derives no less importance from the difficulties and dangers which arise, from the skill necessary to carry its operations to a successful issue, and from the fact that, whereas in medical or surgical affections only one life depends on your knowledge, here two are to be saved.

In no other condition do we find transitions from apparent safety to the most imminent peril supervene with such startling rapidity. You may leave your patient at one moment progressing favourably, everything going on well; the next you are called back to find her life in the balance, and most frequently to which side the scale shall incline—to safety or death—will depend on you and on you alone. In the dead hours of the night, alone, unaided, with no one to help, to advise, to consult with, almost, if not altogether, without warning, you will stand face to face with death. How can you fight, how can you conquer, unless you have your arms at hand, unless you have tried them? You will require all your presence of mind; how can you have it unless you possess that consciousness of power, that calmness of thought, that promptitude of action, which alone accompany a thorough knowledge of your art? Without it you will be as helpless as a child, as incapable of action as the looker-on, who can only wail and moan.

Independently, however, of these sudden crises, abnormal varieties of labour call for diagnostic skill, operative dexterity, and the exercise of a variety of resource seldom, if ever, exceeded in the other branches. To decide in what cases both mother and child can be saved, in what one must perish, requires no little judgment, and entails an amount of responsibility truly appalling.

And the operations that may be needed to carry into effect what you judge to be right are by no means easy, and require great skill for their proper performance. Turning is frequently more difficult than reducing a dislocation; the high forceps operation, cephalotripsy, and embryotomy are more difficult than an amputation; and there is no operation in surgery which surpasses the Cæsarean section, whether we regard the great object in view, the saving of both mother and child, or the skill and tact essential to its proper execution.

It is necessary, too, for you to remember, when comparing obstetrics and general medicine, that in the latter, in the vast majority of acute and even in some chronic diseases, you have two powerful allies—nature and time; but, in the former, time is a deadly enemy, nature often a foe. The natural throes frequently injure your patient, and, as time passes and no relief is given, she becomes exhausted and dies. In most medical or surgical cases, you, if puzzled or undecided, have time for consideration, for consultation, for study; in obstetrics, you most frequently must act at once.

So far for obstetrics: let us see if diseases of women demand from you as great medical knowledge, as high surgical skill, as complete general education, as pure medicine or pure surgery. As the health of the uterine organs is, so will be the health of the woman. If they be diseased, functionally or organically, the general health will more or less fail; and to discover, as experience proves, what is wrong will often be no easy task. In most medical problems, in forming a diagnosis from objective signs, we bring into play our senses of hearing, seeing, feeling, and often smelling; here we very frequently are reduced to feeling alone. We can see only a part, and that a very small part, of the genital system; and some portions lie beyond even the reach of feeling. Hence we are reduced to induction, determining the disease from the evidence we can gather from perverted function, or the patient's story, or the effects of the abnormal condition on other points. Flexions, versions, defects of development, adhesions the result of morbid processes, require not only correct diagnosis, but no slight surgical and mechanical ability. Metritis, puerperal septicæmia, peritonitis, and thrombosis will tax the power and test the knowledge of the physician to the uttermost. What shall we say of ovariectomy, of excision of the uterus, of the operation for vesico-vaginal fistula? Eight-and-twenty years ago, Lawrence asked at the Medical and Chirurgical Society of London, "Can ovariectomy be encouraged and continued without danger to the character of the profession?" So difficult were the diagnosis and operation, so great were the dangers attending it, that the greatest surgeons of the day did not hesitate to condemn it as unjustifiable; and now we find the President of the same Society with truth declaring it to be one of the greatest achievements of surgery in the century; and Lord Selborne calculated that Mr. Spencer Wells alone had, by his first five hundred operations, added ten thousand years to the lives of European women.

One of the greatest evils compatible with life which a woman can suffer from is vesico-vaginal fistula. The urine, constantly dribbling away, irritates and excoriates the vagina and vulva, scalds the insides of her thigh, wets her clothes, and, decomposing, causes a horrible effluvia. The woman's life becomes one of such suffering that it is almost insupportable, whilst her presence becomes absolutely offensive to her friends and relatives. For centuries, surgeons attempted to

remedy this affection, and failed; but now, owing to the labours and writings of Baker Brown, Sims, Bozeman, Simon, and others, the difficulties in the operation have been overcome, the proper principles of treatment established, and this opprobrium of surgery vanquished; and not only by specialists is this operation successfully performed, but by those surgeons in general practice who have had the wisdom and foresight to study diseases of women.

The list does not end here; for, if time permitted, I could point out difficulties overcome and triumphs gained equal to any in surgery or medicine. But I have said enough to prove the truth of my proposition that the subject, from its own intrinsic merits, is as well worthy of your best efforts as the other branches of your profession.

[To be concluded.]

ON AN EXTENSION APPARATUS FOR THE TREATMENT OF CERTAIN INJURIES, DISEASES, AND DEFORMITIES OF THE LOWER EXTREMITIES.*

By WILLIAM STOKES, F.R.C.S.,
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IN the early part of last year, I brought under the notice of the Surgical Society of Ireland an extension apparatus similar in principle to the one I have the honour of bringing under your notice to-day. In some respects, however, this appliance differs from the one I originally exhibited, to which differences I shall presently more particularly allude. As a result of what has been written by some of the most eminent surgical authorities from even early periods of antiquity down to the present day on the subject of extension in the treatment, especially, of oblique fractures of the shaft of the femur, it must be acknowledged that the greatest diversity of opinion has existed, and still exists, as to what means should be adopted to prevent the deformity, which almost invariably results to a greater or less extent where these injuries occur. In the writings of Celsus, Avicenna, J. Bell, B. Bell, Pott, Dupuytren, Delpech, Syme, Malgaigne, Nélaton, Hamilton, Erichsen, and others, we find the most remarkable unanimity of opinion as regards the great difficulty—in truth, impossibility—of obtaining union without shortening in oblique fractures of the shaft of the femur. Mr. Pott was so firmly convinced of this that he advocated, as you all know, abandonment altogether of the application of any mechanical appliance, and introduced the so-called "Physiological Method", and had as converts to his views such eminent authorities as Dupuytren and Delpech. More recently, Mr. Syme advocated a treatment for these injuries, in which no effectual extension can be made, and which is in truth practically a repudiation of the extension principle; the main—and indeed only—object in the arrangement he advocated being to "insure perfect rest of the limb".

Notwithstanding, however, the teaching and practice of the surgeons I have just mentioned, the majority of surgical practitioners still tenaciously cling to the principle of extension, from a conviction, which I believe to be well founded, that by adopting it in some form or other the probabilities of obtaining a minimum amount of deformity are increased. In Liston's splint, and in the modifications and alleged improvements of it, there are undoubtedly grave defects, among which may be mentioned the large amount, and necessity for frequent application, of bandages, making extension from the foot and ankle, and also the oblique perineal bandage. As regards the application of bandages, every practical surgeon will, I think, endorse what Professor Syme has remarked in reference to their use. He observes: "Though they look very neat when first applied, they soon require reapplication. The state of the limb can never be ascertained without either raising the limb to take off the bandage, or cutting it up; and in the latter case, the thigh must be raised in order to reapply the bandage." What Malgaigne has remarked in reference to Dessault's splint bears, too, on this point. He says: "One needs only to apply Dessault's splint once to be convinced that that celebrated surgeon was completely deceived both as to the value of the apparatus and the reality of his cures. In less than twenty-four hours, all the bandages become relaxed; and if we tighten them up every day, we are making repeated and not permanent extension." The application of the extending force from the ankle has also appeared to me to be a disadvantage, for the nearer the force is applied to the situation of the lesion, as Sir A. Cooper has pointed out in speaking of the reduction of the luxations, the greater will be the power over it in reducing any displacement. Lastly, the

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oblique perineal bandage has obvious disadvantages, such as chafing of the groin, pain, cedema, etc., which are doubtless familiar to every one present.

To devise an appliance which would enable the surgeon to get rid of most, if not all, the disadvantages I have mentioned, has for some time been a subject of consideration to me. As the resistance in the injuries already alluded to is constant, so the extending force should be constant; and this can best be accomplished by a mechanical power which is, at the same time, sufficiently great and incapable of relaxation. The principle of making extension by means of a screw force has always appeared to me to be the correct one, as it acts steadily and gradually, and does not relax. This principle was originally introduced, if I mistake not, by Boyer, subsequently adopted by some of our ingenious and talented American surgical confidés, and advocated more recently by my friend Mr. Richardson of Dublin. The appliances in which it is adopted being not more generally in use, may perhaps be accounted for by the fact of their being somewhat complicated in construction, by there being usually an absence of elasticity in the extending force, and,

the sitting posture, or *vice versâ*. The point of pressure remains the same, whichever position he may for the time prefer. I need hardly dwell on the great and obvious advantages to be derived from the patient being able to change his posture occasionally. The distal ends of the two side splints are attached to what may be called the extending portion of the appliance. It consists of a skeleton box, which is made to slide on the outer parallel splints; and these latter and the skeleton box are governed by the horizontal screw placed at one side of the box. The object of placing the screw at the side is to obviate the liability of the heel of the patient pressing on it, which might occur if the screw were placed in the centre. The distance between the two portions of the splint can be increased or diminished by rotating the screw from right to left, or *vice versâ*. To regulate the elevation of the limb, I have affixed a vertical screw. Across the skeleton box are stretched elastic bands, and on these the foot and lower part of the leg rest. A pad and piece of scored splintwood should be placed on the anterior aspect of the thigh, and kept in its place by a strap or belt surrounding the splint and thigh. The two free ends of a long and

lastly, by the absolute immobility or fixation of the counterextending perineal pad, which must impede any attempt of the patient to assume the sitting posture.

In this appliance I have endeavoured to correct the deficiencies to which I have alluded, and have done so, I hope, with a fair measure of success. It consists of two narrow parallel side splints: one for the inner and one for the outer side of the limb. These are made to slide one on the other, to enable the surgeon to adjust them so that the apparatus may be suitable either to a child or to an adult. These splints can be fixed by means of square-headed screws, which are governed by a key similar to what tuners employ in tightening the strings of a pianoforte. In the first appliance I made, these splints were made up of several pieces, varying in length and united by brass plates and winged screw-nuts. The arrangement in this appliance, which I have had made for me by the eminent surgical mechanicians, Messrs. Weiss and Co., is obviously superior. At the upper end of the inner splint, fixed on a hinge-joint, is a pad, which should be so arranged as to press on the perineum. The pad being fixed on the hinge-joint facilitates the patient changing from the recumbent to

broad strip of plaster are then affixed to each side of the injured limb, reaching nearly as high up as the fracture, an India-rubber ring having previously been placed in the loop below the knee. The ring is placed over the hook fixed in the horizontal bar at the lower end of the skeleton box. By rotating the horizontal screw, an amount of extending force can be obtained, which, in the great majority of cases of oblique fracture, will enable the surgeon effectually to restore the normal length of the limb.

It would require more time than is at my disposal to discuss the particulars of all the cases in which I have used this splint. I may mention that I have tested it in cases of fracture of the shaft of the femur, fractured patella, oblique fracture of the tibia and fibula, of contraction of the knee after previous division of the hamstring tendons, of morbus coxae, and ulceration of cartilages of the knee-joint. The appliance, therefore, is, I think, applicable to a variety of injuries and diseases where rest, elevation, and extension are specially indicated.

There can be no doubt that the vexed question as to whether union without shortening in cases of oblique fractures of the femur is possible may be answered in the affirmative. It was, in truth, obtained in four

out of the seven cases of fracture of the femur in which I have used this splint. It is true that two of these cases occurred in young persons aged respectively ten and thirteen years—periods in which it is comparatively easy to obtain union without shortening. Two of the other cases were of men aged thirty-five and forty respectively, and these (when the patients were convalescent) I brought into the hospital theatre, and invited any of those present who chose to determine for themselves by measurement whether there was any shortening present or not. These measurements were most carefully and accurately made, and in several ways, from the anterior superior spine of the ilium to the upper margin of the patella, then from the same process to the inner malleolus, and, lastly, from the top of the trochanter to the upper margin of the patella and the inner malleolus. In one of these cases so measured there was no difference of opinion as to the absence of shortening; in the other case, a question arose as to whether the injured limb was not slightly longer than the uninjured one. I was unable to satisfy myself of this, but there can be no doubt as to the possibility of such a result being obtained, and it should make the surgeon very cautious not to apply a greater amount of extension than is absolutely necessary to restore the limb to its normal length. In two other cases of fracture of the shaft of the femur there had been shortening previous to the accident—the result of morbus coxæ in early life. Both these cases, however, made excellent recoveries.

The last case of fracture of the shaft of the femur to which I shall allude was one in which the patient was of a restless irritable disposition, and could not or would not endure the extension necessary to maintain the fragments in proper apposition. The shortening in this case was fully three-quarters of an inch.

In the other cases in which I used this splint, and to which I have already referred; namely, of morbus coxæ, fractured patella (in conjunction with Sanborn's method), contraction of the knee, ulceration of its cartilages, etc., I have had no reason to be dissatisfied with it, but quite the reverse.

The advantages, therefore, which may reasonably be claimed for this appliance are these.

- I. It is suitable for the treatment of a variety of injuries and diseases of the lower extremities.
- II. It can be adapted to children as well as to adults.
- III. The use of roller bandages, and consequent concealment of the parts, can be dispensed with.
- IV. The power of extension is unlimited.
- V. The oblique perineal bandage, so frequently a source of annoyance to the patient and of interference with the circulation of the limb, is dispensed with.
- VI. The use of the splint does not necessitate the patient remaining in the recumbent posture during the process of union.
- VII. The patient is unable to relax the extending force.
- VIII. The splint is applicable to either the right or left lower extremity.

A DEMONSTRATION ON THE ANATOMY OF HIP-JOINT DISEASE IN CHILDHOOD.*

By EDMUND OWEN, F.R.C.S.,
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IN the course of a short demonstration, one is more likely to be guilty of faults of omission than of commission; but I trust that, in calling attention to one or two well known anatomical facts, by way of preface, I shall not be considered guilty of an error of the latter class.

Anatomy.—In the first place, then, let us examine the capsule of the hip-joint, remarking how strong and unyielding it is in front and above, how thin and loose it is posteriorly and below. So strong, indeed, is it in front, that anatomists have been tempted to give certain bundles of its fibres a separate existence under the name of "accessory" ligament. This part of the capsule must needs be strong; for, with the aid of the psoas, iliacus, and the rectus femoris, it has to check overextension of the thigh. The posterior part of the capsule plays no corresponding rôle; for extreme flexion is checked by the soft parts of the front of the thigh coming into contact with the belly or chest. Within the joint is the ligamentum teres, which, attached below and behind the axis of the head of the femur, checks adduction and inward rotation with flexion of the limb. This ligament, then, is stretched to its utmost, and even strained, when the thigh is partially flexed and forcibly adducted. (This preparation, in which we can watch the working of the ligament, demonstrates the fact.) Lastly, the obturator nerve, in its course to the

knee, supplies the ligamentum teres, and this anatomical connection between the joints has been long since shown to account for the knee-pains in hip-disease.

Cause.—Let us now turn from the anatomy of the joint to the etiology of hip-joint disease. That disease of the joint is generally the result of strain of the ligamentum teres I firmly believe, and I am in this belief in the company of Key, Hilton, Holmes, Thomas Smith, Jacobson, and others. The disease is generally started by that common injury to children, a fall on to the outside of the partially flexed thigh, and by the over-adduction thus resulting the ligamentum teres is severely strained, as I demonstrate by this preparation. In thirty out of the number of cases which have been under my care during the last two years, the patients' parents have told me some such story as this: "He was pushed off the form at school" (a common injury); "he fell downstairs"; "he was pushed over coming out of school", and so on; and they say, "Soon after this, we noticed that he began to limp". Moreover, the *post mortem* examination of specimens of early hip-joint disease would seem to show that the ligamentum teres is the starting-point of the affection. From this the inflammation spreads by continuity of tissue to the synovial membrane, thence to the cartilage and to the bones.

As soon as the synovial membrane becomes affected, thin synovia is secreted in abundance, the joint fills and bulges in the groin, and the limb assumes a faulty position, which I will immediately demonstrate. But, before doing so, I would like to point out what I have done to this recently dissected joint. A hole has been trephined into the acetabulum from the pelvic side, and into this hole a perforated cork has been accurately fitted. Through the perforation runs a tightly fitting glass tube, which is connected with a glass syringe by means of this fine India-rubber tubing. The syringe is filled with water, some of which I will inject into the joint.

Erichsen, Howard Marsh, and other authorities, agree in giving *abduction* as about the earliest position taken up by the affected limb. But even now the obturator nerve is affected, so Hilton's theory of the action of the adductors must not be admitted. I will inject a little water into the joint to imitate the synovial effusion, and see how the femur abducts itself. This mechanical abduction is thus explained. The joint is filling and is filled, and is so distended that more room is required. The upper and anterior part of the capsule cannot yield, but the lower part can give room by abduction of the femur; and abduction is the result. But the inflammation is advancing and more synovia is poured out. How can increased room be obtained? Let me inject more water and see. Increased room is obtained by flexion. Flexion, we know, is the position invariably assumed in advanced hip-joint disease. (*Injection rigidly flexes the femur.*) But, later on, the limb becomes inverted. Further injection into the joint will not force the flexed femur into an inverted position. But the inversion may, I think, be thus accounted for. The psoas, iliacus, rectus femoris, tensor fasciæ femoris, and the adductor longus, become tired with holding the femur so that the joint may be as roomy as possible; so they compel the limb to accept the attractive support offered by the front of the opposite thigh. Further than this, in his anxious search for absolute rest, and in his dread of painful startings from muscular action and of shakes, the child will often nurse the knee upon the belly or chest, and steady it with the opposite limb.

Diagnosis.—Now, concerning the diagnosis of hip-joint disease, if the child be able to walk, he limps, because (as shown by Thomas) his femur being rigidly flexed, his toes cannot reach the ground without the pelvis being tilted forwards. Then the fulness in the middle of the groin, with pain on pressure and pain at the knee, constitutes useful collateral evidence. But, supposing that the child is too ill to walk or too young to localise pain, divert his attention from the affected side by playfully rotating the sound limb, and thus, by a legitimate modification of the confidence trick, you will be enabled to examine the other limb under favourable conditions.

Guarding against all chance of alteration of the relative position of the head of femur and the acetabulum, and fearful lest any movements should increase the intra-articular pressure, the patient will lie with the thigh rigidly flexed, and perhaps held and steadied by the hands. All movements being resisted, a marked stiffness results; this stiffness is almost diagnostic. If you attempt to straighten the limb, you increase the intra-articular pressure, and the pelvis becomes tilted forwards; the lumbar spinous processes arching forward, so as to allow as much apparent extension as possible. Then, if you attempt to evert the thigh—that is, to render tense the front of the capsule and so to increase the intra-articular pressure—the child will roll round with the limb, as if the femur were a handle to the whole trunk. These points I consider to be diagnostic. Percussing the heel or the great trochanter is a test as fallacious as it is unkind. It does not distinguish disease of the spine

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