have been rapidly effected by incisions into the knee-joint and the evacuation of the contained pus without any further accumulations of pus taking place.

Perhaps it is a little premature to publish a solitary instance of a treatment which, so far as I am aware, is original, but the possibility that, under similar circumstances, a life might be spared or even a limb saved by the early publication of this single case must be my excuse for the course I have taken.

A NEW PRINCIPLE OF CURING CLUB-FOOT IN SEVERE CASES IN CHILDREN A FEW YEARS OLD.

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OPERATING surgeons meet with many cases of club-foot which have either not been treated in the first year or two of life, or in whom the treatment at that age has not been satisfactory. Especially when school life begins to approach, the question of remedying the hideous deformity before the child mixes with other children presses itself upon the parents, and they bring it up for treatment.

Those who have had much experience of cases of this kind will admit that, though a great deal can be done by selecting the proper operation for each, or by combining operations, yet none of our plans of treatment are thoroughly satisfactory; all require great and prolonged care and observation of the patient, and after-operations are frequent. Rectification by tenotomy, myotomy, open incision, cuneiform excision, resection of the cuboid, resection of the astragalus, and supra-malleolar osteotomy is imperfect, whether these be used singly or in combination. Phelps's open incision in some cases, and Lund's excision of the astragalus in others, combined with tenotomy of the tendo Achillis, have in my hands given the best results, although far from ideal ones. The former operation is preferable where the deformity is not of the extremest form, the latter where it is so.

A study of the radiographs of such patients, as well as of those from normal children of a like age, suggests a more perfect method than any of them and a more nearly ideal one. I suppose every surgeon nowadays agrees that the aim of all treatment of club-foot is to restore the bones to as nearly as possible a normal shape and position. This, at least, is my view, and the object of this paper is to show how it can be accomplished in suitable cases better than by any method which I have hitherto seen described and myself put on its trial.

The tarsal bones, which oppose the chief obstacles to the rectification of club-foot, do not complete their ossification for many years. In healthy children they consist of a rounded kernel of bone enclosed in a thick layer of cartilage, whose ossification will eventually complete their external configuration (Fig. 1, p. 1525).

In club-foot their ossification is an even slower process (Fig. 2, p. 1525); and when we excise them, as is done in Lund's excision of the astragalus for club-foot, they are always in children seen to present a thick layer of cartilage surrounding a relatively small, somewhat spherical bony centre (Fig. 3).

If the whole or a considerable part of a tarsal bone be resected for club-foot, that bone, or portion of bone, is lost; it is not restored. But if an incision be made through the soft parts at some suitable spot, and deepened so as to divide the enclosing layer of unossified cartilage, the bony kernel may be partially or completely removed by a Volkmann's sharp spoon, and the bone will be restored by ossification from the shell of cartilage which remains.

A tarsal bone which has in this manner been deprived of its osseous centre is soft and plastic, like a squeezed orange, and very moderate pressure upon it suffices to mould it into any required shape, so that it ceases to offer any notable opposition to the rectification of the deformity of the clubbed foot. And several bones can, by gliding the wound of the soft parts in the required directions, be dealt with in the same way through the one external wound in such a manner that the

whole or any required part of their osseous centres can be spooned out where they oppose rectification, until sufficient has been taken away to enable the deformity to be entirely corrected. If this be done with antiseptic precautions, the interior of the scooped out bone is filled by a blood clot, which is, as in a simple fracture, gradually replaced by cartilage which slowly ossifies; and the bone, with all its ligaments and joints, is intact, yet in such a shape that, while perfectly useful, it is accommodated to the form required for the abolition of the deformity.

Fig. 3.—Radiograph of two astragali removed by Lund's operation for club-foot.

The only other structure requiring division is the tendo Achillis, which should be cut in the usual way by a tenotome at the same sitting.

The manner in which the operation is performed is as follows. After the usual disinfection an Esmarch's tourniquet is applied to the leg and tenotomy of the tendo Achillis is performed. An incision through the skin is made in a gentle curve beginning in front of the external malleolus and extending forwards, with its convexity towards the sole, until it terminates over the calcaneo-cuboid joint on its dorsal aspect. When its edges are retracted the outline of the astragalus is visible. The soft parts covering it and the cartilaginous shell surrounding its osseous centre are then divided by a shorter incision in the same line as the cutaneous one, the knife being made to sever everything down to the bony kernel. A Volkmann's spoon, slightly curved forwards at its neck, is passed into the wound, of the cartilages and the whole bony centre, save the upper part constituting the pulley between the two malleoli, is cautiously scraped out. The feeling conveyed through the spoon at once tells when the cartilage is reached. The foot is now placed in the attitude of rectification, and usually the improvement is very great. If the correction be not sufficient, as will be the case in very severe deformity, it is necessary to apply the same treatment to the cuboid and calcis, which stand in the way. The skin incision is glided over the cuboid till its outline can be seen and felt, and it also is incised and its bony centre completely scraped out, sparing all its cartilaginous shell. The anterior end of the calcis is similarly treated and then the rectification is satisfactory.

Fig. 4 shows the foot before operation.

Fig. 4.—The club-foot before operation.

Fig. 1.—Radiograph of a child's tarsus.

Fig. 2.—Radiograph of the tarsus of a child's club-foot, aged 4.

Fig. 10.—Radiograph of club-foot after cure.

Fig. 11.—Radiograph of a foot after Lund's operation for excision of the astragalus in club-foot.

Fig. 5 shows the skin incision and the deeper openings through which the three bones have been emptied.

Fig. 5.—The *evidement* completed.

Fig. 6 shows the amount of rectification obtained.

Fig. 6.—The foot rectified.

In Fig. 7 the limb is encased in plaster, with threads to guide the wire saw on its removal. Before this, it seems

Fig. 7.—The plaster fixation.

superfluous to say, the few vessels which bleed have been secured, and the wound closed without drainage by a carefully applied deep and superficial layer-suture. The plaster bandage is best applied without padding or even the protection of more than a single layer of flannel, and even this may often be omitted with advantage. If the upper portion be first applied and the foot portion last, the surgeon's hand can, while the plaster is setting, constrain the foot into the most perfect rectification possible.

The rectification that can be at once obtained is seen in Figs. 8 and 9, which show the same foot before and three months after operation. The patient trod firmly, on a perfectly flat sole, dorsal flexion was easy to some 15 degrees less than a right angle; only the adduction of the metatarsus and toes remained, and for that no remedy has ever been suggested.

Fig. 10, p. 1525, which is a radiograph of the same foot as was shown in Fig. 2, was done four months after the operation, and the re-ossification is spreading from the pulley of the astragalus and is just commencing in its head, while it is well advanced in the cuboid and front of the calcis.

In performing this operation I have been struck with the ease with which satisfactory rectification of bad club-feet can be produced and its perfection afterwards as compared with

the methods hitherto in use. It has further the advantage that, as no joint is opened or injured, and the ligaments and other important parts of the foot are not interfered with, perfect motion in all the articulations is obtained. This is not the case in Lund's operation, though it is otherwise a very good one in the worst cases; and its radiograph, given in Fig. 11 (p. 1525) shows how inferior it is in result to the method here proposed, and whose result is seen in Fig. 10.

Fig. 8.—Foot before operation.

Fig. 9.—Foot after operation.

I venture therefore to advise this plan of treating club-foot in bad cases in children of a few years old. From my present experience of it I should say it is applicable at least up to 6 years of age, possibly to a couple of years later. But it is always advisable to take a radiograph of the feet before carrying it into effect, so as to be certified that the state of the bones is such as to ensure a success.

Evidement of a tarsal bone is not new; it was, I think, practised by Sedillot, but the principle of his operation is quite different. He advised scraping out the whole spongy centre of a fully-developed tarsal bone, such as the calcaneum, and leaving its compact shell, for carious disease, and this has nothing in common with the principle of treating club-foot which is here recommended.

SMALL-POX IN THE UNITED STATES.—The number of cases of small-pox in the United States officially reported from December 28th, 1901, to May 23rd, 1902, was 34,170, with 1,048 deaths. For the corresponding period of 1901 there were 24,921 cases, with 408 deaths.

ASSOCIATION OF REGISTERED MEDICAL WOMEN.—The annual meeting of the Association of Registered Medical Women was held on Tuesday, June 3rd, at 8 p.m. The election of officers for the ensuing session took place as follows:—*President*: Mrs. Stanley Boyd, M.D. *Treasurer*: Mrs. Stanley Boyd, M.D. *Committee*: Mrs. Berry, M.D., Miss Chadburn, M.D., Miss Cock, M.D., Miss Crosfield, M.D., Miss Douie, M.B., Miss Scharlieb, M.S., Miss Sheppard, M.B., Miss C. Sturge, M.D., Miss Webb, M.B.