Editors' Note: In WriteClick this week, Dr. Montgomery discusses the basal ganglia as oscillator in response to "Subthalamic deep brain stimulation at individualized frequencies for Parkinson disease" by Tsang et al. In reference to "Risk of fractures in patients with multiple sclerosis: A population-based cohort study" by Bazelier et al., Drs. Dobson et al. stress the need to limit anxiolytics/hypnotics and antidepressants where possible in patients with multiple sclerosis given the increased risk for falls and fractures. They also emphasize that the evidence tying short-course IV glucocorticoids to fracture risk is less clear. The authors are developing a clinical risk score for fracture risk assessment in patients with multiple sclerosis.

Megan Alcauskas, MD, and Robert C. Griggs, MD

SUBTHALAMIC DEEP BRAIN STIMULATION AT INDIVIDUALIZED FREQUENCIES FOR PARKINSON DISEASE

Erwin B. Montgomery, Jr., Birmingham, AL: Tsang et al.¹ and Wagle Shukla and Okun² noted frequencies of gamma oscillations recorded from the subthalamic nucleus (STN) and the clinically optimal deep brain stimulation (DBS) frequencies, expecting them to be the same or harmonics.^{1,2} This would be reasonable assuming a single harmonic oscillator for each frequency band and resonance between the oscillator and DBS. This is consistent for nonlinear oscillators in loosely coupled networks as shown in mathematical models.³ Such oscillators, including DBS, can interact when frequencies are commensurate (their ratio is a rational number) and not just harmonic. Such an oscillator can be driven at its fundamental frequency by another of a different frequency.

The basal ganglia–thalamic–cortical system can be considered a loosely coupled system of polysynaptic reentrant oscillators whose components are nonlinear.⁴ Recordings in nonhuman primates demonstrated that individual neurons entrain multiple frequencies simultaneously⁵ and demonstrated multiple resonance frequencies to a single DBS frequency.⁵ Furthermore, local field potentials represent summed activity in the dendritic trees across many neurons. The risk is attribution of the resultant oscillation to the sin-

gle volume, thus single oscillator, when in fact the oscillations within the volume are many and different, including phase as well as frequency.

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RISK OF FRACTURES IN PATIENTS WITH MULTIPLE SCLEROSIS: A POPULATION- BASED COHORT STUDY

Ruth Dobson, Sreeram Ramagopalan, Gavin Giovannoni, London: Bazelier et al.¹ address the important issue of fracture risk in multiple sclerosis (MS) yet the discussion does not go far enough. Use of anxiolytics/hypnotics and antidepressants was strongly associated with fracture risk. These treatments have also been associated with an increased risk of both falls² and fractures³ in large population-based studies. Given the increased risk of falling associated with MS,¹ the recommendation to avoid anxiolytics/hypnotics wherever possible and to increase awareness of the falls risk associated with antidepressants in MS is important.

The authors discuss short-course IV glucocorticoids, used during relapses, as a contributor to fracture risk. Although one study associated glucocorticoid use with fracture risk,⁴ this has not been replicated.^{5,6} The potential for rapid improvement in mobility following glucocorticoid treatment during relapse may have beneficial effects.

A more proactive approach is required in MS. We propose all patients with MS should have formal

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