

## UV-LIGHT TREATMENT OF PSORIASIS

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**Abstract.** An investigation of the therapeutic effects of defined wavelength bands of UV-light has been made, using circular areas within homogeneous psoriatic plaques and irradiating them daily for 3 weeks. Healing, pigmentation, and irritation have been followed in detail. Effective healing of psoriasis was obtained with UV-light of the 313 nm band given in 1 and 2 minimal erythmal doses, but UV-light of the 334, 365, and 405 nm bands did not heal psoriatic lesions even in doses as high as 30 J/cm<sup>2</sup>. A pronounced late pigmentation occurred with the 313, 334, and 365 nm bands but not with the 405 nm band. There was no correlation between the healing properties of UV-light and the pigmentation effect.

**Key words:** UV-light; UV-treatment; Psoriasis

The treatment of psoriasis with UV-light was introduced by Goeckerman (6), who had observed that most patients improved during the summer and therefore concluded that the sun had a favourable effect. Since then, UV-light has been one of the basic regimens for the treatment of psoriasis. It is used either alone or in conjunction with coal tar, dithranol, or psoralens.

Although phototherapy has long been known to be effective (14) and used widely in the treatment of psoriasis, few critical studies on its effectivity have been published (12, 15). Epstein (3) found a very weak healing effect from UV-light but felt that, in the average case, UV-light therapy needs reinforcement by photosensitizers. After making a statistical comparison of dithranol, coal tar baths, and UV-light, Bowers (2) came to the conclusion that dithranol and UV-light are equally effective but the effect of coal tar baths was more doubtful and the combined treatment was the most effective. By contrast, Young (15) found no certain effect from UV-light in psoriasis. A recent report, by Stern & Kihiczak (13), shows a healing effect from a sun-like UV-spectrum in 3 of 6 patients, while

there was no healing from various narrow UV-light bands.

The aim of the present investigation was to determine the healing effect of the different UV-wavelengths and UV-light doses in psoriasis.

### MATERIAL

#### *Lamps*

By means of Philips SP-500 W mercury lamps and filters, UV-light of a high intensity and well-defined spectra has been obtained. The following UV-light bands were used: 313 nm, 334+365 nm, 365 nm, and 405 nm. The combination of 334+365 nm bands has very little stray light shorter than 320 nm and the 365 and 405 nm bands are quite well shielded against the shortwave part of the UV-spectrum. The lamps and their biological effects have been described elsewhere (1).

#### *Patients*

Twenty-three patients (15 men and 8 women) in the age range 24-82 years were studied. They had severe psoriasis and were hospitalized on the dermatology wards of Uppsala University Hospital. The tests were carried out between September and April, the time when the sunlight in Sweden is at its lowest levels.

Interviews and examinations were made with special reference to the patient's reactions to sunlight and artificial UV-light, basic pigment condition, suntan, and type of psoriasis. The duration of the disease varied but was not less than 3 years for any of the patients. The extent of the skin eruptions was between 5 and 30% of the total skin area in 13 patients, while more extensive areas were involved in the remainder. Psoriasis *en plaque* was found in 21 patients and 2 patients had a diagnosis of erythrodermic pustular psoriasis.

Sunlight or a sunlamp was believed to exacerbate the psoriasis in 5 patients, while 3 patients felt that they could tolerate sunlight on some occasions but not at others. Five patients did not feel that the state of their psoriasis was affected by sunlight, or were uncertain about its effect. The remainder felt that exposure to sunlight usually improved their condition (Table I).

Table I. Classification of patients

Patient no.	Sex	Type of psoriasis <sup>a</sup>	Anamnestic reactivity of psoriasis to light <sup>b</sup>	Medication
1	♀	2	H	
2	♂	2	H	(a)
3	♀	1	H	
4	♂	1	W	
5	♀	2	H	(b)
6	♀	2	H	(c)
7	♂	3	H	(d)
8	♂	3	N	
9	♂	3	W	
10	♂	2	W	
11	♀	1	W	(e)
12	♂	2	H	(f)
13	♂	2	H	(g)
14	♂	2	W	(h)
15	♀	2	N	(i)
16	♂	4	V	(j)
17	♀	2	N	(k)
18	♀	1	N	(l)
19	♂	4	V	
20	♂	2	N	
21	♂	3	H	
22	♂	3	H	
23	♂	3	V	

<sup>a</sup> 1=slightly infiltrated psoriasis, 2=moderately infiltrated psoriasis, 3=markedly infiltrated psoriasis, 4=pustular psoriasis.

<sup>b</sup> H=Healing, W=Worse, N=None, V=Variable.

#### Medication

- (a) Methotrexate  
 (b) Diazepam, Amitryptiline hydrochloride, Salicylazosulfapyridine  
 (c) Norgestrel, Ethinyl estradiol  
 (d) Alprenolol, Levopromazine, Diazepam  
 (e) Digoxin, Chlorthalidone, Diazepam, Chlorpropamide, Potassium chloride  
 (f) Methotrexate (second treatment series)  
 (g) Dimethidene maleate  
 (h) Nitrazepam  
 (i) Acetylsalicylic acid  
 (j) Hydroxyurea  
 (k) Hydrochlorothiazide, Diazepam  
 (l) Dimethicon

#### Local treatment

Before the UV-light treatment, some patients had used salt or starch baths and, sporadically, ointments with salicylic acid, fluocinolone acetonide, or betamethasone valerate, but without success. Most patients, however, had had no pretreatment. Five patients had used 0.1% dithranol paste more or less regularly (8) and 2 of them also coal tar baths. None of the patients had sunbathed during the months immediately prior to the experiment but 4 had used a sunlamp 2 to 4 times a week, although only one of them had a real suntan.

During the UV-light treatment, the patients had salt or starch baths. White petrolatum was the only local treatment used on the test areas. Allowing a margin of 10–20

cm around the test areas, psoriasis beyond these margins was treated with the usual ointments. When out in the daylight, the test areas were covered with a double layer of cloth.

After completion of the third week of testing, it would have been desirable to follow the further development of the light-treated psoriatic plaques without other treatment, but the legitimate demand of the patient for active treatment had to be respected.

#### Internal medication

About half of the patients had no internal medication during the tests. In the remainder, the previous medication was continued (Table I).

#### Light tests

The minimal erythematous dose (MED) was determined with the 313 nm band and the reactions to 30 J/cm<sup>2</sup> of the 334+365, 365, and 405 nm filter combinations were tested on normal-appearing skin in all patients before treatment. MED is defined as a weak but definite erythema. The reaction is read at 24 hours (for discussion, see ref. no. 1). The mean MED of the 313 nm band is slightly, but not significantly, higher for the psoriatic patients than that for a group of patients with other diseases. The logarithmic means were 0.50 J/cm<sup>2</sup> and 0.44 J/cm<sup>2</sup> respectively.

#### Methods

Large, stable, and homogeneous plaques of psoriasis on the arms, back, gluteal areas, and thighs were chosen as test areas. The irradiated areas were 22 mm in diameter and separated by at least 1½ cm. They were all similar in appearance, redness, infiltration, and scaling. The areas were marked with 0.1% fuchsin, 2% silver nitrate in 70% alcohol. The psoriatic plaque, treatment areas, and other markings such as birthmarks, etc. were traced onto a transparent plastic cover that was used to accurately relocate the treatment areas for irradiation.

The psoriatic areas were exposed to UV-light once daily, 5 days per week during a 3-week period and the following exposures were given daily: 313 nm band, ½, 1, and 2 MED; 334+365 nm bands, 30 J/cm<sup>2</sup>, 365 nm band, 30 J/cm<sup>2</sup>; and 405 nm band, 30 J/cm<sup>2</sup>. A psoriatic, but untreated, control area that was the same size as the test areas was followed in all the experiments.

It was not always possible to obtain an adequate number of suitable plaques for the whole series of irradiations. Some tests mainly with the wavelengths 334+365 and 405 nm were therefore not done.

#### Evaluations

The degree of healing, irritation, and pigmentation was evaluated twice a week and the test areas photographed once a week (for judgement, see Table II). The healing was correlated to the original status and to the untreated control area. A 6-grade scale was used to rate the healing, which was considered as the summary of the scaling, infiltration, and normalization of the skin's structure. The scaling was the least important factor as, in general, it ceased after a couple of days of treatment with salt baths and white petrolatum. Reduced infiltration and normalization of the skin's outer structure has constituted the most

Table II. Effects of various UV-light doses of the 313 nm band on psoriatic skin at 1, 2, and 3 weeks (w)

Pat. no.	Dose												MED (J/cm <sup>2</sup> )
	½ MED			1 MED			2 MED			Control area			
	1 w	2 w	3 w	1 w	2 w	3 w	1 w	2 w	3 w	1 w	2 w	3 w	
1	1	1	2	2	3	3a	2 <sup>b</sup>	3b <sup>a</sup>	5b	1	1	2	1.0
2	-	-	-	2	3a	3b	2a <sup>b</sup>	3b <sup>a</sup>	4c	1	1	1	1.0
3	1	3	5	2	3	5	3b	4b	5c	1	1	2	0.3
4a	-	-	-	2a	3a	5a	1 <sup>b</sup>	2 <sup>a</sup>	5a	1	1	2	0.6
4b	-	-	-	1	3	5a	1a	3a <sup>a</sup>	5a	1	2	3	0.3
5	1	1	2	2a	3a	4a	1a <sup>a</sup>	2a	4b	1	1	2	0.4
6	1	2	2	2	3	3a	-	-	-	1	1	1	0.6
7a	-	-	-	2	3	5b	2 <sup>b</sup>	3 <sup>a</sup>	5b	1	1	1	1.5
7b	-	-	-	1a <sup>a</sup>	3b	5b	1a <sup>b</sup>	4b	4b	1	1	1	0.6
8	-	-	-	1a	1a	1a	1a	1b <sup>a</sup>	1b	1	1	1	0.6
9	-	-	-	1	2a	3a	1a <sup>a</sup>	3a	4b	1	1	2	0.4
10	1	2a	3a	1	3a	5a	1 <sup>a</sup>	3a <sup>a</sup>	5b	1	1	1	1.0
11	1	1	1	1 <sup>a</sup>	1 <sup>a</sup>	1 <sup>a</sup>	1 <sup>b</sup>	1 <sup>a</sup>	1 <sup>a</sup>	1	1	1	0.3
12a	1	3	4a	1	3b	5b	2 <sup>a</sup>	4b	5c	1	1	2	0.8
12b	-	-	-	1a <sup>a</sup>	4a	2a <sup>a</sup>	1a <sup>b</sup>	3b	0b <sup>a</sup>	1	2	3	0.4
13	-	-	-	1	1	2a	1	2a	4b	1	1	1	0.3
14	1	1	1	2a	3a	4b	1a	3a <sup>a</sup>	5b	1	1	1	0.3
15	1	2	2	1	2	3a	2	3	4a <sup>a</sup>	1	2	2	1.0
16	1	1	0	2	2	2	2	3	1 <sup>b</sup>	1	1	0	0.6
17	1	2	3a	2	3a	5b	2	3a	5c	1	1	1	0.6
18	-	-	-	-	-	-	1	3	5a	1	1	2	0.2
19	1	1	2	1	2 <sup>a</sup>	4	2	2 <sup>b</sup>	1a <sup>b</sup>	1	1	2	0.2
20	1	2	5a	1	2	5a	1	2	5b	1	1	2	0.2
21	-	-	-	2	2	4a	2	3	5b	1	1	2	0.4
22	-	-	-	2	4	5a	2a	5b	5b	1	2	2	0.3
23	-	-	-	1	2	2a	1 <sup>a</sup>	1 <sup>b</sup>	2b <sup>a</sup>	1	1	1	0.6
Mean of healing	1.0	1.7	2.5	1.5	2.6	3.6	1.5	2.8	3.8	1.0	1.1	1.7	Log mean
Mean of pigmentation	0.0	0.1	0.3	0.3	0.5	1.1	0.5	1.0	1.8	0.0	0.0	0.0	0.5

Judgement of the healing: 0=worse, 1=unchanged, 2=slight healing, 3=marked healing, 4=nearly healed, 5=healed. Judgement of the pigmentation: a=slight pigmentation, b=marked pigmentation, c=heavy pigmentation. (The values a=1, b=2, c=3 have been used when determining the means of pigmentation.) Judgement of irritation: <sup>a</sup>erythema and slight edema, <sup>b</sup>marked erythema, edema and slight oozing.

important basis for judging the healing. Evaluation of a more or less pigmented, psoriatic lesion is best made by touching it with the finger tip just as Ingram (8) found with dithranol-stained skin.

Irritation and pigmentation have also been judged by graded scales. The same person made all the evaluations in order to keep the rating variations to a minimum.

### RESULTS

A summary of the results are presented in Figs. 1 and 2 and the details are given in Tables II and III.

#### 313 nm band

The normal healing cycle was as follows: Only a slight effect was seen in the irradiated psoriasis after one-week's treatment. Often, a more or less

marked irritation developed during days 3 to 7. From day 7 to day 15, a rapid healing was generally noted and the irradiated area became less red, dryer, and infiltration was no longer apparent. Those patients with a history of light sensitivity and with fair complexion were often severely irritated by the greatest light doses of the 313 nm band during the first week of treatment and, in 2 cases, a crusted reaction appeared but receded and healed during the third week. Four of the 5 fair-skinned patients in the group with an anamnesis of light sensitivity healed from exposure to the 313 nm band. In some cases, a Koebner reaction appeared in the normal skin where erythema-threshold tests had been performed.

Table III. Effects of UV-light of the 334+365, 365, and 405 nm bands on psoriatic skin at 1, 2, and 3 weeks (w). Daily doses used were 30 J/cm<sup>2</sup>

Pat. no.	334+365			365			405			Control area		
	1 w	2 w	3 w	1 w	2 w	3 w	1 w	2 w	3 w	1 w	2 w	3 w
1	1	2b	4c	-	-	-	1	1	1	1	1	1
2	-	-	-	1	1	2b	-	-	-	1	1	2
3	-	-	-	1 <sup>a</sup>	1 <sup>a</sup>	3b	-	-	-	1	1	2
4a	1	1	1	-	-	-	1	1	1	1	1	1
4b	-	-	-	1	2a	3a	-	-	-	1	2	3
5	1a	1a	2b	1	1	2a	1	1	2	1	1	2
6	1a	1b	2b	-	-	-	-	-	-	1	1	1
7a	1	1	1a	-	-	-	1	1	1	1	1	1
7b	-	-	-	1	1	1a	-	-	-	1	1	1
8	-	-	-	1	1	1	-	-	-	1	1	1
9	-	-	-	1	1	1a	-	-	-	1	1	2
10	1	1	1a	1	1	1	1	1	1	1	1	1
11	1	1	1a	1	1	1	1	1	1	1	1	1
12a	1	2a	4b	1	1	3a	1	1	2	1	1	2
12b	-	-	-	1 <sup>a</sup>	2a	3b	-	-	-	1	2	3
13	-	-	-	1	1	1a	-	-	-	1	1	1
14	1	1	1a	1	1a	1b	1	1	1	1	1	1
15	1	2a	2b	1	1a	2a	1	1	2	1	1	2
16	1	1a	0b	1	1	0	1	1	0	1	1	0
17	1	1a	2b	1	1a	1a	1	1	1	1	1	1
22	-	-	-	1a	2b	2b	1	2	2	2	2	2
23	-	-	-	1	1a	1b	1	1	1	1	1	1
Mean of healing	1.0	1.3	1.8	1.0	1.2	1.6	1.0	1.1	1.2	1.0	1.1	1.5
Mean of pigmentation	0.2	0.8	1.6	0.1	0.4	1.1	0.0	0.0	0.0	0.0	0.0	0.0

For judgement, see Table II.

A marked pigmentation occurred, as a rule, when the skin was exposed to 2 MED and there was an average or slight pigmentation at the lower doses. In a couple of cases, complete healing without pigmentation occurred at the lower UV-light doses.

Three patients, who had not healed completely after 3 weeks of irradiation with 2 MED, received an increased dose of 4 MED on the areas previously

exposed to 2 MED. An irritation occurred that necessitated a reduction of the dose after 3 to 4 days.

With some patients, a central-pigmented and healed zone was seen after 3 weeks' treatment. Around this area there was a 1-3 mm wide zone of healing but without any increased pigmentation and beyond this was the psoriatic skin.

Four of the 5 patients who reported a history of light sensitivity were of light complexion and healed with very careful light treatment. Six additional patients did not heal with irradiation from the 313 nm band. Two of these were using oral light-sensitizing medication (chlorthalidon + chlorpropamid or methotrexate). 2 patients were alcoholics, and 2 had pustular psoriasis.

#### 334+365 nm band

Twelve patients were treated using these bands. Two showed only slightly better healing in the test areas than in the control areas. In most cases, a fairly marked pigmentation was seen after the 3

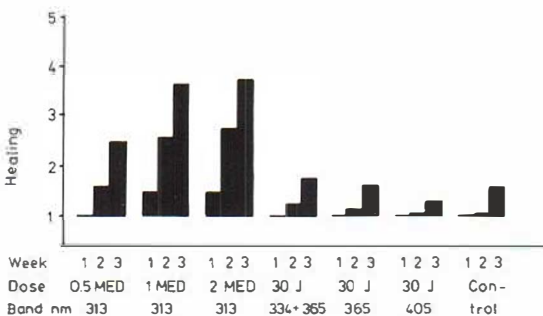


Fig. 1. Mean healing of psoriasis using UV-light of various wavelengths. (For judgement, see Table II.)

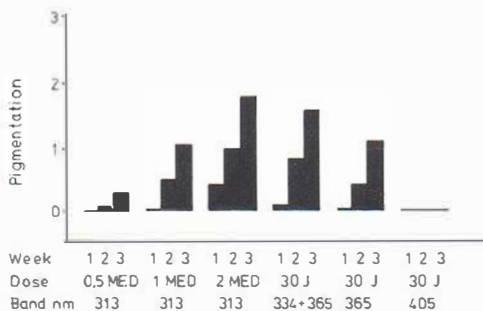


Fig. 2. Mean skin pigmentation using UV-light of various wavelengths. (For judgement, see Table II.)

weeks' irradiation. There was both an immediate marked pigmentation and an increased late pigmentation.

#### 365 nm band

Sixteen patients were exposed with this filter but no definite healing occurred, at least no better than in the control areas. Both an immediate and late marked pigmentation occurred on the irradiated areas.

#### 405 nm band

Eleven patients were treated with light from this filter but no healing occurred in any of them. An immediate, but no late pigmentation, was noted.

#### Woods' filter (UG 11)

In order to evaluate the healing with wavelengths shorter than the 313 nm band, psoriatic areas of 6 patients were treated with UV-light from the Philips SP 500 W high pressure mercury lamp filtered only by water and the UG 11 filter. This filter allows free passage to light from around 280 nm to 380 nm and thus also transmits somewhat shorter wavelengths than the 313 nm band. Doses of 1 and 2 MED were given. These patients were also irradiated with the 313 nm band. With the same MED dose, the healing effect of the 313 nm band was somewhat superior to that of the UG 11-filtered light.

#### Special aspects of some patients

Patient no. 3, a 28-year-old woman with fair skin and dark hair, who quickly becomes suntanned, had had widespread thin plaques of psoriasis for 4 years and also arthritis. Her psoriasis always improves quickly with sunbathing or sunlamp treatment,

while various ointments give a poor healing. Most of the test areas became deeply pigmented in this patient but the areas given  $\frac{1}{2}$  MED with the 313 nm band healed completely without pigmentation. The unpigmented 1–3 mm wide, healed borders around the healed test areas were clearly recognizable in this patient.

Patients no. 7, a 65-year-old, dark-skinned, caucasian man, who quickly becomes suntanned and tolerates sunlight well, had a long history of widespread, therapy-resistant psoriasis *en plaque*. The only certain means of healing his psoriasis had been prolonged exposure to the sun in southern latitudes. The irradiation experiment repeated in two different treatment periods gave consistent results. During the first experiment series, none of the usual local treatments for psoriasis was successful and, after 2 months of hospitalization, the only healed areas were those exposed to UV-light of the 313 nm band. These areas were clearly delineated, pigmented, with normal structure in the centre of the large plaques. Controls made 2 and 4 months after discharge from the hospital showed that these areas still remained healed. A single exposure of the normal skin to MED of the 313 nm band caused an isomorphic psoriatic reaction.

Patient no. 8 was a 28-year-old man who had had large, severely infiltrated plaques of psoriasis since he was 10 years old. He had noticed neither improvement nor worsening of his psoriasis with exposure to the sun. The tests with UV-light did not result in any healing but there was a gradual increase in pigmentation. During irradiation experiments, various local treatments were tried on areas not subjected to the light tests. Fluocinolone (Synalar ointment®; ICI) gave the most satisfactory healing. After the conclusion of the light tests, the patient's back was treated with that ointment and the areas that had been irradiated took 4 to 5 days longer to heal than the non-irradiated areas. This reaction was considered to signify a hidden isomorphic response to the UV-light.

## DISCUSSION

This study has shown that UV-light of the 313 nm band, given in correct doses, has a good psoriasis-healing effect in most patients but that UV-light of the 334, 365 or 405 nm bands has no such effect, even when given in high doses. These findings sub-

stantiate Bower's assumption that glass filtering of a medium high pressure Hg lamp will extinguish its psoriasis-healing properties and that the effective psoriasis-healing spectrum is below 320 nm (2).

It is important that the light is given in adequate amounts. The erythema threshold seems to be a good guide as to the amount of light that will heal psoriasis. With the 313 nm band, light doses lower than 1 MED will give no or only slight healing, whereas if 2 MED is exceeded, such a strong irritation may occur that the treatment cannot be tolerated. Oddozze et al. (10) have pointed out the importance of reaching the erythema level in sunlight treatment of psoriasis. Potosky et al. (11) found a better healing effect from light in fair-skinned persons, probably because the light dose given was adequate for them while the erythema threshold had not been reached in those who had a darker pigmentation.

A higher dose was needed with the UG 11 filtered light (280–380 nm) than from the 313 nm band in order to obtain the same therapeutic effect in psoriasis. To what extent wavelengths shorter than 300 nm will heal psoriasis is still not known, however, since the whole healing from the UG 11-filtered light may be the result of the 313 nm band. With UV wavelengths shorter than the 313 nm band, smaller amounts of light are required to provoke erythema. Within the 280–300 nm region, the MED is 20–40 mW/cm<sup>2</sup> as compared with 400 mW/cm<sup>2</sup> for the 313 nm band (1, 4, 9). It therefore seems evident that higher light doses in relation to the MED are needed in order to obtain a healing of psoriasis with the 280–300 nm range, than with the 313 nm band.

In earlier studies, mainly medium-pressure Hg lamps have been used and the erythema effect of such lamps is mainly due to UV-light shorter than 300 nm. The relation between the effects of wavelengths shorter than 280 nm (UV-C) and those between 280 and 315 nm (UV-B) measured in mW/cm<sup>2</sup> is between 1–2:1 with medium-pressure Hg lamps. Due to this relatively high output of short-wave UV-light, one MED will probably be a too low UV-light dose for an optimal healing of psoriasis. A better therapeutic effect will be obtained if the light dose is raised to 2–3 MED. The diversity of opinion as to the effect of UV-light on psoriasis is obviously due to the sub-optimal light dosage used.

In an attempt to determine the wavelengths

active in the healing of psoriasis, Stern et al. (13), in 6 patients, used single doses of UV-A, 0.8 J/cm<sup>2</sup> (Xenon lamp + glass filter), UV-B, 0.65 J/cm<sup>2</sup> (Xenon lamp + interference filter), UV-C, 0.66 J/cm<sup>2</sup> (254 line of low-pressure Hg lamps), and a combined irradiation of UV-A + UV-B, 8.7 J/cm<sup>2</sup> (Xenon lamp). Healing occurred in three areas irradiated with the combined UV-A + UV-B light, whereas none of the other irradiated areas healed. The lack of healing with UV-B light alone may be due partly to the use of single doses and partly to the lack of adaptation of light doses to the individual patient. The combined UV-A + UV-B radiation may heal psoriasis better than UV-B alone but further research is needed to verify this.

UV-light emitted by a carbon arc has a continuous sun-like spectrum (7). Many of our patients believe that the carbon arc heals their psoriasis better than other artificial light sources do. This may well be true and would result from the sun-like spectral distribution with a high intensity in the UV-A, the moderate intensity in the UV-B, and the small amount of UV-C.

Fluorescent "sunlamp" tubes that have a strong emission in the 280–320 nm range have a good effect on psoriasis. The central wavelength band is 313 nm and yet the wavelengths mainly responsible for the erythema are those within the 290–300 nm region. Referring to the earlier discussion about light dosage, the best effect on psoriasis with sunlamp tubes will be reached with an UV-light dose of 2–3 MED, which is somewhat higher than that usually used.

Generally speaking we have seen a rather strong pigmentation, both immediate and late during the light treatment. In some cases the healed pigmented area could be surrounded by a healed zone that lacked increased pigmentation. This effect is probably due to imprecision when relocating the irradiated area or to movement by the patient during irradiation which causes small light doses to be spread around the central, more heavily irradiated area. Another possibility, which cannot be ruled out, is that UV-light releases a substance in the healing process that diffuses into the adjacent skin areas.

With the 334 and 365 nm bands, an obvious pigmentation was seen, but no healing. In some patients who did not heal from light of the 313 nm band, an intense pigmentation was noted. From this, it can be concluded that the psoriasis-healing

properties of UV-light are not parallel to those that cause pigmentation.

A certain amount of skin irritation is acceptable. If the UV-light treatment is interrupted when the skin is irritated, an isomorphic reaction may occur but, if the irradiation is continued until the irritation of the skin ceases, the risk of such a response is lessened.

The 4 patients who gave a history of light sensitivity but who still healed with a very careful light treatment were all of light complexion. At first they reacted with pronounced irritation to the light treatment but, after repeated irradiations at the 1-2 MED level, their skin healed. These patients were especially prone to an isomorphic reaction at the light test site where their normal-appearing skin was given single irradiations with light doses of 1-6 MED.

On analysis of a larger group of psoriatic patients with an intolerance for UV-light (5), four distinct patient groups have appeared, each with a different basis for their light intolerance, namely:

1. polymorphic light eruption,
2. photosensitizing drugs,
3. large alcohol intake,
4. pustular psoriasis in a labile state.

Of the patients in the present study's test group, 6 can be referred to groups 2-4, 2 in each group. One of the patients on photosensitizing drugs had a history of good tolerance for sunlight and had healed from sunlight until she was given chlorpropamid. Since then, she has reacted adversely to the sun. The man in whom we suspect methotrexate to be the cause of the light intolerance, has been given two treatment series. During the first, when methotrexate was not prescribed, he reacted favourably to light but during the second series, when he was given methotrexate, he had a much more inflammatory response to light. A large alcohol intake or recent alcohol abuse also gives a more marked inflammatory response to light (1). This is probably why psoriasis in such patients does not heal with the light treatment.

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