



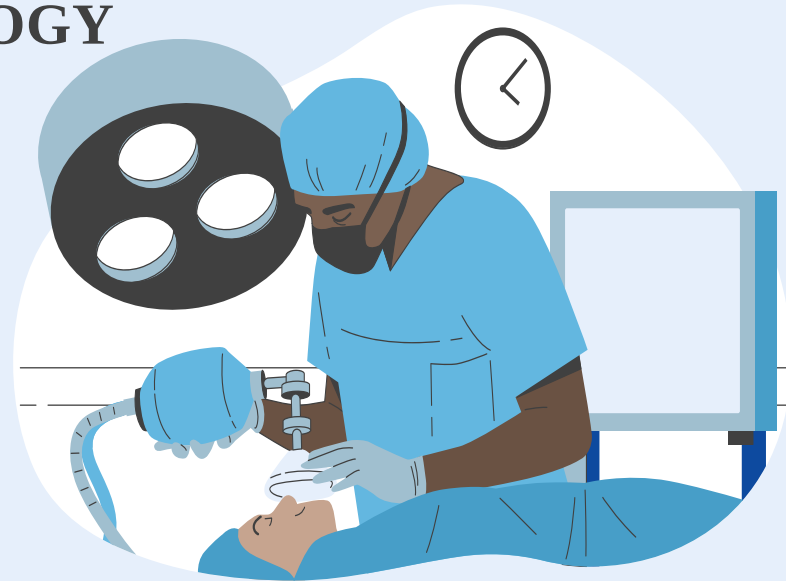
PAIN UNDER MICROSCOPE

DEPARTMENT OF ANESTHESIOLOGY

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OBJECTIVES

01

**Understanding and
identifying the body's
physiological response
to pain**

02

**Apply knowledge to
assess and treat pain**

03

**Strategies &
Medication update**

04

**Advanced
interventional
techniques**





Pain: The Statistics

- ❑ 2nd leading cause of medically related lost working days.
- ❑ 42% adults experience daily pain.
[Ref: National institute of health 2024-25]
- ❑ 50% of population see a doctor with “Pain” as the chief complaint.
[Ref: PLOS global public health 2020]
- ❑ Chronic pain is estimated at approximately US\$147.38 million representing about 0.13% of Bangladesh’s GDP.
[Ref: Journal-BSSP]

What is Pain?

In 2019 International Association for the study of Pain(IASP) defined pain as:

- An unpleasant sensory and emotional experience associated with actual or potential tissue damage or described in terms of such damage.
- According to International Association for the study of pain even if the patient is experiencing pain in the absence of tissue damage, it should be accepted as pain. Eg: Phantom limb





Is Pain All “Bad”?

- Pain is evolutionary necessary for survival
- Acute pain is protective. such as Labour pain
- In some diseases like Leprosy which can be painless, is dangerous as patients may injure themselves without even noticing.

Classification Of Pain

For clarity and simplicity, pain can be classified based on:

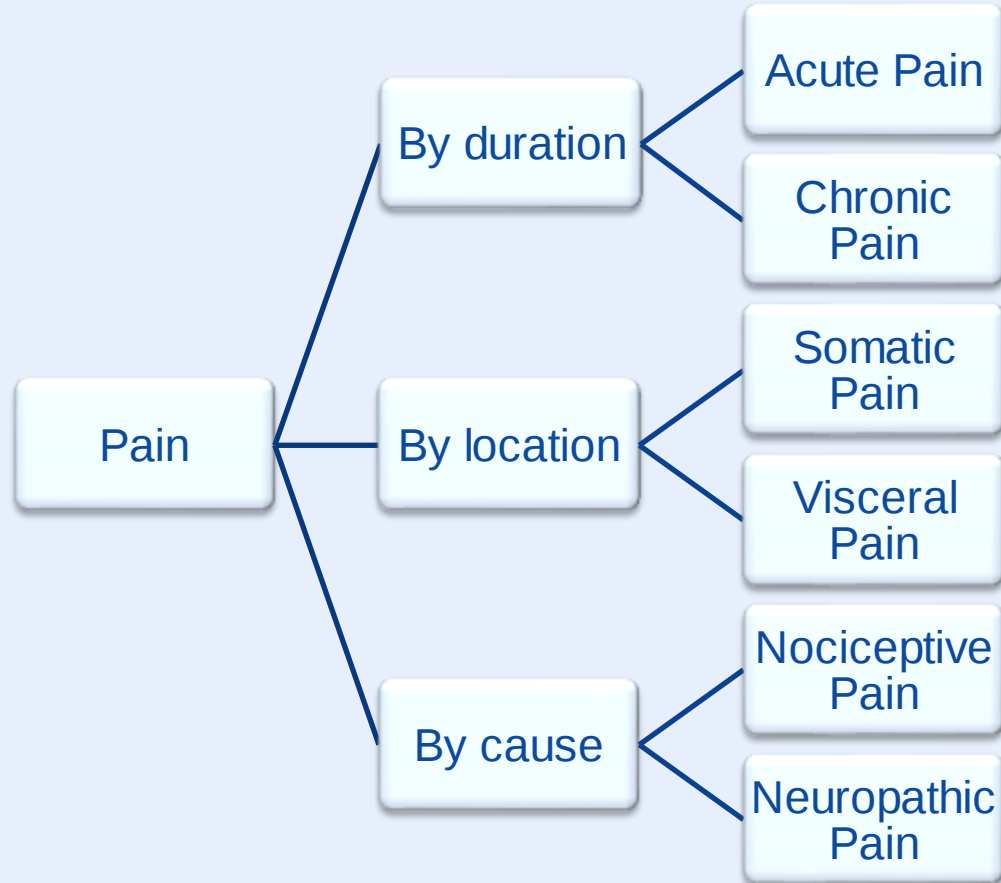
1. Duration

2. Cause

3. Location



Classification of Pain





Acute Pain (<3months)

Pain associated with acute injury (including surgery) or disease.

Chronic Pain (>3months)

Pain that occurs in disease process in which healing doesn't take place or persists beyond the expected time of healing.



Physiology of Pain

Transmission

A painful stimuli first activates peripheral nociceptors.

Transduction

The signal is then carried by afferent nerve fibers toward the dorsal horn of the spinal cord.

Modulation

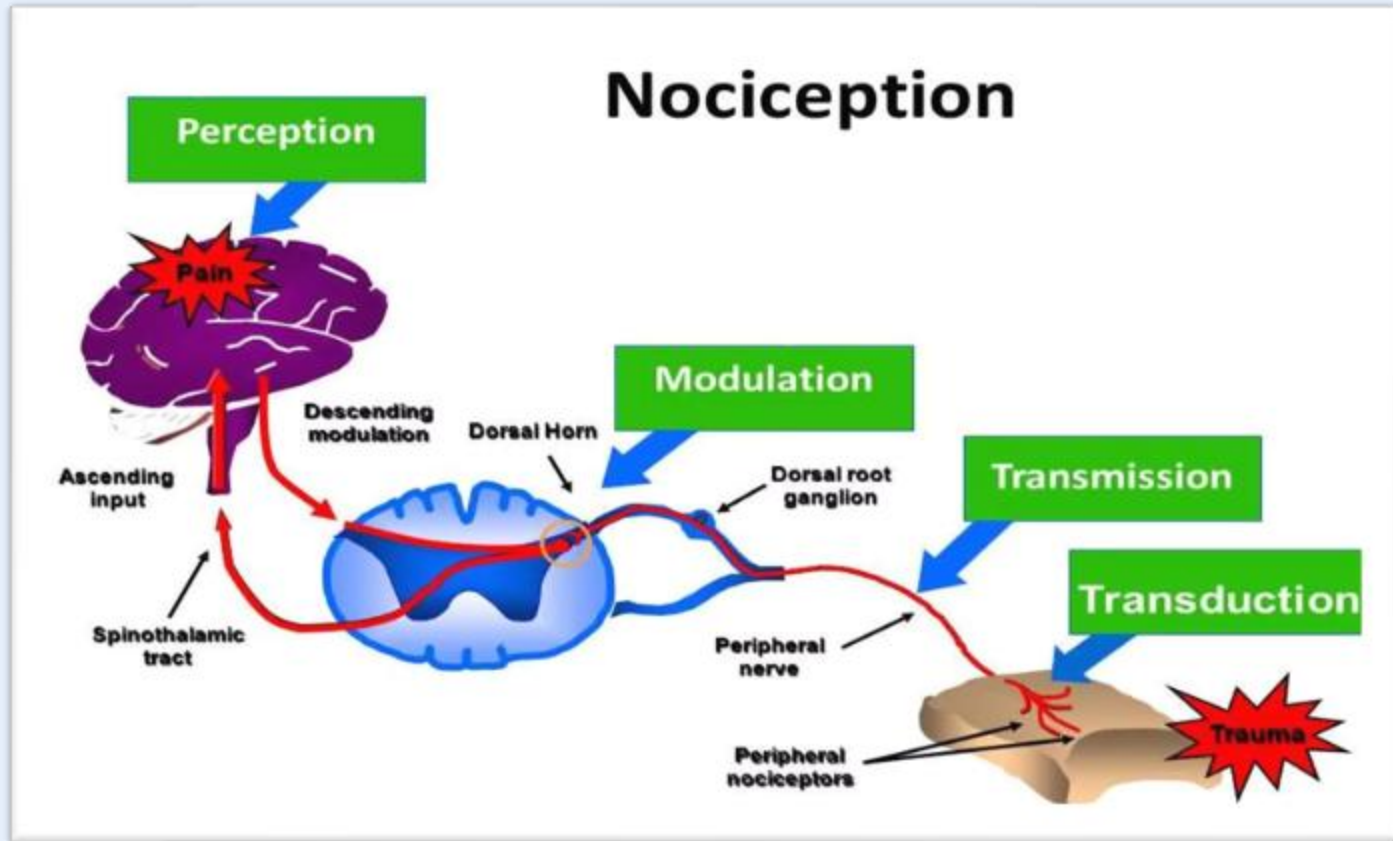
At the dorsal horn, the signal can be modified or inhibited.

Perception

The brain processes the information and we consciously experience pain.



Pain Pathway





GATE CONTROL THEORY

➤ Ronald Melzack and Patric Wall in 1965 suggested that nociceptive afferent fibers were subjected to modulating influence of gate at the 1st synaptic control in the spinal cord.

➤ Large fiber (A-Beta) tends to close the gate while small fibers opens it.



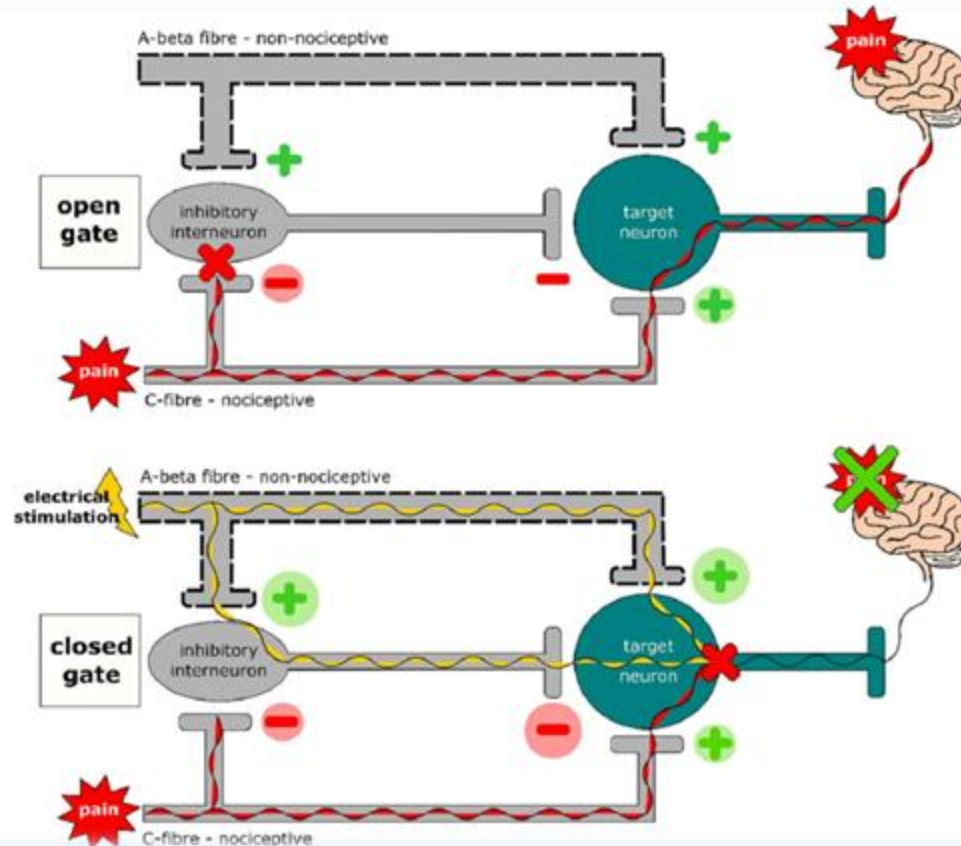


GATE CONTROL THEORY (cont.)

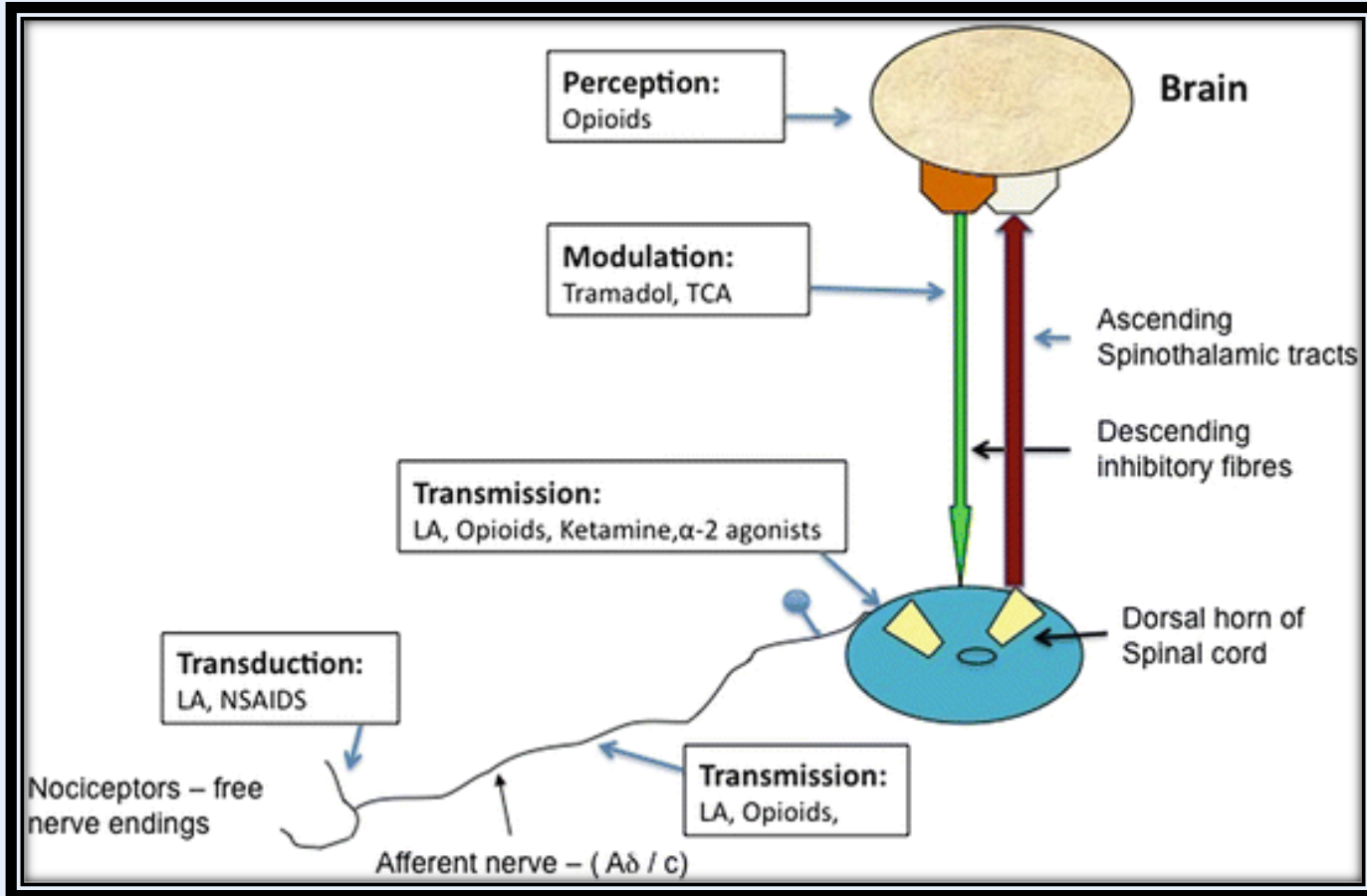
- Large fibers are under cognitive control if they are active, they activate substantia gelatinosa (SG) in the spinal cord.
- If the Substantia Gelatinosa activate, the activity of T cell is diminished, if T cell doesn't reach their threshold, no pain is experienced



GATE CONTROL THEORY



Pain Control: Pharmacologically





Adverse Physiological Effects of Pain

A. Pulmonary System

- Atelectasis
- Arterial hypoxemia
- Pneumonia

B. Cardiovascular System

- Systemic hypertension
 - Tachycardia
 - Myocardial ischemia
- 



Adverse Physiological Effects of Pain

C. Endocrine System

- Hyperglycemia
- Sodium and water retention
- Protein catabolism

D. Immune System

- Decreased immune function





Adverse Physiological Effects of Pain

E. Gastrointestinal System

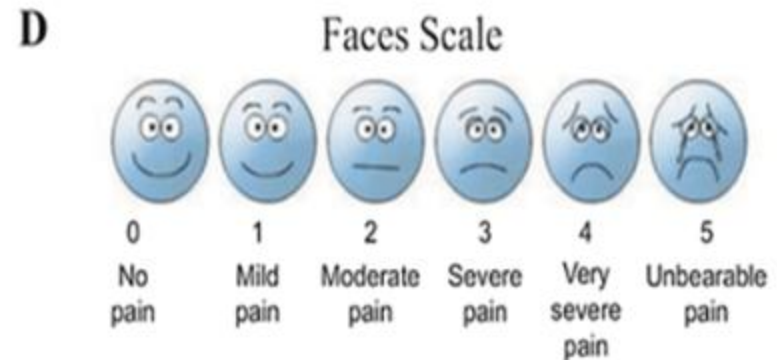
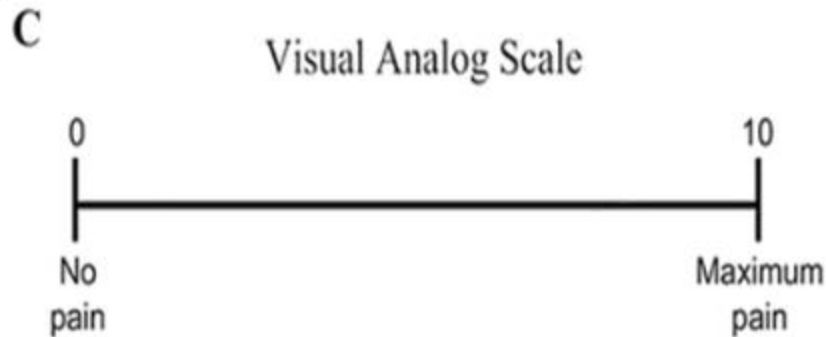
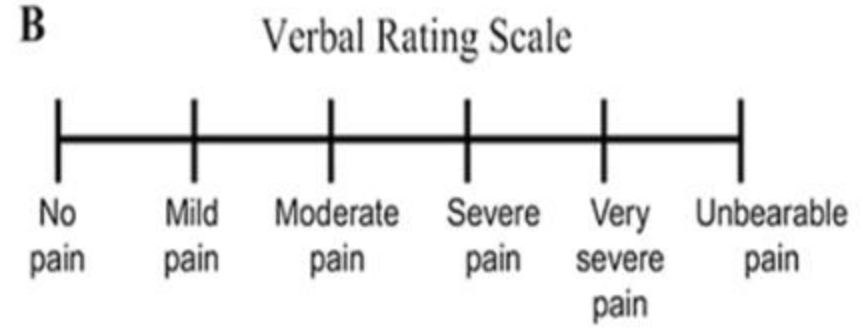
➤ Ileus

F. Genitourinary System

➤ Urinary retention

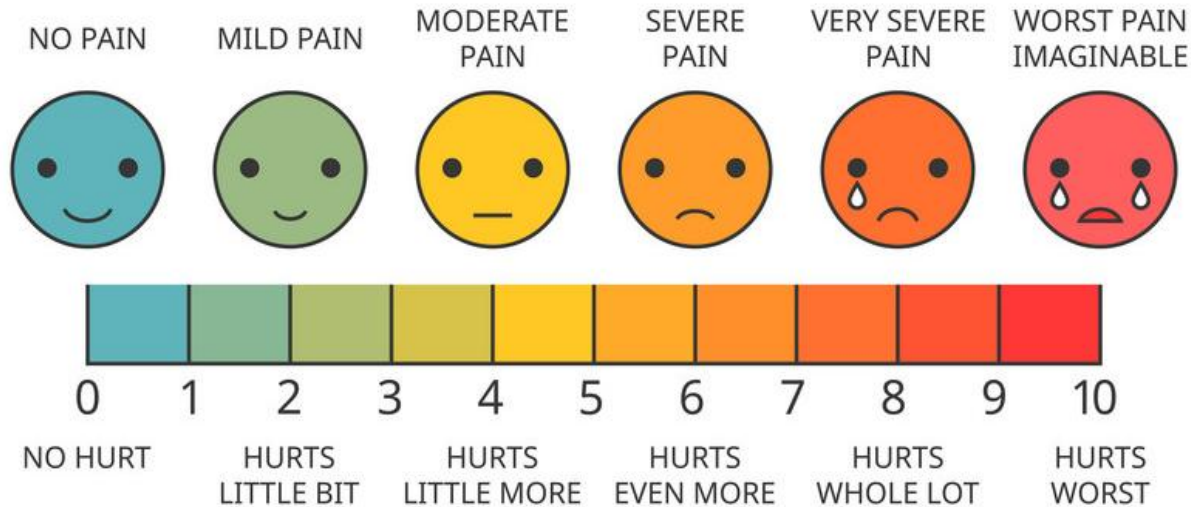


How to evaluate pain?



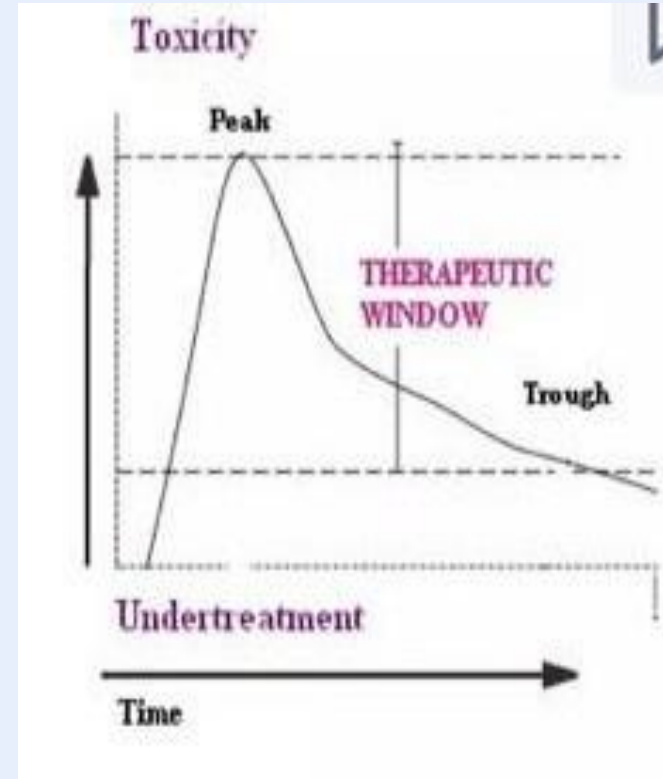
How to evaluate pain?

PAIN MEASUREMENT SCALE



Goals of Treatment

- Reduce pain
- Increase activity level
- Improve quality of life
- Pre-emptive analgesia
- Stay with in “Therapeutic Window”
 - Avoid under treatment
 - Avoid toxicity
- How?
 - Synergism with medicine
 - Multimodal analgesia



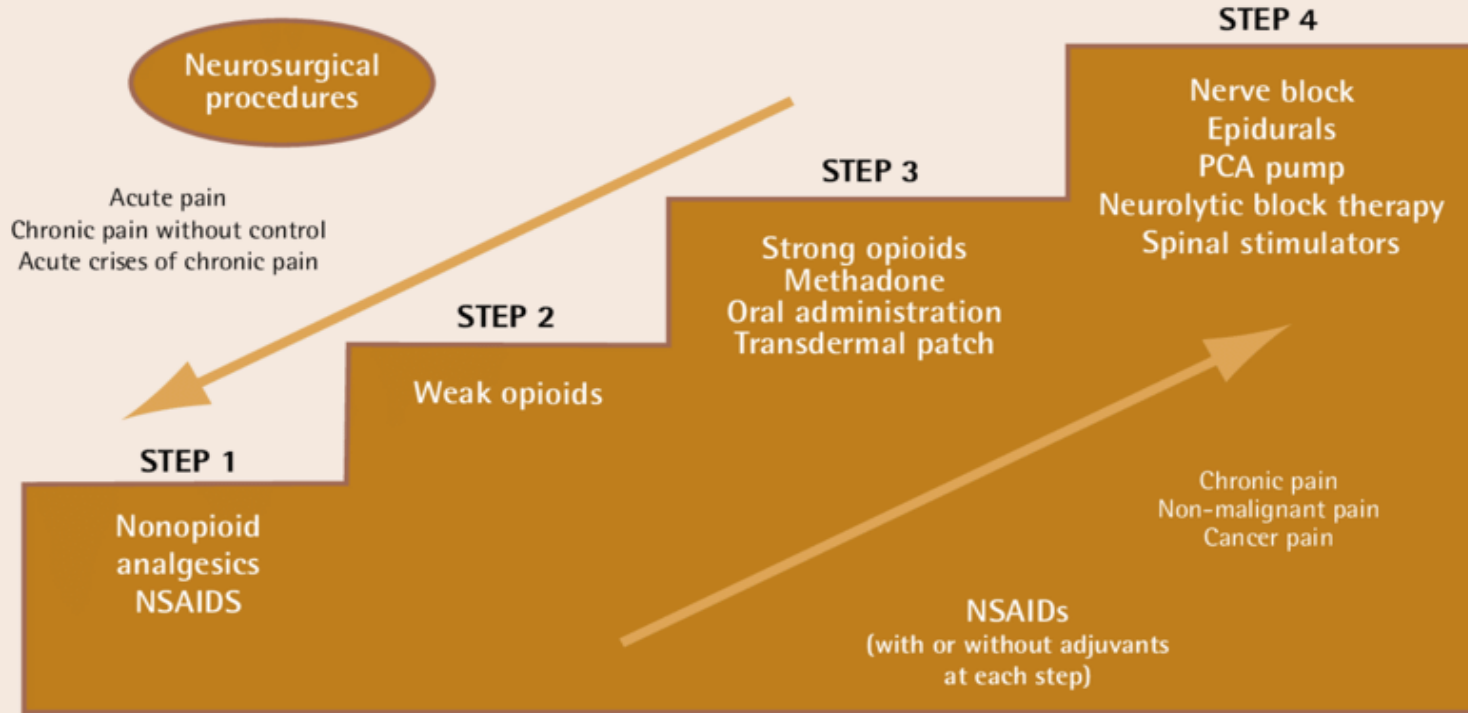


WHO Analgesic Guidelines

- Oral medications whenever possible
- Dose "by the clock"
- But always have "as needed" medications for breakthrough pain.
- Titrate the dose
- Use appropriate dosing intervals-Beware of relative potencies
- Treat side effects



WHO Analgesic Ladder



NSAID—nonsteroidal anti-inflammatory drug, PCA—patient-controlled analgesia.



Opioids

Weak Opioids

Codeine phosphate
Dihydrocodeine
Buprenorphine
Tramadol

Strong Opioids

Morphine
Diamorphine
Pethidine





Non- Opioid Analgesics

- Diclofenac Sodium
- Aspirin
- Non-Steroidal Anti-Inflammatory Drugs (NSAIDs)





Co-analgesic agents

- Anxiolytic drugs
- Anticonvulsants
- Antidepressants
- Ketamine





Non chemical techniques

- Psychological treatments
- Transcutaneous Electrical Nerve Stimulation (TENS)
- Physiotherapy
- Breathing techniques
- Heat application
- Cold therapy
- Distraction method





Preemptive Analgesia

It is an antinociceptive treatment that prevents establishment of altered processing of afferent input which amplifies postoperative pain.

Preemptive analgesia has been defined as treatment that:

- 1) Starts before surgery
- 2) prevents the establishment of central sensitization caused by incisional injury





Preemptive Analgesics

- Acetaminophen
- Pregabalin
- Tramadol





Multimodal (Balanced) Analgesia

- Using more than one drug for pain control
- Different drugs with different mechanism /sites of action along pain pathway.
- Each with a lower dose than if used alone.
- Can provide or synergistic effects.
- Provides better analgesia with less side effects.



Multi Disciplinary Approach





Take Home Message

- Pain is complex sensory and emotional experience and it's effects extend far beyond simple discomfort.
- Understanding the anatomy and physiology of pain help us understand where and how we can intervene.
- Pain should be assessed objectively and reassessed after treatment.



THANK YOU

*“Good anesthesia puts the patient to sleep;
great anesthesia brings the patient
back without pain”*



QUESTIONS &
DISCUSSION

