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Developing a Neuroplasticity-Based Treatment Program for Psychopathy:

Treatment Foci and Options

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Mentor: Professor Boyes, VCU Honors College



Abstract

Psychopathy is a neurodevelopmental disorder that is commonly misunderstood as the condition of criminals, and many people believe the best cure is simple confinement for those who ignore society's laws. Psychopathy, though, is a genuine condition with a genetic basis that manifests itself through neurotransmitter system disruption and hormone imbalances. Psychopathy has a serious neurological impact on an individual, with impairments largely focused in the prefrontal cortex and amygdala, as well as overall negatively affecting the limbic system of the brain. Together, the total impact causes issues with that individual's ability to empathize, to experience emotions normally, to develop a true sense of morality, and other similar consequences to one's moral and emotional self. It does not benefit society to undermine its validity as a genuine neurological condition or to simply define it as untreatable. Confinement and traditional treatment options do not prove substantial choices for working with the core problems of psychopathy, either, as prior cases with psychopathic criminals show. Neuroplasticity, specifically cognitive rehabilitation, non-invasive and deep brain stimulation, and neuropharmacology, has been proven to successfully treat an array of neurological diseases and disorders. Developing a comprehensive treatment program based on neuroplasticity could prove the most effective option for treating psychopathy, and would also have further applications as a modified plan to help treat psychopathic tendencies in children before the condition becomes full-blown psychopathy.



Discussion

Psychopathy is a neurological disorder that results in specific impairments affecting the humanity of an individual through:

- a lack of empathy
- impulsive and aggressive behavior
- overall inability to develop a true sense of morality

These malfunctions are caused largely by:

- abnormalities in the prefrontal cortex & amygdala
- changes in gray/white matter volumes.

Understanding that psychopathy is a neurodevelopmental disorder has led to the conclusion that psychopathy is caused by:

- genetic factors whose manifestation are based on one's environment such as

These genetic factors are believed to manifest themselves most especially through:

- neurotransmitter systems, such as
 - noradrenergic
 - serotonergic
- abnormal hormone levels, such as
 - cortisol
 - Testosterone

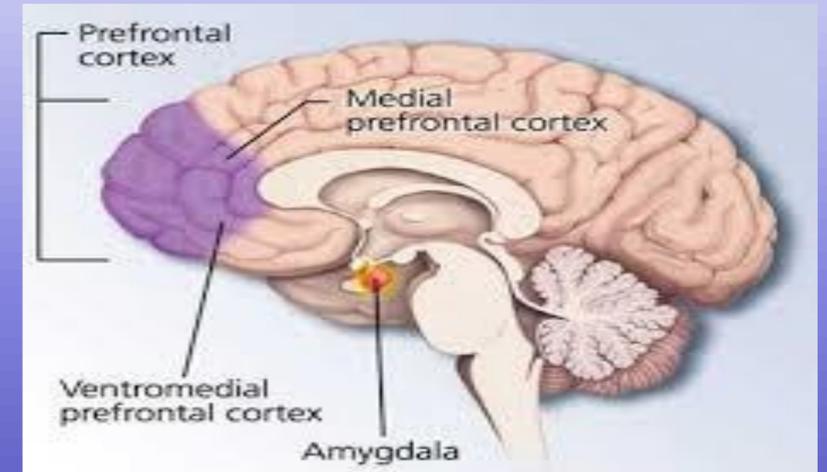
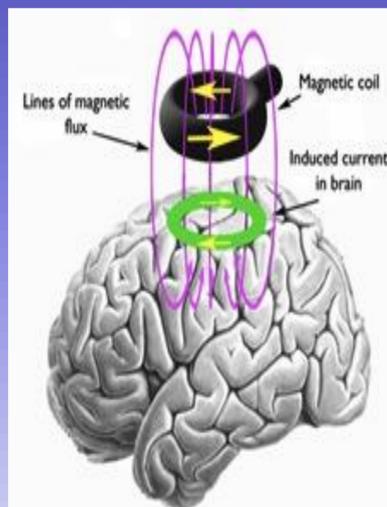
The objective of this research is to suggest a possible treatment program better suited to the nature of psychopathy. Current treatment methods for working with psychopathy include traditional approaches, such as group therapy, all of which have proved unsuccessful. In many cases, though, the pessimistic view that psychopathy can't be treated has led to negligence of its validity as a neurological disorder and/or the necessity of treating psychopathy.

This review of research, though, shows forms of neuroplasticity treatment that could prove successful in treating psychopathy such as:

- cognitive rehabilitation
- non-invasive and/or deep brain stimulation
- neuropharmacology

The mechanics involved in neuroplasticity changes include:

- revealing existing circuits
- reorganization
- modifying synaptic connections
- changing inter-hemispheric relations
- Hebbian learning
- dendritic modifications
- glial size and number,
- growth & regrowth of neurons



Possible Treatment Plan

First group to begin treatment with – psychopathic criminals in prison

- Stems from the danger they pose to society
- Group would likely have already mandated mental rehabilitation

Part A - Cognitive rehabilitation

- Working with psychopath's lack of interest in obtaining treatment for a condition they likely deny having
- NBCCR - work with the psychopath's attitude and produce results as small as making the psychopathic individual question his/her mental health; could help individual become more cooperative in participating in the treatment process

Part B – Brain stimulation (non-invasive and/or deep)

- Non-invasive - activate areas in prefrontal cortex showing decreased activity, help in participation in aversive & reward process thinking (document progress with games involving a reward for certain actions/punishment before & after)
- Deep – activate more central brain structures (i.e. amygdala), work with experiencing fear & social recognition of aversive cues (document progress with sociological studies before & after)

Part C - Neuropharmacology

- Reestablish homeostatic balances of hormones, i.e. testosterone (lowering), serotonin (raising), and cortisol (raising)
- Hope of lowering risk for instrumental and reactive aggression, along with violent behavior
- Test each one separately for benefits/progress

Upon its refinement, program could have implications past treating psychopathic criminals

- Application for youth with early signs of psychopathy in form of callous-unemotional traits and antisocial behavior in youth and adolescents
- Younger brains are more susceptible to neuroplasticity