OBSERVATIONS
ON THE
RADICAL CURE OF CLUB-FOOT,
AND EXHIBITION OF CASES WHICH HAVE BEEN
OPERATED ON.

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As much thought has been bestowed within the last decade on the radical cure of confirmed club-foot, it may not be devoid of interest to recapitulate some of the leading facts gained by experience, and to submit conclusions thereon to the judgment of this Society.

I will divide the consideration of the subject under the following headings :—

1. Some reasons that have suggested operative procedures in cases of intractable club-foot.
2. The cases especially suited for operation.
3. The operation itself, the description of its details, and the necessary instruments.
4. The list of operations (26) performed by myself ; and notes of other cases operated on by British and foreign surgeons.

5. The exhibition of casts taken before and after operation, the osseous wedges removed, and living specimens of the results gained.

6. Concluding remarks.

1. Some reasons that have suggested operative procedures in cases of intractable club-foot.

The obstinate character of severe forms of club-foot, its general tendency to get worse unless subjected to continued treatment, and the discouraging relapses occurring even after proper treatment has been employed, may be mentioned as important grounds for reconsidering the usual methods of practice in vogue up till 1874. My experience showing how absolutely useless instrumentation alone was, I carefully considered the operation of removal of the cuboid bone, an operation that had been suggested by Dr. Little in 1854, and practised by Mr. Solly, of St. Thomas's Hospital, also in 1854.

From an anatomical point of view no structure of special importance is removed either in excision of the cuboid bone, or in the excision of a wedge at the transverse tarsal joint, if the operation described hereafter be practised.

2. The cases especially suited for operation.

I have never yet operated on any case that had not been previously subjected to orthopædic treatment; in some cases such treatment had been carried out during the whole of the patient's lifetime; whilst in others the condition was so incorrigible as to have necessitated the abandonment of treatment as hopeless.

3. The operation itself, the description of its details, and the necessary instruments.

The operation consists of the removal of an osseous wedge at the transverse tarsal joint; this operation has hitherto been confined to cases of talipes varus and equinus, with their combination. I will describe the operation for talipes varus first, then that for equinus.

(1) *The operation for talipes varus.*—The patient being

under the influence of an anæsthetic, and an elastic bandage being placed on the leg after elevation, an oblong piece of skin is excised from the outer side of the foot over the cuboid. This should include the distended and hypertrophic bursa and should correspond nearly with the size of the base of the osseous wedge required. On the inner side of the foot, at the stereotyped crease of skin, and in a line over the astragalo-scaploid joint, a vertical cut is made of sufficient length to include the thickness of the scaphoid bone ; these two imaginary lines, drawn across the dorsum of the tarsal arch, represent roughly the superficial area of the triangular piece of bone to be removed. Next, keeping close to the bones, elevate the tendons, nerves, arteries, and veins with the blunt curved knife on the dorsum, until the triangular space has been cleared from the outer to the inner side, for the transit of the kite-shaped director. Having passed the director between the tarsal bones and the soft structures above direct the probe-pointed saw successively along the grooves on the under surface of the director, and saw the wedge out with precision. It is usually better to saw the distal side of the wedge first, and the ankle-joint side last.

The blunt curved knife is next used on the plantar aspect of the wedge, the operator again keeping close to the bones, and lifting out the wedge in one piece by the aid of strong pointed bone forceps. The wedge usually embraces the component bones of the transverse tarsal joint, the cuboid bone invariably predominating ; and portions of the bones anterior to the transverse tarsal joint, according to the condition of the deformity. Many of these osseous wedges are exhibited to the Society. One shows the component bones of the transverse tarsal joint alone, viz. astragalus, os calcis, scaphoid, and cuboid. Another shows portions of every one of the tarsal bones, and the bases of the four outer metatarsal bones also. (Case 25.)

By this method of operating, simple or compound wedges of bone may be removed with ease and precision ;

their form can also be tested, as they each appear in the shape of one neat block instead of the *débris* of a piecemeal and haphazard dissection.

I prefer, for many reasons, to set up these compound fractures of the foot immediately that the distortion has been corrected by rotation and abduction; the sawn surfaces of the bones should be co-adapted, and maintained *in situ* on the splint, shown in the accompanying woodcut, prior to the patient's awakening from the anæsthetic.

In applying the splint the patient's thigh, knee, and upper half of the leg must be first enveloped in a sock of thick fleecy wool (A) knitted to shape; over this are applied three or four layers of plaster-of-Paris bandage. To the surface of the latter the side irons are accurately adjusted, and are retained in position by additional turns of the plaster bandage (B). The foot-piece slides over the ends of the side irons, and is regulated by a male screw, screw washer, and female thumbpiece on each side iron. Eversion of the anterior half of the foot is carried out by everting the moveable foot-plate on a pivot and fixing it by a thumb-screw (C). Any undue pressure can be at once removed; wide interruptions at the malleoli prevent any inconvenience from œdema; dressings (if thought to be desirable) may be readily applied, and the foot leaves the operating table a fixture.

I neither use sutures, nor dressings; the wounds are exposed to the air. Cleanliness, however, of a strict character is maintained, and free drainage provided for.

I have never met with hæmorrhage of a serious nature ; this may be accounted for by the plan of keeping close to the bones, and bluntly dividing with the curved knife any articular or osseous branches.

(2) *The operation for talipes equinus.*—A few words will suffice to indicate the variation necessary in the operation for cases of talipes equinus.

Taking again the line of the transverse tarsal joint as a guide, on the outer and inner sides of the foot, immediately over this joint, two wedge-shaped pieces of skin are removed equal in extent to the amount of bone demanded. The soft structures are freed on the dorsum of the foot in the way previously described ; but as the base of the osseous wedge for equinus cases is at the dorsum, and its apex at the sole the parallel wire director, instead of the kite-shaped varus one, is used. The saw is successively inserted in its grooves, and by keeping in mind the idea of a keystone, a clean wedge of bone is cut out from the dorsum to the sole of the foot. This wedge is easily extracted in one piece, and consists of the component bones of the transverse tarsal joint, and in severe cases of portions of bone anterior to it. The splint used is the same as for varus.

4. The list of operations (26) performed by myself, and reference to those operated on by other surgeons.

The following list embraces a summary of my own cases :—

Excision of Cuboid Bone and Bases of the two outer Metatarsal Bones.

No.	Sex.	Age.	Admission.	Operation day.	Nature of deformity.	Operation.	Discharged.	Result.
1	Boy	15	Jan. 26, 1874	Jan. 27, 1874	Talipes varus congenital, left	Excision of left cuboid	May 27, 1874	Recovery
2	"	15	"	Mar. 17, 1874	Talipes varus, right	Excision of right cuboid	"	"
3	"	14	Jan. 12, 1875	Jan. 18, 1875	Equino-varus, right	Ditto	April 1, 1875	"
4	"	10	Jan. 14, 1875	Jan. 26, 1875	Ditto	Ditto	May 26, 1875	"
5	"	10	"	"	Equino-varus, left	Excision of left cuboid and fifth metatarsal base	"	"
<i>Excision of Osseous Wedge at the Transverse Tarsal Joint.</i>								
6	Boy	6	Mar. 17, 1876	Mar. 28, 1876	Equino-varus, left	Excision of osseous wedge at transverse tarsal joint	May 22, 1876	Recovery
7	"	12	Nov. 7, 1876	Nov. 14, 1876	Equino-varus, right	Ditto	May 21, 1877	"
8	"	12	"	Jan. 16, 1877	Equino-varus, left	Ditto	"	"
9	Man	20	Nov. 6, 1877	Nov. 20, 1877	Talipes equinus, left	Dorsal wedge excised	Dec. 5, 1877	D. in 14 d.
10	Girl	14	Feb. 22, 1878	Mar. 5, 1878	Talipes varus, right	Excision of osseous wedge at transverse tarsal joint.	April 12, 1878	Recovery
11	Boy	16	May 20, 1878	May 31, 1878	Equino-varus congenital, right	Excision of wedge at transverse tarsal joint	Aug. 29, 1878	"
12	"	14	May 8, 1878	May 25, 1878	Equino-varus, left	Excision of wedge at transverse tarsal joint	Aug. 31, 1878	"
13	"	10	July 6, 1879	July 8, 1879	Talipes varus, right	Ditto	Sept. 9, 1879	"
14	"	4	June 6, 1881	June 7, 1881	Talipes varus, left	Ditto	July 22, 1881	"
15	"	10	June 10, 1881	June 14, 1881	Paralytic equino-varus, right	Ditto	Aug. 9, 1881	"
16	"	11	June 23, 1881	June 25, 1881	Talipes equinus, left	Ditto	Aug. 11, 1881	"
17	"	10	July 28, 1881	Aug. 4, 1881	Equino-varus, right	Ditto	Oct. 21, 1881	"
18	"	5	Nov. 26, 1881	Nov. 29, 1881	Talipes varus, right	Ditto	Feb. 13, 1882	"
19	Girl	4	Mar. 27, 1882	Mar. 31, 1882	Congenital varus, right; malformation developed, left foot	Ditto	June 1, 1882	"
20	"	13	June 1, 1882	June 6, 1882	Equino-varus, left	Ditto	Sept. 9, 1882	"
21	Boy	34	June 17, 1882	June 20, 1882	Double congenital talipes varus	Both trans. tars. joints excised	Aug. 21, 1882	"
22	"	10	June 25, 1883	June 26, 1883	Cong. talipes equino-varus, left	Excision of wedge at left transverse tarsal joint	Dec. 19, 1883	"
23	"	7	July 9, 1883	July 10, 1883	Cong. double talipes equino-varus, especially right	Excision of right transverse tarsal joint	Oct. 19, 1883	"
24	Girl	4	Nov. 13, 1883	Nov. 20, 1883	Ditto	Ditto	Mar. 21, 1884	"
25	Boy	18	Jan. 8, 1884	Jan. 11, 1884	Cong. left talipes equino-varus, toes up side down	Rectangular wedge excised at transverse tarsal joint	Mar. 21, 1884	"

Note.—In 1885 I have successfully operated on two more males.

Up to the present 23 individuals have furnished 26 distinct operations. Two have submitted to the double operation at one sitting, 19 are boys, 4 are girls. Fourteen are cases of talipes equino-varus, ten are cases of varus, two cases of talipes equinus. My oldest case is 20, the youngest 1 year and 4 months. I regret to state that I have lost one out of the 26 operations, giving a mortality percentage of $3\frac{11}{13}$.

The shortest stay in the hospital occurs in Case 10 (38 days) ; the longest stay is 175 days, in Case 22 ; this prolonged residence was due to domestic causes. The average stay in hospital, from the day of operation to the day of discharge, is 77 days.

All the patients, save the one whose case ended fatally, have been enabled to walk, and perform the daily routine of work, subsequent to the operation. In some cases, the application of a plaster-of-Paris or gum and chalk bandage has been found necessary for a time, as in the case of other resections. A high boot must be worn by others. Patients, after the operation, become absolutely plantigrade, the scar is small and well out of the line of pressure ; relapses are prevented, and a useful though shortened foot results.

In recording the work done by British and foreign surgeons in similar cases, the list drawn up by Dr. Granville Faught for Dr. De Forest Willard,¹ of the University of Pennsylvania, is the most complete. Tables are given of excisions of the cuboid bone, of the astragalus, and of wedge-shaped excisions at the transverse tarsal joint.

Amongst British surgeons the pioneer was the late Mr. Solly, who removed the cuboid in 1854 ;² Mr. Davies-Colley³ also performed a similar operation in 1875.

5. The exhibition of casts taken before and after operation, the osseous wedges removed, and living specimens of the results gained.

¹ 'Club-foot,' by Dr. De Forest Willard, Philadelphia.

² 'Medico-Chirurgical Transactions,' vol. xl (1857), p. 118.

³ Ibid., vol. lx (1877), p. 11.

On the table are thirty casts illustrating especially the condition of the feet before and after operation, specimens are also presented showing how the osseous wedge is excised in one block; in all varus cases the cuboid bone predominates.

Specimen No. 25 includes part of all the bones of the tarsus, and the bases of the outer four metatarsal bones. It is seen that the head of the astragalus is dwindled and misshapen, reminding the observer more of the concavo-convex aspect of the trapezium. The scapho-cuboid articulation is exceedingly pronounced, the bones generally are not well developed, the ligaments are tough and hypertrophied, a small bursa is to be seen over the anterior outer aspect of the os calcis.

Seven living specimens are exhibited. One a young man who was operated on seven years ago, and who has never worn any special instrument since. Two of the cases are wearing a high cork sole.

6. General observations on club-foot, with conclusions.

After an excision at the transverse tarsal joint the ankle-joint (as a rule) remains unimpaired; but I have seen stiffening and loss of free motion result.

Excision of an osseous wedge at the transverse tarsal joint is an operation mainly reserved for inveterate cases, and for cases where milder measures have failed.

In conclusion, for cases of talipes varus, equino-varus, or equinus, excision of an osseous wedge at the transverse tarsal joint is, in my opinion, on mechanical grounds a *most* valuable operation for restoring symmetry and utility to a deformed and useless foot, no case is absolutely hopeless, or to be condemned to amputation before the surgeon has given this excision fair consideration; it will, I trust, after judicial criticism, be yet further adopted, and take its place amongst the accepted joint excisions in surgery.

(For report of the discussion on this paper, see 'Proceedings of the Royal Medical and Chirurgical Society,' New Series, vol. i, p. 339.)