

# Nasal Preparations

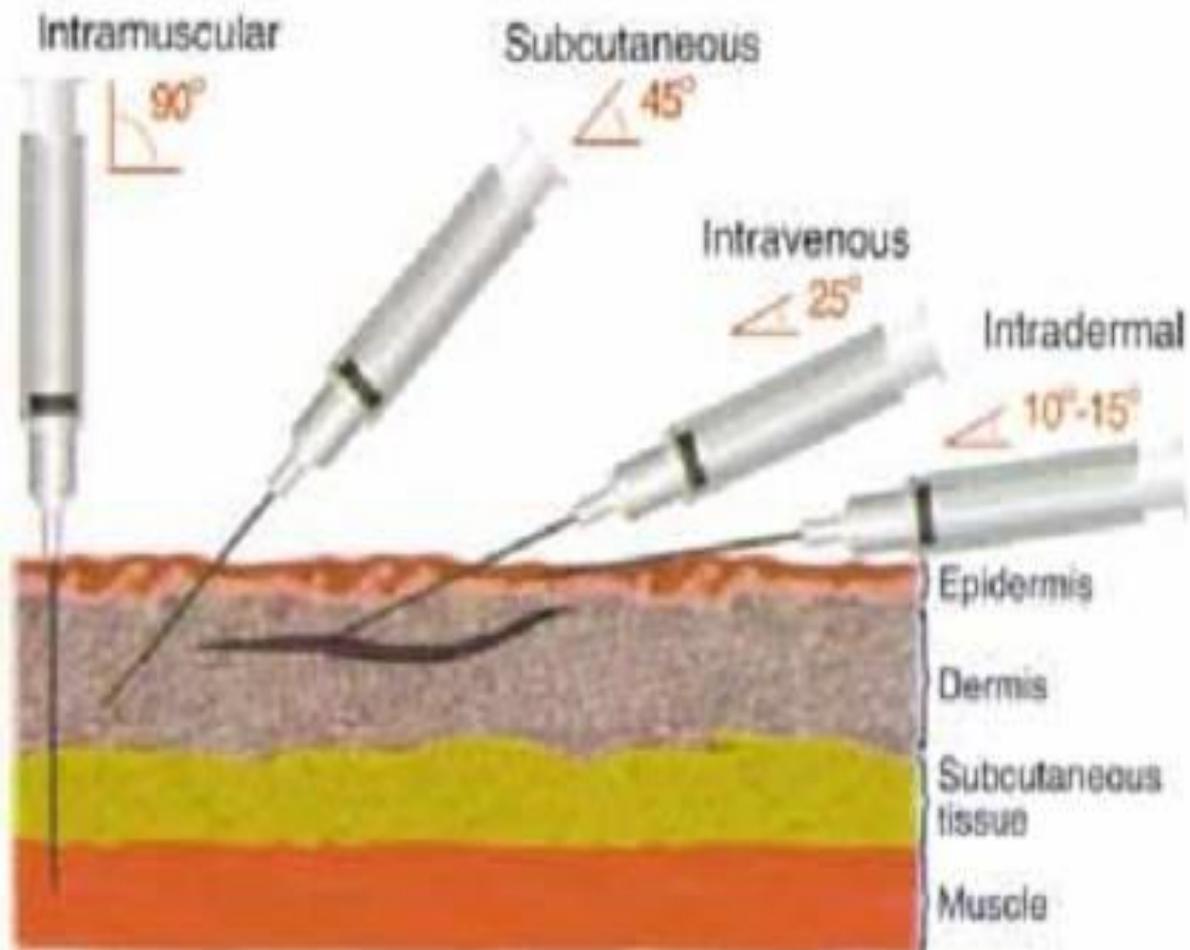
# Parenteral Routes of administration

## 1. Injection dependent routes of administration:

- Intravenous
- Intramuscular
- Intradermal
- Subcutaneous
- Epidural
- Intrathecal

## 2. Injection independent routes of administration:

- Intranasal ✓ لا تستخدم الابرة ←
- Inhalation ✓
- Ophthalmics ✓
- Otic ✓



**Figure 29-18** Angles of Insertion for Parenteral Injections.

# Injection Independent Routes:

- Pharmaceutical dosage forms and drug delivery systems applied topically to the eye, nose, or ear can include solutions, suspensions, gels, ointments, and drug-impregnated inserts.
- **Injection independent** since a needle or catheter is not required to administered formulations via these routes.

# 1. Intranasal

- Intranasal administration has typically been used to administer drugs to the upper respiratory tract.
- The absorption of some drugs give blood concentrations that are very similar to concentrations seen when the drug is intravenously administered.
- Because of this favorable absorption, intranasal administration has been investigated as a possible route of systemic administration for drugs such as insulin, glucagon, progesterone, propranolol, and narcotic analgesics (to mention a few).

صغيرة  
مسكنات الألم

# 1. Intranasal

- Solutions, suspensions, and gels.
- The liquids are typically sterile, isotonic, buffered, and preserved so as to not interfere with the nasal cilia.
- The buffered products are generally at pH between 4 and 8
- Osmotic pressures ranging from 200 to 600 mOsmol/L are acceptable for intranasal administration.

# 1. Intranasal

- Generally solutions and suspensions are administered as drops.
- Solutions can also be administered as a fine mist from a nasal spray bottle.
- Nasal sprays are preferred to drops because drops are more likely to drain into the back of the mouth and throat and be swallowed.
- If the drug is sufficiently volatile, it can be administered as a nasal inhaler. The inhaler is a cylindrical tube with a cap that contains fibrous material impregnated with a volatile drug. The patient removes the cap, and the inhaler tip is placed just inside the nostril. As the patient inhales, air is pulled through the tube and the vaporized drug is pulled into the nasal cavity.

# 1. Intranasal

- If drops or sprays are used, the quantity of drug administered in each drop or each spray should be calibrated.
- **To calibrate a dropper:**
  - drop the formulation into a small graduated cylinder (5 ml or 10 ml) using the dropper the patient will use
  - count the number of drops required to dispense 3 ml of solution
  - divide the number of drops by 3; this will give the number of drops per ml
  - calculate the number of drops needed to dispense the volume of formulation in one dose

## صناديق الاحتقان

# NASAL DECONGESTANT SOLUTIONS

- Most preparations intended for intranasal use contain **adrenergic agents** and are employed for **their decongestant activity on the nasal mucosa**
- Most nasal decongestant solutions are aqueous, rendered isotonic to nasal fluids (approximately equivalent to 0.9% sodium chloride), buffered to maintain drug stability while approximating the normal pH range of the nasal fluids (pH 5.5 to 6.5), and **stabilized and preserved as required**.

# NASAL DECONGESTANT SOLUTIONS

- they are best used for short periods (no longer than 3 to 5 days), and the patient should be advised not to exceed the recommended dosage and frequency of use
- Most solutions for nasal use are packaged in dropper bottles or in plastic spray bottles, usually containing 15 to 30 mL of medication
- The patient should be advised to discard the solution if it becomes discolored and/or contains precipitated matter

# PROPER ADMINISTRATION AND USE OF NASAL DROPS AND SPRAYS

- To minimize the possibility of contamination, the pharmacist should point out to the patient that the nasal product should be used by one person only and kept out of the reach of children.

# How to Use Intranasal Drops

- Blow your nose gently to clear the nostrils.
- Wash your hands with soap and warm water.
- Lie down on a bed with your head tilted back and the neck supported (allow the head to hang over the edge of the bed or place a small pillow under your shoulders). Tilt your head back so that it is hanging lower than your shoulders. Note: If putting drops into the nose of a child, lie the child on his or her back over your lap. The head should be tilted back.
- Draw up a small amount of medication into the medicine dropper.
- Breathe through your mouth.
- Place the tip of the medicine dropper just inside your nostril (about 1/3 inch). Avoid touching the dropper against the nostril or anything else.
- Place the directed number of drops into your nostril.
- Repeat steps 3 - 7 for the other nostril if directed to do so.
- Remain lying down for about 5 minutes, so the medication has a chance to spread throughout your nasal passages.
- Replace the medicine dropper to its container and tightly close the bottle.
- Wash your hands

# How to Use Intranasal Drops



# How to Use Intranasal Sprays or Pumps

- Blow your nose gently to clear the nostrils.
- Wash your hands with soap and warm water.
- Hold your head in an upright position.
- Close one nostril with one finger. ذغلق اءءفتءاء الءنف اللى مارء ءو فع فىءا ..
- With the mouth closed, insert the tip of the spray or pump into the open nostril. Sniff in through the nostril while quickly and firmly squeezing the spray container or activating the pump.
- Hold your breath for a few seconds and then breathe out through your mouth.
- Repeat this procedure for the other nostril only if directed to do so.
- Rinse the spray or pump tip with hot water and replace the cap tightly on the container.
- Wash your hands.

# How to Use Intranasal Sprays or Pumps

- The patient should be told not to shake the plastic squeeze bottle but be sure to remove the plastic cap
- Remove the bottle tip from the nose while maintaining pressure on the bottle sides so as not to aspirate any nasal material into the bottle.

(داخل)



# How to Use Intranasal Sprays or Pumps

- Wipe the tip with alcohol or some other appropriate agent, release the pressure on the sides, and repeat the application as necessary
- Sprays should always be administered with the patient upright. Spraying medicine into the nostrils should not be performed with the head over the edge of a bed (the preferred procedure for administration of nasal drops) <sup>تکون</sup> deeply because it could result in systemic absorption of the drug rather than a local effect.

## 2. Inhalation

- Inhalation dosage forms are intended to deliver drugs to the lungs.
- The lungs have a large surface area and a rich blood supply to the alveolar epithelium both of which favor rapid absorption.
- However, there is considerable variability in the absorption of drugs from the lungs so that this route is not considered an alternative to intravenous administration.
- Drugs administered via this route are to affect pulmonary function or treat allergic symptoms.
- Examples of drugs administered by inhalation include adrenocorticoid steroids (e.g., beclomethasone), bronchodilators (e.g., isoproterenol, metaproterenol, albuterol), and antiallergics (e.g., cromolyn).

(ارتوی)

## 2. Inhalation

- Inhalation formulations are generally solutions, suspensions, and powders.
- These formulations are administered via an aerosol or a dry powder inhaler.
- **Aerosols** are devices where liquid or suspension droplets are the internal phase and a gas is the external phase.
- Commercial aerosols are typically metered dose inhalers (MDI) that deliver a fixed dose in a spray with each actuation of the device.
- For compounded inhalation solutions, atomizers, nebulizers, and vaporizers are the aerosol devices.

*Aerosols :*

(كل حبة)

(جهاز الاستنساخ)  
Nebulizer



- A widely used instrument capable of producing fine particles for inhalation therapy is the nebulizer
- This apparatus contains an atomizing unit in a bulbous glass chamber. A rubber bulb at the end of the apparatus is depressed and the medicated solution is drawn up a narrow glass tube and broken into fine particles by the passing (airstream) ← تيار هوائي
- The larger, heavier droplets of the mist do not exit the apparatus but fall back into the reservoir of medicated liquid.
- The lighter particles do escape with the airstream and are inhaled by the patient, who operates the nebulizer with the exit orifice in the mouth, inhaling while depressing the rubber bulb

(زجاج بصلي الشكل)

فتحة

# Nebulizer

- The pharmacist should advise the patient on the proper technique to use the nebulizer and provide additional instructions, such as not to exceed physician's instructions and to use the smallest amount of product necessary to afford relief.
- The pharmacist may also advise on how to cope with any dryness of the mouth and should emphasize the need to clean the nebulizer after use and explain how to do it.

# Vaporizer → to deliver aerosols

- The common household vaporizer produces a fine mist of steam that may be used to humidify a room.
- When a volatile medication is added to the water in the chamber or to a medication cup, the medication volatilizes and is also inhaled by the patient.



## 2. Inhalation

- Commercially available **dry powder inhalers** contain their dry powders in manufactured cartridges or disks.
- When the patient administers a dose, the device is first activated by some mechanical motion and the dry powder becomes ready for inspiration.
- Then the patient inhales through the device mouthpiece and the powder is drawn into the pulmonary tract along with the inspired air

## 2. Inhalation

تخدير داخل  
عروق العلويات

- Certain gases, such as oxygen and ether, are administered by inhalation
- Sterile Water for Inhalation, USP, and Sodium Chloride Inhalation, USP, may be used as vehicles for inhalation solutions.

## 2. Inhalation

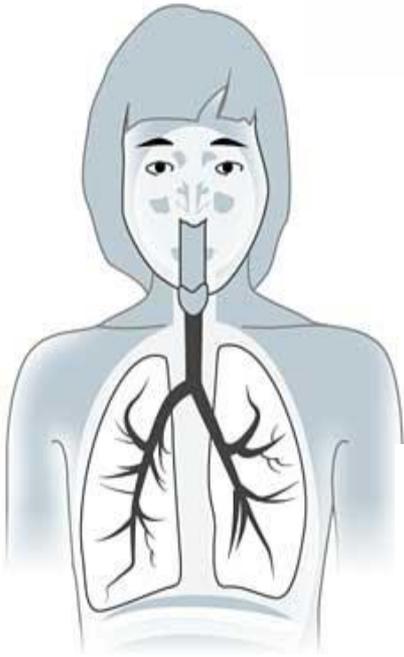
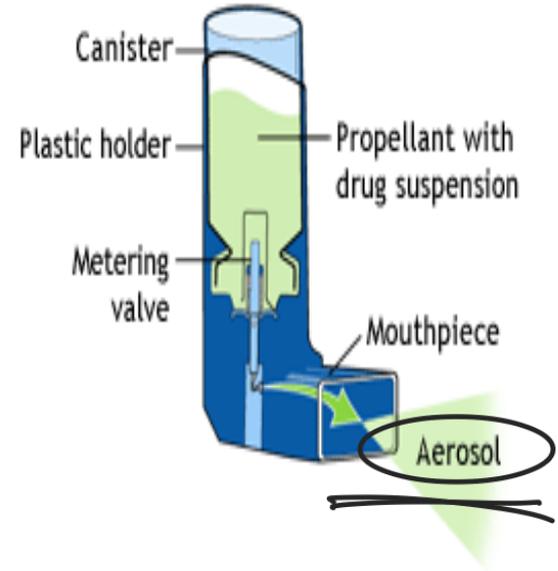
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- Regardless of the formulation or the administration device, inhalation therapy also depends on the coordination, the breathing patterns, and the respiration depth of the patient at the time of administration.
- Inhalation devices produce either liquid droplets or powder particles upon actuation.
- There is a strong correlation between the inspired particle size and its final deposition inside the lungs:
  - Large particles (about 20 microns) impact in the back of the mouth and throat and are eventually swallowed rather than inhaled.
  - Particles from 1 to 10 microns reach the terminal bronchioles and are more available for local therapy.  
القصبَات الهوائية
  - Smaller particles (0.6 micron) penetrate to the alveolar sacs where absorption is most rapid, but retention is minimal since a large fraction of the dose is exhaled  
الحويصلات الهوائية

# Inje 2.1



outes:



- 1 Remove the cap and shake the inhaler.
- 2 Breathe out all the way.
- 3 Place the inhaler in your mouth. Close your lips around it. As you breathe in, press down on the inhaler.
- 4 Hold your breath for a count of 10. Then slowly breath out.