



Exercise and Rehabilitation Therapy on Gait
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I am Peter Feys. I am an associate professor of rehabilitation science and physiotherapy. I work in Hasselt University in Belgium. And I am also currently chair in the Rehabilitation in MS Network in Europe.

So, my research is focusing on gait function and heart function. What we do is try to measure gait function because it seems to be easy but it's much more complex than that. It's not only a walking speed that may be important, but also the confidence in walking, the possibility to run, the possibility to sit and stand and stand up from a chair.

So, it's many components in walking. We try to look which are the best measures to quantify the gait dysfunction and bases of MS.

As every MS patient behaves differently, the gait dysfunction is different, the quality of life is different, the fatigue levels may be different, impacting on the potential improvements.

We don't know if persons with relapsing-remitting have a different effect of exercise compared for example to persons with progressive MS. Persons with more progressive MS, perhaps they need more time to reach the same benefits of relapsing-remitting patients.

So, for many trials – clinical trials – the works are mainly focusing on EDSS, which is a very rough measure. It's a valuable measure, but it is not very sensitive to walking abilities or cognitive dysfunction or the fatigue.

People are also measuring brain lesions and atrophy. And of course it's key – the better the brain the more you can do, but it's no one to one relationship between your brain function and what you can do in a daily life. So, I think it's key to measure the emotional feelings of the patients, the fatigue, the mobility, the cognitive dysfunction and also perhaps the interaction between both. Because we tend to measure physical function separately and cognitive function separately. But likely in real life, you need both functions at the same time.

In the coming 5 years, we should also have a lot of exercise trials - rehabilitation trials, where we look to the impact of that on brain function.

So, there are people who are having mainly problems with coordinating their hand movements, coordinating their gait, their inaccurate in for example grasping an object, making movement which is too large. Or they have some tremor there, or when they're walking they're very unstable...like it looks like they are drunk. They have this coordination problem that it's really socially almost not acceptable.

I am involved in a study that is investigating the effects of eye movements training in patients with ataxia and tremor in the hands and during walking. And there has been evidence in the past that studies interaction between the quality of your eye movement - the accuracy of your eye movements – and your hand movements. So, if you have inaccurate eye movements maybe making too large eye movements, maybe have some tremor of your eyes, it affects how you can take objects of your hand, it affects how you're walking. So the purpose of this project is to see if we can have training programs to improve that coordination.

So, we want to investigate if training at home, if apps – because we have a lot of apps also for eye movement training – if people do this for a week at home, it will improve the quality of their eye movements, the control on their eye movements and on its turn if that will affect as well the accuracy of your hand movements.

But patients maybe... persons with tremor and ataxia may be able to walk more accurately with more stability than before.

The first papers are now appearing about the effects for example of the twelve-weeks training with the "we balance" port. And they see that your changes in the brain and the structure of the brain, the thickness of certain connections.

And I think that's fabulous! It's what really demonstrates rehabilitation and exercise or cognitive rehabilitation. It's not for fun or for keeping people busy. It can really have a structural impact as it has been performed intensively.

At the same time you have to be careful not to provide hope that is not justified. It may also be that we have a risk of overtraining as well in persons with certain types of progressive MS. So, that's the challenge now – is that we all collaborate together and try to find who is responding to which type of treatment. But there is clearly indications in many studies that there can be improvements of different types of treatments.