

# Telehealth Physical Therapy for Sports Medicine Rehabilitation

## What Is Its Role in the Postpandemic Era?

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**Background:** The adoption of telehealth visits for physical therapy (PT) has accelerated because of the COVID-19 pandemic. Patient reception of virtual PT at the outbreak of the pandemic was positive, but it is unclear how telehealth visits compare to in-person visits in the postpandemic era.

**Purpose:** To evaluate utilization trends and patient satisfaction with virtual PT compared with in-person PT during and after the COVID-19 pandemic.

**Study Design:** Cross-sectional study; Level of evidence, 3.

**Methods:** We identified 59,461 in-person and 2016 telehealth visits at a single physical rehabilitation center between March 2020 and December 2021. Patient socioeconomic and demographic variables, including insurance status, were compared between telehealth users and in-person visitors. A total of 1012 patient satisfaction surveys were available and analyzed using the top-box method. Univariable statistics (*t* test or Mann-Whitney *U* and chi-square tests) were used for group comparisons.

**Results:** Overall, telehealth users when compared with in-person visitors were older (median age, 47 vs 42 years, respectively;  $P < .001$ ), and a higher proportion was female (60.6% vs 54.8%;  $P < .001$ ), was White (69.7% vs 66.6%;  $P = .023$ ), spoke English as their primary language (99.2% vs 98.1%;  $P = .001$ ), and had Medicare insurance (20.3% vs 16.1%;  $P < .001$ ). Telehealth patients more often lived out-of-county (50.7% vs 45.8%;  $P < .001$ ) and in small towns rather than in urban areas (1.0% vs 0.3%;  $P < .001$ ). When we compared telehealth use before and after official reopening of the PT center in September 2020, telehealth users in the postpandemic era had an out-of-county rate of 58.7%, and 68.7% were female. Patient satisfaction survey results demonstrated that telehealth patients compared with in-person patients were less likely to recommend visits to others (75.0% vs 89.1%, respectively;  $P = .008$ ) and had lower overall assessment of their visits (71.7% vs 88.6%;  $P = .001$ ). Accordingly, there was a significant reduction in telehealth visits from 2020 to 2021 (from 6.9% to 0.9% of visits;  $P < .001$ ).

**Conclusion:** We noted a decline in telehealth PT use during the postpandemic era, consistent with reduced patient satisfaction when compared with in-person visits. Telehealth is a useful option for populations with limited time or access to care and may serve a role in a hybrid care model. Further studies on long-term outcomes after telehealth PT are warranted to evaluate its efficacy.

**Keywords:** telehealth; rehabilitation; physical therapy; sports medicine; healthcare utilization

Physical rehabilitation in sports medicine has an important role in safely and effectively returning patients to activity and reducing the risk of reinjury.<sup>22,29</sup> Telehealth physical therapy (PT), a branch of telerehabilitation, has demonstrated promising results,<sup>16,30</sup> expanding access to remote areas while mitigating travel and its associated costs for patients with reduced mobility.<sup>13,24,26</sup> Despite its potential, telehealth PT, before 2020, had been limited in the United States due to reimbursement barriers.<sup>12</sup>

In April 2020, the Center for Medicare and Medicaid Services (CMS), in response to the coronavirus 2019 (COVID-19)

shelter-in-place policies that prevented access to rehabilitation, expanded the list of eligible virtual care providers to include rehabilitation therapists.<sup>4</sup> This provided an opportunity window for the expansion of telehealth PT, which was rapidly adopted by hospitals across the United States. Because much of the prior literature on telerehabilitation had been limited to treatment for a specific impairment<sup>22,29</sup> or asynchronous care,<sup>13</sup> delivery of synchronous telehealth PT of this scale was unprecedented. This prompted early studies within months of implementation, which reported widely positive reception by patients although technical difficulties were a common challenge.<sup>14,23,25</sup>

Since the early months of the COVID-19 outbreak, rapid development of vaccines and treatments have propelled the world into a postpandemic era.<sup>1</sup> Now presented with the

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option of in-person care, 1 study concluded that patients were generally willing to use video visits but preferred in-person care.<sup>19</sup> One possible explanation was that patients may perceive telehealth as inferior care.<sup>18</sup> However, patients were also motivated by cost,<sup>19</sup> and in certain settings (ie, postoperative rehabilitation), telehealth PT has been shown to be more cost-efficient due to reduced travel costs.<sup>9</sup>

The future role of telehealth in PT remains unclear. For sports rehabilitation in particular, telehealth PT has shown promise as a platform for nonoperative and postoperative rehabilitation in specific impairments,<sup>5,10,29</sup> but little is known about patient preference for telehealth PT in the postpandemic era. Understanding the role of telehealth PT and patient preference between in-person and virtual visits is key to creating effective reimbursement policies in the postpandemic era.

The present study aimed to (1) evaluate demographic trends in telehealth utilization during and after the COVID-19 pandemic and (2) report patient satisfaction from a survey administered at a single sports medicine rehabilitation center. We hypothesized that telehealth would be preferentially used by certain populations and that patient satisfaction results would be comparable between in-person and telehealth PT.

## METHODS

### Patient Selection

This study was determined to be exempt from institutional review board approval. We queried the electronic health record database for all in-person and telehealth PT visits between March 1, 2020, and December 31, 2021, at a large, university-based, sports medicine PT center (Duke Sports Sciences Institute, Durham, North Carolina). This resulted in 95,817 total visits. In-person pool visits and physical performance testing visits were excluded, as there were no equivalent telehealth visits. Joint health visits, all of which were referred by a single arthroplasty surgeon who practices at a predominantly sports medicine clinic, were removed, and 23,035 cancelled visits and 4968 no-shows were excluded. Ultimately, we included 59,461 in-person and 2016 telehealth visits (1753 video and 263 phone) from 7892 patients in this study.

### Sports Medicine PT Center

The majority of patients evaluated at the center were referred from a directly adjacent orthopaedic sports

medicine clinic from the same health system. Patients living in North Carolina also had direct access to appointments without physician referral. A minimum of 35 board-certified physical therapists were available at any given time, and patients were seen for nonoperative (acute and chronic conditions) and postoperative rehabilitation. The most common reason for a visit was an encounter for orthopaedic aftercare (postoperative visits), followed by chronic and acute knee pain, chronic and acute shoulder pain, and hip pain.

In April 2020, at the onset of the COVID-19 pandemic, physical therapists were advised by health system administrators to work from home. In the next several months, the center gradually allowed more in-person visits, and highest priority was given to acute postoperative patients. In September 2020, the center officially reopened (with physical-distancing limitations), allowing all patients to elect for in-person or telehealth appointments. In a subanalysis, telehealth visits before and after the center officially reopened in September 2020 were compared in order to assess telehealth utilization and patient satisfaction between the pandemic and postpandemic eras. In June 2021, all therapists returned to work at the center full time.

### Telerehabilitation Information

Telehealth visits were officially billable beginning April 20, 2020, although nonbillable telephone calls were conducted informally in the month prior. Initially, telehealth visits were made available to all patients who had been previously evaluated in-person, and new patients were only accepted via telehealth for North Carolina residents. Telehealth was available for out-of-state residents only if they were located in North Carolina at the time of their visit, whereas North Carolina residents could receive telehealth services even if they were located outside the state. Beginning August 26, 2021, telehealth services were offered only to patients located in North Carolina at the time of their visit regardless of permanent residence, which was compliant with institutional mandates.

All physical therapists were trained to use telehealth by the health system administration before beginning its use. Visits were conducted using a secure platform (Zoom). Allotted time was 60 minutes for postoperative visits and 30 or 45 minutes for nonoperative evaluations including follow-up visits. Allotted time was the same for both in-person and telehealth visits.

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Ethical approval for this study was waived by Duke University (ref No. Pro00107580).

## Patient Data Variables

The electronic medical record was used to obtain baseline patient information, including age, sex, race and ethnicity, primary language, and insurance payer. As a measure of geographic reach, we recorded the out-of-county rate (defined as residence in a county other than Durham County) and the distance between patient's home ZIP code and that of the center. To evaluate socioeconomic status, we used patients' home ZIP code to evaluate urbanicity (using rural-urban commuting area codes; US Department of Agriculture<sup>28</sup>) and to obtain median household income based on the 2015-2019 American Community Survey 5-year estimates (US Census Bureau<sup>27</sup>). Incomes were further categorized into quartiles.

## Patient Surveys

All patients, irrespective of visit type, were invited to complete a satisfaction survey. Patients who had telehealth visits were invited to complete an additional telehealth survey. The invitation to take the satisfaction survey was delivered via email to all patients shortly after their visit, and survey results were obtained from our institution's health performance service. Patients were asked to rate their satisfaction on a 5-point Likert scale in 6 domains (comfort, respect, communication, competence, collaboration, and overall experience; 14 questions overall). The telehealth survey contained 7 questions on patients' overall experience, comparison to an office visit, and audio/video connection quality. As with the satisfaction survey, patients rated their satisfaction on a 5-point Likert scale. Response to the surveys was voluntary.

The top-box method was used to dichotomize ratings as either top-box (eg, 5 out of 5) or not top-box before statistical analysis. Only questions existing in both in-person and telehealth surveys were selected for comparison. Questions specific to the quality and nature of the telehealth visit (ie, audio and video connection) were reported separately.

## Statistical Analysis

Descriptive analyses were performed to quantify patient characteristics and patient satisfaction survey data. Univariate analyses were performed using the *t* test or Mann-Whitney *U* test and chi-square or Fisher exact test as appropriate. A *P* value of <.05 defined statistical significance. Statistical analyses were performed with R Version 3.6.1.

## RESULTS

### Patient Demographic Characteristics

On average, patients presenting at telehealth visits were older than patients at in-person visits (median age, 47 vs 42 years, respectively; *P* < .001) and more were female (60.6% vs 54.8% female; *P* < .001) (Table 1). More White patients sought telehealth (*P* = .023), whereas Hispanic

patients and those classified as "not reported/declined" for race and ethnicity used telehealth less (*P* < .001 and *P* = .029, respectively). Telehealth patients had a greater prevalence of speaking English as their primary language compared with in-person patients (99.2% vs 98.1%, respectively; *P* = .001).

Using patients' home postal (ZIP code) data, we determined that the calculated out-of-county visit rate was 50.7% for telehealth visits compared with 45.8% among those choosing in-person visits (*P* < .001). Median distance between patients' homes and the rehabilitation center was also slightly larger in the telehealth group versus the in-person group (median, 16.5 vs 16.0 km, respectively; *P* < .001). Telehealth users were more likely to live in postal codes classified as a "small town" by the US Department of Agriculture.

Regarding socioeconomic factors, the telehealth group had a higher prevalence of patients with estimated incomes in the lowest quartile than patients attending in-person visits (35.2% vs 30.4%, respectively; *P* < .01). With respect to insurance status, 75.1% of visits were covered under private insurance, 16.2% by Medicare, and 4.6% by Medicaid. There was a higher prevalence of Medicare-covered patients among telehealth users versus in-person patients (20.3% vs 16.1%, *P* < .001), and fewer telehealth users fell under the "Other" category (0.7% vs 2.2%, *P* < .001). These visits were covered by another type of payment method such as self-pay, pro bono work, or a third-party administrator.

### Trends in Telerehabilitation Use

Telehealth visits represented a minority of total visits (*n* = 2016; 3.3%) in this study, with a significant reduction in telehealth encounters over time, from 1676 (6.9%) visits in 2020 to 340 (0.9%) visits in 2021 (Figure 1). After reaching a peak number of visits in May 2020, telehealth visits displayed a logarithmic decline to no more than 10 visits per day by January 2021. Meanwhile, in-person visits, after initially reaching a trough around April 2020, rose steadily to nearly the prepandemic volume. Interestingly, on days after holidays, slightly more patients used telehealth versus in-person visits (2.0% vs 1.4%; *P* = .035).

We compared patient characteristics of telehealth use before and after the official reopening of our center in September 2020, when patients' choice for a telehealth versus in-person appointment was more elective than during the pandemic outbreak (Table 2). After September 2020, telehealth users were older and more frequently female as well as primarily English-speaking (*P* = .006, *P* < .001, and *P* = .024, respectively). Telehealth users also lived farther from the center and had a significantly higher out-of-county rate (58.7% vs 46.2%; *P* < .001) and small town or rural residence (*P* < .001 and *P* = .020, respectively). Regarding socioeconomic status, after September 2020, telehealth users had lower estimated median household incomes (median, \$54,551 vs \$58,934; *P* < .001) and more often had Medicaid and Medicare insurance (*P* < .001 and *P* = .001, respectively) compared with users of telehealth PT before September 2020.

TABLE 1  
Characteristics of Telehealth and In-Person Physical Therapy Users<sup>a</sup>

	Overall (N = 61,657)	In-Person (n = 59,641)	Telehealth (n = 2016)	P
Demographic characteristics				
Age, y	43.00 [23.00-59.00]	42.00 [23.00-59.00]	47.00 [27.00-63.00]	<.001
Female sex	33,912 (55.0)	32,690 (54.8)	1222 (60.6)	<.001
Race/ethnicity				
White	41,129 (66.7)	39,724 (66.6)	1405 (69.7)	.023
Black	12,319 (20.0)	11,923 (20.0)	396 (19.6)	≥.999
Hispanic	3008 (4.9)	2950 (4.9)	58 (2.9)	<.001
Asian	2504 (4.1)	2416 (4.1)	88 (4.4)	≥.999
Not reported/declined	1876 (3.0)	1836 (3.1)	40 (2.0)	.029
≥2 Ethnicities/other	821 (1.3)	792 (1.3)	29 (1.4)	≥.999
Primary language not English	1148 (1.9)	1131 (1.9)	17 (0.8)	.001
Patient ZIP code characteristics				
Out of county	28,348 (46.0)	27,326 (45.8)	1022 (50.7)	<.001
Distance from clinic, km	16.50 [9.18-30.83]	16.50 [9.18-30.83]	16.55 [9.18-38.39]	<.001
Urbanicity				
Urban	61,203 (99.3)	59,218 (99.3)	1985 (98.5)	<.001
Small town	174 (0.3)	154 (0.3)	20 (1.0)	<.001
Rural	275 (0.4)	264 (0.4)	11 (0.5)	≥.999
Median household income, US\$	62,297 [53,561-78,934]	62,297 [53,561-78,934]	57,459 [53,561-78,934]	.005
Household income quartile <sup>b</sup>				
Q1	18,402 (30.5)	17,718 (30.4)	684 (35.2)	<.001
Q2	11,811 (19.6)	11,479 (19.7)	332 (17.1)	.018
Q3	15,625 (25.9)	15,145 (26.0)	480 (24.7)	.820
Q4	14,450 (24.0)	14,001 (24.0)	449 (23.1)	≥.999
Insurance type				
Government	1132 (1.9)	1094 (1.9)	38 (1.9)	≥.999
Medicaid	2788 (4.6)	2710 (4.6)	78 (3.9)	.735
Medicare	9842 (16.2)	9440 (16.1)	402 (20.3)	<.001
Other	1293 (2.1)	1279 (2.2)	14 (0.7)	<.001
Private	45,524 (75.1)	44,072 (75.2)	1452 (73.2)	.198
Physical therapy visits				
Visited in 2020	24,262 (39.3)	22,586 (39.1)	1676 (6.9)	<.001
Visited in 2021	37,395 (60.7)	37,055 (60.7)	340 (6.9)	<.001
Day before holiday	1013 (1.6)	986 (1.7)	27 (1.3)	.317
Day after holiday	898 (1.5)	857 (1.4)	41 (2.0)	.035

<sup>a</sup>Data are reported as n (%) or median [interquartile range]. Boldface P values indicate statistically significant difference between the in-person and telehealth groups ( $P < .05$ ).

<sup>b</sup>Median household income quartiles were defined as follows: Q1, \$24,063-\$53,560; Q2, \$53,561-\$62,296; Q3, \$63,297-\$78,933; Q4, \$78,934-\$240,507.

## Patient Satisfaction Survey Results

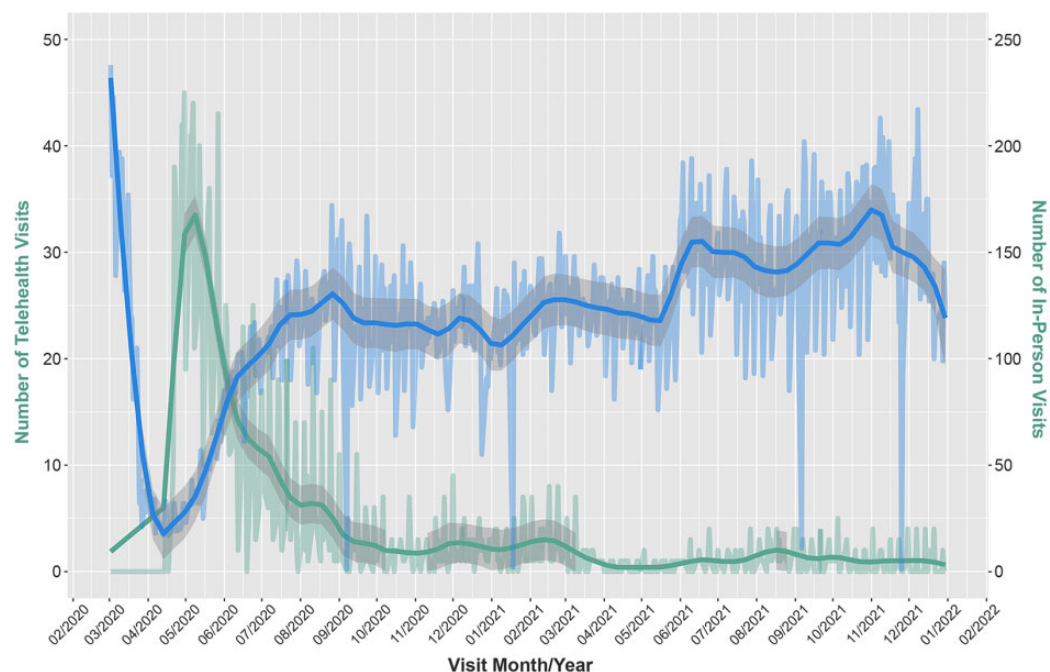
A total of 1012 (1.6%) surveys were completed. Survey results demonstrated that telehealth users were less likely than in-person patients to recommend their encounter to others (75.0% vs 89.1% top-box, respectively;  $P = .008$ ) (Table 3). Telehealth patients also less frequently rated their overall rating as the top-box score (i.e. 5/5) (71.7% vs 88.6%;  $P = .001$ ). However, when we looked across various domains of patient experience such as comfort, respect, and communication, we found no reported differences in selection of the highest rating possible.

## Telehealth Survey Results

Of the 47 telehealth surveys that were completed, only 26 (56.5%) patients responded with the highest rating for the

question asking how the virtual visit compared with an in-person visit, whereas 31 (68.9%) chose the highest rating for the question asking how telehealth visits complement in-person visits (Table 4). However, 37 (80.4%) responders still gave the highest rating for "likelihood of your participating in future video visits." Top-box ratings for video and audio connection were 68.2% and 69.6%, respectively.

When we compared telehealth survey results before and after official reopening of the center in September 2020, we found a significant increase in satisfaction with how well the telehealth visit compared with an in-person visit (39.1% vs 73.9%, respectively;  $P = .036$ ), ease of talking to a care provider over the virtual connection (58.3% vs 95.5%;  $P = .005$ ), and how well the video connection worked (52.2% vs 85.7%;  $P = .024$ ) (Table 5).



**Figure 1.** Trends in telehealth physical therapy (green) and in-person physical therapy (blue) use.

## DISCUSSION

In examining our data, we sought to characterize the use of telehealth PT during and after the pandemic as well as patient perceptions of this platform. Reviewing 59,461 in-person and 2016 telehealth visits, we found a reduction in telehealth PT utilization from 6.9% in the year 2020 to 0.9% in 2021 ( $P < .001$ ). Overall patient satisfaction was lower for telehealth compared with in-person PT (71.7% vs 88.6%, respectively;  $P = .001$ , top-box method). Telehealth users were more often female (60.6% vs 54.8%;  $P < .001$ ), English-speaking (99.2% vs 98.1%;  $P = .001$ ), in the lowest quartile for median household income (35.2% vs 30.4%;  $P < .001$ ), Medicare insurance carriers (20.3% vs 16.1%;  $P < .001$ ), and living out-of-county (50.7% vs 45.8%;  $P < .001$ ) and in nonurban areas (1.5% vs 0.7%;  $P < .001$ ).

Our results support existing findings that patients who used telehealth PT were more often low-income and female.<sup>20,21,23</sup> Low-income patients who may be constrained by inflexible working hours, lack of transportation, or other life stressors may find telehealth visits more convenient, assuming these patients have access to the necessary technology and wireless services.<sup>11</sup> Tenforde et al<sup>23</sup> proposed that female patients, who are more likely to manage multiple responsibilities (balancing work, household, and childcare),<sup>6</sup> may be more likely to use telehealth due to perceived shorter wait times as reported by Polinski and colleagues.<sup>17</sup> Patients who were out-of-county or farther from the clinic used telehealth PT visits significantly more, supporting the utility of telemedicine in increasing access for patients who are geographically limited or live in resource-poor areas.<sup>8</sup> Telemedicine can also serve as a way for a practice to expand its reach across county and state

boundaries. However, because billing and institutional compliance constraints limit access for out-of-state residents, our data may not reflect the potentially larger geographic reach of telehealth PT. Patients who used telehealth were more likely to be older, in contrast with previous studies that showed the opposite trend.<sup>21</sup> Although older Americans may be less comfortable with the online platform, their increased risk of a severe case of COVID-19 infection may increase their willingness to opt for telehealth rather than in-person visits.<sup>7</sup> Older patient age was consistent with a higher proportion of Medicare insurance coverage among patients using telehealth compared with in-person visits. The highest proportion of visits were covered under private insurance, in concordance with data illustrating a higher likelihood of PT use for private insurance holders.<sup>3</sup>

Interestingly, a subanalysis of telehealth utilization before and after official reopening of the PT center revealed similar differences in patient characteristics with those identified between in-person and telehealth visits. That is, after September 2020 (reopening date) compared with before, telehealth users were more often female, lived farther away and in nonurban postal codes, had lower income, and more frequently carried Medicaid or Medicare health insurance. These findings likely reflect the demographic characteristics of patients who would particularly benefit from continuing to provide telehealth as a mode for health-care delivery in the postpandemic era.

Overall, patients were less satisfied with telehealth PT visits compared with in-person visits. This is in contrast to results from studies that emerged shortly after the outbreak of the COVID-19 pandemic (spring 2020), when shelter-in-place policies restricted visit options.<sup>2,14,23</sup>

TABLE 2  
Telehealth Physical Therapy Use Before and After Official Reopening of the Physical Therapy Center in September 2020<sup>a</sup>

	All Telehealth Visits (N = 2016)	Before Reopening (n = 1466)	After Reopening (n = 500)	P
<b>Demographic characteristics</b>				
Age, y	47.00 [27.00-63.00]	47.00 [26.00-62.00]	50.00 [30.00-64.00]	<b>.006</b>
Female sex	1222 (60.6)	844 (57.6)	378 (68.7)	<b>&lt;.001</b>
<b>Race/ethnicity</b>				
White	1405 (69.7)	1013 (69.1)	392 (71.3)	≥.999
Black	396 (19.6)	287 (19.6)	109 (19.8)	≥.999
Hispanic	58 (2.9)	43 (2.9)	15 (2.7)	≥.999
Asian	88 (4.4)	72 (4.9)	16 (2.9)	.300
Not reported/declined	40 (2.0)	29 (2.0)	11 (2.0)	≥.999
≥2 Ethnicities/other	29 (1.4)	22 (1.5)	7 (1.3)	≥.999
Primary language not English	17 (0.8)	17 (1.2)	0 (0.0)	<b>.024</b>
<b>Patient ZIP code characteristics</b>				
Out of county	981 (49.7)	660 (46.2)	321 (58.7)	<b>&lt;.001</b>
Distance from clinic, km	16.55 [9.18-38.39]	16.50 [9.18-30.90]	24.54 [9.31-58.80]	<b>&lt;.001</b>
<b>Urbanicity</b>				
Urban	1985 (98.5)	1458 (99.5)	527 (95.8)	<b>&lt;.001</b>
Small town	20 (1.0)	4 (0.3)	16 (2.9)	<b>&lt;.001</b>
Rural	11 (0.5)	4 (0.3)	7 (1.3)	<b>.020</b>
Median household income, US\$	57,459 [53,561-78,934]	58,934 [53,561-78,934]	54,661 [48,281-78,190.50]	<b>&lt;.001</b>
<b>Household income quartile<sup>b</sup></b>				
Q1	684 (35.2)	451 (32.1)	233 (43.3)	<b>&lt;.001</b>
Q2	332 (17.1)	263 (18.7)	69 (12.8)	<b>.008</b>
Q3	480 (24.7)	364 (25.9)	116 (21.6)	.195
Q4	449 (23.1)	329 (23.4)	120 (22.3)	≥.999
<b>Insurance type</b>				
Government	38 (1.9)	28 (1.9)	10 (1.9)	≥.999
Medicaid	78 (3.9)	39 (2.7)	39 (7.3)	<b>&lt;.001</b>
Medicare	402 (20.3)	265 (18.3)	137 (25.7)	<b>.001</b>
Other	14 (0.7)	11 (0.8)	3 (0.6)	≥.999
Private	1452 (73.2)	1107 (76.3)	345 (64.6)	<b>&lt;.001</b>
<b>Physical therapy visits</b>				
Day before holiday	27 (1.3)	16 (1.1)	11 (2.0)	.173
Day after holiday	41 (2.0)	27 (1.8)	14 (2.5)	.412

<sup>a</sup>Data are reported as n (%) or median [interquartile range]. Boldface P values indicate statistically significant difference between the in-person and telehealth groups ( $P < .05$ ).

<sup>b</sup>Median household income quartiles were defined as follows: Q1, \$24,063-\$53,560; Q2, \$53,561-\$62,296; Q3, \$63,297-\$78,933; Q4, \$78,934-\$240,507.

Although patients reported comparable satisfaction with their provider's and staff's inclusion in treatment decisions, concern for privacy, and response to concerns and complaints, patients who had telehealth visits were significantly less likely to recommend their experience to others and had a lower overall assessment. Previous literature has described a lack of "healing touch" and tactile feedback with telehealth, which may contribute to patients' relative lack of satisfaction.<sup>14</sup> Anecdotally, physical therapists at this site remarked that some patients were uncomfortable demonstrating movements via their video call. Furthermore, technological issues or frustrations may contribute to a lower overall experience, given that top-box ratings for questions on quality of video and audio connection were 68% and 70%, respectively.

Patient satisfaction with telehealth can also be interpreted through the rates of telehealth visits through the first 2 years of the pandemic. Telehealth visits comprised

6.9% of total visits in 2020, although this mode of care delivery was only offered starting in April. In 2021, telehealth PT visits comprised only 0.9% of all visits for the entire 12-month period. These declining rates, combined with lower overall satisfaction rates and likelihood of recommending, demonstrated that when given the option of in-person versus telehealth PT, patients on the whole prefer the in-person experience. This is concordant with patient preferences for in-person over telemedicine visits, except in cases of reduced costs, as reported by Predmore and colleagues.<sup>19</sup>

When comparing satisfaction with telehealth visits before and after official reopening of the center in September 2020, we found that satisfaction rates were generally higher after September 2020. This may be attributable to a variety of reasons. First, as with all industries, video platforms and connectivity improved, creating an easier experience for patients and providers and mitigating

TABLE 3  
Virtual Versus In-Person Patient Satisfaction Survey Results<sup>a</sup>

Domain and Question	In-Person (n = 965)	Telehealth (n = 47)	P
Comfort			
Staff's concern for your questions and worries	862 (91.4)	42 (93.3)	.858
Friendliness/courtesy of the staff who provided your test or treatment	884 (92.7)	43 (95.6)	.661
Staff's concern for your comfort	867 (90.9)	43 (93.5)	.736
Respect			
Staff's concern for your privacy	743 (80.8)	36 (78.3)	.808
Staff treated you with respect and dignity	893 (93.8)	44 (95.7)	.844
Communication			
Staff provided opportunity to ask questions	891 (93.2)	43 (95.6)	.755
Explanations you were given by the doctor about your test and treatment	595 (88.9)	40 (97.6)	.138
Staff's explanation of the test or treatment	877 (92.0)	43 (95.6)	.563
Response to concerns/complaints made during your visit	808 (91.7)	41 (93.2)	.948
Competence			
Your trust in the skill of the staff who provided your test or treatment	872 (91.4)	42 (93.3)	.857
Collaboration			
How well staff worked together to provide care	722 (87.3)	36 (81.8)	.409
Staff's concern to include you in your treatment decisions	859 (91.5)	41 (91.1)	≥.999
Overall			
Likelihood of your recommending our facility to others	845 (89.1)	33 (75.0)	<b>.008</b>
Overall rating	834 (88.6)	33 (71.7)	<b>.001</b>

<sup>a</sup>Data are reported as number (%) of top-box ratings (ie, 5 out of 5). Boldface P values indicate statistically significant difference between the in-person and telehealth groups (P < .05).

TABLE 4  
Telehealth Survey Questions<sup>a</sup>

Question	Telehealth (n = 47)
How well your phone/video visit experience compared with an in-person visit	26 (56.5)
How well you feel that telehealth visits complement your office visits	31 (68.9)
Likelihood of your participating in future video visits	37 (80.4)
Ease of talking with the care provider over the virtual connection	35 (76.1)
How well the video connection worked during your virtual visit	30 (68.2)
How well the audio connection worked during your virtual visit	32 (69.6)
Your overall satisfaction with the phone/video visit experience	33 (71.7)

<sup>a</sup>Data are reported as number (%) of top-box ratings (ie, 5 out of 5).

technological issues. Furthermore, both providers and patients may have become more comfortable with video-based PT visits through continued use of video technology for PT and the use of Zoom in other aspects of their lives. Finally, it is reasonable to assume that self-selection could have occurred in the postpandemic era, as patients who elected to have virtual visits versus in-person visits had higher satisfaction with this mode of care delivery.

Although telehealth PT may not be a replacement for in-person PT, telehealth PT may have utility in a hybrid care model that supports the ongoing use of telerehabilitation

for certain populations and purposes. As outlined above, patients who were geographically distant from the clinical site or in a low-income group used telemedicine significantly more. For these patients, who may be constrained by travel time or cost, medical disabilities including reduced mobility, job or childcare responsibilities, or other life stressors, telemedicine may be a more convenient and feasible option than an in-person visit. Literature has also suggested other less tangible benefits to telehealth PT, including the ability to view patients' home environments and make patient-centric recommendations, particularly for young athletes.<sup>15</sup> Future studies quantifying the utility and efficacy of telehealth PT in respect to these potential benefits are warranted. Additionally, further exploration is needed regarding the role of telerehabilitation in combating health inequities in PT use and availability, given that patients who used telehealth PT had lower estimated household income, were older, had Medicare, and were more likely to be White and English-speaking.

Last, telehealth visits may serve as a helpful "check-in" visit for therapists to touch base with their patients who may not need demonstrations or adjustments. Providers at our site remarked that telehealth served a useful role in answering ongoing questions and providing check-ins for issues that may not necessitate in-person appointments when considering associated travel, costs, and wait times. At this center, telehealth was no longer the predominant modality of care by as early as June 2020 (2 months after implementation), even before complete reopening of the clinic in September 2020, and comprised only 0.9% of PT visits in 2021. Therefore, the described benefits and utility of telehealth PT may affect only a small number of visits.

TABLE 5

Patient Satisfaction With Telehealth Before and After Official Reopening of the Physical Therapy Center in September 2020<sup>a</sup>

Domain and Question	Before Reopening (n = 24)	After Reopening (n = 23)	P
Comfort			
Staff's concern for your questions and worries	20 (87.0)	22 (100.0)	.248
Friendliness/courtesy of the staff who provided your test or treatment	21 (91.3)	22 (100.0)	.489
Staff's concern for your comfort	21 (87.5)	22 (100.0)	.264
Respect			
Staff's concern for your privacy	17 (73.9)	19 (82.6)	.721
Staff treated you with respect and dignity	22 (91.7)	22 (100.0)	.509
Communication			
Staff provided opportunity to ask questions	21 (91.3)	22 (100.0)	.489
Explanations you were given by the doctor about your test and treatment	19 (95.0)	21 (100.0)	.980
Staff's explanation of the test or treatment	21 (91.3)	22 (100.0)	.489
Response to concerns/complaints made during your visit	19 (86.4)	22 (100.0)	.232
Competence			
Your trust in the skill of the staff who provided your test or treatment	20 (87.0)	22 (100.0)	.248
Collaboration			
How well staff worked together to provide care	16 (76.2)	20 (87.0)	.594
Staff's concern to include you in your treatment decisions	19 (82.6)	22 (100.0)	.127
Overall			
Likelihood of your recommending our facility to others	13 (61.9)	20 (87.0)	.117
Your overall satisfaction with the phone/video visit experience	14 (60.9)	19 (82.6)	.190
Telehealth			
How well your phone/video visit experience compared with an in-person visit	9 (39.1)	17 (73.9)	<b>.036</b>
How well you feel that telehealth visits complement your office visits	12 (54.5)	19 (82.6)	.057
Likelihood of your participating in future video visits	17 (73.9)	20 (87.0)	.459
Ease of talking with the care provider over the virtual connection	14 (58.3)	21 (95.5)	<b>.005</b>
How well the video connection worked during your virtual visit	12 (52.2)	18 (85.7)	<b>.024</b>
How well the audio connection worked during your virtual visit	13 (56.5)	19 (82.6)	.108

<sup>a</sup>Data are reported as number (%) of top-box ratings (ie, 5 out of 5). Boldface P values indicate statistically significant difference between the before and after reopening groups ( $P < .05$ ).

Although the present findings reflect patient preferences and trends in use of telehealth PT, additional studies evaluating short- and long-term efficacy are warranted. Nevertheless, we believe that the present study's results can inform important decisions on future reimbursement models for telerehabilitation.

### Limitations

There are several limitations to this study. It was not possible to determine causality of events due to the retrospective nature of this study. Reduced use of telehealth PT may not necessarily be a byproduct of patient preferences as indicated by satisfaction surveys, and we can only make inferences as such. Furthermore, the sample size of telehealth visits was smaller compared with in-person visits, and our survey response rate was low (~1%) due to the voluntary nature of responses, both of which act as potential sources of bias. However, we believe that by evaluating >60,000 visits, we adequately captured telehealth utilization trends and patient preferences. This was a single-center study, and the results may not be generalizable to rehabilitation centers that are not university-affiliated or operate under vastly different compliance regulations and billing infrastructures. Finally, we did not evaluate

functional outcome scores and are unable to report on the efficacy of telehealth PT.

### CONCLUSION

This study illustrates a decline in use of telehealth PT during the postpandemic era, consistent with reduced patient satisfaction when compared with in-person visits. Telehealth is a useful option for populations with limited time or access to care and may serve a role in a hybrid care model. Further studies on long-term outcomes after telehealth PT are warranted to evaluate its efficacy.

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