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Introduction to Anesthesia

“Understanding the Concept”

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Learning Objectives

- Define anesthesia and related terms
- Understand types and stages of anesthesia
- Recognize the triad of general anesthesia
- Review history and evolution of anesthesia
- Operation room 101

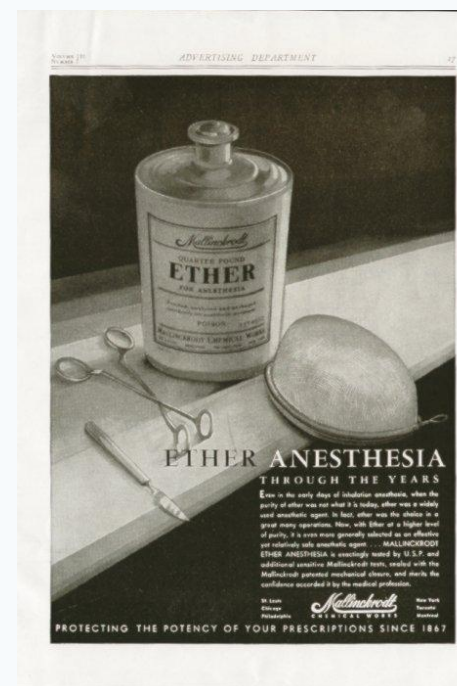
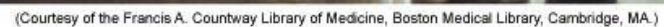
Anesthesiology is a young specialty historically, especially when compared with surgery or internal medicine.

Discoveries in anesthesiology have taken decades to build upon the observations and experiments of many people, and in some instances, we are still searching.

(i.e the ideal volatile)

Evolution of Anesthesia: From Ancient Roots to Precision Medicine

- 3000 BC–Middle Ages: Ancient use of opium, alcohol, herbal sedation, and 'sleep sponges'
- 1772–1840s: Discovery Era – Nitrous oxide (Priestley), Ether (Long, Morton), Chloroform (Simpson)
- 1880–1900s: Local & Regional Advances – Cocaine (Koller), Spinal anesthesia (Bier), Procaine
- 1930–1990s: Modern General Anesthesia – IV agents, halothane, isoflurane, sevoflurane, desflurane
- 1980s–2000s: Monitoring & Safety – Pulse oximetry, capnography, BIS, balanced anesthesia
- 2000s–Present: Precision Era – TCI, pharmacogenomics, AI-driven predictive anesthesia
 - The Era of Precision Anesthesia: From Genes to Smart Algorithms



Consciousness

"Our continuing stream of Awareness of either our surroundings or our sequential thoughts"

Anesthesia

- Anesthesia: Loss of feeling or Sensation

**Latin terminology:*

An ===== No

aesthesia Sensation

Partial or **complete** loss of sensation

with or without loss of consciousness

result of disease, injury, or administration of an anesthetic agent, usually by injection or inhalation

Anesthesia has three main types:

1-*General anesthesia* :

Induces a reversible, controlled state of unconsciousness, along with a lack of sensation and memory during them procedure.

2- Regional anesthesia :

Blocks sensation in a larger region of the body, such as an arm or lower body (patient remain conscious).

3-Local anesthesia :

Numbs a small, specific area of the body (patient Remain conscious) .

The goal is to make the procedure pain-free and ensure the patient remains safe and relaxed.

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Sedation

A medical process where medications are used to:

- Calm or relax a patient
- Reducing anxiety and discomfort
- Without fully putting them to sleep.

Sedation Levels vs Clinical Features

Feature	MILD	Moderate	Deep
Responsiveness	Normal response	Purposeful response to verbal/tactile stimuli	Purposeful response only after repeated/painful stimuli
Airway	Unaffected	Usually maintained	May require support
Spontaneous Ventilation	Unaffected	Adequate	May be inadequate
Cardiovascular Function	Unaffected	Usually maintained	Usually maintained
Use Examples	Anxiolysis (pre-op meds)	Endoscopy, minor surgery	Debridement, painful procedures

Analgesia

- “The state of freedom from pain”
- Can be effected locally, and the patient is still conscious “e.g. by use of local Anesthetics”.
- Can be generalized and patient still coconscious
 - - Systemic Analgesic Drugs.
 - - “stage-one general Anesthesia“.....
(see below)
- Can be part of deep general Anesthesia.
- **So, Anesthesia and analgesia are not interchangeable words!

Muscle Relaxation

“ Rendering the muscles less tense by decreasing their tone, or even paralyzing them ”.

Can be obtained in different ways:

By Central depression of the nervous system.

By local anesthesia of peripheral nerves.

By blocking the neuromuscular junction.

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General Anesthesia

General Anesthesia clinically implies that:

The patient has been rendered reversibly unconscious by DRUGS for the execution of a painful operative or diagnostic test.

Modern “Balanced” General Anesthesia

An altered physiologic state, characterized by Reversible loss of Consciousness, analgesia of the entire body, amnesia, and some degree of Muscle Relaxation.

This is brought about by different groups of drugs that has different specific actions:

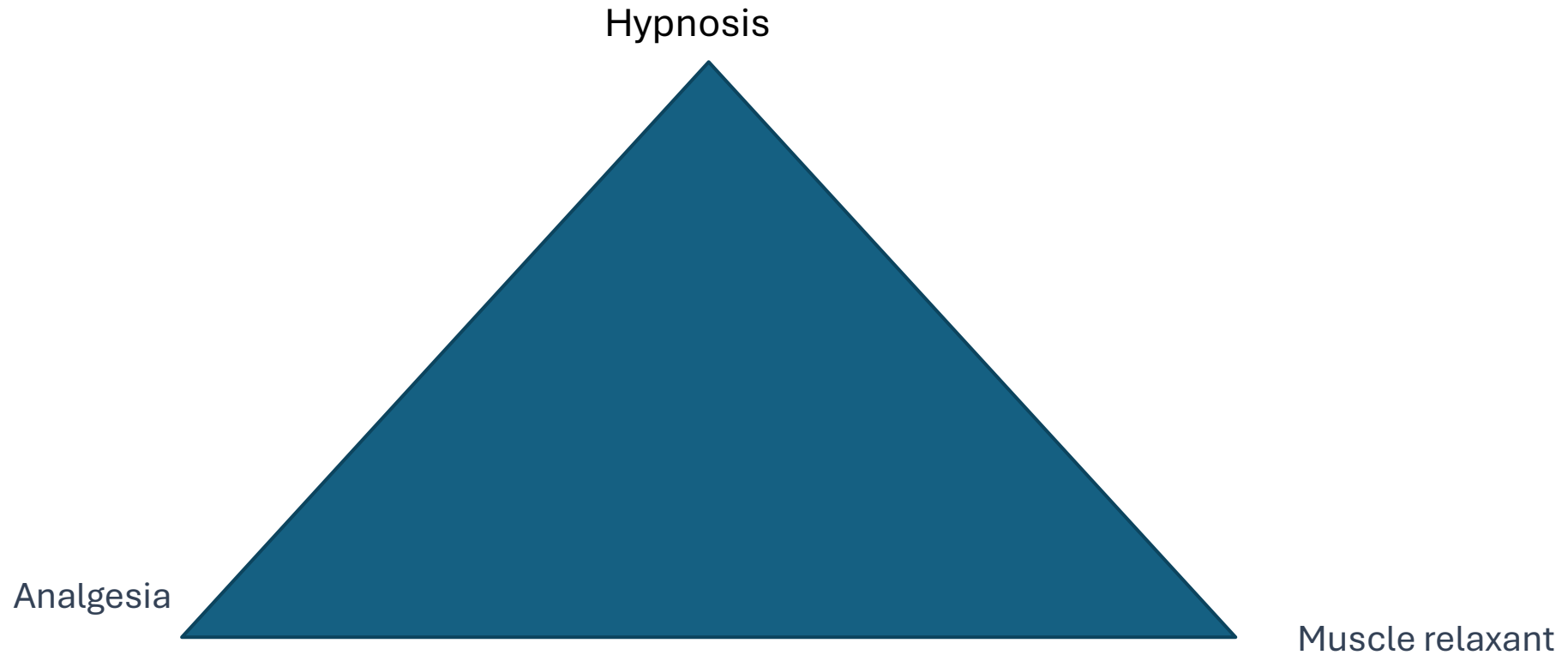
Hypnotic drugs for effecting Loss of Consciousness.

Analgesic Drugs for effecting analgesia.

Muscle relaxant Drugs for effecting muscle paralysis.

This is in comparison with “Old Anesthesia” where all of the above actions were effected by a single agent (e.g. Ether) at high concentrations with higher incidence of side effects.

Triad of General Anesthesia



General Anesthesia

- IT is not a single, all-or-non state of altered Consciousness; rather, it is a continuum of alteration of Consciousness, brought about by increasing plasma and CNS levels of the anesthetic agent.
- *This continuum can be classified into stages characterized by cumulative development of different clinical states of consciousness.*

Stages of Anesthesia

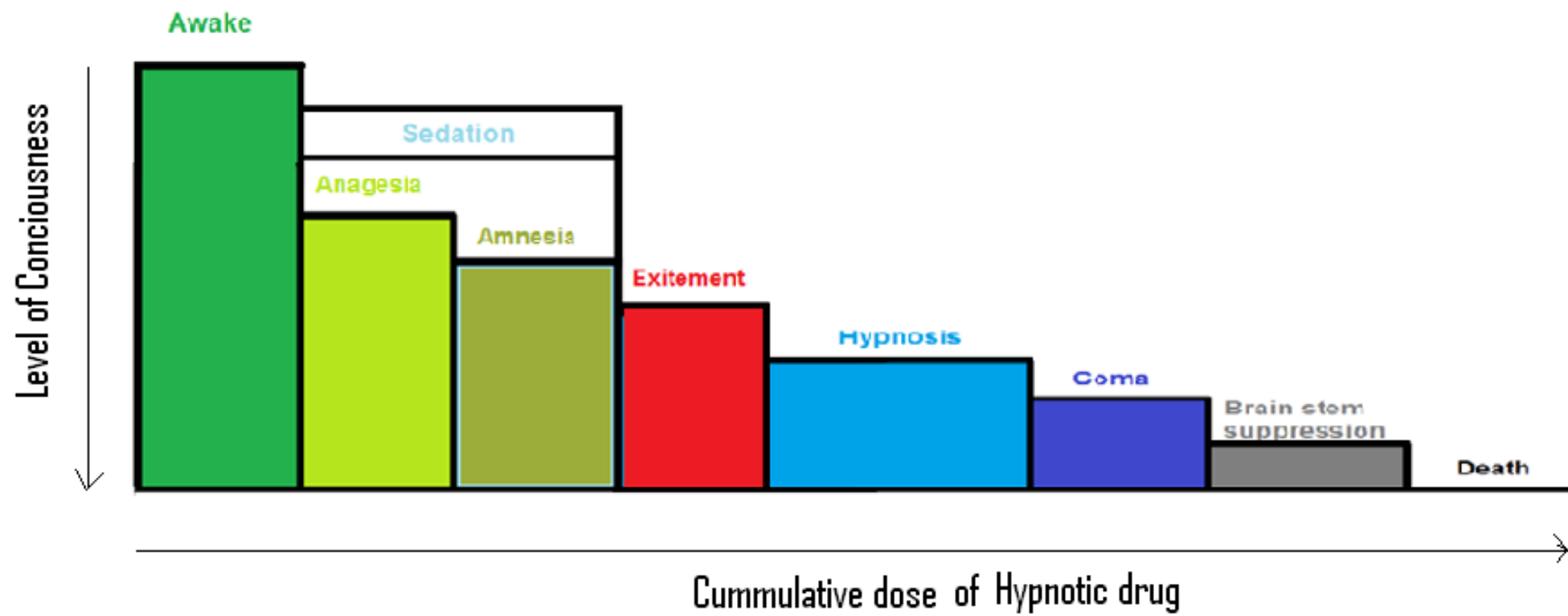
FOUR STAGES:

STAGE 1: Stage of conscious sedation

STAGE 2: *Stage of Excitement*

STAGE 3 : *Stage of Surgical Anesthesia*

STAGE 4: *Stage of Medullary depression*



The stages of General Anesthesia used to be clinically distinct in old anesthesia because of slow onset time of older drugs (Ether, etc...).

In Modern Anesthesia, the distinctive signs of each of the 4 stages are obscured due to:

- Use of drugs with rapid onset of action.

- Use of means of mechanical ventilation.

- Pre or intra-operative use of drugs that influence the signs of anesthesia.

Scope of Anesthesia

Work In Every Area Of Medicine

OR,

PACU, ICU, OB, Peds, Pain Clinic

Work With The Most Diverse Patient Population

Premature Infants To Geriatrics

Provide Medical Care & Critical Care

Prior To, During, And After Surgical Procedures

Work With Advanced Technology

Before anesthesia:...

Surgery was a terrifying last resort in a final attempt to save life.

Anaesthesia is now very safe, with mortality of less than 1 in 250,000 directly related to anaesthesia.

=====cf.=====

The global mortality rate due to traffic accidents was 19 per 100 000 population (1:5263)



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YOUR FIRST DAY IN THE OPERATING ROOM

A practical survival guide for medical students

Goal: enter the OR safely, confidently, and respectfully —
without contaminating the field.



1 • PREPARE

Dress correctly
Know the patient and procedure
Arrive early

2 • PROTECT STERILITY

Recognize the sterile field
Move safely around it
Report contamination

3 • BEHAVE SAFELY

Understand team roles
Use good OR etiquette
Speak up about hazards

4 • PARTICIPATE

Scrub, gown and glove when invited
Stand where directed
Help within your competence

5 • LEARN

Observe actively
Ask questions at appropriate times
Reflect after the case



Before you enter the OR

Preparation starts before you reach the theatre doors.

- Know the patient: indication, planned operation, relevant anatomy, major comorbidities, allergies and imaging.
- Know the procedure at a basic level: positioning, key steps, important structures, common complications.
- Arrive early enough to change, locate the correct theatre and introduce yourself before the case starts.
- Follow local policy for scrubs, footwear, identification badge, masks/eye protection and personal items.
- Remove jewelry before surgical hand antisepsis; keep nails short and avoid artificial nails/extensions in the OR.

POCKET CHECK

- ✓ ID badge
- ✓ Pen + small notebook
- ✓ No dangling jewelry
- ✓ Phone silent / stored
- ✓ Read the case

OPERATING ROOM ZONES

1 UNRESTRICTED

Street clothes may be allowed



Reception • Waiting • Offices

2 SEMI-RESTRICTED

Scrubs + full hair covering



Clean corridors • Supply areas

3 RESTRICTED

Scrubs + hair covering + mask

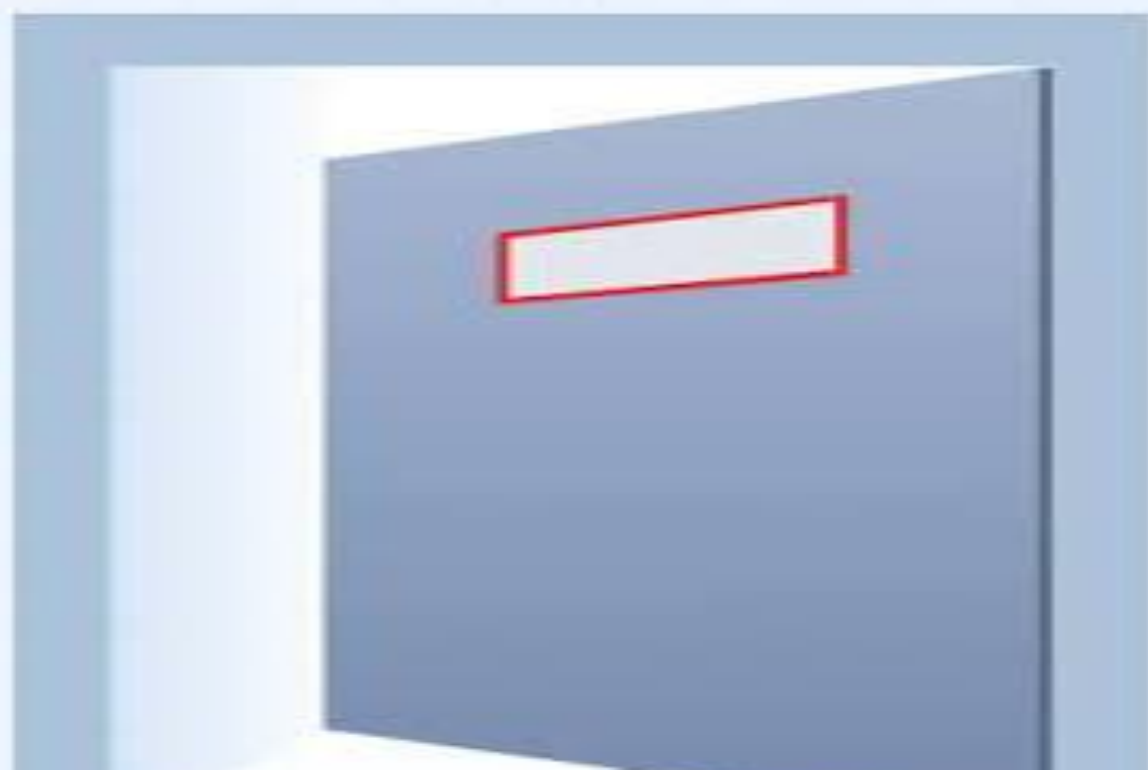


Operating room • Sterile field



INSIDE THE OPERATION THEATRE

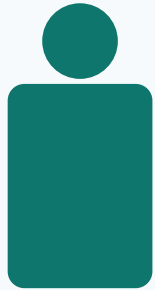
Explore how an OT is structured for
safe and efficient surgeries





Who is who in the OR?

Know the team before you try to help.



SURGEON



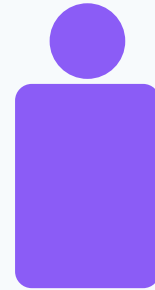
ASSISTANT



SCRUB NURSE



CIRCULATOR



ANESTHESIA



STUDENT

Your role is assigned — not assumed.

Introduce yourself by name and role. Ask the supervising clinician or scrub/circulating nurse where to stand and what you may do.

INSIDE THE OPERATING THEATRE

3 OPERATIVE FIELD

Prepared patient area and surgical site

2 STERILE ZONE

Scrubbed team and sterile tables

1 CIRCULATING ZONE

Non-sterile staff and equipment

FLOW → MORE CONTROLLED

The sterile field: your most important concept

If you are not sure whether something is sterile — stop and ask.

STERILE FIELD

draped patient + sterile tables + sterile team

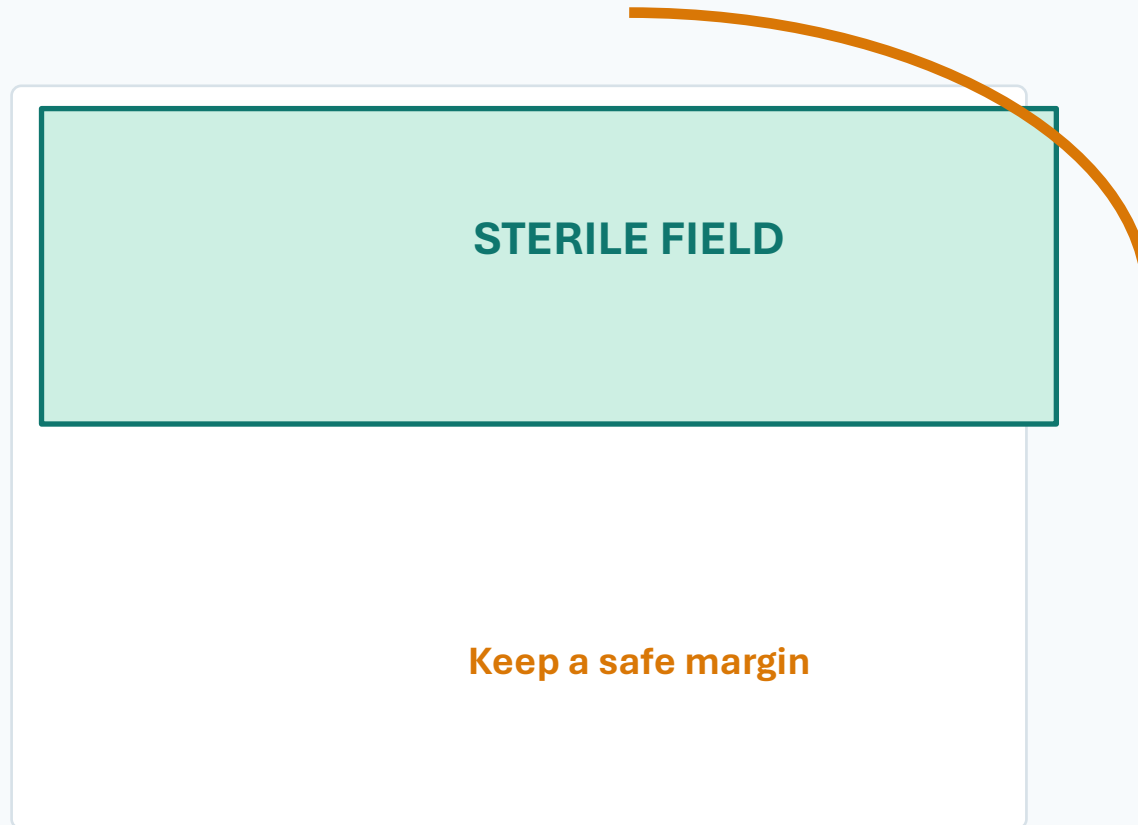
NON-STERILE ZONE

- anesthesia workspace
- room equipment
- walls / doors
- your body if not scrubbed
- anything of uncertain sterility

DO NOT REACH OVER • LEAN ON • BRUSH AGAINST

How to move around the room

Slow, deliberate movement prevents contamination and disruption.



- Walk — do not rush.
- Never squeeze between sterile personnel/equipment unless directed.
- Do not turn or back into a sterile field.
- Do not move stools, tables, cables or equipment without asking.
- Keep anesthesia access and doorways clear.

Surgical hand antisepsis

Scrubbing is a procedure — learn the local method before doing it.



Timing and product depend on the antiseptic manufacturer and your hospital protocol. Do not copy another person's technique without instruction.

OR etiquette: how to behave

DO

- Introduce yourself
- Listen to instructions
- Keep phone silent
- Ask before touching

AVOID

- Unnecessary conversation
- Blocking monitors/doors
- Touching equipment casually
- Leaving without telling the team

TIMING MATTERS

Minimize questions during induction, time-out, critical operative steps or emergencies. Save non-urgent questions for a calmer moment.

A useful question:

“Is this a good time for a question?”

The Surgical Safety Checklist / “Time-out”

When the team pauses, the student pauses too.

BEFORE ANESTHESIA

Identity • procedure/site • consent • anesthesia safety

BEFORE SKIN INCISION

Team introductions • procedure/site • key anticipated events

BEFORE PATIENT LEAVES OR

Procedure recorded • counts/specimens • equipment issues • recovery plan

STOP OTHER CONVERSATION • LISTEN • PARTICIPATE IF ASKED



Patient dignity & confidentiality

An unconscious patient deserves the same respect as an awake patient.

- Use respectful language at all times — the patient may be sedated, anesthetized or unable to respond.
- Protect unnecessary exposure and follow the team's draping/privacy practices.
- Do not photograph or record patients, screens, specimens or procedures unless specifically authorized under institutional policy and consent requirements.
- Discuss cases only for legitimate clinical/educational purposes and in appropriate settings.
- Never post identifiable clinical details on social media.

**THE PATIENT
IS THE CENTER
OF THE ROOM**

Not the operation.
Not the teaching.
Not the technology.

Sharps, blood & occupational exposure

. Do not improvise after an exposure

PREVENT

Know where the sharps zone/container is
Do not handle needles or scalpels unless trained and asked
Stay aware during passing and disposal

IF EXPOSED

Stop safely
Tell the team immediately
Perform first aid as directed
Report through your hospital's exposure pathway

DO NOT

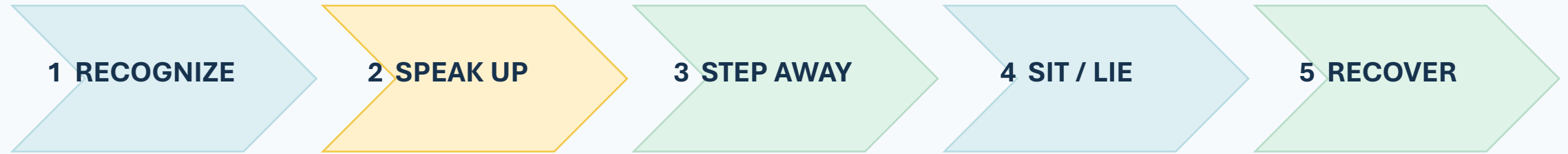
Hide the injury
Continue because you feel embarrassed
Delay reporting
Self-manage without occupational-health guidance

Know your hospital's needlestick / splash protocol BEFORE your first case.



What if you feel faint?

It happens — the dangerous part is staying silent.



Say early: “I’m feeling light-headed. I need to step away.”

Move away from the sterile field and follow staff instructions. Do not try to prove you can tolerate it.

If you contaminate the field

The correct response is immediate, calm honesty.

“I think I may have contaminated my glove / gown / the field.”



STOP → TELL THE SCRUB NURSE / SUPERVISOR → FOLLOW THEIR INSTRUCTIONS

A recognized contamination can be corrected. A hidden contamination cannot.

How to learn during the operation

Preparation turns observation into learning.

BEFORE

Read indication + anatomy
Review imaging
Know major steps
Prepare 2–3 questions

DURING

Identify anatomy
Follow the sequence
Notice teamwork + safety
Ask at appropriate moments

AFTER

Clarify unanswered questions
Review what you saw
Write 3 learning points
Thank the team

Common first-day mistakes

Most are preventable with one habit: ASK BEFORE YOU ACT.

✗ Touching a drape/table

→ Stop. Ask what is sterile.

✗ Reaching across instruments

→ Never reach over the field.

✗ Handling equipment

→ Ask before moving/touching.

✗ Feeling faint silently

→ Tell someone early.

✗ Backing into the field

→ Move slowly; keep awareness.

✗ Talking during time-out

→ Stop and listen.

✗ Hiding contamination

→ Speak up immediately.

✗ Leaving without telling anyone

→ Inform your supervisor/team.

Scenario practice

SCENARIO A

You are scrubbed. Your glove brushes something you think may be non-sterile.

Best response: stop and immediately tell the scrub nurse/supervisor.

SCENARIO B

The surgeon is concentrating during a difficult step and you have an anatomy question.

Best response: wait for an appropriate moment unless it is a safety concern.

SCENARIO C

You become sweaty, nauseated and light-headed.

Best response: tell someone immediately, move away from the sterile field and sit/lie as directed.

Safety concern? SPEAK UP. Learning question? CHOOSE THE MOMENT.

Your first OR: 7 rules to remember

- 1 Know your patient and procedure.
- 2 Introduce yourself and ask where to stand.
- 3 Treat the sterile field as sacred.
- 4 **If unsure: STOP and ASK.**
- 5 **If contamination occurs: SPEAK UP.**
- 6 Respect the patient and the team.
- 7 Your safety matters too — report exposures or feeling faint.

**SAFE
STUDENT
=
GOOD
STUDENT**



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