



Behavior Treatment Options: Non Medication Approaches

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Disclosure

- Nothing to disclose



Learning objectives

- At the end of this presentation participants will improve their knowledge of how environmental approaches and supplements can impact behavior in individuals with harmful and disruptive behaviors with epilepsy.
- At the end of this presentation participants will understand the role of behavioral therapy in improving the quality of life in individuals with harmful and disruptive behaviors with epilepsy.



Take home points

- Improving sleep in individuals with harmful and disruptive behaviors with epilepsy will improve quality of life
 - Improve attention and concentration at school
 - Improve seizure control
- Making environmental changes can improve behavior
 - Improve engagement in school
 - Engaging school early is important (school modifications)
- Supplements can help, always ask the family what other supplements they are using
- Every appointment with your epilepsy patient is an opportunity to help them improve their quality of life, by focusing on ALL their needs, not just the seizures



Sleep

- Sleep problems are more common and severe in youth with epilepsy, compared to healthy controls

(Batista & Nunes, 2007; Tang, Clarke, Owens, & Pal, 2011; van Golde, Gutter, & de Weerd, 2011.)

- High comorbidity between sleep disorders and epilepsy

- Sleep Apnea (OSA) 20%
(Kaleylas et al., 2008; Manni & Terzaghi, 2010.)
- Poor sleep quality is linked to behavioral difficulties in pediatric epilepsy (inattention, hyperactivity, impulsive behavior, psychosomatic complaints)
(Epilepsy & Behavior (2016). , 57(Pt. A), 118–123.)
- Sleep problems, highly associated with daytime behavioral dysfunction, even more than seizure frequency
(Samaitiene et al., 2013.)



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5

Sleep

- Sleep anxiety

- Sleep anxiety in particular, has been associated with more behavioral problems in young children with epilepsy even after controlling for age, sex, seizure frequency, and number of antiepileptic medications used.

- Parasomnias (Larson et al., 2012; Ong et al., 2010; Tang et al., 2011).

- Intermittent insomnia

- Objective evidence from an actigraphy study showed up to 83.3% of the children with epilepsy (CWE) waking for more than an hour during the nocturnal sleep period.
- CWE had worse sleep habits than those without.



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6

Sleep hygiene should be a target for intervention in youth with epilepsy

- Inquire about hours of sleep, latency, and difficulty waking up in the morning
- Inquire about falling asleep in class or difficulty staying awake
- Bedtime routine
- Conditions of the room
- Effect of the AED on sleep and daytime energy
- Timing of the medication, consistency of schedule medication
- Waking up routine (school days vs. weekend)

[Shao-Yu Tsai, Wang-Tso Lee, Suh-Fang Jeng, Chien-Chang Lee, Wen-Chin Weng](#) *Pediatr Health Care* 2019 Mar-Apr;33(2):138-145

Physical activity

- Metanalysis of available studies on the effect of exercise on epilepsy (PRISMA guidelines)
- 82 studies were identified, 14 were included
- 331 people with epilepsy were evaluated
- Significant changes pre-and post-intervention were observed for quality of life, fitness level, psycho-affective and neurocognitive outcomes
- 4 /14 studies show a pre and post-difference (neurocognitive, psycho-affective, seizures and QOL)
- Direct relationship between group and duration of the interaction (more sessions per week)
- Moderate exercise led to no significant decrease of seizures, seizure average was stable
- 9 studies measured QOL, 6 of them have an improvement of QOL after participating in the program (mean improvement of increased of 4.72)
- 8 studies measured psycho-affective outcomes, 6 demonstrated significant improvement in the mood state, physical self-concept, child behavior, somatic and psychological problems
- 4 studies demonstrated improvement in neurocognitive outcomes

Duñabeitia I, Bidaurrezaga-Letona I, Diz JC, Colon-Leira S, García-Fresneda A, Ayán C. Effects of physical exercise in people with epilepsy: A systematic review and meta-analysis. *Epilepsy Behav.* 2022 Dec;137(Pt A):108959

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8

Physical activity and cognitive function in people with epilepsy (PWE), PRISMA guidelines

- Systematic review of physical activity and cognitive function in PWE
- 6 studies, 123 participants. 1 observational study, 5 interventional studies (Alexander B and Allendorfer J Epilepsy & Behavior 142 (2023) 109170)
- There was a positive association between physical activity and cognitive function in PWE. Both interventional studies showed improvement in at least one domain of cognitive functioning
- 3 of the studies in children, ages 8-12- 5 weeks of physical activity intervention for 3 hours, 2x a week (aerobic play activities), also some weight exercises at home (15-20 minutes a week). (Koirala G et al. Epilepsy Behav 2017;76:126-32)
- After 5 weeks there was significant improvements in visual and auditory attention as measured by the Comprehension Attention Test (CAT) and executive function as measured by the Children's Color Trails Test (CCTT) (Eom S et al. Epilepsy Behav 2014;37:151-6.)
- After 30 weeks of home-based exercise, there was even greater improvement in attentional and executive function domains. (Eom S et al J Child Neurol 2016)



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9

Environment and behavior

- Changes in the environment can impact behavior in PWE.
- Especially in those with Autism spectrum disorder (ASD), and patients with developmental issues.
- The primary team at school is key, and they could give us great insight on patient behavioral changes, working closely with the team at school, can help us understand new onset behavioral changes in youth with epilepsy.
- Any changes in the routine, such as changes in the teacher, the aid, or the school, when the patient transitions from one school to the next.
- For PWE who struggle with anxiety at the beginning of the school year, or coming back from the winter or spring break can be a challenge.
- Environment at home is also key, if the parents are moving, if there is family conflict if one of the family members is moving away (sibling going to college).
- Major changes in the routine, from school year – summer.
- Changing the providers who help support the family at home can also have an impact on the behavior.

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10

Bowel habits

- Constipation can be one of the reasons, patients with ASD or intellectual disabilities, or nonverbal patients have behavior problems. (Dos Santos IR, et al J Paediatr Child Health. 2021 Jul;57(7):1003-1008.)
- Incorporate questions about bowel habits, in patients with ASD – parents frequently monitor constipation vs. diarrhea.
- The longer the constipation, the more probability will impact the patient’s behavior.
- Encourage, and increase oral intake of fiber, ask if the constipation started after the addition of a new medication, encourage fluid intake.
- Ask parents – are you taking any supplements? Prebiotics, probiotics, lactulose, polyethylene glycol?
- I could not find any studies linking specific changes in the intestinal microflora with improved outcomes for patients with epilepsy. There are some studies on patients with ASD. (Davies C et al. Neuroscience and Biobehavioral Reviews 128 (2021) 549–557.)
- If the GI disorder is recognized and medical treatment is effective, the behavioral problem may improve. (Al - Beltagi M World J Clin Pediatr 2021; 10(3): 15-28.)

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11

Non-pharmacological interventions for PWE

(Jackson C et al Cochrane Database Syst Rev. 2015 Sep 10;2015(9):CD005502)

- One study is included in this review. Two surgical procedures were compared. This is the only study of its kind, and it was rated as having an overall unclear risk of bias.
- This review highlights the need for well-designed randomized controlled trials conducted to assess the effects of non-pharmacological interventions on seizure and behavioral outcomes in people with intellectual disabilities and epilepsy.
- “Despite the high prevalence of epilepsy among people with intellectual disabilities, interventional studies undertaken to explore epilepsy treatment are relatively rare. As seizures in people with intellectual disabilities are often complex and refractory to AEDs, good quality randomized controlled trials should be conducted to assess the efficacy of alternatives or adjuncts to AEDs for this population.”

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12

Supplements

- **N-Acetylcysteine**

13 RCT for the use of NAC for mood disorders, anxiety, OCD, self-aggression, SIB, picking aggression in youth with ASD

Doses in patients 12-18 should be 2.4 gm (starting with 600 mg – titrating weekly bid) (Deepmala, Slatery J et al. Neurosci Biobehav Rev. 2015 Aug;55:294-321.)

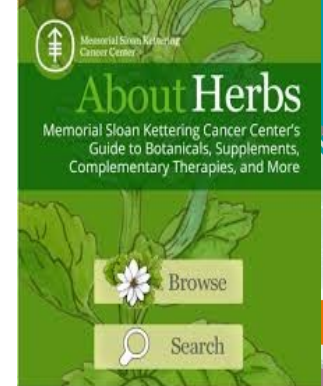
- **Melatonin**

Important to do psychoeducation about sleep hygiene, doses from 1 mg -10mg

Sleep cycle induction dose 3 hours before the desired bedtime, if not only 30 minutes (Liu Z et al. Seizure. 2024 Apr;117:133-141.)

- **Magnesium oxide** – off-label use

To help with migraines, and headaches. Can help patients settle down at night. 9-13 years old 240 mg , 14-18 years old 400mg. (Chang L et al Gastroenterology 2023 Jun;164(7):1086-1106.)



Supplements - Melatonin

- 264 studies reviewed – 10 RCT included
- Melatonin improved sleep latency and seizure severity compared with placebo
- Improvement in sleep quality, particularly in sleep latency
- Improvement on seizure severity (RR: 0.33; 95 % CI: 0.04–0.62; P = 0.03; Fig. 6), but the impact on seizure frequency was not statistically significant (RR: 0.30; 95 % CI: – 0.04–0.63; P = 0.08.)
- Improving the sleep in youth with epilepsy, improved the quality of life of the patient and the caregiver.
- Safe option for individuals with epilepsy.
- Some studies included in this review did not systematically assess sleep quality, seizures, and safety and lacked long-term follow-up data. Thus, further RCTs with long-term follow-up periods are needed.

Liu Z et al. Seizure. 2024 Apr;117:133-141.

Supplements - Fish oil

- Low-dose fish oil (1080 mg) was associated with 33% seizure reduction (De Giorgio C et al J Neurol Neurosurg Psychiatry. 2015 Jan;86(1):65-70.)
- Multicenter double-blind randomized placebo-controlled trial evaluating supplementation with PUFA in children aged >6 and < 16 years old and suffering from any epilepsy and ADHD (inattentive or combined type) a 12-week-double-blind treatment period which was followed by a 12 week-open-label treatment period. The primary outcome was the reduction of the ADHD-rating scale IV attention-deficit subscore after 12 weeks of treatment. Underpower to detect effect. (Rheims S et al Epilepsia Open 2024 Apr;9(2):582-591.)
- In patients with ADHD - supplementation with omega 3 + medication, improved the effect of medication by 20%. (Cheng Chang J Neuropsychopharmacology 2018 Feb;43(3):534-545.)
- Metanalysis of 37 trials with more than 2,374 participants to evaluate the effect of fish oil vs. placebo for people with ADHD. There was also high-certainty evidence that inattention and hyperactivity/impulsivity did not differ between PUFA and placebo groups. (Cochrane Database Syst Rev2023 Apr 14;4(4):CD007986.)

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15

ABA Applied Behavior Analysis

- ABA is an evidence-based treatment for youth with autism
- No specific study for PWE
- Metanalysis 11 studies – 632 participants
- Compared to treatment as usual, minimal or no treatment, comprehensive ABA-based interventions showed medium effects on intellectual functioning
- Language abilities at intake could influence the effect sizes and the influence of treatment intensity might decrease with older age (start early - developmental window), high intensity (20-40 hours a week), address several skills at the same time, naturalistic, and require parent participation. (Clin Psychol Rev. 2010;30(4):387-399.)
- Comprehensive ABA-based interventions (compared to TAU, minimal or no treatment) have a medium effect on intellectual functioning (8 effect sizes) and small effect on adaptive behavior (28 effect sizes). No effect on language ability. (BMC Psychiatry. 2023; 23: 133.)

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16

QOL in parents of children with intellectual disabilities focus in ASD

- Parents of youth with developmental disabilities are exposed to multiple stressors associated with the daily care of children with a developmental disability. These stressors can negatively affect the QOL of caregivers.
- There is an important financial burden, the average lifetime cost of care for one child with ASD is over \$3 million. (Ganz, M. L. (2007). Archives of Pediatrics & Adolescent Medicine, 161(4),343-349.)
- Stressors include the initial diagnosis, daily care, the average cost of therapies, coordinating and accessing medical care and therapies, behavioral problems, time missed from work, financial strain. (Family Caregiver Alliance. (2022, April 7) Caregiver health. www.caregiver.org/caregiver-health)
- Predictors of QOL in parents - Risk factors 1) Aberrant behaviors and 2) parental perceived threat or loss. Protective factors 1) lower severity of ASD and 2) increase family income and higher level of parental education.
- The physical health of the parent was negatively impacted by raising a child with ASD. (8/15 articles in this review).
- Psychological health of the parent was negatively impacted (12/15 studies).

(Turnage D, Conner N. Quality of life of parents of children with Autism Spectrum Disorder: An integrative literature review. J Spec Pediatr Nurs. 2022 Oct;27(4):e12391.)

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19

Implementing interventions to help the child, has the potential to help the whole family QOL

- Families of 526 children with intellectual disabilities ages 5-18; with cerebral palsy, ASD, Downs syndrome, CDKL5 deficiency disorder or Rett syndrome, completed the Quality-of-Life Inventory-Disability.
- Three classes describing domain scores were identified: Class 1) was characterized by higher domain scores overall but poorer negative emotions scores; Class 2) by average to high scores for most domains but low independence scores; and Class 3) was characterized by low positive emotions, social interaction, and leisure and the outdoors scores, and extremely low independence scores.
- The majority of individuals with ASD and Down syndrome belonged to Class 1 and the majority with CDKL5 deficiency disorder belonged to Class 3.
- Those with better functional abilities (verbal communication and independent walking) were predominately members of Class 1 and those with frequent seizures were more often members of Class 2 and 3).
- Individual experiences (strengths and difficulties), rather than the presence or an absence of a diagnosis, should be our driver to suggest (prescribe) intervention for youth and families.
- QOL is a tool that can help us guide the interventions needed for our patients.

Leonard H, et al Res Dev Disabil. 2022 Oct;129:104322.

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20

QOL much more that seizure control

- Children with epilepsy experience greater reductions in quality of life (QoL) when compared to children with other chronic illnesses
- Social withdrawal
- Reduced self-esteem
- Physical inactivity
- Seizure control has long been the target for improving QoL
- Different psychosocial domains impact QoL for CWE compared to children with other chronic illnesses

Falcone T and Fessler J. Chapter 98 QOL in epilepsy. In Wyllie's Tx of Epilepsy Principles and practice – 7th edition, 2020, Edit Wolfers Kluwer

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21

Impact on clinical care

- Sleep hygiene should be a target for intervention in youth with epilepsy
- Early screening of sleep in youth with epilepsy – is important to impact the quality of life long-term
- People with epilepsy can benefit from exercising - impact their QOL
- Behavioral problems impact the quality of life of patients with epilepsy, connect with the school team, caregivers, aids to getting all the information necessary to make informed decisions
- Refer your patient to the services they need; OT, physical therapy, speech therapy, intervention specialist, psychologist, psychiatry
- Communicate with the PCP - care coordination is key



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22

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Scott Belski

“Thank you”

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