

gentle method. This indicates that it is persistent tension on contracted parts rather than the correction of deformity that excites the reaction.

The treatment here recommended is, of course, hardly necessary when the flexion is due to simple muscular spasm; on the other hand, it may be applied to resistant deformity from causes other than tuberculous disease with equal advantage, for example, after gonorrhœal, typhoidal, or other forms of infectious arthritis.

There are cases in which the changes within the joint make it impossible or inadvisable to straighten the limb completely by this or other means. In such cases it is advisable to perform an osteotomy just above the joint; the limb is then straightened and whatever motion is present is thus transferred to a point at which it will be of greatest use.

PRONATION OF THE FOOT.*

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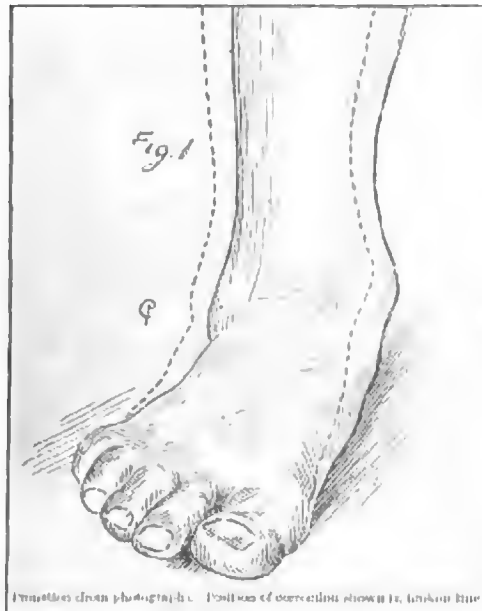
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THIS paper will deal entirely with a pathological condition and not with a physiological function. Pronation is not to be confounded with flat-foot, from which it is distinct. Lovett and Cotton¹ define pronation as "that vicious attitude of the foot in which in habitual standing position it rolls over inward, the inner malleolus projects, and abduction of the front part of the foot occurs."

It is also known as weak foot and weak ankles, and is often an exaggerated or faulty use of a normal position. The cause of pronation is the pressure of the body-weight upon the foot, lifting and carrying heavy burdens. Rheumatism, gout, and rachitis are predisposing causes. Stiff-ankle shoes, by producing weakness of the parts, according to Taylor,² cause pronation. Wilson³ claims comparative freedom from this malformation is noticeable in those who wear sandals or go barefoot. Lovett and Dane⁴ are inclined to the belief that modern footwear deprives the foot of a support and the tendency to pronation is favored. The voluntary adduction of the normal foot (Whitman⁵) is about 30°; abduction is somewhat less. The angle of inclination of that part of the foot anterior to the mediotarsal joint was found by Roberts⁶ to average in males 34.8°, and in females 31.5°. Abduction, with some pronation, is the normal position when the body-weight is sustained without muscular exertion. This, according to Sampson,⁷

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“ becomes pathological when excessive or used in other or all attitudes.” Abduction is the position of weakness and rest; adduction, that of strength and activity. As to the diagnosis of pronation, the old method of taking imprints on smoked paper, etc., is almost universally condemned as being worthless, except in advanced cases or for verification of other diagnostic measures. The method of Lovett and Cotton¹ to determine the amount of rotation of the astragalus is excellent. The horizontal rotation of the malleoli is determined and used as an index. These measurements, as the originators state, are fairly accurate, though not mathematically so, “ as no measure of pronation can be.” The amount of deformity may be determined by the plan

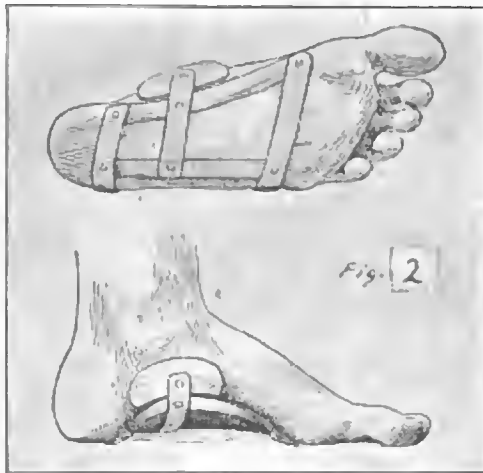


suggested by Young⁸ of taking several photographs upon the same plate with the weight off and on the foot. Briefly stated, the mechanism by which weak foot is produced is as follows:

The head of the astragalus rotates inward and backward, its body forward and outward. This rotation causes the internal malleolus to move backward and the external forward; the front part of the foot is abducted as a whole, and the calcaneum rotates toward a valgus position. In the treatment of pronation strict attention must be given to the footwear. The inner edge of the shoes should be straight; sufficient space is necessary to permit spreading of the toes. Increase adduction: For this purpose Sampson⁷ employs a toe-post, fitted in the shoe, between

the great and second toes. Raise the inner side of the shoe. According to Whitman,⁹ this frequently is all that is necessary. Tip-toe exercises are given to strengthen the adductors and external rotators of the foot. Often mechanical support is necessary. The ordinary metal plates are objectionable, because they are injurious, interfering as they do with muscular action and inducing atrophy of the muscles of the sole, and, more, they do not directly correct the pronation. Ankle supporters inhibit motion and induce atrophy. Lovett and Cotton¹ have devised an apparatus which reduces these objectionable features to a minimum.

It is light, allows free muscle action, and corrects the distortion. Its most important action is derived from the plate, below the tuberosity of the scaphoid, which exerts elastic pressure outward.



In an examination of the feet of 132 white persons, recently made by me, the result demonstrated the frequency of pronation. The ages of these subjects ranged from eight to seventy-two years; 82 were females and 50 males. Of the 50 males, 9 exhibited pronation in the right foot, 16 in the left foot, and 7 in both feet; in other words, 32 (64 per cent.) were so afflicted. Of the 82 females, 14 presented pronation in the right foot, 18 in the left foot, and 33 in both feet—a total of 65 (about 79.2 per cent.). Of 69 male and female negroes examined, the feet were pronated in about 85 per cent. The excessive occurrence of this deformity in negroes is explained by their occupations, which entail, in the majority of them, almost constant standing and the carrying of heavy burdens. In the cases in the white subjects, abduction determined by Roberts' method varies from 6° to 20°. In three cases the amount of rotation of the astragalus was

found to be 58°, 63°, and 68°, respectively. Pain was very severe in 8 cases. According to my observations, pronation of the feet is more frequent in females than in males. The explanation of this is to be found in the feminine footwear—that is, shoes with high heels, narrow toes, and curved so as constantly to abduct the foot.

In conclusion, I desire to thank Mr. George Augustin for his valued assistance in my search for references, and Dr. John Ridlon, who so kindly gave me permission to use the illustrations in the *Transactions of the American Orthopedic Association*.

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A CASE OF ANEURISM OF THE TRANSVERSE PORTION OF THE AORTIC ARCH IN A GIRL OF NINE YEARS, WITH TABLE OF REPORTED CASES UNDER TWENTY YEARS OF AGE.

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THE patient presented, who is the subject of this paper, was brought to St. Christopher's Dispensary on October 19, 1902, for treatment for pain in the left wrist, and a cough which she had had for some weeks.

Violet B., aged nine years.

Family History. Parents living and healthy; no history of rheumatism or specific infection. Two other children living and well. The oldest child died from pertussis shortly after the birth of the patient. At birth there were no signs of specific disease; there was no cyanosis directly after birth, and the labor was not remarkably severe.

Previous History. When nine days old she had an attack of pertussis which lasted for seven weeks. Until three years of age she had no illness, but at that time had a second attack of pertussis which was very severe, and the cough is said to have lasted for six months. When four years old she is thought to have had rheumatism, as in the extremities there were vague joint pains, which have continued at intervals. Some heart trouble was diagnosed at this time. Typhoid fever at seven; and last July she had measles.

Present History. The cough is rather moist, with at times a clear, watery expectoration; occasionally it is hard and quite brassy in character. There is slight pain under the sternum if the cough is severe. The joint pain, which at present is confined to the left wrist, is sharp