substance."¹ The lower tarsal segment, with the lid border, tends to be drawn up on to the anterior surface of the upper segment. Three such sutures are enough, tied in the ordinary way. It is quite unnecessary to tie them tightly. The parts must be simply retained in position and not pulled forcibly into position by the sutures. I have not had any sloughing of the lid margin; but it must be very easy to produce it by tying the sutures tightly. The two end-sutures (of the three) require particular care in the tying, as the parts are apt to be held in their original position by the clamp. Two other sutures, passed through skin only, suffice to bring the edges of the skin wound into close apposition.

One of the main advantages of the operation is its inherent adaptability to the needs of individual cases. Well-developed entropion brings its own remedy in the broader wedge taken, and bad trichiasis or distichiasis insures an application of the sutures which increases the displacement and rotation of the lid border. Its effect is permanent, except in cases where untreated trachoma again leads to cicatricial contraction. The shortening of the lid is slight and of no account in the great majority of cases. In bad cases there is apt to be a depressed line of scar left unless care be taken that the edges of the skin wound are in accurate apposition.

Bombay.

Clinical Notes :

MEDICAL, SURGICAL, OBSTETRICAL, AND THERAPEUTICAL.

LENGTHENING THE TENDO ACHILLIS.

BY R. A. HIBBS, M.D.

ON March 16th, 1900, at a meeting of the section on Orthopædic Surgery of the New York Academy of Medicine, I presented five patients affected with talipes equino-varus, the result of infantile paralysis, on whom I had performed a new operation as follows. The tendo Achillis having been exposed by a parallel incision one and a half inches in length, made to its outer side, it was cut transversely within half an inch of its insertion, through two-thirds of its substance, and with the turned knife it was then split upward a certain distance. A quarter of an inch above the end of the longitudinal cut another transverse cut was made from the opposite side through two-thirds of the substance of the tendon, and the knife being turned the tendon was again split to within a quarter of an inch of the first transverse incision. Thus the tendon was severed in such a manner as to secure its lengthening and at the same time to preserve its continuity. In Fig. 1 the first transverse cut would be

FIG. 1.

from E to C, the first longitudinal from C to D, the second transverse from G to B, and the second longitudinal from B to A. When traction was applied lengthening would occur as shown in Fig. 2, and it would be equal to the sum of the two

FIG. 2.

longitudinal cuts minus the sum of the two laps of a quarter of an inch each. In Fig. 1 if C D is half an inch, B A half an

inch, A to E C quarter of an inch, and D to G B quarter of an inch, then the lengthening would be half an inch plus half an inch minus quarter of an inch plus quarter of an inch, or one inch minus half an inch, or half an inch. It was a matter of choice whether the longitudinal or the transverse cuts were made first, but it was important that the skin incision should be to the outer side of the tendon in order to prevent the scar from falling directly over the tendon which might be rubbed by the shoe. Since operating by this method I have learned that it had already been practised in a case of traumatic talipes equinus by Sporon, a Danish surgeon.¹

CASE 1.—In a girl, aged eight years, a short tendo Achillis had prevented flexion of the right foot within 10° from a right angle. It was lengthened by this method on Sept. 22nd, 1899, and the foot was fixed at a right angle. In two weeks slight voluntary motion was allowed and the muscle received daily exercise with some resistance from the attendant. After half an inch lengthening had been secured there was positive resistance to any further flexion of the foot than was allowed by the lengthening. The child walked with strong control of the os calcis.

CASE 2.—In a girl 12 years of age flexion of the left foot was impossible within 15° from a right angle. The tendon was lengthened three-quarters of an inch on July 6th, 1899. With suitable after-treatment the result was an excellent position of the foot with strong action of the muscles of the calf.

CASE 3.—In a girl aged 14 years flexion of the right foot was prevented within 10° from a right angle. The tendon was lengthened one and a quarter inches on June 16th, 1899, an unusual amount in order to relieve extreme valgus, with resulting good control of the os calcis. As the valgus was recurring a tendon grafting would be done.

CASE 4.—In a girl eight years of age the left foot was inflexible within 45° from a right angle, appearing to be almost in a straight line with the leg. The tendon was lengthened one and three-quarter inches on June 16th, 1899, and the foot was fixed at a right angle. It was believed that an ordinary tenotomy would have been followed by loss of usefulness of the calf muscles. It was seen, however, that their action was excellent.

CASE 5.—In a girl 14 years of age the right foot had been inflexible within 15° from the right angle and the tendon was lengthened three-quarters of an inch on June 16th, 1899, and the foot was fixed at a right angle. The muscle and the tendon showed enough strength to sustain the weight of the body on tip-toe and this had been true of all the cases presented. In no case had an effort been made to correct the talipes equinus beyond a right angle. Further correction might be desirable in congenital equinus but not in acquired equinus.

That the strength of a tendon lengthened in this way was not seriously impaired was proved by the observation that in every case there had been resistance to the carrying of the flexion beyond the limit allowed by the operation and also by the ability of the muscle and tendon to sustain the body on tiptoe. The process of repair had been rapidly completed after operation by this method, which presented obvious advantages over those in which sutures were applied to the tendon. But the greatest advantage had been found in the readiness and certainty with which the desired amount of lengthening could be exactly secured. A perfect gait required the "spring" or elastic quality imparted by the muscles which enabled the anterior part of the foot to sustain the weight of the body in walking. Without this power the gait would be that of one who had a wooden foot or a foot affected with talipes calcaneus. In talipes equinus following infantile paralysis it was probable that the muscles were more shortened than the tendon, and as lengthening the muscle was generally impossible operative relief had to be sought by lengthening the tendon. In operating, however, it was important, on the one hand, to avoid leaving the tendon so long as to impair the action of the muscle and, on the other hand, to avoid leaving it so short that the equinus would not be sufficiently overcome. This method enabled the operator to maintain exactly the proper relation between the length of the tendon and that of the muscle. By subcutaneous tenotomy the equinus was readily corrected, but in many cases the result was a serious defect in the gait from undue lengthening of the tendon and resulting shortening and inefficiency of the muscle.

New York.

¹ Swanzy's Handbook of Diseases of the Eye, p. 166. This is the common description. Fuchs in his text-book directs the hold on the upper piece of the tarsus to be taken through its upper border—i.e., distinctly above the tarsal wound, as it should be.

¹ Hospitals Tidende, third series, vol. ix., No. 50, 1891.