LACK OF WRINKLE FORMATION IN THE FINGERTIPS OF PATIENTS WITH HANSEN'S DISEASE.

CONFIRMATION OF PREVIOUS OBSERVATIONS

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ABSTRACT — Immersion of a hand in water at 38 — 40°C for half an hour was performed in two phases with a one year interval in 38 patients with Hansen's disease and 20 controls. In all 20 controls wrinkles were produced. However, 32 of the 38 patients failed to show wrinkles in the fingertips. In 12, who participated in both phases, results of the second test confirmed those of the first. This may be an indication of irreversible damage. Due to the small number of individuals tested, no conclusions may be drawn in reference to groups and types of the disease. Provided that these results can be confirmed in larger groups of patients, this method could prove to be a tool in the diagnosis of Hansen's disease. Since the test is very easy to perform, it would be of great value in areas far from specialized medical centers.

Key **words:** Hansen's Disease. Hands Wrinkle-formation. Immersion.

1 INTRODUCTION

Immersion of the hand of the healthy individual in warm water (38 — 40°C) for 30 minutes induces wrinkling of fingertips[1]. Hansen's disease may damage ulnar and median nerves as well as terminal nerve fibers of the skin. In view of this, we have asked ourselves if wrinkling of the fingertips occurs in patients with Hansen's disease.

The studies reported here represent the second stage of a project which commenced four years ago and which has already been reported 8. In the present study, we have followed up the patients previously examined and assessed additional patients.

2 MATERIALS AND METHODS

Immersion was done as follows: the whole hand was put into a pan containing water at 38 — 40°C without exerting pressure over the fingertips. Temperature was maintained constant by adding hot water as required. After thirty minutes, the hand was taken out, dried and immediately examined and photographed. For each individual, only one hand was immersed to enable comparison with the second hand.

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In the first phase of this study, we reported 22 patients. Of these, 13 had lepromatous leprosy, 5 dimorphous leprosy (4 lepromatous borderline and 1 tuberculoid borderline), 2 indeterminate leprosy and the remaining 2 tuberculoid leprosy. Ten were clinically active; the disease was inactive in the remainder. The patients, 13 women and 9 men, ranged in age from 21 to 62 years. The duration of the disease process ranged from 6 months to 29 years. Treatment included sulf ones, rifampicin, and clofazimine. All patients had skin biopsies, bacteriological tests and test of peripheral sensitivity (pain, temperature and touch).

Thirteen women and 7 men, ranging in age from 23 to 66 years, served as controls.

The second phase of this study, performed both in Israel and Mara- caibo, comprised 28 patients: 12 from the first phase (in 10 of whom wrinkles had not appeared in the first test) as well as 16 additional cases. Of these additional patients, 11 had lepromatous leprosy, 3 lepromatous border- line, and 2 tuberculoid leprosy. Eleven were active and 5 inactive. The age, duration of the disease and treatment schedule were similar to those described for the first phase.

3 RESULTS

Normal wrinkle formation was observed in all 20 control subjects.

Eighteen out of 22 patients studied in the first phase failed to demonstrate wrinkling. Of the 18, 10 were included in the second phase. These subjects again did not show wrinkling. Two of the 4 patients, who showed wrinkle formation in the first phase, were included in the second stage and again wrinkling was detected.

Only two of the 16 new patients in the second phase exhibited wrinkling; the other 14 failed to do so.

In total, of the 38 leprosy patients studied in both phases, wrinkle for- mation was not observed to follow immersion of the hand in warm water, whereas wrinkle formation was observ- ed to occur in six. Among the six patients in whom wrinkle formation was observed there were 3 patients with lepromatous leprosy, 1 with di- morphous, and 2 with indeterminate leprosy

4 DISCUSSION

Lewis & Pickering[4] initially suggested the possibility of localizing a neurological lesion by means of lack of wrinkling. They described a patient whose median nerve was sectioned. After putting his hand in water, as was described above, the authors saw that the first three fingers and the radial half of the fourth were smooth, whereas, the ulnar half of the fourth finger and the fifth had wrinkles, as did all the fingers of the normal hand.

O'Riain[5] considered hand wrinkling to be an objective and simple method to measure innervation and regeneration of sensory nerves when function was restored.

Bull & Henry 3 showed that this test may be useful in assessing the autonomic nervous system in patients with diabetes mellitus and autonomic dysfunction such as diarrhea and orthostatic hypotension. It has also been found to be useful in the acute phase of the polyneuropathy of Guillain-Bar- ré syndrome. According to these authors, wrinkle formation in the healthy hand depends on two sets of factors : 1.) Epidermal. Swelling and absorption of fluids by the stratum corneum is inversely proportional to the amount of sebum, and directly

proportional to : (a) the difference in pH between that of epidermal keratin and that of the fluid in which the hand was immersed ; (b) the sodium chloride concentration of the immersion fluid and (c) its temperature. 2) Dermal. The less the turgor of deep tissues, the greater the epidermal swelling and the wrinkles. Turgor is more marked when sympathetic tone is low and blood vessels are dilated. After sympathectomy, the hand is warm and edematous, and turgor is so great that it does not allow the epidermis to swell and wrinkle. Thus, in patients with lesions in the autonomic system, no wrinkles will appear in the fingertips. This is confirmed by the observation.

Braham et al. 2, who studied wrinkle formation in 12 patients before and after cervical sympathectomy for hyperhidrosis, immersing the hand in water at 40°C for 20 minutes, wrin- kling was noted in all cases preopera- tively. However, two days post-operatively, the skin remained perfectly smooth in most cases with minimal superficial wrinkling in others.

In patients with Hansen's disease, all the above conditions apply. In addition, there are disturbances of lymphatic, osseous and muscular systems and atrophy in the skin of the fingertips. All patients of the first phase were submitted to tests of sensation (temperature, touch and pain). After immersion, no difference was observed between patients with and without disturbances in sensitivity. This suggests that skin wrinkling is not directly related to the degree of preservation of sensory function. Skin wrinkling persisted in those patients originally demonstrating this phenomenon. This may indicate that nerve damage occurs irreversibly.

Alvarez et a2.1 observed wrinkle formation in only 38 of 54 neurologically healthy subjects, whereas we observed wrinkle formation in all 20 of our control subjects. This difference cannot readily be attributed to small differences in the immersion procedure; Alvarez et al. 1 employed immersion at 38 — 40°C for 30 minutes. Similarly, the small differences of age do not appear to account for the different rates of wrinkle formation between the two studies ; our control subjects ranged in age from 22 to 62 years, whereas those of Alvarez et al.1 ranged from 40 to 60 years.

It appears more likely that the differences between our control subjects and those of Alvarez et ca. 1 may be attributed to ethnic, occupational, or other factors. Ethnic factors are suggested by the work of Weigand et al.T , who pointed out that the skin of negroid subjects has a thicker stratum corneum than that of Caucasians ; this may be the reason that Negro people show more wrinkle formation. On the other hand, Jacyk and Da Silva (1981, personal communication to be published in "Der Hautarzt"), working in the National Leprosy Training Center, examined 20 healthy Africans aged 17 — 43 and 7 Europeans aged 25 — 38. These workers found ethnic differences after immersion at 38 — 40°C for 20 minutes. In 4 out of 20 Africans (20%) there appeared wrinkles, where- as wrinkle formation was observed in all the 7 Europeans, as was the case among our control subjects.

The phenomenon of formation or non-formation of wrinkles in healthy people is controversial and demands more study. This is not the case for patients with Hansen's disease, among whom the non-formation of wrinkles appears clearly to have resulted from the pathological changes produced by the disease.

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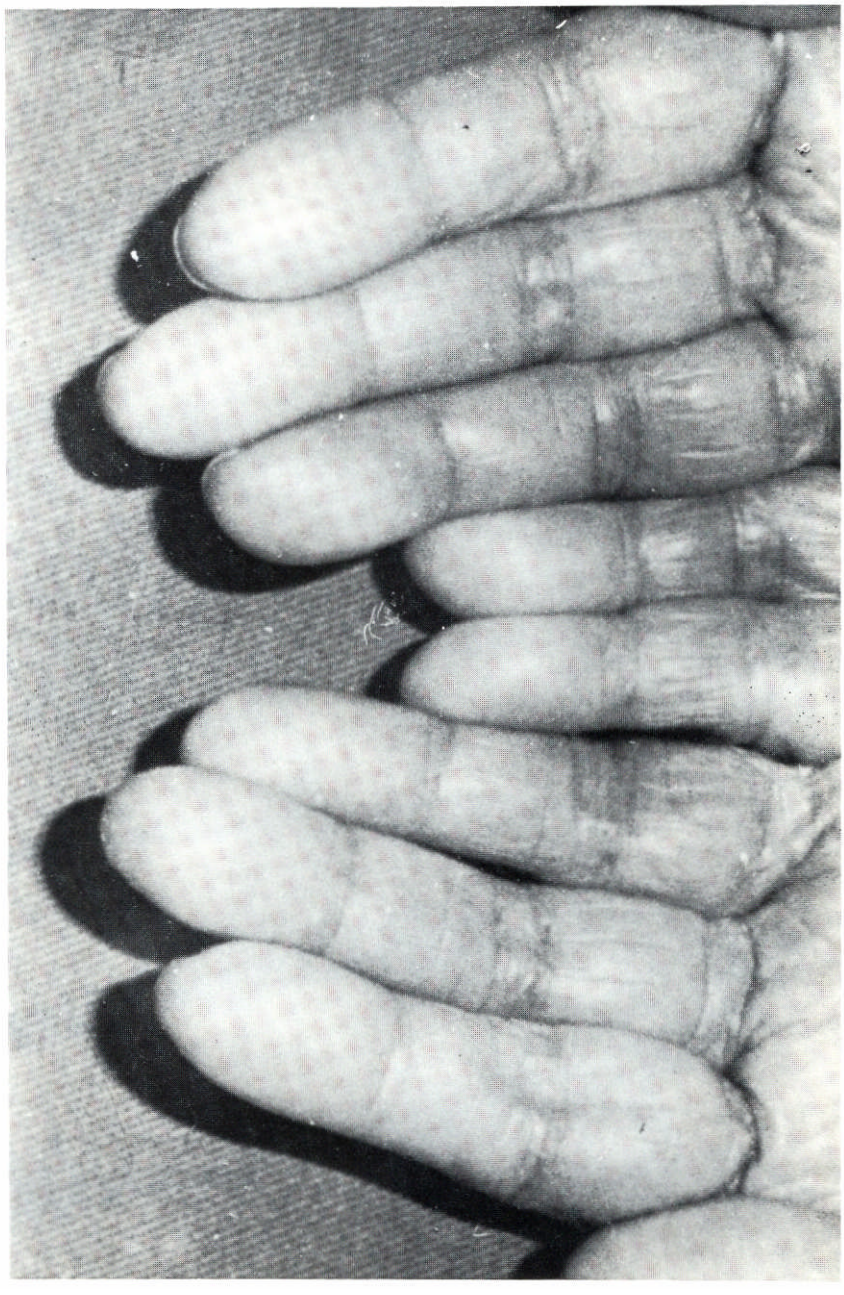


FIGURE 1 — Hands of a patient: the left hand after a bath. No wrinkling of the fingertips is observed.

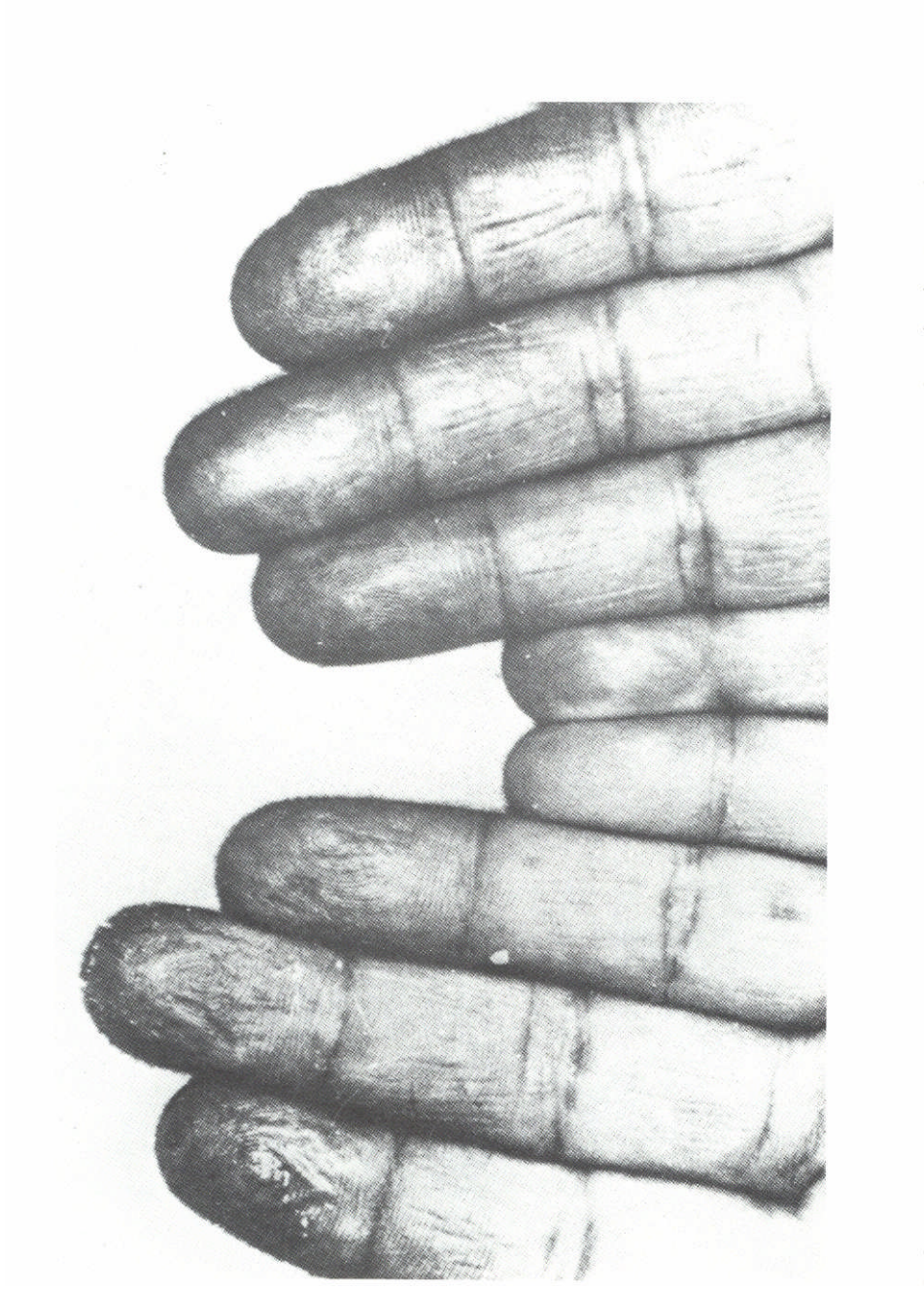
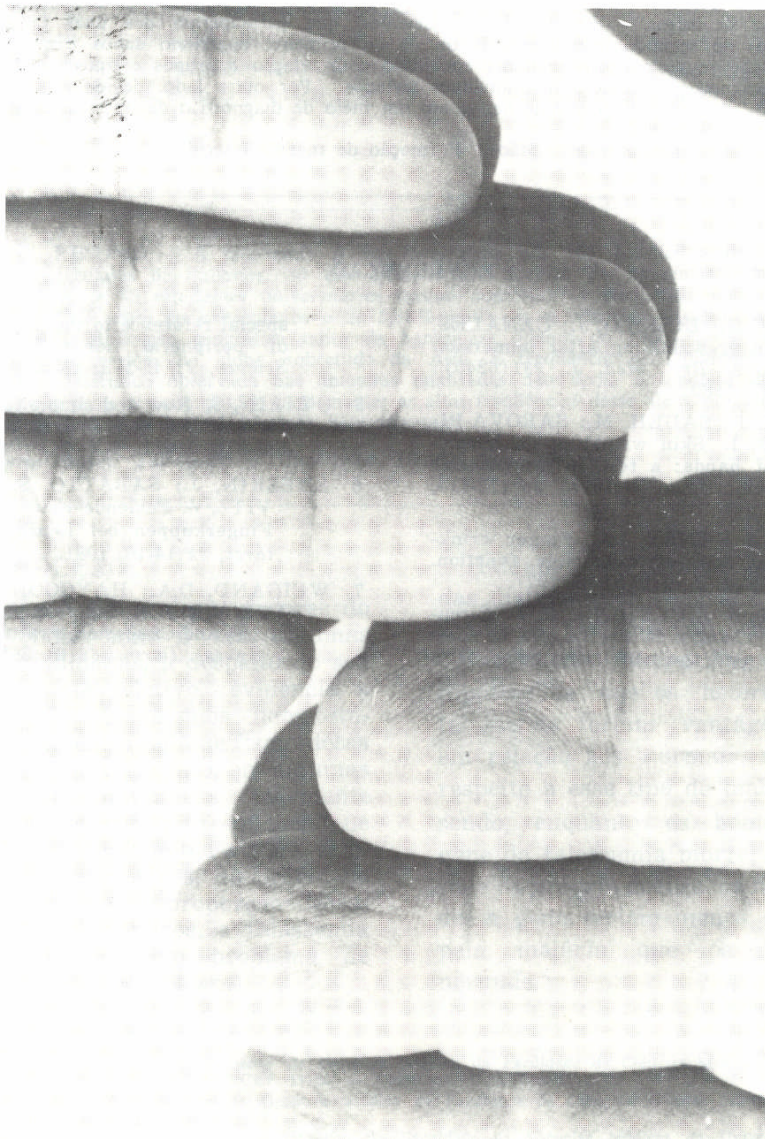


FIGURE 2 — Hands of a control: the left hand after a bath. Wrinkling of the fingertips is observed.



E 3 — On the right is the hand of a control after a bath and on the left is the hand of a patient after a bath. Wrinkling of the fingertips is observed in the control but not in the patient.

RESUMO — Em uma experiência, realizada em duas etapas com intervalo de um ano, manteve-se imersa uma das mãos de 38 hansenianos e de 20 indivíduos, que formaram o grupo controle, em água à temperatura de 38 a 40° C, durante meia-hora. Em todos os 20 componentes do grupo controle, observou-se a formação de rugas nas pontas dos dedos. Contudo, em 32 dos 38 portadores de hanseníase, não ocorreu a formação de rugas. Em 12 destes pacientes, que participaram das duas fases, os resultados do segundo teste confirmaram os do primeiro, sugerindo danos irreversíveis. Porém, não se pode obter nenhuma conclusão com relação a grupos e tipos da doença devido ao pequeno número de indivíduos testados. Por outro lado, devido 5. sua fácil aplicação, esse método poderá tornar-se em um meio de diagnóstico de hanseníase. R.B.L.

Palavras chave: Hanseníase. Mios. Formação de rugas. Imersão.

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