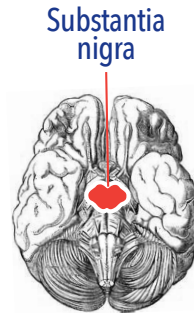




Parkinson's disease (PD) is a degenerative movement disorder that causes tremor and decreased coordination. PD is caused by reduced activity of dopamine producing cells in a part of the brain called the substantia nigra.

Unfortunately, some of the drugs used in PD treatment have behavioral side effects, sometimes causing impulse control disorders (ICD). This fact sheet describes how these drugs work to treat PD and discusses potential explanations for

why these side effects develop and how PD relates to problems with gambling.




Disordered Gambling and Impulse Control Disorders With Parkinson's Disease Treatment

Many studies demonstrate that PD patients being treated with certain drugs develop disordered gambling or impulse control disorders at a higher rate than the general population.¹

A recent study shows:²

- ◆ Levodopa therapy increased the risk for developing disordered gambling or another ICD.
 - Patients taking levodopa therapy were 1.5 times more likely to develop an ICD, with higher doses of levodopa increasing the risk.
- ◆ Dopamine agonist therapy also increased the risk for developing disordered gambling or another ICD.
 - Patients on dopamine agonist therapy were 2.7 times more likely to develop an ICD than those not taking a dopamine agonist. The dose of dopamine agonist did not seem to affect this risk.
- ◆ These side effects are related to the different functions of dopamine in the brain.
 - Levodopa and dopamine agonists are effective in reducing the symptoms of PD because they can mimic the action of the missing dopamine in the substantia nigra.
 - Problem gambling and other ICDs occur as a side effect of treatment when levodopa or dopamine agonists act on pathways elsewhere in the brain, influencing a patient's ability to control behavior.^{4,5}

10-15% of patients being treated with **ANY MEDICATION FOR PD** developed **ONE OR MORE ICDs**



Problem Gambling occurred in about **5% OF PD PATIENTS** at similar frequencies to other ICDs² as compared to **2.0%** of the general adult population of Mass.³



Massachusetts Council on **COMPULSIVE GAMBLING**

We understand the problem. We can help.

What is gambling?

Gambling is risking something of value on the outcome of an event when the probability of winning is less than certain.⁶

What is problem gambling?

Problem gambling is characterized by gambling behavior which leads to adverse consequences for the gambler, others, and the community.⁷

What constitutes social gambling?

Social gamblers gamble for entertainment, typically will not risk more than they can afford, often gamble with friends, chase losses briefly, gamble for limited periods of time, and are not preoccupied with gambling.⁸

See DSM-5 for clinical definitions

The Massachusetts Council on Compulsive Gambling: A Resource For Help

The Council's Helpline provides live, confidential, and compassionate support 24-hours a day, 7-days a week: **800-426-1234**.

Helpline workers provide:

- Information about problem gambling
- Referrals to self-help groups, treatment providers, and other community resources.

For more information, visit masscompulsivegambling.org or contact us at info@masscompulsivegambling.org or 617-426-4554.

continues

Other Risk Factors Among Patients Using Dopamine Agonists

Other risk factors may predispose PD patients to developing disordered gambling or another ICD. Patients with these traits should talk with their doctor about their increased risk of developing an ICD as a side effect of dopamine agonist therapy. These risk factors may include:^{1,2}

- ◆ Younger age
- ◆ Unmarried
- ◆ Smoker
- ◆ Longer PD duration
- ◆ Personal or family history of gambling problems or alcohol abuse

Other Affected Conditions at Risk for Impulse Control Disorders

Dopamine agonists are also used to treat other conditions, including:

- ◆ Restless Leg Syndrome (RLS): A condition in which patients experience uncomfortable or painful sensations in their legs accompanied by a strong urge to move them to relieve the symptoms.⁹
- ◆ Certain tumors of the pituitary known as prolactinomas.

Problems with gambling or compulsive sexual behavior have been reported in patients with RLS who take a dopamine agonist. People who use this type of drug therapy should be aware of signs and symptoms of problem gambling.¹⁰

Signs of a Gambling Disorder

A person shows signs of gambling disorder if he/she:

- ◆ Needs to gamble with increasing amounts of money to achieve the desired excitement.
- ◆ Exhibits restless or irritable behavior when attempting to cut down or stop gambling.
- ◆ Has made repeated unsuccessful efforts to control, cut back or stop gambling.
- ◆ Is preoccupied with thoughts about gambling.
- ◆ Gambles when feeling distress (e.g., helpless, guilty, anxious, depressed).
- ◆ Chases one's losses/returns another day to get even.
- ◆ Lies to conceal the extent of gambling.
- ◆ Jeopardizes a significant relationship, job, or opportunity because of gambling.
- ◆ Relies on others to provide money to relieve desperate financial situations caused by gambling.

For more information about gambling disorder, please refer to evaluation tools provided by the DSM-5.

Endnotes

1. Evans, A. H., Strafella, A. P., Weintraub, D. & Stacy, M. Impulsive and compulsive behaviors in Parkinson's disease. *Mov. Disord. Off. J. Mov. Disord. Soc.* 24, 1561–1570 (2009).
2. Weintraub, D. *et al.* Impulse control disorders in Parkinson disease: a cross-sectional study of 3090 patients. *Arch. Neurol.* 67, 589–595 (2010).
3. Williams, RJ, Zorn, M, Volberg, RA, Stanek, EJ, Freeman, J, Maziya, N, Naveed, M, Zhang, Y, Pekow, PS. (2017). *Gambling and Problem Gambling in Massachusetts: In-Depth Analysis of Predictors*. Amherst, MA: School of Public Health & Health Sciences, University of Massachusetts Amherst.
4. Kumar, R. *et al.* Double-blind evaluation of subthalamic nucleus deep brain stimulation in advanced Parkinson's disease. *Neurology* 51, 850–855 (1998).
5. Ray, N. J. *et al.* Extrastriatal dopaminergic abnormalities of DA homeostasis in Parkinson's patients with medication-induced pathological gambling: A [11C] FLB-457 and PET study. *Neurobiol. Dis.* 48, 519–525 (2012).
6. Korn, D.A. & Shaffer, H.J. (1999). Gambling and the Health of the Public: Adopting a Public Health Perspective. *Journal of Gambling Studies*, 15(4), 289–365.
7. <http://massgaming.com/wp-content/uploads/Responsible-Gaming-Framework-v1-10-31-14.pdf>
8. <http://www.naspl.org/index.cfm?fuseaction=content&menuid=33&pageid=1033>
9. Tippmann-Peikert, M., Park, J. G., Boeve, B. F., Shepard, J. W. & Silber, M. H. Pathologic gambling in patients with restless legs syndrome treated with dopaminergic agonists. *Neurology* 68, 301–303 (2007).
10. Bostwick, J. M., Hecksel, K. A., Stevens, S. R., Bower, J. H. & Ahlskog, J. E. Frequency of new-onset pathologic compulsive gambling or hypersexuality after drug treatment of idiopathic Parkinson disease. *Mayo Clin. Proc.* 84, 310–316