Cannabis Use in Patients with Epilepsy and Autism

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Why I Give My 9-Year-Old Pot, Part 3

We hit a snag and made a big discovery about how medical marijuana works for him.

By Marie Myung-Ok Lee

This is the third DoubleX essay from Marie Myung-Ok Lee about treating her autistic son with marijuana. Read her first essay here and her second essay here.

Last summer, we reached the six-month mark in our cannabis experiment. We'd been using medical marijuana to help quell our autistic son's gut pain and anxiety, and we were seeing some huge changes in his behavior and, presumably, his happiness. J was smiling, interacting (one of home-based therapists said she'd never encountered such...
J, a 9 year-old boy with autism

- He consistently had 30 to 50 aggressions in a school day, with a one-time high of 300
- “J had 300 aggressions today”
- “He began to bite and to smack the glasses off my face”
- The teachers were wearing tae-kwon-do arm pads to protect themselves against his biting
- For a year, his individual education plan at his special-needs school was full of blanks, recording “no progress” because he spent his whole day an “irritated, frustrated mess”
Following Treatment

• After starting cannabis, he began having days—sometimes one after another—with zero aggressions

• After two years of treatment, his mother wrote:
  “I would call our experiment a qualified success. Not because cannabis has cured J, who's now 11, or anything near it. But it's alleviated some of his severest symptoms so that he, my husband, and I can actually enjoy each other, rather than being held hostage by his autism in a house full of screams, destruction, and three very unhappy people”
AUTISM AND AGGRESSION
Autism and Aggression

- Among 1,380 children with ASD
- 68% of the children have behaved aggressively towards caregivers
- 49% towards non-caregivers
- Aggressive behavior has been documented in only 7-11% of people who have intellectual disability but not autism


Autism and Aggression

• Comparing aggressive behaviors in 23 children with autism and 23 typically developing children:
  – Typical children use aggression to achieve social goals, such as getting attention or avoiding adults’ demands
  – Children with autism become aggressive when
    • *adults interfere with a repetitive behavior*
    • *someone takes away an item they need for a repetitive routine*
    • *Trying to escape uncomfortable sensory input*

Autism and Aggression

• Families dealing with aggressive behavior struggle with
  – social isolation
  – concerns about the safety of people and property
  – lack of respite care
  – limited professional supports
  – concerns about alternate housing for child as they age

• Parents described an “unbearable” level of exhaustion

• One mother described her situation as being in “jail for life.”

Autism and Aggression—Treatment

• Forty-six placebo-controlled RCTs of pharmacologic treatments of aggression in youth age 2 to 17 years with ASD

• Compared with placebo, 3 compounds resulted in significant improvement in ABC-I at the end of treatment.
  – Risperidone and aripiprazole were found to be the most effective, with the largest effect sizes.
  – Sedation, extrapyramidal sides effects, and weight gain were common side-effects

6-year-old boy with autism was treated with daily dronabinol for six months

- improvement in hyperactivity, irritability, lethargy, stereotyped behaviors and speech, as measured by the Aberrant Behavior Checklist (ABC)


Small case series (10 patients) showed an improvement in self-injurious behaviors among adolescents following dronabinol therapy

# Cannabis in ASD

<table>
<thead>
<tr>
<th>Patient</th>
<th>Etiology</th>
<th>Regression</th>
<th>Epilepsy</th>
<th>Benefit for Epilepsy</th>
<th>Benefit for Autism</th>
<th>Side-effects</th>
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</tbody>
</table>
EPILEPSY AND AUTISM
Epilepsy and Autism

- Epilepsy occurs in 8 to 20% of children with autism spectrum disorders
- Autism occurs in up to 30% of children with epilepsy
  - It is more common when seizures develop within the first three years
Epidemiology

- There are two peaks for diagnosis of epilepsy
  - Early (Infantile spasms, Dravet)
  - Late
Root Causes
Neurotransmitter Disorders

Astrocyte

Presynaptic cell

Glu

NMDA  AMPA

Glial glutamate transporter

mGluR

Glu

Glutamate
Fragile X

X Chromosome

FMR1 gene (q27.3)
Fragile X

• Rat models of Fragile X syndrome
  – blockade of cannabinoid receptors
    • normalize hippocampal development
    • correct cognitive deficits
    • improve seizures
    • reduce pain sensitivity.
  – Enhancing endocannabinoid signaling
    • correct abnormal synaptic plasticity in the prefrontal cortex
    • improvement in hyperlocomotion and anxiety-related behaviors


Growth Regulation
m-TOR disorders

- Tuberous Sclerosis
- Neurofibromatosis
- Cowden Disease
- Bannayan-Riley-Ruvalcaba
Channelopathies

Diagram showing the effect of mutations on different ion channels:
- **nAChR**: Normal and mutant states, with arrows indicating the direction of ion movement.
- **GABA<sub>A</sub>**: Normal and mutant states, with arrows indicating the direction of ion movement.
- **SCN**: Normal and mutant states, with arrows indicating the direction of ion movement.
- **KCNQ**: Normal and mutant states, with arrows indicating the direction of ion movement.
- **CLC**: Normal and mutant states, with arrows indicating the direction of ion movement.

Types of mutation:
- **GOF**: Gain of function
- **LOF**: Loss of function
Immunologic
Role of Inter-ictal spikes?

Awake

Asleep
Questions?