

# **FUSION IMAGING TECHNOLOGY FOR INTRACRANIAL VENOUS INVESTIGATION**

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**PURPOSE:** Transcranial color coded sonography (TCCS), despite the poor definition of the anatomical details, permits to investigate the cerebral venous flow in different postural and respiratory conditions related to the physiology of cerebral venous return. Usual TCCS windows do not permit to insonate the cavernous and petrosal sinuses. The aim of this study is to investigate the possibility to insonate these sinuses through a novel trans-cranial approach, the condylar window.

**MATERIALS AND METHODS:** We investigated 5 subjects by the means of fusion imaging technology, an advanced ultrasonographic technique consistently used to combine ultrasounds and MRI in different districts of the human body, but never used for studying the brain circulation. Fiducial markers have been placed on the forefront of each patient before the acquisition of MR brain imaging using a 1.5 T scanner. Subsequently, the subjects underwent TCCS performed with the Esaote MyLab70XVG ultrasound scanner equipped with Virtual Navigator technology. Venous circulation has been investigated by using the classic trans-temporal window and the novel transcondylar approach.

**RESULTS:** In all subjects fusion imaging technology demonstrates the possibility to insonate the cavernous sinus and some of the petrosal sinuses through the condylar window. In addition, the insonation of the Rosenthal and other parenchymal veins through the classic trans-temporal window, never validated vs MRI in TCCS study, has been confirmed by this technology.

**CONCLUSION:** The condylar window can be used for the study of intracranial deep cerebral venous system and be useful in clinical practice.