# CONSCIOUS SEDATION

LECTURE BY
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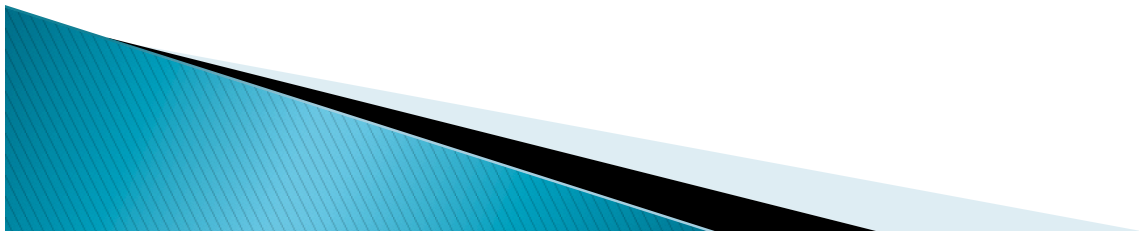
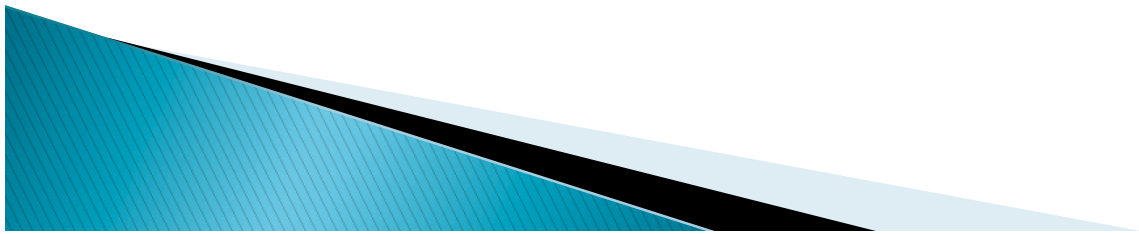
# Conscious sedation:

- **A minimally depressed level of consciousness** that retains the patient's ability to maintain an airway independently and respond appropriately to physical stimulation or verbal command



# Deep sedation :

- **A drug-induced controlled state of depressed consciousness**
- **Partial loss of protective reflexes.**
- Patients is not easily arousable but respond purposefully following repeated or painful stimulation.
- The ability to maintain ventilatory function may be impaired.



# General anesthesia

- A controlled state of unconsciousness.
- partial or complete loss of protective response, including inability to maintain airway .

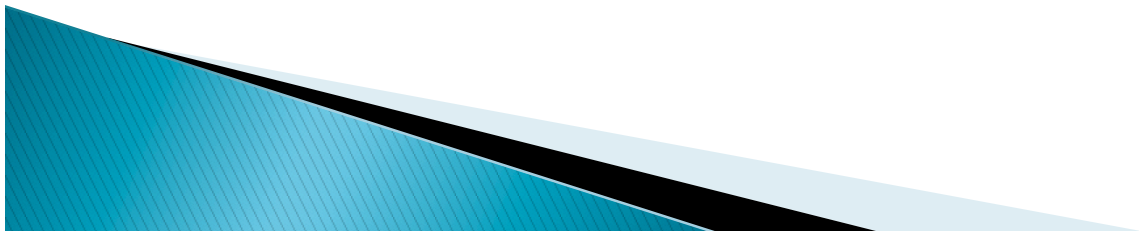
# OBJECTIVES

- **For the Child**
  - To Reduce fear and perception of pain during the treatment
  - To Facilitate coping with the treatment
  - To Prevent development of dental fear and anxiety
  - To Minimize physical discomfort and pain
  - To Minimize psychological trauma.

- **For the Dentist**
  - To Reduce stress and unpleasant emotions
  - To Prevent "burn-out" syndrome

# *Indications*

- Fearful and anxious child.
- Pt. who can not cooperate or understand for definitive treatment.
- Pt.  lacking cooperation because of lack of psychological or emotional maturity.



# Containdication

- Unwilling and uncooperative child
- COPD
- Epilepsy
- Bleeding disorder
- Obstructive sleep apnea.
- Dental difficulties , prolonged surgery and inadequate personnel.

# INSTRUCTIONS TO THE PARENTS

**Eating and drinking** :

- Intake of food and liquid should be limited prior to sedation
- To avoid vomiting and complications during treatment with sedation.

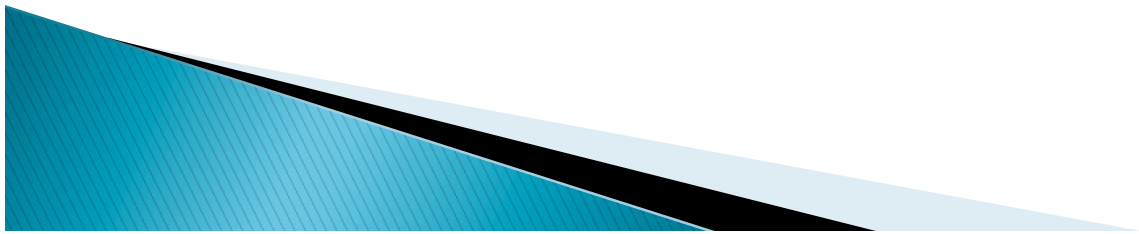
| Ingested food | Minimum fasting period |
|---|---|
| Clear liquid | 2 hours |
| Breast milk | 4 hours |
| Infant formula | 6 hours |
| Non human milk | 6 hours |
| Light meal | 6 hours |

**After treatment :**

- Allow the child to rest,  Do not permit activities for the child after treatment.

- After treatment, the first drink should be plain water.

- Small drinks taken repeatedly are preferable.



# SEDATION TECHNIQUES

## Inhalation Sedation

- Recommended route for conscious sedation for pediatric dentistry.
- most reliable in terms of onset and recovery.
- Efficacy is reduced when children have difficulty breathing through the nose.
- The use of a rubber dam improves the effect of the sedation and reduces atmospheric pollution

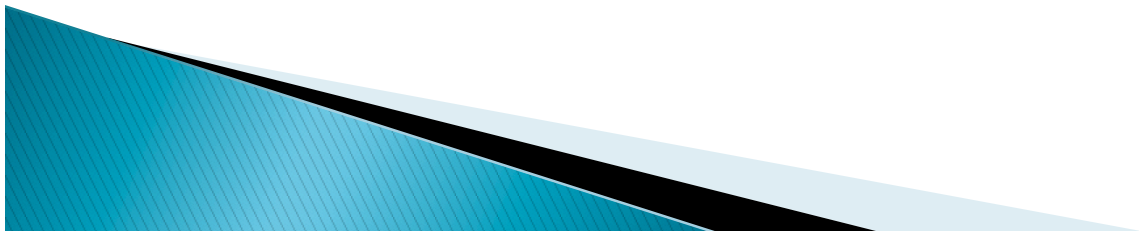
Most commonly used agent is $N_2O$, other are Desfluran and sevofluran.

# Oral Sedation

- Most universally accepted and easiest route of drug administration.
- **Disadvantages** :objectionable taste, variable results, variable consistency, difficult reversal of unwanted effect and slow recovery time.
- Mostly recommended for premedication and combination therapy.
- Agents : Midazolam
  Chloral hydrate
  Hydroxizyne
  Promithazine
  Ketamine

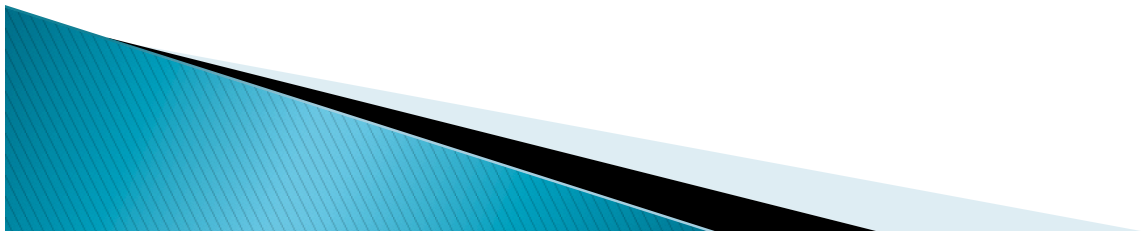
# Rectal sedation

- Absorption is excellent by rectal administration.
- Provides a more reliable and controllable absorption than the oral route.
- IT is not socially acceptable and not recommended without a hospital facility



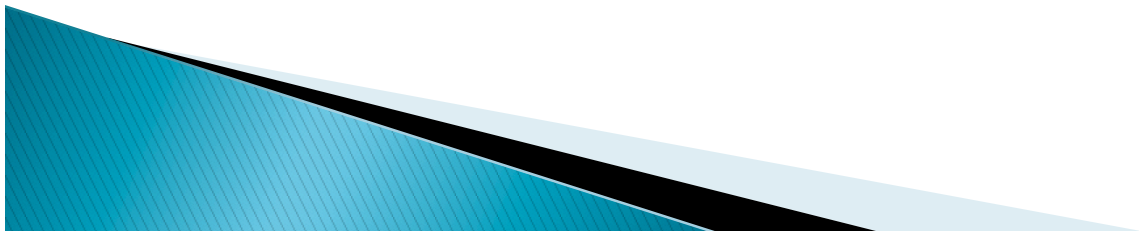
## Intramuscular Sedation

- Anatomic consideration of the injection site and additional training of the operator is required.
- For most patients the upper outer quadrant of gluteal region is safest.
- For small children anterior thigh (vastus lateralis muscle) is the preferred site.



## Submucosal Sedation

- This involves deposition of the drug beneath the mucosa.
- Best method is intranasal
- The oral site usually chosen is the buccal vestibule.



# Intravenous Sedation

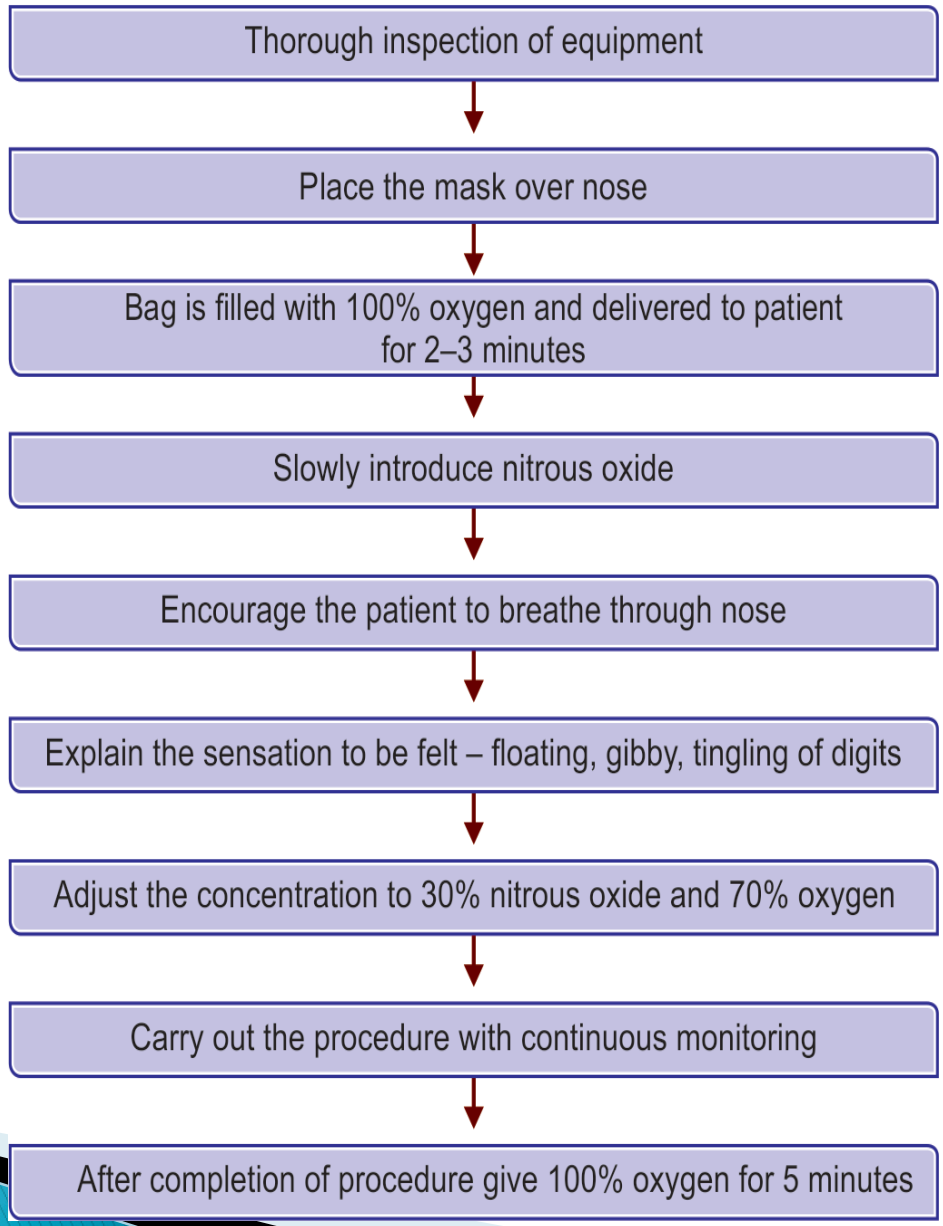
- This is the easiest, most efficient and safest method of parentral sedation  next to inhalation.
- Requires a highly trained team,
- The onset of action – within 30 seconds.
- Few disadvantages include frequent monitoring, incidence of phlebitis and hematoma at the site.
- A pulse oximeter should be used to augment alert clinical observation.
- venous access – dorsum of hand or antecubital fossa.

# NITROUS OXIDE SEDATION

## (Relative analgesia)

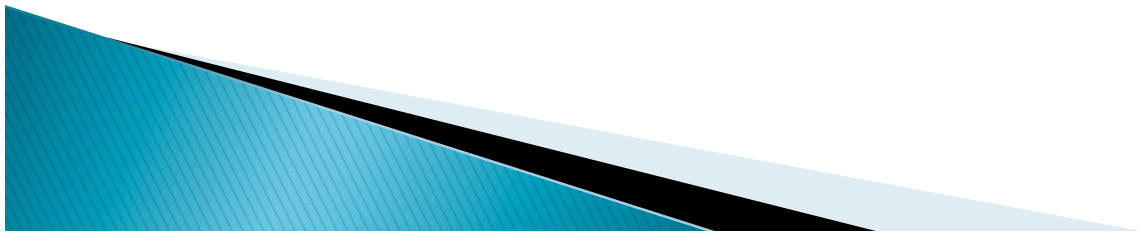
- **Dr. Josheph pristley** inveted $N_2O$.
- **Dr. Horace wellls** introduced $N_2O$ general anesthetic.
- The only one inhalation agent that meets the requirement of conscious sedation
- Nitrous oxide is sweet smelling, colorless, non-inflammable, inert gas.
- Rapid onset and fast recovery because of Poor blood solubility.
- Mech. Of action : Acts by non specific CNS depression.

# Procedure of Administration



# Concertration of $N_2O$ during various stages of sedation

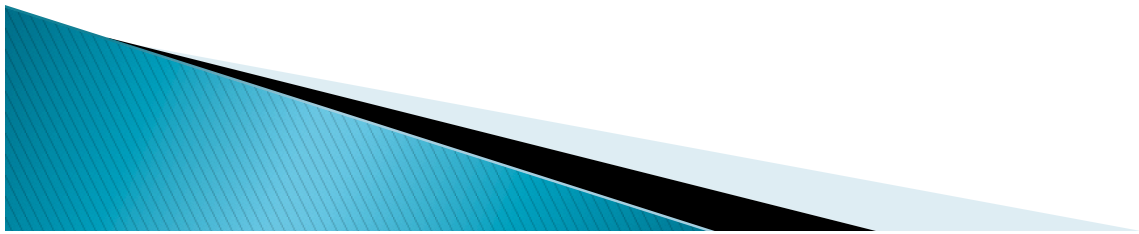
| | |
|---|---|
| Induction | Slow – 0.5 to 1 lit/min<br>Rapid – 2 to 4 lit/min<br><br>40 % $N_2O$ 60% $O_2$ |
| Maintenance | 20 to 30% $N_2O$ |
| Reversal | 100% $O_2$ |



# Stages of Sedation

**Plane I : Moderate Sedation and analgesia**

- $N_2O$ – 5% TO 25%
- Pt. may sense Dizziness and tingling in fingers.
- Marked sense of relaxation and pain threshold is increased.



# Plane II : Dissociation analgesia

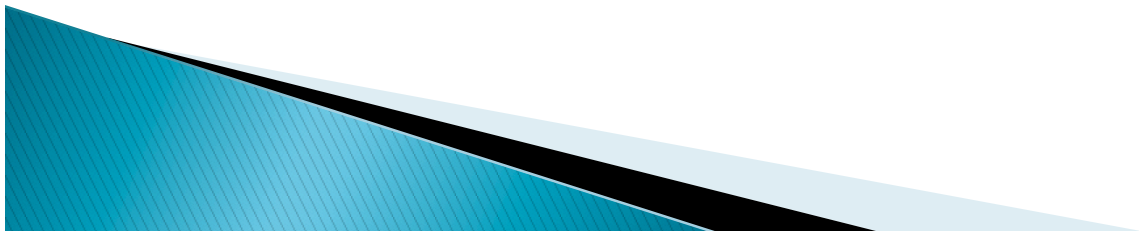
- $N_2O$ – 25% to 45%
- A euphoric stage.
- Pt. experiences floaty feeling.
- Reduction in blink rate.
- Pt. is conscious and respond to verbal stimuli.

**Plane III : Total Analgesia**

- $N_2O$ – 45% TO 65%
- Complete analgesia .
- Marked amnesia.
- Zone between analgesia and light anesthesia.

**Plane IV : Light anesthesia**

- $N_2O$ – 65% TO 85%
- Contact with pt. is lost.



# Advantages

- It is a viable and cost effective alternative to general anesthesia.
- Minimal effect on cardiovascular and respiratory function and the laryngeal reflex.

# Disadvantages

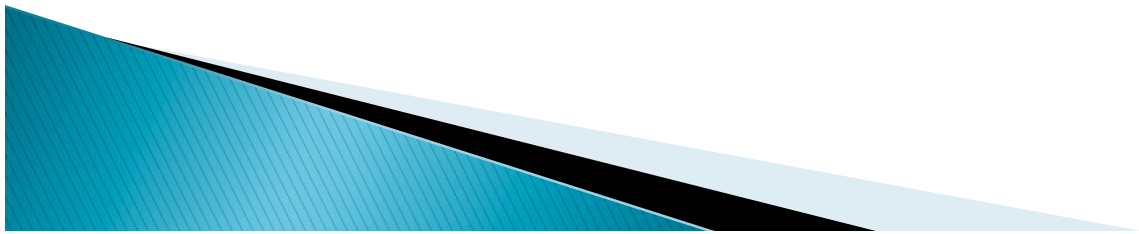
- Acute adverse effects include nausea and vomiting.
- Chronic effects may be impotence, liver toxicity and recreational abuse.
- Exposure to nitrous oxide can result in depression of vitamin B12 activity resulting in impaired synthesis of RNA.

# Diffusion hypoxia

**Diffusion hypoxia may occur as the sedation is reversed** at the termination of the procedure.

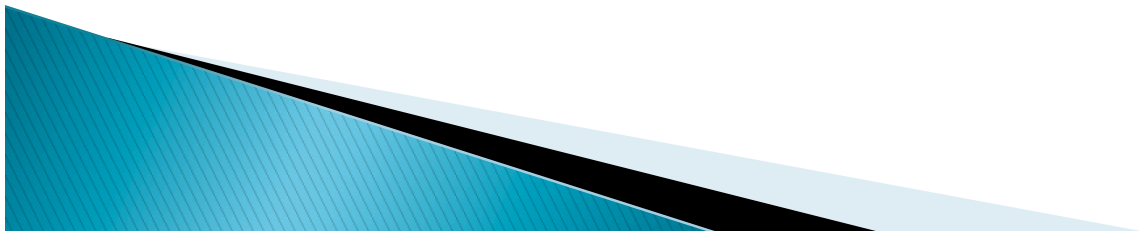
- The nitrous oxide escapes into the alveoli with such rapidity that the oxygen present becomes diluted; thus the oxygen–carbon dioxide exchange is disrupted and a period of hypoxia is created.

- To minimize this effect, the patient should be oxygenated for 3 to 5 minutes after a sedation procedure.



# OPIOIDS

- Commonly use for sedation and analgesia in dentistry.
- Produces sedation and euphoria to greater degree in children than adult.
- Commonly used opioids are : *Morphine*
  *Meperidine*
  *Fentanyl*

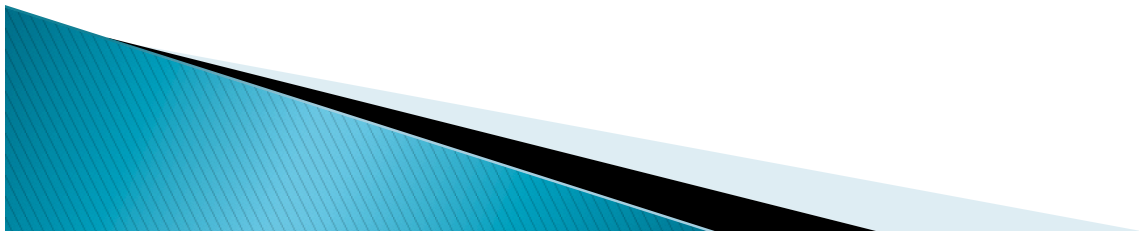


# MORPHINE

- It is opioid agonist.
- Produces sedation, analgesia, and mood alteration.
- The onset – 5 minutes for IV doses
  15minutes for IM doses.
- The peak effect : 20 minutes (IV)
  1 hour (IM).
- The duration of action is 3 to 4 hours.
- Produce prolonged postoperative somnolence, respiratory depression, nausea, vomiting, and itching.

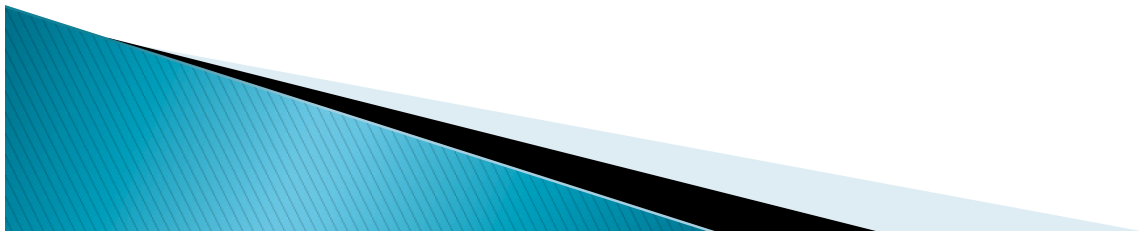
# MEPERIDINE

- Meperidine is about ten time more potent than morphine.
- The onset : 3 to 4 minutes (IV)
  10 to 15 minutes (IM).
- The peak effect : 15 minutes (IV)
  45 minutes (IM).
- The duration of action is 2 to 4 hours.
- Dose : oral ,S.C, I.M - 1.0 to 2.2 mg/kg
  Not more than 100mg



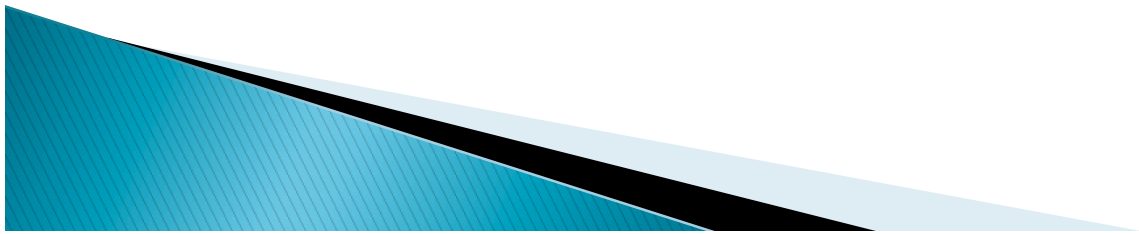
# FENTANYL (SUBLIMAZE)

- Fentanyl has more rapid onset and shorter duration than morphine.
- It is 100 times more potent than morphine.
- The onset : 30 seconds (IV)
  5 to 10 minutes (IM).
- The peak effect : 10 minutes (IV)
  30 to 45 minutes (IM).
- The duration of action is 30 to 60 minutes.
- **Dose** : 2 to 4 microgram/ kg
- Not recommended in children below 2yr.
- when given rapidly intravenous can produce skeletal muscle rigidity called "stiff chest syndrome."



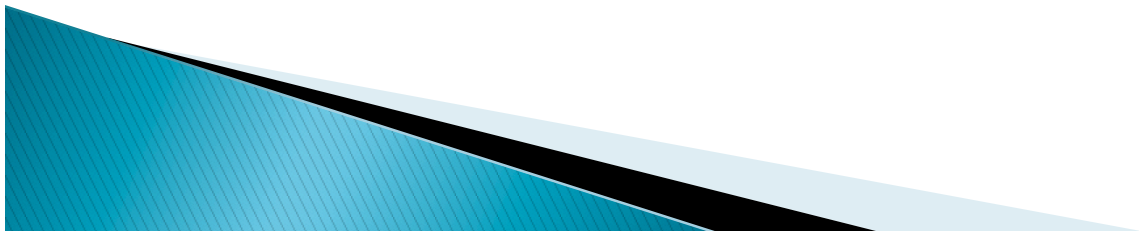
# BENZODIAZEPINES

- Most commonly used for moderate sedation.
- properties- Sedative ,
  Amnesic,
  Anxiolytic,
  Anticonvulsive
  Hypnotic
- Commonly used benzodiazepines are Diazepam, Lorazepam, Midazolam.



# Diazepam (Valium)/Lorazepam (Ativan)

- Diazepam and lorazepam have similar profiles.
- Lorazepam is approximately 5 times as potent as diazepam.
- Safe Agent For mild to Moderate anxiety particularly in child with cerebral palsy.
- Orally : rapidly absorbed from GIT.
  Reaches peak level at 2hr.
- Dose : oral and rectal 0.2 to 0.5 mg/kg
  I.V 0.25 mg/kg

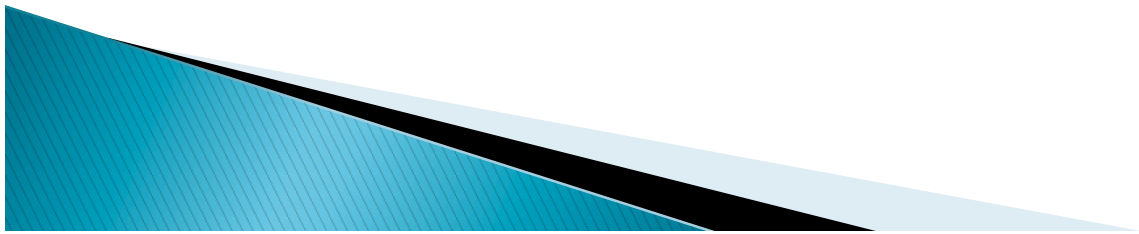


# MIDAZOLAM (VERSED)

- Relatively safe and short-acting nature
- Allows quick recovery and discharge of the patient.
- It can cause disinhibition rather than sedation in children.
- Angry Child Syndrome : paradoxical excitement in children caused by midazolam.
- Dose – Oral 0.03 – 0.75 mg/kg
  (max. single dose 10 mg)
  I.M/I.V – 0.05 TO 0.1 mg/kg
  Intranasal – 0.2 to 0.4 mg/kg
- By oral route : onset 20 to 30 min
  working time 30 min

# Barbiturates

- Barbiturates causes  general CNS depression by acting on the GABA receptor.
- it can produces mild sedation to G.A .
- They have very limited value for pediatric use.



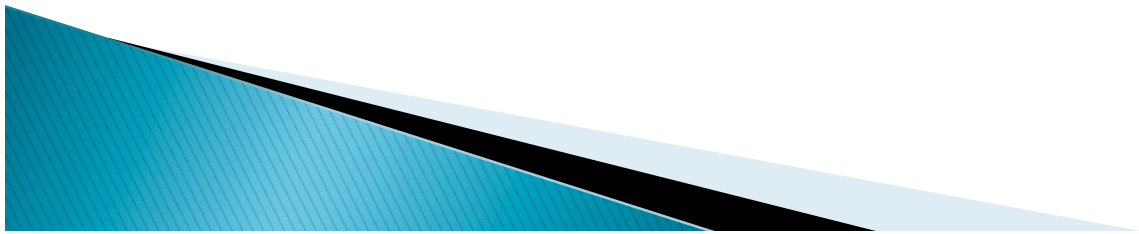
# Chloral Hydrate

- Chlorinated derivative of ethyl alcohol.
- Used for all level of anxiety and have wide range of safety .
- Its metabolite Trichloroethenol is responsible for CNS effect.
- Orally – onset 30 to 60 min
  Duration 4 to 8 hr.
- Dose : 25 to 50 mg/kg
- In children period of excitement and irritability seen before sedation.
- Not recommended for children below 6year and It should avoided in cardiac pt. as it depresses myocardium and cause arrhythmia.

# Propofol

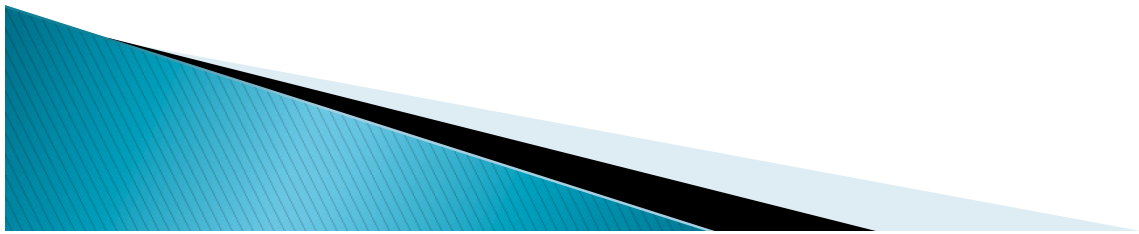
- Fast acting sedative with a narrower margin of safety,
- The dose required to produce a sedative effect is close to that used to induce anesthesia.
- Also called as milk of amnesia.

**Dose : I.V 2 -2.5 mg/kg**



# Ketamine

- Ketamine is a phencyclidine derivative.
- dose : IV 1mg/kg induces sedation in 2minutes
  Effects last 15 to 30 minutes.
- It causes dissociative anesthesia and increase in salivation.
- It is one of the most prevalent drug for recreational use owing to its dissociative properties.



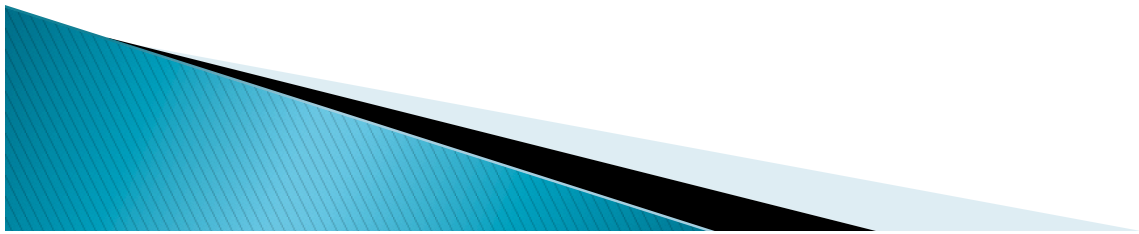
# REVERSAL AGENTS

**Flumazenil**

- Benzodiazepine antagonist.
- Selectively inhibit CNS effect.
- Not recommended in pt. under 18 year of age.
- Given by IV only.
- Onset of reversal – 1 to 2 min.
- Initially – 0.2mg wait for 45 second
  Then after give 0.2mg and wait for 60second.
- Max. dose is 1mg.

# Naloxone

- Opioid antagonist.
- I.V – act after 2 to 5 min.
- Total reversal is in 45 min.
- Dosage : I.V , S.C,I.M - initially 0.01 mg/kg
  after evary 2-3 min. 0.1mg/kg
  Maximum dose – 2 mg



# Discharge criteria

- Vital signs must be stable.
- The patient is easily arousable.
- The patient can talk (if age appropriate).
- The patient can sit up unaided.(if age appropriate)
- Presedation level of responsiveness achieved.
- The state of hydration is adequate.