WHY EXERCISE HELPS PEOPLE WITH MOVEMENT DISORDERS

ulie Robichaud, Ph.D., a research assistant professor at the department of movement sciences at the University of Illinois, knows that her Parkinson's study subjects feel better after they exercise and that their symptoms subside. In a recent study she completed involving strength conditioning, their balance improved, walking velocity increased, and the ability to release a contraction improved by 30 percent. But she just doesn't know why.

"We know that in rats exercise stimulates dopamine production," she says. "Is that happening in humans when they exercise? We just can't measure that yet."

Generally, neurologists and other brain-disorder specialists believe that exercise of any form can do no harm, as long as it is approved and monitored by a health professional.

"There's no such thing as overdosing from exercise, if patients do it at their own pace," says Howard Hurtig, M.D., chair of neurology at Pennsylvania Hospital in Philadelphia. Those with balance issues or whose disease is simply too advanced might have more difficulties, but they could benefit from trying.

"The mystical side is how it affects their attitude—they get revved up, become much less depressed, and feel like they're in better control of their destiny."

Would a stroke patient respond as well to a dance class as someone living with Parkinson's disease? It's unclear.

But researchers suspect that a better understanding of brain plasticity may help answer that question.

THE PLASTICITY OF THE BRAIN allows it to heal and rewire after an injury, and exercise may play a role in that, says Chen Daofen Chen, Ph.D., program director for sensorimotor integration at the National Institute of Neurological Disorders and Stroke.

"With stroke patients, it's a use it or lose it factor," he said. "We know that when animals are engaged in voluntary exercise that it increases new neuronal survival, but does it bring new neurons into functional structure or new neurons?"

"There is a window of vulnerability where the movement therapy could have a maladaptive effect," he says. "If you do it too early, the nervous system may not be ready to accommodate those increased behaviors, and it may adapt in a way that would not help future recovery."

Ivan Bodis-Wollner, M.D., the director of the Parkinson's Disease and Related Disorders Clinic Center of Excellence at the State University of New York at the Downstate Medical Center, believes that dance therapy helps because it works the body as a whole, not as an isolated muscle group. In addition to feeling support from the group and from feeling better from doing exercise—which in itself produces dopamine, Dr. Bodis-Wollner says—there's another benefit as well.

"There's an enormous internal reward as well to dancing," he says. "You move your arm and it looks good and you're satisfied."

"The quintessential neural transmitter in the reward system is dopamine, so part of how dance therapy works is that

it's stimulating that dopamine and other transmitters."

"Parkinson's patients have a tendency to freeze when they walk or when they turn, and some patients say if they listen to the music and walk to the beat, they walk much better and have less freezing," he says.

BY REPEATING THE THOUGHT over and over, patients create a new map in their heads—not exactly rewiring the neurons, but theoretically "reprogramming" the brain to find alternate pathways to successful movement.

So when Parkinson's patients experience bradykinesia, a general slowing of movement, that new pathway can get them back into step—literally. That internal ignition that makes the hand pick up the coffee cup slows and sometimes

stops. But doing it to music, or even thinking about doing it to music, causes a shift in thinking.

Part of the ways dance teachers accomplish this is by doing the same movement over and over, reinforcing a toe-heel step instead of walking, a sideways grapevine, not a turn. That way, when a patient gets stuck, they can think of another movement and take that different map to get them to the same place.

Dr. Bodis-Wollner tells stroke patients who have lost ability in a particular limb to imagine that it is moving in a specific way. See your hand pick up the coffee cup, the toothbrush, the newspaper, he says.

"We know that imagining things creates brain activity, there's more blow flow going to a certain area of the brain," he says. "I don't know if it recircuits the brain," but maybe it reorganizes.

"The conundrum for neurologists is saying 'it helps to do exercise' but not knowing exactly what kind of exercise to prescribe," Dr. Robichaud says. "We have to figure out what works, and then figure out what's best for different types of people." — DAWN FALLIK

