1 - Pregraduate Education

OC-017 - (23735) - FROM IMAGE TO REALITY: 3D PRINTED TRACTOGRAPHY

A. Chaves (Portugal)[1,2]; G. Santos (Portugal)[3]; H. Queirós (Portugal)[1,2]; P. Barradas (Portugal)[1]; D. Pereira (Portugal)[1,2]

1 - Neuroradiology Unit, Coimbra Local Health Unit, Coimbra, Portugal; 2 - Faculty of Medicine of the University of Coimbra, Coimbra, Portugal; 3 - General Surgery Department, Hospital Doutor José Maria Grande, Portalegre, Portugal

Ana Chaves
Coimbra

Guilherme Santos
Portalegre

Henrique Queirós
coimbra

Pedro Barradas
Portalegre

Daniela Pereira
Coimbra

The authors have no conflicts of interest.

Tractography, obtained from diffusion tensor imaging (DTI), allows for the visualization of white matter pathways, but its abstract nature poses challenges in education and clinical interpretation. Converting tractography data into 3D-printed models can provide a tangible tool for medical education purposes.

Tractography was performed in *syngo*.via software on two subjects, both diagnosed with epilepsy but with normal brain anatomy. The following tracts were reconstructed: corpus callosum, uncinate fasciculus, arcuate fasciculus, occipital-frontal fasciculus, optic radiations, corticospinal, and corticobulbar tracts. Tractography data was fused with 3D FLAIR or T1-weighted 3D MPRAGE. DICOM files were imported into 3D Slicer, where white matter tracts were manually segmented slice by slice to create 3D models. These files (.stl) were then processed in Fusion 360 and printed using a Creality Ender-3 V3 KE 3D printer.

Each tract was printed in a different color for identification and assembled on a wooden base with metal and plastic supports to maintain anatomical accuracy. Additionally, several nameplates were printed to identify each tract. The modular assembly allows each tract to be removed and repositioned. The 3D-printed models successfully represented white matter pathways, enhancing the understanding of their spatial organization.

This project serves an educational purpose, offering a tangible representation of white matter anatomy. By providing a physical model derived from real anatomical data, it enhances the study of white matter organization, making an abstract concept more accessible and intuitive.

Palavras-chave : Neuroscience, Tractography, 3D Printing