

# Composite Skin Contact Smears: A Method of Demonstrating the Non-emergence of *Mycobacterium leprae* from Intact Lepromatous Skin\*

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The author's method of preparing composite skin contact smears is fully described. From the microscopical examination of a large number of these smears, taken from various sites on patients with lepromatous leprosy but with intact skin, he concludes that the main source of infection in such cases is not the intact skin, on which very few leprosy bacilli were found, but the nasal mucus.

## INTRODUCTION

It is well known that patients with lepromatous leprosy in an advanced and untreated state, whose skin, by reason of open sores, is not intact, discharge large number of *Mycobacterium leprae* from both the skin and the lining of the nose (as is shown in the report of Case 12). But what of the lepromatous patient, whether in an early or later stage of the disease, whose skin is intact? Is it still correct to link the intact skin with the lining of the nose as a source of infection? One has only to read the literature on leprosy to find that this is often done, the number of bacilli thought to be discharged from "skin and nose", even in a very early case, being referred to as "large", "enormous", or "innumerable" (to quote some of the adjectives used). I have not been able to discover from the literature if this belief is hypothetical or whether it is based on definite evidence.

The following is an account of an attempt to estimate the number of bacilli shed from the intact skin of patients suffering from varying degrees of active and untreated lepromatous leprosy, ranging from the early to the more advanced state of the disease. The method employed is what the writer calls Composite Skin Contact Smears (C.S.C.S.).

## METHOD

A square centimetre is outlined on the middle of a glass slide with a blue glass pencil. The opposite surface of the square is pressed firmly against the skin in different places, superimposing one smear upon another until 10 superimposed smears, contained in the one square centimetre, have been taken. After every second or third superimposed smear, the slide is heat-fixed. Thus, in the preparation of a composite skin contact smear, heat-fixing is employed 4 or 5 times. The writer has proved that this amount of heating does not in any way alter or destroy the bacilli. This was done by preparing 2 skin slit scrape smears from the same site (e.g. an earlobe) of a patient with active lepromatous leprosy. One slide was heat-fixed once, and the other 10 times. After staining, it was impossible to detect any difference in the bacilli of the 2 slides. When staining, in order not to run the risk of dislodging the smear, special care must be taken not to wash the slide under running water, but rather to wash it by gently dipping it in and out of a container full of water. Because the secretion from sebaceous glands tends to be acid-fast (but not alcohol-fast) decolorization, especially of a composite smear from the face, is always done with 0.5% hydrochloric acid in 70% alcohol. Sometimes, for control staining, one skin slit

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FIG. 1

A study of 4 composite skin contact smears representing 40 sq. cm of the surface of maximum infiltrated skin, taken from (a) earlobes (6); (b) cheeks (2) and lower lip (2); (c) forehead (10); (d) right upper arm (10); and (e) left upper arm (10).

scrape smear is placed on the slide well away from the test square centimetre, and is stained at the same time. The patient's maximum infiltrated areas of skin are selected for making these composite skin contact smears.

The search for bacilli in the 1 sq. cm is made easier by the blue pencil outline on the under-surface of the slide which marks the limit for the back-and-forth excursion of the microscope stage. It is reckoned that a thorough search of a 1 sq. cm smear involves examining approximately 1000 microscopic fields, and takes quite 30 to 40 min. For this kind of work it is, of course, essential to use a binocular microscope with an accurately moving stage and interior lighting.

### CASE DESCRIPTION

There now follows a description of 11 cases of lepromatous leprosy in patients with varying stages of the disease, all with intact skin. Case 12, in which the skin was not intact, is added as a contrast. A careful study of the report of these cases will reveal that if there are bacilli to be found on the skin, this composite skin-contact-smear method will pick them up (see Cases 3, 8, 10 and 12). In each case a nasal *mucus* smear was examined, rather than a nasal mucosa-scrape smear, because: (a) the latter is always unpleasant for the patient, and (b) it is not such a good index of the patient's infectivity as a mucus smear. The mucus for the smear was either gently taken from the mucosal surface with a platinum loop, or the patient was asked to blow his nose on a piece of paper and a smear made from the mucus on the paper.

#### CASE 1

*Name:* Than Bahadur. Male, aged 18 years. Hospital No. 47470. *History:* 2 years. Untreated. *Diagnosis:* advanced lepromatous leprosy.

#### *Investigations*

- (1) *Composite skin contact smears*  
Four such smears, each 1 sq. cm in size, and each containing 10 superimposed smears taken from maximum infiltrated areas of skin as follows:
- (i) Earlobes (6), cheeks (2), lower lip (2).
  - (ii) Forehead (10).
  - (iii) R. upper arm (10).

(iv) L. upper arm (10).

These 4 composite skin contact smears represent 40 sq. cm of maximum infiltrated skin surface. *Result of search* (4000 microscopic fields, approximately). No bacilli found.

(2) *Skin slit scrapes*

R. earlobe 4+, 60% solid rods.

L. earlobe 3+, 40% solid rods.

R. upper arm 3+, 60% solid rods.

L. upper arm 3+, 60% solid rods.

*Result:* BI 3.3+ (max. is 4+); MI 55%.

(3) *Nasal mucus smear*

Frequent globi and groups of bacilli in parallel arrangements, also looser scattering of bacilli, 40% judged to be solid rods.

#### *Conclusion*

In spite of his appearance, the patient is infectious only by reason of his infected nasal secretion.

### CASE 2

*Name:* Ruke. Female, aged 30 years. Hospital No. 47583. *History:* face becoming swollen—1 year. Untreated. Lactating. *Diagnosis:* lepromatous leprosy with nodules.

#### *Investigations*

(1) *Composite skin contact smears*

Four such smears, each 1 sq. cm in size, and each containing 10 superimposed smears taken from:

- (i) Face (forehead, brows, earlobes, cheeks, not lips) 10
- (ii) Forearms (skin very infiltrated with some nodules) 10
- (iii) L. breast area (appearance of skin—normal) 10
- (iv) R. breast area (appearance of skin—normal) 10

These 4 composite skin contact smears represent 40 sq. cm of skin surface, of which 20 sq. cm from the face and forearms was very infiltrated in appearance.

*Result of search* (4000 microscopic fields, approximately). No bacilli found.

(2) *Skin slit scrapes*

Upper right eyelid 3+, 5% solid rods (approximately).

Upper left eyelid 4+, 5% solid rods (approximately).

Right forearm 3+, occ. solid rods.

Right breast area 2+, no solid rods.

*Result:* BI 3+ (max. is 4+); MI 3%.

(3) *Nasal mucus smear*

Smear loaded to capacity with globi and innumerable bacilli. *Result:* nasal BI maximum; nasal MI 90%.

#### *Conclusions*

This woman is infectious only by reason of the heavily infected nasal secretions. Often she will remove mucus from her nose between finger and thumb and a moment or two later she will remove mucus from her child's nose in the same way, or she will wipe her nose



FIG. 2

A study of 4 composite skin contact smears representing 40 sq. cm of skin surface, each smear containing 10 superimposed smears. One composite skin contact smear was taken from (a) the face and (b) the patient's husband and 2 children, the younger at the breast.



FIG. 3

A study of 3 composite skin contact smears comprising 26 sq. cm of the surface of maximum infiltrated skin in face, arms and legs.

on the cloth wrapping the baby (see Fig. 2) and then wipe the baby's nose with the same cloth. The child was 5 months old when the photograph was taken and from the time of his birth (when the mother's MI was perhaps much higher) it has probably ingested bacilli in the milk in very significant numbers (see References).

CASE 3

*Name:* Govind. Male, aged 56 years. Hospital No. 603. *History and Diagnosis:* Treated for 6 years for lepromatous leprosy; disease became completely arrested and in state of bacillary negativity. Patient then failed for 4 years to continue maintenance dose of DDS and relapsed into state of advanced lepromatous leprosy with numerous nodules.

*Investigations*

(1) *Composite skin contact smears*

Three such smears, each 1 sq. cm in size and each containing a number of superimposed smears taken from maximum infiltrated areas of skin as follows:

- (i) Face — 6 superimposed smears, each taken over summit of different nodules on forehead, brows, malar areas.
- (ii) Arms— 10 superimposed smears of which 8 were taken from summits of different nodules and 2 over very infiltrated areas of skin.
- (iii) Legs — 10 superimposed smears, of which 8 were taken over summits of different nodules and 2 over very infiltrated areas of skin.

These 3 composite skin contact smears represent 26 sq. cm of maximum infiltrated skin surface. *Result of search* (3000 microscopic fields, approximately). Only 2 somewhat solidly staining bacilli found in the face smear. The 2 smears from arms and legs were negative.

(2) *Skin slit scrapes—taken from 11 sites*

6 from the same nodule summits on the face from which the composite smear was made. *Result:* BI maximum, MI 60%.  
3 from arms, in 2 nodules and 1 infiltrated area from which the composite smear was made. *Result:* BI maximum, MI very high, estimated 70%.  
2 from legs, in 2 nodules from which the composite smear was made. *Result:* BI maximum, MI 60%.

(3) *Nasal mucus smear*

This was made from one platinum loopful of mucus. Frequent globi, sometimes several in a microscopic field, also groups of closely packed bacilli in parallel arrangements, a high proportion of which appear to be in solid rod form. MI 60%.

*Conclusion*

In his present stage of unbroken skin this patient is infectious only by reason of the infected nasal secretion, whence the 2 bacilli in the face composite smear probably came.

CASE 4

*Name:* Dhan Bahadur. Male, aged 56 years. Hospital No. 2072. *History:* Lepromatous leprosy treated several years until became arrested. Defaulted for 18 months and relapsed. *Physical examination:* Skin of face shows some raised erythematous papules and small plaques with diffuse infiltration of the skin. Many such small nodules on back and front of chest and abdominal wall (see Fig. 4).

*Investigations*

(1) *Composite skin contact smears*

Four such smears, each 1 sq. cm in size and each consisting of 10 superimposed smears taken from:

- (i) Face—summits of small plaques and low papules (Fig. 4a, b).
- (ii) Back of neck (Fig. 4c).
- (iii) Back of L. shoulder (Fig. 4d).
- (iv) Breast areas and abdominal wall (Fig. 4e).

These 4 composite skin contact smears comprise 40 sq. cm. of maximum infiltrated skin.

*Result of search* (4000 microscopic fields approximately). No bacilli found.

(2) *Skin slit scrapes*

R. ear	BI Max., MI 20%.
L. ear	" " " 10%.
L. brow (not nodule)	" " " 40%.
L. brow (nodule)	" " " 40%.
L. upp. arm (papule)	" " " 60%.
Nape of neck (papule)	" " " 20%.
Back L. shoulder (papule)	" " " 15%.
Back L. shoulder (papule)	" " " 40%.
R. breast area (papule)	" " " 40%.
Abdominal wall (papule)	" " " 40%.
<i>Result:</i> BI Max., MI 31%.	

(3) *Nasal mucus smear (from nose-blow)*

Loaded with bacilli, many in globi arrangement. MI 70% to 80%.

*Conclusion*

Infectious only by reason of heavily infected nasal secretion.

CASE 5

*Name:* Thik Bahadur. Male, aged 58 years. Hospital No. 46470. *History:* Thinks he may have had leprosy for 18 months. Has noticed thickening of skin of face, loss of feeling in the hands and feet, and slight redness of skin of chest. *Diagnosis:* Finely diffuse lepromatous leprosy.

*Investigations*

(1) *Composite skin contact smears*

Three such smears, each 1 sq. cm in size, the site of each and number of superimposed smears is as follows:

- (i) Both earlobes (2 superimposed smears).
- (ii) Backs of both wrists (4 superimposed smears).
- (iii) Front of both thighs (4 superimposed smears).

These 3 composite skin contact smears comprise 10 sq. cm of fine, diffusely infiltrated skin surface.

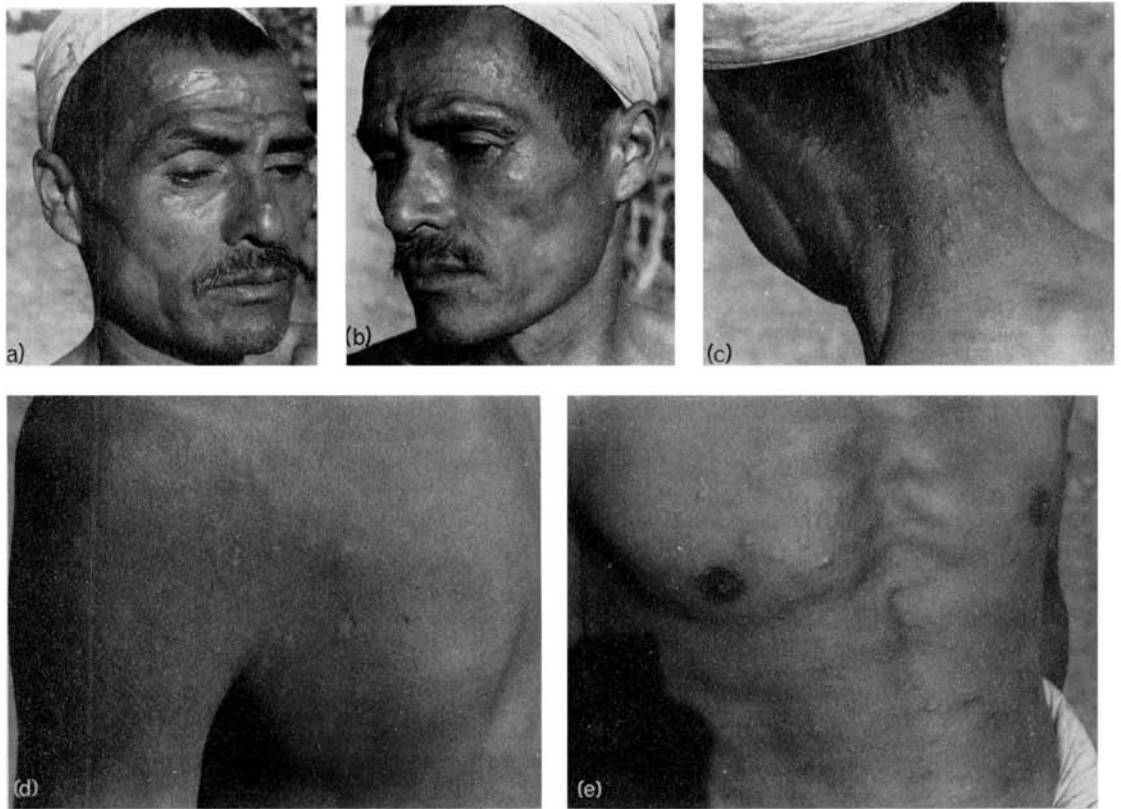


FIG. 4

A study of 4 composite skin contact smears comprising 40 sq. cm of maximum infiltrated skin.

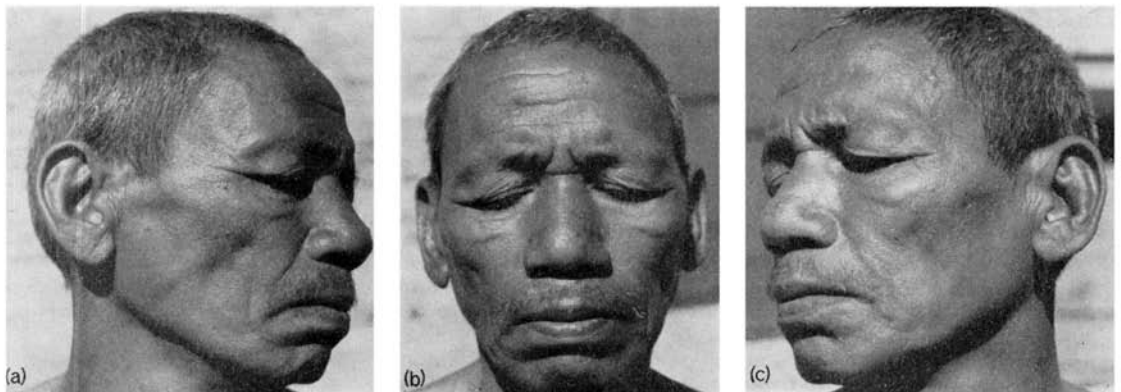


FIG. 5

A study of 3 composite skin contact smears comprising 10 sq. cm of the surface of fine, diffusely infiltrated skin taken from face, arms and legs. Note fine diffuse infiltration of skin, enlarged earlobes, and madarosis—a type of case which is sometimes referred to as non-apparent lepromatous leprosy.

Result of search (3000 microscopic fields approximately). No bacilli found.

(2) *Skin slit scrapes*

R. earlobe 3+ MI 5% approx.  
 L. earlobe 3+ .. .. ..  
 L. brow and R. 3+ each .. .. .. each  
 R. wrist (back) 4+ .. .. ..  
 L. thigh 4+ .. .. ..  
 Result: BI 3.3+ (max. is 4+), MI 5%.

(3) *Nasal mucus smear*

Negative.

*Conclusion*

It is very doubtful if, in his present stage, this man is infectious.

CASE 6

Name: Shadhu. Male, aged 40 years. Hospital No. 47346. History: Patient thinks he has had leprosy for 3 years. Untreated. Diagnosis: Lepromatous leprosy fairly active.

*Investigations*

(1) *Composite skin contact smear*

Two such smears, each 1 sq. cm in size and each composed of 10 superimposed smears taken from different sites on the forehead, cheeks, and chin. Thus, these 2 composite smears comprise 20 sq. cm of infiltrated skin of the face.

Result of search (2000 microscopic fields, approximately). No bacilli found.

(2) *Skin slit scrapes*

R. earlobe BI maximum, MI 15%.  
 L. earlobe BI maximum, MI 18%.

(3) *Nasal mucus-blow smear*

Moderate number of bacilli, often in globi arrangement, in almost every field or alternate fields, the majority appear to be solid staining. MI 80%.

*Conclusion*

Infectious only by reason of infected nasal mucus.

CASE 7

Name: Jagat Bahadur. Male, aged 26 years. Hospital No. 46967. History: Skin of face becoming thick over last 6 months. "Pins and needles" sensation in hands and feet for 2 or 3 years. Diagnosis: Diffuse lepromatous leprosy. Untreated.

*Investigations*

(1) *Composite skin contact smears*

Two such smears, each 1 sq. cm in size (each consisting of 10 superimposed smears), both taken from:

- (i) Face (forehead).
- (ii) Face (both earlobes, both malars, both cheeks).

These 2 composite smears comprise 20 sq. cm of maximum infiltrated skin of face.

Result of search (2000 microscopic fields, approximately). No bacilli found.

(2) *Skin slit scrapes*

R. earlobe 3+, 24% solid rods.  
 L. earlobe 3+, 24% .. ..

R. forearm 2+, 15% .. ..  
 R. thigh 3+, 15% .. ..  
 Inter-brow 4+, 60% .. ..

Result BI 3+ (max. is 4+), MI 30%.

(3) *Nasal mucus smear (from a nose-blow)*

Quite frequent bacilli in almost every field, including some globi; the large majority appear to be in solid rod form.

*Conclusion*

Infectious only by reason of infected nasal secretion.

CASE 8

Name: Pahal Singh Pun. Male, aged 36 years. Hospital No. 46837. History: 1 to 1½ years. Untreated. Diagnosis: Non-apparent active lepromatous leprosy.

*Investigations*

(1) *Composite skin contact smears*

Three such smears, each 1 sq. cm in size, taken from maximum infiltration areas of skin as follows:

- (i) 6 superimposed smears from face: both R. and L. earlobes, brow, and cheeks.
- (ii) 11 superimposed smears from the limbs as follows: 2 from each forearm, 2 from right thigh, in coppery coloured area infiltrated skin, and 5 from left thigh in similar coppery coloured area infiltrated skin.
- (iii) 6 superimposed smears from slightly infiltrated coppery coloured patches distributed symmetrically over the back.

These 3 composite skin contact smears represent 23 sq. cm of maximum infiltrated skin surface.

Result of search (3000 microscopic fields, approximately). In (iii) I found 3 irregularly stained acid-fast organisms shaped like short rods. No bacilli were found in (i) and (ii).

(2) *Skin slit scrapes*

R. earlobe +2, 40% solid rods.  
 L. earlobe +3, 40% .. ..  
 L. brow +2, 40% .. ..  
 R. cheek +1, 25% .. ..  
 R. forearm Negative.  
 R. thigh +2, 30% solid rods.  
 Result: BI 1.8+ (max. is 4+), MI 35%.

(3) *Nasal mucus smear (not scrape)*

Negative.

*Conclusion*

If this patient is infectious it would only be by reason of very scanty bacilli in the nasal mucus secretion, which further smears might have revealed.

CASE 9

Name: Hari Bahadur. Male, aged 37 years. Hospital No. 47376. History and clinical findings: Patient complains of rash, developing over 9 months, on back forearms and thighs; very itchy. Clinically, it consists of numerous small, slightly raised pale papules with very slight erythema, some coalescing, symmetrically distributed on lower back, lower abdominal wall, forearms, and inner aspects of thighs; no loss of sensation. Superficial nerves show no enlargement. Skin



FIG. 6  
A study of 2 composite skin contact smears comprising  
20 sq. cm of infiltrated skin of face.



FIG. 7  
A study of 2 composite skin contact smears comprising 20 sq. cm of infiltrated skin of face. Not very apparent diffuse lepromatous leprosy with some loss of eyebrows.

FIG. 8  
A study of 3 composite skin contact smears representing  
23 sq. cm of the surface of maximum infiltrated skin.  
Note: These bacilli may be *Myc. leprae*, but my  
Japanese colleague, Dr. Ivamura, a very experienced  
bacteriologist, tells me that they could be an acid-  
alcohol-fast mycobacterium, present in the soil, which  
closely resembles *Myc. leprae* and can be picked up by  
sleeping on a mud floor.





of face looked normal on first examination, and it was not until after result of skin slit scrapes was known that I thought I could detect both a very faint erythema and very fine diffuse infiltration of the skin [see Fig. 9 (a), (b), (c)]. *Diagnosis:* Non-apparent lepromatous leprosy (i.e. so far as the exposed parts of the body were concerned when fully dressed).

*Investigations*

(1) *Composite skin contact smears*

Three such smears, each 1 sq. cm in size, and each comprising 10 superimposed smears taken from:

- (i) and (ii) Face (different sites: earlobes, both cheeks, brows and forehead).
- (iii) Forearms (from the surface of numbers of papular lesions).

These 3 composite skin contact smears comprise 30 sq. cm of skin surface, beneath which lay many bacilli, a considerable proportion of them in solid staining form.

*Result of search* (3000 microscopic fields, approximately). No bacilli found.

(2) *Skin slit scrapes*

R. and L. earlobes, each BI 3+, MI 35%.  
 L. brow BI 3+, MI 10%.  
 R. cheek BI 3+, MI 30%.  
 R. forearm (in one of the papules) BI 3+, MI 35%.  
*Result:* BI 3+ (max. is 4+), MI 29%.

(3) *Nasal mucus smear*

Microscopic fields showing scattered bacilli, singly, in small groupings, or clusters and in globi formation, not in every field but in every third or fifth field. A very high proportion of them in solid staining form. MI 70%.

*Conclusion*

How infectious is he? This man would appear to be slightly infectious only by reason of the moderate infection of his nasal secretion, which would soon be rendered negative after a few months on DDS, 50 mg per week.

CASE 10

*Name:* Chandra Singh. Male, aged 26 years. Hospital No. 47288. *History:* Thickening of skin of face and appearance of nodules during 6 months. Untreated. *Diagnosis:* Lepromatous leprosy.

*Investigations*

(1) *Composite skin contact smears*

Two such smears, each 1 sq. cm in size, taken from:

- (i) Face—forehead, brows, cheeks (5 superimposed smears).
- (ii) Upper lip (4 superimposed smears).

*Result of search* (2000 microscopic fields, approximately) of (i) 15 acid-fast organisms found, of which 6 were solid staining rods; of (ii) negative.

(2) *Skin slit scrapes*

R. earlobes 3+, occasional solid rods.  
 L. earlobe 2+, " " "  
 L. earlobe 2+, " " "  
 R. brow 4+, MI 20%.

*Result:* BI 2.7+, MI 5% approximately.

(3) *Nasal mucus smear*

Smear loaded with bacilli and many globi. BI maximum, MI 70%.

*Follow-up note*

When seen again 9 weeks later, after taking 30 mg of DDS per week, a repeat nasal mucus smear was negative.

*Discussion*

A very infectious case by reason of heavily infected nasal secretion, which, however, was soon rendered almost negative by DDS treatment. It is doubtful if the bacilli found in the face composite skin contact smear were shed from the skin—they more likely got there from the nasal secretion.

CASE 11

*Name:* Dhali Ram. Male, aged 30 years. Hospital No. 41529. *History:* Suffered from leprosy for about 3 years. Treated 1 year. Disfiguring nodules removed from right ear and chin. *Diagnosis:* Lepromatous leprosy in nodular stage.

*Investigations*

(1) *Composite skin contact smears*

Four such smears, each 1 sq. cm in size and each containing 10 superimposed smears taken from maximum infiltrated skin areas, thus:

- (i) Forehead and brow. (ii) Both cheeks.
- (iii) Both forearms. (iv) Both thighs.

(2) *Skin slit scrapes*

From 6 sites: forehead, brow, both cheeks, right forearm, and thigh (5 sites shown by cotton wool—see Fig. 11).

*Result:* BI almost maximum, MI zero.

(3) *Nasal mucus smear*

Negative. (N.B.: A year previously when DDS was started, it was highly positive with MI 50% to 60%.)

(4) *Biopsy of skin from chin*

Confirmed bacillary findings, both as regards number and morphology.

*Conclusion*

Not infectious.

CASE 12

*Name:* Um Bahadur. Male, aged 40 years. Hospital No. 49299. *History:* 6 years. Untreated. *Diagnosis:* Advanced lepromatous leprosy with numerous skin ulcers.

*Investigations*

(1) *Composite skin contact smears*

Six such smears, each 1 sq. cm in size, and each containing 10 superimposed smears taken from maximum infiltrated areas of skin as follows: 2 sites on face, 2 sites on back, and one site on each arm. These 6 composite skin contact smears represent 60 sq. cm of maximum infiltrated skin surface.

*Result of search* (6000 microscopic fields, approximately). 112 bacilli found, also one globus arrangement filled with granular acid-fast organisms (from back: 108; from face: 3; from arm: 1).

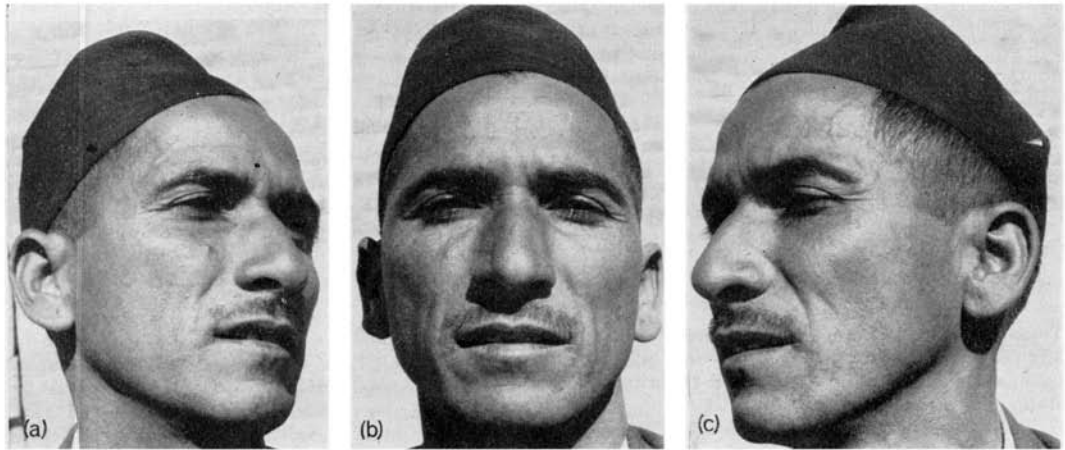


FIG. 9

A study of 3 composite skin contact smears comprising 30 sq. cm of skin surface beneath which lay many bacilli—a fair proportion in solid staining rod form. Non-apparent lepromatous leprosy.



FIG. 10

A study of 2 composite skin contact smears representing 9 sq. cm of maximum infiltration of skin of the face.

- (2) *Skin slit scrapes*  
Five sites: R.E., L. brow, L. cheek, R. forearm, L. back: each smear showed maximum BI and MI 20% to 30%.
- (3) *Nasal mucus smear*  
Loaded with bacilli, many globi—several in almost every field. MI 30% approximately.
- (4) *Smear made from discharge of open sore, L. upp. arm*  
Many bacilli and globi, a considerable proportion of the bacilli are in solid rod form, MI 30%.

#### *Conclusion*

A very infectious case by reason of bacilli being shed from both nasal secretion and discharge of skin sores. This case clearly demonstrates that if bacilli are lying on the skin they will be picked up in a composite skin contact smear.

*Immediate treatment* should be directed (1) at rendering the nasal secretion non-infectious, and (2) by a vigorous course of antibiotics and antiseptic applications to get the skin ulcers healed in order to restore the skin to an intact state.

## DISCUSSION

Taking the first 11 cases together, a surface of 298 sq. cm (or an area little larger than a square with a side 17 cm long) of maximum infiltrated skin was searched for the presence of bacilli. This search consisted in examining 34 composite skin contact smears (34,000 microscopic fields, approximately) and took about 20 hours of microscope work. Now, if it is true to say that "enormous" numbers of bacilli are being discharged from the intact skin of lepromatous patients, then one would certainly have expected to find many more bacilli than were found in the course of this study. In the total area examined only 20 acid-fast organisms were found, as follows:

- Case 3: 2 fairly solid rods—in composite smear from the face.
- Case 8: 3 irregularly stained rods—in composite smear from the back.
- Case 10: 6 solid rods and 9 irregularly stained rods—in composite smear from the face.

How many of these 20 bacilli were discharged from the skin? It is highly probable that the 17 bacilli found in Cases 3 and 10 were not discharged from the skin, but found their way on to the surface of the face from the highly

infected nasal secretion present in both these cases.

An explanation of the 3 rather doubtful acid-fast organisms found in Case 8 is given in the case notes.

## CONCLUSIONS

(1) It appears that the number of *Myco. leprae* discharged from the intact skin of a lepromatous patient, if any, is very small and these few are inactive.

(2) It follows, therefore, that a lepromatous patient with intact skin ceases to be infectious (or to be classed as an "open" case) when the infected *nasal* secretion is rendered negative by treatment.

(3) It can be deduced that so long as the skin of a lepromatous patient is intact, the morphological index of skin slit scrapes remains an index of the activity of the disease, but not of the infectivity of the patient.

The above conclusions have an important bearing on the question:

### IS DOMICILIARY TREATMENT SAFE?

The following considerations will help to provide an answer:

(1) Very few bacilli, if any (and these would probably be inactive), are shed from the intact skin of a lepromatous patient.

(2) Highly infectious nasal secretion can be rendered non-infectious by several months' treatment with DDS. Therefore it is of great importance to make initial and periodical checks of the *mucus* secretion, as *this* is the index of the patient's infectivity.

(3) The members of a patient's household can be protected by taking DDS prophylactically.

## SUMMARY

An attempt to estimate the number of *Myco. leprae* discharged from the intact skin of patients with lepromatous leprosy, ranging from a very early to a more advanced state of the disease, is described. The method used is by

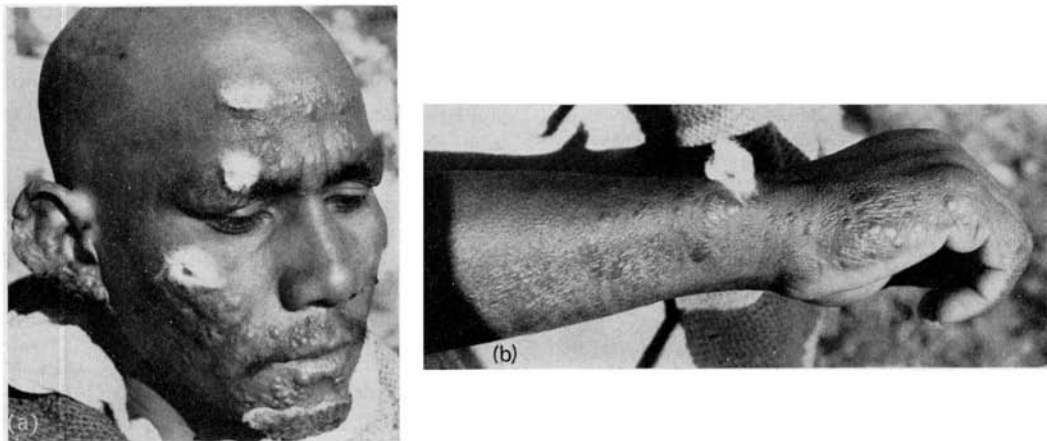


FIG. 11

A study of 4 composite skin contact smears comprising 40 sq. cm of surface of maximum infiltrated skin taken from (a) the face, and (b) the forearms and thighs (similarly infiltrated).



FIG. 12

Untreated lepromatous leprosy with skin ulcerations. A study of 6 composite skin contact smears comprising 60 sq. cm of maximum infiltrated skin surface from (a) face (20 sq. cm); (b) back (20 sq. cm); (c) right forearm (10 sq. cm); and (d) left forearm (10 sq. cm).

taking "composite skin contact smears" from areas of the patient's maximum infiltrated skin. The conclusion is reached that very few bacilli, if any (and these would probably be inactive), are discharged from the intact skin of a lepromatous patient.

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