Chiropractic Management of an 81-Year-Old Man With Parkinson Disease Signs and Symptoms

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Abstract

Objective: The purpose of this case report is to describe the chiropractic management of a patient with Parkinson disease.

Clinical features: An 81-year-old male with a 12-year history of Parkinson disease sought chiropractic care. He had a stooped posture and a shuffling gait. He was not able to ambulate comfortably without the guidance of his walker. The patient had a resting tremor, most notably in his right hand. Outcome measures were documented using the Parkinson's Disease Questionnaire-39 (PDQ-39) and patient subjective reports.

Intervention and outcome: The patient was treated with blue-lensed glasses, vibration stimulation therapy, spinal manipulation, and eye-movement exercises. Within the first week of treatment, there was a reduction in symptoms, improvement in ambulation, and tremor.

Conclusion: For this particular patient, the use of alternative treatment procedures appeared to help his Parkinson disease signs and symptoms.

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Introduction

Parkinson disease (PD) is a neurodegenerative brain disorder that progresses slowly in most patients.¹ When approximately 60% to 80% of the dopamine producing cells are damaged, cardinal motor symptoms

such as akinesia, rigidity, and tremor begin to appear.¹ A small number of patients have a direct mutation that causes it, but genetic predisposition and environmental factors are most commonly the cause.¹ PD is a central nervous system disorder resulting from destruction of the substantia nigra, which initiates dopamine release, an inhibitory transmitter.^{2–4} The lack of dopamine causes a continuous excitatory signal to be sent to the corticospinal tract of the spinal cord, causing over-excitation of the motor cortex; this over-excitation creates the typical PD symptoms.^{2–4}

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PD is diagnosed clinically, based on the presence of resting tremors involving a thumb or few fingers, rigidity, bradykinesia, gait and balance problems, often in the sixth or seventh decade of life.³ A diagnosis of PD is not made from magnetic resonance imaging (MRI), but this imaging can help in determining some of the portions of the brain that are effected.⁵ Regular MRI imaging in the early stages of PD is mostly ineffective; however, late stage PD shows marked cortical atrophy.⁶

PD is typically treated with dopaminergic replacement therapy, monoamine oxidase inhibitors, amantadine, or dopamine agonists.⁷ This treatment tends to be effective in the beginning but as tolerance to medications grows the effectiveness is lessened.⁷ In late stage PD when medication is no longer effective, deep brain stimulation is currently used which may also decrease the progression of cognitive and motor decline in early stages of PD.⁷

There are a variety of conservative, non-pharmaceutical treatments for PD including exercise, physical, occupational, speech therapies, and chiropractic manipulation.⁸⁻¹⁰ There are 2 case reports that suggest that chiropractic treatments may decrease essential tremors in patients.^{8,10} Various complementary and alternative medicine (CAM) therapies have reported to improve activities of daily living and function, and when used in conjunction with medical management or neurosurgical treatment, a PD patient might be able to maximize functional ability and minimize secondary complications.⁸⁻¹¹

At present, there is little published in the chiropractic literature that describes the chiropractic management of patients with PD and no known case reports that include the inclusion of functional neurology. Therefore, the purpose of this case report is to describe the chiropractic management of a patient with PD.

Case Report

An 81-year-old man with a 12-year history of PD presented for a general health checkup to a chiropractic clinic. He used a walker and had short, abrupt steps that shortened progressively as he fatigued. He would stop abruptly at intervals due to his inability to coordinate movement. While standing, he had severe anterior head carriage, as well as excessive kyphotic posturing (~20°-25°) which he was unable to straighten.

Passive ranges of motion of his extremities showed rigidity with movement. It was difficult for him to

extend his arms. His cervical musculature was rigid when lying supine; it took 3 to 5 seconds for his head to relax onto the exam table. When asked questions, he had difficulty responding due to stuttering pauses, which were frequent. His past medical history revealed hypertension controlled with lisinopril, hypothyroidism controlled with levo thyroxine and PD being treated with amantadine and ropinirole.

As part of the examination, he was asked to wear a pair of blue-lensed glasses. He subjectively reported a favorable response to the blue glasses which he said created a slowed tremor; however, there was not a change in visualization of the tremor. On visual examination there was a noticeable leftward lean. When asked about the leaning, he responded that he did not realize he was leaning toward the left.

He performed a finger-to-nose test with both eyes opened then closed, which resulted in a tremor bilaterally at the initiation of movement which subsided throughout the movement, and returned upon ending the test with the finger at his nose. When examining fluidity of eye movement pursuits, there was disruption upon leftward movement. He then followed a moving target to the left of his visual field. When examining the motion of his eyes, there were abrupt pauses in movement. He demonstrated a resting tremor of his right hand that was continuous throughout the entire examination.

Treatment visits consisted of wearing blue lensed glasses, vibration therapy, mirror imaging and cross-crawl exercises, and chiropractic manipulation. During all visits the patient was given blue lensed glasses to wear. He was also asked to wear these blue lensed glasses while at home and as often as possible. Vibration therapy in the form of a VibraCussor was performed on the right side of his body, it was placed on his right wrist, elbow, knee, and ankle for 5 to 15 seconds at each location then repeated. While performing mirror imaging exercises, he would stand laterally with his right side against a mirror in order to inhibit the view of his right side. He was instructed to only observe his left hand, through the reflection in the mirror while performing rapid alternating motions of the left fingers. He would alternate finger movements with palmer flexion and extension exercises. This was performed for no longer than 1 minute, at 2 separate times. During cross-crawl exercises, he would alternate contra lateral arm and leg swings. The patient would perform 10 to 15 repetitions, while lying in a supine position. A long-axis standing thoracic chiropractic manipulation would be performed at every visit focusing on the middle thoracic area.

A PD questionnaire 39 (PDQ-39) was given at the initiation of care and the patient scored a 15. This instrument has the patient rate his or her activities of daily living and well-being.¹² The patient received care twice a week after the initial examination for a duration of 2 months.

After 2 months, the patient completed a PDQ-39 with the score of 9, demonstrating improvement in activities of daily living and well-being. He also noted improvement in his ability to write his name without a tremor. He subjectively indicated an improvement in posture becoming more erect and a reduction in the leftward lean. The patient's wife stated that the patient no longer leaned while sitting. She also stated that friends and family saw change in the patient's posture. When visually documented, his anterior flexion was determined to be 10° to 15° anteriorly, post treatment. This was determined visually by photographing a lateral, full body view of before and after photos with the patient. The photos were then superimposed to show the difference of before and after treatment. To make sure the pictures adequately depicted the findings, the photos were imposed so that the root of the patients neck at cervical vertebrae 7 (C7) imposed, as well as the patients posterior aspect of his waist. This properly portrayed the change in posture from the upper half of the patient's torso. Upon viewing the image an estimation of 10° improvement was found. After seeing positive results in posture he began to walk without assistance from a walker. The patient stated that he no longer felt "unbalanced" to the point of needing assistance while walking, since under care he is no longer using a walker and continues to take more fluid steps with increased strides and stability.

The majority of improvement took place within the first 2 months of care. After this the patient continued care because "he was afraid he would return to his previous state", and he continues to treat to this day with only 1 relapse when he reduced care to once a week. Once returning to care twice a week he returned to pre-relapse status. At the time this case report was written he had been treating for 10 months and has been seen 65 times.

Discussion

When caring for individuals with signs of PD, popular belief is that both the indirect and direct pathways of the basal ganglionic loop, as well as the concomitant connection the basal ganglia shares with

the limbic system through the neostriatal projections are affected.¹³ Therefore, individuals who have PD may develop symptoms of flat affect, or memory loss due to striatal connections and caudate connections (respectively) to limbic and prefrontal areas.¹³

The approach taken in this study stems from the concept that a lack of N-methyl-D-aspartate (NMDA) receptor control leads to a loss of neuronal plasticity, as well as understanding that PD creates dysfunction of dopamine regulation within the nigro-striatal tracts.^{14,15} Treatment was aimed at stimulating the basal ganglia and mesencephalon with non-invasive therapies. Research indicates that plastic changes within neuronal tissue will occur when stimulation is given to a neuronal pool.¹⁶⁻²¹

One of the modalities used to try and elicit plasticity within the basal ganglia was vibration therapy.²² Adding stimulus via vibration is thought to create temporary plasticity, aimed at a temporary inhibition of the patient's passive tremor.²³ Real time functional MRI studies would be indicated in order to deduct factual evidence as to if vibration did elicit putamen activation.

Another modality used was blue light therapy, in the form of blue-lensed glasses. Blue-lensed glasses were given to the patient before all treatment modalities; this has a short wavelength of light. Preliminary reports have suggested using blue light in addressing depression in the older population with mood disorders.^{19,24} This technique was used due to a connection between the limbic system and the basal ganglia, in the neostriatum.^{19,25,26} To test this theory, functional MRI studies could be performed while specific basal ganglionic stimulus is given could help to better understand if this activation is taking place.

A third modality given to the patient was alternating arm swings in the form of cross-crawl exercises. Pre-treatment assessment demonstrated difficulty for the patient to elicit proper alternating arm swing. The motions were lacking in coordination. Due to the consideration that the frontal lobe is activated by the initiation of movement, as well as the coordination of gait mechanics, creating a "gaiting type pattern" was thought to help stimulate the patient's frontal fields.^{19,20,27}

Chiropractic manipulation was given to the patient in an erect posture in order to elicit plasticity within cortical structures.^{19,28} Previous studies done with cortical blind spot mapping have hypothesized that adjustments to the spine create plastic changes within the neuraxis.^{19,20} Afferent excitation of joint mechanoreceptors once a "quick stretch" manipulation was given is thought to excite pathways to the cortex.²⁹ When done in the spine, fast stretch reflexes are thought to be elicited within the intrinsic spinal

musculature, which excites the cerebellum because of cerebellar afferent feedback with mechanoreceptor activation.¹⁷ From the cerebellum the information may then be fed forward to the vestibulospinal tract, where the body might adapt to the afferent impulse with a concomitant efferent change in position. This may then explain the postural change within the patient's erect ambulation.³⁰ However, these hypotheses are not tested and only theoretical. Further studies are needed to test the pathways that are thought to be involved with chiropractic manipulation.

Mirror imaging was another therapy introduced for care. The reason this procedure was used lies behind mirror imaging therapies being used for phantom limb syndromes.³¹ The mechanism is attributed to mirror neurons located in the frontal lobe. Once activated, they create plastic changes within the somatosensory cortices, therefore inhibiting pain.^{31,32} There is also a connection from the somatosensory cortex into the basal ganglia, which may attribute to the secession of the patient's tremor.

It is thought that every action or stimulus affects multiple cortical systems; however, it may be due to constant stimulation through a modality, increased blood supply and oxygen, that creates more potentiation to reach a specific area when comparing areas not receiving stimulation. If longer periods of stimulus are given to the patient, certain areas may receive more excitation or inhibition than others.^{33,34} The aim of this care is to provide positive plastic changes within cortical tissue and understand the amount of stimulation a patient may handle, as well as which cortical areas may be in need of plastic change.

Limitations

This case report has several limitations. It is plausible that placebo or other psychosocial responses were responsible for the patient's improvement. The patient was asked to wear the blue-lensed glasses at home as often as possible and to perform his cross-crawl exercises daily; both of these may or may have not been done on a daily basis and there is no way to measure the amount of time or effort put forth by the patient while not in the office. Another common limitation of case reports is that we were not able to control the environment of the patient. Future research is needed in order to specifically determine whether blue-lensed glasses affect a person's muscular coordination via the basal ganglia or act as a

placebo. Better objective evaluations are needed as well, to determine the effect of the patient's symptoms with and without these treatments. The findings of this case report may not necessarily be applicable to other patients. More subjects will be needed in order to test if the modalities used in this case will effect a more vastly distributed population of patients as well.

Conclusion

This case report describes the responses of a patient with PD who was treated with blue-lensed glasses, vibration stimulation therapy, spinal manipulation, and eye-movement exercises. No definitive conclusions can be drawn from this case; however, it does suggest that the use of chiropractic care may benefit a patient with PD.

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No funding sources or conflicts of interest were reported for this study.

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