Adopting New Technologies

‘Techno-partnering’ with a new robotic-assisted treadmill gait trainer for children with cerebral palsy: What paediatric physiotherapists need to consider

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**Over the past decade**, physiotherapists have become increasingly exposed to opportunities to include interactive technologies within their interventions for children who are learning or re-learning movement patterns or improving motor skill execution.

Some of these technologies are inexpensive, coming directly from the consumer market (e.g., off-the-shelf gaming technologies such as Nintendo Wii, Microsoft Kinect for Xbox), and can be integrated directly or with adaptations into therapy. Others are created to specifically address fine and gross motor skills that therapists and children want to work on. For example, sophisticated gait-focused technologies have been developed by the medical technology industry to permit or support walking actions that are either challenging or not possible for a child to do on their own. These range from systems that target one particular aspect of the walking cycle (e.g., technologies such as the WalkAide® System to robotic gait trainers such as the Lokomat® (www.hocoma.com) that can support and advance the overall action of walking. Some of these technologies may help therapists capitalize on the underlying potential for neuroplasticity (formation and reorganization of neural connections in the brain) in children with neuromotor disorders like cerebral palsy (CP). From a motor learning (ML) viewpoint, system options and potential for added engagement/attention associated with some interactive technologies may promote movement/activity repetitions, variety and challenge (errors/success) and thus may be strong facilitators of enhanced motor outcomes.

Whether considering off-the-shelf products or purpose-built technologies, there is a universal need to evaluate them carefully before they are given a place alongside, or instead of, current interventions. Cost and time trade-offs need to be weighed in light of comparative effectiveness to less costly, lower tech alternatives. There is strong recognition that therapists need to clearly understand the features of these technologies, and that best practice guidelines are needed to optimize outcomes. Physiotherapists and program managers should think about the changes or potential challenges that may...
Participating parents told us that they tend to feel the need to try anything/everything as long as it won’t harm their child. Technology in general tends to be compelling and impart its own authority as far as perceived value. The appeal of the walking-focused technologies such as the WalkAide and Lokomat can be powerful for children, parents, and physiotherapists alike.
intervention effectiveness papers due to length restrictions. Fortunately, a recent consensus-based recommendations paper provides an excellent physiotherapy guide to the Lokomat with respect to goals/options/set-up/activities for children at various levels of functional mobility (GMFCS I through V). If the ML aspect of the Lokomat is also a key ingredient, it will be important to determine the ML approach estrategies that capitalize best on this potential. While the underlying operational characteristics of the Lokomat fit well with ML principles through ability to readily alter guidance force, speed and weight support, its ML potential may go beyond this. The interaction among the physiotherapist, the Lokomat and the child may also boost the use/diversity of ML strategies and overall engagement. For this to happen however, the PT not only has to learn how to ‘drive’ the Lokomat safely and efficiently, but also how best to interact with the child to supplement and support the Lokomat’s action.

Indeed, physiotherapists’ interactive role appears to be as much a part of a Lokomat session as it is in conventional therapy using low tech equipment. One of the four themes that arose in our study – “It’s more than just the Lokomat, it’s the people that make the difference” -