To describe the response in freezing of gait (FoG) in three patients with Parkinson's disease (PD) who underwent deep brain stimulation (DBS) of the pedunculopontine nucleus (PPN).

Among the axial features of advanced parkinsonism, FoG is one of the most disabling symptoms that is often resistant to medical and surgical treatments. The role of FoG on mobility and quality of life (QoL) is well-established although there is no consensus regarding effective surgical interventions. The PPN is a potential target for DBS due to its close association with the mesencephalic locomotor region and extensive connections with the basal ganglia and descending spinal pathways. Based on limited animal and human data, low-voltage PPN stimulation has been suggested to improve gait and balance, but its effects on FoG have not been studied in PD patients.

Using the Unified Parkinson's Disease Rating Scale (UPDRS), Gait and Balance Scale (GABS), and/or video reviews, we studied three patients with advanced PD and disabling FoG resistant to levodopa before and after PPN DBS.

Patient 1 is a 59-year-old man who underwent bilateral PPN DBS with noticeable improvement in his FoG recorded 2 and 6 weeks postoperatively. Patient 2 is a 76-year-old man who had previously received unsuccessful bilateral DBS of the globus pallidus interna (GPi) and had transient improvement in FoG after right PPN DBS. Patient 3 is a 66-year-old man who underwent isolated right PPN but developed a worse GABS score without noticeable improvement in FoG. Sustained improvement was not seen in any of the three patients despite adjustment of DBS parameters. Furthermore, vision changes and balance problems limited these setting adjustments.

This is the first report of PPN DBS for severe FoG associated with PD. Further studies are needed to determine whether further adjustments in stimulating parameters will optimize and prolong the improvement in FoG, noted in two of our three patients.