# Patients With Psoriasis Prefer Solution and Foam Vehicles: A Quantitative Assessment of Vehicle Preference

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*Psoriasis patients' acceptance of the vehicles used in topical therapy contributes to adherence to treatment plans and outcomes, but patient preferences for different vehicles have not been assessed. The purpose of this study was to develop a quantitative measure of patient preferences for different vehicles and to assess these preferences. Focus group sessions were conducted of patients with psoriasis to determine patient perceptions of the advantages and disadvantages of different topical psoriasis therapies. This information was used to derive a vehicle preference measure to assess different topical therapies. Twenty patients with psoriasis sampled different topical psoriasis medications, assessed the effects of the vehicles on quality of life (QOL), and completed the preference measure for each vehicle. The focus group sessions resulted in the development of a 7-item preference measure. The validity of the vehicle preference measure was demonstrated by good correlation with patient expectations of effects on QOL and by test–retest reliability. The foam and solution vehicles were preferred over the cream, gel, and ointment vehicles ($P<.01$). There was no significant difference between preferences for daytime and nighttime application of vehicles. Although validated measures of adherence to topical therapy are not yet available, the results of this study suggest that the characteristics of solution and foam may favor improved adherence to topical therapy.*

Psoriasis is a common skin disorder with tremendous impact.[1] The pain, itching, and social stigma of psoriasis significantly affect the physical, psychological, and overall quality of life (QOL) of patients.[2] Although a cure is not available, numerous treatments—topical, phototherapy, and oral medications—may be used alone or in combination to keep the disease under control. Because of their ease of application, availability, limited side effects, and efficacy, topical corticosteroids are one of the most frequently used treatments.[3]

As with any disorder, patient adherence to therapy is vital to its success and efficacy. Topical therapy is particularly challenging because of patient preferences and cultural or social biases. A patient may feel that messy application is a good reason not to use a medication, even an effective one; using such a treatment may actually reduce this patient's QOL.[4] As the majority of a topical formulation is comprised of a vehicle (not the active ingredient), the tolerability of the medication is directly affected by its vehicle.[5]

Formulations for topical corticosteroids include ointment, gel, solution, cream, emollient, lotion, tape, oil, spray, and foam. Ideal vehicles are inexpensive, nongreasy, odorless, easily applied, and

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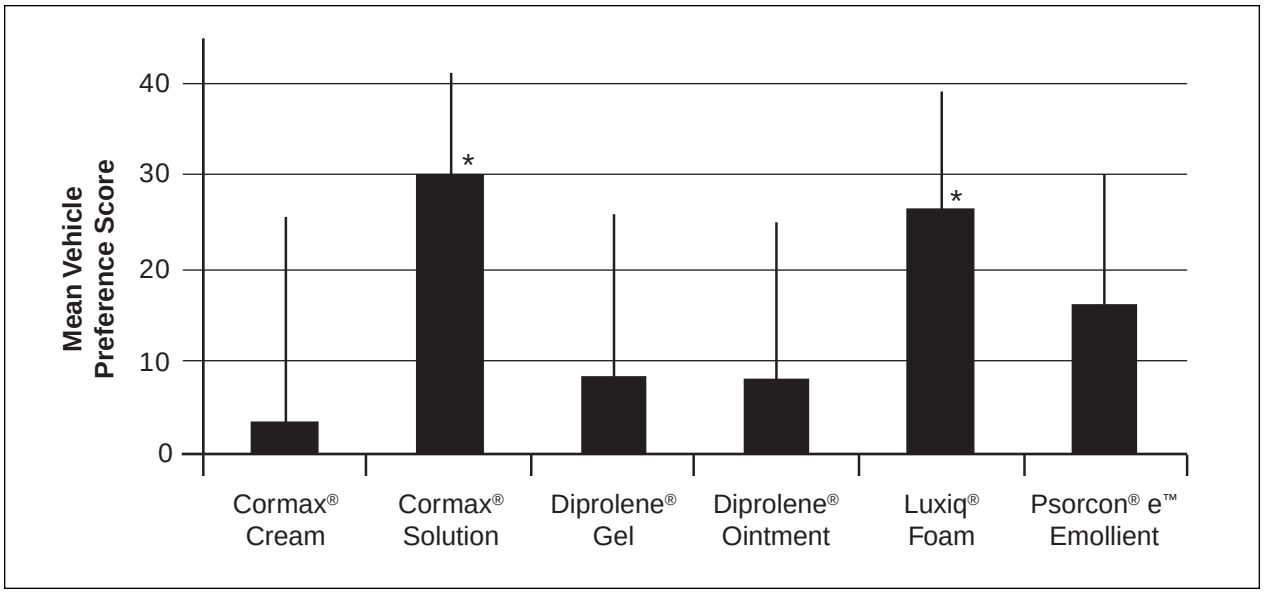


**Figure 1.** For each preparation, a vehicle preference score consisting of 7 vehicle characteristics rated on a 7-point scale was completed by 20 patients with psoriasis. Solution and foam preparations were preferred over cream, gel, and ointment preparations. Lines represent 1 SD. Scores represent the sum of daytime and nighttime preference scores. In Cormax®, the active ingredient is clobetasol propionate; in Diprolene®, betamethasone diproprionate; in Luxiq®, betamethasone valerate; in Psorcon® e™, diflorasone acetate. Asterisk indicates $P<.01$ vs cream, gel, and ointment preparations.

residue-free. The characteristics of vehicles directly affect patient adherence to therapy. It is believed that most patients prefer cream over ointment formulations and gel over cream formulations; the greasiness of topical therapy results in reported nonadherence to therapy.[6,7] Cost was not measured in this study.

The importance of assessing patient preferences for different vehicles has been recognized.[8] The purpose of this study was to provide a quantitative assessment of patient preferences for different vehicles using a validated measure.

## Materials and Methods

Focus group sessions were conducted to determine psoriasis patients' preferences for a topical therapy. Patients were asked about their preferences and about their perceptions of the advantages and disadvantages of topical treatments. A vehicle preference measure was constructed using 7 items derived from these sessions: how easily the topical therapy is applied, how long it takes to apply, how well it is absorbed, how it feels to the touch (greasiness/oiliness), how it smells, how it feels on the skin, and how much it stains. Each item was rated on a 7-point (−3 to +3) scale with the descriptors *extremely unappealing*, *moderately unappealing*, *slightly unappealing*, *neutral*, *slightly appealing*, *moderately appealing*, and *extremely appealing*. Because the investigators expected preferences for daytime and nighttime application to differ, patients were asked to rate each characteristic for both daytime and nighttime use. The highest and lowest possible scores for vehicle preference (for daytime and nighttime use) were 21 and −21, respectively; the highest and lowest possible overall scores were 42 and −42, respectively.

Twenty patients with psoriasis rated their preferences for 6 different topical corticosteroid vehicles: diflorasone diacetate (Psorcon® e™) emollient, betamethasone valerate (Luxiq®) foam, betamethasone diproprionate (Diprolene®) ointment and gel, and clobetasol propionate (Cormax®) solution and cream (the solution is composed of clobetasol propionate in a base of purified water, isopropyl alcohol, carbomer 934P, and sodium hydroxide). For each vehicle, an unmeasured dime-size quantity was dispensed into a 20-mL medicine cup. Using cotton swabs, patients applied the vehicle to a quarter-size area of normal skin on the forearm. Immediately after applying the vehicle, patients completed a preference measure. Different forearm areas were used so that medications were always applied to areas not previously tested. Patients also were asked to rate how a topical therapy would change their QOL; they used a 7-point (−3 to 3) scale with the descriptors *will greatly worsen the quality*, *will*

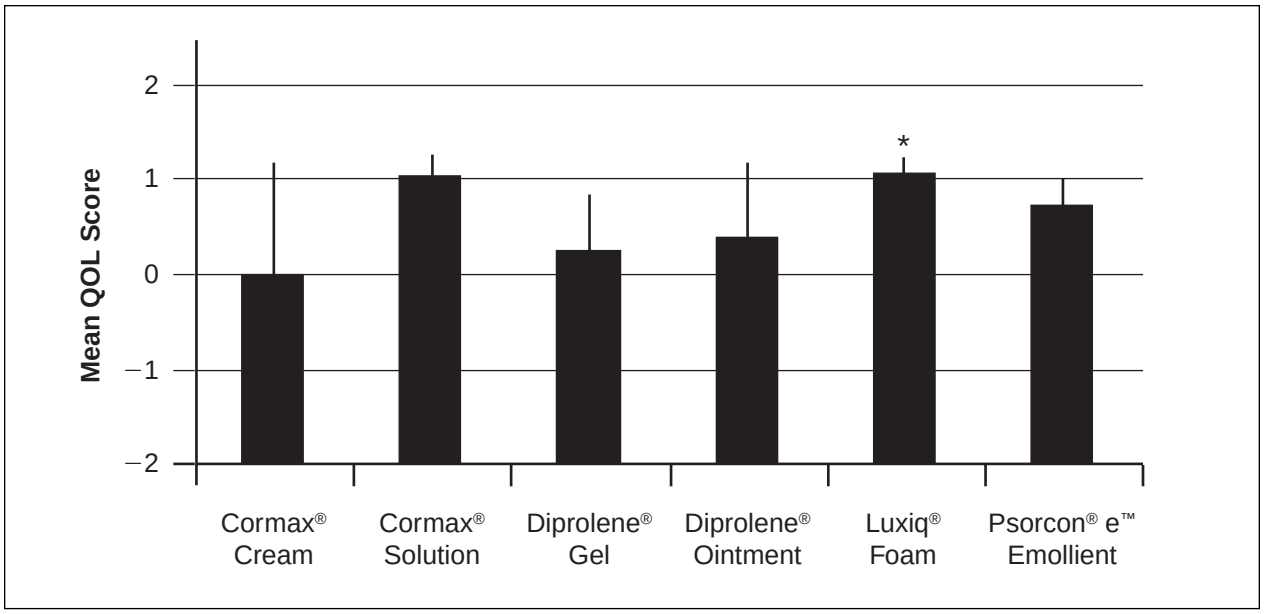


**Figure 2.** Mean quality of life (QOL) scores. Twenty patients applied 6 different topical medications and reported the effect of each vehicle on QOL using a 7-point (−3 to 3) scale. Bars represent mean scores; lines represent 1 SD. See Figure 1 for the active ingredient in each topical treatment. Asterisk indicates $P<.01$ vs cream and gel preparations.

*moderately worsen the quality*, *will slightly worsen the quality*, *will have no effect*, *will slightly improve the quality*, *will moderately improve the quality*, and *will greatly improve the quality*. To assess the test–retest validity of the preference measure, we had 7 patients test and rate each vehicle.

To further assess how characteristics of different vehicles may contribute to topical therapy adherence and to patient QOL, we had patients rate how important each of 13 characteristics was in deciding to use a treatment and in assessing the effect of the treatment on QOL: ease of application, time needed for application, absorption, greasiness/oiliness, smell, feel on the skin (cool/burning/soothing), look of hair when product is applied, amount of stains on clothes and bed linens, cost of product, cost of replacing stained clothes and bed linens, messiness, side effects, and method of application. Scoring was on a 1-to-5 scale with descriptors *not at all important*, *slightly important*, *moderately important*, *quite important*, and *extremely important*.

Wilcoxon signed rank tests were used to analyze the preference and QOL results for the various vehicles and for daytime versus nighttime use. *P* values less than or equal to .01 were considered statistically significant using the Bonferroni method for multiple tests. The Spearman rank correlation ($p$) was used to measure associations, and Cronbach $\alpha$ was used to measure reliability of the summative preference scale. All hypothesis tests were 2-sided, and all analyses were performed using Stata software (version 6; Stata Corporation).

## Results

Eleven men and 9 women participated in this study. Mean age was 49 years (SD, 16 years; range, 23–73 years). Nineteen patients were white, and 1 was black. Solution and foam preparations were preferred over cream, gel, and ointment preparations ($P<.01$; Figure 1). Fifteen of the 20 patients preferred solution over emollient, whereas 3 preferred emollient over solution ($P=.003$); 14 of the 20 preferred foam over emollient, whereas 5 preferred emollient over foam ($P=.02$). The difference between solution and foam was not significant ($P=.4$). In addition, each patient was asked how the topical vehicles would change his or her QOL. Foam was reported to improve QOL more than cream and gel did ($P<.01$; Figure 2).

To further assess the validity of these measures, we examined the correlation between the QOL measure and the vehicle preference measure for each patient and for each vehicle (a total of 20 observations/vehicle). Correlation between the measures was good (Spearman $p$ range, 0.3–0.8; $P<.05$, except for solution, $P=.19$). Six or 7 patients were retested per vehicle, and the vehicle preference measure also correlated positively with retest results for most vehicles (Spearman $p$ range,

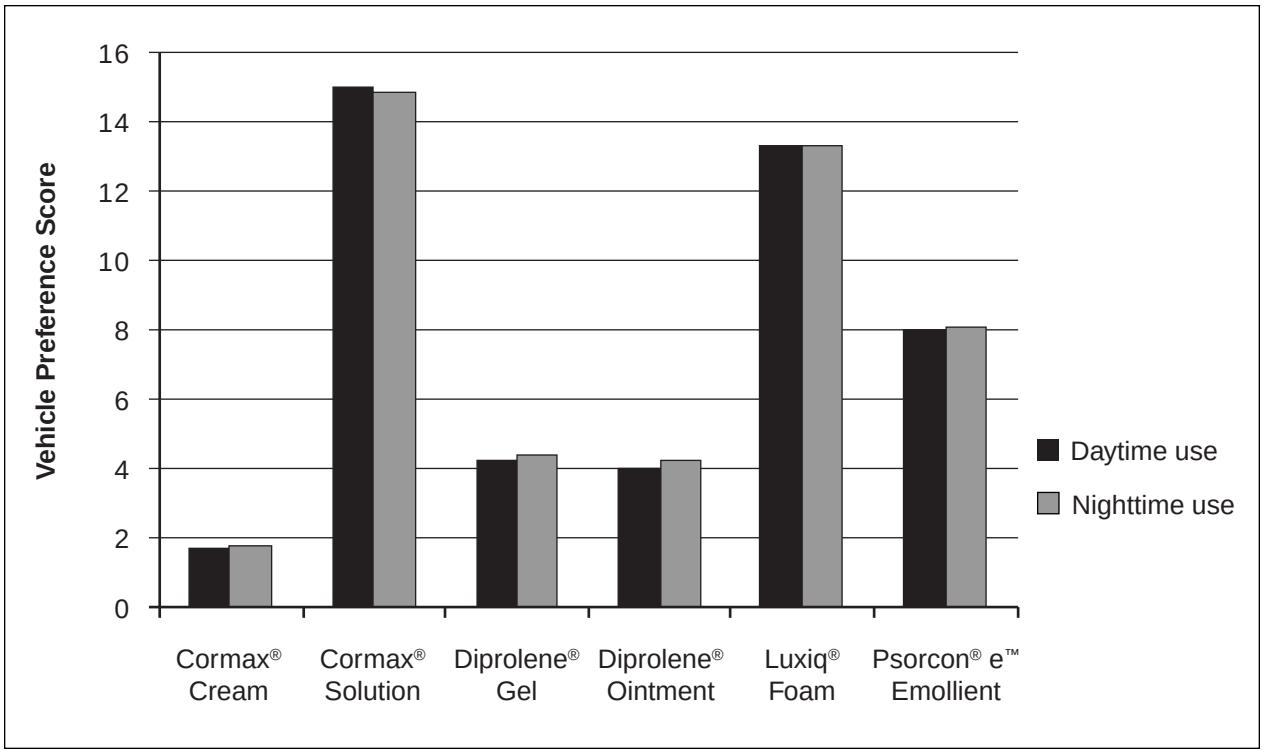


**Figure 3.** Vehicle preference scores for use during daytime and nighttime. In the vehicle preference score, patients with psoriasis rated each vehicle characteristic for both daytime and nighttime use. There was no significant difference in patient preference between daytime and nighttime use for any of the vehicles. The sum of the daytime and nighttime scores equals the vehicle preference score (Figure 1). See Figure 1 for the active ingredient in each topical treatment.

0.4–0.7; *P* values, .06–.43), except for foam, which correlated negatively (Spearman *p*, −0.09; *P*=.87).

The vehicle preference score included separate ratings for daytime and nighttime use (Figure 3). The difference between preference ratings for daytime versus nighttime use was not significant (*P*>.05 for each vehicle). Moreover, for each vehicle, at least 16 of the 20 patients scored daytime and nighttime use equal, and the maximum difference in scores (daytime minus nighttime) was 4. Further validating this instrument as a measure of vehicle preference, each daytime preference measure performed reliably as a summative scale of individual items (Cronbach α range, 0.79–0.93).

Of the 13 topical treatment characteristics assessed for adherence and QOL, side effects were reported to be the most important, and all 13 were rated on average to be more than moderately important for both adherence and QOL (*P*=.0002; Table).

## Comment

Topical therapy is a cornerstone of the practice of dermatology. Vehicle use must be recognized and understood when treating patients with skin disease. Developing a valid quantitative measure for assessing the characteristics of vehicles is an important step in increasing understanding. Although patient preference for creams over ointments has been previously observed, this difference seems small compared with the preference for solutions and foams.

Some healthcare providers believe that recommending different vehicles for daytime and nighttime use increases adherence to and/or efficacy of therapy.[9,10] However, quantitative assessment of vehicles suggests that patient preferences for daytime and nighttime use are not significantly different. Thus, recommending one vehicle formulation for daytime use and another for nighttime use seems unnecessary. Nevertheless, individual patients may have preferences different from the average preferences found in this study, and therefore choice of vehicles may need to be individualized. Aside from the differences in preference for vehicles assessed in this study, the potential for greater efficacy of one vehicle over another must be considered when choosing a topical preparation.[11] Moreover, different vehicles may have direct therapeutic effects to consider when choosing a preparation.[12] At times,

**Mean Scores of Various Characteristics of Topical Therapy in Determining Importance for Patient Use and Quality of Life***

| Characteristic | Mean Score | |
|---|---|---|
| | Importance for Use | Importance for Quality of Life |
| Ease of application | 3.85 | 3.63 |
| Time needed for application | 3.90 | 3.53 |
| Absorption | 3.80 | 3.53 |
| Greasiness/oiliness | 3.72 | 3.26 |
| Smell | 3.65 | 3.47 |
| Feel on the skin (cool, burning, soothing) | 3.50 | 3.37 |
| Look of hair when product is applied | 3.05 | 2.95 |
| Amount of stains on clothes and bed linens | 3.75 | 3.26 |
| Cost of product | 3.80 | 3.53 |
| Cost of replacing stained clothes and bed linens | 3.80 | 3.37 |
| Messiness | 3.85 | 3.79 |
| Side effects | 4.35 | 4.32 |
| Method of application | 3.40 | 3.00 |

*Scoring was on a scale from 1 to 5 with descriptors *not at all important, slightly important, moderately important, quite important,* and *extremely important.*

patients may need to choose a less preferred but more effective vehicle; they may be willing to put up with the adverse aspects of a vehicle if using it leads to improvement in skin condition.[13] A limitation of our study is that we did not include a lotion vehicle; to the extent that specific lotions have characteristics more like those of a solution than those of a cream, we expect that lotions will be preferred over creams.

The efficacy of topical psoriasis therapies may depend in large part on the degree of adherence to recommended application schedules. Differences in therapy adherence could account for the efficacy differences found between various clinical trials (with highly motivated patients) and clinical practice. Assessing this theory is difficult, as we do not yet have validated measures for assessing patient adherence to topical therapy. Still, the findings presented here suggest that patient preferences for vehicles should be considered. Patients reported that vehicle characteristics affect QOL but have even greater importance in determining whether a product will be applied and, we suspect, in being effective in clinical practice.

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