

WORKING WITH THE MAGIC OF MUSIC AND MOVEMENT

Using the RGRM method to treat Parkinson's and other disorders.

Introduction

Parkinson's disease is a chronic, progressive movement disorder. Physiotherapists, in general, tend to be referred these patients once their quality of life is significantly reduced and their medication regime no longer as effective in controlling the symptoms. The development of side effects to medications can present additional problems. (1). As the disease progresses from initial mild symptoms (slight tremors, slower pace of walking, slurred and slowed speech, decreased facial movements), to more severe impairment (loss of mobility, physical co-ordination, stability and speech), the greater becomes the frustration for people living with Parkinson's. There are over 120,000 people in the UK with Parkinson's disease (2), but this does not include the number struggling with Parkinsonism symptoms from other morbidity.

This article discusses the Physiotherapist's role in supporting people with Parkinson's, using exercise programmes to stimulate neuroplasticity through the use of music and movement.

Exercise and Parkinson's disease

In Parkinson's disease, neurons that produce the chemical transmitter, dopamine, in the substantia nigra (basal ganglia) are lost. Dopamine controls movement and coordination and as the disease progresses, dopamine production decreases leaving a person unable to control movement normally. Decreased dopamine causes decreased thalamic inhibition, which will lead to bradykinesia (the reduction in speed of a movement). (2).

Recent research has shown that exercise seems to protect the dopamine-producing nerve cells that are lost in Parkinson's, so that they can work more efficiently and last for longer. (3). Thus exercise may have the potential to slow down the progression of Parkinson's. Exercise appears to modify the substantia nigra and basal ganglia making them more efficient at receiving the dopamine signals. In animals after exercise, research has shown that dopamine stays in their synapses longer and that the dopamine signals last longer. (3) Exercise has also been shown to increase the number of D2 receptors – sites where dopamine binds onto the cells allowing them to receive a stronger signal. A fall in the level of dopamine leads to an increase in glutamate, which damages cells controlling body movements. Exercise may help normalise glutamate signalling so that the body can recover

the ability to move. Studies with animals show that intensive exercise may help control glutamate production. (3).

In summary, exercise may:

- have the potential to slow down the progression of Parkinson's disease;
- help the body to recover the ability to move;
- increase the body's efficiency in terms of using the dopamine available, thus lessening the effects of Parkinson's.

Rationale for Treatment:

The principles of physiotherapy for people with Parkinson's (2) are:

- prevention of deconditioning and complications by the early implementation of a suitable exercise programme;
- monitoring and identification of rehabilitation goals through assessments which are meaningful and practical;
- the identification of deterioration and timely, appropriate intervention;
- functional return or compensation by targeted therapy;
- the involvement of patients and carers in decision-making and management strategies.(2)

Indications for physical therapy for Parkinson's patients include (4):

- impaired activity;
- limited function;
- increased risk of falling and fear of falling;
- increased liability to pressure sores;
- the need to preserve or improve physical capacity (aerobic capacity, muscle strength and joint mobility);
- the need for education regarding the consequences of the disease.

Research into the effects of exercise with Parkinson's sufferers has become more targeted over the last decade. A number of studies (3) have looked at the specific effectiveness of Tai Chi, strength training, cycling, aerobic training, upper body karate training, high intensity treadmill training etc. It has become more important to identify which physical activities improve, and maintain improvement, for Parkinson's patients.

For many years, physiotherapists have used cognitive movement strategies, performing sequences of simple movements to improve function. By concentrating on these simple movements the Parkinson's patient avoids automatic complex movements and consciously

controls their actions, repeating them, and receiving feedback. The basal ganglia (2) controls complex, long and habitual movement sequences therefore dysfunction in this area results in:

- impairment in performing automatic complex movements;
- the amplitude of the movement is reduced (Hypokinesia);
- prevention of dual tasking;
- slower mentally processing;
- thought and action perseveration.

Cueing strategies are also used to assist people with Parkinson's. Self-generated or stimulated by the environment, cues can be used to direct attention and facilitate movement. It may be that cues cause automatic movement driven from the cortex, reducing the involvement of the basal ganglia. Rhythmical, recurring cues aid the rhythmical movements needed for walking, and can be auditory, visual, tactile and cognitive. One new approach that incorporates all of these cues is the RGRM (Ronnie Gardiner Rhythm and Movement) method.

The Ronnie Gardiner Rhythm and Movement (RGRM) method

Ronnie Gardiner, a jazz drummer, started working 32 years ago on the RGRM method, in Sweden, as a way of helping children develop musicality, a sense of rhythm, and improved physical co-ordination. (Figure 1). He has been working with patients since 1993.

It became clear that there were rehabilitative benefits, which Ronnie had not initially imagined or intended. Rehabilitation specialists realised that Ronnie had unwittingly created a method which stimulated the development of neuroplasticity for the neurologically impaired patient. At the invitation of the Stockholm Stroke Association in 1999, Ronnie started training physiotherapists, Occupational Therapists, and rehabilitation professionals to use RGRM therapeutically. Since then, RGRM has trained over 250 practitioners in Sweden, some 40 practitioners in Israel, and to date, there are 8 fully trained practitioners in the UK. Therapists from Holland and Brazil are currently training.

The RGRM method describes a series of movements made using single limbs or both limbs, upper body or lower body, right- or left-side of the body. The patient reads a music-type "score" of RGRM symbols coloured blue or red. (Figure 2) The red symbols relate to the left side of the body and the blue symbols to the right side of the body. The sequence of movements is practised. Once the patient is familiar with the sequence, music is introduced and the movements are performed to a rhythm.

Figure 1. Ronnie Gardiner

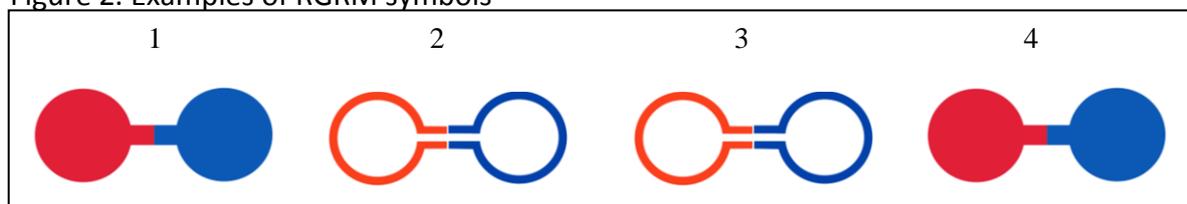


The rhythm and beat of the music is the most important part of RGRM. Each movement can be done to the speed of the beat appropriate to the patient, e.g. slower for Parkinson's or stroke patients, faster for children. Patients' progress can be measured by the fact that they are able to perform the same exercise to a faster beat.

As practitioners of RGRM, you do not need to be musical. As long as you can follow a beat, you can work with RGRM.

Each specific RGRM movement has its own name, which is spoken out loud as the movement is performed. Ronnie created his own language for these names, based on the sounds from a drum kit, which means that this method does not require translation and, as such, can be used in any language. Examples of this are "TICK", "CHOM" and "TOOM".

Figure 2. Examples of RGRM symbols



The Rationale for RGRM

RGRM works on the principle of stimulating brain neuroplasticity (the ability to change and compensate). Research has shown that neural connections and patterns are driven by a combination of different aspects of exercise (4):

- intensity;
- specificity;
- difficulty;
- complexity.

Intensity describes the speed and repetition rate. Specificity is directed at functional ability. Difficulty and complexity are addressed by the way in which the exercise process is directed; listening and processing instructions and the demands made on the individual body.

Music is known to be a powerful medium. It can:

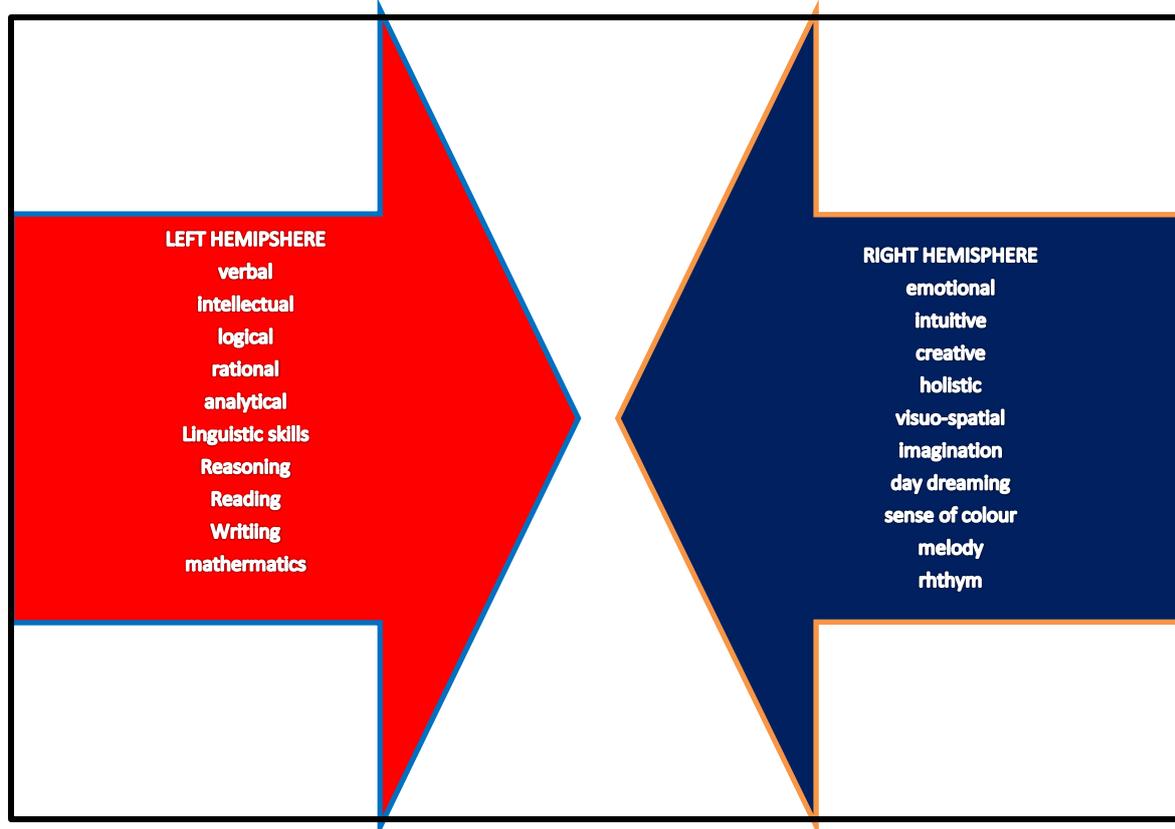
- create a relaxed atmosphere;
- release tension;
- increase energy;
- inspire creativity;
- stimulate body movement;
- focus thoughts;
- stir emotions and energy.

The aim of the RGRM approach is to create new communication between the left and right sides of the brain. The right hemisphere of the brain is responsible for functions that include emotion, intuition, creativity, imagination, melody and rhythm. (Figure 3). The RGRM method stimulates the right hemisphere using colour recognition (the red and blue RGRM colour system), together with visuo-spatial comprehension (the RGRM body symbols), and placement and direction of movements (the RGRM prescribed movements).

The left side of the brain is responsible for functions that include reasoning, analysis and vocalisation. The RGRM method stimulates the left hemisphere using sound recognition (the RGRM sound codes), pattern recognition (the RGRM body symbols) and vocalisation (the RGRM symbol language).

As the patient follows the RGRM audio-visual symbols, the right hemisphere is stimulated to develop rhythm and sequencing, leading to emotional, creative and holistic functioning improvement. Simultaneously, stimulation of the left hemisphere improves linguistic skills, reading, analysing, reasoning skills and concentration. The music tempo and different combinations of movements and sounds enhance the left hemisphere processing skills.

Figure 3. Examples of Functions of the Left and Right Hemispheres



Evidence underpinning the RGRM Method

Small research projects on the RGRM method have already taken place in Sweden at the Karolinska Institute, the Stockholm Stroke Association and Sahlgrenska University Hospital.

Professor Nilsson is the head of rehabilitation medicine at Sahlgrenska University Hospital in Gothenburg and professor of neurology and rehabilitation medicine. He says *“When you work with neurological injury, the stimulation of the external senses is of critical importance for successful rehabilitation. We are currently planning a research project where we will evaluate the RGRM method, the effects of music and dance, and the brain’s “plasticity”.*” *“The method likely influences the dopamine, noradrenalin and serotonin systems, which also is positive. This is meaningful for one of the most important factors within rehabilitation, namely motivation.”* *“With his RGRM method, Ronnie Gardiner was one of the earliest to use dance, music and rhythm as a type of treatment. He has made a pioneering contribution.”*

In addition, there are an increasing number of studies being carried out into the effects of music on the brain including a study by the Neurosciences Institute San Diego, UC San Diego’s Centre for Human Development and the San Diego Youth Symphony and Conservatory to explore how music and martial arts training influence the development of cognitive skills.

In Australia, Auditory Processing Disorder training utilises electronically modified music to re-educate, stimulate and improve the processing of incoming auditory information using the Tomatis techniques. (5)

Daniel Levitin, a musical neuroscientist and Professor in Psychology at McGill University has written a best seller entitled *“This is your brain on music”* (see link).

Research has shown that the best way to improve the function of any sensory system is through its stimulation, and that the most direct form of stimulating the auditory system is through listening to specially arranged music or sounds, where sensory information is simultaneously integrated through sensory-motor activities.(5) The RGRM method reflects this thinking.

Measuring outcomes:

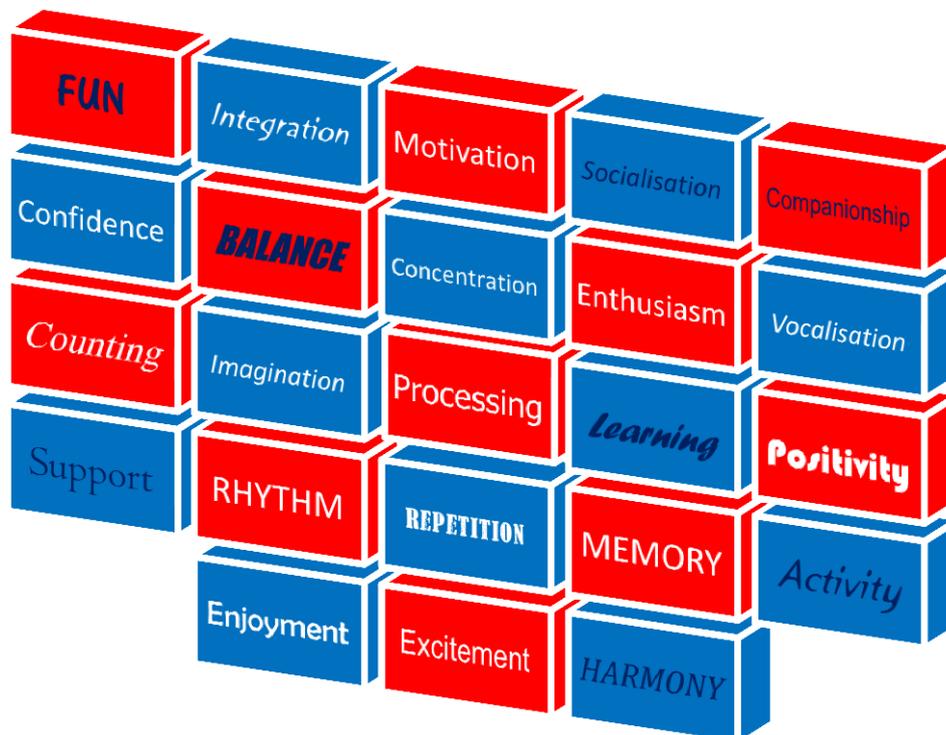
Outcomes following use of the RGRM method can be measured using subjective outcome measurement tools such as patient-specific functional scales or Quality of Life outcome tools. Cognitive tests such as the Stroop test, memory recall and naming 30 items have also been used to quantify progress.(6) A wide range of outcome assessment tools may be used to measure physical outcomes. Tools recommended for an objective inventory for Parkinson’s patients include:

- the Retropulsion test;
- the Parkinson’s Activity Scale (PAS);

- the Timed Up and Go test (TUG);
- the 6 minute walk test;
- the 10 meter walk test. (2)

Subjectively, outcomes reported by RGRM patients include improvements in balance, speech and activities of daily living (Figure 4). Objectively, a baseline measurement of the speed of movement is recorded by using a metronome. Patients' progress is recorded by using a faster beat for an exercise.

Figure 4. Outcomes of RGRM.



RGRM as part of the Therapist's Repertoire

Definitions of "physiotherapy" include the phrase "use of physical approaches in the promotion, maintenance and restoration of an individual's physical, psychological and social wellbeing, encompassing variations in health status."(2). RGRM sits well within this definition and the scope of physiotherapy practice relating to the exercise and movement "pillar of physiotherapy practice". The approach also falls under the "pillar of kindred methods of treatment" (7) as a new and innovative form of exercise treatment utilising multisensory training.

RGRM incorporates a range of physical challenges, includes balance, concentration and memory exercising. It provides a method of treatment that reaches out to those patients who are struggling with physical activity or who are "bored" with the standard treatments

offered. It also gives a wide range of options for therapists who seek a more dynamic way to motivate and encourage physically, mentally and emotionally suffering patients.

Ronnie, the inspirational motivator and instigator of RGRM, tells the story of a lady who attended RGRM sessions, who had minimal active movement control or ability. After attending for 6 weeks, to the amazement of her carers, she suddenly started tapping her feet and moving her hands in time to the music, having not given any previous indication of her ability to understand or process the instructions or movements.

The RGRM method is very flexible. It can be used in group work or in one to one sessions, tailoring programmes to meet the individual's needs, skills and interests, and developing the programme week on week. It gives practitioners the opportunity to deliver group sessions for mixed ability groups, single diagnoses or a mixture of diagnoses.

The companionship, fun and enjoyment that occur in a session encourage people to integrate and to socialise more widely, offering each other positive support and encouragement. The RGRM approach improves socialisation skills and reduces participants' feelings of isolation, helping to diminish depression and the feelings of negativity, which are common with neurological problems such as Parkinson's. One of the most effective results of working with this programme is building self-confidence, as it helps to change people's attitudes to their own abilities and potential.

RGRM Skills and Training

Lee Wax is the organiser of RGRM in the UK. She is an educator, who discovered and learnt the RGRM method in 2008. Since then, she has worked to bring the method to the UK.

She talks enthusiastically about building the RGRM movement in the UK, and about the many different possible applications. *"In Sweden and Israel, RGRM is used in a wide variety of neurological conditions: including Parkinson's, Stroke, brain injury, ADHD, dyslexia, dyspraxia, autism, special needs, depression. It's also used effectively with both ageing and the young, to work on balance and co-ordination, memory, energy, and generally stimulating the brain. It is so moving seeing people having such fun, challenging themselves, and making improvements - people just love it. Ronnie has created something really inspiring. The approach is evidence based, therapeutic, neurologically sound, and on top of that it is enjoyable. It's a great combination, and a real privilege to be bringing it to the UK."*

Ronnie Gardiner is currently visiting the UK twice a year to train new practitioners. It is a two-stage training process, each stage taking 2 days, with trainees practising in their own contexts in the months in between. Parkinson's UK, in central London, supports the RGRM method and provides the location for RGRM training.

The individuality and creativity of the RGRM programme is boundless. It offers a safe but liberating treatment modality for the Parkinson's patient. Any series of movements can be

used with any choice of music. The RGRM method provides endless opportunities for tailoring to the patient's preferences and needs. Once you have the knowledge of the method, you have the ability to create a movement based, motivating programme that allows participants to strive without the fear of failing. The fun of everyone working together, of making mistakes and improving as they go, adds to the companionship and positive culture that the RGRM method inspires.

As a practitioner:

- you do not have to be able to read music;
- you do not have to be able to dance or sing.

As long as you can follow a beat and have the enthusiasm to create your own movement and music programmes then you can use this method. You can incorporate the latest releases or use more traditional music – the choices are endless – and so is the laughter and fun.

References

1 – Drug treatments for Parkinson's.

© Parkinson's UK, November 2010. Parkinson's UK is the operating name of the Parkinson's Disease Society of the United Kingdom. A charity registered in England and Wales (258197) and in Scotland (SC037554).

2 – The Professionals Guide to Parkinson's Disease

© Parkinson's Disease Society of the United Kingdom, 2007

3 - Does Exercise impact Parkinson's? G.M.Petzinger,M.D.

Fall 2009 issue PDF's (Parkinson's Disease Foundation) newsletter, News & Review.

4 - KNGF Guidelines for physical therapy in patients with Parkinson's disease. Royal Dutch Society for Physiotherapy. Supplement to the Dutch Journal of Physiotherapy Volume 114; Issue 3; 2004

5 – www.auditoryprocessing.com.au

6 - The Stroop Test – www.rit.edu/cla/gssp400/sbackground.html

Memory recall – www.acnp.org/g4/gn401000133/ch130.html

The Patient Specific Functional Scale – www.tac.vic.gov.au/upload/Patient-specific.pdf

Quality of Life tool – www.proqol.org/uploads/ProQOL_5_English.pdf

7 – The Chartered Society of Physiotherapy. Curriculum framework for qualifying programmes in physiotherapy. London: The Chartered Society of Physiotherapy; 2002. URL: <http://www.csp.org.uk/publications>

Links

www.rgrm.org.uk

For further information on RGRM training courses, email Lee Wax at info@rgrm.org.uk or call 07791734774.

Old Man in Nursing Home Reacts To Hearing Music From His Era

<http://www.youtube.com/watch?v=fyZQf0p73QM>

This is Your Brain on Music; Daniel Levitin, Atlantic Books 2008. ISBN 978 1 84354716 7

Musical creativity and the Brain. www.dana.org

www.onward-living.com