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# Walking Underwater -- In-Depth Doctor's Interview

*Don Morgan, Ph.D., explains how aquatic therapy can help patients with cerebral palsy.*

**Ivanhoe Broadcast Interview with**
**Don Morgan, Ph.D., Exercise Physiologist**
**Department of Health and Human Performance**
**Middle Tennessee State University, Murfreesboro, Tennessee,**
**TOPIC: Walking Underwater**
**Date of Interview: September 10, 2006**

**What's tough for kids with Cerebral Palsy? What challenges do they face?**

**Dr. Morgan:** One of the major challenges for children with cerebral palsy is they fatigue very easily when they walk or run. If they start fatiguing, then they're less likely to be active. If they're less likely to be active, they'll be more sedentary and there are chances for other health problems to develop. In addition, it's just so important to be able to walk. When you can't walk, it's hard to participate in a lot of activities at school or at home. One of the aims of our project is to improve their ability to walk.

**It just makes it kind of tough to be a kid.**

**Dr. Morgan:** Absolutely. It's tough to jump around and walk without feeling so tired you have to rest while other kids are continuing with physical activity.

**Why do you think underwater treadmill might be a good solution?**

**Dr. Morgan:** There is growing interest in aquatic therapy. People are using pools for rehab. I thought there might be a role for an underwater treadmill. I had seen a few of these, and I started thinking there are a lot of advantages of having people walk in water. Walking through water improves leg strength. If patients can continue to walk in the water, it also increases their cardiovascular function. It reduces stress on their joints because the weightless environment supports more body weight. In the past, people with injuries or arthritis used water exercise because there are a lot of advantages. We wanted to use an underwater treadmill in a different population, children with cerebral palsy, for whom walking is sometimes a very difficult and challenging activity.

**How will this therapy help children with cerebral palsy live "normal" lives?**

**Dr. Morgan:** One thing we hope is this training will help these kids become more active. We're measuring their

walking ability, like how many steps they take per day and how many of those steps are high activity and moderate activity as opposed to low activity or no activity. One thing we hope to see with this training program is they'll be more active after training. They'll take more steps, and more of those steps will be high activity and moderate activity relative to low activity or no activity. For these children, being more mobile can really enhance quality of life, because they can keep up with their brothers and sisters when they go anywhere where you need to be mobile. They can keep up with their peers.

**What kind of feedback have you received from parents of kids in the study?**

**Dr. Morgan:** We have parents answer an open-ended question about how the study has improved their child's quality of life. Each family has found something specific. The parents of one child said he's a lot more balanced when he's walking. He's not wobbling so much. Another parent said her child doesn't fall as much. Another parent said when she goes into a big store her child can keep up with her. She doesn't have to put him in a stroller or in a cart where he might not feel as comfortable; he can walk with the family. Another person said they went to an amusement park, and they didn't need to push him in a stroller. There are a lot of advantages each parent has indicated to me as a result of their child being in the study. Some parents become almost emotional because they're interested in improving their child's ability to be functional. Parents are interested in having their child be more mobile. When they see these improvements, they're very happy. We're happy to be a part of that process.

**Have you had some parents whose children haven't had any improvement with other therapies, or just not anything quite as significant?**

**Dr. Morgan:** They've tried many things. They've had surgeries, pharmacological treatment, bracing, or they've tried certain types of muscle relaxants. Everything helps a little bit. A lot of kids are in sports programs, martial arts and soccer. Parents try to do whatever they can to keep their children active. I think they see this as a unique therapeutic modality. It's interesting and not something they would typically gravitate toward, but some of these kids have had swimming lessons or aquatic therapy in the past. I think they've seen the advantage. One advantage of this is we can be scientific in how we're imposing training. We can be confident in the results we get and attribute them to what we're doing.

**Are there any quantitative results that you've seen?**

**Dr. Morgan:** We're still in the beginning parts of the study. We started about six months ago, so only a few children have gone through everything. I would say we're cautiously optimistic right now. We measure leg strength in these children, and it looks like strength values are going up. It looks like their gait efficiency has improved, so they're using less energy to walk at any given submaximal walking speed. Their heart and lung function has improved and there is some suggestion that their regular walking speed is a bit faster. Some data suggest they are more active outside the lab. These are just preliminary results. We'll have to wait until we have more subjects to complete this study. Right now, though, we're cautiously optimistic and we think we're on the right track.

**What else can you say about why they're getting added benefit from the water exercises?**

**Dr. Morgan:** The training is scientifically developed, so we're helping increase the walking speed. We're helping increase duration of time walking. As they walk over the 10 weeks, we lower the water level so they have to support more of their weight. All of those are specific training functions we give these children. Then we're combining them over a 10-week period. It also seems one issue related to fatigue when they're walking is a relative lack of leg strength. Again, this therapeutic modality aims to increase strength because they are working against a resistance. It's somewhat like weight training. We're combining not just the cardiovascular benefit, but also the strength training benefit. What's neat about this is they're getting both of these modalities in one.

**What do you hear from the kids who are doing this?**

**Dr. Morgan:** They enjoy coming. They love being in the water. While they're walking, they can watch videos or DVDs. It's a break in their routine, and it's a chance for them to demonstrate improvement in something. This is impressive to their parents and impressive to them because it's a challenge. It would be a challenge for anybody. They're not only able to show quantitative laboratory improvements, but they're demonstrating to themselves and their families, "Hey, look at what I've been able to do! I've gotten stronger. I've gotten fitter!" It's a wonderful thing to be proud of.

**How is this rewarding for you as a researcher?**

**Dr. Morgan:** As a researcher, I've done lots of studies on all sorts of topics, but it's always nice when you can be involved in a study that not only looks at basic scientific principles and applies them to a different population, but also provides clinical and real-life benefits. This is a study in which we are doing laboratory testing, but we can see the benefits in the real world. When you have an impact on someone's quality of life, it's a wonderful thing. I'm very privileged to be a part of this project.

**What's your goal? What do you hope you'll see in the next two years that would be ideal?**

**Dr. Morgan:** If we see more children showing these improvements, we would like to extend what we're doing to different sites throughout the United States and gain additional funding to do that, so we could test this on more kids with cerebral palsy or other movement disorders. As another possibility, we're looking for children who are independently ambulatory. In other words, they have cerebral palsy, but they can walk without walkers, or they're not in wheelchairs. In terms of mobility, there's another group of children much more affected. We'd like to look at impacting their lives as well, and strengthening their leg muscles, improving their heart and lung function, to see if we can improve their mobility. There are a couple of things that I would like to see happen. I would like to even consider testing adults with cerebral palsy in a later study. Many adults have cerebral palsy. A lot of times, the available therapy seems to be more abundant for children. I think we're one of the few groups in the world doing this sort of work. Many people that are very interested in what we find. We hope to potentially impact clinical practice; that would be neat.
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***END OF INTERVIEW***

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