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ALTERNATIVE APPROACH FOR THE REGISTRATION OF PERI-IMPLANT BONE LEVEL CHANGES AT THE REMOTE REHABILITATION PERIOD

ABSTRACT. Background. Adaptive changes of residual peri-implant bone level occurring as the result of bone remodeling processes require clear objectification and categorization for the development of new methodological approach for evaluation the quality of dental implantation. **Objective.** To propose an alternative approach for the registration of peri-implant bone level changes with the use of specific geometric data analysis on the cone-beam computed tomography results; to evaluate the perspectives and possible disadvantages of proposed approach in terms of sensitivity and accuracy indicators due to features of tomographic verification methods as diagnostic tools in modern implant practice. **Methods.** DICOM-files of dental patients who have undergone the procedure of dental implantation were used as objects of approbation study. OnDemand3D ™ (Cybermed Inc.) software was used for the conversion of existing DICOM-files to the triangulation file formats (STL-files). Open source software MeshLab 1.3.3. was used to simplify the phase of geometric graphic analysis of the STL-files. The adapted geometric analysis protocol was used for the registration of peri-implant bone level at different time periods. The interpretation of the data obtained during the processing of STL-files was done with the calibration of dimensional scalar values regarding the actual size parameters of dental implant. Processing and analysis of numerical data was conducted using the Microsoft Excel 2016 (Microsoft Office 2016, Microsoft). **Results.** The proposed alternative method for detecting the level of peri-implant bone reduction takes into account the shortcomings of analogical radiological research methods, and provides the possibility for registration dynamic changes that are volume or circular by nature. In addition, the specificity of adapted geometrical analysis based on the evaluation of primary and recurrent tomographic results with the preservation of deflection options, spatial coordinates and number of tangential rays. Such approach helps accurately verify the marginal bone resorption in a particular area of interest, or display a mean value of bone reduction by mathematical calculations, minimizing the factor of subjective interpretation and impact of errors inherent to planar imaging reformats. The proposed approach is appropriate for using at 1 year of longer remote period, when the level bone resorption is close to 1 mm. **Conclusion.** Objectivisation of numerical parameters for bone level changes around the titanium endo-osseus elements can help not only to predict the progression of bone resorption in future, but also to develop specific criteria for assessing the quality of implant intervention based on specific terms of quantitative bone reduction in a remote time period.

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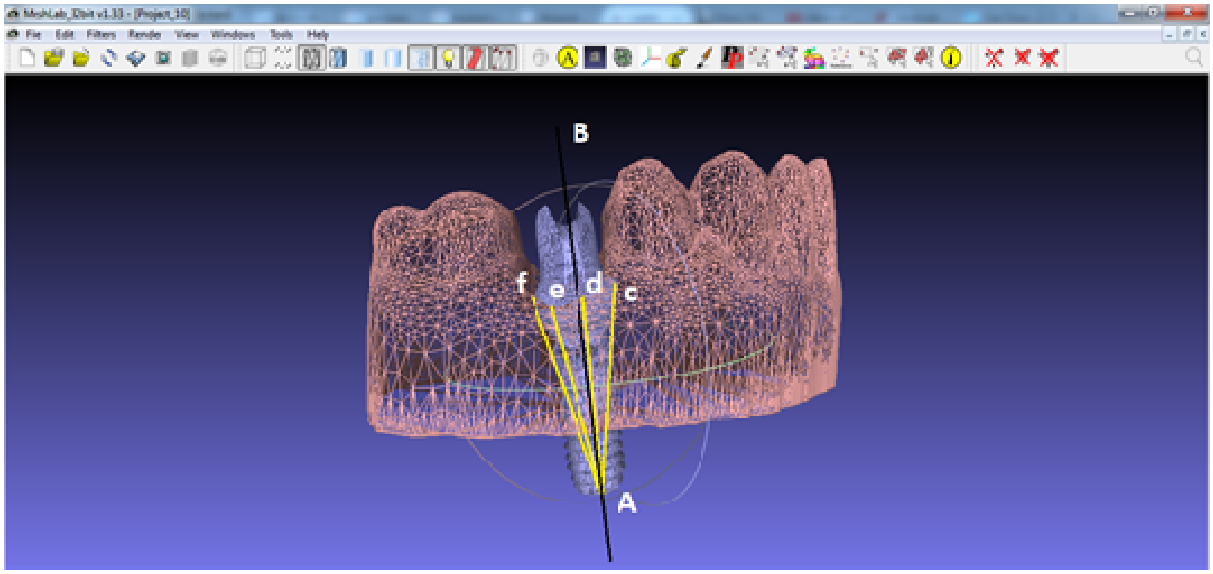

Fig. 1. Schematic image of alternative method realization for registration of peri-implant bone tissue changes in remote period.

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