

3D Dentofacial Surgery Full Planning Procedures

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Abstract— The ARTHUR project consists of a platform that allows the virtual performance of maxillofacial surgeries, offering, in a photorealistic concept, the possibility for the patient to have an idea of the surgical changes before they are performed on their face. For this, the system brings together several image formats, dicoms and objs that, after loading, will generate the bone volume, soft tissues and hard tissues. The system also incorporates the patient's stereophotogrammetry, in addition to their data and clinical history.

After loading and inserting data, the clinician can virtually perform the surgical operation and present the final result to the patient, generating a new facial surface that contemplates the changes made in the bone and tissues of the maxillary area. This tool acts in different situations that require facial reconstruction, however this project focuses specifically on two types of use cases: bone congenital disfigurement and acquired disfiguration such as oral cancer with bone attainment.

Being developed a cloud based solution, with mobile support, the tool aims to reduce the decision time window of patient. Because the current simulations are not realistic or, if realistic, need time due to the need of building plaster models, patient rates on decision, rely on a long time window (1,2 months), because they don't identify themselves with the presented surgical outcome. On the other hand, this planning was performed time based on average estimated values of the position of the maxilla and mandible. The team was based on averages of the facial measurements of the population, without specifying racial variability, so the proposed solution was not adjusted to the real individual physiognomic needs.

Keywords—3D Computing, Image Processing, Image Registry, Image Reconstruction.

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