

Mutaha university

Introduction to anaesthesia

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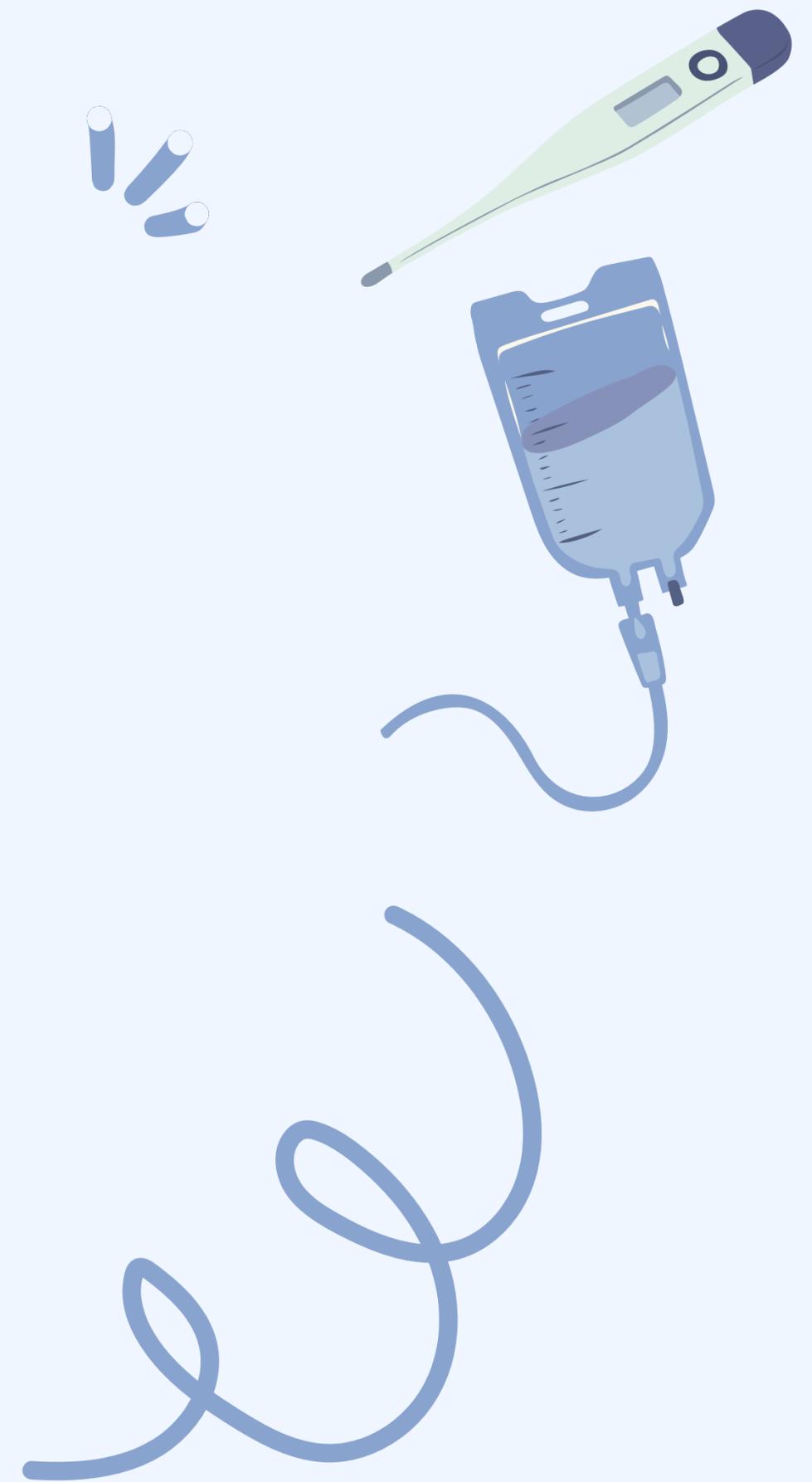
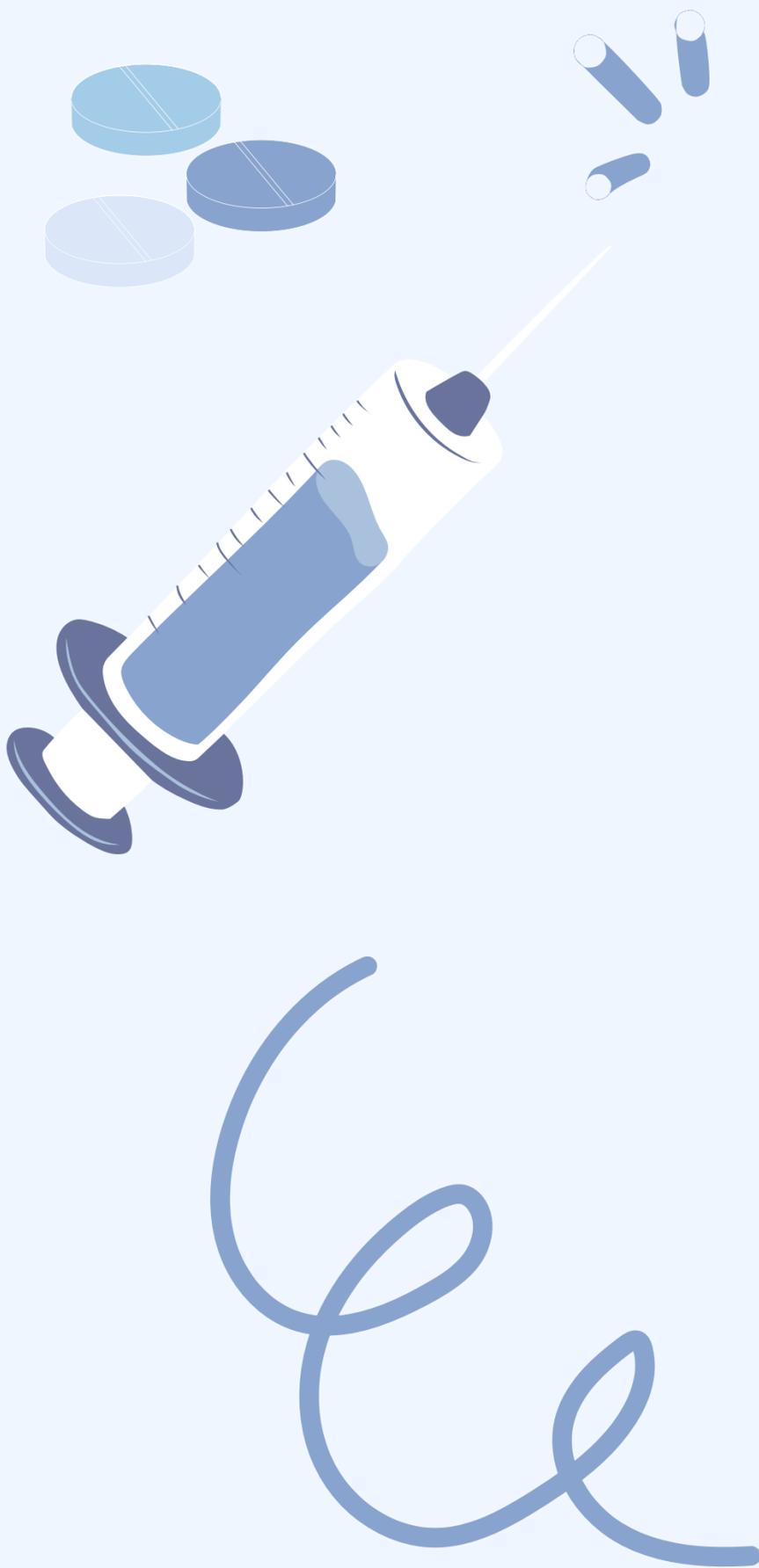
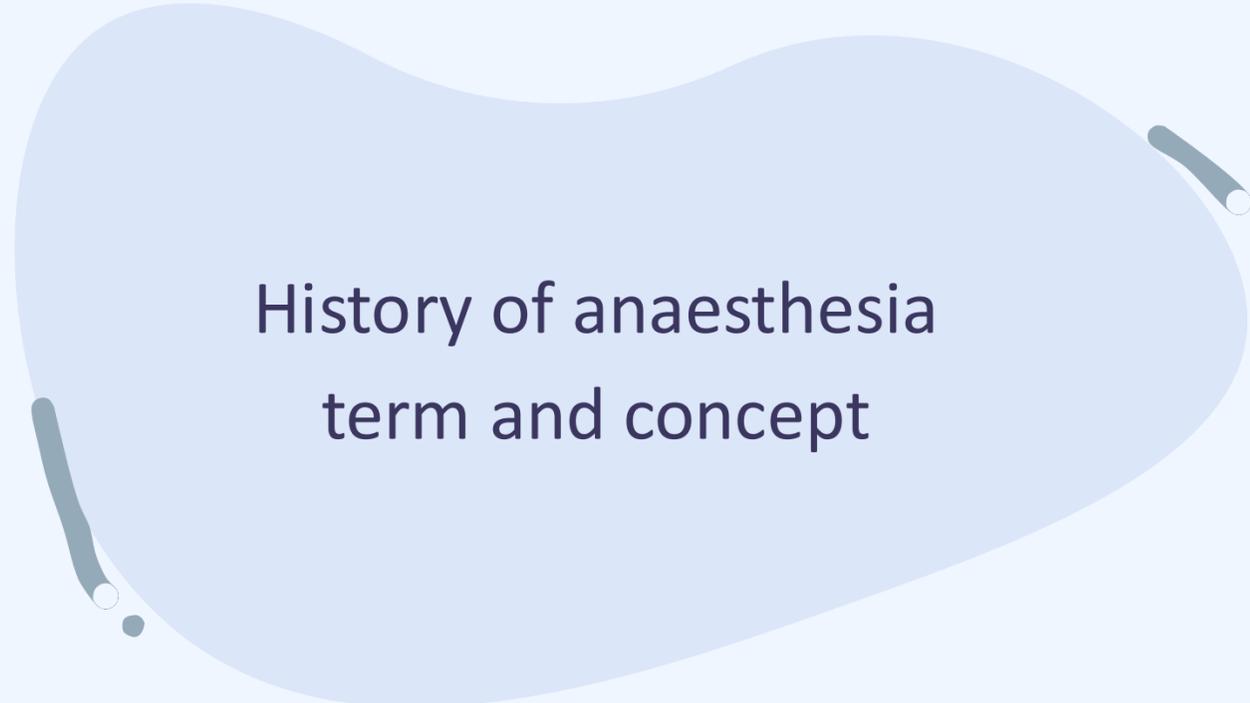


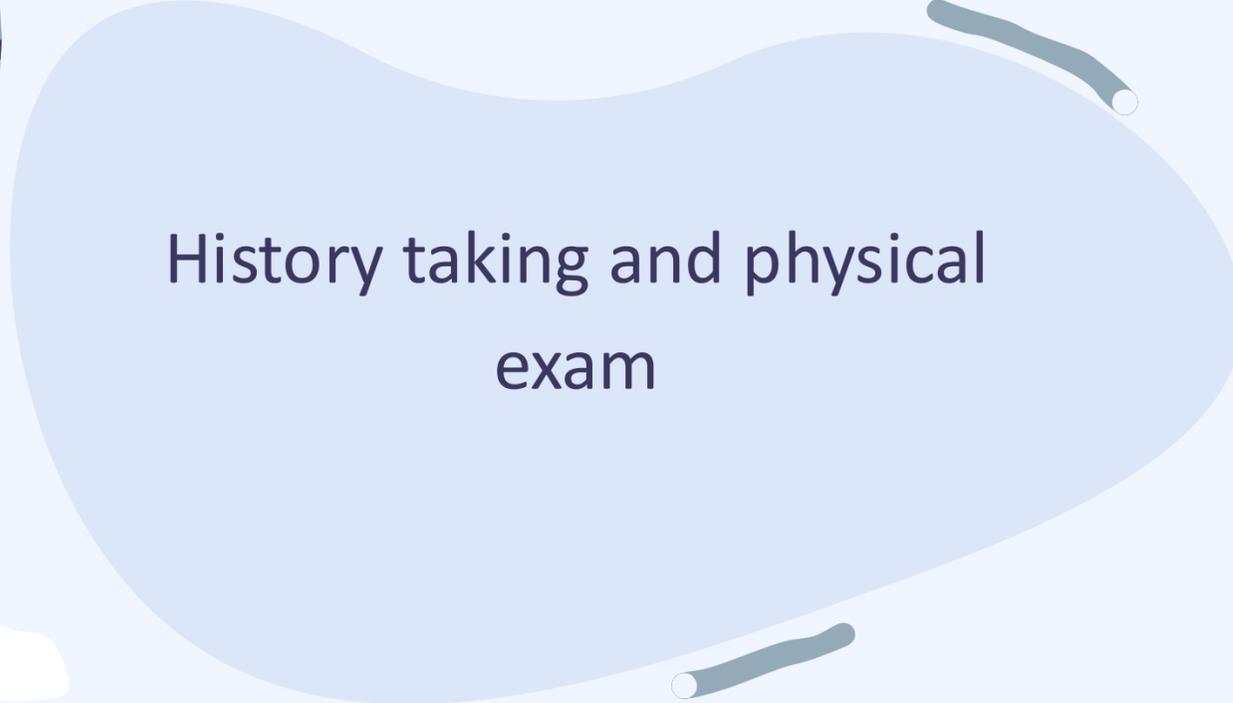
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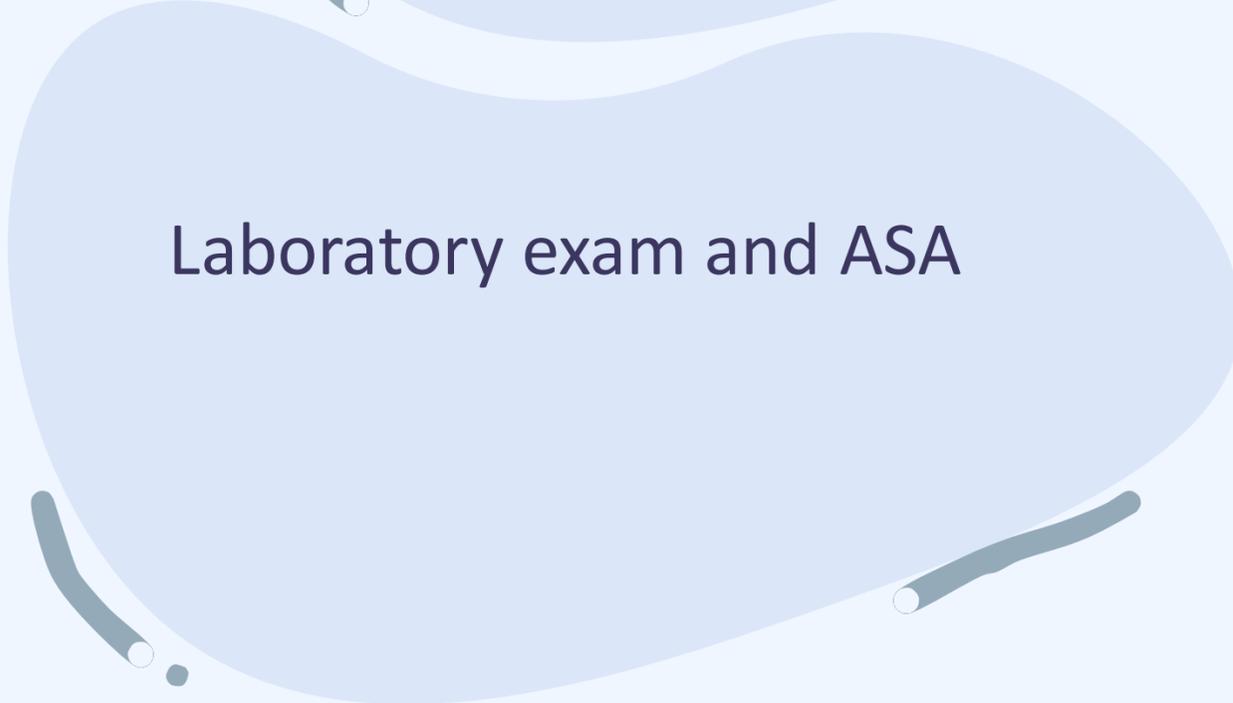
History of anaesthesia
term and concept



Stage and phases



History taking and physical
exam



Laboratory exam and ASA

History

Before 1846

Few drugs / plants products used to remove pain:

Alchole -opium-cocaine

Other method /non drugs method used to remove pain

cold-concussion -carotid compression -hypnosis



1804

The first reliable documentation of an operation to be performed under general anesthesia was conducted by the Japanese surgeon, Hanaoka Seishu, in 1804 who performed a partial mastectomy for breast cancer on a 60-year-old woman.

He used an oral solution composed of blend of some herbal extracts to perform the anesthesia.



Terminology



Anaesthesia

is a state of controlled, temporary loss of sensation or awareness that is induced for medical purposes



Anesthesiology

is the medical specialty concerned with the total perioperative care of patients before, during and after surgery.



Anesthesiologist

A physician specialized in anesthesiology.

Triad of anaesthesia

Analgesia

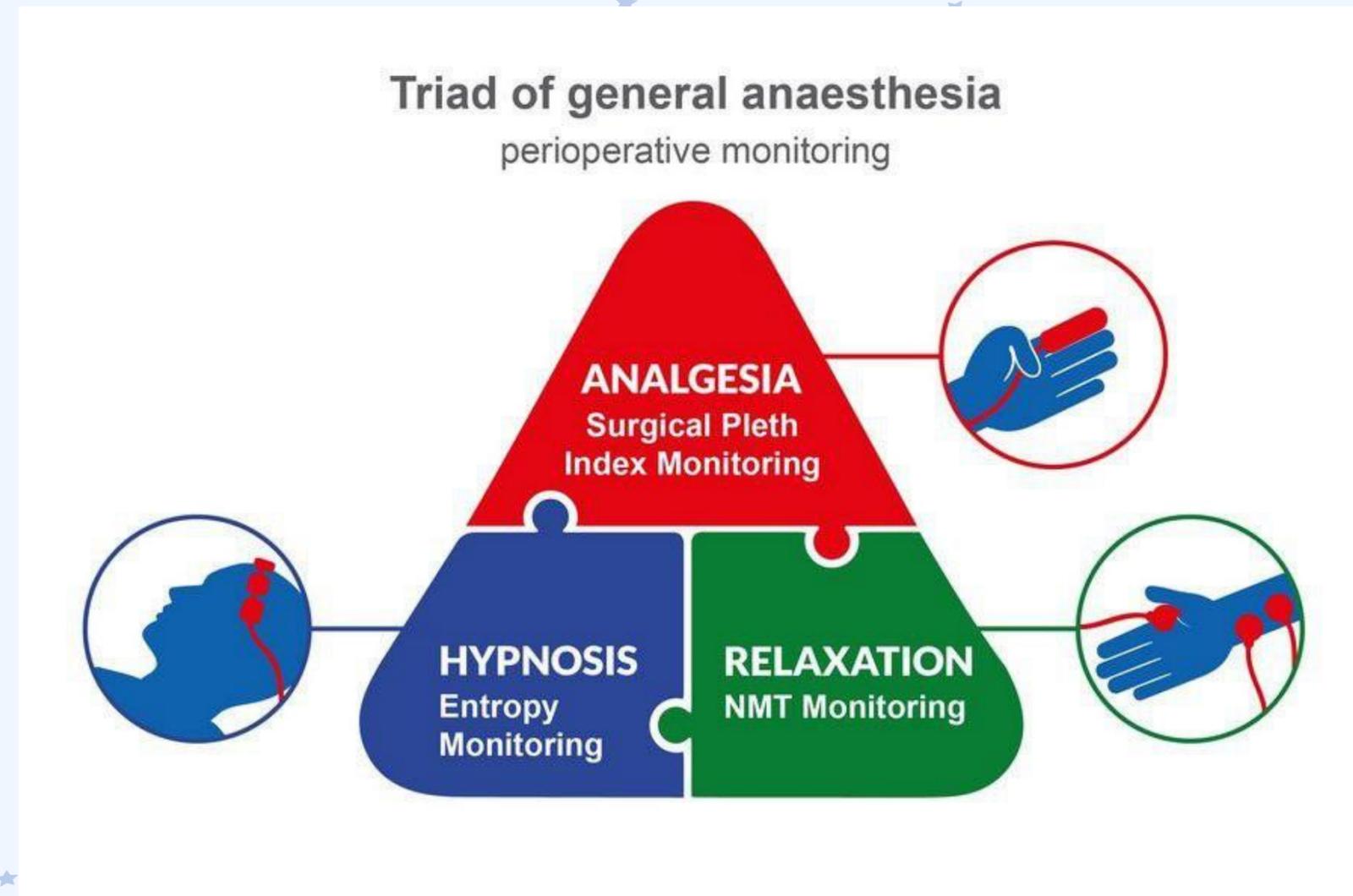
The loss of physical sensation with or without loss of consciousness

Muscle relaxation

Aided by drug which affect skeletal muscle function and decrease the muscle tone by which immobility and relaxation of the skeletal muscle produced

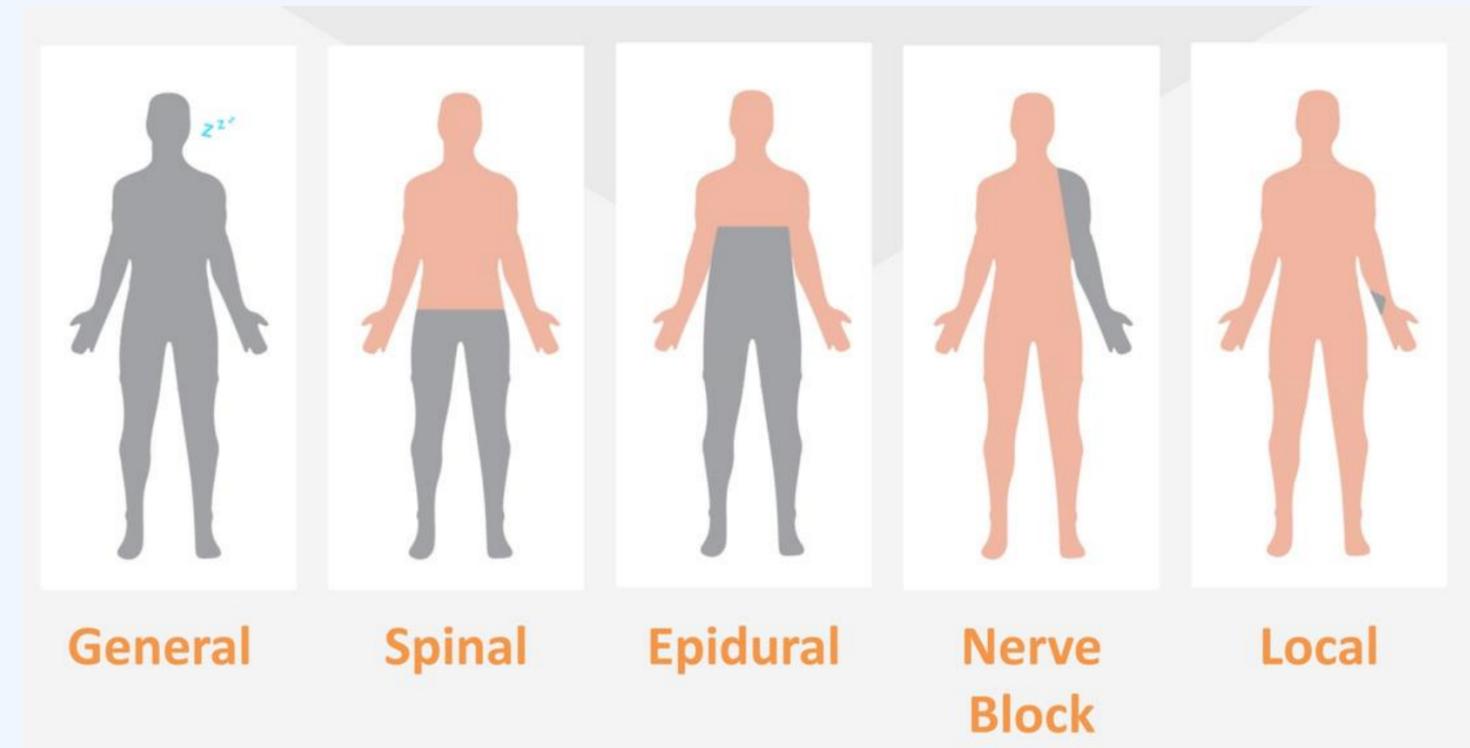
Hyponosis(amnesia)

Refer to the loss of memories, such as fact, information and experience and usually anterograde amnesia



Types of Anesthesia

General
spinal
Epidural
nerve block
Local

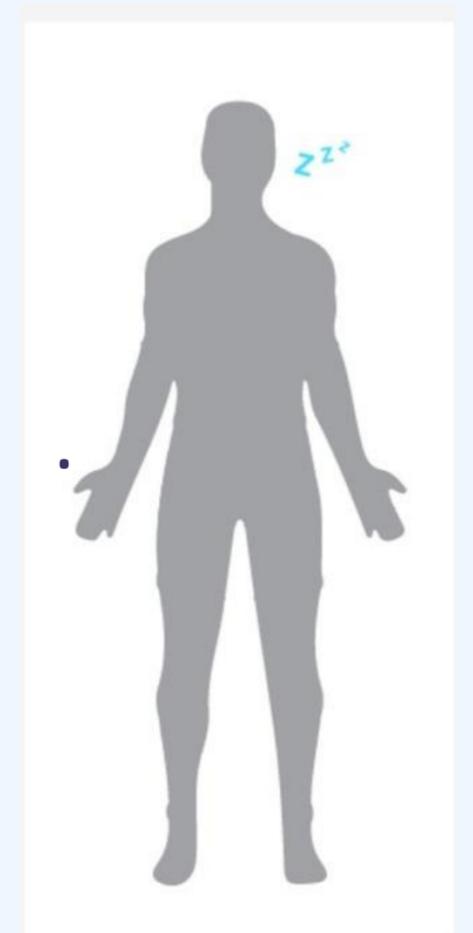
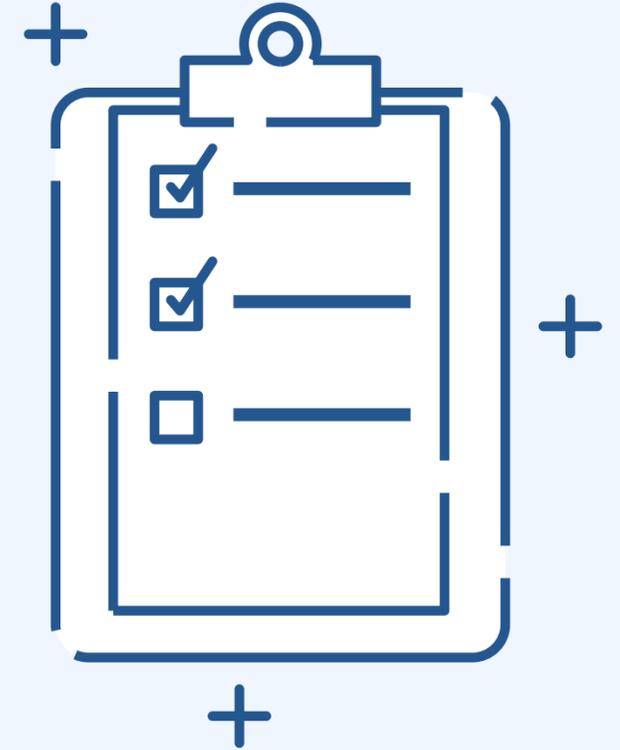


General anaesthesia

an altered physiological state characterized by reversible :

- **Loss consciousness**
- **analgesia** of the entire body
- **amnesia**
- some degree of **muscle relaxant**

it administered by intravenously or through inhalation



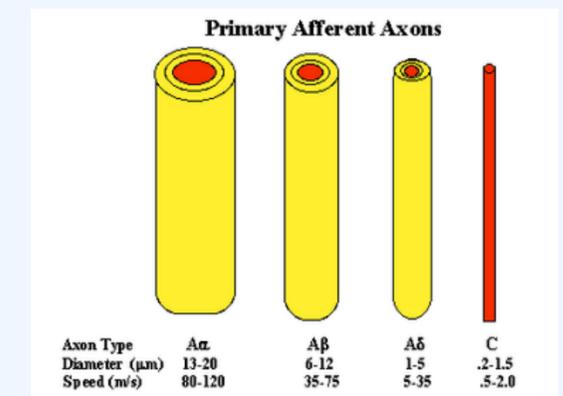
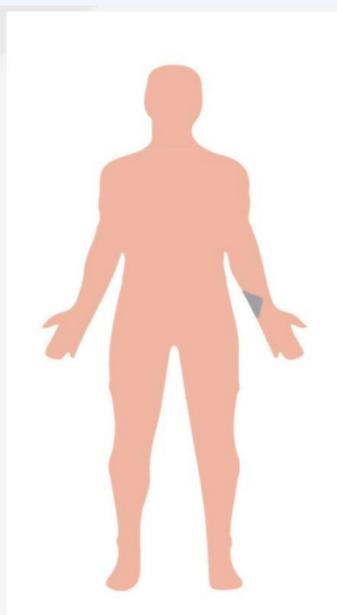
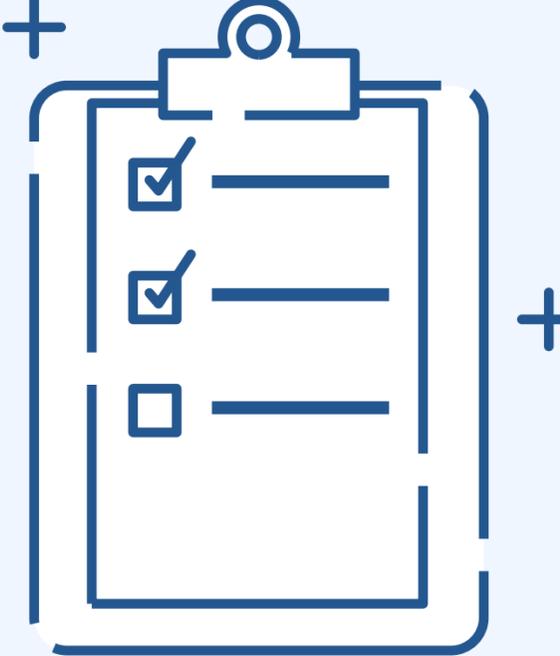
Local anaesthesia

techniques depend on a group of drugs that produces **transient loss of autonomic, sensory and motor function** when the drugs are injected or applied to neural tissue.

it is used when nerve can easily be reached by drops, sprays, ointment or injection. you stay conscious, but free from pain.

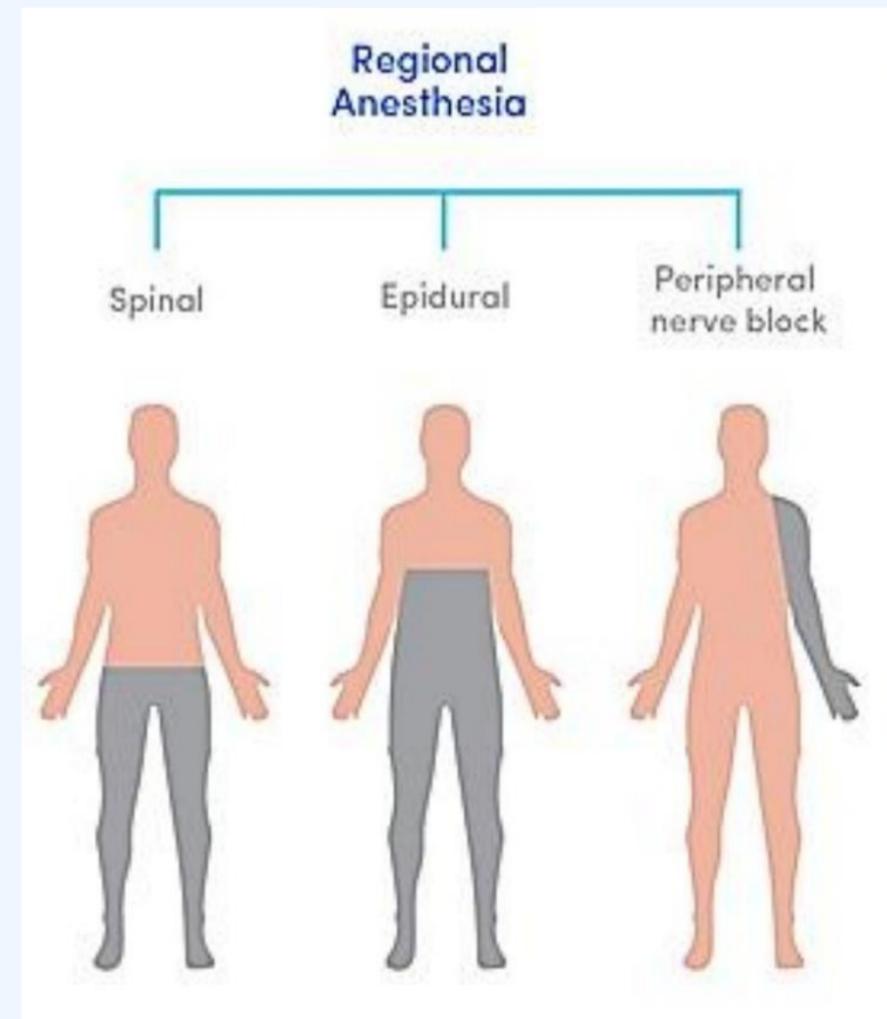
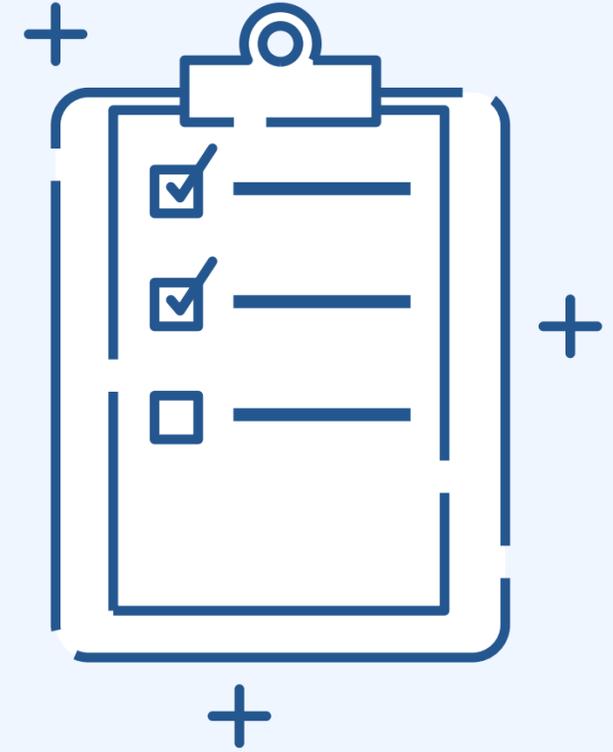
common examples for surgery using local anaesthesia are having **teeth removed** and some common **operations of the eye**.

Note: autonomic > sensory > motorbased on nerve fibers size
(Differential block)



Regional anaesthesia

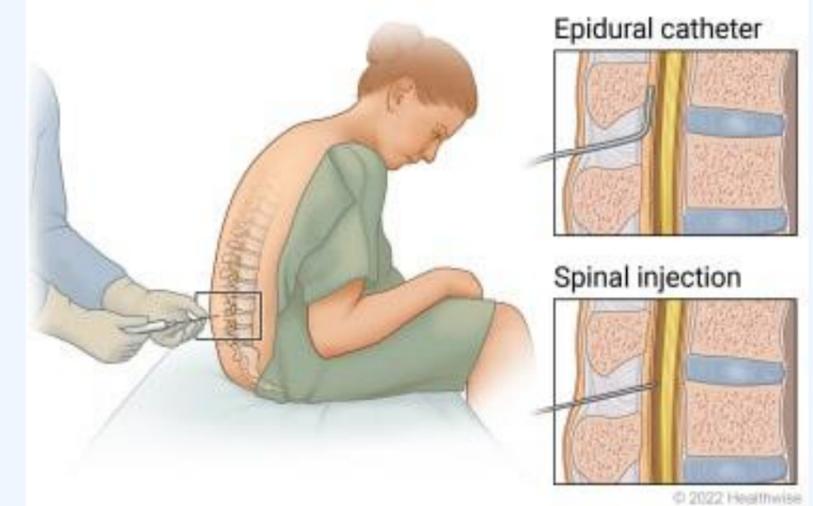
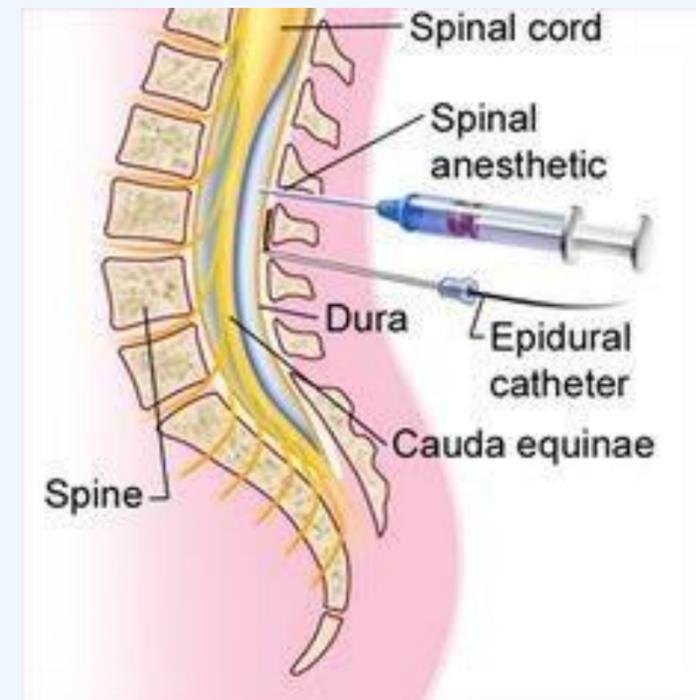
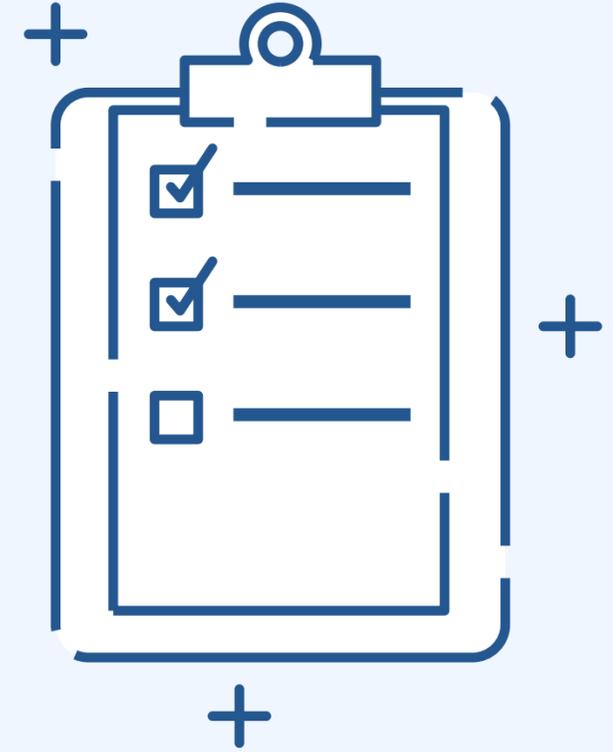
This is when a local anesthetic drug is injected near to the nerves that supply a larger or deeper area of the body. The area of the body affected becomes numb. (Spinal and epidural, nerve block)



A) Spinal & epidural

Spinals and epidurals are the **most common** types of regional anesthetics.

These injections can be used for operations on the **lower body**, such as caesarean section, bladder operations or replacing a hip. You stay conscious, but free from pain



SPINAL ANESTHESIA VERSUS EPIDURAL ANESTHESIA

Spinal anesthesia involves injecting anesthetic drugs to the cerebrospinal fluid

Epidural anesthesia involves injecting anesthetic drugs to the epidural space

Does not use a catheter

Medication will be passed through a catheter

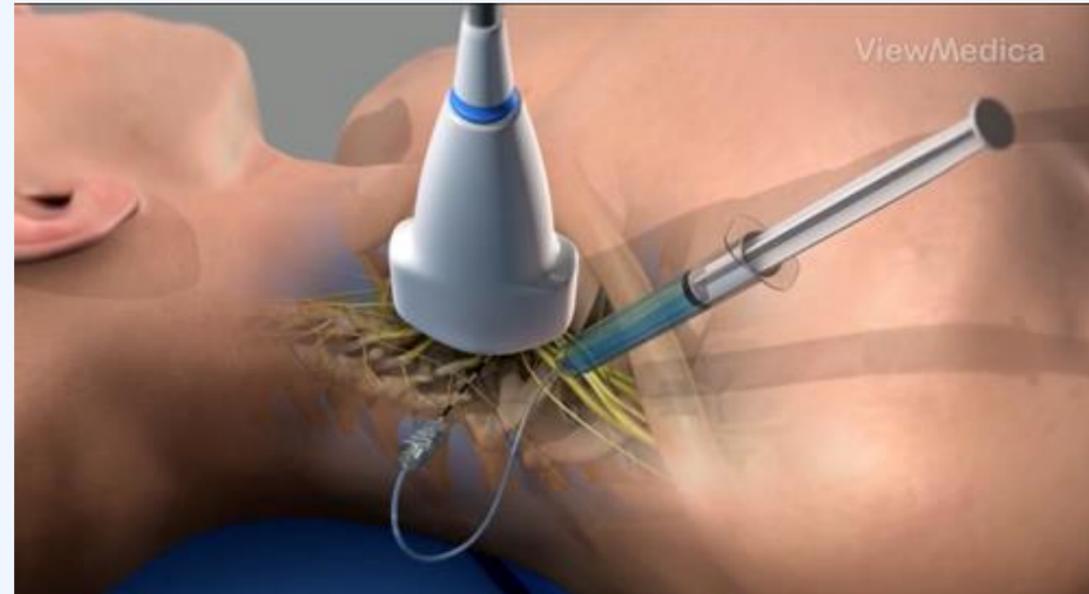
Can be used for lower limb and pelvic surgeries

Can be used for lower limb and pelvic surgeries, and child delivery

B) Nerve block

injection placed **near to a nerve or group of nerves**, for example in the arm or leg

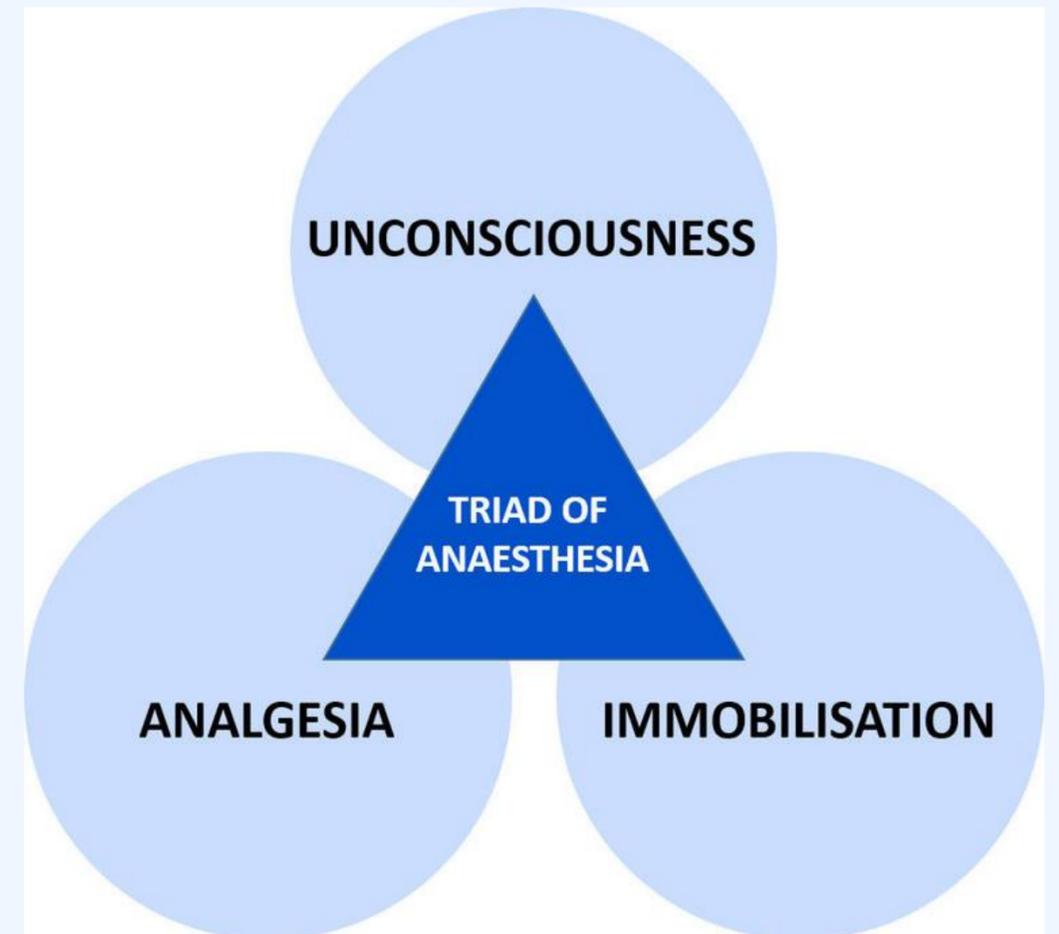
Nerve blocks are also useful for pain relief after the operation, as the area will stay numb for a number of hours (**brachial plexus block**)



Balanced Anesthesia

No one anesthetic agent can produce analgesia, muscle relaxation, loss of body sensations and amnesia, so we employ Balanced Anesthesia in which a **“cocktail”** of different drugs is used to achieve the goals on general anesthesia.

Balanced Anesthesia uses a combination of agents to limit the doses and toxicity of each drug. The objectives of Balanced Anesthesia are to calm the patient, minimize the pain, and reduce the potential for adverse effects associated with analgesic and anesthetic agent



Balanced Anesthesia

Analgesic or painkiller :is any member of the group of drugs used to achieve analgesia, relief from pain (They are distinct from anesthetics Analgesia is pain relief without loss of consciousness and without total loss of feeling or movement Ex (Opioids, NSAIDs, Ketamine .)

Amnesia: refers to the loss of memories, such as facts, information and experiences. Ex (Propofol, Benzodiazepines...)

Balanced Anesthesia

Muscle relaxation: is a type of drug that causes muscle contraction to cease and decrease its tone. By block the nerve impulses to the muscles. They sometimes are also referred to as neuromuscular blocking agents Ex (Succinylcholine, Atracurium ...)

Anxiolytics, or anti-anxiety drugs: are a category of drugs used to prevent anxiety and treat anxiety related to several anxiety disorders. Ex (Benzodiazepines, Alpha-2 Agonists ..)

Stages of Anesthesia

Four main stages are recognized based upon:

- *Patient's body movements
- *Respiratory rhythm
- *Oculomotor reflexes
- *Muscle tone



Stages of Anesthesia

Signs of
~~Stages of~~ Anesthesia

	1.	2.	3.	4.	5.	6.	7.	8.
1 st Analgesia	~~~~~		○ ○	○ ○	○ ○			
2 nd Excitement	~~~~~	++++						
3 rd Surgical	1 ~~~~~	XXXX XXX XX	○ ○	○ ○	○ ○			
	2 ~~~~~		○ ○	○ ○	○ ○			
	3 ~~~~~		○ ○	○ ○	○ ○			
	4 ~~~~~		○ ○	○ ○	○ ○			
4 th Respiratory Paralysis								

Column 1 - Respiration.
 " 2 - Eyeball movement.
 " 3 - Pupils without any premedication.
 " 4 - Pupils with morphine gr 1/4 and atropine or scopolamine gr 1/150.
 " 5 - Pupils with morphine gr 1/4 alone.
 " 6 - Eyelid reflex.
 " 7 - Area of swallowing.
 " 8 - Area of vomiting.

Stage 1

(Amnesia and analgesia)

stage from beginning of the anesthetic to the loss of consciousness. (Amnesia and analgesia)
During this stage, the patient progresses from analgesia without amnesia to analgesia with amnesia. Patients can carry on a conversation at this time

Stage 2

(Excitement)

from loss of consciousness to onset of automatic breathing. Eyelash reflexes disappear but other reflexes remain intact. During this stage, the patient's respiration and heart rate may become irregular in addition, there may be uncontrolled movements, vomiting, suspension of breathing, and pupillary dilatation

Because the combination of spastic movements, vomiting, and irregular respiration may compromise the patient's airway, rapidly acting drugs are used to **minimize time** in this stage and reach Stage 3 as fast as possible

Stage 3

surgical Anesthesia

From onset of automatic respiration to respiratory paralysis.

This is the targeted anesthetic level for procedures requiring general anesthesia. Airway manipulation safe at this level

Ceased eye movement and respiratory depression are hallmarks of this stage. Reaction to skin incision disappear.



planes of stage 3

plane

1

from onset of automatic respiration to cessation of eyeball movements.

Eyelid reflex is lost, swallowing reflex disappears, marked eyeball movement may

occur but conjunctival reflex is lost at the bottom.

Plane

2

from cessation of eyeball movements to beginning of paralysis of intercostal muscles.

Laryngeal reflex and corneal reflex disappear,

secretion of tears increases (a useful sign of light anesthesia), respiration is automatic and regular, movement and deep breathing as a response to skin stimulation disappears.

planes of stage 3

plane

3

from beginning to completion of intercostal muscle paralysis. Diaphragmatic respiration persists but there is progressive intercostal paralysis, pupils dilated and light reflex is abolished.

Plane

4

from complete intercostal paralysis to diaphragmatic paralysis (apne

stage 4

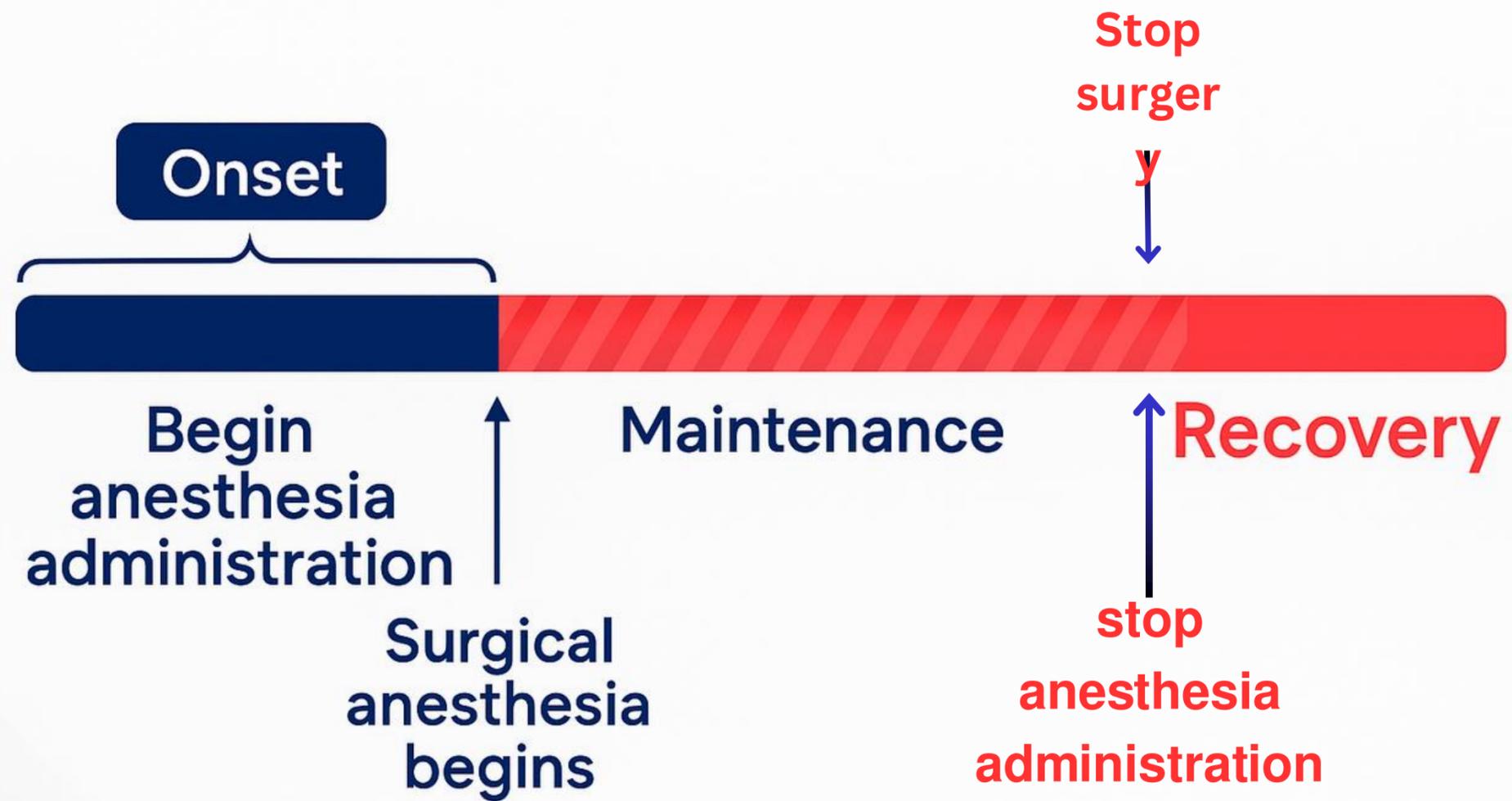
Medullary depression

Also known as overdose, occurs when too much

anesthetic medication is given relative to the amount of surgical stimulation and the patient has severe brainstem or medullary depression, resulting in a cessation of respiration and potential cardiovascular collapse. This stage is lethal without cardiovascular and respiratory support.



Phases of Anesthesia



Phases of Anesthesia

Induction: putting the patient to sleep (initial entry to surgical anesthesia).

Maintenance : keeping the patient asleep without awareness (Maintain depth of anesthesia, ventilation, fluid balance, hemodynamic control, homeostasis).

Emergence (recovery): waking the patient up(resumption of normal CNS function).

Extubation , resumption of normal respiration

Preoperative evaluation of patient



- Preoperative evaluation is important to provide better anesthesia service & prevent anesthesia complication.
- This evaluation is taking history and physical examination of patient as well as doing any indicated laboratory tests & imaging.
- the preoperative evaluation is an opportunity for the anesthesiologist to describe the proposed anesthetic plan in the context of the overall surgical and postoperative plan, provide the patient with psychological support, and obtain informed consent for the proposed anesthetic plan from the surgical patient. (morgan p297).

Preoperative evaluation of patient

History review:

- 1- Current problem and operation.
- 2- Past medical history (other known medical problems).
- 3- Drug history: drug allergy, intolerance, present medical therapy (DM & HTN), alcohol and tobacco intake.
- 4- Previous anesthetic history (Obstetric history & pain history & any complication).
- 5- Family history.
- 6- Social history.
- 7- last oral intake.
- 8- Review of system



History Review

Social History

Smoking history is very important

- why should we stop smoking before surgery

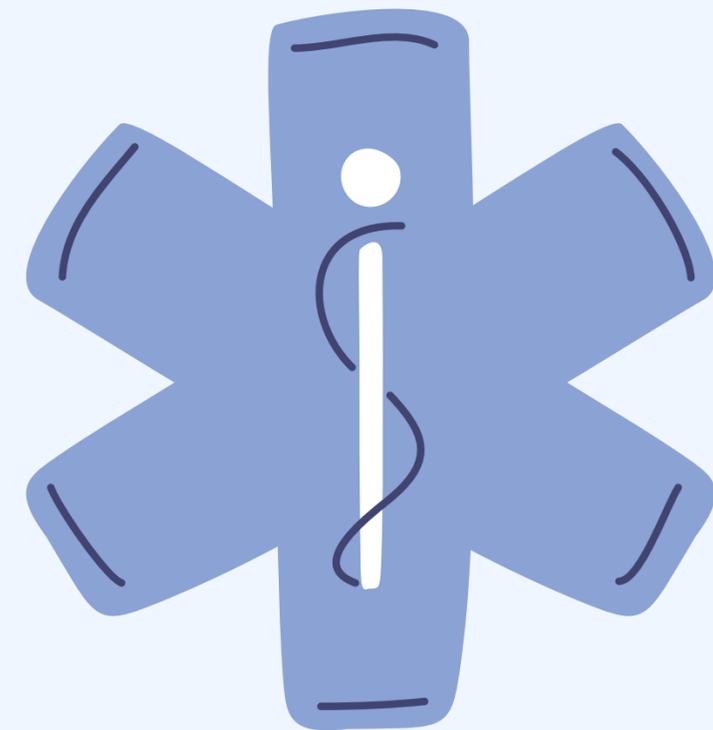
- . Improves lung function and oxygen levels

- Reduces anesthesia risks and complications

- Speeds up recovery and healing

- Normalizes autonomic nervous system balance

(↓ sympathetic overactivity, ↑ parasympathetic tone)



History Review

Social History



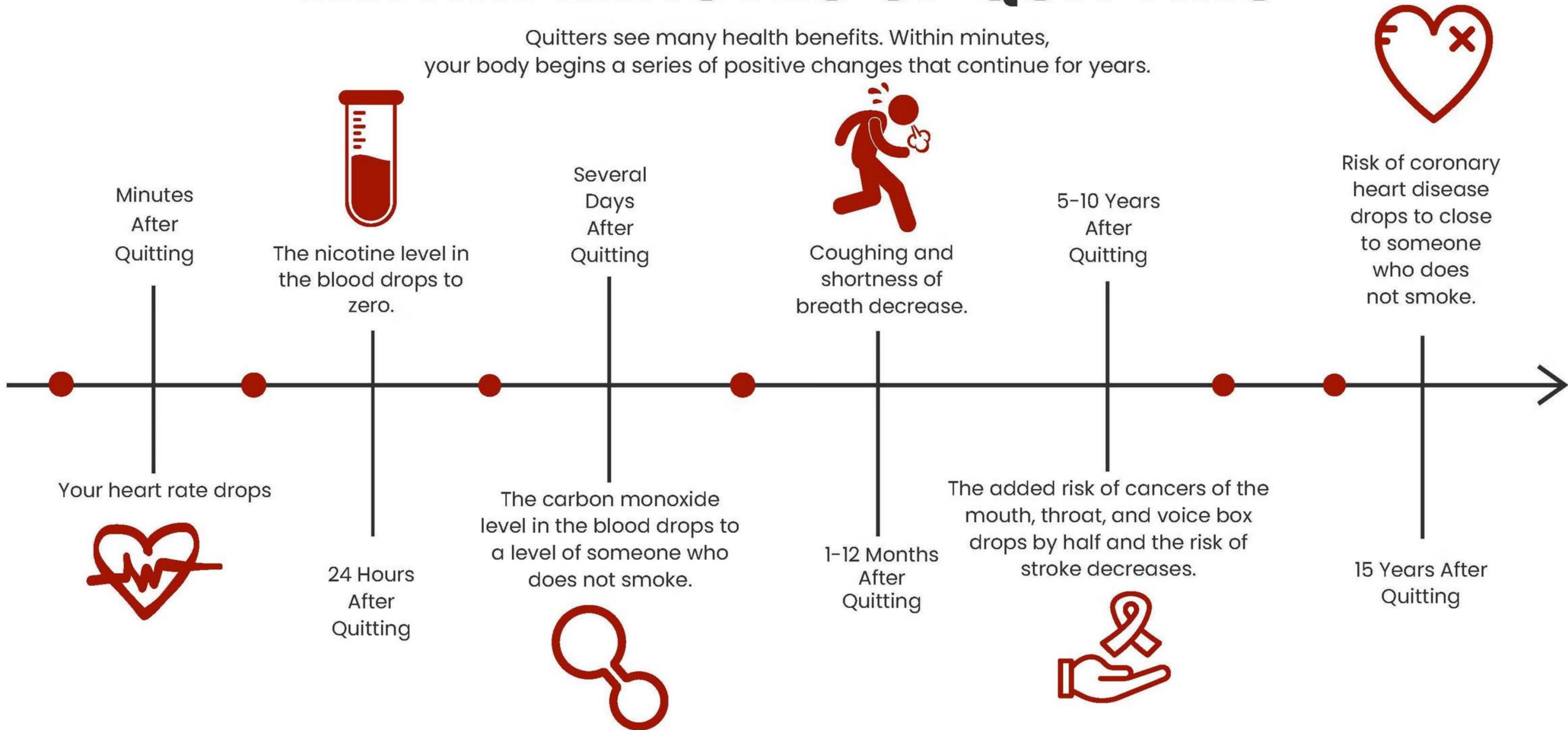
Timeline of Recovery After Quitting Smoking”

- 4-6 hrs decrease Carboxy Hb
- 12-24 hrs decrease nicotine (nicotine is a sympathomimetic and a coronary vasoconstrictor)
- 6-8 weeks normalize mucociliary function
- 2-3 months normalize pulmonary function
- 6-12 months returns to non-smoker lung



WITHIN MINUTES OF QUITTING

Quitters see many health benefits. Within minutes, your body begins a series of positive changes that continue for years.



History Review

Last oral intake

- In case of Elective surgery :
- Clear fluids → 2 -4 hours
- Milk (Breast milk) → 4 hours
- Milk (Formula) → 6 hours
- light food → 6 hours
- Heavy food → 8 hours



History Review

Review of Systems

- RS & CVS
- Renal & electrolyte imbalance
- Hematology
- GI
- Neurological
- Endocrine
- Psychiatric
- Musculoskeletal & dermatological



Physical Examination

1- vital signs and general examination

2- airway assessment (LEMON)

L Look externally

E Evaluate

M Mallampati score

O Obstruction

N Neck mobility

3- heart (HR, B.P, S1 & S2, PULSE)

4- lung (crackles, wheezing, Resp. rate ,dyspnea)

5- neurological examination

6- extremities, edema, deformity



Laboratory Investigations

<u>Investig</u>	<u>Sex</u>	<u>Age</u>
Null	Male	< 40
CBC (Hb)	Female	< 40
CBC (Hb)	M / F	Infant
ECG & BLOOD sugar & Kidney function test	Male	40-60
CBC(Hb) & ECG & BLOOD sugar & Kidney function test	Female	40-60
ALL	M > 40 F > 50	> 60

*** Male > 40 and Female > 50 → Need ECG**



Laboratory Investigations

If a patient is known to have certain diseases, do investigations according to disease existent

- Thyroid → T3 ,T4 ,TSH
- D.M → Glucose level
- Renal disease and hypertension → electrolytes & creatinine
- Liver disease or anticoagulant therapy → INR, aPTT

- aPTT → activated partial thromboplastin time
- INR → international normalized ratio



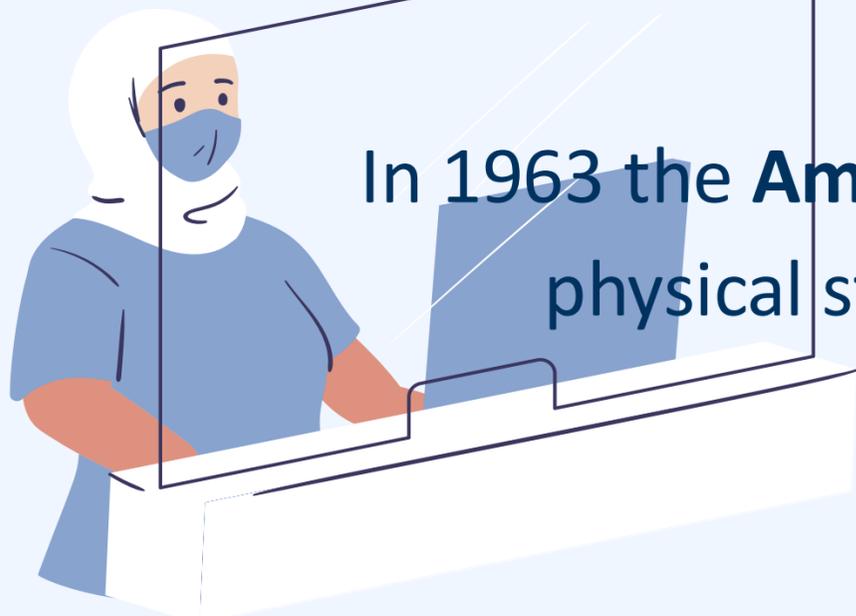
ASA Classification

The ASA physical status classification system is a system for assessing the fitness of patients before a surgical procedure that requires anesthesia.

The purpose of ASA classification is to:

- Keep a record of your health before surgery.
- Provide a uniform system for all anesthesiologists to use.
- Help predict your risk of surgical complications, along with other factors like the type of surgery, your age, the extent of the procedure, surgery timeframe and more.

In 1963 the **American Society of Anesthesiologists (ASA)** adopted a five category physical status classification system; a sixth category was later added.



<u>ASA 1</u>	A normal healthy patient.	Example: Fit, nonobese (BMI under 30), a nonsmoking patient with good exercise tolerance.
<u>ASA 2</u>	A patient with mild systemic disease.	Examples: Patient with no functional limitations and a well-controlled disease (e.g., treated hypertension, obesity with BMI under 35, frequent social drinker, or cigarette smoker).
<u>ASA 3</u>	A patient with a severe systemic disease that is not life-threatening.	Examples: Patient with some functional limitation due to disease (e.g., poorly treated hypertension or diabetes, morbid obesity, chronic renal failure, a bronchospastic disease with intermittent exacerbation, stable angina, implanted pacemaker).
<u>ASA 4</u>	A patient with a severe systemic disease that is a constant threat to life.	Examples: Patient with functional limitation from severe, life-threatening disease (e.g., unstable angina, poorly controlled COPD, symptomatic CHF, recent (less than three months ago) myocardial infarction or stroke).
<u>ASA 5</u>	A moribund patient who is not expected to survive without the operation. The patient is not expected to survive beyond the next 24 hours without surgery	Examples: ruptured abdominal aortic aneurysm, massive trauma, and extensive intracranial hemorrhage with mass effect.
<u>ASA 6</u>	A brain-dead patient whose organs are being removed with the intention of transplanting them into another patient.	The patient is deceased

Note: The addition of “E” to the ASAPS (e.g., ASA 2E) denotes an emergency surgical procedure. The ASA defines an emergency as existing “when the delay in treatment of the patient would lead to a significant increase in the threat to life or body part,

Increase risk of morbidity & mortality in anesthesia

- Age > 70
- Smoking
- MI < 6 months OR unstable angina within 3 m
- Pulmonary edema < 1 week
- Hb < 10 g/dl
- Urea > 20 mmol/L & dehydration
- Wt. loss > 10% in 1 month
- Severe medical illness, sepsis, emergency, major operation.



Patients who are at increased risk of aspiration during surgery

- o Abdominal pathology, especially obstruction.
- o Delayed gastric emptying (e.g. pain, opioids).
- o Incompetent lower esophageal sphincter
- o Altered conscious level resulting in impaired laryngeal reflexes
- o Pregnancy

Rapid Sequence Induction (RSI)

Rapid sequence induction (RSI) is an established method of inducing anesthesia in patients who are at risk of aspiration of gastric contents into the lungs. It involves loss of consciousness during cricoid pressure followed by intubation without face mask ventilation. The aim is to intubate the trachea as quickly and as safely as possible.

Need rapid induction and intubation

Full stomach

Bleeding

Obstetric delays stomach emptying

Diabetes with gastroparesis

Pregnancy (especially in the 2nd & 3rd trimesters)

Non-fasting emergency surgery



Thank you for your
attention

