REPORT OF A CASE

OF

WLADIMIROFF-MIKULICZ OSTEOPLASTIC RESECTION OF THE FOOT.

BY

WILLIAM BARTON HOPKINS, M.D.,

SURGEON TO THE EPISCOPAL HOSPITAL, PHILADELPHIA.

EXTRACTED FROM THE

TRANSACTIONS OF THE COLLEGE OF PHYSICIANS OF PHILADELPHIA,

NOVEMBER 2, 1887.

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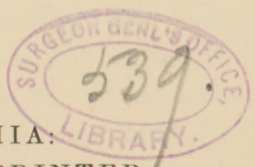

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[Read November 2, 1887.]

The operation which is the subject of this report was originally designed by a Russian, Dr. W. D. Wladimiroff, in 1871, but as he published the account of it in his own language, it was not known out of Russia until nine years afterward. In 1880 Dr. John Mikulicz, of Vienna, performed the same operation and published it as his own device, not knowing that it had ever been done before.

Wladimiroff called it the operation for the production of artificial pes equinus; Mikulicz, the osteoplastic resection of the foot. The toe-stump operation would probably still better distinguish it. It consists essentially in removing the entire heel and ankle-joint and applying what remains of the foot to the leg in a position of pes equinus (Fig. 1), so that the patient walks on his

toes. The conditions for which it has been performed are (1) caries of the larger tarsal bones, and (2) extensive loss of the tissues about the heel, either from disease or injury. For the relief of the former it has been almost exclusively practised, and a number of excellent results have been obtained, though there is, of course, the risk of the disease attacking the remaining

FIG. 1.

Artificial pes equinus.

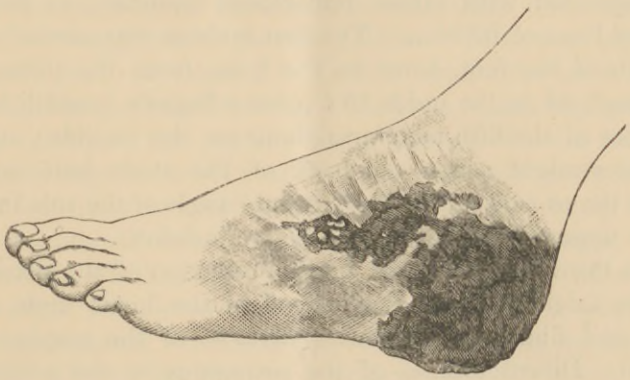
bones and causing relapse. To the latter class of cases, though of these there are as yet but few examples, it will probably prove more particularly applicable, as in them the tissues involved preclude the conservative operations of Chopart, Pirogoff, and Syme, and leave no alternative but amputation of the leg. Should further experience confirm the observations so far made, that this operation is followed by decidedly better functional results than amputation, its future scope will probably include many cases of railroad, gunshot, and the like injuries, where the parts destroyed correspond with those which by it are removed.

There have been twenty-one cases recorded within the past seven years. Most of these have been suc-

cessful, and most of them for caries. The case reported this evening is only the second in which the operation has been done for injury of the tissues about the heel. The patient's history is as follows:

Wm. D., aged thirty-seven, born in Scotland, a strong, healthy man, was admitted to the Episcopal Hospital, November 16, 1886. Two months before his admission he had been run over by a freight car. The wheel had passed over his left foot, tearing away the tissues of the heel down to the bone, laying bare the extensor tendons of the toes, and leaving an isthmus of sound integument upon the dorsum of the foot not wider, according to the patient's recollection, than an inch and a half. During his stay in the hospital of nearly four months, the ulcer, for which he was admitted, obstinately refused to heal. Its cicatricial border having advanced to the utmost limit of its tensile strength, would repeatedly break down, so that all efforts to facilitate healing failed. The accompanying cut (Fig. 2), taken from a photograph of the foot at the

FIG. 2.



Traumatic ulcer of the heel.

time of the operation, shows accurately the position of the ulcer and cicatrix on the outer side. On the inner side the

ulcer did not extend quite so far forward. The operation was performed with proper antiseptic precautions, March 8, 1887.

The patient, after etherization, was placed upon his abdomen; the sound leg was flexed upon the thigh and held out of the way by an assistant. The injured foot having been cleansed, was elevated upon a block placed beneath the rubber cloth and a constant stream of sublimate solution from the irrigator directed upon it during the two hours and three-quarters occupied by the operation.

The first step consisted in dissecting out the posterior tibial nerve. An incision started behind the inner malleolus was carried obliquely downward and forward below it to a point below Chopart's joint. The nerve was found to be so deeply imbedded in newly formed, very dense fibrous tissue, that it was dissected out with some difficulty. It was then divided at the upper and lower angles of the wound, about two inches of its length being removed.

The second step in the operation consisted in forming the flaps. These had to be slightly modified by the form of the ulcer, in order that their edges should consist of moderately healthy skin; in most respects, however, the limits of the ulcer corresponded with rather remarkable accuracy to the prescribed lines of incision. The first incision was carried across the sole of the foot, down to the bone, from the tubercle of the scaphoid on the inside to a point a finger's breadth behind the base of the fifth metatarsal bone on the outside; and the second straight across the back of the ankle half an inch above the os calcis, from the external angle of the sole incision to the upper angle of the tibial nerve incision.

The third step consisted in the resection of the astragalus and os calcis, and the shaving off of the lower ends of the tibia and fibula and posterior surfaces of the scaphoid and cuboid. Disarticulation of the astragalus at the ankle-joint was done from behind forward; of the os calcis at its cuboid joint, and the astragalus at its scaphoid joint from below upward. Due care was taken not to injure the dorsalis pedis during the last-mentioned disarticulation, as the position of

the ulcer necessitated the division and ligation of the posterior tibial artery in forming the flaps.

The last step in the operation included the approximation of the bones, divided nerve and tendon ends, and the closure and dressing of the wound.

With the view of obtaining more perfect fixation of the tarsus to the tibia and fibula than has heretofore been found possible, two sterilized bone dowels were placed in holes drilled into the lower extremity of the tibia at points which corresponded as nearly as possible to the centres of the presenting surfaces of the scaphoid and cuboid; the insertion of their projecting points into these bones being deferred until the final adjustment of the parts. A very fine catgut suture was so placed in the divided and retrenched ends of the posterior tibial nerve as to bring these ends into very accurate apposition without undue pressure. The slack, however, was not yet taken up. In like manner sutures of stronger gut were introduced into the divided and retrenched ends of the tendon of the peroneus longus, about three inches of which were excised, and into the divided end of the tendo-Achillis, and the edge of the plantar fascia exposed in the lower flap. These sutures were all allowed to remain slack until the foot should be brought into its new position. Moderate pressure was sufficient to accomplish this and to impale the tarsal bones upon the sharp-pointed dowels. With the foot firmly retained in this position, the extremities of the nerve were brought accurately together and sutured. The tendon of the peroneus longus was likewise sutured and the terminal extremity of the tendo-Achillis stitched to the edge of the plantar fascia. The introduction of drainage catgut and suturing the skin flaps with catgut completed the approximation of the parts. A dressing of gauze, iodoform, and sublimate cotton was applied and the limb was placed upon a straight posterior splint. The latter was in three days substituted by a plaster-of-Paris double dressing, the foot and leg sections being connected by an iron bracket anteriorly in order to leave ample room for washing and dressing the wound. Five weeks later a small ulcer

remained, but union of the deeper parts was complete and consolidation of the tarsal and leg bones was found to have begun. The patient at this time complained of tingling in the toes accompanied by occasional shooting pains, and there was partial anæsthesia of the sole of the foot. Sensation gradually returned, and is now restored except over a very limited area.

Three months after the operation, under ether, the toes were extended to a right angle; to accomplish which moderate force only was required. Since then there has been nothing to note. The limb continues to gain in strength and the patient can

FIG. 3.

Appearance of the foot after the operation.

now, with a cane, walk four miles a day. He has had the braced shoe which he wears but two weeks, and has, therefore, not yet had time to become thoroughly accustomed to it. He walks well without a cane, while with one, when not fatigued, he shows hardly a limp. This cut (Fig. 3) represents the limb after the operation, and was engraved from a photograph on the block.

Two modifications of the operation, as practised in this case, deserve mention, namely: the employment of

bone pegs or dowels to fix the tarsal bones to the tibia, and the suturing of the divided and retrenched tendons. The dowels provided proved rather too light to make the joint firm and immovable, but they were nevertheless used, as heavier ones were not at hand. Perfect fixation of the tarsus and leg at the outset, by lessening suppuration, by promoting early bony union, and by obviating the necessity of such carefully applied outside support, would seem to be an important factor in the after-treatment of the operation. The dowels should be three-sixteenths of an inch in diameter and three inches in length. They may be sunk two inches in the tibia and one inch in the tarsus. Holes need not be drilled for them in the latter, as their sharp points readily penetrate the cancellated structure of these bones. Uniting the severed tendons has, without doubt, added to the function of the foot in this case. Though suggested in *The Medical News* editorially, it does not appear to have been attempted before. The plantar fascia was chosen as a strong accessible point to which to attach the tendo-Achillis, instead of the tarsal periosteum, as suggested in *The Medical News*.

Within the narrow limits of motion which now remain, the patient can flex, as well as extend the foot. The motion is partly tarso-metatarsal, and partly tarso-tibial. The latter is diminishing, and the braced boot which he wears may probably be cast aside within one year.

The following table includes, it is believed, all the operations which have been performed, with the exception of five Russian cases reported incidentally by Sklifossowsky. The first nineteen cases are taken from the table of Zesas, *Archiv für klinische Chirurgie*, 1886, Bd. 33.

Table of Operations.

No.	Operator.	Year.	Age.	Cause.	Result.	Authority.	Remarks.
1	Wladimiroff,	1871	15	Caries.	Recovery.	Aus den Arbeiten der Gesellschaft der Aerzte der Stadt Kasan, 1872.	Patient walked very well without cane.
2	Mikulicz,	1880	23	Syphilitic ulcer.	Recovery.	Archiv für klin. Chirurgie, Bd. 26.	At the end of four months patient walked with cane and boot, while in eighteen months did hard work, and could walk one hour.
3	Socin,	1881	22	Caries.	Recovery.	Jahresbericht über die chirurgische Abtheilung das Spitales zu Basel, 1881–82	After two months used cane and worked in the field; no relapse after two years.
4	Mikulicz,	1881	27	Caries.	Recovery.	Centralblatt für Chirurgie, 1884.	Patient, with boot, could walk quite far, but without it had to use a cane; six months afterward died of pulmonary tuberculosis.
5	Sklifossowsky,	1882	30	Caries.	Recovery.	Bull. de la Société de Chirurgie de Moskou, 1882.	Patient did well.
6	Haberern,	1882	18	Caries.	Relapse.	Verhandl. der Deutschen Gesellschaft für Chirurgie, 1884.	Amputation of the leg, after five months, from which he recovered.
7	Mikulicz,	1883	16	Caries.	Recovery.	Centralblatt für Chirurgie, 1884.	Patient walked in six months with boot; without it had to use a cane,
8	Lauenstein,	1883	32	Caries.	Recovery.	Ibid.	Patient died in eight months of what appeared to be pulmonary tuberculosis
9	Lauenstein,	1883	25	Caries.	Recovery.	Ibid.	Patient could walk four hours at a time, and without boot could step firmly upon his foot.
10	Mikulicz,	1883	?	Caries.	Recovery.	Verhandl. der Deutschen Gesellschaft für Chirurgie, 1884.	Patient walked well with cane.
11	Roser,	?	?	Caries.	Recovery.	Fischer: Deutsche Zeitschrift für Chirurgie, xxiii. S. 164.	Functional result excellent.

No.	Operator.	Year.	Age.	Cause.	Result.	Authority.	Remarks.
12	Kümmell,	1884	38	Caries.	Relapse.	Centralblatt für Chirurgie, 1885.	After four months resection of the rest of the tarsus, part of the metatarsus, and a portion of the tibia and fibula.
13	Schattauer,	?	10	Caries.	Recovery.	Ibid.	Patient, with boot, could walk many hours without fatigue.
14	Renssen, (Ranke's Clinic.)	1884	?	Deformity resulting from fracture.	Recovery.	Ibid.	Seven and a half months after operation patient walked well with boot; 3½ cm. shortening.
15	Schattauer,	1884	9	Caries.	Relapse.	Ibid.	Five weeks after the operation amputation of the leg; recovered.
16	Fischer,	1884	18	Caries.	Relapse.	Deutsche Zeitschrift für Chirurgie, xxiii. 1 u. 2 Heft.	Resection of second and third cuneiform bones and remainder of cuboid; recovered. At the end of a year patient walked well with boot and cane; could go up stairs.
17	Niehans,	?	50	Injury of heel.	Recovery.	.....	Very good functional result. Without boot or cane became easily fatigued.
18	Srodina,	1885	20	Caries.	Gangrene.	Centralblatt für Chirurgie, 1886, No. 3.	Amputation at the lower third of the leg.
19	Sordina,	1885	11	Caries.	Recovery.	Ibid.	Very good result.
20	Gutsch,	1886	13	Caries.	Recovery.	Archiv für klin. Chirurgie, Bd. 34, 1886.	Resection included parts of all the cuneiform bones and seven centimetres of the tibia and fibula; function completely restored.
21	Fenger,	1886	29	Caries.	Recovery.	Journal of the Amer. Med. Association vol. viii., Jan. 1887.	Fifteen months after the operation can walk without boot and cane, and bear the whole weight on the foot; solid ankylosis; lengthening 5 cm.
22	Hopkins,	1887	37	Traumatic ulcer.	Recovery.	.....	After eight months can walk four miles with cane and boot; limited motion under voluntary control in flexion as well as extension; about ¾ in. lengthening.