

SLEEP and URINARY ISSUES

Dr Christopher Worsnop

**Department of Respiratory and Sleep Medicine
Austin Hospital**

WHAT IS SLEEP ?

- **There are three behavioural states: wakefulness, nonREM sleep, REM sleep.**
- **REM = rapid eye movement.**
- **It is difficult to distinguish between sleep and wakefulness by observation of behaviour, so these states are defined electrophysiologically.**
- **Sleep studies use surface EEG, surface EMG on the face and EOG to assess sleep.**

SLEEP ARCHITECTURE

- **Non rapid eye movement sleep (NREM) – usually no dreaming and it is physiologically quiet.**
 - **stage 1 (1-7 minutes)**
 - **stage 2**
 - **slow wave sleep: stage 3 (10-30 minutes)**
- **Rapid eye movement sleep (REM) - dreaming and the autonomic system is active, 60 to 90 minutes after sleep onset, 20-30 minutes for each period.**
- **About four to five cycles of these stages in a night, each about 90 minutes.**

Curr Neuropharmacol 2008; 6: 367.

Normal values: Sleep 2004; 27:1256. Sleep Med Rev 2008; 12: 109.

WHY DO WE SLEEP ?

- **No-one really knows.**
- **Sleep is seen in animals down to the level of insects.**
- **It may have a role in consolidating memory.**
- **Not simply giving the body and mind a rest.**

INSOMNIA and NOCTURIA

- **Needing to get up during the night to go to the toilet is associated with insomnia.**
- **The adjusted odds ratio for insomnia in those reporting urinary problems = 3.51 (1.82-6.79). Sleep 2007; 30: 213**
- **Nocturia is also associated with falls during the night.**

Sleep Med 2009; 10: 540. Sleep Med 2005; 6: 23.

AGEING and NOCTURIA

- **An overactive bladder with urinary urgency, urinary frequency, nocturia and incontinence increases with age.** BJU Int 2001; 87: 760.
- **This can lead to poor quality sleep.** Am J Med Sci 1997; 314: 232.
- **Nocturia increases with age over 60 in both men and women, and is associated with incontinence, cystitis and diabetes.** BJU Int 2008; 102: 808.

Nocturnal Polyuria Syndrome

- **Seen in the elderly.**
- **Increased nocturnal urine output, increased thirst at night and low nocturnal ADH levels.**
- **24 hour urine volume is usually normal. J Int Med 1991; 229: 131.**

INSOMNIA

- **Dissatisfaction with sleep quality and/or duration**
- **Difficulty initiating sleep**
- **Difficulty maintaining sleep**
- **Circadian rhythm disturbance**
- **Associated with other problems**
 - **depression, anxiety**
 - **pain, dyspnoea, GOR, hyperthyroidism**
 - **drugs**
 - **environmental factors**
- **Unrealistic expectations**

Arch Int Med 2006; 166: 1775. Arch Int Med 2009; 169: 447

MJA 2013; 199 S36

HYPERAROUSAL in INSOMNIA

- **Physiologic, psychological, behavioural and cognitive factors.**
- **Trying to sleep, worrying about lack of sleep, and concerns about functioning the following day can be a part of this. MJA 2013;199(8):S36-40.**
- **Heightened sensory and information processing and memory formation, blurring the distinction between sleep and wakefulness, leading to sleep state misperception, and interfere with the subjective experience of uninterrupted sleep. Sleep Medicine Reviews 2010;14(1):19-31.**

Spielman's model of insomnia



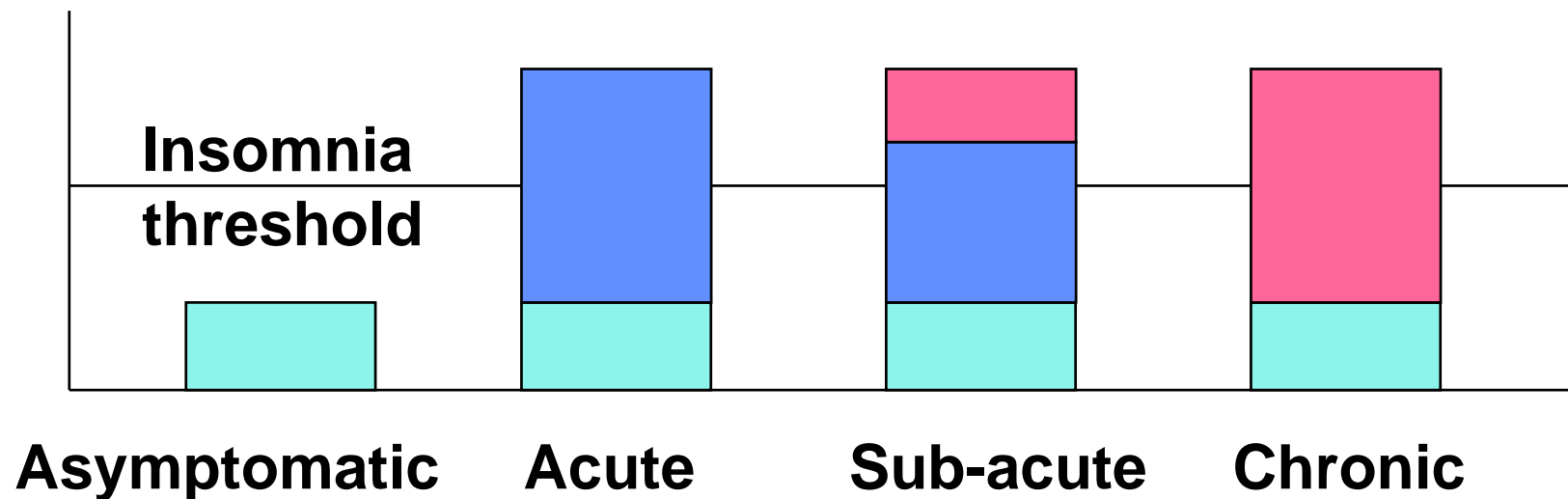
Predisposing factors eg tendency to worry, be anxious



Precipitating factors eg life stress, job loss, bereavement



Maladaptive coping eg too much bed time, naps, alcohol, drugs, preoccupation with sleep, anxiety about insomnia



- **People with insomnia have trouble passively abandoning wakefulness.**
- **One cannot reach out and grab sleep.**
- **Sleep will come to you and stay with you as long as you ignore it.**
- **Mental activity persists in NREM sleep so remembering this activity on waking may be misinterpreted as having been awake.**

Stimulus control (Bootsin)

- **Only go to bed when sleepy.**
 - **If not asleep within an estimated 15 -20 minutes, get up.**
 - **Do not use the bed for anything else but sleep.**
 - **Only return to bed when sleepy.**
 - **Repeat as often as necessary.**
 - **Get up at the same time every day.**
 - **No sleep outside of the bed times.**
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- **Time and effort are required, but the benefits are long-lasting.**

Sleep hygiene / habits before bed

- **Exercise – avoid it just before bed**
- **Caffeine, alcohol, nicotine – avoid them**
- **Naps - avoid them**
- **Large meals – not just before bed**
- **Deal with worrying issues before going to bed**
- **Bedtime routines at the same time each night**

Sleep hygiene / habits in bed

- **Have a comfortable, dark and quiet bed and bedroom**
- **Avoid looking at a clock**
- **Get out of bed if you are not going to sleep**
- **Do something relaxing away from the bed and go back to bed when sleepy**
- **Get up at the same time each morning**
- **Outside light on the eyes when first getting up**

ENURESIS

DIAGNOSTIC CRITERIA

➤ *PRIMARY*

- A.** Age > 5 years
- B.** Recurrent involuntary voiding in sleep \geq twice per week.
- C.** Present for \geq 3 months.
- D.** Never consistently dry during sleep.

➤ *SECONDARY*

- A – C** as above.
- D.** Previously been dry overnight for \geq 6 months.

ENURESIS

- **It is common in children, but also seen 1 -2 % of 18 year olds and 0.5 % of adults.** Mayo Clin Proc 1980; 55: 118. Scand J Urol Nephrol Suppl 1997; 31: 533.
- **Enuresis is related to difficulty arousing from sleep in response to an urge to void.**
- **It may result from fragmented sleep such as occurs with sleep apnoea.** Sleep Med Rev 2003; 7: 403.
- **It can occur in both NREM and REM sleep so it is not simply a disorder of arousal, that is, it is not like sleep walking or sleep talking.** Biol Psychiatry 1982; 17: 947. Arch Gen Psychiatry 1980; 37: 1139.

ENURESIS

- **Sleep architecture is normal. Sleep 2002; 25: 579.**
 - **It may be related to other conditions such as urinary tract infections, heart failure, use of diuretics, diabetes, constipation.**
 - **It may be due to a nocturnal epilepsy.**
Sleep Med 2009; 10:540. Sleep Med 2005; 6: 23.
- J Am Geriatr Society 1996; 44: 139. Urology 1985; 26: 316. Scand J Urol Nephrol Suppl 1999; 202: 20. NEJM 2008; 359: 22.**

OBSTRUCTIVE SLEEP APNOEA



PATHOPHYSIOLOGY OF OSA

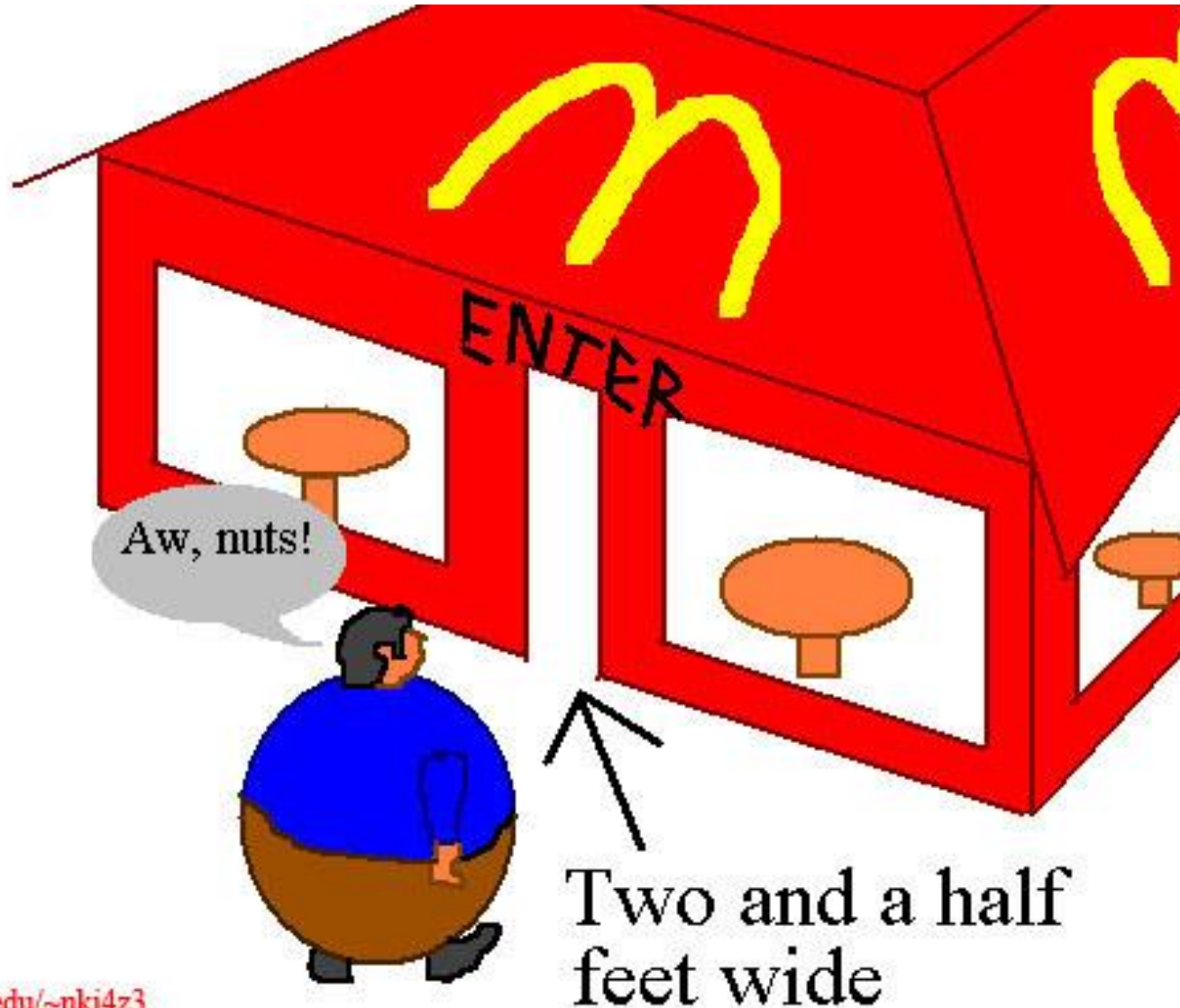
- **Due to an interaction between airway anatomy and compliance, and changes in the upper airway muscles during sleep.**
- **The pharynx is a floppy tube and so acts like a Starling resistor.**

Respirology 2012; 17: 213.

Proc ATS 2008; 5(2): 144.

Chest 2007; 132(1): 325.

Anatomy - obesity



Anatomy - genetics



Airway compliance - alcohol



OSA SYMPTOMS

- **The spouse complains of snoring, apneas, disturbed sleep, sleepiness in the partner.**
- **The patient complains of: sleepiness, choking, feeling unrefreshed, headaches, memory & intellectual impairment, poor concentration, personality changes, impotence, nocturia, accidents, collapse.**

SLEEP APNOEA and NOCTURIA

- **Nocturia > 3 times per night has a positive predictive value for OSA of 0.71. J Sleep Res 2004; 13: 173.**
- **51 % of nocturnal incontinence in the elderly associated with an abnormal breathing event in sleep. Sleep 2004; 27: 153.**
- **Women with OSA have more dilute urine overnight. Am J Obs Gyne 2008; 2006: 198: 598.**

SLEEP APNOEA and NOCTURIA

- Apnoea → ↑ negative intrathoracic pressure → RA and RV distension → ↑ atrial natriuretic peptide → ↓ ADH and ↓ aldosterone → diuresis. *Sleep* 2004; 27: 139.
- **CPAP reduces nocturia.** *ERJ* 1999; 114: 634. *Chest* 1998; 114: 634. *J Psychosom Res* 2004; 56: 511. *Sleep Med* 2001; 2: 225. *J Int Med* 1991; 229: 131. *Am J Obs Gyne* 2006; 2006: 194: 1399.

MANAGEMENT of OSA

- **Weight loss**
- **Continuous positive airway pressure**
- **Upper airway surgery**
- **Mandibular advancement splints**
- **Avoid alcohol**
- **Sleep on the side**





CPAP

- **Colin Sullivan 1981**
- **The air pressure holds open the upper airway.**
- **Very effective at eliminating OSA & snoring.**
- **Well tolerated by most, but not all.**
- **May cause a vasomotor rhinitis**
 - **treat with heated humidification.**
- **Costs > \$1,500 to over \$3,000.**
 - **private insurance.**
- **Automatic CPAP.**
- **Do not confuse CPAP with a ventilator.**



La Meridienne
Van Gogh