dently becoming more fixed in the improved position; the great trochanter did not ascend spontaneously.

On Thursday, December 22nd, 1887, I made another careful examination with the same result and measurements as before. The general health remains very good. It is now a little over one year since the treatment was commenced.

On Thursday, May 10th, 1888, Dr. Thomas May and myself examined our little patient again carefully, only with the result of the same favourable reports as to the length of the legs, which were very nearly equal, and the head of the femur becoming more firmly fixed in the improved position. There had been noticed some little tendency to elevation of the heel, or rather, I should say, inability to flex the foot beyond the right angle, no doubt caused by the foot being so long retained in a position with the toes pointing downwards during the extension, and for this I directed passive movement of the foot with the right hand, whilst some extension of the leg was being made with the left hand. There was nothing further to report.

On Wednesday, October 31st, 1888, as Miss W. has now completed her two years of recumbency with extension which she began on October 29th, 1886, it was arranged that she should begin to walk with a mechanical support, and for this purpose Mr. Ernst took careful measurements of the right leg, which he compared with the left. The legs were very nearly of equal length; not more than one eighth of an inch shortening on the right side could be measured. No inclination to spontaneous displacement, or any movement upwards, when a little manipulation to test this was applied. The ilio-femoral triangle was nearly equal on both sides, the right being about an eighth of an inch less. The joint movements are all free, and the muscular power very good. The general health is excellent, in no way injured by her complete recumbency, with extension, night and day for two years. During this time she has had a mild attack of measles, and also the whooping-cough, but the extension was not materially interfered with.

Monday, November 12th, 1888. Miss W. began to walk to-day with the instrument which Mr. Ernst has constructed for these cases, and I have described in the paper. Mr. Ernst applied it, and, with my assistance, the little girl walked about the room for a short time. This was repeated every day, and she soon got accustomed to the use of her crutches.

Friday, February 1st, 1889. The little girl can now walk about alone, using crutches for half an hour in the morning, and the same in the afternoon. When left to herself on the couch, without the instrument, there is no disposition to displacement at the hip.

Friday, June 14th, 1889. Has walked without crutches sometimes, during the last three months, holding by the table and chairs, but I prefer the use of crutches or two sticks. She lies down on the extension couch two hours every day, and sleeps on it, the extension being used. All the measurements are the same, and there is no disposition to displacement.

Wednesday, August 7th, 1889. She now walks about more freely, but has been a little restrained lately.

After the last visit to me on June 14th, her mamma took her to the Zoological Gardens, and the fatigue and excitement were too much for her, and caused irritability, with some brain excitement in the evening, which has since recurred in the evening. The family having removed to Sevenoaks, Miss W. is now attended by Dr. Worship. The measurements of the leg and hip-joint remain the same, the difference not being more than an eighth of an inch.

ON THE TREATMENT OF DUPUYTREN'S CONTRACTION OF THE PALMAR FASCIA.

By J. MACREADY, F.R.C.S.,
Surgeon to the Great Northern Central Hospital.

THE subcutaneous treatment of Dupuytren's contraction of the palmar fascia is so successful with those who use the necessary observances, that it is hard to understand why the treatment by open wound still holds its ground. There are surgeons in this country and abroad who even now prefer one or other of the methods by open wound; and there is some likelihood that in America the removal of the fascia through long incisions will supplant the subcutaneous operation.

Yet to judge by the results hitherto recorded, the treatment by open wound by no means deserves such credit as it enjoys. Those cases, indeed, of which the details are not given, are said to be successful, but in the majority of those that are fully described the restoration of function is evidently far from perfect. It may be that the most successful cases have not appeared in print. If this be so, it is an instance that contradicts one of the most favoured traditions of surgery.

The cases of open wound that have been published of late years are four done after Goyrand's plan, by which the contracted bands are exposed by longitudinal incisions, and then divided across in several places. Besides these there are eight cases, and one that afterwards came under my own care, treated by Kocher's method, a method suggested by Sir W. Fergusson, by which the affected fascia is excised after it has been laid bare by longitudinal incisions.

The results of these operations are described with perfect frankness, and are put forward as successful, but no very close scrutiny is needed to establish the conclusion that these operations do not generally give complete freedom of movement; that especially are they inapplicable when the phalangeal articulations are contracted; that, as the subjects chosen have been for the most part comparatively young, the method, even by its adherents, is not deemed well suited to persons of advanced age; and, lastly, that the treatment by open wound may end in the ruin of the hand.

The cases treated by Goyrand's method are three by Mr. Hardie that appeared in the *Med. Chronicle*, 1884 (pp. 9 to 16), and one published in the *Bullet. de la Soc. de Chir.*, 1888, xiv, 265, by M. Terrillon.

M. Terrillon performed this operation on the left hand of his patient, aged 45, and briefly states that the result was successful. Mr. Hardie's first case, aged 62, had contraction of the three inner fingers of each hand, more in the left than in the right. The other cases, aged 60 and 63, had flexion of the right ring and little fingers. Photographs were taken after healing, and figures taken from them are given of the hands of the three last cases. In all of them the fingers are seen to be arched; and it is stated that this arching could not be overcome in the first case, in which, moreover, the distal phalanx of the left ring finger was not improved, and the scar of the incision over the right ring finger, where the fascia, instead of being divided, had been dissected out, was more evident than the others, and appeared to be producing some recontraction.

In the second case the patient, a month after operation on his right hand, moved his fingers with some effort, and there was considerable thickening along the line of the incisions. In the third case the power of extension and flexion was said to be almost complete, though somewhat sluggishly performed. The arching of the fingers is more strongly marked in this case than in the others. The flexion in all these cases was good, subject of course to such limitations as have been above indicated.

This operation was adopted by Mr. Hardie in preference to the subcutaneous method, chiefly on the ground that the minute processes connecting the skin with the fascia and binding those two structures together, cannot be divided by the tenotome.¹ That the skin is united with the fascia in these cases only at certain points and not universally, was long ago pointed out by Mr. W. Adams, and in 1882 Dr. Keen, of Philadelphia, observed that "the skin can always be differentiated from the band, even to some extent when they are fused, and where they are not fused, the cord is felt distinctly at a deeper level."² This objection, raised by Mr. Hardie, is not practically valid, and I do not gather that it was found by him to be a drawback when actually performing the subcutaneous operation.

Before passing to the consideration of the cases in which the fascia was dissected out through longitudinal incisions, it is necessary to observe that the contraction which occurs in this affection, may be limited to the fascia in the palm or may extend to the prolongations that are attached to the fingers. In the first instance the metacarpo-phalangeal joints alone are bent, in the second the interphalangeal joints are also flexed. It will be convenient to speak of the first and lesser degree of contraction as palmar and of the second as phalangeal.

To ascertain the effect of the removal of the fascia I will quote

¹ *Loc. cit.* p. 11, and also Vogt in *Patha und Billroth's Handbuch*, 4 Bd. p. 143, 1884.

² *Philadelphia Med. Times*, vol. xii. p. 372, 1882.

the case of Gersuny,³ the four cases of Kocher,⁴ the case of Reeves, occurring in a woman,⁵ that of Le Bec,⁶ that of M. Terrillon above referred to, in which he treated the left hand by Goyrand's and the right by Kocher's method, and lastly, a case that was treated in January, 1889, at one of the large London hospitals and that afterwards came under my care.

Dr. Willy Meyer performed Kocher's operation in 1888 on the hand of a man, aged 60, and communicated the case to the Surgical Section of the New York Academy of Medicine on December 10th, 1888. The result was successful, but the details are not at present accessible, and the account given in the *New York Med. Record* leaves it uncertain whether the disease was palmar or phalangeal. This case cannot therefore be made use of in estimating the difference in the result of the open treatment when the contraction is palmar and when it is phalangeal.

In the nine cases more or less completely described, twelve hands were subjected to the operation, and of these four had palmar and eight phalangeal contraction.

The right hand of Reeves's patient, and of Le Bec's, and the left hand of Gersuny's, had palmar contraction, and the result in all was good. The right hand in Kocher's first case had palmar contraction of the ring and middle fingers. Three years after operation the patient says that the fingers are not at all bent.....only the two middle fingers are not quite useful for writing; that he still works with difficulty, and can only wield the pen with the thumb and index. "In no other way can it be done." "I am (should be?) very well pleased with the operation if only I had more power of grasp (*Spannkraft*) in the hand."

The hands in which phalangeal contraction was present, and which were successfully treated by this operation, were the right hand of M. Terrillon's case and both hands of Kocher's fourth patient. M. Terrillon, soon after the operation, says that the fingers could be completely extended. No further details are given of the movements of the hand.

Kocher's fourth case was that of an apothecary, aged 66, whose little fingers were contracted. He was seen seven months after operation, and then the fingers could be almost extended by voluntary movement. Extension by passive movement was perfect. The scars were somewhat firm, densest on the fingers, weakest on the palm and movable there; when the scars were touched the patient still experienced an unpleasant sensation. The result of the case is not so fully described as that of the others.

The right hand of Gersuny's case had flexion of the first phalangeal joint of the little finger to a right angle and palmar contraction of the ring finger. About a month after the operation there was slight flexion of the first phalangeal joint of the little finger, and a year later Gersuny satisfied himself that the improvement was permanent, but does not say if the little finger was straight.

In Kocher's second case, that of a medical man, aged 42, there was phalangeal contraction of the ring and little fingers of the right hand at the first phalangeal joint, so that the first and second phalanges formed an angle of 110°. Seventeen months later the patient stated that after the operation complete extension of the fingers was not attained, which he attributed to the enforced disuse of the phalangeal joints for the two years previous to treatment; that massage and use had so far improved the condition that by stretching of the hand to the utmost both finger-tips could be brought out so as to fall short of complete extension only by about 2 centimètres. Passively the deficiency of extension could be almost adjusted, but the limited movements of the phalangeal joints in question opposed this. When the hands were closed the terminal segment of the ring finger did not quite touch the hand.

The third patient of Kocher, aged 52, had contraction of both ring fingers, chiefly at the first phalangeal joint, and in the left hand there was also a band going in the direction of the thumb. Three months after operation the flexion was good, but extension of the ring fingers fell short by 30°, and rather more on the left side than on the right. A year later he could work. All that hindered him was a dense cicatricial band of skin that stood out on the palmar surface of the first phalanx of the ring fingers during extension, and was exposed to the pressure of any object that he grasped. The palmar contraction appears to have been remedied, but there still existed a bend of 45° at the first phalangeal joint of both ring fingers.

The last case that I will refer to was operated upon in London in January, 1889. The patient, aged 41, had had contraction of the left little finger for seven or eight years, and the ring and middle fingers had more lately become flexed. According to his statement, the metacarpo-phalangeal and first phalangeal joints of the little finger were at a right angle, the ring finger was less flexed, and the middle still less. The fascia was dissected out through three longitudinal incisions corresponding to the three fingers affected. He came under my care in May, when his left hand presented the appearance depicted in Fig. 1.

Fig. 1.—The left hand of a man, aged 41, after Kocher's operation, performed in London.

The skin of the palm was immovable, and was traversed by three hard, raised and knotty scars diverging from the root of the palm and reaching the first phalangeal joints of the implicated fingers. The only movement possible in the fingers was made at the metacarpo-phalangeal joints, and admitted an excursion of 30° of the ring and of something less of the middle finger. The little finger was absolutely fixed. After many and long-continued attempts to improve this deplorable condition, I was obliged to amputate the little finger, as it rendered the hand completely useless. This is not an isolated instance of disaster after treatment by open wound. A case is related⁷ of a physician who thus lost the use of his little finger, and Dr. Little⁸ gives two cases where the fascia had been removed through crucial incisions. A large contracted cicatrix was left "more rigid than the former state of things, and quite irremediable."

Such are the results of the open treatment of Dupuytren's contraction of the palmar fascia, even when it is undertaken by eminent surgeons with all the aid that skill and knowledge can afford. Though the fullest credit be given to the cases imperfectly described, it is evident that the restoration of function is not generally complete.

The palmar contraction seems to fare somewhat better than the phalangeal, for in four cases of the first kind there was but one bad result, namely, the hand in which the emancipated fingers could not be used to assist in holding a pen.

The phalangeal cases give three successes to four partial and one total failure. It might be supposed that the large proportion of phalangeal cases here quoted is accidental; on the contrary, the proportion is below the average. The frequency per cent. with which these different sets of cases present themselves to the surgeon, can be easily calculated from Professor Keen's table, and amounts to 79.4 per cent of phalangeal to 20.6 per cent. of simple palmar contraction.⁹

³ *Wien. med. Wochenschr.* 32, August 9th, 1884.

⁴ *Central. f. Chirur.* June 25th, 1887, No. 26, 27.

⁵ *JOURNAL*, March 7th, 1885.

⁶ *Gaz. des Hôp.* May 17th, 1887.

⁷ At p. 39 of Mr. W. Adams's book.

⁸ *Holmes's System*, vol. iii., p. 698, Ed. 2, 1870.

⁹ *Loc. cit.*, p. 372.

It is of essential importance, therefore, that an operation should be used that corrects the flexion of the phalangeal as well as of the metacarpo-phalangeal articulations.

The principal objection raised against the subcutaneous operation is that the fascia, which is the seat of the contraction, is left behind, and that therefore recurrence will take place. That some amount of bending occasionally appears with the lapse of time is not denied. There is no hope, however, of ascertaining with precision the proportion of cases that relapse. Mr. W. Adams tells me that his estimate of recurrence is 10 per cent. or a little less. If it were much larger than this a period of freedom for many years would be cheaply purchased at so small a sacrifice as this operation demands. And it has this advantage, that it can be repeated; whereas, after excision of the fascia, a relapse is lifelong and irremediable.

Fig. 2.—The right hand of the same patient as Fig. 1, showing the result of the subcutaneous treatment.

The more plausible objections to the subcutaneous treatment consist in its inability to correct the gouty deformity of the joints which sometimes accompanies the contraction of the fascia and prevents full restoration of movement. Secondly, in the impossibility of dividing the bands when they have undergone calcareous degeneration, and, lastly, in the difficulty of the operation itself.

Unfortunately there is no operation, either subcutaneous or open, that will restore the joints that are damaged by gout, though the gouty swelling often diminishes after the subcutaneous operation. The calcareous degeneration of a part of the fascia, which was met with in a case of my own, can only be dealt with, I presume, by excision.

The open treatment has a manifest advantage in the facility with which it is performed. Anyone, even in his first rudiments, can execute the simple dissection of Kocher, but the subcutaneous operation, easy as it appears, is, in cases of any severity, attended with considerable difficulty. This fact is insisted upon by Dr. Myrtle in the paper wherein he gives the best English description of the onset and course of the disease.¹⁰ But the difficulty of the operation, were it much greater than it is, would be no discouragement to surgeons of such well-known ability as those whose cases of open wound I have ventured to criticise.

The subcutaneous treatment possesses this superiority, that as it produces no constitutional effects, it can be done at any age and in

any condition of health. The average age at operation in the cases above cited, done after Kocher's method was 49.5, and the average in the cases on which I have operated subcutaneously was 60; two of these patients were 68. Few surgeons would recommend an operation involving long incisions to a person verging upon 70, and few persons of that age would accept such a recommendation.

To illustrate the ordinary result of the subcutaneous treatment, two cases will be given, one of palmar and one of phalangeal contraction.

Fig. 3.—The right hand of same patient as in Figs. 1 and 2 before the subcutaneous operation.

The palmar case, Fig. 3, is the right hand of the patient, whose ruined left hand is seen in Fig. 1. The contraction in the right hand had existed for about a year, and affected the three inner

Fig. 4.—The right hand of a naval officer, aged 64, showing extreme phalangeal contraction.

fingers. As the photograph was not taken in profile, the extent of the flexion is not well shown. The operation was done in May, and bands going to the little, ring, and middle fingers were

¹⁰ JOURNAL, December 3rd, 1881.

divided. In Fig. 2 the present condition of the hand is seen. Flexion and extension are fully and freely performed.

Through the kindness of Mr. W. Adams I am able to present a figure of the worst case of phalangeal contraction with which I am acquainted, none of my own cases having reached the degree of severity shown in Fig. 4. The hand is that of a naval officer who distinguished himself in the search for Sir John Franklin. The contraction affected the thumb, index, ring, and little finger, and had begun twenty-five years before. At the time of the operation, which was performed by Mr. Adams five years ago, the patient was 64 years old. The result is seen in Fig. 5, and the condition there shown has been maintained to the present day. The deviation of the ring and little fingers to the inner side, which is often present after the correction of this deformity, is well shown, as well as the marked improvement in the position of the thumb. It will be seen that the index is not completely straight. The movements of the fingers are still quite free and perfect.

Fig. 5.—The right hand of the naval officer after the subcutaneous operation by Mr. W. Adams.

To obtain such results, which are the ordinary results of the subcutaneous operation, it is necessary to observe the difference in the after-treatment between the palmar and phalangeal cases. The palmar can be treated throughout with the ordinary soft metal splint, bent to the fingers and gradually extended. The phalangeal cases, however, are best treated by aid of a dorsal splint with rack and pinion movement over the finger-joints. The apparatus is depicted in Eulenburg's paper in 1864, and in a much improved form in Mr. W. Adams's book on this subject (p. 60). It is quite possible to obtain complete success, even in severe cases, by using the simple metal splint on the palm, but not without much diligence and constant attention on the part of the surgeon.

In all cases extension should not be made at once or pain is produced. After division of the bands and straightening of the fingers they should be allowed to resume their flexed position before the soft metal splint is adapted. Extension, whatever apparatus is used, should not be begun till four or more days have elapsed, and should be continued for a week or more after full extension of the fingers has been accomplished.¹¹ The best knife is that extremely fine instrument designed by Mr. Adams for the purpose, which leaves a wound $\frac{1}{4}$ of an inch long.

The common advice in books on surgery is to use the subcutaneous operation in slight cases and the open operation in severe ones. Looking to the cases adduced in this paper, I submit that this advice might well be reversed, and that the open treatment

should be confined to palmar cases, if, indeed, there is ever any justification for recommending the open operation.

With the exceptions and with the precautions above alluded to, the subcutaneous operation may be trusted to be successful. No matter how far advanced in life the patient may be, nor how severe the contraction, he may be promised complete restoration of function without pain, without danger, and without one hour in bed. As Dr. Abbe says, "this operation leaves nothing to be desired." Like the operation of Medea, it makes the hand young again, but, like hers, it will fail, if practised by an inattentive or an indifferent performer.

ON SUBCUTICULAR SUTURE.¹

By KENDAL FRANKS, F.R.C.S.I.,

Surgeon to the Adelaide Hospital, Dublin.

In these days when the surgeon's knife is much more frequently demanded than formerly, it is often necessary, in the more exposed parts of the body, to leave as little trace of its use afterwards as possible. This is especially desirable in operation wounds about the face or neck of the fairer sex, for in them we cannot hope, nor is it desirable, that as youth passes into the fuller development of maturity, the growth of hirsute appendages will eventually conceal the mark which the operator has been obliged to make. Much has been gained in this direction by the introduction of antiseptics in surgery, by means of which we can in general ensure an immediate union of the wound's edges. We thus substitute for the cicatrix, often thick and wrinkled, of a wound that has healed by granulation, the delicate, pliant and frequently almost unnoticeable scar which we seek to obtain in union by the first intention.

In the neck, for instance, when such a wound is small, and lies in a natural fold of the skin, the scar itself requires no concealment, for it would pass unobserved were it not that on both sides of it small points are most distinguishable, red at first and eventually white, which mark the points at which sutures have been inserted. I have frequently endeavoured to avoid these marks by employing strips of sticking plaster to keep the edges of the wound apposed instead of resorting to stitches, but I was obliged to abandon this method on account of the difficulty of ensuring a perfectly aseptic condition of the parts; because when dry no sticking plaster is reliable, and if it is rendered aseptic by immersion in an antiseptic solution its sticking properties are destroyed. And thus we run the danger either of not keeping the edges of the wound properly apposed, or by allowing the wound to become septic to delay union, in either of which cases the wound must heal by granulation, and the defacement caused by the scar becomes worse than that which would be due to the suture points. These considerations induced me to seek for some other plan which would insure union by first intention, and would at the same time abolish the evidences of the needle. I believe these points are gained by the use of a subcuticular suture. A fine curved needle is required, one of Hagedorn's needles I prefer, and very fine catgut. The suture must be a continuous one. The needle is inserted horizontally, that is parallel to the surface of the skin, at the cut edge of the wound, not vertically to it, and at a distance from the cut edge, as in the ordinary suture. The method of inserting the suture is as follows:—

I begin at a point about quarter of an inch from the upper angle of the wound. The needle is passed horizontally underneath the epidermis of the skin into the cutis vera and emerges again from the cutis vera at the angle of the wound itself. It is then passed in a similar manner into the cutis vera alone of the opposite side of the wound, beginning at the extreme angle and emerging at a point a quarter of an inch from it. The catgut is drawn through so as to leave just enough at the first point of entrance to enable it to be tied to the portion of the suture which holds the needle. This forms a standing point. The needle is again inserted horizontally into the true skin, beginning immediately below the first point of entrance and comes out again a quarter of an inch lower down; it is then passed similarly into the other edge of the wound, at a point corresponding exactly to the last point of emergence on the opposite side, being brought out again quarter of an inch lower down.

¹ Read in the Section of Surgery at the Annual Meeting of the British Medical Association held in Leeds.

¹¹ Adams, *loc. cit.*, 59.