A Course of Lectures¹

ON

SURGICAL MANIPULATION;²

EXPLAINING THE USE AND METHOD OF EMPLOYING THE VARIOUS KINDS OF BANDAGES, INSTRUMENTS, AND APPARATUS,

SO ARRANGED AS TO FORM A CONCISE INTRODUCTION TO THE PRACTICE OF OPERATIVE SURGERY.

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Introductory Remarks.

GENTLEMEN,—I have the honour, this afternoon, to commence a course of lectures, on a branch of surgery which, I trust, you will all think of sufficient importance for your consideration, and to possess a degree of interest, to make it worthy of taking some pains to become practically acquainted with. If I may be allowed to give my own opinion, founded upon what experience I have had of my profession, I should say, that the subject which I have to treat is one that all should possess a thorough knowledge of, and one requiring more practical acquaintance with than many other branches of surgery; for it is one that the surgeon is most constantly called upon to consider, and therefore most imperatively required to understand. Whether we take the student, as a dresser at an hospital, or as an assistant during his apprenticeship, (more particularly in the country,) or as house-surgeon to an hospital,—an office which, without exception, I say is the most important and valuable one he can possess, and one which all should be desirous to obtain,—or as the surgeon in active practice, they are, one and all, constantly called upon to make use of the bandages or instruments, either as therapeutical agents, (for such some of them are) or as mechanical agents only, or as an important adjunct to many, if not most, of the operations which are required in the wide, and varied, and most interesting field of surgery.

You must know how to use your hands, gentlemen; you are called surgeons because you have to use them; you cannot be surgeons without them. You are not only called upon to bandage, but to know how to use the various instruments employed in surgery, and not merely their use, but their mechanism; to know that their shape and construction are such as to gain the desired end. You should, to a certain extent, be mechanists as well; for you must not consider the facilities which public institutions offer with regard to procuring all instruments, (and even here there are often cases in which you have to exercise your own ingenuity to meet particular emergencies,) but you must and often will be placed in positions in private practice, more particularly in the country, where you will have to invent for yourselves, and will find that the mechanical part of surgery is of an importance not to be despised.

I much fear that this branch of surgery, if not altogether neglected, has but very little attention paid to it by students, and that many, if not the majority, enter practice having only heard of the names of most of the instruments and bandages employed, or if they have seen them, have not taken the trouble to examine their construction, or to make themselves practically acquainted with them. How, then, is it possible that they should understand their application? or how is it likely that they should be able to employ them with advantage to their patients, or credit to themselves?

By the mechanical part of surgery, is meant nothing more than the employment of certain instruments or apparatus, which more easily enable the surgeon to obtain the desired end, namely, the cure of the disease, injury, or deformity, which is under treatment. In fact, the whole of the operative part of surgery is, to a certain extent, mechanical, only with this important peculiarity, that it requires a thorough know-

ledge of the anatomical structure of the human body, and to know the laws regulating the different functions, to make the surgeon a scientific and successful operator rather than a mere empirical mechanic.

In laying so much stress on the mechanical part of surgery, and in describing to you the various instruments and apparatus that are employed, I wish distinctly to be understood as to the value I put upon it, and the degree of importance I wish to attach to it. I mean nothing more, then, than to state, that all those who practise surgery should endeavour to make themselves thoroughly acquainted, first of all, with the necessity of using instruments or apparatus, in certain injuries, diseases, and deformities, and secondly, with the nature, use, and best mode of employing them, when convinced of their necessity, and to bear constantly in mind that operative surgery does nothing more (or ought to) than relieve nature by the removal of any part that is destroying the health and interfering with important functions, and to assist nature by giving direct mechanical support, as in the treatment of fractures, deformities, &c.

It is not because surgery in the present day holds so high a rank (and justly so) in medical science, nor because so large a class of diseases now come under the care of the surgeon, which formerly were considered to belong to the province of the physician, that you are to neglect those branches of it which, in earlier times, were intrusted to the ignorant and unscientific; for in this, as in all other departments of art or science, you will find that as education has advanced, and knowledge has increased, complexity has given place to simplicity, and difficulties have been with facility overcome, which were before thought to be insurmountable. The advancement of science, or, in other words, knowledge, and its application, have done that for the mechanical part of surgery which it has done for the therapeutical part of medicine—namely, swept away useless and complicated machines and instruments, and inert and obnoxious drugs, and given place to others of more easy application, and of more certain employment—in fact, the object to be gained is with more certainty known, the means to be employed are with more certainty understood, and the result to be expected is with more certainty anticipated,—all of which resolves itself into this fact—that diseases are with more certainty cured.

In the foregoing remarks there are two important points to bear in mind. I mean, the object you should have in view, and the means to be employed to gain that object, and these include many points which at once render this branch of surgery of equal importance with any other, and one that I hope to show is worthy of equal attention, and therefore deserving of the surgeon's serious consideration.

The object to have in view in the treatment of all surgical diseases and injuries, in which you employ mechanical means, is similar to that in all other branches of medicine or surgery—namely, to reinstate the patient in his former health, or to rectify the deformity and injury that may exist, or may have been inflicted. Now with regard to the peculiar branch of surgery which I have in the present course of lectures to treat of, there are many points which have to be considered; first, as general principles applying to all cases; secondly, as peculiar, and referring to those cases immediately under treatment.

Surgical instruments or apparatus, of whatever kind they may be, ought to be employed in those cases only where disease or injury, or both, have so affected the part, that Nature herself is unable to repair it, and medicine is found not only to be unfitted for, but to be totally incapable of offering any chance of relief. Something more, then, is required; and here the operative and mechanical parts of surgery are brought to aid. If there be disease existing, or abnormal growths, or deformities, or injuries, the knife, the ligature, bandages, and various kinds of instruments or apparatus, may be required, to remove the disease or deformity on the one hand, or to redress and repair the injury on the other.

I need not remind you how important it is to well consider, in the employment of all kinds of surgical instruments and apparatus, the nature of the case for which you have determined to use them. You must remember that you have to deal with living parts, and that whether it be the knife or any other sharp instrument you are employing, or a bandage, splint, or other apparatus, that you may, by ignorance and carelessness, not only cause, in many cases, direct injury to the parts with which your instruments come in contact, by producing abrasion of surface, inflammation, ulceration, sloughing, &c., but may also, in some cases, endanger the patient's life, if not be the cause of the loss of it, as when the

¹ The Lectures on Bandaging were delivered at the Middlesex Hospital School, in the year 1845. I have now extended them, by describing all the most useful instruments and apparatus.

² Strictly speaking, the term surgical manipulation is tautology, but it is admissible, considering the present acceptance of the word surgery.

knife and other sharp instruments are employed, by wounding vessels, which, if not properly secured, to prevent the too great flow of blood, may, either directly or indirectly, be the means of bringing the patient to such a state of exhaustion that it may be difficult, if not impossible, to recover him from. The anatomical and physiological knowledge of the human body are as much required to enable the surgeon to employ mechanical means with success in the treatment of diseases or injuries, as they are by the physician, to enable him to point out the nature of the complaint for which he administers his drugs, as well as the functions of the different organs which naturally influence the varied secretions upon which his medicines are intended to act.

The simple operation of putting a bandage round the leg or arm cannot be done without at once interfering with the circulation of the limb, if the physiology of the circulation itself be not understood; for if the bandage be made to press more on the upper than lower part, it will of course obstruct the return of the blood from thence, as it is from the extremities of the limb that the blood is returning in its course to the heart. The practical rule deduced from the knowledge of this fact is, of course, evident—namely, that the bandage must press less and less as it ascends towards the upper part of the limb.

In the treatment of fractures and dislocations, the anatomy and physiology of the muscles must be known, if you wish to apply your mechanical means with success, for the proper position of the limb, and the application of the splints and bandages to keep the ends of the bone from being drawn out of place, can only be gained by a knowledge of the various muscles, and their particular mode of action, both on the joints with which the fractured bone is connected, as well as upon the fractured ends of the bone themselves. In former days, when this important class of injuries was entrusted to people who were totally ignorant both of anatomy and physiology, it must have been deplorable to have seen the effects of their treatment; for when we consider that the only chance of bringing a fractured bone into position is by knowing the action of the muscles which are causing the displacement, it is easy to conceive how many fractures must have remained unreduced, and how frightful must have been the deformities after the so-called cure.

In the works of Ambrose Paré, in which there is so much good as well as curious surgery, there are opinions, with regard to the treatment of fractures, which surprise us, as coming from a man who no doubt was in every sense of the word a sound surgeon. I shall extract the passage from his book on Fractures, as a specimen of what may be called pure mechanical surgery. He says—

“Sometimes the surgeon is constrained to use machines, as for old luxations, and for fractures and luxations of the great bones, and in robust subjects, with great joints, because the force which is then required cannot oftentimes be made by the sole hand of the surgeon; for so much the more the muscles are strong and powerful, so much have they more force and disposition to draw themselves towards their origin, on which account we are constrained to use machines, because the hands of the surgeon are not sufficient to pull and to reduce such fractures and luxations. It is always necessary to take care not to pull too hard, for fear of causing accidents, such as tearing the muscles or nerves, and causing pain, gangrene, convulsions, and paralysis, and other accidents, which happen more to the robust and old than to young people, because they are less hurt than old people when they are strongly pulled, on account of their frame being moist and soft; for in the same way we can pull leather when it is soft and moistened, but when it is hard and dry it breaks soon; so is it with the muscles, nerves, and ligaments; for when they are moist and soft, they yield, and do not break easily; but when they are dry and hard, they cannot stretch without great force, and even if a small force be applied the nerves and muscles break. This does not occur in young people, and generally in all those who have the flesh soft and moist, such as children, women, and eunuchs.”

Now here the muscles are treated like so many strings and cords, the only point to be considered with regard to them being, that you are to take care not to pull too hard, for fear of breaking them. There is no consideration paid to placing the joint so as to bring the limb in a position that at once relaxes all those muscles, which are the very obstacles to the reduction of the bone, and the only possible way of avoiding the necessity of employing such a degree of force as M. Ambrose Paré talks of. It is the anatomy and physiology of the muscles, then, which require to be known to guide the surgeon in the successful employment of his mechanical means in the treatment of fractures and dislocations, and

which make him the man of science rather than the empiric and the ignorant surgeon.

I will quote another case, from Wiseman's work on Surgery, (surgeon to Charles the Second,) to show how curious a method of treatment may be employed, (by which I mean unscientific,) owing to a want of knowledge of the simple physiological laws that govern the action of the muscles which are connected with the bones, as well as of the mechanism of the skeleton. I refer to a case of fractured clavicle, detailed in his work. He commences his case by saying that—“A page attending a noble family, riding behind the coach, fell down, bruised his face, and broke his right collar-bone.” After describing the symptoms of the injuries of the face and of the clavicle, he continues,—

“All things being in this hopeful condition, we advised him to keep his bed, and left him to observe the directions of his physician, by whose prescription a clyster was administered that evening, which he voided into a white earthen chamber-pot, which his chirurgeon looking into, called it blood, and alarmed his friends; but a discreet person looking afterwards upon it, concluded it only the clyster, tintured with red sugar, hiera piera, &c. I, being soon after fetched, confirmed the same, and appeased that clamour. About the tenth day, our chirurgeon, contrary to former order, undressed the fractured clavicle, upon whose binding it too slack, the bone started, and from that time it grew painful, so that he dressed it again four or five days after; but the pain increasing the more, I was fetched, and upon opening, saw one end of the clavicle riding over the other, and pricking against the skin. The callus being confirmed, the patient was removed from his chirurgeon's house to his mother's, in the city, where, being in great pain, his chirurgeon dressed him again, and the straighter he made the bandage, the greater was the pain. He, not imagining the cause, imputed the fault to the unruliness of the patient, and declared that the fracture was yet in the bone, and that it was incapable of cure, upon which I was sent for; and seeing the pain to proceed from the end of the fractured bone pricking in the skin, and the more when it was bound, I caused half a walnut-shell to be plastered over it; and having thereby defended it from pressure, he made use of his arm, and complained no more of pain. I then designed to cut off that end of that bone, if it again pained him; but from that time it continued easy, and he recovered the use of the arm very soon.”

Now this case is curious, as showing the difficulty there appeared in comprehending the cause of this prominence of the fractured end of the bone, as well as the ignorance of the easy and simple method of relieving it, all that is requisite being to place a firm pad in the axilla, to act as a fulcrum; to make the humerus act as the lever, and then, by bringing the elbow before the chest, the outer portion of bone must be pulled outwards, and the prominent end be apparently reduced immediately. You have only to keep the elbow in this position, and the cure is certain and easy.

There is a class of deformities which has lately had much attention paid to it, for the treatment of which mechanical means are employed, as forming one of the most essential parts of the cure: I refer to club feet, and contractions of every kind, which are now more generally included under the head of orthopædic surgery. Without proper mechanical apparatus there would be no chance of relieving any of those deformities which have in many instances existed from birth, and in others for a length of time, having their origin in disease. But the treatment in these cases has a higher claim than that of being purely mechanical, for without the division of those tendons connected with the muscles which are keeping up the contraction, and therefore continuing the existence of the deformity, no cure could be effected. The knife must therefore be used, and here, as in other operations in surgery, the surgeon must know the anatomy of the muscles, arteries, and nerves, for it is with them that he has to deal, and must possess as much skill as an operator for this as for other operations which he has to perform.

From the earliest times, no doubt, deformities have existed, and have, no doubt, been treated by mechanical means, but by mechanical means only, and the result has been what might be expected—namely, that they have been treated ineffectually. But now, and I speak from actual observation which I have had opportunities of making on a very large number of cases, from being connected with an institution solely for their treatment, the majority of those frightful deformities which render those afflicted with them cripples for life, often objects of ridicule to others, as well as constant sources of misery to themselves, are certain of cure. The deformity can be removed, the patient rendered a useful

member of society, and his mind relieved from the never-ceasing anxiety, the consciousness of his affliction must have caused. I hope you will not think me saying too much, if I class the advancement that has been made in this branch of surgery as one of the greatest of modern times.

These extraordinary cures, however, are not made by mechanical means only, but must have the assistance of the surgeon's knife as a preliminary step; certain obstacles have to be overcome before your mechanical force can be made to act. These obstacles are the various muscles which tend by their action, either from birth, or from disease in after life, to keep the joint in the deformed position, which was given to it in utero from mechanical pressure, or from disease or injury afterwards.

The operation required for these cases, before the mechanical apparatus is applied, is very simple, at the same time that it is most effectual. It consists in passing a fine knife beneath the tendon of the muscle or muscles which are keeping the joint in the contracted position, and then dividing it from below upwards, while an assistant makes extension in the limb or joint affected. As soon as the tendon is divided, it is felt distinctly to give way as the two ends separate, the end connected with the muscle being retracted. The other end is then brought as close to it as possible, by placing the joint in its original deformed position for a week or ten days, till union has sufficiently advanced to allow of the continuity of the two ends being established. The mechanical means are then employed, so as gradually to overcome the ligaments, and to stretch the uniting medium of the two ends of the tendon, which ultimately becomes converted into a substance as strong as the rest of the tendon—in fact, a new portion of tendon is formed. The different kinds of apparatus required for these cases I shall show you at a future lecture. There is a preparation on the table, which I shall send round, showing how firmly a tendon can unite. It was taken from a boy, operated on by Mr. Tuson for a case of talipes equinus, or horse-foot, as it is called. It was a very severe case of the deformity, the heel being raised fully three inches from the ground; the tendo-Achillis was divided about two inches from its insertion into the os calcis. The deformity was quite cured, and the boy was walking about with the heel flat on the ground; he unfortunately, however, was attacked with scarlet fever at the end of four months, of which he died. The preparation is exceedingly interesting, and a very valuable one, as showing the formation of the new tendon, and the perfect restoration by the junction of the two ends, which, in fact, was so strong and perfect, that it was difficult to feel where the division had been made, and, had the boy lived, the limb would ultimately have been as useful as the other.

The operation is as harmless as it is simple, for out of the hundreds of cases in which the divisions of the various tendons have been performed since the Orthopædic Hospital has been established, I am not aware of a single untoward event having occurred, clearly proving that neither local nor constitutional irritation need be feared, nor advanced as reasons against the operation being performed. Even in young infants the operation is perfectly harmless. A short time ago, a child, only three weeks old, was brought to me with double club-foot, both feet being completely inverted, and the contraction very rigid. I divided the tibialis posticus and anticus, and tendo-Achillis, in each leg, at the same operation, making a division of six tendons altogether. Not a bad symptom followed; there was no constitutional disturbance, and all the wounds healed without the slightest inflammation arising. But I need not quote cases, because experience has fully confirmed the fact, that the mere division of tendons is a perfectly harmless operation, and one that may be performed with impunity at all periods of life.

As I have already stated, there is no class of cases which so well illustrates the use and adaptation of mechanical means as the different kinds of deformities, yet, strange to say, there are those to be found who still run down this branch of surgery, and all but deny its utility.

It is interesting, in all branches of science, to learn what has been done in the earliest ages; to know if, centuries ago, men's minds took the same view with regard to certain subjects, or if they adopted the same means to gain certain ends which we do in the present day. It is so with medicine and surgery, and as a general rule we no doubt may consult the earliest writers on these branches of science, and gain much valuable information, by making a proper use of the experience we so gain, by observation and attention to the labours of those who have gone before us, being careful to weed the merely curious, and to preserve the good that may be contained in their works. We should accept those points only which experience has

established as facts, cherish and take the realities to exercise our reason upon, and leave the visions to those whose minds seem more inclined to theory, and prone and apparently more anxious for the marvellous.

With regard to the branch of surgery on which I have to give a few lectures, I do not believe that much information can be gained from early writers, for as most of the operations have been improved upon by the advancement of the sister sciences, anatomy and physiology, rudeness in the performance, and uncertainty in their cure, have given way to simplicity and certainty. It is so with bandages and the various kinds of apparatus and instruments; many old and complicated ones are no longer employed, and new ones have been invented, and now supersede them. There is, however, much curious matter to be found, even in reference to this branch of surgery, in the works of the older authors, which may interest those who choose to consult them. To those who may be so inclined, they will find in M. Gerdy's work, (the most complete on the subject of bandaging,) the history of bandages arranged under so many different periods, with reference to the numerous works, both ancient and modern.

I shall arrange the division of these lectures in two parts. The first, including the description of the different kinds of bandages used as bandages only, together with the various kinds of apparatus in which bandages of one sort or another form a very essential part, as in fractures and dislocations, treatment of deformities, &c. The second will include the description of the various instruments, cutting and otherwise, used in the operations, properly so called. It will be my endeavour so to arrange the subject, that the use, mechanism, and mode of application of the various kinds of instruments and apparatus employed, may be so explained as to form a concise introduction to the practice of operative surgery, with brief observations on the particular cases for which their use is required.

I need not dwell upon the importance of knowing how to employ the many kinds of bandages, and how to use the various instruments; for in all operations, the one or the other, or both, are brought into requisition, rendering it essential that the surgeon should be thoroughly acquainted with them if he wish to be a successful and skilful operator, including, of course, expertness and neatness.

(To be continued.)

The Introductory Address

Delivered at St. George's Hospital, October 1st, 1850.

By SIR B. C. BRODIE, BART., F.R.S. &c.

ALTHOUGH several years have now elapsed since I resigned the office of surgeon to the hospital, within whose walls we are now assembled, I trust that I need not assure you of the great interest which I still feel in the prosperity of the hospital itself, and in the reputation of the medical school which is connected with it. It would, indeed, be strange if it were otherwise. It was here that I began the study of that profession, the practice of which has been the main object of my life. Whatever knowledge I have been able to acquire—for whatever advantages have accrued to me professionally—for these I am more or less indebted to my connexion with this institution, which is, moreover, associated, in my mind, with many agreeable recollections, of friendships with my colleagues and pupils—of the interesting pursuits, the hopes, and fears, and aspirations of my early life.

It was my good fortune to be elected assistant-surgeon to the hospital at a very early period; and partly as assistant-surgeon, and partly as surgeon, I was attached to it during the space of thirty-two years. In that period great things were accomplished. The old and inconvenient building (which nevertheless afforded the means of obtaining a great reputation to Sir Caesar Hawkins and Sir Everard Home, and a still greater one to John Hunter) was exchanged for this handsome and commodious edifice, possessing all the advantages over the former one which greater experience and the improved state of science could afford.

Let honour be given where honour is due. In advertent to this subject, it is but just that I should add, that it is chiefly to one individual that we are indebted for this great improvement in our condition. It was Mr. Fuller who first proposed that the hospital should be rebuilt. Many thought it a hope-