

# The Hair Root Pattern in Psoriasis of the Scalp

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Several reports suggest that a localized effluvium of scalp hair may occur in patients with psoriasis. The percentages of telogen and catagen hair have been claimed to be normal or increased in isolated cases. In the present study the anagen/telogen ratio was quantified under standardized conditions in psoriatic plaques and uninvolved areas of the scalp in 22 patients and the scalp of 22 normal controls. This assessment was carried out by light microscopic analysis of hair roots, obtained by the hair pluck-method. A consistent increase in the percentages of telogen and catagen hair was shown in psoriatic plaques, compared with the uninvolved areas. Compared with the scalp of normal controls, this percentage was significantly increased in psoriatic plaques, but not in the uninvolved areas. **Key words:** Alopecia.

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Psoriasis may involve the nails and mucous membranes in addition to the typical skin lesions. It is not commonly appreciated that the hair is involved in the psoriatic process (1). Several clinical observations, however, have demonstrated that hair growth and differentiation can be abnormal in psoriatic patients. In erythrodermic and generalized pustular psoriasis, loss of scalp hair is a wellknown feature (2). In chronic plaque psoriasis, alopecia has been described in some cases (3-5). Histologically, a destruction of hair follicles in such cases of 'psoriatic alopecia' was observed by Wright & Messenger (6).

Studies on hair growth in psoriatic patients revealed some changes in the keratinization process. Thinning of hair shafts in psoriatic plaques has been reported, using histological and electronmicroscopical assessment (7-9). Orfanos observed changes in hair shafts by scanning electron microscopy which are compatible with abnormal keratinization. Histological examination of psoriatic plaques of the scalp again showed a reduction of the hair shaft and a normal density of hair follicles (10). Sharad & Marks could not show any abnormality with respect to tritiated thymidine labelling of the compartments of the hair follicle apparatus, though the upper external root sheath had a significant increase in the labelling index (11). A critical question remains to be answered: To what extent are these abnormalities reflected in the proportions of telogen and catagen hair?

In biopsies taken from psoriatic plaques of the scalp, the anagen/telogen ratio did not differ significantly from the ratio in biopsies taken from the clinically uninvolved skin (7). Using the hair pluck method, information on a larger sample of hair roots can be obtained (12,13). Braun Falco & Rassner reported "generally speaking a significant influence of psoriasis

of the scalp on the hair root pattern could not be found, though pathological results could be obtained in single cases" (14,15).

The aim of the present study was to quantify under standardized conditions the proportions of telogen and catagen hair in hair plucks taken from lesions and clinically uninvolved skin of psoriatic patients and in plucks taken from healthy volunteers.

## MATERIALS AND METHODS

Altogether 22 patients (7 men and 15 women, aged 22-67 years) with chronic plaque psoriasis with scalp involvement and 22 age-matched healthy controls without any history or signs of psoriasis, participated in the investigation. One in each group showed signs of androgenic alopecia and 5 used contraceptives. Only patients and healthy controls were included who fulfilled the following criteria:

- at least 5 days before the investigation, washing of the scalp hair had been omitted;
- no topical antipsoriatic treatment, 'permanent'-waving or hair dyeing had been carried out for at least 2 weeks;
- women who were pregnant or had given birth within the last 6 months were excluded from the study;
- with erythrodermic or pustular psoriasis did not participate in the investigation.

Hair plucking was performed exclusively from the occipital region in controls and patients. From each psoriatic patient, two samples were taken: one from a psoriatic plaque and the other from a clinically uninvolved area free from erythema or scaling.

The method of hair plucking was as described by Van Scott et al. (13). Briefly, using surgical needle-holding forceps, a hair sample was pulled from the occipital region. The jaws of the forceps had been covered with plaster. A quick, forceful pull resulted in a sample of 50-100 hairs. Hairs were embedded in Permoun<sup>®</sup> embedding medium (Fisher Scientific, Fair Lawn, New Jersey, USA). The numbers of anagen, telogen and catagen hairs were assessed by light microscopical investigation.

Statistical analysis was carried out using the Wilcoxon signed rank test for paired data, the Mann-Whitney test, and linear regression analysis.

## RESULTS

In 12 out of 22 patients a localized effluvium was observed, restricted to the psoriatic plaques. Total hair loss within the psoriatic plaques was not observed. Whereas scaling was often experienced as a cosmetic handicap, the effluvium was not. In

Table I. Proportions, telogen + catagen hair (Mean + SD)

Involved areas patients	26.23 ± 10.02	} $p < 0.0001$	} $p < 0.001$
Uninvolved areas patients	14.69 ± 12.47		
Normal scalp	10.69 ± 4.75	} N. S.	



one patient and one healthy control a moderate manifestation of androgenetic alopecia was seen. No correlation between effluvium and degree of scalp psoriasis (erythema, scaling and induration) could be found.

Table I summarizes the proportions of telogen + catagen hair in psoriatic plaques and uninvolved areas of patients and normal controls.

A pronounced and highly significant increase in the proportion of telogen + catagen hair was observed in psoriatic plaques compared with the uninvolved areas of the patients (paired Wilcoxon ranking test). When comparing psoriatic plaque with the scalp of normal controls, again a statistically significant difference was observed (Mann-Whitney test). No significant difference could be shown between uninvolved areas in patients and the scalp of normal controls. No correlation between proportions of telogen + catagen hair and the degree of scalp psoriasis (erythema, scaling, induration) was found.

## DISCUSSION

The present study confirms previous reports that an effluvium may be associated with scalp psoriasis (2-4). The psoriatic effluvium is not restricted to generalized pustular psoriasis or erythrodermic psoriasis, but may also occur in psoriasis vulgaris. In the present series the patients did not experience the hair loss as a cosmetic problem. The explanation for 'psoriatic effluvium' is not clear. It is difficult to exclude the influence of topical antipsoriatic treatment, applied in recent years, although our patients had not used any such medication within at least 2 weeks before the investigation.

The proportion of telogen + catagen hair is markedly and significantly increased in psoriatic plaques, vis-a-vis normal scalp hair. Braun Falco & Rassner found pathological results in isolated cases (14). The present study, using paired comparison, revealed in all patients an increased percentage of telogen + catagen hair. In this respect it might be of relevance that we applied more strict inclusion criteria.

No statistically significant difference was shown between normal scalp and uninvolved areas of psoriatic patients. However, the standard deviation of the proportion of telogen + catagen hair was substantially increased in the uninvolved skin of the patients. An explanation might be that abnormal hair

growth advances beyond the clinical boundaries of the psoriatic lesion. Alternatively, previous treatments and manipulations might involve lesional and lesion-free areas.

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