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Masterclass

Telehealth for musculoskeletal physiotherapy

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ABSTRACT

Introduction: Musculoskeletal conditions are a leading cause of global morbidity. Access to traditional in-person healthcare can be difficult for some under usual conditions and has become a ubiquitous barrier throughout the COVID-19 pandemic. Telehealth, defined as the 'delivery of healthcare at a distance using information and communication technology' is a solution to many access barriers and has been rapidly adopted by many healthcare professions throughout the crisis. While significant advancements in technology has made the widespread adoption of telehealth feasible, there are many factors to be considered when implementing a telehealth service.

Purpose: The aims of this masterclass are to (i) introduce telehealth and outline the current research within the context of musculoskeletal physiotherapy; (ii) provide insights into some of the broader challenges in the wide-scale adoption of telehealth; and (iii) to describe a systematic approach to implementing telehealth into existing healthcare settings, along with some practical considerations.

Implications: Telehealth is a broad concept and should be implemented to meet the specific needs of a healthcare service. This masterclass offers a structured approach to the implementation of a musculoskeletal physiotherapy telehealth service, and highlights practical considerations required by both clinicians and healthcare organisations throughout all stages of the implementation process.

1. Introduction

The 2018 Global Burden of Disease Study (GBD, 2017 Disease and Injury Incidence and Prevalence Collaborators, 2018) identifies musculoskeletal conditions as a leading cause of global morbidity. While not considered to be life-threatening, these conditions can place profound restrictions on an individuals' ability to participant in daily activities, employment and recreational activities (Australian Institute of Health and Welfare, 2019) and subsequently account for one-fifth of the world's total 'years lived with disability' (YLDs) (GBD, 2017 Disease and Injury Incidence and Prevalence Collaborators, 2018). International guidelines recommend that in the absence of sinister 'red flag' pathology (e.g. fracture, neoplasm), first-line interventions for the majority of musculoskeletal conditions should involve simple non-surgical management, where interventions are tailored to the individual's needs and clinical presentation (National Institute for Health and Care Excellence, 2016; Zhang et al., 2010). Despite these recommendations, the timely, affordable and equitable access to such healthcare services can be severely limited for some. Traditionally these access barriers are associated with geographical issues due to a significantly reduced health workforce capacity in regional and remote communities (Australian Institute of Health and Welfare, 2013). However access barriers are not only the result of geographical isolation (Cottrell et al., 2017), with an indisputable example being the strict social distancing policies initiated in response to the COVID-19 pandemic. This has demanded organisations to rethink how traditional healthcare services can be delivered with many services rapidly adopting telehealth service delivery methods. The objectives of this masterclass are to (i) introduce the reader to telehealth and outline the current research within the context of musculoskeletal conditions; (ii) provide insights into why the adoption of telehealth into routine clinical practice has been slow to date; and (iii) to describe a systematic approach, along with practical considerations, that can be used to successfully implement telehealth into an existing healthcare setting. This approach is relevant to both the establishment of a long term, sustainable telehealth service and for the rapid implementation of telehealth during the COVID-19 crisis.

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2. What is telehealth?

The term 'telehealth' can be thought of as an umbrella term to describe the provision of healthcare at a distance using information and communication technology (ICT) sources and is inclusive of all healthcare professions (Darkins and Cary, 2000). Over more recent years, there has been an explosion of new terminology that aims to describe the healthcare profession involved (e.g. telepsychiatry, teleradiology), the type of interaction (e.g. telerehabilitation, teleconsultation), or be more inclusive of the ways in which health information can now be exchanged digitally (e.g. e-Health, digital practice) (Shaw et al., 2017; World Confederation for Physiotherapy, 2019). Specific to the field of physiotherapy, the term 'telerehabilitation' has been used in much of the literature to date and is defined as 'the delivery of rehabilitation services via information and communication technologies' (Brennan et al., 2010). The abundance of nomenclature can be confusing and there is no agreed upon taxonomy (Bashshur et al., 2011), particularly as terminology can be interchangeable, and can vary across countries based upon the available technology, and the regulatory and professional bodies involved.

The choice of ICT also determines whether the healthcare interaction takes place either asynchronously or in real-time. Asynchronous (commonly referred to as 'store-and-forward') telehealth is where there is a temporal delay between the sending and viewing of health information. Common store-and-forward ICT includes secure messaging services and email, however newer applications such as wearables, virtual reality and activity trackers are increasingly being used within the health setting (Dear et al., 2015; Lorig et al., 2008; Mallari et al., 2019). In contrast, real-time telehealth implies that information is exchanged instantaneously between all users, with telephone and videoconferencing being the most prevalent forms of ICT. For the purpose of this masterclass paper, we will continue to refer to the more inclusive term of 'telehealth' as it has been defined above, where the scope will be limited to the use of 'real-time' videoconferencing as the telehealth delivery medium.

3. Telehealth research in musculoskeletal physiotherapy

Literature investigating the use of telehealth for the management of musculoskeletal conditions continues to grow. Several systematic reviews have demonstrated that telehealth can provide improvements in pain, physical function and disability that are similar to that of usual care for individuals with musculoskeletal conditions such as osteoarthritis, non-specific low back pain, or following total knee arthroplasty (Cottrell et al., 2016; Dario et al., 2017; Jiang et al., 2018). The use of telehealth has also been shown to increase exercise adherence for a variety of musculoskeletal conditions (Bennell et al., 2019; Lambert et al., 2017). There is however vast heterogeneity between studies included within these systematic reviews with respect to the healthcare interventions provided and the selected ICT, highlighting the need for further large, high-quality controlled trials to be undertaken to strengthen findings.

The validity and reliability of undertaking a physiotherapy assessment via telehealth has also been investigated. A systematic review by Mani et al. (2017) found that telerehabilitation assessments demonstrated good concurrent validity for pain, swelling, range of motion, muscle strength, balance, gait and functional assessment. However, only low to moderate concurrent validity was found for several special orthopaedic tests, neurodynamic tests, and lumbar posture. Diagnostic agreement between telehealth and in-person assessments has been investigated for a variety of musculoskeletal conditions and ranged from 59.7% to 93.3% (Lade et al., 2012; Richardson et al., 2017; Russell et al., 2010a,b; Steele et al., 2012). Substantial agreement (83.3%) between the two delivery mediums regarding clinical management decisions was also demonstrated in a recent study (Cottrell et al., 2018b) for patients referred to an advanced-practice physiotherapy-led screening clinic.

Telehealth research in the field of musculoskeletal physiotherapy has universally reported high levels of patient satisfaction (Lawford et al., 2018; Moffet et al., 2017; Tousignant et al., 2011), where satisfaction can also be significantly higher compared with those receiving in-person care (Cottrell et al., 2019b). This is not unique to musculoskeletal physiotherapy and demonstrates the value that individuals place on accessing care via telehealth. While more work needs to be done to confirm the economic implications of providing musculoskeletal services via telehealth, research to date has shown telehealth services to be cost-effective with cost-savings to the health service generally favouring telehealth over usual in-person care (Cottrell et al., 2019a; Nelson et al., 2019; Pastora-Bernal et al., 2017; Tousignant et al., 2015).

4. Why has the adoption of telehealth been so slow?

Despite the obvious benefits, up until the onset of the COVID-19 pandemic the widespread uptake of telehealth has been slow (Tanriverdi and Iacono, 1999; Wade et al., 2016). There have been significant efforts made to understand the challenges that hamper telehealth adoption. The primary barrier often cited from an organizational perspective is the cost of implementing telehealth services. This includes not only the initial financial outlay in obtaining necessary ICT infrastructure (Moffatt and Eley, 2011) but also the lack of reimbursement that healthcare services across many countries receive for telehealth consultations (Kruse et al., 2018; Ross et al., 2016). The advancement of affordable consumer-grade technology (both hardware and software applications) and data (Internet) coverage throughout the world in recent years negates the need for expensive bespoke ICT infrastructure, while advocacy from professional bodies, particularly in response to the COVID-19 pandemic, has supported the reimbursement of telehealth services by numerous funding bodies (McDonald, 2020). These changes have paved the way for a recent rapid adoption of telehealth services into practice.

From a patient perspective, barriers to engaging in telehealth can include age, level of education and computer literacy (Kruse et al., 2018; Sanders et al., 2012). In contrast, trust and acceptance towards technology and telehealth, and dissatisfaction towards traditional healthcare, are considered strong predictors in a patient's willingness to engage (Russell et al., 2015).

The vast majority of literature investigating the barriers to telehealth adoption has however focused on the perspective of the clinician, where Wade et al. (2014) acknowledges that clinician acceptance is a primary determinant in the success or failure of a telehealth service. Factors such as resistance to changing clinical practice (Brewster et al., 2013), poor technological self-efficacy (Kruse et al., 2018), perceived de-personalization of care (Green et al., 2016) and patient privacy and safety concerns (Mair et al., 2008) have been cited as key barriers to clinician acceptance towards telehealth. This is most likely due to the additional skills that are required of clinicians to be able to deliver care safely and effectively via this alternative medium. Telehealth requires the clinician to be somewhat reliant on the patient to provide information that may be normally derived from general observation or the physical 'hands-on' examination (Hinman et al., 2017). As such, clinicians need to be technologically competent in navigating the chosen telehealth software (i.e. videoconferencing) platform while also adapting existing clinical knowledge and communication skills. These adaptive processes can be further challenged by both the physical environment in which the patient is located (e.g. small, clutter space) and the event of technical disruptions during the consultation. As such, telehealth can lead to a 'power-shift' in the empirical roles of the clinician and patient (Hinman et al., 2017), which may contribute to clinician resistance and poor acceptance. With this in mind, there needs to be recognition of the complex and often implicit processes that take place when clinicians are first exposed to telehealth. Specific training and upskilling of clinicians to provide care via telehealth is paramount to ensure a sustainable telehealth service, with more recent studies

demonstrating that clinician acceptance and confidence does improve with both direct training and repeated exposure (Cottrell et al., 2018a).

The rapid uptake of telehealth in response to the strict social distancing policies associated with COVID-19 has cut through many of these traditional barriers to telehealth adoption. For many organisations, a rapid shift to telehealth has been the only option to generate income and for patients to receive services. While some organisations have been circumspect and considered in their approach, others have rapidly adopted services without consideration of many important factors which may impact on the success and long-term sustainability of the service. It is yet to be seen if these two different approaches will impact on the long-term adoption of telehealth as social distancing restrictions ease. It is undoubted that the first-hand experience of telehealth by both practitioners and patient will shift views, either positively or negatively, about this service delivery method.

5. Implementing a musculoskeletal telehealth service: considerations and implications

5.1. Using theories and frameworks to support implementation

Using an implementation framework or an action-process model can assist healthcare services and organisations to undertake a structured and systematic approach to their telehealth implementation efforts (van Dyk, 2014). Frameworks such as the I2I-4-Telehealth (Theodoros et al., 2016) or the Knowledge-to-Action (KTA) model (Graham et al., 2006) have been developed as a means to conceptualize the implementation process into a series of (uni- or bi-directional) steps. These frameworks can be advantageous as they outline the practical actions required at each phase of implementation and where efforts should be directed. They also encourage a formal evaluation to determine the success of the implementation efforts and whether the desired outcomes were obtained.

5.2. Identifying the need

Traditionally, telehealth has been advocated to overcome geographical barriers for individuals who reside in rural communities (Armfield et al., 2014). However, many other barriers such as work commitments, access, and costs related, to transport can restrict individual access to healthcare services (Brewster et al., 2013; Cottrell et al., 2017). The social distancing policies related to the COVID-19 pandemic has been an example of an additional, major disruptor to the way conventional healthcare services can be delivered. Undertaking a formal needs assessment, such as that described by Al Dossary et al. (2017), is a useful way to understand how telehealth will address the specific issues being faced by a service. A wide range of stakeholders (e.g. patients, clinicians, management, community) can also be engaged as part of the needs assessment process.

5.3. Pre-implementation considerations

Once the need for telehealth has been identified, the 'readiness' of stakeholders to engage should be ascertained. Readiness can be assessed on a variety of levels, and includes not only the stakeholders' willingness to engage, but also their ability to engage through the availability of necessary technology, business case/funding models, and alignment with organizational strategic plans (Alami et al., 2019; Theodoros et al., 2016). Even with the best of intentions and a genuine need, many telehealth services do not thrive due to a lack of stakeholder readiness. For example, an audit of existing patients (particularly those identified as having challenges in accessing the service) should be undertaken to determine if they have access to an Internet-enabled computer device and are willing to engage in this alternative method of service delivery. From an organizational perspective a robust business case should be developed early in order to ensure long-term financial sustainability of the telehealth model. As such, a readiness assessment can assess the feasibility of telehealth within the context of a specific service or organization, and thereby help improve the chances of successful implementation. There are a number of telehealth readiness tools available to assist this process as described by Légaré et al. (2010).

It is also encouraged at this stage to consider what information needs to be collected to formally evaluate the success of the telehealth initiative and determine whether it should/can be sustained beyond the initial implementation phase. It is essential that an evaluation plan is formulated prior to the commencement of clinical activity in order to ensure the right data is collected at the right time. Considering the rapid adoption of telehealth during COVID-19, many organisations may find themselves in the situation of not having completed this step. As the panic of adopting services subsides, these practices are being encouraged to complete this step to ensure that the right data is collected to determine implementation success and ensure that the service can be sustained into the future. Data should be collected from numerous sources at the level of both the individual (e.g. patient, clinician) and the organization (e.g. practice, department, healthcare service, community) (Glasgow et al., 1999).

5.4. Practicalities when implementing and delivering a telehealth service

5.4.1. Clinical triaging considerations

The following clinical factors may need to be considered when implementing a musculoskeletal telehealth service. These factors should be considered on a service-by-service basis where clear documentation is provided to guide clinicians in their selection of patients who may be appropriate for a telehealth consultation.

- *Individual patient factors* such as age, medical co-morbidities, mobility/balance deficits, language barriers and visual/hearing/cognitive impairments may determine the eligible criteria for telehealth. In addition the patient's clinical presentation including symptom severity, chronicity, urgency to access care, and the presence of (potential) red and/or yellow flags may further impact their suitability for telehealth.
- *Mode of delivery:* Telehealth services can be offered in a hybrid model, with some consultations provided in-person and some via telehealth. Complex patients may be managed more successfully if an in-person assessment is performed initially and subsequent management provided via telehealth. Consider which patients may be appropriate for a hybrid service and which are appropriate to be managed exclusively via telehealth.
- The *patient's physical location* (e.g. home, local healthcare facility). This is relevant in the context of patient privacy (if others in the house may overhear a consultation), or if another person or healthcare practitioner is required to assist the patient on the remote end. Geographical location may also impact on internet connectivity which should be tested prior to the first consultation.
- *Clinician experience and/or skill mix* to be able to appropriately manage the client. Consider the level of clinician training and coaching that is appropriate for the patient cohorts that will receive telehealth. Clinicians should be familiar with both the technology available and how clinical care can be adapted to be delivered via telehealth. For example, for patients who would have traditionally received manual therapy techniques, consider whether other treatment interventions, such as exercise and self-management techniques, are suitable to be used instead. Clinicians should be aware of the research evidence which supports a 'hands-off', or active management approach for the clinical conditions that they are managing via telehealth (Foster et al., 2018; Teo et al., 2019).
- Patient selection may be influenced by current *rebate/reimbursement* eligibility criteria for telehealth consults. This should be considered as part of the initial business plan in the readiness assessment.

5.4.2. Telehealth (videoconferencing) platform selection

There is a plethora of videoconferencing software platforms readily available on the market with most platforms allowing patients to connect with their clinicians using their own personal devices. While this may facilitate implementation efforts, it is imperative that the videoconferencing platform is carefully selected to ensure that it meets the needs of the intended telehealth initiative. It is recommended that healthcare services carefully review the patient types that will be seen via telehealth and undertake a task analysis of the various interactions they will have with these patients in order to make informed decisions on a platform (Russell and Theodoros, 2018). It is recommended that services limit the final selection to a single platform such that clinicians and support staff (e.g. receptionists, Telehealth Coordinators) do not have to learn how to navigate and trouble-shoot multiple platforms. Irrespective of the platform that is chosen, selection should not be made solely on the basis of cost or that it is already available within the service. With this in mind, the following considerations can be applied throughout the selection process:

- Ensure that the platform is *fit-for-purpose* and meets the basic needs of what is required during the telehealth consultation. For example, if range of motion measures are required, select a platform that offers this as a feature.
- Consider whether the platform meets national *privacy and security regulations* (e.g. Health Insurance Portability and Accountability Act [HIPAA]; General Data Protection Regulation [GDPR]) for the transmission and storage of electronic medical information.
- Consider the *usability of the platform* (for both the patient and clinician). Theoretical constructs such as perceived ease-of-use and effort expectancy have been shown to be determinants in an individuals' choice to adopt a new technology such as telehealth (Venkatesh et al., 2012). As such, a platform that requires minimal effort for the patient and clinician to connect with one another should facilitate the implementation process.
- Ensure that the clinician/healthcare service remains *in control of when a patient can enter the consultation.* This can be achieved with platforms that have designated 'virtual waiting rooms' where the patient waits until the clinician connects the call to commence the consultation.
- Consider the *financial cost* of accessing the platform. The majority of telehealth platforms require the healthcare provider to pay a license/subscription fee, however costs regarding data usage, particularly for home-based telehealth services, also need to be taken into account.
- Consider the *interoperability* of the platform and whether it can be accessed across different operating systems (e.g. Android/iOS) and/or web browsers (e.g. Google Chrome, Microsoft Edge, Mozilla FireFox, etc.) or interact with other hardware-based videoconferencing systems.
- The number of *'end-points' or connections* allowed for a consultation may be of relevance when using telehealth for group classes or case conferences that require three or more end-points.
- Many telehealth platforms have *additional built-in features* such as appointment scheduling, photo/video-recording and playback, exercise libraries, questionnaires and measurement tools (e.g. goniometry) which can assist the overall telehealth experience.

5.4.3. Preparing the physical environment

Aside from the technology requirements, Table 1 outlines some of the considerations that need to be made regarding the physical environment and surroundings in order to enhance the telehealth consult.

5.4.4. Ethical & professional considerations

Telehealth is just an alternative way in which to provide healthcare, and as such clinicians must continue to work within their scope of practice that has been outlined by their professional and/or regulatory bodies (American Physical Therapy Association, 2020; Australian Physiotherapy Association, 2020). However, given that telehealth is relatively novel in certain countries, it is important to understand that specific restrictions may be imposed on scope of practice if care is being delivered via telehealth. In addition to scope of practice, clinicians should ensure that their professional indemnity insurance policies explicitly cover the provision of healthcare via telehealth within their jurisdiction. Clinicians must also be aware that they are required to have professional registration with the jurisdiction/s where their patients are located during a telehealth consultation. This is an important consideration if practicing inter-state or internationally.

Table 1
Considerations for preparing the physical environment for a telehealth consultation.

Physical environment	• Select a physical space that is: o Large enough to perform necessary tasks, e.g. perform an exercise; o Free from clutter and potential trip hazards; o Private to reduce unwanted distractions and maintains a level of privacy and confidentiality • Ensure necessary furniture (e.g. bed, chair) and/or equipment (e.g. light weights) is available.
Acoustic environment	• Eliminate as much background noise as possible – close doors/windows; turn off television/radio; move to a room near the back of the house. • A headset (with microphone) can be worn to further reduce background noise while maintaining privacy and confidentiality. • Physical spaces with soft furnishings (e.g. carpet) can minimise echoing and other audio distortions.
Visual environment	• Encourage backgrounds that are stationary and neutral in colour • Chose artificial lighting over natural light that is positioned in front and above the computer device to avoid glare and shadows.
Appropriate clothing	• Encourage clothing that is plain and light in colour; clothes with heavy patterns or stripes can create visual distortions. • As per an in-person consult, ensure patient is wearing clothing that allows for necessary movement or de-robing as part of the examination.

Patient consent also needs to be considered, and whether the consent process needs to differ from standard in-person care. Clinicians should check with relevant regulatory and/or professional bodies whether there are any specific consent processes required within the jurisdiction. Even if written consent is not required, the patient should be provided with information (either written or verbal) about what telehealth is, how it may differ to an in-person consultation, and what the advantages and disadvantages may be in accessing care via telehealth. Providing this information can ensure that an informed decision is made prior to participating in a telehealth consultation.

Privacy and confidentiality during a telehealth consultation must be held to the same standard as an in-person consultation. Consultations should be conducted in a private and secure physical setting (at both the clinician and patient ends) such that conversations cannot be overhead. As with in-person consultations, the patient may have a support person present with them during the consultation, however it can be difficult to ascertain who may be 'off screen' particularly when the patient is located within their own home. This can present a challenge when discussing sensitive topics, and clinicians may need to specifically enquire about the presence of other individuals and receive consent for their participation by all parties.

5.5. Evaluating the implementation of the telehealth service

As with any new service or service redesign, an evaluation should be undertaken to determine whether the telehealth initiative has succeeded in meeting the objectives identified as part of the initial needs assessment (Agboola et al., 2014). Evaluation efforts can target outcomes at both the individual- and organization-level (Glasgow et al., 1999) and

may include clinical (e.g. improvements in pain and function), experiential (e.g. patient/clinician satisfaction), economic (from the perspective of the patient and/or the service), and service utilization (e.g. referral and attendance rates) metrics. Repeated or cyclic evaluation efforts may also provide valuable information throughout the initial implementation period to ensure that intended outcomes are being achieved.

6. Conclusion

Healthcare organisations have had to rapidly adjust the way in which individuals can access fundamental healthcare in response to the recent COVID-19 pandemic, which has led to the widespread adoption of telehealth. Telehealth has been shown to be a viable and effective alternative for individuals who are unable to access in-person healthcare services for the management of many musculoskeletal conditions. This masterclass provides an overview of the literature supporting telehealth for musculoskeletal physiotherapy, as well as some of the broader challenges that need to be considered when implementing a telehealth service. A systematic approach offering practical suggestions has been described to support the successful and sustainable adoption of telehealth as part of routine clinical service delivery. While telehealth is set to bridge the gap in healthcare access during the time when social distancing is mandated, COVID-19 is expected to leave a lasting impact on how individuals access healthcare once restrictions are lifted. Therefore, telehealth should not be considered a temporary stop-gap, but rather as a sustainable alternative mode in which individuals can safely access healthcare.

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Declaration of competing interest

None.

Appendix A. Supplementary data

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