THE NON-OPERATIVE TREATMENT OF MET-ATARSALGIA.¹

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A VERY good description of the neuralgia which is now termed "metatarsalgia" is given in a paper by Dr. Charles E. Woodruff, Assistant Surgeon, United States Army, in the *Medical Record*, January 18, 1890. The title of his paper is "Incomplete Luxations of the Metatarso-Phalangeal Articulations." The term "Morton's toe," has been in use for many years, because of Dr. Thomas G. Morton's paper, which was presented in 1876, in the *American Journal of the Medical Sciences*, under the title "A Peculiar Painful Affection of the Fourth Metatarso-Phalangeal Articulation." Dr. Thomas S. K. Morton in 1893 published a paper in the "Transactions of the Philadelphia Academy of Surgery," which gave the literature from the date of the first paper of Dr. Thomas G. Morton in 1876.

In this first paper above mentioned, the mechanism of the pressure is given in detail, and I cannot do better than quote as follows: "The occurrence of neuralgia may be understood by a reference to the anatomy of the parts. The metatarso-phalangeal joints of the first, second and third toes are found in almost a direct line with each other, while the head of the fourth metatarsal is from one-eighth to one-quarter of an inch behind the head of the third, and the head of the fifth is from three-eighths to half an inch behind the head of the fourth. The joint of the third of these is slightly in advance of the joint of the fourth, and the joint of the fifth is considerably behind the joint of the fourth.

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"The fifth metatarsal joint is so much posterior to the fourth that the base of the first phalanx of the little toe is brought on a line with the head and neck of the fourth metatarsal, the head of the fifth metatarsal being opposed to the neck of the fourth.

"On account of the character of the peculiar tarsal articulation, there is very slight lateral motion in the first three metatarsal bones. The fourth has greater mobility, the fifth still more than the fourth, and in this respect it resembles the fifth metacarpal. Lateral pressure brings the head of the fifth metatarsal and the phalanx of the little toe into direct contact with the head and neck of the fourth metatarsal, and to some extent the extremity of the fifth metatarsal rolls above and under the fourth metatarsal.

"The mechanism of the affection now becomes apparent when we consider the nerve supply of the parts. The branches of the external plantar nerve are fully distributed to the little toe and to the outer side of the fourth; there are also numerous branches of this nerve deeply lodged in between these toes, and they are liable not only to be unduly pressed, but pinched by a sudden twist of the anterior part of the foot. Any foot movement which may suddenly displace the toes when confined in a shoe may induce an attack of this neuralgia. In some cases, no abnormal or other specific cause for the disease has been detected."

It was reserved for Dr. Auguste Pollosson, of Lyons, to give us the name "metatarsalgia" in 1889. He looked upon a certain laxity of the transverse metatarsal ligament as a cause, and naturally directed his attention to the correction of the flat foot which results from this laxity of the ligament. Mr. Edmund Roughton, in the *Lancet* for March, 1889, takes the same view, and reports a case which he relieved by having the patient raise himself on the toes and ball of the foot, or even on tip-toe, in order that the tendons and muscles of the sole of the foot may be strengthened. The literature, however, as shown by Dr. C. L. Dana, in the *Medical Record* for

July, 1885, antedates the paper of Morton. For instance, Velpeau, in France, described cases in 1883; S. Weir Mitchell, of Philadelphia, in 1872.

Referring again to the mechanism, Dr. Woodruff makes this statement: "The first phalanx of the second, third and fourth toe, having no muscular attachments, except the feeble interosei, has no aid from muscular contraction to help keep it in position. I do not know why the middle toe should be the one nearly always affected, unless it is due to the fact that when the weight of the body is placed on the toes dorsally extended, the third metatarsal being the key of the arch, is brought near the floor and causes the corresponding toe to be more forcibly flexed and receive more of the weight than the others. A slight flattening or hollowing out of the end of the metatarsal would materially aid in preventing the return of the phalanx. Habit, undoubtedly, is a great factor in perpetuating the trouble, and after a few weeks dislocation is produced by the very trifling motions of the toes."

The treatment suggested and carried out by Thomas G. Morton is perfectly rational, namely: excision of the fourth metatarso-phalangeal articulation, and this surgeon has reported a number of interesting cases where relief has been permanent. Nearly all of the authors including Morton, himself, who have presented histories of cases, refer to the constriction of the sole and instep as a means of temporary relief. Such expressions as the following are common in speaking of pain: "was sometimes so severe as to cause him to remove his boot and grasp the sole of his foot in his hand;" "grasping the foot in the hand and pressing it between the hands on sole and dorsum will ease the pain;" "grasping the foot tightly around the metatarsal region will answer;" "I have sometimes worn a circlet of India rubber band binding the foot around the instep."

Dr. E. H. Bradford, of Boston, has reported a number of cases, and in a paper, "Metatarsal Neuralgia, or Morton's Affection of the Foot," in the *Boston Medical*

and Surgical Journal, 1891, Volume II, page 52, he states that in none of his thirteen cases was any degree of flat foot present. The rheumatic or gouty diathesis, I am convinced, plays an important part in the etiology of this affection, yet few of the writers seem to regard this as a very significant factor.

From a very careful study of the cases reported, and from a careful study of my own cases in private practice, as well as from the association of metatarsalgia with certain cases of flat foot, I have become convinced that we must recognize three factors, sometimes operating together, but more frequently not associated. These three factors are (1) the twist above referred to; (2) a moderate grade of flat foot; (3) the rheumatic or gouty diathesis.

For several years it has been my custom in examining these feet, to grasp the sole and instep with my hand and make firm pressure, in order to determine, if I could, the measure of relief afforded. In this way, I have become familiar with the relief the patients get by resorting to this same procedure. If one, for instance, grasp the metacarpal bones near the proximal ends, it will be found that the distal ends are separated, as any of you can demonstrate.

The shoemaker, Mr. J. Henry Block, who has built orthopedic shoes for me, finally suggested a Spanish last, which raises the arch of the foot and makes considerable pressure in this region, as a good last on which to build a boot for the relief of metatarsalgia. We found by a little experimenting that a boot built on such a last and laced snugly across the instep and left rather free across the ball of the foot, with a modified French heel, that is, a combination of a French heel and an English heel, would nearly always give relief. I found that patients who wore boots thus constructed were not compelled, as they frequently had been, to remove them in the theatre, or in a warm building, and go through the usual means of relief so common to these sufferers. I have here a Spanish last, which is nothing more than a

last with high instep, for your inspection. The heel referred to is a heel which is rather long and throws the weight of the body well upon this portion of the boot. It must be rather high in order to accommodate the foot to the high arch caused by the Spanish last. It is difficult to get a shoemaker to build a boot of this kind, especially where there is a complication of flat foot. I have employed for a number of years an artist of this kind, who will modify or change a boot to suit the indications which to me seem necessary, and I am at liberty to discard a pair of boots if they meet my disapproval. One can't get this sort of service in the ordinary shoe establishment, for the reason that the foreman is usually so much impressed with his own importance, that the real owners are afraid of offending him. So that when one dislikes a boot and orders it changed, it requires a great amount of patience to put up with the suggestions of the foreman in question, and when it does come in to suit you, there are a number of extra charges tacked on, which are apt to disgust the patient with the whole proceeding, and hence the difficulty of securing the kind of relief which I have suggested in this paper. I have found this procedure a very practical one, namely, to have my own shoemaker make one pair, then let the patient take this to the one with whom he deals, and very often a satisfactory boot is constructed.

A few cases may be of interest.

CASE I.—A lady, aged 22, came to me for relief November 28th, 1889. She had suffered for several years with pain about the junction of the third with the fourth toe. The pain would sometimes extend up the dorsum of the foot, but more especially along the palmar aspect as far back as the mid-tarsal joint. It came in paroxysms lasting sometimes for an hour or two. She knew of no cause. If the metatarsal bones were crowded together at their distal ends, the pain was induced. A shoe was ordered for her made as above described, and she soon got relief. I have had no opportunity of getting a personal report from this patient, but the shoemaker tells

me that he has been making shoes for her since that date, and that she has expressed to him perfect relief so long as the boots were in good order. A few of her friends who have been similarly affected have consulted her shoemaker at her suggestion.

CASE II.—A gentleman, 48 years of age, fond of an out-of-door life and quite a sportsman, was referred to me by Dr. Pierrepont, of New York, on the 8th of May, 1890. He had complained occasionally of a burning pain under the sole of his foot, and over a small area about the end of the fourth metatarsal bone. His symptoms were aggravated by walking, and occasionally after he had been sitting a long while. The paroxysm at times became so great that he was compelled to loosen his shoe and take it off frequently during an evening. Even after the shoe was removed the pain would continue for a little while. He wore, at the time of his first visit, a pair of laced boots which were drawn quite snugly over the instep, and when these were tightly laced, he said he got relief. There was no flat foot in the case. His family was gouty, but he himself had never been subjected to many gouty symptoms. He was treated in the same way, and reported to me two or three times after the first visit as entirely relieved by the boot. He continues to wear the same boot, and only recently have I heard from him through the shoemaker.

CASE. III.—A lady about 30 years of age was referred to me by Dr. Doubleday on the 13th of March, 1890. The diagnosis made was metatarsalgia, right foot. Twelve years before she first experienced pain in the ball of the foot, without any special cause, lasting then until she would remove her shoe, sometimes half a day.

After a season these pains would pass away, and she would not suffer for six or eight months. The intervals of relief, however, got shorter, and at the end of about five years she began to have these paroxysms much more frequently. For a year prior to my first observation she had suffered almost continuously during the daytime. She reported that new shoes were much more comfortable than old ones. A large pair of shoes which she wore the summer preceding aggravated her pains. She responded to the usual tests. The Spanish last boot was prescribed. I saw that she had a good fit, and on the second of March, 1894, I learned that she had very little pain, in fact, none, so long as she wore the prescribed boot.

CASE IV.—A lady, 30 years of age, was referred, April 11th, 1890, by Dr. Carmen, of Harlem. She had suffered for several months with pains in the outer side of the left foot, extending up the calf, and even as far as the thigh at times. She was compelled to go through with the usual movements of relief, such as loosening the boot and grasping the body of her foot with the hand. I prescribed for her the same line of treatment, but I learned during the end of the year that she had not experienced the relief that she expected, and on investigating it, I found that she had tried to get her shoes made elsewhere on account of some trouble between herself and the shoemaker, but on the 16th of February, 1891, she told me that she was quite positive that the first pair of shoes made were satisfactory in every way, that she was relieved entirely of pain in her foot, and that she had not been able to get anything quite so satisfactory. I learned later from the shoemaker that she wanted a handsomer fit about the toes, objected somewhat to the style of boot, that she tried elsewhere, and finally returned to her first love, and in March, 1894, she was still relieved.

CASE V.—A gentleman, about 40 years of age, was referred by Dr. Barrows. He led a very active life, was quite a high liver, suffered from gout and rheumatism, was an inveterate smoker. The pain he described came on irregularly, and in the most inconvenient places, for instance, at the theatre, or at the dinner table, the starting point being at the distal end of the fourth metatarsal and extending back to the tarsus, seldom, if ever, up to knee. He always got relief by removing the boot. Walking did not produce the disturbance. He had a feeling as if one bone were riding by the other. Pressure of the distal ends with one's hand produced a paroxysm, and direct pressure over the distal end of the bone with one's finger would produce pain. There was no flat foot in this case. The relief from the boot ordered was not prompt, and the Paquelin cautery was applied over the point of tenderness. About a month after the first observation all the members of the family testified to the relief that he had finally experienced, and on this occasion he wore a pair of dress shoes for the first time in months with comfort. It was exceedingly difficult to regulate his diet or to exert any discipline in the way of living, so he passed from my observation, and I am unable to give a final report.

CASE VI.—A lady, 35 years of age, was referred by Dr. Frank Kinnicutt on the 8th of December, 1891. She had suffered for nearly a year, and had been treated by a traction brace, the object of which was to extend the tendo-Achillis daily. I was not informed as to how often the stretching process was resorted to, but she reported that she spent a whole winter under this treatment. The pain was at first on the inner side of the foot, but it shifted to the outer side and was much more severe in character. Dr. Kinnicutt himself had looked upon the case as *gouty*, and had prescribed without material relief. A paroxysm was about as follows: The pain began near the distal end, under surface, of the fourth metatarsal, right side, coming on without special provocation, extending over the outer side of the foot, back of the malleolus, up the calf, and the painful sensation increasing for a time, so that she felt as if her foot were in a vise. She was compelled to take off her shoe quickly, and after a little while would get relief. She responded to the usual tests. The arch was well-formed, and she volunteered the testimony that when she wore shoes with French heels she suffered less. My last report was on the 11th of February, 1892, when I learned that her own shoemaker had succeeded in building her satisfactory boots. She regarded herself as practically cured, although an occasional pain would come on, but it was very light and of brief duration.

I could relate a number of similar cases, but the details are so much like those already recorded that they will add nothing to the value of the paper. Personally, I have had very little opportunity of treating the *gouty* or rheumatic manifestations, inasmuch as the patients came to me from the family physician, and where any such diathesis existed it was he who gave it attention. There are certain neuræsthenics who suffer in this way and almost any treatment fails to relieve permanently, but I have notes of a few of this class where relief has eventually come, and I am convinced that strict attention to details, such as the proper construction of the boot, and prompt repair when it begins to break down, will assuredly accomplish more than any other form of non-operative treatment with which I am familiar: