Wii For Me

Applications for the use of Wii

Nintendo Wii™ Gaming System

- Wii Sports Starter package
- Accessories
  - Games
  - Memory card(s)
  - Wii remote
  - Wii Fit

Precautions/Safety Concerns

- Fall prevention
- Use of wrist strap
- Monitoring vital signs
- Physician clearance
- Pacemakers
- Seizure disorders
- Wii Fit weight limitations

Benefits of Wii Gaming

- Wii game participation improve
  - Balance & posture
  - Strength, range of motion (ROM), & coordination
  - Problem solving & decision making
  - Cognition & attention span

Balance & Posture

- Wii Sports
- Wii Fit
  - Balance tests
  - Weight shifting activities
    - Table tilt
    - Bubble course
    - Soccer ball heading
    - Penguin slide
    - Snowboarding/skiing
    - Yoga
Strength, ROM, & Coordination

- Wii Fit
  - Strength training
  - Yoga
  - Hula hoop
  - Tightrope
  - Step aerobics
  - Rhythm boxing

Problem Solving & Decision Making

- Wii Fit
- Wii Sports
- Wii Resort
- Photo Channel
  - Puzzles
  - Drawing

Cognition and Attention span

- Mii Development
- Wii Fit
- Wii Sports
- Wii Resort
- Photo Channel
  - Puzzles
  - Drawing

Modifications

- Activity planning
  - Intensity
  - Upper extremity activities, lower extremity activities, upper & lower extremity activities
  - Number of players
  - Wii remote accessories
- Use of assistive devices
- Modifications of floor surface
- Sitting vs standing

Allen Cognitive Disability Model

Regardless of the activity in question, we want to provide residents with successful experiences.
We need a model and tools which help determine not what a resident can’t do, but what they can do.

Allen Cognitive Disability Model

- The Allen Cognitive Disability Model helps identify the severity of the cognitive deficit of a person.
- It measures cognitive ability and then classifies it into 6 different levels.
- The cognitive level is a measure of what the person can do.
- Knowing the cognitive level of function, helps us with realistic goal setting for our residents.
Allen Model cont.
- A hierarchical scale of 0 to 6 where level 0 indicates profound cognitive deficit and 6 indicates normal cognitive functioning.
- Allen levels 4,3 and 2 map to the early, middle and late stages of dementia, respectively.
- The 6 levels are further classified in to 26 performance modes.

Early, Middle and Late
- It’s helpful to start with the classifications of early, middle and late stages of Dementia.
- Once determined, this will help caregivers to establish programs based upon the resident’s abilities.

Early Stage Dementia
- Relies on procedural memory to make associations for new learning.
- Capable of new learning related to things that are important to them.
- Responds well to structure and routine.
- Understands left/right and back/front.
- Often very social.
- Needs cues for thoroughness.
- Activity is goal directed.

Middle Stage Dementia
- At the stage repetitive actions and the handling of objects are seen.
- Manual actions are prevalent but often random.
- Visual field of 12-14 inches.
- Follows one step directions.
- Frequent or constant cues are needed.

Early Stage Dementia
- In this stage of dementia, electronic gaming could be a viable activity.
- The repetitive nature of the movements and the familiarity of some of the activities would ensure success for many.
- The movements of many of the games could also assist with balance issues and falls prevention.

Middle Stage Dementia
- The desire to hold and manipulate objects could make some aspects of electronic gaming successful.
- The limited visual field and limited attention span would require adaptations to most gaming programs.
Late Stage Dementia

- Postural insecurity with a fear of falling.
- Cognitive processing is 2-3 times slower.
- Generally enjoys reciprocal movement.
- Responds better to visual cues
- Becomes agitated if hurried.

Late Stage Dementia

- The intense visual cues of some electronic games may appeal to this resident.
- Postural concerns and severely limited attention span may interfere with this being a successful endeavor. However, observing the game may be enjoyable.

References For Allen Tools


Clinical Benefits of Wii

- Increased motivation
- Promotes healthy competition and camaraderie
- Increased confidence/sense of accomplishment
- Family involvement
- Improved strength, endurance, function, motor planning, cognition, hand-eye coordination, balance, reaction time

Early Stage Dementia & Wii Use

- Develop Mii
- Single or multiple players
- New or familiar activities
- Improved ability for button and arm movement coordination

Middle Stage Dementia & Wii Use

- May need assistance to develop Mii
- Multiple player activities may be more difficult
- New activities may be more difficult
- Decreased ability for button and arm movement coordination
### Late Stage Dementia & Wii Use
- Increased difficulty with timed/scored activities
- Single player activity
- Rely on familiarity of task or image
- Limited ability for button and arm movement coordination

### Bowling examples for early, middle, and late stage dementia
- **Early**
  - Manual Mode
  - Optional features (100 pin, barriers in path, etc)
- **Middle**
  - Automatic mode
  - Traditional 10 pin
- **Late**
  - Photo channel bowling options

### Documentation in the clinical setting
- **Recommended documentation components**
  - Activity performed
  - Assistance level (physical assistance and cueing)
  - Score achieved or duration tolerated
  - Vital signs (if applicable)
  - Frequency of use
  - Individual’s response to treatment
  - Clinical rationale for activity/treatment
- **Goals**
  - Combine desired Wii performance with anticipated functional outcome

### Case Studies
- Gladys
- Jim
- Ruth

### Research Review
The “proof” is in the evidence…

“**You’re Never too old for a Wii**”

### Evidence
- **Epidemiology/Impact**
  - 68% of American households have gaming consoles in their home¹
  - More than 25% of gamers are age 50 and over¹
  - Nursing home chains and senior centers now offer health gaming as part of their programming²
  - Over 85% of games on market are labeled “E” = Everyone³
- **Gaming industry has evolved to include a new area of research called “Health Games”⁴**
Evidence

Epidemiology/Impact

- Cognitive rehabilitation improves functional performance\(^5\)
  - "Adding a treatment regimen that stimulates cognitive function might further enhance functional level or prevent decline of functional status compared with an exercise intervention alone\(^5\)
- Commercially available health games can provide cognitive stimulation and potentially increase an older adults physical activity levels\(^5\)

Evidence

Current and Future Research

- Most published studies are in pediatric or adolescent care\(^6,9\)
  - Funding for gaming projects in senior care\(^10\)
  - Interactive Games for Individuals with Chronic Mobility and Balance Deficits Post-Stroke \(^12\)
  - Seniors Cyber-Cycling with a Virtual Team: Effects on Exercise Behavior, Neuropsychological Function, and Physiological Outcomes at Union College
  - Game to Enhance Cognitive Health in Older Adults at University of California, San Francisco

Evidence

Current and Future Research

- Brains of Expert Video Gamers
  - Improve hand-eye coordination\(^24\)
  - Increased processing in the periphery\(^26\)
- Greater divided attention abilities
- Faster reaction times\(^26\)
- Enhanced contrast sensitivity\(^27\)
- Improved visual processing (attentional blink) (multiple object tracking Paradigm)\(^28\)

Evidence

Current and Future Research

- Training with Action Video Games can enhance
  - Visuo-spatial attention\(^25\)
  - Dynamics of visual attention\(^25\)
- Number of objects of attention\(^29\)
  - Video game players have faster reaction time\(^26\)
- Integrate sensory information more efficiently

Evidence

Current and Future Research

- Wii
  - Individuals in their 90s and 100s are using the system\(^11\)
  - The most popular senior game is bowling\(^8\)
- Early publications focused on overuse injuries in youths\(^12,15\)
  - Three recent publications (2 case reports and pilot study) demonstrated improvements with strength, balance, and fall risk in older adults\(^16,18\)
  - Erickson Living/Nintendo “Bowling Championships”

Evidence

Current and Future Research

- Wii
  - Funded studies (NIH and Medical College of Georgia)
  - Wii Mote reliability and validity\(^19\)
  - Wii gaming vs recreational activity stroke rehab\(^20\)
  - Effect of Wii on movement and depression in Parkinson’s\(^21\)
Efficacy

Ten (10) women ages 30-58 with balance and QOL limitations received pre-programmed Wii Fit regimes determined for age and physical ability or a sham treatment for 30 minutes, 2 times weekly, for 10 weeks. Balance and lower limb muscle strength showed significant improvement. CV endurance, mobility, weight change, activity level and well-being were not clinically, but not statistically significant. Authors report the need to confirm findings through statistically powered studies.  

98 year old female with unspecified balance disorder resulting in multiple falls. Hx included controlled bipolar disease and schizophrenia. Intervention consisted of 6 one hour Wii bowling simulation sessions over a 2 weeks. Game aligned meaningful recreation with rehab of impaired physiological systems (visual, somatosensory, vestibular). Subject played 2 games per session competing against the investigator. Berg Balance Scale improved from 48 to 53, Dynamic Gait Index improved from 14.9 to 10.5 seconds, and Activities-specific Balance Confidence score improve from 88 to 90%. Subjects overall fall risk was reduced by 30-40% and likelihood of falling decreased by 12-16%.

Other Systems for Older Adults

DanceTown

- Slower dance steps and grab bars
- Incorporates valid, senior-specific assessments
  - Senior Fitness Test
  - Timed Up and Go
  - Tinetti
  - Six Minute Walk Test
- Generates performance reports
- Its precursor, Dance, Dance, Revolution, is equivalent to moderate intensity walking in children 5-9.

References

References


References

20. Wiimote game controller as a device to study movement disorders. 2009

References


References