Asian Journal of Research № 4-6, 2020 ISSN 2433-202x
IMPACT FACTOR JOURNAL DOI 10.37057/2433-202x
SJIF 6,1 www.journalofresearch.asia
IFS 3,7 info@journalofresearch.asia

BONE TISSUE CONDITION PECULIARITIES AT DENTAL IMPLANTATION IN PATIENTS WITH SOMATIC DISEASES.

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http://dx.doi.org/10.37057/2433-202x
Issue DOI http://dx.doi.org/10.37057/2433-202x-209-2020-4-6
Article DOI http://dx.doi.org/10.37057/2433-202x-2020-4-6-14

Abstract: In everyday practice about 7-10% of cases of dentist's appointment with a dentist are patients who come for prosthetics using dental implants and have somatic background pathology. In this study, 72 patients who were planned for this type of treatment were determined by the structural and functional state of bone tissue by the level of calcium-regulating hormones: parathyroid hormone (PTH), calcitonin (CT_n), calcitriol (CT_r), osteocalcin (OC_c). During the work only 25 (34,7%) patients had indicators within the norm. Disturbances of structural and functional properties of bone tissue in the form of osteopenia of different severity in 36 (79,6%) and osteoporosis in 11 (23,4%) patients were revealed in the remaining 47 (65,3%) patients. The main parameters of structural and functional state of bone tissue, osteogenesis markers and calcium-regulating hormone levels in patients with future dental implantation were studied. Disturbances in strength characteristics of bone tissue, changes in levels of calcium-regulating hormones and markers of osteogenesis, indicating the necessity of prophylactic and medical measures at all stages of observation and treatment in this contingent of patients, are revealed.

Keywords: dental implantation, somatic diseases, osteopenia, osteoporosis. markers of osteogenesis, calcium-regulating hormones, densitometry.

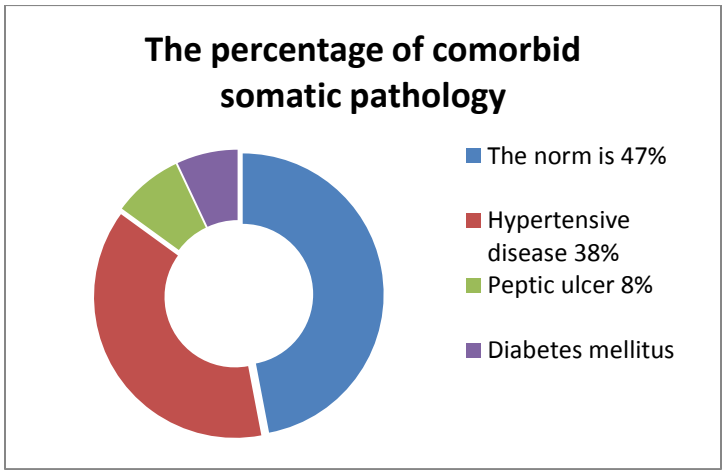
Nowadays some somatic diseases most frequently occurring in dental patients: hypertension, gastric ulcer, diabetes mellitus in the compensation stage are considered to be a relative contraindication to dental implantation [1,3,7,10]. The well-known reasons for the relative contraindication from dental implantation are: reduced reaction to surgical intervention, microcirculation disorders in the oral cavity tissues, possibility of local and systemic pre-operative complications, reduction of the number of patients with disabilities.

For an implantologist, the phenomenon of "rarefication" or "discharging", which occurs in the course of prolonged arterial hypertension and constant hypotensive drugs, which is manifested by the reduction of the total surface of metabolic vessels [5,9], is important. In case of dental implantation, it is important not only to make a diagnosis

but also the state of adaptive-compensatory mechanism. So, the conclusion of an implantologist on the probability of implantation in the required volume should be based on the diagnosis of the disease, as well as the duration and effectiveness of the corrective treatment.

The aim of the research was to study densitometric indices of bone tissue of patients with background somatic disease, planning dental implantation.

Research materials and methods. We have carried out clinical and laboratory examination of 72 patients with dental defects who applied for dental treatment, aged 40 to 65 years. Among the examined women there were 45 (62,5%) people, men - 27 (37,5%). The structure of accompanying pathology (Fig.1) included: hypertension - 27 (38%), stomach ulcer - 6 (8%), diabetes mellitus - 5 (7%). The study determined the density index (DI,%). The control group included 34 practices of healthy people of both sexes.



Pic. 1 The structure of the accompanying pathology of the subjects.

In the blood serum of the examined patients the levels of calcium-regulating hormones were determined: parathyroid hormone (PTH), calcitonin (CTn), calcitriol (CTr). CTn were determined using the reagents Calcitronin-IFA (CHEMA, Russia). CTr level was determined by ELISA kit 1,25 Vitamin D ELISA (Immundiagnostik, Germany). As markers of serum bone formation we studied the level of osteocalcine (OSC) by ELISA kit N-MIDO steocalcin (Canada).

For processing the received data, we used methods of parametrical and nonparametrical statistics by means of Statistica 6.0 program.

Research results and their discussion. In this study the structural and functional state of bone tissue was determined in 72 patients for whom this type of treatment was planned, densitometric parameter density index - (DI,%) was determined. In the course of study only in 25 (34,7%) patients the indices were within normal limits. Disturbances of structural and functional properties of bone tissue in the form of osteopenia of

different severity in 36 (79,6%) and osteoporosis in 11 (23,4%) patients were revealed in the remaining 47 (65,3%) patients.

Analysis of ultrasonic densitometry data showed that DI values were significantly low in all age groups, but a greater degree of fall and frequency of osteoporosis detection were observed at the age of 60-65 years. Osteopenia occurred at the age of 45-50 years in 7 (14,8%), at the age of 50-59 years in 20 (42,5%), at the age of 60-65 years in 6 (12,7%); osteoporosis at the age of 42-49 years was observed in 4 (36,4%), at the age of 50-59 years in 6 (54,5%), at the age of 60-65 years in 1 (9%) patients.

The main role in the mechanism of structural and functional disorders of bone tissue is given to the state of hormonal regulation of formation and resorption of bone tissue. [12,13]. The main calcium-regulating hormones include calcitonin, calcitriol, and parathyroid hormone, the levels of which we determined in 52 patients who underwent dental implantation (Table 1).

Deoxypyridinoline/creatinine is a marker of bone resorption, which gets at destruction by osteoclasts from bone tissue into the vascular channel [10,11]. The analysis showed a reliable increase of deoxypyridinoline level in the examined patients - 6,26±0,22 ($p<0,01$), that indicated activation of osteoclasts and prevalence of bone resorption processes. From Table 2 in the group of patients with osteoporosis the content of deoxidipyridinoline was reliably higher than the index - 6,99±0,36 ($p<0,001$) and reliably higher than the index of the group of patients in whom osteopenia was determined during densitometric examination - 6,24±0,29 ($p<0,05$).

In the analysis of ultrasonic densitometry indicators, considering nosological forms and gender, it was found that all indices of structural and functional state of bone tissue in women in the period of postmenopause, as well as in diabetes mellitus were authentically low ($p<0.001$).

Table 1

Calcium-regulating hormone levels in groups

Calcium-regulating hormones	Control group indicators	Examined Patient Group Indicators
Calcitonin	23,3 ±2,01;p<0,001	3,56±2,01
Calcitriol	60,8±3,86; p <0,001	20,38±2,75
Parathyroid hormone	43,37±2,16; p <0,01	51,33 ± 2,43

Calcium-regulating hormone levels in patients with impaired bone structure and function properties

Calcium-regulating hormones	Patients with osteoporosis	Patients with osteopenia
Calcitonin	2,17±1,04;p<0,001	3,46±1,08; p < 0,001

Calcitriol	15,23±2,11;p<0,001	21,71±2,76;p<0,05
Parathyroid hormone (PTH)	53,46±2,17; p <0,01	42,53 ± 3,09; p < 0,001
Osteocalcine	68,19±5,71;p < 0.001	81,94±3,65; p < 0,001
Deoxypyridinoline/ creatinine	6,99±0,36 p < 0,001	6,24±0,29;p<0,05

Conclusions. As a result of the conducted research the presence of persistent structural and functional disorders of bone tissue in patients with periodontal disease complicated by somatic pathology for whom dental implantation was planned was revealed. They are manifested by reduction of densitometric parameters - SRU, SHOU, bone tissue IE. More often these changes are expressed in patients after 55-60 years of age, in women in the postmenopause period, against the background of existing somatic pathologies. Pathological processes in this category of patients are accompanied by varying levels of calcium-regulating hormones and osteogenesis markers.

Conducting dental implantation in patients over 55 years of age and having anamnesis inflammatory periodontal disease, complicated by background pathology, requires a number of preparatory measures before the operation, associated with the restoration of strength characteristics and architectonics of bone tissue, prolonged monitoring of structural-functional and laboratory characteristics of bone tissue.

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