

THE RESPONSE OF A GROUP OF INDIAN INFANTS AND CHILDREN TO THE SCHICK TEST.

A PRELIMINARY REPORT OF 186 TESTS.*

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I AM reminded, as I tell of such a few cases and with such little experience with the Schick test, of Dr. John B. Deaver, the Philadelphia surgeon, in whose scintillating lectures we, as students used to sit spellbound. Drawing himself up to his full height he would denounce the ignorant inexperienced physician or surgeon, who talks too much, with the modification of the Litany, "Deliver us from the man who has had a case." However, to begin one must begin and so the following experience and observations are recorded, the first it is believed made on Indian children. Fox, McCombie Young, and McDonald made observations in Shillong on European and Anglo-Indian children, all of the school age. They also found that although the children tested had had among them in former years as many as forty cases in one year, there was no tendency for the disease to spread among the Indian children in an epidemic form although at the same time sporadic cases appeared among the Indian children population (Personal communication from Dr. E. C. R. Fox).

In the report of eleven cases of diphtheria in the Central Provinces, Rambo (1928), the question arises again, why was the spread of diphtheria so limited? It was to throw some light on this question that the 186 Schick tests were done. It has been said that only an expert can accurately judge the results of this test. However, after reading J. D. Rolleston's review of the Schick test in the *Medical Annual*, 1928, and realizing that there were so many checks upon the tests and also that even an expert in a European country might have difficulty in judging the reactions on the tropical epidermis, it was determined to go ahead.

The Schick test material was obtained in very convenient form from Arnhold and Company, Bombay, agents for Mulford of Philadelphia. Fifty is the number for which each unit of the material is prepared. The control is found in a packet containing one ampoule and the toxin in another packet together with distilled water sufficient to dilute the toxin, together with complete directions.

In the first group of fifty, two Europeans were included so as to get, if possible, the text-book reaction and prove the potency of the material. In the other three groups of fifty, two other

Europeans were tested. Fortunately all but one of them gave perfectly unmistakable positive reactions, thus assuring us of the efficacy of the material used.

A few adult Indians are included among those tested, partly for the test's sake and partly because, at the time of injecting the test material, there were no more children to be had. As the material must be used quickly, it was thought advisable to use it up directly. The arguments used to get the village mothers to bring their children and infants to receive the tests would make an article in themselves. Suffice it to mention that at one time victory was snatched out of failure, when the chaprasi returned, saying no one would come, by my assistant going into two sections of the village and urging the mothers to come. The fact that forty-five children and infants appeared at the hospital within an hour of his visit proves a fine sense of appreciation on his part of a new scientific test and also his ability as a leader. Not all our tests could be given in the hospital. The last fifty were given in the homes and again my assistant made possible many tests that were allowed only with the greatest difficulty. They, however, became popular before we finished and one mother came after a group was completed asking that the child be tested also.

Throughout, the toxin was injected into the epidermis of the right forearm flexor surface and the control into the epidermis of the left forearm flexor surface. It might be well to explain that the control contains exactly the same substances as the toxin, except that the toxin was detoxicated by heating as mentioned below.

Quoting from Rolleston in the *Medical Annual*, 1928 "Four varieties of the Schick test are described, viz., (1) Negative; (2) Positive; (3) Pseudo, or negative and pseudo; (4) combined, or positive and pseudo.

1. The *Negative* reaction is a complete absence of reaction.

2. In the *Positive* reaction a red flush appears at the site of intracutaneous inoculation of diphtheria toxin within 24 to 48 hours and reaches its maximum in 40 days, when it forms a circumscribed swollen area measuring 1 to 2 cm. in diameter. It then slowly fades in a further 7 to 10 days to a circumscribed brownish tint with desquamation of the epidermis.

3. The *Negative and Pseudo* reaction develops rapidly both on the arm injected with toxin and on the control arm injected with toxin which has been heated to 75°. By the fourth day the reaction has mostly disappeared, but often leaves a reddish or brownish pigmentation with some desquamation.

4. In the *Positive and Pseudo* reaction the pseudo effect develops rapidly on both arms and as it fades the true positive reaction appears on the test arm.

(1) and (3) indicate immunity, and (2) and (4) susceptibility, to diphtheria."

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Reading the tests.

There was among the younger children and infants not the slightest doubt about which test was positive and which negative. But among the children above three there were some cases that did not show the hearty reaction seen without exception in younger patients. This feeble reaction consisted of a single papule 0.3 by 0.4 cm. that appeared only on the arm receiving the toxin. This papule developed within the first twenty-four hours and disappeared leaving not the slightest sign, except that of the needle prick, by the end of 48 or 72 hours. These were called negative. In these occasional cases truly an expert is needed to pronounce proper judgment. Some of the children were not seen on the fourth day so that the reading made on the second or third day was counted final. This introduces probably a small error. Copeman, O'Brien, Eagleton, and Glenny (1922) made tentative readings in 24 hours in 400 cases and found that 5 per cent. proved later to be incorrect.

Concerning the positive reactions it would be well to say that in the darker epidermis this redness is combined with the degree of darkness of the skin tested in each particular case. In only one case was this reaction not present on the second day following the test. This case developed a positive reaction on the third day and continued the usual moving picture to the end of the test. Instead of the reacting area fading after the fourth day, the test becomes more and more evident, taking on a raised blackish purple colour on the fourth and fifth day and becoming almost a black area on a brown or olive skin by the seventh to ninth. From our experience we would say that this reaction is usually so definite, in younger children especially, that in case the examining physician could see the arm tested once only after the test, the examination at the end of the fourth to seventh day would show every case positive. This agrees with the report of the Schick test given in the Medical Research Council's monograph on diphtheria, page 362. In the children above four later signs of the reaction were not so marked and often did not scale typically and did not leave any hyperpigmentation. The hyperpigmentation lasts in many instances for a month, or longer in the marked cases.

Only two *Negative and Pseudo* reactions were seen. In these cases a slight papule 5 cm. in diameter appeared on the fourth day, in both arms exactly the same. The reaction lasted for three days and entirely disappeared simultaneously leaving no pigmentation or trace whatever.

No *Positive and Pseudo* reaction was seen in our series.

The group tested included the entire household of the pastor mentioned above whose daughter had diphtheria. P. S. the pastor, S. B. his wife, V. S. his son of five, and the youngest daughter just 15 days old were all *Negative*. The girl who had had diphtheria in February 1928 as mentioned above was *Positive*.

Statistics.

Schick tested children and infants, including a few adults.

Age group.	Number tested.	Number positive.	Pseudo-reactions.	Per cent. positive.
1-3 months	7	1	0	14
3-6 "	8	0	0	0
6-12 "	12	8	0	66.6
1-3 years ..	45	25	0	62
3-6 " ..	28	3	0	10.7
7-10 " ..	36	5	0	14
11-14 " ..	38	1 plus minus, very slight reaction yet apparently Positive.	1 Negative and Pseudo.	2.6
15-20 " ..	12	0	0	0
Total children and infants.	186			
21-30 years.	4	0	1 Negative and Pseudo.	
31-40 "	1	0	0	
41-50 "	1	0	0	
51-60 "	1	0	0	
Total Indians.	193			
European adults.	4	3	0	
GRAND TOTAL	197			

As this is such a small number of cases, percentages are not to be considered to be accurate, but they are an indication as to the approximate findings that may be expected in a larger survey.

One of the striking things is the small percentage of the children of the groups from the age of four and up who are susceptible. This is the roaming age and it may be because of this fact that there are fewer cases and that when a case does appear it does not spread as it might possibly otherwise do if these older children were more susceptible.

Of the seven-to-ten-year children two in the boarding school, who were found positive, are said to be the most slovenly and ill kept of the entire boarding school.

For the apparently high immunity of the infants under 6 months, I have no explanation except that perhaps the average Indian mother may be endowed with a high anti-toxin creating power which she transfers to her infant through her milk. After six months the infant has an opportunity to get other food and after nine months *dal* and rice even are given by mothers, especially those who do not have enough milk for their offspring.

The statistics on the frequency of the Schick reaction among the populations of different countries furnish results essentially different. The marked increase during the period from the second year of life to the beginning of school, as brought out by the American statistics, is entirely lacking in the German statistics.

In the statistics presented for India there is a very marked decrease of susceptibility before the sixth month and after the third year. In making comparisons the fact is again evident that insufficient statistics are at hand to make comparison with the statistics taken from the multitude of cases recorded in Germany and in America. It is hoped that others may make and report observations of Schick tests until sufficient statistics are available. Unfortunately there were no statistics of other nations at hand in the station to present for further comparisons.

Age group.	American Statistics.	German Statistics.	Our Statistics.
1-3 months ..	15%	21.5%	14%
3-6 " ..	30%	44%	(Insufficient data) 0%
6-12 " ..	56-91%	42%	66.6%
1-3 years ..	83%	43.4%	62%
4-6 " ..	53%	45%	10.7%
7-10 " ..	36%	41%	14%
11-14 " ..	22%	29%	0%

It might be interesting to quote from the results among European and Anglo-Indian children obtained by Fox, McDonald, and McCombie Young in Shillong.

Showing the number of positive Schick reactions and pseudo-reactions according to age.

Age.	Number tested.	Number positive.	Percentage positive.	Number of pseudo-reactions.
1-5 years	11	6	54.5	0
5-10 years	97	50	51.5	3
10-15 years	137	57	41.5	5
Over 20 years	6	4	66.6	2
TOTAL ..	271	125	46.1	12

Conclusion.

To-day, September 4th, the author has lost a case of diphtheria, an Indian child. ("The smears show a few diphtheria bacilli" is the report returned by Major G. Shanks, of the Department of Pathology and Bacteriology, Medical College, Calcutta, thus confirming the diagnosis). In spite of the fact that he has been concentrating on the Schick test and diphtheria for the last two months this case was enough to trip him and the anti-toxin was not given in time to stay off a cardiac paralysis. This goes to show that the results of such an investigation as above presented may not be untimely, warning us all

again that there is a very large group of little children and infants around us that are susceptible to this serious and often terrible disease. It also indicates that in looking for diagnoses, the throat should be one of the places routinely examined and when in doubt anti-toxin should be given.

This report seems to indicate that in efforts for prophylaxis the children belong to the group from six months to four years should receive the prophylaxis treatment first. There is no question that this susceptible group should be Schick tested and those with positive reactions should have toxin, anti-toxin or the toxoid as a permanent protection. Before making any deductions about the older "school age" children more statistics are required, and the writer would urge all those in charge of schools to do the Schick test and give their results together with their experiences with diphtheria so that some intelligent conclusion may be drawn to guide us with this problem. There are many unknown factors in this matter that need further investigation. Why is not diphtheria more common? There is probably much more diphtheria around than we notice.

BIBLIOGRAPHY.

Fox, E. C. R., McDonald, E. J. C., and McCombie Young, T. C. (1923). The Schick Test and Immunization by Toxin—Anti-toxin in Assam. *Indian Med. Gaz.*, September, p. 419.
 Rambo, V. C. (1928). Diphtheria an Ever-Present Danger in India: A Report on a Series of Cases in Bilaspur District. Central Provinces, India. *Indian Med. Gaz.*, October, p. 575.
 Copeman, S. M., O'Brien, R. A., Eagleton, A. J. and Glenn, A. T. (1928). Experiences with the Schick test and Active Immunization Against Diphtheria. *Brit. Journ. Exp. Path.*, p. 342.
 (Quoted from the Medical Research Council's Monograph on Diphtheria.)
 Berlin letter to the *Journ. Amer. Med. Assoc.*, 18th Feb., 1928, Vol. 90.

A Mirror of Hospital Practice.

A CASE OF POST-KALA-AZAR DERMAL LEISHMANIASIS.

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A CASE of dermal leishmaniasis after a cure for kala-azar has been effected, is a rare condition; still rarer in Assam. In my experience extending over a period of four years as a Sub-Assistant Surgeon on kala-azar duty in the most heavily infected areas of Nowgong (Assam) district, which is admittedly a renowned epidemic area for kala-azar, and where treatment and survey are both constant and intensive, I have come across only this one case:—

C. R., aged 12 years, Hindu, male, from Nowgong (Assam).

Chief complaint:—

(1) Brownish discoloration of the skin in patches of 1 inch diameter over the entire