

Application of an antisaccade and antitapping task in early-stage Parkinson's patients

Johan JM Pel, Casper de Boer and Johannes van der Steen

Vestibular and Ocular motor Research group, dept. of Neuroscience, Erasmus MC, Rotterdam, The Netherlands

Author Disclosure Information: JJM Pel, None; C de Boer, None and J van der Steen, None

Introduction

The antisaccade paradigm is frequently used to assess disinhibition rates in Parkinson's patients (PD). Subjects are instructed to inhibit reflexive eye movements upon stimulus presentation and to direct gaze in the opposite direction.

Despite the relatively high disinhibition rates found in PD, data on sensitivity / specificity for this task are still lacking. Presumably, inhibition of reflexive eye movements alone may not be sufficient enough to provoke pronounced disinhibition rates, especially in early stages of PD.

Aim:

To increase the level of behavioral difficulty, an antitapping instruction was added to the antisaccade task.

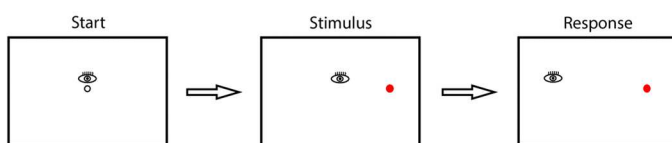
The aim of this study was to compare the performance of the antisaccade task with the antisaccade AND antitapping task in early stage PD patients.

Methods

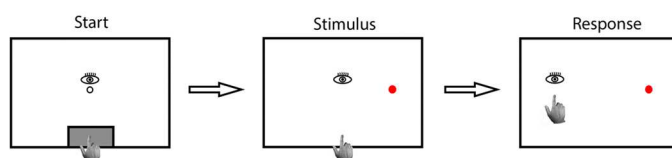
Subjects: 25 early-stage PD patients (FAB score: 16.4 (1.4); UPDRS score: 9.3 (4.8); Hoehn & Yahr stage: 1.1 (0.6)) and 25 healthy age-matched controls performed an antisaccade task and an antisaccade and antitapping task.

Procedure: The measurement setup consisted of a 32-inch touch screen (ELO touch systems, Leuven, Belgium) and an eye tracking system (Chronos Vision, Berlin, Germany).

Antisaccade task: Subjects were instructed to fixate a centrally placed white dot for 2 s. Next, a peripheral red dot (2 degrees) was presented either to the left or to the right. Participants were instructed to make an eye movement in the opposite direction.



Antisaccade and antitapping task: Subjects were instructed to fixate a centrally placed white dot while placing their hand at a bar at the bottom of the screen for 2 s. Next, a peripheral red dot (2 degrees) was presented either to the left or to the right of the white dot. Subjects were instructed to make an eye - and a hand movement in the opposite direction of the red dot.

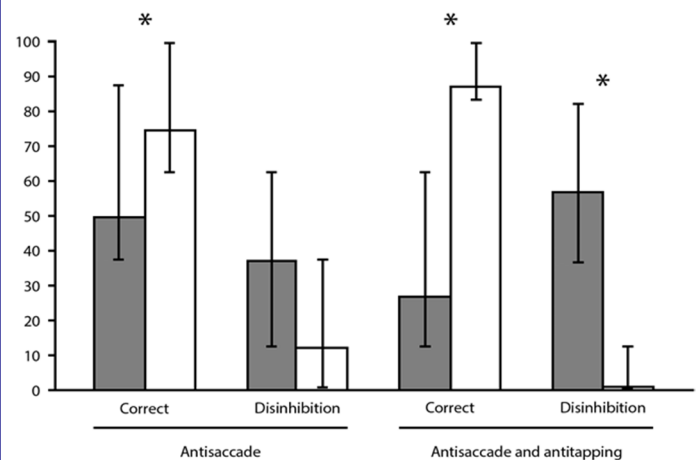


Subjects were allowed 3 test trials per task. Next, 8 trials per task were conducted. Disinhibition rates and eye - and hand latencies (of correctly performed trials) were compared between tasks and between groups.

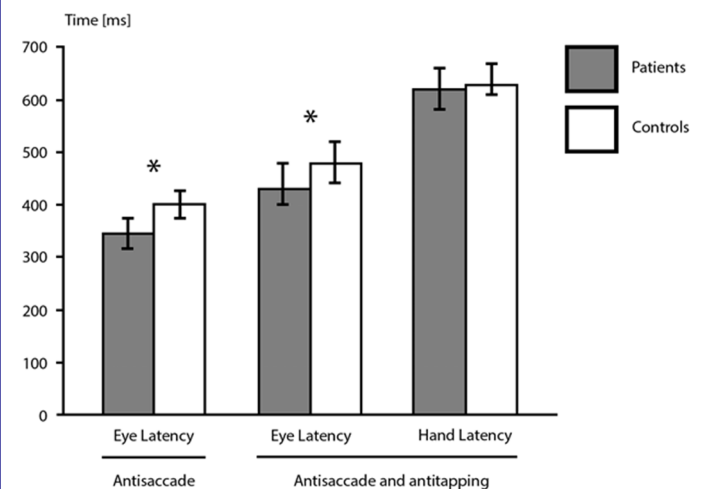
Results

Overall performances: Patients and controls correctly performed 180 trials per task (incorrect trials per task < 8%).

Disinhibition rates:



Eye and hand latencies:



Classification: Subject classification based on disinhibition rates and eye latencies resulted in a sensitivity of **0.75** and a specificity of **0.86**, with 21% false negatives (control in stead of PD), 14% false positives (PD in stead of control). 4% of the PD patients could not be correctly classified.

Conclusions

A combination of saccadic disinhibition rates and eye latencies resulting from an antisaccade and tapping task seems a sensitive approach to differentiate PD patients from controls. This screening test holds promise for early detection of PD.