Author's response to reviews

Title: Brain regions essential for improved lexical access in an aged aphasic patient: A case report

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Version: 2  Date: 3 March 2006

Author's response to reviews:

Dear editors,

I agree to transfer the manuscript as a case report to BMC Neurology and I made the formatting changes required.

Only minor changes to the content of the earlier version of the manuscript submitted to BMC Neuroscience have been made: In the original version (technical) information concerning the MR-scanner we used was missing. This information was added.  

In response to the questions I received from the editorial office (Dr. Lee) - Description why this case report is exceptional and the scientific merit of the report is described in the cover letter that is pasted below. Written informed consent has been obtained by the patient's daughter (Dr. Schnack) who is a physician. I scanned the form and send it to your office by e-mail.

In the background section of the manuscript (and the cover letter of the initial submission) we emphasised that this is the first report to elucidate the neural substrate of correct lexical access and errors which has never been investigated before. Indeed, to our knowledge only two studies ever investigated overt language production in aphasia (Martin et al. 2005, Leger et al. 2002). None of them contrasted brain activation for errors and correct word retrieval. This has been included into the background section.

below you will find the slightly modified cover letter for your information:

Dear Sir or Madam,

Please find enclosed an electronic version of our manuscript entitled "Brain regions essential for improved lexical access in an aged aphasic patient: A case report", by Marcus Meinzer and colleagues (Responsible author: Dr. Marcus Meinzer, University of Konstanz, ZPR, Feuersteininstr.55, 78479 Reichenau-Lindenbuhl, Tel. 0049-7531-884626, Fax. 0049-7531-884601, marcus.meinzer@uni-konstanz.de). All coauthors have seen and agreed with the contents of the manuscript. The manuscript is not under review at any other publication. All authors declare that they have no competing financial interests.

Statement of the main point:

For the first time, this study elucidates the neural underpinnings of correct as well as erroneous word retrieval and production in aphasia using functional magnetic resonance imaging (fMRI). Furthermore, improvement of language performance and concomitant changes in brain activation were induced by short-term intensive training (3 hours/day within two weeks). We report multi-session functional imaging and behavioral data from an 80-year old patient with long-standing chronic aphasia (>2 years) as well as three age- and gender-matched control subjects. Using an overt picture naming task and fMRI acquisition in a temporal sparse sampling procedure, the design allowed to monitor the patient's overt verbal responses during scanning (before and after treatment) and post-hoc categorization of different response types.

First, correct naming responses compared to errors yielded an increased activation pattern mainly in right inferior frontal areas. Second, when we compared errors produced before therapy that turned into correct responses after therapy (i.e. the same pictures before and after therapy) this was mirrored by an increased
fronto-thalamic activation pattern.

In this aged chronic patient, the dramatic brain functional changes were accompanied by significant improvement in several language tasks, while stability in more general measures of attention/concentration and working memory was assured. Moreover, control subjects did not show behavioral changes or increased activation when tested repeatedly within the same 2-week time interval.

Our results bear further significance in that the changes in brain activation reported can unequivocally be attributed to the short-term training program and a language domain-specific plasticity process. This further challenges the claim of a limited recovery potential in patients with long-standing aphasia, even at very old age. Our results also have major implications for the most recent endeavours to treat aphasic symptoms (e.g. using repetitive transcranial magnetic stimulation, rTMS). Delineation of areas crucial for word retrieval, on a single case basis, might help to improve treatment in the future.

Therefore, we would be much obliged if our manuscript would be considered for publication in BMC Neurology.

Sincerely,

Dr. Marcus Meinzer