



## The frequency of buccopalpebral reflex in Parkinson disease

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**Background/aim:** This study aimed to define the frequency of a primitive reflex, the buccopalpebral reflex (BPR), and its association with the clinical situation in patients with Parkinson disease.

**Materials and methods:** Between May 2010 and May 2011, 222 patients, 115 with Parkinson disease and 107 patients without any sign of neurodegenerative disease, were included in the study. All included patients were examined for BPR and snout reflex and were also evaluated with the Mini Mental State Examination. All patients with Parkinson disease were classified with the Unified Parkinson's Disease Rating Scale (UPDRS) and the Hoehn and Yahr Score to determine their clinical severity.

**Results:** Sixteen patients with Parkinson disease (13.9%) had a BPR (+) and 4 patients in the control group (3.7%) ( $P < 0.001$ ). The UPDRS score, UPDRS daily life activities score, and UPDRS motor system score were all higher in the group with BPR (+). All patients with a BPR also had a positive snout reflex.

**Conclusion:** BPR is more frequent in patients with Parkinson disease than in patients without a neurodegenerative disease.

**Key words:** Buccopalpebral reflex, primitive reflex, Parkinson disease

### 1. Introduction

Primitive reflexes are pathological reflexes that are observed during widespread brain diseases in adults. They may occur in Parkinson disease and other neurodegenerative diseases. The most common reflexes found in neurodegenerative diseases are the glabellar reflex, snout reflex, palmomentary reflex, and sucking reflex (1). The buccopalpebral reflex (BPR), which is eye blinking and shrinking of the lips upon tapping of the upper lip, have been noticed in Parkinson disease. This reflex may be a more complex primitive reflex than the glabella reflex and the snout reflex (2). Our aim is to examine the frequency of the BPR in a group of patients with Parkinson disease and to compare them with a group of patients without neurodegenerative diseases, as well as to investigate the relationship with disease severity and cognitive situation in patients with Parkinson disease and to investigate its coexistence with the snout reflex.

### 2. Materials and methods

Patients with idiopathic Parkinson disease, who were seen in the outpatient clinic of the Ministry of Health Ankara Training and Research Hospital between May 2010 and

May 2011, were included the study consecutively. The study was designed according to the principles of the Helsinki Declaration and approved by the local ethics committee.

The diagnosis of Parkinson disease was made by 2 different neurologists according to published criteria (3). Demographic information (age and sex), disease-related information (disease duration, Hoehn and Yahr score, Unified Parkinson's Disease Rating Scale (UPDRS) scores, and first clinical symptom), dopaminergic treatment history, and personal medical history were collected from each of the patients with Parkinson disease. All patients had undergone a computer tomography scan or magnetic resonance scan of their brain. Patients with secondary causes of Parkinsonism were excluded from the study.

Patients older than 55 years of age, who were admitted to the outpatient clinic and were found to have no neurodegenerative diseases, formed the control group.

During the study period 115 patients with idiopathic Parkinson disease and 107 patients in the control group were included in the study. Each patient included in the study was examined for snout reflex and BPR. The

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cognitive functions of the patients were evaluated by the Mini Mental State Examination (MMSE).

The BPR test was performed with the patient in a sitting position. The upper lip was tapped once per second and this was repeated at least twice in order to determine an accurate response. A positive reflex was determined when the eyelids were completely closed with each tap.

### 2.1. Statistical analysis

Data analysis was performed using SPSS. The Shapiro–Wilk test was used to examine whether the distribution of continuous variables was close to normal. Descriptive statistics for continuous variables were shown as mean  $\pm$  standard deviation or median (minimum–maximum) and categorical variables were shown as number of cases and in percentage.

The significance of differences between groups was examined by Student t-test or by Mann–Whitney U test. Nominal variables were assessed by the Pearson chi-square test or Fisher exact chi-square test.  $P < 0.05$  was considered significant.

### 3. Results

Table 1 shows some of the basic data from both the Parkinson disease group and the control group. BPR was observed in 16 (13.9%) patients and the snout reflex in 71 (61.7%) patients with Parkinson disease, while in the control group BPR was only observed in 4 (3.7%) patients and the snout reflex in 40 (37.4%) patients. A significant difference ( $P < 0.001$ ) was found between the groups.

Dementia was diagnosed in 6 (5.2%) patients with Parkinson disease and 4 (3.7%) patients in the control group. No statistically significant difference was found. MMSE scores of patients with Parkinson disease were  $23.6 \pm 4.9$ , and for the control group they were  $26.6 \pm 2.5$ . The difference between the groups was statistically significant ( $P < 0.001$ ).

Six (5.2%) patients had cerebrovascular disease in the Parkinson disease group and 31 (29%) patients in the control group did; the difference was statistically significant ( $P < 0.001$ ).

The comparison between Parkinson disease patients with positive BPR (BPR(+)) or without positive BPR (BPR(-)) is presented in Table 2. For most of the data no significant difference was found. However, we found statistical differences for UPDRS total score, UPDRS daily life activities score, and UPDRS motor system score.

### 4. Discussion

We have found that the BPR is more frequently present in patients with Parkinson disease than in patients without a neurodegenerative disease. The snout reflex was also found when BPR was found. Various primitive reflexes are observed in patients with Parkinson disease and other neurodegenerative diseases. The prevalence and clinical value in Parkinson disease was presented earlier (4,5). The diagnostic importance of these reflexes, their relationship with the disease severity, and the underlying pathology are unknown (6). The BPR is a newly described primitive reflex in Parkinson disease (2). Parkinson disease is a neurodegenerative disorder with neural damage, which may to some extent explain why we found statistically more patients with positive BPR in the group with Parkinson disease.

We found statistically higher UPDRS total scores, UPDRS motor scores, and UPDRS daily life scores in BPR(+) patients in the Parkinson disease group (Table 2). A statistically significant difference has not been found earlier, which be due to a limited number of patients (2). Our BPR(+) patients had less bradykinesia as an initial symptom than other studies have found (2). In an earlier study, similar to our study, there was no difference between BPR(+) and BPR(-) groups regarding Hoehn and Yahr scores and the duration of disease (2).

**Table 1.** Comparison of Parkinson disease patients with a control group of patients without neurodegenerative disease.

| Variable         | Parkinson (n = 115)     | Control (n = 107)       | P      |
|------------------|-------------------------|-------------------------|--------|
| Age              | 69.8 $\pm$ 8.6          | 66.8 $\pm$ 8.4          | 0.009  |
| Sex, F / M       | 47 (40.9%) / 68 (59.1%) | 50 (46.7%) / 57 (53.3%) | 0.379  |
| SVD history      | 6 (5.2%)                | 31 (29.0%)              | <0.001 |
| Dementia history | 6 (5.2%)                | 4 (3.7%)                | 0.750  |
| BPR              | 16 (13.9%)              | 4 (3.7%)                | 0.008  |
| Snout reflex     | 71 (61.7%)              | 40 (37.4%)              | <0.001 |
| MMSE             | 23.6 $\pm$ 4.9          | 26.6 $\pm$ 2.5          | <0.001 |

SVD: Small vessel disease.

**Table 2.** Distribution of demographic variables and clinical properties of patients with Parkinson disease with positive BPR and negative BPR.

| Variable                          | BPR positive<br>(n = 16) | BPR negative<br>(n = 99) | P-value |
|-----------------------------------|--------------------------|--------------------------|---------|
| Age                               | 70.4 ± 9.2               | 69.8 ± 8.5               | 0.794   |
| Initial symptom                   |                          |                          |         |
| Bradykinesia                      | 5 (31.3%)                | 20 (20.2%)               | 0.335   |
| Tremor                            | 10 (62.5%)               | 77 (77.8%)               | 0.214   |
| Postural instability              | 1 (6.3%)                 | 2 (2.0%)                 | 0.365   |
| Dopaminergic treatment            | 14 (87.5%)               | 90 (90.9%)               | 0.650   |
| Disease duration (years)          | 4.5 (0.5–15.0)           | 3.0 (0.5–9.0)            | 0.489   |
| Hoehn and Yahr score              |                          |                          |         |
| Grade I                           | 3 (18.8%)                | 31 (31.3%)               | 0.387   |
| Grade II                          | 6 (37.5%)                | 44 (44.4%)               | 0.603   |
| Grade III                         | 7(43.8%)                 | 16 (16.2%)               | 0.018   |
| Grade IV                          | -                        | 5 (5.1%)                 | 1.000   |
| Grade V                           | -                        | 3 (3.0%)                 | 1.000   |
| MMSE                              | 22.9 ± 5.1               | 23.7 ± 4.9               | 0.477   |
| UPDRS, total                      | 42.5 ± 22.1              | 32.2 ± 22.0              | 0.028   |
| UPDRS (mentation, behavior, mood) | 3.0 ± 2.3                | 2.8 ± 2.4                | 0.682   |
| UPDRS (daily life activities)     | 13.3 ± 7.1               | 9.6 ± 7.7                | 0.019   |
| UPDRS (motor)                     | 26.2 ± 13.8              | 19.2 ± 13.0              | 0.019   |
| UPDRS (complications of therapy)  | 0.7 ± 1.0                | 0.9 ± 1.6                | 0.709   |

Primitive reflexes have been observed in patients with cognitive impairment (5,7,8). However, they were not associated with the duration of the disease (5,8). We found no significant difference in terms of disease duration between the BPR(+) and BPR(-) groups. The MMSE score was lower in the Parkinson disease group than in the control group. This may be explained by the age difference between the group with Parkinson disease and the control group. However, the difference is to be expected because the incidence of dementia is higher in Parkinson disease patients than the normal population (9). No difference was found in MMSE score between BPR(+) and BPR(-) patients with Parkinson disease, and therefore no association between BPR and cognitive dysfunction could be detected.

The reappearance of primitive reflexes in adulthood usually indicates cortico-subcortical neuronal loss. A possible explanation for their reappearance in adults is the loss of cortical inhibition, resulting from atrophy of normal

aging or more severe lesions of degenerative dementias (10). It can be associated with leukoaraiosis (11) or other cerebral lesions (12).

The mechanism of glabellar reflex in patients with Parkinson disease may be associated with loss of dopamine inhibition and it has been shown that the glabellar response decreased in some patients after L-dopa treatment (13). Replacement of dopamine can change the reflex frequency response in Parkinson disease (13). However, others have not been able to show that the incidence of glabellar reflex changed with dopamine level (14). In our study 14 patients with positive BPR (87.5%) and 68 with snout reflex (95.8%) received treatment related to dopamine. It may be thought that dopamine replacement treatment cannot inhibit primitive reflexes such as the BPR or snout reflex.

Interestingly, we found that all patients with positive BPR reflexes also had positive snout reflexes at the same time. The BPR and the snout reflex may have similar mechanisms, which may explain why they coexist.

Another explanation is that the BPR is an aggravated form of the snout reflex.

In this study we investigated the frequency of the BPR, a newly described primitive reflex, in patients with Parkinson disease. The frequency of BPR was higher in patients with Parkinson disease. There were no differences in cognitive function between the BPR positive and

negative groups; however, the clinical severity was higher in BPR(+) patients with Parkinson disease. Some investigators thought that the BPR and snout reflex could be seen together. These two reflexes might have similar mechanisms, or the BPR might be an aggravated form of the snout reflex. The BPR is a newly identified reflex, and more studies will be required about this.

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