The neuro trainer

FitPro had such a great response from its online article featuring neurological conditions so, here, **Tim Webster** explains the current routes of care relating to neurodegenerative conditions and we share one trainer's experiences.

Neuroplasticity, the ability of the brain to rewire itself given the right stimulus, could be about to present the health and fitness industry in general, and exercise professionals in particular, with a once-in-a-lifetime opportunity to join a multi-disciplinary team working with neurodegenerative conditions. This will therefore help to enhance a healthcare pathway that currently comes to a shuddering halt with physios and occupational therapists (OTs).

The reason high-intensity exercise is being seen as something of a panacea for neurodegenerative conditions is because it produces a brain-derived neurotrophic factor (BDNF) that facilitates an environment in which neuroplastic adaptation occurs. In his much-acclaimed book, *Spark*, Harvard Professor John Ratey explains that BDNF is Miracle Gro® for the brain.

In other words, the right kind of exercise opens up the possibility that the functionality of brains that have been compromised by a loss of dopamine (Parkinson's), demyelination (MS) or hypoxia/anoxia (stroke) can be restored to some degree by the rewiring process (neurogenesis). In my view, the right kind of exercise can also ensure that as few brain cells as possible are destroyed going forward (neuroprotection).

With the exception of neurophysios, designing and delivering a neuroadaptive exercise programme is not in the skill set of most physios. That's not a criticism of physios, they do a great job in their field of expertise, but they can't cover everything. It's not in most PTs' bag of tricks either, which is why I believe exercise professionals who DO know how to put such an exercise programme together are going to be a rather precious commodity in the next few years.

The current care pathway

Let's take Parkinson's (PD) as an example of what happens most of the time. Say you lose your sense of smell – a classic early warning sign for PD – but think nothing of it. Then, a few years (maybe even a decade) later, you notice a slight tremor in your hand. You take yourself off to the GP expecting some medication but instead they refer you to a neurologist. The neurologist does some physical tests (there are no blood tests or scans for Parkinson's) and they tell you they suspect PD. They refer you to a physio and suggest that exercise would be a good idea, but they don't tell you what kind of exercise or where to find it (because they don't know, which is a whole other issue).

If the neurologist refers you to an aforementioned neurophysio, happy days, but they are in short supply, so don't hold your breath. Nine times out of 10 you'll see a regular physio who might be great with musculoskeletal stuff but doesn't necessarily understand PD (or MS, or stroke). Anyway, said physio gives you a bunch of exercises that you won't do and recommends that you join a gym.

So, off you go to the gym where you sign up for some personal training. Chances are the PT won't understand PD either, so you'll get a standard exercise programme, which will make you a bit fitter but won't begin to address the motor and cognitive challenges that PD presents. And, sadly, you've probably reached the end of the road without ever accessing a meaningful exercise programme that could change your life.

Neuroplastic adaptation

So, what would an exercise programme targeted towards neurological conditions look like? There are a number of commonly quoted factors involved with neuroplasticity, namely: use-it-or-lose-it, lose-it-and-improve-it, intensity, duration, repetition, salience, specificity, age, transference and interference. Time doesn't permit me to go into all of these (another article perhaps), but the principle of intensity and the ensuing production of BDNF is critical. With Parkinson's patients we are also looking to include amplitude (big movements), complexity, accuracy (PD patients have a greater than average speed-accuracy trade-off), power (power is compromised by PD, strength isn't), stability, gait control, and so on. In short, a bit different to your average workout.

The neuro trainer

Let's say we create a category of exercise professional who is skilled at working with neurodegenerative conditions; someone who sits between a physio and a regular PT and who talks the language of both. We'll call them neuro trainers for want of a better name. The neuro trainer understands the pathophysiology of PD (and MS and stroke). They are familiar with key symptoms such as bradykinesia, tremor, rigidity and postural instability, and they know what kind of exercise is required to combat them. They know about medications such as Levodopa, MAO-B inhibitors and dopamine agonists, plus their side effects. They also know how to test and assess progress, and are aware of the cognitive and emotional challenges that PD patients can face. In my opinion, the individual will know more about exercise for PD (and MS and stroke) than the vast majority of GPs, neurologists, OTs and physios (notwithstanding neuros).

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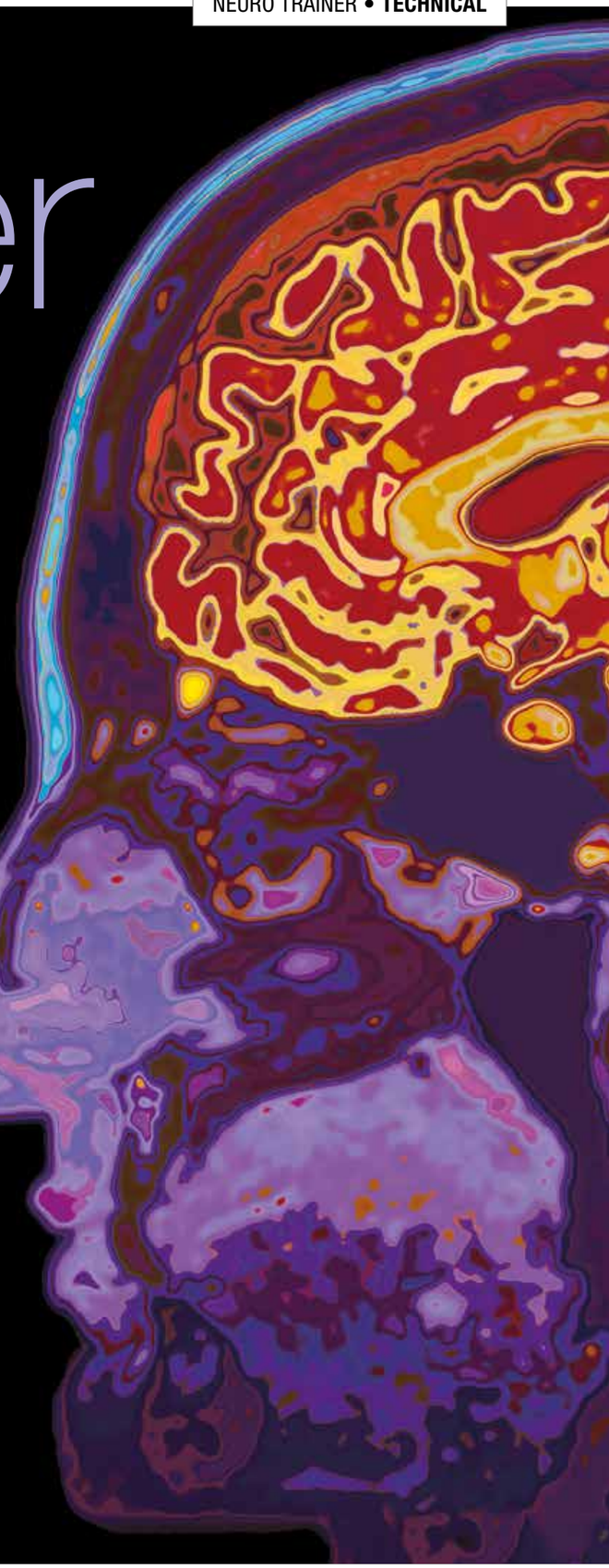
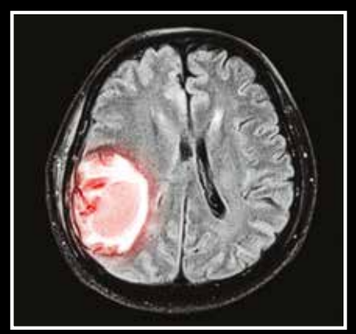
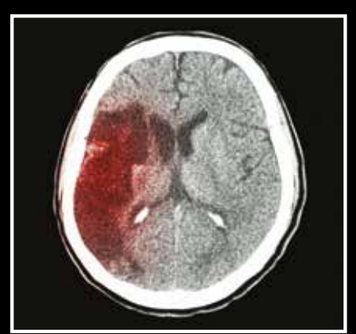
Now, all of a sudden, the physiotherapy business and the exercise business have moved closer together and the end of the road for the PD patient (and MS and stroke) just turned into a motorway. Oxford Brookes University delivers an excellent course entitled, Supporting People with Long-Term Neurological Conditions, and I understand The Wright Foundation is developing a course for neurological conditions. Meanwhile, on its education platform, FitPro has the Parkinson's Pro Foundation course for exercise professionals.

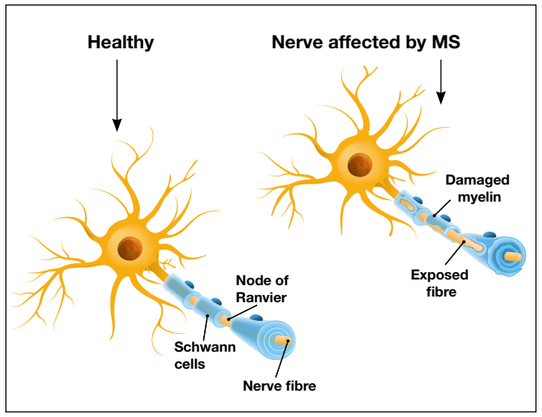






Multiple Sclerosis

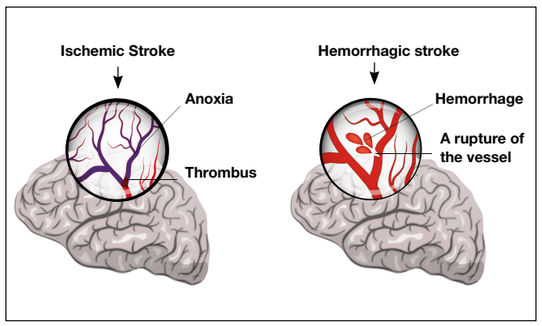
Before we move on, let's cover a couple of other areas that I see a neuro trainer managing. MS is a progressive, inflammatory, demyelinating, autoimmune/neurodegenerative disease. Progressive because it will get worse with time and there is currently no cure. Inflammatory because the disease causes inflammation in the areas of the central nervous system it attacks. Demyelinating because the problem revolves around the stripping of the myelin sheath that protects axons. Autoimmune because MS is the result of the immune system wrongly identifying myelin as a pathogen, and neurodegenerative because the condition compromises the nervous system.



Until relatively recently it was thought that exercise exacerbated the condition and therefore MS patients were encouraged not to do it, which is why the MS population is arguably the most deconditioned of all the long-term conditions. We now know that, not only is exercise good for MS patients, but they are able to tolerate high-intensity work as long as the intervals are short, and temperature control and fatigue (the two biggies for MS) are factored in[1]. Some physios will tell you that MS patients can only tolerate gentle exercise but that's an old-school approach in my view, as is the belief that strength training causes high muscle tone (spasticity).

Stroke

Stroke is the result of a block (ischaemic) or a bleed (haemorrhagic) in the cerebral arteries. It's considered to be a catastrophic life event and it's a little more challenging to work with in the sense that limb function on one side (hemiplegia) is often affected, which can limit the range of activity and increase the risk of falls. Having said that, there are some great techniques that can be used by exercise professionals after acute, physio-based care has ended and the patient has been mobilised, in order to help stroke survivors recover some gross motor function (or compensate for the loss of it) and indeed improve hand and wrist function.



Acquired brain injury

Brain injury can result from a variety of things including an external force such as a blow to the head (concussion), hypoxia (lack of oxygen to the brain), substance abuse, and infections such as meningitis. As you would expect, the cognitive repercussions of brain injury are complex, and they can lead to a variety of behaviours including disinhibition, impulsivity and egocentricity. The physical symptoms are usually a little more straightforward and they include impaired strength, hypertonia (increased muscle tone), ataxia (impaired co-ordination and balance), seizures and pain. Aerobic exercise improves cardiac and cognitive function, and strength training is fine as long as you are aware of any alterations in joint mechanics (as a result of increased muscle tone for example), which may cause swollen or painful joints. Social interaction is important for brain injury patients, too. The point I want to make here is that, unlike PD, MS and stroke, the key to working with brain injury isn't the exercise prescription itself, which is relatively straightforward, it's understanding which areas of the brain have been affected and the behaviours this is likely to evoke.

What now?

Let's assume you have gained neuro trainer status and you have a sound knowledge of working with Parkinson's, MS, and maybe stroke and brain injury. Where do you go? In my experience, GPs are already overloaded and, while there are of course exceptions, they are not a great source of referrals. Better to talk to PD (MS and stroke) nurses on the ground, specialist hospital physios, private physios and local support groups, i.e., the PD, MS, brain injury and stroke foundations or societies in your area.

You will be at the cutting edge of this sector of the industry, so don't expect doors to automatically open, but I can tell you that from conversations with a number of neurologically based healthcare professionals from PD nurses to physios and OTs, I detect a gradual acceptance of the fact that the 'exercise thing' is here to stay, and they are ill-equipped to manage or deliver it.

The secret to being accepted is to see yourself as part of a multi-disciplinary team and work hard to ensure that there's a steady flow of information between you and the other members of that team. That way you are perceived as an asset, not a threat.

Useful contacts

1. Parkinson's UK
2. Michael J. Fox Foundation
3. ActiveMSers
4. MS-UK
5. Stroke Association
6. PD Warrior
7. Headway

Case study: personal trainer, Grant Bones

"The change that I see in my clients is something that I'm extremely proud of"

I was diagnosed with Parkinson's on 15 February 2017; a day I will never forget. Words such as 'degenerative', 'progressive' and 'incurable' hit me hard and, in an instant, all my plans for the future went out of the window. I decided to qualify as a PD Warrior instructor, while also completing my Level 3 Exercise Referral qualification. I then undertook a course at Oxford Brookes – Exercise Prescription for Long-Term Neurological Conditions, Level 4 course – and I have just finished the Middlesex University and ARNI Institute course in Functional Rehabilitation and Exercise after Stroke. I set up Neuroactive Fitness – the complete workout for your brain and body. We offer functional rehabilitation, personal training, and group exercise for clients living with Parkinson's, MS, neuromuscular disorders, and individuals who have had medical approval to commence exercise post-stroke.

The programmes are founded on well-tested clinical exercise specific to individual symptoms, fitness and stage of disease progression. Where appropriate, we incorporate a blend of the most effective elements from emerging neuroplasticity-based exercise concepts. The programmes can incorporate anything from gait training, upper limb rehabilitation and repetitive task-based training, to high-intensity intervals, boxing and strength training. Ensuring that the client has fun is key to the experience, and we seek to provide more active individuals with an alternative to traditional support groups so they can network with others who see exercise as a vital component of their treatment plan.

In my opinion, this area of the fitness industry isn't prepared at all and very few fitness professionals have even a basic knowledge – with neurophysios straying into exercise prescription in an attempt to fill the void. The change that I see in my clients is something that I'm extremely proud of. I work with a retired teacher in her 70s who has Parkinson's – she can now blow-dry her hair and do up her buttons. I also work with a lady in her 40s who took her first jogging paces again after a devastating stroke. I help individuals to regain control of their lives through exercise; this makes running a specialist neurological exercise service an absolute privilege.

For further information about Neuroactive Fitness, visit: neuroactivefitness.co.uk *fp*

BIOGRAPHY ▶

Tim Webster has 35 years' experience in the health and fitness industry. The founder of *Bodylife* magazine, Tim served on the board of the FIA (now ukactive) for six years and has received the UK Health and Fitness Industry's Lifetime Achievement Award. He is now resident in New Zealand, where he specialises in working with people with neurodegenerative conditions.