and grip of the fingers, and make what is called a good stump, with adequate covering; and on the other, to avoid risking a life for the sake of a limb, or spending valuable time and strength in the endeavour to save a severely injured finger, which, when ultimately healed, would be permanently stiff and deformed, and instead of being a help in work would be a hindrance; and this in the face of the following considerations: 1. That it was impossible, perhaps, to make out, until it was discovered in the course of the operation, exactly what was and what was not injured; and 2. That it was impossible either to lay down or follow any rule in operating, the amount removed and the form and situation of the flaps for covering being different in every case, and only to be decided by the nature and extent of injury, the injury not being adapted or adaptable to any special operation, but the operation having to be adapted to the injury.

It would take up too much time to give notes of special cases; but I may exhibit photographs of one case of very severe compound smash of the metacarpal and phalangeal bones and laceration of soft parts, caused by the hand being locked in the cogged wheels of machinery, where we were able to save the last three fingers entire, the three metacarpal bones belonging to them, the proximal third of the second metacarpal bone, and the whole of the carpus; a good useful hand remaining. Another man shall exhibit himself in person. He was feeding a circular large-toothed steam-saw, when his hand slipped, and the saw instantly tore through the fingers and palm into the carpus, lacerating the soft parts of the radial half of the hand most severely, and splintering the bones to fragments. The thumb and first two fingers were hopelessly mangled, and the saw had grazed down the radial side of the third, so that it was a question whether even that finger could be saved. We ventured, however, to leave it, removing the first two fingers and the thumb, portions of the trapezium and trapezoid bones, with the whole of the second and distal half of the third metacarpal bones. The covering we had to get as we could, and it was rather tight at first, but the case did extremely well, and after leaving the hospital, the man went back to the same work, under the same master, at the same wage as he earned before the accident; and his master tells me that for his work, as far as he can see, the hand is quite as good as ever it was.

I may mention that in this and similar operations involving the carpus, the dorsal, palmar, and interosseous ligaments have to be freely divided, and the carpo-metacarpal synovial membrane opened; but that this is a matter of little importance, and does not perceptibly affect the subsequent motion of the wrist-joint, provided the radio-carpal articulation be uninterfered with and its synovial membrane be left entire. Where it is not a question of disarticulation, but of dividing bone, we always use the bone-forceps, greatly preferring it to the metacarpal saw, though the latter is the newer instrument, advocated by some most eminent and august authorities, while the latter is at least three hundred years old. Ambroise Paré gives an engraving of what he calls "Cutting Mallets neatly made for the cutting off of superfluous fingers", though, in another place, he says, when we come to the bone, we may, if we choose, "nimble divide it with a little saw".

ON THE TREATMENT OF GENU VALGUM WITHOUT DIVISION OF BONE.*

By HENRY F. BAKER, F.R.C.S. Ed.,

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It is not my intention to enter into the respective merits of the several operations for the cure of genu valgum. Whatever opinion may be held as to the risk of cutting into the knee-joint or producing a compound fracture in its immediate neighbourhood, I think all surgeons will agree that, in many of the cases that come under their notice, especially in private practice, the deformity is not of so serious a nature that the proposal to perform a severe operation would be entertained by them, or consented to by the friends of the patient. It is a matter of great importance, however, that the treatment of these cases should not be neglected, more especially because, if they be not entirely cured, tilting of the pelvis must take place, and this is necessarily followed by lateral curvature of the spine.

I shall be forgiven, probably, for going somewhat into detail with regard to the treatment of these cases, and mentioning what must appear to be very obvious directions to many of the Fellows of this Society. My excuse must be, that I am convinced by practical experience that the neglect of very trifling points in the manufacture and adjustment of instruments in the treatment of all orthopædic cases has been the frequent cause of disappointment and failure.

Cases of genu valgum may be conveniently divided into two classes, viz.: (1) those that can be cured by gradual extension alone; and (2) those that can be cured by gradual extension after the subcutaneous division of tendon or ligament. The tendons or ligaments that may require division are the biceps femoris, the ilio-tibial band, and the external lateral ligament. Through the kindness of Mr. Eve, the Curator of the Museum at St. Bartholomew's Hospital, I am able to show to-night a knee-joint carefully dissected by my friend Mr. Bowlby, which shows the tendons and ligaments around the joint. The long external lateral ligament is well shown between the two points of insertion of the tendon of the biceps; and it is at this point that it can be readily divided, either with or without the tendon, according to the severity of the case. With reference to the decision as to the necessity of tenotomy, an examination should be made of the deformed limb, and an attempt be made to straighten it. While this is being done, the structures above mentioned should be felt for; and, if little or no contraction can be detected, the case is one for treatment by gradual extension without operation. If, on the other hand, either the tendon of the biceps or any band of fascia or ligament can be felt holding the limb in its deformed position and preventing its being straightened, one or all of them must be divided according to the severity of the deformity. I think the reason why many surgeons consider that the treatment of genu valgum by these simple means is unsatisfactory, is that they have not made use of a properly constructed instrument; or have, in some cases, allowed the patient to walk about during the treatment.

To carry out this mode of treatment satisfactorily, it is in the first place absolutely essential that the patient be kept off his feet; and the important points to attain in the construction of a proper instrument are that it should keep the knee in the *extended* position, and prevent the leg from *rotating*, at the same time that, by its means, the knee-joint can be acted upon in the *lateral* direction, with sufficient force to gradually overcome the deformity. No instrument fitted to a boot and used while the patient walks about can do this.

The instrument here shown (Fig. 1) has been constructed at my sug-

Fig. 1.

gestion, and, I believe, carries out these conditions efficiently. It will be seen to consist of a trough (A) for the thigh, which takes its bearing on the great trochanter of the femur, and is connected with the leg-splint by a stem on the outer side of the leg, which is provided with a cog-wheel (B) opposite the knee-joint. A band (C) encircles the knee. The special points in which it differs from the trough-instruments in common use are, that it has a wing hinged to the back part of the leg-splint, on the inner side of the leg and ankle, which, together with an ankle-strap (D) and an inside toe-strap (H), keeps the heel and leg from rotating

* Read before the Medical Society of London.

inwards, a pad (I) being introduced within the wing at F, to press on the internal tubercle of the os calcis, and the wing being kept in its place by the straps M and N. There is also a rigid bar (K) at the back of the knee, and its action is to keep the joint in a perfectly extended position, whatever amount of force is used laterally. To this bar is attached a carefully made leather strap (C), formed in such a way as to cause the least possible amount of pressure on the patella, and also to diffuse the pressure over the inner condyle when the cog-wheel (B) at the knee is acted upon. The instrument is also made in such a manner that, in drawing the limb straight, it adapts itself to its altered position, and fits the straightened limb as well as it before fitted the deformed one. Figure 2 shews the apparatus applied.

Fig. 2.

Before the application of the instrument, a soft woollen stocking should be put on the deformed limb, and a bandage carefully applied over it from the foot upwards. The instrument is then made to exactly correspond to the angle of the deformed leg by means of the screw (H) at the knee-joint, and is to be then applied and the straps adjusted, and the wing and pad fixed in their place. The cog-wheel (B) opposite the knee-joint is then acted on so as to slightly straighten the leg until pain is complained of, when the screw must be a little reversed, and the patient made quite easy. In this manner, the leg must be slightly stretched every day, when the resistance will be found to gradually give way, and the limb will be brought into the straight position. Great caution must be used in the application of pressure; for, if a sore be allowed to form on the skin on the inner condyle of the femur, all treatment must for a time be abandoned, and much time will be lost.

It is advisable that the instrument should be removed occasionally, and more frequently at first, before the skin has become accustomed to its pressure; and the leg should then be washed and powdered, and the knee flexed and extended to prevent its becoming stiff. This treatment must be continued until the limb is quite straight; and, as there is danger of relapse in this, as in all other deformities, it is necessary that, when the patient begins to walk, steel supports, fixed to the boots and extending to the hips, should be worn during the day.

In those cases in which it is necessary to subcutaneously divide any tendon or ligament, a piece of folded lint is to be put on the puncture, and the leg kept at rest until the wound is healed, which takes place in four or five days. The instrument is then to be applied, and the limb brought into the straight position as before described.

The instrument here shown has been made for me by Mr. Gumpel of Leicester Square, and many of the details are the result of his ingenuity.

EXCISION OF THE KNEE-JOINT FOR SYNOVIAL DISEASE OF FOURTEEN YEARS' DURATION;

WITH DISLOCATION OF THE TIBIA BACKWARDS, AND RETRACTION OF THE LEG TO A RIGHT ANGLE.*

By FREDERICK J. GANT, F.R.C.S.,

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THE conditions of disease which may be appropriate for excision of the knee-joint, almost exclusively have reference to the probability of ankylosis taking place, as the natural mode of cure, without such surgical interference. Formerly, the question of joint-excision was viewed in relation to amputation of the limb, as if the two were alternative operations. But the comparatively early period proper for excision, namely, before the supervention of marked constitutional disturbance or perhaps hectic and exhaustion, is too early to justify amputation; and the later period, when any such constitutional condition co-exists, is too late for excision, as implying the loss of the vital reserve power requisite for the prolonged process of union after this operation. When, therefore, either operation becomes justifiable for disease, the other should not be entertained. But while I have long held this rule—at variance with the preconceived estimate of excision *versus* amputation—there are exceptional cases in which (ankylosis having failed) the question as to the choice of these operations may be discussed. Thus, in chronic joint-disease, whether synovitis or caries, when the patient has perchance retained or regained sufficient constitutional vigour to undergo an operation entailing a long process of repair, the condition of the joint may, even under extreme circumstances, permit excision, with the probability of restoring a useful limb, instead of sacrificing it by amputation. Destruction of the articular surfaces, and perhaps of the ligaments—in short, irreparable destruction of the whole articulation—having long since occurred, this condition has been accompanied by dislocation and flexion of the limb, proceeding slowly until the latter change has resulted in extreme malposition. Eventually, the limb becoming fixed, it cannot be straightened by extension or by tenotomy combined, with the view to the bare chance of ankylosis; and as the limb wastes from functional inactivity, the atrophied state of this useless appendage would seem to further preclude the hope of recovery by removal of the joint.

The following case falls within these conditions, and illustrates the local as well as the constitutional states under which I should deem excision to be preferable to amputation; reserving the latter operation as the last resource after a fair trial of the former.

A man, aged 24, was kicked accidentally on the left knee, fourteen years ago. From his description of the immediate symptoms, this injury appears to have caused acute synovitis; and, as the patient's general health bore no evidence of scrofula or other constitutional taint, the synovial inflammation seems to have been purely traumatic. Suppuration ensued within the capsule, and the abscess broke. The boy, an orphan, was sent from Islington Workhouse to the sea-side, where he remained for more than three years; and then he returned to the Union for two years. During the whole of this period, there was copious discharge from the knee-joint through two or three fistulous openings, which never permanently closed. Soon afterwards, he was drafted into the Shoe-Black Brigade, and remained in this employment ever since. Two years ago, he went into one of the metropolitan hospitals; a cast of his leg was taken, but no operation seemed advisable, and he left the hospital in a week. Last winter, a severe fall on the pavement renewed the synovitis; and the fistulous tracks, which had dried up for a month, again discharged. Then he was sent from the union infirmary to the Royal Free Hospital, and admitted under my care.

Although this was apparently a hopeless case for excision, viewing the state of the joint and of the limb, as already noticed, and considering that this condition had resulted from destructive changes of many years' duration, yet the circumstances were not, in my experience, beyond the reach of conservative surgery; while the synovial character and purely traumatic origin of the joint-disease, coupled with my estimate of the patient's remaining health, encouraged me to subject him to the issue of this operation. Accordingly, on May 10th, I excised the articular ends of bone, quite parallel, and carefully removed the whole of the thickened synovial membrane, leaving only the semilunar flap of healthy integument. The limb was brought down with difficulty; and having placed the femur and tibia in exact apposition, the splints which I am accustomed to use—a long back splint from the buttock to just above the heel and an external interrupted splint with foot-piece—were applied, each being secured by broad strips of adhesive plaster and roller-bandage.

* Read in the Section of Surgery at the Annual Meeting of the British Medical Association in Cork, August 1879.