ADHD AND SLEEP PROBLEMS

by Mark Dobson

DID YOU KNOW

50-75% of adults with ADHD experience sleeping problems [1]

Up to 70% of children with Attention Deficit Hyperactivity Disorder (ADHD) suffer from problems with their sleep [2]

INTRODUCTION

How ADHD and sleep problems are inter-related and what we can do for better sleep!

Insomnia is found in 43-80% of adults with ADHD, with Sleep On-set Insomnia being the primary complaint!

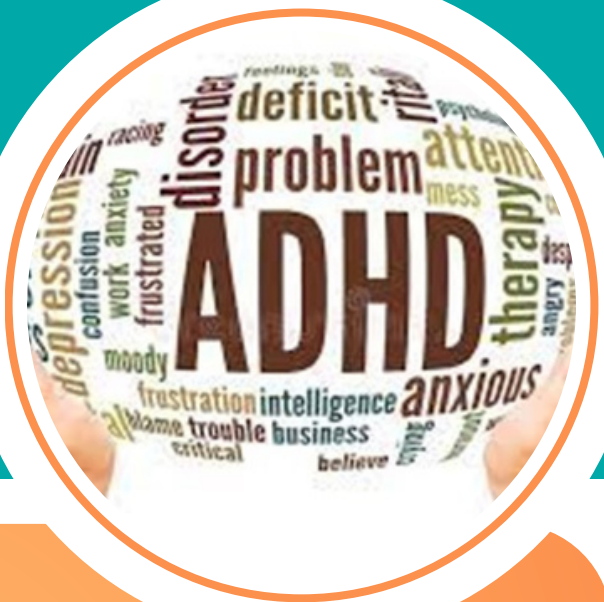


Image credit Home Healing

KEY TAKE-AWAYS

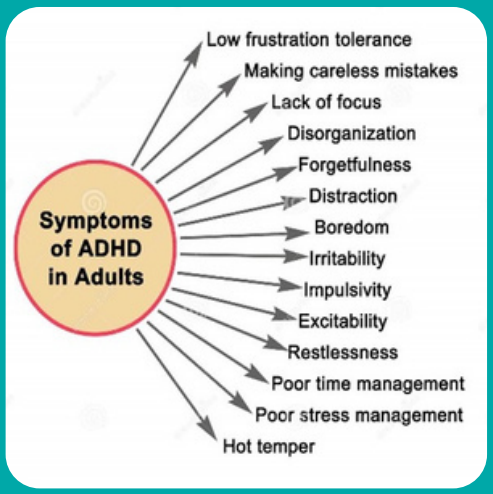
- What is ADHD
- Sleep on-set Insomnia in ADHD
- Can Obstructive Sleep Apnea (OSA) lead to Attention Deficit Disorders?
- Delayed Melatonin and Delayed phase circadian rhythms
- What can help the ADHD population sleep better
- Restless Leg Syndrome (RLS)

At Sleep Focus we specialise in resolving sleep difficulties through the use of Cognitive Behaviour Therapy for Insomnia (CBT-I).

mark@sleep-focus.com www.sleep-focus.com

WHAT IS ADHD?

The characteristics of ADHD in children and adults are shown here:



These symptoms of ADHD generally are noticed in children at an early age by their parents, teachers and care givers. Most cases are diagnosed when children are under 12 years old, but sometimes it's diagnosed later in childhood. [2B]

Children can go through periods of restlessness or show signs of being inattentive, this may not show they have ADHD. Indeed, your GP may first suggest a period of "watchful waiting" – lasting around 10 weeks – to see if your child's symptoms improve, stay the same or get worse. [2B]

It is advised for you to discuss your concerns and observations with your child's teacher, or special educational needs coordinator (SENCO) and your family GP when you feel your child's behaviour may be different from other children of their age.

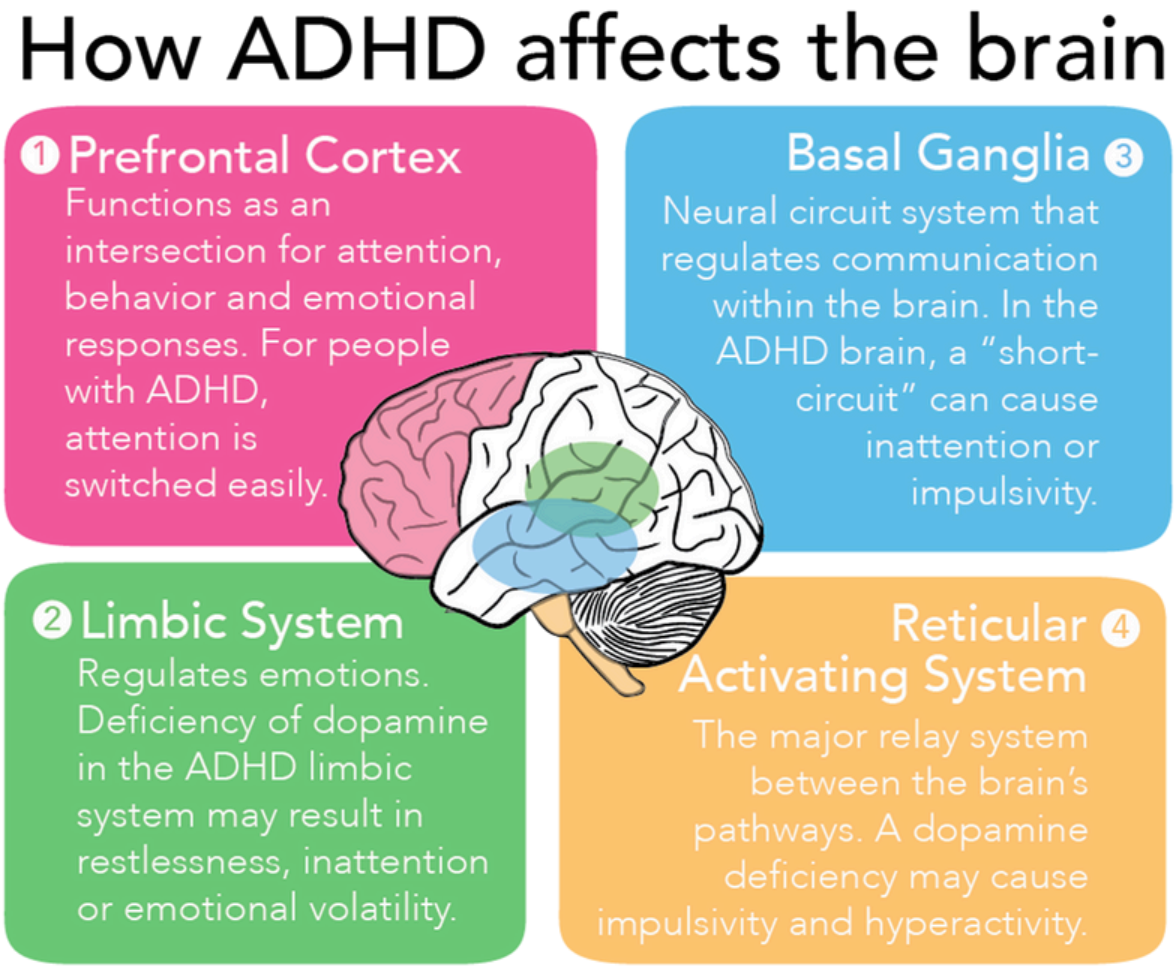
In adulthood, if you feel such a diagnosis may have been missed, then again approach your GP who can further help with the diagnoses.

Many of these characteristics of ADHD are associated with our executive functioning, a group of cognitive skills such as self-awareness, inhibition, non-verbal working memory, verbal working memory, emotional self-regulation, self-motivation and planning and problem solving. We all use these skills to manage day-to-day tasks, such as time management, staying organized, and planning. While there are several different parts of the brain that contribute to executive functioning, the prefrontal cortex is especially important in regulating these skills.

mark@sleep-focus.com www.sleep-focus.com

HOW ADHD AFFECTS THE BRAIN

Research has shown that in children with ADHD, the prefrontal cortex matures more slowly than typically developing children. It is also slightly smaller in size. Similarly, the cerebellum, hippocampus, and amygdala are also thought to be smaller in volume in children with ADHD [3]



(Source, The Appalachian on-line) [4]

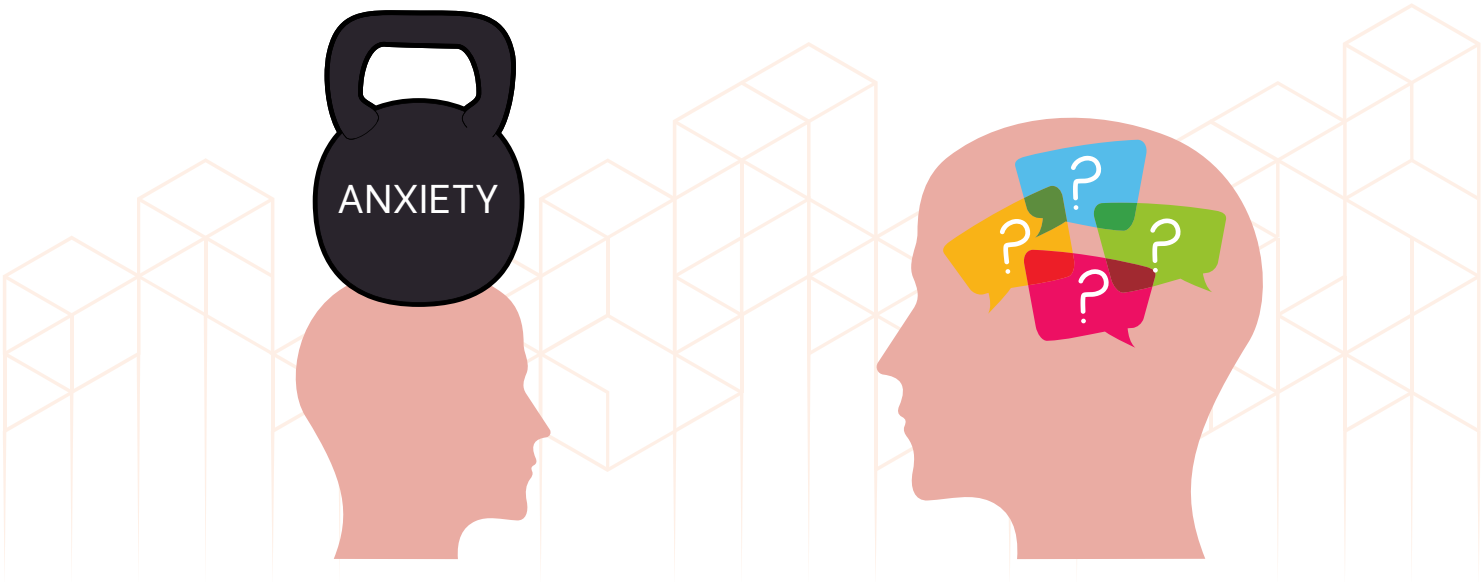
Although these regions of the brain may remain smaller in people with ADHD, there are studies that do show that they continue to grow and mature as children get older. By adulthood, the difference in size, when compared to individuals without the disorder, have appeared to be less significant [3] [5]

mark@sleep-focus.com www.sleep-focus.com

SLEEP ON-SET INSOMNIA
IN ADHD

Anxiety - Why People with ADHD Feel So Anxious

As ADHD expert William Dodson. M.D, writes: “The vast majority of adults with an ADHD nervous system are not overtly hyperactive. They are hyperactive internally. Most people with unmedicated ADHD have four or five things going on in their minds at once.” [6]



When we experience higher levels of stress this can disrupt our sleep by prolonging how long it takes to fall asleep and fragmenting our sleep, so we are awake in the early hours,

“have you woken up at 3am and been unable to fall back to sleep?”

This sleep loss also triggers our body’s stress response system, leading to an elevation in stress hormones, namely cortisol, which further disrupts sleep leading to chronic insomnia A condition of unsatisfactory quantity and/or quality of sleep, which persists for a considerable period of time, including difficulty falling asleep, difficulty staying asleep, or early final wakening. Insomnia is a common symptom of many mental and physical disorders, (ICD-10 Criteria for Nonorganic Insomnia) [7]

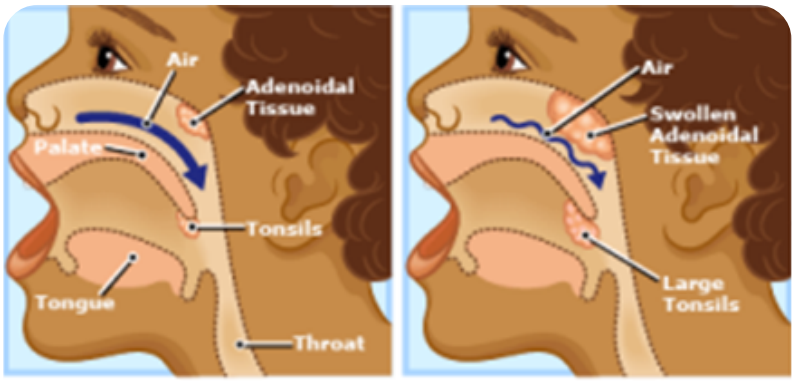
mark@sleep-focus.com www.sleep-focus.com

CAN OBSTRUCTIVE SLEEP APNEA (OSA) LEAD TO ATTENTION DEFICIT DISORDERS?

Sleep-Focus
SLEEP THERAPY

‘Does my child have ADHD, or Obstructive Sleep Apnea or Both’?

A large-scale American study involving over 11,000 children, experiencing some form of Sleep Disorder Breathing (SDB) sleep apnoea, were 40 to 100% more likely to show behavioural problems by the age of 7 that mimic those of children who have been diagnosed with ADHD. [8-9]



Normal Anatomy
Open airways allow air to flow easily.

Common Causes of Sleep Apnea
Large tonsils and adenoids make airflow more difficult.

Also, 95% of paediatric patients with OSA, reported attention deficits. [10]

Enlarged tonsils and or adenoids, these are common physical causes that narrow the airway contributing to Sleep Disorder Breathing (SDB) [8]

Sleep Disorder Breathing (SDB) in children has been shown to:

- Induce their impulsivity.
- Increase their Hyperactivity, and
- Contribute to Problematic Behavioural Issues such as agitation, impulsivity, excitability and difficulty to pay attention.[8]

The difference between adults and children with SDB, is that children will try to compensate for their disrupted sleep by speeding up, whilst adults usually become lethargic and sluggish.

For more information on this condition please visit the Sleep Better Clinic where Dr Ingleby explains more on this condition and treatment.

SLEEP BETTER
SNORING & APNOEA SOLUTIONS

mark@sleep-focus.com
www.sleep-focus.com

WHAT ARE THE SIGNS TO LOOK FOR IF YOUR CHILD HAS SDB?

Sleep deprivation:
has your child become inattentive, moody and disruptive at school and at home?

Snoring:
Snoring is the sound made by the airway vibrating as it reopens after a partial collapse, and this is one of the most obvious signs in children with OSA. Large tonsils and adenoids can partially block the airway at night. This can cause snoring, gasping or chocking during their sleep.

Growth:
There may be slower growth development in children with SDB, due to interrupted growth hormone that is secreted during the night.

Abnormal urine production:
Have you noticed 'bedwetting'? SDB in children can increases the urine production. [8]

It is worth noting that about10 to 20% of children aged 6-8 years are diagnosed with OSA, and almost 50% of these children with OSA are obese![11]

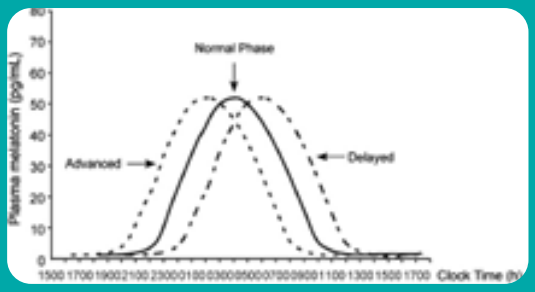
There is a reciprocal relationship between ADHD and OSA, with each exacerbating the symptoms of the other!

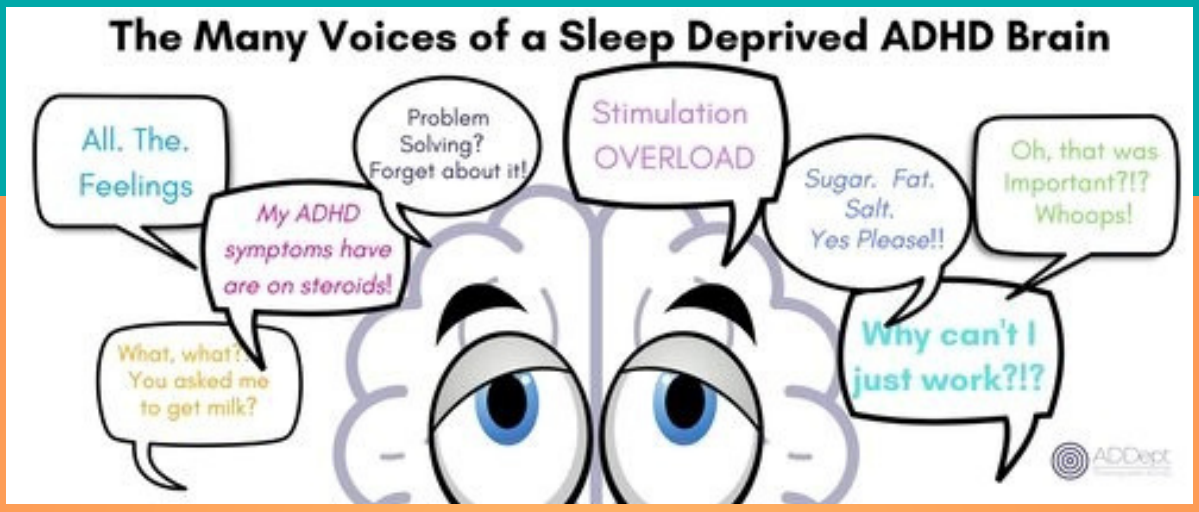
A recent article in the Sleep Foundation (2024) says "Experts generally recommend screening patients for sleep problems before prescribing medication for ADHD". [12]

mark@sleep-focus.com www.sleep-focus.com

DELAYED MELATONIN AND DELAYED PHASE CIRCADIN RHYTHMS.

Delayed Sleep Phase Syndrome (DSPS), relating to a disturbance in the circadian rhythm, is a common sleep disorder experienced in ADHD.





It is still unknown what the exact relationship between ADHD and the delayed circadian rhythm is, However, the late release of Melatonin by the Pineal gland is known to be a factor. [13]

For most of us the onset of melatonin is around 09:30 p.m. Children who have ADHD, this can be delayed by 45 minutes so around 10:15 p.m. and in adults even 90 minutes later, resulting in a delay in sleep of two hours or more. [13]

This clearly presents the ADHD population with a social/academic problem as the day may need to start at 07:00 a.m. leading to acute sleep deprivation of 5-6 hrs (optimal 9-12 hours in children aged 6-12 years, 8-10 hours for teens aged 13-18, and 7-8 hours for adults) which exacerbates the symptoms of psychiatric disorders. [14]

mark@sleep-focus.com www.sleep-focus.com

WHAT CAN HELP THE ADHD POPULATION SLEEP BETTER.

Sleep Hygiene

How Sleep Hygiene, Melatonin, and Light Therapy can build better sleep in the ADHD population.

How to have better Rhythm!

The NHS have written a helpful guide 'Sleep information for parents of children with ADHD' found here: https://camhs.rdash.nhs.uk/wp-content/uploads/2021/01/DP8668-Sleep-information-for-parents-of-children-with-ADHD-leaflet-01.21.pdf

The bedroom is a 'sleep room', not a catch up on work emails, social media, TV, to-do-lists room. All of these need to be completed before you go into your sleep room.

Image: The Sleep Foundation

Your sleep room needs to be as dark as possible, with blinds and curtains to block out natural light. No light emitting electronic devices and cool to about 18 degrees. If you have a bed partner who takes up most of the duvet then adopt the Scandinavian method of separate duvets.

mark@sleep-focus.com www.sleep-focus.com

WHAT CAN HELP THE ADHD POPULATION SLEEP BETTER.

A standing fan is a useful addition to help block out external environmental noise and aids in keeping the sleep room stay cool too.

Try to keep the intake of caffeinated drinks to the morning, caffeine has a long half life of up to 8 hours and will disrupt our deep sleep stages.

Alcohol disrupts REM sleep, our emotional restorative sleep, so with the understanding that it takes our bodies about 1 hr to process 1 unit of alcohol, try to limit the consumption to the early evening only.

Anxiety in the sleep room will delay sleep on-set and wake us up in the early hours of the night.

A Daily Thought Record (DRT) used in Cognitive Behaviour Therapy is a very good tool to notice, note down and resolve anxious thoughts throughout the day. Set some time aside to put anxious thoughts in context reducing their effect before its time for sleep.

mark@sleep-focus.com www.sleep-focus.com

THE BUFFER ZONE

We are not machines; it can take some time for our minds and bodies to switch off from the days stresses to enable us to fall asleep.

The buffer zone is a time period, recommended of 1hr, before we intend to go to sleep to put the day to rest. Have a hot bath or shower, sit in a low lux lit room (less than 180 lumen [21], use a lux meter app for an iPhone to help measure the environment lighting level). This is especially important in allowing the natural release of melatonin. Engage in calming activities such as yoga, meditation, reading, drawing, writing a diary etc.

The Calm app from Calm.com https://www.calm.com/ Is a useful tool for meditation before sleep.

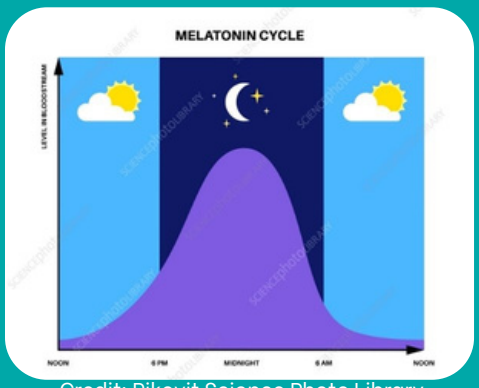
The buffer zone is especially important with ADHD due to the difficulty in falling asleep because of an overactive mind and delayed sleep-phase syndrome.

mark@sleep-focus.com www.sleep-focus.com

MELATONIN USES WITH ADHD IN HELPING WITH DELAYED SLEEP PHASE SYNDROME

Sleep hygiene is the recommend practice first, before considering taking melatonin to help with delayed sleep phase syndrome (DSPS). To date, there has been no proven cause of this delayed sleep phase in ADHD. Some experts suggest the brain's synapses may have a reduced responsiveness to melatonin. [15]

Melatonin is a hormone that is produced by the pineal gland in our brain to the dimming of the environmental light, referred to as Dim Light Melatonin Onset (DLMO). It essentially tells our brains "hey it's getting dark, time to start getting ready for sleep".



Credit: Pikovit Science Photo Library

There are a number of conditions, including ADHD, cerebral palsy and chronic fatigue syndrome [16], that can affect sleep, where melatonin is used in the longer term to help with sleep related problems. It is important to note that melatonin is only to be taken under the guidance of a specialist. Excessive melatonin levels can adversely affect sleep, especially if taken at an incorrect time. [17]

Helping to advance the sleep schedule,
Under the correct medical supervision, melatonin products that are licensed, can help shift the sleep schedule by approximately 1.5hrs earlier, giving the benefit of better synchronisation with the social and academic world. [20]

In collaboration with Light Therapy.

Some studies do show how the combined use of melatonin in the late afternoon or evening to help with an earlier sleep schedule, and morning light at the same time every day, help to shorten sleep onset and reset the biological rhythm leading to longer and more restorative sleep. This can be more effective than taking a melatonin supplement alone. [19]

In the U.K. some melatonin products are under license for children aged 6 and upwards who have been diagnosed with insomnia. Some indicate that their melatonin product can improve sleep onset by up to 70 minutes in children aged 6-17, research in this ADHD age group shows that 73% experience some form of sleep problem. [18]

mark@sleep-focus.com www.sleep-focus.com

LIGHT THERAPY

"May your day be full of sunlight and active with your night environment dark, quiet, relaxed and cool"

To help reset our biological clock, in the spring and summer months step outside and allow the natural light to switch off the production of melatonin and turn on cortisol. Natural light is natures cup of coffee in the morning for us.

In the later autumn and winter months of low daylight hours, it can help people with ADHD to use a synthetic blue or white light of 10,000 lux or more, 20 cm from the eyes and for 30 minutes each morning, between 7-8 a.m.. This can help prevent low moods, reset/anchor our circadian rhythm helping us fall asleep earlier in the evening increasing our total sleep time. [22]

mark@sleep-focus.com www.sleep-focus.com

RESTLESS LEG SYNDROME (RLS)

Restless Legs with ADHD.

When you try to relax in the evening or during sleep at night, do you experience unpleasant restless feelings in your legs?

If you do, would this feeling be relieved by walking or movement?

Is it worse at night or at rest?

Do you find this is worse with antihistamine medication?

Restless Legs Syndrome (RLS) gives an unpleasant tingling sensation in the legs that is relieved by moving them. This is reported in up to 50% of people with ADHD. The unpleasant feeling makes it harder to fall asleep and increased number of sleep awakenings during the night. [23]

Dopamine levels naturally fall towards the end of the day, which may explain why the symptoms of RLS are often worse in the evening and during the night. [24-25-26]

Some studies report that RLS can be the cause of a lack of iron or indeed difficulty processing iron, which is an important mineral to many of our brain activities. Other conditions such as diabetes and medications like antihistamines which when controlled or stopped can help relieve the symptoms of RLS. [24-25-26]

Treatment: here it is advised to consult with your GP to assess if there is an iron deficiency and what treatment is available.

mark@sleep-focus.com www.sleep-focus.com

REFERENCES

[1] NHS Berkshire Health Care. ADHD and Sleep. https://www.berkshirehealthcare.nhs.uk/media/109514310/7-adhd-guide-sleep.pdf

[2A] Child Development Clinic. B. Yeoh. (2019). Why can't my child with ADHD sleep at night?. https://www.childdevelopmentclinic.com.au/adhd-sleeping-at-night.html#:~:text=Behaviourally%20based%20sleep%20difficulties%20in%20ADHD&text=You%20may%20observe:,asleep%20or%20stay%20asleep%20overnight.
[2B] NHS. (2021). Attention deficit hyperactivity disorder. https://www.nhs.uk/conditions/attention-deficit-hyperactivity-disorder-adhd/

[3] How is the ADHD Brain different, F. Wilkins (2024). An in-depth look at the underlying causes of ADHD symptoms in children. https://childmind.org/article/how-is-the-adhd-brain-different/#:~:text=Similarly%2C%20the%20cerebellum%2C%20hippocampus%2C,especially%20relevant%20to%20ADHD%20symptoms.

[4] Unlocking ADHD. (2021), ADHD From a scientific point-of-view. https://www.unlockingadhd.com/adhd-from-a-scientific-point-of-view/

(Executive functioning & ADHD brain continues to grow ref)
[5] Associations of pineal volume, chronotype and symptom severity in adults with attention deficit hyperactivity disorder and healthy controls. Jan Malte Bumb et al, (2016). https://kops.uni-konstanz.de/server/api/core/bitstreams/4c477ad6-b953-4aaa-aa54-444bcc62dbbd/content

[6] ADDITUDE, A Kravit. (2024). Everything You Never Knew About the ADHD Brain. https://www.additudemag.com/adhd-brain-prefrontal-cortex-attention-emotions/
(Anxiety quote)

[7] National Library of Medicine. E. Mai et al (2009). *Insomnia: Prevalence, Impact, Pathogenesis, Differential Diagnosis, and Evaluation.* *https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2504337/#:~:text=ICD%2D10%20Criteria%20for%20Nonorganic,asleep%2C%20or%20early%20final%20wakening.*

[8] Ear Nose Throat Houston & Allergy. J. Martin. (2017). *ADHD and Children with Sleep Disordered Breathing (Sleep Apnea). https://www.houstonent.com/blog/adhd-and-children-with-sleep-disordered-breathing-sleep-apnea*

[9] American Academy of Paediatrics. K. Bonuck. (2012). Sleep-Disordered Breathing in a Population-Based Cohort: Behavioural Outcomes at 4 and 7 Years. https://publications.aap.org/pediatrics/article-abstract/129/4/e857/32299/Sleep-Disordered-Breathing-in-a-Population-Based?redirectedFrom=fulltext

[10] National Library of Medicine. N. Youssef. (2011). Is obstructive sleep apnea associated with ADHD?. https://pubmed.ncbi.nlm.nih.gov/21808754/

[11] Journal of Nutrition and Metabolism. I. Narang et al. (2012). Childhood Obesity and Obstructive Sleep Apnea. https://onlinelibrary.wiley.com/doi/10.1155/2012/134202

At Sleep Focus we specialise in resolving sleep difficulties through the use of Cognitive Behaviour Therapy for Insomnia (CBT-I).

mark@sleep-focus.com www.sleep-focus.com

REFERENCES

[12] The Sleep Foundation Mental Health and Sleep. D. Pacheco et al. (2024). *ADHD and Sleep Problems: How Are They Related?.* https://www.sleepfoundation.org/mental-health/adhd-and-sleep

[13] Member Portal. S. Kooij. (2016). *Are You a Night Owl? About ADHD and Late Sleep. https://apsard.org/are-you-a-night-owl-about-adhd-and-late-sleep/*

[14] KidsHealth. M. Gavin. (2021). *Kids and Sleep. https://kidshealth.org/en/parents/sleep.html#:~:text=How%20Much%20Sleep%20Do%20Kids,years):%208%E2%80%9310%20hours*

[15] Scientific Reports. G. Park et al. (20180. *Melatonin inhibits attention-deficit/hyperactivity disorder caused by atopic dermatitis-induced psychological stress in an NC/Nga atopic-like mouse model. https://www.nature.com/articles/s41598-018-33317-x*

[16] NHS. (2023). *How and When to Take Melatonin. https://www.nhs.uk/medicines/melatonin/how-and-when-to-take-melatonin/*

[17] Health Line. (2023). *Melatonin Overdose. https://www.healthline.com/health/melatonin-overdose*

[18] European Pharmaceutical Review. C. Eckford. (2022). *First UK-licensed melatonin for children with insomnia and ADHD. https://www.europeanpharmaceuticalreview.com/news/175516/first-uk-licensed-melatonin-for-children-with-insomnia-and-adhd/*

[19] National Library of Medicine. R. Fargason et al. (2017). *Correcting Delayed Circadian Phase with Bright Light Therapy Predicts Improvement in ADHD Symptoms: A Pilot Study. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7959333/*

[20] ADHD Online. (2023). *Can Melatonin Help With ADHD Sleep Issues?. https://adhdonline.com/articles/can-melatonin-help-with-adhd-sleep-issues/*

[21] Sleep Score Labs. (2018). *How Light and Temperature Mix with Sleep. https://www.sleepscore.com/blog/light-temperature-and-a-good-nights-sleep/#:~:text=To%20illustrate%20this%2C%20a%20small,not%20be%20more%20than%205*

[22] National Library of Medicine. E. Biol. (2019). *Bright Light Therapy: Seasonal Affective Disorder and Beyond. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6746555/*

At Sleep Focus we specialise in resolving sleep difficulties through the use of Cognitive Behaviour Therapy for Insomnia (CBT-I).

mark@sleep-focus.com www.sleep-focus.com

REFERENCES

[23] National Library of Medicine. R. Ferri et al. (2013). *Time structure of leg movement activity during sleep in attention-deficit/hyperactivity disorder and effects of levodopa.* *Time structure of leg movement activity during sleep in attention-deficit/hyperactivity disorder and effects of levodopa - PubMed (nih.gov)*

(50% of people with ADHD)

[24]NHS. (2022), Restless Legs Syndrome. https://www.nhs.uk/conditions/restless-legs-syndrome/causes/#:~:text=This%20is%20known%20as%20secondary,dopamine%2C%20triggering%20restless%20legs%20syndrome)

[25] Sleep Doctor. (2024). *ADHD and Sleep Problems: How Are They Related?.* *https://mecp.springeropen.com/articles/10.1186/s43045-022-00226-9*

(Dopamine)

[26] University of Rochester Medical Centre Health Encyclopaedia.2024. *Restless Leg Disorders in Kids with ADHD.* *https://www.urmc.rochester.edu/encyclopedia/content.aspx?ContentTypeID=160&ContentID=62#:~:text=Two%20of%20the%20most%20common,more%20likely%20to%20have%20RLS*

At Sleep Focus we specialise in resolving sleep difficulties through the use of Cognitive Behaviour Therapy for Insomnia (CBT-I).

mark@sleep-focus.com www.sleep-focus.com