

## CASE REPORT

# Is *Ginkgo biloba* and/or a Multivitamin-multimineral Supplement a Therapeutic Option for Parkinson's Disease?

Gary D. Conrad, MD

**Author Affiliation**

Gary D. Conrad, MD

**Correspondence**

garydc7@gmail.com

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conflicts to disclose.**ABSTRACT**

For a number of years, there has been speculation about the potential benefit of Parkinson's disease by treatment with *Ginkgo biloba*. In this case report, my grandfather, who had a known history of Parkinson's, had dramatic improvement after supplementation with ginkgo and a multivitamin-multimineral supplement. Human studies are needed for confirmation.

**INTRODUCTION**

*Science is the orderly gathering of knowledge by methodical inquiry and experiment, but where do you get ideas to inquire about or experiment with except through your experience of the world around you?*<sup>1</sup>

—Andrew Weil, MD

In the late 1980s, I received a call from my aunt, who was concerned about my grandfather. He had a long-standing diagnosis of Parkinson's disease (PD) and was beginning to have frequent falls. She was afraid that, unless there was some sort of intervention, he would no longer be able to live by himself.

The only medication he was on for his PD was Sinemet (carbidopa-levodopa), which afforded little symptomatic relief. While impaired balance is a typical symptom of Parkinson's, at the time I wondered if his falls could be due to vertigo or perhaps arterial insufficiency, both of which could potentially be helped by *Ginkgo biloba*. I recommended he start ginkgo at 40 mg three times a day. The product I chose was standardized to contain 24% ginkgoflavonglycosides, 6% terpene lactones, and 2% bilobalide. I also initiated a multivitamin-multimineral supplement, two tablets a day.<sup>2</sup>

The results were near-miraculous. Over a 6-week period, not only did my grandfather's falling episodes dramatically decrease, but his tremors improved by 80% to 90%. Before, when he attempted to eat, he would "sling food across the room" and frequently had to be spoon-fed by family. After treatment with ginkgo and the multivitamin-multimineral, he was capable of feeding himself and going out to eat. He was able to continue to live at home, and his overall quality of life had markedly improved.

In early 1997, when he was eventually placed in a nursing facility, he was taken off his ginkgo and multivitamin-multimineral supplement. By that time, he had been on them for around 10 years. He died some 3 months later, and his tremors never returned to their pretreatment levels.

**PATIENT INFORMATION**

My grandfather was born in 1907 and lived in southwest Oklahoma, near the small town of Friendship. He was white and a farmer of wheat, alfalfa and cotton.

**DISCUSSION**

Parkinson's disease is a neurodegenerative disorder, which is characterized by the loss of the dopamine-producing neurons of the substantia nigra pars compacta. The principal motor symptoms of PD are resting tremor, bradykinesia, rigidity and postural instability. Non-motor symptoms can include cognitive dysfunction, sleep disorders, fatigue, depression, and autonomic abnormalities.<sup>2</sup> It affects around one million Americans, and more than 50 000 new cases are reported annually.<sup>3</sup>

*Ginkgo biloba*, also called the maidenhair tree, is native to eastern China. The biological activity of ginkgo is considered to be associated with numerous constituents rather than a single compound, as the effects observed in clinical studies using the leaf extract have not been replicated in studies using individual components. The compounds that have stimulated the most pharmacological and analytical interest are the terpene trilactones and flavonoid glycosides.<sup>4</sup>

*Ginkgo biloba* is one of the most widely studied herbs in the world, and the internal use of ginkgo leaf extract has only rarely been associated with adverse reactions, most of which are minor.<sup>4</sup> A March 2013 study from the US government's National Toxicology Program suggested that ginkgo extract causes liver cancer in mice, and there is "some evidence" that it causes thyroid cancer in rats. According to the American

<sup>2</sup> The multivitamin-multimineral supplement contained the following per six [emphasis the author's] tablets: beta carotene, 20,000 IU; vitamin C, 1000 mg; vitamin D-2, 100 IU; vitamin E (mixed tocopherols including d-Alpha), 400 IU; vitamin B-1, 100 mg; vitamin B-2 (riboflavin), 75 mg; vitamin B-3 (niacin), 150 mg; vitamin B-6, 50 mg; pyridoxal 5-phosphate, 15 mg; folic acid, 800 µg; vitamin B-12, 300 µg; biotin, 400 µg; vitamin B-5, 150 mg; calcium (amino acid chelate), 900 mg; iodine, 150 µg; magnesium (amino acid chelate), 450 mg; zinc (amino acid chelate), 40 mg; selenium (amino acid chelate), 150 µg; copper (amino acid chelate), 2 mg; manganese (amino acid chelate), 20 mg; chromium (amino acid chelate), 150 µg; potassium (amino acid chelate), 99 mg; vitamin B-10, 75 mg; bioflavonoids (citrus), 200 mg; betaine HCL, 150 mg.

Botanical Council, this research is flawed for a number of compelling reasons.<sup>5</sup>

What is the evidence that *Ginkgo biloba* could offer benefit in the treatment of PD? To date, the data are scant and can only be found in animal models. In a study in 2004, it was discovered that the *Ginkgo biloba* extract, EGb 761 (Dr Willmar Schwabe, GmbH & Co, Germany), exhibited a neuroprotective effect in rats that were given the PD-inducing chemical 6-OHDA. The authors concluded that “These data indicate a possible role for the extract in the treatment of Parkinson’s disease.”<sup>6</sup> In a 2005 study, rats were again pretreated with *Ginkgo biloba* extract before being given 6-OHDA. The authors also noted that ginkgo offered dose-dependent protection against chemically induced Parkinsonism. They concluded, “Considering our behavioural studies, biochemical analysis, and immunohistochemical observation, we conclude that EGb [ginkgo] can be used as a therapeutic approach to check the neuronal loss following parkinsonism.”<sup>7</sup>

What are the potential mechanisms that ginkgo could benefit the patient with PD? In the above-referenced article, the authors state that “*Ginkgo biloba* appears to act via antioxidant, free radical scavenging, monoamine oxidase B (MAO-B)-inhibiting, and dopamine-enhancing mechanisms that rescue the compromised cells within the dopaminergic lesions.” The idea that *Ginkgo biloba* acts as a MAO-B inhibitor is especially appealing, as this class of agents has been used clinically in the United States for the treatment of PD. MAO-B inhibitors act by slowing down the breakdown of dopamine. These agents include selegiline and rasagiline.

Is *Ginkgo biloba* actually a MAO-B inhibitor? The literature is mixed. Articles from White et al<sup>8</sup> in 1996 and Wu et al<sup>9</sup> in 1999 answer positively, while Fowler et al<sup>10</sup> in 2000 was negative. In 2009, Fehske et al found that *in vivo* MAO activity in mice was not affected by the *Ginkgo biloba* extract EGb 761 but that norepinephrine uptake was significantly decreased, perhaps explaining its enhancement of dopaminergic neurotransmission.<sup>11</sup>

Another theory was proposed by Smith et al in an article published in 1996. He points out that one of the components of *Ginkgo biloba*, ginkgolide B, is a potent platelet-activating factor (PAF) antagonist. PAF antagonists seem to exert a neuroprotective effect, though the mechanisms involved in how they achieve this is unknown.<sup>12</sup>

The second variable in this case is the multivitamin-multimineral supplementation. I have reviewed the literature and teased out studies that investigated specific components, though not necessarily the same dosing.

A small Brazilian study in 2004 combined the elimination of red meat with high-dose riboflavin supplementation (30 mg every 8 hours) in those with PD. Of the 19 patients who completed the 6-month treatment period, the “average motor capacity” increased from 44% to 71%.<sup>13</sup>

In an open-label study in 1993, Birkmayer et al found that of 885 patients given IV or oral nicotinamide adenine dinucleotide (NADH, the active form of niacin), around

80% had “very good” or “moderate” improvement in their PD. In this study, they discovered that younger patients and those with a shorter length of illness were more likely to have marked improvement than older patients and with a longer duration of symptoms.<sup>14</sup>

Fahn discovered in a 1993 article that high doses of vitamins E and C (3200 mg and 3000 IU, respectively, in four divided doses daily) were able to delay the administration of levodopa for 2.5 years for those with PD. There were only 66 in the entire study and there was no control group.<sup>15</sup>

In a massive retrospective study in 2002, Zhang et al concluded that taking a multivitamin, vitamin C or E supplements, or high intake of carotenoids, did not reduce the risk of PD. However, those who had high intake of *dietary* [emphasis mine] vitamin E significantly decreased the risk of PD.<sup>16</sup>

## CONCLUSION

My grandfather had a progressive, disabling form of Parkinson’s disease, and it is possible that *Ginkgo biloba* and/or a multivitamin-multimineral supplement effected remarkable improvement in his symptoms. This allowed him to stay out of institutional care for many years.

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