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DIAGNOSTIC SCALE ANALYSIS OF DESQUAMATING DERMATOSES

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Abstract. A routine examination of stained scales from desquamating dermatoses is proposed as a diagnostic method. This examination provides information about the presence of microorganisms on the scales (fungous elements, candida species, pityrosporum ovale et orbiculare, cocci etc.). The scales may present ortho- and/or parakeratosis. Leukocytes may be found dispersed or collected in microabscesses. Some dermatoses present characteristic scale patterns, even if they are not pathognomonic. The method has been of diagnostic value in several cases.

The microscopic examination of scales is given little, if any, attention in textbooks. In older literature, it is mentioned how scales may be examined for fungous elements and bacteria by staining with methylene blue after "defatting" with alcohol or ether, and finally embedded in canada balsam.

Improved methods have been introduced during recent years for the investigation of the stratum corneum. In 1939 and 1940 Wolf (5, 6) used cellophane for the stripping of monolayers of corneal cells which were transferred to albumin-coated glass slides. In 1961 and 1967 Goldschmidt & Kligman (1, 2) described new methods for "skin surface biopsy" by which they obtained direct transfer of horny cells onto adhesive-coated glass slides.

Marks & Dawber (3) used cyanoacrylate adhesives. A drop of the adhesive was placed on the skin. A glass slide was placed on the drop and pressed lightly onto the skin. The slide was quickly removed after 30–40 sec. A layer of horn was removed by the adhesive which remained attached to the glass slide. The preparations could be stained with histological and histochemical methods.

None of the above-mentioned investigators have proposed a routine examination of stained scales as a diagnostic method, though Goldschmidt & Kligman mention that exfoliative cytology of the horny layer may be of diagnostic value.

Recently, Shelley (4), in psoriatic scales, has demonstrated adenosine triphosphatase activity, but further investigations are necessary to confirm the diagnostic value of this finding.

The present study was started 3 years ago in the hope that the scales from some dermatoses would present characteristic aspects. More than 600 specimens from various desquamating skin diseases have been studied.

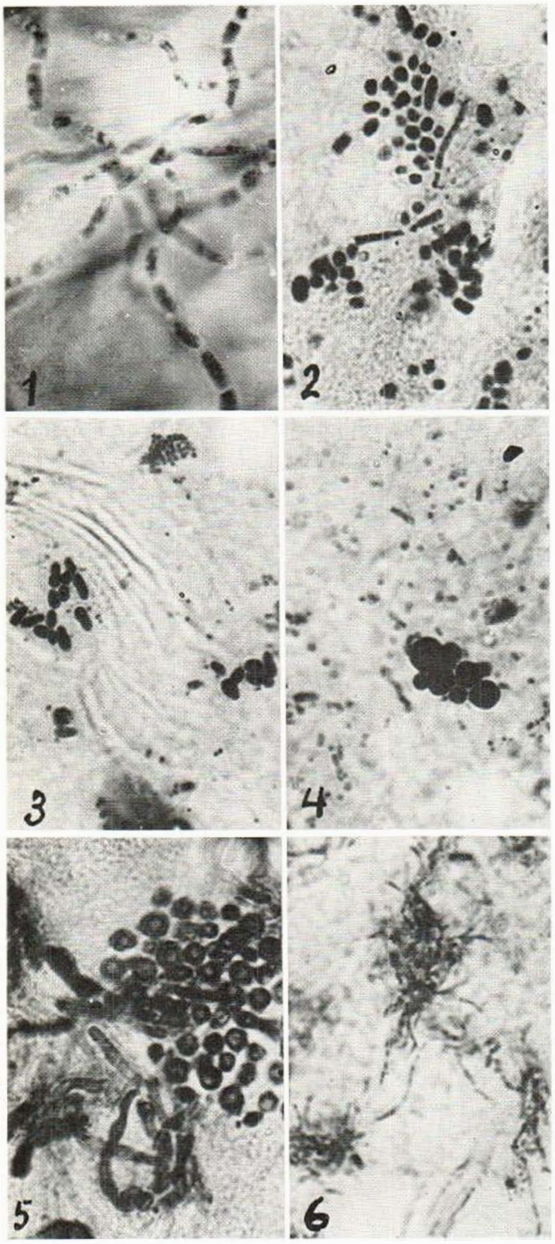
METHOD

The principle of the method is that the scales to be examined are fixed to a glass slide by means of a thin layer of albumin solution, fixed by heating over a flame and stained with methylene blue solution.

The scales are preferably collected from untreated skin lesions by means of a curette. The scraping is done with a light hand, since the scales ought to be as thin as possible. A drop of a glycerol-albumin solution, as used by pathologists in fixing paraffin sections to the slides (50 ml white of egg, 50 ml glycerol, one crystal of thymol), is placed on a dry, clean glass slide. The solution keeps nearly indefinitely in a refrigerator. The drop is spread out on the slide in a thin layer with a clean fingertip. Thereafter the scales are applied to and pressed down into the sticky albuminous layer by means of another glass slide and permanently fixed by passages through a flame. After fixation the scales may be "defatted" with acetone and stained with methylene blue solution, which is washed away after a few seconds. Finally the specimen is dried over a flame. The whole procedure takes only a few minutes. The scales are then examined in immersion oil with both the low- and high-power microscopic objectives (no cover glass).

OBSERVATIONS

Fungus elements from tinea cutis are easily visualized with this technique (Fig. 1).



Figs. 1–6. 1, Fungus elements; *2,* Candida albicans; *3,* P. ovale and cocci; *4,* P. orbiculare and cocci; *5,* Malassezia furfur; *6,* C. minutissimum (× 950).

Candida species are sometimes found in intertriginous dermatitis (Fig. 2) and this examination is important in making a distinct etiological diagnosis: candidiasis or simple intertrigo. Candida species may also be present in scales from napkin dermatitis and angular cheilitis.

Pityrosporum ovale (Unna's "bottle-bacillus") (Fig. 3) is present almost everywhere on the skin surface. In the present study it has been demonstrated in great numbers in dandruff from seborrhoeic scalp and in scales from seborrhoeic dermatitis.

Pityrosporum orbiculare (Fig. 4) may also be found everywhere on the skin surface. In the present material it was possible to demonstrate clusters of Pityrosporum orbiculare in scales from pityriasis rosea, though not in all cases. Morphologically it is impossible to distinguish Pityrosporum orbiculare from the spherical elements in Malassezia furfur (Fig. 5).

Cocci (Figs. 3, 4) in great numbers were found in scales from intertrigo, infective and seborrhoeic dermatitis, particularly the retroauricular form. They were also present in scales from other types of eczema, but not regularly and not as abundantly. In angular cheilitis and napkin dermatitis cocci are a common finding.

Corynebacterium minutissimum (Fig. 6) in erythrasma is clearly demonstrated by the above-described staining technique.

In addition to microorganisms this staining method also gives information about various characteristics of the scales, about orthokeratosis or parakeratosis, and leukocytes in the stratum corneum.

Parakeratotic epithelium in the scales is particularly pronounced in cases of chronic eczema, for instance atopic dermatitis. The usual pattern in other types of eczema and psoriasis (Fig. 7) is an intermixture of parakeratosis and orthokeratosis. Orthokeratotic horny cells are not stained with the short staining used in the present study. In ichthyosis, necrobiosis lipoidica, and usually in lupus erythematosus and lichen planus one observes only cornified epithelium without visible nuclei.

Migrating leukocytes. The scales from many desquamating dermatoses present mono- and polymorphonuclear cells, occurring dispersed, or collected in microabscesses (Fig. 7). The nuclei are often deformed, and sometimes it may be difficult to determine whether they represent lymphocytes or polymorphonuclear cells.

In eczemas they are sometimes found scattered over the scales but also collected in microabscesses. Microabscesses are regularly observed in psoriasis except in old lesions and treated cases,

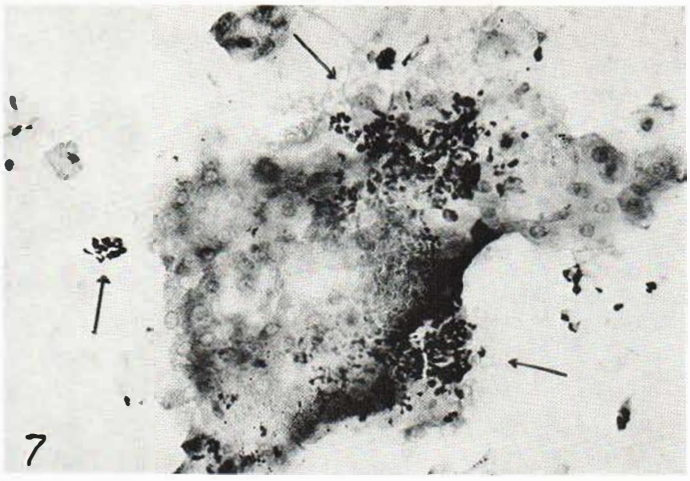


Fig. 7. Scales from psoriasis with microabscesses (*arrows*) and some parakeratosis (× 160).

as also in keratoses and psoriasiform eruptions in Reiter's disease, in various forms of dermatites and pityriasis rosea. Leukocytes were not observed in ichthyosis, necrobiosis lipoidica and in the discoid form of lupus erythematosus. In lichen planus the former were few or absent.

The microscopic pattern of the scales is rarely pathognomonic, but the method provides the clinician with information about parakeratosis, migrating cells and the presence of microorganisms in the stratum corneum.

Table I presents the findings of scale analysis in some dermatoses. In psoriasis, for example, we observe microabscesses, a mixture of orthokeratosis and parakeratosis, and as a rule absence of microorganisms. In seborrhoeic dermatitis we find P. ovale and cocci in addition to parakeratosis and collections of leukocytes in varying degrees. In chronic eczema there is often merely a pronounced parakeratosis. It may be of diagnostic interest that scales from lupus erythematosus and lichen planus present very few parakeratotic and migrating cells, if any at all.

In the present study, scale analysis has been of value for the diagnosis of several cases, e.g. cases of psoriasis, resembling seborrhoeic dermatitis, nummular eczema and chronic eczema and vice versa, as well as some cases of lupus erythematosus. The demonstration of cocci and/or candida species in the scales of eczematous eruptions has also been of great value in some cases. In any event the examination has one advantage: A tinea cutis is not easily overlooked.

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Table I

+ = present, (+) = exceptionally present, − = not present

	Parakeratosis	Leukocytes	Cocci	P. ovale	P. orbiculare
Psoriasis	+	+	−(+)	−	−
Seborrhoeic dermatitis	+	+	+	+	(+)
Allergic contact dermatitis	+	(+)	− +	−	−
Nummular eczema	+	+	−(+)	−	−
Chronic eczema	+	−(+)	−(+)	−	−
Infective dermatitis	+	+ −	+	−	−
Pityriasis rosea	+ −	+ −	−(+)	−	+ −
Lupus erythematosus	−(+)	−(+)	−(+)	−(+)	−(+)
Lichen planus	−(+)	−(+)	−(+)	−(+)	−(+)
Necrobiosis lipoidica	−	−	−	−	−

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