Łanowy Patrycja, Bichalski Miłosz, Mocny-Pachońska Katarzyna, Pachoński Marek, Tanasiewicz Marta. Oral cavity disorders among patients with Parkinson's disease - case reports. Journal of Education, Health and Sport. 2019;9(6):388-393. eISNN 2391-8306. DOI http://dx.doi.org/10.5281/zenodo.3252733
http://ojs.ukw.edu.pl/index.php/johs/article/view/7047

The journal has had 7 points in Ministry of Science and Higher Education parametric evaluation. Part B item 1223 (26/01/2017).
1223 Journal of Education, Health and Sport eISSN 2391-8306 7

The authors declare that there is no conflict of interests regarding the publication of this paper.

Received: 05.05.2019. Revised: 25.05.2019. Accepted: 23.06.2019.

Oral cavity disorders among patients with Parkinson's disease - case reports

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ABSTRACT

Parkinson's disease (PD) is a progressive, neurodegenerative ailment, caused by the loss of dopaminergic neurons in the specific area of a brain. Motor disability which is a symptom of PD, make maintaining the proper hygiene in the mouth difficult. Despite motor disorders, also cognitive dysfunctions can have a negative impact on the oral health of the patient, due to the lack of interest in the condition of the patient's oral cavity. Non-motor symptoms and even those associated with the oral cavity may be an indication for proper and early diagnosis of the patient. Disorders which occurs in the oral cavity during the sickness, are often neglected by patients and their caregivers. The role of the dentist in this situation is to make patients and their environment aware of the importance of the oral cavity - especially, due to the fact that newest studies suggest the association between ongoing systemic inflammation in the body, including periodontitis, and the development and progression of Parkinson's disease.

KEYWORDS: Parkinson's disease, xerostomia, caries, periodontal inflammatory disease

INTRODUCTION

Parkinson's disease (PD) is a chronic, progressive and associated with aging neurodegenerative disease. The disease usually begins after the age of 40, its prevalence in Europe among people above 60 yr is estimated at 1.6%. An increased risk of developing PD is observed in people> 70 yr, after a stroke or a mechanical brain injury, and those diagnosed with hypertension. Parkinsons's disease occurs 1.5 times more often among men than women. The cause of the disease is the destruction of dopaminergic neurons in the substantia nigra - resulting in motor disorders (Table 1). The area of the substantia nigra is responsible for the beginning and control of movements (1,2,3). As a result, the balance between the neurotransmitters in the brain is disturbed. Symptoms appear when 60-70% of dopaminergic neurons are destroyed and can be divided on motor, non-motor and behavioral (1,4). The impairment of cognitive ability appears already in the early stages of the disease (5). Among

symptoms may occur a lack of facial expression (‚mask-like' face) the number of eye blinks slow reaction and monotonous voice. Hoehn and Yahrs scale divide 5 stages of the disease, stage 1 and 2 are considered as an early disease, 3 as moderate, 4 as advanced and the last one stage as severe/fully developed (4).

The Parkinson's disease is incurable, but the symptoms may be controlled with a appropriate therapy. Main medicament used in Parkinson's therapy is levodopa, which is transformed inside organism into dopamine. Levodopa may be combined with the appropriate inhibitors to prevent the conversion of levodopa into dopamine into systemic circulation, before it reaches and percolate the ematoencephalic barrier. Anticholinergic drugs are also used. (1,3)

Symptoms occurring in Parkinson's disease.

Type of symptoms	Symptoms
Motor	-akinesia, **rigidity,** **-tremor,** **-bradykinesia,** -postural instability,
Non-motor	-cardiac arrhythmia, -constipation, -orthostatic hypotension, -sexual dysfunction,
Behavioral	-dementia, -depression, -psychosis.

Tabel 1. Symptoms occurring in Parkinson Disease (1,3).

ORAL CAVITY HEALTH STATUS AMONG PATIENTS WITH PARKINSON'S DISEASE

Cognitive and neuromuscular deficits in some cases make difficult to maintain proper hygiene in the oral cavity. (1) Also, some medicines used to treat Parkinson's disease may aggravate oral health problems, causing hyposalivation, muscular or behavioral disorders (4). Oral health problems among patients with Parkinson's are complex and requires the involvement of physicians, patients and also their caregivers.

Problems with chewing and swallowing

One of the main motor symptoms of Parkinson's disease is akinesia - the difficulty of initiating arbitrary movements - and rigidity of the muscles, which may affect limb muscles, but also to laryngeal and chewing muscles. Some patient's mobility (may occur limitation of the movements) may be impaired and the movements may be slowed down. With the progression of the disease motor disability increases and dysfunction with chewing and swallowing escalates (1,6).

Bradykinesia in patients with PD may cause impairment of the first phase of swallowing - orphanopharyngeal phase. That results with disruption of further swallowing phases. In 30-80% of patients diagnosed with Parkinson's disease being stopped in the oral cavity and drooling from the corners of the mouth. In addition to salivation, chewing dysfunction and dysphagia, lead to significant underweight of patients and worsening their quality of life. Improper teeth cleaning may cause or escalate periodontal disease (1,6).

A problem reported by patients diagnosed with Parkinson's disease, is also bruxism. This disorder is characterized by abnormal chewing muscles activity leading to clenching ang gnashing of

teeth., which may results in musculosceletal pain and temporomandibular disorders. Bruxism also may be associated with treatment with levodopa (7).

Issues with maintaining a proper oral hygiene

Symptoms such as tremor or akinesia can effectively hinder oral hygiene. Also, levodopa treatment can cause motor side effects such as dyskinesias, i.e. uncoordinated and uncontrolled limb movements impede effective cleaning of the dental surfaces (5).

Cognitive disorders such as depression or dementia, which may appear in the course of the disease, reduce the patient's interest in daily activities - including oral hygiene habits. Cognitive impairment is also associated with a reduction/lack of interest in the state of oral health and reduced frequency of/irregular visits at the dentist (5). The above consist in increasing the incidence of periodontal diseases and hard dental tissues.

Drooling of saliva

Drooling of saliva is associated with swallowing disfunction and facial muscle disfunction, many studies confirmed relationship between dysphagia and drooling. Drooling may be caused both by dysphagia and reduced frequency of swallowing. Available studies shows that the occurrence of drooling is connected with severity and duration of the disease and may be divided into diurnal (while patient is awake) and nocturnal. Excessive salivation may be caused to excessive salivary production, however, many studies have shown that among patients with Parkinson's disease, saliva production is decreased in comparison to control groups. (6,8)

Xerostomia

A frequent complaint reported by patients with PD is dry mouth, which is an autonomous symptom of the disease - available studies show that xerostomia is twice as frequent among patients as in the population and that it is associated with a decrease in the amount of stimulated and resting saliva. Xerostomia can also be drug-related - as a result of administration of antihistamines or antidepressants. Among the drugs used to treat Parkinson's disease, in addition to levodopa, anticholinergic drugs are also used. Xerostomia is a side effect of this class of medicaments (1,6).

Burning mouth syndrome (BMS)

This syndrome occurs more frequently among PD patients than in population (due to its estimated association with dopaminergic disfunction), and also more often affects women than men. BMS has an uncharacteristic symptom, which is burning in the mouth. It has been reported that depression, anxiety, phobias, and social stress are associated with the occurrence of BMS (6).

CASE REPORT 1

The patient is 79-years-old male, diagnosed with Parkinson’s disease 10 years ago. Comorbidities - gout and hypertension. The patient lives in the countryside, he is under the care of his son. Symptoms of Parkinson's disease in a patient include significant left-hand tremor, heavy difficulty in walking and speaking. Parkinson's disease therapy in a patient is based on carbidopa with levodopa and a cholinolytic, muscarinic receptor blocking medicament.

Patient's oral hygiene is insufficient. Around single remaining tooth in the mandible, a large accumulation of plaque, marginal gingivitis (Figure 1). Reported bleeding when blowing from a syringe. On the lip of the lower purple, well-limited change, which according to the patient's relationship is since he remembers, does not change the measurements, does not hurt and does not bleed - probably a cavernous hemangioma.

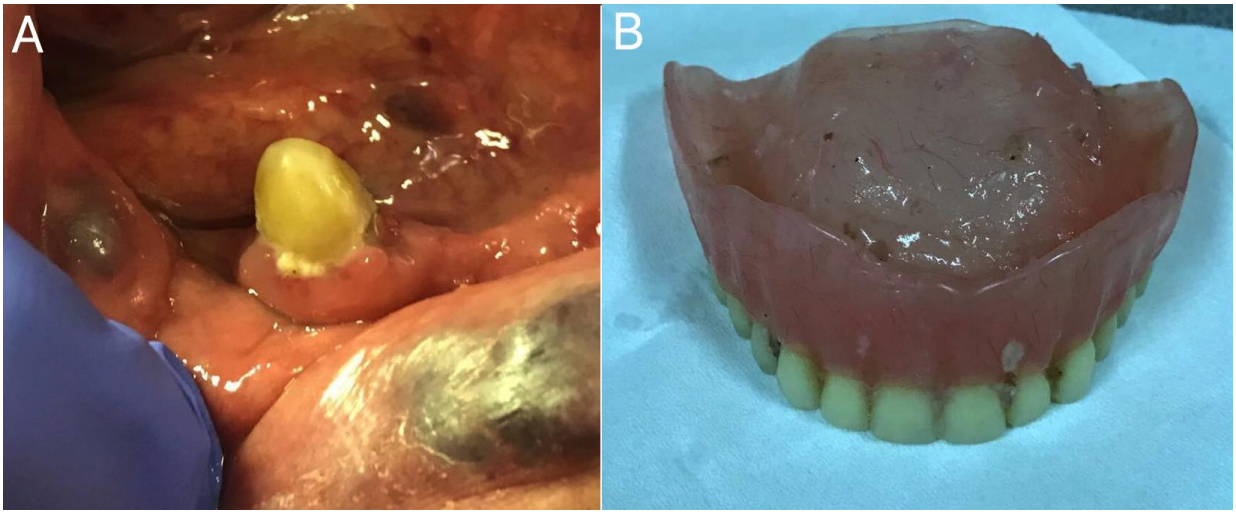

Figure 1. The oral condition of the patient. In the picture A visible single neglected tooth with encircling dental plaque and inflammation? of gum tissue adherent to the tooth. A purple tumor, probably a cavernous hemangioma, is visible on the lower lip. Picture B shows the upper prosthesis used by the patient. The patient does not clean it properly, visible sediment and accumulated food remains between acrylic teeth.

CASE REPORT 2

72-years-old female, living in good condition under the care of his wife. In 2000 he underwent post-traumatic subarachnoid hemorrhage, he was diagnosed with degenerative changes in the lumbar spine. In 2007, was diagnosed with Parkinson's Disease - and excerebration of the disease was between 2017 and 2018 - what manifest with weakness of the lower limbs, slowness of movement, trembling of the limbs. Patient cleans his teeth once a day with a manual toothbrush. He complains about dry mouth (especially in the morning). According to the interview, the deterioration condition of his teeth coincidence with the start of Parkinson's disease therapy. The patient was not able to name his medicaments. The patient claims that his visits to the dentist are fairly regular.

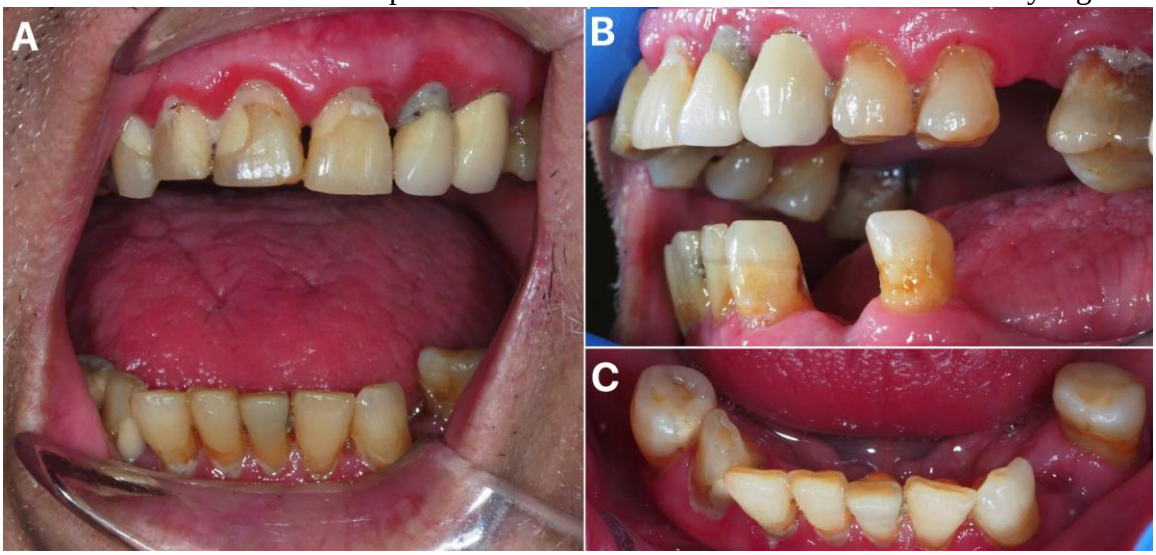

Figure 2. The oral condition of the other patient diagnosed with Parkinson's Disease. Patient present a lack of numerous side teeth. The patient's front teeth, especially in the maxilla, with numerous fillings. Picture A and C presents visible plaque and discoloration of the teeth near the gingival margin. In the picture A clearly marked redness of the gingival margin, indicating gingivitis

DISSCUSION

Nakayama et al., conducted a research among patients diagnosed with Parkinson disease and reval that more half of them have got problem with chewing food. Also among those patients reported a issues with swallowing saliva. (9)

According to *Bakke et al.,* research, performed on 15 the patients with Parkinson's disease evaluated their masticatory ability as remarkably poorer than the age-matched control group. Also, patients with PD, more often than the control group (CO), reported problems in the mouth, drooling saliva. Interestingly, between the control group and PD patients there were no statistically significant differences in the number of natural teeth held (4). Xerostomia is one of the factors connected which, increased prevalence of caries. Research conducted by *Barbe et al.,* on 30 patients (and 30 from control group) reveal that hyposalivation more often appear PD patients than CO. (10)

Cicciù et al., studied 90 PD patients. Patients with Parkinson's disease had a greater number of missed teeth than control group. (5)

Also, studies conducted by *Müller et al.,* on 101 patients confirm the worse than in the control group of oral hygiene among patients diagnosed with PD. Patients with PD, compared to the control group, less frequently brushed their teeth and visited the dentist with at longer time intervals. Among these patients, increased papilla bleeding index and reduced salivary flow were also recorded. (2)

Einarsdóttir et al., conducted research on a group of 67 patients with Parkinson's disease. The control group consisted of members of the patients' families. Compared with the control group, patients with PD had higher caries frequency, more missing teeth, more plaque, and the condition of their periodontium was definitely poorer. (11)

The periodontal health condition among patients with Parkinson's disease in different stages (n=45) studied *Praadep et al.,* by evaluating among others gingival index (GI), pocket depth (PD), bleeding on probing (BoP) and plaque index (PI). Research revealed statistically important differences in PI, Bop, GI and PI between patients with PD and CO. The clinically evaluated parameters were getting worse with the degree of Parkinson's disease. (12)

It is worth mentioning here the possible connection between periodontal inflammatory disease (PID) and Parkinson's disease. A study conducted by *Cheng-Kai et al.,* revealed, that patients diagnosed with PID are 1,43x times more likely to develop Parkinson's disease in the future. Potentially it is caused by inflammatory factors - such as bacterial lipopolysaccharide - synthesis and release of pro-inflammatory mediators IL-1, IL-6, TNF-α. Mentioned above factors may activate microglia for the production of reactive oxygen species and nitric oxide, which cause dopaminergic neuron necrosis. (3)

CONCLUSIONS

Parkinson's disease is the second most common neurodegenerative disease after Alzheimer's disease. Main symptoms of PD make inhibit the maintainience of proper hygiene in the mouth. Care for the patient should be multidisciplinary, with carefully selected pharmacological treatment. Its worth to emphasize that proper therapy should actively engage, among other specialties, the dentist. It is important to educate patients and their caregivers in this area.

References:

1. Bollero P, Franco R, Cecchetti F, Miranda M, Barlattani A Jr, Dolci A, Ottria L. Oral health and implant therapy in Parkinson's patients: review. Oral Implantol (Rome). 2017;10(2):105-111.
2. Müller T, Palluch R, Jackowski J. Caries and periodontal disease in patients with Parkinson's disease. Spec Care Dentist. 2011;31(5):178-81.
3. Chen CK, Wu YT, Chang YC. Periodontal inflammatory disease is associated with the risk of Parkinson's disease: a population-based retrospective matched-cohort study. PeerJ. 2017;5:e3647.
4. Bakke M, Larsen SL, Lautrup C, Karlsborg M. Orofacial function and oral health in patients with Parkinson's disease. Eur J Oral Sci. 2011;119(1):27-32.
5. Cicciù M, Risitano G, Lo Giudice G, Bramanti E. Periodontal health and caries prevalence evaluation in patients affected by Parkinson's disease. Parkinsons Dis. 2012;2012:541908.
6. Srivanitchapoom P, Pandey S, Hallett M. Drooling in Parkinson's disease: a review. Parkinsonism Relat Disord. 2014;20(11):1109–1118.
7. Verhoeff MC, Lobbezoo F, Wetselaar P, Aarab G, Koutris M. Parkinson's disease,temporomandibular disorders and bruxism: A pilot study. J Oral Rehabil. 2018;45(11):854-863.
8. Zlotnik Y, Balash Y, Korczyn AD, Giladi N, Gurevich T. Disorders of the oral cavity in Parkinson's disease and parkinsonian syndromes. Parkinsons Dis. 2015;2015:379482.
9. Nakayama Y, Washio M, Mori M. Oral health conditions in patients with Parkinson's disease. J Epidemiol. 2004;14(5):143-50.
10. Barbe AG, Heinzler A, Derman S, Hellmich M, Timmermann L, Noack MJ. Hyposalivation and xerostomia among Parkinson's disease patients and its impact on quality of life. Oral Dis. 2017;23(4):464-470.
11. Einarsdóttir ER, Gunnsteinsdóttir H, Hallsdóttir MH, Sveinsson S, Jónsdóttir SR, Olafsson VG, Bragason TH, Saemundsson SR, Holbrook WP. Dental health of patients with Parkinson's disease in Iceland. Spec Care Dentist. 2009;29(3):123-7.
12. Pradeep AR, Singh SP, Martande SS, Raju AP, Rustagi T, Suke DK, Naik SB. Clinical evaluation of the periodontal health condition and oral health awareness in Parkinson's disease patients. Gerodontology. 2015;32(2):100-6.