Article

CORRELATION of COGNITIVE FUNCTIONS with DENTAL STATUS

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Abstract:

Introduction: Maintaining oral health with age is crucial for healthy longevity, as it is associated with improving the processes of swallowing, chewing, nutrition, communication, and socialization. This is an important indicator of overall health, well-being and quality of life. The poor condition of the oral cavity is characterized by tooth loss and periodontitis. They are widespread among the elderly, especially among people with weakness and cognitive impairment.

The aim of the study was to assess the dental condition of the elderly people included in the study and its relationship with cognitive impairment.

Materials and methods: this scientific study was conducted during 2022-2023 were examined in everyday practice at a dental clinic in Khimki. A total of 40 people aged 60 to 94 years were included in the study (the average age was 72.5±10.06 years), including 19 people with good cognitive status, 21 people with poor cognitive status. The study assessed the geriatric, dental and somatic status of patients. All patients who were diagnosed with cognitive decline were given individual recommendations for the treatment and prevention.

Results: In the course of the study, it was found that there is heterogeneity of geriatric status in patients undergoing dental treatment. It turned out that 19 patients out of 47.5 % have an MMSE test score in the range of 28-30 points, which indicates the absence of cognitive impairment, and 21 patients (52.5%) have less than 28 points, which reveals cognitive impairment. One patient (2.5%) of the total number of examined patients was diagnosed with severe dementia.

Conclusion: the present study showed that patients with dementia had a significant decrease in the hygienic status of the oral cavity, a progressive course of periodontal diseases, as well as significant tooth loss. The problem of impaired dental status in patients with cognitive dysfunctions requires further clinical interdisciplinary research to assess cognitive functions and oral health.

Keywords: oral health, dentistry, cognitive functions, gerodontology, gerontostomatology, geriatrics, dementia

1. Introduction

Maintaining oral health as we age is crucial for healthy longevity as it is associated with improved swallowing, chewing, eating, communication, socialisation. It is an important indicator of overall health, well-being, and quality of life. Poor oral health is characterised by tooth loss and

periodontitis. They are common among older people, especially those with frailty and cognitive impairment.

2. Patients and Methods

This scientific study was conducted during 2022-2023 on the basis of a private dental clinic in Khimki. Khimki. A total of 40 people aged 60 to 94 years (mean age was 72.5±10.06 years), including 19 people with good cognitive status and 21 people with poor cognitive status were included in the study. The geriatric, dental and somatic status of the patients was assessed during the study. Inclusion criteria: elderly age 60-94 years, absence of oncological disease, absence of contraindications to dental treatment.

3. Results

The present study included two phases. Stage 1: comprehensive geriatric assessment of patients subject to dental treatment. Data were extracted from primary medical records, questionnaire survey, instrumental dental examination. Specialised questionnaires and scales were used for this purpose: the Minimental State Examination (MMSE) Brief Mental Status Evaluation Scale and the "Clock Drawing" test. Stage 2: comparative analysis of dental and geriatric status in patients undergoing dental treatment.The study revealed that there is heterogeneity of geriatric status in patients undergoing dental treatment. It was found that 19 patients (47.5%) had MMSE test score between 28-30 points indicating no cognitive impairment and 21 patients (52.5%) had less than 28 points revealing cognitive impairment. One patient (2.5%) of the total number of patients examined was found to have severe dementia. A significant correlation between the number of lost teeth, low level of hygiene, poor periodontal index and the degree of cognitive impairment was revealed. It turned out that people with the number of extracted teeth 3.78±6.32, good and satisfactory oral hygiene, and periodontal index CPITN 1.73±0.87 points have MMSE test score of 25-30 points, which indicates the absence of cognitive impairment. Further increase in the number of lost teeth, poor hygiene and periodontal CPITN index leads to a high probability of development of senile dementia. Thus, among patients who lost an average of 8.41±6.34 teeth, the MMSE test showed a score of 24 - 27, indicating pre-dementia cognitive impairment in these patients. Among those who lost 9.33±4.72 teeth, mild dementia was detected. In patients with MMSE index scores 0-19 the number of extracted teeth ranged from 20±11,89 to 32. In this group of patients dementia manifestations of moderate and severe degree of severity. Meanwhile, the dependence on the level of oral hygiene was also revealed. Patients with good cognitive functions demonstrate sufficient and satisfactory level of hygiene. The index of hygiene index OHI-S corresponds to 1.4±1.47, which is a satisfactory level of hygiene. Patients with a good level of oral hygiene have a low risk of developing dementia. Patients with this level of risk have a high chance of avoiding the development of dementia. With a satisfactory level of oral hygiene, patients need extra attention and may have some chance of developing dementia. Patients with unsatisfactory and poor oral hygiene, have a high risk of developing dementia. Urgent action should be taken to improve oral health in these patients. Periodontal CPITN index in patients with MMSE scores 0-27 averaged a code of 2.88±0.19, indicating the presence of bleeding gums, tartar and pathological gum pockets (Fig. 1).
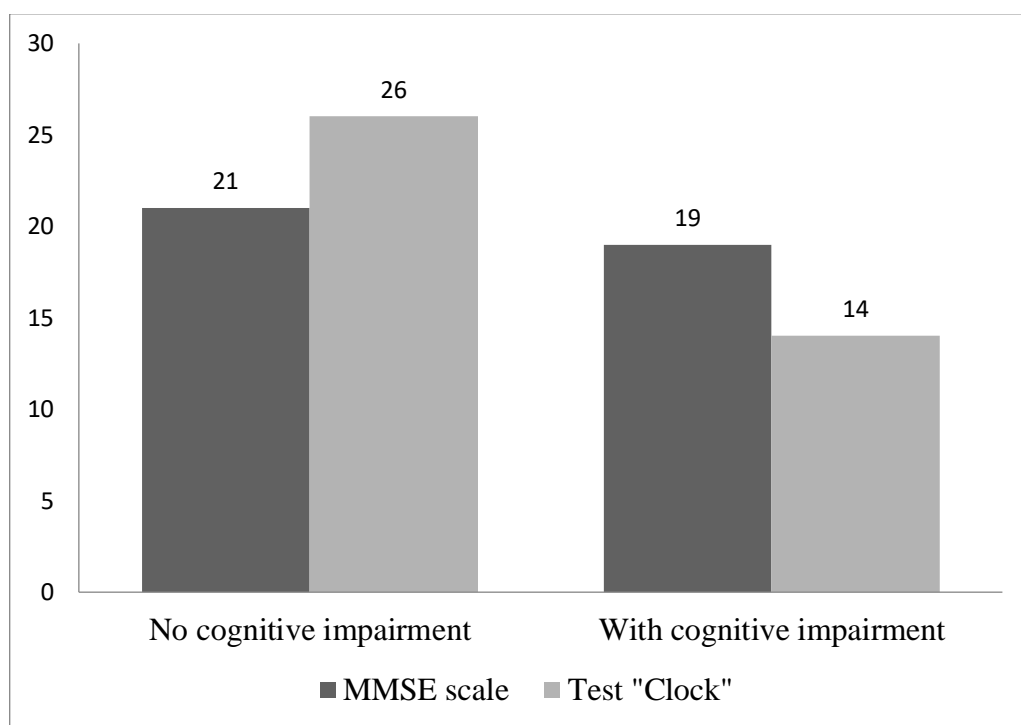
Figure 1. Assessment of cognitive functions of patients using the MMSE scale and the "Clock Drawing" test at the first stage of the study.

4. Discussion

With the decline in cognitive function, the increase in periodontal disease is not surprising, as adequate plaque control and oral care require both cognitive and motor skills. To prevent these problems, it is recommended that patients and their carers be supported and assisted with oral care. Based on the results of the study, a methodology for adapting medical procedures and clinical approaches in patient care is being developed to improve the accessibility of dental care for patients with senile dementia. Knowledge and understanding of a patient's cognitive and mental state can facilitate communication and support dental care. Oral health is both a marker and predictor of cognitive impairment. Oral health is a modifiable risk factor that is often neglected in clinical practice. Standards of clinical practice to guide the management of complex treatment of older people with, personalised targeted therapies in dental practice is a pressing unmet need and the integration of oral health into routine clinical practice and primary care should be a priority for every region. Every physician should identify oral health problems in a timely manner, and dentists should identify cognitive impairment with appropriate treatment. Since oral health and cognitive impairment are modifiable risk factors for healthy ageing, population-level screening for correlations between oral health status and cognitive impairment should be a priority.

5. Conclusions

In the process of this scientific study, it was revealed that elderly and elderly patients who seek oral health care in a dental clinic need not only standard clinical and paraclinical examinations within the framework of dentistry. The present study showed that patients with reduced cognitive functions had a significant decrease in oral hygiene status, progressive course of periodontal diseases, and significantly pronounced tooth loss. The problem of impaired dental

status in patients with cognitive dysfunction requires further clinical interdisciplinary research on the assessment of cognitive function and oral health.

Application of artificial intelligence:

The article is written without the use of artificial intelligence technologies.

Conflicts of interest. The authors declare that there are no conflicts of interest.

References

1. Maksimova MJ, Tsalikova NA, Dubova LV, Surmilo I.M. Relationship between dental status and cognitive function. Medical advice. 2022;16(14):57-62.
2. Benzian H, Guarnizo-Herreno CC, Kearns C, Muriithi MW, Watt RG. The WHO global strategy for oral health: an opportunity for bold action. Lancet. 2021;398(10296):192–4.
3. Bergdahl M, Habib R, Bergdahl J, Nyberg L, Nilsson LG. Natural teeth and cognitive function in humans. Scand J Psychol. 2007 Dec;48(6):557-65.
4. Kiuchi S, Kusama T, Sugiyama K, Yamamoto T, Cooray U, Yamamoto T, Kondo K, Osaka K, Aida J. Longitudinal Association Between Oral Status and Cognitive Decline Using Fixed-effects Analysis. J Epidemiol. 2022 Jul 5;32(7):330-336.
5. Lawton MP, Brody EM. Assessment of older people: self-maintaining and instrumental activities of daily living. Gerontologist. 1969;9(3):179–186.
6. Scheltens P, De Strooper B, Kivipelto M, Holstege H, Chetelat G, Teunissen CE, et al. Alzheimer's disease. Lancet. 2021;397(10284):1577–90.
7. Tan LF, Chan YH, Merchant RA. Association between dentition and frailty and cognitive function in community-dwelling older adults. BMC Geriatr. 2022 Jul 25;22(1):614.
8. Tanaka T, Takahashi K, Hirano H, Kikutani T, Watanabe Y, Ohara Y, et al. Oral frailty as a risk factor for physical frailty and mortality in community-dwelling elderly. J Gerontol A Biol Sci Med Sci. 2018;73(12):1661–1667.
9. Watanabe Y, Okada K, Kondo M, Matsushita T, Nakazawa S, Yamazaki Y. Oral health for achieving longevity. Geriatr Gerontol Int. 2020;20(6):526–38.
10. Yang HL, Li FR, Chen PL, Cheng X, Chen M, Wu XB. Tooth loss, denture use and cognitive impairment in Chinese older adults: a community cohort study. J Gerontol A Biol Sci Med Sci. 2021.

Clinical case