Use of iPads by Occupational Therapists in a Medical Intensive Care Unit

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As the number of patients admitted to the intensive care unit (ICU) each year continues to increase, so does the incidence of mechanical ventilation (Carson, Cox, Holmes, Howard, & Carey, 2006). Survivors of critical illness are at increased risk for long-term impairments in their physical, mental, and cognitive status (Parker, Sriracharoenchai, & Needham, 2013). More specifically, patients who experience lengthy ICU admissions are at risk for ICU-acquired weakness due to prolonged periods of immobility and impaired physical functioning (e.g., inability to perform activities of daily living [ADLs]) and cognitive impairments (e.g., deficits in executive function, memory, attention, and mental processing speed). Patients surviving critical illness who demonstrate these long-term impairments are given the diagnosis of post-intensive care syndrome (PICS; Needham et al., 2012; Parker et al., 2013; Robinson, 2013).

Individuals with PICS can experience a variety of limitations and impairments that are not always easily recognized. Limitations can be apparent, such as neuromuscular dysfunction, or less evident, such as mild cognitive impairments (Robinson, 2013). Patients who present with these new or worsening impairments often see them persist beyond their acute care hospitalization, and they can last for several months or years after hospital discharge (Parker et al., 2013). In a cohort of survivors of acute respiratory distress syndrome, only 34% returned to the workforce 2 years following their ICU admission. This group of survivors demonstrated physical deficits such as fatigue and impaired endurance, and well as cognitive deficits in memory, executive function, and attention that limited their ability to return to work (Hopkins & Jackson, 2006).

As early mobility and rehabilitation in the ICU setting become more commonplace, the potential role of occupational therapy in the ICU is also emerging. Evidence supporting the benefits of early occupational therapy and physical therapy in the ICU has evolved, demonstrating that early rehabilitation in the ICU is both safe and beneficial (Needham et al., 2010; Schweickert et al., 2009). However, providing early intervention by engaging in activities geared toward the patient’s current physical and cognitive condition may be a difficult task in the ICU, as patients may require life support, including mechanical ventilation and/or dialysis, and have a multitude of lines, tubes, and drains. Occupational therapy practitioners are turning to advanced technology and alternate devices such as the iPad to assist with successfully completing therapeutic activities in the ICU setting (Needham, Truong, & Fan, 2009). The iPad is already being used for therapeutic purposes in school systems and outpatient rehabilitation facilities as a tool to address social participation, communication, motor planning, fine motor coordination, and sensory perception (Hoesterey & Chappelle, 2012; Waite, 2012).

The use of the iPad and various software applications, or apps to assist patients during physical and cognitive rehabilitation has become more common over the past few years (Waite, 2012). The iPad is a handheld tablet device that is roughly the size of a sheet of paper, weighs approximately 1.5 pounds, and has a touch screen display. The iPad was originally designed for consumers who wanted a mobile device that was bigger than a smartphone but smaller than a laptop, and it has evolved into a tool that can be very useful for communicating, engaging, and interacting with patients in a variety of practice settings. The iPad provides a more high-tech option for communication than commonly used paper-and-pen communication boards, or dry-erase boards. Over the last several years, iPad apps have been developed and used by therapists (e.g., Dexteria, Aphasia, MyMedList) to target specific rehabilitation therapy goals in both inpatient and outpatient clinic settings. There is therapeutic value for patients who use iPad devices during their occupational therapy sessions, which is evident across populations and settings, because the device allows the user to interact with the environment in a versatile, unique way (Hoesterey & Chappelle, 2012). There are apps that support patients with varying diagnoses to participate in tasks requiring fine motor skills, figure-ground perception, spatial memory and planning, and communication.

Incorporating iPads Into Occupational Therapy Sessions in the ICU

The use of the iPad in the ICU setting has been under researched, although it has potential to significantly benefit patients in this practice area. The ICU can be a stressful environment for patients with critical illness, which is exacerbated by a patient’s inability to communicate or engage in routine self-care activities. The imbalance of stimulation that is typical in this environment often results in either overstimulation or understimulation. Introducing a piece of assistive technology such as the iPad can improve communication, provide access to the environment, and increase a sense of control, decreasing the stress and frustration often experienced by patients in this setting.

Oncology Forum on OT Connections

Please go to the Oncology Forum in OT Connections to network with other practitioners who are working with clients with cancer, post questions, and share cancer rehabilitation resources. You will need to log in to see the members-only forums. The Oncology Forum is supported by the PDSSIS and located at http://otconnections.aota.org/more_groups/practice_areas/oncology/if/4068.aspx
In a cohort of patients with acute respiratory distress syndrome who were receiving occupational therapy services in the ICU, the most common interventions by occupational therapists included upper-extremity exercise, range of motion, ADL training, and functional mobility (Dinglas et al., 2013). These standard methods of practice adequately address a patient’s basic occupational needs in the ICU. However, by incorporating iPad-based activities into therapy sessions, patients are given the opportunity to challenge their cognitive abilities as well as their physical function, and to interact with technology in a physically limiting environment. The iPad has the potential to facilitate cause and effect skills, upper-extremity coordination, fine motor skills, communication, visual-perceptual skills, and sequencing in a manner that is unique to each patient and provides the just-right challenge.

Patients can be assessed for their appropriateness and ability to use the iPad device during their initial occupational therapy evaluation. Considerations include their current method of communication, ability to perform fine motor coordination tasks, and cognitive status (ability to comprehend and follow simple/complex directions). When screening patients for appropriateness with using the iPad, patients should demonstrate some active range of motion in their fingers or wrists of at least one upper extremity in order to activate the controls and iPad screen, and demonstrate the ability to touch the iPad screen when prompted at a basic level. The motivating aspect of the iPad, paired with the versatility of the device (which is portable and can be kept at the patient’s bedside), enables patients to continue to use it for further therapeutic value after the therapist has provided a daily therapy session and left the room. Patients can be provided with specific apps to use after their occupational therapy treatment session is completed in order to continue to work toward therapy goals. Examples of these apps include Matrix Game 2 for visual perception, Little Finder for figure-ground perception, and Dexteria for fine motor coordination.

iPads in the Medical Intensive Care Unit (MICU)
The 24-bed medical intensive care unit (MICU) at Johns Hopkins Hospital in Baltimore uses four iPad devices in conjunction with occupational therapy treatment sessions for patients who are critically ill. The patients admitted to the MICU have a variety of medical diagnoses, including acute respiratory failure and sepsis. These patients are often receiving mechanical ventilation, but are frequently awake and alert. Muscle weakness and fatigue often make using a pen and paper to communicate difficult; the same is true for completing basic self-care tasks. Many of these patients develop delirium as a result of their diagnosis, their need for mechanical ventilation, and organ failure. Delirium is characterized by impairment with attention, orientation, and memory.

Upon the patient’s initial occupational therapy evaluation in the MICU, the patient is screened for use of the iPad. Patients who would be considered for iPad-based therapy include those who are alert, are able to follow simple step commands, and have the use of their hand(s) to make contact with the iPad screen. When the iPad is introduced to patients in the MICU, they are oriented to how the device is controlled through a series of finger-activated selections made on the iPad screen. Apps, such as Little Finder and Letter Quiz, are then trialed based on patients’ physical capabilities, ability to comprehend the information being presented, and occupational therapy goals. Apps are also available to assist with patient and family education on various medical topics, including the ICU. Examples of patient-caregiver education apps include Patient Communicator and iOrtho+, which are designed to assist both patients and family members in understanding their medical stay, as well as help them to express concerns or issues related to their pain, their level of comfort, and overall hospital stay. Features of these two apps include translations into a variety of languages, diagrams, and definitions of commonly used phrases. Family members are also provided with guidance on how to assist the patient with using apps that are introduced by the occupational therapist.

In addition to the iPad being a therapeutic tool, it also has many supplementary functions including visual or audio recording, word processing, and even augmentative communication. Settings can be adjusted to accommodate each patient’s specific needs. Adjustable settings include a voiceover function for patients with impaired vision, automatic dictation of voice to text formation (speak-to-text function), size of text, high contrast backgrounds, volume controls, and accessibility options such as custom gestures or finger movements to control the screen and apps (Hoesterey & Chappelle, 2012).

The iPad can also be used as an augmentative communication device for patients who are orally intubated or otherwise unable to communicate, allowing patient participation in more meaningful activities, such as communicating with others through written conversation, and expressing feelings or emotions through words or pictures.

The majority of patients in the MICU who are using the iPad are supine with the head of the bed elevated to at least 30°. Adaptations may be necessary to promote optimal use of the iPad, including positioning it close to the patient’s arms and hands and providing physical assistance. A foam wedge, available for patient positioning, can be used to mimic a desk on a patient’s lap and is available on the unit for all staff members to provide to patients who are using an iPad. The iPad is placed on this wedge so the patient can see it better. Standard pillows are often used underneath the patient’s elbows for proximal support when attempting to reach or make contact with the device. The occupational therapist can then grade the amount of physical assistance that is needed for the patient to perform various tasks on the iPad. The occupational therapist’s role continues to include adjusting the position of the patient and/or the device for optimum use, adapting the type and difficulty of tasks within the apps to progress the patient toward individualized therapeutic goals, and educating staff and family members on how to facilitate increased use of the iPad throughout the day. Nursing and other staff members who assist with the daily care of the patient are educated on the adaptations provided by the occupational therapist, and how to maintain these adaptations to increase the patient’s participation with the iPad to achieve goals.

Case Example
Laura is a patient who initially presented to the Neurosciences Critical Care Unit at Johns Hopkins Hospital for seizure activity. However, she was subsequently transferred to the MICU due to severe...
acutely intubated, she was orally intubated upon transition to the MICU and mechanically ventilated.

Laura was evaluated by an occupational therapist on her second day in the MICU, while she was still receiving mechanical ventilation. She presented with substantial global weakness that prevented functional use of her arms and legs in daily activities. Her occupational therapy sessions were geared toward improving physical strength in both gross and fine motor functions, engaging in ADL tasks, and increasing functional mobility while mechanically ventilated. Assisting Laura to engage in functional activity and mobility early on, even while receiving mechanical ventilation, was crucial for improvements in her physical function upon hospital discharge (Schweickert et al., 2009).

Laura and her family expressed that she enjoyed technology and would be eager to utilize the iPad during her occupational therapy sessions. Laura was still unable to communicate with staff members using pen and paper, unable to activate or control her nursing call-bell, and unable to assist with basic ADLs due to ICU-acquired weakness and an overall deconditioned state. The iPad was used during occupational therapy sessions to improve finger strength to perform fine motor coordination tasks, to increase finger isolation movements to activate her call-bell, and to increase functional communication with staff members.

The most frequently used communication app during Laura’s therapy sessions were Talk Tablet US and Speak Aid HD. The Speak Aid HD app allowed Laura to select thoughts, feelings, or basic expressions on picture boards. She simply had to make contact with a picture corresponding to her thoughts or feelings, and the iPad would state her selection aloud. Once Laura was able to form isolated finger movements and had the upper extremity strength to move her hand across the screen, she began using the Talk Tablet US app. This app had pre-made picture boards for communication, but also allowed her to use her finger as a stylus to manually write out what she wanted to say on the screen.

The apps used to assist Laura with fine motor coordination included Bubble Snap, Letter Quiz, and Little Finder. She initially participated in gravity-eliminated upper extremity exercises using the Bubble Snap App, which required her to make contact with all of the targets on the screen with her fingers. This app can be graded in difficulty by changing the size of the targets. As Laura gained strength in her fingers and hands, the occupational therapist introduced letter formation apps, such as Letter Quiz. Laura was required to use proper finger positioning to trace letters on the screen. The Little Finder App was also used for Laura to increase her upper extremity endurance while isolating finger movements to locate objects on the screen. Laura would locate this object on the screen and use her finger to select it without making contact with other objects located on the same board.

The apps used during Laura’s occupational therapy sessions were graded daily in order to adapt to her improvements in anti-gravity movements, finger strength, and overall endurance. Laura initially required significant hand-over-hand assist for correct hand and finger positions during activities, adaptations to the position of the iPad to better see it during use, and increased rest breaks to accommodate her fatigue. Laura continued to make progress during each session with the iPad and was able to write basic comments and feelings using the apps that were previously described. Laura and her family were provided with a list of apps used in her occupational therapy sessions during her ICU stay and they were encouraged to continue to use the iPad as a therapeutic tool in the inpatient rehabilitation setting and at home when discharged.

Conclusion

The use of the iPad during occupational therapy interventions is increasing in a variety of practice settings. The iPad has therapeutic value in the hands of a skilled occupational therapist when equipped with a diverse selection of applications geared to address a multitude of impairments and injuries. The iPad plays a particularly important role when working with patients who are receiving mechanical ventilation and present with communication, cognitive, or physical deficits in the ICU. Occupational therapists working in this unique practice setting can utilize the iPad to improve communication between the patient and staff or family members, while simultaneously improving a patient’s cognition, physical abilities, and quality of life by increasing the patient’s successful interaction with the environment.

Resources

Dexterity—www.dexterity.net

Matrix Game 2—www.myfirstapp.com

Patient Communicator—www.sccm.org

Bubble Snap—www.shinyfoil.com

Letter Quiz—www.tantrumapps.com

Little Finder—www.alligatorapps.com

Talk Tablet US—www.talktablet.com

Speak Aid HD—www.dementidapps.blogspot.com

iOrtho—www.therapeauticarticulations.com

References


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Research Opportunities

Interested in interventions to address pain experienced by clients with work-related upper-limb injuries? This Critically Appraised Paper (CAP) featured at http://goo.gl/qgvqNe provides an at-a-glance summary of how self-administered exercise programs in combination with ergonomic workplace improvements can be used to reduce pain and increase productivity with work-related tasks.

Visit the Evidence Exchange page at http://www.aota.org/Practice/Researchers/Evidence-Exchange.aspx for information on other CAPs and opportunities to be a CAP Submitter and CAP Reviewer.