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As a family vacation to the Dominican Republic in July 2002 came to an end, Anna Nicasio was sad to leave her friends. That is the last thing she recalls from that fateful trip. Anna, who was only 15 years old at the time, had sustained a severe traumatic brain injury (TBI) as a passenger in a car crash.

Two days after the crash, Anna was airlifted back to the U.S. and admitted to University Hospital in Newark, NJ, where she spent two months in a coma. When she emerged, Anna faced significant challenges, needing to relearn how to do even the most basic tasks. She had difficulty walking and talking, was unable to use her previously dominant right hand, and required assistance to perform everyday activities such as brushing her teeth and eating.



**PERSONAL PERSPECTIVE**

**Anna Nicasio: Keep Moving Forward**

By Ray Ruben, Research Assistant, Center for Traumatic Brain Injury Research, Kessler Foundation

After her acute hospitalization, Anna was transferred to Children's Specialized Hospital in Mountainside, NJ, for comprehensive inpatient rehabilitation. She eventually moved to their day program and finally transitioned to their outpatient program in 2003. Despite all that she had been through, Anna was eventually able to complete high school and earn a bachelor's degree in communications from Fairleigh Dickinson University in 2010. Following graduation, Anna began to pursue a passion she had discovered during her rehabilitation, starting an aromatherapy company with her mother.

Anna has continued to benefit from ongoing physical, occupational, and speech therapies. She has also improved her memory by getting involved in research at Kessler Foundation. She was a participant in an experimental stem cell study that greatly improved her motor control, breathing, and speech and helped relieve spasticity. She says the study was "wildly successful"—a true milestone in her recovery—and she has not needed Botox injections for spasticity in over a year.

Anna's determination and perseverance have fueled her ability to keep going forward. She credits this positive attitude to her parents, who have been



her strongest supporters throughout her entire journey. Anna understands that a TBI can happen to anyone at any time. She emphasizes how important it is to work hard and try to resume your life as soon as possible. She also wishes that everyone knew that some causes of TBI are preventable, including many motor vehicle accidents, so others do not face the same consequences.

Today, Anna continues to explore new avenues of interest. She is busy assisting with her parents' real estate company and taking vocal lessons to improve both her singing and breathing abilities. Motivated by an appreciation of architecture, she is working to enhance her drawing skills—using her right hand again. There is no doubt that when Anna puts her mind to do something, she can achieve it. As she says, "There is nothing preventing you from accomplishing anything except yourself." ■

# RESOURCE REFRESH

## Sex After Traumatic Brain Injury

By Marisa King, PT, DPT, Rehab Therapy Manager, Kessler Institute for Rehabilitation, West Orange, NJ

Changes in sexual functioning are common after traumatic brain injury (TBI). While some people experience increased sexual desire or difficulty controlling their sexual behaviors, it is more common for desire or interest in sex to diminish after TBI. Changes in arousal may cause problems in getting and keeping an erection for men and decreased vaginal lubrication for women. Both may have greater difficulty reaching orgasm. Some women stop menstruating or develop irregular periods and may have trouble becoming pregnant. Men may have decreased sperm production, making it more challenging to get a woman pregnant.

Still, it is important always to practice safe sex and to speak with your doctor about the best method(s) to protect against sexually transmitted infections and unplanned pregnancy.

There are many reasons for sexual issues after TBI. The injury to the brain might include areas that control sexual functioning or affect the production of important sex hormones (testosterone, progesterone, and estrogen). Many individuals with TBI experience fatigue, which can impact sexual interest and performance. Similarly, emotional changes and altered thinking can impact desire and sexual functioning. Decreases in self-esteem, confidence, and feelings of attractiveness can affect comfort

with sexual activity. Problems with movement may also make it more difficult or uncomfortable to have sex. Following a TBI, some individuals may lose relationships or have trouble meeting new people, presenting obstacles to finding a sexual partner. Keep in mind that medications can impact sexual functioning; however, you should never stop or skip a medication without speaking to your doctor in detail.

Partners may also experience changes in sexual functioning after their significant other's TBI. Contributing factors include changes in responsibilities, roles, communication and relationships, diminished expressions of affection, and safety concerns. Many partners also report feelings of loss, fatigue, and anxiety, which adversely affect sexual desire and functioning.

If you are experiencing changes in sexual functioning, you are not alone. Many resources are available, and professionals can help. Problems with sexuality can be addressed just like other medical issues. Talking with your doctor or other health or rehabilitation professionals is important, and women should see a gynecologist. Individual or couples therapy can help navigate changes and stressors placed on an intimate relationship following TBI. A certified sex therapist, an expert who helps people overcome sexual problems,



Marisa King, PT, DPT, has 14 years of experience as a physical therapist, specializing in acquired brain injury at Kessler Institute for Rehabilitation. Marisa oversees therapy services, staff education, and program development for the West Orange inpatient acute rehabilitation brain injury unit. Marisa was involved in the TBI Model Systems project addressing sexuality and intimacy in brain injury rehab and actively participated in the development of a staff education curriculum.

may be beneficial. Physical, occupational, or speech-language therapists may assist with finding more comfortable positions, saliva management, energy conservation, communication, and social skills, to name a few. There are also sexual aids that can help with positioning or sexual functioning. ■

You can find more information and resources at [msktc.org/tbi](https://msktc.org/tbi).

# EXPERT OPINION

## Virtual Reality's Potential in Brain Injury Rehabilitation

By Denise Krch, PhD, Senior Research Scientist, Center for Traumatic Brain Injury Research, Kessler Foundation



After leaving the acute care hospital, many persons with brain injuries need additional rehabilitation to help relearn the skills they lost. This treatment is often aimed at retraining or recovering cognitive skills, like paying attention or remembering things. Cognitive rehabilitation requires a lot of time and hard work, and sometimes the biggest challenge is keeping patients motivated and willing to put in the work. Virtual reality (VR) is an exciting technology used to create more enjoyable, exciting, and challenging therapies.

VR is a computer program through which a person can interact with objects, perform activities, and “feel” as if they are actually in that world. At Kessler Foundation, we have evaluated a game-like VR cognitive rehabilitation treatment called Wonderworks. This treatment focuses

on improving the ability to juggle multiple tasks, switch between tasks, and learn to ignore distractions.

All of the treatment tasks take place in a virtual office, unlike any you have ever been in. There are animated goats and cows and a pesky colleague that tries to steal your faxes. The more someone struggles with the tasks, the more the game can be slowed down. As users progress and their performance improves, additional distractions are introduced, and the challenge level increases.

Even though this treatment is administered using a computer in a “non-immersive” environment, participants easily feel immersed. This is exactly what makes VR a highly motivating and attractive rehabilitation tool: the treatment challenges people to use and improve meaningful skills in their real lives

through a virtual environment that is less formal than a regular therapy environment.

Research shows that VR-based cognitive rehabilitation treatments can be more enjoyable and engaging than some traditional therapies, resulting in longer training sessions and improved outcomes. While this research suggests that VR has great promise as a rehabilitation tool, new treatments like Wonderworks must be comprehensively tested before rolled out for clinical use. This ensures the treatment is safe, effective, and a viable therapy option for patients. The exciting news is that VR is increasingly being adopted in the field of rehabilitation. Many researchers are testing VR therapies that will ultimately promote autonomy and increase the quality of life for TBI survivors. ■