in both patients and controls. Additionally, EMG and IMU analyses showed more efficient gait initiation when PD patients started walking with enhanced arm swing compared to without arm instructions.

Conclusions: Initiating gait with preparing enhanced arm swing results in beneficial power changes across the EEG frequency spectrum leading to more efficient gait initiation in PD patients, indicating that the task serves as an internal cue to overcome gait initiation difficulties.

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Pramipexole regulates the depressive-like symptom through dopamine D3 not dopamine D2 receptor in a mouse model of Parkinson's disease

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Objective: The aim of this study is to understand if the antidepressant effect of pramipexole is mediated by D2R or D3R in a mouse model of Parkinson's disease.

Background: Depression, as a comorbid non-motor symptom, can be observed preceding the motor symptoms in Parkinson's disease. But mechanisms underlying it are unknown and its current medication is insufficient. The previous study found D3 receptor, a member of D2 like receptor family, expression is decreased in striatum of PD patients. In clinical practice aspect, some kinds of dopamine agonists, especially for pramipexole(PPX) as a dopamine D2/D3 receptor agonist, have an effect on treating Parkinson's disease-associated depression. But it is not clear whether the action is D3 receptor(D3R)woking with D2 receptor(D2R) together or alone. To find the key to this problem, D2R knock out mice, D3R mutant mice were used in this study.

Methods: We used rotarod test and open field test to evaluate motor function of experimental mice. Forced swimming test, tail suspension test and light/dark boxtest were used to examine depressive-like and anxiety symptom of the mice. HPLC was used to determine DA and DOPAC levels in striatum.

Results: The deficiency of D3R mice had a depressive-like and anxiety symptom which was detected by forced swimming test, tail suspension test and light/dark box test. What's more, the administration of NGB2904, dopamine 2-like receptor antagonist, results the depressive-like behavior in D2R knock out mice which shows the regular emotional behavior before. We found that PPXhas an antidepressant effect for wild type mice in forced swimming test, but not for D3R mutant mice, it indicated PPXhas no effect on treating depression in experimental our mice with dopamine receptor D3 deficiency.

Conclusions: Our results suggested D3R is essential for antidepressant effect of PPX in DA transmitter system and D3R may serve as a therapeutic target for depression.

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The role of Dopamine in Preparatory Inhibition: What can we learn from Parkinson's disease?

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Objective: Investigating the influence of dopamine on motor inhibition during action preparation.

Background: By measuring the amplitude of motor-evoked potentials (MEPs) elicited by transcranial magnetic stimulation (TMS) during choice reaction time (RT) tasks, many studies have revealed a strong suppression of corticospinal excitability during action preparation. This phenomenon, called preparatory inhibition, has never been investigated in Parkinson's disease (PD). Yet, it would allow addressing the role of dopamine in the generation of preparatory inhibition.

Methods: Preparatory inhibition was probed on two consecutive days in 11 right-handed PD patients (ON and OFF dopamine replacement therapy [DRT]; randomized order) and 11 matched healthy subjects. Participants performed an instructed-delay choice RT task, in which they had to choose between a left or right index finger response based on the position of a preparatory cue, but had to wait until the onset of an imperative signal to release their movement. Single-pulse TMS was applied concurrently over both primary motor cortices at rest and during the preparatory delay, eliciting MEPs in both hands. Preparatory inhibition was assessed by expressing MEP amplitudes obtained during the preparatory delay relatively to those obtained at rest.

Results: PD patients with a relatively short disease duration (4.2 $\pm$ 1.1 y) exhibited MEP suppression during action preparation, similarly to healthy subjects. However, preparatory inhibition was less obvious in PD patients with a long disease duration (12.3 $\pm$ 2.3 y). In fact, in those patients, MEPs were only suppressed when the finger was not selected for the response. Interestingly, the lack of suppression found in the selected finger was even worse in the presence of DRT, especially in the dominant hand, where MEPs became facilitated.

Conclusions: Taken together, those results confirm the presence of preparatory inhibition in healthy subjects, as previously shown in the literature. This phenomenon is also evident in PD patients, but seems to decline throughout the disease. Most importantly, DRT medication appears to decrease the strength of preparatory inhibition, especially in the dominant hand, suggesting a role of dopamine in the mechanisms at the very basis of preparatory inhibition.

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Computing algorithms can detect bradykinesia from smartphone videos

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Objective: To investigate whether computer vision algorithms can detect bradykinesia using standard smartphone video alone.

Background: Bradykinesia is the core clinical feature of Parkinson's disease is bradykinesia. However the detection of bradykinesia relies on a subjective visual judgement made by the clinician. Inter-rater reliability and diagnostic accuracy are moderate at best. Existing objective methods to detect or measure bradykinesia require either a specific piece of hardware, or they require patient interaction with an app or website. Thus, none are in routine clinical use.

Methods: 70 videos of finger tapping were recorded using a standard integrated smartphone camera (40 patient hands, 30 control hands). Computing algorithms were used to automatically separate hand from background and then measure the movement of pixels representing the hand. The pixel movement signals were then further processed to extract features likely to be related to finger-tap frequency, amplitude and rhythm (e.g. fast fourier transform, jitter and peak-to-peak variability). The videos were also blindly rated by two movement disorder specialists.

Results: Using support vector machine analysis, we predict the presence of bradykinesia with accuracy of 0.74 (sensitivity: 0.85, specificity: 0.65) and the presence of a Parkinson's diagnosis with accuracy of 0.67 (sensitivity = 0.60, specificity = 0.77).

Conclusions: Although our results are preliminary and the data set small, they show an accuracy similar to that recorded by blinded human clinical experts, and our contactless method requires no special equipment, and no patient interaction with an app or website.

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Camptocormia in Parkinson's disease – impaired kinesthesia of the trunk extensors

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Objective: In this study the kinesthesia of back Extensors of PD patients with Camptocormia was examined.

Background: Camptocormia is a pathological flexion of the trunk occurring during idiopathic Parkinson's disease (iPD) and it is often associated with back pain. Histological similarities between biopsies of paravertebral muscles of Patients with camptocormia and muscles after tendectomy suggest that a disturbed proprioceptive feedback contributes to pathogenesis.

Methods: iPD patients with camptocormia (CC, n = 20), iPD patients without camptocormia (PD, n = 20) and healthy controls (HC, n = 20) were recruited at the Neurological Department of Kiel University. Camptocormia was defined as a forward bending of more than 30 degrees. We used a dynamometer to measure the back muscles' force. Patients were