Inhalation Sedation

The IHS Technique

Learning outcomes:-
At the end the students should know:-
✓ A brief historical background re RA
✓ Know RA’s role in dentistry
✓ The objectives of RA
✓ Guedel planes of anaesthesia
✓ The effect a mixture of N₂O and O₂ may have on a patient
✓ The clinical status of a sedated patient
✓ The clinical signs of hypoxia and how to avoid it
✓ The recovery process and fitness for discharge

Historical Background

1771 Joseph Priestley discovered OXYGEN.

1772 Joseph Priestley discovered NITROUS OXIDE.

1779 Humphrey Davey discovers some of the effects of Nitrous Oxide.

1840s Horace Wells, a dentist, employed Nitrous Oxide as anaesthetic agent.

1889 Liverpool Dental Hospital used Nitrous Oxide analgesia for cavity preparation on teeth.

1937 Dr Harry Langa in the USA began using Nitrous Oxide analgesia. He was later to write the standard textbook on Relative Analgesia.

Conscious Sedation

A technique in which the use of a drug or drugs produces a state of depression of the CNS enabling treatment to be carried out, but during which verbal contact with the patient is maintained. The drug and techniques used should carry a margin of safety wide enough to render loss of consciousness unlikely.

WHY CONSCIOUS SEDATION?

20% Having high fear of dentistry of which 2/3 of these acquired in early childhood (Milgrom, JADA 1988)

25% Of adult - fear of injections (Milgrom, JADA 1997)

30% Are somewhat or very nervous or terrified of going to the dentist (Dioonne,ADA Feb 1998)

23 million are willing to go to the dentist if GA and CS more readily available.
Evidence of effectiveness

15% of cases referred for paediatric DGA were successfully treated with inhalation sedation (2002)

Nitrous Oxide/oxygen...very successful adjunct in community paediatric dentistry Bryan RA (2002)

In fearful, inhibited children, integrated use of sedation appeared to facilitate acceptance Anup K (2001)

The effect of RA are primarily threefold:-

Sedative effect

Analgesic effect

Degree of amnesia (memory loss)

The various psychomotor and sensory effects occur in three overlapping planes of analgesia

The definition of Inhalation sedation

Inhalation sedation is a state of euphoria during which painful stimuli are relatively ignored, the pain threshold being raised without loss of consciousness.

The state of euphoria is brought about by submitting the patient to inhalation of nitrous oxide and oxygen and adding to this varying amount of suggestion.

The aim of Inhalation Sedation

Although the term RA was coined by Lange in 1937 the principal aim is to sedate the patient and for this reason the term conscious sedation rather than RA is preferred.

Improve patient co-operation

Alleviate fear, apprehension and anxiety

Change mental focus away from painful stimuli

To raise pain reaction threshold

To reduce fatigue

The Principle of Inhalation Sedation

To supply N₂O and O₂ to the patient

The amount needed is decided by using the patient as a monitor. This is done by observing changes in the patient’s demeanour and noting symptoms reported by the patient.

The objective of Relative Analgesia

To give as little nitrous oxide as possible so that the patient is treatable and remains conscious throughout the whole treatment.
RA is an adjunct to behavioural management

Planes of Inhalation sedation
Anaesthesia by inhalation of ether has been divided into 4 stages by Guedel.

1. Analgesia (Plane 1 - 3)
   - Moderate sedation and analgesia
   - Dissociation Sedation
   - Dissociation Analgesia
   - Total analgesia

2. Excitement (delirium)

3. Surgical anaesthesia (plane 1 - 4)

4. Respiratory paralysis

Approximate Percentages
as per Harry Langa 1937

- **Plane 1**: 5% to 25% N\textsubscript{2}O
  - Moderate sedation and analgesia

- **Plane 2**: 25% to 55% N\textsubscript{2}O
  - Dissociation Sedation and Analgesia

- **Plane 3**: 55% to 70% N\textsubscript{2}O
  - Total Analgesia

The Planes of Analgesia

The degree of analgesia achieved with nitrous oxide is a continuum and the effects tend to be somewhat variable within each plane.

**RA Technique**

- Turn mixture to 100% O\textsubscript{2}
- When patient settled 85%
- Allow 2 mins. for plane 1
- If not 5% increment to 80% O\textsubscript{2} [20% N\textsubscript{2}O]
- Allow further 2 mins. to establish plane 1
- Further 5% increments to establish plane 2

**Plane 1 Relative Analgesia**

- 5 - 25% Nitrous oxide
  - Fear reduced
  - Possibly slight amnesia
  - Relaxation begins
  - Tingling beginning in fingers & toes lips or tongue
  - Physiology otherwise normal
  - Patient responds clearly to questions and commands
Plane 2 Relative Analgesia
25 - 55% Nitrous oxide

- Pain reaction markedly reduced
- Fear eliminated
- Amnesia more likely
- Pleasant euphoria, mild intoxication
- Patient less bothered by surroundings
- Sense of detachment, floating or lethargy

Change in character of voice (throaty)
Physiology, reflexes normal
Communication easy
Mouth stays open
Responses may be sluggish
Nausea is rare

Plane 3 Relative Analgesia
50 - 70% Nitrous oxide

- Pain reaction is eliminated
- Fear is eliminated (may return after 1-2 minutes)
- Amnesia is complete

But

Relaxation is lost - patient becomes restless
Mouth closes & respiration increases
Communication is difficult
Very hard stare
Possible hallucinatory dreams

Therefore in Plane 3...

The deterioration of co-operation deteriorates
Treatment becomes impossible

Plane 3 acts as a buffer between the end of stage 1 and stage 2 of anaesthesia
**ANALGESIA**

It is estimated that a 20% : 80% mixture of \( \text{N}_2 \text{O} \cdot \text{O}_2 \) produces the analgesic effectiveness of 10-15mg of morphine.

The optimum concentration of \( \text{N}_2 \text{O} \) for the production of analgesia is **35%**.

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**CLINICAL STATUS OF A SEDATED PATIENT**

- Ability to maintain a patent airway
- Ability to maintain verbal contact
- Ability to maintain an open mouth
- Ability to cough & swallow
- Ability to maintain open eyes

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**Additional objective signs showing readiness for treatment**

- Mental and physical relaxation
- Parasthesia
- Mild intoxication and euphoria
- Lethargy
- Feeling warm
- Dreaming
- Indifference to surroundings and passage of time

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**Elimination of \( \text{N}_2 \text{O} \) & Diffusion Hypoxia**

- For few minutes on termination of RA the \( \text{O}_2 \) may drop to 10% !!
- There is a rapid elimination of \( \text{N}_2 \text{O} \) from the blood into the alveoli.
- This dilutes the \( \text{O}_2 \) present and causes the hypoxia.
- Hypoxia causes headache, nausea, and lethargy/hangover effect.

**Prevent DIFFUSION HYPOXIA by giving 100% oxygen for 2 - 3 minutes.**

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**Recovery**

- Turn off the \( \text{N}_2 \text{O} \)
- 100% \( \text{O}_2 \) for 2-3 mins.
- Supervised during recovery
- Check responses with EVE or ROMBERG sign

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**CONSCIOUS SEDATION**

**Fitness for Discharge**

- Discharged by the sedationist
- Accompanied home by a responsible adult
- Post-operative advice given to both
- Adult patient may be discharged unaccompanied at the dentist’s discretion
GOOD WORKING PRACTICES

• Check equipment prior to use
  Good seal of mask - is the bag moving?
  Minimise mouth breathing
  Minimise patient talking
  Minimise levels of Nitrous used

• 2 minutes oxygen to finish.
• Keep mask on for further 2 minutes

Any questions?