TABLETS

INTRODUCTION

•The oral route is the most common way of administering drugs and among the oral dosage forms, tablets of various kinds are the most common type of solid dosage form in contemporary use.

•The term ‘tablet’ (from Latin *tabuleta)* is associated with the appearance of the dosage form, i.e. tablets are small disc-like or cylindrical specimens.

➢**Tablets** are defined as ‘solid preparations each containing a single dose of one or more active substances with or without excipients.

➢Pharmaceutical **tablets** are solid, flat or biconvex dishes, unit dosage form, prepared by compressing a drug or a mixture of drugs, with or without diluents.

•They may vary in size, shape, weight, hardness, thickness, disintegration, and dissolution characteristics and in other aspects, depending on their intended use and method of manufacture.

• Most tablets are used in the oral administration of drugs. Many of these are prepared with colorants and coatings of various types.

• Other tablets, such as those administered sublingually, buccally, or vaginally, are prepared to have features most applicable to their particular route of administration.

The advantages of the Tablet dosage form are:

1.The preparation procedure enables accurate dosing of the drug.

2. Cost is lowest of all oral dosage form.

3. The oral route represents a convenient and safe way of drug administration.

4. Easiest and cheapest to package and strip.

5. Easy to swallowing with least tendency for hang-up.

6. Sustained release product is possible by enteric coating.

7. Objectionable odour and bitter taste can be masked by coating technique.

8. Suitable for large scale production.

9. Greatest chemical and microbial stability compared to liquid dosage forms.

10. Tablets are convenient to handle and can be prepared in a versatile way with respect to their use and the delivery of the drug.

Disadvantages of Tablet dosage form are:

1. Difficult to swallow in case of children and unconscious patients.

2. Some drugs resist compression into dense compacts, owing to amorphous nature, low density character.

3. Drugs with poor wetting, slow dissolution properties, optimum absorption high in GIT may be difficult to formulate or manufacture as a tablet that will still provide adequate or full drug bioavailability.

4. Bitter testing drugs, drugs with an objectionable odor or drugs that are sensitive to oxygen may require encapsulation or coating. In such cases, capsule may offer the best and lowest cost.

TYPES OF TABLETS

A. Tablets ingested orally:

1. Compressed tablets.
2. Multiple compressed tablets.
3. Repeat action tablets.
4. Enteric coated tablets.
6. Sugar coated tablets.
7. Film coated tablets.
8. Chewable tablets.

B. Tablets used in the oral cavity:

1. Buccal tablets.
2. Sublingual tablets.
3. Lozenge tablets and traches.
4. Dental cones.

C. Tablets administered by other routes:

1. Implantation tablets.
2. Vaginal tablets.

D. Tablets used to prepare solutions:

1. Effervescent tablets.
2. Dispensing tablets.
3. Hypodermic tablets.
4. Tablet triturates.

1- Compressed tablets (C.T.) (Standard compressed tablet):

• These tablets are uncoated and made by compression of granules.

• These tablets are usually intended to provide rapid disintegration and drug release.

• These tablets contain water soluble drugs which after swallowing get disintegrated in the stomach and its drug contents are absorbed in the gastrointestinal tract and distribute in the whole body.

2- Multi compressed tablets (M.C.T.) :

• Multiply compressed tablets are prepared by subjecting the fill material to more than a single compression .

Tablets can be designed and manufactured to have separate layers or a core tablet inside a tablet. In this way, two or more drugs can be kept separate in a single tablet.

•Such complicated systems have found limited applications over the years in the pharmaceutical industry, but there is a revival of interest in the use of combination dosage forms for the treatment of diseases such as AIDS, where multiple drugs are administered each day.

•Each layer may contain a different medicinal agent, separated for reasons of chemical or physical incompatibility, OR for controlled drug release.

•In preparation of tablets within tablets, special machines are required to place the preformed core tablet precisely within the die for application of surrounding fill material.

• The colour of each layer may be the same or different. The tablets having layers of different colours are known as “multicoloured tablets”.

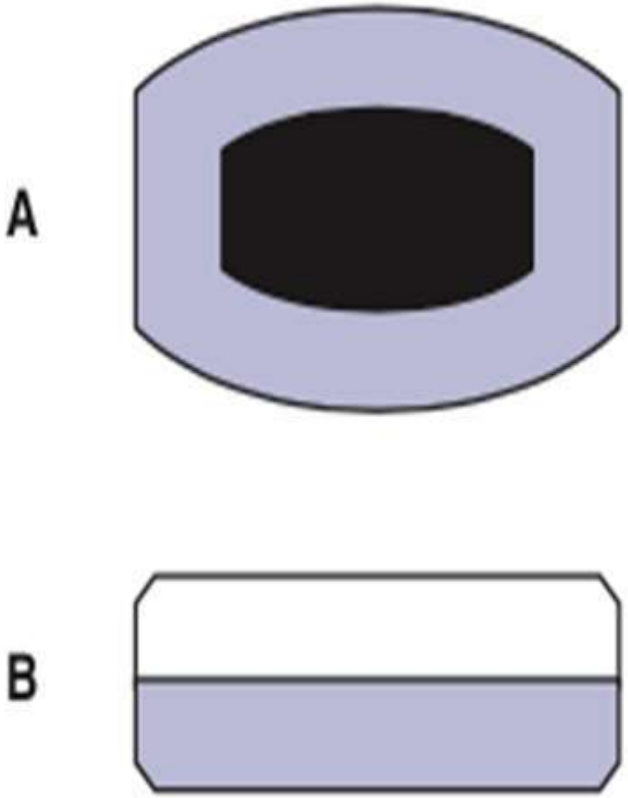


FIGURE 8.3 Multiply compressed tablets. **A.** A core of one drug and a shell of another. **B.** A layered tablet of two drugs.

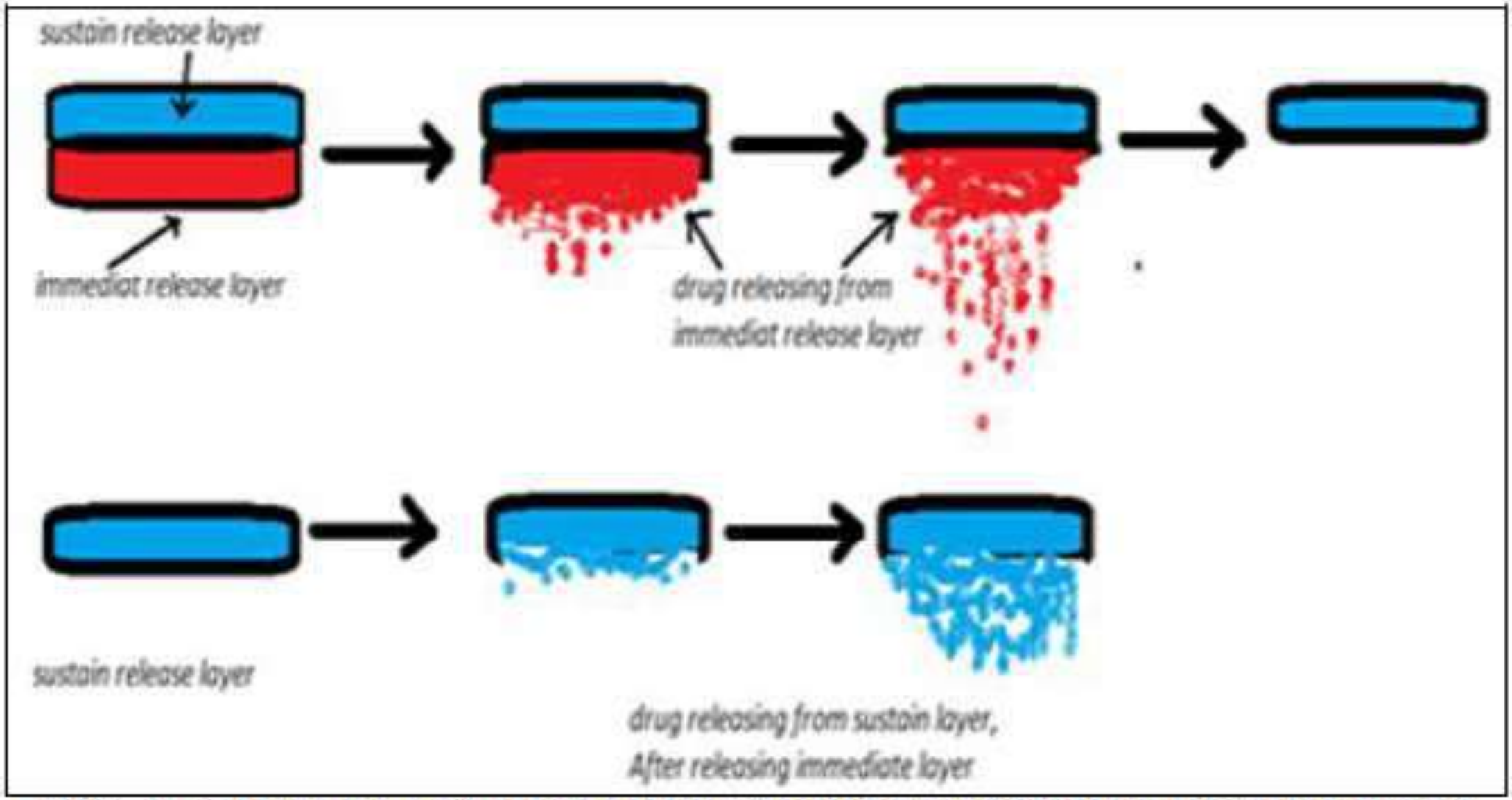
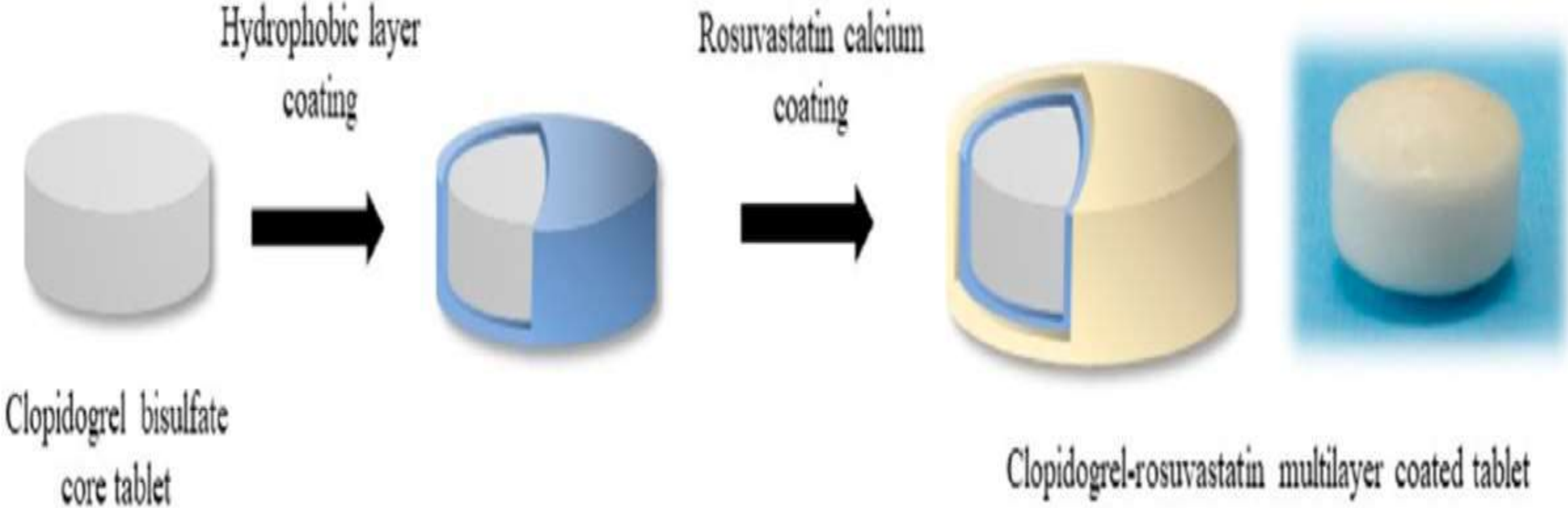


FIG. 4: MULTILAYER TABLET AND CONTROLLED RELEASE


Hydrophobic layer coating
Rosuvastatin calcium coating
Clopidogrel bisulfate core tablet
Clopidogrel-rosuvastatin multilayer coated tablet

3- FILM-COATED TABLETS

• Film-coated tablets are compressed tablets coated with a thin layer of a polymer capable of forming a skin-like film.

➢ The film is usually colored and has the advantage over sugar-coatings in that it is:

1. more durable.

2. less bulky.

3. less time- consuming to apply.

• By its composition, the coating is designed to rupture and Expose the core tablet at the desired location in the Gastrointestinal tract.

4- SUGARCOATED TABLETS:

Compressed tablets may be coated with a colored or an uncolored sugar layer.

- The coating is water soluble and quickly dissolves after swallowing.

➢**The sugarcoat protects the enclosed drug from the environment and provides a barrier to objectionable taste or odor.**

➢ **The sugarcoat also enhances the appearance of the compressed tablet and permits imprinting of identifying manufacturer's information.**

•Among the disadvantages to sugarcoating tablets are the time and expertise required in the coating process and the increase in size, weight, and shipping costs.

• Sugar coating may add 50% to the weight and bulk of the uncoated tablet.

5- ENTERIC-COATED TABLETS

• Enteric-coated tablets have delayed-release features.

• They are designed to pass unchanged through the stomach to the intestines, where the tablets disintegrate and allow drug dissolution and absorption and/or effect.

➢ Enteric coatings are employed when the drug substance:

✓ is destroyed by gastric acid or

✓ is particularly irritating to the gastric mucosa or

6- IMMEDIATE-RELEASE TABLETS

Immediate-release tablets are designed to disintegrate and release their medication with no special rate-controlling features, such as special coatings and other techniques.

7- EXTENDED-RELEASE TABLETS

Extended-release tablets (sometimes called controlled release tablets) are designed to release their medication in a predetermined manner over an extended period.

7- Chewable tablets:

• Chewable tablets are chewed and thus are mechanically disintegrated in the mouth. The drug is, however, normally not dissolved in the mouth but swallowed and dissolves in the stomach or intestine.

Thus, chewable tablets are used primarily to accomplish a quick and complete disintegration of the tablet and hence obtain a rapid drug effect or to facilitate the administration of the tablet.

• A common example of the former is antacid tablets and vitamins tablet.

• **General advantage** of a chewable tablet is that this type of medication can be taken when water is not available .

Also, the elderly and children in particular have difficulty swallowing tablets and so a chewable tablet is an attractive form of medication.

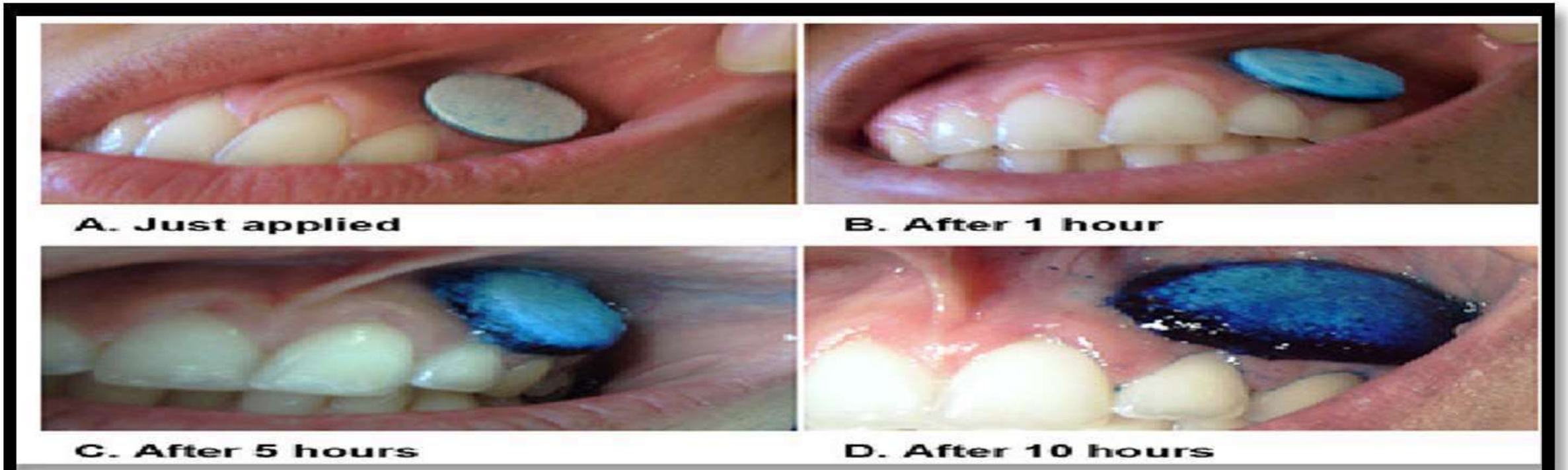
• Chewable tablets are similar in composition to conventional tablets except that a disintigrant is normally not included in the composition.

• Flavouring and colouring agents are common and, sorbitol and mannitol are common examples of fillers.

8- Buccal tablets:

• These tablets are to be placed in the side of the cheek (buccal pouch) where they dissolve or erode slowly and are absorbed directly in the buccal cavity without passing into the alimentary canal.

• Therefore, they are formulated and compressed with sufficient pressure to give a hard tablets. e.g. Progesterone tablets.



9- Sublingual tablets:

• These tablets are to be placed under the tongue where they dissolve or disintegrate quickly and are absorbed directly without passing into GIT.

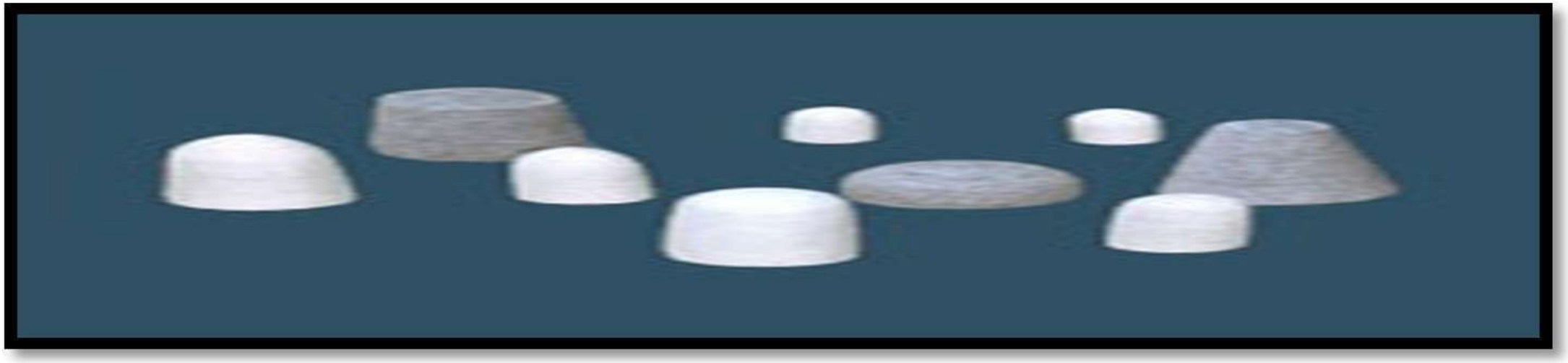
10- Lozenges:

Lozenges are compressed tablets that do not contain a disintegrant.

- Some lozenges contain antiseptics (e.g., benzalkonium) or antibiotics for local effects in the mouth.
- Lozenges are also used for systemic effect. For example, a lozenge containing vitamin supplements (multivitamin tablets).
- Lozenges must be palatable and slowly soluble.

11-Dental cones:

• These are compressed tablets meant for placement in the empty sockets after tooth extraction. They prevent the multiplication of bacteria in the socket following such extraction by using slow-releasing antibacterial compounds or to reduce bleeding by containing the astringent.



12- Implantation tablets:

These tablets are placed under the skin or inserted subcutaneously by means of minor surgical operation and are slowly absorbed. The implants must be sterile and should be packed individually in sterile condition.

✓To provide prolonged drug effects.

13- VAGINAL TABLETS

• Vaginal tablets, also called vaginal inserts, are uncoated, bullet shaped or ovoid tablets inserted into the vagina for local effects. these tablets are used to release steroids or antimicrobial agents

14- E**ffervescent Tablets:**

These tablets are formulated to allow dissolution or dispersion in water prior to administration and should not be swallowed whole. These tablets contain sodium carbonate or bicarbonate and an organic acid such as tartaric acid. In the presence of water, these additives react, liberating carbon dioxide, which acts as a disintegrator and produces effervescence.

15- HYPODERMIC TABLETS:

•Hypodermic tablets are soft, readily soluble tablets and originally were used for the preparation of solutions to be injected.

These tablets are dissolved in sterile water or water for injection and administered by parenteral route. these tablets are not preferred now-a-days because the resulting solution is not always sterile.

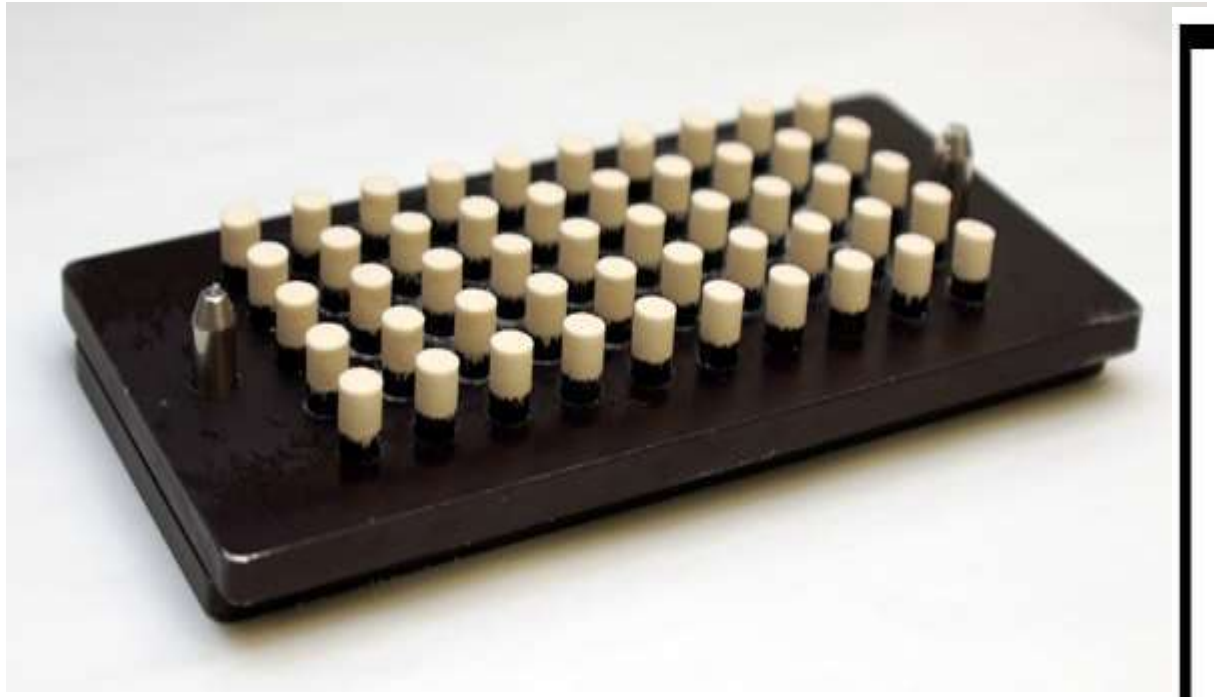
16- TABLET TRITURATES (Molded Tablet)

• These are powders moulded into tablets. They are flat, circular discs, usually containing a potent substance mixed with lactose, lactose and sucrose, dextrose, or other suitable diluent.

• Since they are intended to disintegrate very quickly in contact with moisture, water insoluble adjuncts are avoided.

• The name ‘tablet triturate’ is appropriate because they usually contain triturations (trituration = dilution with an inert substance).

• The few tablet triturates that remain are used sublingually, such as nitroglycerin tablets.



17-Gelatin-Coated Tablets:

- A recent innovation is the gelatin-coated tablet.
- The innovator product, the gelcap, is a capsule- shaped compressed tablet that allows the coated product to be about one-third smaller than a capsule filled with an equivalent amount of powder. The gelatin coating facilitates swallowing, and gelatin- coated tablets tamper evident than unsealed capsules.

FIGURE 8.4 Cutaway view of gelcaps dosage form, a gelatin-coated capsule-shaped tablet. Dosage form is more easily swallowed than a comparable tablet, smaller than an equivalent capsule, and tamper evident. (Courtesy of McNeil Consumer Products.)