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Static and dynamic application of multi-planar reconstructed (MPR), and 3D CT images to improve image guidance for FESS, based on lamellae landmarks

Introduction: For three decades, coronal sinus (CT) along with multi-planar reconstruction (MPR) reconstructions/displays has guided surgeons performing functional endoscopic sinus surgery (FESS) in their procedures. Image guided surgery (IGS) has improved the familiarity of the surgeon with the surgical field and correlation between the regional morphology and the imaging information. Unfortunately, image guidance is not always or universally available. For these situations, it is our aim to provide the FESS surgeons more dynamic use of the imaging information to guide their surgical approach in a systematic and safe manner, using landmarks they are already familiar with.

Teaching Points: The surgical approach for FESS is systematic, as it progressively follows sequential surgical steps and landmarks, based on the four lamellae from anterior to posterior: Uncinate process; ethmoidal bulla; basal lamella and; superior turbinate. The aim of this communication is to highlight the CT evaluation of the structures related to each of these four lamellae, and the important role that dynamic multiplanar reformatting can play. Imaging evaluation will specifically focus on the structures involved in the performance of the four steps of the surgery, namely uncinectomy, anterior and posterior ethmoidectomy, sphenoidotomy and frontal sinusotomy.

Summary: Aim of this presentation is to show that, using orthogonally reconstructed MPR CT images can provide a more accurate display of the structures of the nasal cavity and the paranasal sinuses in preparation for FESS. Use of a more dynamic CT display is needed and more advantageous to demonstrate the intricate relationship and structural variations surrounding the various mucociliary outflow tracts/drainage pathways. Curved coronal and 3D reconstructions are needed to display the usually convoluted path of the frontal recess and its outflow tract. In general, this dynamic approach of the imaging evaluation can provide a more accurate pre-surgical planning platform, especially in instances where image guidance is unavailable for surgery.

Biography

Simion James Zinreich is a Professor of Radiology, Otolaryngology Head and Neck Surgery at the world renowned Johns Hopkins Medical Institution, as well as he is a successful Medical Entrepreneur. Always at the forefront of medical innovation, he is recognized as the first to start 3D imaging in Neuroradiology in 1984. Together with the Neurosurgery department at Johns Hopkins, he was first to clinically introduce Image Guided Surgery in the USA in 1991. He became captivated by the world of medical technologies, developing and patenting the worldâ€™s finest Multi-Modality Skin Markers (still in use today) under the company he founded together with his wife Dr. Eva Zinreich, IZI Medical INC., which produced the Multimodality Skin Markers, as well as other skin markers used in Radiology and Radiation Therapy.

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