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General anaesthesia in oral surgery and outpatient surgery

History

1844	Horace Wells	nitrous oxide	extraction of one of his own wisdom teeth by a colleague
1846	William Morton (pupil of Wells)	ether	extraction
1946	introduction of lidocaine		

General anaesthesia should be strictly limited to those patients and clinical situations in which local anaesthesia (with or without sedation) is not an option.

Bourne JG. General anaesthesia in the dental surgery. B Dental J 1962; 113: 54-7.

Coleman F. The history of nitrous oxide anaesthesia. Dental Record 1942; 62: 143-9

Naveen Malhotra General Anaesthesia for Dentistry ndian Journal of Anaesthesia 2008;52:Suppl (5):725-737

Types of general anaesthesia

Outpatient anaesthesia

- **Dental chair anaesthesia**

Relative analgesia → for simple extraction

- **Day care anaesthesia**

Conscious sedation (Sedoanalgesia) → for minor oral surgery

In patient anaesthesia

Intubation with or without neuromuscular blocking →
→ for complicated extractions, oral- and maxillofacial
surgical procedures

Indications of general anaesthesia

- Acute infection (pain)
- Children
- Mentally challenged patients
- Dental phobia
- Allergy to local anaesthetics
- Extensive dentistry & facio-maxillary surgery

Equipments

- anaesthesia machine, vaporizers
- oxygen, nitrous oxide
- breathing circuits (adult and pediatric)
- nasal and facial masks
- oral and nasal air-ways
- different laryngoscopes with all sizes of blades
- nasal and oral tracheal tubes
- Independent suction apparatus



Monitoring standards

- Peripheral arterial oxygen saturation,
- ECG,
- non-invasive blood pressure and capnography
- All resuscitation drugs
- Defibrillator

Conditions of general anaesthesia

- Anaesthesiologist
- Dedicated assistant
- Dentist
- Dental assistant

Minimum of four people are required!

Written and informed consent by the patient or parent/guardian!

Procedure

Only **ASA physical status class I & II patients** should be administered

Steps

- Pre-anaesthetic preparation
- Premedication
- Induction of anaesthesia
- Intubation
- Maintenance
- Recovery

Pre-anaesthetic preparation

Preoperative examinations are indicated:

- Anamnesis
- Physical examinations (by the anaesthiologist)
- Blood tests
- Urine tests
- ECG
- Lung x-ray
- Informed consent form!

Premedication

Clear fluids are allowed up to 4 hours (children) or 6 hours (adult) preoperatively.
(preoperative fasting)

Premedication

- **Anxiolysis**

Benzodiazepine: midazolam-Dormicum, alprazolam- Xanax →
→ Sedation, Amnesia, Anticonvulsive

- **Preemptive analgesia**

NOA (non opioid analgetic) metamizol, diclofenac, ibuprofen, paracetamol
In case of need **opioid** Tramadol, Pethidin, Morphin

- **Antisalivation**

Parasympatholytic (Anticholinerg): Atropin (0.03mg/kg), Scopolamin,
Glycopyrrolat (reflekt. Bradycardie)

- **Antacide**

Antihistamins: (H2-Blocker) ranitidin, famotidin

Protonpump inhibitors: omeprasole, esomeprasole, Na-citrat (p.o. 30 ml)

- **Antibiotic prophylaxis** (in case of need)

Cefazolin 1-2 g, Ampicillin/clavulic acid 1.2 g or Amoxicillin/sulbactam or
Clindamycin 600 mg.

Induction of anaesthesia

Gaseous induction

using *sevoflurane* or 66% *nitrous oxide* in oxygen (isoflurane, halothan)

Laryngeal mask airway (**LMA**) is being used for all but the simplest extractions. It provides some barrier to aspiration when compared to mask



Intubation

Types of intratracheal intubations

- Oral
- Nasal
- Submental

Pharynx should be properly packed!

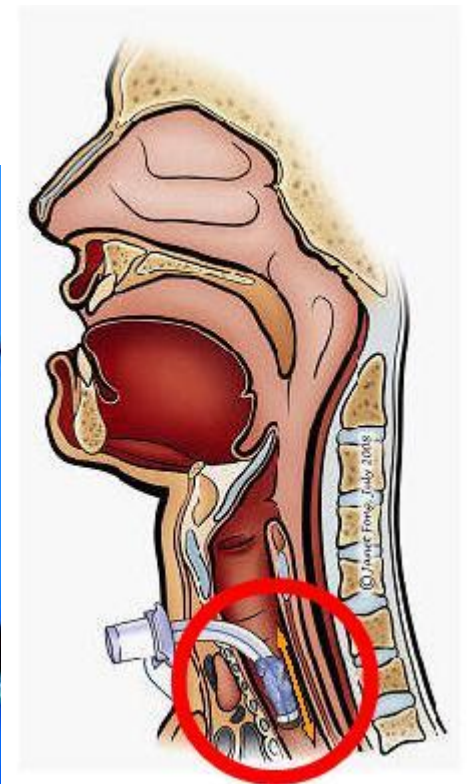


Risks of intubation

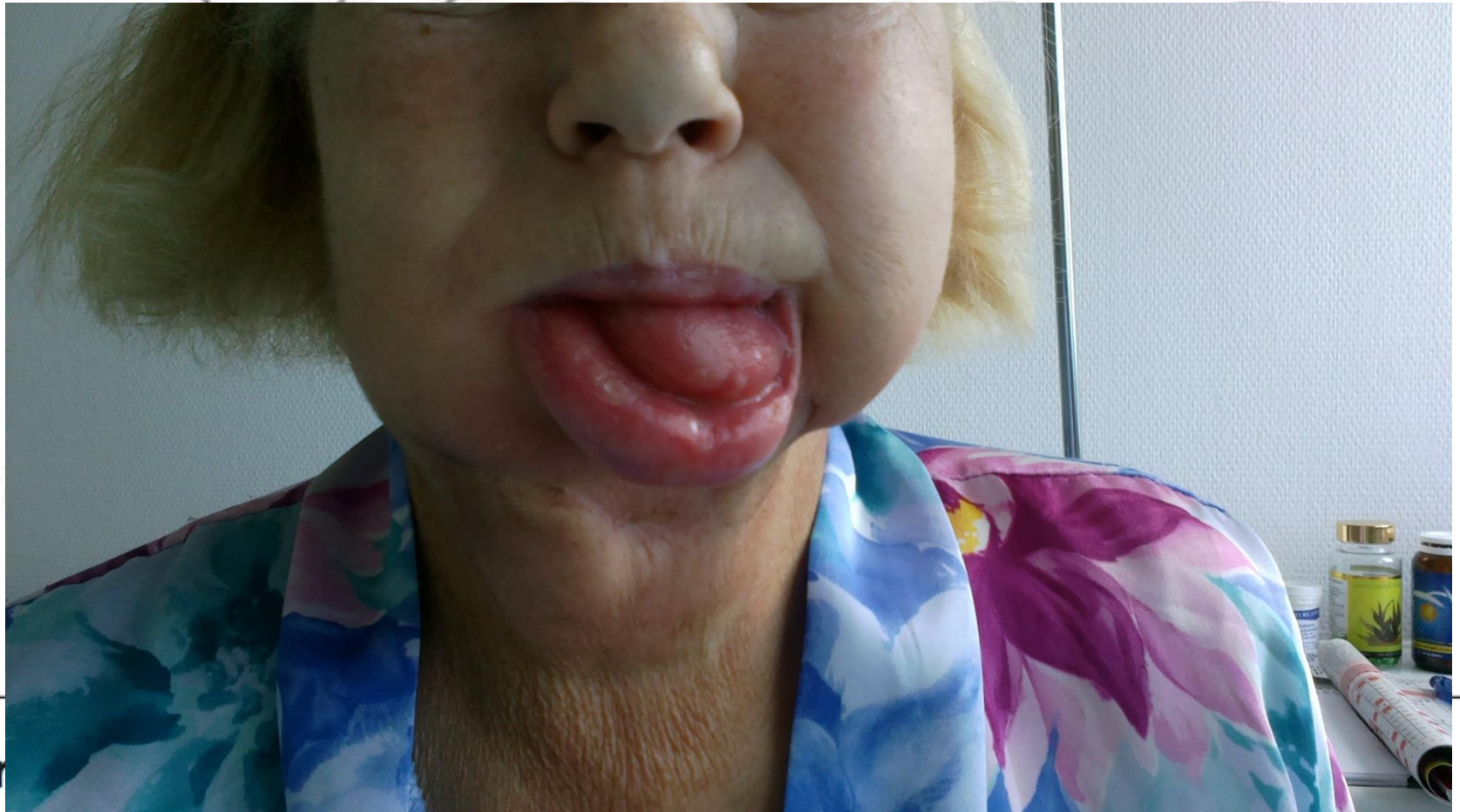
- Anatomic factors (Mallampati scores)
- Limited opening
- Oedema
- Mobility of neck
- Size of tongue
- Dental status

Methods in case of difficulties

- Fiberoptic intubation
- Blind nasal intubation
- Preoperative tracheotomy



Uvula
Hard palate
Soft palate



Figure

Class 1. Complete visualization of the soft palate

Class 2. Complete visualization of the uvula

Class 3. Visualization of only the base of the uvula

Class 4. Soft palate is not visible at all

Maintenance of general anaesthesia

Operating position

The most commonly used position is semi-supine. In this position the head and neck helps in maintenance of airway



Intubation without neuromuscular blocking agent (short operation)

- spontaneous respiration of inhalational agent, **nitrous oxide** and oxygen (50% inspired oxygen concentration → decrease hypoxaemic episodes)
- Continuous, controlled infusion of **propofol** or **etomidat** or **tiopental** (**Hypnotikums**) → MAINTENANCE OF ANAESTHESIA

Intubation with neuromuscular blocking agent

- Non-depolarizing **neuromuscular blocking agent** ((Esmeron, Tracrium, Norcuron, Nimbex) /*depolarizing is not recommended (e.g. succinylcholine) because of muscle pains/*
- **Anaesthesia** is maintained with administration of halothane /**sevoflurane** and **nitrous oxide** in oxygen. Diclofenac and dexamethasone are administered to reduce pain and swelling. Local anaesthetic may be infiltrated into the sockets by the surgeon,
- For more extensive procedures, short acting opioid like **fentanyl** is administered

Recovery

- The LMA or endotracheal tube should not be removed until the cough reflex has returned.
- Prerequisites of extubation: sufficient spontaneous breathing, return of protective reflexes.
- Antagonizing:
 - Opioid with **naloxone**
 - non-depolarizing neuromuscular blocking relaxants with **Cholinesterase**
- Free airways!
 - Pharyngeal pack is removed
 - No bleeding towards to oral cavity
- Extubation
 - After the return of protective reflexes, muscle strength, sufficient spontaneous breathing
 - The presence of the surgeon and conicotomy readiness.
 - Extubate under constant sucking
 - Possibly delayed extubation
- Risks of free airway at: - laryngospasm - bleeding in the mouth - bleeding between the soft tissues (Compression airway obstruction) - obstruction caused edema - backwards falling tongue

Complications

Hypoxaemia

Arrhythmias

Emphysema

Dislocation of temporo-mandibular joint

Tooth fracture

Bleeding

Mucosa injury

Operating room pollution

General anaesthesia in outpatient surgery

- The surgical procedure usually lasts not longer than one hour and there are no anticipated post operative complications. ASA physical status class I or II.
- Advantages of outpatient surgery:
 - Cost savings
 - Conserving hospital beds for other patients
 - Fewer nosocomial infections
 - Fewer thromboembolic complications
 - Suitable conditions for the surgeon during surgery
 - Reduces the psychological burden of patients
- Types:
 - Relative analgesia (Inhalation sedation technique)**
 - Conscious sedation (Sedoanalgesia)**

Relative analgesia

Inhalation sedation technique

- **Premedication** is advised in form of oral alprazolam or midazolam, but it can delay recovery
- **Elements:**
 1. administration of nitrous oxide in oxygen (0-70%);
 2. nitrous oxide begins to exert its pharmacological effects
 3. use of failsafe gas preventing accidental administration of 100% nitrous oxide.
e.g. Sevoflurane 0.1-0.3% and 40% nitrous oxide in oxygen has been used for inhalational conscious sedation in children

A proper consent is taken. Intravenous induction with propofol is done in adults and older children. Neuromuscular blockade is achieved with atracurium or vecuronium

Conscious sedation (Sedoanalgesia)

Conscious sedation may be induced by any one of the following modalities:

1. Oral administration of a single sedative drug (midazolam, diazepam, alprazolam, lorazepam, zolpidem, promethazine, chloral hydrate).
2. Nitrous oxide and oxygen
3. Combination of oral sedative drugs or nitrous oxide and oxygen with an oral sedative drug
4. Parenteral administration of sedative drugs (intravenous- midazolam, propofol; intramuscular; subcutaneous; submucosal or intranasal- midazolam)

Drugs used in intravenous anaesthesia

Benzodiazepine (midazolam): dose-dependent anxiolytic, sedative and hypnotic

- Onset of action within 2-3 min. - Action time 10-15 min.
- Elimination half time 1.5-2 h.
- Sedo-analgesia: Dose, 0.05-0.1 mg / kg
- Antagonist flumazenil: **Anexat** (0.1-0.2 mg i.v.)
- Relative contraindications: obesity, Alcoholabusus, hepatopathy, older age

Propofol:

- Lipid emulsion - for induction of anesthesia 1.5-2.5 mg / kg,
- Onset of 30-45s - Duration of hypnotic effect 4-6 min
- Elimination half-time 1-3 h
- No analgesic effect – side effects: apnea, hypotension - Does not antagonists

Barbiturate: thiopental (Trapanal)

- No analgesic effects
- Dose 4-5 mg / kg i.v. - Onset of 20-50 s - Duration of hypnotic effect 5-10 min.
- Elimination half-time 5-10 h
- Antikunvulziv effect (epilepsia)
- Laryngo- and bronchospasm (histamine release)
- Contraindication: porphyria, asthma, allergy, severe liver damage

Nalbuphin (Nubain)

- belongs to opioids
- Duration of action is approximately 2-3 h

Aftercare

Observation

Modern anaesthetic drugs permit rapid recovery of consciousness and early discharge, but it should be recognised that it may take more than 24 hours for all traces of the agents to be eliminated.

Thus when, in the opinion of the anaesthesiologist, patients are ready for discharge they must be accompanied by a responsible, legally competent adult who has been given clear instructions regarding the implications of anaesthetic 'hangover' effects.