Virtual Reality Training for Parkinson’s

A participant uses virtual reality as part of a study directed by Dr. Jeffrey M. Hausdorff and his team at Tel Aviv Sourasky Medical Center, a Center of Excellence.

Can virtual reality training be used to help prevent falls and bring more independence to people with Parkinson’s disease (PD)? At the Parkinson’s Foundation 2017 Center Leadership Conference, two studies made this case.

According to our Parkinson’s Outcomes Project, the largest-ever clinical study of Parkinson’s, 71 percent of people living with Parkinson’s for at least 10 years, experience falls. Parkinson’s can impact gait and balance, which can increase the risk of falls. Falls, especially in older people, can cause serious injury, disability, lead to social isolation and even nursing home placement.

“Research is making life better for people with Parkinson’s. Supporting a virtual reality study that resulted in reducing falls does just that,” said Peter Schmidt, PhD, Parkinson’s Foundation senior vice president and chief research and clinical officer.

...continued on page 2
Virtual Reality Training for Parkinson’s  
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Jeffrey M. Hausdorff, PhD, from the Tel Aviv Sourasky Medical Center, a Parkinson’s Foundation Center of Excellence, recently led a multi-center clinical study demonstrating that virtual reality training combined with treadmill exercise improves gait and reduces risk of falls (Mirelman et al., Lancet, 2016).

In the Tel Aviv-led study, which received the funding to begin preliminary work from the foundation, 302 participants underwent treadmill training for six weeks — one group used treadmill training with virtual reality, while the other used treadmill training alone. Participants wore a harness to prevent falls and a camera-based system to monitor gait. Steps were projected on a screen in front of the treadmill, where participants had to avoid virtual obstacles, such as objects or people, that blocked the virtual walking path.

“From an immediate results perspective, treadmill training with or without virtual reality both improved gait, and other mediators of fall risk,” Dr. Hausdorff said. “However, six months after the training program, those who had virtual reality training were still seeing better results in gait and falls, which naturally carried over into the real world.”

Previous studies have shown that walking and attempting another task at the same time — as simple as looking for cars while crossing a street — increases fall risk. Using the customized, game-like environment, the virtual reality program promotes motor learning, teaches participants how to better navigate real-life motor and cognitive challenges and empowers them to work on dual tasking, planning, scanning and walking patterns.

Participants who had virtual reality training saw improvements in the frontal part of the brain, as measured by imaging scans used to map brain activity (fNIRS and fMRI), reported better quality of life and had a 40 percent reduction in falls compared to those trained with treadmill exercise alone. The next step of this study is to measure how often participants need to re-visit gait training to continue seeing longer-term benefits.

About 2,500 miles from the Tel Aviv center resides Giuseppe Frazzitta, MD, in Italy. He is the head of the Parkinson Disease and Neuromotion Rehabilitation Department at the Moriggia-Pelascini Hospital. Dr. Frazzitta studied a different use of virtual reality with the support of the foundation’s partnership with the Fresco Institute Italia.

Through his multidisciplinary intensive rehabilitation treatment program, Dr. Frazzitta tested if virtual reality could provide real-time guidance to improve gait and balance. Instead of using virtual reality to put people into an artificial environment, the team used projectors to display physical therapy guidance, such as showing participants where to place their feet on a treadmill. Essentially, the program provided a virtual therapist. Each of the 50 participants were asked to follow the projected gait. On a weekly basis, the team would change the gait pattern to further normalize the gait.

During each session, a physical therapist provided support and adjusted the participant’s posture. Eventually, virtual reality programming was introduced. While walking, participants would complete puzzles and games or solve math problems.

Throughout the program, gait, footfall pressure, falls and coordination were all evaluated. All participants saw significant improvements after treatment, including a more normalized gait and an improvement in posture. Those who used virtual reality were better able to avoid obstacles while walking when compared to the treadmill-only group.

“Virtual reality is the future for patients with Parkinson’s to improve not only their gait, but their quality of life,” Dr. Frazzitta said. “Making virtual reality a component of Parkinson’s treatment is an opportunity for us, as movement disorder specialists, to make real progress.”

TOP TAKE-AWAYS ON GAIT AND BALANCE

- Gait is not automatic. Completing simple obstacles while walking can cause gait to suffer, leading to falls.
- Treadmill-only and treadmill plus virtual reality training both improve gait and cognition.
- Gait can be improved in all stages of PD: virtual reality (helps with obstacle management), hydrotherapy (helps with severe freezing) and dance therapy (improves range of joints).
- Gait training promotes motor learning.

Learn more about preventing falls at home at www.parkinson.org/safety-at-home.
Letter from the CEO

Dear Friends and Supporters:

Every nine minutes, someone in the United States is diagnosed with Parkinson's disease (PD). Today, we know that approximately 90 percent of people with Parkinson's are treated by doctors who may not have the training to understand the complex, multifaceted issues their patients grapple with, including timing and dosing of medications, anxiety, and depression. That is unacceptable.

A Parkinson's diagnosis is a shock that often leaves people and their loved ones confused and afraid. Diagnosis is difficult because there is no standard test for Parkinson's other than a clinical examination. That is another reason it is critical for anyone facing a Parkinson's diagnosis to see a qualified neurologist or a movement disorder specialist for evaluation and treatment.

For all of these reasons, the Parkinson’s Foundation is supporting scientific research to help us better understand the underlying disease, how to treat it and hopefully how to prevent, slow or stop it. We also provide the support, resources and tools that people need to access the best available care at every stage of the disease.

Through our global Center of Excellence network, we are working with world-class experts in Parkinson's care and research to focus on new and effective treatments so that every person with the disease can live his or her best-possible life today. In fact, in this issue we cover the latest in Parkinson’s treatments: like how one center’s study found that virtual reality can reduce fall risk and how a new type of infusion pump can deliver Parkinson’s medication. Through our network, we are also the leading funder of training for the next generation of movement disorder specialists who can provide the care people desperately need.

At the Parkinson's Foundation, our goal is to ensure that people with Parkinson's and their caregivers find the support they need so no one has to face the disease alone. If you or someone you know or love is living with Parkinson's, take advantage of all the resources we have to offer. Remember, every nine minutes someone else will be counting on us to help navigate this disease. Let's envision a world without Parkinson's disease and end it once and for all.

Yours in the fight,

John L. Lehr, Chief Executive Officer, Parkinson's Foundation

The Parkinson's Foundation board and staff rang the NASDAQ stock market opening bell in New York, NY, on April 6 for Parkinson's Awareness Month.

Foundation staff, board and People with Parkinson's Advisory Council members stood #together4PD at the Parkinson's Unity Walk in New York, NY, on April 22.
You may know the feeling. Your heart starts racing. Your chest feels tight. You have trouble breathing and you’re dizzy. You’re having a panic attack.

About seven percent of people with Parkinson's disease (PD) experience panic attacks, but up to 40 percent develop some form of anxiety. Many people may not know that Parkinson's symptoms such as increased heart rate, changes in blood pressure and profuse sweating can also be signs of an anxiety disorder.

"Anxiety can take many different shapes and forms when it comes to Parkinson’s," said Jennifer G. Goldman, MD, MS, associate professor at Rush University Medical Center, a Parkinson’s Foundation Center of Excellence.

While anxiety starts in the mind, it causes real physical symptoms such as muscle tension and digestive problems. But because these symptoms often accompany PD as well, family members and physicians often misunderstand what’s going on. According to our Parkinson's Outcomes Project study, anxiety is under-recognized and adds to the complexity of treating Parkinson’s. The key to distinguishing PD from an anxiety disorder is seeing a movement disorder specialist.

The reality of anxiety
A Parkinson's diagnosis is a challenge from the start, so worrying about the future may seem like a natural tendency. However, when nervousness and near-constant worry about what might happen next limits life, it’s considered a disorder.

In fact, anxiety adversely affects quality of life in people with PD even more than movement symptoms such as slowness and stiffness. Elaine Book, a clinic social worker at the Pacific Parkinson's Research Centre, a Center of Excellence, helps people with PD manage anxiety. "Identify triggers and take action to manage them. For example, if crowds make you anxious, avoid them. If running late increases your anxiety, leave early," Book said.

In some cases, anxiety becomes so second nature that people stop noticing it. According to the largest Parkinson’s clinical study, which is being conducted by the Parkinson’s Foundation, the most common types of anxiety related to PD are panic disorder, generalized anxiety disorder and social phobia. In addition to constantly worrying about everyday things, people with Parkinson’s may feel fatigued and experience additional sleep and concentration problems.

“Some patients have generalized anxiety that manifests during certain situations, such as feeling pressure when paying at a grocery store and seeing a growing line of people behind them," Dr. Goldman said.

Anxiety is why some people prefer to stay home and avoid going to unfamiliar places or meeting new people. Social and specific phobias occur in about eight percent and 13 percent of people with PD.

Making matters worse, when it comes to Parkinson's, anxiety can affect motor function, which poses the chicken-or-the-egg question: does anxiety make movement more difficult or does difficulty with movement cause anxiety?

Anxiety often goes hand in hand with the PD medication cycle — becoming more obvious during an “off” phase when medications are less effective. “When medications begin to wear off, people can see worsening tremors, but also can experience non-motor
symptoms as wearing off phenomena, that are rarer and not as easily recognized, like a sudden, deep depression or panic attacks,” Dr. Goldman said.

When experiencing a pattern of anxiety associated with “on-off” fluctuations, talk to a neurologist about making medication adjustments.

Getting help
Fortunately, anxiety can usually be treated, which leads to a better quality of life. A variety of tools including medication (anti-depressants and anti-anxiety), psychotherapy and lifestyle changes can help people regain a sense of control over their lives. When treatment is tailored to the individual, it’s likely to be successful.

The Parkinson’s Foundation Helpline is a good resource, as well as a good place to get your anxiety questions answered. Psychotherapy can be helpful for those who experience anxiety associated with on-off fluctuations. Behavioral therapy can help identify cues that trigger anxiety and help teach coping techniques, like relaxation strategies.

“Cognitive behavioral therapy can help understand the nature of a person’s anxiety — helping us find out whether it’s due to: being diagnosed; a lifelong condition exacerbated by PD; neurodegeneration; trouble adjusting to living with Parkinson’s or caused by dopamine medications,” said Andrew Howard, MD, a neuropsychiatrist at the Pacific Parkinson’s Research Centre, a Parkinson’s Foundation Center of Excellence.

Even if you can’t eliminate the anxiety caused by PD itself, you can change how it affects you. Non-medical strategies help people overcome negative emotions and break the vicious cycle. Exercise is a good coping strategy. Massage, yoga and Tai Chi help relax muscle tension and increase a sense of well-being. Moral support from family and friends is also crucial to success.


TIPS FOR EASING ANXIETY

Living with Parkinson’s can be stressful, triggering a cascade of worries. When managing anxiety, medication, therapy or a combination can help. Social worker Elaine Book shares her anxiety tips:

Give it a number.
Use a scale of 1-10 (1 being a minor hassle and 10 being a catastrophe) to assign a number to your situation. This can help put the issue in perspective.

Choose an affirmation.
Think of a short, clear positive statement that focuses on your strengths. Try saying a phrase like, “I can handle this,” in anticipation of an anxiety provoking experience.

Ask for help.
It’s a sign of strength. Sourcing out what you need will help you live well with PD.
Can you tell me more about advertised stem cell treatments for Parkinson’s? What questions should I ask the researchers offering these treatments?

Advances in stem cell therapy are exciting. Scientists now have the ability to generate stem cells from various tissue sources in the human body, for example skin cells, and reprogram them to become new or embryonic-like cells. Discovered in the last decade, this technology is known as induced pluripotent stem cells (iPS) and can generate adult stem cells from various organs. These cells can replace any other kind of cell in the body and repair damage. Stem cell medicine is promising in its potential to change the future of PD treatment.

However, stem cell therapy is still a work in progress. It’s important to be cautious about stem cell clinics offering unproven procedures. Stem cell treatment has shown the most success in animal models of PD, slowing the progression of the disease. But the treatment hasn’t proven to be as successful in human trials. There is no evidence that stem cell injections can even treat Parkinson’s symptoms. Simply injecting stem cells into the blood, spine or brain is not enough to alleviate all PD symptoms, and can cause adverse reactions. In general, when considering experimental medical treatments, always review the research study with your neurologist. All stem cell research should be approved by the institutional review board (IRB), preferably university-based. Ask the researcher to see the stamped IRB-approved protocol and informed consent. In addition, there should be no cost for any research procedure. If you’re asked to pay thousands for an unproven research procedure, it’s likely conducted by a for-profit organization — even if it is listed on www.ClinicalTrials.gov (a website maintained by the National Library of Medicine at the National Institutes of Health). This is known as stem cell tourism and it’s a growing business. Also, be wary of clinics claiming to treat multiple diseases with the same treatment.

The outlook for stem cell research is hopeful. Stem cells can provide a tremendous opportunity to develop novel drugs for PD. In the meantime, always be skeptical and aggressively question the science and claims behind advertised stem cell therapy.
Every year, top Parkinson’s experts share their cutting-edge research along with their care tips at our Centers of Leadership Conference. This May, Jori Fleisher, MD, led a panel with Rob Skelly, FRCP, Claude Lamoureux, PT, and Megan Rochford, OT, where they offered their tips to improve activities of daily living:

See an occupational therapist (OT) and physical therapist (PT) early on. Both can help with day to day life, regardless of PD stage.

Simplify cooking. Many products are designed to make cooking easier, such as, cutting boards with suction cups, hand choppers and silicone pan attachments to help drain pasta.

Get administrative help. Make a stamp of your signature and try voice-typing software.

Host game night. Play games that can help with dexterity and have physical or cognitive benefits (like Cranium).

Meditate. Meditating 10 minutes before you go to sleep and when you wake up calms the central nervous system.

Learn how to floor transfer. An OT and PT can help you learn how to safely get back up from a fall.

Carry a shopping bag. Placing a plastic shopping bag on a seat before sitting helps reduce friction when sitting down and getting up.

Call our Helpline at 1-800-4PD-INFO (473-4636) to speak to a Parkinson’s specialist for more tips on daily living.
Deep brain stimulation (DBS) surgery has helped tens of thousands of people worldwide. The approach works by delivering electrical impulses to targeted areas in the brain that control movement. After surgery to implant electrodes, most patients with Parkinson’s disease (PD) see improvement in tremor, “on-off” fluctuations, dyskinesia and “off” time. But because brain surgery is required, DBS carries risk of serious complications.

Currently, Ed Boyden, PhD, and colleagues at the Massachusetts Institute of Technology (MIT) are exploring a new, non-invasive way to deliver DBS. Called temporal interference (TI), this innovative method delivers electrical currents to precise targets deep within the brain using electrodes placed on the scalp. TI works by delivering multiple electrical currents to the brain at high frequencies (frequency is the number of impulses per second). These high-frequency currents pass through the brain without initiating artificial firing of brain cells (brain cells ignore the noise if the frequency is high enough). But when two electrical currents from different sources and frequencies are introduced from outside the brain, they intersect with one another deep within the brain, creating a low-frequency current that stimulates neuron activity. Dr. Boyden’s team is working to activate specific locations and structures deep within the brain using this technique.

To prove the concept, the MIT team stimulated the brains of mice and specifically directed a current at the hippocampus, the part of the brain involved in memory. The research results (published in the June 1 issue of journal Cell) revealed that brain cells in the hippocampus could be stimulated without affecting surrounding tissues in the brain.

While this clever technique has the potential to target deep brain circuits without the need for neurosurgery, there is still more research to be done. Several questions that relate to using this therapy to treat Parkinson’s symptoms remain unanswered:

- Will the currents be able to provide the high frequencies necessary to treat the most disabling Parkinson’s symptoms (depression, tremor, rigidity and bradykinesia)?
- Can the current be steered to precise regions of the brain that provide sustainable benefit without causing undesirable side effects?
- Can the MIT team create a practical wearable device that can continuously stimulate a region of the brain without the need for a surgical implant?

Dr. Boyden and his team have demonstrated something truly remarkable. While DBS surgery remains a viable option for people with PD it is important to remember that there are still alternatives to DBS, like transcranial magnetic stimulation (TMS) and transcranial direct current stimulation (tDCS). But these therapies are limited in their power because they are applied to the brain’s surface and can be imprecise in the way they activate different parts of the brain.

The next steps for TI therapy include refining the new technology and conducting a carefully designed clinical trial with PD patients. Though not currently available for human use, in the near future this approach could be a potential option for specific Parkinson’s-related symptoms.

Author: Michael S. Okun, MD, National Medical Director

Read Dr. Okun’s monthly column, “What’s Hot in PD?” online at www.parkinson.org/whatshot.
Louisville Hosts First-Ever Moving Day® Alongside “I Am Ali” Festival

Before a fight, when Muhammad Ali said the iconic words, “I am the greatest” he made the world believe nothing was impossible.

This year, Moving Day® Louisville was part of the six week long “I Am Ali” Festival that honors the life and legacy of Muhammad Ali. The June 10 event was also the first-ever Moving Day®, a walk for Parkinson’s, in Kentucky.

The Muhammad Ali Center’s mission is to preserve and share Ali’s legacy and ideals and to inspire adults and children everywhere to be as great as they can be. One way the center does this is through its annual “I Am Ali” festival.

“We were thrilled not only to be a part of the festival and celebrate Muhammad Ali’s life and amazing contribution to raising Parkinson’s disease (PD) awareness, but to have the honor to be the festival’s signature event,” said Kristin Trulock, Parkinson’s Foundation national coordinator of signature events.

During the event, Rasheda Ali received an award for Muhammad Ali’s legacy to the Parkinson’s community. Followed by Lonnie Ali, wife of the late Ali, who gave an inspirational speech encouraging the audience to move and fight every day.

“My father has demonstrated how he lived every day with Parkinson’s disease and sent a special message to those still battling the condition. He encouraged everyone fighting this disease to never lose faith and never stop living each day to the fullest extent possible,” said Rasheda Ali.

For Joanie Prentice, a Moving Day Louisville committee member and hundreds of other walkers united in the fight against Parkinson’s, the walk and festival were a perfect pair.

“Muhammad Ali was from here, trained here and has always been a proud Louisvillian. He still inspires people to challenge themselves and give their all, Joanie said.

Joanie’s husband, Sonny, was first diagnosed with young onset Parkinson’s in 2001, but has had PD symptoms for more than 20 years. Their entire lives, especially after his diagnosis, he and Joanie have always been passionate advocates for staying active.

“We love to hike, go to beaches, mountains and everything in between. We know that the best way to continue to enjoy our lives is through moving and exercising,” Joanie said. Last year, Joanie, a retired nurse, and her family attended Moving Day® Chicago and left inspired.

“Seeing the Chicago Parkinson’s community come together made me want to show my community what we offer here in Louisville,” Joanie said.

But she didn’t know what to do next. It was almost fate when Joanie met Kristin, Moving Day Louisville coordinator, at a PD caregiver support group. Joanie immediately volunteered to help organize the walk.

“This support group opens the floor so each caregiver could talk about anything and everything. Once someone talks about a sensitive subject everyone just opens up,” Kristin said. “Louisville has a huge Parkinson’s community that is very tight knit.”

Sonny’s Stars, the team name chosen by Joanie’s grandchildren, raised the most money for Moving Day Louisville and were thrilled to kick off the event with Rasheda Ali. “Just because you have Parkinson’s doesn’t mean you stop living. If you work together and modify things, you can keep going and keep doing,” Joanie said.

To find a Moving Day walk near you visit www.npfmovingday.org.
2017 Fall Event Calendar

Visit our event calendar at www.parkinson.org/events.

SEPTEMBER

9/10: Moving Day® Buffalo, NY
Register online: www.movingdaybuffalo.org

9/12: Webinar PD Expert Briefing:
Nutrition and Weight Management in PD
Sign up online: www.pdf.org/parkinsononline

9/24: Moving Day® Columbus, OH
Register online: www.movingdaycolumbus.org

OCTOBER

10/1: Moving Day® NC Triangle, NC
Register online: www.movingdaynctriangle.org

10/1: Moving Day® Rochester, NY
Register online: www.movingdayrochester.org

10/14: Moving Day® Boston, MA
Register online: www.movingdayboston.org

10/15: Moving Day® Chicago, IL
Register online: www.movingdaychicago.org

10/21: Moving Day® Atlanta, GA
Register online: www.movingdayatlanta.org

10/28: Moving Day® Los Angeles, CA
Register online: www.movingdaylosangeles.org

NOVEMBER

11/4: Moving Day® DFW, TX
Register online: www.movingdaydfw.org

11/5: Moving Day® Boca Raton, FL
Register online: www.movingdaybocaraton.org

11/12: Moving Day® Miami, FL
Register online: www.movingdaymiami.org

11/21: Webinar PD Expert Briefing: Depression and Parkinson's: Treatment Options
Sign up online: www.pdf.org/parkinsononline
Team Hope™ for Parkinson’s 2017 Endurance Events

- **October 8, 2017** – Bank of America Chicago Marathon
- **October 22, 2017** – Marine Corps Marathon
- **November 5, 2017** – TCS New York City Marathon
- **Race of your choice** – Choose any endurance event and run it as a Team Hope member.

For more information, please email teamhope@parkinson.org or visit www.parkinson.org/teamhope.
Support our mission to help every person diagnosed with Parkinson’s live their best possible life now. Your gift will help us fund better research, better treatments and better lives.

Give Now: www.parkinson.org/donate

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