Reviewer’s report

Title: Repeatability and Variability of Region-of-Interest Methods Using Quantitative Diffusion Tensor MR Imaging of the Brain

Version: 2 Date: 17 May 2012

Reviewer: Liang Zhan

Reviewer’s report:

This is an extension work of the authors’ previous IFMBE abstract. In this paper, the authors present an important topic in DTI area: the repeatability and variability. The authors use ROI-based methods (CM and FM) to investigate these two items on FA and ADC, although it can be expected that CM is better than FM since CM’s ROI volume is far smaller than FM’s, it’s still valuable to compare different ROI performance.

Major Compulsory Revisions:
1) The repeatability and variability are also closely related to the spatial resolution and angular resolution of the DTI, the author should at least acknowledge some related work in background part.
2) The authors didn’t provide enough information about data processing, did they correct eddy current distortion before they compute the FA and ADC?
3) In this study, the authors investigated 11 ROIs, however there is a high correlation among FA values across the 11 ROIs, so they are not independent tests. The authors set significance p value to be 0.05, which is not right, here should use Bonferroni correction. In other words, the Bonferroni corrected significance threshold should be set to p=0.05/11. And same correction threshold is applied to ADC as well.
4) In first paragraph, Page 6, the authors reported there is large variation (9.7~48.4, and 213.1~487.5) in ROIs volume, but I’m not clear this variation is across 30 subjects or across 11 ROIs in same subject. If this variation is across 30 subjects, then it comes out another question---the ROI volume probably will affect the results a lot. So directly comparing these results may be unfair. To be fairness, the results should be normalized by the relative ROI volume, and relative ROI volume can be defined as the ROI_volume/whole_brain_volume, this is the easiest way. To be more rigorous, the author could try GLM in SPSS to remove the age/gender/volume effect.

Minor Essential Revisions:
1) In “MRI acquisition” part, b factor 0 and 1000 s/mm3, here should be s/mm2.
2) In the 4th row, page 5, “Absolute p values were also defined, the statistical …..”, I’m not clear how they define the p value
3) No Figure illustration, for example, in figure 1, please clarify which one is FM
ROI and which one is CM ROI etc.
4) Table 3 is presented before Table 2, should change Table order.

**Level of interest:** An article of importance in its field

**Quality of written English:** Needs some language corrections before being published

**Statistical review:** Yes, and I have assessed the statistics in my report.

**Declaration of competing interests:**
I declare that I have no competing interests