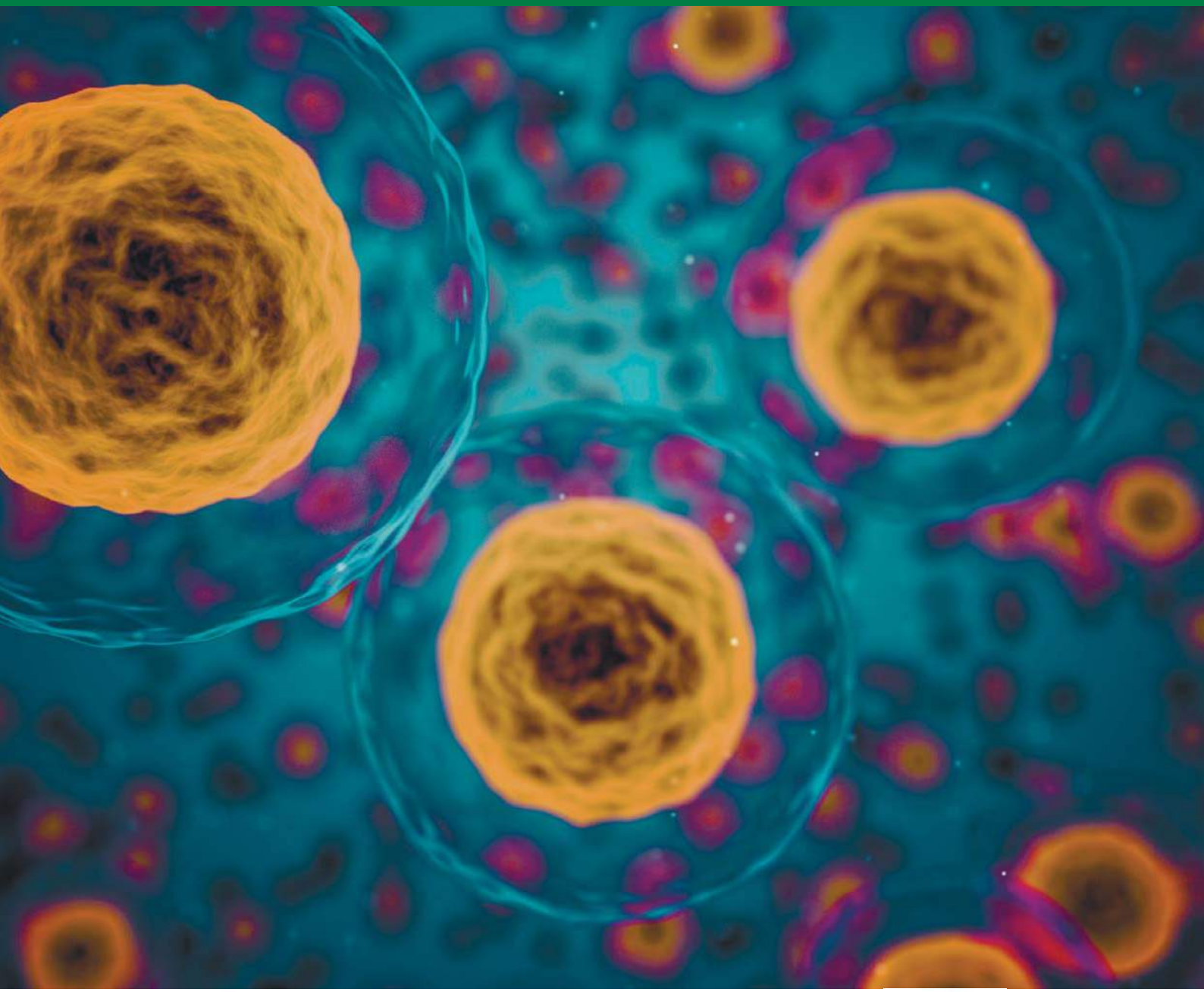
Kharkiv National Medical University

INTERNATIONAL SCIENTIFIC INTERDISCIPLINARY CONFERENCE ISIC - 2021



diameter is most pronounced in males; the proportions of the facial skull are preserved in men and women with a wide type of face; in women with a narrow and medium type of face with a higher frequency of orthognathic occlusion, and in women with a broad type of face - a direct occlusion; in men, regardless of the type of face, the orthognathic type of occlusion is more often registered. Men with a wide type of face also have a large percentage of progenic occlusion.

Conclusions.

1. The obtained results are important for the diagnosis and prediction of the dental system diseases and should be taken into account when planning and conducting medical manipulations in orthopedic dentistry and orthodontics.

2. The conducted researches allow to reveal the changes which occur in dental system during the orthopedic and orthodontic treatment.

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CREATION OF A TOOTH MODEL WITH NONCARIOUS CERVICAL LESIONS FOR ANALYSIS BY THE FINITE ELEMENT ANALYSIS

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Introduction. Noncarious cervical lesions (NCCLs) are one of the most common non-carious lesions that occur after teething. These defects violate the structural integrity of the tooth tissues, lead to increased tooth sensitivity, contribute to the retention of dental plaque and the progression of periodontal disease, negatively affect the vitality of the pulp and aesthetics. Therefore, the study of the mechanism of their development, as well as the planning of further treatment is relevant. One of the main factors in the occurrence of NCCLs is the abfraction process. To perform the structural analysis such as a computation of a stress distribution inside a body the 3D computer model is needed. To obtain the close to real-world results it has to satisfy two requirements: sufficient quality of the mesh and everywhere touching contact surfaces for composite

materials. These are necessary conditions to use the model for the computations in CAD systems like ANSYS.

Materials and methods. To build the model that meets the requirements for finite element analysis (FEA) we used the results of CT and the programs: 3D Slicer, Meshmixer, Blender, Rhino 7 and SpaceClaim.

Results. To perform the first approximation of the model we used 3D Slicer - free, open-source software that can build a 3D object using CT slices. Applying this program for the CT of the tooth, we obtain the model that contains five different materials: enamel, dentine, pulp, cancellous bone, and cortical bone, which are visible parts on the images. However, the CT resolution is not enough to capture the thin shell of the tooth - cementum. In addition, both of the above-mentioned sufficient requirements are not satisfied for the obtained 3D model. These are the reasons for using the 3D Slicer results just as a reference for creating another 3D.

The output format of this program is STL (stereolithography), which is widely used for storing three-dimensional models of objects. To build the model with the appropriate mesh and touching contact surfaces Meshmixer and Blender programs are used. Meshmixer allows repairing a low-quality mesh that can be too dense or with self-intersections. Here, it is used to remesh the constructed objects by 3D Slicer and obtain the appropriate triangular mesh for them. Then, they are exported to Blender – free, open-source software for 3D modeling where the step of connecting contact surfaces is done. In addition, the cementum material is added in Blender as a separate object. After Rhino 7 is used for making NURBS (Non-uniform rational B-spline format) models from meshed objects to simplify further work in ANSYS.

The final step consists of possible mesh error fixing and boolean subtraction for nested materials like dentine and pulp. The STL describes a shell but it contains no information about the internal structure of the object. For this goal, SpaceClaim module from ANSYS for students package is used. It can import STL objects, fix mesh errors and make the solid object from the STL shell. Then, it is possible to subtract solid pulp from dentine and finalize the model preparation for structural analysis.

Conclusion. Correctly created model for research using FEA will allow us to analyze the distribution of tooth stresses in the study of NCCLs and planning their further treatment.