

Spreading Relief: Update on Topical Steroids



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Topical steroids were introduced to medicine about 50 years ago (in 1952).¹ Topical corticosteroid cream and ointment formulations have an important role in the management of skin disease including eczema and dermatitis (*i.e.*, atopic, seborrheic, nummular, dyshidrosis, contact, which includes allergic, irritant and stasis). These preparations are available in a number of formulations, including:

- lotions (powder in water or alcohol),
- creams (continuous water with suspended oil),
- ointments (continuous oil with suspended water) and
- gels (particles suspended in a crystalline lattice that should not be compounded).

Lotions

Lotions are suitable for greasy skin or hairy areas, such as the scalp. When the water evaporates, there is a drying effect that should not be used on dry skin as found in the winter months.^{2,3}

Topical steroids

Topical steroids can be divided into groups. Classification consists of:

- weak,
- moderate,

- potent,
- very potent and
- extremely potent agents.

The penetration of a topical steroid from the plantar surface of the foot is much less than the cheeks.⁴ Accordingly, on the palms and soles, topical steroids (with six to nine times the potency of hydrocortisone) are required to provide the same effect as hydrocortisone on the forearm.^{3,4} In order to optimize the anti-itch effect, topical steroid creams can often be kept in a refrigerator to produce a cooling effect when applied. Alternatively, 0.25% to 0.5% menthol or camphor is added to the topical steroid cream or lotion preparation for cooling and anti-itch effects.

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Table 1

Quantities to dispense for two weeks, twice per week

Area	Example	Amount
Part of a single region	Face Foot	45 gm
Single region	Arm	90 gm
Double region	Leg (anterior/ posterior/trunk)	180 mg
Multiple regions	Whole body	450 gm

Tachyphylaxis

Tachyphylaxis is a common problem with use of steroids in the practice. It is characterized by a decreasing topical steroid effect during continued or prolonged treatment that frequently necessitates topical steroids of greater potency.¹ To prevent this phenomenon, as the patient improves, the topical steroid should gradually be decreased in potency, or be tapered by the use of alternating lubricating or hydrating creams as a substitute.



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Factors affecting topical steroid potency

Vehicle

The vehicle directly affects absorbency and potency of the steroid. Creams contain preservatives to prevent bacterial contamination as they contain water with a small amount of oil added. Some preservatives contain formaldehyde that can cause contact allergy in susceptible individuals. Ointments have a greasy or petrolatum-like base and they will not support bacterial growth, so a preservative is not required.²

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Quantity/location

The quantity of topical steroid (enough to cover one fingertip) is referred to as one finger tip unit (FTU = 0.5 g).³ When severe eczema covers the lower leg, three FTUs of topical steroid should be applied daily for a few days. The amount of corticosteroids should gradually be decreased.

Most topical steroids are applied on a twice daily schedule, until one or two weeks after the lesions have resolved. As the patient improves, the topical steroid should gradually be decreased in potency and can be substituted with lubricating or hydrating creams for one of the two daily doses.

For maintenance and to prevent recurrences, a topical steroid may be useful once or twice a week. Red areas need topical steroids, but dry areas should be treated with emollient alone. One application of cream to the whole body would require 50 gm of cream or the equivalent of 100 FTU (Table 1).

In spite of thick skin and less absorption of palm and soles, the face and body folds have increased absorption, so that only weak-to-moderate steroids should be used in these areas.

The relative strength of topical steroids has been calculated by multiplying the strength of the therapeutic class that the agent is part of, with the relative site specific cutaneous absorption (Table 2) to obtain the effective concentration applied. The absorption of topical steroids has been reported to vary both between different individuals and with defective epidermal

Table 2

Relative absorption

Forearm: 1.0 times
 Scalp: 3.5 times
 Cheeks: 13 times
 Plantar foot: 0.14 times
 Forehead: 6 times
 Scrotum: 42 times

barriers. The penetration of steroids is two to 10 times greater in damaged skin (e.g., atopic dermatitis) compared to healthy skin. In general, the same steroid cream will be slightly stronger in an ointment base or under occlusion compared to a cream base.

Relative steroid potency

Table 3 compares the classes of topical steroids with hydrocortisone assigned an arbitrary

Table 3

Relative topical steroid potency

Groups	Name	Concentration (%)	Available format
Weak (x 1)	Hydrocortisone	1.0, 0.5	C, O, L
Moderate (x 3)	Desonide	0.05	C, O
	Hydrocortisone valerate	0.5	C
	Triamcinolone acetonide	0.025, 0.1	C, O, L
Potent (x 6)	Mometasone furoate	0.1	C, O, L
	Betamethasone	0.05, 0.1	C, O
Very potent (x 9)	Desoximetasone	0.025	C
	Fluocinonide	0.01, 0.05	C, O, G
	Halcinonide	0.025, 0.1	C, O, L
Extremely potent (x 12)	Betamethasone dispropionate	0.5	C, O, L
	Clobetasol propionate	0.05	C, O, L

X: Times C: Cream O: Ointment L: Lotion G: Gel



Figure 1. Acne.



Figure 2. Atrophy.

The absorption of topical steroids has been reported to vary both between different individuals and with defective epidermal barriers.

concentration of one.^{1,2} Remember that a topical steroid has its potency determined by substitutions in the steroid ring and the relative concentration is meaningful only for the specific steroid molecule. For example, 0.1% betamethasone valerate is six times more potent than 1% hydrocortisone.

Adverse effects of topical corticosteroids^{1,4}

The most common adverse events of topical corticosteroid use are:


- Acne (Figure 1):
 - Steroid rosacea
 - Perioral dermatitis
 - Steroid addiction
- Atrophy (Figure 2):
 - Telangiectasia
 - Striae
 - Satellite pseudo scar
 - Purpura
- Infection:
 - Aggravation of infection
 - Miliaria
 - Folliculitis
 - Tinea incognita

Rare systemic adverse effects are summarized in Table 4. When we suspect an allergy to topical steroids, we must check the steroid molecule, but also other vehicle components and preservatives, such as:

- benzyl alcohol, fragrance,
- imidazolidinyl urea,
- formaldehyde releaser,
- lanolin,
- propylene glycol and
- parabens.

Take-home message

- Use topical steroids with appropriate potency to achieve disease control
- For maintenance, use less potent preparations. Taper topical steroids by reducing the frequency of application gradually with disease control (e.g., alternate applications or once a day or weekend use)
- Use topical steroids with caution in areas of high percutaneous absorption, including the elderly and children

Topical corticosteroid preparation sensitization can be confirmed with patch tests and referral to a Dermatologist or Allergist. As a screening procedure, clinicians can instruct patients to apply a topical steroid to the normal skin on the forearm just below the flexural part of the elbow. The cream is applied to normal skin in a small patch about the size of a dollar coin twice daily for three days. If discrete erythema and itch is produced, the patient is most likely allergic to one of the components in the topical preparation. 

The most common adverse events of topical corticosteroid use are: acne, atrophy and infection.

Table 4

Systemic adverse effects (rare)

Endocrine

- Cushing disease

Metabolic

- Hyperglycemia
- Osteopathy
- Adrenocortical suppression
- Decreased growth rate

Electrolyte balance

- Edema
- Hypocalcemia
- Hypertension

Ocular

- Cataract
- Glaucoma

References

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