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CLINICAL DENTAL STATUS OF STROKE PATIENTS AND JUNCTION WITH POSTSTROKE COMPLICATIONS

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Abstract:

The consequences of a stroke directly or indirectly affect various organs and systems, including the oral cavity. The most common direct consequence is sialorrhea and pain syndrome, and due to motor disorders, patients have significant difficulties in maintaining oral hygiene, which in turn leads to various dental problems. In this study, an analysis of the state of the oral cavity in stroke patients was carried out, considering the type of acute cerebrovascular accident, post-stroke complications and risk factors. Most patients were found to have an unsatisfactory state of oral hygiene, signs of gingivitis and periodontitis, which indicates the need to develop protocols for the prevention, treatment and prosthetics of stroke patients.

Keywords: Hemorrhagic stroke, ischemic stroke, gingival index, DMFT index, hygiene index, gingivitis, periodontitis

INTRODUCTION. According to the statistics, almost 15 million people worldwide suffer a stroke every year, 5 million of them die, and 5 million continue to live with disabilities. According to statistics, more than 65,000 new cases of stroke are registered in Uzbekistan every year. At the same time, more than 160 new cases occur in the country every day. There are 25-30 cases of stroke every day in Tashkent. Ischemic stroke accounts for 85% of cases of acute cerebrovascular accident, while hemorrhagic stroke accounts for 15% of cases of cerebrovascular accident. Stroke is generally associated with loss of sensitivity or unilateral paralysis of orofacial structures [1, 3, 6].

The effects of stroke directly or indirectly affect various organs and systems, including the oral cavity. The most common direct consequence is sialorrhea and pain syndrome, and because of motor disorders, patients experience significant difficulties in maintaining oral hygiene, which in turn leads to various dental problems. It should be noted that the post-stroke rehabilitation period includes taking medications that change the properties of blood and the nature of hemodynamics, which must be considered when providing dental care to this category of patients [2, 4, 12].

Even with mild neurological disorders, patients do not maintain good oral hygiene. In patients with speech disorders and dysphagia, paresis of the facial muscles, loss of tissue sensitivity, flabby, folded and asymmetrical tongue, food residues can stick to the teeth, accumulate on the tongue and oral mucosa [5, 8, 11].

Patients undergoing rehabilitation after a stroke are at risk of deterioration of the oral cavity for a few reasons. The long-term effects of brain damage, such as limited physical abilities, cognitive impairments, impaired coordination, neuropsychological complications, as well as mental health problems, make it difficult to maintain good oral health. Complications after a stroke, such as hemiparesis (unilateral weakness), hemiplegia (unilateral paralysis), loss of sensitivity, apraxia (inability to perform skilled motor actions), dysarthria (impaired motor speech), swallowing dysfunction, and ataxia (lack of muscle control or coordination of voluntary movements), are a serious problem in the daily care of oral cavity and dentist visits [7, 9, 10].

AIM OF THE STUDY. To study and analyze of the oral cavity (hygienic status, dental hard tissues, periodontal tissues, dentition) in patients with stroke.

MATERIALS AND METHODS. A dental examination was performed on 92 patients (56 men and 36 women) diagnosed with subarachnoid hemorrhage, intracerebral hemorrhage, or cerebral infarction. Inpatient patients were excluded if they had a nasogastric tube installed, or if they had difficulty communicating (they could not execute a one-step command), or if they had a second stroke.

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The patients' medical histories, medical history, initial diagnosis, type of stroke (subarachnoid or intracerebral infarction), time since diagnosis, the presence of risk factors for stroke (diabetes mellitus, hypertension, hyperlipidemia, atrial fibrillation, coronary heart disease, heart failure), the nature of the consequences of stroke (hemiplegia/hemiparesis, tetraplegia (upper and lower body paralysis), dysphagia (swallowing problems), dysarthria/anarthria (complete loss of speech motor skills), ataxia and depression).
During dental examination, the condition of the oral cavity was assessed based on the overall DMFT score (dental caries intensity index), oral hygiene assessment and periodontal condition, where D-T is the number of teeth affected by caries, M–T is the number of missing teeth, F-T is the number of sealed teeth. DMFT is the sum of the indicators of the condition of teeth with caries, missing teeth and fillings. The state of oral hygiene was assessed based on the percentage of plaque on the surface of the teeth. To assess the periodontal condition, the appearance of the gums was checked, and the depth of the pocket was measured with each tooth in the mouth. All information was entered in a special dental form. The dental examination was performed using a dental mirror and a periodontal probe.

The data was analyzed using descriptive statistics. Statistical processing of the obtained data was carried out using nonparametric methods (Mann-Whitney criterion) and correlation analysis (Pearson criterion). The results were presented as a median, and the reliability of the difference in average values was evaluated according to the Student's criterion. The principles of evidence-based medicine are used in the organization and conduct of research. The statistical analysis was performed using the OriginPro 8.6 program (OriginLab Corporation, USA). The value of $p < 0.05$ was considered statistically significant.

RESULTS. When examining medical records, it was found that the majority of patients had suffered an ischemic stroke – 72 (78.3%) of the subjects. By age, 66 (71.7%) patients aged 50 to 79 years prevailed, and men (60.9% of the studied) by gender. Among the risk factors for acute cerebrovascular accident, arterial hypertension was more common in 69 (75%) and hyperlipidemia in 27 (29.4%) patients. Smoking (17 (18.5%) patients) and alcohol consumption (15 (16.3%) patients) were observed with relatively similar frequency (Table 1).

Table 1.
Patients' characteristics

Parameter	Number of patients (n=92)
Sex, n (%)	
Male	56 (60,9%)
Female	36 (39,1%)
Age, M ± m years	52,4 ± 8,2
Age group, n (%)	
18-24 years	1 (1,1%)
25-49 years	23 (25%)
50-65 years	33 (35,9%)
65-79 years	30 (32,6%)
≥ 80 years	9 (9,8%)
Stroke type, n (%)	
hemorrhagic	20 (21,7%)
ischemic	72 (78,3%)
Time since diagnosis, M ± m months	10,2 ± 2,2

Hemiparesis was diagnosed in 60 (65.2%) patients, while no significant differences were found between post-stroke symptoms such as tetraplegia, dysphagia, anarthria, ataxia, and depression. One patient had aphasia, 10 (10.9%) had facial asymmetry (Table 2).

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Table 2.

The structure of post-stroke symptoms

Syptom	**Frequency of occurrence**
Hemiparesis	60 (65,2%)
Dysarthria	29 (31,5%)
Dysphasia	9 (9,8%)
Aphasia	1 (1,1%)
Facial asymmetry	10 (10,9%)
Sensitivity disorder	6 (6,5%)
Other	16 (17,4%)

The study of dental status revealed high average scores on the DMFT index (19.89), DT (3.44), MT (15.44) and low average scores on the F-T (1.89). A statistically significant relationship was found between the DMFT index value ($p = 0.002$), the M-T component ($p = 0.025$) and the type of stroke, while no differences were found between the D-T ($p = 0.38$) and F-T components ($p = 0.58$). The highest values of the DMFT index and the M-T component were recorded in ischemic stroke. The lowest DMFT index values were recorded in patients with the subarachnoid subtype of hemorrhagic stroke (Table 3).

Table 3.
Dental status (DMFT index) and its relation to the type of stroke

Stroke type	**n**	**D-T**	**M-T**	**F-T**	**DMFT**
hemorrhagic	20	3,52 ± 1,24	12,88 ± 2,12*	1,95 ± 0,85	18,04 ± 5,08*
ischemic	72	3,22 ± 0,88	16,02 ± 3,21*	1,77 ± 0,72	20,55 ± 4,42*
Total	92	3,44 ± 1,02	15,44 ± 2,88	1,89 ± 0,68	19,89 ± 4,94

* $p < 0,05$

Presumably, these results are related to physical impairments and difficulties in accessing dental care, which do not allow for adequate dental treatment and prosthetics. It was found that in many cases, due to communication problems and the patient's special medical status, the dentist could choose simpler and faster treatment methods. The above factors also affected the state of oral hygiene and periodontal tissues. There were rather high indicators of the hygiene index and gingival index, which indicated an inadequate level of oral care. Consequently, the state of oral hygiene in most patients was assessed as poor or very poor (Table 4).

Table 4. Oral hygiene and periodontal tissues

Parameter	**M ± m**
Hygiene index (%)	78,8 ± 10,12
Gingival index	55,6 ± 9,72
Probing depth, mm	3,88 ± 1,76
Oral hygiene	**n (%)**
very good	0
good	1 (1,1%)
satisfactory	25 (27,2%)
bad	36 (39,1%)
very bad	30 (32,6%)
Periodontal diseases	**n (%)**

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gingivitis	28 (30,4%)
periodontitis	
mild	32 (34,8%)
moderate	21 (22,8%)
severe	11 (12%)

Due to poor oral hygiene, as well as xerostomia that developed while taking medications, gingivitis and periodontitis of varying severity were diagnosed in the subjects. Mild periodontitis prevailed in 32 (34.8%) and gingivitis in 28 (30.4%) patients. The probing depth averaged 3.88 ± 1.76 mm. During the survey, patients noted that they regularly experience difficulties brushing their teeth due to impaired hand motor skills, as well as impaired functioning of the chewing muscles, lips, tongue, soft palate and pharynx, which affected speech, eating and oral cleansing. The effects of stroke were a serious problem with daily oral care and dental visits. In the present study, the main residual consequence was hemiparesis (paralysis of half the body). Impaired mobility made it difficult to clean teeth optimally. Insufficient oral care has led to an increase in the number of oral infections, caries and its complications.

CONCLUSIONS. Based on the results of this study, it can be concluded that in patients who had suffered a stroke, the state of oral health was unsatisfactory in a number of parameters. Poor oral health was associated with several aspects: socio-demographic, type of stroke, risk, and behavioral factors affecting oral health, combined with physical or cognitive difficulties. Thus, the data obtained indicate structural changes and the need to develop, based on an interdisciplinary partnership, a new model of oral care, treatment and prosthetics for stroke patients on an individual level.

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