

## Effect of DDS Therapy on the Acetylcholine Sweat Function Test in Fifty Cases of Tuberculoid and Maculoanesthetic Leprosy<sup>1</sup>

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Father Joseph Damien de Veuster first observed in the year 1889 that perspiration was absent on the macules of leprosy which had appeared in his own skin. The sweat glands are supplied by the nonmedullated sympathetic fibers. Unlike other sympathetic innervated structures, they are not adrenergic but are cholinergic. The physiology of sweat secretion is a complex matter. Anhidrosis and hypohidrosis resulting from early denervation of sweat glands supplied by the cholinergic postganglionic sympathetic fibers, due to the neuritis of leprosy, has led to the development of intradermal sweat tests, i.e., sudomotor tests for the early diagnosis of leprosy. Pilocarpine nitrate, metacholine (1) and adrenaline tests are some of the examples of sudomotor tests. According to Arnold (1) and Parikh (2), impairment of the sweat function probably precedes the development of demonstrable anesthesia. Parikh *et al* (2) have reported a simple method of detecting anhidrosis and hypohidrosis by using 0.1% acetylcholine and bromphenol blue paper. We have used this test for the last five years and find it very useful in the diagnosis of early and doubtful cases of nonlepromatous leprosy. The main purpose of this investigation was to study the effect of one year's regular DDS treatment on the sweating function in typical cases of maculoanesthetic and tuberculoid lesions of leprosy.

### MATERIALS AND METHODS

Fifty previously untreated cases of nonlepromatous leprosy comprising 31 typical cases of tuberculoid leprosy and 19 typical

cases of maculoanesthetic leprosy were studied. Only patients showing definite loss of thermal and tactile sensations were selected. The youngest patient was an eight year old Hindu girl while the oldest patient was a sixty year old Parsi gentleman. All the patients belonged to the upper middle strata of society and were seen in our private consulting rooms.

There were 29 male and 21 female patients. Of the females, 6 had maculoanesthetic leprosy while 15 had tuberculoid leprosy. Among the male patients, 13 had maculoanesthetic and 16 had tuberculoid leprosy. Thus, there were a total of 19 maculoanesthetic and 31 tuberculoid cases.

All the patients in this series were treated with oral DDS. They received 10 mg DDS daily for the first two months. For the next four months, the dose was increased to 25 mg/day and thereafter all the patients received 50 mg DDS daily (3).

Before beginning treatment, thermal and touch sensations were tested and the acetylcholine sweat function test was done.

**Sweat Function Test (SFT).** The lesion and a corresponding area of normal skin on the opposite side were cleaned with alcohol. Using a tuberculin syringe, 0.05 ml of 0.1% aqueous solution of acetylcholine was injected intradermally into both areas. Any leaked droplets of solution were gently blotted off. After two minutes, two square pieces of bromphenol blue paper (actually yellow colored) were pressed lightly on the sites of injection for about 15 seconds and then removed. The sweat drops were represented on the paper as blue dots and depending upon the number of blue dots the test was interpreted in the following four grades:

- 1+ Slightly diminished when the number of blue dots were about or up to 30% less than in the control area.
- 2+ Moderately diminished in case the blue dots were 30% to 60% less than in the control area.

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3+ Markedly diminished if the number of blue dots were more than 60% less than in the control site.

4+ Absent when no blue dots were seen.

All the patients had monthly clinical checkups. After one year's regular treatment, thermal and touch sensations were retested, and the sweat function test (SFT) was repeated. To minimize any error due to the effect of temperature and humidity on sweating, the test was repeated in the same manner and in the same month after one year.

TABLE 1. *Initial pretherapy Sweat Function Test (SFT).*

Loss of sweating	No. cases	Type of leprosy
4+	21	maculoanesthetic 3 tuberculoid 18
3+	10	maculoanesthetic 5 tuberculoid 5
2+	17	maculoanesthetic 10 tuberculoid 7
1+	2	maculoanesthetic 1 tuberculoid 1

### RESULTS

Prior to the onset of treatment (Table 1), lesion sweating was absent in 21 cases (maculoanesthetic 3 and tuberculoid 18), markedly diminished in 10 cases (maculoanesthetic 5 and tuberculoid 5), moderately diminished in 17 cases (maculoanesthetic 10 and tuberculoid 7) and slightly diminished in two cases (maculoanesthetic 1 and tuberculoid 1). Thermal and touch sensations were lost in all instances.

At the end of DDS treatment for one year, 46 of 50 patients (92%) showed no change in sweat function. Only one maculoanesthetic patient, who first showed 4+ SFT reading, changed to a 2+. The remaining three patients (maculoanesthetic 1 and tuberculoid 2) showed only marginal one grade improvement in sweat function. One year's DDS therapy did not improve sensory loss in 49 of the 50 cases. In one tuberculoid patient only was there satisfactory improvement in thermal and touch sensations on the cheek lesion. Following DDS treatment, all the lesions of tuberculoid leprosy became flat and their erythema practically disappeared,

while in maculoanesthetic leprosy, although the patch remained nearly the same, the margins became less distinct.

### SUMMARY

This study included 19 previously untreated cases of maculoanesthetic and 31 of tuberculoid leprosy. Only typical patients showing definite loss of thermal and touch sensations were selected. Acetylcholine sweat function test (SFT) was done before and after one year of DDS treatment. There was then scarcely any significant change either in sensory impairment or in sweating. Only one tuberculoid patient presented satisfactory improvement in thermal and touch sensations, while in only one maculoanesthetic case did the SFT change from absent to moderate response. There was no change in SFT in 46 of 50 cases while in 3 cases the improvement in the SFT was negligible. After one year of DDS intake, all tuberculoid lesions became flat and their erythema practically disappeared. In cases of maculoanesthetic leprosy, although the patches remained nearly unaltered, the margins definitely became less distinct.

### RESUMEN

Este estudio incluyó 19 casos de lepra maculoanestésica y 31 de lepra tuberculoides, todos sin tratamiento. Se seleccionaron sólo pacientes típicos que mostraban pérdida definida de sensaciones táctiles y térmicas. Se hizo una prueba de función sudorípara con acetilcolina (PFS) antes del tratamiento con DDS y un año después de haber sido iniciado. Después de ese lapso, prácticamente no se observó ningún cambio significativo, ya sea de las alteraciones sensoriales o de la sudoración. Sólo un paciente tuberculoides mostró una mejoría satisfactoria de las sensaciones de tacto y de calor, mientras que sólo en un caso maculoanestésico cambió la respuesta a la prueba de función sudorípara de ausente a moderada. En 46 de 50 casos no hubo cambio de la PFS, mientras que en 3 casos la mejoría de la PFS fué de poca importancia. Después de un año de ingestión de DDS, todas las lesiones tuberculoides se hicieron planas y su eritema prácticamente desapareció. En los casos de lepra maculoanestésica, aunque las placas permanecieron sin alteraciones, los márgenes se hicieron claramente menos visibles.

### RÉSUMÉ

Cette étude a porté sur 19 cas de lèpre maculoanesthésique et 31 cas de lèpre tuberculoides, qui n'avaient pas été traités auparavant. Seuls

de malades typiques, présentant une perte définitive du toucher et du sens de la chaleur, ont été choisis pour cette étude. On a procédé à des épreuves fonctionnelles de sudation par l'acétylcholine, avant et après un an de traitement par la DDS. C'est à peine si des modifications significatives ont été notées dans les troubles sensoriels ou dans la sudation. Un malade tuberculoïde seulement a présenté une amélioration satisfaisante du toucher ou du sens thermique, alors que l'épreuve à la sudation s'est rétablie chez un cas maculoanesthésique seulement. On n'a pas noté de modifications de l'épreuve à la sudation chez 46 des 50 cas; par ailleurs, chez 3 cas, l'amélioration dans les épreuves de sudation a été négligeable. Après un an de traitement par la DDS, toutes les lésions tuberculoïdes se sont aplaties

et l'érythème a pratiquement disparu. Dans les cas de lèpre maculoanesthésique, les bords des macules sont devenus nettement moins distincts, alors que les macules elles-mêmes restaient presque identiques.

#### REFERENCES

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