**Use of the Nintendo Wii Gaming System in Physical Therapy**

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**Abstract:**

This paper discusses the increasing use of the Nintendo Wii gaming system in physical therapy settings. The paper describes the gaming system and refrences a specific case study involving the use of the Wii in rehabilitation, cleverly referred to as “wiihabilitation”. It provides information of “wiihab’s” benefits to the patients and the physical therapists. Finally, this paper describes some negative aspects to the gaming system’s use and how this form of technology is being used to educate patients on how to properly rehabilitate themselves.

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**Introduction:**

As many undergraduate students know, practice makes perfect. Therefore, as an aspiring physical therapist, I spend a large amount of time in physical therapy clinics observing and doing what I can to help out the therapist while experiencing the environment that I hope to work in some day. Through my observations, past experiences as a physical therapy patient, and some current online research, I have come to recognize that although I love the idea of physical therapy, many people (especially patients) do not. In fact, many patients joke that the abbreviation PT does not stand for “physical therapy” but instead stands for “pain and torture” (Tanner, 2008). I can sympathize with these patients, because physical therapy can at times be “painful and tedious”, often including “hours of stretching and lifting exercises” in order to “recover from injury, illness, or even surgery” (Parker, 2008). There are however, new forms of technology that therapists have adopted to eliminate these monotonous routines and keep patients more interested and engaged in their rehabilitation. “Wiihabilitation” is a new wave of therapy that utilizes the technology of Nintendo’s Wii gaming system along with the guidance of therapists and physicians to form a more exciting form of treatment for physical therapy patients. Patients of all ailments and ages can benefit mentally and physically from the Wii’s incorporation into the physical therapy world.

**Description of Nintendo Wii:**

Virtual reality, defined as “an immersive, interactive, 3-dimensional computer experience occurring in real time” was first utilized as a form of physical therapy several years ago. These systems allow therapists to control exercise duration, intensity and environments in order to simulate a real world experience without putting patients in danger’s way. Unfortunately these systems are very uncommon in physical therapy clinics because most of the systems are not commercially available and are very expensive (Deutsch, Borbely, Filler, Huhn & Guarrera-Bowlby, 2008). For these reasons, more low-cost commercially available technologies, such as Nintendo’s Wii gaming system, are being subject to testing for use in rehabilitation clinics. Outside of this clinical use, Wii gaming systems are found in many homes and used by healthy individuals as a fun, interactive video game that “use a remote, hand-held motion-sensing wireless controller” that is hooked up to a television. The retail cost of the components is around $500, much cheaper than any clinical virtual reality systems. This system uses “Wii Sports software, a collection of 5 sport-simulations” (Clark & Kraemer, 2009) including “golf, baseball, bowling, boxing, and tennis games” (Mickey, 2012) all which are found to aid in a variety of ailments among different physical therapy patients. Some researchers go above and beyond the use of the Wii Sport software and even introduce the Wii Fit program. The Wii Fit includes accessories such as a Balance Board which “incorporates even more body movement and conditioning principles than Wii games alone, … acts as a scale [that] can chart a [patient’s] body mass index, help set fitness goals, calculate a player’s fitness level and provide tips for improving balance” (Parker, 2008) all of which aid the physical therapist in providing more accurate care for their patients. Overall, Wii games “require body movements similar to traditional therapy exercises”, but are more fun for patients because the patients “become so engrossed mentally [that they are] almost oblivious to the rigor” of the exercises that they are completing (Tanner, 2008).

**Case Study involving “Wiihabilitation”:**

Although therapists use the Wii for many different ailments of patients, ranging from athletes to the elderly, in each situation the therapist first needs to evaluate the patient’s individual needs before deciding which Wii game the patient should play, for how long, at what intensity, and several other factors to prevent further injury or overuse of the body. In a 2009 case study evaluating the clinical use of the Nintendo Wii bowling game’s effect on reducing the fall risk of an elderly patient, the patient’s physical therapist used the gaming system to create a program “designed to reduce falls in the elderly typically [due to] three major components: strength, balance, and endurance”. This physical therapist’s initially diagnosed the patient with a balance disorder indicating that in order to progress the patient needs an “exercise program such as progressive muscle strengthening, balance training, and an ambulation plan”. The Wii gaming system is chosen for this patient because it is an “activity that involves many of the key biological systems (e.g., visual, somatosensory, vestibular) involved in maintaining balance”. After the use of the Wii bowling simulation for 6 one-hour treatment sessions, the case report of the elderly woman favors the possibility that intervention with the Wii “can produce improvement in balance dysfunction and reduction in fall risk for other similar patients” (Clark & Kraemer, 2009). Similarly, in a study conducted regarding the Wii for rehabilitation of an adolescent male with cerebral palsy, the different sports among the Wii Sport games were each found to have “different motor control and visual-spatial demands”, clinically affecting different parts of the body. The study found that “trunk control was promoted by all games”, whereas “the games played in a standing position [as opposed to the sitting position] emphasize balance with weight transfer between the lower extremities” (Deutsch, Borbely, Filler, Huhn & Guarrera-Bowlby, 2008). Uniformly, a 2008 article quotes Dr. Anne Pinto of Pinto Chiropractic and Rehabilitation in Williamsburg describing how “on-target” the Wii interactive games are with original therapy programs. Dr. Pinto describes how the game “incorporates core stabilization and movement, and posture- all things [she] does with [her] patients in other ways” (Parker, 2008). The obvious benefit to using this gaming system is that the patient gets to believe he or she is playing a fun game, when in reality the patient is rehabilitating.

**Patient’s Benefits of “Wiihabilitation”:**

A physical therapist’s job not only consists of getting a patient back to functioning, but is also to make sure the patient has an enjoyable experience in therapy. For most patients, physical therapy is not a one-time thing, it is something that needs to be done over and over again ranging anywhere from a few weeks, to years, to a lifetime for some chronic disorders. The use of the Wii gaming system in physical therapy allows patients to relax and have fun with their rehabilitation so that the thought of returning to rehab is not a negative one. The most ideal candidates for Wii use are therapy patients who love to watch or play sports. This love for competition and games makes the “treatment more meaningful”. Similarly, there are games on the Wii that “simulate daily activities beyond sports”. Interactive games involving “cooking, outdoor activities, and even music” are enticing to non-sport-loving patients. Regardless of the Wii simulation that the patient is using, “patients have fun without realizing that they’re also improving and enhancing functions in areas of the body” that need to be rehabilitated. In fact, these Wii sports games involve stimulation of “the brain to change and relearn movements because of the high number of repetitions that individuals are motivated to perform” (McCarthy & Flynn). Since the Wii is a form of virtual reality, the gaming system also gives patients the added benefit of realizing that although they are injured, there is still a possibility of returning to their favorite sports and activities, ultimately leading to more motivation to get better and therefore a quicker and more efficient rehabilitation. A specific study conducted evaluating the use of Wii golf in physical therapy clinics states that the among the added physical benefits of the game, the reality of the simulation comforted the patients, helping them to know that they can still get out there and play golf. This idea of comfort also leads to the motivational benefits of the Wii. Since games are played, regardless of whom the patients are competing against, they are in fact competing. This innate competition, whether it is against oneself, or another, leads to motivation and the drive to continue playing, and therefore continue building strength and rehabilitating (Mickey, 2012). Sometimes, physical therapy patients are allowed to compete against friends, family, or even other patients, using the multi-player function of the game. This game function, especially in the case of the adolescent male with cerebral palsy, tends to “facilitate social interaction” adding an “unexpected therapeutic benefit” (Deutsch, Borbely, Filler, Huhn & Guarrera-Bowlby, 2008). Similarly, when the multiplayer function is shared among people of separate generations, the game can bridge the gap between the generations, as seen in several studies where elderly patients took the gaming console home and played with their children, or even grandchildren (McCarthy & Flynn). Overall the Wii helps physical therapy patient’s put their “mind over matter”. As stated by James Osborn, a supervisor of rehabilitation services at an Illinois hospital, “When people can refocus their attention from the tediousness of the physical task, oftentimes they do much better” (Tanner, 2008). The distraction and entertainment of the game helps patients to forget about any ailments and just have fun while rehabilitating.

**Physical Therapist’s Benefits of “Wiihabilitation”:**

Although the Wii gaming system has many benefits for patients, there are a multitude of medical advantages of the game, as well. One obvious advantage to the physical therapist is that “patients are more willing to do the practice and repetition [that the therapist is] asking them to do in therapy if they’re having fun” (Mickey, 2012). Therefore, since the patient is having fun, it is actually less work for the therapist. Some patients can be unhappy during therapy sessions because of the preconceived association with “pain and torture” and when patients are unhappy they are a lot less willing to do exercises correctly, or at all. Medically, the game increases a patient’s “hand-eye coordination, balance and control, strength and stability and fine- and gross-motor skills” (McCarthy & Flynn), all functions of the body that most patients go to physical therapy to improve. Another benefit for therapists, as well as patients, is that the Wii gaming system actually speeds up recovery time, and can be used at home (after instructed by a therapist that it is safe to do so). This is a benefit for patients because they do not have to pay for as much treatment and do not have to leave their own home as often for treatment. Physical therapists benefit from a shortened treatment period because they can see and treat more patients in a shorter time frame. Therapists of patients with neurological disorders also clinically benefit from the use of the Wii. As seen in the study of the adolescent with cerebral palsy, the “training [is] task driven and requires problem solving”, both of which “have been shown to promote behavioral changes as well as neural plasticity in children with cerebral palsy” (Deutsch, Borbely, Filler, Huhn & Guarrera-Bowlby, 2008). The constant repetition that the game requires helps to change neurons and enhance motor learning (McCarthy & Flynn), just another added benefit for therapists of patients with neurological disorders. However, the most significant benefit to patients and therapists, when using the Wii gaming system is the feedback that the game provides. The Wii game actually provides users with “haptic feedback” which is the “physical sensation connected with the interaction with objects in the virtual environment” (Deutsch, Borbely, Filler, Huhn & Guarrera-Bowlby, 2008). For example, when playing Wii tennis, the user feels the ball make contact with the racket via the handheld remote, while virtually making contact with the ball in order to hit the ball over the net. This sensory feedback allows the patient to feel more engrossed in the game and helps keep their mind off of the fact that they are actually rehabilitating. Not only do patients receive haptic feedback, but patients as well as therapists receive “scoring [that] provides feedback as [a patient’s] motor skills, range of motion, balance and coordination improve with activity” (Mickey, 2012). This scoring feedback allows patients to see how they are doing, and feeds their competitiveness, while also providing therapists with crucial information needed to adjust the patient’s exercise regiment.

**Conclusion:**

Although Nintendo’s Wii gaming system may seem perfect for physical therapy patients, the technology has still not been approved for formal use in a clinical setting, as the sole form of rehabilitation for patients. There are some disadvantages to “Wiihabilitation” such as the prospect of injury if the games are not played properly (McCarthy & Flynn), or the threat of overuse which one patient called “Wiiitis”, found to in fact be acute tendonitis, a common ailment among real-life tennis players (Tanner, 2008). Personally, as a future physical therapist, I would love to see Nintendo’s Wii incorporated into more physical therapy clinics. I think that technological advances, such as the Wii, are the way of the future and that we should take advantage of the fun and interactive ways to get patients better, such as the Wii in physical therapy clinics. In my opinion, there is no better way to educate patients on different forms of exercises in rehabilitation then to show them how to properly play a different games on the Wii gaming console with one another while, all the while encouraging them to remember that in order to get better you need to practice because “practice makes perfect”.

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