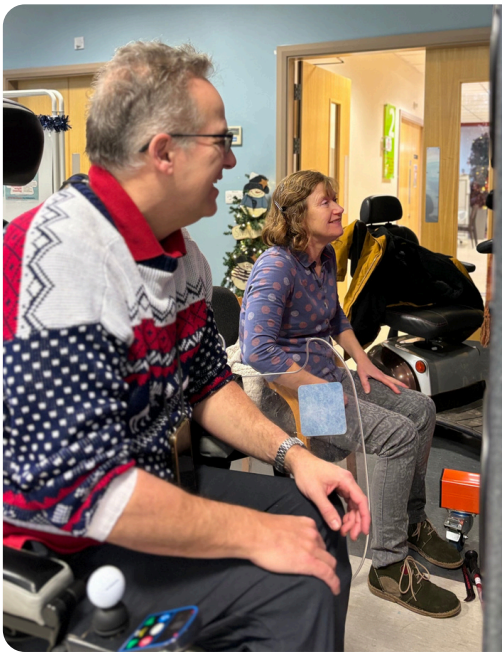
The Impact of CardioWall Exercise on Mood, Participation, and Balance in Individuals with Neurological Conditions

CardioWall® Impact Study: The Brightwell Centre for Neurological Wellness and Physical Recovery

Study Overview



Our 12-Week CardioWall Impact Study at The Brightwell has shown that regular participation in exercise classes that incorporate the CardioWall can have a range of **physical, cognitive, and social benefits** for people with MS and other neurological conditions.

Through two clinical outcome measures, a health and wellbeing survey, and a CardioWall questionnaire, we found found that regular use of the **CardioWall alongside a neurological wellness exercise program** can....

Reduce the impact of fatigue

Improve balance and general mobility

Lift mood and reduce stress

About The Brightwell

The Brightwell is a wellness centre based in Bristol, UK, that offers **rehabilitation, physiotherapy, exercise and wellbeing support** for people with **MS and other neurological conditions** in a **non-clinical environment.**

In 2023, we installed a **CardioWall Landscape** in The Brightwell gym to be **used in weekly exercise classes**. We have collaborated with the Physio Team on pilot study to understand **the impact of gamified exercise on people with chronic, neurological diseases**, such as MS, Parkinsons, ME, stroke, and brain injury.

The CardioWall

The CardioWall is a 9-lightpod **reaction wall** that challenges **reaction speed**, **mobility**, **spatial awareness** and **hand-eye coordination**, whilst improving **balance**, **flexibility**, and general **mobility** levels.

The four games, which involve hitting out specific lightpods, offer **fun**, **engaging** and **social exercise** that is inclusive to a range of physical and cognitive conditions. It is a **rehabilitation and wellness tool** that encourage physical activity and social interaction, with little to no supervision.

Study Methods & Objectives

The Study included **20 participants**, all who have one or more neurological conditions, who took part in a weekly exercise class at The Brightwell. The class circuit involved seated and standing exercises, a Terra-cycle, and **10-15 minutes CardioWall** use.

Our objectives were to:

- ✓ Measure the benefits of regular exercise on participants physical health and wellbeing
- ✓ Understand the perceived impact on participant mobility, mood, enjoyment
- ✓ Evaluate the feasibility of a more detailed research study

Study Outcome Measures

Modified Fatigue Impact Scale[1]
This assesses the effects of fatigue on physical, cognitive and psychosocial functioning. It contains 21 questions which participants answer on a scale of 0 (no problem) to 4 (extreme problem).

Berg Balance Scale/Function in Sitting Scale[2]
The Berg Balance Scale measures the ability to move through a set of 7 tasks that test balance and mobility (i.e standing with eyes closed, moving from standing to sitting). The Function in Sitting Scale was completed by 4 participants who were unable to stand for the Berg Balance.

Health and Wellbeing Scale
The Health and Wellbeing Scale covered 12 questions relating to physical, cognitive and social wellness, such as motivation to exercise and socialise, stress, mood and mental alertness.

What are Neurological Conditions?

Neurological conditions are a wide range of disorders that affect the **brain, spinal cord, nerves, and muscles**. They can be caused by a number of factors, including genetic disorders, brain injury, aging, and comorbidities.

Common conditions: Parkinson's, Multiple Sclerosis (MS), Alzheimer's, Acquired Brain Injury, Motor Neuron Disease, Cerebral Palsy, and Stroke.
Possible symptoms: Changes in sensations (numbness, tingling, or loss of feeling), changes in senses, muscle weakness or paralysis, poor coordination and balance, pain, tiredness, confusion.

Study Results: Physical Benefits

Modified Fatigue Impact Scale

47% **Improved on the Modified Fatigue Impact Scale**

With some great results on the following measures:

- **33%** less trouble maintaining physical effort for long periods
- **33%** felt their muscles were weak less often
- **33%** increased ability to maintain physical efforts for long periods
- **33%** improved muscle weakness

Berg Balance Scale (Non-Seated Participants)

31% **Improved on the Berg Balance Scale**

With a significant impact on the following measures:

- **46%** improved in standing unsupported with one foot in front of the other
- **33%** improved in the ability to place an alternative foot on a step or stall and standing

Physical Activity, Mobility, and Pain Impact

43% Increased ability to complete low-level and moderate exercises

43% Noticed a decrease in physical limitations for everyday activities

50% Experienced a decrease in pain levels

27% Achieved their physical health goals

*"The CardioWall is great, it **keeps us moving**, it **keeps us entertained**, and we have competitions with other members and try and beat their times. It's just **great for exercise**, I try to use it once a week when I can. It's all upper body for me but I can do it from my wheelchair. There's four games but generally I use ClearOut.*

Roger
Study Participant

Study Results: Cognitive and Social

General Mood, Wellbeing, and Social Impact

- **73%** Noticed a reduction of stress and anxiety
- **43%** Experienced an increase in happiness
- **39%** Saw an increase in general mood
- **53%** Achieved personal wellness goals
- **43%** Had an improvement in motivation to be productive
- **40%** Felt more comfortable participating in group activities

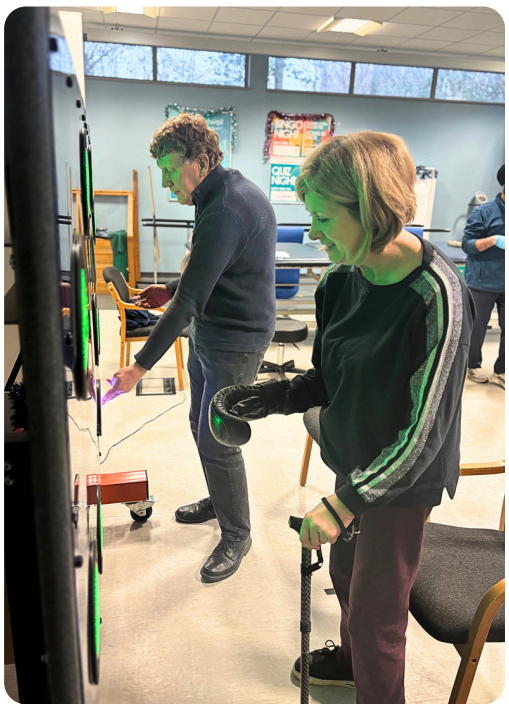
> *I find the CardioWall really good **cognitively and for my balance**, with standing - I don't actually realise I'm **standing for so long** which is good. I've seen **improvement in my cognition**, my **balance**, and definitely my **peripheral vision** with the Chaser game. I'm just really pleased we've got it here and we can use it.*

Sheila
Study Participant

CardioWall Survey

Our 10-question CardioWall survey showed that participants percieved the following benefits from the 12-week exercise program:

- **73%** Reaction speed
- **53%** Coordination, Flexibility
- **47%** Functional mobility, Motivation to exercise
- **33%** Balance, Personal wellbeing, Social integration
- **27%** Strength
- **20%** Independence



Study Results: Cognitive and Social

Impact on Participation at The Brightwell

Not only have participants in the Exercise Program benefitted from regular exercise and CardioWall games, but Physios have seen better engagement in the classes.

- **47%** Felt more motivated to challenge themselves, physically and mentally
- **33%** Found it more enjoyable than other exercises or equipment
- **20%** Were encouraged to participate in group activities
- **33%** Felt it helped form stronger relationships
- **30%** Felt more confident socialising with others

"I've been using the CardioWall since it was brought to us and I think it's an excellent invention. It's good to use my arms and shoulders and get them moving quickly and in different areas. I like it very much, and it's something a bit more stimulating than the exercises we do with the physios.

Mary
Study Participant

Reflection on these Results

The study shows that the regular exercise classes with the addition of the CardioWall led to significant improvements in **physical, cognitive, and social wellbeing**. Participants experienced better endurance, reduced muscle weakness, improved balance, less pain, and increased ability to perform daily tasks. It also **reduced stress**, **boosted happiness**, and encouraged more **social participation**.

Overall, the CardioWall was seen as **more engaging and stimulating** than traditional exercises, enhancing motivation and confidence in both physical and social activities.

Staff Feedback

The CardioWall is loved by The Brightwell members, which helps the physio team to promote physical activity through exercise they enjoy.

Amrik, Clinical Lead Neuro-Physiotherapist, has noticed...

Increased Motivation
Participants are more motivated to participate, and Amrik has seen that when members are having fun, they get more out of the activity.

"The main benefits would be that people love the interaction, people love to have fun, and that's how they see it. That's what I like about it because sometimes when you ask people to do any exercise, they're like "It's going to be tiring", but when I ask people to do the CardioWall, they're up for it and say "Yes, I want to have a go!".

Amrik Sidhu
Clinical Lead Neuro-Physiotherapist

Inclusive Design
Amrik emphasizes the inclusivity of the CardioWall, highlighting that it can be used by individuals of all mobility levels and abilities. Whether seated in a wheelchair or requiring additional balance support, users can engage with the CardioWall through adaptive exercises and accessories like reach extenders, sparring gloves, or Pilates balls

Minimal Supervision
Amrik believes that all rehab exercise facilities can benefit from the CardioWall as it doesn't need a high level of supervision, it's an activity that patients can use independently, *"giving them much more control of their health and active lifestyle"*.

"The CardioWall is a fantastic piece of equipment. I wanted to use gaming technology and a cardiovascular activity that we could use together to help people to get fit and keep them active.

Amrik Sidhu
Clinical Lead Neuro-Physiotherapist

CardioWall Impact Study Summary

The Brightwell Exercise Program, which incorporated the CardioWall in the weekly circuit, has shown a range of physical, cognitive, and social benefits from weekly session in our 12-Week Study.

Regular use of the CardioWall alongside a neurological wellness exercise program can....

Reduce the impact of fatigue

Improve balance and general mobility

Lift mood and reduce stress

Plans for the CardioWall at The Brightwell

Now that the CardioWall Impact Pilot Study is complete, The Brightwell are looking to have the **CardioWall readily available i**n the communal area of the centre, as **requested often by members**.

This will promote **self-motivated exercise**, **social interaction**, and a further opportunity for members to **stay active** outside of scheduled classes.

In addition, **Amrik** Sidhu is exploring **further research** into the CardioWall's impact on mood, participation and balance for people with neurological conditions.

We want to say a huge **thank you to The Brightwell and its members** for assisting us in this pilot study.

CONTACT US

To find out how the CardioWall can support your members and residents to stay active, email us at **sales@rugged-interactive.com**, or give us a call on **+44 1726 981 123.**

REFERENCES

[1] https://www.nia.nih.gov/health/parkinsons-disease/parkinsons-disease-causes-symptoms-and-treatments
[2] https://www.escardio.org/The-ESC/Press-Office/Press-releases/Ability-to-sit-and-rise-from-the-floor-is-closely-correlated-with-all-cause-mort