



UNIVERSITÀ
DEGLI STUDI
DI UDINE

Università degli studi di Udine

Musculoskeletal Physical Therapy During the COVID-19 Pandemic: Is Telerehabilitation the Answer?

Original

Availability:

This version is available <http://hdl.handle.net/11390/1186941> since 2020-06-29T12:28:20Z

Publisher:

Published

DOI:10.1093/ptj/pzaa093

Terms of use:

The institutional repository of the University of Udine (<http://air.uniud.it>) is provided by ARIC services. The aim is to enable open access to all the world.

Publisher copyright

(Article begins on next page)

TITLE: Musculoskeletal Physical Therapy During the COVID-19 Pandemic: Is Telerehabilitation the Answer?

RUNNING HEAD: Telerehabilitation During COVID-19 Pandemic

TOC CATEGORY: COVID-19

ARTICLE TYPE: Point of View

AUTHOR BYLINE: Andrea Turolla, Giacomo Rossetini, Antonello Viceconti,

Alvisa Palese, Tommaso Geri

UNCORRECTED MANUSCRIPT

© The Author(s) 2020. Published by Oxford University Press on behalf of the American Physical Therapy Association. All rights reserved. For permissions, please email: journals.permissions@oup.com

The coronavirus disease 2019 (COVID-19) pandemic has induced worldwide governments to adopt severe rules limiting individual freedom and imposing social distancing (eg, closing school, mandatory quarantine, restricting entertainments)¹ in order to prevent the collapse of national health care systems. In addition to the goal of reducing the COVID-19 pandemic, this paradigm shift brings a different allocation of resources within diagnosis-related groups toward high-intensity levels of care (eg, intensive care units) needed for patients suffering of severe COVID-19. Although these measures are necessary in this pandemic, they constitute a barrier for health care professionals who are usually in close contact with patients needing low-intensity care, such as musculoskeletal (MSK) physical therapists.

The World Confederation for Physical Therapy has recommended that its member organizations postpone treatments considered not urgent in order to ensure safety, still guaranteeing the essential rehabilitation services.² As a consequence, almost all MSK physical therapists have suspended their not-urgent professional activities. Although this decision underscores the high social responsibility of physical therapists, it also may create a sense of bewilderment—both among patients, who may be living with pain and disability, and among professionals who find their practice limited and their income reduced.³ The described scenario has promoted the publication of a position statement of the World Confederation for Physical Therapy on the use of telerehabilitation to improve accessibility to rehabilitation care, offering to the community of physical therapists the opportunity to reflect on this new method of care delivery.⁴ At the national level, different member organizations (eg, Chartered Society of Physiotherapy, Italian Physiotherapy Association, Australian Physiotherapy Association, American Physical

Therapy Association) have already introduced or expanded resources and advice to implement telerehabilitation.⁵⁻⁸

Physical therapists adopt a mixture of hands-on and hands-off skills to manage MSK pain related to acute and chronic disorders (eg, low back pain) and elective orthopedic postsurgical conditions (eg, joint arthroplasty). Manual therapy is a prime example of the hands-on skills, encompassing several approaches (eg, education, therapeutic exercises) aimed at increasing patients' self-efficacy and restoring functional capabilities.⁹ Recently, several recommendations on the management of patients with MSK pain have increasingly highlighted the importance of hands-off approaches to improve the quality of care and, consequently, the quality of life.¹⁰ It seems that the time is ripe, therefore, to exploit the potential of telerehabilitation for patients with MSK pain. This Point of View debates the values and limits of telerehabilitation in patients with MSK pain, reflecting on the use of telerehabilitation during COVID-19 outbreak.

The aims of this point of view are to (1) report clinical evidence on telerehabilitation, (2) describe its feasibility and acceptability, (3) explain opportunities and challenges for MSK physical therapists, and (4) suggest clinical implications, calling to action the community of physical therapists.

Clinical Evidence on Telerehabilitation

Several systematic reviews and meta-analysis have assessed the efficacy of telerehabilitation following total arthroplasty (eg, shoulder, knee, hip) and upper limb interventions (eg, proximal humerus fractures, carpal tunnel release surgery, rotator cuff tear).¹¹⁻¹⁵ Within this context, findings are promising as outcomes commonly considered in postsurgical physical therapy (eg, reduction in pain intensity and improvements in range of motion, muscle strength, functional activities, and disability) are similar or even superior in comparison with face-to-face usual care.¹¹⁻¹⁵

Moreover, the effects of telerehabilitation, when associated with usual care or as a stand-alone intervention, has been investigated also in chronic nonmalignant MSK pain (eg, low back pain, lumbar stenosis, neck pain, osteoarthritis, fibromyalgia, arthritis).¹⁶⁻¹⁸ Thus, preliminary evidence has suggested adopting telerehabilitation in substitution of face-to-face interventions for reducing pain and improving physical function, daily life activities, and quality of life in patients affected by these disorders.¹⁶⁻¹⁸

Caution should be applied, however, to avoid overestimation of findings given the several methodological weaknesses in available studies, such as small sample size ($n < 100$), short follow-up (< 12 months), missed evaluation of barriers/facilitators, and lack of blinding of participants, caregivers, and outcomes assessors.^{11,14,16}

Feasibility and Acceptability of Telerehabilitation

Systematic reviews have also reported that telerehabilitation-based consultation for MSK pain is feasible in terms of concurrent validity and intrarater and interrater

reliability in the assessment of peripheral joints and the spine, with good to excellent psychometric properties for the different clinical outcomes (eg, pain, swelling, muscle strength, balance, gait, active and passive range of motion).¹⁹⁻²⁰ Lower validity and reliability have been identified in the assessment of the shoulder and elbow joints, for the examination of the nerve functioning around the elbow, the scar assessment of the knee, and the evaluation of lumbar spine posture.¹⁹⁻²⁰ Furthermore, the absence of reporting of standard error of measurement and coefficient of variation, and the involvement of assessors with different clinical expertise and training (eg, naïve, expert) may limit the generalization of findings.¹⁹⁻²⁰

On the other hand, one strength of qualitative studies investigating both patients' and physical therapists' perspectives is the good acceptability of telerehabilitation in terms of overall user experience, adherence, and satisfaction, both in MSK disorders and after elective orthopedic surgical conditions.^{17,20-21} Furthermore, preliminary economic analyses have revealed that telerehabilitation enhances the quality of MSK care, which in turn impacts the total cost savings for national health care systems.²⁰ Nevertheless, satisfaction and economic outcomes are often poorly reported and not standardized, thus limiting usefulness of data.²⁰

Opportunities of Telerehabilitation

Recent advancements in information and communication technology have made low-cost internet connections, smart devices (eg, smartphone, tablet) and related applications (eg, Skype, Microsoft Teams) available to a large segment of health care professionals

and patients.²² At multiple levels (Figure), user-friendly design of interfaces opens opportunities to the community of physical therapists to individualize the delivery of MSK care by telerehabilitation in conjunction with face-to-face usual care. These opportunities are especially evident during the COVID-19 pandemic.

Patients can gain benefits from telerehabilitation, such as (1) the reduction of hospitalization rates and the prevention of readmissions, (2) an early discharge from rehabilitation units, (3) immediate access to outpatient rehabilitation services, reducing costs and saving time, (4) and improvements in health outcomes and quality of life and an early return to work.²²⁻²³

Telerehabilitation also benefits physical therapists, allowing them to: (1) maintain continuity of MSK care, educating patients through remote consultation, directly in their own home environment, (2) perform a physical assessment and plan a targeted therapeutic exercise program, and (3) monitor patients' progress, providing them continuous feedback and supervision.²²⁻²³

At the level of the health care services (eg, inpatient and outpatient settings), telerehabilitation permits rehabilitation professionals to: (1) adapt intensity, frequency, and duration of rehabilitation programs in accordance with patients' needs, (2) increase care efficiency while containing costs, (3) reduce waiting lists, thus increasing sustainability of services, and (4) guarantee adequate and continued services to both acute (eg, postsurgery) and chronic (eg, degenerative) conditions.²²⁻²³

Challenges of Telerehabilitation

This new field of professional practice, if deployed on a large scale, introduces some challenges that have not been debated thoroughly.

First, it has been recognized that effectiveness of MSK physical therapy relies not only on direct interventions provided through the use of proxemics and touch but also on other concealed contextual factors intrinsic to patients' experience when attending the practice (eg, the atmosphere around the treatment).²⁴ Moreover, during telerehabilitation, certain signs and symbols of care—such as the healing rituality associated with therapy administration, the interaction with other patients, the sight of the therapy table, the smell of cream, the noise of physical modalities—are not present, which increases the risk of underrating the therapeutic encounter between physical therapist and patient. Thus, telerehabilitation should be enriched with other contextual factors,²⁵ including specific elements of verbal communication (eg, paraphrase and language reciprocity, clear instructions, expressions of support) and nonverbal communication (eg, affirmative head nodding, eye contact, open body posture) tailored to the individual patient's profile.

Second, during the clinical examination, the impossibility of using palpation and other special tests as diagnostic tools may compromise the screening process aimed at excluding red flags.²³ Therefore, a face-to-face first-contact visit should be carefully considered for patients requiring a higher intensity of care (eg, complex clinical cases) on the basis of clinical findings that emerge from their history. In that situation,²⁶ prior to the physical assessment, the physical therapist must execute a triage while maintaining social distance to investigate the main symptoms (eg, fever >37.5, cough, weakness) indicating potential infection of COVID-19. In addition, the physical

therapist must ask whether the patient has been in contact with infected people in the past 14 days. The same questions should be asked again at the beginning of every face-to-face assessment. Finally, both patient and physical therapist should wear personal protective equipment (eg, surgical mask, gloves, visor) during the assessment and wash hands before and after the encounter.

Third, equipment barriers such as the lack of rehabilitation instruments (eg, elastic bands, medical balls, weights) could limit the delivery of MSK care by reducing the range of therapeutic solutions.²³ Therefore, during the initial planning of the rehabilitation program, physical therapists might establish which tools are needed for engaging in therapeutic exercise so that they can be rented and delivered to the patient's home.

Fourth, time for consultation and reimbursements for telerehabilitation services differ widely among countries, as compared with traditional face-to-face care.²³ As a whole, in many countries with an insurance-based private health care system, telerehabilitation has been included in the list of reimbursed services; conversely, in those countries with universal health care systems and for therapists in private practice, it might be feasible to create monthly subscription fees established according to the related diagnosis-related groups.

Finally, medicolegal aspects need to be considered while using the telerehabilitation.²⁷

Protection of health care data and patient privacy within the deontological principles and codes, as indicated in the declaration of the Ethical Principles of World

Confederation for Physical Therapy,²⁸ should be maintained in order to ensure an honest, competent, and accountable professional service. Physical therapist administrators should consult experts in the field (eg, information and communication technology professionals, lawyers). The use of commercial applications (eg, voice-over-internet-protocol [VOIP] technologies available for free) may not guarantee health data protection (information and communication technology safety and security). By virtue of their legal relationship with political and administrative organs, national professional associations should urgently provide guidelines for choosing the most appropriate technological tool to protect patient's data within the context of telerehabilitation, in accordance with the provisions of the privacy guarantors in each country. The American Physical Therapy Association, for example, provides a telehealth guidelines page (<http://www.apta.org/Telehealth/>).

Future Directions for Telerehabilitation

Is telerehabilitation the answer for MSK physical therapy during COVID-19 pandemic?

At multiple levels (Table), telerehabilitation unveils itself as a promising and timely model of care to be adopted alternatively, or in combination with, face-to-face usual care for patients who have MSK dysfunction during the COVID-19 pandemic. Health policy decision makers, physical therapists, and researchers are called to action to

discover when and how telerehabilitation can be a useful tool for MSK physical therapy *beyond* the contingent COVID-19 pandemic.

A. Turolla, PT, PhD, Laboratory of Rehabilitation Technologies, IRCCS San Camillo Hospital, Venice, Italy.

G. Rossettini, PT, PhD, Department of Neuroscience, Rehabilitation, Ophthalmology, Genetics, Maternal and Child Health, University of Genoa, Campus of Savona, Via Magliotto, 2-17100 Savona, Savona, Italy. Address all correspondence to Dr Rossettini at: Giacomo.rossettini@gmail.com

A. Viceconti, PT, MSc, Department of Neuroscience, Rehabilitation, Ophthalmology, Genetics, Maternal and Child Health, University of Genoa.

A. Palese, RN, PhD, Department of Medical Sciences, School of Nursing, University of Udine, Udine, Italy.

T. Geri, PT, PhD, Department of Neuroscience, Rehabilitation, Ophthalmology, Genetics, Maternal and Child Health, University of Genoa.

ACCEPTED: May 4, 2020

SUBMITTED: April 17, 2020

Author Contributions and Acknowledgments

Concept / idea / research design: A. Turolla, G. Rossettini, A. Viceconti, A. Palese, T. Geri

Writing: A. Turolla, G. Rossettini, A. Viceconti, A. Palese, T. Geri

Project management: T. Geri

Consultation (including review of manuscript before submitting): A. Turolla, G. Rossettini, A. Viceconti, A. Palese, T. Geri

This work was developed within the framework of the DINOGMI Department of Excellence of MIUR 2018-2022 (law 232 del 2016).

Disclosures

The authors completed the ICMJE Form for Disclosure of Potential Conflicts of Interest and reported no conflicts of interest.

References

1. McCloskey B, Zumla A, Ippolito G, et al. Mass gathering events and reducing further global spread of COVID-19: a political and public health dilemma. *Lancet*. 2020 doi: 10.1016/S0140-6736(20)30681-4. [Epub ahead of print]

2. World Confederation for Physical Therapy. Information and resources about COVID-19. <https://www.wcpt.org/news/Novel-Coronavirus-2019-nCoV>. 2020. Accessed April 23rd 2020.
3. Pedersini P, Corbellini C, Villafañe JH. Italian physical therapists' response to the novel COVID-19 emergency. *Phys Ther*. 2020 doi: 10.1093/ptj/pzaa060. [Epub ahead of print]
4. World Confederation for Physical Therapy. Report sets out future of digital physical therapy practice. <https://www.wcpt.org/news/report-sets-out-future-of-digital-physical-therapy-practice>. 2020. Accessed April 23rd 2020.
5. CSP, Chartered Society of Physiotherapy. Remote service delivery options. <https://www.csp.org.uk/news/coronavirus/remote-service-delivery-options>. 2020. Accessed April 23rd 2020.
6. AIFI, Associazione Italiana Fisioterapisti Italiani. Suggerimenti operativi per la teleriabilitazione. <https://aifi.net/suggerimenti-operativi-per-la-teleriabilitazione/>. 2020. Accessed April 23rd 2020.
7. APA, Australian Physiotherapy Association. Telehealth. <https://australian.physio/home/events/telehealth-apa-qa-webinars>. 2020. Accessed April 23rd 2020.
8. APTA, American Physical Therapy Association. Digital telehealth practice - connect for best practice, compliance, and health care. <https://learningcenter.apta.org/student/mycourse.aspx?id=f4259a2e-9c55-485c-a353-079e073de74d>. 2020. Accessed April 23rd 2020.
9. Saunders DG. Therapeutic exercise. *Clin Tech Small Anim Pract*. 2007. 22:155-159. doi: 10.1053/j.ctsap.2007.09.003.

10. Lin I, Wiles L, Waller R, et al. What does best practice care for musculoskeletal pain look like? Eleven consistent recommendations from high-quality clinical practice guidelines: systematic review. *Br J Sports Med*. 2020. 54:79-86. doi: 10.1136/bjsports-2018-099878
11. Agostini M, Moja L, Banzi R, et al. Telerehabilitation and recovery of motor function: a systematic review and meta-analysis. *J Telemed Telecare*. 2015. 21:202-213. doi: 10.1177/1357633X15572201.
12. Pastora-Bernal JM, Martín-Valero R, Barón-López, FJ, Estebanez-Pérez, MJ. Evidence of benefit of telerehabilitation after orthopedic surgery: a systematic review. *J Med Internet Res*. 2017. 19: e142. doi: 10.2196/jmir.6836.
13. Shukla H, Nair SR, Thakker D. Role of telerehabilitation in patients following total knee arthroplasty: evidence from a systematic literature review and meta-analysis. *J Telemed Telecare*. 2017. 23:339-346. doi: 10.1177/1357633X16628996.
14. Jiang S, Xiang J, Gao X, Guo K, Liu B. The comparison of telerehabilitation and face-to-face rehabilitation after total knee arthroplasty: a systematic review and meta-analysis. *J Telemed Telecare*. 2018. 24:257-262. doi: 10.1177/1357633X16686748.
15. Dávila Castrodad IM, Recai TM, Abraham MM, et al. Rehabilitation protocols following total knee arthroplasty: a review of study designs and outcome measures. *Ann Transl Med*. 2019. 7:S255. doi: 10.21037/atm.2019.08.15.
16. Cottrell MA, Galea OA, O'Leary SP, Hill AJ, Russell TG. Real-time telerehabilitation for the treatment of musculoskeletal conditions is effective and comparable to standard practice: a systematic review and meta-analysis. *Clin Rehabil*. 2017. 31:625-638. doi: 10.1177/0269215516645148.

17. Piga M, Cangemi I, Mathieu A, Cauli A. Telemedicine for patients with rheumatic diseases: systematic review and proposal for research agenda. *Semin Arthritis Rheum*. 2017. 47:121-128. doi: 10.1016/j.semarthrit.2017.03.014.
18. Adamse C, Dekker-Van Weering MG, van Etten-Jamaludin FS, Stuiver MM. The effectiveness of exercise-based telemedicine on pain, physical activity and quality of life in the treatment of chronic pain: a systematic review. *J Telemed Telecare*. 2018. 24:511-526. doi: 10.1177/1357633X17716576.
19. Mani S, Sharma S, Omar B, Paungmali A, Joseph L. Validity and reliability of Internet-based physiotherapy assessment for musculoskeletal disorders: a systematic review. *J Telemed Telecare*. 2017. 23:379-391. doi: 10.1177/1357633X16642369.
20. 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. doi: 10.1177/1357633X17700781.
21. Gilbert AW, Jaggi A, May CR. What is the patient acceptability of real time 1:1 videoconferencing in an orthopaedics setting? A systematic review. *Physiotherapy*. 2018. 104:178-186. doi: 10.1016/j.physio.2017.11.217.
22. Galea MD. Telemedicine in rehabilitation. *Phys Med Rehabil Clin N Am*. 2019. 30:473-483. doi: 10.1016/j.pmr.2018.12.002.
23. Howard IM, Kaufman MS. Telehealth applications for outpatients with neuromuscular or musculoskeletal disorders. *Muscle Nerve*. 2018. 58:475-485. doi: 10.1002/mus.26115.

24. Geri T, Viceconti A, Minacci M, Testa M, Rossettini G. Manual therapy: exploiting the role of human touch. *Musculoskelet Sci Pract*. 2019. 44:102044. doi: 10.1016/j.msksp.2019.07.008.
25. Testa M, Rossettini G. Enhance placebo, avoid nocebo: How contextual factors affect physiotherapy outcomes. *Man Ther*. 2016. 24:65-74. doi: 10.1016/j.math.2016.04.006.
26. World Confederation for Physical Therapy. Information and resources about COVID-19. Published 2020. <https://www.wcpt.org/news/Novel-Coronavirus-2019-nCoV#who>. Accessed April 23rd 2020.
27. Watzlaf VJM, Zhou L, Dealmeida DR, Hartman LM. A systematic review of research studies examining telehealth privacy and security practices used by healthcare providers. *Int J Telerehabil*. 2017. 9:39-59. doi: 10.5195/ijt.2017.6231.
28. World Confederation for Physical Therapy. Policy statement: Ethical responsibilities of physical therapists and WCPT members. Published 2020. <https://www.wcpt.org/policy/ps-ethical-responsibilities>. Accessed April 23, 2020.

Table. Implications for Health Policy Decision Makers, Physical Therapists, and Researchers During the COVID-19 Pandemic and Beyond^a

Health Care Levels	Actions
Health policy	Health care decision makers should implement telerehabilitation for patients with MSK pain, with the aim to: <ul style="list-style-type: none"> (1) reduce the risk of COVID-19 contagion, eliminating physical proximity during therapy meeting;

	<p>(2) reduce costs by redistributing resources from high to low intensity of care to be delivered by telerehabilitation;</p> <p>(3) guarantee accessibility to the best standard of care, in accordance with MSK clinical practice guidelines and WCPT recommendations;</p> <p>(4) offer specialised MSK physical therapy treatment to patients living in the COVID-19 outbreak areas, or diagnosed as COVID-19 infected, thus limiting the burden of mobility.</p>
Physical therapists	<p>Physical therapists should adopt telerehabilitation for patients with MSK pain, with the aim to:</p> <p>(1) promote their engagement and their own decision-making strategies, to help the transition from being passive to becoming active protagonists of their physical therapy program;</p> <p>(2) stimulate their self-efficacy and self-confidence capability, by alleviating fears and uncertainty, correcting maladaptive beliefs and expectations through education and advices;</p> <p>(3) guarantee their optimal recovery, minimising potential complications through the delivery of physical assessment, exercises, and periodical follow-ups.</p>
Researchers	<p>Researchers should run further studies on telerehabilitation for patients with MSK pain, with the aim to:</p> <p>(1) evaluate efficacy in different phases (eg, acute, chronic) and conditions (eg, injury, post-surgery) of MSK pain, including</p>

patients' drop-out and adverse effects;

- (2) inform about impact on long-term outcomes, using large sample sizes to establish which patients are likely to take advantage from this modality;
- (3) consider socioeconomic implications for patients, health care professionals, and National Health care Systems worldwide, embracing cost-effectiveness analyses;
- (4) develop virtual environments where the interaction with the physical therapist and the execution of exercises is enriched through patient's unique profiling.

^aCOVID-19 = coronavirus disease 2019; MKS = musculoskeletal; WCPT = World Confederation for Physical Therapy.

Figure legends

Figure. Opportunities for telerehabilitation during the COVID-19 pandemic and beyond.

