SURVEY IN CHINA AND INDIA OF FEET THAT HAVE NEVER WORN SHOES*

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WHILE serving in the Army of the United States during the recently concluded war, the author spent more than a year in various parts of China and India. Most of the people there both male and female, particularly the many poor people and those in rural communities were noted to go barefoot at all times. Because many of these barefoot individuals labored long hours on their feet and carried very heavy burdens for long distances, it became interesting to note the orthopedic condition of those feet in order to compare them with the average of those of us who wear shoes almost all our lives.

The survey was begun in Kunming, China, and its vicinity over a period of eight months and concluded in and around Calcutta, India, for an additional two month period. My knowledge of the Mandarin Chinese and Hindustani languages being meagre, an efficient interpreter was employed whenever possible. Crude but accurate instruments were constructed to measure the angles of foot motion. All persons surveyed said they had never worn shoes of any kind though a light, flat and very pliable sandal was sometimes worn. These were made of thin bamboo or felt, attached to the feet with no more than two thin straps around the ankle and between the first and second toes. None of these sandals had any arch-supporting features, their use being as a partial protection against cuts and bruises of sharp stones and broken glass . . . but they were not used most of the time. No socks were worn.

Persons with any obvious generalized disease or deformity, acquired or congenital, were not considered as falling within the scope of the survey and so were not included. This ruled out talipes, leprosy, elephantiasis affecting the lower limbs, rickets and tuberculosis. Two cases of macrodactylism and twenty-one cases of polydactylism were included, however. No functional or painful debility marked any of these congenital abnormalities.

In China, 3,906 persons were interrogated and examined, their ages ranging from four years to eighty-seven years as near as could be determined. 1,222 persons were similarly surveyed in India with almost the same range of ages. All feet were examined both at rest and when bearing weight. The results were very surprising when compared with foot conditions as we know it among those who wear shoes in our country.

4,017 persons or 78.46% were male and the rest female. Because of customs and social habits it was very difficult and often impossible to have women surveyed without arousing animosity. Even the native interpreters had a difficult task finding suitable female subjects for the survey. No appreciable difference was noted between the male and female survey results so both were combined. The age ranges were similar. In Western China a large number of women were seen with bound feet in the old Chinese tradition, but these were not included in the survey, of course. It may be of interest to note that this custom

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is now rare in Eastern China, which is more modern in every way. And the custom is dying out rapidly in Western China, too. Indian women do not have their feet bound. One old Chinese lady with bound feet was seen in Calcutta.

Table I

Number of Persons Examined—China 3906—India 1222—Total 5128

Condition	*China*	*India*	*Total*	*% of Total*
Weakfoot	91	29	120	2.34%
Pes Planus (Congenital)	44	12	56	1.09%
Eczemas of All Types	41	11	52	1.01%
Epidermophytosis	30	9	39	.75%
Arthritic Complaints	21	6	27	.53%
Polydactylism	16	5	21	.41%
Tylomata and Depressed A.M.A.	13	5	18	.35%
Sebaceous Cyst	14	4	18	.35%
Tibiale Externum	13	4	17	.33%
Verruca (Plantar)	11	4	15	.29%
Varicosities	11	3	14	.27%
Pigmented Nevi	10	3	13	.25%
Flattened Foot	6	4	10	.19%
Congenital Overlapping Toes	6	3	9	.18%
Fibroma	5	2	7	.14%
Lacerations and Abrasions	3	2	5	.10%
Mycetoma	0	4	4	.08%
Onychauxis	3	1	4	.08%
Burns	2	0	2	.04%
Onychogryphosis	1	1	2	.04%
Macrodactylism	2	0	2	.04%
Hallux Rigidus	1	1	2	.04%
Os Vesalianum	1	1	2	.04%
Sprained Ankle	0	1	1	.02%
Lipoma	0	1	1	.02%
Ulcer	1	0	1	.02%
Totals	346	116	462	9.01%

The measurements of the angles of voluntary motion were limited to inversion, eversion, flexion and extension of the feet with the knee held straight. Those with lacerations and abrasions, mycetoma, burns and sprained ankles were not included in this part of the survey, it being considered that their foot motions were limited by ailments not de-

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pendent upon their actual ability to move their feet as far as their musculature and joint structures were concerned. Some secondary motions at the mid-tarsal joint were noted, but none of these motions were excessive. No shortened calf muscles were found.

Table II
Number of Persons Measured—5,116

	From	*To*	*Average*
Inversion	7'	24'	16'
Eversion	2'	13'	8'
Flexion	11'	27'	17'
Extension	21'	55'	34

The voluntary motions of toes were not measured, but it was noted that remarkable ranges of motion were performed in most cases, particularly abduction of the great toe. In a few cases some voluntary individual motions of lesser toes were noticed resembling to some extent the common motions of the hand.

The average height of the longitudinal arches was quite a bit lower than we usually consider average in the United States. But the height of the arch, per se, had no significance when compared with orthopedic malfunction. The lower the arch, the less distance it can fall, the less possible strain upon it and the less possible bony mal-alignment and pain it can cause.

Of special interest is the fact that not a single person with weakfoot, and there were ninety-one of them, complained of pain of any kind.

The one ulcer was found on the right great toe of a thirty-two year old Chinese farmer. It looked and felt like a typical primary leutic ulcer or chancre. It had been present approximately one week and was painless, the man said. There were, unfortunately, no laboratory facilities for a dark-field or Kahn test. No other part of his body revealed any leutic manifestations. The man had no idea why he had gotten the ulcer nor did he understand my questions and suggestions about it. He was unmarried.

The low incidence of dermatomycotic infection here noted might be attributed to the fact that most foot fungi require dark, warm and damp interdigital spaces for growth such as that provided by shoes and stockings on a foot that has no free outlet for its persperation. In addition, these bare feet get the beneficial fungicidal effects of the sun's ultra-violet rays. My experience leads me to believe, though statistics are not available, that the Chinese and Indians who wear shoes have a foot-fungi infection rate at least as high as is found in the United States.

Only eighteen pairs of feet had depressed anterior metatarsal arches when not bearing weight and those were the only ones with plantar tylomata. All the others, however, did have a marked thickening of the plantar epidermis as nature's aid against injury. The thickened skin around the heels often showed some shallow fissures that did not extend below the corium but these were painless and did not interfere with normal walking in any way.

None of those interviewed complained of symptoms that had no objective significance.

The fact that not a single heloma of any type was found shows rather conclusively that ill-fitting footgear is always responsible for causing that painful lesion to form.

Upon questioning, about one-seventh of the Chinese and one-third of the Indians gave past or present histories of Uncinariasis. The actual incidence of that hookworm disease was probably higher. Beyond questoning, no further inquiries or diagnostic attempts were made regarding Uncinariasis.

The four cases of mycetoma were not confirmed by laboratory tests. It is felt that the disease has far greater prevalence in India than the percentage noted because those suffering from mycetoma are not apt to walk around or be found where they could have been included in this survey.

No instances among the barefoot feet were found of: Onychocryptosis, Hyperidrosis, Bromidrosis, Hallux Valgus, Hallux Varus, Bursitis at the first or fifth metatarso-phalangeal articulations.

Without footgear that interfere with nail growth, and because these people allowed their toenails to grow long and did not have the habit of digging into the corners of their nails when cutting them, onychocryptosis did not form even when nails were malformed. The resulting complete absence of onychocryptosis should serve to prove that proper nail care plus nonrestrictive footgear are all that is necessary to prevent the condition even in the presence of congenital nail malformations that are considered predisposing factors.

It has long been contended by many that there is a predisposition to hallux valgus among various families that show prevalent cases through a number of generations. Presence of a so-called "metatarso-cuneiform wedge" is also cited as a predisposing cause. Such may be the case. But this survey shows rather conclusively that hallux valgus will not develop if footgear are not worn and it is reasonable to expect that regardless of predisposing factors, hallux valgus will not develop when well-fitted footgear are worn.

Almost everyone surveyed showed a marked spacing between the first and second toes such as that found on young babies. The great toe was either pointing straight ahead or slightly abducted to provide a greater weight-bearing base or, possibly, to compensate for a shortened first metatarsal segment.

Seventeen persons had prominent scaphoids which were considered as supernumary secondary scaphoids. Six cases of flattened foot and nine of weakfoot were found among them, showing that the tibiale externum or enlarged scaphoid very often causes foot pathology even in the absence of shoe irritation against the bony prominences. Two cases of enlargement at the base of the fifth metatarsal were suspected of being the os vesalianum. No orthopedic pathology was associated. It was impossible without Roentgen-ray examination to further determine the incidence or extent of sumernumary and sasamoid bone occurrence.

One hundred and eighteen of those interviewed were rickshaw coolies. Because these men spend very long hours each day on cobblestone or other hard roads pulling their passengers at a run it was of particular interest to survey them. If anything, their feet were more perfect than the others. All of them, however, gave a history of much pain and swelling of the foot and ankle during the first few days of work as a rickshaw

puller. But after a rest of two days or a week's more work on their feet, the pain and swelling passed away and never returned again. There is no occupation more strenuous for the feet than trotting a rickshaw on hard pavement for many hours each day yet these men do it without pain or pathology.

These figures prove that restrictive footgear, particularly ill-fitting footgear, cause most of the ailments of the human foot. We need only to compare these figures with those from people who wear restrictive footgear. It is not intended that this paper is advocating that everyone should go barefoot through all climates and over every sort of terrain. But it is strongly urged that all children go barefoot from birth until they walk outside of their own homes. Baby shoes cause great harm to growing, formative feet. The so-called "sentimental" value of baby's shoes might well be dispensed with. When necessary, large loose socks will provide all the warmth needed during winter months in the home, even on cold linoleum floors. Strong, sturdy feet need to be developed naturally through the uninhibited normal exercises of crawling, playing and the first months of walking. Neither should the child be encouraged or aided to begin walking by supporting him by his arms or by wheeled baby-walkers. The child will walk when it is physically able, there being no standard age at which it should begin. Overzealous parents should be cautioned in this respect. Remember, a kitten learning to walk is unaided and very clumsy but soon develops into a sure-footed, graceful animal. Remember, too, that a child who had developed a strong, well-formed pair of feet by going barefoot the first few years of its life will not thereafter tolerate shoes that fit badly. When shoes are finally necessary they should be pliable and have ample toe room. Only feet that are weak need supportive rigid shanks.

Conclusion

People who have never worn shoes acquire very few foot defects, most of which are painless and non-debilitating. The range of their foot motions are remarkably great, allowing for full foot activity. Shoes are not necessary for healthy feet and are the cause of most foot troubles. Children should not be encouraged to walk prematurely and should not wear any footgear until absolutely necessary. Footgear is the greatest enemy of the human foot.

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THE MIRROR OF OURSELVES

THE WORLD has a way of reflecting back to us the face we present to it, and this is true of business organizations as well as individuals. Be honest, and you will be treated honestly. Wish well of others, and they will wish well of you. Be helpful, and your helpfulness will be rewarded.

But your attitude must be a true one, and from the heart. In these matters you cannot long fool either the public or yourself.

"No man," wrote Nathaniel Hawthorne, "for any considerable period can wear one face to himself, and another to the multitude, without finally getting bewildered at to which may be the true."

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A direct link to the actual publication is no longer available, and available images from the actual pages are of very poor quality. The above pages are an accurate replica of the original pages.

Glossary of various medical terms in the article

bromidrosis	Perspiration with an offensive odor.
corium	Inner layer of skin, a.k.a. dermis.
dermatomycotic	Having any of various skin diseases caused by fungi.
elephantiasis	Condition of grossly enlarged limbs caused by a parasitic infection.
epidermophytosis	Fungal skin infection, such as Athlete's foot.
fibroma	Benign tumor composed of fibrous or connective tissue.
hallux rigidus	Disorder of the big toe making it rigid.
hallux valgus	Displacement of the big toe toward other toes.
hallux varus	Displacement of the big toe away from other toes.
heloma	Soft callus or corn on foot.
hyperidrosis	Excessive perspiration.
lipoma	Benign "fatty" tumor.
macrodactylism	Excessive size of one or more fingers or toes.
metatarsal	Related to any of the five bones of the mid-foot.
metatarso-phalangeal	Related to Joint between metatarsal bone and toe bone.
mycetoma	Chronic infection of the skin and subcutaneous tissue, caused by bacteria or fungi.
onychauxis	Abnormal thickening or overgrowth of nails.
onychocryptosis	Ingrown toenail.
os vesalianum	Uncommon extra small bone at base of fifth metatarsal.
pes planus (congenital)	Flatfoot.
pigmented nevi	Skin moles.
polydactylism	Having extra fingers or toes.
sasamoid bone	Small bone embedded within a tendon or muscle.
scaphoids	Small bones in the foot, a.k.a. navicular bones, that facilitate foot movement.
supernumary	In excess of normal number, as in supernumary bones.
talipes	Clubfoot.
tibiale externum	Enlarged scaphoid bone.
tylomata and depressed a.m.a.	Abnormal callus, particularly with depressed anterior metatarsal arches.
uncinariasis	Hookworm disease.
varicosities	Abnormally dilated blood veins.
verruca (plantar)	Wart on sole of foot.