Holland Bloorview
Kids Rehabilitation Hospital

Bloorview
RESEARCH INSTITUTE

Virtual world exergaming for children with cerebral palsy

As children and youth with cerebral palsy (CP) progress to adolescence, they often experience a period of transition of combined factors in which their mobility and physical functioning may deteriorate, and lead to poor physical fitness and muscle weakness from lack of use. As a result, youth with CP can become increasingly socially isolated, which can have a negative impact on their quality of life.

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To address these important issues, scientist Dr. Darcy Fehlings and the CP Discovery Lab in the Bloorview Research Institute, in partnership with Dr. Nicholas Graham and the EQUIS Lab at Queen's University, engineered 'CP Exergames' to help develop cardiovascular strength and enhance social interaction opportunities for children and youth with CP by allowing multiple users to play and interact with each other from their homes in a virtual world.

Introducing CP Exergames

CP Exergames are interactive, multi-player exercise video games powered by pedaling on a customized recumbent bicycle. Pedaling in their cardiovascular heart rate zone provides added game-play benefits such that the CP Exergames can promote improvements in physical fitness and cardiovascular health benefits.

CP Exergames brings users through cooperative, interactive environments to navigate virtual challenges such as running from a fire-breathing lizard, fighting off an invasion of zombie cats, and playing space hockey. CP Exergames uses a simple one-button and joystick control scheme to help support play especially for those with fine motor difficulties. Socially, CP Exergames allows users to connect with other players online, interacting through headsets and voice chats as the games are played at home over the internet. Players can also observe each other's avatars as they move through the virtual world.

Overall, the goal is to improve cardiovascular health and track physical fitness gains of children and youth with CP as they engage over time.

Currently, the research on the CP Exergames shows an improvement in cardiovascular fitness and quality of life in youth with CP. Qualitatively, past players have enjoyed playing the CP Exergames with consistently high average play times across 8-10 weeks and their families have appreciated the home-based nature of the intervention supporting their child's physical and social health. Further research explorations are underway to develop and evaluate computer driven algorithms that would balance for different levels of gross motor and fine motor ability so that the CP Exergames can be inclusive for all players of all abilities. In addition, commercialization efforts are underway to ensure that the equipment needed to play the CP Exergames are affordable and compatible with commercially available equipment.

For more information about CP Exergames or about ongoing research projects, please contact scientist Dr. Darcy Fehlings at dfehlings@hollandbloorview.ca

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