RESEARCH UNLOCKED:
Research summaries for families

"Exergaming": Getting youth with cerebral palsy moving and motivated

Important note! This summary represents emerging research. The program is not available to the public at this time.

What is this study about?

Youth with cerebral palsy (CP) can find it difficult to access and participate in physical activity, which can lead to higher rates of inactivity and poor cardiovascular (heart) health. To encourage and motivate youth with CP to engage in physical activities, it is important that activities designed to promote health and wellbeing be:

- age appropriate
- interesting
- engaging
- accessible

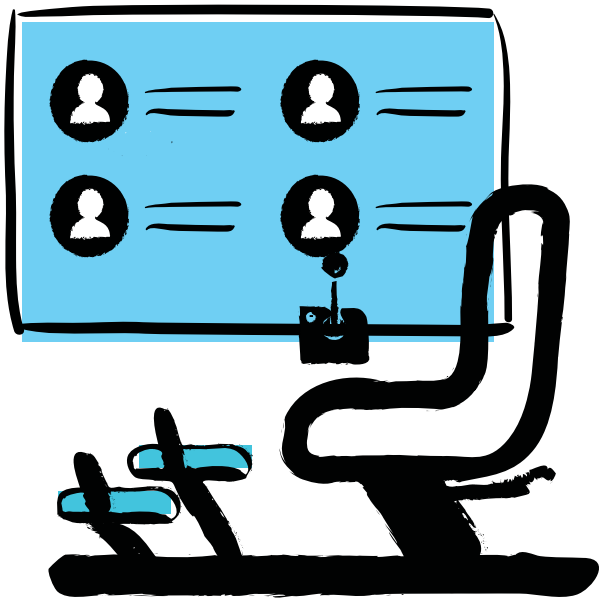
In this study, researchers tested a new type of exergame (exercise videogame) with eight youth (8-14 years of age) who had bilateral spastic diplegic CP (stiffness in both legs) to see if they could boost their cardiovascular (heart) fitness while also having fun. Each participant had his or her own stationary bicycle and with each pedal, the youth powered their own avatars (online character). Thus by exercising, they were able to play the video game.

Because some youth can pedal faster than others, researchers measured three separate algorithms – or methods of play – to see which method most encouraged the youth to keep pedaling, giving their hearts a workout. The three methods of play were:

- Method 1: all avatars move at the same speed no matter how fast one pedals
- Method 2: avatars move faster if one pedals faster
- Method 3: avatar's speed was driven by each child's heart rate *and* individual gross motor function levels

What is gross motor function?

Children with CP have varying levels of gross motor function – physical skills involving the large muscles in the body, where the entire body moves to coordinate an activity, such as jumping, running or standing.



What did the study team find?

Researchers found that

- all players enjoyed the exergame experience
- all players rated each of the three game methods both fair and fun
- the methods proved to be equally helpful in supporting cardiovascular health

Game 1 was the most balanced for wins, with all players doing similarly well. **Game 2** led to the widest imbalance in 'wins' because those who pedaled faster were more successful. **Game 3** ranked in the middle for wins.

Researchers are now working to adjust method 3 as it has the best potential to encourage fast pedaling and even out wins.

What this means for caregivers

In this study, youth with physical disabilities were drawn to exergaming. Interactive computer play to motivate youth with CP and other disabilities to exercise and be social is a powerful concept.

In a social exergame, if one pedals faster and keeps winning, others may be discouraged. They may give up and move on to other, lower level activities. Algorithms (methods of play) provide the balance to keep everyone engaged. It's therefore up to designers to create fast-paced fun games that youth with CP can play with friends of all physical abilities.

Ultimately, the exergame system in this study is only for research and is not yet commercially available. The researchers hope to build a system that can be played from the comfort of home, by adapting a stationary bicycle.

From a parent who read this study:

"Sometimes it's a lot of extra work to motivate teens to exercise in addition to therapy and school work. If we can make them feel fulfilled because the game evens the playing field, that's a big positive."

Next steps

While the team (co-led by Dr. Fehlings, Bloorview Research Institute and Dr. Graham, Queen's University) seeks funding to bring this game to market, caregivers may wish to see if similar opportunities are currently available in their area. Exergaming is becoming increasingly popular, but it would be a matter of finding one most appropriate for a child with physical disabilities. Caregivers may also ask their health-care providers about accessible, fun activities for their child, or what types of technology they recommend to keep him or her active and having fun with others.

For more information

Find the abstract here or visit your local library:

MacIntosh, A., Switzer, L., Hwang, S., Schneider, A.L.J., Clarke, D., Graham, T.C.N., & Fehlings, D.L. (2017). Ability-based balancing using the Gross Motor Function Measure in Exergaming for Youth with Cerebral Palsy. Games Health J, 6(6):379-385.

- View **Dr. Fehlings'** researcher profile
- Check out the CP Discovery Lab to learn more.

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