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# Telehealth Physical Therapy in Musculoskeletal Practice

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The World Health Organization defines *telehealth* as the delivery of health care services, where distance is a critical factor, by all health care professionals using information and communication technologies for the exchange of valid information for diagnosis, treatment, and prevention of disease and injuries; for research and evaluation; and for the continuing education of health care providers, all in the interests of advancing the health of individuals and their communities.<sup>18</sup> The American Physical Therapy Association (APTA) defines telehealth as the use of secure electronic communications to provide and deliver a host of health-related information and health care services, including but not limited to physical therapy-related information and services for patients and clients.<sup>1</sup>

Internationally, physical therapists utilize *telerehabilitation* as the common term for telehealth applications. For example, the Australian Physiotherapy Association's position statement<sup>2</sup> describes the provision of rehabilitation across the spectrum of acute, subacute, and community settings at a distance, using telecommunication technology to deliver real-time audio and video conferencing between providers and patients as synchronous telehealth. Other telehealth applications include secure electronic transmission of clinical information and medical data, described as asynchronous or store-and-forward telehealth.

Operationally, a health care professional at a distant site may interact with a patient who is at the originating site via synchronous and asynchronous telehealth. In addition, remote patient monitoring has gained support alongside the advent of emerging biotechnology, virtual reality, and wearable technology. Rehabilitation professionals utilize telerehabilitation to deliver physical, occupational, and speech therapy, while physicians, nurse practitioners, and other health care professionals utilize telemedicine in practice. As the digital health field grows with new technologies, an absolute definition of telehealth, telerehabilitation, and telemedicine remains elusive.<sup>18</sup>

Telehealth may enhance patient satisfaction, overcome barriers to access to physical therapy services, and reduce the costs of musculoskeletal care in society. Russell and colleagues<sup>16</sup> reported high patient satisfaction with a 6-week telerehabilitation intervention compared to usual care in outpatients after total

knee arthroplasty in Australia. Palsbo<sup>12</sup> reported that telerehabilitation helped Medicaid programs in the United States deliver specialized physical therapy care to locations with provider shortages in rural communities. Tousignant and colleagues<sup>19</sup> found a cost differential in favor of the telerehabilitation group compared to the usual-care group after a patient following total knee arthroplasty had to travel more than 30 km (round trip) from home to a physical therapy clinic in Canada.

Overall, telehealth physical therapy has the potential to transform many critical areas of care in musculoskeletal practice. However, the amount of hype around telehealth needs to be carefully examined, because widespread implementation has been stalled by payment and regulatory barriers in physical therapy.<sup>8,9</sup> Therefore, the purposes of this Viewpoint are to highlight (1) the current level of implementation, (2) telehealth musculoskeletal evidence, and (3) future opportunities in the digital age.

## Telehealth Implementation in Musculoskeletal Practice

Various health systems around the world have utilized telehealth to improve access to care in musculoskeletal practice. Numerous innovative musculoskeletal practices have emerged with the advancement

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of smart technologies, such as apps, mobile devices, and wearable technologies. More importantly, use of digital technology and devices has become ubiquitous in developed countries.

In the United States, the Department of Veterans Affairs and the Indian Health Service utilize telehealth to facilitate the need for musculoskeletal physical therapy expertise where provider shortages exist.<sup>8</sup> Kaiser Permanente, a US-based health maintenance organization, utilizes telehealth physical therapy for musculoskeletal triage and consultations.<sup>8</sup> In the United Kingdom, PhysioDirect telephone consultation services for patients with musculoskeletal problems are advancing toward a telehealth delivery model.<sup>20</sup> Online physical therapy musculoskeletal practice has emerged in Australia, while Alberta, Canada has allowed physical therapy across provincial borders with the courtesy register process for telerehabilitation.<sup>13</sup> Other international collaborations between 4 European Union member states (Italy, the Netherlands, Spain, and Poland) are establishing telerehabilitation delivery standards to achieve accreditation from their respective governmental agencies.<sup>6</sup>

As telehealth implementation in physical therapy ramps up, it is helpful to address real-world barriers, such as unpredictable weather hampering internet connectivity or the inability to manually assist or assess a patient during a telehealth encounter. Recently, the US Federation of State Boards of Physical Therapy developed its model regulation of telehealth to assist regulatory physical therapy stakeholders in addressing administrative, ethical, and technical standards in practice.<sup>4</sup> For example, patient-informed consent and verification of identity during a telehealth encounter, as well as privacy, patient safety, and emergency procedures, must be in place prior to telehealth practice. In addition, principles and guidelines developed by the American Telemedicine Association indicate a practitioner's ethical responsibility to discuss with a patient his or her

right to refuse or discontinue a telehealth service.<sup>15</sup> The APTA, in partnership with the Private Practice Section and the Academy of Orthopaedic Physical Therapy, has developed educational webinars, monographs, and frequently-asked-questions documents for practitioners to address barriers and support implementation of telehealth.<sup>1</sup> Last, the Frontiers in Rehabilitation, Science, and Technology Council was established to advance science and technology in physical therapy, in concert with APTA leadership and approved by the APTA Board of Directors.

Hence, current guidelines and resources in telehealth should be reviewed by musculoskeletal practitioners (**TABLE**). Most recently, the World Confederation for Physical Therapy (WCPT) and the International Network of Physiotherapy Regulatory Authorities announced a formal collaboration to develop a model regulation of providing telehealth physical therapy rehabilitation services.<sup>20</sup> Therefore, musculoskeletal physical therapy practitioners have an opportunity to collaborate with international organizations, including the WCPT and International Network of Physiotherapy Regulatory Authorities, to improve access to quality care in physical therapy with telerehabilitation in the digital age. Overall, global engagement of telerehabilitation physical therapy professionals in musculoskeletal practice could address the WCPT goals of knowledge sharing

and recognition of value for the physical therapy profession in the world.

### Telehealth Musculoskeletal Evidence

As reported in the literature, technology advancement in the global marketplace has generated telerehabilitation research in musculoskeletal physical therapy.<sup>5</sup> Several academic research centers, including the University of Queensland (Australia) and the University of Sherbrooke (Canada), have led research evidence in musculoskeletal telerehabilitation. Early investigations in telehealth focused on the reliability and validity of musculoskeletal examinations of upper and lower extremities, as well as musculoskeletal dysfunction.<sup>17</sup> More recently, telehealth feasibility in total joint replacement was examined.<sup>11</sup> A systematic review of telehealth videoconferencing for physical therapy in people with musculoskeletal conditions noted a moderate quality of intervention and a positive impact on health outcomes and satisfaction.<sup>5</sup> However, this review and past systematic reviews<sup>8</sup> indicate lack of cost analysis as a weakness to remedy before promotion of delivery of telehealth musculoskeletal practice. The main justification for telerehabilitation was local shortages of practitioners, especially in rural areas.<sup>12</sup> Therefore, future telehealth research addressing the physical therapist workforce and cost analysis is urgently needed.

**TABLE**

### KEY TOPICS COVERED IN TELEHEALTH RESOURCES<sup>1,2,4,15</sup>

Topics in Telehealth Resources	APA <sup>2</sup> (Under Review)	APTA <sup>1</sup>	ATA <sup>15</sup>	FSBPT <sup>4</sup>
Administrative			X	X
Clinical	X	X	X	X
Education		X		
Ethical	X	X	X	X
Regulation	X	X		X
Research		X		
Technical		X	X	X

*Abbreviations: APA, Australian Physiotherapy Association; APTA, American Physical Therapy Association; ATA, American Telemedicine Association; FSBPT, Federation of State Boards of Physical Therapy.*

In academia, a US-based study involving 139 nurse practitioner, occupational therapy, and physical therapist students (who comprised half of the sample) assessed student perceptions of telehealth in treating patients as interprofessional teams in both simulated and actual outpatient musculoskeletal clinics.<sup>14</sup> Findings revealed that students, although remaining positive about telehealth, perceived that it introduced barriers to the treatment process, particularly in establishing rapport with patients and other members of the health care team. The study, which corroborates similar findings from the literature,<sup>10</sup> recommends that physical therapy education about telehealth include content that specifically addresses potential barriers and ethical delivery, while optimizing the advantages that the technology can provide in the continuum of care.

According to one musculoskeletal researcher (Trevor G. Russell) in a March 2018 e-mail, a state-of-the-art telerehabilitation clinic is used at the University of Queensland (Australia), with physical and occupational therapy, speech pathology, and audiology students under the supervision of clinical educators, to develop unique skill sets in telehealth. Students are introduced to the theory and practical aspects of telehealth service delivery through online learning modules, including clinical scenarios, and also through a hands-on practicum in which students and clinical educators can work through clinical cases via telehealth. Overall, further academic research is necessary for telehealth, as a means for physical therapist musculoskeletal practice, to become a reality.

### Future Telehealth Opportunities

Regulations allowing cross-state practice represent telehealth implementation opportunities in the future.<sup>3,13</sup> As of March 2018, 21 states in the United States have enacted legislation to allow cross-state physical therapy practice, known as the *interstate compact*.<sup>3</sup> The purpose of the compact is to increase consumer access

to physical therapy services by reducing regulatory barriers to interstate practice. In Canada, a memorandum of understanding for cross-border physical therapy has been established as well.<sup>13</sup> Similar telemedicine regulatory actions removed barriers for nursing and medical professionals to address provider shortages and access to quality health care.<sup>8</sup> Given the potential importance of telehealth to reduce health care disparities associated with limited access to medical services, funding support for health services research with community collaborations for ethical delivery should be established within the physical therapy profession. These initiatives necessarily require collaboration between physical therapy professionals and their professional societies to advance telehealth in musculoskeletal practice.

Diffusion of telehealth practice will require clear solutions to key topics identified in the literature (TABLE). Experienced telehealth practitioners should lead in educating novice users and students on practical applications and lessons learned from the real world. For example, interpersonal aspects of physical therapist–patient communication using telehealth require unique verbal and nonverbal behaviors for information giving and seeking, social conversation, and partnership building.<sup>10</sup> By offering both in-person clinic visits and follow-up telehealth encounters with patients and caregivers, the opportunity for personalized care can be further established with secure technology. Hence, we invite musculoskeletal professionals in health services, engineering, and academic research to collaborate with the Frontiers in Rehabilitation, Science, and Technology Council and the WCPT to advance science and technology that will favorably influence the future of musculoskeletal telehealth practice.

As the aging population and health care expenditures grow in the future, telehealth in musculoskeletal practice may assist in solving the looming health care crisis. Currently, physical therapists

are not listed as Medicare-eligible telehealth providers in the United States.<sup>8</sup> This barrier alone limits opportunities for millions of older adults to access high-quality physical therapy services via telehealth, as traveling to a physical therapy clinic can be a challenge for some older adults. In the literature, Medicaid programs have supported physical therapy telehealth services,<sup>12</sup> and cost benefits have been demonstrated by in-home telerehabilitation in Canada.<sup>19</sup> Therefore, we believe it is time to advocate for Medicare eligibility for telehealth physical therapy by funding musculoskeletal telehealth research, supporting payment policy, and educating providers in practice. Ultimately, telehealth is a tool to provide high-quality personalized physical therapy as part of musculoskeletal practice in society.

### Conclusion

The use of telehealth in musculoskeletal practice has been stalled by implementation, research, and policy barriers in physical therapy.<sup>7-9</sup> Systematic reviews in musculoskeletal telehealth literature demonstrate comparable outcomes and patient satisfaction.<sup>5</sup> Barriers to consumer access to physical therapy services are being lessened by physical therapy stakeholders.<sup>3,13</sup> In the future, telehealth in musculoskeletal research and practice must aim to establish equitability in access, cost-effectiveness, clinical outcomes, and ethical delivery in the digital age. ●

### REFERENCES

1. American Physical Therapy Association. Telehealth. Available at: <http://www.apta.org/Telehealth/>. Accessed January 11, 2018.
2. Australian Physiotherapy Association. Telerehabilitation and physiotherapy: position statement. Available at: [http://www.physiotherapy.asn.au/DocumentsFolder/Advocacy\\_Position\\_Telerehabilitation\\_2009.pdf](http://www.physiotherapy.asn.au/DocumentsFolder/Advocacy_Position_Telerehabilitation_2009.pdf). Accessed February 6, 2018.
3. Federation of State Boards of Physical Therapy. Physical therapy licensure compact. Available at: <http://www.fsbpt.org/FreeResources/PhysicalTherapyLicensurecompact.aspx>. Accessed August 3, 2018.

4. Federation of State Boards of Physical Therapy. Telehealth in physical therapy: policy recommendations for appropriate regulation. Available at: <https://www.fsbpt.org/FreeResources/RegulatoryResources/TelehealthinPhysicalTherapy.aspx>. Accessed January 11, 2018.
5. Grona SL, Bath B, Busch A, Rotter T, Trask C, Harrison E. Use of videoconferencing for physical therapy in people with musculoskeletal conditions: a systematic review. *J Telemed Telecare*. 2018;24:341-355. <https://doi.org/10.1177/1357633X17700781>
6. Habilis® Platform. Available at: [https://www.sig-nomotus.it/en/prodprot/habilisplatform\\_en.php](https://www.sig-nomotus.it/en/prodprot/habilisplatform_en.php). Accessed July 31, 2018.
7. Kairy D, Lehoux P, Vincent C, Visintin M. A systematic review of clinical outcomes, clinical process, healthcare utilization and costs associated with telerehabilitation. *Disabil Rehabil*. 2009;31:427-447. <https://doi.org/10.1080/09638280802062553>
8. Lee AC, Harada N. Telehealth as a means of health care delivery for physical therapist practice. *Phys Ther*. 2012;92:463-468. <https://doi.org/10.2522/ptj.20110100>
9. McAllister J. Is it time for mainstream 'tele-physiotherapy' in Canada? Available at: <https://physiotherapy.ca/blog/it-time-mainstream-telephysiotherapy-canada>. Accessed February

- 6, 2018.
10. Miller EA. The technical and interpersonal aspects of telemedicine: effects on doctor-patient communication. *J Telemed Telecare*. 2003;9:1-7. <https://doi.org/10.1258/135763303321159611>
11. Nelson MJ, Crossley KM, Bourke MG, Russell TG. Telerehabilitation feasibility in total joint replacement. *Int J Telerehabil*. 2017;9:31-38. <https://doi.org/10.5195/ijt.20176235>
12. Palsbo SE. Medicaid payment for telerehabilitation. *Arch Phys Med Rehabil*. 2004;85:1188-1191. <https://doi.org/10.1016/j.apmr.2003.09.008>
13. Physiotherapy Alberta. Cross-border physiotherapy. Available at: [https://www.physiotherapyalberta.ca/applicants/cross\\_border\\_physiotherapy#forms\\_and\\_instructions](https://www.physiotherapyalberta.ca/applicants/cross_border_physiotherapy#forms_and_instructions). Accessed February 6, 2018.
14. Randall K, Steinheider B, Isaacson M, et al. Measuring knowledge, acceptance, and perceptions of telehealth in an interprofessional curriculum for student nurse practitioners, occupational therapists, and physical therapists. *J Interact Learn Res*. 2016;27:339-353.
15. Richmond T, Peterson C, Cason J, et al. American Telemedicine Association's principles for delivering telerehabilitation services. *Int J Telerehabil*. 2017;9:63-68. <https://doi.org/10.5195/ijt.20176232>

16. Russell TG, Buttrum P, Wootton R, Jull GA. Internet-based outpatient telerehabilitation for patients following total knee arthroplasty: a randomized controlled trial. *J Bone Joint Surg Am*. 2011;93:113-120. <https://doi.org/10.2106/JBJS.I.01375>
17. Russell TG, Jull GA, Wootton R. Can the Internet be used as a medium to evaluate knee angle? *Man Ther*. 2003;8:242-246. [https://doi.org/10.1016/S1356-689X\(03\)00016-X](https://doi.org/10.1016/S1356-689X(03)00016-X)
18. Telehealth Alliance of Oregon. Telemedicine or Telehealth - Definitions. Available at: <http://www.ortelehealth.org/content/telemedicine-or-telehealth-definitions>. Accessed March 19, 2018.
19. Tousignant M, Moffet H, Nadeau S, et al. Cost analysis of in-home telerehabilitation for post-knee arthroplasty. *J Med Internet Res*. 2015;17:e83. <https://doi.org/10.2196/jmir.3844>
20. World Confederation for Physical Therapy. WCPT and INPTRA announce a formal collaboration. Available at: [http://www.wcpt.org/sites/wcpt.org/files/files/resources/press/WCPT\\_PressRelease\\_20Feb17.pdf](http://www.wcpt.org/sites/wcpt.org/files/files/resources/press/WCPT_PressRelease_20Feb17.pdf). Accessed February 9, 2018.



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