



Disorders of Pain, Temperature, Sleep and Sensation

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Disorders of Pain, Temperature, Sleep and Sensation

- Cranial Nerves: I, II, VII, VIII, and IX
 - Need to know as prerequisite learning
 - See p. 385-386
 - Our sensory receptors are connected via afferent (away) pathways to specific areas located in our cerebral cortex. Moreover, the disorders affiliated with peripheral nerve interference and disorders of the CNS are responsible for pathological changes in clients.



Poena

- Is a complex concept affected by peripheral nerve function and the patient's age, culture, gender, and previous experience.
- Peripheral nerves direct sensory information and convey pain messages to CNS via afferent fibers with speed of transmission dependent on myelination & size of nerve fibers
 - Interpretation is diminished in infants d/t absence of myelin sheet
 - Elderly: diminished perception of pain



Pain Theories

- **Specificity** (Von Frey, 1894)
 - Each sensation is transmitted by one nerve ending. Pain is stimulation of a specific nociceptor and received by specific cortical areas in the brain.
- **Pattern** (Goldschneider, 1896)
 - This theory says there are pain spots in the tissues, composed of nerve endings and their nerve fibers. Pain means stimulation of each of these pain spots. Pressure can be perceived as pain
 - e.g. Labor and delivery



Acute Pain

- “Acute” or “Physiologic” pain alerts the organism to immediate retreat (0.1 second) from injurious or harmful stimuli
 - Receptor: A-delta myelinated fibers
- Receptors are distributed all over the body surface
 - sympathetic responses accompany acute pain
 - Sharp, pricking, electric feeling
 - Not felt in the deep tissues of the body



Acute Pain

- Symptoms
 - Tachycardia, hypertension, pupil dilation, diaphoresis, hyperglycemia, < blood flow to viscera and skin, fear and anxiety

Chronic Pain

- “Chronic” or “Clinical” pain is a slower conducting pain by the primitive non-myelinated “C” fibers
 - C axon is attached to a nociceptor
 - non-injurious stimulus
 - can be a response to no apparent stimuli
 - ache, burning, dull, throbbing, or undiagnosable
 - allodynia: low-intensity stimuli causing pain
 - Difficult to treat; pain for > 6 month period

Chronic Pain

- Symptoms:
 - No CNS changes over time
 - Change in personality
- Common presentations
 - Low back, neuralgias, myofascial, hemiagnosia
- Phantom pain
- Cancer associated pain: terminal cases

Faces Pain Rating Scale

0 1 2 3 4 5

0-10 Numeric Pain Intensity Scale

0 1 2 3 4 5 6 7 8 9 10

No Pain Moderate Pain Worst Pain

McCaffery M., Pasero C.: Pain: Clinical manual, p.67, 1999, Mosby, Inc.



Pain

- **Threshold: the point that pain is perceived**
 - Does not vary over time
 - May be affected by “perceptual dominance”
 - Pain signal takes priority over less active signals
- **Tolerance: the time before a person initiates a pain response**
 - Very affected by culture, mind/body, and role in society

Medications

Type	Example	Action
Analgesia (mild)	Aspirin NSAIDs	Blocks prostaglandin synthesis
Analgesia (narcotic)	Morphine	Opiate receptors in the CNS
Local Anesthetic	Lidocaine	Blocks axonal sodium channels
Tranquilizers	Benzodiazepines	Alters CNS transmitter function
Antidepressants	Tricyclics	Alters CNS transmitter function
Anticonvulsants	Barbituates	Alters CNS transmitter function



Age Differences

- **Children**
 - All pathways and neurotransmitters are functional at pre- and term births
 - Ability to signal pain is dependent upon child's developmental level, cognition, language, and temperament
 - Infants: demonstrate squared mouth, furrowed brow
 - Toddlers: tense body posture
 - School-Age: more of a response
- **Elders**
 - Perception is affected by the presenting disease
 - E.g. peripheral neuropathies (DM), CNS disorders (CVA)



Temperature

- Infants and elders require special attention
 - Fever: in response there are certain substances released
 - Vasopressin, melanocyte hormone, corticotropins
 - Benefits of fever:
 - Kills pathogens, < glucose demand
 - Pathology:
 - Pediatric seizures, heat cramps & exhaustion, heat stroke, malignant hyperthermia (following anesthesia)
- Hypothermia: accidental (infants and elderly)
 - Therapeutic: near-drowning incidents, cardiac surgery



Sleep

- EEG shows at least four stages
 - Non-REM: < release of neurotransmitters from RAS, < BMR, pupil constriction, release of GH
 - REM: relaxation of upper pharynx
 - Snoring, airway obstruction
- Children: newborns (16 h/day)
 - Adult sleep pattern around preschool age
- Elders: require less sleep, awake during the night and rise early
- Pathology: sleep apnea, night terrors, SIDS



Vision

- Toddlers and Preschool
 - 20/20 vision
- By age 40
 - Presbyopia
- Common pathologies
 - Conjunctivitis, glaucoma, strabismus, retinal detachment, age related macular degeneration, papilledema, hypertension r/t tobacco use



Auditory

- One third of elders experience loss effects
 - Presbycusis is common for > tones
 - Speech and consonants (s, sh, f)
 - Hearing can be tested in newborns
 - Long term aminoglycoside antibiotics
 - Follow for hearing loss
- Common pathologies
 - Otitis media, Sensorineural (noise exposure)
 - Meniere's disease (Van Gogh)
 - Brain tumors



Olfactory and Taste Sensation

- Pediatric clients
 - Taste sweet then bitter
- Elder clients
 - Decreased sensitivity to odors with age (anosmia)
 - Beware: spoiled food may be consumed
 - Taste for sweets < age
- Common Pathologies
 - Olfactory hallucinations, seizures, schizophrenia, hypoagnesia, parageusia (taste perversion can lead to malnutrition)



References

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- Hansen, M. (1998). *Pathophysiology: Foundations of disease and clinical intervention*. Philadelphia: Saunders.
- Huether, S. E., & McCance, K. L. (2002). *Pathophysiology*. St. Louis: Mosby.
