

Attention Deficit / Hyperactive Disorder (ADHD) vs Sleep Disordered Breathing (SDB) conundrum

Increased associations have been reported between AD(H)D and SDB (Sedky, Bennett & Cavalho 2014). Both conditions have a negative impact on a person's ability to learn. Because the symptoms are so similar, it often takes a more holistic approach and a multidisciplinary team to solve the conundrum. The following case study illustrates the effectiveness of a multidisciplinary team.

Comorbidity of ADHD and SDB

There is evidence that children scheduled for adenotonsillectomy often have mild to moderate Sleep Disordered Breathing and significant neurobehavioral morbidity -- including Hyperactivity, Inattention, Attention-

Deficit/Hyperactivity Disorder, and Excessive Daytime Sleepiness - all of which tend to improve by one year after surgery (Chervin, et al., 2006). In Principles and Practice of Pediatric Sleep Medicine, Sheldon, et.al. (2014) suggest that children with complaints related to attention, behavior and learning should be screened for major sleep disorders.

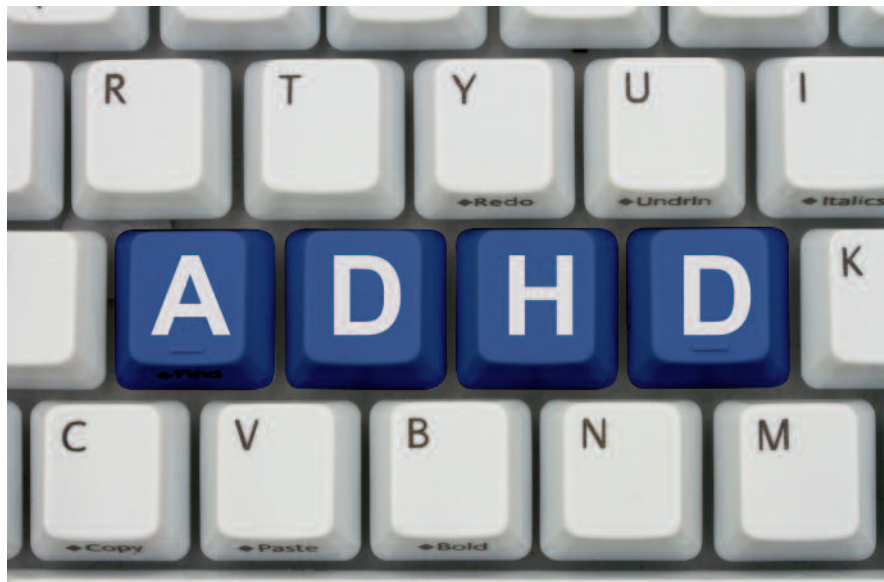


Case Study

Penelope (pseudonym) aged 20, has several interrelated difficulties. She underwent an adenotonsillectomy as an infant. At 8 years, Penelope was diagnosed by a pediatrician with ADHD and Metabolic Dysfunction. She had an elevated triglyceride count and a slightly elevated HOMA index. Her BMI was 27, she weighed 57 Kgs and she was reported to be at risk for type 2 diabetes.

Her first psychoeducational evaluation was at the age of 5. The findings report Penelope to have average range intellectual ability, with good fine motor coordination. The report also states that although she is confident in herself, Penelope exhibits mild anxiety when completing tasks. Several other psychoeducational assessments reveal emotional dysregulation with heightened anxiety, and learning difficulties.

Penelope spent some time in a remedial school and eventually completed Grade 12 at a private school with learning support. IEB granted two concessions : a reader and permission to write in a separate venue. Even though Penelope had no foundation in Physical Science and Chemistry she was guided to follow a course in the medical field. Her transition from school to tertiary education was fraught with difficulties. She displayed several criteria of Generalized Anxiety Disorder with Panic Attacks. Despite good policy promulgated by the university she attended, she was not afforded any learner support. Penelope was not able to manage the career pathway suggested for her. She was referred to a psychologist who uses an alternate approach to career direction, which is not based on "test and tell method". A more holistic approach was needed.



During the first psychotherapeutic intervention, Penelope described difficulty concentrating, excessive daytime sleepiness (EDS), chronic fatigue, high levels of anxiety and the need to comfort eat. She also complained of severe snoring and of waking herself gasping for air (snoring herself awake). These are indications of Sleep Disordered Breathing (SDB) and Obstructive Sleep Apnea (OSA). The Epworth Sleepiness Scale scored 20 and 22 on different occasions, indicating severe sleepiness. (Scale of 16-24 indicate severe EDS). She had a Fatigue Severity Scale of 58/63, indicating high levels of fatigue. She kept a sleep diary which indicated fragmented sleep of poor quality. Penelope was referred for an overnight polysomnogram (PSG). (First study done on 09/06/2016). This indicated that she has mild SDB, mild OSA and Upper Airway Resistance Syndrome (UARS).

A multi-disciplinary treatment approach was followed. The SDB and OSA was treated with a Mandibular Advancement Device (MAD). She consulted with the dietician and an exercise regime was established. Penelope was redirected into a course in the field of early childhood education, which she began at the beginning of the student year. She attended short term psychotherapy using the psychology of Hope as a foundation for therapy. Her level of anxiety reduced significantly. She was coping with the course and enjoying it.

FIGURE 1: SUMMARY OF SIGNS AND SYMPTOMS OF SDB IN PENELOPE

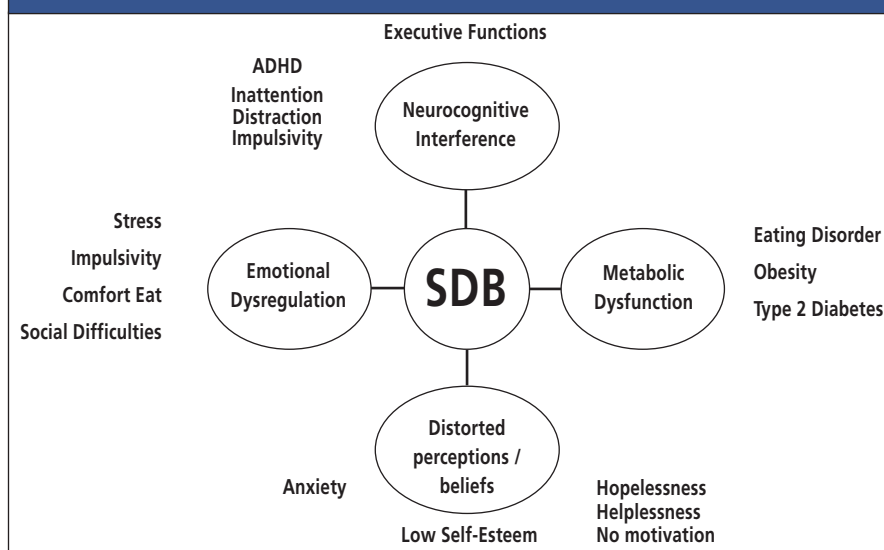


TABLE ILLUSTRATING THE IMPROVEMENT FROM INTERVENTIONS

	First PSG Study (09/06/2016)	Second PSG Study (23/03/2017)
Arousals	21.2	10.2
RDI per hour	12.3	7.9
AHI per hour	6.5	1.4
SaO2	92% Minimum 88%	98% Minimum 92%
Snoring	Moderate	Mild
Obstructive Apnoea	Present	Absent
Central Apnoea	Present	Absent

With continued motivation, support and compliance to treatment with the dietician, Penelope has lost 14 kgs (no longer classified as morbidly obese). The Sleep Apnea Quality of Life Index, a questionnaire designed to track improvement, increased from a score of 17 to a score of 70. A second PSG was done (23/03/2017) to follow up improvement of treatment for SDB and OSA. This second study showed a significant reduction in arousals, RDI, AHI and snoring. Despite OSA falling within bounds of normal, there is still evidence of UARS. Weight reduction, continued wearing of the MAD and supportive psychotherapeutic intervention will help to reduce the effect of UARS in time.

MDT’s role in the Conundrum

Penelope received treatment from a multidisciplinary team.

- Mandibular Advancement Device (MAD) designed to increase pharyngeal airway space.
- Monitoring SDB
- Pharmacological intervention
- Psychotherapeutic plan
- Diet plan
- Exercise plan

After treatment Penelope reports:

- Her quality of sleep has improved
- She doesn’t wake up feeling fatigued
- Her weight is reducing
- Her ability to concentrate has improved
- She is beginning to achieve better in her academic course
- She is finding social relationships easier
- Her anxiety is under control
- She has found part-time work.

Multi-disciplinary team included:

- Clinical technologist, Selisha Reddy
- Dentist, Dr Clyde Keevy
- Dietician, Kathryn Green
- Ear Nose and Throat Specialist, Dr Carl Van Wyk
- Neurologist, Dr Kevin Rosen
- Pharmacist, Jacque Fox
- Physiotherapist, Candice Venter
- Psychiatrist, Dr Anben Pillay
- Psychologist, Dr Gloria Marsay

Conclusion

Investigation for comorbid SDB should be considered for children and adolescents presenting with ADHD symptomatology. Simply using the results of Epworth Sleepiness Scale and Fatigue scale, and qualitatively examining a sleep diary, will provide the clues pointing to SDB as the primary cause, in which case the treatment protocol has a different focus from the protocol for ADHD. Multi-Disciplinary Teams provide an excellent forum for solving conundrums of comorbid conditions.



References available on request

The complexity of associations between different disorders cautions the clinician against an overly simplistic formulation of cause and effect. Thus, while adenotonsillectomy sometimes produces dramatic improvement in daytime behavior, there are many cases in which changes are more modest, leaving residual symptoms of the same kind, chronic symptoms that are not readily reversed, or a separate problem aggravated by SDB but not caused by it. Put in the simplest possible way, non-sleep-specialist practitioners ought to think routinely in etiological terms about even the most ordinary presentations of behavior and learning disorders, attending in particular to the possibility that sleep plays an etiologic role in daytime behavior complaints. (Sheldon, et al 2014)

