

Japan-US Brain Research Cooperation Program
The Dispatch of Joint Researcher Report in 2005 fiscal year

[field: 3]

1. Affiliation/ Title/ Name:

Department of Child Development, School of Medicine, Kumamoto University, Kumamoto, Japan/
MD, PhD/ Akemi Tomoda

2. The Project Title:

Morphometric and functional brain MRI studies on pediatric patients with post-traumatic stress disorder (PTSD) secondary to maltreatment.

3. U.S. Investigator's Name, Title, and Affiliation:

Martin H. Teicher, MD, PhD, Department of Psychiatry, Harvard Medical School, Boston, MA, and
Developmental Biopsychiatry Research Program, McLean Hospital, Belmont, MA USA

4. The Term of Research: From 2005. April. 1. To 2005. November. 17. (8 Months)

5. The Abstract, the Result and the Significance of Research(300 Words):

Objective: Childhood sexual abuse (CSA) has been associated with alterations in brain morphology using region of interest analyses that have focused on stress sensitive target regions. This study was designed to ascertain the effects of exposure to CSA on gray matter volume (GMV) in a healthy population of young adult college students selected based on history of exposure regardless of psychiatric outcome. Voxel-based morphometry (VBM) provided unbiased delineation of brain regions most strongly affected.

Methods: High-resolution T1-weighted MRI data sets were obtained on 23 unmedicated females with CSA and 14 healthy female controls of equivalent age and socioeconomic status with no history of trauma. Cortical surface-based analysis (FreeSurfer) was performed to verify VBM results.

Results: GMV was reduced by 14.1% ($P < 0.0001$, corrected) in left primary visual (LV-1) and visual association cortex of abused subjects. This reduction was directly related to duration of CSA before age 12. GMV of LV-1 correlated with an overall index of visual memory ($r=0.45$, $P=0.005$) and capacity to discriminate targets from non-targets on a visual attention test ($r=0.45$, $P < 0.02$). Cortical surface-based analysis indicated that GMV of abused subjects was reduced in left fusiform gyrus ($P=0.004$), left middle occipital gyrus ($P=0.04$) and right lingual gyrus ($P=0.002$).

Conclusions: Early visual experience exerts a strong influence on the development of the mammalian visual cortex. Present findings indicate that exposure to traumatic events may also affect the development of this region, and are even apparent in a population of subjects who are sufficiently healthy to matriculate.

6. The Others (Other Comments): None.

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