Therapeutic Class Overview
Antipsoriatic Agents

INTRODUCTION

- The goal of treatment for patients with psoriasis is to control the disease. There are 3 main treatment modalities available at present for the treatment of psoriasis: topical agents, phototherapy, and systemic agents. Topical therapies are the mainstay for mild disease either as monotherapy or in combination, and topical therapies are also commonly used in conjunction with phototherapy, traditional systemic agents, or biologic agents for moderate to severe disease. Phototherapy, photochemotherapy, and traditional systemic agents are generally used for moderate or severe disease and in situations in which topical therapy is ineffective or otherwise contraindicated (*Menter et al, 2011, Feldman 2019*).
- Topical corticosteroids (eg, betamethasone, clobetasol, triamcinolone, etc.) are the cornerstone of treatment for the majority of patients with psoriasis. Their effectiveness in treating psoriasis is due to anti-inflammatory, antiproliferative, immunosuppressive, and vasoconstrictive effects. Drawbacks associated with topical corticosteroid treatment are local cutaneous side effects and more serious systemic side effects that are associated with long-term use over a large body surface area (*Menter et al 2011*). Due to these side effects, several agents have been developed and tested as monotherapy or in combination with topical corticosteroids in the hopes of reducing the duration of corticosteroid treatment.
- Other topical antipsoriatic agents include anthralin, calcitriol, calcipotriene, and tazarotene. These agents are available in a variety of vehicles. Early forms of treatment also included coal tar. In the United States, coal tar use has declined due to lack of standardization of available compounds and the development of other agents with less cosmetic issues such as odor and staining.
- Oral antipsoriatic systemic agents are typically reserved for moderate to severe psoriasis and are often combined with other therapies. Acitretin, a topical retinoid, modulates the cellular differentiation of the epidermis and is known to have immunomodulatory and anti-inflammatory activity (*Menter et al 2009[b]).* Acitretin is most effective as a maintenance therapy, usually after the disease has been stabilized, or in combination with other treatments such as phototherapy (*Villasenor-Park et al 2012*). Methoxsalen is a naturally occurring photosensitivity agent (psoralen) that enhances skin reactivity to ultraviolet light A (UVA). The combination of psoralen and UVA is referred to as photochemotherapy or PUVA. PUVA is an option for psoriasis that does not respond to topical medications alone or for lesions that are too extensive for topical treatment (*Menter et al 2010*).
- Agents included in this review are the topical and oral antipsoriatics, which are listed in Table 1. Biologics and targeted agents (ie, adalimumab, adalimumab-adaz, adalimumab-adbm, adalimumab-atto, apremilast, brodalumab, etanercept, etanercept-szzs, etanercept-ykro, guselkumab, infliximab, infliximab-abda, infliximab-dyyb, infliximab-qbtx, ixekizumab, risankizumab-rzaa, secukinumab, tildrakizumab-asmn, and ustekinumab) that are used to treat psoriasis and other inflammatory/immunologic diseases are not included in this review. Topical corticosteroids are also not included in this review.
- Medispan Class: Antipsoriatics, Antipsoriatic – Systemic, and Topical Steroid Combinations

Table 1. Medications Included Within Class Review

Generic	Brand	Generic Availability
Topical Agents		
Anthralin*	Dritho-Creme HP cream	-
	Zithranol shampoo	-
Calcipotriene	Dovonex cream	✔
	Sorliux foam	-
	Topical ointment	✔
	Topical scalp solution	✔
Calcitriol	Vectical ointment	✔
Tazarotene**	Tazorac cream	✔

Generic	Brand	Generic Availability
	Tazorac gel	-
Calcipotriene/ Betamethasone dipropionate	Enstilar foam	-
	Taclonex suspension	-
	Taclonex ointment	✔
Tazarotene/ Halobetasol propionate	Duobrii lotion	-
Oral Systemic Agents		
Acitretin	Soriatane capsules	✔
Methoxsalen	Oxsoralen-Ultra capsules	✔

*Anthralin products are unapproved marketed drugs that have not been formally evaluated by the Food and Drug Administration (FDA) as it was initially marketed before the Federal, Food, Drug, and Cosmetic Act was passed.
**Tazarotene 0.1% topical foam (Fabior) is approved for the treatment of acne. The Avage brand of tazarotene 0.1% topical cream is approved for cosmetic indications.
(*DRUGS@FDA 2019*, *Orange Book: Approved Drug Products with Therapeutic Equivalence Evaluations 2019*, *Clinical Pharmacology 2019*)

INDICATIONS

Table 2. Food and Drug Administration Approved Indications

Drugs	Psoriasis (Quiescent or Chronic)	Severe Psoriasis	Plaque Psoriasis	Photo-chemotherapy	Acne Vulgaris
Topical Agents					
Anthralin (Dritho-Creme, Zithranol)	✔				
Calcipotriene (Dovonex, Sorilux, calcipotriene ointment, calcipotriene scalp solution)			✔ *		
Calcitriol (Vectical)			✔ **		
Tazarotene (Tazorac)			✔		✔ †
Calcipotriene/ betamethasone dipropionate (Enstilar foam)			✔ ‖		
Calcipotriene/ betamethasone dipropionate (Taclonex suspension)			✔ ‡		
Calcipotriene/ betamethasone dipropionate (Taclonex ointment)			✔ ‖		
Tazarotene/ halobetasol propionate (Duobrii lotion)			✔		
Oral Systemic Agents					
Acitretin (Soriatane)		✔			
Methoxsalen (Oxsoralen-Ultra)				✔ ¥	

*Sorilux indicated for plaque psoriasis of scalp and body in patients 12 years or older; calcipotriene Topical Solution, 0.005% (Scalp Solution) is indicated for the treatment of chronic, moderately severe psoriasis of the scalp.
**Mild to moderate plaque psoriasis in adults 18 years and older.

†Tazorac 0.1% cream and gel.
‡Taclonex suspension indicated for plaque psoriasis of the scalp and body in patients 12 years and older.
‖Indicated for plaque psoriasis in patients 12 years of age and older.
¥For control of severe, recalcitrant, disabling psoriasis not adequately responsive to other forms of therapy and when the diagnosis has been supported by biopsy.
(Prescribing Information: *Calcipotriene ointment 2017, Calcipotriene solution 2018, Dovonex 2017, Dritho-Creme 2014, Duobrii 2019, Enstilar 2019, Oxsoralen-Ultra 2017, Soriatane 2018, Sorilux 2019, Taclonex ointment 2018, Taclonex suspension 2019, Tazorac cream 2017, Tazorac gel 2018, Vectical 2018, Zithranol 2011*)

- Information on indications, mechanism of action, pharmacokinetics, dosing, and safety has been obtained from the prescribing information for the individual products, except where noted otherwise.

CLINICAL EFFICACY SUMMARY

- Various strengths and formulations of anthralin or dithranol have been evaluated (*Fredriksson 1983, Jones et al 1985*). Results from these trials support efficacy of anthralin in the treatment of psoriasis with no significant differences identified between dosage strength, formulation, or administration.
- Topical calcipotriene has demonstrated favorable efficacy in treating psoriasis in several studies with marked improvements in clearing of psoriatic lesions occurring in approximately 50 to 70% of patients (*Highton et al 1995, Dubertret et al 1992, Thaci et al 2001*). Treatment success was reported in patients with psoriasis who were treated with topical calcipotriene foam in two 8-week, multicenter, randomized, double-blind, vehicle-controlled clinical trials (*Feldman et al 2012, Feldman et al 2013*).
- For the treatment of plaque psoriasis, topical calcipotriene has demonstrated favorable efficacy when combined with betamethasone, psoralen plus ultraviolet A (PUVA), and methotrexate (*Buckley et al 2008, De Jong et al 2003, Kragballe et al 2009, Luger et al 2008, Ortonnne et al 2009, Ozkan et al 2012, Torras et al 2014, van de Kerkhof et al 2009*). The combination of calcipotriene plus betamethasone has demonstrated superior efficacy when compared to monotherapy with either calcipotriene or betamethasone or placebo in several clinical trials (*Buckley et al 2008, Douglas et al 2002, Guenther et al 2002, Jemec et al 2008, Kaufman et al 2002, Kragballe et al 2004, Kragballe et al 2009, Luger et al 2008, Ortonne et al 2009, Papp et al 2003, Parslew et al 2005, Singh et al 2000, van de Kerkhof et al 2005, van de Kerkhof et al 2009, van de Kerkhoff et al 2004*).
- The efficacy of calcitriol ointment for the treatment of mild to moderate plaque psoriasis was demonstrated in 2 double-blind, randomized controlled studies involving 839 patients. Calcitriol applied twice daily for 8 weeks was significantly more effective than the vehicle. Additionally, there were no clinically relevant changes in calcium homeostasis or other routine laboratory parameters in calcitriol-treated patients (*Lebwohl et al 2007*).
- Head-to-head trials comparing the vitamin D analogues have been conducted. Ortonne et al found calcitriol to be significantly better tolerated than calcipotriol in sensitive skin fold areas (*Ortonne et al 2003*). In another 12-week, randomized trial in patients with chronic plaque psoriasis, calcitriol demonstrated similar efficacy to calcipotriol and had a significantly better safety profile (*Zhu et al 2007*).
- Head-to-head trials comparing therapies from different medication classes for the treatment of psoriasis also exist. Veronikis et al compared calcipotriene to coal tar and found that both agents were effective in the treatment of plaque psoriasis with no significant differences found between treatment groups (p value not reported) (*Veronikis et al 1999*). Calcipotriol solution has been compared to clobetasol shampoo, with clobetasol being found to be significantly more efficacious in terms of total severity score measures as well as global severity score ($p < 0.05$ for all) (*Reygagne 2005*).
- Tazarotene was shown to be more effective than placebo in treating plaque psoriasis (*Weinstein et al 1997*). Results demonstrated that both tazarotene 0.1% and 0.5% gel were significantly more effective than placebo in reducing the severity of signs and symptoms of target lesions ($p < 0.05$). A second, placebo-controlled trial with the same methodology found similar results (*Weinstein et al 2003*). Topical tazarotene in combination with a low-, medium-, and high-potency topical corticosteroid has been evaluated in patients with mild to moderate plaque psoriasis (*Guenther et al 2000, Lebwohl et al 1998*). While all treatments were effective, the tazarotene and topical corticosteroid combination produced significantly higher treatment success rates at weeks 2, 8, and 12 vs tazarotene monotherapy (all $p < 0.05$). Bowman et al compared the combination of tazarotene gel plus calcipotriene ointment to clobetasol ointment in patients with stable psoriasis and found that both treatments were effective in reducing scaling, plaque elevation, and overall lesion severity with no significant differences between the 2 groups ($p = 0.93$, $p = 0.76$, and $p = 0.29$, respectively) (*Bowman et al 2002*).
- The efficacy of topical tazarotene and halobetasol propionate fixed combination was evaluated in 2 Phase 3, multicenter, double-blind randomized controlled trials in 418 patients with moderate-to-severe plaque psoriasis. More patients treated with topical tazarotene 0.045%/halobetasol propionate 0.01% lotion achieved treatment success at 8 weeks compared to patients who received vehicle in both studies *(Gold et al 2018).* Similarly, in a double-blind,

multicenter Phase 2 trial, more patients who received combination tazarotene/halobetasol propionate achieved treatment success after 8 weeks compared to halobetasol propionate 0.01%, tazarotene 0.045%, or vehicle *(Sugarman et al 2017).* Tazarotene/halobetasol propionate lotion was also compared to halobetasol propionate 0.05% cream and vehicle in patients with moderate-to-severe plaque psoriasis. Treatment success was achieved in 32.8% of patients with tazarotene/halobetasol propionate, 34.0% of patients with halobetasol propionate 0.05%, and 3.3% of patients with vehicle *(Bhatia et al 2018).*

- Acitretin has been shown to be effective in the treatment of patients with moderate to severe psoriasis in open-label studies and controlled clinical trials (*Olsen et al 1989, Tosti et al 2009*). In combination with calcipotriol, acitretin demonstrated improved clinical outcomes compared to acitretin alone or placebo (*Rim et al 2003, van de Kerkhof et al 1998*). Acitretin in combination with phototherapy can enhance treatment efficacy for patients with moderate to severe chronic plaque psoriasis that does not clear using UVB, PUVA, or acitretin alone. Compared with acitretin or UV light monotherapy, the combination regimen enhances efficacy and limits treatment frequency, duration, and cumulative doses (*Lebwohl et al 2001*).
- Several large multicenter trials have demonstrated the efficacy of oral methoxsalen with UVA (PUVA) in psoriasis, indicating clearance of lesions in 70% to 89% of patients (*Henseler et al 1981, Roenigk et al 1979, Melski et al 1977*). Two systematic reviews of the large majority of PUVA studies verified these findings demonstrating that between 70% and 100% of patients treated with PUVA achieved clearing of psoriasis lesions (*Griffiths et al 2000, Spuls et al 1997*).
- The Agency for Healthcare Research and Quality (AHRQ) published a comparative effectiveness review of the biologic systemic agents compared to nonbiologic systemic agents or phototherapy on an individual drug level for the treatment of chronic plaque psoriasis. A total of 5 randomized clinical trials and 4 observational studies were identified. In summary, limited data exist that compare agents. Existing data were considered to be low strength of evidence, which in general favored the biological agents over the non-biologic agents (*Lee et al 2012*).
- A Cochrane Review was conducted to compare the effectiveness, tolerability, and safety of topical treatments for chronic plaque psoriasis, relative to placebo, and to similarly compare vitamin D analogues (alone or in combination) with other topical treatments. A total of 177 randomized controlled trials with 34,808 participants were included. When used on the body, most vitamin D analogues were significantly more effective than placebo. Dithranol, combined treatment with vitamin D/corticosteroid, and tazarotene all performed significantly better than placebo. Head-to-head comparisons of vitamin D for psoriasis of the body against potent or very potent corticosteroids had mixed findings. For both the body and scalp psoriasis, combined vitamin D and corticosteroid treatment performed significantly better than vitamin D alone or corticosteroid alone. When applied to psoriasis of the scalp, vitamin D was significantly less effective than both potent corticosteroids and very potent corticosteroids. Vitamin D generally performed better than coal tar, but findings compared to dithranol were mixed. For both body and scalp psoriasis, potent corticosteroids were less likely than vitamin D to cause local adverse events, such as burning or irritation. No comparison of topical agents found a significant difference in systemic adverse effects (*Mason et al 2013*).
- In addition to its FDA approval for the treatment of psoriasis, tazarotene, a topical retinoid agent, is also FDA-approved for the treatment of acne vulgaris. In a placebo-controlled trial by Bershad et al, tazarotene 0.1% gel was compared with tazarotene 0.1% gel plus a vehicle gel, or vehicle gel alone (*Bershad et al 2002*). The primary efficacy endpoint, reduction in acne vulgaris lesions, was significant in both tazarotene treatment groups compared to the vehicle group ($p = 0.002$). Clinical trials comparing tazarotene to other topical retinoid agents have shown conflicting results, with tazarotene being equally or more effective than other topical retinoids (*Pariser et al 2008, Tanghetti et al 2010*).

CLINICAL GUIDELINES

- The current guidelines for the management of psoriasis and psoriatic arthritis from the American Academy of Dermatology (AAD) recommend topical agents for mild to moderate psoriasis. Topical agents are also used adjunctively with ultraviolet light or systemic medications for resistant lesions or more severe disease. Topical corticosteroids are recommended as first-line treatment for most patients. Other topical agents included in the guidelines are vitamin D analogues, tazarotene, tacrolimus, pimecrolimus, anthralin, coal tar, and combination products. Combination products include corticosteroid and salicylic acid, corticosteroid and vitamin D analogue, corticosteroid and tazarotene, and tacrolimus and salicylic acid. When used in conjunction with ultraviolet radiation B or psoralen and UVA phototherapy or biologics, acitretin is effective for psoriasis and the treatment of choice in human immunodeficiency virus-positive patients with severe psoriasis due to its lack of significant immunosuppression (*Menter et al 2009[a], Menter et al 2009[b], Menter et al 2010, Menter et al 2011, Menter et al 2019*).
- In a 2013 position paper published by the AAD, psoriasis patients with moderate to severe psoriasis may avoid stepwise-therapy (ie, first phototherapy, then oral systemic therapies, followed by biologic therapies) and be moved to later line therapy based on disease severity (*AAD 2013*). Treatment needs vary depending on the severity of disease,

body location of disease, characteristics of the psoriasis being treated including lesion thickness, degree of erythema and amount of scaling, as well as patient preferences.

- Topical retinoids such as tazarotene are also effective in the treatment of acne vulgaris. Guidelines do not recommend one retinoid over another but do generally recommend these agents as a first-line combination option (*Thiboutot et al 2009, Eichenfield et al 2013, Zaenglein et al 2016*).
  - According to the AAD, topical retinoids (eg, tretinoin, adapalene, tazarotene) are recommended among the first-line treatment options for the management of acne (strength of recommendation: A [based on consistent and good-quality patient-oriented evidence]; level of evidence I [good-quality patient-oriented evidence, ie, evidence measuring outcomes that matter to patients: morbidity, mortality, symptom improvement, cost reduction, and quality of life], and II [limited-quality patient-oriented evidence]) (*Zaenglein et al 2016*). Topical retinoids are important in addressing the development and maintenance of acne and are recommended as monotherapy in primarily comedonal acne, or in combination with topical or oral antimicrobials in patients with mixed or primarily inflammatory acne lesions. The guidelines do not prefer one topical retinoid over another.
    - There are several head-to-head studies with retinoid products. Some support greater efficacy of tazarotene over adapalene and tretinoin, and adapalene over tretinoin, but the concentrations and formulations were varied. Overall, the limitations of the existing studies prohibit direct efficacy comparisons of topical retinoids.
  - According to the Medical Letter, topical retinoids can be used alone or in combination with antibiotics to treat both inflamed and noninflamed acne lesions, or for maintenance treatment of acne (*Medical Letter 2016*).

SAFETY SUMMARY

- Topical calcipotriene is contraindicated in individuals with hypersensitivity to any components of the preparation. Additionally, calcipotriene administration in patients with vitamin D toxicity or hypercalcemia is also contraindicated. Calcipotriene should not be used for the treatment of the face, and the scalp solution is contraindicated in acute psoriatic eruptions. The most common adverse effects of calcipotriene are local effects including burning, pruritus, peeling, stinging, dryness, skin irritation, rash, and erythema. Contact dermatitis has been reported to occur with use of topical calcipotriene. Systemic side effects of vitamin D analogs, including hypercalcemia, are rare unless patients apply more than the recommended dosage of 100 g per week (*Clinical Pharmacology 2019*).
- There are no known contraindications to topical calcitriol. Among patients receiving laboratory monitoring, hypercalcemia was observed in 24% (18/74) of patients exposed to active drug and in 16% of (13/79) patients exposed to vehicle. This increase in calcium and albumin-adjusted calcium levels was < 10% above the upper limit of normal. The effects of calcitriol on calcium metabolism have not been evaluated for treatment durations of > 52 weeks. Additionally, increased absorption of calcitriol may occur with the use of occlusive dressings. Avoid exposure of treated areas to artificial or natural sunlight. The safety and efficacy of topical calcitriol in patients with disorders of calcium metabolism and patients with erythrodermic, exfoliative, or pustular psoriasis have not been evaluated. The most common adverse effects include hypercalciuria, pruritus, and lab test abnormalities (not otherwise specified).
- There are no known contraindications to calcipotriene/betamethasone suspension, ointment, or foam. Caution should be used with all formulations in patients with elevated serum calcium levels. Additionally, hypothalamic-pituitary-adrenal axis suppression has occurred due to systemic absorption of the topical corticosteroid. Avoid exposure of treated areas to artificial or natural sunlight. Local adverse reactions such as atrophy, irritation, and allergic contact dermatitis are more likely to occur with occlusive use. Common adverse effects include pruritus, worsening of psoriasis, erythema, and burning sensation.
- Topical tazarotene is contraindicated in patients who are pregnant or who have a documented hypersensitivity reaction to any component of the formulation. Tazarotene should not be used on eczematous skin as severe irritation may occur. Additionally, increased photosensitivity may occur with concurrent administration of fluoroquinolones, phenothiazines, sulfonamides, tetracyclines, and thiazides. Patients should be cautioned to take protective measures (eg, sunscreens, protective clothing) against exposure to sunlight or ultraviolet light (eg, tanning beds) until tolerance is determined. Excessive pruritus, burning, skin redness or peeling may occur. Discontinue tazarotene until skin integrity is restored, or reduce the dosing interval or switch to a lower concentration. The most common adverse effects include burning, erythema, and pruritus.
- Topical tazarotene/halobetasol propionate lotion is contraindicated in pregnancy. Warnings include hypothalamic-pituitary-adrenal axis suppression and photosensitivity. Common adverse effects include contact dermatitis, application site pain, folliculitis, skin atrophy, and excoriation. Local adverse reactions are more likely to occur with occlusive dressings.
- Topical anthralin is contraindicated in acute or actively inflamed psoriatic eruptions. Additionally, the agent should not be used if there is a hypersensitivity to the active ingredient or any of its components. The most common side effects of anthralin are skin irritation and staining of lesional and adjoining skin, nails, and clothing.

- Acitretin is teratogenic and its use, therefore, is limited to male and female patients of nonchildbearing potential. Acitretin should only be considered for women of childbearing potential with severe psoriasis unresponsive to other therapies or whose clinical condition contraindicates the use of other treatments. Other contraindications for acitretin include severe liver or kidney impairment, chronic elevation of lipid profile, and use in combination with methotrexate or tetracyclines. Potential adverse effects of acitretin include dry skin and mucus membranes, alopecia, skin peeling, pruritus, cheilitis, rhinitis, hyperlipidemia, liver toxicity, and teratogenicity. Periodic monitoring of bones, lipid profile, liver function, and eyes is recommended.
- Methoxsalen is contraindicated with a history of light sensitivity, melanoma, invasive squamous cell carcinoma or aphakia. Skin irritation, including severe edema, erythema, blistering, and exfoliative dermatitis, can occur during PUVA therapy. Pruritus and other dermatological effects may occur as well. Nausea occurs in 10% of patients receiving methoxsalen, and central nervous system (CNS) effects including depression, dizziness, and headache have been reported. Patients who have received PUVA therapy should be monitored throughout their lives for the development of cutaneous malignancies.
- Pregnancy and lactation:
  - Anthralin: Pregnancy Category C. It is not known if anthralin is excreted in breast milk. Due to the potential for serious adverse reactions in the nursing infant, a decision should be made whether to discontinue nursing or to discontinue the drug, taking into account the importance of treatment to the mother.
  - Calcipotriene: Unclassified in accordance with the FDA's Pregnancy and Lactation Labeling Rule (PLLR) for Sorilux and Dovonex. It is not known if calcipotriene is excreted in breast milk; caution is advised.
  - Calcitriol: Pregnancy Category C. It is not known if calcitriol is excreted in breast milk; caution is advised.
  - Calcipotriene/betamethasone: Unclassified in accordance with the FDA's Pregnancy and Lactation Labeling Rule (PLLR) for Taclonex Ointment. Pregnancy Category C for Taclonex suspension and Enstilar foam. It is not known if calcipotriene/betamethasone is excreted in breast milk; caution is advised. It should not be applied to the breast if breast-feeding.
  - Tazarotene and tazarotene/halobetasol: Use in pregnancy is contraindicated. It is not known if tazarotene and/or halobetasol are excreted in breast milk. The decision to continue or discontinue breastfeeding during therapy should take into account the risk of infant exposure, the benefits of breastfeeding to the infant, and benefits of treatment to the mother.
  - Acitretin: Category X. Acitretin is a known teratogen and use is contraindicated in females who are or may become pregnant. Acitretin is excreted in breast milk. Due to the potential for serious adverse reactions in the breastfeeding infant, the manufacturer does not recommend acitretin prior to or during breastfeeding.
  - Methoxalen: Unclassified in accordance with the FDA's PLLR. It is not known if methoxsalen (systemic) is excreted in breast milk; either methoxsalen ingestion or nursing should be discontinued.

DOSING AND ADMINISTRATION

Table 3. Dosing and Administration

Drug	Available Formulations	Usual Recommended Frequency	Comments
Topical Therapy			
Dritho-Crème (anthralin)	Cream	Apply once a day to psoriatic lesions for 5 to 10 minutes using the lowest strength possible for at least 1 week; may increase contact time up to 30 minutes as tolerated.	Avoid spreading cream onto the forehead; remove by washing or showering. For scalp psoriasis, comb hair to remove scalar debris; wet and part hair; rub cream into lesions.
Zithranol (anthralin)	Shampoo	Apply onto wet scalp 3 to 4 times per week.	Leave on scalp for 3 to 5 minutes and then rinse thoroughly.
Dovonex (calcipotriene)	Cream	Apply a thin layer to affected area 1 to 2 times per day and rub in completely.	

Drug	Available Formulations	Usual Recommended Frequency	Comments
Sorilux (calcipotriene)	Foam	Apply a thin layer twice daily to the affected areas and rub in gently and completely.	Avoid contact with the face and eyes. Not for oral, ophthalmic, or intravaginal use.
Calcipotriene ointment	Ointment	Apply a thin layer to affected area 1 to 2 times per day and rub in gently and completely.	
Calcipotriene scalp solution	Solution	Comb hair to remove scaly debris and apply twice daily, only to lesions, and rub in gently and completely.	Do not spread to forehead. Keep well away from eyes. Avoid applying to uninvolved scalp margins.
Vectical (calcitriol)	Ointment	Apply to affected areas twice daily, morning and evening.	The maximum weekly dose should not exceed 200 g. Not for oral, ophthalmic, or intravaginal use.
Enstilar (calcipotriene/ betamethasone dipropionate)	Foam	Apply to affected area once daily for up to 4 weeks.	Do not use more than 60 g every 4 days. Do not use with occlusive dressings unless directed by a physician. Not for oral, ophthalmic, or intravaginal use. Avoid use on face, groin, axillae, or if skin atrophy is present at treatment site.
Taclonex (calcipotriene/ betamethasone dipropionate)	Ointment, topical Suspension	Ointment: Apply to affected areas once daily for up to 4 weeks. Topical Suspension: Apply to affected areas once daily for up to 8 weeks.	Maximum weekly dose should not exceed 100 g for patients ≥ 18 years of age. For patients 12 to 17 years of age, maximum weekly use should not exceed 60 g. Treatment of > 30% of body surface area is not recommended. Do not use on face, axillae, or groin. Do not use with occlusive dressings unless directed by a physician. Do not use if skin atrophy is present at treatment site. Shake topical suspension before use. Not for oral, ophthalmic, or intravaginal use.
Tazorac (tazarotene)	Cream, gel	Psoriasis for ages ≥ 12 years old (gel) and ≥ 18 years old (cream): Apply a thin film to	Psoriasis: Start with 0.05% cream/gel, then increase to 0.1% if tolerated and medically indicated. Treatment of >

Drug	Available Formulations	Usual Recommended Frequency	Comments
		affected area once daily in the evening. Acne vulgaris for ages ≥ 12 years old: Apply a thin film to affected area once daily in the evening.	20% of body surface area is not recommended (gel only). Not for oral, ophthalmic, or intravaginal use. Avoid contact with eyes, mouth, or other mucous membranes. Apply to dry skin and at least an hour after using emollients.
Duobrii (tazarotene/ halobetasol propionate)	Lotion	Apply a thin layer to affected area once daily.	Maximum weekly dosage should not exceed approximately 50 g. Not for oral, ophthalmic, or intravaginal use. Do not use on face, axillae, or groin. Apply to dry skin.
Oral Therapy			
Soriatane (acitretin)	Capsules	Once daily with the main meal	
Oxsoralen (methoxsalen)	Capsules	Take 1.5 to 2 hours before UVA exposure with low-fat food or milk (see prescribing information for weight-based dosing instructions)	The number of doses per week will be determined by the schedule of UVA exposures.

See the current prescribing information for full details

CONCLUSION

- Numerous topical and systemic therapies are available for the treatment of psoriasis. Topical treatment is considered to be the safest option and is widely used for mild psoriasis, followed by systemic and phototherapies, which are used for moderate to severe psoriasis. Selection of medication must take into account severity of disease, thickness and scaling of the lesions, relevant comorbidities, patient preference, efficacy, and evaluation of individual patient response (*AAD 2013, Hsu et al 2012, Menter et al 2009[b], Menter et al 2019*).
- Topical corticosteroids are the cornerstone of treatment for the majority of patients with psoriasis. Drawbacks associated with topical corticosteroid treatment are local cutaneous side effects and more serious systemic side effects that are associated with long-term use over a large body surface area (*Menter et al 2011*). Several agents have been developed and tested as monotherapy or in combination with topical corticosteroids in the hopes of reducing the duration of corticosteroid treatment.
- The vitamin D analogs, calcipotriene and calcitriol, are other first-line topical agents with proven efficacy in the treatment of psoriasis. Although less effective than topical corticosteroids, they are often used in combination with topical corticosteroids to enhance efficacy and reduce the risk of atrophy, especially over the long term. One potential advantage of calcitriol is that there are no known contraindications for use, whereas calcipotriene (alone, but not in combination with betamethasone) is contraindicated in patients with hypercalcemia and vitamin D toxicity and in acute or actively inflamed psoriatic lesions. Another possible advantage of calcitriol is that it has been shown to be better tolerated in sensitive skin fold areas as well as associated with less stinging, burning, edema and erythema (*Weinstein et al 2003, Zhu et al 2007*).
- The combination of calcipotriene and betamethasone (Enstilar and Taclonex) has been evaluated in several studies for the treatment of psoriasis compared to placebo and to its individual components. Overall, results indicated that the combination product was more effective in reducing psoriasis area and severity index scores, and it increased the percentage of patients with clear or almost clear disease compared to either agent alone or placebo (*Douglas et al 2002, Guenthe et al 2002, Kaufman et al 2002, Kragballe et al 2004, Papp et al 2003, Parslew et al 2005, Singh et al 2000,*

van de Kerkhof et al 2004, van de Kerkhof et al 2005). The combination is available as a suspension, ointment, and foam.

- Tazarotene is the only retinoid agent that is FDA-approved for the treatment of psoriasis. Clinical trials have demonstrated its efficacy alone as well as in combination with other antipsoriatic agents. Guidelines recommend its use as an adjunct to topical corticosteroids (*Menter et al 2009[b]*). No significant differences were observed between calcipotriene or calcitriol and tazarotene in several head-to-head studies (*Guenther et al 2000, Schiener et al 2000, Tzung et al 2005*). Tazarotene is also available in fixed combination with halobetasol propionate. The combination has shown efficacy compared to its individual components *(Sugarman et al 2017).* Other topical preparations, including anthralin, have taken on more secondary roles and are particularly challenging as they stain clothing and skin.
- Of the systemic therapies, acitretin is the least effective as monotherapy and is therefore often used in conjunction with ultraviolet B or psoralen plus UVA phototherapy. Acitretin does not lead to immunosuppression or the associated risk of infection like biologic agents. Guidelines recommend the use of acitretin in combination with phototherapy as first-line treatment for psoriasis when not contraindicated, before resorting to other agents including methotrexate, cyclosporine, or biologic treatments (*Lebwohl 2001, Menter et al 2009, Menter et al 2010*). Acitretin should not be used in women of childbearing potential.
- Methoxsalen and ultraviolet light (PUVA) is an effective method of treating psoriasis. PUVA is indicated in patients with moderate to severe psoriasis that is unresponsive to other forms of therapy or for lesions that are too extensive for topical treatment (*Menter et al 2010*).
- In a position paper published by the AAD, psoriasis patients with moderate to severe psoriasis may avoid stepwise-therapy (i.e., first phototherapy, then oral systemic therapies, followed by biologic therapies) and be moved to later line therapy based on disease severity (*AAD 2013*). Consensus guidelines agree that the decision for treatment should be based on efficacy, potential adverse effects, prior treatments, patient preference, duration and severity of disease, medical risk factors**,** co-morbidities, and potential impact on quality of life (*AAD 2013*).
- Topical retinoids such as tazarotene are also effective in the treatment of acne vulgaris. Guidelines do not recommend one retinoid over another but do generally recommend these agents as a first-line combination option (*Thiboutot et al 2009, Zaenglein et al 2016, Eichenfield et al 2013*).

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