ON THE TREATMENT OF FRACTURES:

A PROBLEM OF ORGANIZATION.*

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On the Acquisition and Application of Knowledge.

In the forward march of human progress it is the pioneer, or discoverer of new paths and fresh territory, who holds the public eye and captures the popular imagination. But if the new discovery is to be of any lasting value the pioneer must be followed by an organized band of workers who colonize and cultivate the new territory, whether this be actual land or a mere domain of knowledge. Quite rightly we shall always regard Columbus and Cabot as amongst the greatest of the world's heroes, but the practical value of their heroism would have been wasted if successive generations of seamen, engineers, and colonists had not established an easy and safe route to the New World and developed its resources. Thus it is, too, in matters of applied science—it is only given to the fortunate few to acquire new knowledge, but it is the duty of those who come after to see that this new knowledge is applied.

There is no doubt some danger at present in medical science of the attention being so concentrated on the quest for new knowledge of hidden mysteries that the patient and systematic application of knowledge already in our possession about everyday ailments may be neglected. It is quite right that ceaseless work should be expended on trying to discover the cause and cure of cancer, but we must nevertheless remind ourselves and instruct the public that the causation and treatment of tuberculosis are known, and that we ought to apply knowledge already in our possession at the same time that quests for new knowledge are being organized.

For the moment, however, I wish to discuss a problem which is even simpler than that of tuberculosis—namely, the treatment of fractures.

In this matter it may be well to begin by considering the conditions and lessons of the late war. There was no great medical problem at the beginning of the war which seemed so hopeless as that of the treatment of gunshot fractures, and there was certainly none which by the end of the war was so satisfactorily solved. And yet, when we come to ask, "To what discovery was this happy result due?" we are forced to admit that there was no new thing found, but that the whole progress was due to organization, team work, and the training of workers. It was not the acquisition of new knowledge, but the application of well-established principles which turned failure into success. As far as I know, there was no new discovery made about the treatment of fractures during the war. The importance of early excision of infected wounds was established, and this seemed to be more important than any of the chemical disinfectants—hypochlorates, hypertonic salt, bipp, or flavine—each of which proved useful, but could not be claimed as essentially new. Probably the Carrel-Dakin treatment, combining mechanical with chemical cleansing, was the nearest approach to a new discovery in the realm of fracture treatment.

On the other hand, progress was definitely hindered by what at that time was a comparatively new method—namely, the plating of fractures—and many limbs were lost or ruined before this was finally set aside. Success in fracture treatment during the war was achieved by organization, team work, the training of new men, and the segregation of difficult cases in special hospitals; this success was made possible by the fact that the general control of fracture treatment was entrusted to one (our own revered emeritus president) whose unrivalled know-

ledge of how to treat fractures was only equalled by his wonderful capacity for knowing how to deal with men—both men above him, in brass hats, and the men below him, in hide-bound traditions.

I think that we are all convinced that the fracture problem of to-day is one like that of the war, in that it requires not new knowledge, but the organized application of the knowledge we already possess. It requires the segregation of cases, the training of team workers, and the systematic tabulation of results. We want not merely a collection of x-ray records, but an accurate knowledge of functional results.

The Arguments for Reform.

Before discussing the details of reorganization of the teaching and practice of fractures it may fairly be asked. What evidence exists that such reform is necessary? Naturally the first argument which springs to the mind is the very great number of bad fracture results which are constantly met with in practice. The stiff shoulder-joints with the arm tied to the side, the fixed elbow-joint, the pronated hand, the unreduced Colles's fracture, the ununited neck of the femur, the short leg, the crooked shin, and the everted backwardly displaced foot—these are conditions which we are consulted about perhaps once or twice every week, and in nearly all we are oppressed with the thought that prevention of such deformities would have been easy, but that complete cure is almost impossible. In the great majority of these cases the original fault has been a matter of neglect or oversight. Either the patient has been in a large hospital, where in the press of work he has been relegated to the care of a junior resident and hurried out at the earliest possible moment, or he may have been in a small country hospital, where he was splinted and made comfortable for the time being, in the happy belief that if he did not make a good recovery he could be transferred elsewhere later on for "orthopaedic treatment"; in a small minority of cases the fault has been that of attempting too much. An open or a comminuted fracture has seemed to call for operative treatment, and this has been undertaken without the experience and training which are necessary to justify such.

The mere collection and review of any series of bad fracture results must, then, lead to the question as to frequency of such disasters, and whether it is sufficiently great to justify a demand for reorganization of the fracture service. And here we are at once faced with what in itself constitutes a strong reason for reform—namely, the absence of any systematic records of after-results. We really do not know what proportion of cases of broken limbs leads to permanent or to partial incapacity. And yet from an economic or industrial point of view this is surely important information which we ought to be able to get. Does there exist in this country a single hospital or fracture service which collects and tabulates the results of its fracture cases one year after the injury? Such information would be invaluable, both for noting the type of injury which gives the worst final result, and especially as a standard of comparison with which new methods and organization could be compared.

We certainly know that in most places, including the majority of the teaching and municipal hospitals and all the small hospitals, there is no attempt at organization of the immediate or the after treatment of fractures. There is no segregation, or team work, or systematic following up of cases. In fact, all those features of organization which the war taught us to value are conspicuous by their absence in modern civil practice.

There is, then, ample evidence of the need for improvement in the fracture service of this country, and we shall be justified in considering how this improvement may best be brought about in relation to different types of hospital and in general practice.

The Teaching Hospitals.

The university teaching hospital is usually one which contains about 300 to 500 beds, and it has long been obvious that the right policy to be adopted there is the

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provision of a fracture department of a suitable size to deal with in-patient and out-patient fracture cases. The actual number of beds to be set aside for fracture work would probably be about 10 per cent. of the whole. It would be unnecessary and undesirable to make any rule that all fracture cases must go to the fracture wards. The department would be there, and the cases would go there naturally if the work was well done. The very great majority of general surgeons would be only too glad to rid their wards of fractures, although they might wish occasionally to keep some special case in their own hands.

The personnel responsible for the fracture department would consist of a surgeon, an assistant, a resident, sisters, an officer in charge of the physiotherapy, and the massage staff. In addition to these there ought to be a registrar, with sufficient clerical staff to carry out a regular tabulation of results with a good follow-up system. Every student would have to act as a dresser for two or three months, and during this time he would see both the in-patient and out-patient work; he would assist in putting up fractures in the first place, and he would see the after-treatment and the late results. This is, of course, no novel plan. Its adoption has been urged ever since the war. The reasons in its favour are convincing, while the arguments against it are so weak that it really no longer presents a debatable proposition. By providing a department the very *raison d'être* of which is the study, treatment, and cure of fractures, each patient admitted to the department would be assured of the best possible chances of a speedy recovery. On the other hand, in many of the teaching hospitals now the beds are overcrowded; the fracture case is regarded as a nuisance to be dealt with by a resident, who himself is probably more interested in abdominal work, and whose chief aim is to avoid blocking the beds with fractures. If, in spite of his vigilance, a fracture case is admitted, his next aim is to shift it as quickly as possible to the limbo of a general out-patient department or to a Poor Law hospital. Very naturally, then, if a fracture has been put up in plaster or other splint in a teaching hospital and then sent on to a Poor Law hospital, the medical officer at the latter institution, who is overdriven with routine work, will be content to carry on without himself making any critical examination or initiating any fresh treatment.

The present education of the student, too, is most unsatisfactory in relation to fractures; he often never sees any treated except in the casualty department, and then only for a brief moment. More often his experience of fractures includes seeing some difficult case operated upon while the more ordinary ward cases are wrapped up and got rid of. No wonder that when he comes to practise himself he carries out the same ideas—that is, if he is cautious, he always contents himself with giving some sort of rough and ready first aid, and then tries to find out how he can send the patient away to someone else. If he is adventurous and the patient is a suitable one, he will suggest doing an open operation, and provides himself with some plates and screws for the purpose.

If the argument for a special fracture department is so strong at every teaching hospital, if it will improve the quality of the treatment and expedite the patient's recovery, if it will improve the teaching of students and train practitioners to know this part of their work—then we may well ask why this reform has not been adopted long ago in all our chief institutions. The reasons must be of an obscure character, because they have never been put into plain words by those who deprecate any change. Probably reluctance on the part of the surgical staff to specialize in fracture treatment, together with a shortage of beds, are the two main factors which tend to block progress; but in this respect there is a very definite indication of a steady change in the right direction. Many of the teaching hospitals have now got either a fracture ward or else an orthopaedic department to which fractures are sent. In most cases the number of beds available for fractures is wholly inadequate, but this is being generally remedied. I would like to emphasize this one point very strongly: most hospitals now have 10 to 15 per cent. of their beds occupied by fractures, and it will not necessitate

any provision of fresh beds if this 10 per cent. of the cases be put together in the same wards instead of being scattered about all over the hospital.

Municipal Hospitals.

It is quite clear, however, that the teaching hospitals, together with the other large voluntary hospitals, cannot deal with all fracture cases or even all of those of a serious character—for example, fractured spine, pelvis, femur, and tibia. At any rate, the voluntary hospitals cannot keep such cases for the full period necessary for functional recovery. Under existing arrangements one of two things happens. Either the bad case is refused admission to the overcrowded voluntary hospital and is sent direct to the municipal hospital, or, more commonly, it is first taken to the voluntary hospital, and then, after a few weeks, it is transferred to the municipal hospital. Sooner or later, therefore, the municipal hospital must take over many serious cases of fracture, and these will, of course, be just those which require the greatest care and skill in their treatment. The majority of municipal hospitals are, however, very much understaffed. For example, a municipal or Poor Law hospital of 500 or 600 beds often only has four whole-time medical officers and four visiting consultants—a total staff of eight, as compared with the twenty-five or thirty men who are on the staff of a voluntary hospital of the same size. In these circumstances it is almost impossible for fracture cases to receive anything but the most perfunctory treatment, and usually this is only of an expectant character. The remedy for this state of affairs is not difficult to suggest, but very difficult to carry out.

In the first place there ought to be a definite co-operation between the voluntary and municipal hospitals. Whatever else this includes it should certainly imply an active liaison between the staffs of the two types of institution. The surgical staff in charge of the fractures at the voluntary hospital should be consulting surgeons to the municipal hospital, and should superintend the work at both places. It will then be a matter of local circumstances whether bad fractures first go to the voluntary hospital and are later transferred to the municipal hospital, or whether from the outset certain types of fracture—for example, those of the femoral neck, pelvis, or spine—should from the outset go to the municipal hospital. The main and essential point is that in every city and large country town there should be secured a single fracture service for working-class patients. This would be carried out by a team of men working under a single chief, and the work would be partly done at the voluntary or teaching hospital and partly at the Poor Law or municipal institution. At the latter place there should be full provision for functional after-treatment—curative workshops where men during their recovery could be kept usefully employed, instead of drifting into that hopeless condition of compensation neurosis which awaits so many who are sent home with nothing to do. In any case such a man is a charge on the community during his invalidity, and it would really be much more economical to keep him at an institution where he is trained to resume work than to allow him to become a waster.

The Smaller Hospitals.

The problem of fracture treatment at the smaller hospitals in country towns is becoming more important every day, because of the large number of motor accidents which occur almost at their doors; and in the country hospitals there is a definite selective influence by which only the worst cases remain for treatment. The injured person is usually far from home, and his own wish is to be removed to an institution near his home; this may be effected after treatment has been given. Therefore a large proportion of the fractures in country hospitals are of a serious character. The character of these smaller hospitals, the extent of their equipment, and the work turned out by them varies very much in character. Some of them are modern and very well equipped; others are certainly bad, and if it were not for the protective halo of our cherished voluntary system they would be reformed or abolished.

Probably in the better type of country hospital the fracture work compares very favourably with that done in the teaching hospitals in the service of men not interested in fractures; but, on the other hand, there are many small hospitals where the treatment is very bad. This may be due to faults in the personnel or in the equipment; it is much easier to deal with the latter than the former. It should be generally conceded that, except as a temporary emergency, no serious cases of fracture should be admitted to a hospital which is not provided with an x-ray plant and a proper supply of splints and appliances. An elaborate aseptic operating theatre is certainly not necessary. The matter of personnel is one of great difficulty, chiefly because, in the type of hospital in my mind—that of about twenty beds in a town with a population of two or three thousand—all the general practitioners are on the staff, and it is difficult for one or other to act as a specialist or consultant for the other.

Probably the easiest solution of the difficulty is the appointment of a resident house-surgeon who has a good knowledge of fracture work. Such a man will be of invaluable assistance to the whole staff, who will be only too glad to let him carry out routine fracture treatment. Unfortunately a large number—and I would say the majority of recently qualified men—do not possess this requisite knowledge, or, rather, practical experience. This brings us back to the first part of my thesis—namely, that our teaching hospitals do not give a student enough practical fracture work to fit him for this part of his profession. If we are asked where a man could go to in this country to get a three months' intensive post-graduate training in the treatment of fractures, we should have to admit that there are very few such places. Now this is certainly a most serious indictment of our surgical educational system.

To return to the small hospital and its fractures. At present what happens at the less satisfactory of these institutions is that fractures are put up within the first few days of admission and then nothing further is done for perhaps six to eight weeks. If at the end of that time marked deformity is revealed when the bandages are removed, or the patient gets up, the case is sent off to a specialist at some teaching centre for further treatment. Such conditions as fracture of the neck of the humerus with bad position and a stiff joint, forearm bones with crossed union, an unreduced Colles's fracture, an ununited neck of the femur, a shaft of the femur with two or three inches overlapping, a malunited fracture of the tibia, or an unreduced fracture-dislocation of the ankle are common instances of serious crippling deformities which would have been comparatively easy to deal with during the first few days after injury, but which are not only difficult after several months, but at that period can seldom be restored to full functional recovery. Every case of fracture in which reduction and good position has not been attained by the end of the second week ought to have further treatment other than mere *laissez-faire*, and in the case of the small hospitals some arrangement should be made by which a consultant's opinion can be called for without any loss of prestige on the part of the practitioner in charge. This might be arranged by the national health insurance authorities, or else by the accident or compensation insurance companies, in whose interests it surely is that these cases should be quickly and efficiently brought to recovery.

The Relation to the Insurance Companies.

This opens up another point of view about the treatment of fractures. A man has a motor accident in which he sustains a fracture. If he is a better-class patient and is conscious after the accident, he is taken to his own doctor or to a nursing home, and the cost of the treatment which he undergoes is ultimately borne by the insurance company. But if he is far from home, or if he is a working man, he is taken to hospital, and it usually happens that all professional attendance is given gratuitously, the insurance company merely paying for loss of time or the scale of the Workmen's Compensation Act. It frequently occurs that the gravity of the case is overlooked, and that

the fracture is put up in such deformity that the patient is either permanently crippled or else has to be sent to another institution for corrective treatment, which seldom gives such a good result as if the case had been efficiently treated from the outset. Surely, as a mere matter of economy, it would pay the insurance societies, in which should be included the national health insurance authority, to safeguard themselves in this matter. This could be done to some extent by providing for the services of a consultant in all severe fracture cases, soon after the accident, instead of delaying until a bad result is inevitable. Still better would it be if in all large centres of population good fracture clinics could be provided where the best treatment could be given in the first place, and where after-care until the patient is restored to work would be provided. Such an institution is actually in existence in Madrid, and is supported partly by a Government grant, but chiefly by the insurance societies. It is very desirable that some of the chief insurance companies should be persuaded, as a first step in this direction, to draw up a table showing the number and classification of their fracture cases, the length of time taken for recovery, and the cost of such cases during invalidity. I am confident that such a statistical inquiry would go a long way towards convincing the companies concerned that it would be in their own interests to help in the working out of some such scheme as has been suggested.

An Ambulance and X-Ray Service.

As far as I have been able to learn, many of the ambulance first-aid services have not modified their methods since the lessons of the war. In towns where accident patients have not far to be carried this is perhaps no great matter, but when fracture cases have to be transported for many miles over country roads we may well ask why it is that the Thomas splint is not used instead of the Liston. This point has been recently brought to my mind by a vigorous letter from my friend and fellow student Pearson, who writes urging this belated reform upon the overseas branch of the St. John Ambulance. The essential nature of good x-ray work, both in the first diagnosis and also in the after-treatment of fractures, is generally admitted, and the equally important provision of a good ambulance service is also necessary. Both these things are to hand in all cities and large towns, but they are often difficult to obtain in the country districts. Patients after an accident are frequently taken to their own homes, and sometimes—for example, in an injury to the hip-joint—it is not possible to be sure of the diagnosis without x rays. It ought to be possible to provide a portable x-ray apparatus which could be taken to such patients, and then, if serious fracture is discovered, the same motor ambulance could, if necessary, move the injured man to the nearest suitable hospital. The provision of such a service should be a part of our national hospital system; unfortunately, however, such a system does not exist, and the voluntary hospitals are overburdened already with the struggle for existence, and have, moreover, no sense of responsibility for national schemes. The charge would therefore have to be made out of the county rates, supplemented by the insurance funds.

Conclusions.

I am very sensible of the fact that I have been preaching to the converted, and that in the main I have only been saying what has been said so much better by our founder, Sir Robert Jones. But reforms do not come in a day, and it is better to repeat what we know to be true than to remain silent because good advice is not acted upon immediately.

We know now how fractures ought to be treated, and that correct treatment will save personal disablement and economize loss. We know, too, that organization, segregation, and team work are the essentials of good fracture work as much in peace time as in war. I have therefore thought it my duty in the high office you have conferred upon me to repeat these things you know so well, in the hope that we may be further stimulated to work for the much-needed reforms.