Gibney (V. P.)

WITH THE AUTHOR'S COMPLIMENTS.

CARIES OF THE ANKLE

IN CHILDREN.

THE RESULTS OF EXPECTANT TREATMENT FROM A STUDY OF THIRTY CASES.

BY

V. P. GIBNEY, A.M., M.D.,

Of the Hospital for the Ruptured and Crippled, New York.

[A Paper read at the New York State Medical Society February 3d, 1880.]

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No less than *thirty-four* amputations were performed in England alone in one year, and that, too, recently, for caries of the ankle, wrote Mr. Hancock in 1873.[1]

I have been unable to get accurate statistics from hospital reports as to the number of children who are annually subjected to the loss of a foot for disease of this jont, yet in St. Bartholomew's alone I find that, in a period of nine years (1870–1878 inclusive), seventeen amputations of the foot were performed for caries of the ankle in children—under sixteen years of age—and that of this number two died.

I take it that London occupies a high position in conservative surgery, indeed I have heard American surgeons condemn the surgery of London as being too conservative. The incompleteness of hospital reports as published in our own country has prevented the compilation of statistics regarding amputation; still, I do not believe that the general surgeon on this side of the Atlantic hesitates longer than our English brother as to the disposition to make of a limb when an extensively diseased ankle-joint presents.

Dr. Gross, in his last edition (vol. ii., pp. 1092, 1093), expresses his preference for amputation when the astragalus is involved; yet he advises a free, bold incision when other bones of the foot are implicated. He states, what is very true, that we never know how many may participate in the carious process. Even of the calcaneum—that bone which one would think could be diseased and easily removed without fear of other bones being diseased—he speaks rather discouragingly

[1] Anatomy and Surgery of the Human Foot, London, 1873.

of the efforts to get a useful foot, and amputation is reported as having followed excisions. It is true, that since excision and *evidement* have become popular, the sacrifice of the foot has become much less frequent, but it is likewise true that many cases, wherein these operations fail to arrest the disease, are subsequently condemned to amputation.

Sédillot, in 1867, made a strong plea for *L'évidement des os* (scooping out the interior of the bone—partial excision), and published many cases that appeared to be remarkably good results from this method of treatment. Yet the operation was condemned by Hancock and others, so that *l'évidement* fell into disrepute, and one does not often hear of any other operations about the foot than excision and amputation.

Excision had its warmest advocate in Mr. Hancock, who became intolerant of anything save a *complete excision*. In fact, one reading carefully his arguments in favor of this operation can but feel that his zeal in a warfare against amputations, so stoutly advocated by Mr. Syme, led him to overlook facts, and to take for granted as proven that which was by no means well established. He did a good work when he raised his voice so powerfully against the sacrifice of the human foot; yet he did not know, I am sure, how many carious ankles get well in children, whose parents remove them from hospitals and from their medical advisers, to place them under the care of some old woman who uses a mysterious kind of salve, or of some professional bone setter, or to take them to some shrine where the laying on of hands and a prayer, followed by a period of time varying between one and three years, serves to effect a cure.

We have yet much to learn of the pertinaciousness with which children hold out against chronic diseases. Vulnerable they may be, yet their powers of resistance, at times, are simply marvellous.

I am quite sure that many a reader of this paper can recall to his mind a case of joint-disease, for instance, in a child where amputation was advised, and seemed indeed imperative, where the parents declined absolutely to have the operation performed, and where the patient subsequently made a recovery with a useful limb. Some of the most brilliant results in orthopedic surgery have been observed in just such cases.

To show what excision promises, I have had recourse to that monument of human industry—the Prize Essay of the American Medical Association, for 1876. I refer to the work of Dr. H. Culbertson, on "Excision of the Larger Joints."

On pages 302 and 303 is his summary of the 108 cases excised for disease of the bones entering into this articulation. I have collected from his table all wherein the disease developed prior to the sixteenth year of life, and the number is *thirty-eight.* The results are as follows, and are given in the order of usefulness:—*Five* (Nos. 147, 152, 256, 265, 267) recovered with a "perfect limb;" *one* (No. 233) walked without lameness; *five* walked easily, though with a limp; in *thirteen*, the "result good," although no mention was made of the gait; in *six*, the result was doubtful; *six* walked without support; in *two*, amputation was subsequently resorted to. The average period at which these thirty-eight cases were "last heard from" was 22¹ months. The five perfect results were reported by the following:

1. *No.* 147.—Textor, Jr., of Germany, in Heyfelder's tables. The excision included the "ends of tibia, fibula, and astragalus," the result given as "very good, mobility perfect," and the patient was last heard from four months after the operation.

2. *No.* 152.—S. F. Statham, London, reported in Hodge's tables; the "astragalus and part of the calcis" were removed, and at the end of ten months there was "complete mobility," and the patient "walks and runs without pain."

3. *No.* 256.—T. G. Morton, of Philadelphia, reported in *Am. J. Med. Sc.*, N. S., lxi., p. 424. The "astragalus and os calcis" were removed, and at the end of seven months "very perfect recovery followed as to motion and to usefulness of foot."

4. *No.* 265.—A. G. Walter, of Pittsburgh, Pa., reported to Dr. Culbertson in a letter. There were two operations: "1st, lower surface of tibia and slice of astragalus; 2d, removal of sequestrum through involucrum;" the result, "at fourteen months able to work in a glass factory; perfect usefulness of joint in every respect; joint and foot normal in shape;" was heard from thirty months after the first operation.

5. *No.* 267.—The same, and reported in the same manner. There were removed "6 inches of fibula; ¾ inch of tibia; entire

astragalus; almost all of the calcaneum; all of the os naviculare, and part of the cuboid." The patient recovered in "seventeen months," had less than one inch "shortening;" got "an admirable limb and foot; useful to the fullest extent, without any deformity, save the scars;" was last heard from "twenty-eight months."

The above statistics appear to be the facts in connection with excision of the ankle-joint in children, and it were useless to record opinions and theories; yet Mr. Hancock is so good an authority that I shall quote him. On page 294, in arguing for excision, he says: "We know that diseased ankle-joints do not invariably recover." With equal force could he predicate the same of excised joints.

Speaking of excision, Mr. Bryant[1] says, "I have had no experience of this operation, having in majority of cases of disorganized ankle-joints obtained good results by the expectant treatment and by free incision. . . . Where excision may be expected to be successful is where the disease is limited to the articular surfaces of the bones, and it is in such that the treatment by incision and the expectant principle is so successful."

"My own impression is," says Mr. Macnamara,[2] "that the longer we deal with cases of advanced tuberculous disease of the bones, the clearer we appreciate the importance of time and hygienic conditions as affecting their issue."

Dr. Frank Hamilton, discussing the relative merits of excision and amputation, says, "Nor must it be forgotten that, with strumous children, rest alone, with proper hygienic measures, is often competent to effect a cure, without the interposition of any strictly surgical interference."

Farther on he says, "Excisions at this articulation for chronic disease of the joint [ankle] is seldom, if ever, advisable, since inflammation is prone to propagate itself downwards through the tarsal bones, leading, eventually, to the necessity of amputation, if it does not result in death."[3]

There is a plan of treatment very popular with Dr. Sayre, of New York, viz., the passage through the joint of setons of

[1] Practice of Surgery. Philadelphia, 1873, p. 786.
[2] Diseases of Bone. Macmillan & Co., London, 1878, p. 129.
[3] The Principles and Practice of Surgery. New York, 1873, pp. 398, 399.

oakum and the use at the same time of a splint for securing fixation and extension, the foot being first placed in normal position by means of force or tenotomy.

I find in his work on Orthopedic Surgery, 1876, the records of four cases in children, and the results are as good as those of excision, infinitely better than those of amputation.

They are as follows: I quote from pages 176 et seq.

1. "The motions are almost perfect, and she can walk without pain."

2. "It is now twenty-one years since this case was operated on, and she is as well in one leg as the other, and the motions are almost perfect," and a little farther on in the same paragraph it is stated of the same patient, "The motions are equally perfect; in fact she is the prize skater of the city."

3. Twenty years after the operation (on page 180): "This motion has very materially increased and is now almost as perfect as the other. The foot is smaller than the other and about half an inch shorter, but he supplies the deficiency by a thick sole inside his boot and can run and skate without the deformity being detected."

4. On page 184: "Perfectly well without deformity and in robust health." The mobility is not stated and from the photograph on page 183, one recognizes a slight degree of valgus (splay foot), which indeed is recorded as existing three months earlier.

We see that the disease ran its usual course; in one about two and a half years; in another about three years; in another a little over three years; and in still another nearly two years. Dr. Sayre does not claim for a single one a joint absolutely perfect, but he does get, as we all get, highly useful joints. Besides, the treatment was not materially shortened. Furthermore, we have no fears of amyloid degeneration in prolonged suppuration about this joint as we have when it is in the neighborhood of the other larger joints.

True, one of the cases, in my analysis to follow, died of septicemia or pyemia (the differential diagnosis was not made); yet I have no less an authority than Bilroth for the following: "Recoveries take place under all these modes of treatment, but I think there are more recoveries and cer-

tainly fewer deaths from pyemia under the expectant treatment."[1]

With one or two exceptions, all the children whose cases I am about to analyze owe the usefulness of their limbs, I am glad to state, to the conservatism of Dr. James Knight, the founder of the Hospital for the Ruptured and Crippled.

I have not included a single case in my table about which there can be any doubt as to the final condition of the foot. I have made it a point to examine every one personally, or, when that were impracticable, to have them examined by some one on whose accuracy of observation I could implicitly rely. To trace out patients in New York, when years sometimes have passed since one last knew their whereabouts, is a task by no means agreeable.

I have been careful to give the minutest details as to function, and when details were wanting, I have been careful to so state. These thirty cases do not, by any means, comprise the whole number we have had under treatment. There are several still under treatment, a few have died of intercurrent diseases totally disassociated from the bone disease, wherein the sinuses were not closed; many have passed from our hands into those of surgeons who have performed various kinds of operations before the disease was arrested; some I have been unable to find after prolonged and diligent search. It is *very difficult to find* thirty cases in New York City, whereon an operation has not at some time been held.

I shall not, in this paper, report all the cases, but only about one-half, and these shall be reported as briefly as possible. For the other half I would refer such of my readers as are desirous of studying them more thoroughly to a report by my friend, Dr. T. E. Satterthwaite, to the Therapeutical Society of New York, in December last, and published in the *New York Medical Journal* for March or April, 1880. In the *Medical Record*, January 31st, 1880, p. 126, is an abstract, and the definition of expectant treatment is given by Dr. Satterthwaite as follows:

[1] Surgical Pathology. 4th Ed. Translated by Hackley, N. Y., 1879, p. 476.

"If the joint is inflamed, entire rest is ordered; if abscess form, it is opened; if loose bone be detected, it is simply removed as if it were a foreign body interfering with the process of healing; if, in the further progress of the case, malposition of the parts is found, a support or brace is given to rectify the deformity." This I accept as the expectant plan of treatment. Of course, the health is attended to on general principles.

CASE II.—A frail, phthisical-looking girl in her seventh year, began to walk lame, and some swelling without heat or pain was observed about the right ankle. Her family was tuberculous and no exciting cause could be found. The invasion was almost imperceptible; little attention was given to the foot, and six months afterward she first began to have pain. Later she had a fall which aggravated the disease, and just fifteen months after the first symptom, she entered the hospital, April 4th, 1871.

She walked badly, and usually got about by hopping on the left leg. The natural depressions about the ankle were effaced, and there was a pulpy feel imparted to one's finger as the parts were handled; the joint was not tender on concussion, but on passive motion, which was very limited, there was much pain. The right calf was 7½ inches, left, 9½ inches; over malleoli, right side, 7½ inches, left, same; heel and instep, right side, 9 inches, left, 9¼ inches.

The expectant treatment was adopted in this as in the other cases, and for a long time no change was observed. She got better in time, no suppuration ever occurred, the malleoli continued tender, although the patient walked with very little if any lameness by the 30th of April, 1873, when she was discharged about cured, *i. e.*, there was no tenderness on rough handling, no swelling, and the movements were nearly normal. The foot, however, was three-quarters of an inch short. I saw and examined the case on December 3d, 1879, six years and six months after the date of discharge. She was in good health, was walking without any lameness, though at times, when weather is changing, she has a little halt, could flex foot beyond 90°, though not to full extent, could extend the front of the foot, the heel moving very little, and could in- and evert over about one-half the normal arc. Both malleoli appeared to be expanded. Measurements: *right*, calf, 11 inches; malleoli, 8½ inches; heel and instep, 10½ inches; foot (in length), 8¾ inches; *left*, same points, 12½, 8½, 11, 9½ inches. She never had any suppuration and never any relapse.

CASE XIV. was not fully reported in Dr. Satterthwaite's report to the Therapeutical Society, inasmuch as I had failed,

at the time said report was made, to find the child. I shall now give the case briefly, in order to record the last examination made quite recently.

This case, then, was a girl whose family history was wretched, and who contracted disease about the left ankle when two years of age, supposably from a fall. It could not be definitely learned when suppuration began, but on admission to hospital, fifteen months after the first symptoms, December 28th, 1875, there was an open sinus, surrounded by a cicatrix, over the external malleolus.

There was, likewise, much tumefaction in this neighborhood, the child was not very lame, movements were not limited to any great extent, and there was very little deformity of the foot. At the end of two months, the old abscess sac had refilled and broken, leaving an ulcer about three-quarters of an inch in diameter, and separated from a similar condition on outer side by a healthy strip of integument. By the end of May, however, both ulcers had healed, and on September 27th, 1876, the case was discharged as cured.

May 22d, 1877, was re-admitted on account of the recurrence of a large abscess on the inner aspect of the ankle, of short duration. The pain was so great that child was carried in on a pillow. Three days later, the abscess was opened, but the skin sloughed, leaving an ulcer about the size of a silver quarter of a dollar. This healed by the middle of July, and the case was again discharged, cured, on August 3d, of same year.

January 21st, 1880, I succeeded in finding the child, and learned that no more relapses had occurred, that she had been very active. She was not lame, could flex and extend perfectly, and could in- and evert over nearly the normal arc. Long cicatrices existed about each malleolus and the internal malleolus was elongated about one-half inch. The measurements are given in the appended table.

CASE XV. was admitted to the hospital February 7th, 1878. The patient was a boy, whose right ankle became diseased in his second year, and now one and a half years had elapsed. There was no history of any exciting cause, but the paternal family was tuberculous. The little fellow on admission walked quite lame, everting the foot, and there was very marked tumefaction over each malleolus. The joint movements were nearly abolished, the calf was 6 inches against 7 inches for its fellow, the circumference over malleoli was $6\frac{1}{2}$ against $5\frac{1}{2}$ for that of opposite side. At the end of a month an abscess had developed about the internal malleolus and was incised March 2d, an ounce of pus being evacuated. A sinus remained, yet the boy suffered very little from pain. May 14th, 1879, a small spicula of bone was exfoliated and removed through the sinus, after which the discharge

ceased, the opening closed, only to re-open again by August 26th, when another piece of bone was removed as it protruded from the sinus. This was the last, and on December 3d it was recorded that he walked without any lameness, that the sinus had been closed for three months, that all movements were normal except extension, and this was nearly normal, that the limbs were of equal length, the right calf 7 inches, left 7½ inches; the internal malleolus a little enlarged, the circumference here being 6⅜ against 5¾ for opposite side, and that the case was regarded as cured. Has been seen quite recently, and the condition remains the same. There is no deformity.

Case XVIII.—On June 23d, 1876, there was admitted to hospital a strumous-looking girl with the history of chronic epiphyseal ostitis at the right ankle, two years standing, beginning when the child was two years of age. It was reported that she got a blow, yet no swelling or stiffness followed until a long time afterwards. There was gradually increasing soreness and lameness. At the time of admission she walked very lame, the foot being markedly everted and receiving the weight on the heel; there was an elastic tumefaction over each malleolus, and the movements were almost nil; the calf measured 7 inches, the other one 8 inches, the three ankle measurements were 5¼, 7½, 5½ inches against 5½, 7¾, 6 inches. There was very little tenderness on moderare handling of the foot, and no sign of suppuration. Massage was employed and an effort made by medication to restore the health. Slow progress was made toward increasing the motion at the joint, and nothing occurred to relieve the monotony until January, 1878, in which month a small patch of strumous naso-facial erysipelas appeared, soon passing off. In April had varicella. In May it was thought that some motion had been gained, and no inflammation had been excited by a pretty severe passive motion twice daily. By November 15th, it seemed that the movements were better, yet the deformity and the lameness were about the same, and at mother's request child was discharged.

January 28th, 1880, Dr. A. M. Vance, of our staff, found the case for me, and learned that the patient had not had any treatment since leaving the hospital. He examined the limbs carefully and the calf measured 7½ inches against 8¼ inches, the ankle 5⅜, 8⅛, 6 inches against 6, 8¼, 6½ inches, the foot 6½ inches in length, against 7 inches, the limbs were equal in length; the child did not walk lame at all, flexion, extension, in- and eversion and rotation were perfect, in fact, the cure was complete. There was never any suppuration.

Case XIX.—A pale-looking girl, ten years of age, was brought to the out-door department of the hospital, May 26th, 1873, for disease about the right ankle of one year's standing, coming on shortly after a varicella. It had been very insidious in its development, presenting the usual remissions and exacerbations.

The family history was both rheumatic and scrofulous. The child, on her appearance at the hospital, could scarcely walk, and an abscess was already forming. The treatment was purely expectant, and within a few months the abscess had opened, a sinus remaining. The case ran a tedious course, if we take into account the resulting deformity, talipes equinus. This was being treated, when in July, 1875, without known provocation, a caries of the lumbar spine developed, femoral abscess right side followed, and the thigh became much deformed. The equinus was, however, eventually relieved, and the case, so far as this joint is concerned, long since cured. The patient is still under treatment for the spinal disease, but the movements at the ankle are perfect, except in flexion. She uses crutches with a high shoe on left foot, and gets about quite freely.

CASE XX.—Of this patient we did not have full notes; in fact, none were made until August 12th, 1875, the girl being then five years of age, and the note related to a marked valgus which had resulted from a caries of the ankle, left side. The child at this time had chronic phlyctenular conjunctivitis and blepharitis and presented about all the signs that go to make up a strumous habit. The family history was so interesting that I made the following notes: The maternal grandfather died of cancer, the grandmother of "disease of the womb," at the age of forty-eight years, after an illness of nine months, one uncle at the age of twenty-seven years of hemoptysis, and another of "spasms" of some kind, and an aunt (who has since died) was marked with cicatrices of old glandular abscess and had a convergent strabismus; the father suffers much from a chronic hacking cough, the paternal grandfather died of consumption, the grandmother of pneumonia (kind not ascertained), and an uncle was very low with consumption.

A cicatrix was found back of the external malleolus. A spring was applied, and the case was seen a few times, then lost sight of. Dr. Vance found it, however, January 28th, 1880, and learned from the mother that, when the child was one year old, disease of the ankle came on, and that Dr. Knight treated her as an out-patient, for about a year continuously, that in that time abscess formed, ulceration supervened, and that as the case improved she discontinued her attendance, returning two or three years later, when the valgus became so marked. Since 1875, however, there has been an uninterrupted progress toward recovery. The child is not lame at all, and can walk any distance without harm to the ankle. Movements, active and passive, are perfect in all directions; the limbs are equal in length, the calf is one inch smaller than its fellow, the foot is one-half inch short, while the measurements over malleoli are the same as those of opposite side. A deep and long cicatrix is present, and there is just a perceptible amount of splay foot.

CASE XXI.—A girl, æt. 2 years, presented at the out-patient

department December 31st, 1875, with disease at right ankle, of six months' standing. An abscess was already forming over external malleolus. The case was not seen again until January 25th, 1876, when it was noted "integument and subjacent tissues have sloughed, leaving a large, deep, ragged-edged ulcer (1½x1 inch); charcoal and flaxseed poultices ordered." By February 5th, the edges of the ulcer had healed, and the general appearance of the foot was vastly better. There was some constitutional disturbance, however, and a decoction of cinchona, gentian, and serpentaria was ordered. The case was not seen again until January 28th, 1880, when Dr. Edward Swasey, of our staff, visited the house and found the child in good health, walking and running with great ease, though perceptibly limping. There is never any pain unless occasionally in damp weather, movements in all directions about one-third normal, a large cicatrix over external malleolus; 1 inch atrophy of calf, ¾ inch enlargement over malleoli; foot, ¼ inch short. The mother continued to employ the poultice, and after six months' time, the ulcer was healed, sinus closed. It re-opened again a few months later, but soon closed. The case has been regarded as cured for three years.

Case XXII.—On the second of March, 1876, A. C., a male æt. 21 years, called at the office, and from him we obtained a history as follows:

At the age of ten years he suddenly felt one day a sharp sticking pain in the left ankle, and about four weeks thereafter, a swelling appeared just below the internal malleolus, which swelling gradually extended toward the outer side, and an abscess opened spontaneously, immediately above the external malleolus, six months later. The discharge was profuse, and the relief from pain was great. An ulcer appeared, and eight months after the opening, a small piece of bone, honeycombed in appearance, was found one day in the dressings removed. At this time, the ulceration was so deep that the tendons and muscles here were exposed, and the foot was condemned to amputation by some prominent surgeons. He came under Dr. Knight's care, and expectant treatment was employed. The ulcer soon healed, but a sinus remained, which ultimately closed permanently. There was observed a long deep cicatrix over external malleolus, and on January 29th, 1880, he called by request, when the calf was found 2 inches smaller than the right; the foot 1 inch shorter; the limbs of equal length; the foot anchylosed at a right angle with the leg. He can "walk five miles without pain," is on his feet constantly, and is a machinist by occupation.

Case XXIII.—A boy, æt. 1½ years, came under treatment as an out-patient July 6th, 1878. There was an elastic swelling over the external malleolus left side, lameness, pain, and stiffness of the joint; all of three months' standing. The exciting cause was not learned. An anklet was applied, a liniment ordered, and moderate rest enjoined. Syrup of the iodide of iron was also prescribed.

August 23d, the swelling had diminished a little, and the boy could walk more freely. October 25th, not seen since date of last note, and now there is an abscess over the malleolus. This is opened, a small quantity of pus evacuated, and simple dressings ordered. January 9th, 1879, an ulcer formed, but is now about healed, the discharge is very slight; movements perfect in all directions, and boy walks without lameness. February 7th, sinus closed; no induration; about cured. April 4th, sac of old abscess refilling within past few days; cold water dressings and rest. Ordered, also, dialyzed iron and cod-liver oil. April 25th, inflammation has subsided. May 7th, a little thickening; nothing more remains.

January 28th, 1880, in looking up the case to-day, I found the mother who reported that the child died on May 9th of malignant scarlet fever; was taken violently ill the evening of its last visit to the hospital, and attended by the family physician.

CASE XXIV.—A cachetic-looking girl, æt. 5 years, came under treatment April 22d, 1878, for a lameness of three months' duration. There was a small elastic tumor at instep just over the astragalus, the circumference at this portion of the foot being nearly ½ inch greater than at corresponding portion of other foot; the movements were imperfect. The bone was tender on pressure; the child tired easily, and at times was quite lame. The exciting cause was not ascertained. Cod-liver oil, an alterative tonic, a liniment, and an anklet were prescribed; the patient was seen a few times afterwards, and then ceased to attend. Dr. Swasey visited her home January 28th, 1880, and learned from the mother (the child was at school) that the patient fell into other hands, a spring was used until about six months ago, since which time the case has been considered cured. She admits, however, that there is a perceptible lameness, though never any pain. There was never any suppuration.

CASE XXV.—A girl at the age of 5 years fell while at play, and was thought to have strained her right ankle, though there was no symptom until two or three months later. Then she walked lame, and "swelling and soreness came and went." An elastic anklet was employed for a time, but the child continued lame, and suffered more or less pain. She came under our observation August 18th, 1876—three years after the initial symptom. There was a boggy swelling over the external malleolus; the calf was 1 inch smaller than its fellow; and the movements at the tibio-tarsal joint were but little impaired. We advised that patient be admitted to the hospital, but the mother declined to leave the child, and I saw nothing more of the case until January 28th, 1880; I found the child perfectly free from lameness and deformity, able to extend, in- and evert and rotate the foot to the normal extent, but unable to flex to quite the full extent. The external malleolus was a little enlarged, and just above this was a depression

—a remnant, most likely, of an old sac—the contents of which had been absorbed. There had never been any suppuration. The calf was ¾ inch smaller than its fellow, and the foot ½ inch short. The child had been regarded as cured for nearly three years; never had any treatment after the date of our last note.

Case XXVI.—A hearty-looking boy, æt. 3 years, was admitted to hospital February 12th, 1874, for the relief of a diseased foot and ankle of two years' standing. The mother died of consumption, and the boy became lame without any exciting cause, so far as known. The onset was very slow, and it was a long time before the affection attracted any special attention. On admission he was totally unable to walk, there was marked tumefaction across the instep; the skin was red, and from a small ulcer over the scaphoid sero-pus exuded. There was also much swelling about the malleoli, and the foot was quite tender The right calf was 6¾ inches; the left, 7½ inches; the right foot, 7½ inches; the left, 5½ inches in circumference. The mobility was not tested. The treatment consisted of cleanliness, simple dressings, tonics, and rest. February 15th, spontaneous opening over the middle third of the foot, inner aspect, with a discharge rather profuse. Little was recorded of the case until December 1st, when it was noticed that the ulcers have healed; all sinuses have closed, and the foot appears comparatively sound. The boy walks well, though with marked valgus, for the relief of which a spring is applied. February 20th, 1875, the spring has caused no return of the ulceration, and the valgus is much less marked. April 15th, examined pursuant to discharge. Stands and walks with foot in valgus, and limps perceptibly. There is no open sinus. Within past few days a little tenderness has developed over scaphoid and in the joint, and it is decided to keep him in the hospital a week or two longer. May 1st, is discharged this date, although not regarded as cured. He is to continue an out-patient.

He did not return, and was traced by Dr. L. E. Holt, who found him free from lameness, able to extend and flex the foot to the full extent with ease, but unable to invert or rotate the foot. He could evert a little, yet this was not perfect. The disease seemed to have involved chiefly the scaphoid, and in this locality he found three cicatrices, two of which adhered to the bone. There was still a moderate degree of valgus. There was ¾ atrophy of calf, and ¼ inch shortening of foot. The aunt reported that the boy had been regarded as cured for three years, and had not had any other treatment after leaving the hospital.

Case XXVII.—A girl, aged 11 years, was admitted to hospital August 6th, 1873, with disease at right ankle, induced, it was thought, by a strain two years before. She was quite lame when she came in, the internal malleolus and scaphoid were enlarged and tender to pressure, yet there was a fair degree of motion preserved. No suppuration had ever occurred, and there was now no

sign of abscess. A little rest, with massage twice daily, soon relieved her, so that on the 29th of August she was able to walk without lameness. She was allowed home on the 18th of September, walked to excess, and came back very much worse—scarcely able to walk at all. From this time to May 15th, 1874, there was nothing special to record, save exacerbations of pain, swelling and lameness, caused by exertion, and periods of apparent cure. On this date she was discharged cured, and continued without any relapse (so she reported) up to the 21st of December, 1879, when I made an examination at her house. There was on that date a slight halt, almost imperceptible. She works all day standing, and is able to dance without pain or inconvenience, unless she dances to excess, then she has a little pain about instep. The arch of foot is a little deeper than that of its fellow; there is no bony enlargement, but a little tenderness on pressure over medio-tarsal joint. No cicatrices anywhere; flexion and extension are perfect, and in- and eversion nearly normal. Calf is $\frac{3}{4}$ inch small, and foot $\frac{1}{2}$ inch short.

CASE XXVIII.—On May 8th, 1876, a girl, aged fourteen, came to the hospital, seeking relief from a slight strain of her right ankle, which on examination proved to be an old carious ankle long since cured. There was a deep cicatrix one inch in length to the outer side of the tendo Achillis and spreading out over the external malleolus, a small one in front of this process, and another still, one inch above. The foot was at a right angle with the leg, could be extended fairly, but not flexed beyond 90°, and as this was done one could feel a roughening within the joint. There was no swelling, tenderness, or pain on handling, yet as she walked there was some pain; this, however, was recent. The calf was atrophied two inches, and the foot was one-half inch short. The history was, that five years before this examination she fell down eight steps, spraining her ankle, that within a year or two abscess formed, ulceration of the soft parts followed, yet no pieces of bone were exfoliated, that the treatment was chiefly constitutional, that the discharge ceased about one and a half years later, and that she had considered herself as long since relieved. I heard from her on the 28th of January, 1880, and the report was that she was not lame, had about perfect use of the foot, and was in excellent health.

CASE XXIX.—A boy, aged eight years, was admitted to hospital August 16th, 1878, for the relief of a deformity resulting from disease at the left ankle. When six and a half years of age, during a tardy convalescence from measles, he had multiple abscesses over body—about twenty in number—and four months later the ankle swelled, boy was lame, and three months afterward was admitted to Mount Sinai Hospital, where he was treated by local applications and rest. Improved, became very active, was imprudent, and finally became worse than ever; abscess formed, was

incised, and rest again resorted to. On admission he had talipes valgus, and the skin about the ankle was seamed with cicatrices. He has been under treatment a long while for the deformity which is now about overcome. Yet he walks without the normal springiness to the arch. An examination, made January 29th, 1880, finds two inches atrophy of the calf, a half-inch shortening of the foot, and movements limited to about one-half the normal extent. A roughened condition of the joint can be perceived as one employs passive motion.

Case XXX.—A boy at the age of two years began to walk lame and to complain of pain at his left ankle, marked tenderness being evinced by stepping on anything irregular. The parents knew of no exciting cause. There was very little pain, however, during the first six months. He came under treatment in the out-patient department, May 19th, 1876, just twelve months after the beginning of the disease.

There was at that time an elastic swelling over both malleoli, and the foot was in talipes calcaneus; there was considerable muscular rigidity, and extension could not be made to a right angle. The calf was three-quarters of an inch smaller than its fellow. The treatment we advised was not carried out, but the case was treated for a while with a plaster-of-Paris bandage which is reported to have excoriated, then it came under domestic treatment. Dr. Vance found the boy, January 31st, 1880, and examined the limb carefully. There was anchylosis at the tibio-tarsal joint at a right-angle; two cicatrices back of the external malleolus, and one in front of and below the same; one-inch atrophy of the calf, one-half of an inch shortening of the foot, the limbs of equal length. The boy walked decidedly lame and had no spring to the arch of his foot. He was very active, however, and there was no sign of active disease about the joint.

Some of the cases I have reported recovered with joints more or less anchylosed. This could have been obviated, I am sure, if we could have had an opportunity of employing passive motion and using an apparatus during the stage of repair.

The results as summarized from the appended table are as follows:

Age.—The disease developed in 14 cases prior to the fourth year of life; in 11 between four years and nine years, and in 5 between the ages of nine and thirteen years. It is thus seen that this, like all other joint diseases of a tuberculous nature, is peculiar to early childhood.

Bones Involved.—He who has had much experience in caries of the bones entering into the ankle and medio-tarsal

joints, will readily appreciate the difficulty of definitely locating the disease. It is well known that the ostitis rarely limits itself to a single bone. Those who resort to operations can have a better opportunity of learning what bones are involved. In my tables I have endeavored to locate the carious process approximately, and hence my statements in this connection must be taken, not as of facts, but as of opinions.

In 14 of the 30, the lower epiphyses of the tibia and the fibula, and one or more bones of the tarsus were involved, the astragalus especially. In 10, or one-third, the tibia and fibula seem not to have been implicated, but the tarsus alone was the seat of disease. In 4, the tibia and fibula were the only bones carious, and in 2 the os calcis alone.

SUPPURATION in 19 was extensive, *i. e.*, at times profuse and long continued; in 6 it was moderate, and in 5 there was none. It is worthy of note that in three of those wherein resolution took place, the joint has continued more or less tender, and at times a little lameness is manifest.

Two of these have made perfect recoveries, so far as the function of the joint is concerned, one after 2½ years, the other after 3 years. The atrophy of the calf still persists, and with this single exception one could not believe from personal inspection that there had ever been any disease.

TREATMENT extended over a period less than 6 months in 5 cases; between 6 months and 1 year, in 9; between 1 and 2 years, in 12; and between 2 and 3 years, in 4. The average duration was one year and three months.

THE DURATION OF THE DISEASE was one year for the minimum, and six years for the maximum. The average was three years and three months.

THE INTERVAL BETWEEN THE CURE AND THE LAST EXAMINATION was such as to enable me to speak with absolute certainty of the great majority of all included in my analysis.

One died of scarlatina about a week or two after the closure of a sinus that had been merely oozing for a long time, and the boy was regarded as cured; one died during the progress of the disease. I saw and examined six cases, six months after a cure had been pronounced. This was the shortest inter-

val. The longest was thirty-two years. The average was three years and ten months.

Shortening of Limb.—In 9 cases this was not ascertained, in 8 there was no shortening; in 7 there was no apparent shortening; in 3 there was ½ inch, and 2 it was from ½ to 1 inch.

The Foot was not shortened at all in 3 instances, was less than ½ inch in 16, less than 1 inch in 4, and in 7 the difference was not ascertained.

In only one case was there no atrophy of the calf, and this was one wherein the os calcis was alone diseased and 32 years have elapsed since the cure was complete.

Lameness.—Of the whole 30 cases tabulated, 20 or two-thirds came out without any lameness; 7 had a slight halt in their gait, yet could walk long distances and felt no fatigue on account of the limb; in one only was the lameness marked. Not a single one walks with a crutch, a cane, or a high shoe even. One girl, it is true, goes now on crutches, but she does so, *not* because of any lameness of her ankle, but because of a lumbar Pott's complicated with great deformity of the hip and thigh consequent on femoral abscess. She can and does, at times, walk without any support, but we have insisted on her using the crutches, with a high shoe on the foot of the sound limb.

As to Mobility.—Five were normal, *i. e.*, can flex, extend, invert and evert and rotate the foot perfectly. Two of these had disease in the os calcis alone, two in the tibia or fibula, suppuration not occurring, and the other one had disease of the scaphoid alone.

Six patients got well with a complete restoration of motion in eversion and inversion, while there was not perfect flexion or extension. This defect could be made out only by careful comparison.

Five were normal in flexion and extension, while there was a limit to complete inversion or eversion, or both.

In seven, careful comparison was not made, but it was decided that there was "good motion."

In two, there was complete anchylosis at the tibio-tarsal joint. Yet, in these there seemed to be an exaggeration of

motion at the medio-tarsal, which compensated in a measure for this condition.

In four, there was limitation to normal motion in all directions, yet the limb was useful.

In three, there was splay foot, yet not enough to cause any marked inconvenience.

During the progress of the disease, talipes equinus would frequently arise, yet this was overcome by apparatus in due time.

CONCLUSIONS.

From the foregoing analysis, and from the facts I have gathered concerning the results of operative procedures in caries about the joints of the foot, I am fully warranted in drawing the following conclusions:

1. Many children annually undergo amputation of the foot for caries of the ankle, when, by conservatism and a proper amount of respect for the *vis medicatrix naturæ*, the member could be saved, the child be spared the mortification of being thus hopelessly maimed, and surgery itself be ennobled.

2. Excision as a rule is not attended with as good results in children as authorities have led us to expect; and is *rarely ever justifiable.*

3. Partial excisions, the passage of tents through the joint, and other operative procedures offer no advantages over the expectant plan.

4. Nature herself, unaided by art, gets useful limbs, but, as a rule, anchylosis varying in degree and deformity more or less marked.

5. The expectant plan of treatment, fully carried out, assures us of more results that are perfect, and more limbs that are useful without the aid of support, than does any other plan known to the profession.

The accompanying statistics are deduced from the table appended, and have already been summarized.

NO.	AGE WHEN DISEASE BEGAN.	BONES INVOLVED.	SUPPURATION.	DURATION OF TREATMENT.	DURATION OF DISEASE.	INTERVAL BETWEEN CURE & LAST NOTE.	SHORTENING		ATROPHY OF CALF.	LAMENESS.	RESULT AS TO MOBILITY AND USEFULNESS.	REMARKS.
							LIMB.	FOOT.				
1	5	Tibia and tarsus.	Moderate.	2 yrs.	3 yrs.	7 yrs.	None.	½ inch.	1½ in.	None.	Flexion and extension nearly normal; inversion and eversion perfect; no pain unless he walks to excess; is very active.	
2	7	Tibia, fibula, and astragalus	None.	2 "	3¼ "	6¾ "	None.	¾ "	1½ "	None.	Extension and eversion not quite normal; flexion and inversion perfect; no pain except at weather changes; malleoli expanded but not tender.	
3	3	Fibula and tarsus.	Extensive.	½ "	6 "	½ "	.....	.....	2 "	None.	"Good motion at joint;" no deformity of foot; no tenderness.	
4	4	Tarsus.	Moderate.	1⅓ "	5½ "	½ "	.....	½ "	2 "	None.	Movements accomplished with ease; no deformity, pain, or tenderness.	
5	12	Tarsus.	Extensive.	1¾ "	3 "	7½ "	No apparent.	¾ "	1½ "	None.	Can dance well but cannot skate well; flexion perfect; extension, inversion, and eversion about one-half normal.	About two years ago a relapse of two months' duration.

NO.	AGE WHEN DISEASE BEGAN.	BONES INVOLVED.	SUPPURATION.	DURATION OF TREATMENT.	DURATION OF DISEASE.	INTERVAL BETWEEN CURE & LAST NOTE.	SHORTENING		ATROPHY OF CALF.	LAMENESS.	RESULT AS TO MOBILITY AND USEFULNESS.	REMARKS.
							LIMB.	FOOT.				
6	6	Tibia and Fibula.	Moderate.	$\frac{33}{36}$ yrs.	$2\frac{1}{2}$ yrs	$6\frac{3}{4}$ yrs	None.	$\frac{1}{2}$ inch.	1 inch.	None.	Very slight extension; flexion nearly normal; inversion and eversion normal; malleoli enenlarged, and a little tender on pressure.	
7	$1\frac{3}{4}$	Tibia and tarsus.	Extensive.	1 "	2 "	$1\frac{1}{2}$ "	.....	.....	.....	Very slight.	No deformity; mobility not recorded, though apparently normal.	
8	1	Tibia and tarsus.	Extensive.	2 "	3 "	$2\frac{1}{2}$ "	$\frac{1}{2}$ inch.	None.	$\frac{1}{2}$ inch.	None.	Flexion to 90°; extension normal; inversion one-half normal; eversion normal; a slight valgo-equinus.	Wearing apparatus for the deformity.
9	10	Tibia and tarsus.	Extensive.	1 "	3 "	$4\frac{1}{2}$ "	$\frac{1}{4}$ "	$\frac{1}{2}$ inch	$1\frac{1}{2}$ "	Slight	Inversion normal; eversion and extension one-half normal; very slight flexion; stands much; no pain.	No lameness except after prolonged exertion.
10	13	Os Calcis.	Extensive.	1 "	$1\frac{1}{2}$ "	32 "	No apparent.	.....	None.	None.	All movements perfect; never any pain, or sign of relapse.	Had caries of spine at same time, and was treated by Mr. Colles of Dublin.
11	$2\frac{1}{2}$	Tarsus.	Extensive.	$\frac{1}{2}$ "	2 "	.....	.....	.....	.....	.....	Died from septicemia.	Autopsy showed nearly all tarsal bones diseased.

12	11	Tarsus and metatarsus both feet.	Extensive.	1 yrs.	1 yrs.	⅔ yrs.	None.	None.	½ inch.	None.	Slight valgus both feet; all movements normal; no pain.	Began in both feet at same time, and ran about same course in each. A later examination shows valgus to be relieved by treatment with apparatus.
13	7	Os Calcis.	Extensive.	2¼ "	5 "	2 "	None.	None.	½ inch	None.	No loss of function; movements in all directions normal; walks and runs any distance without pain.	
14	2	Tibia and tarsus	Extensive.	1st, 1 year. 2d, 3 mos	3 "	2¼ "	None.	¼ inch.	½ "	None	No deformity; flexion and extension perfect; inversion and eversion nearly so; lower epiphysis of tibia a little elongated.	
15	2	Tibia and tarsus.	Moderate.	1½ yrs	3 "	6 mos.	½ inch.	¼ "	½ "	None.	Extension nearly normal; all other movements normal; no deformity.	
16	1	Tarsus.	Extensive.	1¼ "	6 "	1½ yrs.	½ "	½ "	½ "	None	Flexion and extension normal; inversion and eversion about one-half normal; no pain; no deformity.	
17	6	Scaphoid and prob. other tarsal bones.	Extensive.	1 "	2 "	4 mos	No apparent.	½ "	½ "	None.	Flexion and extension normal; inversion and eversion nearly so; a slight valgus remains.	Valgus nearly relieved by treatment.

NO.	AGE WHEN DISEASE BEGAN.	BONES INVOLVED.	SUPPURATION.	DURATION OF TREATMENT.	DURATION OF DISEASE.	INTERVAL BETWEEN CURE & LAST NOTE.	SHORTENING		ATROPHY OF CALF.	LAMENESS.	RESULT AS TO MOBILITY AND USEFULNESS.	REMARKS.
							LIMB.	FOOT.				
18	2	Tibia and fibula.	None.	2½ yrs	5 yrs.	1 year	No apparent.	½ inch.	¾ inch	None.	Movements in all directions normal; no deformity; no pain even after long walks.	
19	9	Tarsus.	Moderate.	2 "	3 "	4 "	.....	.....	.....	.....	Flexion not quite normal; other movements perfect; bears most of her weight on the foot.	Caries of lumbar vertebræ with femoral abscess on right side, and deformity of this limb; walks on crutches; the right ankle the one formerly carious.
20	1	Tarsus.	Extensive.	2 "	3 "	6 "	None.	½ inch.	1 inch	None.	Movements in all directions normal; a very slight valgus; never any pain.	
21	1¾	Tibia, and probably tarsus.	Extensive.	3 mos.	2½ "	3 "	None.	½ "	1 "	Slight	Movements in all directions about one-third the normal; girl quite active on the foot.	
22	10	Tibia and astragalus	Extensive.	1½ yrs.	3½ "	10 "	¾ inch.	1 inch.	2	Slight	Anchylosis at tibio-tarsal joint; excessive movements in medio-tarsal joint (can walk 5 miles without pain).	
23	1¼	Fibula and tarsus.	Slight.	10 mos.	1 "	.....	.....	.....	.....	None.	Mother reported that movements of this foot were as good as those	Died of scarlatina.

											of the other; no deformity.	
24	5	Tarsus.	None.	3 mos.	2 yrs	6 mos.	.....	.....	.....	Slight	Mother reported the child as cured, and as walking lame only after much exertion; movements not ascertained.	
25	5	Fibula.	None.	2 mos.	3 "	3½ yrs.	No apparent.	½ inch.	¾ inch	None.	Flexion not quite normal; other movements normal; never any pain; no deformity.	
26	1	Scaphoid.	Extensive.	2½ "	5½ "	2 "	No apparent.	¼ "	½ "	None.	Flexion and extension normal; inversion and eversion imperfect; never any pain; a slight valgus.	
27	9	Tarsus.	None.	9 mos.	3 "	5½ "	No apparent.	½ "	¾ "	Slight	Flexion and extension perfect; inversion and eversion one-half normal; is on her feet much of the time; dances well.	
28	9	Fibula and astragalus	Extensive.	1 "	4 "	5 "	.....	¼ "	2 "	None.	Reported as having a perfect foot, though mobility of joint not definitely ascertained.	
29	6½	Tibia, fibula, and tarsus.	Extensive.	2 "	3 "	4 mos	1 inch.	1 "	2 "	Slight	Movements over one-half normal; lacks the springing motion of the foot in walking.	Is wearing apparatus to overcome deformity.
30	2	Tibia and tarsus.	Extensive.	2½ "	3½ "	1 yr.	None.	½ "	1 "	Marked.	Anchylosis; slight varus; walks without pain; natural spring being lost, however.	Never under any regular course of treatment.

AGE.	
Under 4 years	14
Between 4 and 9 years	11
" 9 and 13 "	5

EXCITING CAUSE.	
None known	20
Fall or blow	10

BONES INVOLVED.	
Tibia, or Fibula and Tarsus	14
Tarsus	10
Tibia and Fibula	4
Os Calcis	2

SUPPURATION.	
Extensive	19
Moderate	6
None	5

DURATION OF TREATMENT.	
Under 6 months	5
Between 6 mos. and 1 year	9
" 1 year and 2 years	12
" 2 " " 3 "	4

DURATION OF DISEASE.	
Under 1 year	2
Between 1 year and 2 years	4
" 2 " " 3 "	13
" 3 " " 4 "	4
" 4 " " 5 "	2
" 5 " " 6 "	4
Died	1

SHORTENING OF LIMB.	
From ½ to 1 inch	2
One-half inch	3
None	8
No apparent	7
Not ascertained	9
Lengthening of tibia ½ inch	1

SHORTENING OF FOOT.	
Less than 1 inch	4
" " ½ "	16
None	3
Not ascertained	7

ATROPHY OF CALF.	
Between 1 and 2 inches	8
" ½ " 1 "	7
One-half inch	8
Not ascertained	6
None	1

LAMENESS.	
None	20
Slight	7
Marked	1
Not ascertained	2

INTERVAL BETWEEN CURE AND LAST EXAMINATION.			
32 years	1	4 years	2
10 "	1	3 "	2
7 "	4	2 "	6
6 "	1	1 "	3
5 "	2	½ "	6

One died of intercurrent disease a week or two after cure was pronounced. One died of septicemia.

MOBILITY.	
Normal	5
" except flexion, extension, or both	6
" " inversion and eversion	5
" "good motion"	7
Anchylosis at tibio-tarsal joint	2
Motion in all directions, but limited	4
Death	1