

# Comfort and Sedation

**Pain:** is ‘an unpleasant sensory and emotional experience associated with actual or potential tissue damage, or described in terms of such damage.

**Anxiety:** is a state marked by apprehension, agitation, autonomic arousal, fearful withdrawal, or any combination of these

**Pain and anxiety** are often interrelated and may be difficult to differentiate because the physiological and behavioral findings are similar for each. The relationship between pain and anxiety is cyclical (Figure 5-1). Anxiety may contribute to pain perception by activating pain pathways, altering the cognitive evaluation of pain, increasing aversion to pain, and increasing the report of pain.



**FIGURE 5-1** The anxiety-pain cycle. (From Cullen L, Greiner J, Titler MG. Pain management in the culture of critical care.)

## **Physiology of Pain and Anxiety**

- Pain travels nervous system to the brain
- Acute pain activates sympathetic nervous system
- Chronic pain, less activation
- Acute pain travels via A-delta fibers
- Chronic pain travels via C fibers
- Nociceptors most abundant receptors
- Mechanical stimuli
- Chemical stimuli
- Thermal stimuli
- Very little adaptation to pain
- Initiation of the inflammatory response to tissue injury
- Anxiety is confined within the brain

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- Purely psychogenic disorder; no actual tissue damage
  - Linked to reward and punishment center.
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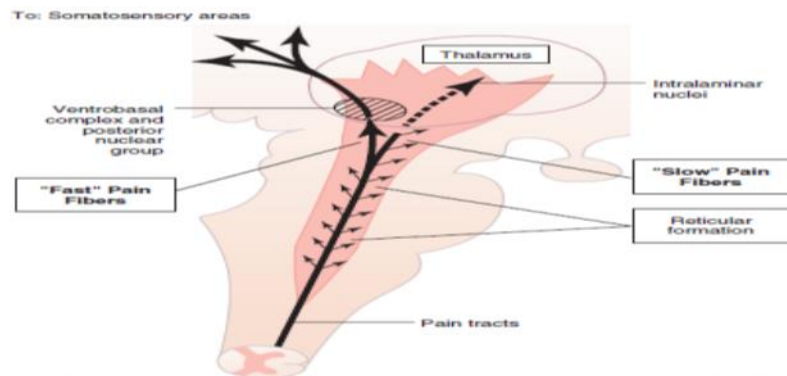


FIGURE 5-2 Transmission of pain signals into the brainstem, thalamus, and cerebral cortex by way of the "fast" pain pathway and "slow" pain pathway. (From Guyton A, Hall J. *Textbook of Medical Physiology*. 12<sup>th</sup> ed. Philadelphia: Saunders; 2011.)

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### **Causes of Anxiety:**

1. Any stressor that threatens a person's sense of wholeness, containment, security, and control can cause anxiety.
2. Illness and injury are such stressors.
3. Feelings of increased vulnerability and decreased security, which occurs when patients admitted to ICUs perceive a loss of control, a sense of isolation, and fear of death or loss of functionality. Anxiety, pain, and fear can all initiate or perpetuate the stress response.

### **Anxiety occurs when people experience the following:**

- Threat of helplessness
- Loss of control
- Sense of loss of function and self-esteem
- Failure of former defenses
- Sense of isolation
- Fear of dying.

### **Predisposing Factors to Pain and Anxiety**

#### **A. Physical**

- Illnesses and injuries treated in the critical care setting (eg, myocardial infarction, thoracic and neurosurgery, multiple trauma, extensive burns)
- Wounds—post-trauma, postoperative, or post procedural
- Sleep disturbance and deprivation

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- Immobility, inability to move to a comfortable position because of tubes, monitors, or restraints
- Temperature extremes associated with critical illness and the environment—fever or hypothermia.

### **B. Psychosocial**

- Anxiety and depression
- Loss of control
- Impaired communication, inability to report and describe pain
- Fear of pain, disability, or death
- Separation from family
- Unfamiliar and unpleasant surroundings
- Boredom or lack of pleasant distractions

### **C.Environment and Routine**

- Continuous noise from equipment and staff
- Continuous or unnatural patterns of light
- Awakening and physical manipulation every 1 to 2 hours for vital signs or positioning.
- Continuous or frequent invasive, painful procedures.
- Competing priorities in care—unstable vital signs, bleeding, dysrhythmias, poor ventilation—may take precedence over pain management.

### **Positive Effects of Pain/Anxiety**

- Increase performance levels
- Removes one from potential harm
- Fight-or-flight response

### **Negative Effects of Pain/Anxiety:**

- Raises catecholamines
  - Tachycardia and hypertension
- Interference with healing
- Increased oxygen consumption
  - End-organ ischemia

- Increased respiratory effort and hyperventilation

### **Effects of Pain:**

| <b>System</b>           | <b>Effect</b>                                                       | <b>Outcome</b>                                                                                             |
|-------------------------|---------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------|
| <b>Cardiovascular</b>   | Increased heart rate, BP, contractility, vasoconstriction           | Increases myocardial workload, thereby promoting or exacerbating ischemia                                  |
| <b>Pulmonary</b>        | Splinting; decreased respiration; reduced pulmonary volume and flow | Increased incidence of pulmonary complications (eg, atelectasis, pneumonia)                                |
| <b>Neurologic</b>       | Increased anxiety and mental confusion; disturbed sleep             | Delayed recovery; more pain                                                                                |
| <b>Gastrointestinal</b> | Decreased gastric emptying & intestinal motility                    | Impaired function; ileus; inhibits positive nitrogen balance                                               |
| <b>Musculoskeletal</b>  | Muscle contractions, spasms, & rigidity                             | Inhibits movement and coughing and deep breathing, putting patient at risk for complications of immobility |
| <b>Immune</b>           | Suppressed immune function                                          | Increases risk for pneumonia, wound infections, sepsis                                                     |

### **Classification of Pain**

1. Acute (less than 12 weeks' duration or pain that occurs during the expected period of healing) .
2. Chronic (pain of more than 12 weeks' duration or pain that continues after the expected period of healing).
3. Somatic.
4. Visceral.
5. Bone.
6. Neuropathic Emotional/Spiritual

Classified by inferred pathophysiology:

- Nociceptive pain (stimuli from somatic and visceral structures)
- Neuropathic pain (stimuli abnormally processed by the nervous system)
- Nociceptive: Caused by invasion &/or destruction &/or pressure on superficial somatic structures like skin, deeper skeletal structures such as bone & muscle and visceral structures and organs.

Types: superficial somatic, deep somatic, & visceral.

- Neuropathic:

Caused by pressure on &/or destruction of peripheral, autonomic or central nervous system structures.

Radiation of pain along dermatomal or peripheral nerve distributions.

Often described as burning and/or deep aching & associated with dysesthesia .

- Inflammatory pain is a result of activation of the pain pathway by a variety of mediators released due to tissue inflammation; cytokines  
Examples include appendicitis, rheumatoid arthritis, inflammatory bowel disease, and herpes zoster.

**Assessment of anxiety**: is challenging in the critical care population because of the severity of illness, barriers to communication, and altered cognitive states.

According to many critical care nurses, the top five physiological and behavioral indicators of anxiety are agitated behavior, increased blood pressure, increased heart rate, verbalization of anxiety, and restlessness.

### **Pain Assessment**

Quality pain management begins with a thorough assessment, ongoing reassessment, and documentation to facilitate treatment and communication among health care providers. The American Pain Society guidelines recommend a five-step hierarchy approach to pain measures:

- Pain should be assessed and treated promptly in all patients.
- The patient should be actively engaged in the pain management plan.
- Healthcare providers need to preemptively treat patients with analgesics to safely, effectively, and equitably manage pain.
- Pain should be reassessed and treatment adjusted to meet the patient's needs.
- Healthcare facilities need to establish a comprehensive quality improvement program that monitors both healthcare provider practice and patient outcomes.

### **Pain Assessment Tools**

Factors to consider in choosing a pain scale

1. Age of patient
2. Physical condition

3. Level of consciousness
4. Mental status
5. Ability to communicate

Several tools are available to ensure that the appropriate pain assessment questions are asked.

### Pain Measurement Tools

One tool used in assessing the patient with chest pain is the PQRST method. The PQRST method is a mnemonic the nurse can use to ensure that all chest pain characteristics are documented.

**P**—Provocation or position. What precipitated the chest pain symptoms, and where in the chest area is the pain located?

**Q**—Quality. Is the pain sharp, dull, crushing?

**R**—Radiation. Does the pain travel to other parts of the body?

**S**—Severity or symptoms associated with the pain. The patient is asked to rate the pain on a numerical scale and to describe what other symptoms are present.

**T**—Timing or triggers for the pain. Is the pain constant or intermittent, and does it occur with certain activities?

**A second tool is known as the FACES Pain Scale.** Patients are asked to describe how they feel by pointing to a series of faces ranging from happy to distressed (Figure 5-3). The FACES method involves a higher level of emotional intellect because the patient must be able to accurately process different yet similar visual stimuli. The most common versions of the FACES scale use between five and seven different images.

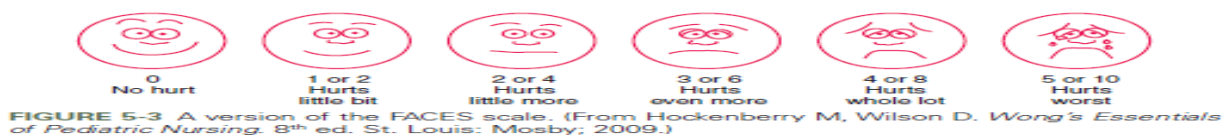
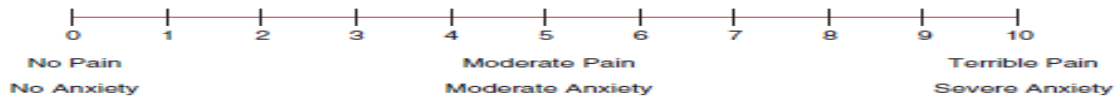


FIGURE 5-3 A version of the FACES scale. (From Hockenberry M, Wilson D. *Wong's Essentials of Pediatric Nursing*. 8<sup>th</sup> ed. St. Louis: Mosby; 2009.)

**Third tool is visual analog scale (VAS).** The VAS is a 10-cm line that looks similar to a timeline. The scale may be drawn horizontally or vertically, and it may or may not be numbered. If numbered, 0 indicates no pain, whereas 10 indicate the most pain (Figure 5-4).



## Pain Measurement Tools for Nonverbal Patients

Identification of the optimal pain scales for non-communicative patients

Several behavioral pain tools are available to assess critically ill adult patients.

1. **Behavioral pain scale:** was developed to assess pain in the critically ill adult who is nonverbal and unable to communicate (Table 5-2). The Behavioral Pain Scale provides critical care nurses with an objective and reliable pain measurement tool. It is designed to be used for the mechanically ventilated patient and therefore may not be appropriate in other patients.

2. **the Critical-Care Pain Observation Tool** (Table 5-3). It was initially validated in cardiac surgery patients and most recently in other critically ill patients. The Critical-Care Pain Observation Tool is appropriate for the assessment of patients with or without an endotracheal tube.

| ITEM                        | DESCRIPTION                                          | SCORE |
|-----------------------------|------------------------------------------------------|-------|
| Facial expression           | Relaxed                                              | 1     |
|                             | Partially tightened (e.g., brow lowering)            | 2     |
|                             | Fully tightened (e.g., eyelid closing)               | 3     |
|                             | Grimacing                                            | 4     |
| Upper limbs                 | No movement                                          | 1     |
|                             | Partially bent                                       | 2     |
|                             | Fully bent with finger flexion                       | 3     |
|                             | Permanently retracted                                | 4     |
| Compliance with ventilation | Tolerating movement                                  | 1     |
|                             | Coughing but tolerating ventilation most of the time | 2     |
|                             | Fighting ventilator                                  | 3     |
|                             | Unable to control ventilation                        | 4     |

\*Each of the categories—facial expression, upper limbs, and compliance with ventilation—is scored from 1 to 4. The values are added together for a total score between 3 and 12.

From Payen JF, Bru O, Bosson JL, et al. Assessing pain in critically ill sedated patients by using a behavioral pain scale. *Critical Care Medicine*. 2001;29(12):2258-2263.

| INDICATOR                                                                         | SCORE |
|-----------------------------------------------------------------------------------|-------|
| <b>Facial Expression</b>                                                          |       |
| • Relaxed, no muscle tension                                                      | 0     |
| • Tense facial muscles (brow lowering, orbit tightening, and levator contraction) | 1     |
| • Grimacing with tense facial muscles                                             | 2     |
| <b>Body Movements</b>                                                             |       |
| • Absence of movements                                                            | 0     |
| • Protection                                                                      | 1     |
| • Restlessness                                                                    | 2     |
| <b>Muscle Tension in Upper Extremities</b>                                        |       |
| • Relaxed                                                                         | 0     |
| • Tense, rigid                                                                    | 1     |
| • Very tense or rigid                                                             | 2     |
| <b>Compliance with the Ventilator</b>                                             |       |
| • Tolerating ventilator or movement                                               | 0     |
| • Coughing but tolerating ventilator                                              | 1     |
| • Fighting ventilator                                                             | 2     |
| <b>Nonventilator, Vocalization</b>                                                |       |
| • No sound                                                                        | 0     |
| • Sighing, moaning                                                                | 1     |
| • Crying out, sobbing                                                             | 2     |
| <b>Total Score</b>                                                                | —     |

Data from Gelinas C, Fillion L, Puntillo KA, et al. Validation of the critical-care pain observation tool in adult patients. *American Journal of Critical Care*. 2006;15:420-427.

## **Pain management**

Pain management: This program is to describe basic pain management principles related to types of pain, how to recognize pain, and how to use pharmacological and non-pharmacological pain treatments.

## **Management of Pain**

### **NonPharmacological Management**

Many non-medicine treatments are available to help you manage your pain. A combination of treatments and therapies is often more effective than just one. Some non-medicine options include:

1. Heat or cold: use ice packs immediately after an injury to reduce swelling. Heat packs are better for relieving chronic muscle or joint injuries.
2. Physical therapies: such as walking, stretching, strengthening or aerobic exercises may help reduce pain, keep you mobile and improve your mood. You may need to increase your exercise very slowly to avoid over-doing it
3. Massage: this is better suited to soft tissue injuries and should be avoided if the pain is in the joints. There is some evidence that suggests massage may help manage pain.
4. Relaxation and stress management techniques: including meditation and yoga.
5. Cognitive behavior therapy (CBT) – this form of therapy can help you learn to change how you think and, in turn, how you feel and behave about pain. This is a valuable strategy for learning to self-manage chronic pain.
6. Acupuncture a component of traditional Chinese medicine. Acupuncture involves inserting thin needles into specific points on the skin.
7. Transcutaneous electrical nerve stimulation (TENS) therapy – minute electrical currents pass through the skin via electrodes, prompting a painrelieving response from the body.
8. Music Therapy: Music therapy may be effective in reducing pain and anxiety if patients are able to participate. Its effect on patients who are heavily sedated, chemically paralyzed, or physically restrained needs



further study.

## Pharmacological Management :

**TABLE 5-4 Medications Used in Pain Management**

| Medication                                                                                                             | Mechanism of Action                                                                                                                      | Nursing Considerations                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Acetaminophen                                                                                                          | Inhibit prostaglandins                                                                                                                   | <ul style="list-style-type: none"> <li>Lacks anti-inflammatory action</li> <li>Avoid use in patients with liver or kidney disease</li> <li>Doses exceeding 4000 mg/d increase risk for hepatic toxicity</li> <li>Perform routine liver and renal profile testing for patients on a continuous, high-dose regimen</li> </ul>                                                                                                                                                                                       |
| Aspirin                                                                                                                | Inhibit prostaglandins and thromboxanes                                                                                                  | <ul style="list-style-type: none"> <li>Adverse effects include gastrointestinal or postoperative bleeding</li> <li>Contraindicated in patients with bleeding ulcers, hemorrhagic disorders, asthma, and renal insufficiency</li> </ul>                                                                                                                                                                                                                                                                            |
| NSAIDs<br>Ibuprofen (Motrin)<br>Naproxen (Naprosyn)<br>Celecoxib (Celebrex)                                            | Inhibits prostaglandin synthesis by inhibiting the action of the enzyme cyclooxygenase, which is responsible for prostaglandin synthesis | <ul style="list-style-type: none"> <li>Adverse effects include gastrointestinal bleeding, platelet inhibition, and renal insufficiency</li> <li>Avoid use in patients with liver or renal disease</li> <li>Perform routine liver and renal profile testing for patients on a continuous, high-dose regimen</li> </ul>                                                                                                                                                                                             |
| Opioid analgesics<br>Morphine<br>Fentanyl<br>Hydromorphone (Dilaudid)<br>Codeine<br>Methadone (Dolophine)<br>Oxycodone | Bind to receptor sites in the central and peripheral nervous system, changing the perception of pain                                     | <ul style="list-style-type: none"> <li>Adverse effects include respiratory depression, oversedation, constipation, urinary retention, and nausea</li> <li>IV administration is usually the preferred route</li> <li>Older patients are often more sensitive to the effects of opioids</li> <li>Patients and families need education about tolerance and the risk of dependence</li> </ul>                                                                                                                         |
| Local anesthetics<br>Bupivacaine<br>Chloroprocaine                                                                     | Act synergistically with intraspinal opioids and block pain by preventing nerve cell depolarization                                      | <ul style="list-style-type: none"> <li>Adverse effects include CNS excitation, drowsiness, respiratory depression, apnea, hypotension, bradycardia, arrhythmias, and/or cardiac arrest</li> <li>Commonly administered by the epidural route in combination with epidural or intrathecal analgesia</li> </ul>                                                                                                                                                                                                      |
| Antiemetics<br>Promethazine<br>Hydroxyzine                                                                             | Antagonizes central and peripheral H1 receptors                                                                                          | <ul style="list-style-type: none"> <li>Adverse effects include hypotension, restlessness, tremors, and extrapyramidal effects in the older patient</li> <li>In high doses, can create auditory and visual hallucinations causing panic and intense fear</li> <li>During long-term therapy, monitor blood cell counts, liver function studies; perform electrocardiogram and electroencephalogram</li> </ul>                                                                                                       |
| Opioid antagonists<br>Naloxone<br>Naltrexone                                                                           | Antagonizes various opioid receptors                                                                                                     | <ul style="list-style-type: none"> <li>Administering the drug too quickly or giving too much can precipitate severe pain, withdrawal symptoms, tachycardia, dysrhythmias, and cardiac arrest; patients who have been receiving opioids for more than a week are particularly at risk</li> <li>Drug should be diluted and given intravenously, very slowly</li> <li>Monitor for acute withdrawal syndrome patients who are physically dependent on opioids, or who have received large doses of opioids</li> </ul> |
| Benzodiazepines<br>Diazepam<br>Lorazepam<br>Midazolam                                                                  | Increase the efficiency of a natural brain chemical, GABA, to decrease the excitability of neurons                                       | <ul style="list-style-type: none"> <li>Adverse effects include phlebitis, acidosis, renal failure, prolonged waking and delayed weaning from ventilator, and pain on injection site</li> <li>Monitor the patient for oversedation and respiratory depression</li> </ul>                                                                                                                                                                                                                                           |
| Benzodiazepine-specific reversal agent<br>Flumazenil                                                                   | Antagonizes benzodiazepine receptors                                                                                                     | <ul style="list-style-type: none"> <li>Commonly administered intravenously</li> <li>Adverse effects include CNS manifestations, re-sedation, cardiovascular effects, seizures, and alterations in intracranial pressure and cerebral perfusion pressure</li> <li>Re-sedation may occur within 1–2 h after administration, so repeated doses or a continuous infusion may be required to maintain therapeutic efficacy</li> </ul>                                                                                  |
| Sedative-hypnotic<br>Propofol                                                                                          |                                                                                                                                          | <ul style="list-style-type: none"> <li>Adverse effects include low blood pressure, apnea, and pain at the injection site</li> <li>Monitor the patient's blood pressure</li> <li>Contraindicated in patients allergic to eggs or soy products</li> </ul>                                                                                                                                                                                                                                                           |