A SIMPLE AND CHEAP SPLINT FOR THE EXTENSION OF CONTRACTED WRIST AND FINGERS.

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TWO years ago, I showed, at the Liverpool Medical Institution, a form of wooden splint which I had made for me, and had used with most satisfactory results in the treatment of contraction of the wrist or fingers. Without going into the question of originality, I think I may recommend its use on the three grounds of simplicity, utility, and cheapness.

A glance at the woodcut will prevent the necessity for much in the

way of description; the essential parts being an arm-piece (A), which should tolerably fit the back of the forearm; a hand- or finger-piece (B), broad enough to somewhat overlap the hand or fingers (to avoid too great compression); a hinge to connect these two portions; a wooden bridge (C) with pulley (D) at the wrist, or, in case of contraction of the fingers, at the metacarpus; and an elastic cord or cords passing over the pulley and attached by hooks to rings in the two portions of the splint. By this means, gradual extension is kept up, at the same time that voluntary flexion is allowed. It is hardly necessary to point out that the extension power may be varied to any extent by the thickness of the elastic, by the number of the cords, and by the position of the rings. To illustrate its practical utility, I will mention two cases, one of which was that for which the splint was first made for me.

A boy, aged 12, was admitted into the Northern Hospital with his right hand flexed at a right angle with the forearm. This resulted from severe thecal inflammation, for which he had been treated six months before at another hospital. That the case had been a serious one, was shown by the cicatrices of various incisions in the hand and along the forearm. Under chloroform, attempts were made by myself and one of my colleagues to straighten the wrist; but not the slightest effect was produced. I then divided subcutaneously the palmaris longus and the flexor carpi ulnaris, which stood out most prominently. By this means, a little more extension was obtained, but not much. The tenotomy-wounds were dressed in the usual method, and after three or four days the splint was adapted. The effect exceeded my most sanguine expectations. Even in twenty-four hours, slight improvement was showing itself, and, in the course of three or four weeks, the hand was straight with the forearm.

This case occurred in July 1875; and after that I had two similar cases, but not of such an extreme degree; I need not allude to them, but will pass on to the second case, which occurred in 1878, and illustrates the treatment of flexed fingers. It was that of a girl aged 7, who had been under treatment about twelve months before in a country hospital for extensive disease of the radius. Apparently, the greater portion of the shaft had been removed, and a new radius formed, containing, however, a few sequestra of the old bone. In this case, all the fingers and the thumb were bent on the palm. Under chloroform, when the hand was placed in a straight line with the forearm, the fingers could not, without risk of breaking them, be forced out beyond the position of a right angle with the palm. The sinuses in the arm having been laid open, and the cloacæ in the new bone enlarged sufficiently, the sequestra were removed. The splint depicted (in this case with the fulcrum or bridge opposite the metacarpo-phalangeal articulations) was adopted; the flexed thumb being supported by a pad of lint adapted over the bandage.

This case, although somewhat more tedious than the last, had a like satisfactory termination. The girl left the hospital six weeks after the operation, with the power of completely straightening the fingers; but, as the extensor muscles were much wasted, she was directed to wear the splint for some time longer.

In this last case especially, it was found necessary to watch every few hours for the first few days, to avoid the chance of gangrene. The

extension force in this instance being applied to fingers somewhat wasted, there was a tendency to blueness of the finger-tips even though cotton-wool padding was freely used, and though the hand-piece well overlapped the fingers, it was found on several occasions necessary to relax the elastic extension.

[Years ago, when I was house-surgeon to the Liverpool Royal Infirmary, the same principle, adapted in a somewhat converse direction, was found most useful in overcoming that tendency to pointing of the toes which sometimes occurs after long treatment of fractured leg. A hinged splint, with slightly hollowed out leg- and foot-pieces, hinged in front of the ankle, was carefully adapted and fixed to the anterior or extensor surface of the limb, and elastic cords attached by rings to the foot-piece and to the leg-piece just below the knee. This was found most useful in cases where the ordinary stirrup and elastic generally used for this purpose could not be borne.]

It has struck me that such a splint as I have depicted might be of service in cases of lead-palsy, and of infantile paralysis. The late Dr. Inman, formerly physician to the Liverpool Royal Infirmary, used to have the hands of his lead-poisoned patients supported by anterior splints; and great relief they appeared to derive thereby. But as in such cases support, not fixation, is required, it appears to me that a splint by which extension is constantly made, while voluntary flexion is possible, must be much more serviceable, by allowing and even encouraging a sort of gymnastic exercise of the affected muscles. This applies especially in the case of children, who, I have found, derive some amusement from working the hinge and elastic. I have not had the opportunity myself of trying it in such cases; but my friend Dr. Rawdon, surgeon to the Children's Infirmary, used one of these splints last year in a case of paralysis occurring in a child, and informs me that it has decidedly proved of service.

N.B.—A light and well hollowed out *anterior* splint for the forearm will be found an additional assistance in some cases, for the purpose of diffusing the pressure of the bandage, and thus allowing a firm application of the apparatus without hindrance to the circulation in the limb.

THE CONSERVATIVE SURGERY OF THE HAND.*

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I FEEL it an act of great presumption to speak on a subject which, in comparison with the rest of those upon the list, must seem to many a very trite and simple one, and should certainly not have thought of doing so had it not been that accidents to the hand are of common occurrence in these large towns of the West Riding of Yorkshire, and that some most trite and simple subjects are really most important and valuable, on account of the interests they involve—interests, at any rate, to the unfortunate persons who meet with these dreadful accidents, if not equally so to ourselves.

I shall not mention injuries to the fingers, further than to say that in cases of smashing of soft parts only, we rarely operate at all (and it is astonishing how well many of these cases do with only simple dressings, the great vascularity of the hand assisting the repair of injuries which elsewhere would be very intractable); but that, if the bone be extensively smashed as well, and we are obliged to operate, we do not amputate at a joint unless it comes naturally in the way, preferring to save even the smallest fragment of a phalanx if sound; we trim off the fractured ends of bone with bone-forceps, and get our covering as we can. We frequently have, however, very severe crushes and smashes, involving not only the phalanges, but also both the bones and soft parts of the palm; and several of these cases, with the fingers in an almost hopeless condition, have also recovered without any operation, a good useful hand being saved entire. There may have been extensive inflammation, perhaps sloughing, and subsequent gluing together of tendons; but the flexors and extensors have preserved a certain amount of mobility, and the crippled hand, even in that state, has been of infinitely greater value than any artificial substitute; not to mention that, with use, a considerable amount of liberation of the tendons takes place in such cases. In other instances, it is impossible to save the hand entire, and our course lies between an amputation of the entire hand and some partial amputation. I need hardly say that we invariably aim at the latter, and my colleague (Mr. Walker) and I have been very successful in a number of extremely unpromising cases. What we have had to consider, in each of these cases, has been how, on the one hand, to save every particle that could be saved with utility, and especially how to retain to the fullest extent the strength and breadth of the hand

* Read before the Yorkshire Branch.

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.