

Fig. 1: Structures of Stress Perception

### Structures of Stress Perception

- **Thalamus** rather for physical stressors
- **Limbic system** (a.o. hippocampus, amygdala, hypothalamus) together with the frontal lobe and the olfactory bulb rather for emotional stressors

### Stress Reactions

- Production of **cytokines** as e.g. tumor necrosis factor alpha (TNF- $\alpha$ ), Interleukin-1 (IL-1), Interleukin 6 (IL-6)
- for fighting off infections and for other immune responses
- dysregulated and pathological in inflammation, trauma, and sepsis
- adverse effects of cytokines: linked to many disorders as e.g. *schizophrenia*, *major depression* and *Alzheimer's disease* or cancer

### HPA axis

- **Hypothalamus** releasing
  - the neuropeptide arginine vasopressin (AVP)
  - the corticotropin releasing hormone (CRH)
- Anterior **pituitary** releasing adrenocorticotropic hormone (ACTH)
- **Adrenal** cortex releasing glucocorticoids, adrenaline and noradrenaline

### Autonomic nervous system (ANS)

Dominance of the sympathetic NS (fight or flight) over the parasympathetic NS (rest and digest)

## Burnout Seminar: Stress Neurophysiology and Tips

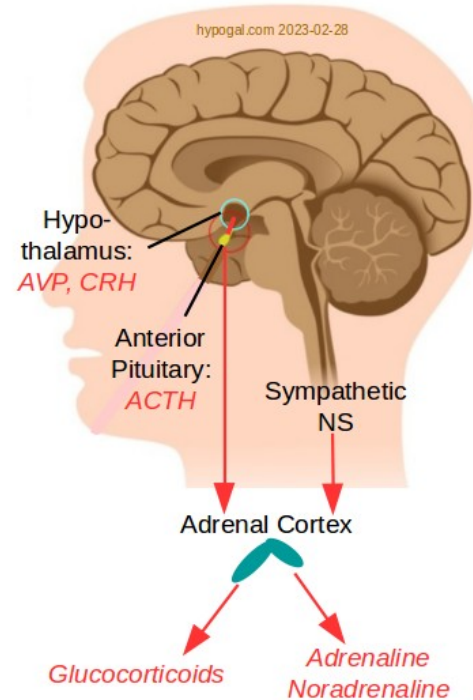


Fig. 2: Structures and Messengers of Stress Reactions

### Possible Consequences of Chronic Stress

- Burnout syndrome (with the following symptoms)
- Sleep disorders (look at the next pages)
- Reduced physical performance and fatigue
- Metabolic dysfunction
- Immunodeficiency
- Pain syndrome
- Lack of concentration and memory problems
- Other *mental problems*

### Chronic Stress Can Lead to Allostatic Load

**Homeostasis:** Maintain a balance in countless parameters; self-regulated by means of feedforward and feedback mechanisms.

**Allostasis:** Stability by means of change involving the adaptation to current and future challenges.  
**Consequences of allostasis:** damages such as wear and tear (**allostatic load**).

Allostasis can be needed to achieve homeostasis for more dominant parameters.

Factors provoking an allostatic load:

- Repeated hits: too frequent occurrence of stress reactions
- Lack of adaptation: no habituation to stressors
- Prolonged response: too long duration of stress reaction
- Inadequate response: too weak or too strong reaction to stressor

### Treatments and Tips

#### Behavioral Changes

- Avoidance of stressors
- Better structured work
- Regular (short) breaks: between two patients or tasks
- Step by step, focusing on one task at a time
- Looking for joyful experiences

#### Physical Exercises

- Activation with pleasure, partly implemented in daily activities
- Cozy relaxation techniques
  - conscious breaths at the window
  - pursed lips breathing in the coachman's seat
  - times for not thinking and not planning, but for being and feeling

#### Orthomolecular, Phyto- and Aromatherapy

- Vitamins: e.g. B12, C, E
- Minerals (magnesium) and trace elements
- Phytotherapy for sleep or stress disorders: e.g. ginseng, taiga root, rose root
- Calming scents: e.g. vanilla, cinnamon, jasmine

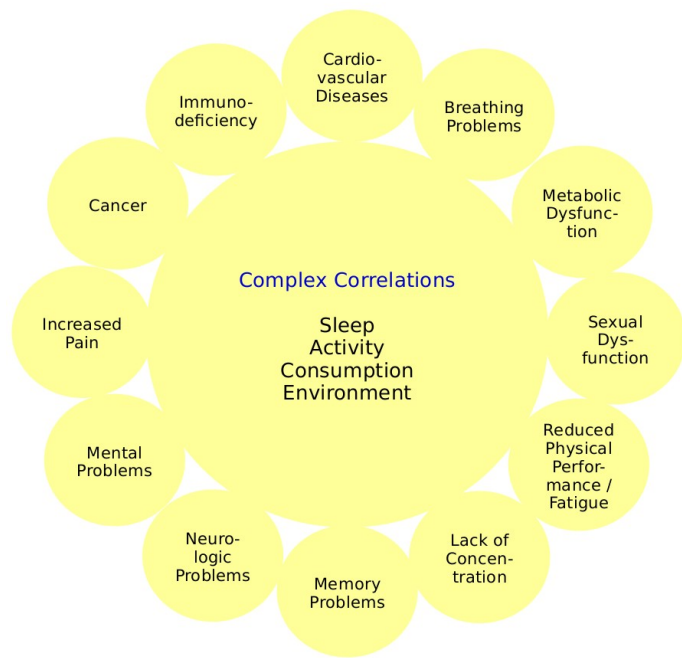


Fig. 1: Vicious Circles of many Parameters and Disorders

**Sleep is important for regeneration and homeostasis.** However, health depends on different parameters. There exist vicious circles influencing each other (Fig. 1). **One of them includes sleep and mental health.** Sleep disorders can be prodromal or aggravate mental disorders and vice versa.

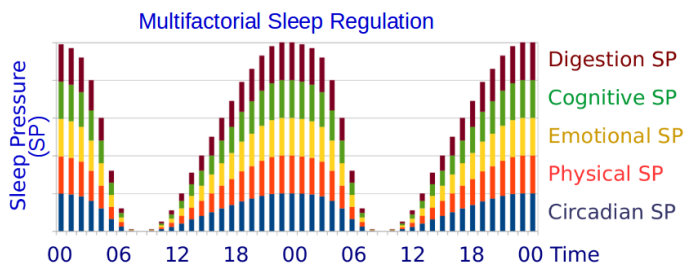


Fig. 2: Circadian Rhythm of Sleep Pressure

**Sleep is impacted by many parameters** (circadian, physical, emotional, cognitive, digestion). Sleep occurs when sleep pressure (SP, Fig. 2) is high enough. Some parameters are behavior controlled.

References: Palagini L, Hertenstein E, Riemann D, Nissen C. Sleep, insomnia and mental health. Review. Journal of Sleep Research. 2022; 31(4):e13628. doi: 10.1111/jsr.13628. – Scott AJ, Webb TL, Martyn-St James M, Rowse G, Weich S. Improving sleep quality leads to better mental health: A meta-analysis of randomised controlled trials. Sleep Medicine Reviews. 2021; 60: 101556. 10.1016/j.smrv.2021.101556. – Staub C, Droth B, Vanderlinden J. Daytime Behavior & Sleep. Healthy lifestyle book. Ausgeschlafen.ch. 2021. – cristina-staub@sunrise.ch

## Burnout Seminar: Sleep

### Disorders I: Neurophysiological

- Insomnia
- Sleep-related central breathing disorders
- Central nervous disorders with daytime sleepiness
- Circadian sleep-wake rhythm disorders
- Parasomnias
- Sleep-related movement disorders
- Restless-limbs syndrome
- Bruxism
- Sleep-related medical or neurological disorders

**Physiotherapists can support patients to improve sleep quality and quantity.**

### Treatments I The healthy lifestyle is fundamental.

Neurophysiological disorders are treated partly by cognitive behavior therapy for sleep disorders (CBT-S) including essential information e.g. on sleep hygiene (regular sleep-wake rhythm, individual sleep duration, quietness, darkness, bed for sleep, sleep rituals, no clock).

Physiotherapists additionally can promote physical and cognitive activities, and relaxation skills (manually stimulated).

### Sleep Pathologies

#### Disorders II: Physical

- Obstructive and restrictive breathing disorders; e.g. obstructive sleep apnea (OSA)

#### Other Symptom Complexes

- Sleep and pain
- Sleep and tinnitus
- Hypothyroidism, hyperthyroidism

**More than a third of the population suffers from sleep disorders.** Many causes are **neurophysiological** (and included in it psychic), some sleep-related breathing disorders have a **physical reason** (breathing obstructions or restrictions). **Other symptom complexes** are often not mentioned as sleep disorders; however, they are mostly related to sleep problems.

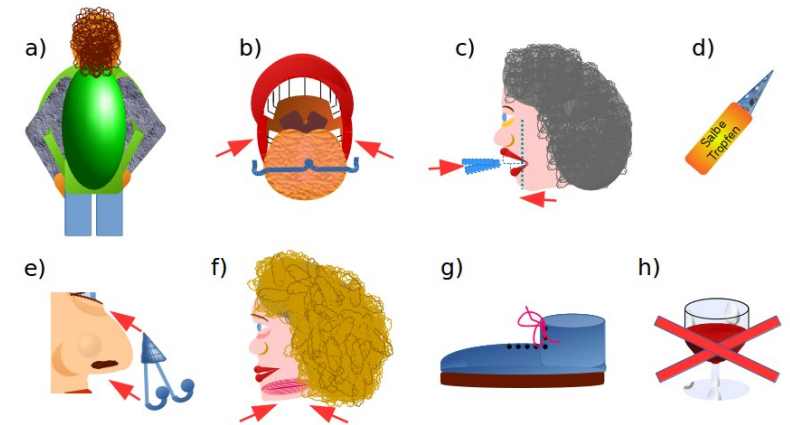
Diagnostic procedure: look at the next page.

### Treatments II

Physical disorders can be treated easiest by positioning, but also by some alternatives (Fig. 3).

Physiotherapists work with evidence-based practice.

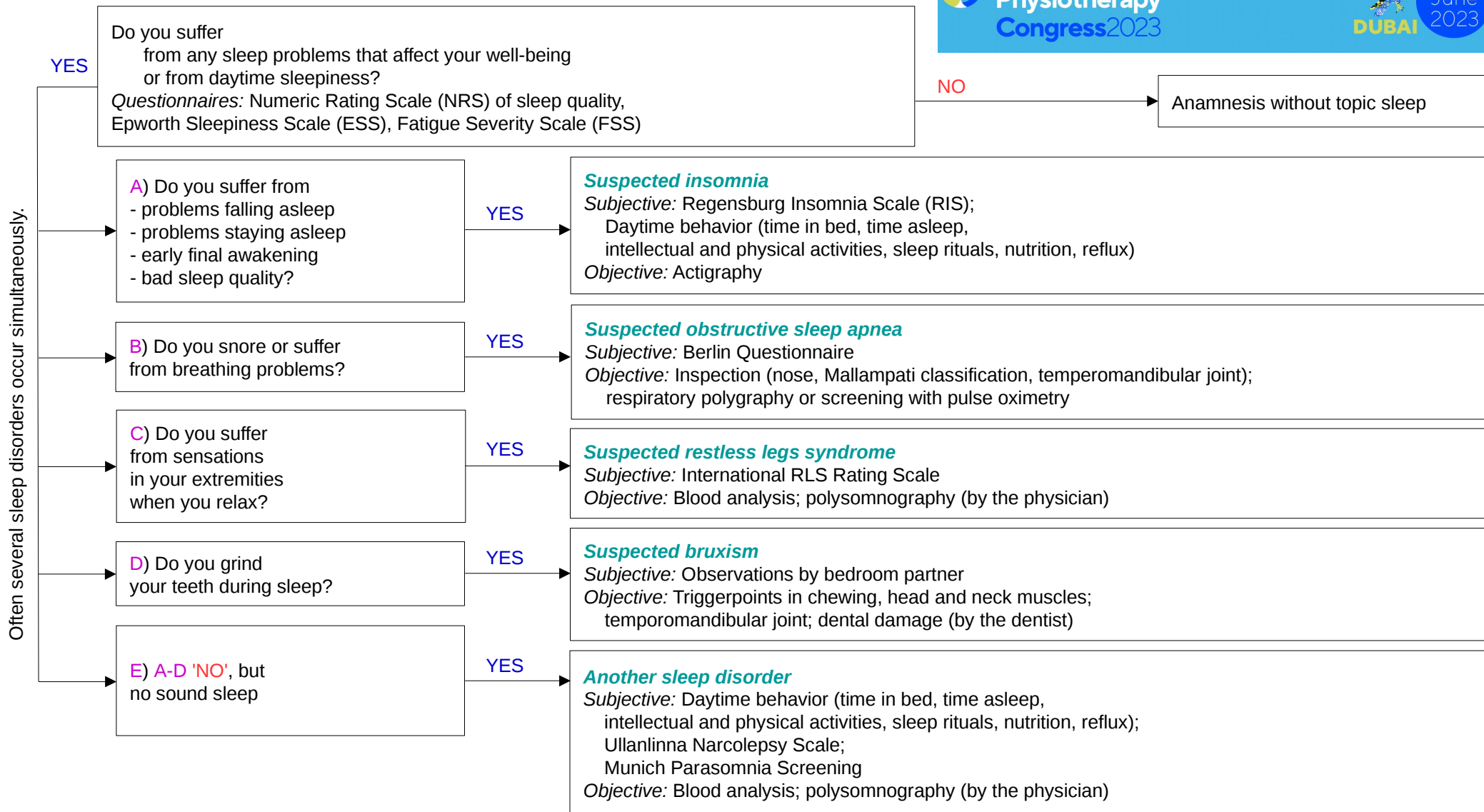
**However, all symptoms must be treated in a holistic manner that is individually adapted to the situation and the patient.**



- a) Positional treatments (e.g. backpack) – b) Palatal device
- c) Mandibular advancement device – d) Care of the nasal mucosa
- e) Nasal dilator – f) Training (oropharyngeal muscles)
- g) Weight reduction (endurance training, change in diet)
- h) Consumption behavior (alcohol, smoking)

Fig. 3: Treatments of Physical Sleep Disorders

# Staub Sleep Screening Questionnaire 2020



*Evidence Based Medicine (EBM), neurophysiological explanations and assessments are crucial for the treatment success. EBM does not mean to have as many reviews as possible on a treatment option. And newer publications with the same results as older ones hardly lead to better therapeutic results, especially if the basics of pathology are not considered. In order to be able to adapt the treatment optimally to the individual in the actual situation, we must understand the neurophysiological explanations why a treatment can work but does not always work for every patient. E.g. negative associations with physical activity can reduce the positive effect of the exercises. In such cases, a different approach to the body can be helpful at the beginning. For EBM it is important that we measure the treatment success. Specific questionnaires and/or objective tests are always necessary to assess the severity of a disease. Procedures (practical work, studies) that do not take this into account are not worth much.* – cristina-staub@sunrise.ch

References: Sacket DL, Rosenberg WMC, Muir Gray JA, Haynes RB, Richardson WS. Evidence based medicine: what it is and what it isn't. It's about integrating individual clinical expertise and the best external evidence. British Medical Journal. 1996; 312: 71-72. – Staub C, Droth B, Vanderlinden J. Daytime Behavior & Sleep. Healthy lifestyle book. Ausgeschlafen.ch. 2021.