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

* Given in the Section of Surgery at the Annual Meeting of the British Medical Association in Bath, August 1878.

or of the sacro-iliac articulation, and its very essence is the eliciting of pain.

Now, I will proceed to demonstrate that peculiar flattening of the buttock, the obliteration of the firm natal fold, and the alteration of its level, together with the real (not *apparent*) widening of the hip. To this interesting point my attention was directed by my friend Mr. Herbert Page, who was examining this preparation with me. For this purpose, I remove the syringe from the India-rubber pipe and substitute a vertical glass tube, the joint being full of water which rises to this (indicated) level in the tube. Now, I press the great trochanter inwards, driving the head of the femur into the acetabulum; see how the fluid rises in the tube. Then I remit pressure; the joint fills again, and the great trochanter is forced outwards.

Treatment.—Lastly, we come to the question of treatment of hip-joint disease; but, before discussing it, I would like to demonstrate the effect of extension and counter-extension upon the preparation. When the limb is brought down (no matter by what means), the intra-articular pressure is increased. The anterior part of the capsule being rendered tense, the capacity of the joint is diminished. The more the limb is brought down to the straight, the further the head of the femur is forced up into the acetabulum. This I demonstrate by the rise and fall of the water in the vertical tube corresponding to depression and flexion of the femur.

"But", it may be argued, "when the limb is brought down the patient is easier." This is probably because the apparatus which has been used to bring the limb down is also used to steady the joint against muscular and irregular movements. Moreover, the intra-articular pressure thus induced helps in the absorption of the chronic effusion. Scott's dressing to the distended knee-joint by pressure plays an analogous part. By watching the head of the femur through the bottom of the acetabulum, it may be seen that traction in the straight line does not draw it away from the bottom of the acetabulum. The indication in treatment is absolute and continuous rest in the corrected position. This is only partially obtained by the weight and pulley. Thomas's apparatus insures absolute rest to the diseased parts, while it allows the patient to be carried out of doors and even to walk. It is the only one which answers every demand. The attractive method introduced by Dr. Sayre; and the American and other methods which are supposed to secure rest and yet to allow movement at the joint, are correctly estimated by Giraldès, who remarks:—"L'idée de tous ces appareils est mauvaise."

THE SOLID RUBBER BANDAGE.

By HENRY A. MARTIN, M.D., Boston, U.S.A.

I WISH to say a word or two in regard to the sort of bandage I recommend. In all the papers I have written on the subject, I have directed the use of bandages of a certain thickness, as being, on the whole, the best.* Bandages somewhat thinner would undoubtedly fulfil almost all indications in a large proportion of cases; and *very much thinner* bandages would meet the requirements of certain cases, as of some cutaneous affections, particularly eczema, if uncomplicated with a varicose condition—every requirement, indeed, excepting one, viz., durability. The thinner the bandage, the lower the price at which it can be obtained, even if the materials be the best; but, taking into consideration the fact that very thin rubber bandages are very apt to be torn, to be stretched out of shape, and to be acted on by moisture in a way that renders them irregular and uneven, and on all these accounts that they will often require to be renewed in the treatment of even a single case, while one of the thicker bandages, of proper quality, is not only sufficient for the treatment of a single case through its whole course, but for the cure of many successive cases, I have no hesitation at all in repeating my recommendation of bandages of the thickness indicated in my paper in the JOURNAL of October 26th, as on all accounts the best, and, although they cost somewhat more, in

* The thickness recommended is 19 (Stubbs's wire gauge) for bandages for the knee and ankle; and in some cases, as of oedema, in which firm and considerable pressure is desirable, No. 21 in the very large majority of cases in which the rubber bandages are recommended. Of course, bandages a little thinner would often answer in many cases, but no better than those I advise; and it is very desirable to simplify the matter, and not to have an useless and confusing multiplicity of sizes and thicknesses. The width recommended is three inches and three and a half inches; the latter width for bandages for the knee and ankle, and where it is necessary to apply a bandage from the foot to the groin. The width of three inches and a length of ten feet and a half are proper for bandages for ulcer, eczema, etc., of leg below the knee. Smaller bandages six feet in length, two and a quarter inches wide, and twenty-one inches (Stubbs's gauge) thick, are made for children's legs, and for the wrist, etc., of adults, but are rarely required. The bandage of ten and a half feet long, three inches wide, and No. 21 thick, meets the requirements of ninety per cent. of all the cases to which the pure rubber bandage treatment is peculiarly applicable.

the end the most economical. As it is my hope that this method may be largely introduced into hospital and infirmary practice, and so become a benefit to the vast masses of the suffering poor, I am anxious to be understood on this point clearly. The use of very thin rubber bandages was never recommended by me. A very eminent practitioner of New York, who early after its publication adopted my practice, is their suggestor, on the ground, I believe, that they are cheaper. Bandages of the thickness I recommend certainly fulfil all indications as well as if of any lesser thickness, and some very important indications in large classes of cases very much better. The only objection to them of any force whatever is their slightly greater first cost. If gentlemen, however, see fit to use the thin bandages, I would suggest one thing that they should *not* do, viz., apply them *double*. If this be done, evenly diffused constantly equable pressure in all parts of the limb cannot be obtained, or at any rate so perfectly obtained, as where the bandage is applied of *single* thickness. This may be proved by actual and easy experiment.

Another point to which I wish to allude is that, in applying a pure rubber bandage to the knee-joint, its edges, particularly the lower edge, are apt to chafe and even to cut the skin. I have often met this by applying a strip of sticking plaster to the skin at the point with which the edge of the bandage comes into contact, and this answers pretty well; but I now procure to be made for me knee-caps of pure rubber of the same thickness as used for the bandages. These knee-caps are simply tubes of pure rubber of different diameter and of proper thickness—just, in fact, as if from one leg of a "skin-fitting" pair of rubber tights one should cut out a section including the knee and three or four inches above and below the joint. For about three-quarters of an inch from the top and bottom, these tubes are of a slightly greater diameter, so as to "feare out" like the lips of a trumpet. In practice, I find these caps to fulfil all the purposes of the bandage, and to be quite free from the annoyance I have mentioned.

All that I have said of the durability of the rubber bandage, and its consequent economy as an appliance of hospital treatment, supposes the bandage to be of proper thickness, well made, evenly cut, and of the very best material, viz., Para India-rubber, properly "cured". I mention this, as instrument-makers here, contending to produce bandages at the lowest price, have made an article which *looked* very well, but went to pieces in a week or two of actual use. It may not be generally known that there are many different varieties of rubber, very widely differing in quality and price. Another fact is, that many other gums, of next to no value, may be combined with rubber in almost any proportion. As a result, "India-rubber" bandages may be produced at almost any price, and, as I have stated in one of my former papers, of an *appearance even more* attractive than those made in the most honest way and of the very best materials. The only true test is use. If a "pure rubber" bandage stretch out of shape, become brittle or "gummy", and so worthless, in a short time, it is not what it ought to be. A pure rubber bandage of proper thickness, properly cut, and made of pure well "cured" Para rubber, is almost indestructible, and should at the end of two years' constant and careful use be as good and useful as when first made. I hope, as it seems probable that my bandages may come to be in considerable demand in England, that instrument-makers, while they produce them at the lowest paying price, will not do so at any sacrifice of labour in making or of excellence of material.

BILHARZIA HÆMATOBIA.

By W. K. HATCH, M.B.,
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A CASE of this somewhat rare disease was admitted into the European General Hospital, Bombay, in August 1878, under Dr. Puttock.

X. Y., an English gentleman, had been travelling for the last two years, in Arabia, Syria, Palestine, and Egypt; in the latter country, he remained only fifteen days. In the winter of 1877, he was detained near Medina by the Turks, under guard of an Abyssinian soldier, who was suffering from irritation of the bladder, frequent desire to micturate, and scalding; micturition being afterwards followed by severe pain. X. Y. first noticed some pain on passing urine, of which he took no notice. After his release, he resumed his travels in Arabia, and in June 1878 noticed a pimple at an inch above the left patella; this became a shallow ulcer, and at the same time he experienced an irresistible desire to micturate, on alighting from the back of the camel on which he travelled, his urine being pinkish in colour. Some other similar sores appeared on both legs, and for these principally he came into hospital. Milk had been almost his only food for the last year,