# Cerebral Palsy: Update 2011—Interview with Mark Driscoll

Douglas L. Beck, AuD, speaks with Mark Driscoll, a cerebral palsy (CP) researcher, about the definition, causes, symptoms of CP.

Cerebral palsy (CP) is the term used to cover a wide range of motor-based impairment and disorders that includes multiple types of CP including: spastic, dyskinetic, ataxic, hypotonic, and others. CP has multiple etiologies associated with injury and/or damage to the brain in-utero or within the first 24 months of life. Symptoms range from mild to severe and may involve one or both sides of the body. The Centers for Disease Control (CDC, 2010) estimates three cases per thousand children. The most common form of CP appears to be spastic CP (present in some 87 percent of all CP cases).

Mark Driscoll is a PhD candidate and the principal investigator of a two-year international multi-center prospective cohort study exploring the influence of therapeutic stimulation on the functional performance and well-being of children afflicted with CP. Driscoll's background includes a bachelor's degree in mechanical engineering and a master's degree in biomedical engineering. His particular area of research is musculoskeletal biomechanics particularly in the cases of extreme movement disorders such as cerebral palsy. Following are excerpts from a recent interview.

- *Academy:* Hi, Mark. Thanks for your time today. I know that in general, children who are disabled by CP range in abilities from mild (grade one) to very significant (grade five). And, in particular, often children with grade five CP are quadriplegic and live most of their lives in wheel chairs—is that right?
- **Driscoll:** Yes, that's right. And because their presentation of CP can vary tremendously, the treatments range broadly based on the severity of a child's condition, with an attempt to tailor treatments to their needs and abilities.
- *Academy:* And treatment includes physical therapy, as well as medical, surgical and other modalities?
- *Driscoll:* Yes. Children with spastic CP may undergo different medical or surgical treatments to lower the intensity of spasticity, or to reduce muscular overuse and tension. These approaches are done out of the very best intentions to help allow the parents to actually get by more easily with a child in a wheel chair.
- *Academy:* I've read recently that one of the goals of medical/surgical treatments for CP is indeed to better allow the child with CP to use, or accommodate to, wheelchairs. That's sounds a bit rough at first, but the more I thought about it, the more it made sense that often it's better to be able to get around in a wheelchair, than to not be able to.
- Driscoll: Well, true. Being practical and setting realistic goals is indeed important. Traditional therapies with casts and braces that are geared to enhance the wheelchair use are of some benefit. Sometimes even the surgeries that fuse the spine in order to contain the progression of deformities have value as well. However, such a narrow scope of a goal setting, where most of the treatments revolve around the fitting of a severe child to wheelchair use leads to conformity and conserves the present status quo. For example, sometimes the treating docs will

inject Botox to switch some spastic muscles out of a contraction. As a result, Botox often allows a child to be more comfortable and makes CP kids easier to manage for their parents but fundamentally, Botox being a toxic agent, won't help children with cerebral palsy establish new functions and that's a clear limitation.

- *Academy:* Are there any evidence-based treatments shown to be superior in treating children with CP?
- **Driscoll:** That's a very good question and I'm sorry to say that there's not much out there. That is, there are many encouraging case reports and lots of treatment protocols, but when placed under the rigor of systematic literature reviews, conclusions are less optimistic.

Furthermore, there is even less information regarding more severely affected CP patients, that is those categorized grades four and five, as this cohort is very difficult to manage and often are compelled to resort to salvage surgeries.

- *Academy:* I understand. Okay, Mark, and then you come into the CP arena as a researcher with an engineering background—and what did you notice?
- *Driscoll:* Well, first, it seemed obvious to me that for children in wheelchairs and others who are more or less unable to move and exercise, they need movement and they need exercise—and without it, they're not likely to be any different in 12 or 24 months.

So if one wants to see progress in these kids, it goes without saying that one needs to work hard and consistently. However, more importantly, these atrophic conditions of severe CP kids provide an unfavorable metabolic milieu to a wide array of musculoskeletal tissues setting a vicious cycle of their progressive deterioration. Couple this challenge with the fact that the structures that need the most mechanical stimulus are the ones that are most hidden or sheltered and least likely to be involved in the voluntary movements of a child—and you are facing a really complicated task. Hence, exercises imported from the gym are not likely to prevail over such limitations.

Consequently, one needs not only to work hard but also to outsmart the physical challenges by delivering the right mechanical stimulus into the right musculoskeletal targets. This is the core of advanced biomechanical rehabilitation (ABR). The ABR therapy is a home-based therapy taught to parents and it provides physical stimulus to the muscles and other myofascia tissues of the body which are otherwise neglected, and we believe the outcomes will point to a better quality of life (QOL) with respect to short-term benefits and long-term gains through tissue remodeling/strengthening and returning the tissue to a more normal state of being.

Of course, the downside to such an approach is that it requires significant devotion from the CP child's parent or caregiver as, in order to successfully induce beneficial biomechanical changes to the musculoskeletal system, a significant amount of stimulus and time is required. In other words, only a parent or caregiver who is ready to work hard and smart for extended periods of time can expect the developmental progress of a child that exceeds the usual grim expectations.

- *Academy:* And have you got any hard data that indicates and substantiates improvements via your ABR protocol?
- *Driscoll:* Well, another good question! To date, we have an extensive database of encouraging patient follow-up files. However, since within the scientific community, proof is on the shoulders of the newcomer, such qualitative assessments are currently being supported by an extensive objective and quantitative study. We are in the middle of a multi-center, 24-month study that we hope to publish in 2011 or 2012. So I hope to have good news to report soon, but I can't reveal very much about outcomes today!
- *Academy:* The preliminary data I saw showed a remarkable change in the thoracic and abdominal development of children with grades four and five CP.
- *Driscoll:* Yes, those results have been very encouraging and we're excited to continue our work along these lines as the children with CP may indeed have a neurological deficiency—but that doesn't mean they necessarily have to have a secondary motoric deficit—and maybe we can improve the secondary issues through ABR.

Mark Driscoll is a PhD candidate and the principal investigator of a two-year international multi-center prospective cohort study exploring the influence of therapeutic stimulation on the functional performance and well-being of children afflicted with CP.

Douglas L. Beck, AuD, Board Certified in Audiology, is the Web content editor for the American Academy of Audiology.

## For More Information, References, and Recommendations

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### On ABR and Beyond

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