

## **VIDEO GAME TRAINING – UPPER EXTREMITY**

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### **What is video game training?**

Video game training refers to the use of commercially available video game consoles (e.g. Nintendo Wii™, Sony PlayStation EyeToy, Microsoft Xbox Kinect) for post-stroke rehabilitation. After a stroke, the patient can use the gaming system in different ways during rehabilitation, to help improve motor function and motor recovery. The video game systems include hand-held devices and/or pressure sensitive footpads that respond to the patients motion in real-time. Games are typically based around sports and exercise (e.g. tennis, golf, bowling, yoga, dancing etc.), although some games involve daily activities such as cooking.



**Nintendo Wii.** Photo courtesy of the Wikimedia Commons, a freely licensed media file repository.



**Sony Playstation EyeToy.** Photo courtesy of the Wikimedia Commons, a freely licensed media file repository.

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**Example of a hand held controller.** Photo courtesy of Wii-based Movement Therapy from the McNulty group at NeuRA, Australia.



**Example of a pressure sensitive foot-pad.** Photo courtesy of the Wikimedia Commons, a freely licensed media file repository.

### Why use video game training after a stroke?

It is common for individuals to experience loss of movement and strength after a stroke. Difficulties with movement and muscle weakness can impact on the patient's ability to use his/her arm and hand. Video game training can be a fun and motivating way to improve arm and hand strength and motor function. The video games use visual images that respond to movement made by the patient while he/she is playing the game. These visual images provide the patient with immediate feedback about his/her body movements. The patient can then adjust or adapt his/her movements in response to this visual feedback. This visual feedback has been shown to help with motor learning and motor recovery following stroke.

The patient's rehabilitation team will identify some video game exercises that will help him/her with the difficulties caused by the stroke. The patient can practice

## **VIDEO GAME TRAINING – UPPER EXTREMITY**

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these video game exercises in hospital, and can continue to practice at home after he/she has been discharged from hospital.

### **Does it work for stroke?**

Researchers have studied how video game training can help stroke patients:

**In individuals with ACUTE stroke (up to 1 month after stroke), 1 fair quality study found that video game training:**

- Was as helpful as another treatment for improving self-care skills (e.g. dressing and bathing), pain, and physical skills of the arms.

**In individuals with SUBACUTE stroke (1 month to 6 months after stroke), no studies up to date have investigated the effects of video game training.**

**In individuals with CHRONIC stroke (more than 6 months after stroke), 3 high quality studies, 1 fair quality study and 1 non-randomized study found that video game training:**

- Was more helpful than the usual treatment alone for improving dexterity, motivation, arms range of motion, arms activity,
- Was as helpful as other treatments for improving self-care skills (e.g. dressing and bathing), grip strength, quality of life, physical skills of arms and legs, walking activity level and walking speed.

**In individuals with stroke (acute, subacute and/or chronic), 5 high quality studies and 1 fair quality study found that video game training:**

- Was more helpful than the usual treatment alone for improving dexterity, motivation, arms range of motion and arms activity.
- Was as helpful as other treatments for improving self-care skills (e.g. dressing and bathing), dexterity, cognitive function (e.g. memory), grip strength, quality of life, range of motion, spasticity, physical skills and activity of the arms.

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### **Side effects/risks?**

No real risks have been reported as long as you remember to pace your activity level. It is important to try each activity for a short time the first time and see how your muscles feel the next day. Pacing yourself and building up your tolerance is important. So take your time, try out activities slowly and then add in new activities once you have an idea of which activities seem to be best for you.

### **Who provides the treatment?**

It is important to speak to an occupational therapist or physical therapist before beginning video game training after a stroke. He or she can help you to decide which video game exercises will be best suited to you, according to your rehabilitation goals and your level of ability. Different video game exercises will help with different rehabilitation goals such as improving coordination, strength, fine motor control, etc. Once you have a good idea which games best suit your needs you can then use the video game training system at home regularly as a form of therapy. Video game training is also a great activity to do with other family members such as your children and grandchildren.

### **How many treatments?**

Information on the amount and intensity of video game training needed is not yet available. High quality studies need to be conducted before advice can be given regarding specific programs and content of treatment sessions. Speak with your occupational therapist or physical therapist, and use your judgment by beginning slowly and building in new activities and longer periods of training over time.

### **How much does it cost?**

The cost of these various video games and the game console are relatively affordable. The average price in 2017 for commercially available gaming systems in Canada is approximately 300\$ – 400\$. You will also need to buy different programs, which your therapist can help you pick.

### **Is video game training for me?**

There is some evidence that video games training is more effective than regular therapy or no therapy for improving arm and hand function and functional

## **VIDEO GAME TRAINING – UPPER EXTREMITY**

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independence after stroke. However, studies have also shown that it is not more effective than other therapies for improving grip strength, quality of life, hand dexterity and motor recovery in some patients.

It is best to talk with your occupational therapist or physical therapist to decide whether video game therapy is suitable for you.

*Information on this web site is provided for informational purposes only and is not a substitute for professional medical advice. If you have or suspect you have a medical problem, promptly contact your professional healthcare provider.*