A POSSIBLE MODE OF ENTRY TO THE BODY OF *MYCOBACTERIUM LEPRAE*

Sir,

It is remarkable that after more than a century of research on leprosy the mode of transmission of *Mycobacterium leprae* is still unknown. The major mode of exit was quickly elucidated[1] although the work was ignored for some years before enjoying a recent revival.[2] But the mode of entry of the bacillus still remains unclear.[3]

Whilst writing a university dissertation recently on the mode of transmission of *M. leprae*, I considered the importance of the distribution of initial skin lesions in assessing the skin as a potential mode of entry of the bacillus. Several good quantitative surveys have been performed this century[4–9] and an attempt at assimilating this data was made. The conjecture was that if the initial lesion is formed at the initial point of entry of the infection then the distribution of such lesions should be biased towards those regions of the body which are frequently exposed. If such a biased distribution were to be found, then this would lend support to the skin as a portal of entry of the bacillus. If, however, the distribution were random, then this would suggest a systemic distribution of the bacilli from some other portal of entry, e.g. the upper respiratory tract.

The data from 6 surveys, covering 1288 patients, were simply accumulated and 4 zones of skin area assessed: 1, the head; 2, arms and hands; 3, trunk/buttock/thighs; and 4, legs and feet. Also two broad age groups, children and adults, were delineated (574 adults, 714 children). The accumulated

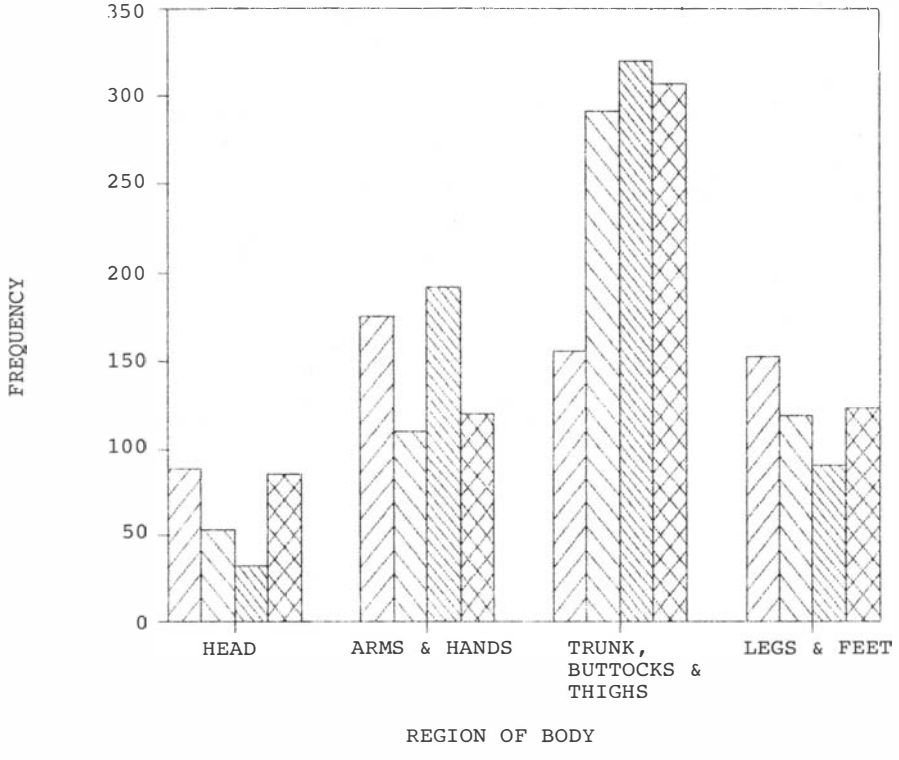

Figure 1. The site of the initial skin lesion in leprosy, the accumulated data of six studies. ▨, the expected frequency for adults, and ▨, for children, if predicting a random distribution based on the skin area of each body region. ▨, the observed adults' and ▨, the observed children's distributions.

Table 1. Initial lesion location—accumulated data

Site of first lesion	Adults			Children		
	Observed	Expected	χ^2	Observed	Expected	χ^2
Head	89	53	4·26007	47·8	96·363	3·42865
Arms and hands	176	110·4	6·79089	196·6	135·2651	3·89630
Trunk, buttocks and thighs	156	291·4	10·9606	359·4	344·7654	0·08702
Legs and feet	153	119·2	1·66972	110	138·4772	0·82042
			23·6813			8·23241

or 'observed' values were compared with values predicting a random distribution of lesions, calculated on the basis of the surface area of the skin in each of the regions,[10]—the 'expected' values (Figure 1, Table 1).

The deviations of the observed values away from the values predicting the random distribution were calculated and plotted (Figure 2). The significance of these deviations was assessed with the chi-squared test, and the adults' distribution ($P = < 10–8$) was found to be more significant than the childrens' ($P = 0·05$).

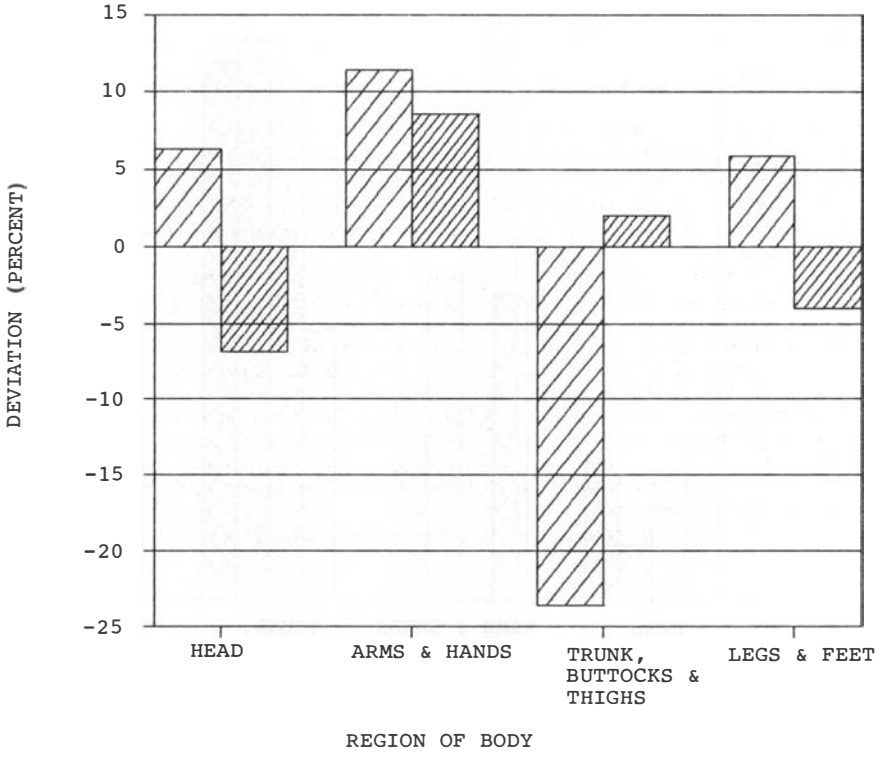

Figure 2. The deviation of the initial lesion distributions in adults and children away from a calculated random distribution (0%). ▨, the adult distribution, and ▨, the child.

The adult distribution, as see in Figure 2, is very significantly depressed in the trunk/buttock/thighs region, whereas the childrens' distribution is not. In the adult, these regions of the body are the most frequently covered, whereas children in these parts of the world at the times of these studies were generally unclothed or scantily clad. Thus the results do indeed, suggest that the initial lesion distribution is influenced by the degree to which body regions are exposed, and this supports the skin as a mode of entry of the bacillus.

There are however several problems associated with the collection and interpretation of this data. There is a lack of consideration of the nasal mucosa as a site for initial lesions and there is very little detail as to the type of clothing worn. Furthermore, it has been suggested that the site of the initial lesion may not be linked in any way to the initial site of entry of the bacillus, but may be controlled by a number of other predilecting factors, e.g. peripheral nerve turnover rates[11] temperature,[12] and blood supply. There is also the problem of the lack of any convincing experimental or histopathological evidence, despite persistent studies,[13,14] for the entry of *M. leprae* through the skin. Despite these problems, the distribution data presented here strongly suggests that the skin may be an important mode of entry of *M. leprae*.

M MACHIN

Oriel College
Oxford

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