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DETERMINATION OF BONE DENSITY IN THE GRINDER TEETH AREA

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Abstract:

Comparison of bone density among men and women in the area of the proposed dental implantation in the region of the grinder teeth of the upper jaws. In the 21st century, various methods are used to determine bone density in the area of dental implantation; the most common is computer tomography. For a better understanding of computed tomography scans, the dentist uses various computer programs. In our work, we used the Ez3D2009 program of Vatech Co., Ltd. to compare bone density in the area of intended dental implantation in the region of the grinder teeth of men and women. Estimation of bone density in the area of intended dental implantation in the region of the grinder teeth is necessary for the best choice of implants, the progress of the surgical operation, makes it possible to predict more accurately the duration of treatment, ensure reliable fixation and long-term functioning of implants.

Key words: *Bone tissue, dental implantation, comparison of bone density, bicuspid tooth, computer tomography, multi-cuspid tooth, Ez3D2009 program.*

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INTRODUCTION:

To restore the masticatory function among patients, dentists use various methods, including dental implantation[1-3]. However, as with other operations, with implantation a number of complications are possible: sinusitis, implant failure, periimplantitis, osteomyelitis, and others[4-7]. In order to reduce the possibility of these complications as much as possible, it is necessary to know the density of the tissues in the area of the intended implantation. The bone tissue classifies into 4 types of density: D1 dense cortical, D2 porous cortical, D3 coarse trabecular, D4 fine trabecular. Bone density is measured in Hounsfield units, where 1000 is air, 0 is the density of water, 1000 is the density of solid bone[4,6-12].

There are several methods to determine the type of bone tissue: X-ray densitometry, suprasonic osteometry, orthopantomography and computer tomography[2,3]. However, these methods have several disadvantages. They are including the effect of radiation exposure on the patient's body, the resulting images of bone structures have distorted shapes, so determining the true dimensions of the bone is not always possible. Also there are difficulties in interpreting the data. The most accurate determination of the density of solid tissues shows studies, which use computer tomography[13,14]. Various programs are used to interpret CT studies. In our research was compared bone density in the area of intended dental implantation of patients using the Ez3D2009 program of Vatech Co., Ltd. The purpose of our research[6-12].

In order to find out the difference in bone density among men and women in the area of grinder teeth, the following manipulations were performed:

1. Evaluation of bone density in the area of grinder teeth of the upper jaws of men.
2. Evaluation of bone density in the area of grinder teeth of the upper jaws of women.
3. Comparison of the results.

MATERIALS AND METHODS:

This work was done at Sechenov University with supported by the "Russian Academic Excellence Project 5-100". A computer program for determining bone density - Ez3D2009 of Vatech Co., Ltd. Computed tomography scans of 11 patients of different genders. Using the Ez3D2009 program of Vatech Co. Ltd. to determine bone density in the intended area of dental implantation, it is necessary to set the axis of cuts correctly: sagittal and coronal. To properly assess the area of the planned dental implantation, this object should be seen from three sides from the side and from above. To determine the bone density in the region of the grinder teeth, the selection of the desired area is used. This module gives us the following data: the perimeter, the area of the maximum, minimum and average bone density. This instrument gives the data in Hounsfield units. Another method for determining bone density in the Ez3D2009 program is to install implants in the planned area. From the proposed list of implants, we select the appropriate one and put it in the area of the intended dental implantation. This option helps us to evaluate how the implant will be positioned in the patient's jaw. After selecting the implant using the "show bone density" function, we get information about bone density inside and outside the implant. During the choosing a cut thickness of 2 mm, we will know the bone density within 2 mm. The implant is indicated by the symbols D5.

Results of own research:

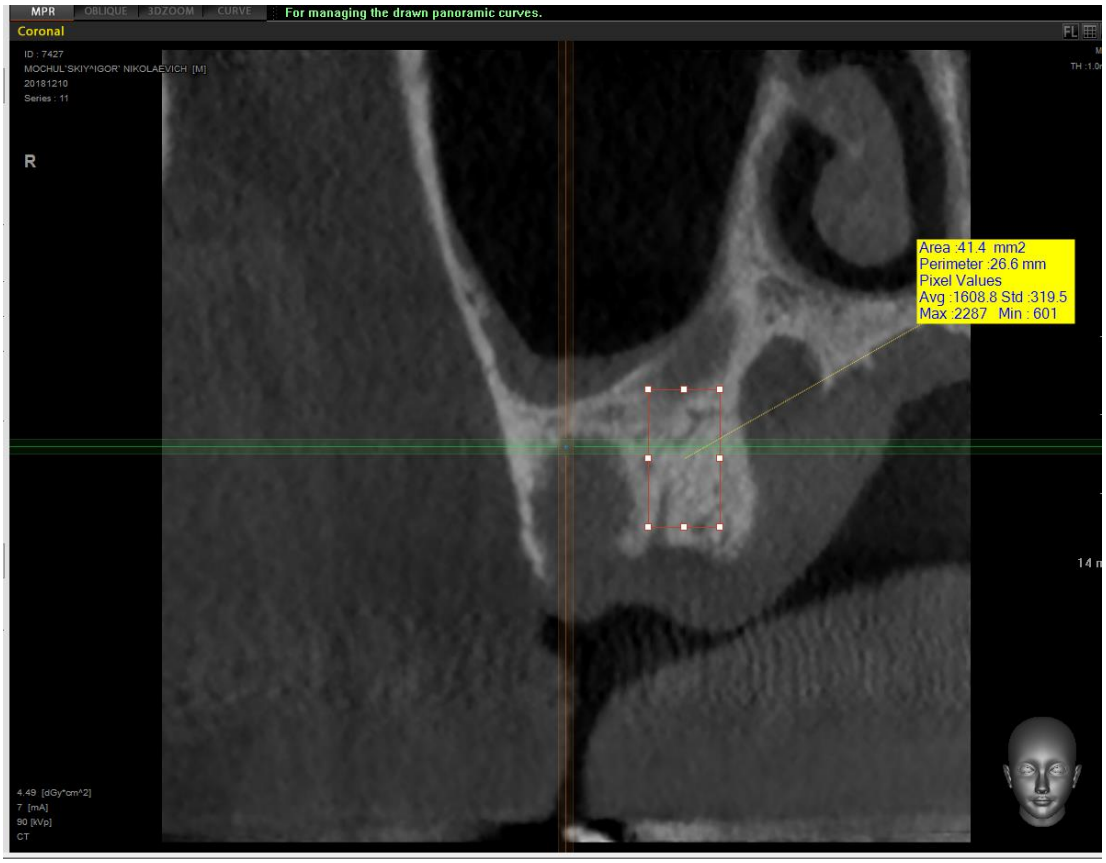


Figure 1 Patients' bone tissue in the area of the proposed dental implantation refers to type 1 (D1).

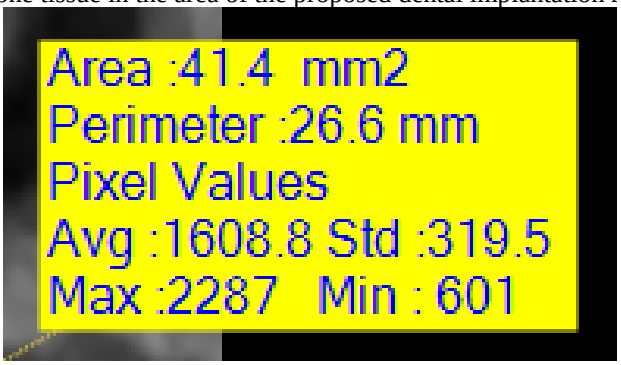
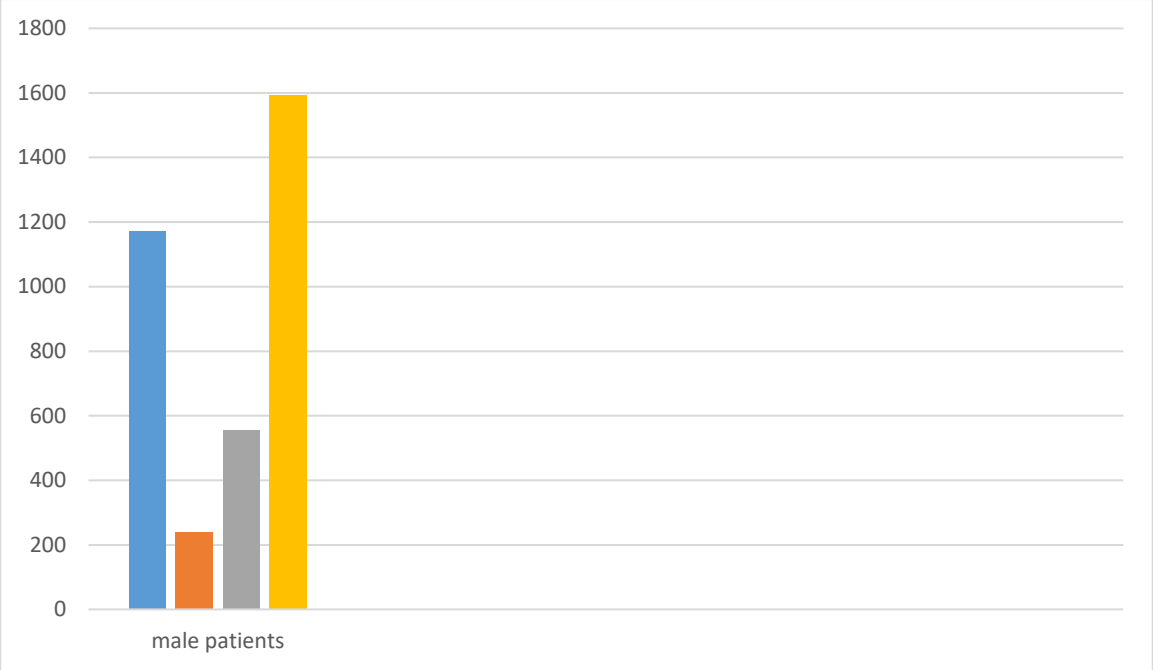


Figure 2 The average bone density was 1608 in Hounsfield units

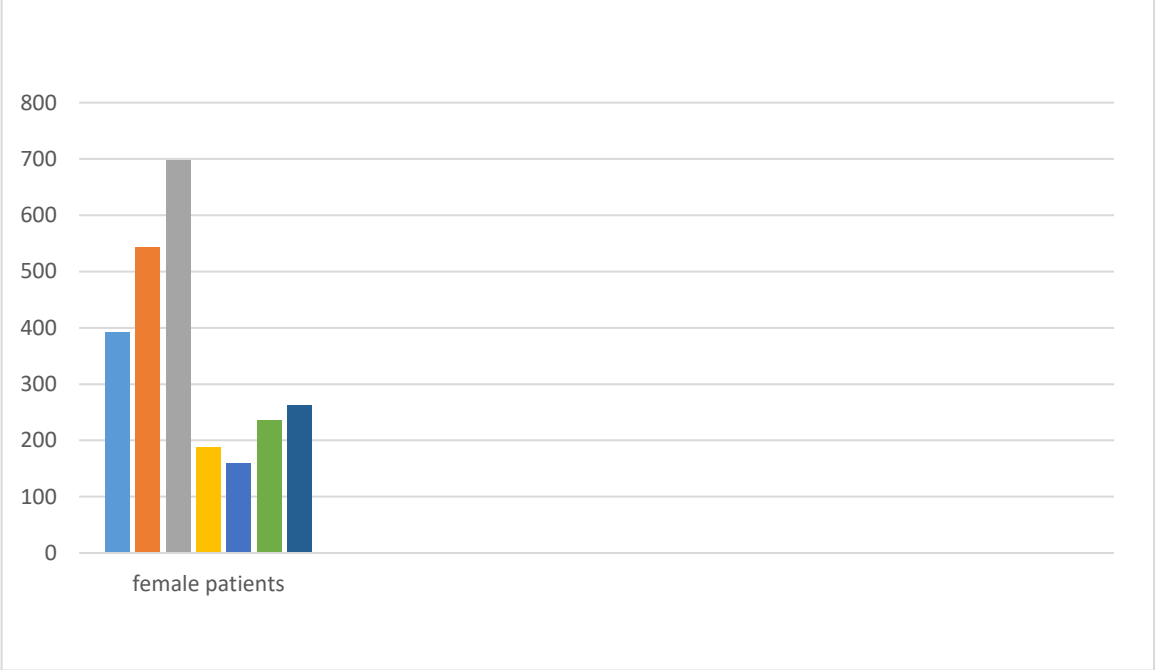
During the examination of the areas of supposed dental implantation in the region of the grinder teeth of the upper jaws among men, the average bone density was 658 in Hounsfield units, as shown in Fig. 3. This means that, on the average, patients' bone tissue in the area of the proposed dental implantation refers to type 1 (D1).

Figure 3: Men's bone density



During the examination of the areas of supposed dental implantation in the region of the grinder teeth of the upper jaws among women, the average bone density was 262 in Hounsfield units. This means that, on the average, patients' bone tissue in the area of the proposed dental implantation refers to type 4 (D4), as shown in Fig. 4.

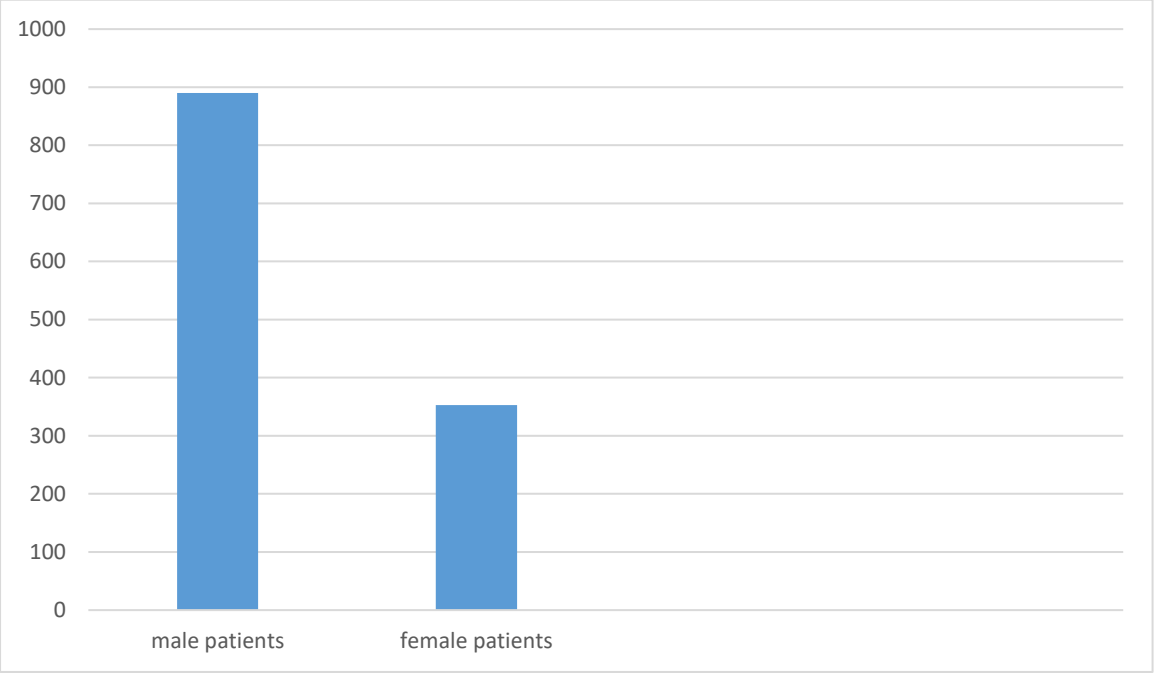
Figure 4: Women's bone density



CONCLUSIONS:

On the basis of this research, it can be concluded that the male grinder teeth of the upper jaws has a greater density than the female patients' bone tissue in the region of the grinder teeth of the upper jaw, as shown in figure 5.

Figure 5: The average bone density of men and women



Thus, on the basis of the obtained results, it is possible to recommend, in order to achieve maximum primary stability without the risk of bone ischemia after installing dental implants in the region of the grinder teeth of the upper jaws, for women to use implants with active threading, and for men implants with passive threading.

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