

**BGS Movement Disorder Section Essay Prize
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“The Art of Parkinson’s”

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Parkinson's disease (PD) is a chronic, progressive, neurodegenerative disease characterised by both motor and non-motor symptoms. The disease was first discovered by Dr James Parkinson in 1817 in which he wrote "An Essay on the Shaking Palsy" encompassing these very noticeable symptoms¹. From 2018 studies, it is predicted that PD affects approximately 145,519 people in the UK². The disease primarily effects the elderly population, posing a great burden to our health care system as the degenerative effects on mobility and muscle control cause a gradual loss of independence and a significant clinical reliance on families and caregivers. In contrast to these changes, damage to the brain can paradoxically improve artistic production such as that described in stroke, epilepsy, autism and frontotemporal dementia (FTD). Although many artists with PD exist, very little is known about the visual art produced by PD patients and the neurological underpinnings that produce this creative drive.

The exact cause of PD has still yet to be discovered however research has shown the relationship between parkinsonism and the prominent degeneration of dopaminergic neurons in the substantia nigra pars compacta within the basal ganglia of the corpus striatum giving rise to the consequent loss of motor function³. Recognizable motor signs (such as bradykinesia, resting tremor, postural instability and rigidity known collectively as the symptom complex of parkinsonism) and non-motor signs (such as decreased cognition) appear only after substantial degeneration of the nigrostriatal neurons, which can develop over the course of decades⁴. Most patients who develop signs of PD are over the age of 60, however early-onset PD (onset between 21-40 years), and juvenile-onset Parkinson's disease (onset before age 21) can rarely occur⁵. The loss of dopaminergic neurons in the striatum of PD patients results in the eventual dysfunction of the neuro transmitter gamma aminobutyric acid (GABA), leading to an inhibition of the thalamus. This in turn can result in a decreased ability of the thalamus to activate the frontal cortex, leading to decreased motor activity¹. The other histopathological finding associated with PD is the formation of lewy bodies (LBs) recognisable as the hallmark of other neurodegenerative diseases such as lewy body dementia, which has some cross over with PD. The protein alpha synuclein is a major constituent of LBs and has been identified as a potential target for future PD therapy⁶. Overall the loss of dopaminergic neurons along with spreading brain lesions produce a wide number of symptoms ranging from issues with motor control and cognitive processes (including language and memory), as well as sensory, and emotion regulation. Presently there is no cure for the disease, but merely symptomatic relief through the use of dopamine precursors, such as Levodopa, and dopamine agonists.

Interestingly, in addition to the medical importance of the disease, emerging evidence also suggests that with the diagnosis and antiparkinsonian treatment, a subset of individuals appear to have evoked new artistic flare and creativity through changes in style and changes in artistic work produced. Obsessive-compulsive traits produced by neurologic disease can create a disposition to produce art, as seen in FTD and autism. FTD artists often work compulsively on visual themes whilst children with autism can become preoccupied with drawing specific objects, such as horses or buildings⁷. It is these obsessive-compulsive symptoms that in turn are mediated by dopaminergic and serotonergic systems⁸. It is common for patients with PD on dopamine agonists to develop obsessive compulsive traits

such as gambling⁹ and thus it is very possible that these patients express this trait through their art rather than through other means. A study published by *Lakke (1999)*¹⁰ first considered the relation of PD to changes of creativity and style in art, comparing artworks made before and after the onset of PD. Originally *Lakke* hypothesised that PD would be a hinderance to the artwork and a decline in overall quality noting that artists with PD “might be impoverished in originality and creativity.” However, contrary to expectations, pictorial capacity remained unaffected with the study noting that almost all artists showed “continuing and maturing creativity.”¹⁰ Patients in this study also experienced a redoubled focus and urge to create artworks again leaning towards this notion of an obsessive composition. Of course, some changes to the patient’s style and movement ability were observed by *Lakke*, where patients changed to using a cross hatching style to make use of their tremor. A study by *Pinker (2002)*, focused on visual artworks completed before and after the diagnosis of PD, reporting that it was “practically impossible to determine which canvases predated the clinical symptoms.”¹¹ The increased compulsion to produce artwork combined with the increased creative capacity in these studies are similar to that experienced by the artist *Johanne Vermette* who felt an enhancement with her artwork since her diagnosis with PD, stating her paintings were “less precise but more vibrant” and “I have a need to express myself more. I let myself go, sometimes painting with enraged fingers.”¹²



*Johanne Vermette, Un après-midi au verger, 2000–2001 (after diagnosis of Parkinson's disease). Acrylic on canvas*¹³.

So far, many studies have shown a link between artists that increase their creativity and production of artwork after the diagnosis of PD. Yet studies have also revealed patients who have never before produced art, suddenly begin to create visual art.

The onset of art production or motivation to produce art by novices, after diagnosis of PD, and the commencement of antiparkinsonian medication has been sparsely noted in literature. *Walker et al. (2006)*¹³ reported a patient with PD that became interested in art and started producing large amounts of pastel drawings, after an increase of a dopamine

agonist. The patient believed himself that his use of the medication had boosted his creativity. Another study similarly followed an infrequent artist, who had studied art in his youth but refrained from the hobby for many years. Through the diagnosis of PD and beginning levodopa/dopamine agonists the individual began to use coloured pencils and abstract compositions to enhance his creative expression whilst using crosshatching techniques. The patient produced a vast amount of specific themed pieces of work describing himself as “being obsessed by his art,”¹⁴. Thus it is possible to hypothesise that both the disease and medication positively contribute to artistic development.

However, it remains a very grey area in regard to the exact process: either the disease itself or simply the medication, that underpins this “artistic drive” that seems to ensue patients with PD. A study by *Lhommée et al. (2014)* investigated the tie between the onset or stoppage of dopaminergic therapy (through the use of deep brain stimulation surgery) and general creativity, with a specific interest in impulse control disorders comparing creative PD patients (including sculptors and painters) to non-creative patients. It was found that through the surgery and withdrawal of dopamine agonists, creative drive began to disappear after one year¹⁵. Additionally, another study evaluating the relationship between pharmacotherapy, artistic inclination (including prior art-involvement), and creative thinking using the Abbreviated Torrance Test of creative thinking for Adults (ATTA) found that professional artists with PD developed an over productive obsession and “spent most of the day producing art disregarding ...other daily life interests” than PD patients with no previous art experience or control subjects. Whilst professional artists and control subjects both had higher ATTA scores than non-artistic patients, the results found no relationship between dopamine therapy and the emergence of artistic creativity. The author hypothesised that it is perhaps the dopamine therapy that increases the drive of reward seeking behaviour than the actual creative imagination¹⁶.

In summary there is emerging evidence that neurodegenerative diseases such as PD, causes a remarkably increased artistic motivation. It is hard to distinguish if this motivation is due to addiction or compulsive types of behaviours. Both individuals with previous artistic experience and no artistic experience can be affected by the creative motivation, yet previous artists tend to be affected more. The onset of creating art also appears to coincide with the use of Parkinson medication, in particular dopamine agonists. Although studies have found no link between assessing the role of dopaminergic therapy in triggering this “artistic drive” many self-reports by patients have indeed expressed an increased feeling of creativity over the course of their illness. Additionally, case studies of prior artists before and after the diagnosis of PD, report an increase or at least no decline in the quality of artwork produced. Most case studies show a productive period of art creativity extending many years after initial diagnosis with the *Lakke (1999)* study showing continued artistic productivity over ten years after the initial diagnosis of PD. Due to the small number of studies and sample sizes it is very difficult to attribute the onset and treatment of PD to the increased creative drive of patients, however from the evidence presented, it is clear that the creation of artwork can be highly popular for patients with neurodegenerative disorders and provide some therapeutic distraction from the disease process. These studies perhaps

provide some clue to help aid towards a better understanding of the process of parkinsons disease.

Word Count: 1,470

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