Reviewer's report

Title: Study on the Clinical Application of Pulsed DC Magnetic Technology for Tracking of Intraoperative Head Motion During Frameless Stereotaxy

Version: 1 Date: 8 March 2006

Reviewer: E. Thomas T Chappell

Reviewer’s report:

General

The authors have made a most important contribution to the future of image-guidance in surgery. To my knowledge this is the first report of a safe and accurate way to overcome the problems of rigid fixation, line-of-sight, and post-registration head movement (inadvertent or desired). They have designed, applied clinically, and proven accurate a device they aptly refer to a a "Dynamic Reference Frame". The investigators have capitalized on the many advantages of a Direct Current magnetic field in a device attached to the patients head in non-invasive and non-intrusive way. This allows generation of another virtual 3-dimensional representation of the patients head that moves precisely with the head if it moves or is reposition. This allows continuous "re-registration" with the diagnostic image data set so that instrument navigation remains accurate even with head movement. It is true that other authors have described devices that serve a similar purpose, but all to date have been limited by line-of-site, patient comfort, field of effect, or direction of movement issues. The DRF described here has none of these limitations. However, it does have a few limitations of its own. The use of magnetic cortical stimulators in its presence requires special care and it cannot be used in the presence of an intra-operative MRI or any other device that generates a magnetic field. Nonetheless, the DRF is a land-mark advance in the practical application of image-guidance.

Major Compulsory Revisions (that the author must respond to before a decision on publication can be reached)

Minor Essential Revisions (such as missing labels on figures, or the wrong use of a term, which the author can be trusted to correct)

Discretionary Revisions (which the author can choose to ignore)

Please, revise to clarify the first sentence under "Background" in the Abstract.

What next?: Accept after discretionary revisions

Level of interest: An article of outstanding merit and interest in its field

Quality of written English: Acceptable

Statistical review: No, the manuscript does not need to be seen by a statistician.