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A CLINICAL LECTURE ON THE OPERATIONS FOR GENU VALGUM CONTRASTED.

Delivered at University College Hospital.

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GENTLEMEN,—Having lately had occasion to operate on several cases of genu valgum, and having tried some of the various methods which have from time to time been practised for the relief of this troublesome deformity, it has occurred to me that it might be desirable, in alluding to the cases you have seen, to describe to you besides, briefly, all the other modes of operation on the femur designed for the same purpose, and contrast them as to their advantages, disadvantages, and results, as far as it is possible at present to judge of the latter. In doing this, we shall see that some important improvements have been made, both as regards the cure of the deformity and the elimination of danger from the operative procedure.

The number of methods for the *gradual* relief of this deformity by the use of surgical appliances is very large, and many of them have been in use for many years; but with these we are not concerned here, and will confine our attention entirely to those operations on the femur which have for their object the *immediate* straightening of limbs presenting the deformity in question.

Nor need we occupy ourselves now with the pathology of genu valgum; this question you have heard dealt with elsewhere. I shall only allude to it here so far as to say that, whatever may be the primary cause, its pathological expression is seen in the greater prominence downwards of the internal condyle of the femur than of the external. Owing to this, the long axis of the tibia inclines outwards from the middle line to an extent proportionate to this relatively increased length of the inner condyle.* Certain secondary changes in the bones of the leg and foot may subsequently take place; but to these we need not allude.

It was apparently the proper and full recognition generally of this relation of the condyles of the femur to one another in genu valgum which first led the minds of surgeons to the conception of those operative measures for its immediate cure, which are now coming into general use. Be that as it may, all the most recent of these are based upon this view of the cause of the deformity, and endeavour to remedy it.

Looking carefully into the matter, in the light of the home and foreign literature of many years past, I find that a few operations had been done for the deformity in question, or for genu varum, several years ago, but not on the principle of bringing the condyles of the femur into a proper relation to one another and to the long axis of the bone; and probably for this reason they never came into general use. The first of these that I can find recorded is one by Billroth, who on December 16th, 1872, for genu varum simply divided the tibia partly through with a chisel one inch below the spine, fracturing the rest by forcible straightening of the limb. (*Langenbeck's Archiv*, 1875.) On July 2nd, 1873, he performed a similar operation for genu valgum, the fibula being fractured in straightening the leg (*loc. cit.*) These two cases made a good recovery. Schede, too, operated successfully on February 23rd, 1876, for genu valgum, by cutting with a chisel a wedge-shaped piece out of the head of the tibia at the same point as in

the last cases, and then dividing the fibula before finally bringing the limb straight. (*Berlin. Klinische Wochenschrift*, 1876, No. 52.)

Now, although the condition of the end of the femur alluded to as a cause of genu valgum was first noticed by Böttcher as long ago as 1792, it does not appear to have been brought prominently under the notice of surgeons as a ground for operation, until M. Delore of Lyons read a paper on the subject in February 1874 at the Société de Chirurgie, a digest of which appears in the *Gazette Hebdomadaire* for that month. In this, he described the deformity as resulting from the changes noticed above, and based his conclusions on dissections, especially on one of the knee of a child operated on by his method (presently to be alluded to), who died of measles about three weeks afterwards. (Fig. 1.)

At the same time, he described a mode of procedure for immediately remedying the defect which may be regarded, so far as published records go, as the first which had in view, among other objects, the restoration of the lower end of the femur to a proper shape. And I think it probable that it was this operation which first suggested those now employed, which were invented not long afterwards. His method, known as "redressement brusque", was as follows. The patient being anaesthetised, the affected limb was extended and laid upon its outside on the operating-table. The ankle being now held firmly by an assistant, the operator pressed downwards upon the inner aspect of the knee, which stood up like a bridge from the table. At first, gentle pressure only was used, but was then gradually increased, until a tearing was heard in many cases, and the limb was straightened. The whole process sometimes lasted half an hour. When finished, the limb was put up straight in splints, and left so for about two months, when the patient was allowed to attempt walking with lateral supports. But it was not until after six months that the case could be said to be to any degree a complete one. Moreover, it was found that, even after this time had elapsed, there was a decided tendency to relapse.

The lesions produced by this forcible straightening of the limb, as verified by the dissection alluded to above, were as follows: a tearing asunder of the outer two-thirds of the epiphysary line of the femur; a stretching of the external lateral ligament; a tearing asunder of the epiphysary line of the fibula, and even partially of the tibia. (Fig. 1.) The author believed that one or more of these lesions were present in all cases. Now, the advantages of this method are, that there is no cutting; that the joint is not necessarily opened; that it is easy of performance; that it seems to involve no danger to life. Its disadvantages are, that the operator cannot be sure of tearing the epiphysary line alone, and may simply rend the external lateral ligament, so producing a

* Those interested in this point will find an admirable article by Mikulicz dealing with it, and illustrated by drawings of careful dissections, in *Langenbeck's Archiv*, Band 23, Heft 3, 1879.

weak joint; again, that it takes at least six months for the limb to become firm; and, lastly, that there is a tendency to a return of the deformity as the plastic material effused between the separated surfaces in the epiphysary line becomes condensed and shrinks. Now, as to the ultimate results: the deformity was reduced in all; but there was a tendency to return in many. But, out of nearly two hundred and fifty cases which made up the author's experience at the time of writing, he had seen no ill effects in any. A longer time, however, would have to elapse before it would be possible to say whether the forcible tearing asunder of the epiphyses might not result in more or less arrest of growth in the femur.

We now come to the first cutting operation on the femur for the relief of genu valgum, which appears to have been performed by Mr. Annandale on March 16th, 1875. This was recorded in the *Edinburgh Medical Journal*, vol. xxi, p. 18. It may be said to have been a very daring procedure, and one not to be repeated. In fact, it was only repeated once, so far as I can learn; namely, by Mr. Howse. (*Guy's Hospital Reports*, 1875.)

The operation was briefly as follows. A long incision was made over the inner side of the joint longitudinally; the internal lateral ligament was then cut, also the crucial ligaments, and finally the external lateral. The end of the femur was then turned, so that a saw could be laid across its lower surface, and the too prominent internal condyle, with a little of the encrusting cartilage of the external, was sawn off (Fig. 2). The tibia could now be adjusted to the straight sawn surface of the femur, and was held thus for several weeks. All this was done on strict antiseptic principles with free drainage. But the result could hardly be said to be a good one, so far as the record of the case went. The limb was straight, but almost quite stiff, and at the end of some months required to be forcibly flexed under an anæsthetic, with what ultimate result is not related.

Now, as to the advantages of this operation, hardly anything can be said in its favour, except that the limb was made straight in a ready if somewhat rough way. The disadvantages are obvious, in spite of antiseptics. The free opening of the joint and division of all its ligaments bring it as close to a resection of the part as possible, and the dangers to limb and life are considerable. Nor could the results as detailed be regarded as good. But, for want of a better operation, and where a limb was so deformed as to be quite useless, no doubt this procedure was justifiable as giving a straight though stiff limb. But out of it there soon developed a much better operation—namely, that of Dr. Ogston—which quickly made a place for itself among the recognised procedures of our art. This was performed for the first time on May 17th, 1876, and was recorded in the *Edinburgh Medical Journal* for March 1877. It consisted in making a puncture with a long tenotome in the skin above the inner condyle, and then thrusting the blade down in front of the bone into the joint in a direction towards the inner side of the crucial ligaments, and dividing all the soft structures quite down to the bone along this line. An Adams's saw was then introduced into the wound along the track of the knife, and the inner condyle was sawed off from before backwards. The limb could then be straightened, the internal condyle slipping up on the cut surface; in this position it united and left an useful and straight limb. Now, you will see by this diagram (Fig. 3), that the line of incision is far more vertical than that in Annandale's operation, and that all the ligaments are left intact, as well as the convex surfaces of the condyles; further, that the opening in the skin is but a puncture, as also the subcutaneous wound of the joint. In these points are found the chief advantages of this method over the last, and they are very important. Moreover, the three cases first recorded (*loc. cit.*) showed such excellent results as compared with the other operation, that a decided advance might be very justly claimed by Dr. Ogston. Theoretically, however, there are several objections which may still be raised to this operation. First of all, the joint is freely trespassed on, and the dangers incidental to such an event are well known, and without antiseptics would be held by most surgeons to forbid the operation. Then a ridge is left on the articular surface of the joint at the line of section, which might modify unfavourably its movements; besides which, the *débris* from the cut of the saw are left within it.

Again, there is the danger of non-union of the internal condyle, or of its necrosing. But experience has shown that the latter three objections do not hold; and, as regards the first, there is only one case recorded in which death followed the operation. This, I regret to say, occurred in my own practice. The case was operated on in this theatre with the strictest antiseptic precautions, but died exactly forty-eight hours afterwards of well-marked septicæmia. It is possible, as a German writer (Mikulicz, *loc. cit.*) remarks, in alluding to the record of this case, which I published in the *Transactions of the Clinical Society of London*, 1879, that others equally fatal may have occurred; but that

this is the only one that has come to light. Since then, I have operated for the deformity six times without the smallest ill effect.

Not very long after Dr. Ogston's cases were published, an operation was designed and carried out, for which it was claimed that the overgrown condyle could be as effectually shortened without opening the joint at all. This, performed by Dr. Macewen for the first time on May 10th, 1878, consisted in removing a wedge-shaped portion of the internal condyle, the apex of which should not quite reach the encrusting cartilage of the joint, while its base lay at the upper part of the internal surface of the condyle (Fig. 4). On its removal with the chisel, the leg

FIG. 4.

FIG. 5.

FIG. 6.

was forcibly brought into a straight line, when the two surfaces of the wedge-shaped gap were squeezed together and united so, the encrusting cartilage bending and yielding sufficiently to permit this. Now, in theory this had the great advantage claimed for it of not opening the joint; but it is questionable whether in practice it would not be found that in most cases the articulation had been entered. At all events, the author seemed to think that it was still open to that objection; for, at the same time, he tried another second plan, which certainly did not involve the joint, and to which he has for some time past given the preference in a large number of operations. He conceived, too, that by this there would be less risk of necrosis, which had occurred to a small extent in a case operated on by the first. This, Macewen's second method, which you saw me employ a few days ago, consists in simply dividing the femur with a thick chisel transversely for its inner two-thirds, in a line about half an inch above the epiphysary cartilage (Fig. 5). The limb is then forcibly straightened, and the remaining third thus undergoes either rupture or infraction, like a "green stick" fracture, after which the limb is put up in plaster until union has taken place. This operation, to which I feel inclined to give the preference myself, has the advantages of not opening the joint or interfering with its surfaces or ligaments in any way, of being easy of execution, and quite efficient in restoring the shape of the limb. It is still a question, however, whether the near proximity of the line of division to the epiphysary cartilage may not have a deleterious effect on the growth of the bone.

The last operation to which I wish to call your attention was performed a few days after Dr. Macewen's first, by Mr. Reeves of the London Hospital, and on the same principles as in the first method of the latter surgeon. Anxious to avoid opening the joint, he made a cut with a chisel in the internal condyle, in the same line as in Ogston's operation, but not quite down to the encrusting cartilage (Fig. 6). Having thus loosened the condyle, he found that it was possible, by forcibly straightening the limb, to force it up sufficiently to remove the deformity, and this without opening the joint at all. This proceeding, first practised on May 17th, 1878, had the advantage over Macewen's method of being more purely subcutaneous, and, as no wedge of bone was removed, of causing less danger of suppuration and necrosis. But I must say that, though there can be no doubt of the possibility of carrying it out without opening the joint, still I do not think that this often occurs; and I know that, in some of my own cases, although observing the greatest caution, the joint has been trespassed on considerably. However, this seems to be of little real importance, for in no case has the slightest ill effect followed; and the results, as regards the relief of the deformity, have been very good.

Another mode of operation combining to a great extent that of Billroth (*loc. cit.*), and Macewen's second method, has been pro-

posed and practised by Mr. Barwell, for the first time on February 4th, 1878. It consists in a double procedure with a considerable interval of time between. First, he divides the femur with a chisel a little above the epiphysal junction for about its external third. Macewen's line of division is on the inside of the femur to the same extent. He then straightens the limb, and allows the gap thus left in the end of the femur to fill up and consolidate. When this has taken place, he completes the second step of the operation by division of the fibula (obliquely) and the tibia (transversely) about one inch below the joint, and by then bringing the limb into a perfectly straight line. No very great advantages have been generally recognised for this operation. Its disadvantages are apparent: a double osteotomy where one will suffice, and so increased danger and loss of time; a gap left at the lower end of the femur, to be filled up by material which may afterwards yield before quite solid to the weight of the body; and this, instead of a lesion (Macewen's operation), resembling more an impacted fracture than anything else. The operation is described in the *BRITISH MEDICAL JOURNAL* of May 25th, 1878.

You have now, gentlemen, had a brief sketch of the various operative procedures for the removal of the deformity of genu valgum which have been published; and you have seen the development out of what may be called rather rude beginnings of the more perfect operations of to-day. You have had, besides, an opportunity of judging of the results for yourselves on cases treated in this theatre by the different methods. There now only remains to glance at the statistics as regards mortality, etc. In doing this, it may be better to group, in the first place, the results of all four last methods together as tolerably similar. Now I think I have collected very nearly all, if not quite all, the cases of the kind recorded up to the present in this country and abroad in the various surgical periodicals. And without giving (for the sake of brevity) a list of the names of the operators which I have before me, I may say that I have collected fifty-five operations by Ogston's method, seventy-two by Macewen's, and fifty-seven by Reeves's, with allusions to others not actually published. But of course many others have been performed. Here, then, we have at least one hundred and eighty-four osteotomies of the femur for genu valgum. Now, admitting it to be possible that others ending fatally may have occurred and not have been recorded, I can only find one fatal case directly due to the operation: namely, that already alluded to. This was operated on by Ogston's method strictly. Another death is recorded by Thiersch (Langenbeck's *Archiv*, April 1879) as following six weeks after the same operation; but this cannot be regarded as the result of the latter. The patient was a sickly girl, and died with uræmic symptoms, her kidneys being found after death to be of the small contracted kind. A drawing of the condition of the joint in this case six weeks after the operation, which I now hand round, appears to me particularly interesting as showing the lesion of the bone produced by the saw-cut, the shifting upwards of the loose internal condyle (doubted hitherto by some), and the filling up of the irregularities so produced by plastic material. Now, supposing we were to admit (which I do not for a moment propose to do) that the fatal termination in this last case was due to the operation, we still have a percentage of deaths of only about one per cent.; a very small one, you will admit. And as to other unfavourable results of the procedures, we have very few to note; such as ankylosis after articular suppuration, useless limbs, etc. Stiffness lasting in the knee for some time has been noticed, but was soon overcome. And all this, in spite of the fact that some accidents have happened during the operation here and there, which would formerly have been regarded as very dangerous. Thus several surgeons at home and abroad have noticed the free entry of air into the joint with no subsequent troubles; this occurred in one of my own cases. Again, Kolaczek (*Centralblatt für Chirurgie*, No. 14, 1879) mentions that, in one of the operations in Breslau, the point of the saw broke off, and remained between the bony surfaces without producing any ill effect. The only other troubles that I can find attributed to the operation are recorded by the last observer; namely, that in two cases, paralysis of the bladder appeared, and lasted two days; and, in another, transient paralysis of the extensors of the leg.

In conclusion, gentlemen, I think you will agree with me that, however promising these methods of correcting the deformity of genu valgum may appear at present, we must still wait, observe, and collect facts in regard to them on a much larger scale, before deciding definitely what place the various procedures shall take among the regular operations of surgery.

PROFESSOR E. NEUBAUER, the celebrated chemist, died in Wiesbaden on the night of June 2nd. Dr. Neubauer was the author, together with Dr. Vogel, of a well known manual on the chemical examination of urine, a translation of which was published some years ago by the New Sydenham Society.

REMARKS

ON

FORCIPRESSURE AND THE USE OF PRESSURE-FORCEPS IN SURGERY.

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[Concluded from vol. i, page 928.]

THE use of forcipressure in surgery may be considered under three heads: first, as one way of carrying out the principle of Esmarch's "bloodless surgery" during an operation; secondly, as a mode of dispensing with either the cautery or the *écraseur* as alternatives for knife or scissors; and, thirdly, as a substitute both for torsion and the ligature for permanently closing bleeding vessels.

Few can estimate more highly than I do the great advantages gained by the use of Esmarch's elastic bands and bandages in amputations, excision of joints, or in any operation where they can be conveniently applied. But in the operations which of late years I have been most frequently called upon to perform—the removal of large ovarian and uterine tumours, and amputation of the breast, the cure of ruptured perineum and vaginal fistulæ, or the removal of large tumours in various regions—Esmarch's proceedings are quite inapplicable. I have occasionally had Lister's tourniquet for compressing the aorta applied as a precautionary measure; but have only twice had to exert compression. In every other case, pressure-forceps have always been sufficient for the suppression of hæmorrhage, at least until the completion of the operation. Any vessel divided in the first incision through the skin and integuments, either of the abdominal wall or any other part of the body, may be seized almost as soon as divided, and the forceps left hanging on as long as necessary. Deeper vessels may be secured in the same way. I have removed very large mammary tumours, one weighing nine, and another thirteen pounds; sometimes putting the forceps on a large vessel before dividing it, sometimes directly after the division, until from twelve to twenty forceps had been used, and thus large vascular tumours were separated with scarcely any loss of blood. In ovariectomy, shreds of vascular omentum or mesentery may be thus secured before separating them from the cyst, or any vessels which bleed after separation from the cyst may be made safe until the pedicle has been secured and the tumour removed. If it be inconvenient to tie the pedicle before dividing it, then two or three pressure-forceps may be applied, one at each extremity of the pedicle, and one or two more towards the middle; and the tumour may be cut away without any fear of losing the end of the pedicle or its vessels. In Cæsarean section, splenotomy, nephrotomy, and the removal of a large undescended testicle in a man, forcipressure has proved quite as useful to me as in ovariectomy or hysterotomy. In operating for the cure of old ruptures of the perineum, troublesome bleeding often occurs as the mucous membrane is denuded. If ligatures be used, they may interfere with union between the raw surfaces when they are brought together by suture; but, as a rule, pressure-forceps amply suffice for stopping all bleeding until the sutures have been passed and are ready for closing. A little pressure is then all that is needed. So in operating on vaginal fistulæ, very troublesome bleeding, which would interfere with accurate paring of the edges and passing of the sutures may be immediately and effectually controlled; and if the forceps be left on until it is time to fasten the sutures, it will almost always be found that bleeding has ceased.

I need now say very little as to the use of the *écraseur* or the cautery. There are cases where one or the other may be preferred to the knife or scissors. But, with a sufficient number of pressure-forceps at hand, the fear of hæmorrhage need not influence the decision.

The permanent closure of vessels divided during an operation, or by an accident, is a question of greater importance than the mere temporary stopping of bleeding. Acupressure, filopressure, and uncipressure have all failed to gain general acceptance by practical surgeons. Torsion, though deserving of far more general adoption than it has hitherto attained, has made but very slow progress. But I have never yet found anyone who has tried forcipressure who has not been immediately convinced of its convenience and the great advantages obtained, at least in the temporary suppression of hæmorrhage. Confidence in forcipressure as a substitute for the ligature, or as a mode of permanently closing considerable arteries, is attained more slowly, and requires much more observation and more extended trials before its real value can be accurately estimated. On this point, rather than rely on my own trials,