

Medical Cannabis:  
Practical Treatment of Pediatric Patients  
for Epilepsy, Autism, Cancer, and  
Psychiatric Disorders

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# Diagnoses

## ADULTS:

- ❖ Chronic pain
  - ❖ Arthritis/Migraine/DDD/Post-Traumatic Injuries/Neuropathy
- ❖ Sleep Disorders
- ❖ Autoimmune Disease
- ❖ Fibromyalgia
- ❖ Psychiatric Illness – Anxiety/Depression/Bipolar/PTSD/Schizophrenia
- ❖ Cancer
- ❖ GI Disorders – IBS/Crohn's/Ulcerative/GERD/Nausea/Anorexia
- ❖ MS, ALS, Parkinson's

## PEDIATRICS:

- ❖ Treatment-Resistant Epilepsy
- ❖ Autism Spectrum Disorder
- ❖ Advanced Cancer
- ❖ Severe Psychiatric Disorders
- ❖ PANDAS (Pediatric Autoimmune Neuropsychiatric Disorders Associated with Streptococcal Infections)

# Rationale for Cannabis Use in Pediatrics

- ❖ Scientific evidence of endocannabinoid dysfunction
- ❖ Excellent safety profile, generally tolerated quite well
- ❖ Quality of life
- ❖ Compassionate care/end-of-life
- ❖ Ability to test quality of products
- ❖ Research still desperately needed

# Results: Pediatric Epilepsy

- ❖ Diagnosis of treatment resistant epilepsy
- ❖ At least three months on tested whole plant oil extract
- ❖ 201 patients aged 5 months – 18 years of age
- ❖ Average number of prior AEDs: 12 (range 2 – 22)
- ❖ Average number of concomitant AEDs at onset of treatment: 3 (range 0 – 7); 15 patients not taking AEDs at onset of CBD treatment (7%)
- ❖ Common comorbidities: global delay, CP, Autism, CVI, feeding difficulties, growth delay, precocious puberty, behavioral issues
- ❖ Strains and CBD:THC ratios of oils used:
  - Charlottes Web: 27:1
  - ACDC: 28:1, 25:1, 24:1, 15:1

# Results: 201 Pediatric Epilepsy Patients

<b>Worsening Seizures</b>	<b>8/201</b>	<b>4%</b>
<b>No response</b>	<b>6/201</b>	<b>3%</b>
<b>No reduction of # but reduction in severity and duration with cognitive improvement</b>	<b>28/201</b>	<b>14%</b>
<b>25-49% reduction of seizures</b>	<b>21/201</b>	<b>10%</b>
<b>50-74% reduction of seizures</b>	<b>36/201</b>	<b>18%</b>
<b>75-99% reduction of seizures</b>	<b>75/201</b>	<b>37%</b>
<b>Seizure free</b>	<b>27/201</b>	<b>13%</b>

**Overall 68% of patients had >50% reduction of seizures**

- ❖ Of the 27 seizure-free patients, 8 are now AED free
- ❖ 40% of patients have been able to wean one or more AED
- ❖ Negative side effects: drowsiness, diarrhea
- ❖ Positive side effects: more alert, better mood, better sleep, more energy, better response to therapy, improved appetite, improved focus, “able to argue”, no ER visits or hospitalizations, less need for rescue medication, two patients with Type 1 DM reported more stable glucose

# Whole Plant Extract Oil Dosing for Pediatric Epilepsy

- ❖ 1 mg/kg/day every 8 hours starting dose, increase in increments of 0.5-1 mg/kg/day every 2 weeks (oral, sublingual, G-tube)
- ❖ Average dose ~5-8 mg/kg/day
- ❖ Can change strains and/or ratios if not responding
- ❖ No tolerance to CBD
- ❖ CBD “saturation”
- ❖ Check AED levels
- ❖ THCA oil – seizure reduction (especially for drop seizures)
- ❖ Cost is an issue for most patients!

# Autism Spectrum Disorder

- ❖ Main issues: communication difficulties, repetitive behaviors, and social challenges, including anxiety, tantrums and self-injurious behavior
- ❖ ECS regulates emotional responses, including anxiety, behavioral reactivity to context, social interaction, and the function of the immune system, all of which are aspects of autism
- ❖ Preliminary evidence in animal studies shows that genetic mutations associated with autism can result in ECS dysfunction
- ❖ Human study shows children with autism have up-regulated cannabinoid receptors in WBC (Siniscalco, Dario, et al. "Cannabinoid receptor type 2, but not type 1, is up-regulated in peripheral blood mononuclear cells of children affected by autistic disorders." *Journal of autism and developmental disorders* 43.11 (2013): 2686-2695.)

# Results: Autism

- ❖ Diagnosis of Autism Spectrum Disorder without Seizures
- ❖ 27 patients aged 3 -18 years, treated for 3 months with CBD-rich oil
  - ❖ Worsening: 4/27 (15%) – more agitated, sleep disturbance
  - ❖ No response: 6/27 (22%)
  - ❖ Improved: 17/27 (63%) – calmer, reduced or eliminated self-injurious behavior, improved communication, improved focus, improved reports from therapists/teachers
- ❖ Dosing
  - ❖ Lower doses than epilepsy patients, 1-3 times/day dosing
  - ❖ Popular strains – Harlequin, Cannatonic, ACDC, Charlotte's Web
  - ❖ High CBD can be too stimulating for some - lower CBD:THC ratio

# Pediatric Cancer

- ❖ **Cannabis can treat symptoms and side effects of cancer and cancer treatment**
  - **Nausea/Poor appetite/weight loss**
  - **Pain/anxiety/sleep**
  - **Low doses of THC or CBD or both, taken as needed for symptom relief**
  
- ❖ **Cannabinoids have been shown to:**
  - **Inhibit tumor growth**
  - **Cause cancer cells to commit suicide (apoptosis) while leaving non-cancer cells alone**
  - **Inhibit metastasis/cancer cell migration**
  - **Inhibit angiogenesis (growth of new blood vessels)**
  - **Work synergistically with certain chemotherapies**
  
- ❖ **Majority of my patients are advanced cases who have exhausted most options – treatment failure or chemo toxicity**
  
- ❖ **High dose CBD+THC concentrated oil (10 - 25 mg/kg/day) - start low and titrate up weekly**
  
- ❖ **Generally well-tolerated**

# Pediatric Cancer

- ❖ Case report: **Cannabis Extract Treatment for Terminal Acute Lymphoblastic Leukemia with a Philadelphia Chromosome Mutation.**  
Singh Y., Bali C. Case Rep Oncol 2013;6:585-592
  - “Demonstrated complete disease control and a dose response curve”
  
- ❖ Unpublished case report: 16 year old with Stage 4 Osteosarcoma presented to my office April 2015
  - Treated with high dose (500 mg CBD + 500 mg THC) - Scans showed no evidence of disease after 3 months, remains cancer free on oil after 1 year
  - Cannabinoids alone vs Gemcitabine/Cannabinoid synergy?  
**Gemcitabine/cannabinoid combination triggers autophagy in pancreatic cancer cells through a ROS-mediated mechanism.**  
Donadelli, M., et al. *Cell death & disease* 2.4 (2011): e152.

# Cannabis Treatment of Pediatric Psychiatric Disorders

- ❖ Majority of patients are teenagers with severe debilitating anxiety/ADD/ADHD/Bipolar/Self-injurious (cutting)/PTSD
- ❖ No improvement and/or had significant side effects with conventional treatment
- ❖ Start with high CBD:THC ratios, start low dose and titrate up for effect; different strains and ratios depending on response
- ❖ Generally very well tolerated

# PANDAS

- ❖ Pediatric Autoimmune Neuropsychiatric Disorders Associated with Streptococcal Infections
- ❖ Strep triggers a misdirected immune response resulting in brain inflammation, leading to OCD, anxiety, tics, personality changes, decline in math and handwriting abilities, irritability, aggressive behavior, emotional lability
- ❖ 3 cases in my practice – all responding well to CBD-rich cannabis oil – significant reduction of OCD, tics, anxiety, and aggression; one parent reported “mood stabilized”

# Product Requirements for Sick Children

## ❖ Concentrated

- ❖ For example, 50 mg/ml, 100 mg/ml, 200 mg/ml

## ❖ Consistent in strain

- ❖ Different strains (even if high CBD) can wreak havoc in pediatric patients

## ❖ Laboratory Tested

- ❖ potency, pesticides, mold/microbes, residual solvent (if used)

## ❖ Affordable (i.e. 5 cents/mg vs 35 cents/mg)

## ❖ Reliable supply

- ❖ Patients who start treatment may wean other medications
- ❖ Catastrophic if oil not available

Thank you!

