

# Let's Have a Look See - Alternatives to Health Care for Children with Disabilities

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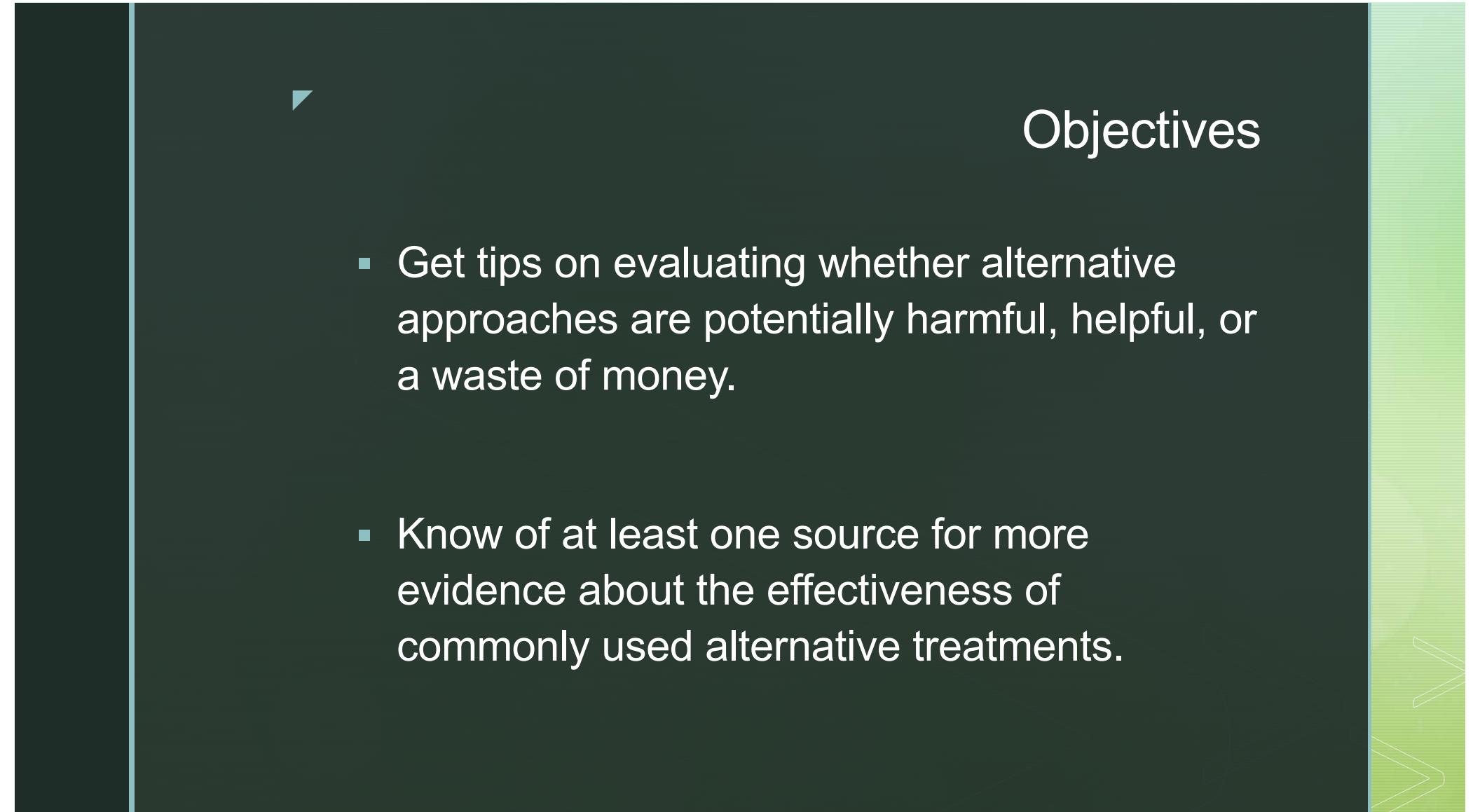
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Ching, MD,  
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October 17, 2020



## Objectives

- Discuss non-medical/alternative treatments that the parents of children with disabilities are considering using to address their child's symptoms
- Be more aware of evidence regarding the efficacy of certain alternatives to traditional medical care, including CBD oil, neurofeedback, special diets, supplements, etc.



## Objectives

- Get tips on evaluating whether alternative approaches are potentially harmful, helpful, or a waste of money.
- Know of at least one source for more evidence about the effectiveness of commonly used alternative treatments.



## Alternatives to Medications for ADHD

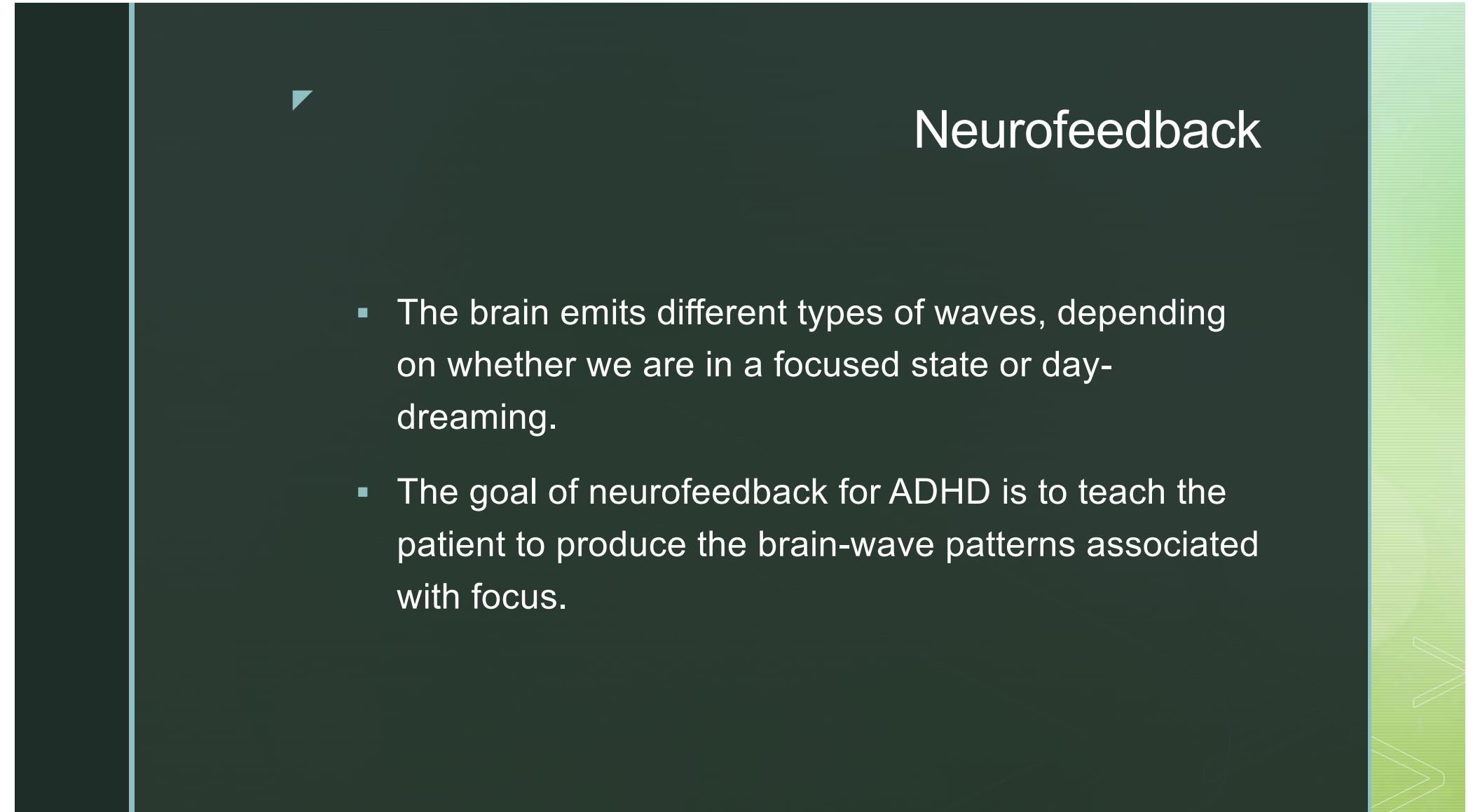
Is there something other than stimulant medication that can help with ADHD including paying attention and finishing tasks to completion?

Side effects (e.g. headaches, dizziness, reduced appetite), lack of certainty around potential long-term risks, reappearance of symptoms after discontinuation of treatment, and non-response to medication have sparked the search for non-invasive long-term treatments that can be provided without negative consequences

People with ADHD seek out alternative therapies because medication has stopped working (or never worked), produces unwelcome side effects, or, most commonly, doesn't manage all the symptoms of the condition

## Strategies to Possibly Improve ADHD

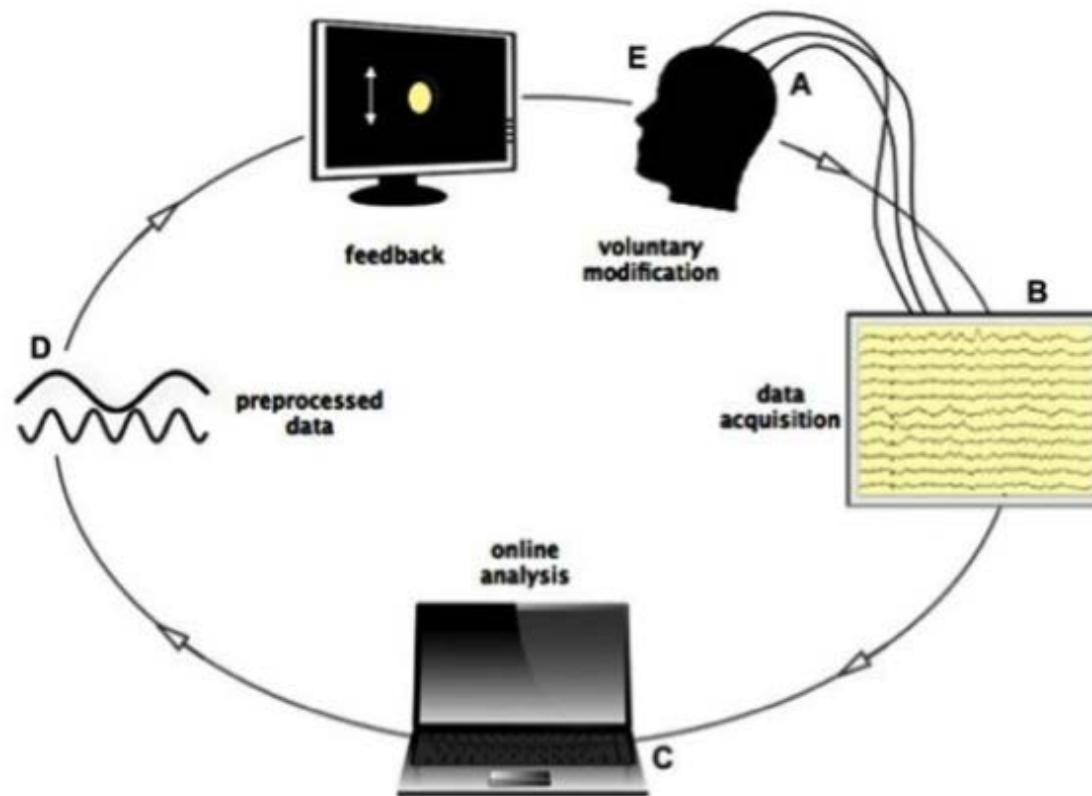
- Neurofeedback
- Technological aids
- Mindfulness plus reflection training
- Medication



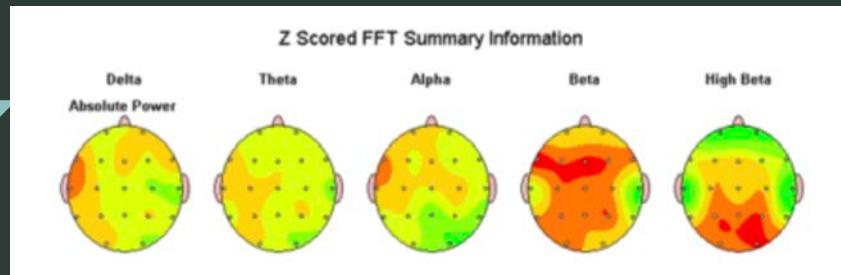
## Neurofeedback

- The brain emits different types of waves, depending on whether we are in a focused state or day-dreaming.
- The goal of neurofeedback for ADHD is to teach the patient to produce the brain-wave patterns associated with focus.

**Figure 1. Neurofeedback intervention loop.** This figure is adapted from Bagdasaryan and Le Van Quyen. It depicts a simplified overview of neurofeedback that is delivered via electroencephalography (EEG) (Bagdasaryan 2013). During the neurofeedback session, the individual's brain signal is acquired through the EEG equipment (A, B). The software processes the incoming brain signal and provides information about the degree of alignment between the participant's real-time brain activity and predetermined training goal parameters (C, D). This information is presented to the participant as visual or auditory feedback in real time, to continuously update the participant about modulation of his or her own brain activity (E; Bagdasaryan 2013; Huster 2014).



From  
<https://nhahealth.com/brain-mapping/>



## Initial Session

- A practitioner takes a detailed history of the patient
- This person maps the patient's brain.
  - The patient dons a cap lined with electrodes and sits with his eyes closed for several minutes.
  - He is then asked to perform a complex cognitive task, such as reading aloud.
  - The results are shown as a color-coded map on a computer screen, indicating areas of the brain where there is too much or too little brain-wave activity
  - This digital map enables a person's brain activity to be compared with other brain-wave patterns stored in databases — and can help fine-tune a treatment plan by delineating sites for the electrodes.

## Sessions

- EEG neurofeedback is commonly conceptualised as computer game-based training of awareness or control of cognitive state that can be achieved by providing participants with real-time feedback on their own brain states. It is thought that participants can learn to modify or control targeted brain-state activity, which leads to improved self-regulation in daily activities.
- EEG neurofeedback is not dependent on complex verbal instructions; therefore, this brain-training intervention can be effectively implemented cross-culturally and in groups with language and communication impairment. It is designed to be embedded in a game format, which helps in treatment of children.



# Metaanalysis

- At the class level, behavioural therapy (alone or in combination with stimulants), stimulants, and non-stimulant seemed significantly more efficacious than placebo. Behavioural therapy in combination with stimulants seemed superior to stimulants or non-stimulants. Stimulants seemed superior to behavioural therapy, cognitive training and non-stimulants. Behavioural therapy, stimulants and their combination showed the best profile of acceptability. Stimulants and non-stimulants seemed well tolerated. Among medications, methylphenidate, amphetamine, atomoxetine, guanfacine and clonidine seemed significantly more efficacious than placebo. Methylphenidate and amphetamine seemed more efficacious than atomoxetine and guanfacine. Methylphenidate and clonidine seemed better accepted than placebo and atomoxetine. Most of the efficacious pharmacological treatments were associated with harms (anorexia, weight loss and insomnia), but an increased risk of serious adverse events was not observed. There is lack of evidence for cognitive training, neurofeedback, antidepressants, antipsychotics, dietary therapy, fatty acids, and other complementary and alternative medicine. Overall findings were limited by the clinical and methodological heterogeneity, small sample sizes of trials, short-term follow-up, and the absence of high-quality evidence; consequently, results should be interpreted with caution.

Citation: Catalá-López F, Hutton B, Nuñez-Beltrán A, Page MJ, Ridao M, Macías Saint-Gerons D, et al. (2017) The pharmacological and nonpharmacological treatment of attention deficit hyperactivity disorder in children and adolescents: A systematic review with network meta-analyses of randomised trials. PLoS ONE 12(7): e0180355

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# Metaanalysis 2020

- Efficacy and effectiveness are compared to medication and behaviour therapy using benchmark studies. Only recent systematic reviews and meta-analyses as well as multi-centre randomized controlled trials (RCT's) will be included. Two meta-analyses confirmed significant efficacy of standard neurofeedback protocols for parent and teacher rated symptoms with a medium effect size, and sustained effects after 6–12 months. Four multicenter RCT's demonstrated significant superiority to semi-active control groups, with medium-large effect sizes end of treatment or follow-up and remission rates of 32–47%. Effectiveness in open- label studies was confirmed, no signs of publication bias were found and no significant neurofeedback-specific side effects have been reported. Standard neurofeedback protocols in the treatment of ADHD can be concluded to be a well-established treatment with medium to large effect sizes and 32–47% remission rates and sustained effects as assessed after 6–12 months.

Arns M, Clark CR, Trullinger M, deBeus R, Mack M, Anifto M. Neurofeedback and Attention-Deficit/Hyperactivity-Disorder (ADHD) in Children: Rating the Evidence and Proposed Guidelines. *Appl Psychophysiol Biofeedback*. 2020 Jun;45(2):39-48. doi: 10.1007/s10484-020-09455-2. PMID: 32206963; PMCID: PMC7250955.

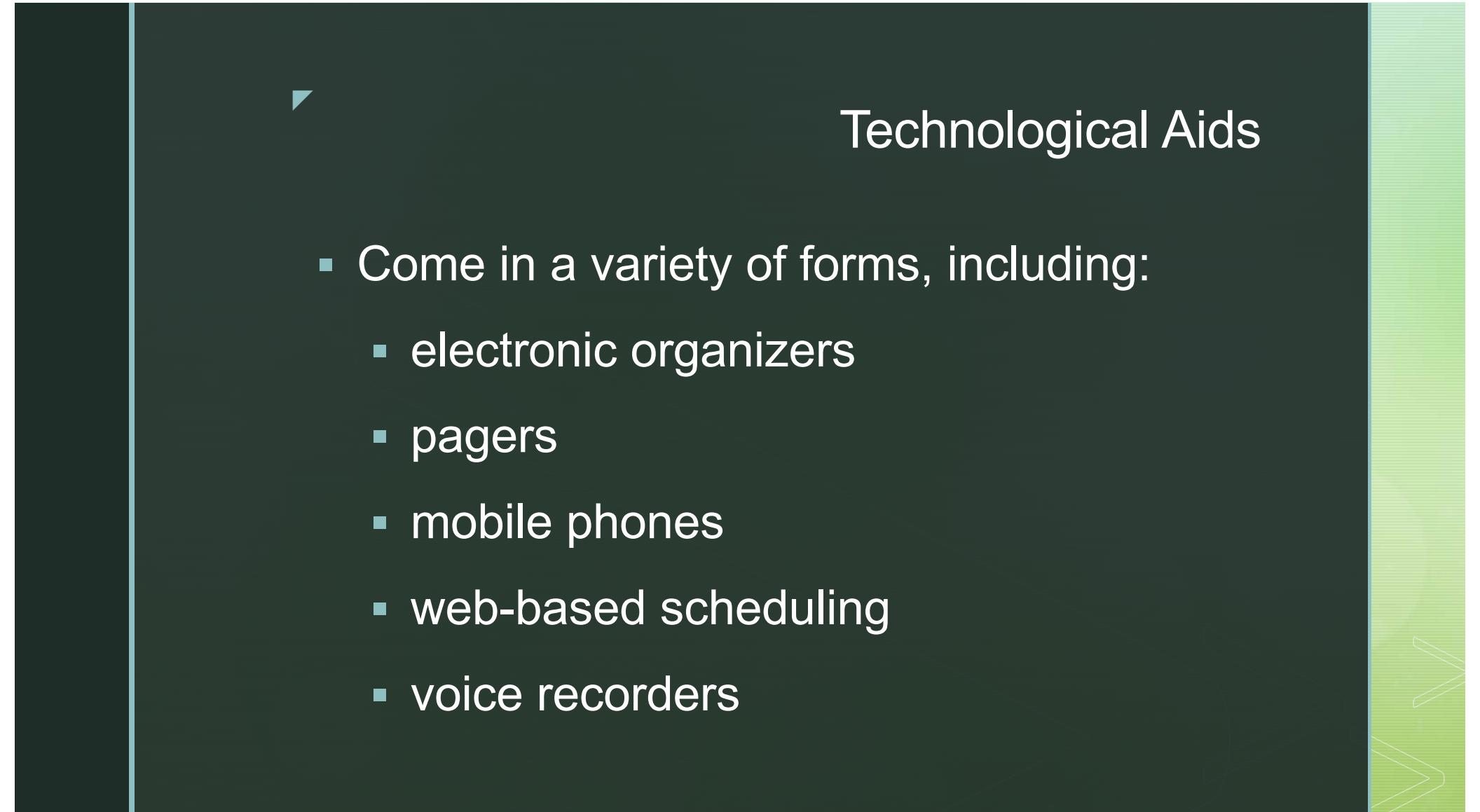
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## Costs

- Whether neurofeedback is more or less cost-effective than medication and/or behavioral therapy is yet to be determined in sufficient detail.
- Broadly, though, neurofeedback usually requires 30–40 treatment sessions and, depending on geographical region, may cost between US \$4000 and US \$6000.
- In contrast, medication may be required for many years, possibly for 10 years or more. At an average cost of \$2 per day, the overall cost of medication would amount to \$3500 to \$7000 for periods ranging between 5 and 10 years.



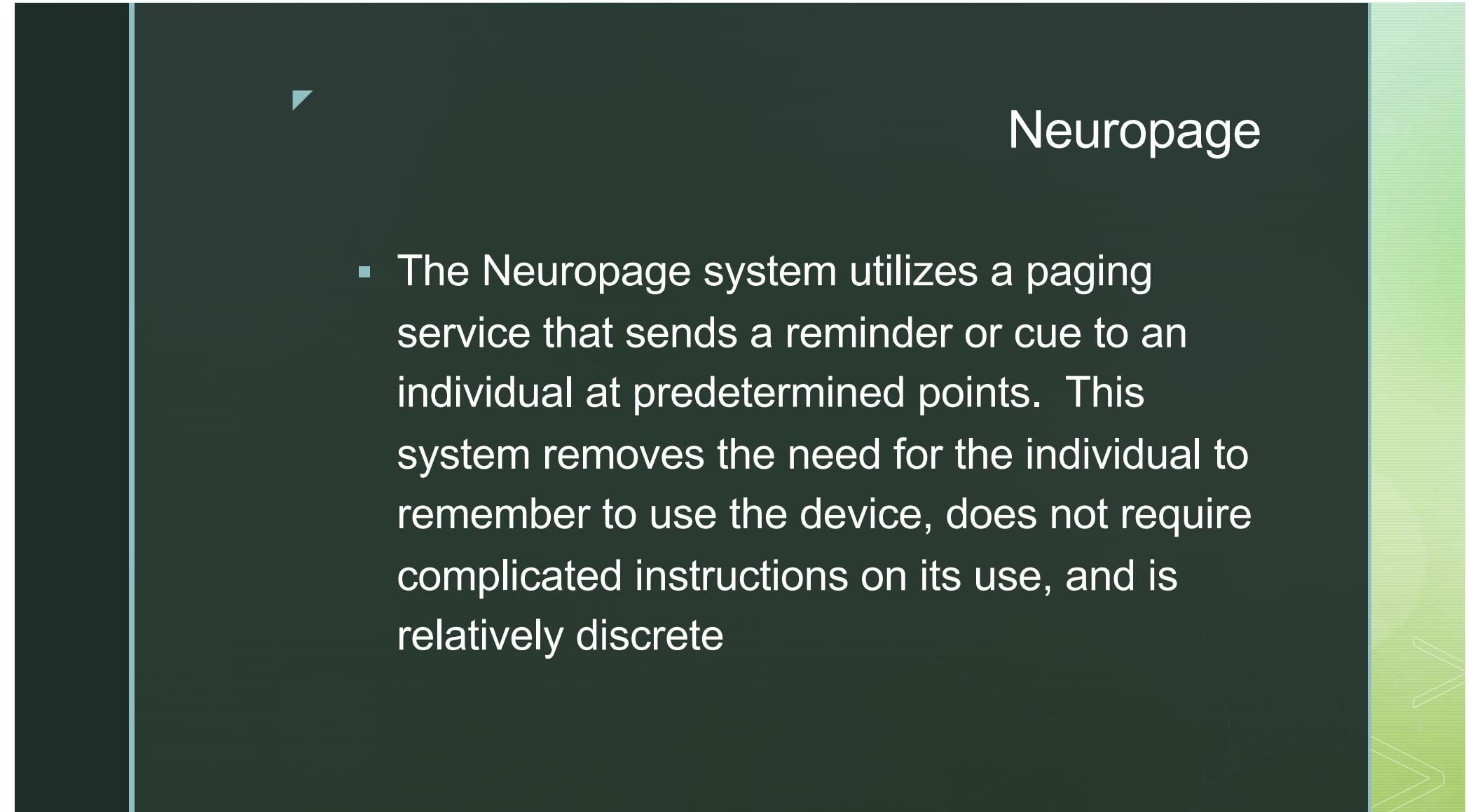
## Technological Aids

- Come in a variety of forms, including:
  - electronic organizers
  - pagers
  - mobile phones
  - web-based scheduling
  - voice recorders

## Example – Neuropage System

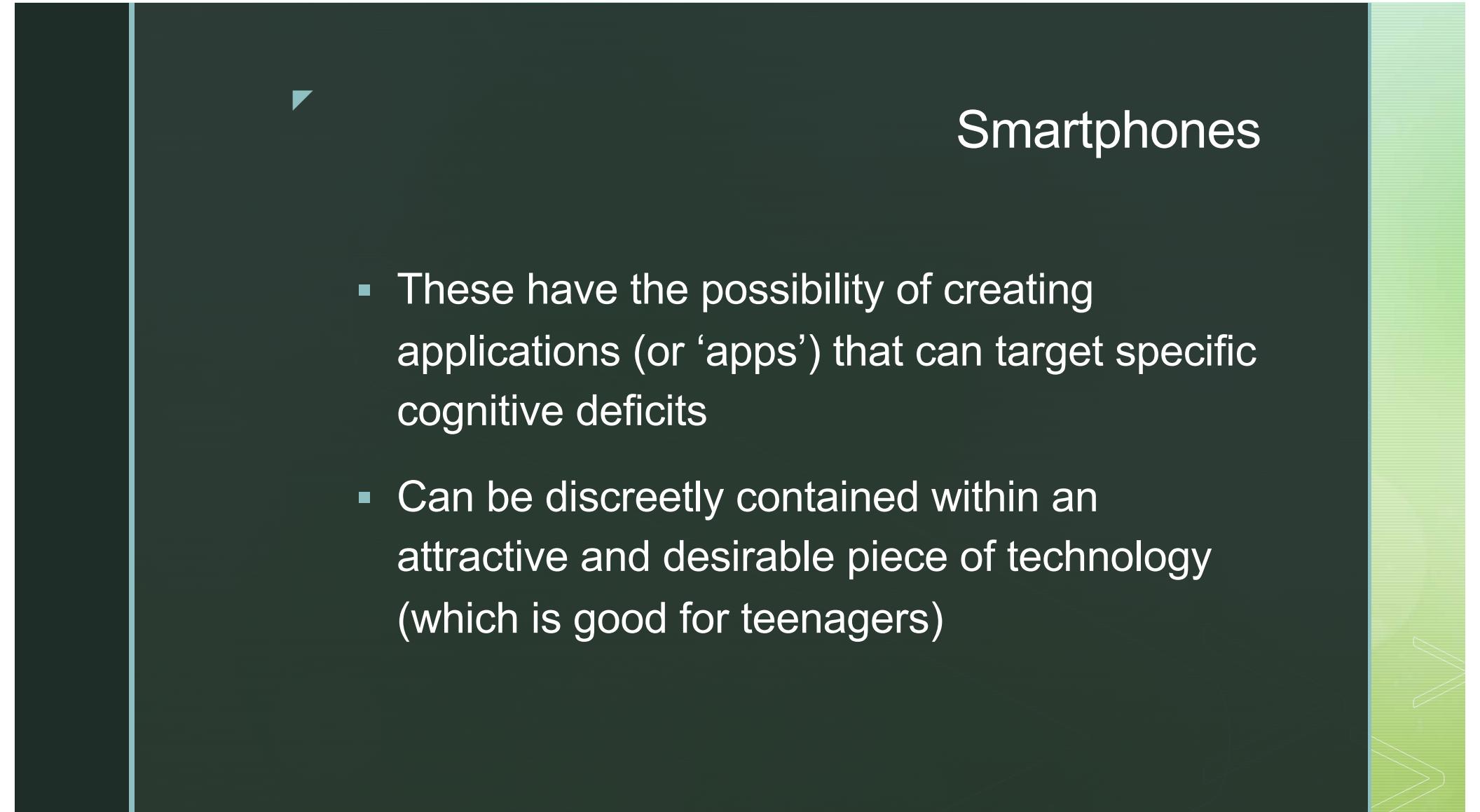
- For example, the NeuroPage system is a reminder system that was developed in California by the father of a young man who suffered a brain injury, and the young man's neuropsychologist.





## Neuropage

- The Neuropage system utilizes a paging service that sends a reminder or cue to an individual at predetermined points. This system removes the need for the individual to remember to use the device, does not require complicated instructions on its use, and is relatively discrete



## Smartphones

- These have the possibility of creating applications (or ‘apps’) that can target specific cognitive deficits
- Can be discreetly contained within an attractive and desirable piece of technology (which is good for teenagers)



## Shucks

- A review found evidence that interventions employing technological aids did improve executive functions in adolescents with traumatic brain injury (i.e. a brain injury resulting from a road traffic accident, fall, or blow to the head). However, this result was relatively modest and is unlikely to have a clinically important effect on the child.

Linden M, Hawley C, Blackwood B, Evans J, Anderson V, O'Rourke C. Technological aids for the rehabilitation of memory and executive functioning in children and adolescents with acquired brain injury. *Cochrane Database of Systematic Reviews* 2016, Issue 7. Art. No.: CD011020.



Review article

## Attention-deficit/ hyperactivity disorder mobile apps: A systematic review

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<sup>b</sup> The International Institute for the Advanced Studies of Psychotherapy and Applied Mental Health, Cluj-Napoca, Romania

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ARTICLE INFO

**Keywords:**

Attention-deficit/hyperactivity disorder

Apps

Mobile

Children

Parent

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ABSTRACT

**Background:** Attention-Deficit/ Hyperactivity Disorder (ADHD) is a prevalent condition in children and adolescents. Although there are pharmacological and non-pharmacological treatments for this disorder, barriers in accessing evidence-based treatments are still a major problem. Digital health interventions are promising for multiple mental health problems. Recent years have brought an increase in the number of existing mobile apps designed for the management of ADHD. The aim of this study was to systematically review the existing mobile apps designed for ADHD in terms of general characteristics, empirical support for their development and efficacy/ effectiveness, and to describe the content and design of the four most downloaded ADHD apps.

**Method:** We conducted systematic searches on iTunes/iOS (Apple App Store), Google Play and the National Health Service Health Apps Library up to May 2017 and checked for changes in March and September 2019. We included those apps that were designed for ADHD, target assessment, treatment, or both, were in English and were functional. We identified 355 apps in the virtual stores, out of which we included 109 apps in the present systematic review. For each app we extracted the following information: target population, developer, price, number of downloads, ratings, privacy, available language other than English, category, purpose and empirical support. A second search was conducted in literature databases up to September 2019: PsycINFO, Pubmed, Scopus, Web of Science, Cochrane database.

# “Very few apps contained information regarding their development and none contained information regarding evidence for its efficacy/ effectiveness.”

Gosmina Roxana Radurean<sup>a</sup>, Germar Andersson<sup>b,c</sup>, Alina Dobrescu<sup>a</sup>



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<sup>d</sup> Department of Clinical Neuroscience, Division of Psychiatry, Karolinska Institute, Stockholm, Sweden

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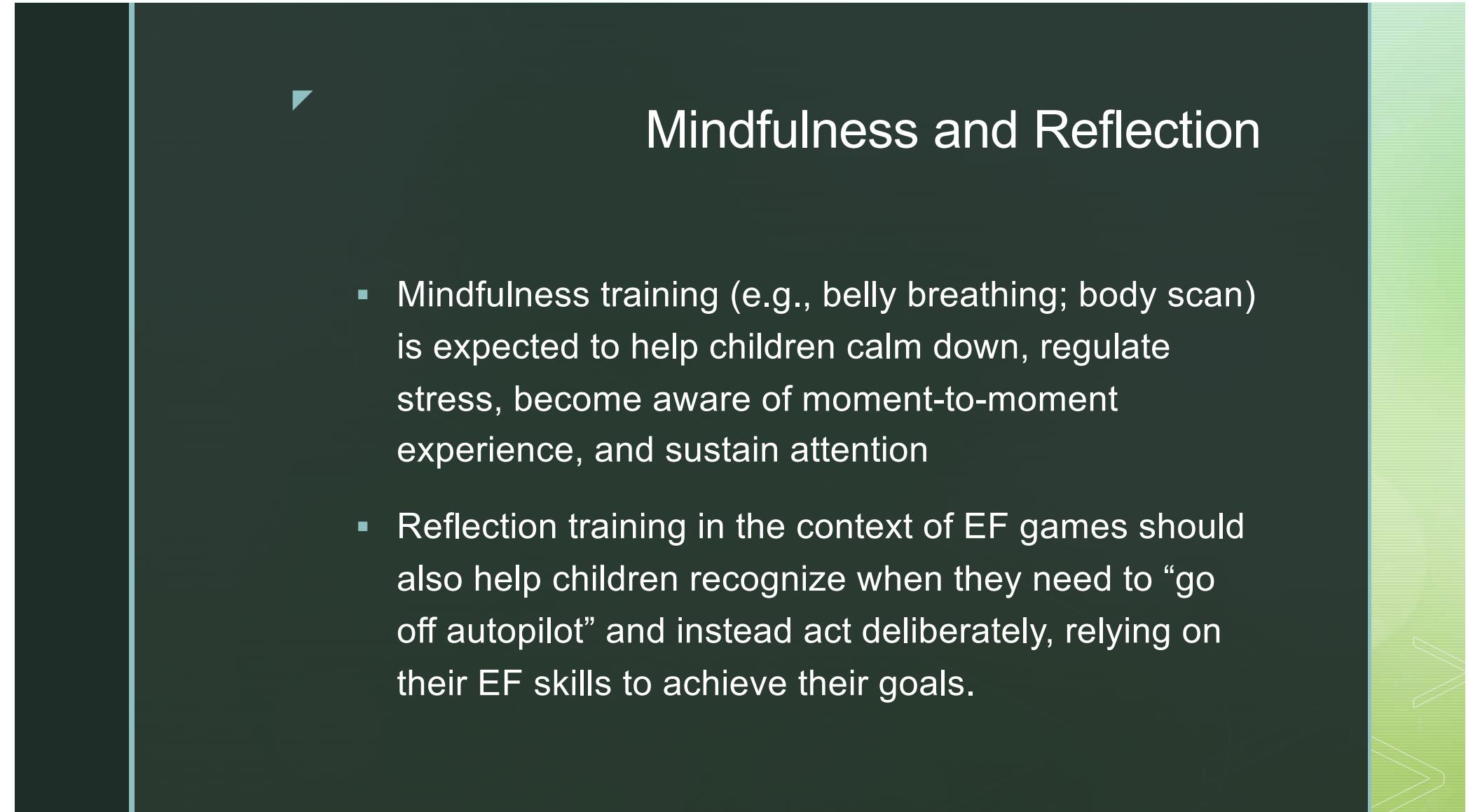
Children

Parent

## ABSTRACT

**Background:** Attention-Deficit/ Hyperactivity Disorder (ADHD) is a prevalent condition in children and adolescents. Although there are pharmacological and non-pharmacological treatments for this disorder, barriers in accessing evidence-based treatments are still a major problem. Digital health interventions are promising for multiple mental health problems. Recent years have brought an increase in the number of existing mobile apps designed for the management of ADHD. The aim of this study was to systematically review the existing mobile apps designed for ADHD in terms of general characteristics, empirical support for their development and efficacy/ effectiveness, and to describe the content and design of the four most downloaded ADHD apps.

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## Mindfulness and Reflection

- Mindfulness training (e.g., belly breathing; body scan) is expected to help children calm down, regulate stress, become aware of moment-to-moment experience, and sustain attention
- Reflection training in the context of EF games should also help children recognize when they need to “go off autopilot” and instead act deliberately, relying on their EF skills to achieve their goals.



## Mindfulness apps

- Apps are a great tool to use with students, since they typically enjoy using technology. Headspace, Calm, and Smiling Mind are apps that students have liked.
- Encourage your child to try a few in order to find the best fit. Headspace's guided meditations are 10 minutes each, and Calm has slightly shorter ones. Smiling Mind offers different meditations depending on a child's age. Additionally, Smiling Mind allows greater choice when deciding on the type of meditation to use.



## Mindfulness Scripts

- Scripts- There are many activities and scripts available for parents to use with their children when teaching mindfulness. Here are a few that might be helpful:
  - Breathing Buddies- Daniel Goleman explains how to teach students mindful breathing using stuffed animals
  - Mindful Eating- Many mindfulness programs incorporate the mindful eating of a raisin or chocolate kiss.
  - Spiderman Meditation- For superhero fans, this uses a Spiderman script to walk you through teaching your child to become aware of what he/she is sensing with all five senses.

## Breathing Buddies





## Breathing Buddies

- 1. To practice belly-breathing, ask your child to lie comfortably and place his hands on his belly (if he uses a stuffed animal, he can hold it on top of his belly if he lies down).
- 2. As you count to three, ask him to inhale deeply through his nose. Tell him to fill his belly with air as he inhales; he should feel it get bigger and bigger and bigger throughout the count to three. If his stuffed toy sits atop his belly, he might see it rise as his belly “fills with air”.
- 3. Ask him to exhale to a slow count to four. Tell him he might see his toy fall as he feels his belly shrinking and shrinking throughout the count to four.
- Do five to ten rounds of belly-breathing to get started.

# 6 Ways to Practice Mindful Eating

## Mindless Eating

- 1** Eating past full and ignoring your body's signals
- 2** Eating when emotions tell us to eat (i.e., sad, bored, lonely)
- 3** Eating alone, at random times and places
- 4** Eating foods that are emotionally comforting
- 5** Eating and multitasking
- 6** Considering a meal an end product

## Mindful Eating

- Listening to your body and stopping when full
- Eating when our bodies tell us to eat (i.e., stomach growling, energy low)
- Eating with others, at set times and places
- Eating foods that are nutritionally healthy
- When eating, just eating
- Considering where food comes from

List created by Christopher Willard PsyD



## Spiderman script

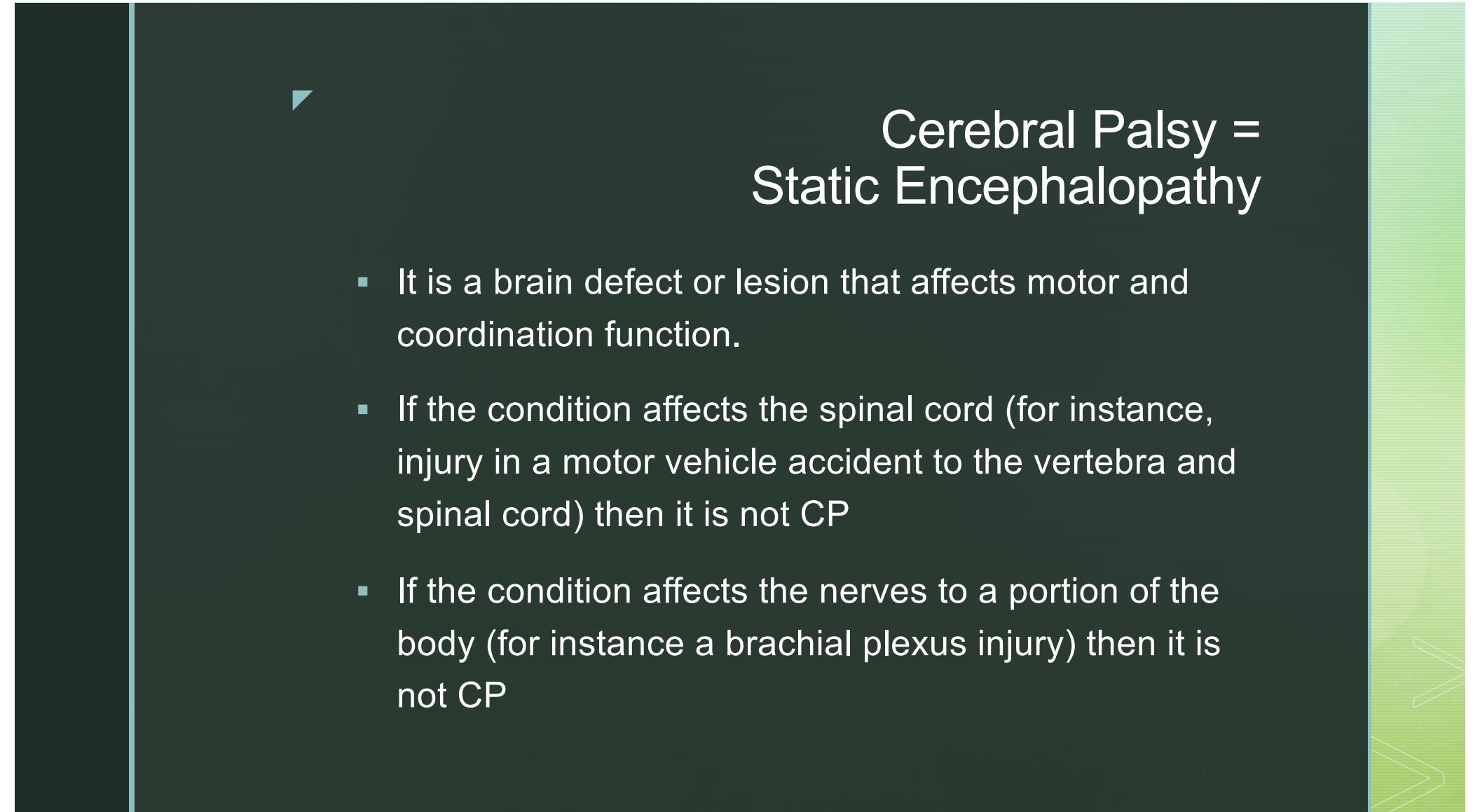
- Right now we are going to learn to activate your super powers to tune into your senses, just like Spider--Man. These are your Spider--Man Super Senses. What it takes is a little practice. Let's start with your sense of hearing.
- First let's sit down. Close your eyes and place your hands on your knees. I am going to ring a bell. When you hear the bell, pay attention to the ring until you can no longer hear the ringing sound, clasp your hands together in your lap. (Repeat 3 times). Like Spiderman, we have activated your super power of ultra hearing! Excellent work!
- Next we are going to activate your super powers of ultra seeing, touching and smelling. I'm going to give each of you a flower. Hold your flower gently in your hand. When I ring the bell, I want you to gently touch the petals. Feel what each petal is like beneath your fingers. Pay attention to if the petal is soft, rough, wet, furry, smooth, or prickly. See what you can feel. Imagine, like Spiderman, your hands have the power to sense very carefully what the flower feels like...



## Mindfulness Websites

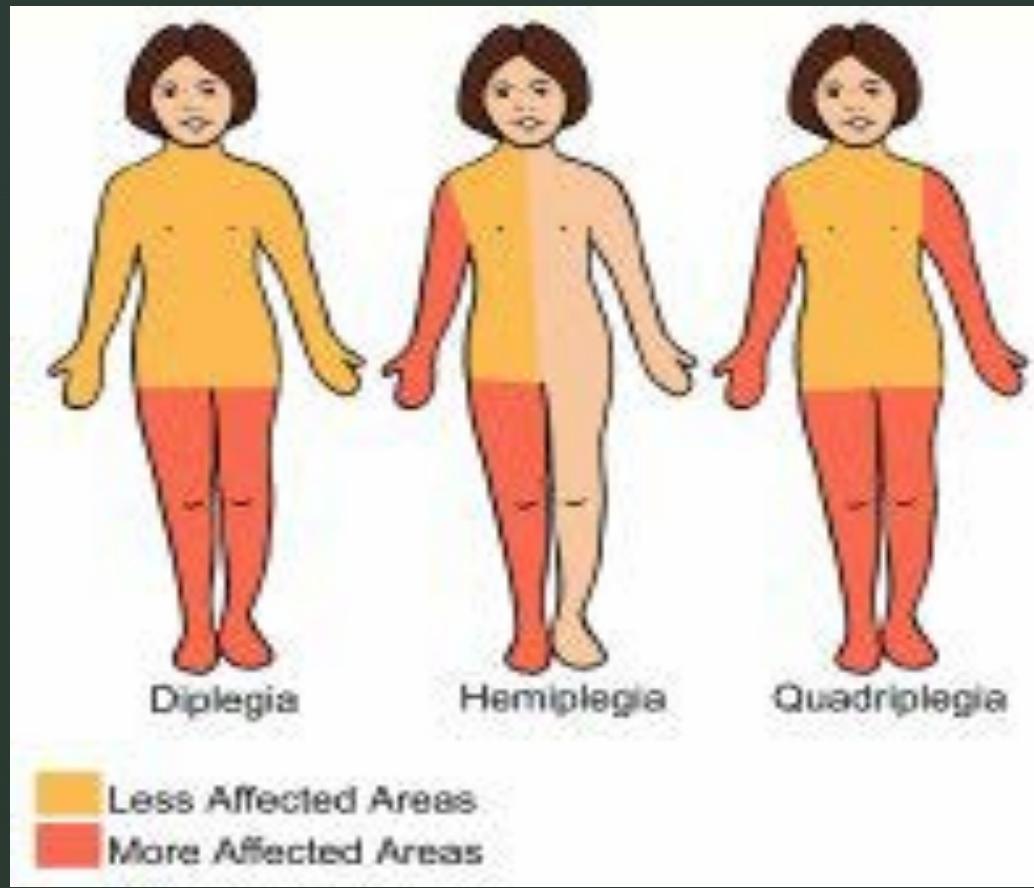
- Websites- Gonoodle.com and calm.com are resources for parents to use when looking for short mindfulness activities. Headspace also has a website that functions similarly to the app.

Apps, Scripts and websites are those suggested in the website Beyond BookSmart

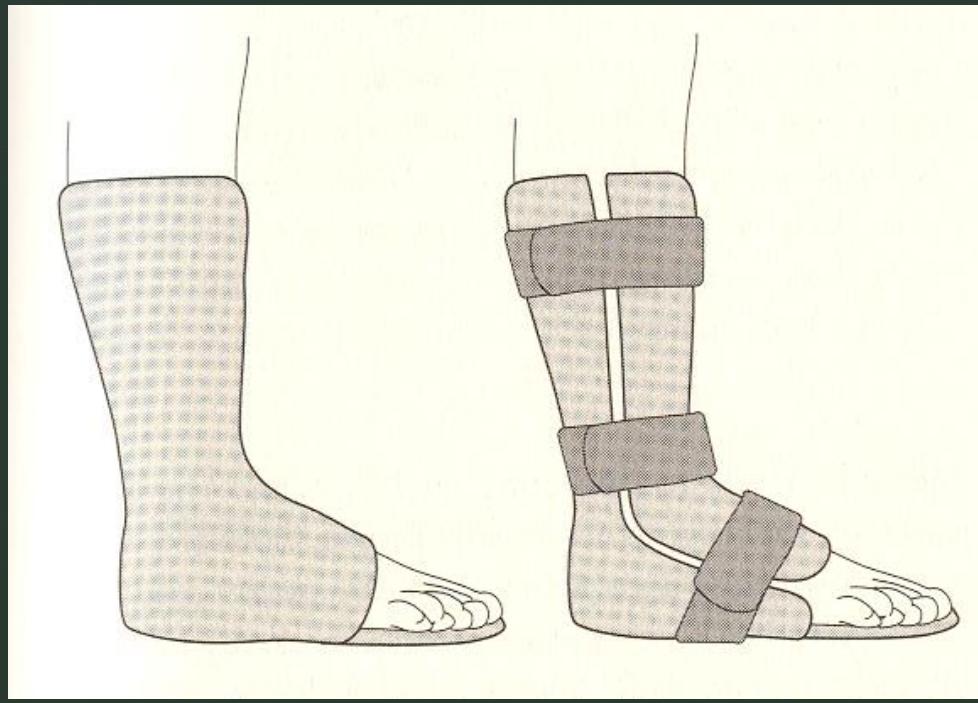


## Cerebral Palsy = Static Encephalopathy

- It is a brain defect or lesion that affects motor and coordination function.
- If the condition affects the spinal cord (for instance, injury in a motor vehicle accident to the vertebra and spinal cord) then it is not CP
- If the condition affects the nerves to a portion of the body (for instance a brachial plexus injury) then it is not CP



Ankle Foot Orthosis -  
1) to stretch tight muscles and 2)  
for positioning



SPECIAL ARTICLE



# Practice Parameter: Pharmacologic treatment of spasticity in children and adolescents with cerebral palsy (an evidence-based review)

Report of the Quality Standards Subcommittee of the American Academy of Neurology and the Practice Committee of the Child Neurology Society



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[guidelines@aan.com](mailto:guidelines@aan.com)

## ABSTRACT

**Objective:** To evaluate published evidence of efficacy and safety of pharmacologic treatments for childhood spasticity due to cerebral palsy.

**Methods:** A multidisciplinary panel systematically reviewed relevant literature from 1966 to July 2008.

**Results:** For localized/segmental spasticity, botulinum toxin type A is established as an effective treatment to reduce spasticity in the upper and lower extremities. There is conflicting evidence regarding functional improvement. Botulinum toxin type A was found to be generally safe in children with cerebral palsy; however, the Food and Drug Administration is presently investigating isolated cases of generalized weakness resulting in poor outcomes. No studies that met criteria are available on the use of phenol, alcohol, or botulinum toxin type B injections. For generalized spasticity, diazepam is probably effective in reducing spasticity, but there are insufficient data on its effect on motor function and its side-effect profile. Tizanidine is possibly effective, but there are insufficient data on its effect on function and its side-effect profile. There were insufficient data on the use of dantrolene, oral baclofen, and intrathecal baclofen, and toxicity was frequently reported.

**Recommendations:** For localized/segmental spasticity that warrants treatment, botulinum toxin type A should be offered as an effective and generally safe treatment (Level A). There are insufficient data to support or refute the use of phenol, alcohol, or botulinum toxin type B (Level U). For generalized spasticity that warrants treatment, diazepam should be considered for short-term

## Treatments

- Novak I, Morgan C, Fahey M, et al. State of the Evidence Traffic Lights 2019: Systematic Review of Interventions for Preventing and Treating Children with Cerebral Palsy. *Curr Neurol Neurosci Rep.* 2020;20(2):3.

EFFECTIVE

### MOTOR

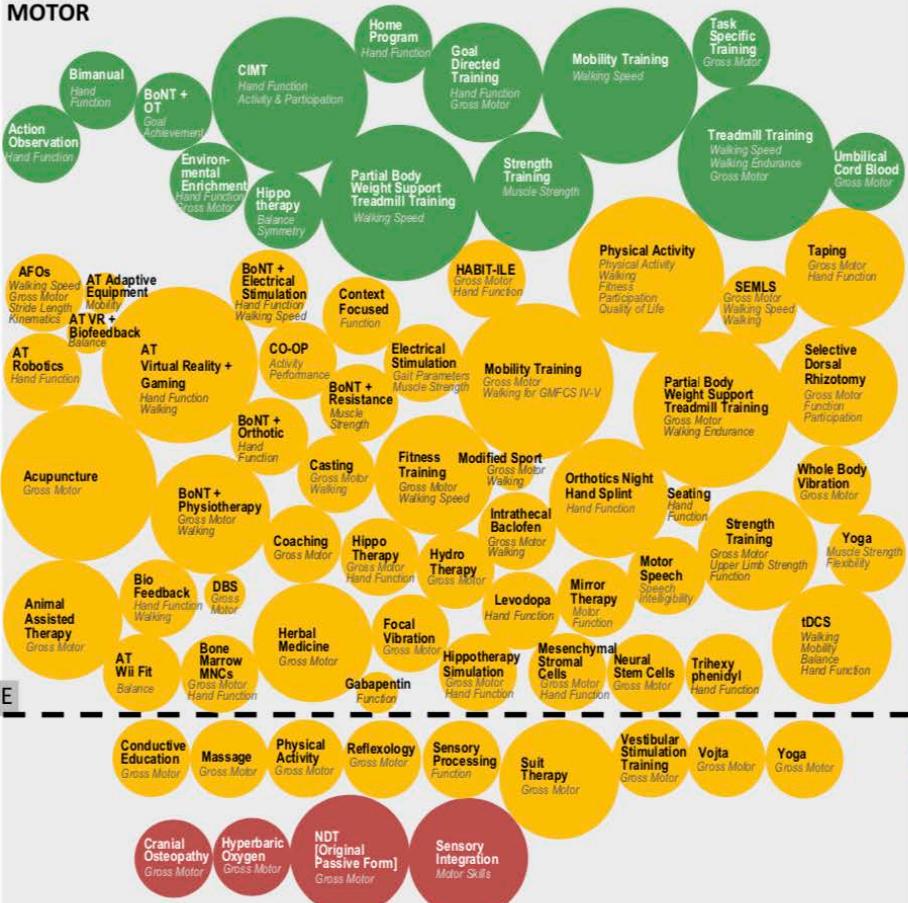
DO IT  
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PB DO IT  
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WORTH IT LINE

PB DON'T DO IT  
S -

INEFFECTIVE



### EARLY INTERVENTION



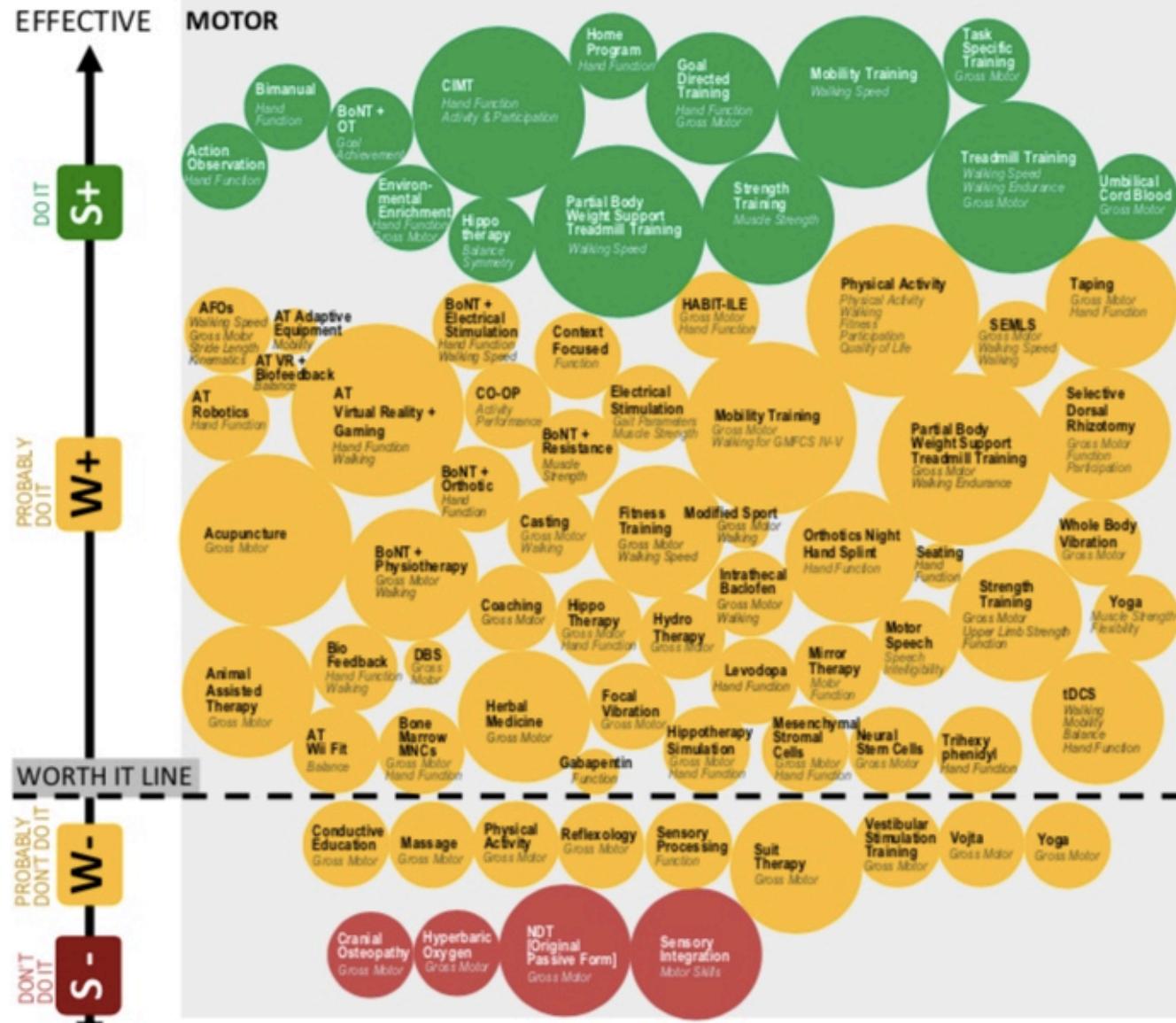
### TONE



### CONTRACTURE & ALIGNMENT

LEGEND: AFOs=Ankle Foot Orthoses; AT=Assistive Technology; BoNT=Botulinum Toxin; CIMT=Constraint Induced Movement Therapy; CO-OP=Cognitive Orientation to Occupational Performance; COPCA=Coping with and Caring for infants with Special Needs - a family centered program; DBS=Deep Brain Stimulation; GAME=Goals Activity Motor Enrichment; NDT=Neurodevelopmental Therapy; OT=Occupational Therapy; SEMLS=Single Event Multi Level Surgery; tDCS=Transcranial Direct Current Stimulation

Observational Studies ONLY



## MOTOR



## MOTOR





## Hippotherapy

- Develop and enhance neurological and physical functioning by channeling the movement of the horse.
- Hippotherapy is built on the concept that the individual's neuromuscular development is enhanced when their body makes adjustments to the gait, tempo, rhythm, repetition and cadence of a horse's movement.

## Hippotherapy

- Based on the concept that humans with physical challenges can benefit from both learned and spontaneous reactions while riding a horse, hippotherapy was conceived in the 1960s
- Used primarily in Germany, Austria, and Switzerland as a companion to more established treatments.
- Hippotherapy was recognized in the United States in the 1980s as a therapy that not only helps patients with neuromuscular dysfunction increase physical strength and cognitive ability, but also offers the individual a chance to take advantage of an enjoyable activity that contributes to a positive therapeutic experience.



Official Journal of the European Paediatric Neurology Society



## Review article

# Benefits of hippotherapy in children with cerebral palsy: A narrative review<sup>☆</sup>



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Horseback riding therapy

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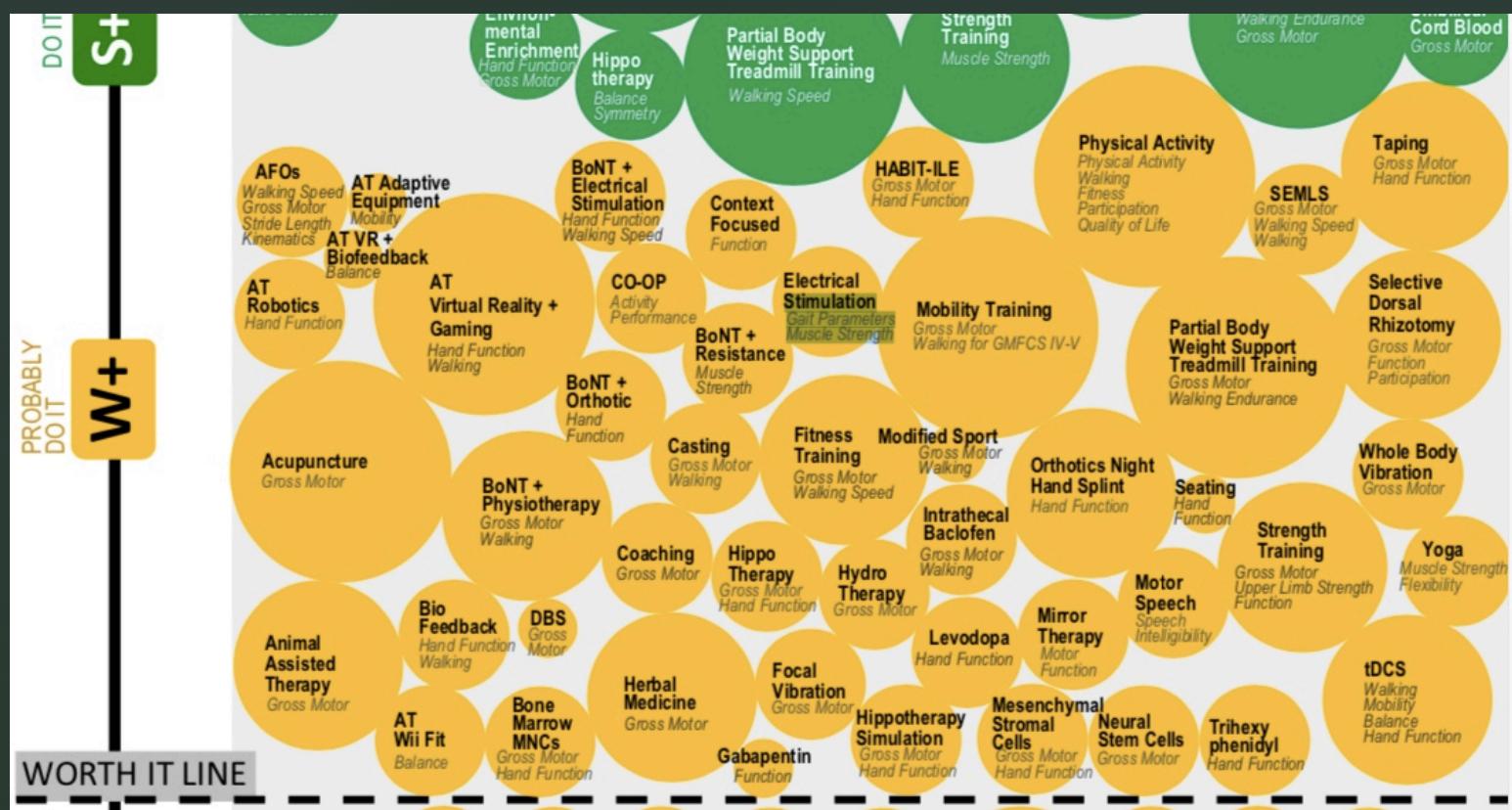
### ABSTRACT

Children with cerebral palsy display disorders in pelvic movement and require effective rehabilitation. There is evidence to support the hippotherapy due to improvements in balance. The aim of this narrative review was to summarise the grades of recommendation regarding the benefits of hippotherapy in children with cerebral palsy.

**Data sources and extraction:** We searched electronic databases, limiting the searches to studies published between 2004 and February 2017. The selected documents were classified according to the strength of recommendation provided by Duodecim (the Finnish medical society). The methodological quality of the selected studies was evaluated using the PEDro scale.

**Results:** 18 studies (four graded A, eight graded B and six graded C) showed clinical changes in the outcomes of gross motor function, sitting independently, speed of walking, length of stride and postural alignment of the head in children with cerebral palsy. Study quality was poor to good (mean PEDro Score of 6 out of 10). Benefits were identified in relation to psychological factors, as well as positive effects on quality of life and the performance of daily life activities.

**Conclusions:** Gains were also observed in postural alignment and the balance of head and trunk. Moreover, there were improvements in quality of life and the activities of daily life.







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# Are You Considering a Complementary Health Approach?

Millions of Americans use complementary health approaches. Like any decision concerning your health, decisions about whether to use complementary approaches are important. The National Center for Complementary and Integrative Health (NCCIH) has developed this fact sheet to assist you in your decisionmaking about complementary health products and practices.

Share



- The National Center for Complementary and Integrative Health is dedicated to exploring complementary health products and practices in the context of rigorous science, training complementary health researchers, and disseminating authoritative information to the public and professionals.
- For additional information, call NCCIH's Clearinghouse toll-free at 1-888-644-6226, or visit the NCCIH Web site at [nccih.nih.gov](http://nccih.nih.gov). NCCIH is 1 of 27 institutes and centers at the National Institutes of Health, the Federal focal point for medical research in the United States.