

Section of General Practice with Section of Dermatology

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Short Papers

Pitfalls in Dermatology [Abstract]

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Important pitfalls in dermatology are few. The resultant errors may be important because they are common or because they may have serious effects. Sometimes both reasons obtain. The most common errors are in the diagnosis and treatment of dermatitis (eczema). Serious consequences may ensue if syphilis, parasites or new growths are overlooked. In dermatitis the endogenous causes most frequently disregarded are systemic drugs and an area of primary dermatitis elsewhere. For potential exogenous irritants the order of investigation should be: parasites, hobbies, work and previous treatment. The most common causes of failure in treatment of dermatitis are: (1) Continued exposure to the cause or to secondary irritants including treatment, soap and water. (2) Insufficient rest. (3) Perhaps the most important - inadequate reassurance and explanation of the details of treatment. Syphilis and parasites are no respecters of social or biological status and are most commonly overlooked through lack of awareness.

Tinea Pedis in Adolescence¹

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These observations are based on an investigation carried out in a school in Berkshire, where boys are resident from the age of 13 to 18. It is a school of 400 boys, made up of eight boarding houses which are described by the letters A to H. Each house contains approximately 50 boys. All houses have their own bathrooms and changing rooms which might prove of some significance in the light of the investigation by Gentles & Holmes (1957) in miners. From an analysis of the school sanatorium out-patient records over ten years it was found that tinea pedis was more prevalent

in the summer terms, 12% of all attendances being for clinical tinea pedis with symptoms.

Details of Survey

Every boy in the school was examined for the presence of tinea infection. Scrapings were taken from the fourth interdigital toe cleft of every boy, and also from suspicious lesions in the foot, groin or elsewhere. At the same time skin swabs were taken of the fourth toe cleft for bacteriological examination. The mycological work was carried out by Dr Clayton without knowledge of the school, or details of the boy and his condition. Approximately one-third of each specimen was used for direct examination and the remainder cultured on to Sabouraud's dextrose agar, containing 0.5 mg/ml actidione and incubated at room temperature.

Clinical Findings

When the feet were examined, a large number of lesions suspicious of tinea were found; 271 (68%) of the boys showed some abnormality between the toes. The changes were recorded according to a classification similar to, but simpler than, that of Holmes & Gentles (1956): Peeling 103 (25.6%), maceration 10 (2.5%), peeling and maceration 62 (15.5%), fissures 72 (18.0%), scaling 22 (5.5%), vesicles 2 (0.5%).

Bacteriological Investigation

When the mycological culture results were obtained, only about half of those showing abnormalities (31.5% of the school) were proved to be due to a fungus infection, as follows: *Trichophyton mentagrophytes* 76%, *Trichophyton rubrum* 18%, *Epidermophyton floccosum* 6%. *Staphylococcus aureus* was grown from only two of all the swabs taken from the interdigital clefts of all boys. In this survey, bacteriological infection was therefore of no importance as a cause of interdigital maceration. When the group of boys entering the school for the first time from the preparatory schools was examined, it was found that only 3 of the 60 (5%) were positive (Table 1). This appeared to be a very low incidence, but is similar to that found in primary school boys of

¹This work formed the basis of part of a thesis submitted by Dr Munro-Ashman for the degree of Doctor of Medicine of the University of London 1960

Table 1
Distribution in each house

House	No. of boys in house	No. of boys mycologically positive	% positive
A	42	17	40.5
B	42	18	43
C	41	14	34.1
D	41	12	29.3
E	46	19	41.3
F	40	12	30
G	46	19	41.3
H	42	12	28.5
Total in houses	340	123	36.2
New boys	60	3	5
Total in school	400	126	31.5

the same age recently in Bristol (English & Gibson 1959). Therefore preparatory schools are not responsible for the high incidence. Of the 340 boys already in the school, 123 were positive.

Recently, following the work of Sarkany *et al.* (1961), we have investigated 52 cases of clinical tinea pedis for evidence of erythrasma. Eighteen showed coral red fluorescence under Wood's light, and erythrasma was confirmed microscopically and on culture in 9. Four of these cases also grew ringworm fungi.

Distribution of infection in houses: Infection appeared to be of fairly uniform distribution amongst the houses. The highest incidence was in B house, where 43% were positive, and the lowest in H house, where 28.5% were positive. When the types of ringworm fungi were examined in each house there were marked differences in incidence, especially in the case of *T. rubrum* infections (Table 2). Of 21 such infections, 9 were in B house and 5 were in H house; in A house all 17 cases of tinea were due to *T. mentagrophytes* var. *interdigitale*. The results suggest that case-to-case infection was operating.

Infection related to period at school: When the results were classified according to the

Table 2
Type of fungus in each house

House	<i>T. mentagrophytes</i> var.		<i>E. floccosum</i>	Microscopically positive, culture negative
	<i>T. rubrum</i>	<i>interdigitale</i>		
A	0	17	0	0
B	9	8	1	0
C	2	9	0	3
D	1	10	1	0
E	2	13	4	0
F	1	10	1	0
G	1	15	0	3
H	5	5	0	2
New boys	0	3	0	0
Total	21	90	7	8
Identified cultures (%)	18	76	6	0

number of years each boy had been at the school, a very sharp rise in the number of cases was evident, particularly in the first two years. Five per cent of the boys were mycologically positive as they entered the school, 19% were positive after one year and 36% were positive after two years. Those who had been at school for four or more years showed an infection rate of 54%. This was considered to be evidence of exogenous infection within the school.

Infection related to age: When the incidence of fungus infection was studied in the various age groups, a steep rise in infection was found, 5% were infected of those aged 13, 18% were infected of those aged 14, and 55% of those aged 17. In a small group of senior boys aged 18 or more the incidence was 60%. Such rapid acquisition of simple exogenous infection in a community would appear to be a result of little immunity to ringworm. In the final age group there is a slowing of the rate of incidence which may indicate a development of some immunity.

Infection related to bathing: The bathing arrangements were made to give every boy two baths a week. This had been altered only in B house, where boys had a bath six nights a week, the same water being used by three boys. This arrangement, while quite satisfactory in other ways, was associated with the highest incidence of tinea pedis in the school (43%).

Type of Disease

Tinea cruris: Only 8 boys were found to have tinea cruris, 4 of them in E house: from 2 of them *E. floccosum* was grown.

Tinea pedis apart from interdigital infection: In 4 cases there was a spread of infection on the side of the foot and in 10 the sole was involved. In 4 cases the dorsum of the foot was affected. Toe nails were involved in 5 cases, from one of which *T. rubrum* was grown.

Correlation of Clinical and Laboratory Examination

Comparison of clinical and laboratory findings confirms that by clinical examination alone the causative fungus cannot be identified (Table 3). Maceration alone and scaling were rarely caused by a fungus infection. On the other hand, the presence of fissures was associated with a fungus in 61% of cases. Fissures were present in half the cases with *T. rubrum* infection, and in 5 of 8 *E. floccosum* infections. The most interesting study was that of the clinically negative, but culture-positive cases, which later became clinically positive. Eighteen cases (4.5%) which were considered to be normal on clinical examination, were found to be mycologically positive on

Table 3
Clinical features

	Normal	Maceration	Fissures	Scaling	Peeling	Peeling & maceration	Vesicles	Total
<i>Trichophyton mentagrophytes</i>	14	0	27	5	25	17	1	89
<i>Trichophyton rubrum</i>	4	0	10	0	4	3	0	21
<i>Epidermophyton floccosum</i>	0	0	5	0	1	1	0	7
Not grown (microscopically positive)	0	0	1	0	5	2	0	8
No fungus found	111	10	29	17	68	39	1	275
Total	129	10	72	22	103	62	2	400

culture. In 4 the fungus concerned was *T. rubrum* and in 14 it was *T. mentagrophytes* var. *interdigitale*. When these boys were re-examined six months later, 16 of the 18 had become clinically positive, 14 showing peeling alone. It is believed that these appearances are due to 'primary infection' in most instances.

It is postulated that tinea pedis begins with a primary infection which is associated with a peeling superficial lesion, which spreads rapidly in the toe cleft. In three instances such a lesion has been associated with an enlarged inguinal gland which may constitute a 'primary complex'. If the fact of a primary infection and universal susceptibility followed by resistance after infection is accepted, many of the obscure aspects of the aetiology of tinea pedis are explained. External infection takes place first, and here the environment is the important factor. Later, Sulzberger's theory of endogenous reactivation is more important, with environment playing a minor role. Both theories are correct, and one usually follows the other.

Control

The 126 positive cases gave an opportunity to assess different methods of treatment. After much discussion it was decided to compare the new with the traditional, and treat them with Whitfield's ointment combined with a salicylic acid dusting powder, an undecylenic acid aerosol spray (Pheet) and hedaquinium chloride (Teoquil) gel and powder. The cases were randomly selected by a statistician into three groups but with the same number of *T. rubrum* and *E. floccosum* infections in each group. All cases were treated for five weeks and rested for a week and then re-examined. The undecylenic acid aerosol spray gave the best results, 87.8% becoming mycologically negative; this preparation could also be used for spraying into shoes and on to socks. Whitfield's ointment with a salicylic acid dusting powder also returned very good results: 86.5% became negative mycologically. Using heda-

quinium chloride gel and powder, 63.6% became negative mycologically. The perfect fungicide has yet to be found, and Whitfield's ointment still holds its place as an efficient and cheap method of treatment, exactly fifty years after Dr Whitfield first described the value of this ointment to this Society (Whitfield 1911).

Preventive Measures and the Environment

Various authorities state that it is more important to treat the feet than the environment (Sulzberger & Baer 1954, Weidman *et al.* 1945, Baer *et al.* 1955). Recent evidence has shown the importance of exposure to infection - in pithead baths in miners (Gentles & Holmes 1957) and in swimming baths in students (Tritsmans & Vanbreuseghem 1955) and children (English & Gibson 1959). In this survey the rapid rise in incidence in the first two years at school from 5% to 36% must indicate a case-to-case infection in a community with no immunity. The prevention of this direct spread is therefore of great importance in this age group. It does, however, present a very difficult problem. Dermatophytes are present on the floors of bath and changing rooms in a highly infected population (Gentles 1956). *T. mentagrophytes* was found on a bathroom floor and a duckboard at the school, so it is advisable for boys not to walk about the wet floors with bare feet. It is impossible to keep the floors dry without considerable structural alteration to the buildings. The floors are simply sluiced down for cleaning, which is probably as effective as using strong disinfectant (English & Gibson 1959). Bathing arrangements should be watched closely. Regular foot inspection should be carried out each term and all clinically suspicious cases treated with Whitfield's ointment and salicylic acid dusting powder for six weeks. 'Resistant' cases should then be treated with undecylenic acid aerosol spray. All boys should dry their feet thoroughly after bathing, salicylic acid dusting powder then being applied, and direct contact with wet floors avoided as far as possible,

slipper racks being provided close to the baths. As a result of these measures the incidence of clinical tinea pedis has been reduced to 26%.

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Contact Dermatitis

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It is apparent that individual experience in this field varies widely with the area in which the dermatologist works, the extent of contact clinics within the department and the doctor's own particular interests. My hospital practice lies in a semi-rural setting, without any concentration of heavy industries; 1.2% of the population are seen each year in hospital and private practice suffering from new skin disease.

The proportion of cases of contact dermatitis seen has doubled in the last decade, accounting in 1961 for 4.5% of all new cases (not including industrial cases, since these vary so much in different areas). They accounted for 26% of all cases of 'eczema'. This is as much an indication of an increased awareness on the part of the dermatologist as an increase in causes. It is obvious that in the past we have failed to separate many cases of contact dermatitis from the general category of eczema, in which many of our cases used to be placed. A large number of people in this country are still continuing to suffer, under this guise of constitutional eczema, from a condition which is due to or perpetuated by contact sensitizers or irritants. However, it is now one of the essential functions of a dermatological department to investigate such patients. For example, many patients suffering from hand eczema, and advised to wear rubber gloves to avoid the effect of detergents on the hands,

develop a sensitivity to one of the accelerators or antioxidants in the rubber. In fact, the condition is relatively so common that I would single it out for attention. Whether the use of rubber gloves for more than a few minutes at a time is ever desirable is questionable. Certainly much less harm usually comes from immersing the hands in water and a reasonable amount of soap or detergent, than from enclosing them in a rubber glove for long periods at a time, particularly under conditions of heat.

Common Causes of Contact Dermatitis

Nickel (Table 1) is the commonest single cause of contact dermatitis in women; this pattern is readily recognized but it may sometimes be confused with sensitivity to rubber of the suspenders (Wilson 1960).

Cosmetic dermatitis is widely scattered, ranging from lipstick and nail varnish to sensitization to ingredients of powders, perfumes, hair-dyes and other cosmetic materials. These cases are often difficult to confirm.

Table 1

Clinical diagnosis in 373 cases

	Percentage of cases
Nickel	14.5
Cosmetics	14.5
Medicaments	19.0
Clothing and accessories	10.4
Flowers, weeds and vegetables	10.5
Rubber	4.9
● No diagnosis made	19.0

● That is, clinically. 'Battery' patch-testing led to a diagnosis in many of these cases

Clothing dermatitis has become rather more frequent; the causes are: dye in hair-nets and nylon stockings or other clothing; rubber in girdles; and, more recently, a sensitivity to formalin from urea- and melamine-formaldehyde resins, used to proof and 'drip-dry' the garment (Cronin 1962, in press). Most crease-proof and 'drip-dry' clothing contains these agents, and may produce an irritating rash, particularly around the borders of the axillæ, the waist, groins, neck and other areas where friction and sweating occur. Sensitization to shoe materials is complex and difficult to break up. There are over thirty separate components of shoes, and there may be difficulty in advising patients, unless it can be established which particular part of the shoe is responsible for the dermatitis. This dermatitis shows itself on the front and sides of the foot and around the heel, but not on the soles.

Flower and vegetable sensitivities: Primulas and chrysanthemums are the chief offenders, but occasionally other flowers, ivies, plants and grasses give rise to a contact dermatitis. These