

## A Survey of Leprous Deformities in the Ryukyu Islands<sup>1</sup>

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A survey of leprous deformities was made of the patients hospitalized in the two leprosaria of the Ryukyu Islands at the request and with the cooperation of the U.S. Civil Administration through the Department of Public Health and Welfare. The examinations were performed during the period 5-25 June 1967. They were made in order to ascertain the nature, prevalence and problems of leprous deformity. This study constitutes a continuation of the evaluation of the leprosy problem in the Ryukyu Islands by Brubaker and McCullough (<sup>2</sup>).

### GEOGRAPHY OF THE RYUKYU ISLANDS

The Ryukyu archipelago is one of three groups of islands, including the Kuriles and Japan, which extend from the Kamchatka Peninsula in a southwesterly direction to Taiwan (Formosa). They are the lowermost group that divide the East China Sea from the Pacific Ocean. Only 47 of the total of 73 islands are inhabited. The population in 1965 was 934,000 (<sup>3</sup>).

The Ryukyu Islands are divided into three groups—the Okinawa, Miyako, and Yaeyama Gunto. Okinawa is the largest and most important of the islands, possessing about 81 per cent of the population. It is probably the most densely populated area in the world, excluding such metropolitan areas as Hong Kong. It is estimated that there is an average of 1,492 persons per square mile on Okinawa Gunto and 1,671 persons per square mile on the island of Okinawa. Table 1 gives a comparison with other countries.

### HISTORY OF THE ISLANDS

Very little is known about the people of the Ryukyu Islands prior to the 14th century. Their origin is attributed mainly to invaders and settlers coming from northern areas, including the Asian mainland, Korea, and Japan. Predominant physical characteristics particularly suggest descent from the Ainu of Hokkaido. Migration from the southern areas, the Philippines, and Taiwan is also advanced in pointing out similarities to the people of Indo-China, Indonesia, Melanesia, and Polynesia.

The history of Okinawa is characterized by cultural contact with the two great civilizations of the Far East; viz., China and Japan. Chinese influence was predominant during a period of 500 years from the 14th to the 19th century. The Chinese government showed a benevolent interest in the welfare of the islanders, never attempting to bring them under its rule. In 1879 Japan declared its sovereignty over the islands. The Japanese reign was ended in 1945 with the invasion of the U.S. Military Forces. The Ryukyu Islands are now administered by the U.S. Government under the provisions of Article 3 of the Treaty of Peace with Japan.

### THE LEPROSARIA

There are two leprosaria in the Ryukyu Islands. Airaku-en Hospital is located on Yagaji Island, which is connected to the mainland of Okinawa by a permanent causeway. It is approximately 37 miles northeast of Naha, the principal city and port. It has a capacity of 960 beds, with a census of 738 patients as of June 1967.

Nansei-en Hospital is located on the outskirts of Hirara City, the principal city of port of Miyako Island. The bed capacity of the hospital is 274, with a census of 258 patients.

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TABLE 1. *Population densities of selected countries, 1964.*

Country	No. persons per square mile
Okinawa	1,492
Taiwan	869
Japan	679
India	402
Philippines	270
U.S.A.	33

The first facilities for leprosy patients were provided in 1937 by the Mission to Lepers (now The Leprosy Mission) organized by the pastors of Okinawan Churches. The buildings of both leprosaria were destroyed during World War II, but are now completely rebuilt.

#### SURVEY OF THE PATIENTS

There were 996 patients in the two leprosaria, of whom 923 were examined in this study. The remaining 73 patients were not examined because of patient embarrassment or absence from the hospital. Table 2 illustrates the relationship of the examined patients to the institution, clinical type of leprosy, and sex.

An analysis of Table 2 reveals that of the 923 patients examined, the ratio of males to females was 1.5 to 1 (549 males and 374 females). The prevalence rates among the clinical types of leprosy were lepromatous

57 per cent, tuberculoid 40.5 per cent, and dimorphous (borderline) 2.3 per cent.

Table 3 correlates the duration of the disease with the year when it was recognized. It indicates that in the span of a 70-year period from 1897 to 1967, 347 cases (37.5 per cent) traced the origin of their illness to the 8-year period between 1937 and 1945. Incidentally, this is the period when Japan was involved in World War II, first with China, and later the United States.

#### PREVALENCE OF DEFORMITY

It is acknowledged by leprologists that, apart from the medical aspects of leprosy, deformity is a problem deserving specific attention. A study of the nature and prevalence of deformity was made of the 923 inpatients who were examined. There were 722 patients (83.6 per cent) with deformity and 151 (16.3 per cent) without deformity. Table 4 classifies patients without deformity by institution, clinical type of leprosy, and sex.

An analysis of Table 4 reveals that 151 patients (16.3 per cent) of the total number examined were without deformity, consisting of 94 males (62.2 per cent) and 57 females (37.8 per cent).

The table shows that among the patients without deformity 107 were lepromatous patients (20 per cent of all lepromatous patients); 25 were tuberculoid (7 per cent of all tuberculoid patients; and 19 dimorphous (borderline) (86.3 per cent of all dimorphous patients).

TABLE 2. *Classification of examined patients.*

Type of leprosy	Sex	Institution		Total
		Airaku-en	Nansei-en	
Lepromatous	M	234	100	334
	F	124	69	193
Tuberculoid	M	154	43	197
	F	152	25	177
Dimorphous (borderline)	M	18	0	18
	F	4	0	4
Total		686	237	923

TABLE 3. Duration of disease as related to clinical types of leprosy.

Duration (yrs.)	Corresp. years	Institutions					Total
		Airaku-en			Nansei-en		
		L	T	D	L	T	
Less 1	1966-67	9	0	3	0	0	12
1-5	61-66	42	4	15	14	7	82
6-10	56-61	25	7	4	17	2	55
11-15	51-56	19	11	—	10	6	46
16-20	46-51	39	20	—	23	10	92
21-25	41-46	68	47	—	29	9	153
26-30	36-41	87	74	—	27	6	194
31-35	31-36	37	46	—	20	8	111
36-40	26-31	19	33	—	14	8	74
41-45	21-26	8	27	—	10	9	54
46-50	16-21	2	17	—	3	3	25
51-55	11-16	1	10	—	0	0	11
56-60	06-11	1	7	—	2	0	10
61-65	01-06	1	1	—	0	0	2
66-70	1897-01	0	2	—	0	0	2

TABLE 4. Patients without deformity by type of leprosy and sex.

Type of leprosy	Institution			
	Airaku-en		Nansei-en	
	Male	Female	Male	Female
Lepromatous	51	26	16	14
Tuberculoid	8	9	4	4
Dimorphous (borderline)	15	4	0	0
Total	74	39	20	18

Table 5 classifies patients with deformity by institution, clinical type of leprosy, and sex. An analysis of Table 5 reveals that there were 772 patients with deformity, consisting of 455 males (58.9 per cent) and 317 females (41.1 per cent).

The clinical forms of leprosy among the patients with deformity were as follows: 420 lepromatous (79.6 per cent of all lepromatous patients); 349 tuberculoid (93 per cent of all tuberculoid patients); and 3

dimorphous (13.6 per cent of all dimorphous patients).

A simple classification of leprosy deformities was used as a guide for the survey. It is based upon deformities only, as distinguished from disability. Although the words "deformity" and "disability" are generally used interchangeably, they are not synonymous. Disability signifies impairment of function; deformity is usually disabling but may not be. On the other hand,

TABLE 5. *Patients with deformity by type of leprosy and sex.*

Type of leprosy	Institution			
	Airaku-en		Nansei-en	
	Male	Female	Male	Female
Lepromatous	183	98	84	55
Tuberculoid	146	143	39	21
Dimorphous (borderline)	3	0	0	0
Total	332	241	123	76

impaired function manifested by loss of sensation is a common feature, which is disabling in varying degree, depending upon its extent and the site of involvement; however, it is not deformity *per se*. The classification in Table 6 includes the common deformities of leprosy. Since leprosy deformities have a predilection for the face, hand, and foot, the classification embodies these areas.

Certain features are predominant in relation to the prevalence of deformity:

(a) The largest number of patients with deformities, as related to the clinical forms of leprosy, was 349 cases, or 93 per cent. This occurred in the tuberculoid group of patients.

(b) The prevalence of deformity was relatively high in the lepromatous group also, occurring in 420 patients, or 79.6 per cent.

(c) The lowest prevalence of deformity affected three patients; i.e., 13.6 per cent of the dimorphous group.

(d) The ratio of deformity among males and females was essentially the same as the ratio of males to females in the leprosy population.

#### NUMBER OF PATIENTS DEFORMED IN RELATION TO AGE GROUPS

Table 7 shows the prevalence of deformities by age groups. It reveals noteworthy information related to age groups of patients with deformity.

(a) No deformity was encountered in the group 5 years of age or younger.

TABLE 6. *Classification of leprosy deformities.*

Face	
1. Megalobule	4. Sagging facial skin
2. Loss of eyebrows	5. Lagophthalmos
3. Nasal deformity	6. Facial paralysis
Hand	
1. Partial clawing, due to ulnar palsy.	
2. Complete clawing, with intrinsic-minus thumb, due to ulnar and median nerve paralysis (a useful thumb may exist as a result of partial involvement of the median nerve).	
3. Combined paralysis of the radial, ulnar, and median nerves, producing a total intrinsic-minus hand with the addition of wrist drop.	
Foot	
1. Clawed toes, due to paralysis of the intrinsic muscles of the foot, which are innervated by the posterior tibial nerve.	
2. Drop foot, due to paralysis of the dorsiflexors and evertors of the foot, which are innervated by the common peroneal (lateral popliteal) nerve.	
a. Complete foot drop, produced by involvement of both functional components, resulting in the combined loss of dorsiflexion and eversion.	
b. Partial foot drop manifested by involvement of only one component function, resulting in loss of either dorsiflexion or eversion.	

TABLE 7. Number of deformed patients in relation to age groups.

Age group (yrs.)	Institution		Total
	Airaku-en	Nansei-en	
0-5	0	0	0
6-10	1	1	2
11-20	2	4	6
21-30	18	7	25
31-40	89	39	128
41-50	179	61	240
51-60	162	52	214
61-70	72	22	94
71-80	39	12	51
81-90	11	1	12
Total	573	199	772

(b) Only two deformities were noted in the 6-10 age group. The number of patients within the age groups up to age 10 was five, or 0.5 per cent of the total number of patients. The prevalence of only two deformities in this group is estimated to be 0.2 per cent.

(c) The greatest number of deformities occurred in the 41-50 age group, with slightly less prevalence in the 51-60 age group.

#### DEFORMITIES AS RELATED TO AREAS OF THE BODY

Table 8 classifies deformities in relation to areas of the body that are commonly affected; viz., the face, hands, and feet.

TABLE 8. Deformities as related to commonly affected areas of body.

Area	Lepromatous		Tuberculoid		Dimorphous		Total
	Airaku-en	Nansei-en	Airaku-en	Nansei-en	Airaku-en	Nansei-en	
A. Face	31	18	1	1	1	0	52
B. Hand	19	10	22	5	1	0	57
C. Foot	7	7	14	7	0	0	35
A. & B.	11	12	5	1	0	0	37
B. & C.	36	32	146	25	0	0	239
A. & C.	16	8	3	1	0	0	28
A. B. & C.	153	50	102	11	0	0	326
Total	381	137	293	61	2	0	774

(a) The hand was the most frequent single involved area.

(b) In considering involvement of single and multiple areas, the hand and foot were almost equally affected and exceeded the prevalence of facial deformities by approximately 35 per cent.

(c) Facial deformities were more prevalent among lepromatous than tuberculoid patients by a ratio of 3 to 2.

(d) There was an almost equal distribution of deformities of the hand and foot in the lepromatous and tuberculoid patients.

(e) The greatest number of deformities occurred with involvement of multiple areas (A, B, and C), in which group there are 326 patients, or 42.1 per cent of deformed patients.

#### MULTIPLE DEFORMITIES

Deformities were numerous, and many patients suffered from multiple deformities. These findings correspond to surveys reported by Antia (<sup>1</sup>). Table 9 illustrates the relationship of the number of deformities to the number of affected patients.

(a) There were 772 patients with deformity. The deformities among them ranged from one to 12 per patient.

(b) A total of 3,462 deformities was determined among all the patients.

(c) The average number of deformities per patient with deformity was 3.75.

#### FACIAL DEFORMITIES

Table 10 shows the prevalence of facial deformities and compares their numbers.



TABLE 9. Number of deformities per patient with deformity.

No. deformities	Total No. patients	Number patients		Total No. deformities
		Airaku-en	Nansei-en	
	69	39	30	69
2	85	62	23	170
3	112	85	27	336
4	145	104	41	580
5	119	95	24	595
6	93	75	18	558
7	83	67	16	581
8	41	29	12	328
9	12	9	3	108
10	7	5	2	70
11	5	2	3	55
12	1	1	0	12
Total	772	573	199	3,462

(a) Lagophthalmos was the most common facial deformity encountered in this series. It occurred in 209 cases, or 47 per cent of all patients with facial deformity. Lagophthalmos is due to involvement of the zygomatic branch of the facial nerve; this branch innervates the orbicularis oculi muscle, which has the function of opening and closing the eyelids. Of the 209 cases in which it occurred, 106 were bilateral, 62 affected the left eyelids only, and 41 the right eyelid. In the cited instances lagophthalmos occurred alone. It was noted also as a manifestation of complete facial paralysis, being present bilaterally in five cases, affecting the left face only in 32 cases, and the right side of the face in 36 cases. Lagophthalmos is considered a serious complication. Because of inability to close the eyelids, the insensitive cornea is prone to injury from foreign bodies and the drying effect of winds. As a result of repeated cycles of trauma and infection followed by scarring, blindness is produced.

It is interesting to note, in comparison with the prevalence of 209 patients with lagophthalmos, that only 62 of all the patients were blind. Whereas lagophthalmos was a common complication of tuberculoid leprosy, blindness occurred more frequently in patients with lepromatous disease. There were twice as many blind patients

among the inactive lepromatous cases as among the tuberculoid cases. Also, whereas 16 patients with active lepromatous leprosy were blind, blindness was not encountered in patients with active tuberculoid leprosy. It was apparent that the majority of cases of blindness were not related to lagophthalmos. The morbidity of lagophthalmos in this series was not great. Although it was responsible for blindness in some cases, it was primarily a problem of cosmetics.

(b) Loss of eyebrows was the second most prevalent facial deformity. It occurred in 187 cases, an estimated prevalence of 20.7 per cent of all facial deformities. Involvement was always bilateral. Total loss occurred in 109 patients. Although it is a common finding, it is a late manifestation of lepromatous leprosy. It is manifested in the early stages by loss of the lateral portions, which was encountered in 78 patients. Forty-one of these patients had been subjected to operation. Replacement was accomplished by transplantation of single hair follicles. The postoperative appearance was satisfactory and acceptable to all patients. Unfortunately the stigma of superciliary alopecia is misinterpreted by the public as an indication of leprosy. Should a patient be ostracized from society because of absent eyebrows, the request for replacement in such instances is made primarily

TABLE 10. Number of common facial deformities.

Type of deformity	Number of cases		Total cases	Per cent
	Airaku-en	Nansei-en		
1. Megalolobule	108	40	148	16.4
2. Eyebrow				
Lateral loss	63	15	78	8.6
Total loss <sup>a</sup>	91	18	109	12.1
3. Nose	102	35	137	15.2
4. Sagging facial skin				
Periorbital	105	40	145	16.1
Nasal-labial <sup>b</sup>	87	30	117	13.0
5. Lagophthalmos				
Right	29	12	41	4.5
Left	52	10	62	6.8
Bilateral	82	24	106	11.7
6. Facial paralysis				
Right	29	7	36	4.0
Left	27	5	32	3.5
Bilateral	5	0	5	.5
7. Alopecia	1	0	1	8.0
Total	694	206	900	99.5

<sup>a</sup> Includes both operated and nonoperated cases.<sup>b</sup> Included in the periorbital cases.

for social rather than cosmetic reasons.

(c) Megalolobule, sagging facial skin, and nasal collapse occurred in that order of frequency respectively. The deformity affecting the ear lobes is generally considered to be the most common facial deformity. In this series it had the third highest prevalence. Although the deformity was apparent, the majority of patients were not particularly concerned about it. It is correctable by a simple plastic surgical procedure; however, this operation had not been performed.

(d) Sagging facial skin did not pose any problem. It is recognized as a manifestation affecting the elderly nonleprous person also, and therefore does not carry the stigma borne by patients with loss of eyebrows or nasal collapse. All patients with involvement of facial skin had periorbital redundant skin, but of the total number of 145 patients only 117 had accompanying wrinkling of the nasal labial area.

(e) Nasal deformity is noticeable and distressing to the patients. It is the factor contributing most to ostracism of the in-

dividual by society. There were 137 cases, or 15.2% of nasal deformities in this series of facial deformities. Fifteen patients had been subjected to operation with the use of a bone graft. Cosmetically, the results were satisfactory. Without exception, however, in the case of each graft union failed at its base. This feature did not appear to detract from the patient's appearance. It was felt, therefore, that reoperation was not indicated solely on that basis.

Total facial paralysis occurred infrequently; and alopecia of the scalp, seen in only one patient, was considered rare.

#### DEFORMITIES OF THE EXTREMITIES

The following features were noted in relation to the extremities. There were 659 deformities of the hand and 628 deformities of the foot in the group of 774 patients with deformity.

**The hand.** Deformities of the hand were of different types. Although the underlying cause of clawing is paralysis of the intrinsic muscles, the deformities were not always

similarly manifested. The basic primary deformities of the upper extremities were as follows:

(a) Ulnar clawing was present in 114 patients, occurring bilaterally in 23 cases, affecting the right hand only in 50 and the left hand only in 41 patients.

(b) Deformities due to combined ulnar and median nerve palsy were the most frequent of all types of deformity affecting both the upper and lower extremities. They occurred in 557 patients, 416 cases being bilateral, 58 affecting the right hand only, and 88 the left hand only. This type of deformity was highly variable, because of association with complications, particularly absorption. Generally all fingers were clawed. Some fingers retained flexible interphalangeal joints, but in the case of other deformities the interphalangeal joints were semirigid to rigid.

In cases where there was total involvement of the median nerve, the thumb was useless as a result of total loss of its intrinsic muscle action. With incomplete involvement of the median nerve, on the other hand, the actions of the thumb were weakened, but the digit remained useful. Although it may be said that median palsy was always accompanied by ulnar palsy, there were four cases in which the deformity due to median palsy was predominant, without clawing affecting the ring and little fingers. Evidence of ulnar involvement was manifested, instead, in these patients by atrophy of the intrinsic muscles of the hypothenar eminence. The nature of the deformity was influenced also by the occurrence of absorption. Fingers with absorption of less than two-thirds of their lengths retained sufficient length to manifest clawing. With absorption of more than two-thirds of the length, however, the reattachment of the flexor digitorum tendons to the proximal phalanges caused them to assume the function of flexing the metacarpophalangeal joints, which in effect provides a substitution for the lost function of the intrinsic lumbrical muscles. Thus, proximal phalangeal stumps of the hand in combined ulnar and median nerve paralysis were not observed to be clawed. However, the thumb remained totally useless with regard to its intrinsic action.

(c) There were nine patients in whom the three peripheral nerves innervating the hand; viz., the ulnar, medial, and radial, were paralyzed. Triple paralysis occurred bilaterally in three patients, also affecting the right hand only in three patients, and the left hand in three other patients. In every instance where triple paralysis affected either hand, the opposite member was deformed as a result of combined ulnar and median nerve palsy.

**The foot.** The primary deformities of the lower extremity were clawed toes and drop foot. The most prevalent was clawed toes, which were encountered in 497 patients, occurring bilaterally in 282, and affecting the right foot only in 103 and the left foot in 112. Claw-toe deformity presented various patterns, manifested in varying degree by involvement of different toes. Very seldom were all digits of the same foot affected to the same extent. Clawing may be more developed, affecting either the great or small toe and involving adjacent toes in progressively lesser extent. Less frequent was clawing affecting only a single toe; the great or little toe appeared to be most frequently affected, but the 2nd, 3rd, or 4th toe was occasionally noted to be separately clawed.

The extent of deformity also varied. First degree clawed toes were common, with evidence of trauma to the toe tips, seen frequently in patients who wore getas (wooden sandals). The geta possesses a wooden sole supported by two wooden bars, one placed under the heel and the other under the forefoot. It provides a rigid sole and functions as a rocker mechanism. With this type of sandal a greater thrust is applied to the toe tips, with toe rise that increases the morbidity of this deformity. Second degree clawed toes tend to be overlooked because of the absence of complications. The toe tips are raised higher than in the first degree, and therefore escape trauma. Although the dorsa of the interphalangeal joints are subject to trauma during this stage, trauma was not encountered, since it usually resulted from pressure by wearing leather shoes and these patients generally did not wear shoes. Significant was the role of flexible



joints affecting the toes. Flexible joints permitted movement that prevented the development of injuries. Whereas semirigid and rigid toes were associated with various complications, the association of plantar ulceration with third degree clawed deformity in which there was a subluxation of the metatarsophalangeal joint was frequently encountered, and was noted overlying the sites of all metatarsal heads. In far advanced clawed toe deformities metatarsophalangeal joints were absorbed and the digits flail and functionless.

Drop foot was observed in 268 patients, occurring bilaterally in 73, and affecting the right foot only in 98 and the left foot in 97. In 27 patients there was partial paralysis of the foot, affecting dorsiflexion in three cases, and eversion in 24 cases; weakness affecting dorsiflexion alone was readily recognized by the dropped position of the foot. However, impairment of eversion of the foot was concealed and became apparent only during routine examination.

These figures reflect the prevalence of the two deformities of the foot as evident on examination. However, it is felt, on the basis of amputation noted of all toes in many instances, and in 66 cases of below-knee amputation, that the prevalence of both deformities probably has been slightly greater in the past.

### DISCUSSION

Deformities among leprous Ryukyu Islanders were noted to be numerous, with multiple lesions affecting a large number of patients. They reflect late manifestations of leprosy, occurring in the majority of patients with inactive disease. This survey revealed that these patients had not sought early treatment, but instead had sought late refuge.

Although the number of deformities is large, it does not correlate with the extent of problems due to disease. Many of the late deformities were beyond need for surgical reconstruction. Their main problem was the preservation of remaining parts, which is accomplished by instituting preventive measures.

In other instances, when reconstructive surgery is performed, the results would not

be entirely satisfactory. This is due to the morbidity of late deformities, which is increased by the presence of multiple and secondary complications such as digital absorption and contractures. Another disadvantage is the fixed-habit pattern, especially of the hand, which had developed over a period of many years. It is difficult to overcome the habit in spite of successful surgery and intensive instructions for reeducation of tendon transfer procedures.

Although extremities ideal for reconstructive surgery were not common, much can be done to improve the functions of either the hand or the foot. A return of the function of opposition to the thumb with total intrinsic loss enables the patient to use the hand for basic functions. Also, the correction of deformed feet to provide an even distribution of weight bearing on the sole is fundamental in preventing foot problems. For the deformities in which function of the remaining part cannot be salvaged, amputation is performed.

It is recognized that a number of patients are institutionalized and have no plans to leave the leprosaria. They have become psychologically and socially adjusted, living in a community with other patients who have similar deformities. It may be said that they are psychosocially rehabilitated to their new environment.

Various features of deformity as encountered in this survey support the concept proposed by Marshall *et al.* (<sup>4</sup>) that "deformity is leprosy." This concept must be changed. The majority of deformities occurring in patients with leprosy can be prevented, and many deformities that are developed can be corrected. The two main avenues of approach are through prevention and surgical rehabilitation. Preventive measures are most effective when instituted early in the course of the disease, whereas reconstructive surgery is most effectively applied for patients who possess mobile joints and normal lengths of their digits.

The vicious cycle of misinformation regarding leprosy and its stigma of deformity must be interrupted. This may be accomplished to a large extent by integration of

the care of patients with leprosy in the general hospitals. This would hasten the understanding of the disease and realization that leprosy is not dissimilar to other infectious diseases.

### SUMMARY

This study was made to ascertain the nature and extent of the problems of deformity among the patients with leprosy hospitalized at the Airaku-en and Nansei-en leprosaria in the Ryukyu Islands. It is a continuation of the work evaluating the prevalence of the disease in the Ryukyu Islanders by Brubaker and McCullough.

Little is known about the history of the Ryukyu (or Loochoo) Islands and their people, except that their culture was predominantly influenced by the Chinese during the 14th to the 19th centuries and by the Japanese during the 19th and 20th centuries.

The first known efforts to cope with the problem of leprosy in these islands were made during 1937 by The Mission to Lepers, which organization was composed of the pastors of the Okinawan churches. The original leprosaria were destroyed during World War II, but modern facilities have been built to replace them.

It is of interest that the population density in Okinawa is probably the greatest in the world, and that the prevalence of leprosy is high.

The prevalence of leprosy deformities was also found to be high, with multiple deformities affecting a large number of patients. A simple classification of leprosy deformities was used as a basis for compiling the data. The number and types of deformity were studied in relation to age, sex, clinical types of leprosy, and the commonly affected areas of the body, viz., the face, hands and feet.

The survey indicates that deformity has been neglected and that by virtue of its prevalence and advanced development, support is given to the misconception that "deformity is leprosy."

An active program of surgical rehabilitation and prevention of leprosy deformities is needed for the Ryukyu Islands. Only

when these measures are instituted as part of an overall program for leprosy control will the attitude of the people be influenced to accept leprosy as another infectious disease requiring treatment for both disease activity and deformity.

### RESUMEN

Este estudio fué hecho para determinar la naturaleza y extensión del problema de la deformidad entre pacientes con lepra hospitalizados en los leprosarios de Airaku-en y Nansei-en en las Ryukyu Islands. Es una continuación del trabajo para evaluar la prevalencia de la enfermedad en los Isleños de Ryukyu realizado por Brubaker y McCullough.

Poco se conoce acerca de la historia de las Ryukyu Islands o de su pueblo, excepto que su cultura fué predominantemente influenciada por los Chinos durante los siglos 14 al 19 y por los Japoneses durante los siglos 19 y 20.

Los primeros esfuerzos conocidos para afrontar el problema de la lepra en esas islas fueron hechos durante el año 1937 por The Mission to Lepers, cuya organización estaba compuesta de los pastores de las iglesias de Okinawa. Los leprosarios originales fueron destruidos durante la 2ª Guerra Mundial, pero se han construido facilidades modernas para reemplazarlos.

Es de interés que la densidad de población en Okinawa es probablemente la mayor del mundo, y que la prevalencia de la lepra es alta.

La prevalencia de deformidades de la lepra se encontró también ser muy alta, con las múltiples deformidades afectando un largo número de pacientes. Una clasificación simple de deformidades de la lepra se usó como base para reunir la información. El número y tipo de las deformidades fueron estudiadas en relación a la edad, sexo, tipos clínicos de lepra y las áreas del cuerpo comunmente afectadas, v. gr: cara, manos y pies.

El estudio indica que no se habían prestado atención a las deformidades que en virtud de su prevalencia y desarrollo avanzado, se da apoyo al concepto errado que "deformidad es lepra."

Un activo programa de rehabilitación quirúrgica y prevención de las deformidades de lepra es necesario para las Ryukyu Islands. Solamente cuando estas medidas se establecen como parte de un programa general para el control de la lepra la actitud de las personas será influenciada de modo que acepten la lepra como otra enfermedad infecciosa que requiere tratamiento tanto para la enfermedad como para las deformidades.

## RÉSUMÉ

Cette étude a été menée pour évaluer la nature et l'étendue du problème des mutilations parmi les malades atteints de lèpre et hospitalisés aux léproseries de Airaku-en et de Nansei-en, dans les Iles Ryukyus. Elle constitue la poursuite du travail entamé par Brubaker et McCullough pour évaluer la prévalence de la maladie chez les autochtones des Iles Ryukyus.

On connaît fort peu l'histoire des Iles Ryukyus (ou Loochoo) et de leurs habitants, si ce n'est que la culture a été influencée de manière prédominante par les chinois du 14<sup>ème</sup> au 19<sup>ème</sup> siècle et par les japonais au cours des 19<sup>ème</sup> et 20<sup>ème</sup> siècles.

Les premiers efforts connus pour s'attaquer au problème de la lèpre dans ces îles date de 1937, et sont dus à la Mission to Lepers, organisation qui était constituée de pasteurs des églises d'Okinawa. Les léproseries du début furent détruites au cours de la seconde guerre mondiale, mais des installations modernes ont été construites pour les remplacer.

Il est intéressant de signaler que la densité de la population à Okinawa est probablement la plus forte du monde, et que la prévalence de la lèpre y est élevée.

On a également observé que la prévalence des mutilations lépreuses était élevée, et qu'un grand nombre de malades souffraient de mutilations multiples. Une classification simple des mutilations lépreuses a été utilisée pour analyser les données. Le nombre, ainsi que les types, de mutilations ont été étudiés en fonction de l'âge, du sexe, du type clinique de la lèpre,

et des régions du corps communément atteintes, c'est à dire le visage, les mains et les pieds.

Cette enquête montre que le problème des mutilations a été négligé, et qu'en raison de la prévalence de la maladie et de son degré d'avancement, la conception erronée selon laquelle la lèpre est assimilée aux mutilations en est renforcée.

Un programme actif de réhabilitation chirurgicale et de prévention des mutilations lépreuses est requis pour les Iles Ryukyus. Ce n'est que lorsque de telles mesures auront été instituées, dans le cadre d'un programme global de lutte anti-lépreuse, que l'attitude de la population pourra être influencée de manière à lui faire accepter la lèpre comme une maladie infectieuse parmi d'autres qui requiert un traitement à la fois pour la maladie et pour les mutilations.

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