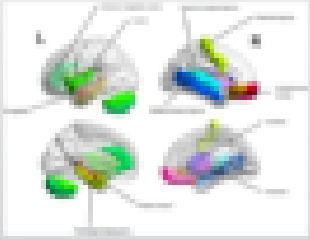
Grey Matter Depletion in Conduct Disorder Adolescents through Magnetic Resonance Imaging Studies

Thuvien Pham, Riley Sinkinson, Dr. Jonathan Terry (DO)

CHSU
COLLEGE OF OSTEOPATHIC MEDICINE
osteopathic.chsu.edu

BACKGROUND

- Conduct disorder (CD) refers to a collection of antisocial behavior and delinquent conduct that persists within a six-month window. Of note, conspicuous injurious behaviors include bullying, aggression, and violation of interpersonal rules.[1]
- Total grey matter volume (GMV) is lower in patients with CD, and alterations in changes in specific areas like corpus callosum, lobules, and striatum have been found.[2]
- Psychiatric diagnoses of conduct disorder, depression, mood, bipolar, schizophrenia, substance abuse, and more have all been found to be associated with decreased GMV.[3]
- Psychopathic traits such as callousness, lack of empathy, and guilt are also associated with lower GMV in adolescents with CD.[4]
- Magnetic resonance imaging (MRI) is a non-invasive, non-ionizing, and safe imaging technique that can be used to study brain structure and function. Functional magnetic resonance imaging (fMRI) is a specific MRI technique that can be used to study brain activity by detecting changes in blood flow.[5]
- Voxel-based morphometry (VBM) is a neuroimaging technique that can be used to investigate focal differences in brain anatomy, using statistical parametric mapping tools to localize where these differences are most significant.[6]



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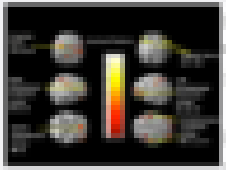
METHODS AND MATERIALS

- A systematic literature search was conducted using databases including PubMed, ScienceDirect, and Google Scholar.
- Studies published between 2010 and February 2021 that used fMRI to investigate and examine brain morphology and/or degradation in CD were included.
- Key search terms included "conduct disorder," "MRI," "voxel," "grey matter."
- Studies not in English, not using magnetic resonance imaging, not using human subjects, and not using conduct disorder were excluded. The inclusion criteria were limited to human studies published in English.
- Articles that studied neurotransmitter imaging and were not related to the criteria were excluded.



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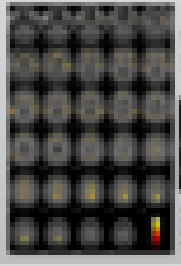
RESULTS

- Adolescents with CD were shown to have a deep penetration with decreased total GMV in voxel-based scans.
- Specifically, the voxel-based morphometry scans show the differences in the orbitofrontal cortex, anterior cingulate gyrus, insula, inferior temporal gyrus, middle temporal gyrus, middle frontal gyrus, cingulate gyrus, and precuneus gyrus.
- Cognitive deficits in executive functioning, working memory, and emotional judgment also were also identified.
- Other prominent findings in CD were a reduced cortical thickness in the superior and middle temporal gyrus, right anterior cingulate, and temporal gyrus and reduced surface coverage.
- The effects of this study are significant, because untreated conduct disorder can result in poor changes in school, and may require extensive incarceration.
- Some studies have not found significant differences in cortical thickness, surface area, and cortical area between male CD and other males and no psychiatric.



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CONCLUSION

- We found a significant correlation between conduct disorder and decreased total gray matter. Findings of reduced gray matter volume in prominent areas such as the orbitofrontal cortex, anterior cingulate gyrus, insula, inferior temporal gyrus, middle temporal gyrus, middle frontal gyrus, cingulate gyrus, and precuneus gyrus through MRI scans is consistent in previous studies and was supported by findings.
- These findings could be incorporated into psychiatric evaluations to identify risk factors affecting the prognosis for conduct disorder. Magnetic resonance imaging (MRI) can be a valuable tool in diagnosing conduct disorder in the future.
- Future research is needed to fully characterize the structural changes in GMV associated with CD, and further investigation of the potential for neuroimaging to be used as a tool for screening and monitoring conduct disorder is necessary.

REFERENCES

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