

An objective measure of dyskinesia



Stephen

Project information

Lead researcher	Dr Stephen Smith
Location	University of York, Leeds Teaching Hospitals NHS Trust
Cost	£33,935 over 12 months
Start date	October 2010
Type of project	Innovation
Project code	K-1005

Project background

Levodopa is the main drug used to treat the symptoms of Parkinson's. It helps nerve cells in the brain to make more of a chemical called dopamine that's important for voluntary movement. People with Parkinson's have less dopamine than other people because many of the nerve cells that produce it have died in a part of the brain called the substantia nigra. But even though levodopa generally works well at first, there can be severe side-effects. About 50% of people who take it for more than five years will develop dyskinesias – uncontrolled movements that can affect people just as much as the symptoms of Parkinson's do.

- **Why does dyskinesia develop?** Levodopa treats Parkinson's symptoms but doesn't do anything to stop the dopamine-producing nerve cells from dying. As Parkinson's progresses, more and more levodopa is needed to make the most of the remaining nerve cells. But dopamine is also used in other parts of the brain. As the balance of dopamine levels around the brain changes, other nerve cells involved in movement can become overactive. This overactivity is what produces dyskinesia.

- **How is dyskinesia managed?** At the moment it's quite hard for doctors to help people with Parkinson's manage dyskinesias very effectively. It's possible to find out how much the involuntary movements affect people's quality of life by asking them and their carers. But there is no accurate way to measure how severe people's dyskinesias are physically. Often people need long stays in hospital to be assessed and to have their medication adjusted, and even then, it doesn't always help.
- **What's the aim of the project?** To develop a simple, reliable and safe way to measure dyskinesia in people with Parkinson's, using a computer-based system.

What the researchers are doing

In this project, Dr Stephens and the teams in Leeds and York will measure six people with Parkinson's who have dyskinesia over a period of 24 hours each. The participants will wear four wireless sensors, two on their arms and two on their legs. The sensors will be able to pick up movements automatically to record how strongly and how often they happen. They'll then be analysed on computer using specially written software that aims to tell the difference between dyskinesias and ordinary movements.

How the research will help people with Parkinson's

At the moment it's hard for doctors to adjust medication for people who've developed dyskinesia after taking levodopa long-term. There's no standard measure of dyskinesia and people with Parkinson's often need to undergo long stays in hospital that are distressing for them and expensive for the NHS. At the project's end the team hope to have developed a system that can measure dyskinesia objectively. The next stage would be to test the system in a clinical trial. We hope this will allow doctors to more easily adjust people's medication to reduce or get rid of dyskinesia, hugely improving people's quality of life. It could also save the NHS some of an estimated £400 million to £3.9 billion in costs every year for Parkinson's, most of which is spent on hospital stays.

For more information, please talk to the Research Team

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