

Medication Administration

Medication .

A Drug :is any substance that alters physiologic function, with the potential of affecting health.

A medication :is substance used in the diagnosis, treatment, cure, relief, or prevention of health alteration.

Indications

Drugs can be administered for these purposes:

–Diagnostic purposes: e.g. assessment of liver function or diagnosis of myasthenia gravis.

–Prophylaxis :e.g. heparin to prevent thrombosis or antibiotics to prevent infection.

–Therapeutic purpose: e.g. replacement of fluids or vitamins, supportive purposes(to enable other treatments, such as anesthesia), palliation of pain and cure (as in the case of antibiotics).

Names

Generic-Given before drug officially approved Official

Brand/TRADE-Given by manufacturer Several names if several manufacturers

Chemical–Name by which the chemists know it

Legislation and Standards :

- Federal regulations
- State and local regulations
- Health care institutions and medication laws
- Nursing practice

Medication: Forms

Caplet – Shaped like a capsule and coated for easier swallowing

Capsule – powder, liquid or oil in gelatin shell

Tablet – compressed powder

Enteric coated – dissolves in small intestine

Time release – granules with different coatings, or some tablets that dissolve slowly

Lozenge – dissolves in mouth

Elixir – mixed with water or alcohol and a sweetener

Syrup – Medication dissolved in a sugar solution

Suspension – drug particles in a liquid medium when left alone will settle in the bottom

Solution – Sterile preparation that contains water and one or more dissolved compounds (IM, SQ, or IV)

Lotion – liquid suspension for skin

Ointment – semisolid (salve another name)

Paste – semisolid, but thicker than ointment – slower absorption

Transdermal disk or patch – semi-permeable membrane disk or patch with drug applied to skin

Suppository – solid drug mixed with gelatin inserted into body cavity to melt (rectum or vagina)

Pharmacokinetics

- Route: how enter the body
- Absorption: from site into blood
- Distribution: from blood into cells, tissues, or organs
- Action: how a medication acts
- Metabolism: changed to prepare for excretion
- Excretion: how they exit the body

Effects of Drugs

- Therapeutic/Desired: what is intended or reason it was prescribed
- SE: secondary effect: effect that is not intended May be harmful or harmless
- Adverse Effects: more serious side effects or a reaction to the drug
- Drug toxicity: related to overdose, ingestion when meant to be external in use, or build up in blood.
- Allergic Reaction: immune response to drug
- Anaphylactic Reaction: severe allergy to drug that could become fatal

Factors that affect med. Action

- Developmental factors
- Gender
- Genetics/culture

- Diet
- Environment
- Psychologic
- Illness/disease
- Time of administration

Mild allergic reactions

–Skin rash :Small, raised vesicles that are usually reddened, often distributed over entire body.

Pruritus :itching of the skin with or without rash.

–Angioedema :edema due to increase the permeability of the blood capillaries

–Rhinitis :inflammation of mucous membranes lining nose ,causes swelling and clear, watery discharge.

Medication: Routes

The **route of administration** (ROA) that is chosen may have a profound effect upon the speed and efficiency with which the drug acts

- The possible routes of drug entry into the body may be divided into two classes:

● Enteral

● Parenteral

Enteral Routes

- **Enteral** - drug placed directly in the GI tract:
 - sublingual - placed under the tongue
 - oral - swallowing (p.o., per os)
 - rectum - Absorption through the rectum

Sublingual/Buccal

Some drugs are taken as smaller tablets which are held in the mouth or under the tongue.

- **Advantages**
 - rapid absorption
 - drug stability
 - avoid first-pass effect

Sublingual/Buccal

- **Disadvantages**
 - inconvenient
 - small doses
 - unpleasant taste of some drugs

Oral

○ Advantages

- **Convenient** - can be self- administered, pain free, easy to take
- **Absorption** - takes place along the whole length of the GI tract

Cheap - compared to most other parenteral routes

○ Disadvantages

- **Sometimes inefficient - only part of the drug may be absorbed**
- **First-pass effect - drugs absorbed orally are initially transported to the liver via the portal vein**
- **irritation to gastric mucosa - nausea and vomiting**
- **destruction of drugs by gastric acid and digestive juices**
- **effect too slow for emergencies**
- **unpleasant taste of some drugs**
- **unable to use in unconscious patient**

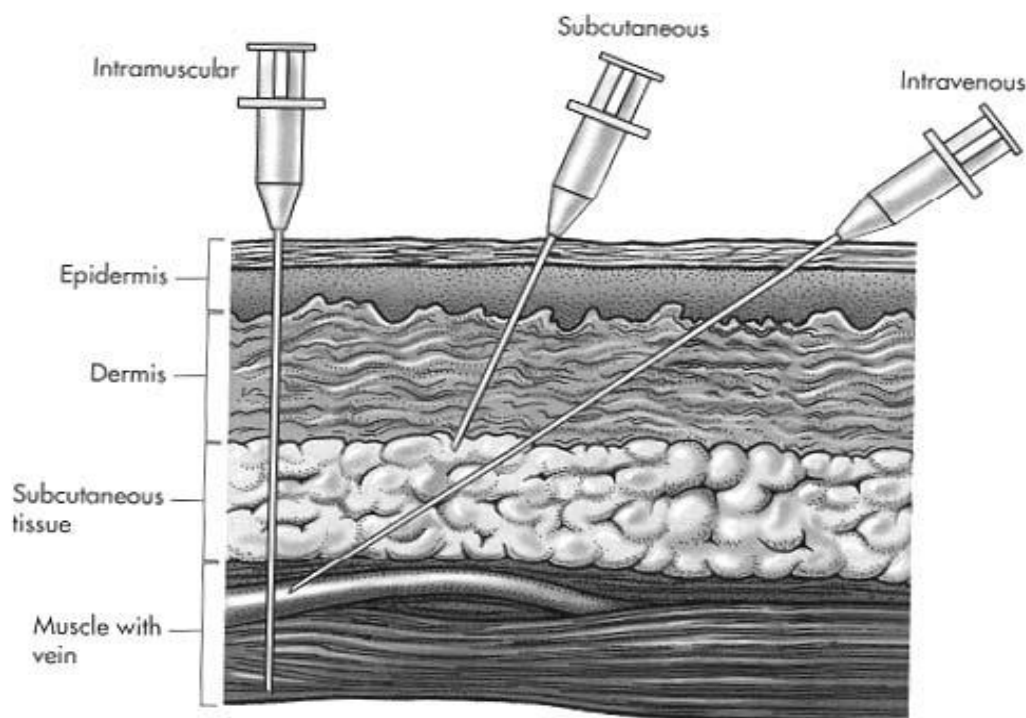
Rectal

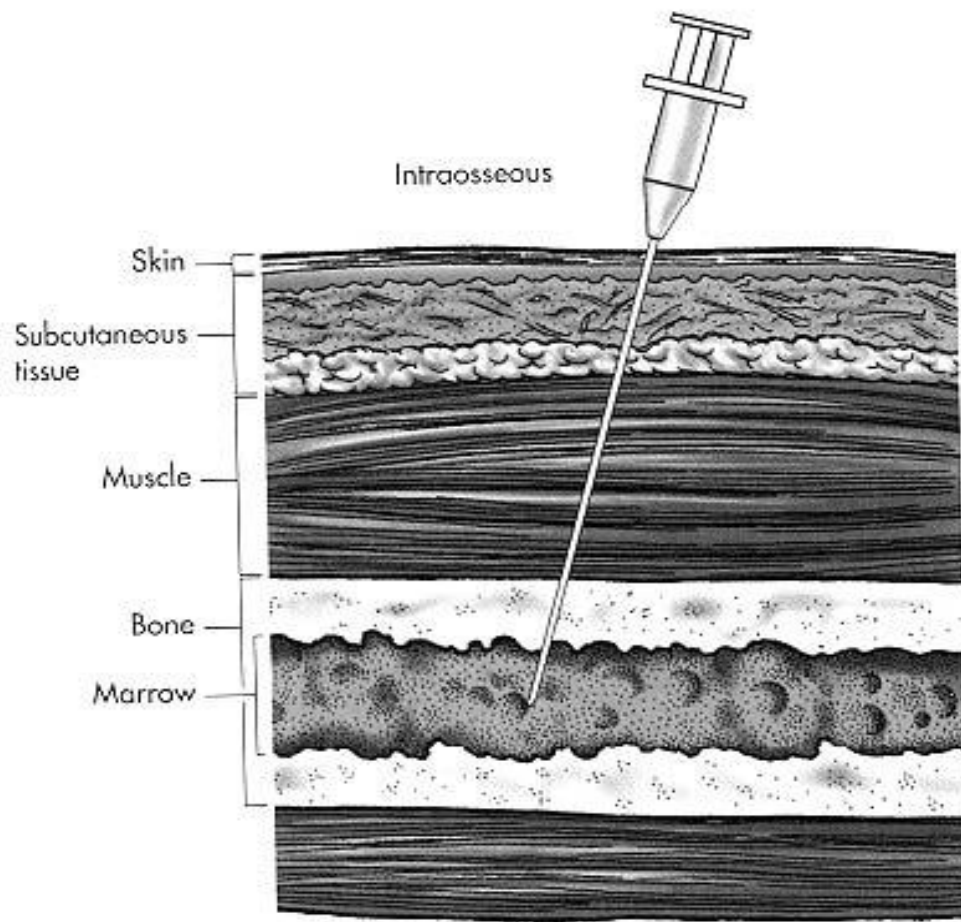
1. unconscious patients and children
2. if patient is nauseous or vomiting
3. easy to terminate exposure
4. absorption may be variable

5. good for drugs affecting the bowel such as laxatives
6. irritating drugs contraindicated

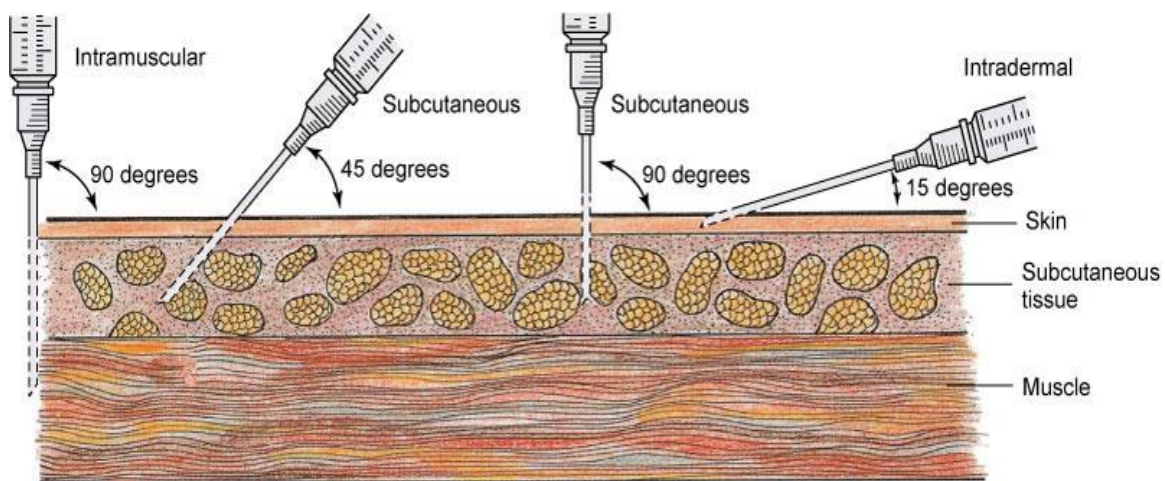
Parenteral Routes

- **Intravascular** (IV, IA)- placing a drug directly into the blood stream
- **Intramuscular** (IM) - drug injected into skeletal muscle
- **Subcutaneous** - Absorption of drugs from the subcutaneous tissues
- **Inhalation** - Absorption through the lungs





Comparison of Angles of Insertion for Injections



Intravascular

Absorption phase is bypassed

(100% bioavailability)

1. precise, accurate and almost immediate onset of action,
2. large quantities can be given, fairly pain free
3. greater risk of adverse effects
 - a. high concentration attained rapidly
 - b. risk of embolism

Intramuscular

1. very rapid absorption of drugs in aqueous solution
2. repository and slow release preparations
3. pain at injection sites for certain drugs

Subcutaneous

1. slow and constant absorption
2. absorption is limited by blood flow, affected if circulatory problems exist
3. concurrent administration of vasoconstrictor will slow absorption

Inhalation

1. gaseous and volatile agents and aerosols

2. rapid onset of action due to rapid access to circulation

- a. large surface area
- b. thin membranes separates alveoli from circulation
- c. high blood flow

Topical

- **Mucosal membranes** (eye drops, antiseptic, sunscreen, nasal, etc.)
- **Skin**
 - a. Dermal - rubbing in of oil or ointment (local action)
 - b. Transdermal - absorption of drug through skin (systemic action)
 - i. stable blood levels
 - ii. no first pass metabolism
 - iii. drug must be potent or patch becomes too large

Route for administration -Time until effect-

- *intravenous 30-60 seconds*
- *intraosseous 30-60 seconds*
- *endotracheal 2-3 minutes*
- *inhalation 2-3 minutes*
- *sublingual 3-5 minutes*
- *intramuscular 10-20 minutes*

- *subcutaneous 15-30 minutes*
- *rectal 5-30 minutes*
- *ingestion 30-90 minutes*
- *transdermal (topical) variable (minutes to hours)*

Oral Sublingual, buccal	Parenteral ID, Sub-Q, IM, IV
Epidural, Intrathecal (brain), Intraosseous (bone), Intraperitoneal (abdomen-ex.chemo), Intrapleural (ex. Chemo), Intraarterial (ex. Clot dissolve)	Topical (ex. Nitro, fentanyl)
Inhalation	Intraocular

Route	Rate
Enteral	
Per rectum (PR)	Rapid
Ingestion (oral)	Slow
Parenteral	
Intravenous (IV)	Immediate
Intraosseous (IO)	Immediate
Subcutaneous (SC)	Slow
Intramuscular (IM)	Moderate
Inhalation	Rapid
Sublingual (SL)	Rapid
Transcutaneous	Slow

-Oral (PO)

-Sublingual (SL)

-Buccal

-Parenteral

- Subcutaneous (SC)
- Intramuscular (IM)
 - Intradermal (ID)
 - Intravenous (IV)
 - Intra-arterial (IA)
 - Intra cardiac (IC)
 - Intra osseous (IO)
 - Intrathecal (intraspinal) (IT)(IS)
 - Epidural (ED)
 - Intra-articular

Topical

-Dermatological

-Instillations and irrigations

-Inhalation

-Ophthalmic, otic, nasal, rectal, and vagina

Routes of medication administration include oral, sublingual, buccal, parenteral, and topical

-In oral administration the drug is swallowed. It is the most common, least expensive, and most convenient route for most clients

-In sublingual administration a drug is placed under the tongue, where it dissolves.

Buccal means "pertaining to the cheek." In buccal administration a medication is held in the mouth against the mucous membranes of the cheek until the drug dissolves

Some common routes for parenteral administration include subcutaneous (hypodermic), into the subcutaneous tissue just below the skin; intramuscular, into the muscle; intradermal, under the epidermis (into the dermis)

intravenous, into a vein-

intra-arterial, into an artery-

intracardiac, into the heart muscle; intraosseous, into the bone-

-intrathecal or intraspinal, into the spinal canal

-epidural, into the epidural space; and intra-articular, into a joint

-Topical applications are those applied to a circumscribed surface area of the body. Routes for topical applications include dermatologic, applied to the skin; instillations and irrigations, applied into body cavities or orifices such as the urinary bladder, eyes, ears, nose, rectum, or vagina

-ophthalmic, otic, nasal, rectal, and vaginal topical preparations; and inhalations, administered into the respiratory system by a nebulizer or positive pressure breathing apparatus

Parts of a Medication Order

- Full name of the client
- Date and time the order written
- Name of drug to be administered
- Dosage
- Frequency of administration
- Route of administration
- Signature of person writing the order

Types of Orders in Acute Care Agency

Standing or routine:

Administered until the dosage is changed or another medication is prescribed

prn:

Given when the patient requires it

Single (one-time):

Given one time only for a specific reason

STAT:

Given immediately in an emergency

Now:

When a medication is needed right away, but not STAT

Prescriptions:

Medication to be taken outside of the hospital

Systems of Measurement

-Metric

Ordered by units of 10

Decimal system

Liter and gram are basic units

kilogram

milligram

microgram

milliliter

-Apothecary

- Older than metric
- Grain
- Minum
- Pound
- Pints
- quarts

-Household

- Drops
- Teaspoons
- Tablespoons
- Cups

- Glasses

Six Essential Steps for Administering Medications

- Identify the client
- Inform the client
- Administer the drug
- Provide adjunctive interventions as indicated
- Record the drug administered
- Evaluate the client's response to the drug

Right Of Medication Administration safety

Six Rights:

- Right drug
- Right client
- Right dose
- Right time
- Right route
- Right documentation

Other Rights:

- Right reason
- Right to know
- Right to refuse

Converting using Ratio Proportion

Review of common equivalents

$$1 \text{ mg} = 1000 \text{ mcg}$$

$$1 \text{ oz} = 30 \text{ ml}$$

$$1 \text{ gm} = 1000 \text{ mg}$$

$$1 \text{ tsp} = 5 \text{ ml}$$

$$1 \text{ kg} = 1000 \text{ gm}$$

$$1 \text{ lb.} = 2.2 \text{ kg}$$

$$1 \text{ L} = 1000 \text{ ml}$$

$$1 \text{ grain} = 60 \text{ mg or } 65 \text{ mg}$$

Ratio and Proportion:

D= Desired dose, mg, units, mEq

H= Dose on Hand, mg, g, units,

V= Vehicle or liquid

$$\frac{D}{H} \times V = \text{Amount to Give}$$

Solve for X = Unknown

Dose on hand = What the Dr. ordered
volume/tablet X

Example: The doctor orders 10 mg of a drug and you have 5 mg tabs on hand. You will give ____ tabs.

$$5 \text{ mg} = 10 \text{ mg}$$

$$1 \text{ tab} \quad X \text{ tab}$$

$$5X = 10 \times 1 = 5X = 10 \quad X = 2 \text{ Tablets}$$

Example

Order-Dilatin 50 mg orally TDS

Drug Available-Dilatin 125mg/5ml

D=50mg H=125mg V=5ml

$$\frac{50}{125} \times 5 = \frac{250}{125} = 2ml$$

Example

Order –Keflex 1gm orally TID

Drug Available-Keflex 250mg/capsule

D=1gm(note; need to convert to mg)

H=250mg

V=1 capsule

250X=1000

$$X = \frac{1000}{250} = 4 \text{ capsules}$$