

NOTES ON FOOT DISORDERS AMONG NATIVES OF
THE BELGIAN CONGO

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One of the objectives of the recent African expedition undertaken by Columbia University and the American Museum of Natural History, New York, was a study of the feet of the native African. Such observations were desired for comparison with the feet of shoe-wearing city dwellers, because, owing to advancing changes in habits of primitive peoples, opportunities for study of the natural unshod foot will be increasingly difficult to obtain. The African continent is rapidly becoming industrialized, especially along the coast and well up the larger rivers such as the Congo. With the steadily progressive advent of American and European commercial enterprise, the habits and modes of civilization have affected native life. This is conspicuously the case in the adoption of the white man's wearing apparel. At present, shoes and other articles of white man's clothing are worn mainly as a matter of pride which the native feels in his possession of them, and the sense of superiority it affords him over his fellows. About seaports and larger towns, the native use of clothing follows somewhat more conventional lines; but in outlying districts where contact with the whites has been more recent and infrequent, very strange and incongruous effects are often met with.

When a native is fortunate enough to acquire a pair of shoes, he wears them, not from a standpoint of protection or utility, but purely to satisfy a very general and primitive emotion of personal vanity. The proper fitting, or even proper pairing, of shoes plays no necessary part in their use. One rarely sees a shod negro laborer or house-boy whose shoes fit his feet. Indeed, the majority of shoes worn by natives have been either given by, or otherwise acquired from, their white employers. These remarks do not apply to that class of negroes who have been for a long period in contact with the whites, and have attained responsible clerical and commercial positions, as particularly observed in the west coast towns.

In outlying districts, however, such as the areas of the eastern plateau, footwear is an extreme rarity, and may be regarded as practically unknown; here, never having as yet worn shoes at any time in their lives, the natives afford excellent opportunity to study the human foot under purely natural conditions and unmarred by the use of shoes.

In fact, from the standpoint of protection, it might be said that some adequate type of foot covering would really be advantageous to the natives in order to reduce hookworm infection, chigger infestation, and injuries to the toes and foot.

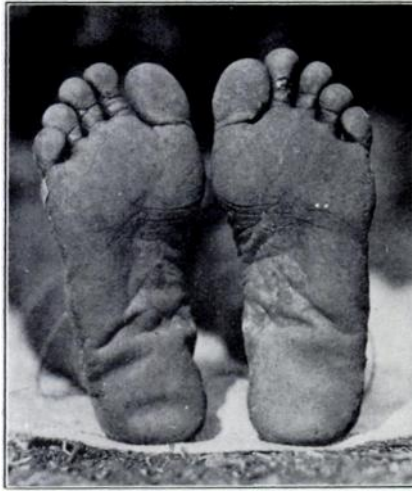


FIG. 1

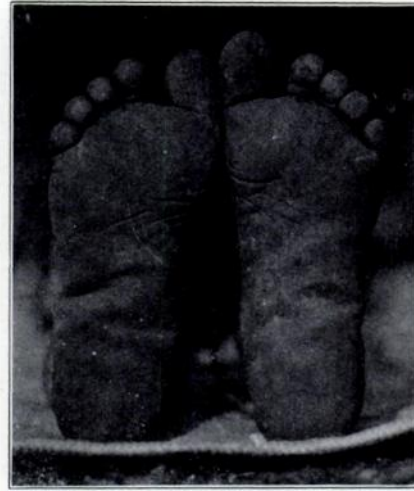


FIG. 2

The course of the expedition led across Central Africa from east to west. Foot studies were first made of natives in the mountainous regions of eastern Belgian Congo and within the environs of Lake Kivu and Lake Tanganyika; they were continued among natives along the middle and lower Congo River areas. These studies included the use of still and motion pictures and of a kinetographic footboard which had been specially designed and previously used by one of us for analysis of foot mechanics and gait. The functional aspect of this problem will be given from detailed studies of these records in later publications, the purpose of this paper being to give only our observations of the most common types of foot trouble which affect these primitive people.

Conditions of life among the negroes of the interior have a very definite bearing upon their foot disorders. In this connection the extraordinary thick, pachydermatous skin on the sole of the foot is worthy of comment (Figs. 1, 2, and 3). Since these individuals have from their earliest years been living in rough, hilly, and mountainous country with no foot protection whatever, the keratinized layer becomes very thick and tough. Some idea of the thickness and stiff, leather-like character of the skin of the sole may be gained from the photographs, by the depth of the sharply defined transverse creases immediately behind the ball of the foot, and by the shallow but heavy wrinkles under the arch.

It is not an uncommon thing in the colder areas of the Congo to see negroes sitting for some time at a small outdoor fire with their feet resting on live coals. When requested to do so, our porters would not hesitate to walk through a bed of live coals, apparently experiencing no discomfort whatsoever.

It might also be mentioned how wrinkling of the skin about the ankles seems to vie with facial wrinkles in natives over forty years of age (Fig. 4).

Signs of senility develop quite early in the bush native, especially the females; they are old women at the time the European is just approaching middle age. It is unusual for the male negroes in the areas visited to develop obesity, and the notable wrinkling about the ankles as a sign of age is obviously due to disappearance of subcutaneous fat which is present in younger individuals and contributes to their remarkably graceful body form.

Another superficial character frequently observed in both young and adult individuals is a reduction in the usual size of the toenails, especially that of the great toe. A conspicuous example of this condition is shown in Figure 5; it may also be seen in some of the other photographs. The portion of the nail remaining becomes quite thick and cornified. Although the "chiggers" which are discussed later might in some cases account for this apparently impaired growth of the toenails, according to the little information that could be gathered from the natives, the condition may more properly be regarded as due essentially to attrition, resulting from striking the toes against obstacles, and other mild injuries.

In so far as actual ailments and deformities of the feet are concerned, the most conspicuous and frequent type is absence or deformity of one or more toes. The great majority of these have been acquired through infection of some kind. Clinical histories of these cases were very obscure and difficult to obtain, due to the inadequate knowledge of the native languages on the part of the investigator. Naturally, the results were obvious, but under the circumstances the primary cause of the defects was not easy to determine.

Among the natives the loss of toes is more or less comparable in frequency with static disorders of the feet among our city dwellers. Where we suffer from arch strains, they lose a toe or two. Observations made during the course of the trip substantiate earlier reports that African natives are notably free from the ordinary types of static foot trouble with which we are so familiar in our civilized centers of population. Although their un-

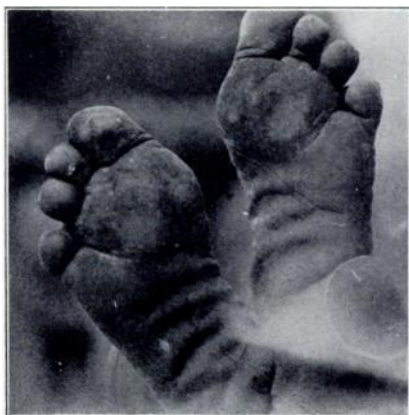


FIG. 3



FIG. 4

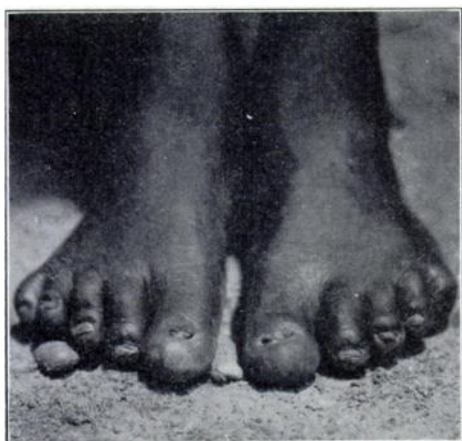


FIG. 5

shod feet give the impression of having lower arches generally than the feet of white races, the range of arch *height* seems to be about the same in both groups. Pronation is not a common condition; their legs are well positioned above the feet, insuring an even distribution of body weight upon the latter.

The chief source of foot trouble among these Africans is infection, microbic or parasitic. Any traumatism or injury of the toes develops a secondary infection which the native has

no idea how to treat. If it pains him, he covers it, but primarily as a means of protection rather than as a surgical dressing.

Although in some parts of Africa, *ainhum* (*Dactylolysis spontanea*) is responsible for loss of toes, and most frequently the fifth toe (only ten per cent. of the cases involving the other four toes, according to Castelloni and Chambers), there was only one instance seen during the expedition in which it seemed probable that the deformity was due to this cause. *Ainhum* is of known origin. Its pathology comprises a slow constricting ingrowth of epithelium at the base of the toe, ultimately effecting a complete amputation. It is confined to tropical countries and apparently affects only the natives.

The two most frequent types of specific infection are the "chigger", which directly involves the toes and foot (*Dermatophilus penetrans*) and



FIG. 6

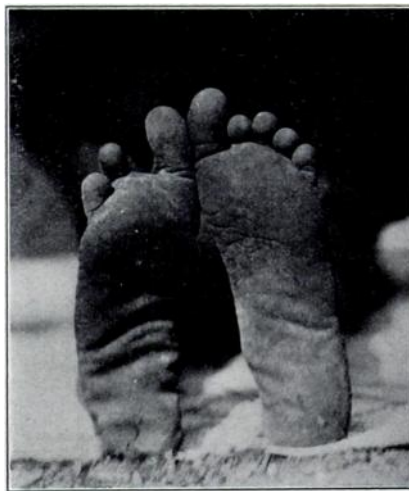


FIG. 7

“yaws” (*Treponema pertenuis*). Both of these conditions were encountered quite frequently.

The “chigger” was introduced into the west coast of Africa from the Americas as recently as 1872, and is now abundant throughout Central Africa. This sand flea is regarded by many of the physicians in charge of native hospitals as being the primary cause of many ulcerated toes and their ultimate loss. As is well known, the gravid female of the species burrows into sweat glands between the toes, along the edge of, or under, the nail, and there deposits her eggs. Natives were frequently seen sitting about, picking at their toes with a thorn, a piece of glass, or a knife blade in an effort to remove the parasite. Even though the insect and eggs are removed, it is obvious that under such conditions a focus very favorable to secondary infection remains. Even the majority of Europeans in these districts are from time to time infected by “chiggers”, as also were members of our party. Consequently, since shoe-wearing is shown not to be sufficient protection, it is obvious that infection must be very general among barefooted natives.

Chesterman¹ stated that ninety-five per cent. of the native population around Stanleyville, through which our expedition passed, acquire yaws before puberty. The ulcerations caused by this parasite are well known, and are extremely common in all districts. In Figure 1 the beginning of an ulceration, probably of this nature, can be seen at the base of the distal phalanx of the second toe of the left foot. Rarely are such ulcerations given an opportunity to heal. They are not dressed nor bandaged, and are subject to constant irritation. Sometimes, when the erosion becomes more extensive and causes pain the native covers it with a rough bark bandage, or one made from green banana leaves. Usually the erosion continues until the toe is entirely lost.

Other types of tropical phagedenic ulcers of the feet prevailing in

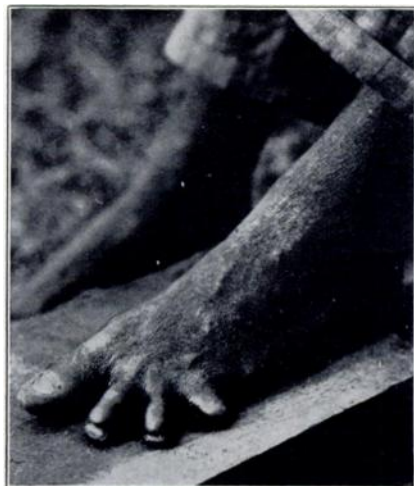


FIG. 8



FIG. 9



FIG. 10

Africa were undoubtedly mingled with the cases we saw. There was no opportunity, however, to study them from a differential and bacteriological viewpoint, as was done by the members of the Harvard African Expedition (Strong²). In the well-documented volumes reporting their findings, many of the pathological conditions seen by our group are discussed and illustrated. They do not, however, place emphasis upon the loss of toes as a prevailing deformity which appeared to be so common in the areas visited by our party, probably because they

were chiefly concerned with the primary lesions.

These toe deformities were predominantly of an acquired nature. They consist chiefly of absences and retractions following some type of ulceration or destructive infections. Two cases, shown in Figures 6 and 7, also 8 and 9, are examples of such absences. In the first case the second and fourth toes of the right foot had been lost with no apparent damage to the corresponding metatarsals. In the second case, the fifth toe of the left foot is missing and a marked lateral spreading of the second, third and fourth toes is shown. Here also the metatarsal bones seemed unaffected upon palpation, although the shape of the foot appears as if the distal end of the fifth metatarsal had been destroyed. No apparent interference in function of the foot, however, has followed the loss of the toes.

Retraction of the toes as a result of destructive inflammatory conditions is well shown in Figures 10, 11, and 12. The first individual gave the story of "a great soreness in the foot" when a boy. It resulted in a rigidly retracted toe displaced well above the normal position for the head of the fourth metatarsal bone. Lack of x-ray facilities prevented a definite interpretation of the extent of bone destruction, although physical examination indicated that the distal end of the fourth metatarsal bone was missing. The second indi-



FIG. 11

vidual showed a similar condition, but without the rigidly fixed displacement of the former.

Congenital deformities are represented in Figures 3, 13, and 14. Figure 3 gives an example of bilateral absence of the fourth toe, while the others are instances of bilateral imperfect development of the fourth digit. In all three of these cases there seemed to have been a corresponding retardation in growth of the metatarsal bone; but again the lack of x-ray facilities prevented a more accurate record.



FIG. 12

Of the congenital types of deformity encountered during the journey, the fourth digit and its metatarsal seemed to be the member most susceptible to anomaly of this sort.

A review of the observations made on this expedition seems to indicate that the foot problem from an orthopaedic standpoint is not an urgent one among natives. The flat-footed condition among the negroes of our country, which is sufficiently common to give it repute as a racial character, would seem to find its origin in some locally developed diathesis of a rachitic nature, for no such imputation could be ascribed to the posture and contour of the feet of those primitive people with whom the expedition had contact. Their foot trouble was chiefly of surgical types, a primary traumatism in some cases, but essentially infection (primary, secondary,



FIG. 13

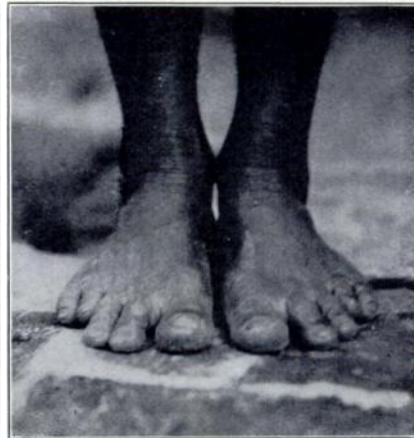


FIG. 14

or mixed) in the vast majority. Congenital deformities of a mild nature, as of the toes, were occasionally recognized, but no example of congenital club-foot was seen throughout the trip, although a great many thousands of natives came under our general observation. Likewise, major amputations of the lower extremity were never seen by us in the interior. Obviously native life has no place for the survival of those unfortunates who are born with, or acquire, so severe a physical handicap.

Although the African natives present so little to the orthopaedic surgeon in the way of static disorders of the feet, it is expected that the records made will yield valuable information to help us understand better these disorders as they prevail within our more artificial environment of city life. The native feet which were studied have not been affected by shoes or footwear, nor has the use of their feet been influenced by theoretical recommendations or suggestions of how this should be done. In other words, the result is a purely native product, and in its analysis we may hope for information which will lead to a clearer comprehension of the natural mechanism of the foot and help toward a better understanding of the foot troubles of our own people.

REFERENCES

1. CHESTERMAN, C. C.: *British J. Venereal Dis.*, IV., 64, 1928.
2. STRONG, RICHARD (editor): *The African Republic of Liberia and the Belgian Congo. The Harvard African Expedition, 1926-1927.* Cambridge, 1930.