

Sleep, Pain, and Rehabilitation

**Canadian Pain Society
Calgary, AB
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UNIVERSITY OF
ALBERTA



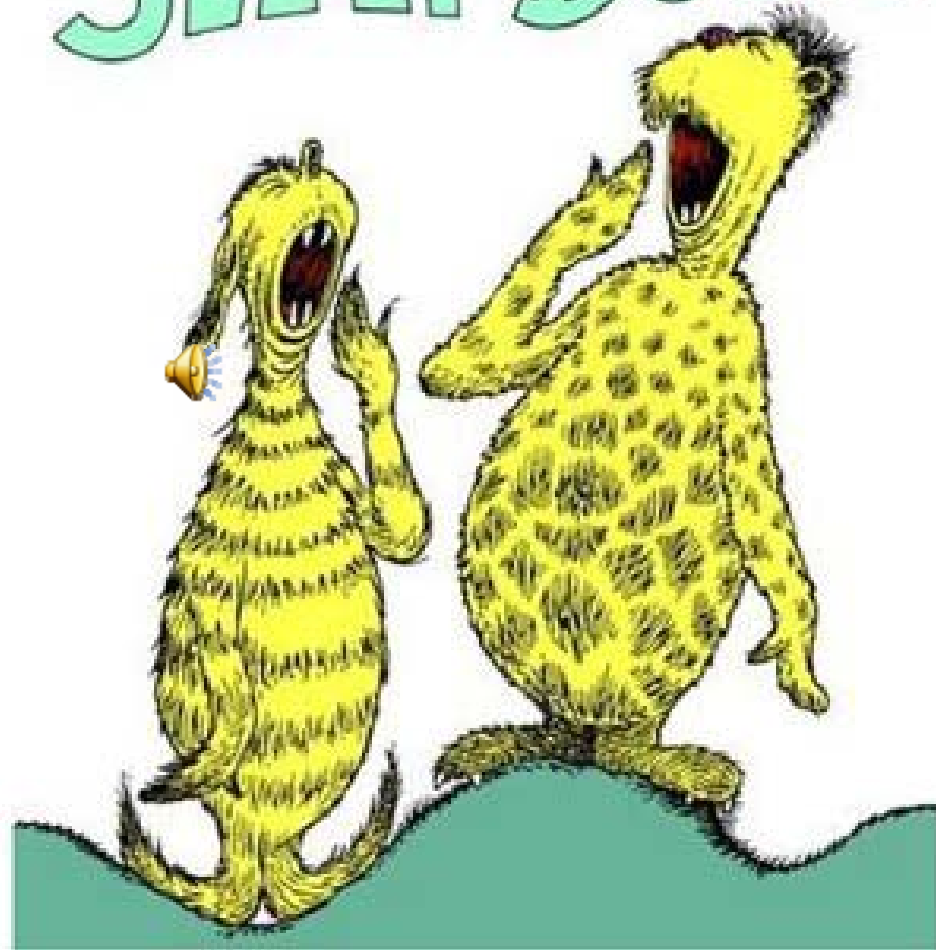


Session objectives



- ◆ Relationship between sleep and pain
- ◆ Bidirectional nature of the relationship
- ◆ Applying a systems model to guide rehabilitation assessment and intervention
- ◆ Case studies
- ◆ Resources

Dr. Seuss's SLEEP BOOK





Who cares?



- ◆ List as many activities as you can that are influenced by sleep.
- ◆ Now list as many as you can that are not influenced by sleep.

Outcomes of disordered sleep, influences on pain perception, outcomes of enduring pain condition

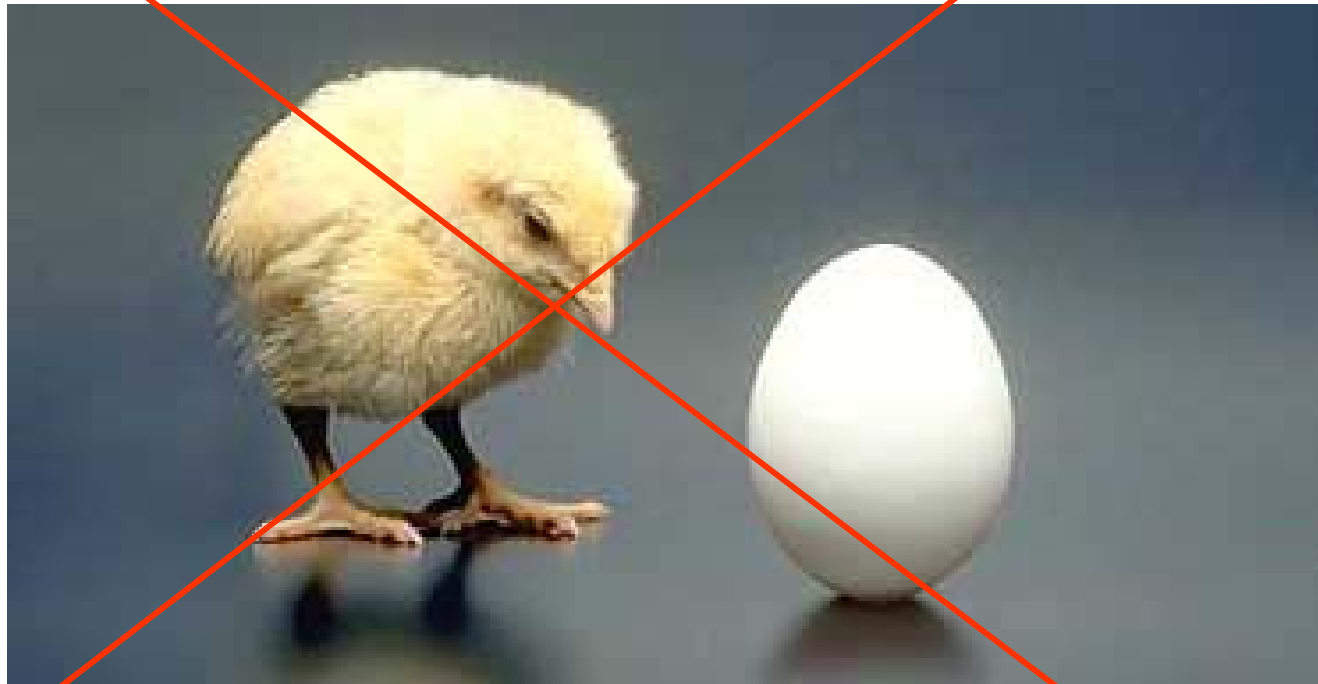
◆ Physiological:

- Healing
- Digestion
- Hormonal activity
- Central nervous system
- Sensation
- -
- - **Synaptic organisation and memory**

◆ Psychological:

- Perception of well-being
- Concentration
- Affect
- Sensory perception
- Paranoia
- -
- -

Not a linear relationship



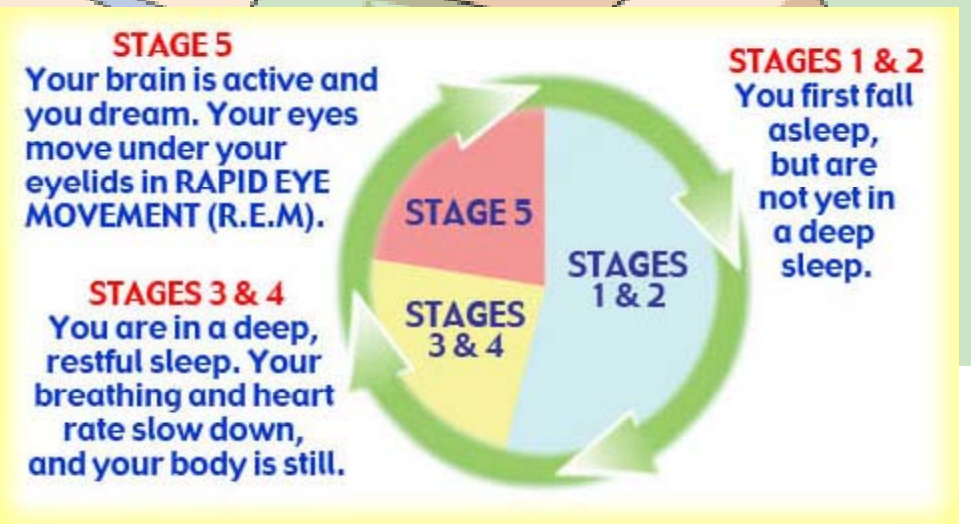
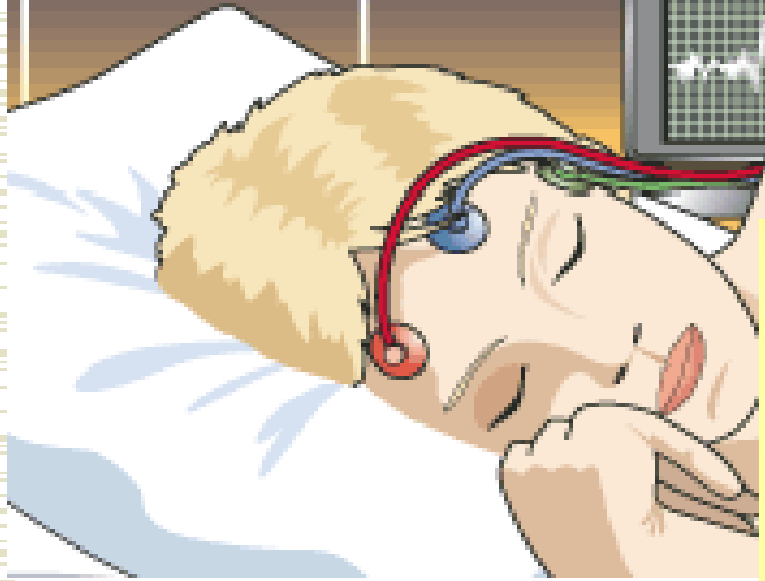
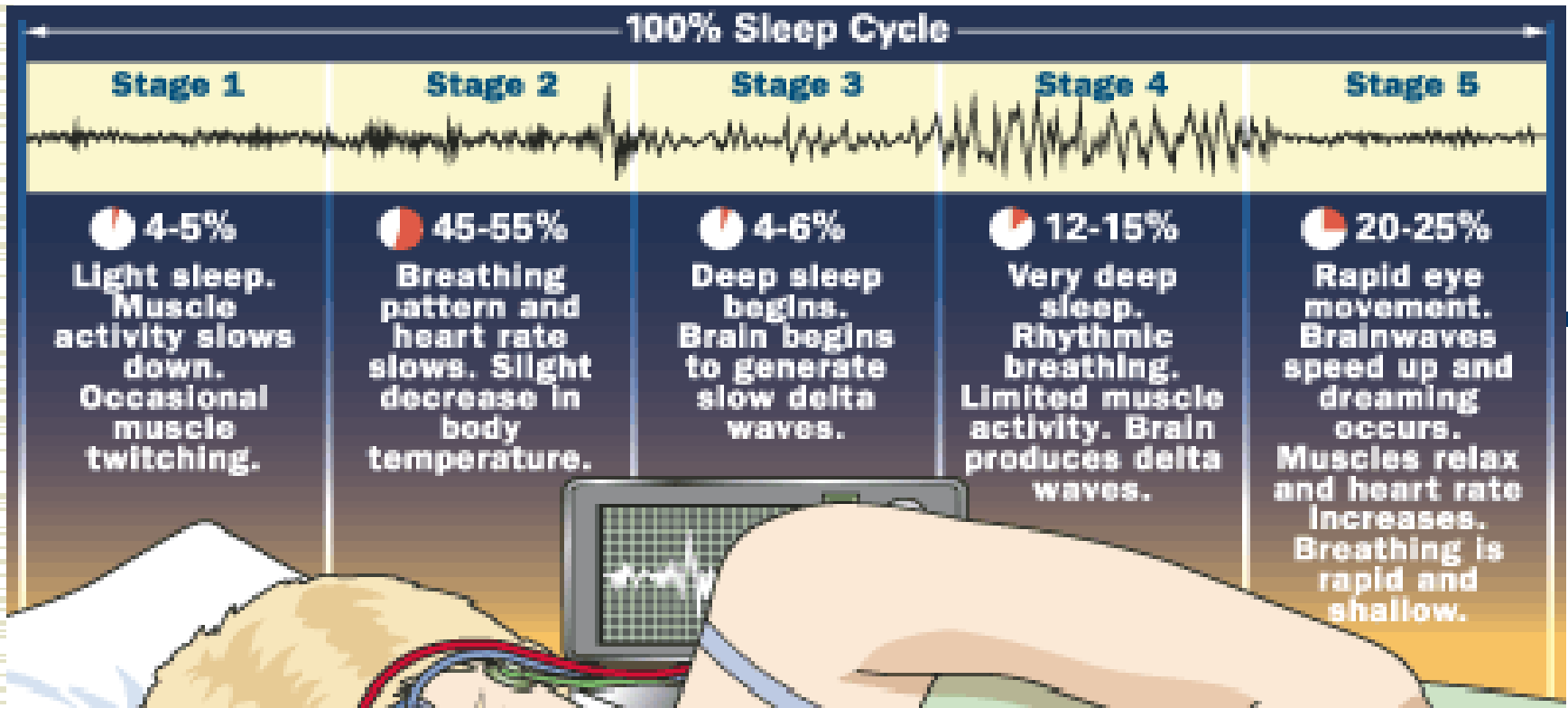
Sleep, pain, function, environment,...

- ◆ Complex adaptive system-
the whole is greater than
the sum of its parts
- ◆ Highly interactive
- ◆ Non-linear
- ◆ Inputs and outputs are
disproportionate



What are sleep disorders?

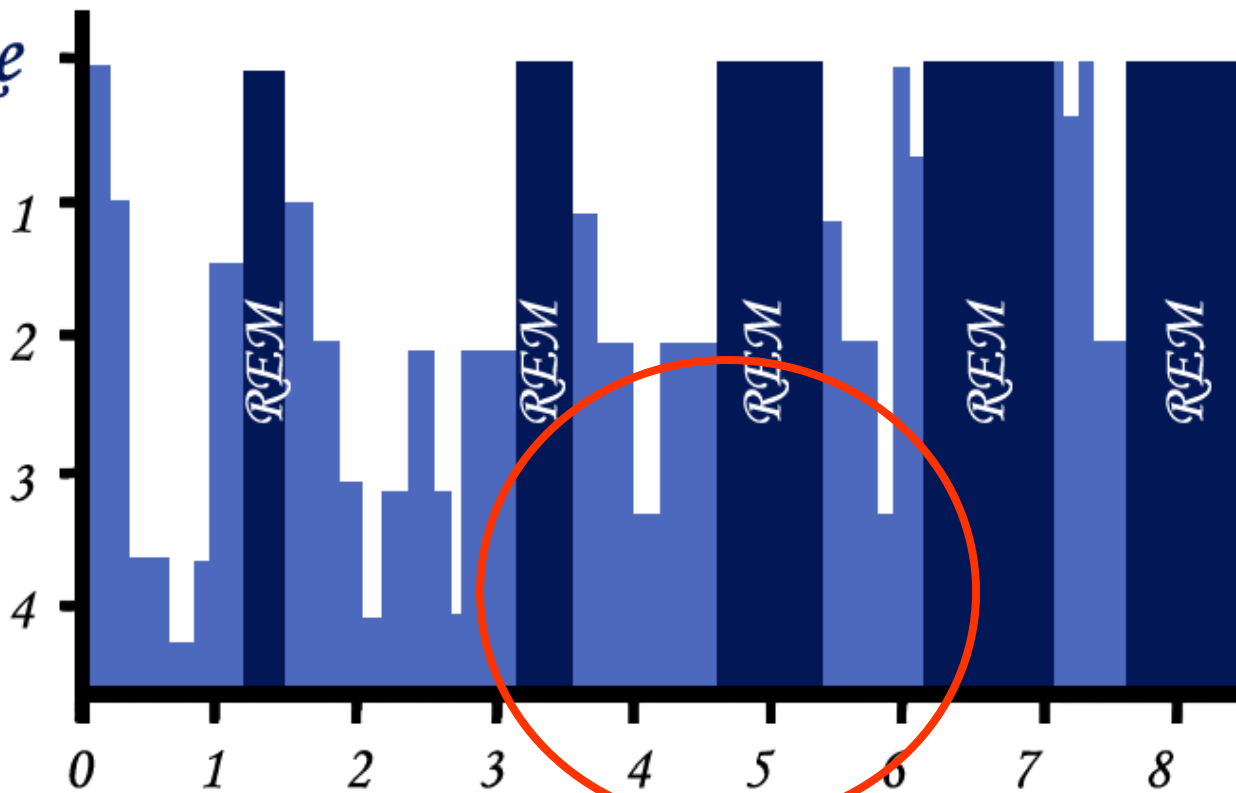
- ◆ Parasomnia
 - Abnormal behaviours or physiological events
- ◆ Hypersomnia
 - Excessive sleepiness
- ◆ Insomnia
 - Most common problem
 - Often 'unhappy' people
 - Insufficient, disturbed or non-restorative sleep
- ◆ Circadian disturbances
 - Alterations of the sleep-wake cycle



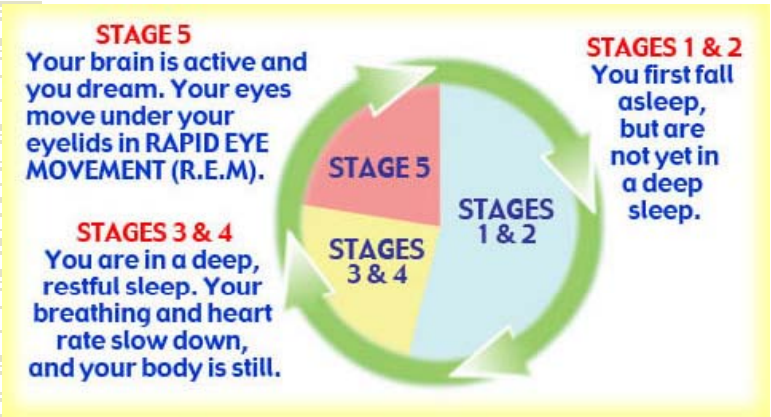
1 Cycle = aprox. 90 minutes

Awake

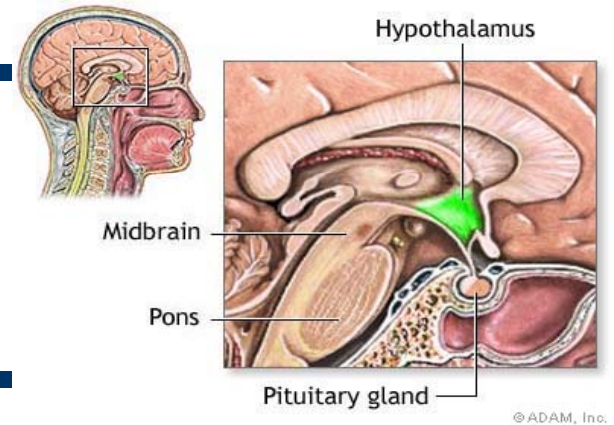
Stages of Sleep



Hour of sleep



Neurophysiology



- ◆ Homeostasis mediated by neurotransmitters: (eg. Adenosine and serotonin)
 - - increase during wakefulness
 - - bucket is full, tipping point for sleep
 - Depleted during sleep cycle
 - Can be blocked by other chemicals (eg cortisol)
- ◆ Circadian rhythms (sleep clock) – regulated in
 - **hypothalamus**
Requires light/dark receptors to regulate, the hormone
Melatonin



Reviews of the evidence-base for a bi-directional relationship

- ◆ Pain and insomnia
- ◆ Poor sleep and low pain threshold
- ◆ Duration of sleep and intensity of pain report
- ◆ Duration of sleep and frequency of pain report
- ◆ Pain, distress and insomnia

(Abernethy (2008) Pain 137:1-2)

Tang (2008) Reviews in Pain 2(1):2-7

- ◆ Poor sleep is a significant stressor
 - Increased anxiety, depression, maladaptive use of sleep as a coping strategy
- ◆ Self reports range from 20% in general patients with pain up towards 90% of those in PMP
- ◆ standardized assessment – 53%
- ◆ Problems include: long sleep latency, frequent & lengthy waking, shorter total time and reduced quality
- ◆ Perceived and measured consistent
- ◆ Insomniacs at higher risk of chronic pain condition
- ◆ Overlapping risk factors for sleep problems and for chronic pain (eg inactivity, substance misuse, depression)



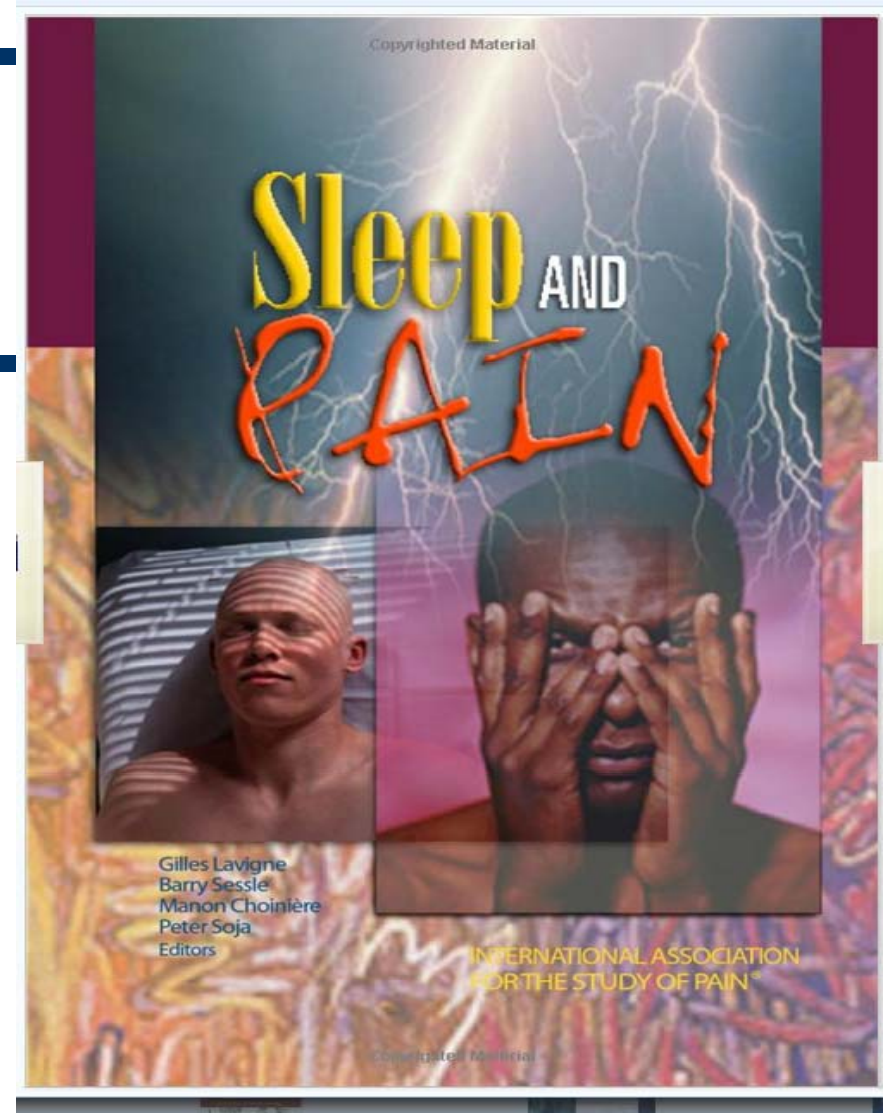
O'Brien et al (2010) Clin J Pain 26(4):310-319

- ◆ Relationship between poor sleep and pain is mediated by negative mood
- ◆ Interventions addressing sleep, OR mood have positive outcomes for chronic pain

Editors: Lavigne, Sessle,
Choinière, and Soja (2007)
(reprinted in softcover in
2009), 474 pages

ISBN 978-0931092-80-0

<http://www.iasp-pain.org//AM/Template.cfm?Section=Home>



Sleep problems should be expected, not the exception

Importance of assessment

- ◆ Leeds Sleep Assessment Questionnaire (LSEQ), Parrott & Hindmarch 1978)
- ◆ Pittsburg Mind-Body Centre
- ◆ Pittsburgh Sleep Quality Index (PSQI)
- ◆ Epworth Sleepiness Scale

Sleep background

- ◆ CBS 60 Minutes, the Science of Sleep Part I & II
 - (13 minutes/ 11 minutes)



The Model of Human Occupation and Sleep

- ◆ Human open system
- ◆ Events and components interact and alter the whole system
- ◆ The outcome is greater than the sum of the parts
- ◆ Output is not proportionate to input

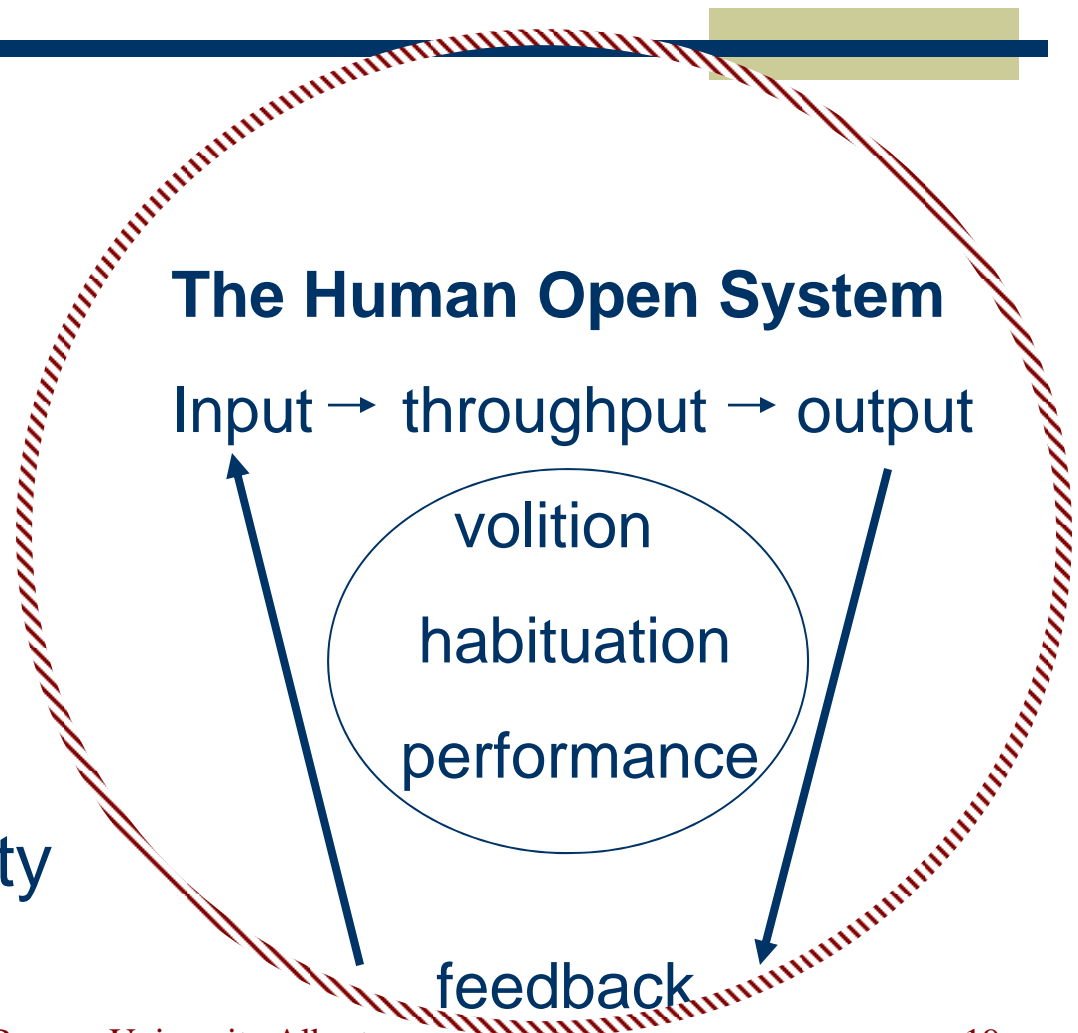


Arthus-Bertrand – the Earth from the Air

Change and adaptation

Features of change

- ◆ Repetition
- ◆ Environmental change
- ◆ Traumatic
- ◆ Continuous
- ◆ Feeds back on self
- ◆ Process of circularity



3 Subsystems

(insomniac mother of a teenager out past curfew)

- ◆ Volition (Will)
 - The way we make choices in life
 - ◆ Habituation (Drill)
 - That which organises our life
 - ◆ Performance (Skill)
 - How we carry out our occupations of life
- ‘my family is most important to me’
- ‘I always wait up for my daughter when she is out late’
- ‘I drink lots of cola to help me stay awake’.

Group activity

Groups of 4

- ◆ Using the case study provided on the table, think about what elements of the case study relate to each subsystem of the Model of Human Occupation and to the environmental context.
- ◆ Diagram the system as it relates to your case study on the flip chart paper
- ◆ The person whose birthday is closest to the month of February will be the group spokesperson

- **PATIENT SCENARIO: Diabetic Neuropathy** (courtesy of the CPS Education SIG)
- Jose is a 63 year old male diagnosed with painful diabetic neuropathy in his feet, obesity, CAD (coronary artery disease) and PVD (peripheral vascular disease).
- Chief Concern: Can't sleep at night and cannot stay alert in the daytime
- describes pain in both feet that is present day and night but worse at night, has steady, burning constant pain in his toes and the bottom of his feet NRS 8/10
- has electric shock pain about every 2 hours in feet and up his legs NRS 10/10
- feet are sensitive to light touch such as bedclothes, feet feel numb and feels like walking with soles on feet, has paresthesias
- Medications: Takes 6-8 acetaminophen with 30mg codeine/days with little relief, amitriptyline 25 mg hs, gabapentin 100 mg TID
- History of Illness: diagnosed with Type II diabetes mellitus 20 years ago and CAD a year ago, has been on oral diabetic agents for 10 years and diet is not always well controlled
- some kidney impairment and retinopathy related to his diabetes, is ~40 lbs overweight, has a history of hypertension, elevated cholesterol and occasional bouts of atrial fibrillation. had CABG bypass 5 years ago
- Has pain in both calf muscles when walks about 100 metres that is relieved when he stops and rests
- describes a sedentary lifestyle and frequent tobacco and alcohol use. Sleeping and walking are a problem because of pain and he is depressed
- due to work accident 20 years ago he developed chronic back pain that he manages with heating pad and acetaminophen.
- Physical Exam: BP 170/100 both arms, P 85 regular, T 37C, chest clear, no pulses in feet, thickened nails, feet cool, loss of sensation in feet up to midcalf to touch, pinprick, cold, both ankle reflexes absent, knee jerks 1 +, has extreme sensitivity in feet which he says is a problem in bed at night because of sheets, has problems with urinary frequency and nausea
- Social History: born in Portugal and came to Canada when 15 years old, speaks English fairly well. Has been married for 35 years to Maria; they have 2 children not at home. worked in trades/factory but due to his back pain and latterly problems with legs has not worked for the last year, has small disability pension
- Maria is 58 years and works at Zellers full time, is the main wage earner; wife is aware of his need to watch his weight but meals are the only thing he enjoys right now, is worried about him. Smokes one pack/day, reduced from 2 packs previously. 1-1.5litres of diet coke during the day 'to stay awake', and 2-3 glasses of wine in the evening to 'relax'.
- live in 2-story semi-detached house with no mortgage; bathroom is on the 2nd floor so he mostly spends days on main floor and uses a urinal
- 21 year old daughter is in her 3rd year at Trent University; son lives in North Bay, works in construction and does not see them often.
- Jose's 80 year old mother lives with them, is very dependent and refuses to consider an assisted living facility or retirement home. Increasing reports of night wandering and unsafe behaviors.

Interventions

- Sleep hygiene
- Phase advance
- Sleep restriction
- Cognitive behavioral approaches
- Environmental modification
- Caregiver education
- Light therapy
- Melatonin replacement therapy (caution)

MOHO- system's approach

=

multiple entry points for
intervention

Treatment/Intervention

- Remember sleep is a system- you can intervene at many levels (motivation, habits, performance components, environment)
- Sleep hygiene
- Phase shifts
- Sleep restriction
- Backward chaining
- [Cognitive behavioral treatments/approaches](#)
- Social marketing- acceptability

Resources

- Sleep & Pain Health Literacy Resources for Therapists Working with Children

- Mail postcard or email request to cary.brown@ualberta.ca

Sleep and pain health literacy resources for children, parents, and healthcare providers




Please email to me the resource pack of health literacy PDF brochures.

Name: _____

Email: _____

Organization: _____

Profession: _____



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Interventions

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