

## Telehealth in Physical Therapy Practice for Musculoskeletal Disorders: An Administrative Case Report

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### ABSTRACT

**Study Design.** Administrative case report.

**Objectives.** The objectives of this paper are to: 1. summarize the current regulatory considerations for physical therapy telehealth services for musculoskeletal disorders; 2. describe the implementation process of a telehealth program by an outpatient physical therapy organization across its 20 clinics during the SARS-CoV-2 (COVID-19) pandemic; and 3. provide recommendations for regulatory, organizational and research changes needed to support implementation of long-term telehealth services in musculoskeletal physical therapy practice.

**Background:** The COVID-19 pandemic has greatly disrupted the delivery of healthcare services. Telehealth provides a possible solution for improving delivery of services by enhancing access and fostering patient-centered approaches but has not been well-described in physical therapy practice.

**Methods:** The implementation processes of telehealth services by a large outpatient physical therapy center in California are described. Three patient cases are summarized for a more detailed description of the experience.

**Analysis:** Telehealth services were successfully implemented in a large outpatient physical therapy center in response to the COVID-19 pandemic. Initial responses from patients with musculoskeletal disorders and physical therapists about telehealth services were positive.

**Conclusions:** Telehealth has the potential to enhance physical therapy practice, though its specific structure and magnitude are unclear. Regulatory and organizational changes as well as research trials are needed to help clarify the role of telehealth.

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### Introduction

The SARS-CoV-2 (COVID-19) pandemic globally disrupted the delivery of healthcare services.<sup>1</sup> Those services that traditionally required face-to-face interactions with repeated visits over time, such as exercise interventions and similar rehabilitation services,<sup>1</sup> were particularly impacted. Patients with musculoskeletal disorders experienced additional occupational, personal, and/or psychological stressors, altered work schedules or unemployment, and reduced access to healthcare providers. Likewise, gyms, fitness facilities, and recreational areas were closed, or were subject to social distancing constraints, leaving patients to seek other solutions for preventive and therapeutic exercise services. While the current pandemic may be temporary, resulting changes in healthcare delivery may be longer lasting.

Guideline-based care for musculoskeletal disorders encourages early and appropriate interventions, active care, and efficient return to usual activities of daily living.<sup>2</sup> Therapeutic exercise programs and behavioral approaches for musculoskeletal disorders are typically delivered with direct onsite one-on-one or group supervision, which is recommended for treatment and prevention.<sup>2</sup> This delivery approach limits access and is not pragmatic for global crises, such as the COVID-19 pandemic. Thus, alternatives are needed.

Telehealth provides a possible solution for improving service delivery for patients with musculoskeletal disorders by enhancing access and fostering patient-centered approaches. As defined by the World Health Organization, telehealth is “The delivery of health care services ... using information and communication technologies for the exchange of valid information for diagnosis, treatment and prevention of disease and injuries, research and evaluation...”<sup>3</sup> Telehealth is a component of “digital practice,” which is “... a term used to describe health care services, support, and information provided remotely via digital communication and devices...”<sup>4</sup> Digital physical therapy practice can improve access to care and information while managing health care resources.<sup>4</sup>

The physical therapy profession rapidly adapted to the need to provide an alternative mode of patient interaction in response to the public health emergency (PHE). According to an American Physical Therapy Association (APTA) survey, 98% of physical therapists did not utilize video conferencing patient interactions prior to the pandemic. By July 2020, 47% of the survey respondents reported using video telehealth in their practice.<sup>5</sup> Furthermore, school system (93%), private outpatient office or group practices (71%), and hospital-based outpatient facility or clinic and other (50%, 61%) were leading the telehealth adoption.<sup>5</sup> This uptake of telehealth delivery initially occurred with limited guidance as to how to proceed.

Those recent experiences with telehealth adoption have resulted in research that has started to fill in gaps on the topic.<sup>6-10</sup> Preliminary evidence from observational and experimental studies suggests that telehealth may be useful for management of patients with musculoskeletal disorders.<sup>9,11-14</sup> Grundstein et al.<sup>9</sup> reported on the implementation of physical therapy telehealth services during the pandemic for patients with musculoskeletal disorders in a large hospital network. Services delivered by physical therapists via telehealth in this report included remote evaluations for which guidelines were developed and interventions, which primarily consisted of home exercise programs. The authors concluded that telehealth can be valuable as assessed by several implementation outcomes such as: 1) quicker access to care compared to in-clinic services (2.7 days vs. 6.8 days, respectively); 2) an expanded geographical area within one state and across state boundaries to deliver care to patients compared to in-clinic services; and, 3) similar patient satisfaction compared to in-office services. While the findings of this study may not be generalizable to other physical therapy settings, it provided useful information and recommendations about delivering telehealth services in a pandemic environment.

A recent systematic review assessed the safety and effectiveness of synchronous telehealth compared to in-office delivery for the management of non-acute musculoskeletal

conditions in adults.<sup>15</sup> Eight randomized controlled trials (RCTs) were uncovered in this systematic review - one RCT assessed telehealth delivered via videoconferencing and seven RCTs assessed telehealth delivered via telephone. The settings for the studies in this review were community clinic (n = 1), outpatient hospital (n = 4), and academic hospital (n = 3). The studies compared: telehealth to in-office delivery for headaches (n = 1), low back pain (n = 1), and knee osteoarthritis (n = 1); telehealth combined with in-office delivery to in-office delivery alone for low back pain (n = 1), knee osteoarthritis (n = 1), hip or knee osteoarthritis (n = 1), and general osteoarthritis (n = 1); and four types of interventions, two of which included telehealth to deliver education to patients, for hip or knee osteoarthritis (n = 1). Interventions were delivered by a physical therapist-directed approach (n = 4) or physician-directed approach (n = 4). The systematic review concluded that synchronous telehealth is as safe and effective as in-office management of musculoskeletal conditions. The investigators stated that the results are not generalizable to rural regions and populations with different socioeconomic characteristics than those assessed in the RCTs. They suggested future research is needed on telehealth in these areas, as well as the use of contemporary technologies to deliver telehealth.<sup>15</sup>

While preliminary research has been promising, implementation strategies about telehealth for musculoskeletal disorders have not been thoroughly tested in experimental research and clinical practice guidelines do not provide recommendations regarding telehealth. Thus, specific guidance for patients, clinicians, private outpatient physical therapy organizations, and policy makers is missing. Moreover, perceived barriers to implementing telehealth for musculoskeletal disorders can be substantial and may include lack of reimbursement, scope of practice and licensure restrictions, lack of sufficient information technology (IT) infrastructure, minimal staff expertise, privacy concerns, inadequate broadband access, and lack of remote monitoring equipment. Thus, telehealth for musculoskeletal disorders has had limited adoption prior to the pandemic and is

fragmented. If demonstrated to be effectively implemented on a wider scale, telehealth could provide a larger number of patients with an accessible and flexible method to facilitate therapeutic exercise programs and behavioral consultations with physical therapists beyond the PHE.

With this context in mind, the aims of this paper are to: 1. summarize the current regulatory considerations for physical therapy telehealth services for musculoskeletal disorders; 2. describe the implementation process of a telehealth program by a large outpatient physical therapy organization during the pandemic; and 3. provide recommendations for regulatory, organizational and research initiatives need to support long-term implementation of telehealth services in physical therapy practice for musculoskeletal disorders. Three patient cases are summarized to illustrate our experiences.

### Regulatory and Professional Considerations

Planning for telehealth physical therapy practice must consider regulatory and professional guidelines and resources. Temporary regulatory changes at the state and federal levels have made telehealth more accessible for rehabilitation since the PHE was declared. Scope of practice has been expanded to accommodate telehealth by rehabilitation providers and this methodology is currently being reimbursed at the same rate as in-office visits in many states.<sup>16</sup> While driven by the pandemic, these changes suggest broader acceptance and perceived value of this service.

Physical therapy is considered an essential medical service in California.<sup>17</sup> Physical therapists have direct access to patients and can provide care without a medical diagnosis for 12 visits or 45 days. The COVID-19 pandemic prompted the Governor of California to relax the requirements for an in-person visit with a physician when this period was exhausted.<sup>18</sup> This scope of practice allows physical therapists to be the first encounter for patients with musculoskeletal complaints and, as needed, triage patients to other healthcare specialists. The ability to provide direct access care is particularly useful for telehealth physical

therapy practice. However, to our knowledge, there are no current legislative efforts to permanently mandate coverage for telehealth services specific to physical therapy.

Payment for telehealth physical therapy services also is not guaranteed for the long-term. The existing Medicare payment for physical therapy delivered via telehealth will sunset at the end of the current PHE. The Centers for Medicare and Medicaid Services (CMS) has indicated that they do not have the authority to permanently authorize physical therapists and physical therapist assistants as providers under the Medicare Telehealth program when the PHE ends. However, CMS also states that they can add the authority to allow these providers to perform communication-based technology services such as e-visits, virtual check-ins, telephone assessments and telehealth services for Medicare Part B (outpatient) beneficiaries.<sup>16</sup> Medicare defines e-visits separately from telehealth visits. Thus, if authorization for telehealth delivered by physical therapists is not extended beyond the pandemic, there will still be a much more limited interaction allowed under e-visits. The largest distinction is that e-visits have pre-determined frequencies and time limits that do not follow the physical therapist's plan of care. In addition, these forms of remote interactions are not face-to-face and have restrictions on the timing of the interactions. For example, e-visits by qualified nonphysician healthcare professionals must meet the definition of online digital assessment and management for an established patient that can be provided for up to 7 days with cumulative times of 10, 20, or greater than 21 or more minutes. They are also reimbursable at a rate far less than current in-person therapy.

While many commercial payors have reimbursed for telehealth services at a level that is the same as in-person therapy, few have committed to continue with this policy beyond the pandemic. Many commercial payors follow Medicare payment policies. In addition, policy specifics vary by payor and by state. States need to adopt permanent policies regarding payment if telehealth physical therapy is to continue. For example, California is among 12 states that have already passed payment parity legislation

that will survive beyond the pandemic.<sup>18,19</sup> The CA Healthcare Payment Parity Law (AB 744 Health & Safety Code section 1374.14) was passed prior to the pandemic in October 2019. It requires all payors to pay providers at the same or equivalent rates that providers are paid for identical in-person services. It applies to all health care providers and all health plans. This means that the use of CPT codes that normally would be billed during an in-person visit can be used during a telehealth visit (as appropriate) without a loss of income for the provider.

In summary, clinicians should consider state practice acts and other local and federal laws and regulations before initiating services with new and established patients. A resource that helps guide providers through the complexities of these regulations can be found at the National Consortium of Telehealth Resource Centers at: [www.telehealthsourcecenter.org](http://www.telehealthsourcecenter.org).

### Telehealth Implementation

Spine & Sport Physical Therapy, a private outpatient physical therapy organization in Southern California, implemented a telehealth program for musculoskeletal disorders across its 20 clinics during the early stages of the COVID-19 pandemic. The precipitating event to implement the program was the stay-at-home order issued by the State of California in March 2020. The implementation process began shortly after the mandate took effect, with full implementation for patient care beginning in April 2020.

As early adopters of telehealth during the pandemic, minimal information was available to help guide implementation specifically for an outpatient physical therapy setting. Our clinics remained open, so patients had the option of in-person visits. However, we determined that the purpose of the telehealth program was to extend the reach of rehabilitation services to patients with medical necessity who may not otherwise have access due to transportation barriers, potential risks with past health conditions, or compliance with the government mandate for quarantine. The telehealth program was intended to be a meaningful clinical encounter that was value driven, patient-centered, and

distinct compared to onsite visits. The goals of telehealth treatment included providing health education, promoting healing, and improving quality of life through physical therapy.

### Program Development

Program development required a collaborative effort from multiple domains of the organization and partners, including clinical staff (training, assessment, intervention), administrative staff, IT, integration staff, research personnel, and legal counsel, which formed the "Telehealth Task Force." Each stakeholder provided critical input based on their expertise with healthcare delivery and the group developed a telehealth standard operating procedure document (SOP). Numerous strategic meetings were held with the group over four to six weeks before implementation and during pilot roll out, followed by monthly meetings for six months after implementation to share best practices. The costs for implementing this telehealth program were multifactorial, for example personnel costs for development, training, and implementation; technology for remote delivery - updates, pilot testing, and implementation; evidence synthesis to guide telehealth approaches; modifications to scheduling systems; and legal counsel to review telehealth and patient consent procedures. The organization did not have a specific budget for telehealth implementation since the main focus was to balance staffing needs with dynamic schedule changes due to the pandemic and physical plant distancing requirements.

Since no standard existed for a platform to deliver telehealth sessions, the task force systematically investigated the available options. The primary platform used was Doxy which is compliant with the privacy rules in the Health Information Portability and Accountability Act (HIPAA). Additional backup platforms also could be used to complete the session, such as Zoom, Facetime, and Duo. Use of non-HIPAA compliant platforms was highly discouraged, though this use was approved during the early stages of the COVID-19 pandemic.<sup>20</sup>

Dedicated therapists were selected to deliver telehealth services, with at least one therapist

per clinic. All physical therapists selected to deliver telehealth sessions were trained in a group or individually by the Chief Compliance Officer or Regional Clinic Director. The therapists were given the telehealth SOP. Weekly virtual meetings were held in which the therapists had an opportunity to share best practices. These weekly meetings were especially helpful when discussing evaluative techniques and treatment modalities since the therapists were suddenly unable to touch their patients.

Numerous operational changes were needed to implement telehealth services among various units of the organization. For example, patient scheduling, staff scheduling, and billing systems were updated to accommodate telehealth sessions. Compliance policies were updated to include pandemic-related matters and telehealth. Dedicated private spaces within each clinic, along with computers with audio-visual capabilities and the electronic platform, were established to support the telehealth sessions.

### Service Delivery Formats and Content

The telehealth program consisted of synchronous and asynchronous components. For the synchronous live audio and video telehealth encounter, a system was implemented using an existing electronic medical record (EMR) platform and a telehealth platform with real time audio and video. In cases where connection was lost, telephone was used as a back-up strategy. Regardless of connectivity, the session was always synchronous, and the session was rescheduled if all audio options were lost (telehealth platform and telephone).

The initial focus of the synchronous telehealth session was providing education (e.g., addressing expectations for recovery, motivation, biopsychosocial aspects) about the chief complaint. Subsequent assessments and therapeutic interventions varied depending on available resources, evidence, and patient preferences. Interventions included therapeutic exercise, therapeutic activities, neuromuscular reeducation and functional training to address deficits in flexibility, strength, endurance, balance, motor control, and cardiac conditioning. Choice of exercise

was dependent upon each patient's available resources and preferences, and often included household items such as cans of soup and jugs of soap in the absence of specialized equipment. Manual techniques and modalities were unable to be administered via telehealth. However, it was possible to teach patients how to complete a limited number of safe manual techniques independently including cross friction massage, scar massage, patellar mobilizations, and myofascial release using a ball. This education was important because independence in safe manual treatment ultimately serves to make patients more independent in their overall care and may assist with long-term compliance.<sup>7</sup>

The synchronous telehealth sessions were augmented by asynchronous components including store-and-forward educational videos and electronic handouts for home exercise programs. Other asynchronous elements included electronic patient-reported outcomes (PROs). These PROs were administered serially to guide the plan of care, educate patients, and assess outcomes, allowing physical therapists to individualize plans of care based on patient-centered goals. Additionally, patient satisfaction was assessed via a Net Promoter Score (NPS),<sup>21</sup> which allowed patients to provide feedback on the telehealth encounter with the provider.

### Documentation and safety

All patients consented to the physical therapy clinical procedures per the organization's SOPs. Additionally, each patient completed an electronic consent that was sent via DocuSign prior to the first telehealth session and, if needed, reviewed by the physical therapist at the first session. The telehealth consent was developed by the Chief Compliance Officer and compliance attorney.

In addition to the consent process prior to the first treatment session, the patient verbally consented to treatment during each telehealth session. Consent, necessity for physical therapy, and plan of care notations were documented within the existing EMR in a similar format as in-clinic visits. Clinical documentation was largely unchanged. Like in-office visits, all documentation requirements of state,

federal, and commercial payors were met. For telehealth visits, documentation was added stating who participated in each session. The patient's subjective comments were documented throughout telehealth session. Verbal reports of pain or any issues that may have arisen during the session or with the home exercise program were documented as appropriate.

Therapists were prepared to manage safety matters with the following strategies:

- Patients who required assistance with activities of daily living (ADLs) or those who were at risk for falls were required to have a

caregiver, family member, or other personnel available as a "spotter" during the telehealth session to ensure safety of the exercises. Otherwise, the therapist would only have the patient perform seated exercises during that session.

- The therapist always asked for an emergency contact to keep on file if something unexpected occurred. If there was a true emergency and a 911 call was indicated, the patient's address was on file to inform EMS personnel of the patient's location.

*Implementation outcomes*

The telehealth program was efficiently

implemented as the pandemic began and it evolved as stay at home mandates were imposed. Full-scale operations were established across 20+ physical therapy centers, numerous therapists, and 40+ patient visits per week. At the telehealth program's peak in May 2020, over 900 telehealth visits were completed which accounted for 7.5% of the total patient volume. Patient satisfaction was high for those who participated indicating that patients recognize the benefits of therapy provided via telehealth sessions. Example patient comments included "Excellent instructor" and "convenience of physical therapy remotely."

**Sample Patient Cases**

**Table 1. Demographic information and description of three representative cases.**

	Case 1	Case 2	Case 3
<b>Age (years)</b>	55	50	65
<b>Gender</b>	Male	Female	Female
<b>Race / Ethnicity</b>	White / Hispanic-Latino	White / Not Hispanic-Latino	White / Not Hispanic-Latino
<b>Insurance / Third Party Payor Type</b>	Workers' Compensation	Private HMO/PTO	Medicare
<b>Diagnosis</b>	Lumbar Intervertebral disc displacement	Hereditary Spastic Hemiparesis	Total Hip Arthroplasty (Anterior Approach)
<b>Duration of Condition at Baseline</b>	1 year, 2 months	10 years	20 days post-op
<b>Therapeutic Goals</b>	Improve lumbar ROM. Negative dual stump test. ODI to <10%. Centralize pain to low back. Improve work-rated function - e.g., frequent carrying pans and trays of food, intermittent pushing and pulling trash cans and food carts. RTW.	Patient goals: Prevent future injuries and learn exercises to improve balance. Therapy goals: Independent with HEP. Improve SLS to ≥ 5 sec bilaterally. Improve tandem stance with R LE in back to 10 sec. Improve TUG to ≤ 15 sec.	Don/Doff socks and shoes symptom free. Achieve 130 degrees of hip flexion. Return to participation in Pickle Ball symptom free. Improve LEFS to 72.
<b>Therapies Delivered In-Office</b>	None	Balance and gait training, LE strengthening exercises, balance exercises, manual LE stretching.	None
<b>Therapies Delivered via Telehealth</b>	Activity modifications, education, therapeutic exercise, directional-preference exercises, therapeutic activities, neuromuscular re-education, self-massage with tennis ball, performance testing, repeated motions, ADL- and job-related functional training, HEP.	Balance training, LE strengthening exercises, core strengthening, transfer training (floor transfers, sit to stand), caregiver training on how to safely assist during transfers in the home.	Education on anterior hip surgery precautions and self-stretching, LE strengthening exercises, Reactive plyometric drills, HEP.
<b>Treatment Frequency</b>	7x / week	7x / week	7x / week
<b>Treatment Duration</b>	6 weeks	1 year, 5 months	10 weeks
<b>Number of Visits Conducted In-Office</b>	0	27 (prior to telehealth)	0
<b>Number of Visits Conducted via Telehealth</b>	12	66	19

Key: ADL: Activities of Daily Living, Don/Doff: Put on / Take off, FTFSTS: Five Time Functional Sit To Stand test, HEP: Home Exercise Program, HMO: Health Maintenance Organization, KOS: Knee Outcome Survey in % functional ability, LE: Lower Extremity, Lower Extremity Function Scale from 0-80 in which higher score = higher functional ability, ODI: Owelty Disability Index in % disability, POC: Plan of Care, PPO: Preferred Provider Organization, ROM: Range of Motion, RTW: Return to Work, SLS: Single Leg Stance test, TUG: Timed Up and Go test, VAS: Visual Analog Scale - pain severity 0-10

For this report, treating physical therapists selected three cases of patients who received telehealth services as part of a quality improvement project. Three patients were selected because they: 1) represented cases that were conducive to telehealth services; and 2) were distinct cases across various diagnoses, chronicity, payor types, and geography (e.g., distance to clinics). The protocol for case selection and review was submitted to the WIRB Copernicus Group IRB (Puyallup, WA) who determined that this quality improvement project was not human subjects research and

thus was exempt from IRB oversight.

Demographic information and case descriptions, clinical outcomes, and telehealth barriers and solutions are depicted in Tables 1, 2, and 3, respectively. Overall, telehealth provided an effective delivery mechanism for the plan of care and clinical goals were achieved in most instances including improvement in physical function, pain, and activities of daily living (ADLs). Telehealth was safe as no adverse events were reported and it provided a supportive environment for ADLs, sports-specific, and job-related therapies at home.

Furthermore, due to the social distancing requirements related to the pandemic, clinics were too small for some function-related activities. Thus, telehealth provided an alternative solution to perform these activities.

Several barriers were observed during the implementation of the telehealth program, many of which involve using technology for the telehealth visit. Appointments often were interrupted by internet disruptions causing audio and/or video malfunction. Therapists quickly adapted to overcome technology barriers and came prepared to use the primary

**Table 2. Clinical outcomes for the three representative cases.**

	Case 1	Case 2	Case 3
<b>Functional Outcome Measure - Test Name / Baseline Score</b>	ODI: 14%	KOS: 24%	LEFS: 29/80
<b>Functional Outcome Measure - Test Name / Discharge Score</b>	ODI: 18%	KOS: 30%	LEFS: not tested (information not gathered at discharge)
<b>Pain Outcome Measure - Test Name / Baseline Score</b>	VAS: best 6/10, worst 8/10	VAS: best 0/10, worst 8/10. Pain fluctuated due to nature of condition and co-morbidity of Complex Regional Pain Syndrome.	Not tested (information not gathered at baseline)
<b>Pain Outcome Measure - Test Name / Discharge Score</b>	VAS: best 4/10, worst 10/10	VAS: best 0/10, worst 5/10. Pain fluctuates due to nature of condition and co-morbidity of Complex Regional Pain Syndrome.	Not tested (information not gathered at discharge)
<b>Physical Fitness Outcome Measure - Test Name / Baseline Score</b>	Prone Plank Test (core muscular endurance): 8 sec	TUG: 23 sec Tandem stance (R LE back): 3 sec SLS: 1 second bilaterally	FTFSTS: Unable without UE support
<b>Physical Fitness Outcome Measure - Test Name / Discharge Score</b>	Prone Plank Test (core muscular endurance): 27 sec	TUG: 17 sec Tandem stance (R LE back): 7 sec R SLS (modified with opposite great toe touching ground): 15 sec L SLS (modified with opposite great toe touching ground): 7 sec	FTFSTS: 9 sec without UE support
<b>Were goals achieved? If not, why?</b>	Goals achieved. Side bending ROM, centralization, some functional (ADL- and job-related), core endurance goals. Goals not achieved: Other ROM, ODI, RTW goals. Goals were not achieved due to a plateau of strengthening as well as the need for manual therapies to improve tissue mobility, lumbar mobility, and manual cues during exercises to improve posture during lifting activities.	Yes, goals were achieved. New goals were added to POC due to making more progress than what was initially expected. Telehealth sessions were more functional as the patient was able to practice many difficult ADLs including couch transfers and floor transfers in the event of a fall. With therapy, the patient was able to progress from needing Moderate Assistance from her spouse to Modified Independent, using furniture to assist.	Yes

Key: ADL: Activities of Daily Living, Don/Doff: Put on / Take off, FTFSTS: Five Time Functional Sit To Stand test, HEP: Home Exercise Program, HMO: Health Maintenance Organization, KOS: Knee Outcome Survey in % functional ability, LE: Lower Extremity, Lower Extremity Function Scale from 0-80 in which higher score = higher functional ability, ODI: Owelty Disability Index in % disability, POC: Plan of Care, PPO: Preferred Provider Organization, ROM: Range of Motion, RTW: Return to Work, SLS: Single Leg Stance test, TUG: Timed Up and Go test, VAS: Visual Analog Scale - pain severity 0-10.

**Table 3. Satisfaction, barriers, solutions, and safety for the three representative cases.**

	Case 1	Case 2	Case 3
<b>Satisfaction at Discharge</b>	Patient stated that he appreciated telehealth services because his child was immunocompromised, and telehealth decreased risk of transmission of infectious diseases.	Patient stated that telehealth was very beneficial, and she preferred telehealth sessions over in-office sessions.	Patient stated that she was satisfied with services, particularly assisting with return to Pickleball and regular workout routine.
<b>Barriers Observed During Telehealth Sessions: E.g., Technology, Resources, Other</b>	Limited weights and space for exercises. Unable to complete MMTs and ROM tests. Unable to complete manual therapies, more time required to communicate specific exercises and motions with inability to give manual cues	Patient required assistance from spouse for safety during all telehealth sessions. Occasional technical issues with audio during telehealth sessions.	Internet reception was occasionally poor. No formal exercise equipment for resistance training. Unable to use tactile cues to correct exercise technique.
<b>Solutions to Barriers Observed during Telehealth Sessions</b>	Used household items (e.g., large bulk containers of soap) to perform functional training. Observed motor control and ability to hold against gravity to test strength.	Scheduled all telehealth appointments around patient's spouse's work schedule so he could be present. Patient called in using cell phone to have synchronous audio and video.	Patient was able to perform exercises in various rooms using props around the house (pillow, broom stick, belt, her TheraBand's, couch). Verbal cues were provided throughout to ensure all exercises were properly performed.
<b>Safety</b>	No safety issues were observed or reported.	No safety issues were observed or reported.	No safety issues were observed or reported.

platform (Doxy), along with multiple backup platforms to complete the session. While these contingency plans often worked as a solution, sometimes visits were lost due to technical difficulties.

Patients with low technological literacy were initially hesitant to attempt telehealth. Another limitation was a lack of specialized equipment, and the therapist was limited to what the patient had available at home. Finally, telehealth delivery was challenging for patients at risk for falls. Family members needed to be present for sessions if it was not safe for the patient to independently transfer or stand.

Finally, lack of specialized equipment was particularly problematic for patients with higher level function who would not be sufficiently challenged by bodyweight exercises. However, it forced clinicians to be more creative with use of home equipment and helped patients become independent using resources that they already have on hand. The asynchronous intervention included a home exercise program that was administered via an “app” (HEP2Go, Scottsdale, Arizona). Progressions in weight during functional exercises were made using common household items, such as large soap containers, juice jugs, and large platters to mimic work demands.

In summary, we found that the ideal patient for successful treatment via telehealth in our

practice had basic technological literacy, reliable internet access (broadband), rudimentary exercise equipment in the home (dumbbells, resistance bands), computer/laptop/smartphone capable for use, and the cognitive capability to mitigate safety risks. Telehealth and communication-based technology services can be specifically beneficial for pre- and post-op patient education, assessing for signs of infection, establishing a basic early mobility program, and for combating logistical concerns associated with an in-clinic appointment including inability to drive.

**DISCUSSION**

Telehealth services were successfully implemented for patients with musculoskeletal disorders presenting to physical therapists in our outpatient setting. Since its peak, the volume of telehealth visits has fluctuated, depending on the number of COVID-19 positive cases and additional stay-at-home orders. It is possible that the use of telehealth will remain at current levels and possibly increase slightly as a mechanism of increasing access to care to those individuals in remote areas or who have difficulty with transportation. It is also anticipated there will be an increase in utilization when a patient would otherwise cancel an in-office session on short notice due to illness or other personal issues.

Not only can telehealth advance a patient's autonomy in their own environment, but it can also relieve the burden of transportation. A recent systematic review found that transportation is a major barrier to healthcare that decreases the quality and accessibility of care to patients from low income households.<sup>22</sup> In our practice, telehealth gave the ability to reach more patients that may not have been able to receive therapy otherwise. Telehealth also provided an opportunity to treat post-operative patients in a more accessible setting.

Our experience with implementing a telehealth program for physical therapy management of musculoskeletal disorders had some similarities with other published work on this topic. For example, Grundstein et al.<sup>9</sup> noted that telehealth (compared to in-office services) improved access to care and resulted in similar patient satisfaction, which was consistent with our experience. The authors of this report and our work also found that clinicians had some difficulty with the technology needed to deliver telehealth services and that staff training (via guidelines or SOP) was useful. Additionally, the systematic review by Corso et al.<sup>15</sup> reported that telehealth for musculoskeletal disorders was safe and effective. Similarly, our found that telehealth was safe (i.e., no reports of adverse events or side effects). While our work was not designed to assess clinical

effectiveness, preliminary observations suggest that telehealth could be effective in terms of functional improvements.

Based on the available evidence and lessons learned in this case series, our recommendations for telehealth in physical therapy practice are outlined herein, which build upon others' recommendations within and outside of the physical therapy profession.<sup>1,4,7,9,10,23,24</sup>

*Regulatory*

First, physical therapy scope of practice and licensure requirements vary across states and other jurisdictions. However, regulations for telehealth in physical therapy practice should start with federal mandates, such as:

- Including telehealth provided by physical and occupational therapists as a payable service.
- Creating parity of payment between in-person and telehealth services.

- Ensuring that telehealth services provided by a physical therapist can be delivered across state lines through universal adoption of the Physical Therapy Licensure Compact.<sup>25</sup>

*Clinical Care*

While telehealth in physical therapy practice does not replace the in-person patient experience, it can be used to augment care as follows:

- Telehealth can enhance patient-centered care, such Psychologically Informed Physical Therapy Practice,<sup>26</sup> by encouraging active approaches and discouraging passive modalities.

- Telehealth can promote adherence to a current plan of care, including a home exercise program, when transportation, personal issues, and other reasons for missed appointments arise.

- Telehealth should continue to be used for training in the home as an adjunct to care that may be difficult to re-create in the clinic, such as instructing a caregiver in how to safely transfer a patient in a small bathroom using proper body mechanics or to improve ergonomics in

a home workstation.

- Telehealth can help educate patients on at-home maintenance programs to help improve outcomes, promote safety, and reduce the recurrence of symptoms.

- Telehealth can extend opportunities for care to individuals living in rural areas who do not have access to clinics nearby.

- Telehealth can provide direct and immediate access to patients to assist with coping mechanisms during events that may cause exacerbation of symptoms, and to promote recovery through education.

- It is important to note that telehealth is not appropriate for certain patient populations, such as patients for which manual therapy is indicated, patients at risk of falling who do not have someone with them at home for safety, and patients without the necessary technology and internet access.

Given its potential to augment patient management, areas of expansion for physical therapy telehealth programs should be explored, such as the use of telehealth for ergonomic evaluations and the development of telehealth protocols for pre- and post-operative rehabilitation of common orthopedic surgeries. Another possible expansion opportunity for utilizing telehealth is for the management of other populations and conditions, such as pediatrics and vestibular or balance conditions. While approximately 98% of the patients seen in this practice are insured, there is great opportunity to expand telehealth delivery for practices focusing on cash-based business (self-pay). Also, it is currently unclear if the characteristics of effective physical therapists are the same for in-person compared to telehealth services since remote care requires additional clinical decision and reasoning skills. Thus, future training courses should be developed specifically for telehealth physical therapy.

*Research*

The available evidence for telehealth for the management of musculoskeletal disorders is limited. Research is needed in the following areas:

- Randomized controlled trials are needed to compare the effectiveness of in-person care, telehealth, and the combination of these two delivery methods using a wide range of clinical outcome measures.

- Observational studies are needed to assess the safety, timing, and dose of telehealth.

- Observational studies are needed to compare clinical outcomes and satisfaction between telehealth and in-office delivery methods, and to compare outcomes pre-pandemic and post-pandemic.

- Research is needed to assess the implementation process of telehealth across the major implementation-related variables, such as implementation outcomes (e.g., acceptability, adoption, appropriateness, costs, feasibility, fidelity, penetration, sustainability), service outcomes (e.g., efficiency, safety, effectiveness, equity, patient-centeredness, timeliness), and client outcomes (e.g., satisfaction, function, symptomatology).<sup>27</sup>

- Research is needed on physical therapy telehealth to assess various approaches for clinician training procedures and outcomes, acute care screening, yearly follow up evaluations, updating home exercise programs, and educating patients on managing symptoms and improving function within home environment.

- Research is needed to assess the safety, efficacy, and implementation of physical therapy telehealth for the management of other populations and conditions, such as pediatrics and vestibular/balance conditions.

- Health economic evaluation is needed to assess the cost-effectiveness, cost utility, and cost benefit of telehealth in various payment models, such as third-party payor systems and self-pay.

**CONCLUSION**

Physical therapy telehealth services for managing patients with musculoskeletal disorders is a rapidly changing field. The recent COVID-19 pandemic has compelled many clinicians, regulatory bodies, and researchers to re-think their positions on how to best apply telehealth in this new environment. This

administrative case report provides insight about how telehealth services were developed and implemented in a large outpatient physical therapy organization. While future regulatory, operational and research changes are needed to clarify the role of telehealth for physical therapy practice, telehealth in the future can be beneficial as a complement to in-office visits to increase access to the best possible patient-centered care.

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