in a physician practice. This study implicates the possibility of athletic trainers using telemedicine in other areas of medicine, such as a therapy setting, and becoming more prevalent in Sports Medicine and Orthopedic practices. As mentioned, this study did have limitations, such as a wide range of post-operative follow up dates and the response rate of the Press Ganey Patient Experience Survey. Implications for clinical practice from this study suggest higher utilization of telemedicine by athletic trainers.

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