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Adjustable, Modular Frame Adapter for Head Stabilization and Positioning in Medical Imaging Devices

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Patent pending; available for exclusive or non-exclusive licensing.

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Background

Medical imaging such as computed tomography (CT), magnetic resonance imaging (MRI), and positron emission tomography (PET) require that subjects be placed and remain still in a certain position to accurately capture a desired image. Remaining still is difficult enough for most subjects, but the process becomes far more complicated when the subject suffers from a condition causing tremors or other uncontrolled movement, such as Parkinson's disease.

Systems preventing movement of the subject's head generally take a one-size-fits-all approach and allow little to no capability of tailoring the subject's head position. This can put the subject in an awkward or uncomfortable position, further increasing anxiety in an already tense situation. Currently there is an unmet need for an adjustable positioning device which allows subjects to be comfortably oriented in a selected position so that stable and accurate images may be acquired.

Technology

A University of Colorado research group led by mechanical engineer Chris Yakacki (in collaboration with neurosurgeon Aviva Abosch) has developed an adjustable adapter to position and restrain a patient's head movement during a variety of medical imaging scans. For example, this type of adapter would make deep brain stimulation (DBS) for movement disorders such as Parkinson's more effective: since DBS requires stereotaxy (3-D mapping of the brain) to help precisely place an electrode, accurate treatment is made very difficult when patients suffer from uncontrollable tremors that disrupt the imaging process. By integrating with the MRI table, this adapter provides a comfortable, stable and customizable constraint for Parkinson's patients suffering from uncontrollable tremors, ultimately leading to more successful stereotaxy and better DBS outcomes.

Advantages

- ⇒ High degree of adjustability and modularity, allowing quick implementation to different MRI tables and stereotaxy frames.
- ⇒ Can be fitted to a patient quickly and comfortably by offering both translational (e.g. along the length of the table), vertical/height and rotational adjustments during the fitting procedure. This customization reduces overall time for medical imaging and frustration when multiple adjustments are required.
- ⇒ Modular system functional with a variety of head frames and tables
- ⇒ Reduces physical and emotional toll caused by discomfort and long procedures; reduces long appointment times and costs.

Key Document

"Magnetic Resonance Imaging (MRI) Table-to-Head Frame Adapter." Provisional patent application filed January 15, 2014; available under CDA.