



Topical Formulations and Topical Steroids

DR. AMAL ALEREBI



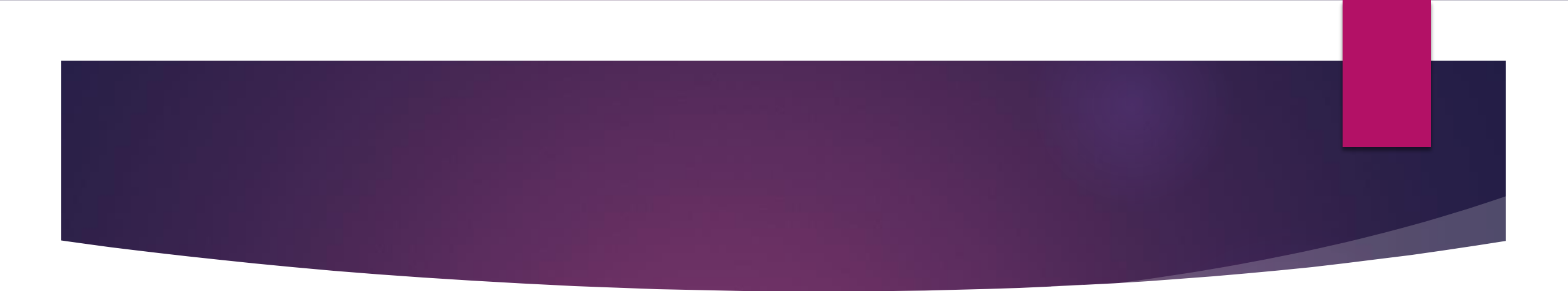
*Dermatologic treatment usually involves the use of topical therapy.
Topical formulations are applied directly to the skin.*

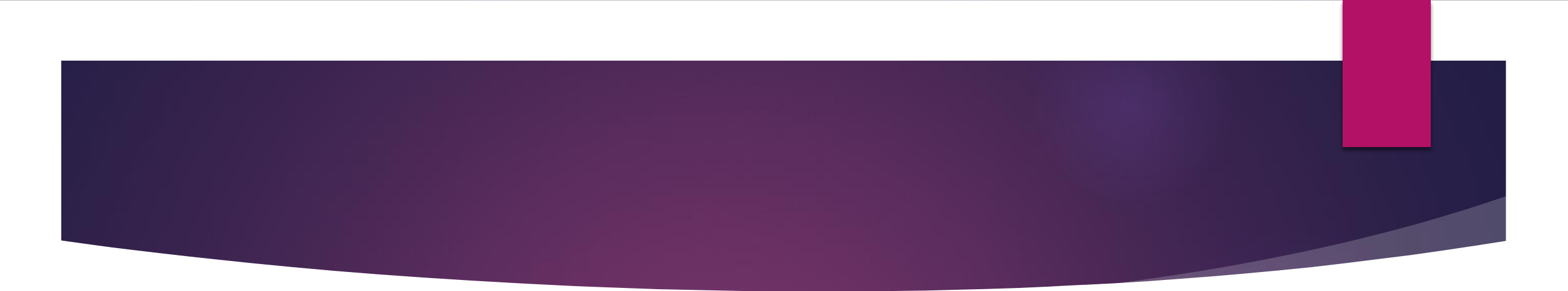
Advantages of this include:

- 1. Increased dose of medication where it is needed*
- 2. Reduced side effects and toxicity to other organs*

Disadvantages include:

- 1. Time consuming*
- 2. At times, complicated e.g. if several different formulations have been prescribed*
- 3. May be messy or uncomfortable*

- 
- ▶ *The stratum corneum is the major barrier to any substance applied to the skin surface.*
 - ▶ *The skin surface shows marked variation in permeability*
 - ▶ *Removing this layer increases permeability*
 - ▶ *Because the epidermis is the major barrier, abraded or damaged skin will be more susceptible to the effects and side effects of topically applied substances*

- 
- ▶ *Topical formulations are made up in a vehicle, or base, which may be optimised for a particular site of the body or type of skin condition.*
 - ▶ *The product may be designed to be moisturising or to maximise the penetration of an active ingredient, a medicine, into or through the skin.*

Vehicle

- ▶ *Inactive Substance of topical therapy that bring specific drug into contact with the skin*
- ▶ *The vehicle itself may have effects on the skin by possessing cooling, protective, emollient, occlusive*
- ▶ *The vehicle contains water, oil, alcohol or propylene glycol mixed with preservatives, emulsifiers, absorption promoters and fragrances*

Features of the vehicle

1. *Easy to apply*
2. *Cometically acceptable*
3. *Should not cause irritant or allergic dermatitis*
4. *Does not affect the specific drug unto*
5. *Should be stable*
6. *Must release the specific drug to the target skin site*

Types of vehicles

A. Monophasic : *made of single component*

1. *Powders*

2. *Liquids*

3. *Greases*

B. Biphasic : *Mixture of two monophasic*

Lotion

Cream

Ointment

Gel

Paste

Powders

- *Powders promote drying.*
- *They adhere poorly to the skin,*
- *Use is almost completely limited to cosmetic and hygienic purposes.*
- *Most powders consist of zinc oxide or titanium oxide for covering properties, talc (hydrous magnesium silicate) for smooth application, and a stearate (usually zinc or magnesium) for improved adherence to the skin.*
- *They provide soothing and cooling effects by minimizing friction and increasing surface area.*
- *Inert powders may be mixed with active agents (eg, antifungals) to deliver therapy to the feet.*

Liquid

- *Used as solvents for drugs*
- *Liquid vehicles include*
 1. Baths and soaks
 2. Solutions
 3. Lotions
 4. Gels
- ▶ *Clinical applications include wet dressings, baths, tinctures, paints, topical solutions, aerosols and sprays.
e.g Gentian violet*

Grease

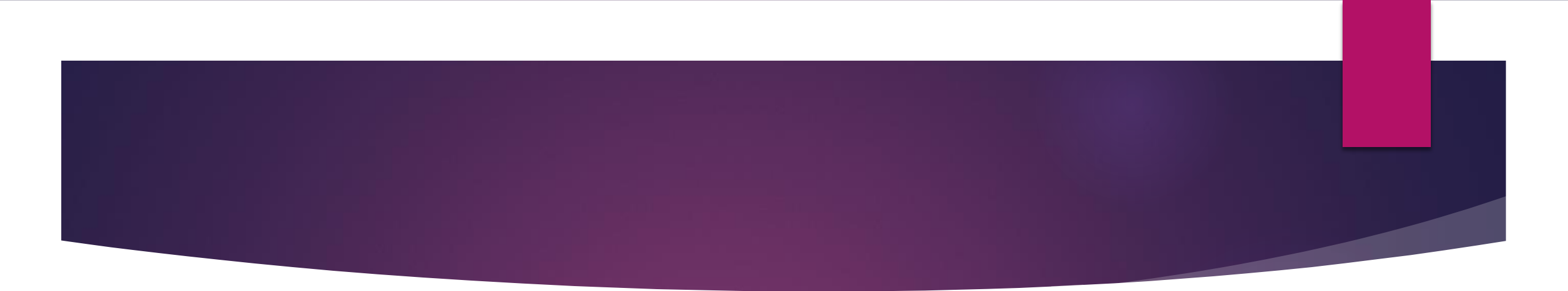
- ▶ Highly occlusive
 - ▶ Water insoluble
 - ▶ Emollient effects
- e.g vaseline

Lotions

- *are water-based emulsions.*
- *lotions are made by mixing water and powder*
- *Lotions cool and dry acute inflammatory and exudative lesions, such as contact dermatitis, tinea pedis, and tinea cruris.*
- *Usually considered thicker than a solution and more likely to contain oil as well as water or alcohol.*
- *A shake lotion separates into parts with time so needs to be shaken into suspension before use.*

Creams

- ▶ *These are semi-solid emulsions of oil-in-water (O/W). containing both lipid and water.*
- ▶ *They are used for moisturizing and cooling and when exudation is present.*
- ▶ *They are the most popular topical vehicles because they feel cool and soothing*
- ▶ *most creams are weaker than their ointment counterparts.*
- ▶ *Creams with high propylene glycol content will sting when applied to abraded sites*

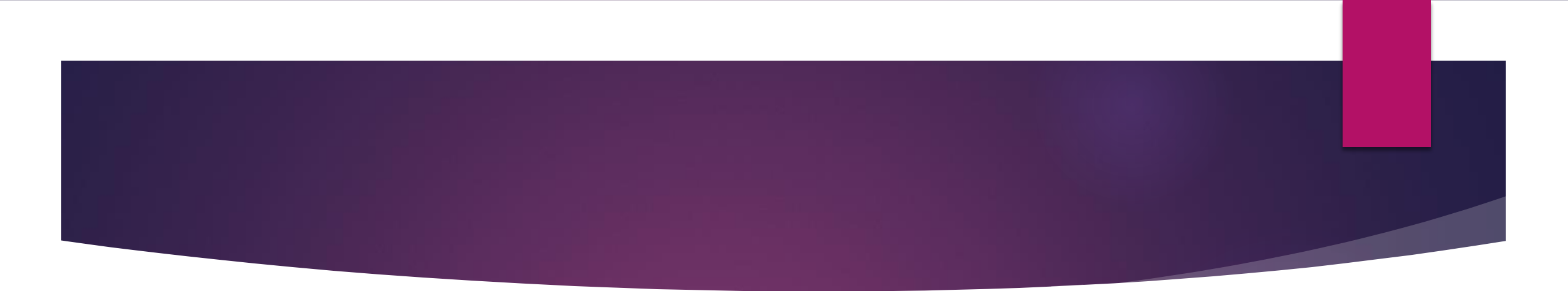
- 
- ▶ *Useful for most conditions*
 - ▶ *Acceptable to most patients*
 - ▶ *Helps ‘dry out’ moist lesions*
 - ▶ *Tell patients to rub in well*
 - ▶ *Topical creams generally more potent than lotions*
 - ▶ *Because of high water content, preservatives added- (may cause allergy)*

Ointments

- *These are semi-solid vehicles composed of lipid*
- *Ointments are water-free or nearly water-free (80% oil).*
- *Greasy, sticky, emollient, protective, occlusive.*
- *They are preferred for lichenified lesions and lesions with thick crusts including psoriasis and lichen simplex chronicus.*
- *Ointments are less irritating than creams for erosions or ulcers*
- *Do not use them to treat macerated, moist, or oozing lesions*
- *Ointments are optimal lubricants and increase drug penetration because of their occlusive nature.*
- *No need for preservative so contact allergy is rare.*

Gels

- ▶ *Aqueous or alcoholic semisolid emulsion,*
- ▶ *They are thickened aqueous lotions.*
- ▶ *Apply easily and disappear without a visible residue*
- ▶ *They are most useful on the scalp and hair-bearing regions of the trunk where the epidermis is thick.*

- 
- ▶ *Often includes preservatives and fragrances.*
 - ▶ *They are often used in acne, rosacea, and psoriasis of the scalp*
 - ▶ *Spreads over wide areas easily*
 - ▶ *Cosmetically more acceptable in these areas*

Pastes

These are semi-solid preparations containing a high proportion of finely powdered material such as zinc oxide or starch.

They have Concentrated suspension of oil, water and powder.

They are difficult to apply and remove, but their stiffness permits accurate localization of the paste and any constituent medication.

They are occlusive, protective and hydrating.

- ▶ *Pastes may be useful in intertriginous dermatitis*
- ▶ *difficult to remove*

Regional Differences in Penetration

1. MUCOUS MEMBRANE
2. SCROTUM
3. EYELIDS
4. FACE
5. CHEST AND BACK
6. UPPER ARMS
7. LOWER ARMS AND LEGS
8. DORSA OF HANDS AND FEET
9. PALMAR AND PLANTAR SKIN
10. NAILS

MORE PENETRATION



LEAST PENETRATION

- ▶ Normally, topical medications should be applied to the skin as a thin layer.
- ▶ Expect 1 gram of cream to spread out over a 10cm² area of skin and an ointment spreads a little further.
- ▶ **The fingertip unit** (0.5g) is a guide to the amount of a cream or ointment needed to treat an area for a certain time. One fingertip unit covers one side of 2 flat hands and one gram covers both sides of the two hands.
- ▶ It takes 20 to 30g of cream or ointment to cover an adult once.

Tube Sizes to prescribe

- ▶ *Rule of thumb to estimate how much cream or ointment needed to cover area of body*
- ▶ **Rule of 9'S**: *divide body into 11 areas--head, each arm, anterior chest, posterior chest, abdomen, lumbar/buttocks, half of each leg--
2 grams/application cream/area*

The fingertip unit



Topical steroids

- ▶ *Topical steroids are the topical forms of corticosteroids.*
- ▶ *Topical steroids are the mainstay of treatment for most noninfectious inflammatory dermatoses.*
- ▶ *Topical steroids are the most commonly prescribed topical medications for the treatment of rash, eczema, and dermatitis. Topical steroids have anti-inflammatory properties, and are classified based on their skin vasoconstrictive abilities. There are numerous topical steroid products.*
- ▶ *All the preparations in each class have the same anti-inflammatory properties, but essentially differ in base and price.*



DermNetNZ.org



The effects of topical steroid on various cells in the skin are:

- *Anti-inflammatory*
- *Immunosuppressive*
- *Anti-proliferative*
- *Vasoconstrictive.*



▶ **The efficacy and efficiency of topical applied steroids depends on**

1. *Potency of topical steroids*
2. *The anatomical sites where topical steroids applied*
3. *Vehicals*
4. *Occlusions*

Potency

- ▶ *Topical corticosteroids range in potency from mild (class IV) to superpotent (class I)*
- ▶ **Class I :**
- ▶ *Very potent or superpotent (up to 600 times as potent as hydrocortisone)*
- ▶ *Clobetasol propionate 0.05% { Dermovate Gamavate}*
- ▶ *Betamethasone dipropionate*
- ▶ *Fluocinolone acetonide 0.25% {synalar}*

Class II

- ▶ *Potent (100–150 times as potent as hydrocortisone)*
- ▶ *Betamethasone valerate 0.01% {Betinovate}*
- ▶ *Betamethasone dipropionate (cream, ointment, gel)*
- ▶ *Diflucortolone valerate*
- ▶ *Hydrocortisone 17-butyrate {Locoid}*
- ▶ *Mometasone furoate 0.01% {Elocome}*
- ▶ *Methylprednisolone aceponate*

Class III

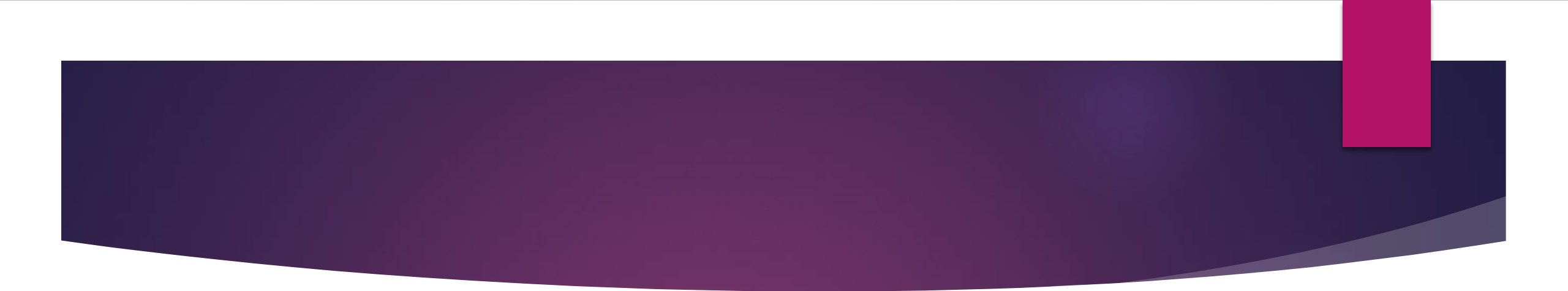
- ▶ *Moderate (2–25 times as potent as hydrocortisone)*
- ▶ *Clobetasone butyrate 0.05%*
- ▶ *Triamcinolone acetonide*

Class IV Mild

- ▶ *Hydrocortisone acetate 1% {Alafacort ,Hydroderm}*

Vehical

Ointements > *Creams* > *Lotions* > *Gels*

- 
- ▶ *Lotions are useful on intertriginous areas and the face.*
 - ▶ *Gels are useful on the scalp and in management of contact dermatitis.*
 - ▶ *Creams are useful on the face and in intertriginous areas and for management of inflammatory dermatoses.*
 - ▶ *Ointments are useful for dry scaly areas and when increased potency is required.*
 - ▶ *Topical corticosteroids range in potency from mild (class VII) to superpotent (class I)*
 - ▶ *Intrinsic differences in potency are attributable to fluorination or chlorination (halogenation) of the compound.*

Occlusions

- ▶ *Occlusions enhance penetrates from 10 to 100*
- ▶ *The anatomical sites where topical steroids*

1. MUCOUS MEMBRANE

2. SCROTUM

3. EYELIDS

4. FACE

5. CHEST AND BACK

6. UPPER ARMS

7. LOWER ARMS AND LEGS

8. DORSA OF HANDS AND FEET

9. PALMAR AND PLANTAR SKIN

10. NAILS

MORE PENETRATION



LEAST PENETRATION

side effects of topical steroid

▶ **Cushing syndrome**

- ▶ *only after long-term use of large quantities of topical steroid (eg > 50 g of clobetasol propionate or > 500 g of hydrocortisone per week).*

▶ **ocular side effects**

- ▶ A topical steroid should be used cautiously on eyelid skin, where it commonly results in periocular dermatitis.
- ▶ Potentially, excessive use over weeks to months might lead to glaucoma or cataract

Cutaneous side effect :

1. Development of miliaria
2. Skin atrophy
3. Striae
4. Bacterial or fungal infections
5. Adrenal suppression
6. Acneiform eruptions
7. Periorificial dermatitis (common); this can occur in children
8. Steroid rosacea
9. Symptoms due to topical corticosteroid withdrawal
10. Pustular psoriasis.



THANKS