

# The Etiology of Hallux Valgus in Japan

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Orthopedic literature has informed us that hallux valgus is a common foot deformity in Europe. However, in Japan we had until recently few patients with hallux valgus, and no report of this deformity had been presented at the annual meetings of the Japanese Orthopaedic Association until April 1979. Because hallux valgus is occurring more frequently in Japanese people, we investigated its etiology.

## HALLUX VALGUS AND FOOTWEAR

In 1960, approximately eight million pairs of leather shoes were manufactured in Japan. By 1975 that number had increased six times. Conversely the manufacture of the traditional footwear, such as the clog of Japan which is called "geta," has been decreasing. The number of wooden footwear factories decrease every year, and we can no longer find authoritative statistics of wooden footwear production in Japan. Today, few people wear geta during the day, and the wearing of geta is usually not allowed at work.

Traditional Japanese footwear consists of a thong and flat. When one wears them, one also wears traditional Japanese socks called "tabi." Tabi allow the big toe and the other toes to move rather freely (Figs. 1-3).

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Received: June 6, 1980.

## HISTORICAL STUDY OF THE FOOT

In 1978, the footprints of ancient Japanese were discovered at the relics of the Johmon period in the north of Kiushu, which is the southernmost of the four large islands of Japan. There was no evidence of hallux valgus in the footprints. Archeologists consider that the Johmon period continued from about 6,000 B.C. to nearly 300 B.C. (Figs. 4 and 5).

In France physicians had referred to hallux valgus as early as the eighteenth century.<sup>5</sup> Before that, most common footwear was made in Greco-Roman style, generally flat-soled thongs that can be seen in statues of the Greco-Roman era and the Renaissance. Thus, it seems certain that hallux valgus deformity became more frequent after the wearing of leather shoes became more widespread. These same circumstances have been happening in Japan during recent years.

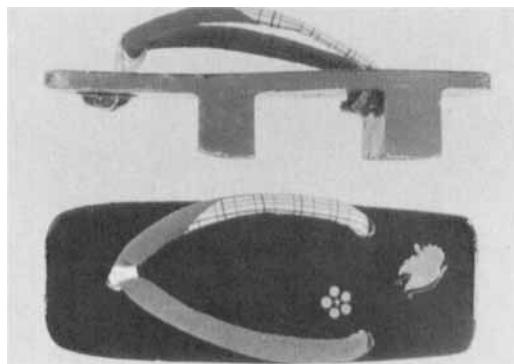


FIG. 1. A clog ("geta") belonging to a Japanese girl.

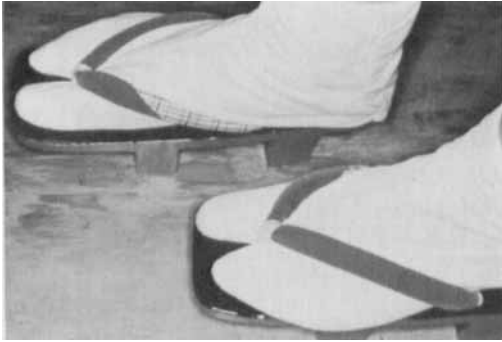


FIG. 2. Tabi and geta—tabi are also traditional Japanese footwear.

### MATERIAL

Before 1972, we had performed no operation for hallux valgus because no patients had required operative treatment. During the years after 1972, we saw 85 patients with hallux valgus at the orthopedic clinic of our university and an affiliated



FIG. 4. The footprint of an ancient Japanese of the Jomon period. This footprint is believed to be approximately 2,300 years old; it appears to show hallux valgus. (Reprinted with permission from: Ikematsu, R. (ed.): Asahi Graph, Asahi Newspaper, No. 2871: 82, 1978.)

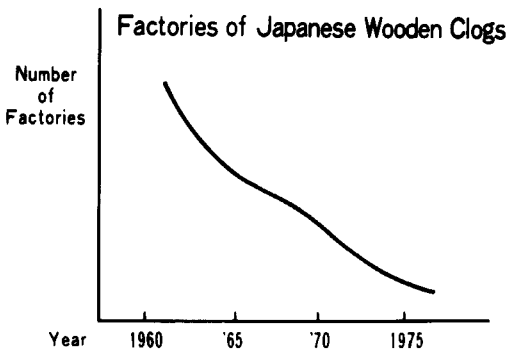
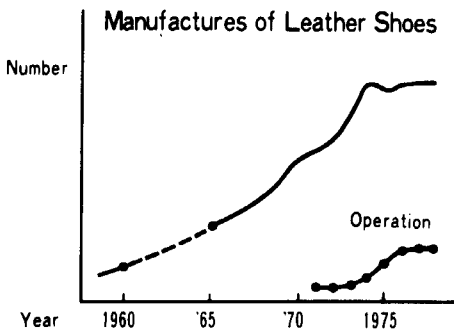


FIG. 3. The relation of footwear to the incidence of hallux valgus.



FIG. 5. On the right, the footprint of an ancient Japanese. On the left, the foot sole of a modern Japanese. (Reprinted with permission from: Ikematsu, R. (ed.): Asahi Graph, Asahi Newspaper, No. 2871: 82, 1978.)

## Intermetatarsal Angle

Roentgenographic Study of Our Cases : In 8...20Degrees

Case of Operation : Over 9Degrees

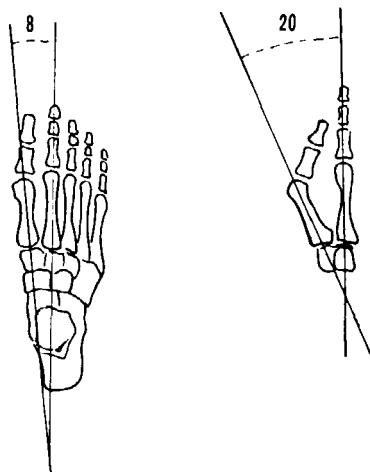


FIG. 6. Diagram of the foot illustrating the intermetatarsal angle.

hospital. Of these patients, 75 were women and 10 were men. Twenty-five feet in 19 women and five feet in four men were treated surgically. The average age of the women was 35 years, and that of the men was 52 years.

## ROENTGENOGRAPHIC STUDY OF THE FOOT

Weight-bearing X-ray films of the foot were examined, and the angle between the long axis of the first and second metatarsal was measured. The intermetatarsal angles

ranged from 8° to 20°. All cases had an angle of 9° or greater preoperatively (Fig. 6). Partite sesamoids were in a third of the cases operated on. This percentage of partite sesamoids may decrease in a larger series of patients with valgus. The displacement of the sesamoids and the changes in surrounding soft-tissue structures were the same as other authors have described.<sup>2,3</sup>

## MEASUREMENT OF LENGTH AND WIDTH OF STANDING FOOT

Some anatomic differences of the foot between male and female patients have been described in the literature.<sup>1</sup> One is the ratio of the width to the length of a foot. The feet of 368 girls and 465 boys between the ages of 10 and 14 years were investigated. These ratios were almost the same for the girls and the boys (Table 1). The average ratio of the boys' foot was 39.4% on the left side and 39.5% on the right side; the girls' foot was 39.1% on the left side and 39.0% on the right side. There was no evidence of painful hallux valgus among these pupils.

The compulsory education period in Japan is six years of elementary school and three years of junior high school. The ages of the pupils during this period are from six years to 14 years. After this compulsory period, the students may wear fashionable shoes freely. Thus, it is highly possible that improper shoes will promote the occurrence of hallux valgus among Japanese women.

TABLE 1. Ratio of Foot Width to Length (%)

Age (Years)	Boys			Girls		
	No.	Left	Right	No.	Left	Right
10	58	39.3	39.3	42	39.3	38.3
11	44	39.9	39.6	27	39.0	39.6
12	138	39.4	39.7	114	38.8	38.8
13	105	39.6	39.6	93	38.8	39.2
14	120	38.9	39.3	92	39.3	39.5
	465	39.4	39.5	368	39.0	39.1

### SUMMARY

Until recent years, hallux valgus did not exist in Japan. Changing customs and styles of footwear during the past ten years have led to an increasing number of patients with the classic hallux valgus deformity. These are not mild deformities, but are painful and require surgical correction. The ratio of the width to the length of the foot is similar in both sexes and was measured in children up to the age of 14. Coincidentally, at about that time students may freely wear any type of fashionable shoe. We conclude, therefore, that the hallux valgus deformities we are

now seeing with greater frequency are caused, at least in part, by the change in footwear.

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