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THE USE OF IMPRESSION MATERIALS FOR THE TRANSMISSION OF PERSONALIZED CALCULATED ACCESS DURING INTERVENTIONS ON THE PARANASAL SINUSES

Currently, three-dimensional (3D) modeling methods have proven their effectiveness in various branches of medicine. 3D modeling is used at many stages of surgical treatment, including preoperative planning, taking into account the personalized anatomical features of the patient. A fundamental component for creating a 3D model of an anatomical area of interest is the presence of its 3D image. Such a basis is the patient data obtained during magnetic resonance imaging (MRI) or computed tomography (CT) [1, 26-35; 3, 12-16].

The aim of our research was to develop a method for transferring a personalized calculated area of the trepanation defect of the anterior wall of the maxillary sinus from a 3D model of a fragment of the facial skeleton to the surgical field.

Using impression materials, a technique is proposed for transferring a personalized area of the trepanation defect of the anterior wall of the maxillary sinus from a 3D model of a fragment of the facial skeleton to the surgical field.

Based on CT data from patients, a 3D model of a fragment of the facial skeleton was created using the 3D Slicer program, and an individually optimal trepanation defect zone was calculated using a special mathematical algorithm, followed by printing this model on a 3D printer [2, 29-31; 4, 53-58] .

Figure 1 – Printed bone model with a personalized calculated area of the upcoming trepanation hole

Next, using Detax silicone impression materials (Germany), an impression was created that repeats the contour of a fragment of the facial skeleton with a personalized area of trepanation defect of the anterior wall of the maxillary sinus. The impression impression captured the area of the alveolar process of the upper jaw with the existing dentition, as shown in Figures 2 and 3.

Figure 2. Formation of an impression from a 3D model

Figure 3. Personalized impression

In the following stages, the chemical sterilization of the impression was carried out and preoperative marking was carried out using it. The sequence of actions is shown in Figures 4 and 5.

Figure 4. Fixing the impression

Figure 5. Preoperative marking of the alveolar arch

The research shows the possibility of using silicone rubber-based imprints in preoperative planning to translate a personalized area of trepanation defect of the anterior wall of the maxillary sinus during extranasal interventions.

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