Patient Pathways

Bariatric Surgery May Help Sleep Disturbance

Sleep duration and sleep quality are bidirectionally linked to obesity.[1,2] People living with obesity may be at increased risk for sleep disturbances.[1,2] Reduced duration and quality of sleep are associated with weight gain and related adverse metabolic outcomes including type 2 diabetes.[3,4] Weight loss can improve sleep quality and reduce symptoms of sleep disorders such as obstructive sleep apnoea (OSA) and excessive daytime sleepiness (EDS).[5-7] Bariatric surgery may be an effective option for long-term weight loss (after an energy-controlled diet and physical exercise have been unsuccessful),[8,9] and may reduce EDS by improving sleep quality, even without resolution of OSA.[7,10]

What's the burden of sleep disturbances?

- Reduced sleep duration and quality are increasing in prevalence:
  - **+5% increase** in adults who reported sleeping 6 hours or less between 1985 and 2004[1]
- Inadequate sleep may be associated with risk for type 2 diabetes, hypertension, and cardiovascular disease[1]
- Repeated fragmentation of sleep may impair cognitive function, mood, energy levels, libido and increase cardiovascular risk[11]
- **OSA**, a common sleep disorder that affects up to **40% of adults**, increases risk for:[12,13]

Car accidents:
2.5x increased risk

Workplace injuries:
1.8x increased risk

Stroke:
2.1x increased risk

Coronary artery disease:
1.0x increased risk

Congestive heart failure:
1.2x increased risk

- Of the sleep disturbances, the economic impact of OSA in 2020 was **$101 million in hospital costs**:
  - An average of 180 patients with OSA are hospitalised each day, costing $1,457/day[12]

Sleep duration and sleep quality are linked to obesity

- **Reduced duration and quality of sleep are associated with weight gain**, and an increased incidence of obesity and related adverse metabolic outcomes including type 2 diabetes[3,4]
    - Adults who sleep less than 6 hours each night have **a 50% risk of developing obesity**[4]
- Obesity and sleep disturbances are bidirectionally related:
    - Reduced sleep duration and quality can lead to weight gain whilst weight gain and obesity can result in inadequate sleep[1,2]
    - **The risk of developing OSA increases 2x with every 10 kg increase in body weight** and increases 4x with a 6-unit increase in BMI or a 13-15 cm increase in waist or hip girth[14]
    - Up to 58% of moderate-severe OSA is caused by and accelerated by obesity[13]
- Severe obesity is associated with excessive daytime sleepiness (EDS) and disrupted sleep homeostasis, even in people without OSA[3,15,16]
    - **EDS is present in about 30% of people with a BMI >35**,[7] which may be a consequence of obesity or weight gain rather than a risk factor for developing obesity[3]
- A combination of behavioural pathways and biological mechanisms likely underlie the relationship between inadequate sleep and obesity[1,2]
    - Reduced sleep may decrease energy expenditure and physical activity, while increasing time available to eat and calorie intake to boost energy levels[1-3]
    - Reduced sleep may alter levels of hormones, leading to increased hunger and appetite and a preference for calorie-dense foods, and affect metabolic pathways that decrease glucose tolerance and increase insulin resistance[1,2,4,13,17]
- Inadequate sleep and obesity are both associated with chronic low-grade inflammation, which may trigger metabolic dysregulation that influences both conditions[3]

Weight loss may improve sleep quality and symptoms of OSA and EDS

- **When diet, exercise, medication and other lifestyle interventions aren't effective enough on their own, bariatric surgery may be an effective option for people seeking significant sustained weight loss**[8,9]
- The level of weight loss achieved with bariatric surgery may lead to reduced airway resistance and improved respiratory mechanics[18]
- In patients with obesity and OSA, bariatric surgery can lead to improved clinical symptoms and reduced severity of their OSA (measured by the apnoea-hypopnoea index [AHI]) and may also improve metabolic regulation. The extent of benefit depends on OSA severity and patient characteristics[5,6]
    - 1 year after bariatric surgery, people with OSA demonstrated reduced respiratory disturbances during sleep but OSA was not entirely resolved, suggesting that weight loss after bariatric surgery improves sleep quality by reducing respiratory disturbances[7*]
    - **Remission of OSA has been reported in 60%–70% of people with OSA after bariatric surgery**, with younger age, lower BMI, and lower nocturnal oxygen desaturation index at baseline and greater postoperative weight loss associated with a greater likelihood of OSA improvement[19,20†]
    - After bariatric surgery, a 1-unit reduction in BMI may be associated with a 2.3 reduction in AHI, with an average BMI decrease of 18 units translating into an AHI decrease of 38.2[21‡]
- Bariatric surgery can benefit sleep quality and EDS, with reduced EDS possibly related to improved sleep secondary to reduced OSA but also to reduced metabolic and inflammatory abnormalities[10]
    - EDS may be reduced after bariatric surgery even without satisfactory resolution of respiratory disturbances in patients with OSA, suggesting that reduced EDS after bariatric surgery may relate to improved sleep quality with fewer arousals and reduced nocturnal hypoxia[7]

Patient Consultation Guide

Where long-term, non-surgical weight loss interventions have been unsuccessful,[8,9] it can be challenging to repeatedly address weight management concerns with patients living with obesity.

Create opportunities for discussion

- Look out for opportunities to identify and discuss symptoms related to sleep disturbances while reviewing other concerns with your patients (e.g., low energy levels, daytime fatigue, reduced sleeping hours)
- Regular check-ups and examinations (e.g., blood pressure measurements, respiratory evaluations) may provide opportunities to discuss weight and its relationship with sleep disturbances

Evaluate the patient

- Taking a complete medical history and performing a physical examination allows you to assess for complications of obesity, including sleep disturbances, that may remain undiagnosed
- Bariatric surgery may be suitable for adults with BMI >35 and sleep disturbances[9,22]

Discuss options for management

- Refer your patients to our patient weight loss surgery website for information about how bariatric surgery may be beneficial for sleep disturbances, as well as the different bariatric procedures and how to access them

* Prospective observational study of 44 patients with obesity and OSA who underwent bariatric surgery between December 2014 and May 2018.[7]

† Cohort study of 44 patients with obesity and OSA who underwent bariatric surgery between June 2013 and August 2014.[19] National registry cohort study of 4015 patients with obesity and OSA who underwent bariatric surgery between January 2009 and June 2017.[20]

‡ Data from meta-analysis of patients with obesity and OSA who underwent bariatric surgery.[21]

AHI, apnoea-hypopnoea index. BMI, body mass index. EDS, excessive daytime sleepiness. OSA, obstructive sleep apnoea.

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