Commentary

The Emerging Role of Telehealth for Concussion Clinical Care During the Coronavirus (COVID-19) Pandemic

Melissa N. Womble, PhD; Erin Reynolds, PsyD; Alicia Kissinger-Knox, PsyD; Michael W. Collins, PhD; Anthony P. Kontos, PhD; Robin V. West, MD; Shawn Eagle, PhD, ATC; R. J. Elbin, PhD

The coronavirus disease 2019 (COVID-19) pandemic has substantially altered the delivery of healthcare for providers and their patients. Patients have been reticent to seek care for many diseases and injuries including concussion due to fears of potential exposure to COVID-19. Moreover, because of social distancing recommendations and stay-at-home orders, patient screening, evaluation, and delivery of care have become less efficient or impossible to perform via in-person clinic visits. Consequently, there was a sudden need to shift healthcare delivery from primarily in-person visits to telehealth. This sudden shift in healthcare delivery brings with it both challenges and opportunities for clinical concussion care. This article is designed to discuss these challenges and opportunities and provide an experiential-based framework for providing concussion care via telehealth. We first provide an overview of a clinical concussion model utilized at concussion specialty clinics from 3 geographically disparate healthcare systems for in-person service delivery prior to COVID-19. We then discuss the creation of new clinical workflows to facilitate the continued provision of concussion specialty care using telehealth. Finally, we examine lessons learned during this healthcare delivery shift including limitations and potential barriers for telehealth for concussion care, as well as opportunities for expansion of concussion care in rural and underserved areas. We also discuss the need to empirically evaluate the comparative efficacy of telehealth and in-person concussion care moving forward. Key words: COVID-19, sports-related concussion, telehealth

Author Affiliations: Inova Sports Medicine Concussion Program, Fairfax, Virginia (Dr Womble); Baylor Scott & White Sports Concussion Program, Frisco, Texas (Dr Reynolds); Sports Medicine Concussion Program, Department of Orthopaedics, The University of Pittsburgh Medical Center, Pittsburgh, Pennsylvania (Drs Kissinger-Knox, Collins, Kontos, and Eagle); Inova Sports Medicine, Fairfax, Virginia (Dr West); and Office for Sport Concussion Research, Department of Health, Human Performance and Recreation, University of Arkansas, Fayetteville (Dr Elbin).

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Corresponding Author: R. J. Elbin, PhD, Office for Sport Concussion Research, Department of Health, Human Performance and Recreation, University of Arkansas, Fayetteville, AR 72701 (rjelbin@uark.edu).

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T HE CORONAVIRUS DISEASE 2019 (COVID-19) pandemic abruptly limited in-person healthcare. Some clinics that specialize in providing interdisciplinary care for concussion (ie, mild traumatic brain injury) made a swift transition from in-person to telehealth services. This article describes the clinical challenges and lessons learned from 3 interdisciplinary concussion specialty clinics that transitioned from inperson care to telehealth care to meet the physical distancing guidelines of COVID-19. The concussion clinical care model is described, followed by an overview of telehealth prior to the pandemic, transition of specialized concussion care to telehealth during the pandemic, and barriers to further telehealth concussion care postpandemic.

OVERVIEW OF AN INTERDISCIPLINARY CONCUSSION CLINIC

Specialty concussion clinics typically consist of an interdisciplinary team led by a provider with specialized

training in concussion. The interdisciplinary team provides a comprehensive assessment that captures the various clinical presentations of concussion and determines a targeted, individualized treatment plan for the patient. This team may include, but is not limited to, neuropsychology, athletic training, physical medicine and rehabilitation, physical therapy, neurology, neurosurgery, behavioral optometry, and psychology/ psychiatry.

Comprehensive care for concussion traditionally includes face-to-face interactions with the patient. A detailed clinical interview is administered to obtain a personal/family health history, including risk factors and preexisting conditions (eg, posttraumatic migraine),¹ and information related to the current injury (eg, mechanism, signs/symptoms). This face-toface interaction between the provider and the patient helps establish a therapeutic alliance and provides an opportunity for patient education and reassurance about recovery. The clinical assessment typically includes a symptom inventory, neurocognitive testing, and vestibular/ocular-motor screening (VOMS). This information can be used to identify a clinical profile(s)^{2–5} with a corresponding treatment plan.

Access to specialty concussion care has been problematic. Most specialty concussion clinics are predominantly located in highly populated areas of the United States, which limit care to individuals located in less populated regions (eg, rural). This lack of access requires patients to travel long distances for treatment, which is inefficient and costly. Patients who choose to travel for care often have same-day appointments with the medical team, which can stress the clinic schedule. These challenges have prompted some clinics to use telehealth prior to the COVID-19 pandemic.⁶

TRANSITIONING SPECIALIZED CONCUSSION CARE TO TELEHEALTH DURING THE COVID-19 PANDEMIC

Telehealth is reported to improve healthcare access, efficiency, and reduce associated costs.⁷ Telehealth platforms have been used in several medical specialties including psychology,⁸ neurology,⁹ and primary care.¹⁰ The transition from an in-person, interdisciplinary concussion model to a telehealth model would ideally involve staff education, training, and pilot evaluation of the telehealth platform. Unfortunately, this "test drive" period was short due to COVID-19 and occurred during "real-time" patient care.

Selecting a telehealth platform

There are several platforms (eg, Zoom, Microsoft Teams, WebEx, EPIC Vidyo) available for the remote

delivery of healthcare services. These should be evaluated multiple times on different devices (eg, tablet, laptop), browsers, and internet connection speeds before implementing for patient care. Moreover, these platforms should be compliant under the Health Insurance Portability and Accountability Act (HIPAA). A list of platforms that are HIPAA compliant is provided here: https://www.hhs.gov/hipaa/for-professionals/ special-topics/emergency-preparedness/notificationenforcement-discretion-telehealth/index.html.¹¹

Scheduling appointments

Patients should be provided links to the telehealth platform, hardware/software requirements, and instructions for at-home assessments to be completed before the appointment. Support staff should be available to patients before and during the clinical encounter. These individuals could comprise medical assistants/nurses, physician extenders, athletic trainers, or administrative staff members who are knowledgeable about the telehealth platform, clinic scheduling process, and the logistics and/or flow of the clinical visit. The telehealth scheduling process should be a stress-free experience for patients to ease anxiety and nervousness about their clinical appointment.¹²

Conducting the clinical interview in a telehealth setting

The clinical interview is the cornerstone of a comprehensive concussion assessment and includes demographic, patient/family health history, and details about the current concussion. This dialogue between the provider and the patient helps establish the therapeutic alliance, and the virtual environment may require more time to develop rapport with the patient. Several researchers report that the therapeutic alliance can be established in the telehealth clinical environment¹³⁻¹⁵ and is comparable with the traditional in-person setting.¹⁶ Simpson and colleagues¹⁴ commented that the telehealth platform, used during the COVID-19 pandemic, created a more neutral therapeutic setting that provided patients with greater opportunities for connection with the healthcare provider. A positive patient-provider relationship increases trust, patient disclosure, compliance, and clinical outcomes.¹⁷ The telehealth clinical interview should be conducted in a private area (eg, a designated room in a house or office space). It is also important for providers to involve family members or significant others who would normally accompany patients at in-person appointments. However, technological limitations or legal restrictions may hinder the involvement of these individuals. For example, the video frame may not be wide enough for multiple people, which can prevent the provider from hearing comments and observing nonverbal cues. This information can help reveal interpersonal dynamics and home environment, which can influence the patient's recovery. The provider should be aware of age and other confidentiality-related restrictions that may prohibit others from attending telehealth sessions.

Administering concussion assessment tools in a telehealth setting

The recommended multifaceted assessment approach for concussion includes a symptom, cognitive, vestibular, ocular, and psychological evaluation.¹⁸ Self-reported symptom scales (eg, Post-Concussion Symptom Scale,¹⁹ Graded Symptoms Checklist²⁰) and mood measures (eg, Generalized Anxiety Disorder,²¹ Patient Health Questionnaire²²) can be completed prior to a telehealth session, and several of these are recognized as part of the recommended common data elements (CDEs) for concussion.²³ The CDEs for sports-related concussion were established by a collaboration between the National Institute of Neurological Disorders and Stroke (NINDS), the Department of Defense (DOD), and a working group of more than 30 experts in concussion.²³ This initiative produced a comprehensive list of recommended assessments and summaries of empirical support. These CDEs may overlap or supplement emerging inventories (eg, Clinical Profiles Screen: CP Screen⁴) that together can help identify specific concussion impairments or even clinical profiles (eg, anxiety/mood, cognitive, headache/migraine, ocular, vestibular).2,4

Computerized neurocognitive testing can be completed before or during a telehealth session. Testing may take 20 to 40 minutes and may not be feasible during telehealth due to time constraints. Recently, some computerized neurocognitive testing batteries have promoted the use of at-home testing,²⁴ which is debated among providers and researchers due to lack of supervision.²⁵ At-home testing recommendations (eg, quiet room) should be sent to the patient and reviewed with the provider. Regardless of the administration method, there may still be distractions that the provider should account for during interpretation of the test. Although used less frequently in the acute injury phase, paper-and-pencil-based neurocognitive testing has also been successfully implemented in telehealth neuropsychology clinics.^{26,27} More specifically, Brearly and colleagues²⁸ reported that verbally administered neurocognitive tests were unaffected by the testing environment (eg, in person or telehealth), and Parks et al²⁹ reported that data obtained from telehealth administration of neurocognitive testing in the domains of attention, processing speed, language, visuospatial processing, and memory were sensitive to the subtle effects of mild traumatic brain injury. This evidence suggests that telehealth is a viable option for paper-and-pencil neurocognitive testing.

The VOMS³⁰ evaluates vestibular and ocular impairments and symptoms. The VOMS includes smooth pursuits, saccades, vestibular ocular reflex, and visual motion sensitivity components and a measurement of near point of convergence (NPC). The VOMS requires a 3×3 -sq ft space for administration, and 3 ft of distance is recommended between the patient and the provider. During telehealth, patients may need to be closer to the camera to provide a clear view of eye movements for the provider. The measurement of NPC distance can be completed with assistance from a family member, and the provider may request frontal and side views of the patient to observe eye movements and distance, respectively. Video quality, lighting, and camera angle are other factors that may affect the administration of the VOMS during telehealth. Despite other clinicians and researchers using the VOMS in a telehealth setting for concussion,⁶ the validity and/or reliability between a telehealth and an in-person administration of this measure are unknown and future research is needed.

Individualized treatment options

Individualized treatment plans involve behavioral strategies (eg, regulating sleep, hydration/nutrition, stress), physical activity, and/or specialty referral (eg, vestibular therapy). During COVID-19, adjustments due to patients' remote work/school schedules, distancing guidelines influencing outdoor physical activity, and limitations surrounding exposure to complex environments must also be considered by providers. Although treatment and/or rehabilitation options can be offered via telehealth, there may be limitations for specific aspects of treatment, such as monitoring of vital signs for progression of exercise tolerance and/or medication management. In these instances, an in-office clinical visit may be necessary to complement the telehealth session.

Interdisciplinary communication

Communication among treating providers is essential when providing comprehensive concussion care to ensure the treatment team is in agreement and conveying consistent messages to patients. Telehealth did not change the ability to converse as a group, though it did prompt regular use of group communication via secure chats (eg, Epic Secure Chat, Microsoft Teams). This change has helped ensure that conversations between patient appointments are not forgotten through an

Benefits	Challenges/limitations	Potential solutions
Increased access to specialty care for concussion	Education required for clinician and staff for using telehealth (eg, using Zoom)	Implement quarterly updates on new technology/updates on telehealth platforms on an ongoing basis
Reduced time commitment for patients (ie, eliminating clinic commute)	Educating and preparing patients for the telehealth visit (eg, accessing and using technology, ensuring a secure environment for the visit)	Identifying a point person in the clinic who is available to assist patients when needed
Reduction in clinical costs	Environmental distractions for patients during clinical assessments for concussion	Discuss the optimal environment with patients via phone when the appointment is scheduled
Improved engagement for patients who otherwise may become very symptomatic in the office	Interstate licensing laws	Multistate licensure to allow service provision to patients in other states
Some patients are more comfortable in their own	Reimbursement	Advocacy for continued reimbursement for telehealth
home and/or have anxiety about hospitals/medical providers	Building adequate rapport via technology	Clinicians may need to spend more time building therapeutic alliance and/or modify clinical evaluation to include more unstructured interview time
	Lack of literature substantiating ability to administer VOMS via telehealth	Research evaluating reliability/validity of using concussion assessments in telehealth context

 TABLE 1
 Potential benefits, challenges/limitations, and potential solutions for using telehealth for specialty care for concussion

Abbreviation: VOMS, vestibular/ocular motor screening.

ongoing conversation regarding developing information for patients between appointments.

BARRIERS TO CONCUSSION TELEHEALTH TREATMENT POST-COVID-19

Potential barriers to telehealth for specialty concussion care include interstate licensing laws, legal liabilities, institutional obstacles, billing, and patient access. Regarding licensing, it is important to determine whether the provider is legally allowed to treat a patient based on geography. In general, providers have to be licensed in the state in which they practice and the patient must also physically be in the same state. Although some exceptions to interjurisdictional restrictions were afforded during the COVID-19 pandemic, it is unlikely these exceptions will continue in the future. As such, providers should verify and document the location of the patient during each telehealth visit.

There are several legal considerations to look at when implementing telehealth for concussion care. As with traditional in-person care, patients must give consent for treatment. It is the provider's duty to protect confidentiality and to minimize the risk of the session being compromised. Privacy and confidentiality can be accomplished through the utilization of password protection and ensuring the visit is being conducted in a private space free of distractions. Telehealth sessions may not be recorded without written, informed consent of the patient. If the patient is a minor, parents will need to provide their consent (along with the minor's assent) for the use of telehealth services. An informed consent checklist should be provided to all patients outlining the potential risks and benefits of telehealth for concussion care. Patients may exhibit or report "red flag" signs/symptoms or mental health issues (eg, suicidal ideation) that may require emergent intervention. In the event that a patient requires emergency care, a clear safety plan, including emergency contacts, referrals, and the closest emergency department, should be established prior to the start of treatment.

There may be some institutional barriers to concussion telehealth. Telehealth platforms that are integrated into the electronic health record may be costly and may result in separate record systems if they cannot share information. Providers and staff will likely require training. Although telehealth medical services are currently being covered by most major payers and commercial insurers due to the COVID-19 pandemic, this may not be the case in the future. Comprehensive specialty concussion care is based on a team approach, and few patients will be seen by only one provider. Patients need to be informed if they will be required to pay out of pocket for services rendered by additional providers (eg, physical therapists). The American Psychological Association (APA),³¹ the American Medical Association (AMA),³² and the American Physical Therapy Association (APTA)³³ offer guidelines to help navigate telehealth, as well as provide information on federal and state regulations. Providers should check these resources frequently, as changes are common and may impact the feasibility of providing telehealth services.

Perhaps, the most important barrier to telehealth care following a concussion is patient access. Successful implementation of telehealth services is based on the assumption that patients have access to the necessary technology and internet to support telehealth platforms. However, some telehealth platforms only work on certain web browsers or require rapid download speeds that may not be available to all patients. Furthermore, patients may not have quiet, private space in which to speak with a provider via telehealth. Special consideration should be made for patients from disadvantaged or traditionally marginalized backgrounds, those with physical and cognitive disabilities, hearing impairment, and language barriers, and those who require other special accommodations. Some healthcare facilities have increased access to telehealth for individuals with

connectivity issues (eg, no internet access or limited cellular data plans) by expanding their telehealth network capability to include satellite clinics (eg, urgent care, community clinics, school-based health centers) that act as a "hub" for nearby patients to travel to and use telehealth technology.

CONCLUSION

The abrupt shift in concussion clinical care from in-person visits to telehealth due to the COVID-19 pandemic resulted in several important lessons learned. First, healthcare providers and staff must be flexible with the transition from in-person to telehealth delivery. Although many healthcare systems began using telehealth for concussion care prior to COVID-19, they were not prepared for the scale of telehealth delivery that was required to replace inperson visits. Despite some initial challenges, patients were appreciative of telehealth. Although certain aspects of the clinical evaluation may be altered, all components of a comprehensive concussion evaluation are transferrable to telehealth. A list of benefits, challenges, and solutions to implementing telehealth for specialty concussion care is presented in Table 1.

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